

**nemco**<sup>®</sup> ELECTRONICS CORP

RoHS  
Compliant

# TANTALUM CAPACITORS

**NEW SIZES**

**0402**

**0603**



**[www.nemcocaps.com](http://www.nemcocaps.com)**

**Toll Free: (800) 227-4058**

675 Mariners Island Blvd., San Mateo, CA 94404

Telephone: (650) 571-1234 • Fax: (650) 571-0825



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## *Nemco Tantalum Capacitors Since 1975*

Over the past 3 decades, Nemco Electronics Corp. has brought to the world market the highest quality tantalum products. Our philosophies and processes are focused on our goal of meeting and exceeding the demanding standards (EIA, IECQ, etc.) and ever changing needs of the electronic manufacturing community with programs for low ESR, low profile and lead-free devices. Research, product development and on-going quality improvement programs are integral components of our plan to ensure that state of the art tantalum capacitors are shipped from our production lines.

This product short form catalog has been prepared to help our customers in the component selection process. The products shown are widely available. Contact your local Nemco distributor or sales representative for more information.

Visit Nemco on the internet at **[www.nemcocaps.com](http://www.nemcocaps.com)**. Our web site is constantly updated and linked to authorized distributors. Technical information and samples can be requested on the internet.

Thank you for choosing Nemco.

**nemco**<sup>®</sup>  
electronics corp.

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# Table of Contents

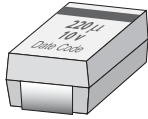
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|                                                                           | Page |
|---------------------------------------------------------------------------|------|
| <b>Cross Reference</b> . . . . .                                          | 4    |
| <b>Part Numbering System</b> . . . . .                                    | 5    |
| <b>Marking</b> . . . . .                                                  | 6    |
| <b>Packaging</b> . . . . .                                                | 7    |
| <b>Case Dimensions</b> for all Surface Mount Tantalums . . . . .          | 8    |
| <b>PCT</b> Surface Mount Tantalum Capacitors                              |      |
| Standard and Extended Range. . . . .                                      | 9    |
| Low Profile . . . . .                                                     | 12   |
| <b>LSR</b> Low ESR Tantalum Capacitors                                    |      |
| Standard and Extended Range . . . . .                                     | 15   |
| Low Profile . . . . .                                                     | 24   |
| <b>MCT</b> Miniature Surface Mount Tantalum Capacitors . . . . .          | 27   |
| <b>CGT</b> Consumer Grade Miniature Surface Mount Tantalum Capacitors . . | 29   |
| <b>TB</b> Dipped Tantalums . . . . .                                      | 33   |
| <b>Tips for Design and Use</b> . . . . .                                  | 36   |

# Cross Reference

## Nemco Type PCT

(low profile included)



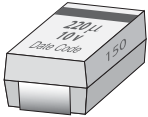
### MANUFACTURER

### TYPE

|                  |                                             |
|------------------|---------------------------------------------|
| AVX              | TAJ                                         |
| EPCOS            | B45190E, B45192E, B45194E, B45196E, B45196H |
| Kemet            | T491, T494                                  |
| KOA              | TMC, TMU                                    |
| Matsuo           | 267, 277, 278                               |
| NEC              | TEESV, TEFSV                                |
| NIC              | NTC - T                                     |
| Nichicon         | F92, F93, F97                               |
| Panasonic        | ECSH, ECST                                  |
| Samsung          | TCSCN, TCSVN, TCSCS, TCSVS, TCSCS           |
| Vishay (Sprague) | 292D, 293D, 592D                            |

## Nemco Type LSR

(low profile included)



### MANUFACTURER

### TYPE

|                  |                                             |
|------------------|---------------------------------------------|
| AVX              | TPS, TPM                                    |
| EPCOS            | B45190R, B45192R, B45194R, B45197A, B45396R |
| Kemet            | T494, T495, T510                            |
| KOA              | TMCR                                        |
| Matsuo           | 281                                         |
| NEC              | TESVZ                                       |
| NIC              | NTC - L                                     |
| Nichicon         | F72, F75, F91                               |
| Panasonic        | EEJL                                        |
| Samsung          | TCSCE, TCSVE                                |
| Vishay (Sprague) | 592D, 593D, 594D, 595D, 597D, TR3           |

## Nemco Type MCT



### MANUFACTURER

### TYPE

|          |                                |
|----------|--------------------------------|
| AVX      | TAC (sizes K, L), TPC (size L) |
| Matsuo   | 251 (size M)                   |
| NEC      | TEFSV (size J)                 |
| Nichicon | F98 (size M)                   |
| Samsung  | TESCM (size J)                 |

## Nemco Type CGT



### MANUFACTURER

### TYPE

|     |                  |
|-----|------------------|
| AVX | TLC (sizes K, L) |
|-----|------------------|

## Nemco Type TB



### MANUFACTURER

### TYPE

|                  |                        |
|------------------|------------------------|
| AVX              | TAP                    |
| Kemet            | T350-T356              |
| Mallory          | TDC, TDL               |
| Matsuo           | 202, 204               |
| NEC              | ND, NP                 |
| NIC              | NDTM                   |
| Nichicon         | S89                    |
| Panasonic        | ECSF                   |
| Sprague (Vishay) | 199D, 489D, ETPW, ETQW |

Please contact your Nemco sales representative for exact part number cross referencing.  
Some specifications may differ per capacitor type.

# Part Numbering

All Nemco products are manufactured lead-free and RoHS compliant.  
The use of the "LF" suffix code is optional when customers choose to establish a unique part number.

## PCT Series

Example: PCT10/16CK

|        |                               |                 |         |           |           |                                |
|--------|-------------------------------|-----------------|---------|-----------|-----------|--------------------------------|
| PCT    | 10                            | /               | 16      | C         | K         | (optional)                     |
| Series | Capacitance<br>in microfarads | (forward slash) | Voltage | Case Size | Tolerance | LF = lead free, RoHS compliant |

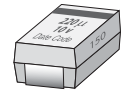


Standard packaging is tape and reel, 7" diameter reel. (For 13" dia. reel please contact the factory for ordering information)

## LSR Series

Example: LSR470/10HK100

|        |                               |                 |         |           |           |                      |                                |
|--------|-------------------------------|-----------------|---------|-----------|-----------|----------------------|--------------------------------|
| LSR    | 470                           | /               | 10      | H         | K         | 100                  | (optional)                     |
| Series | Capacitance<br>in microfarads | (forward slash) | Voltage | Case Size | Tolerance | Max ESR<br>milliohms | LF = lead free, RoHS compliant |



Standard packaging is tape and reel, 7" diameter reel. (For 13" dia. reel please contact the factory for ordering information)

## MCT and CGT Series

Examples: MCT1/16RM7500 or CGT1/16RM7500

|            |                               |                 |         |           |           |                      |
|------------|-------------------------------|-----------------|---------|-----------|-----------|----------------------|
| MCT or CGT | 1                             | /               | 16      | R         | M         | 7500                 |
| Series     | Capacitance<br>in microfarads | (forward slash) | Voltage | Case Size | Tolerance | Max ESR<br>milliohms |



Only available in M tolerance.

Only available lead-free, RoHS compliant.

Standard packaging is tape and reel, 4" diameter reel. (For 7" dia. reel please contact the factory for ordering information)

## TB Series

Example: TB10/35K1

|        |                               |                 |         |           |                      |            |                                                   |
|--------|-------------------------------|-----------------|---------|-----------|----------------------|------------|---------------------------------------------------|
| TB     | 10                            | /               | 35      | K         | 1                    | (optional) | (optional)                                        |
| Series | Capacitance<br>in microfarads | (forward slash) | Voltage | Tolerance | Lead spacing<br>code | LF         | TR = Tape & Reel Packaging<br>TA = Ammo Packaging |



Standard packaging is bulk.

### Voltages

| PCT<br>LSR | MCT<br>CGT | TB      |
|------------|------------|---------|
| 4          | 2          | 6 (6.3) |
| 6 (6.3)    | 3          | 10      |
| 10         | 4          | 16      |
| 16         | 5          | 20      |
| 20         | 6 (6.3)    | 25      |
| 25         | 10         | 35      |
| 35         | 16         | 50      |
| 50         | 25         |         |

### Case Sizes

| PCT / LSR          | MCT / CGT   |
|--------------------|-------------|
| A (3216-18)        | P (1005-07) |
| B (3528-21)        | R (1608-10) |
| C (6032-28)        |             |
| D (7343-31)        |             |
| H (7343-43)        |             |
| Z (7361-37)        |             |
| <b>Low Profile</b> |             |
| XL (2012-12)       |             |
| AL (3216-12)       |             |
| BL (3528-12)       |             |
| CL (6032-15)       |             |
| DL (7343-20)       |             |

### Tolerances

M ( $\pm 20\%$ )  
K ( $\pm 10\%$ )  
  
J ( $\pm 5\%$ ) may be  
available upon request,  
contact the factory

### Lead Spacing Codes

| TB                  |
|---------------------|
| 1 ( 0.1 inches )    |
| 2 ( 0.2 inches )    |
| 250 ( 0.25 inches ) |
| E1 ( 0.1 snap in )  |
| E2 ( 0.2 snap in )  |
| F ( 0.1 inches )    |

# Marking

Nemco surface mount tantalum capacitors are marked by laser on the top surface. The positive (+) end of the body has a videcon readable bar marking for improved polarity identification. Space permitting, with the exception of MCT miniature surface mount series, marking shall consist of:

- Capacitance in  $\mu\text{fd}$
- Voltage or voltage code (+85°C Vr)
- Polarity Bar (+)
- Date Code (Not available on: TB, CGT, MCT, PCT XL case size, LSR XL case size)

## Date Code System

The Nemco date code uses a two character system. The first character defines the year of manufacture. The second character defines the month of manufacture.

examples: W3 = March 2008  
VN = November 2007

### Year

| 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| N    | P    | R    | S    | T    | U    | V    | W    | X    | A    | B    | C    |

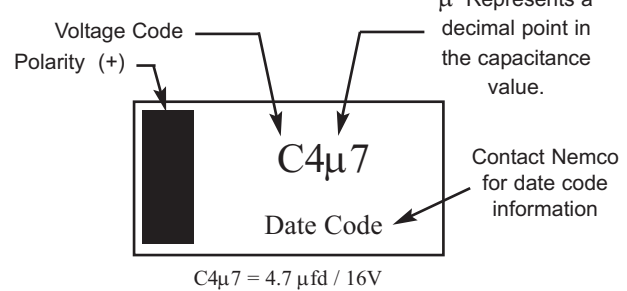
### Month

| January | February | March | April | May | June |
|---------|----------|-------|-------|-----|------|
| 1       | 2        | 3     | 4     | 5   | 6    |

| July | August | September | October | November | December |
|------|--------|-----------|---------|----------|----------|
| 7    | 8      | 9         | 0       | N        | D        |

## PCT / LSR Series

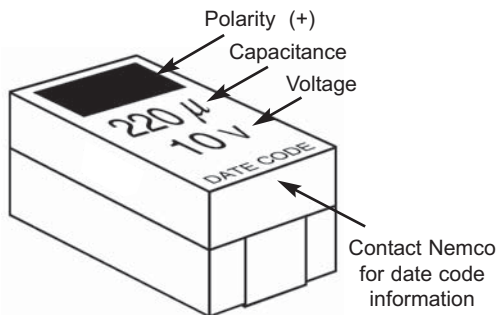
### Case Sizes XL, A, AL, B, BL



| Voltage VDC  | 4V | 6.3V | 10V | 16V | 20V | 25V | 35V | 50V |
|--------------|----|------|-----|-----|-----|-----|-----|-----|
| Voltage Code | G  | J    | A   | C   | D   | E   | V   | T   |

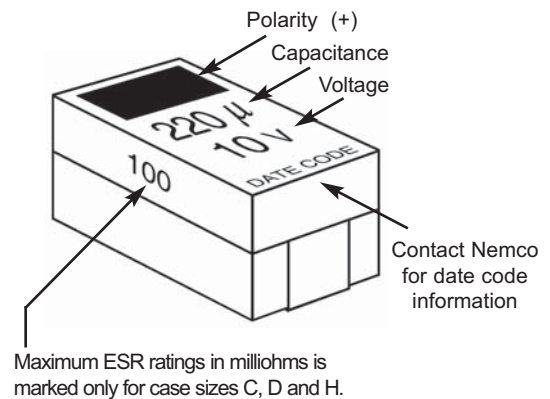
## PCT Series

### Case Sizes C, CL, D, DL, H, Z



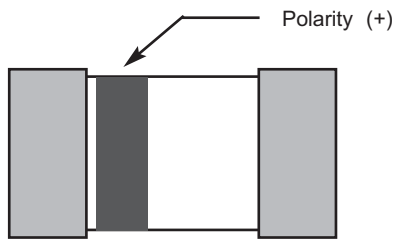
## LSR Series

### Case Sizes C, CL, D, DL, H, Z



## MCT and CGT Series

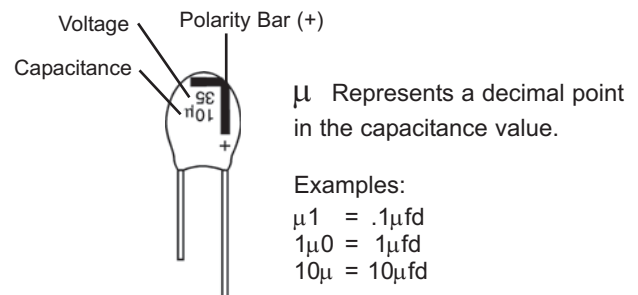
### Case Size P, R



Due to small size, only polarity identification appears on the component

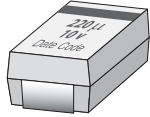
## TB Series

Radial dipped tantalum capacitors are marked by laser on the capacitor body. The positive (+) lead of the capacitor has a polarity stripe for improved recognition.



# Packaging

## PCT and LSR Series



| STANDARD                 |             |                                           |                      |
|--------------------------|-------------|-------------------------------------------|----------------------|
| Case Size                | Case Size   | Standard Packaging<br>7"<br>Reel Quantity | Available            |
| NEMCO                    | EIA<br>IECQ |                                           | 13"<br>Reel Quantity |
| A                        | 3216-18     | 2000                                      | 8000                 |
| B                        | 3528-21     | 2000                                      | 8000                 |
| C                        | 6032-28     | 500                                       | 3000                 |
| D                        | 7343-31     | 500                                       | 2500                 |
| H                        | 7343-43     | 400                                       | 1500                 |
| Z                        | 7361-37     | 400                                       | 1500                 |
| <u>Low Profile Sizes</u> |             |                                           |                      |
| XL                       | 2012-12     | 2500                                      | 10000                |
| AL                       | 3216-12     | 2500                                      | 10000                |
| BL                       | 3528-12     | 2500                                      | 10000                |
| CL                       | 6032-15     | 1000                                      | 5000                 |
| DL                       | 7343-20     | 1000                                      | 5000                 |

## MCT and CGT Series



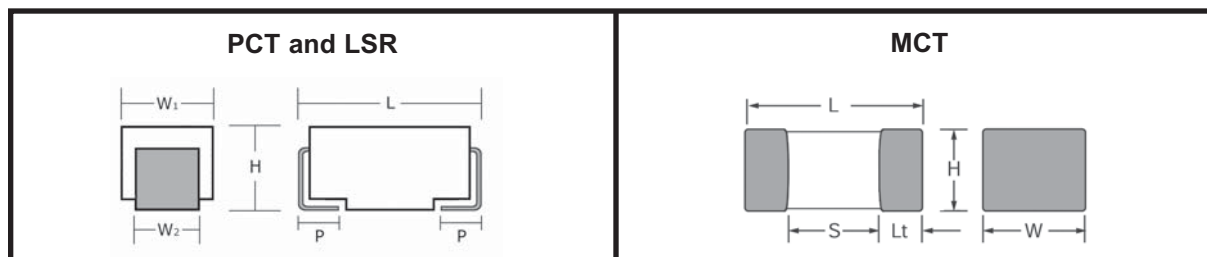
| STANDARD  |             |                                           |                     |
|-----------|-------------|-------------------------------------------|---------------------|
| Case Size | Case Size   | Standard Packaging<br>4"<br>Reel Quantity | Available           |
| NEMCO     | EIA<br>IECQ |                                           | 7"<br>Reel Quantity |
| P         | 1005-07     | 1000                                      | 10000               |
| R         | 1608-10     | 500                                       | 3500                |

## TB Series



| STANDARD  |                            |             |      |
|-----------|----------------------------|-------------|------|
| Case Size | Standard Packaging is Bulk | Tape & Reel | Ammo |
| A         | 1000                       | 1500        | 3000 |
| B         | 1000                       | 1250        | 3000 |
| C         | 1000                       | 1250        | 3000 |
| D         | 1000                       | 1250        | 3000 |
| E         | 1000                       | 1000        | 2500 |
| F         | 1000                       | 1000        | 2500 |
| G         | 1000                       | 750         | 2500 |
| H         | 1000                       | 750         | 2000 |
| J         | 500                        | 750         | 1000 |
| K         | 500                        | 500         | 1000 |
| L         | 500                        | 500         | 1000 |
| M         | 500                        | 500         | 1000 |
| N         | 500                        | N/A         | N/A  |
| O         | 500                        | N/A         | N/A  |

# Surface Mount Tantalum Case Dimensions



## Standard PCT and LSR

millimeters (inches)

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L<br>± 0.2 (± 0.008) | W <sub>1</sub><br>± 0.2 (± 0.008) | H<br>± 0.2 (± 0.008)    | W <sub>2</sub><br>± 0.1 (± 0.004) | P<br>± 0.3 (± 0.012) | S<br>Min.    |
|--------------------|-------------------------|----------------------|-----------------------------------|-------------------------|-----------------------------------|----------------------|--------------|
| A <sub>(4)</sub>   | 3216-18                 | 3.2 (.126)           | 1.6 (.063)                        | 1.6 (.063)              | 1.2 (.047)                        | 0.8 (.031)           | 1.10 (0.043) |
| B                  | 3528-21                 | 3.5 (.138)           | 2.8 (.110)                        | 1.9 (.075)              | 2.2 (.087)                        | 0.8 (.031)           | 1.40 (0.055) |
| C                  | 6032-28                 | 6.0 (.236)           | 3.2 (.126)                        | 2.6 (.102)              | 2.2 (.087)                        | 1.3 (.051)           | 2.90 (0.114) |
| D                  | 7343-31                 | 7.3 (.287)           | 4.3 (.169)                        | 2.9 (.114)              | 2.4 (.094)                        | 1.3 (.051)           | 4.40 (0.173) |
| H                  | 7343-43                 | 7.3 (.287)           | 4.3 (.169)                        | 4.1 (.162)              | 2.4 (.094)                        | 1.3 (.051)           | 4.40 (0.173) |
| Z                  | 7361-38                 | 7.3 (.287)           | 6.1 (.240)                        | 3.45±0.3<br>(.136±.012) | 3.1 (.120)                        | 1.4 (.055)           | 4.40 (0.173) |



## Low Profile PCT and LSR

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L<br>± 0.2 (± 0.008) | W <sub>1</sub><br>± 0.2 (± 0.008) | H<br>(MAX) | W <sub>2</sub><br>± 0.1 (± 0.004) | P<br>± 0.3 (± 0.012) | S<br>Min.    |
|--------------------|-------------------------|----------------------|-----------------------------------|------------|-----------------------------------|----------------------|--------------|
| XL <sub>(3)</sub>  | 2012-12                 | 2.05 (.080)          | 1.3 (.050)                        | 1.2 (.047) | 1.2 (.047)                        | 0.5 (.020)           | 0.85 (0.033) |
| AL <sub>(4)</sub>  | 3216-12                 | 3.2 (.126)           | 1.6 (.063)                        | 1.2 (.047) | 1.2 (.047)                        | 0.8 (.031)           | 1.10 (0.043) |
| BL                 | 3528-12                 | 3.5 (.138)           | 2.8 (.110)                        | 1.2 (.047) | 2.2 (.087)                        | 0.8 (.031)           | 1.40 (0.055) |
| CL                 | 6032-15                 | 6.0 (.236)           | 3.2 (.126)                        | 1.5 (.059) | 2.2 (.087)                        | 1.3 (.051)           | 2.90 (0.114) |
| DL                 | 7343-20                 | 7.3 (.287)           | 4.3 (.169)                        | 2.0 (.079) | 2.4 (.094)                        | 1.3 (.051)           | 4.40 (0.173) |

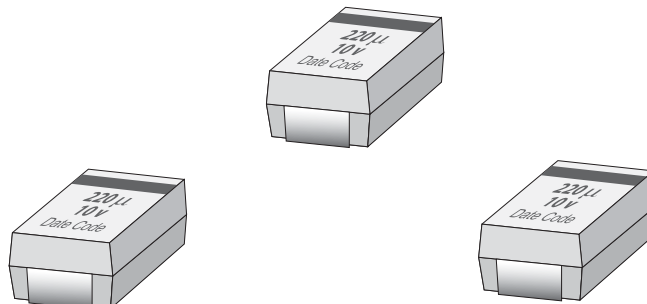


## MCT and CGT

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L                                             | W                                              | H                                              | S<br>Minimum | Lt<br>Minimum |
|--------------------|-------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|--------------|---------------|
| P <sub>(1)</sub>   | 1005-07                 | 1.00 (.039)<br>+ 0.2, - 0.0<br>(+0.008, -0.0) | 0.50 (.020)<br>+ 0.2, - 0.0<br>(+0.008, -0.0)  | 0.50 (.020)<br>+ 0.2, - 0.0<br>(+0.008, -0.0)  | 0.40 (.016)  | 0.10 (.004)   |
| R <sub>(2)</sub>   | 1608-10                 | 1.60 (.063)<br>+ 0.2, - 0.0<br>(+0.008, -0.0) | 0.85 (.033)<br>+ 0.15, - 0.0<br>(+0.006, -0.0) | 0.85 (.033)<br>+ 0.15, - 0.0<br>(+0.006, -0.0) | 0.65 (.0255) | 0.15 (.006)   |

- (1) 0402 Footprint Compatible
- (2) 0603 Footprint Compatible
- (3) 0805 Footprint Compatible
- (4) 1206 Footprint Compatible

## Standard and Extended Range



### FEATURES

- **Lead-free, RoHS compliant**
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- Capacitance range: 0.1  $\mu\text{f}$  to 1500  $\mu\text{f}$
- Voltage range: 4 to 50 WVDC
- Down sized, extended range values
- **Low profile sizes (see low profile section)**
- Surge tested for maximum robustness
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Precision molded case with flat surfaces for vacuum pick-up
- Laser marking and bold videcon - readable polarity stripe
- Compliant terminations
- Glue pad on underside for bonding to circuit board prior to soldering
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1



Lead Free



RoHS  
compliant

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | $\tan \delta$<br>max. (%) | ESR<br>@ 100kHz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|---------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|---------------------------|--------------------------------------|

## 4 V DC @ 85°C

|        |   |                |      |    |     |
|--------|---|----------------|------|----|-----|
| 33.0   | A | PCT33 / 4A _   | 1.3  | 6  | 3.0 |
| 47.0   | A | PCT47 / 4A _   | 1.9  | 8  | 2.6 |
| 68.0   | A | PCT68 / 4A _   | 2.7  | 10 | 1.5 |
| 68.0   | B | PCT68 / 4B _   | 2.7  | 8  | 1.8 |
| 100.0  | A | PCT100 / 4A _  | 4.0  | 30 | 1.4 |
| 100.0  | B | PCT100 / 4B _  | 4.0  | 8  | 0.9 |
| 150.0  | B | PCT150 / 4B _  | 6.0  | 8  | 1.5 |
| 150.0  | C | PCT150 / 4C _  | 6.0  | 6  | 0.3 |
| 220.0  | B | PCT220 / 4B _  | 8.8  | 12 | 1.1 |
| 220.0  | C | PCT220 / 4C _  | 8.8  | 8  | 1.2 |
| 220.0  | D | PCT220 / 4D _  | 8.8  | 8  | 0.9 |
| 330.0  | C | PCT330 / 4C _  | 13.2 | 8  | 0.9 |
| 330.0  | D | PCT330 / 4D _  | 13.2 | 8  | 0.9 |
| 470.0  | C | PCT470 / 4C _  | 18.8 | 14 | 0.3 |
| 470.0  | D | PCT470 / 4D _  | 18.8 | 12 | 0.9 |
| 470.0  | H | PCT470 / 4H _  | 18.8 | 10 | 0.5 |
| 680.0  | D | PCT680 / 4D _  | 27.2 | 14 | 0.5 |
| 680.0  | H | PCT680 / 4H _  | 27.2 | 14 | 0.9 |
| 1000.0 | D | PCT1000 / 4D _ | 40.0 | 60 | 0.2 |
| 1000.0 | H | PCT1000 / 4H _ | 40.0 | 14 | 0.4 |
| 1500.0 | H | PCT1500 / 4H _ | 60.0 | 30 | 0.2 |

## 10 V DC @ 85°C

|       |   |                |      |    |     |
|-------|---|----------------|------|----|-----|
| 2.2   | A | PCT2.2 / 10A _ | 0.5  | 6  | 7.0 |
| 4.7   | A | PCT4.7 / 10A _ | 0.5  | 6  | 5.0 |
| 6.8   | A | PCT6.8 / 10A _ | 0.7  | 6  | 4.0 |
| 6.8   | B | PCT6.8 / 10B _ | 0.7  | 6  | 3.0 |
| 10.0  | A | PCT10 / 10A _  | 1.0  | 6  | 3.0 |
| 10.0  | B | PCT10 / 10B _  | 1.0  | 6  | 2.5 |
| 15.0  | A | PCT15 / 10A _  | 1.5  | 6  | 3.2 |
| 15.0  | B | PCT15 / 10B _  | 1.5  | 6  | 2.8 |
| 22.0  | A | PCT22 / 10A _  | 2.2  | 8  | 3.0 |
| 22.0  | B | PCT22 / 10B _  | 2.2  | 6  | 2.4 |
| 22.0  | C | PCT22 / 10C _  | 2.2  | 6  | 1.8 |
| 33.0  | A | PCT33 / 10A _  | 3.3  | 8  | 1.7 |
| 33.0  | B | PCT33 / 10B _  | 3.3  | 6  | 1.8 |
| 33.0  | C | PCT33 / 10C _  | 3.3  | 6  | 1.6 |
| 47.0  | B | PCT47 / 10B _  | 4.7  | 8  | 1.0 |
| 47.0  | C | PCT47 / 10C _  | 4.7  | 6  | 1.2 |
| 47.0  | D | PCT47 / 10D _  | 4.7  | 6  | 0.9 |
| 68.0  | B | PCT68 / 10B _  | 6.8  | 6  | 1.4 |
| 68.0  | C | PCT68 / 10C _  | 6.8  | 6  | 1.3 |
| 68.0  | D | PCT68 / 10D _  | 6.8  | 6  | 0.9 |
| 100.0 | B | PCT100 / 10B _ | 10.0 | 8  | 1.4 |
| 100.0 | C | PCT100 / 10C _ | 10.0 | 8  | 1.2 |
| 100.0 | D | PCT100 / 10D _ | 10.0 | 6  | 0.9 |
| 150.0 | C | PCT150 / 10C _ | 15.0 | 8  | 0.9 |
| 150.0 | D | PCT150 / 10D _ | 15.0 | 6  | 0.9 |
| 150.0 | H | PCT150 / 10H _ | 15.0 | 8  | 0.9 |
| 220.0 | C | PCT220 / 10C _ | 22.0 | 8  | 0.5 |
| 220.0 | D | PCT220 / 10D _ | 22.0 | 8  | 0.5 |
| 220.0 | H | PCT220 / 10H _ | 22.0 | 8  | 0.5 |
| 330.0 | D | PCT330 / 10D _ | 33.0 | 8  | 0.9 |
| 330.0 | H | PCT330 / 10H _ | 33.0 | 8  | 0.9 |
| 470.0 | H | PCT470 / 10H _ | 47.0 | 10 | 0.5 |

## 6.3 V DC @ 85°C

|        |   |                |      |    |     |
|--------|---|----------------|------|----|-----|
| 10.0   | A | PCT10 / 6A _   | 0.6  | 6  | 4.0 |
| 15.0   | A | PCT15 / 6A _   | 0.9  | 6  | 3.5 |
| 15.0   | B | PCT15 / 6B _   | 1.0  | 6  | 2.5 |
| 22.0   | A | PCT22 / 6A _   | 1.4  | 6  | 3.0 |
| 22.0   | B | PCT22 / 6B _   | 1.4  | 6  | 2.5 |
| 33.0   | A | PCT33 / 6A _   | 2.1  | 8  | 2.5 |
| 33.0   | B | PCT33 / 6B _   | 2.1  | 6  | 2.2 |
| 33.0   | C | PCT33 / 6C _   | 2.1  | 6  | 1.8 |
| 47.0   | A | PCT47 / 6A _   | 2.8  | 10 | 1.6 |
| 47.0   | B | PCT47 / 6B _   | 3.0  | 6  | 2.0 |
| 47.0   | C | PCT47 / 6C _   | 3.0  | 6  | 1.6 |
| 68.0   | B | PCT68 / 6B _   | 4.0  | 8  | 0.9 |
| 68.0   | C | PCT68 / 6C _   | 4.3  | 6  | 1.5 |
| 68.0   | D | PCT68 / 6D _   | 4.3  | 6  | 0.9 |
| 100.0  | B | PCT100 / 6B _  | 6.3  | 10 | 1.7 |
| 100.0  | C | PCT100 / 6C _  | 6.3  | 6  | 0.9 |
| 100.0  | D | PCT100 / 6D _  | 6.3  | 6  | 0.9 |
| 150.0  | B | PCT150 / 6B _  | 9.5  | 10 | 1.2 |
| 150.0  | C | PCT150 / 6C _  | 9.5  | 6  | 1.3 |
| 150.0  | D | PCT150 / 6D _  | 9.5  | 6  | 0.9 |
| 220.0  | C | PCT220 / 6C _  | 13.9 | 8  | 1.2 |
| 220.0  | D | PCT220 / 6D _  | 13.9 | 8  | 0.9 |
| 220.0  | H | PCT220 / 6H _  | 13.9 | 8  | 0.9 |
| 330.0  | C | PCT330 / 6C _  | 19.8 | 12 | 0.5 |
| 330.0  | D | PCT330 / 6D _  | 20.8 | 8  | 0.4 |
| 330.0  | H | PCT330 / 6H _  | 20.8 | 8  | 0.4 |
| 470.0  | D | PCT470 / 6D _  | 28.0 | 12 | 0.4 |
| 470.0  | H | PCT470 / 6H _  | 28.0 | 10 | 0.4 |
| 680.0  | H | PCT680 / 6H _  | 42.8 | 10 | 0.5 |
| 1000.0 | Z | PCT1000 / 6Z _ | 63.0 | 16 | 0.4 |

## 16 V DC @ 85°C

|       |   |                |      |    |      |
|-------|---|----------------|------|----|------|
| 1.0   | A | PCT1 / 16A _   | 0.5  | 4  | 11.0 |
| 1.5   | A | PCT1.5 / 16A _ | 0.5  | 6  | 8.0  |
| 2.2   | A | PCT2.2 / 16A _ | 0.5  | 6  | 6.5  |
| 3.3   | A | PCT3.3 / 16A _ | 0.5  | 6  | 5.0  |
| 3.3   | B | PCT3.3 / 16B _ | 0.5  | 6  | 4.5  |
| 4.7   | A | PCT4.7 / 16A _ | 0.8  | 6  | 4.0  |
| 4.7   | B | PCT4.7 / 16B _ | 0.8  | 6  | 3.5  |
| 6.8   | A | PCT6.8 / 16A _ | 1.1  | 6  | 3.5  |
| 6.8   | B | PCT6.8 / 16B _ | 1.1  | 6  | 2.5  |
| 6.8   | C | PCT6.8 / 16C _ | 1.1  | 6  | 2.5  |
| 10.0  | A | PCT10 / 16A _  | 1.6  | 8  | 3.0  |
| 10.0  | B | PCT10 / 16B _  | 1.6  | 6  | 2.8  |
| 10.0  | C | PCT10 / 16C _  | 1.6  | 8  | 2.0  |
| 15.0  | A | PCT15 / 16A _  | 2.4  | 6  | 2.0  |
| 15.0  | B | PCT15 / 16B _  | 2.4  | 6  | 2.5  |
| 15.0  | C | PCT15 / 16C _  | 2.4  | 6  | 1.8  |
| 22.0  | B | PCT22 / 16B _  | 3.5  | 6  | 2.3  |
| 22.0  | C | PCT22 / 16C _  | 3.5  | 6  | 1.6  |
| 22.0  | D | PCT22 / 16D _  | 3.5  | 6  | 1.1  |
| 33.0  | B | PCT33 / 16B _  | 5.3  | 8  | 2.1  |
| 33.0  | C | PCT33 / 16C _  | 5.3  | 6  | 1.5  |
| 33.0  | D | PCT33 / 16D _  | 5.3  | 6  | 0.9  |
| 47.0  | C | PCT47 / 16C _  | 7.5  | 6  | 1.4  |
| 47.0  | D | PCT47 / 16D _  | 7.5  | 6  | 0.9  |
| 68.0  | C | PCT68 / 16C _  | 10.9 | 6  | 1.3  |
| 68.0  | D | PCT68 / 16D _  | 10.9 | 6  | 0.9  |
| 100.0 | C | PCT100 / 16C _ | 16.0 | 8  | 1.0  |
| 100.0 | D | PCT100 / 16D _ | 16.0 | 6  | 0.9  |
| 100.0 | H | PCT100 / 16H _ | 16.0 | 6  | 0.9  |
| 150.0 | D | PCT150 / 16D _ | 24.0 | 6  | 0.9  |
| 150.0 | H | PCT150 / 16H _ | 24.0 | 8  | 0.3  |
| 220.0 | H | PCT220 / 16H _ | 35.2 | 10 | 0.5  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | $\tan \delta$<br>max.<br>(%) | ESR<br>@ 100kHz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|

## 20 V DC @ 85°C

|       |   |                |      |   |     |
|-------|---|----------------|------|---|-----|
| 1.0   | A | PCT1 / 20A _   | 0.5  | 4 | 9.0 |
| 1.5   | A | PCT1.5 / 20A _ | 0.5  | 6 | 6.5 |
| 2.2   | A | PCT2.2 / 20A _ | 0.5  | 6 | 5.3 |
| 2.2   | B | PCT2.2 / 20B _ | 0.5  | 6 | 3.5 |
| 3.3   | A | PCT3.3 / 20A _ | 0.7  | 6 | 4.5 |
| 3.3   | B | PCT3.3 / 20B _ | 0.7  | 6 | 3.0 |
| 4.7   | A | PCT4.7 / 20A _ | 0.9  | 6 | 4.0 |
| 4.7   | B | PCT4.7 / 20B _ | 0.9  | 6 | 3.0 |
| 6.8   | A | PCT6.8 / 20A _ | 1.4  | 6 | 2.5 |
| 6.8   | B | PCT6.8 / 20B _ | 1.4  | 6 | 2.5 |
| 6.8   | C | PCT6.8 / 20C _ | 1.4  | 6 | 2.0 |
| 10.0  | B | PCT10 / 20B _  | 2.0  | 6 | 2.1 |
| 10.0  | C | PCT10 / 20C _  | 2.0  | 6 | 1.9 |
| 15.0  | B | PCT15 / 20B _  | 3.0  | 6 | 2.0 |
| 15.0  | C | PCT15 / 20C _  | 3.0  | 6 | 1.7 |
| 22.0  | B | PCT22 / 20B _  | 4.4  | 6 | 1.8 |
| 22.0  | C | PCT22 / 20C _  | 4.4  | 6 | 1.6 |
| 22.0  | D | PCT22 / 20D _  | 4.4  | 6 | 0.9 |
| 33.0  | C | PCT33 / 20C _  | 6.6  | 6 | 1.5 |
| 33.0  | D | PCT33 / 20D _  | 6.6  | 6 | 0.9 |
| 47.0  | C | PCT47 / 20C _  | 9.4  | 6 | 0.9 |
| 47.0  | D | PCT47 / 20D _  | 9.4  | 6 | 0.9 |
| 47.0  | H | PCT47 / 20H _  | 9.4  | 6 | 0.9 |
| 68.0  | D | PCT68 / 20D _  | 13.6 | 6 | 0.9 |
| 68.0  | H | PCT68 / 20H _  | 13.6 | 6 | 0.9 |
| 100.0 | D | PCT100 / 20D _ | 20.0 | 8 | 0.9 |
| 100.0 | H | PCT100 / 20H _ | 20.0 | 8 | 0.9 |
| 150.0 | H | PCT150 / 20H _ | 30.0 | 8 | 0.3 |

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | $\tan \delta$<br>max.<br>(%) | ESR<br>@ 100kHz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|

## 35 V DC @ 85°C

|      |   |                |      |   |      |
|------|---|----------------|------|---|------|
| 0.1  | A | PCT.1 / 35A _  | 0.5  | 4 | 24.0 |
| 0.15 | A | PCT.15 / 35A _ | 0.5  | 4 | 21.0 |
| 0.22 | A | PCT.22 / 35A _ | 0.5  | 4 | 18.0 |
| 0.33 | A | PCT.33 / 35A _ | 0.5  | 4 | 15.0 |
| 0.47 | A | PCT.47 / 35A _ | 0.5  | 4 | 12.0 |
| 0.47 | B | PCT.47 / 35B _ | 0.5  | 4 | 10.0 |
| 0.68 | A | PCT.68 / 35A _ | 0.5  | 4 | 8.0  |
| 0.68 | B | PCT.68 / 35B _ | 0.5  | 4 | 8.0  |
| 1.0  | A | PCT1 / 35A _   | 0.5  | 4 | 7.5  |
| 1.0  | B | PCT1 / 35B _   | 0.5  | 4 | 6.5  |
| 1.5  | A | PCT1.5 / 35A _ | 0.5  | 6 | 7.5  |
| 1.5  | B | PCT1.5 / 35B _ | 0.5  | 6 | 5.2  |
| 1.5  | C | PCT1.5 / 35C _ | 0.5  | 6 | 4.5  |
| 2.2  | A | PCT2.2 / 35A _ | 0.8  | 6 | 4.5  |
| 2.2  | B | PCT2.2 / 35B _ | 0.8  | 6 | 4.2  |
| 2.2  | C | PCT2.2 / 35C _ | 0.8  | 6 | 3.5  |
| 3.3  | B | PCT3.3 / 35B _ | 1.2  | 6 | 3.5  |
| 3.3  | C | PCT3.3 / 35C _ | 1.2  | 6 | 2.5  |
| 3.3  | D | PCT3.3 / 35D _ | 1.2  | 6 | 2.5  |
| 4.7  | B | PCT4.7 / 35B _ | 1.2  | 6 | 3.1  |
| 4.7  | C | PCT4.7 / 35C _ | 1.6  | 6 | 2.2  |
| 4.7  | D | PCT4.7 / 35D _ | 1.6  | 6 | 1.5  |
| 6.8  | C | PCT6.8 / 35C _ | 2.4  | 6 | 1.8  |
| 6.8  | D | PCT6.8 / 35D _ | 2.4  | 6 | 1.3  |
| 10.0 | C | PCT10 / 35C _  | 3.5  | 6 | 1.6  |
| 10.0 | D | PCT10 / 35D _  | 3.5  | 6 | 1.0  |
| 10.0 | H | PCT10 / 35H _  | 3.5  | 6 | 0.9  |
| 15.0 | C | PCT15 / 35C _  | 5.3  | 6 | 1.4  |
| 15.0 | D | PCT15 / 35D _  | 5.3  | 6 | 0.9  |
| 22.0 | D | PCT22 / 35D _  | 7.7  | 6 | 0.9  |
| 22.0 | H | PCT22 / 35H _  | 7.7  | 6 | 0.9  |
| 33.0 | D | PCT33 / 35D _  | 11.6 | 6 | 0.9  |
| 33.0 | H | PCT33 / 35H _  | 11.6 | 6 | 0.9  |
| 47.0 | H | PCT47 / 35H _  | 16.5 | 6 | 0.9  |
| 68.0 | Z | PCT68 / 35Z _  | 23.8 | 6 | 0.5  |

## 25 V DC @ 85°C

|       |   |                |      |   |     |
|-------|---|----------------|------|---|-----|
| 1.0   | A | PCT1 / 25A _   | 0.5  | 4 | 8.0 |
| 1.5   | A | PCT1.5 / 25A _ | 0.5  | 6 | 7.5 |
| 1.5   | B | PCT1.5 / 25B _ | 0.5  | 6 | 5.0 |
| 2.2   | A | PCT2.2 / 25A _ | 0.6  | 6 | 7.0 |
| 2.2   | B | PCT2.2 / 25B _ | 0.6  | 6 | 4.5 |
| 3.3   | A | PCT3.3 / 25A _ | 0.8  | 6 | 3.7 |
| 3.3   | B | PCT3.3 / 25B _ | 0.8  | 6 | 3.5 |
| 3.3   | C | PCT3.3 / 25C _ | 0.8  | 6 | 2.8 |
| 4.7   | A | PCT4.7 / 25A _ | 1.2  | 6 | 3.1 |
| 4.7   | B | PCT4.7 / 25B _ | 1.2  | 6 | 2.8 |
| 4.7   | C | PCT4.7 / 25C _ | 1.2  | 6 | 2.4 |
| 6.8   | B | PCT6.8 / 25B _ | 1.7  | 6 | 2.8 |
| 6.8   | C | PCT6.8 / 25C _ | 1.7  | 6 | 2.0 |
| 10.0  | B | PCT10 / 25B _  | 2.5  | 6 | 2.0 |
| 10.0  | C | PCT10 / 25C _  | 2.5  | 6 | 1.8 |
| 10.0  | D | PCT10 / 25D _  | 2.5  | 6 | 1.2 |
| 15.0  | C | PCT15 / 25C _  | 3.8  | 6 | 1.6 |
| 15.0  | D | PCT15 / 25D _  | 3.8  | 6 | 1.0 |
| 22.0  | C | PCT22 / 25C _  | 5.5  | 6 | 1.4 |
| 22.0  | D | PCT22 / 25D _  | 5.5  | 6 | 0.9 |
| 33.0  | D | PCT33 / 25D _  | 8.3  | 6 | 0.9 |
| 33.0  | H | PCT33 / 25H _  | 8.3  | 6 | 0.9 |
| 47.0  | D | PCT47 / 25D _  | 11.8 | 6 | 0.9 |
| 47.0  | H | PCT47 / 25H _  | 11.8 | 6 | 0.9 |
| 68.0  | H | PCT68 / 25H _  | 17.0 | 6 | 0.9 |
| 100.0 | Z | PCT100 / 25Z _ | 25.0 | 8 | 0.4 |

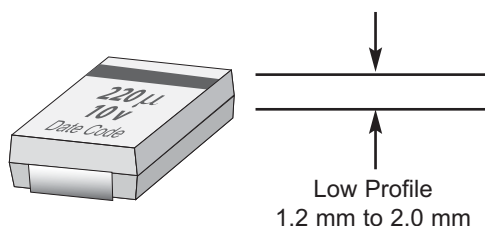
## 50 V DC @ 85°C

|      |   |                |      |   |      |
|------|---|----------------|------|---|------|
| 0.1  | A | PCT.1 / 50A _  | 0.5  | 4 | 22.0 |
| 0.15 | A | PCT.15 / 50A _ | 0.5  | 4 | 15.0 |
| 0.15 | B | PCT.15 / 50B _ | 0.5  | 4 | 17.0 |
| 0.22 | A | PCT.22 / 50A _ | 0.5  | 4 | 18.0 |
| 0.22 | B | PCT.22 / 50B _ | 0.5  | 4 | 14.0 |
| 0.33 | B | PCT.33 / 50B _ | 0.5  | 4 | 12.0 |
| 0.47 | A | PCT.47 / 50A _ | 0.5  | 4 | 9.5  |
| 0.47 | B | PCT.47 / 50B _ | 0.7  | 4 | 9.5  |
| 0.47 | C | PCT.47 / 50C _ | 0.5  | 4 | 8.0  |
| 0.68 | A | PCT.68 / 50A _ | 0.5  | 4 | 7.9  |
| 0.68 | B | PCT.68 / 50B _ | 0.5  | 4 | 8.0  |
| 0.68 | C | PCT.68 / 50C _ | 0.5  | 4 | 7.0  |
| 1.0  | A | PCT1 / 50A _   | 0.5  | 4 | 6.6  |
| 1.0  | B | PCT1 / 50B _   | 0.5  | 4 | 7.0  |
| 1.0  | C | PCT1 / 50C _   | 0.5  | 4 | 5.5  |
| 1.5  | C | PCT1.5 / 50C _ | 0.8  | 6 | 4.5  |
| 1.5  | D | PCT1.5 / 50D _ | 0.8  | 6 | 4.0  |
| 2.2  | C | PCT2.2 / 50C _ | 1.1  | 6 | 3.0  |
| 2.2  | D | PCT2.2 / 50D _ | 1.1  | 6 | 2.5  |
| 3.3  | C | PCT3.3 / 50C _ | 1.7  | 6 | 2.5  |
| 3.3  | D | PCT3.3 / 50D _ | 1.7  | 6 | 2.0  |
| 4.7  | C | PCT4.7 / 50C _ | 0.5  | 4 | 1.4  |
| 4.7  | D | PCT4.7 / 50D _ | 2.4  | 6 | 1.4  |
| 6.8  | C | PCT6.8 / 50C _ | 3.4  | 6 | 1.0  |
| 6.8  | D | PCT6.8 / 50D _ | 3.4  | 6 | 1.0  |
| 10.0 | D | PCT10 / 50D _  | 5.0  | 6 | 0.8  |
| 10.0 | H | PCT10 / 50H _  | 5.0  | 6 | 1.0  |
| 15.0 | D | PCT15 / 50D _  | 7.5  | 4 | 0.6  |
| 15.0 | H | PCT15 / 50H _  | 7.5  | 6 | 0.6  |
| 22.0 | Z | PCT22 / 50Z _  | 11.0 | 8 | 0.6  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## Low Profile



## FEATURES

- **Lead-free, RoHS compliant**
- Low Profile Heights. Excellent for PCMCIA applications.
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- Capacitance range: 0.1  $\mu$ f to 470  $\mu$ f
- Voltage range 4 to 35 WVDC
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Surge tested for maximum robustness
- Precision molded case with flat surfaces for vacuum pick-up
- Laser marking and bold videocon - readable polarity stripe
- Compliant terminations
- Glue pad on underside for bonding to circuit board prior to soldering
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1

Nemco offers low profile surface mount tantalum capacitors including an **0805** (EIA 1212) size for applications where component height is a critical concern. These devices are often selected when maximum heights as small as 1.2 to 2.0 millimeters are needed to meet the heights of standard integrated circuits after mounting.

Case sizes AL, BL, CL, DL have the identical footprints of standard A, B, C, D devices.



**Lead Free**



**RoHS  
compliant**

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | tan $\delta$<br>max.<br>(%) | ESR<br>@ 100Khz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|

### 4 V DC @ 85°C

|       |    |              |      |    |      |
|-------|----|--------------|------|----|------|
| 2.2   | XL | PCT2.2 / 4XL | 0.5  | 6  | 25.0 |
| 2.2   | AL | PCT2.2 / 4AL | 0.5  | 6  | 25.0 |
| 3.3   | XL | PCT3.3 / 4XL | 0.5  | 6  | 20.0 |
| 3.3   | AL | PCT3.3 / 4AL | 0.5  | 6  | 18.0 |
| 4.7   | XL | PCT4.7 / 4XL | 0.5  | 6  | 12.0 |
| 4.7   | AL | PCT4.7 / 4AL | 0.5  | 6  | 10.0 |
| 6.8   | XL | PCT6.8 / 4XL | 0.5  | 6  | 5.2  |
| 6.8   | AL | PCT6.8 / 4AL | 0.5  | 6  | 8.0  |
| 6.8   | BL | PCT6.8 / 4BL | 0.5  | 6  | 6.0  |
| 10.0  | XL | PCT10 / 4XL  | 0.5  | 6  | 7.0  |
| 10.0  | AL | PCT10 / 4AL  | 0.5  | 6  | 6.0  |
| 10.0  | BL | PCT10 / 4BL  | 0.5  | 6  | 5.0  |
| 15.0  | XL | PCT15 / 4XL  | 0.6  | 8  | 4.0  |
| 15.0  | AL | PCT15 / 4AL  | 0.6  | 8  | 4.0  |
| 15.0  | BL | PCT15 / 4BL  | 0.6  | 6  | 2.0  |
| 22.0  | XL | PCT22 / 4XL  | 0.9  | 8  | 3.8  |
| 22.0  | AL | PCT22 / 4AL  | 0.9  | 8  | 3.5  |
| 22.0  | BL | PCT22 / 4BL  | 0.9  | 6  | 1.9  |
| 33.0  | AL | PCT33 / 4AL  | 1.3  | 8  | 1.7  |
| 33.0  | BL | PCT33 / 4BL  | 1.3  | 6  | 1.7  |
| 33.0  | CL | PCT33 / 4CL  | 1.3  | 6  | 0.6  |
| 47.0  | BL | PCT47 / 4BL  | 1.9  | 10 | 2.0  |
| 47.0  | CL | PCT47 / 4CL  | 1.9  | 6  | 0.5  |
| 68.0  | BL | PCT68 / 4BL  | 2.7  | 15 | 1.5  |
| 68.0  | CL | PCT68 / 4CL  | 2.7  | 6  | 0.4  |
| 100.0 | BL | PCT100 / 4BL | 4.0  | 14 | 1.4  |
| 100.0 | CL | PCT100 / 4CL | 4.0  | 6  | 1.3  |
| 150.0 | CL | PCT150 / 4CL | 6.0  | 6  | 1.3  |
| 150.0 | DL | PCT150 / 4DL | 6.0  | 6  | 0.4  |
| 220.0 | CL | PCT220 / 4CL | 8.8  | 8  | 1.2  |
| 220.0 | DL | PCT220 / 4DL | 8.8  | 8  | 0.3  |
| 470.0 | DL | PCT470 / 4DL | 18.8 | 14 | 0.9  |
| 680.0 | DL | PCT680 / 4DL | 27.2 | 25 | 0.2  |

### 6.3 V DC @ 85°C

|      |    |              |     |    |      |
|------|----|--------------|-----|----|------|
| 1.5  | XL | PCT1.5 / 6XL | 0.5 | 6  | 25.0 |
| 1.5  | AL | PCT1.5 / 6AL | 0.5 | 6  | 25.0 |
| 2.2  | XL | PCT2.2 / 6XL | 0.5 | 6  | 20.0 |
| 2.2  | AL | PCT2.2 / 6AL | 0.5 | 6  | 18.0 |
| 3.3  | XL | PCT3.3 / 6XL | 0.5 | 6  | 12.0 |
| 3.3  | AL | PCT3.3 / 6AL | 0.5 | 6  | 9.0  |
| 4.7  | XL | PCT4.7 / 6XL | 0.5 | 6  | 7.0  |
| 4.7  | AL | PCT4.7 / 6AL | 0.5 | 6  | 7.5  |
| 4.7  | BL | PCT4.7 / 6BL | 0.5 | 6  | 6.0  |
| 6.8  | XL | PCT6.8 / 6XL | 0.5 | 8  | 7.0  |
| 6.8  | AL | PCT6.8 / 6AL | 0.5 | 6  | 7.0  |
| 6.8  | BL | PCT6.8 / 6BL | 0.5 | 6  | 5.0  |
| 10.0 | XL | PCT10 / 6XL  | 0.6 | 8  | 6.0  |
| 10.0 | AL | PCT10 / 6AL  | 0.6 | 6  | 6.0  |
| 10.0 | BL | PCT10 / 6BL  | 0.6 | 6  | 4.0  |
| 15.0 | XL | PCT15 / 6XL  | 0.9 | 8  | 4.1  |
| 15.0 | AL | PCT15 / 6AL  | 0.9 | 8  | 4.0  |
| 15.0 | BL | PCT15 / 6BL  | 1.0 | 6  | 3.5  |
| 22.0 | AL | PCT22 / 6AL  | 1.3 | 10 | 1.8  |
| 22.0 | BL | PCT22 / 6BL  | 1.4 | 8  | 2.5  |
| 22.0 | CL | PCT22 / 6CL  | 1.3 | 6  | 0.6  |

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | tan $\delta$<br>max.<br>(%) | ESR<br>@ 100Khz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|

### 6.3 V DC @ 85°C cont.

|       |    |              |      |    |     |
|-------|----|--------------|------|----|-----|
| 33.0  | BL | PCT33 / 6BL  | 2.1  | 10 | 2.5 |
| 33.0  | CL | PCT33 / 6CL  | 2.1  | 6  | 1.8 |
| 47.0  | BL | PCT47 / 6BL  | 2.8  | 10 | 1.6 |
| 47.0  | CL | PCT47 / 6CL  | 3.0  | 6  | 1.5 |
| 68.0  | CL | PCT68 / 6CL  | 4.3  | 6  | 1.5 |
| 100.0 | CL | PCT100 / 6CL | 6.3  | 6  | 0.9 |
| 100.0 | DL | PCT100 / 6DL | 6.3  | 6  | 0.9 |
| 150.0 | CL | PCT150 / 6CL | 9.0  | 8  | 0.3 |
| 150.0 | DL | PCT150 / 6DL | 9.0  | 6  | 0.4 |
| 220.0 | DL | PCT220 / 6DL | 13.9 | 10 | 0.9 |
| 330.0 | DL | PCT330 / 6DL | 20.8 | 8  | 0.9 |
| 470.0 | DL | PCT470 / 6DL | 28.2 | 20 | 0.2 |

### 10 V DC @ 85°C

|       |    |               |      |    |      |
|-------|----|---------------|------|----|------|
| 1.0   | XL | PCT1 / 10XL   | 0.5  | 4  | 25.0 |
| 1.0   | AL | PCT1 / 10AL   | 0.5  | 4  | 25.0 |
| 1.5   | XL | PCT1.5 / 10XL | 0.5  | 6  | 20.0 |
| 1.5   | AL | PCT1.5 / 10AL | 0.5  | 6  | 20.0 |
| 2.2   | XL | PCT2.2 / 10XL | 0.5  | 6  | 15.0 |
| 2.2   | AL | PCT2.2 / 10AL | 0.5  | 6  | 12.0 |
| 3.3   | XL | PCT3.3 / 10XL | 0.5  | 6  | 8.0  |
| 3.3   | AL | PCT3.3 / 10AL | 0.5  | 6  | 8.0  |
| 3.3   | BL | PCT3.3 / 10BL | 0.5  | 6  | 6.0  |
| 4.7   | XL | PCT4.7 / 10XL | 0.5  | 6  | 9.0  |
| 4.7   | AL | PCT4.7 / 10AL | 0.5  | 6  | 5.0  |
| 4.7   | BL | PCT4.7 / 10BL | 0.5  | 6  | 5.0  |
| 6.8   | XL | PCT6.8 / 10XL | 0.7  | 6  | 5.2  |
| 6.8   | AL | PCT6.8 / 10AL | 0.7  | 6  | 4.0  |
| 6.8   | BL | PCT6.8 / 10BL | 0.7  | 6  | 4.0  |
| 10.0  | XL | PCT10 / 10XL  | 1.0  | 20 | 6.0  |
| 10.0  | AL | PCT10 / 10AL  | 1.0  | 8  | 4.0  |
| 10.0  | BL | PCT10 / 10BL  | 1.0  | 6  | 3.0  |
| 15.0  | AL | PCT15 / 10AL  | 1.5  | 6  | 2.0  |
| 15.0  | BL | PCT15 / 10BL  | 1.5  | 8  | 2.8  |
| 15.0  | CL | PCT15 / 10CL  | 1.5  | 6  | 0.7  |
| 22.0  | BL | PCT22 / 10BL  | 2.2  | 8  | 2.2  |
| 22.0  | CL | PCT22 / 10CL  | 2.2  | 6  | 0.6  |
| 33.0  | CL | PCT33 / 10CL  | 3.3  | 6  | 1.6  |
| 47.0  | CL | PCT47 / 10CL  | 4.7  | 6  | 1.4  |
| 47.0  | DL | PCT47 / 10DL  | 4.7  | 6  | 0.5  |
| 68.0  | CL | PCT68 / 10CL  | 6.8  | 6  | 1.3  |
| 68.0  | DL | PCT68 / 10DL  | 6.8  | 6  | 0.9  |
| 100.0 | CL | PCT100 / 10CL | 10.0 | 6  | 0.4  |
| 100.0 | DL | PCT100 / 10DL | 10.0 | 6  | 0.9  |
| 150.0 | DL | PCT150 / 10DL | 15.0 | 6  | 1.2  |
| 220.0 | DL | PCT220 / 10DL | 22.0 | 10 | 0.5  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | $\tan \delta$<br>max.<br>(%) | ESR<br>@ 100Khz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|------------------------------|--------------------------------------|

## 16 V DC @ 85°C

|       |    |                 |      |    |      |
|-------|----|-----------------|------|----|------|
| 0.68  | XL | PCT.68 / 16XL _ | 0.5  | 4  | 25.0 |
| 0.68  | AL | PCT.68 / 16AL _ | 0.5  | 4  | 25.0 |
| 1.0   | XL | PCT1 / 16XL _   | 0.5  | 4  | 20.0 |
| 1.0   | AL | PCT1 / 16AL _   | 0.5  | 4  | 15.0 |
| 1.0   | BL | PCT1 / 16BL _   | 0.5  | 4  | 5.0  |
| 1.5   | XL | PCT1.5 / 16XL _ | 0.5  | 6  | 10.0 |
| 1.5   | AL | PCT1.5 / 16AL _ | 0.5  | 6  | 12.0 |
| 2.2   | XL | PCT2.2 / 16XL _ | 0.5  | 6  | 6.5  |
| 2.2   | AL | PCT2.2 / 16AL _ | 0.5  | 6  | 6.0  |
| 2.2   | BL | PCT2.2 / 16BL _ | 0.5  | 6  | 6.5  |
| 3.3   | XL | PCT3.3 / 16XL _ | 0.5  | 8  | 5.0  |
| 3.3   | AL | PCT3.3 / 16AL _ | 0.5  | 6  | 5.0  |
| 3.3   | BL | PCT3.3 / 16BL _ | 0.5  | 6  | 5.0  |
| 4.7   | AL | PCT4.7 / 16AL _ | 0.5  | 6  | 4.5  |
| 4.7   | BL | PCT4.7 / 16BL _ | 0.8  | 6  | 4.5  |
| 6.8   | AL | PCT6.8 / 16AL _ | 1.1  | 8  | 2.4  |
| 6.8   | BL | PCT6.8 / 16BL _ | 1.1  | 6  | 3.5  |
| 10.0  | BL | PCT10 / 16BL _  | 1.6  | 8  | 2.2  |
| 10.0  | CL | PCT10 / 16CL _  | 1.6  | 6  | 2.0  |
| 15.0  | BL | PCT15 / 16BL _  | 2.4  | 6  | 2.0  |
| 15.0  | CL | PCT15 / 16CL _  | 2.4  | 6  | 0.7  |
| 22.0  | CL | PCT22 / 16CL _  | 3.5  | 6  | 1.6  |
| 33.0  | CL | PCT33 / 16CL _  | 5.3  | 6  | 1.5  |
| 33.0  | DL | PCT33 / 16DL _  | 5.3  | 6  | 0.9  |
| 47.0  | CL | PCT47 / 16CL _  | 7.5  | 6  | 0.4  |
| 47.0  | DL | PCT47 / 16DL _  | 7.5  | 6  | 0.7  |
| 68.0  | DL | PCT68 / 16DL _  | 10.9 | 6  | 0.9  |
| 100.0 | DL | PCT100 / 16DL _ | 16.0 | 6  | 0.9  |
| 150.0 | DL | PCT150 / 16DL _ | 24.0 | 15 | 0.3  |

## 20 V DC @ 85°C

|      |    |                 |      |   |      |
|------|----|-----------------|------|---|------|
| 0.1  | XL | PCT.1 / 20XL _  | 0.5  | 4 | 25.0 |
| 0.1  | AL | PCT.1 / 20AL _  | 0.5  | 4 | 25.0 |
| 0.15 | XL | PCT.15 / 20XL _ | 0.5  | 4 | 25.0 |
| 0.15 | AL | PCT.15 / 20AL _ | 0.5  | 4 | 25.0 |
| 0.22 | XL | PCT.22 / 20XL _ | 0.5  | 4 | 25.0 |
| 0.22 | AL | PCT.22 / 20AL _ | 0.5  | 4 | 25.0 |
| 0.33 | XL | PCT.33 / 20XL _ | 0.5  | 4 | 25.0 |
| 0.33 | AL | PCT.33 / 20AL _ | 0.5  | 4 | 25.0 |
| 0.47 | XL | PCT.47 / 20XL _ | 0.5  | 4 | 25.0 |
| 0.47 | AL | PCT.47 / 20AL _ | 0.5  | 4 | 25.0 |
| 0.68 | XL | PCT.68 / 20XL _ | 0.5  | 4 | 25.0 |
| 0.68 | AL | PCT.68 / 20AL _ | 0.5  | 4 | 20.0 |
| 0.68 | BL | PCT.68 / 20BL _ | 0.5  | 4 | 15.0 |
| 1.0  | XL | PCT1 / 20XL _   | 0.5  | 4 | 20.0 |
| 1.0  | AL | PCT1 / 20AL _   | 0.5  | 4 | 12.0 |
| 1.0  | BL | PCT1 / 20BL _   | 0.5  | 4 | 9.0  |
| 1.5  | XL | PCT1.5 / 20XL _ | 0.5  | 6 | 9.6  |
| 1.5  | AL | PCT1.5 / 20AL _ | 0.5  | 6 | 5.0  |
| 1.5  | BL | PCT1.5 / 20BL _ | 0.5  | 6 | 6.5  |
| 2.2  | XL | PCT2.2 / 20XL _ | 0.5  | 6 | 4.5  |
| 2.2  | AL | PCT2.2 / 20AL _ | 0.5  | 6 | 4.5  |
| 2.2  | BL | PCT2.2 / 20BL _ | 0.5  | 6 | 6.0  |
| 3.3  | BL | PCT3.3 / 20BL _ | 0.7  | 6 | 3.0  |
| 4.7  | BL | PCT4.7 / 20BL _ | 0.9  | 6 | 3.0  |
| 6.8  | BL | PCT6.8 / 20BL _ | 1.4  | 6 | 2.6  |
| 10.0 | CL | PCT10 / 20CL _  | 2.0  | 6 | 1.9  |
| 15.0 | CL | PCT15 / 20CL _  | 3.0  | 6 | 1.7  |
| 22.0 | CL | PCT22 / 20CL _  | 4.4  | 6 | 1.6  |
| 22.0 | DL | PCT22 / 20DL _  | 4.4  | 6 | 0.9  |
| 33.0 | DL | PCT33 / 20DL _  | 6.6  | 6 | 0.5  |
| 47.0 | DL | PCT47 / 20DL _  | 9.4  | 6 | 0.4  |
| 68.0 | DL | PCT68 / 20DL _  | 13.6 | 6 | 0.4  |

## 25 V DC @ 85°C

|      |    |                 |      |   |      |
|------|----|-----------------|------|---|------|
| 0.15 | XL | PCT.15 / 25XL _ | 0.5  | 4 | 24.0 |
| 0.22 | XL | PCT.22 / 25XL _ | 0.5  | 4 | 21.0 |
| 0.33 | XL | PCT.33 / 25XL _ | 0.5  | 4 | 17.0 |
| 0.47 | XL | PCT.47 / 25XL _ | 0.5  | 4 | 15.0 |
| 0.47 | AL | PCT.47 / 25AL _ | 0.5  | 4 | 14.0 |
| 0.68 | XL | PCT.68 / 25XL _ | 0.5  | 4 | 13.0 |
| 0.68 | AL | PCT.68 / 25AL _ | 0.5  | 5 | 10.0 |
| 1.0  | XL | PCT1 / 25XL _   | 0.5  | 4 | 8.0  |
| 1.0  | AL | PCT1 / 25AL _   | 0.5  | 4 | 8.0  |
| 1.5  | AL | PCT1.5 / 25AL _ | 0.5  | 6 | 5.4  |
| 1.5  | BL | PCT1.5 / 25BL _ | 0.5  | 6 | 5.0  |
| 2.2  | BL | PCT2.2 / 25BL _ | 0.6  | 6 | 4.5  |
| 3.3  | BL | PCT3.3 / 25BL _ | 0.8  | 6 | 3.5  |
| 3.3  | CL | PCT3.3 / 25CL _ | 0.8  | 6 | 1.6  |
| 4.7  | BL | PCT4.7 / 25BL _ | 1.2  | 6 | 3.1  |
| 4.7  | CL | PCT4.7 / 25CL _ | 1.2  | 6 | 1.2  |
| 4.7  | DL | PCT4.7 / 25DL _ | 11.8 | 6 | 0.9  |
| 6.8  | CL | PCT6.8 / 25CL _ | 1.7  | 6 | 2.0  |
| 10.0 | CL | PCT10 / 25CL _  | 2.5  | 6 | 1.8  |
| 15.0 | DL | PCT15 / 25DL _  | 3.8  | 6 | 1.0  |
| 22.0 | DL | PCT22 / 25DL _  | 5.5  | 6 | 0.9  |
| 33.0 | DL | PCT33 / 25DL _  | 8.3  | 6 | 0.5  |

## 35 V DC @ 85°C

|      |    |                 |     |   |      |
|------|----|-----------------|-----|---|------|
| 0.1  | XL | PCT.1 / 35XL _  | 0.5 | 4 | 29.0 |
| 0.1  | AL | PCT.1 / 35AL _  | 0.5 | 4 | 24.0 |
| 0.15 | XL | PCT.15 / 35XL _ | 0.5 | 4 | 24.0 |
| 0.15 | AL | PCT.15 / 35AL _ | 0.5 | 4 | 21.0 |
| 0.22 | XL | PCT.22 / 35XL _ | 0.5 | 4 | 21.0 |
| 0.22 | AL | PCT.22 / 35AL _ | 0.5 | 4 | 18.0 |
| 0.33 | XL | PCT.33 / 35XL _ | 0.5 | 4 | 17.0 |
| 0.33 | AL | PCT.33 / 35AL _ | 0.5 | 4 | 15.0 |
| 0.47 | XL | PCT.47 / 35XL _ | 0.5 | 4 | 15.0 |
| 0.47 | AL | PCT.47 / 35AL _ | 0.5 | 4 | 12.0 |
| 0.47 | BL | PCT.47 / 35BL _ | 0.5 | 4 | 10.0 |
| 0.68 | AL | PCT.68 / 35AL _ | 0.5 | 4 | 8.0  |
| 0.68 | BL | PCT.68 / 35BL _ | 0.5 | 4 | 8.0  |
| 1.0  | AL | PCT1 / 35AL _   | 0.5 | 4 | 7.5  |
| 1.0  | BL | PCT1 / 35BL _   | 0.5 | 4 | 6.5  |
| 1.5  | BL | PCT1.5 / 35BL _ | 0.5 | 6 | 5.2  |
| 2.2  | BL | PCT2.2 / 35BL _ | 0.8 | 6 | 4.2  |
| 3.3  | CL | PCT3.3 / 35CL _ | 1.2 | 6 | 1.6  |
| 4.7  | CL | PCT4.7 / 35CL _ | 1.6 | 6 | 2.2  |
| 6.8  | DL | PCT6.8 / 35DL _ | 2.3 | 6 | 0.9  |
| 10.0 | DL | PCT10 / 35DL _  | 3.5 | 6 | 1.0  |
| 15.0 | DL | PCT15 / 35DL _  | 5.3 | 6 | 0.6  |
| 22.0 | DL | PCT22 / 35DL _  | 7.7 | 6 | 0.5  |

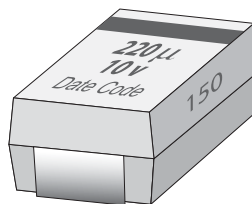
## 50 V DC @ 85°C

|      |    |                 |     |   |      |
|------|----|-----------------|-----|---|------|
| 0.1  | AL | PCT.1 / 50AL _  | 0.5 | 4 | 19.0 |
| 0.15 | AL | PCT.15 / 50AL _ | 0.5 | 4 | 16.0 |
| 0.22 | AL | PCT.22 / 50AL _ | 0.5 | 4 | 13.0 |
| 0.33 | AL | PCT.33 / 50AL _ | 0.5 | 4 | 11.0 |
| 0.33 | BL | PCT.33 / 50BL _ | 0.5 | 4 | 11.0 |
| 0.47 | AL | PCT.47 / 50AL _ | 0.5 | 4 | 9.5  |
| 0.47 | BL | PCT.47 / 50BL _ | 0.5 | 4 | 9.5  |
| 1.0  | CL | PCT1 / 50CL _   | 0.5 | 6 | 4.4  |
| 1.5  | CL | PCT1.5 / 50CL _ | 0.8 | 6 | 3.1  |
| 3.3  | DL | PCT3.3 / 50DL _ | 1.7 | 4 | 1.7  |
| 4.7  | DL | PCT4.7 / 50DL _ | 2.4 | 6 | 1.2  |
| 6.8  | DL | PCT6.8 / 50DL _ | 3.4 | 6 | 0.9  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## Low ESR



### FEATURES

- **Lead-free, RoHS compliant**
- Very Low Equivalent Series Resistance (ESR), **Ideal for Power Supplies**
- High ripple and surge current capability
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- **Pre-conditioned, surge current tested for maximum robustness**
- Capacitance range: 1.0  $\mu\text{f}$  to 1500  $\mu\text{f}$  (higher values in development)
- Voltage range: 4 to 50 WVDC
- Low Profile sizes (see Low Profile LSR section)
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Precision molded case with flat surfaces for vacuum pick-up
- Laser marking and bold videcon - readable polarity stripe
- Compliant terminations
- Glue pad on underside for bonding to circuit board prior to soldering
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1

**Nemco LSR** (Low Equivalent Series Resistance) surface mount tantalum capacitors are specifically designed for those applications such as **POWER SUPPLIES** requiring the highest level of robustness available to tantalum capacitor technology. These devices have inherently **low ESR** due to special manufacturing process and powder technology improvements. They are capable of handling higher ripple currents than standard product. The benefits of using Nemco LSR Series components are its capability to handle higher ripple currents producing lower ripple voltage output and less power dissipation resulting in less heating.

After manufacturing, parts are conditioned by being subjected to an elevated temperature overvoltage burn-in, applied for a minimum of 2 hours. Parts are monitored on a 100% basis for DCL at elevated temperatures. Parts are then subjected to a low impedance surge current. Surge current testing is performed on a 100% basis. Each capacitor is individually monitored. All devices undergo 100% test for capacitance, dissipation factor, DCL, and ESR at 100 kHz to LSR requirements.



Lead Free



RoHS  
compliant

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 4 V DC @ 85°C

|        |   |     |                   |      |    |      |      |      |
|--------|---|-----|-------------------|------|----|------|------|------|
| 47.0   | A | 500 | LSR47 / 4A _ 500  | 1.9  | 8  | 387  | 348  | 155  |
| 100.0  | B | 200 | LSR100 / 4B _ 200 | 4.0  | 8  | 652  | 587  | 261  |
| 100.0  | B | 250 | LSR100 / 4B _ 250 | 4.0  | 8  | 583  | 525  | 233  |
| 100.0  | B | 350 | LSR100 / 4B _ 350 | 4.0  | 8  | 493  | 444  | 197  |
| 100.0  | B | 500 | LSR100 / 4B _ 500 | 4.0  | 8  | 412  | 371  | 165  |
| 150.0  | B | 250 | LSR220 / 4B _ 250 | 6.0  | 10 | 583  | 525  | 233  |
| 150.0  | C | 70  | LSR150 / 4C _ 70  | 6.0  | 6  | 1254 | 1128 | 501  |
| 150.0  | C | 80  | LSR150 / 4C _ 80  | 6.0  | 6  | 1173 | 1055 | 469  |
| 220.0  | D | 40  | LSR220 / 4D _ 40  | 8.8  | 8  | 1936 | 1743 | 775  |
| 220.0  | D | 50  | LSR220 / 4D _ 50  | 8.8  | 8  | 1732 | 1559 | 693  |
| 220.0  | D | 100 | LSR220 / 4D _ 100 | 8.8  | 8  | 1225 | 1102 | 490  |
| 330.0  | C | 100 | LSR330 / 4C _ 100 | 13.2 | 8  | 1049 | 944  | 420  |
| 330.0  | D | 25  | LSR330 / 4D _ 25  | 13.2 | 8  | 3194 | 2874 | 1277 |
| 330.0  | D | 35  | LSR330 / 4D _ 35  | 13.2 | 8  | 2699 | 2429 | 1080 |
| 330.0  | D | 45  | LSR330 / 4D _ 45  | 13.2 | 8  | 1826 | 1643 | 730  |
| 330.0  | D | 100 | LSR330 / 4D _ 100 | 13.2 | 8  | 1225 | 1102 | 490  |
| 470.0  | D | 25  | LSR470 / 4D _ 25  | 18.8 | 8  | 3194 | 2874 | 1277 |
| 470.0  | D | 35  | LSR470 / 4D _ 35  | 18.8 | 8  | 2699 | 2429 | 1080 |
| 470.0  | D | 45  | LSR470 / 4D _ 45  | 18.8 | 12 | 1826 | 1643 | 730  |
| 470.0  | D | 100 | LSR470 / 4D _ 100 | 18.8 | 12 | 1225 | 1102 | 490  |
| 470.0  | H | 35  | LSR470 / 4H _ 35  | 18.8 | 10 | 2171 | 1954 | 868  |
| 470.0  | H | 45  | LSR470 / 4H _ 45  | 18.8 | 12 | 1915 | 1723 | 766  |
| 470.0  | H | 100 | LSR470 / 4H _ 100 | 18.8 | 12 | 1285 | 1156 | 514  |
| 680.0  | D | 25  | LSR680 / 4D _ 25  | 27.2 | 8  | 3194 | 2874 | 1277 |
| 680.0  | D | 45  | LSR680 / 4D _ 45  | 27.2 | 14 | 1915 | 1643 | 730  |
| 680.0  | D | 60  | LSR680 / 4D _ 60  | 27.2 | 14 | 1581 | 1423 | 632  |
| 680.0  | D | 100 | LSR680 / 4D _ 100 | 27.2 | 14 | 1225 | 1102 | 490  |
| 680.0  | H | 18  | LSR680 / 4H _ 18  | 27.2 | 6  | 3873 | 3486 | 1549 |
| 680.0  | H | 23  | LSR680 / 4H _ 23  | 27.2 | 6  | 3426 | 3084 | 1370 |
| 680.0  | H | 40  | LSR680 / 4H _ 40  | 27.2 | 14 | 2031 | 1828 | 812  |
| 680.0  | H | 60  | LSR680 / 4H _ 60  | 27.2 | 14 | 1658 | 1492 | 663  |
| 680.0  | H | 100 | LSR680 / 4H _ 100 | 27.2 | 14 | 1284 | 1156 | 513  |
| 1000.0 | D | 25  | LSR1000/ 4D _ 25  | 40.0 | 8  | 3194 | 2874 | 1277 |
| 1000.0 | D | 45  | LSR1000/ 4D _ 45  | 40.0 | 8  | 2380 | 2142 | 952  |
| 1000.0 | H | 18  | LSR1000/ 4H _ 18  | 40.0 | 6  | 3873 | 3486 | 1549 |
| 1000.0 | H | 23  | LSR1000/ 4H _ 23  | 40.0 | 6  | 3426 | 3084 | 1370 |
| 1000.0 | H | 40  | LSR1000/ 4H _ 40  | 40.0 | 14 | 2031 | 1828 | 812  |
| 1000.0 | H | 60  | LSR1000/ 4H _ 60  | 40.0 | 14 | 1658 | 1492 | 663  |
| 1000.0 | Z | 18  | LSR1000/ 4Z _ 18  | 40.0 | 6  | 3979 | 3581 | 1592 |
| 1000.0 | Z | 25  | LSR1000/ 4Z _ 25  | 40.0 | 16 | 3162 | 2846 | 1265 |
| 1000.0 | Z | 35  | LSR1000/ 4Z _ 35  | 40.0 | 16 | 2673 | 2405 | 1069 |
| 1000.0 | Z | 40  | LSR1000/ 4Z _ 40  | 40.0 | 16 | 2500 | 2250 | 1000 |
| 1000.0 | Z | 50  | LSR1000/ 4Z _ 50  | 40.0 | 16 | 2236 | 2012 | 894  |
| 1500.0 | H | 15  | LSR1500/ 4H _ 15  | 40.0 | 6  | 4243 | 3818 | 1697 |
| 1500.0 | H | 50  | LSR1500/ 4H _ 50  | 60.0 | 30 | 1817 | 1635 | 727  |
| 1500.0 | H | 75  | LSR1500/ 4H _ 75  | 60.0 | 30 | 1483 | 1335 | 593  |
| 1500.0 | Z | 50  | LSR1500/ 4Z _ 50  | 60.0 | 30 | 2236 | 2012 | 894  |
| 1500.0 | Z | 75  | LSR1500/ 4Z _ 75  | 60.0 | 30 | 1826 | 1643 | 730  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | $\tan \delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|------------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                              | 25°C                                              | 85°C | 125°C |

### 6.3 V DC @ 85°C

|       |   |      |                    |      |    |      |      |      |
|-------|---|------|--------------------|------|----|------|------|------|
| 6.8   | A | 1800 | LSR6.8 / 6A _ 1800 | 0.5  | 6  | 204  | 184  | 82   |
| 10.0  | A | 1500 | LSR10 / 6A _ 1500  | 0.6  | 6  | 224  | 200  | 89   |
| 15.0  | A | 700  | LSR15 / 6A _ 700   | 0.9  | 6  | 327  | 295  | 131  |
| 15.0  | A | 1500 | LSR15 / 6A _ 1500  | 0.9  | 6  | 224  | 200  | 89   |
| 22.0  | A | 500  | LSR22 / 6A _ 500   | 1.4  | 6  | 387  | 349  | 155  |
| 22.0  | A | 900  | LSR22 / 6A _ 900   | 1.4  | 6  | 289  | 260  | 115  |
| 22.0  | B | 375  | LSR22 / 6B _ 375   | 1.4  | 6  | 476  | 428  | 190  |
| 22.0  | B | 600  | LSR22 / 6B _ 600   | 1.4  | 6  | 376  | 339  | 151  |
| 33.0  | A | 600  | LSR33 / 6A _ 600   | 2.1  | 6  | 353  | 318  | 141  |
| 33.0  | B | 250  | LSR33 / 6B _ 250   | 2.1  | 6  | 583  | 525  | 233  |
| 33.0  | B | 350  | LSR33 / 6B _ 350   | 2.1  | 6  | 493  | 444  | 197  |
| 33.0  | B | 450  | LSR33 / 6B _ 450   | 2.1  | 6  | 435  | 391  | 174  |
| 33.0  | B | 600  | LSR33 / 6B _ 600   | 2.1  | 6  | 376  | 338  | 151  |
| 47.0  | A | 800  | LSR47 / 6A _ 800   | 2.8  | 10 | 306  | 276  | 122  |
| 47.0  | B | 250  | LSR47 / 6B _ 250   | 3.0  | 6  | 583  | 525  | 233  |
| 47.0  | B | 350  | LSR47 / 6B _ 350   | 3.0  | 6  | 493  | 444  | 197  |
| 47.0  | B | 500  | LSR47 / 6B _ 500   | 3.0  | 6  | 412  | 371  | 165  |
| 47.0  | C | 300  | LSR47 / 6C _ 300   | 3.0  | 6  | 606  | 545  | 242  |
| 68.0  | B | 250  | LSR68 / 6B _ 250   | 4.3  | 8  | 583  | 525  | 233  |
| 68.0  | B | 350  | LSR68 / 6B _ 350   | 4.3  | 8  | 493  | 444  | 197  |
| 68.0  | B | 500  | LSR68 / 6B _ 500   | 4.3  | 6  | 412  | 371  | 165  |
| 68.0  | C | 150  | LSR68 / 6C _ 150   | 4.3  | 6  | 856  | 771  | 343  |
| 68.0  | C | 200  | LSR68 / 6C _ 200   | 4.3  | 6  | 742  | 667  | 297  |
| 100.0 | B | 250  | LSR100 / 6B _ 250  | 6.3  | 10 | 583  | 525  | 233  |
| 100.0 | B | 400  | LSR100 / 6B _ 400  | 6.3  | 10 | 461  | 415  | 184  |
| 100.0 | C | 75   | LSR100 / 6C _ 75   | 6.3  | 6  | 1211 | 1091 | 484  |
| 100.0 | C | 150  | LSR100 / 6C _ 150  | 6.3  | 6  | 856  | 771  | 343  |
| 150.0 | C | 50   | LSR150 / 6C _ 50   | 9.5  | 6  | 1483 | 1335 | 593  |
| 150.0 | C | 90   | LSR150 / 6C _ 90   | 9.5  | 6  | 1106 | 995  | 442  |
| 150.0 | C | 150  | LSR150 / 6C _ 150  | 9.5  | 6  | 856  | 771  | 343  |
| 150.0 | C | 200  | LSR150 / 6C _ 200  | 9.5  | 6  | 742  | 667  | 297  |
| 150.0 | C | 250  | LSR150 / 6C _ 250  | 6.3  | 6  | 663  | 597  | 265  |
| 150.0 | D | 50   | LSR150 / 6D _ 50   | 9.5  | 6  | 1732 | 1559 | 693  |
| 150.0 | D | 125  | LSR150 / 6D _ 125  | 9.5  | 6  | 1095 | 986  | 438  |
| 220.0 | C | 70   | LSR220 / 6C _ 70   | 13.9 | 8  | 1254 | 1128 | 501  |
| 220.0 | C | 100  | LSR220 / 6C _ 100  | 13.9 | 10 | 1049 | 944  | 420  |
| 220.0 | C | 125  | LSR220 / 6C _ 125  | 13.9 | 8  | 938  | 844  | 375  |
| 220.0 | C | 250  | LSR220 / 6C _ 250  | 13.9 | 10 | 663  | 597  | 265  |
| 220.0 | D | 50   | LSR220 / 6D _ 50   | 13.9 | 8  | 1732 | 1559 | 693  |
| 220.0 | D | 100  | LSR220 / 6D _ 100  | 13.9 | 8  | 1125 | 1102 | 490  |
| 220.0 | D | 125  | LSR220 / 6D _ 125  | 13.9 | 8  | 1095 | 986  | 438  |
| 220.0 | H | 100  | LSR220 / 6H _ 100  | 13.2 | 8  | 1285 | 1156 | 514  |
| 330.0 | D | 25   | LSR330 / 6D _ 25   | 19.8 | 8  | 3194 | 2874 | 1277 |
| 330.0 | D | 35   | LSR330 / 6D _ 35   | 19.8 | 8  | 2699 | 2429 | 1080 |
| 330.0 | D | 45   | LSR330 / 6D _ 45   | 20.8 | 8  | 1826 | 1643 | 730  |
| 330.0 | D | 50   | LSR330 / 6D _ 50   | 20.8 | 8  | 1732 | 1559 | 693  |
| 330.0 | D | 70   | LSR330 / 6D _ 70   | 20.8 | 8  | 1464 | 1317 | 586  |
| 330.0 | D | 100  | LSR330 / 6D _ 100  | 20.8 | 8  | 1125 | 1102 | 490  |
| 330.0 | H | 50   | LSR330 / 6H _ 50   | 20.8 | 8  | 1817 | 1635 | 727  |
| 330.0 | H | 100  | LSR330 / 6H _ 100  | 20.8 | 8  | 1285 | 1156 | 514  |
| 330.0 | H | 125  | LSR330 / 6H _ 125  | 20.8 | 8  | 1149 | 1034 | 460  |
| 330.0 | H | 150  | LSR330 / 6H _ 150  | 20.8 | 8  | 1049 | 944  | 420  |
| 470.0 | D | 45   | LSR470 / 6D _ 45   | 29.6 | 12 | 1826 | 1643 | 730  |
| 470.0 | D | 60   | LSR470 / 6D _ 60   | 29.6 | 12 | 1581 | 1423 | 632  |
| 470.0 | D | 100  | LSR470 / 6D _ 100  | 29.6 | 12 | 1225 | 1102 | 490  |
| 470.0 | D | 200  | LSR470 / 6D _ 200  | 29.6 | 12 | 866  | 779  | 346  |
| 470.0 | H | 18   | LSR470 / 6H _ 18   | 28.0 | 6  | 3873 | 3486 | 1549 |
| 470.0 | H | 23   | LSR470 / 6H _ 23   | 28.0 | 6  | 3426 | 3084 | 1370 |
| 470.0 | H | 30   | LSR470 / 6H _ 30   | 28.0 | 6  | 3000 | 2700 | 1200 |
| 470.0 | H | 45   | LSR470 / 6H _ 45   | 29.6 | 10 | 1915 | 1723 | 766  |
| 470.0 | H | 50   | LSR470 / 6H _ 50   | 29.6 | 10 | 1817 | 1635 | 727  |
| 470.0 | H | 60   | LSR470 / 6H _ 60   | 29.6 | 10 | 1658 | 1492 | 663  |
| 470.0 | H | 100  | LSR470 / 6H _ 100  | 29.6 | 10 | 1285 | 1156 | 514  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 6.3 V DC @ 85°C cont.

|        |   |     |                   |      |    |      |      |      |
|--------|---|-----|-------------------|------|----|------|------|------|
| 470.0  | H | 200 | LSR470 / 6H _ 200 | 29.6 | 10 | 908  | 817  | 363  |
| 470.0  | Z | 40  | LSR470 / 6Z _ 40  | 29.6 | 10 | 2500 | 2250 | 1000 |
| 470.0  | Z | 55  | LSR470 / 6Z _ 55  | 29.6 | 10 | 2132 | 1919 | 853  |
| 470.0  | Z | 100 | LSR470 / 6Z _ 100 | 29.6 | 10 | 1581 | 1423 | 632  |
| 680.0  | H | 18  | LSR680 / 6H _ 18  | 41.0 | 6  | 3873 | 3486 | 1549 |
| 680.0  | H | 23  | LSR680 / 6H _ 23  | 41.0 | 6  | 3426 | 3084 | 1370 |
| 680.0  | H | 45  | LSR680 / 6H _ 45  | 42.8 | 10 | 1915 | 1723 | 766  |
| 680.0  | H | 60  | LSR680 / 6H _ 60  | 42.8 | 10 | 1658 | 1492 | 663  |
| 680.0  | H | 100 | LSR680 / 6H _ 100 | 42.8 | 10 | 1284 | 1156 | 514  |
| 680.0  | Z | 23  | LSR680 / 6Z _ 23  | 41.0 | 6  | 3520 | 3168 | 1408 |
| 680.0  | Z | 35  | LSR680 / 6Z _ 35  | 42.8 | 14 | 2673 | 2405 | 1069 |
| 680.0  | Z | 40  | LSR680 / 6Z _ 40  | 42.8 | 10 | 2500 | 2250 | 1000 |
| 680.0  | Z | 50  | LSR680 / 6Z _ 50  | 42.8 | 10 | 2236 | 2012 | 894  |
| 1000.0 | Z | 40  | LSR1000/ 6Z _ 40  | 60.0 | 16 | 2500 | 2250 | 1000 |
| 1000.0 | Z | 50  | LSR1000/ 6Z _ 50  | 60.0 | 16 | 2236 | 2012 | 894  |

### 10 V DC @ 85°C

|       |   |      |                     |      |   |      |      |     |
|-------|---|------|---------------------|------|---|------|------|-----|
| 2.2   | A | 1800 | LSR2.2 / 10A _ 1800 | 0.5  | 6 | 204  | 184  | 82  |
| 4.7   | A | 1400 | LSR4.7 / 10A _ 1400 | 0.5  | 6 | 231  | 208  | 93  |
| 6.8   | A | 1800 | LSR6.8 / 10A _ 1800 | 0.7  | 6 | 204  | 184  | 82  |
| 10.0  | A | 900  | LSR10 / 10A _ 900   | 1.0  | 6 | 289  | 260  | 115 |
| 10.0  | A | 1800 | LSR10 / 10A _ 1800  | 1.0  | 6 | 204  | 183  | 82  |
| 15.0  | A | 1000 | LSR15 / 10A _ 1000  | 1.5  | 6 | 274  | 246  | 110 |
| 15.0  | B | 450  | LSR15 / 10B _ 450   | 1.5  | 6 | 435  | 391  | 174 |
| 15.0  | B | 600  | LSR15 / 10B _ 600   | 1.5  | 6 | 376  | 339  | 151 |
| 22.0  | B | 400  | LSR22 / 10B _ 400   | 2.2  | 6 | 461  | 415  | 184 |
| 22.0  | B | 500  | LSR22 / 10B _ 500   | 2.2  | 6 | 412  | 371  | 165 |
| 22.0  | B | 700  | LSR22 / 10B _ 700   | 2.2  | 6 | 348  | 312  | 139 |
| 22.0  | C | 300  | LSR22 / 10C _ 300   | 2.2  | 6 | 606  | 545  | 242 |
| 33.0  | A | 700  | LSR33 / 10A _ 700   | 3.3  | 8 | 327  | 295  | 131 |
| 33.0  | B | 250  | LSR33 / 10B _ 250   | 3.3  | 6 | 583  | 525  | 233 |
| 33.0  | B | 425  | LSR33 / 10B _ 425   | 3.3  | 6 | 447  | 402  | 179 |
| 33.0  | B | 500  | LSR33 / 10B _ 500   | 3.3  | 6 | 412  | 371  | 165 |
| 33.0  | B | 650  | LSR33 / 10B _ 650   | 3.3  | 6 | 362  | 325  | 145 |
| 33.0  | C | 150  | LSR33 / 10C _ 150   | 3.3  | 6 | 856  | 771  | 343 |
| 33.0  | C | 375  | LSR33 / 10C _ 375   | 3.3  | 6 | 542  | 484  | 217 |
| 33.0  | C | 500  | LSR33 / 10C _ 500   | 3.3  | 6 | 469  | 422  | 188 |
| 47.0  | B | 250  | LSR47 / 10B _ 250   | 4.7  | 8 | 583  | 525  | 233 |
| 47.0  | B | 350  | LSR47 / 10B _ 350   | 4.7  | 8 | 493  | 444  | 197 |
| 47.0  | B | 500  | LSR47 / 10B _ 500   | 4.7  | 8 | 412  | 371  | 165 |
| 47.0  | B | 650  | LSR47 / 10B _ 650   | 4.7  | 8 | 362  | 325  | 145 |
| 47.0  | C | 200  | LSR47 / 10C _ 200   | 4.7  | 6 | 742  | 667  | 297 |
| 47.0  | C | 350  | LSR47 / 10C _ 350   | 4.7  | 6 | 561  | 505  | 224 |
| 47.0  | D | 100  | LSR47 / 10D _ 100   | 4.7  | 6 | 1225 | 1102 | 490 |
| 68.0  | B | 600  | LSR68 / 10B _ 600   | 6.8  | 8 | 376  | 339  | 151 |
| 68.0  | C | 80   | LSR68 / 10C _ 80    | 6.8  | 6 | 1173 | 1055 | 469 |
| 68.0  | C | 100  | LSR68 / 10C _ 100   | 6.8  | 6 | 1049 | 944  | 420 |
| 68.0  | C | 200  | LSR68 / 10C _ 200   | 6.8  | 6 | 742  | 667  | 297 |
| 68.0  | C | 300  | LSR68 / 10C _ 300   | 6.8  | 6 | 605  | 544  | 242 |
| 68.0  | D | 100  | LSR68 / 10D _ 100   | 6.8  | 6 | 1225 | 1102 | 490 |
| 68.0  | D | 150  | LSR68 / 10D _ 150   | 6.8  | 6 | 1000 | 900  | 400 |
| 100.0 | B | 400  | LSR100 / 10B _ 400  | 10.0 | 8 | 461  | 415  | 184 |
| 100.0 | C | 75   | LSR100 / 10C _ 75   | 10.0 | 8 | 1211 | 1090 | 484 |
| 100.0 | C | 100  | LSR100 / 10C _ 100  | 10.0 | 8 | 1049 | 944  | 420 |
| 100.0 | C | 150  | LSR100 / 10C _ 150  | 10.0 | 8 | 856  | 771  | 343 |
| 100.0 | C | 200  | LSR100 / 10C _ 200  | 10.0 | 8 | 742  | 667  | 297 |
| 100.0 | D | 50   | LSR100 / 10D _ 50   | 10.0 | 6 | 1732 | 1559 | 693 |
| 100.0 | D | 65   | LSR100 / 10D _ 65   | 10.0 | 6 | 1519 | 1367 | 608 |
| 100.0 | D | 80   | LSR100 / 10D _ 80   | 10.0 | 6 | 1369 | 1232 | 548 |
| 100.0 | D | 100  | LSR100 / 10D _ 100  | 10.0 | 6 | 1225 | 1102 | 490 |
| 100.0 | D | 125  | LSR100 / 10D _ 125  | 10.0 | 6 | 1095 | 986  | 438 |
| 100.0 | D | 150  | LSR100 / 10D _ 150  | 10.0 | 6 | 1000 | 900  | 400 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 10 V DC @ 85°C cont.

|       |   |     |                    |      |    |      |      |      |
|-------|---|-----|--------------------|------|----|------|------|------|
| 100.0 | H | 125 | LSR100 / 10H _ 125 | 10.0 | 6  | 1149 | 1034 | 460  |
| 150.0 | D | 50  | LSR150 / 10D _ 50  | 15.0 | 6  | 1732 | 1559 | 693  |
| 150.0 | D | 85  | LSR150 / 10D _ 85  | 15.0 | 8  | 1328 | 1195 | 531  |
| 150.0 | D | 100 | LSR150 / 10D _ 100 | 15.0 | 6  | 1225 | 1102 | 490  |
| 150.0 | H | 100 | LSR150 / 10H _ 100 | 15.0 | 8  | 1285 | 1156 | 514  |
| 220.0 | D | 35  | LSR220 / 10D _ 35  | 22.0 | 8  | 2699 | 2429 | 1080 |
| 220.0 | D | 50  | LSR220 / 10D _ 50  | 22.0 | 8  | 1732 | 1559 | 693  |
| 220.0 | D | 100 | LSR220 / 10D _ 100 | 22.0 | 8  | 1225 | 1102 | 490  |
| 220.0 | D | 150 | LSR220 / 10D _ 150 | 22.0 | 8  | 1000 | 900  | 400  |
| 220.0 | H | 50  | LSR220 / 10H _ 50  | 22.0 | 8  | 1817 | 1635 | 727  |
| 220.0 | H | 60  | LSR220 / 10H _ 60  | 22.0 | 8  | 1658 | 1492 | 663  |
| 220.0 | H | 70  | LSR220 / 10H _ 70  | 22.0 | 8  | 1535 | 1382 | 614  |
| 220.0 | H | 100 | LSR220 / 10H _ 100 | 22.0 | 8  | 1285 | 1156 | 514  |
| 220.0 | H | 125 | LSR220 / 10H _ 125 | 22.0 | 8  | 1149 | 1034 | 460  |
| 220.0 | H | 150 | LSR220 / 10H _ 150 | 22.0 | 8  | 1049 | 944  | 420  |
| 330.0 | D | 35  | LSR330 / 10D _ 35  | 33.0 | 8  | 2699 | 2429 | 1080 |
| 330.0 | D | 50  | LSR330 / 10D _ 50  | 33.0 | 8  | 1732 | 1559 | 693  |
| 330.0 | D | 65  | LSR330 / 10D _ 65  | 33.0 | 8  | 1519 | 1367 | 608  |
| 330.0 | D | 100 | LSR330 / 10D _ 100 | 33.0 | 8  | 1225 | 1102 | 490  |
| 330.0 | D | 150 | LSR330 / 10D _ 150 | 33.0 | 8  | 1000 | 900  | 400  |
| 330.0 | H | 23  | LSR330 / 10H _ 23  | 33.0 | 6  | 3426 | 3084 | 1370 |
| 330.0 | H | 35  | LSR330 / 10H _ 35  | 33.0 | 6  | 2777 | 2500 | 1111 |
| 330.0 | H | 40  | LSR330 / 10H _ 40  | 33.0 | 8  | 2031 | 1828 | 812  |
| 330.0 | H | 50  | LSR330 / 10H _ 50  | 33.0 | 8  | 1817 | 1635 | 727  |
| 330.0 | H | 60  | LSR330 / 10H _ 60  | 33.0 | 8  | 1658 | 1492 | 663  |
| 330.0 | H | 100 | LSR330 / 10H _ 100 | 33.0 | 8  | 1285 | 1156 | 514  |
| 330.0 | Z | 40  | LSR330 / 10Z _ 40  | 33.0 | 10 | 2500 | 1250 | 1000 |
| 330.0 | Z | 60  | LSR330 / 10Z _ 60  | 33.0 | 10 | 2041 | 1837 | 816  |
| 330.0 | Z | 100 | LSR330 / 10Z _ 100 | 33.0 | 10 | 1581 | 1423 | 632  |
| 470.0 | H | 23  | LSR470 / 10H _ 23  | 47.0 | 6  | 3426 | 3084 | 1370 |
| 470.0 | H | 30  | LSR470 / 10H _ 30  | 47.0 | 6  | 3000 | 2700 | 1200 |
| 470.0 | H | 45  | LSR470 / 10H _ 45  | 47.0 | 10 | 1915 | 1723 | 766  |
| 470.0 | H | 50  | LSR470 / 10H _ 50  | 47.0 | 10 | 1817 | 1635 | 727  |
| 470.0 | H | 60  | LSR470 / 10H _ 60  | 47.0 | 10 | 1658 | 1492 | 663  |
| 470.0 | H | 100 | LSR470 / 10H _ 100 | 47.0 | 10 | 1285 | 1156 | 514  |
| 470.0 | H | 200 | LSR470 / 10H _ 200 | 47.0 | 10 | 908  | 817  | 363  |
| 470.0 | Z | 40  | LSR470 / 10Z _ 40  | 47.0 | 10 | 2500 | 2250 | 1000 |
| 470.0 | Z | 60  | LSR470 / 10Z _ 60  | 47.0 | 10 | 2041 | 1837 | 816  |
| 470.0 | Z | 100 | LSR470 / 10Z _ 100 | 47.0 | 10 | 1581 | 1423 | 632  |

### 16 V DC @ 85°C

|      |   |      |                     |     |   |     |     |     |
|------|---|------|---------------------|-----|---|-----|-----|-----|
| 2.2  | A | 1800 | LSR2.2 / 16A _ 1800 | 0.5 | 6 | 204 | 183 | 81  |
| 2.2  | A | 3500 | LSR2.2 / 16A _ 3500 | 0.5 | 6 | 146 | 131 | 59  |
| 3.3  | A | 3500 | LSR3.3 / 16A _ 3500 | 0.5 | 6 | 146 | 131 | 59  |
| 4.7  | A | 2000 | LSR4.7 / 16A _ 2000 | 0.8 | 6 | 194 | 174 | 77  |
| 4.7  | B | 800  | LSR4.7 / 16B _ 800  | 0.8 | 6 | 326 | 293 | 130 |
| 4.7  | B | 1500 | LSR4.7 / 16B _ 1500 | 0.8 | 6 | 238 | 214 | 95  |
| 6.8  | A | 1500 | LSR6.8 / 16A _ 1500 | 1.1 | 6 | 224 | 201 | 89  |
| 6.8  | B | 600  | LSR6.8 / 16B _ 600  | 1.1 | 6 | 376 | 339 | 151 |
| 6.8  | B | 1200 | LSR6.8 / 16B _ 1200 | 1.1 | 6 | 266 | 240 | 106 |
| 10.0 | B | 500  | LSR10 / 16B _ 500   | 1.6 | 6 | 412 | 371 | 165 |
| 10.0 | B | 800  | LSR10 / 16B _ 800   | 1.6 | 6 | 326 | 293 | 130 |
| 10.0 | C | 500  | LSR10 / 16C _ 500   | 1.6 | 6 | 469 | 422 | 188 |
| 15.0 | B | 500  | LSR15 / 16B _ 500   | 2.4 | 6 | 412 | 371 | 165 |
| 15.0 | B | 800  | LSR15 / 16B _ 800   | 2.4 | 6 | 326 | 292 | 130 |
| 22.0 | B | 400  | LSR22 / 16B _ 400   | 3.5 | 6 | 461 | 415 | 184 |
| 22.0 | B | 600  | LSR22 / 16B _ 600   | 3.5 | 6 | 376 | 338 | 150 |
| 22.0 | C | 150  | LSR22 / 16C _ 150   | 3.5 | 6 | 856 | 771 | 343 |
| 22.0 | C | 250  | LSR22 / 16C _ 250   | 3.5 | 6 | 663 | 597 | 265 |
| 22.0 | C | 300  | LSR22 / 16C _ 300   | 3.5 | 6 | 605 | 545 | 242 |
| 22.0 | C | 375  | LSR22 / 16C _ 375   | 3.5 | 6 | 542 | 487 | 217 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>μF<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. mΩ<br>(milliohms) | Nemco Part No. | DCL<br>μA max.<br>(microamps) | tan δ<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|------------------------------------|--------------|-------------------------------------------|----------------|-------------------------------|----------------------|---------------------------------------------------|------|-------|
|                                    |              |                                           |                |                               |                      | 25°C                                              | 85°C | 125°C |

### 16 V DC @ 85°C cont.

|       |   |     |                    |      |    |      |      |      |
|-------|---|-----|--------------------|------|----|------|------|------|
| 33.0  | B | 350 | LSR33 / 16B _ 350  | 5.3  | 8  | 493  | 444  | 197  |
| 33.0  | B | 500 | LSR33 / 16B _ 500  | 5.3  | 8  | 412  | 371  | 165  |
| 33.0  | C | 100 | LSR33 / 16C _ 100  | 5.3  | 6  | 1049 | 944  | 420  |
| 33.0  | C | 150 | LSR33 / 16C _ 150  | 5.3  | 6  | 856  | 771  | 343  |
| 33.0  | C | 225 | LSR33 / 16C _ 225  | 5.3  | 6  | 699  | 629  | 279  |
| 33.0  | C | 300 | LSR33 / 16C _ 300  | 5.3  | 6  | 606  | 545  | 242  |
| 33.0  | D | 200 | LSR33 / 16D _ 200  | 5.3  | 6  | 866  | 779  | 346  |
| 47.0  | C | 110 | LSR47 / 16C _ 110  | 7.5  | 6  | 1000 | 900  | 400  |
| 47.0  | C | 350 | LSR47 / 16C _ 350  | 7.5  | 6  | 561  | 505  | 224  |
| 47.0  | D | 80  | LSR47 / 16D _ 80   | 7.5  | 6  | 1369 | 1232 | 548  |
| 47.0  | D | 100 | LSR47 / 16D _ 100  | 7.5  | 6  | 1225 | 1103 | 490  |
| 47.0  | D | 150 | LSR47 / 16D _ 150  | 7.5  | 6  | 1000 | 900  | 400  |
| 47.0  | D | 200 | LSR47 / 16D _ 200  | 7.5  | 6  | 866  | 775  | 346  |
| 68.0  | C | 125 | LSR68 / 16C _ 125  | 10.9 | 6  | 938  | 844  | 375  |
| 68.0  | C | 200 | LSR68 / 16C _ 200  | 10.9 | 6  | 741  | 667  | 296  |
| 68.0  | D | 70  | LSR68 / 16D _ 70   | 10.9 | 6  | 1464 | 1317 | 586  |
| 68.0  | D | 100 | LSR68 / 16D _ 100  | 10.9 | 6  | 1225 | 1102 | 490  |
| 68.0  | D | 150 | LSR68 / 16D _ 150  | 10.9 | 6  | 1000 | 900  | 400  |
| 100.0 | C | 200 | LSR100 / 16C _ 200 | 16.0 | 6  | 742  | 667  | 297  |
| 100.0 | D | 60  | LSR100 / 16D _ 60  | 16.0 | 6  | 1581 | 1423 | 632  |
| 100.0 | D | 100 | LSR100 / 16D _ 100 | 16.0 | 6  | 1225 | 1102 | 490  |
| 100.0 | D | 125 | LSR100 / 16D _ 125 | 16.0 | 6  | 1095 | 986  | 438  |
| 100.0 | D | 150 | LSR100 / 16D _ 150 | 16.0 | 6  | 1000 | 900  | 400  |
| 100.0 | H | 55  | LSR100 / 16H _ 55  | 16.0 | 6  | 1732 | 1559 | 693  |
| 100.0 | H | 100 | LSR100 / 16H _ 100 | 16.0 | 6  | 1285 | 1156 | 514  |
| 100.0 | H | 125 | LSR100 / 16H _ 125 | 16.0 | 6  | 1149 | 1034 | 460  |
| 100.0 | H | 150 | LSR100 / 16H _ 150 | 16.0 | 6  | 1049 | 944  | 420  |
| 150.0 | D | 60  | LSR150 / 16D _ 60  | 24.0 | 6  | 1581 | 1423 | 632  |
| 150.0 | D | 85  | LSR150 / 16D _ 85  | 24.0 | 6  | 1328 | 1196 | 531  |
| 150.0 | D | 100 | LSR150 / 16D _ 100 | 24.0 | 6  | 1225 | 1103 | 490  |
| 150.0 | D | 125 | LSR150 / 16D _ 125 | 24.0 | 6  | 1095 | 986  | 438  |
| 150.0 | D | 150 | LSR150 / 16D _ 150 | 24.0 | 6  | 1000 | 900  | 400  |
| 150.0 | H | 30  | LSR150 / 16H _ 30  | 24.0 | 6  | 3000 | 2700 | 1200 |
| 150.0 | H | 40  | LSR150 / 16H _ 40  | 24.0 | 6  | 2598 | 2338 | 1039 |
| 150.0 | H | 100 | LSR150 / 16H _ 100 | 24.0 | 6  | 1285 | 1156 | 514  |
| 150.0 | Z | 45  | LSR150 / 16Z _ 45  | 24.0 | 6  | 2357 | 2121 | 943  |
| 150.0 | Z | 75  | LSR150 / 16Z _ 75  | 24.0 | 8  | 1826 | 1643 | 730  |
| 220.0 | H | 25  | LSR220 / 16H _ 25  | 35.2 | 6  | 3286 | 2958 | 1315 |
| 220.0 | H | 40  | LSR220 / 16H _ 40  | 35.2 | 6  | 2598 | 2338 | 1039 |
| 220.0 | H | 100 | LSR220 / 16H _ 100 | 35.2 | 10 | 1285 | 1156 | 514  |
| 220.0 | H | 150 | LSR220 / 16H _ 150 | 35.2 | 10 | 1049 | 944  | 420  |
| 220.0 | Z | 50  | LSR220 / 16Z _ 50  | 35.2 | 8  | 2236 | 2012 | 894  |
| 220.0 | Z | 75  | LSR220 / 16Z _ 75  | 35.2 | 8  | 1825 | 1643 | 730  |
| 220.0 | Z | 100 | LSR220 / 16Z _ 100 | 35.2 | 8  | 1581 | 1423 | 632  |
| 220.0 | Z | 150 | LSR220 / 16Z _ 150 | 35.2 | 8  | 1290 | 1162 | 516  |

### 20 V DC @ 85°C

|     |   |      |                     |     |   |     |     |     |
|-----|---|------|---------------------|-----|---|-----|-----|-----|
| 1.0 | A | 3000 | LSR1 / 20A _ 3000   | 0.5 | 4 | 158 | 142 | 63  |
| 2.2 | A | 3000 | LSR2.2 / 20A _ 3000 | 0.5 | 6 | 158 | 142 | 63  |
| 3.3 | A | 2500 | LSR3.3 / 20A _ 2500 | 0.7 | 6 | 173 | 156 | 69  |
| 3.3 | B | 1300 | LSR3.3 / 20B _ 1300 | 0.7 | 6 | 256 | 230 | 102 |
| 4.7 | A | 1800 | LSR4.7 / 20A _ 1800 | 0.9 | 6 | 204 | 183 | 82  |
| 4.7 | B | 750  | LSR4.7 / 20B _ 750  | 0.9 | 6 | 337 | 303 | 135 |
| 4.7 | B | 1000 | LSR4.7 / 20B _ 1000 | 0.9 | 6 | 292 | 262 | 117 |
| 6.8 | A | 1000 | LSR6.8 / 20A _ 1000 | 1.4 | 6 | 274 | 246 | 110 |
| 6.8 | B | 600  | LSR6.8 / 20B _ 600  | 1.4 | 6 | 376 | 339 | 151 |
| 6.8 | B | 1000 | LSR6.8 / 20B _ 1000 | 1.4 | 6 | 292 | 262 | 117 |
| 6.8 | C | 700  | LSR6.8 / 20C _ 700  | 1.4 | 6 | 396 | 357 | 159 |

\_ Insert tolerance M (±20%) or K(±10%) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 20 V DC @ 85°C cont.

|       |   |      |                    |      |    |      |      |      |
|-------|---|------|--------------------|------|----|------|------|------|
| 10.0  | B | 500  | LSR10 / 20B _ 500  | 2.0  | 6  | 412  | 371  | 165  |
| 10.0  | B | 1000 | LSR10 / 20B _ 1000 | 2.0  | 6  | 292  | 261  | 117  |
| 10.0  | C | 500  | LSR10 / 20C _ 500  | 2.0  | 6  | 469  | 422  | 188  |
| 10.0  | C | 700  | LSR10 / 20C _ 700  | 2.0  | 6  | 396  | 357  | 159  |
| 15.0  | B | 500  | LSR15 / 20B _ 500  | 3.0  | 6  | 412  | 371  | 165  |
| 15.0  | C | 400  | LSR15 / 20C _ 400  | 3.0  | 6  | 524  | 472  | 210  |
| 15.0  | C | 450  | LSR15 / 20C _ 450  | 3.0  | 6  | 494  | 442  | 198  |
| 22.0  | B | 400  | LSR22 / 20B _ 400  | 4.4  | 6  | 461  | 415  | 184  |
| 22.0  | B | 600  | LSR22 / 20B _ 600  | 4.4  | 6  | 376  | 339  | 151  |
| 22.0  | C | 100  | LSR22 / 20C _ 100  | 4.4  | 6  | 1049 | 944  | 420  |
| 22.0  | C | 150  | LSR22 / 20C _ 150  | 4.4  | 6  | 856  | 771  | 343  |
| 22.0  | C | 400  | LSR22 / 20C _ 400  | 4.4  | 6  | 524  | 472  | 210  |
| 22.0  | D | 200  | LSR22 / 20D _ 200  | 4.4  | 6  | 866  | 779  | 346  |
| 22.0  | D | 300  | LSR22 / 20D _ 300  | 4.4  | 6  | 707  | 636  | 283  |
| 33.0  | C | 300  | LSR33 / 20C _ 300  | 6.6  | 6  | 606  | 545  | 242  |
| 33.0  | D | 100  | LSR33 / 20D _ 100  | 6.6  | 6  | 1225 | 1102 | 490  |
| 33.0  | D | 200  | LSR33 / 20D _ 200  | 6.6  | 6  | 866  | 779  | 346  |
| 47.0  | D | 75   | LSR47 / 20D _ 75   | 9.4  | 6  | 1414 | 1273 | 566  |
| 47.0  | D | 100  | LSR47 / 20D _ 100  | 9.4  | 6  | 1225 | 1102 | 490  |
| 47.0  | D | 200  | LSR47 / 20D _ 200  | 9.4  | 6  | 866  | 779  | 346  |
| 47.0  | H | 70   | LSR47 / 20H _ 70   | 9.4  | 6  | 1535 | 1382 | 614  |
| 47.0  | H | 125  | LSR47 / 20H _ 125  | 9.4  | 6  | 1149 | 1034 | 460  |
| 47.0  | H | 150  | LSR47 / 20H _ 150  | 9.4  | 6  | 1049 | 944  | 420  |
| 47.0  | H | 200  | LSR47 / 20H _ 200  | 9.4  | 6  | 908  | 817  | 363  |
| 47.0  | H | 250  | LSR47 / 20H _ 250  | 9.4  | 6  | 812  | 731  | 325  |
| 68.0  | D | 70   | LSR68 / 20D _ 70   | 13.6 | 6  | 1464 | 1317 | 586  |
| 68.0  | D | 150  | LSR68 / 20D _ 150  | 13.6 | 6  | 1000 | 900  | 400  |
| 68.0  | D | 200  | LSR68 / 20D _ 200  | 13.6 | 6  | 866  | 779  | 346  |
| 68.0  | D | 300  | LSR68 / 20D _ 300  | 13.6 | 6  | 707  | 636  | 283  |
| 68.0  | H | 125  | LSR68 / 20H _ 125  | 13.6 | 6  | 1149 | 1034 | 460  |
| 68.0  | H | 150  | LSR68 / 20H _ 150  | 13.6 | 6  | 1049 | 944  | 420  |
| 68.0  | H | 200  | LSR68 / 20H _ 200  | 13.6 | 6  | 908  | 817  | 363  |
| 100.0 | D | 85   | LSR100/ 20D _ 85   | 20.0 | 6  | 1328 | 1196 | 531  |
| 100.0 | D | 100  | LSR100/ 20D _ 100  | 20.0 | 6  | 1225 | 1102 | 490  |
| 100.0 | D | 150  | LSR100/ 20D _ 150  | 20.0 | 6  | 1000 | 900  | 400  |
| 100.0 | H | 35   | LSR100/ 20H _ 35   | 20.0 | 6  | 2777 | 2500 | 1111 |
| 100.0 | H | 45   | LSR100/ 20H _ 45   | 20.0 | 6  | 2449 | 2205 | 980  |
| 100.0 | H | 100  | LSR100/ 20H _ 100  | 20.0 | 6  | 1285 | 1156 | 514  |
| 100.0 | H | 150  | LSR100/ 20H _ 150  | 20.0 | 6  | 1049 | 944  | 420  |
| 100.0 | H | 200  | LSR100/ 20H _ 200  | 20.0 | 6  | 908  | 817  | 363  |
| 100.0 | Z | 60   | LSR100/ 20Z _ 60   | 20.0 | 8  | 2041 | 1837 | 816  |
| 100.0 | Z | 85   | LSR100/ 20Z _ 85   | 20.0 | 8  | 1715 | 1543 | 686  |
| 100.0 | Z | 100  | LSR100/ 20Z _ 100  | 20.0 | 8  | 1581 | 1423 | 632  |
| 100.0 | Z | 200  | LSR100/ 20Z _ 200  | 20.0 | 8  | 1118 | 1005 | 447  |
| 150.0 | H | 35   | LSR150/ 20H _ 35   | 30.0 | 10 | 2777 | 2500 | 1111 |
| 150.0 | Z | 80   | LSR150/ 20Z _ 80   | 30.0 | 8  | 1768 | 1591 | 707  |

### 25 V DC @ 85°C

|      |   |      |                     |     |   |     |     |     |
|------|---|------|---------------------|-----|---|-----|-----|-----|
| 0.47 | A | 7000 | LSR.47 / 25A _ 7000 | 0.5 | 4 | 103 | 93  | 41  |
| 0.68 | A | 6000 | LSR.68 / 25A _ 6000 | 0.5 | 4 | 112 | 101 | 45  |
| 1.5  | A | 3000 | LSR1.5 / 25A _ 3000 | 0.4 | 6 | 158 | 141 | 63  |
| 1.5  | B | 1800 | LSR1.5 / 25B _ 1800 | 0.5 | 6 | 217 | 196 | 87  |
| 2.2  | B | 900  | LSR2.2 / 25B _ 900  | 0.6 | 6 | 307 | 277 | 123 |
| 2.2  | B | 1200 | LSR2.2 / 25B _ 1200 | 0.6 | 6 | 266 | 240 | 106 |
| 2.2  | B | 2500 | LSR2.2 / 25B _ 2500 | 0.6 | 6 | 184 | 166 | 74  |
| 3.3  | A | 1000 | LSR3.3 / 25A _ 1000 | 0.8 | 6 | 274 | 246 | 110 |
| 3.3  | A | 1500 | LSR3.3 / 25A _ 1500 | 0.8 | 6 | 224 | 201 | 89  |
| 3.3  | B | 750  | LSR3.3 / 25B _ 750  | 0.8 | 6 | 337 | 303 | 135 |
| 3.3  | B | 1500 | LSR3.3 / 25B _ 1500 | 0.8 | 6 | 238 | 214 | 95  |
| 3.3  | B | 2000 | LSR3.3 / 25B _ 2000 | 0.8 | 6 | 206 | 186 | 82  |
| 4.7  | B | 700  | LSR4.7 / 25B _ 700  | 1.2 | 6 | 348 | 314 | 139 |
| 4.7  | B | 900  | LSR4.7 / 25B _ 900  | 1.2 | 6 | 307 | 277 | 123 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>μF<br>(microfarads) | Case<br>Size | ESR<br>@ 100KHz<br>max. mΩ<br>(milliohms) | Nemco Part No. | DCL<br>μA max.<br>(microamps) | tan δ<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|------------------------------------|--------------|-------------------------------------------|----------------|-------------------------------|----------------------|---------------------------------------------------|------|-------|
|                                    |              |                                           |                |                               |                      | 25°C                                              | 85°C | 125°C |

### 25 V DC @ 85°C cont.

|       |   |      |                     |      |   |      |      |     |
|-------|---|------|---------------------|------|---|------|------|-----|
| 4.7   | B | 1500 | LSR4.7 / 25B _ 1500 | 1.2  | 6 | 238  | 213  | 95  |
| 6.8   | B | 700  | LSR6.8 / 25B _ 700  | 1.7  | 6 | 348  | 314  | 139 |
| 6.8   | C | 500  | LSR6.8 / 25C _ 500  | 1.7  | 6 | 469  | 422  | 188 |
| 6.8   | C | 600  | LSR6.8 / 25C _ 600  | 1.7  | 6 | 428  | 385  | 171 |
| 6.8   | C | 700  | LSR6.8 / 25C _ 700  | 1.7  | 6 | 396  | 357  | 159 |
| 10.0  | B | 1800 | LSR10 / 25B _ 1800  | 2.5  | 6 | 217  | 196  | 87  |
| 10.0  | C | 300  | LSR10 / 25C _ 300   | 2.5  | 6 | 606  | 545  | 242 |
| 10.0  | C | 500  | LSR10 / 25C _ 500   | 2.5  | 6 | 469  | 420  | 188 |
| 15.0  | C | 220  | LSR15 / 25C _ 220   | 3.8  | 6 | 707  | 636  | 283 |
| 15.0  | C | 300  | LSR15 / 25C _ 300   | 3.8  | 6 | 606  | 545  | 242 |
| 15.0  | D | 100  | LSR15 / 25D _ 100   | 3.8  | 6 | 1225 | 1102 | 490 |
| 15.0  | D | 300  | LSR15 / 25D _ 300   | 3.8  | 6 | 707  | 636  | 283 |
| 22.0  | C | 275  | LSR22 / 25C _ 275   | 5.5  | 6 | 632  | 569  | 253 |
| 22.0  | C | 400  | LSR22 / 25C _ 400   | 5.5  | 6 | 524  | 472  | 210 |
| 22.0  | D | 100  | LSR22 / 25D _ 100   | 5.5  | 6 | 1225 | 1102 | 490 |
| 22.0  | D | 200  | LSR22 / 25D _ 200   | 5.5  | 6 | 866  | 779  | 346 |
| 22.0  | D | 300  | LSR22 / 25D _ 300   | 5.5  | 6 | 707  | 636  | 283 |
| 33.0  | D | 100  | LSR33 / 25D _ 100   | 8.3  | 6 | 1225 | 1102 | 490 |
| 33.0  | D | 200  | LSR33 / 25D _ 200   | 8.3  | 6 | 866  | 779  | 346 |
| 33.0  | D | 300  | LSR33 / 25D _ 300   | 8.3  | 6 | 707  | 636  | 283 |
| 33.0  | H | 100  | LSR33 / 25H _ 100   | 8.3  | 6 | 1285 | 1156 | 514 |
| 33.0  | H | 175  | LSR33 / 25H _ 175   | 8.3  | 6 | 971  | 874  | 388 |
| 33.0  | H | 200  | LSR33 / 25H _ 200   | 8.3  | 6 | 908  | 817  | 363 |
| 33.0  | H | 300  | LSR33 / 25H _ 300   | 8.3  | 6 | 742  | 665  | 297 |
| 47.0  | D | 125  | LSR47 / 25D _ 125   | 11.8 | 6 | 1095 | 986  | 438 |
| 47.0  | D | 150  | LSR47 / 25D _ 150   | 8.3  | 6 | 1000 | 900  | 400 |
| 47.0  | D | 250  | LSR47 / 25D _ 250   | 8.3  | 6 | 775  | 697  | 310 |
| 47.0  | H | 80   | LSR47 / 25H _ 80    | 8.3  | 6 | 1436 | 1293 | 574 |
| 47.0  | H | 100  | LSR47 / 25H _ 100   | 8.3  | 6 | 1285 | 1156 | 514 |
| 47.0  | H | 125  | LSR47 / 25H _ 125   | 8.3  | 6 | 1149 | 1034 | 460 |
| 68.0  | H | 45   | LSR68 / 25H _ 45    | 17.0 | 6 | 2449 | 2205 | 980 |
| 68.0  | H | 55   | LSR68 / 25H _ 55    | 17.0 | 6 | 2216 | 1994 | 886 |
| 68.0  | H | 125  | LSR68 / 25H _ 125   | 17.0 | 6 | 1149 | 1034 | 459 |
| 68.0  | H | 200  | LSR68 / 25H _ 200   | 17.0 | 6 | 908  | 817  | 363 |
| 68.0  | Z | 80   | LSR68 / 25Z _ 80    | 17.0 | 6 | 1768 | 1591 | 707 |
| 68.0  | Z | 95   | LSR68 / 25Z _ 95    | 17.0 | 8 | 1622 | 1460 | 649 |
| 68.0  | Z | 150  | LSR68 / 25Z _ 150   | 17.0 | 8 | 1291 | 1162 | 516 |
| 68.0  | Z | 200  | LSR68 / 25Z _ 200   | 17.0 | 6 | 1118 | 1006 | 447 |
| 100.0 | Z | 100  | LSR100 / 25Z _ 100  | 25.0 | 8 | 1581 | 1423 | 632 |

### 35 V DC @ 85°C

|      |   |      |                     |     |   |     |     |     |
|------|---|------|---------------------|-----|---|-----|-----|-----|
| 0.22 | A | 6000 | LSR.22 / 35A _ 6000 | 0.5 | 4 | 112 | 101 | 45  |
| 0.33 | A | 6000 | LSR.33 / 35A _ 6000 | 0.5 | 4 | 112 | 101 | 45  |
| 0.47 | A | 6000 | LSR.47 / 35A _ 6000 | 0.5 | 4 | 112 | 101 | 45  |
| 0.47 | B | 4000 | LSR.47 / 35B _ 4000 | 0.5 | 4 | 146 | 131 | 58  |
| 0.68 | A | 6000 | LSR.68 / 35A _ 6000 | 0.5 | 4 | 112 | 101 | 45  |
| 1.0  | A | 3000 | LSR1 / 35A _ 3000   | 0.5 | 4 | 158 | 142 | 63  |
| 1.0  | B | 2000 | LSR1 / 35B _ 2000   | 0.5 | 4 | 206 | 186 | 82  |
| 1.5  | B | 2500 | LSR1.5 / 35B _ 2500 | 0.5 | 6 | 184 | 166 | 74  |
| 2.2  | A | 1500 | LSR2.2 / 35A _ 1500 | 0.8 | 6 | 224 | 201 | 89  |
| 2.2  | B | 750  | LSR2.2 / 35B _ 750  | 0.8 | 6 | 337 | 303 | 135 |
| 2.2  | B | 1500 | LSR2.2 / 35B _ 1500 | 0.8 | 6 | 238 | 214 | 95  |
| 2.2  | B | 2000 | LSR2.2 / 35B _ 2000 | 0.8 | 6 | 206 | 186 | 82  |
| 2.2  | C | 1000 | LSR2.2 / 35C _ 1000 | 0.8 | 6 | 332 | 298 | 133 |
| 3.3  | B | 1000 | LSR3.3 / 35B _ 1000 | 1.2 | 6 | 292 | 262 | 117 |
| 3.3  | C | 700  | LSR3.3 / 35C _ 700  | 1.2 | 6 | 396 | 357 | 159 |
| 4.7  | B | 700  | LSR4.7 / 35B _ 700  | 1.2 | 6 | 348 | 314 | 139 |
| 4.7  | B | 1500 | LSR4.7 / 35B _ 1500 | 1.6 | 6 | 238 | 213 | 95  |
| 4.7  | C | 600  | LSR4.7 / 35C _ 600  | 1.6 | 6 | 428 | 383 | 171 |
| 4.7  | D | 700  | LSR4.7 / 35DC _ 700 | 1.6 | 6 | 463 | 417 | 185 |

\_ Insert tolerance M (±20%) or K (±10%) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 35 V DC @ 85°C cont.

|      |   |     |                    |      |   |      |      |     |
|------|---|-----|--------------------|------|---|------|------|-----|
| 6.8  | C | 350 | LSR6.8 / 35C _ 350 | 2.4  | 6 | 561  | 505  | 224 |
| 6.8  | D | 150 | LSR6.8 / 35D _ 150 | 2.4  | 6 | 1000 | 900  | 400 |
| 6.8  | D | 400 | LSR6.8 / 35D _ 400 | 2.4  | 6 | 612  | 551  | 245 |
| 6.8  | D | 500 | LSR6.8 / 35D _ 500 | 2.4  | 6 | 548  | 493  | 219 |
| 10.0 | D | 125 | LSR10 / 35D _ 125  | 3.5  | 6 | 1095 | 986  | 438 |
| 10.0 | D | 300 | LSR10 / 35D _ 300  | 3.5  | 6 | 707  | 636  | 283 |
| 10.0 | H | 200 | LSR10 / 35H _ 200  | 3.5  | 6 | 908  | 817  | 363 |
| 15.0 | C | 350 | LSR15 / 35C _ 350  | 5.3  | 6 | 561  | 505  | 224 |
| 15.0 | C | 450 | LSR15 / 35C _ 450  | 5.3  | 6 | 494  | 445  | 198 |
| 15.0 | D | 100 | LSR15 / 35D _ 100  | 5.3  | 6 | 1225 | 1102 | 490 |
| 15.0 | D | 300 | LSR15 / 35D _ 300  | 5.3  | 6 | 707  | 636  | 283 |
| 22.0 | D | 125 | LSR22 / 35D _ 125  | 7.7  | 6 | 1095 | 986  | 438 |
| 22.0 | D | 200 | LSR22 / 35D _ 200  | 7.7  | 6 | 866  | 779  | 346 |
| 22.0 | D | 300 | LSR22 / 35D _ 300  | 7.7  | 6 | 707  | 636  | 283 |
| 22.0 | D | 400 | LSR22 / 35D _ 400  | 7.7  | 6 | 612  | 551  | 245 |
| 22.0 | H | 60  | LSR22 / 35H _ 60   | 8.0  | 6 | 2121 | 1909 | 849 |
| 22.0 | H | 100 | LSR22 / 35H _ 100  | 7.7  | 6 | 1643 | 1479 | 657 |
| 22.0 | H | 125 | LSR22 / 35H _ 125  | 7.7  | 6 | 1149 | 1034 | 460 |
| 22.0 | H | 200 | LSR22 / 35H _ 200  | 7.7  | 6 | 908  | 817  | 363 |
| 22.0 | H | 300 | LSR22 / 35H _ 300  | 7.7  | 6 | 742  | 665  | 297 |
| 33.0 | D | 200 | LSR33 / 35D _ 200  | 11.6 | 6 | 866  | 779  | 346 |
| 33.0 | D | 300 | LSR33 / 35D _ 300  | 11.6 | 6 | 707  | 636  | 283 |
| 33.0 | H | 50  | LSR33 / 35H _ 50   | 12.0 | 6 | 2324 | 2091 | 930 |
| 33.0 | H | 65  | LSR33 / 35H _ 65   | 12.0 | 6 | 2038 | 1834 | 815 |
| 33.0 | H | 100 | LSR33 / 35H _ 100  | 11.6 | 6 | 1285 | 1156 | 514 |
| 33.0 | H | 250 | LSR33 / 35H _ 250  | 11.6 | 6 | 812  | 731  | 325 |
| 33.0 | H | 300 | LSR33 / 35H _ 300  | 11.6 | 6 | 742  | 667  | 297 |
| 33.0 | Z | 200 | LSR33 / 35Z _ 200  | 11.6 | 6 | 1118 | 1006 | 447 |
| 47.0 | H | 55  | LSR47 / 35H _ 55   | 16.0 | 6 | 2216 | 1994 | 886 |
| 47.0 | H | 65  | LSR47 / 35H _ 65   | 16.0 | 6 | 2038 | 1834 | 815 |
| 47.0 | H | 200 | LSR47 / 35H _ 200  | 16.5 | 6 | 908  | 817  | 363 |
| 47.0 | H | 250 | LSR47 / 35H _ 250  | 16.5 | 6 | 812  | 731  | 325 |
| 47.0 | Z | 150 | LSR47 / 35Z _ 150  | 16.5 | 6 | 1291 | 1162 | 516 |
| 47.0 | Z | 200 | LSR47 / 35Z _ 200  | 16.5 | 6 | 1118 | 1006 | 447 |
| 68.0 | Z | 150 | LSR68 / 35Z _ 150  | 23.8 | 6 | 1291 | 1162 | 516 |
| 68.0 | Z | 200 | LSR68 / 35Z _ 200  | 23.8 | 6 | 1118 | 1006 | 447 |

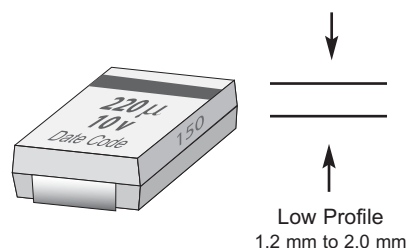
### 50 V DC @ 85°C

|      |   |      |                     |      |   |      |      |     |
|------|---|------|---------------------|------|---|------|------|-----|
| 0.15 | A | 9000 | LSR.15 / 50A _ 9000 | 0.5  | 4 | 91   | 82   | 36  |
| 0.22 | A | 7000 | LSR.22 / 50A _ 7000 | 0.5  | 4 | 103  | 93   | 41  |
| 0.47 | C | 2300 | LSR.47 / 50C _ 2300 | 0.5  | 4 | 219  | 197  | 87  |
| 1.0  | C | 2500 | LSR1 / 50C _ 2500   | 0.5  | 4 | 210  | 189  | 84  |
| 1.5  | C | 1500 | LSR1.5 / 50C _ 1500 | 0.8  | 6 | 271  | 243  | 108 |
| 1.5  | C | 2000 | LSR1.5 / 50C _ 2000 | 0.8  | 6 | 234  | 211  | 94  |
| 2.2  | D | 1200 | LSR2.2 / 50D _ 1200 | 1.1  | 6 | 354  | 318  | 141 |
| 3.3  | D | 800  | LSR3.3 / 50D _ 800  | 1.7  | 6 | 433  | 390  | 173 |
| 4.7  | D | 300  | LSR4.7 / 50D _ 300  | 2.4  | 6 | 707  | 636  | 283 |
| 4.7  | D | 500  | LSR4.7 / 50D _ 500  | 2.4  | 6 | 548  | 493  | 219 |
| 4.7  | D | 700  | LSR4.7 / 50D _ 700  | 2.4  | 6 | 463  | 417  | 185 |
| 6.8  | D | 200  | LSR6.8 / 50D _ 200  | 3.4  | 6 | 866  | 779  | 346 |
| 6.8  | D | 300  | LSR6.8 / 50D _ 300  | 3.4  | 6 | 707  | 636  | 283 |
| 6.8  | D | 500  | LSR6.8 / 50D _ 500  | 3.4  | 6 | 548  | 493  | 219 |
| 6.8  | D | 600  | LSR6.8 / 50D _ 600  | 3.4  | 6 | 500  | 450  | 200 |
| 10.0 | H | 120  | LSR10 / 50H _ 120   | 5.0  | 6 | 1500 | 1350 | 600 |
| 10.0 | H | 400  | LSR10 / 50H _ 400   | 5.0  | 6 | 642  | 578  | 257 |
| 10.0 | H | 500  | LSR10 / 50H _ 500   | 5.0  | 6 | 574  | 517  | 230 |
| 15.0 | H | 75   | LSR15 / 50H _ 75    | 7.5  | 6 | 1897 | 1708 | 759 |
| 15.0 | H | 100  | LSR15 / 50H _ 100   | 7.5  | 6 | 1643 | 1479 | 657 |
| 15.0 | H | 250  | LSR15 / 50H _ 250   | 7.5  | 6 | 812  | 731  | 325 |
| 15.0 | Z | 250  | LSR15 / 50Z _ 250   | 7.5  | 6 | 1000 | 900  | 400 |
| 22.0 | H | 75   | LSR22 / 50H _ 75    | 11.0 | 8 | 1897 | 1708 | 759 |
| 22.0 | H | 100  | LSR22 / 50H _ 100   | 11.0 | 8 | 1643 | 1479 | 657 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## Low Profile - Low ESR



### FEATURES

- **Lead-free, RoHS compliant**
- Low Profile Heights. Excellent for PCMCIA applications.
- Very Low Equivalent Series Resistance (ESR), Ideal for Power Supplies
- High ripple and surge current capability
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- Pre-conditioned, surge current tested for maximum robustness
- Capacitance range: 1.0  $\mu\text{f}$  to 330  $\mu\text{f}$
- Voltage range: 4 to 20 WVDC
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Precision molded case with flat surfaces for vacuum pick-up
- Laser marking and bold videcon - readable polarity stripe
- Compliant terminations
- Glue pad on underside for bonding to circuit board prior to soldering
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1

Nemco LSR (Low Equivalent Series Resistance) surface mount tantalum capacitors are specifically designed for those applications such as POWER SUPPLIES requiring the highest level of robustness available to tantalum capacitor technology. These devices have inherently low ESR due to special manufacturing process and powder technology improvements. They are capable of handling higher ripple currents than standard product. The benefits of using Nemco LSR Series components are its capability to handle higher ripple currents producing lower ripple voltage output and less power dissipation resulting in less heating.

After manufacturing, parts are conditioned by being subjected to an elevated temperature overvoltage burn-in, applied for a minimum of 2 hours. Parts are monitored on a 100% basis for DCL at elevated temperatures. Parts are then subjected to a low impedance surge current. Surge current testing is performed on a 100% basis. Each capacitor is individually monitored. All devices undergo 100% test for capacitance, dissipation factor, DCL, and ESR at 100 kHz to LSR requirements.



Lead Free



RoHS  
compliant

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 4 V DC @ 85°C

|       |    |      |                    |     |   |      |      |     |
|-------|----|------|--------------------|-----|---|------|------|-----|
| 10.0  | XL | 3000 | LSR10 / 4XL _ 3000 | 0.5 | 6 | 135  | 122  | 54  |
| 100.0 | CL | 100  | LSR100 / 4CL _ 100 | 4.0 | 6 | 949  | 854  | 379 |
| 220.0 | DL | 40   | LSR220 / 4DL _ 40  | 8.8 | 8 | 1768 | 1591 | 707 |
| 220.0 | DL | 75   | LSR220 / 4DL _ 75  | 8.8 | 8 | 1291 | 1162 | 516 |

### 6.3 V DC @ 85°C

|       |    |      |                     |      |    |      |      |      |
|-------|----|------|---------------------|------|----|------|------|------|
| 2.2   | XL | 7000 | LSR2.2 / 6XL _ 7000 | 0.5  | 6  | 88   | 79   | 35   |
| 4.7   | AL | 4000 | LSR4.7 / 6AL _ 4000 | 0.5  | 6  | 127  | 115  | 51   |
| 10.0  | XL | 1000 | LSR10 / 6XL _ 1000  | 0.6  | 8  | 235  | 211  | 94   |
| 10.0  | XL | 1500 | LSR10 / 6XL _ 1500  | 0.6  | 8  | 191  | 172  | 76   |
| 10.0  | XL | 3000 | LSR10 / 6XL _ 3000  | 0.6  | 8  | 135  | 122  | 49   |
| 10.0  | BL | 1000 | LSR10 / 6BL _ 1000  | 0.6  | 6  | 283  | 255  | 113  |
| 22.0  | AL | 900  | LSR22 / 6AL _ 900   | 1.4  | 8  | 269  | 242  | 107  |
| 33.0  | BL | 800  | LSR33 / 6BL _ 800   | 2.1  | 10 | 316  | 285  | 126  |
| 47.0  | BL | 1200 | LSR47 / 6BL _ 1200  | 2.8  | 10 | 258  | 232  | 103  |
| 68.0  | CL | 110  | LSR68 / 6CL _ 110   | 4.3  | 6  | 905  | 814  | 362  |
| 68.0  | CL | 125  | LSR68 / 6CL _ 125   | 4.3  | 6  | 849  | 764  | 339  |
| 68.0  | CL | 250  | LSR68 / 6CL _ 250   | 4.3  | 6  | 600  | 540  | 240  |
| 100.0 | CL | 100  | LSR100 / 6CL _ 100  | 6.3  | 6  | 949  | 854  | 379  |
| 100.0 | CL | 150  | LSR100 / 6CL _ 150  | 6.3  | 6  | 775  | 697  | 310  |
| 100.0 | DL | 100  | LSR100 / 6DL _ 100  | 6.3  | 6  | 1118 | 1006 | 447  |
| 150.0 | DL | 40   | LSR150 / 6DL _ 40   | 9.5  | 6  | 1768 | 1591 | 707  |
| 220.0 | DL | 30   | LSR220 / 6DL _ 30   | 13.2 | 6  | 2646 | 2381 | 1058 |
| 220.0 | DL | 100  | LSR220 / 6DL _ 100  | 13.9 | 8  | 1118 | 1006 | 447  |
| 220.0 | DL | 150  | LSR220 / 6DL _ 150  | 13.9 | 10 | 913  | 822  | 365  |
| 330.0 | DL | 100  | LSR330 / 6DL _ 100  | 20.8 | 12 | 1118 | 1006 | 447  |
| 330.0 | DL | 150  | LSR330 / 6DL _ 150  | 20.8 | 12 | 913  | 822  | 365  |
| 470.0 | DL | 150  | LSR470 / 6DL _ 150  | 28.2 | 20 | 913  | 822  | 365  |

### 10 V DC @ 85°C

|       |    |      |                      |      |    |      |      |     |
|-------|----|------|----------------------|------|----|------|------|-----|
| 1.0   | XL | 9000 | LSR1 / 10XL _ 9000   | 0.5  | 4  | 78   | 70   | 31  |
| 3.3   | BL | 1500 | LSR3.3 / 10BL _ 1500 | 0.5  | 6  | 231  | 208  | 92  |
| 4.7   | XL | 3000 | LSR4.7 / 10XL _ 3000 | 0.5  | 6  | 135  | 122  | 54  |
| 4.7   | XL | 5000 | LSR4.7 / 10XL _ 5000 | 0.5  | 6  | 105  | 94   | 42  |
| 6.8   | BL | 1800 | LSR6.8 / 10BL _ 1800 | 0.7  | 6  | 211  | 189  | 84  |
| 10.0  | BL | 1000 | LSR10 / 10BL _ 1000  | 1.0  | 6  | 283  | 254  | 113 |
| 10.0  | BL | 2000 | LSR10 / 10BL _ 2000  | 1.0  | 6  | 200  | 180  | 80  |
| 15.0  | BL | 1200 | LSR15 / 10BL _ 1200  | 1.5  | 8  | 258  | 232  | 103 |
| 22.0  | BL | 800  | LSR22 / 10BL _ 800   | 2.2  | 8  | 316  | 284  | 126 |
| 33.0  | CL | 350  | LSR33 / 10CL _ 350   | 3.3  | 6  | 507  | 456  | 203 |
| 47.0  | CL | 125  | LSR47 / 10CL _ 125   | 4.7  | 6  | 849  | 764  | 339 |
| 47.0  | CL | 150  | LSR47 / 10CL _ 150   | 4.7  | 6  | 775  | 697  | 310 |
| 47.0  | CL | 250  | LSR47 / 10CL _ 250   | 4.7  | 6  | 600  | 540  | 240 |
| 68.0  | CL | 100  | LSR68 / 10CL _ 100   | 6.8  | 6  | 949  | 854  | 379 |
| 68.0  | CL | 150  | LSR68 / 10CL _ 150   | 6.8  | 6  | 775  | 697  | 310 |
| 68.0  | DL | 100  | LSR68 / 10DL _ 100   | 6.8  | 6  | 1118 | 1006 | 447 |
| 68.0  | DL | 200  | LSR68 / 10DL _ 200   | 6.8  | 6  | 791  | 712  | 316 |
| 100.0 | CL | 150  | LSR100 / 10CL _ 150  | 10.0 | 6  | 775  | 697  | 310 |
| 100.0 | DL | 45   | LSR100 / 10DL _ 45   | 15.0 | 8  | 2160 | 1944 | 864 |
| 100.0 | DL | 100  | LSR100 / 10DL _ 100  | 10.0 | 6  | 1118 | 1006 | 447 |
| 100.0 | DL | 150  | LSR100 / 10DL _ 150  | 10.0 | 6  | 913  | 822  | 365 |
| 100.0 | DL | 200  | LSR100 / 10DL _ 200  | 10.0 | 6  | 791  | 712  | 316 |
| 150.0 | DL | 100  | LSR150 / 10DL _ 100  | 15.0 | 6  | 1118 | 1006 | 447 |
| 150.0 | DL | 150  | LSR150 / 10DL _ 150  | 15.0 | 6  | 913  | 822  | 365 |
| 150.0 | DL | 200  | LSR150 / 10DL _ 200  | 15.0 | 6  | 791  | 712  | 316 |
| 220.0 | DL | 150  | LSR220 / 10DL _ 150  | 15.0 | 10 | 912  | 822  | 364 |
| 220.0 | DL | 200  | LSR220 / 10DL _ 200  | 15.0 | 10 | 791  | 712  | 316 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>$\mu\text{F}$<br>(microfarads) | Case<br>Size | ESR<br>@ 100Khz<br>max. $\text{m}\Omega$<br>(milliohms) | Nemco Part No. | DCL<br>$\mu\text{A}$ max.<br>(microamps) | tan $\delta$<br>max.<br>(%) | Max. Ripple Current<br>@ 100kHz mA<br>(milliamps) |      |       |
|-----------------------------------------------|--------------|---------------------------------------------------------|----------------|------------------------------------------|-----------------------------|---------------------------------------------------|------|-------|
|                                               |              |                                                         |                |                                          |                             | 25°C                                              | 85°C | 125°C |

### 16 V DC @ 85°C

|       |    |      |                      |      |    |      |      |     |
|-------|----|------|----------------------|------|----|------|------|-----|
| 2.2   | BL | 2000 | LSR2.2 / 16BL _ 2000 | 0.5  | 6  | 200  | 180  | 80  |
| 10.0  | BL | 800  | LSR10 / 16BL _ 800   | 1.6  | 8  | 316  | 284  | 126 |
| 10.0  | BL | 1000 | LSR10 / 16BL _ 1000  | 1.6  | 8  | 283  | 255  | 113 |
| 10.0  | CL | 500  | LSR10 / 16CL _ 500   | 1.6  | 6  | 424  | 382  | 170 |
| 10.0  | CL | 600  | LSR10 / 16CL _ 600   | 1.6  | 6  | 387  | 349  | 155 |
| 22.0  | CL | 500  | LSR22 / 16CL _ 500   | 3.5  | 6  | 424  | 382  | 170 |
| 33.0  | CL | 140  | LSR33 / 16CL _ 140   | 5.3  | 6  | 802  | 722  | 321 |
| 33.0  | CL | 175  | LSR33 / 16CL _ 175   | 5.3  | 6  | 717  | 646  | 287 |
| 33.0  | CL | 250  | LSR33 / 16CL _ 250   | 5.3  | 6  | 600  | 540  | 240 |
| 33.0  | CL | 400  | LSR33 / 16CL _ 400   | 5.3  | 6  | 474  | 427  | 189 |
| 33.0  | CL | 500  | LSR33 / 16CL _ 500   | 5.3  | 6  | 424  | 381  | 169 |
| 33.0  | DL | 300  | LSR33 / 16DL _ 300   | 5.3  | 6  | 645  | 580  | 258 |
| 33.0  | DL | 400  | LSR33 / 16DL _ 400   | 5.3  | 6  | 559  | 503  | 224 |
| 47.0  | CL | 200  | LSR47 / 16CL _ 200   | 7.5  | 6  | 671  | 604  | 268 |
| 47.0  | DL | 250  | LSR47 / 16DL _ 250   | 7.5  | 6  | 707  | 636  | 283 |
| 68.0  | DL | 150  | LSR68 / 16DL _ 150   | 10.9 | 6  | 913  | 822  | 365 |
| 68.0  | DL | 200  | LSR68 / 16DL _ 200   | 10.8 | 6  | 791  | 712  | 316 |
| 68.0  | DL | 250  | LSR68 / 16DL _ 250   | 10.8 | 6  | 707  | 636  | 283 |
| 100.0 | DL | 100  | LSR100 / 16DL _ 100  | 16.0 | 8  | 1118 | 1006 | 447 |
| 100.0 | DL | 150  | LSR100 / 16DL _ 150  | 16.0 | 8  | 913  | 822  | 365 |
| 100.0 | DL | 200  | LSR100 / 16DL _ 200  | 16.0 | 8  | 791  | 712  | 316 |
| 150.0 | DL | 200  | LSR150 / 16DL _ 200  | 24.0 | 15 | 791  | 712  | 316 |

### 20 V DC @ 85°C

|      |    |      |                    |     |   |     |     |     |
|------|----|------|--------------------|-----|---|-----|-----|-----|
| 1.0  | XL | 6000 | LSR1 / 20XL _ 6000 | 0.5 | 4 | 96  | 86  | 38  |
| 1.0  | AL | 6000 | LSR1 / 20AL _ 6000 | 0.5 | 4 | 104 | 93  | 42  |
| 1.0  | BL | 2000 | LSR1 / 20BL _ 2000 | 0.5 | 4 | 200 | 180 | 80  |
| 10.0 | CL | 500  | LSR10 / 20CL _ 500 | 2.0 | 6 | 424 | 382 | 170 |

### 25 V DC @ 85°C

|      |    |      |                    |     |   |     |     |     |
|------|----|------|--------------------|-----|---|-----|-----|-----|
| 1.0  | XL | 2500 | LSR1 / 25XL _ 2500 | 0.5 | 4 | 148 | 133 | 59  |
| 1.0  | XL | 4000 | LSR1 / 25XL _ 4000 | 0.5 | 4 | 117 | 106 | 47  |
| 33.0 | DL | 200  | LSR33 / 25DL _ 200 | 8.3 | 6 | 791 | 712 | 316 |

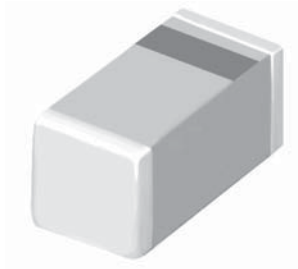
### 35 V DC @ 85°C

|      |    |     |                    |     |   |     |     |     |
|------|----|-----|--------------------|-----|---|-----|-----|-----|
| 10.0 | DL | 250 | LSR10 / 35DL _ 250 | 3.5 | 6 | 707 | 636 | 283 |
| 15.0 | DL | 250 | LSR15 / 35DL _ 250 | 5.3 | 6 | 707 | 636 | 283 |
| 22.0 | DL | 200 | LSR22 / 35DL _ 200 | 7.7 | 6 | 791 | 712 | 316 |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## Miniature Surface Mount Tantalum Capacitors



**0603  
footprint  
case size  
R**



**0402  
footprint  
case size  
P**

### FEATURES

- **0402 footprint - Nemco case size P**
- **0603 footprint - Nemco case size R**
- Lead-free
- RoHS compliant
- Capacitance range: 0.47  $\mu\text{f}$  to 22  $\mu\text{f}$
- Voltage range: 2 to 16 WVDC
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- Surge tested for maximum robustness
- Laser marking polarity stripe
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1



**Lead Free**



**RoHS  
compliant**

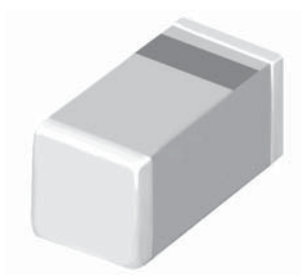
| Capacitance (μF)                    | Case Size | Nemco Part No.     | DCL (μA) max. | tan δ max. (%) | ESR @ 100kHz max. mΩ |
|-------------------------------------|-----------|--------------------|---------------|----------------|----------------------|
| <b>0402 FOOTPRINT / CASE SIZE P</b> |           |                    |               |                |                      |
| <b>2 V DC @ 85°C</b>                |           |                    |               |                |                      |
| 3.3                                 | P         | MCT3.3 / 2PM15000  | 0.5           | 8              | 15000                |
| 4.7                                 | P         | MCT4.7 / 2PM15000  | 0.5           | 12             | 15000                |
| 6.8                                 | P         | MCT6.8 / 2PM15000  | 0.5           | 6              | 15000                |
| 10.0                                | P         | MCT10 / 2PM15000   | 0.5           | 15             | 15000                |
| <b>3 V DC @ 85°C</b>                |           |                    |               |                |                      |
| 2.2                                 | P         | MCT2.2 / 3PM15000  | 0.5           | 6              | 15000                |
| 3.3                                 | P         | MCT3.3 / 3PM15000  | 0.5           | 8              | 15000                |
| 4.7                                 | P         | MCT4.7 / 3PM 8000  | 0.5           | 12             | 8000                 |
| 4.7                                 | P         | MCT4.7 / 3PM15000  | 0.5           | 12             | 15000                |
| <b>6.3 V DC @ 85°C</b>              |           |                    |               |                |                      |
| 1.0                                 | P         | MCT1.0 / 6PM15000  | 0.5           | 6              | 15000                |
| 2.2                                 | P         | MCT2.2 / 6PM 8000  | 0.5           | 8              | 8000                 |
| 2.2                                 | P         | MCT2.2 / 6PM15000  | 0.5           | 8              | 15000                |
| <b>10 V DC @ 85°C</b>               |           |                    |               |                |                      |
| 0.47                                | P         | MCT.47 / 10PM15000 | 0.5           | 6              | 15000                |
| 0.68                                | P         | MCT.68 / 10PM15000 | 0.5           | 8              | 15000                |
| 1.0                                 | P         | MCT1 / 10PM15000   | 0.5           | 6              | 15000                |
| <b>20 V DC @ 85°C</b>               |           |                    |               |                |                      |
| 0.1                                 | P         | MCT.1 / 10PM15000  | 0.5           | 6              | 15000                |

| Capacitance (μF)                    | Case Size | Nemco Part No.    | DCL (μA) max. | tan δ max. (%) | ESR @ 100kHz max. mΩ |
|-------------------------------------|-----------|-------------------|---------------|----------------|----------------------|
| <b>0603 FOOTPRINT / CASE SIZE R</b> |           |                   |               |                |                      |
| <b>2 V DC @ 85°C</b>                |           |                   |               |                |                      |
| 3.3                                 | R         | MCT3.3 / 2RM7500  | 0.5           | 6              | 7500                 |
| 4.7                                 | R         | MCT4.7 / 2RM7500  | 0.5           | 6              | 7500                 |
| 6.8                                 | R         | MCT6.8 / 2RM7500  | 0.5           | 6              | 7500                 |
| 10.0                                | R         | MCT10 / 2RM7500   | 0.5           | 10             | 7500                 |
| <b>3 V DC @ 85°C</b>                |           |                   |               |                |                      |
| 2.2                                 | R         | MCT2.2 / 3RM7500  | 0.5           | 6              | 7500                 |
| 3.3                                 | R         | MCT3.3 / 3RM7500  | 0.5           | 6              | 7500                 |
| 4.7                                 | R         | MCT4.7 / 3RM7500  | 0.5           | 6              | 7500                 |
| 6.8                                 | R         | MCT6.8 / 3RM7500  | 0.5           | 6              | 7500                 |
| 10.0                                | R         | MCT10 / 3RM7500   | 0.5           | 10             | 7500                 |
| 22.0                                | R         | MCT22 / 3RM7500   | 0.7           | 20             | 7500                 |
| <b>4 V DC @ 85°C</b>                |           |                   |               |                |                      |
| 1.5                                 | R         | MCT1.5 / 4RM7500  | 0.5           | 6              | 7500                 |
| 2.2                                 | R         | MCT2.2 / 4RM7500  | 0.5           | 6              | 7500                 |
| 3.3                                 | R         | MCT3.3 / 4RM7500  | 0.5           | 6              | 7500                 |
| 4.7                                 | R         | MCT4.7 / 4RM7500  | 0.5           | 6              | 7500                 |
| 6.8                                 | R         | MCT6.8 / 4RM7500  | 0.5           | 8              | 7500                 |
| 10.0                                | R         | MCT10 / 4RM7500   | 0.5           | 10             | 7500                 |
| 15.0                                | R         | MCT15 / 4RM7500   | 0.6           | 20             | 7500                 |
| 22.0                                | R         | MCT22 / 4RM5000   | 0.9           | 6              | 5000                 |
| 22.0                                | R         | MCT22 / 4RM7500   | 0.9           | 20             | 7500                 |
| <b>5 V DC @ 85°C</b>                |           |                   |               |                |                      |
| 22.0                                | R         | MCT22 / 5RM7500   | 1.1           | 20             | 7500                 |
| <b>6.3 V DC @ 85°C</b>              |           |                   |               |                |                      |
| 1.0                                 | R         | MCT1 / 6RM7500    | 0.5           | 6              | 7500                 |
| 1.5                                 | R         | MCT1.5 / 6RM7500  | 0.5           | 6              | 7500                 |
| 2.2                                 | R         | MCT2.2 / 6RM7500  | 0.5           | 6              | 7500                 |
| 3.3                                 | R         | MCT3.3 / 6RM7500  | 0.5           | 6              | 7500                 |
| 4.7                                 | R         | MCT4.7 / 6RM7500  | 0.5           | 8              | 7500                 |
| 6.8                                 | R         | MCT6.8 / 6RM7500  | 0.5           | 10             | 7500                 |
| 10.0                                | R         | MCT10 / 6RM6000   | 0.6           | 10             | 6000                 |
| 10.0                                | R         | MCT10 / 6RM4000   | 0.6           | 10             | 4000                 |
| 15.0                                | R         | MCT15 / 6RM7500   | 0.9           | 20             | 7500                 |
| <b>10 V DC @ 85°C</b>               |           |                   |               |                |                      |
| 0.47                                | R         | MCT.47 / 10RM7500 | 0.5           | 6              | 7500                 |
| 0.68                                | R         | MCT.68 / 10RM7500 | 0.5           | 6              | 7500                 |
| 1.0                                 | R         | MCT1 / 10RM7500   | 0.5           | 6              | 7500                 |
| 1.5                                 | R         | MCT1.5 / 10RM7500 | 0.5           | 6              | 7500                 |
| 2.2                                 | R         | MCT2.2 / 10RM7500 | 0.5           | 6              | 7500                 |
| 3.3                                 | R         | MCT3.3 / 10RM7500 | 0.5           | 8              | 7500                 |
| 3.3                                 | R         | MCT3.3 / 10RM5000 | 0.5           | 8              | 5000                 |
| 4.7                                 | R         | MCT4.7 / 10RM6000 | 0.5           | 10             | 6000                 |
| 4.7                                 | R         | MCT4.7 / 10RM5000 | 0.5           | 10             | 5000                 |
| 6.8                                 | R         | MCT6.8 / 10RM7500 | 0.7           | 20             | 7500                 |
| 10.0                                | R         | MCT10 / 10RM7500  | 1.0           | 20             | 7500                 |
| 10.0                                | R         | MCT10 / 10RM4000  | 1.0           | 20             | 4000                 |
| <b>16 V DC @ 85°C</b>               |           |                   |               |                |                      |
| 0.47                                | R         | MCT.47 / 16RM7500 | 0.5           | 6              | 7500                 |
| 0.68                                | R         | MCT.68 / 16RM7500 | 0.5           | 6              | 7500                 |
| 1.0                                 | R         | MCT1 / 16RM7500   | 0.5           | 6              | 7500                 |
| 2.2                                 | R         | MCT2.2 / 16RM7500 | 0.5           | 10             | 7500                 |

Available in M (± 20%) tolerance only.

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

## Consumer Grade Surface Mount Tantalum Capacitors



**0603  
footprint  
case size  
R**



**0402  
footprint  
case size  
P**

### FEATURES

- **0402 footprint (EIA 1005-07) - Nemco case size P**
- **0603 footprint (EIA 1608-10) - Nemco case size R**
- Capacitance range: 0.47  $\mu\text{f}$  to 47  $\mu\text{f}$
- Voltage range: 2 to 25 WVDC
- Operating temperature range -55°C to +125°C,  
linear derating above +40°C to 0.5 x  $V_r$  at +85°C and 0.2 x  $V_r$  at +125°C
- Meets or exceeds EIA 535 BAAC and IECQ standards (QC300801/US0001, IS - 28)
- Laser marking polarity stripe
- Encapsulant material satisfies the UL 94 VO flammability classification
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 3
- Reliability .2% per 1000 hours at 85°C, 0.5x $V_r$  with 0.1ohm/V series impedance with 60% confidence level



**Lead Free**



**RoHS  
compliant**

| Capacitance<br>(μF) | Case<br>Size | Nemco Part No. | DCL<br>(μA) max. | ESR @ 100kHz<br>max. mΩ |
|---------------------|--------------|----------------|------------------|-------------------------|
|---------------------|--------------|----------------|------------------|-------------------------|

## 0402 FOOTPRINT (EIA 1005-07) - CASE SIZE P

|                        |   |                    |     |       |
|------------------------|---|--------------------|-----|-------|
| <b>2 V DC @ 40°C</b>   |   |                    |     |       |
| 3.3                    | P | CGT3.3 / 2PM15000  | 0.5 | 15000 |
| 4.7                    | P | CGT4.7 / 2PM15000  | 0.5 | 15000 |
| 10.0                   | P | CGT10 / 2PM15000   | 0.5 | 15000 |
| <b>3 V DC @ 40°C</b>   |   |                    |     |       |
| 2.2                    | P | CGT2.2 / 3PM15000  | 0.5 | 15000 |
| 3.3                    | P | CGT3.3 / 3PM15000  | 0.5 | 15000 |
| 4.7                    | P | CGT4.7 / 3PM15000  | 0.5 | 15000 |
| 6.8                    | P | CGT6.8 / 3PM15000  | 0.5 | 15000 |
| 10.0                   | P | CGT10 / 3PM15000   | 0.5 | 15000 |
| <b>4 V DC @ 40°C</b>   |   |                    |     |       |
| 4.7                    | P | CGT4.7 / 4PM15000  | 0.5 | 15000 |
| 6.8                    | P | CGT6.8 / 4PM15000  | 0.5 | 15000 |
| 10.0                   | P | CGT10 / 4PM15000   | 0.5 | 15000 |
| <b>6.3 V DC @ 40°C</b> |   |                    |     |       |
| 1.0                    | P | CGT1.0 / 6PM15000  | 0.5 | 15000 |
| 2.2                    | P | CGT2.2 / 6PM15000  | 0.5 | 15000 |
| 4.7                    | P | CGT4.7 / 6PM15000  | 0.5 | 15000 |
| 10.0                   | P | CGT10 / 6PM15000   | 0.5 | 15000 |
| <b>10 V DC @ 40°C</b>  |   |                    |     |       |
| 0.47                   | P | CGT.47 / 10PM15000 | 0.5 | 15000 |
| 0.68                   | P | CGT.68 / 10PM15000 | 0.5 | 15000 |
| 1.0                    | P | CGT1 / 10PM15000   | 0.5 | 15000 |
| 2.2                    | P | CGT2.2 / 10PM15000 | 0.5 | 15000 |
| <b>16 V DC @ 40°C</b>  |   |                    |     |       |
| 0.47                   | P | CGT.47 / 16PM15000 | 0.5 | 15000 |

## 0603 FOOTPRINT (EIA 1608-10) - CASE SIZE R

|                      |   |                  |     |      |
|----------------------|---|------------------|-----|------|
| <b>2 V DC @ 40°C</b> |   |                  |     |      |
| 3.3                  | R | CGT3.3 / 2RM7500 | 0.5 | 7500 |
| 4.7                  | R | CGT4.7 / 2RM7500 | 0.5 | 7500 |
| 6.8                  | R | CGT6.8 / 2RM7500 | 0.5 | 7500 |
| 10.0                 | R | CGT10 / 2RM7500  | 0.5 | 7500 |
| 47.0                 | R | CGT47 / 2RM7500  | 0.9 | 7500 |
| <b>3 V DC @ 40°C</b> |   |                  |     |      |
| 2.2                  | R | CGT2.2 / 3RM7500 | 0.5 | 7500 |
| 3.3                  | R | CGT3.3 / 3RM7500 | 0.5 | 7500 |
| 4.7                  | R | CGT4.7 / 3RM7500 | 0.5 | 7500 |
| 6.8                  | R | CGT6.8 / 3RM7500 | 0.5 | 7500 |
| 10.0                 | R | CGT10 / 3RM7500  | 0.5 | 7500 |
| 22.0                 | R | CGT22 / 3RM7500  | 0.7 | 7500 |
| 47.0                 | R | CGT47 / 3RM7500  | 1.4 | 7500 |
| <b>4 V DC @ 40°C</b> |   |                  |     |      |
| 1.5                  | R | CGT1.5 / 4RM7500 | 0.5 | 7500 |
| 2.2                  | R | CGT2.2 / 4RM7500 | 0.5 | 7500 |
| 3.3                  | R | CGT3.3 / 4RM7500 | 0.5 | 7500 |
| 4.7                  | R | CGT4.7 / 4RM7500 | 0.5 | 7500 |
| 6.8                  | R | CGT6.8 / 4RM7500 | 0.5 | 7500 |
| 10.0                 | R | CGT10 / 4RM7500  | 0.5 | 7500 |
| 15.0                 | R | CGT15 / 4RM7500  | 0.6 | 7500 |
| 22.0                 | R | CGT22 / 4RM7500  | 0.9 | 7500 |
| 33.0                 | R | CGT33 / 4RM7500  | 1.3 | 7500 |
| 47.0                 | R | CGT47 / 4RM7500  | 1.9 | 7500 |

| Capacitance<br>(μF) | Case<br>Size | Nemco Part No. | DCL<br>(μA) max. | ESR @ 100kHz<br>max. mΩ |
|---------------------|--------------|----------------|------------------|-------------------------|
|---------------------|--------------|----------------|------------------|-------------------------|

## 0603 FOOTPRINT (EIA 1608-10) - CASE SIZE R

|                        |   |                   |     |      |
|------------------------|---|-------------------|-----|------|
| <b>6.3 V DC @ 40°C</b> |   |                   |     |      |
| 1.0                    | R | CGT1 / 6RM7500    | 0.5 | 7500 |
| 1.5                    | R | CGT1.5 / 6RM7500  | 0.5 | 7500 |
| 2.2                    | R | CGT2.2 / 6RM7500  | 0.5 | 7500 |
| 3.3                    | R | CGT3.3 / 6RM7500  | 0.5 | 7500 |
| 4.7                    | R | CGT4.7 / 6RM7500  | 0.5 | 7500 |
| 6.8                    | R | CGT6.8 / 6RM7500  | 0.5 | 7500 |
| 10.0                   | R | CGT10 / 6RM7500   | 0.6 | 7500 |
| 10.0                   | R | CGT10 / 6RM6000   | 0.6 | 6000 |
| 10.0                   | R | CGT10 / 6RM4000   | 0.6 | 4000 |
| 15.0                   | R | CGT15 / 6RM7500   | 0.9 | 7500 |
| 22.0                   | R | CGT22 / 6RM7500   | 1.4 | 7500 |
| 33.0                   | R | CGT33 / 6RM7500   | 2.1 | 7500 |
| <b>10 V DC @ 40°C</b>  |   |                   |     |      |
| 0.47                   | R | CGT.47 / 10RM7500 | 0.5 | 7500 |
| 0.68                   | R | CGT.68 / 10RM7500 | 0.5 | 7500 |
| 1.0                    | R | CGT1 / 10RM7500   | 0.5 | 7500 |
| 1.5                    | R | CGT1.5 / 10RM7500 | 0.5 | 7500 |
| 2.2                    | R | CGT2.2 / 10RM7500 | 0.5 | 7500 |
| 3.3                    | R | CGT3.3 / 10RM7500 | 0.5 | 7500 |
| 3.3                    | R | CGT3.3 / 10RM5000 | 0.5 | 5000 |
| 4.7                    | R | CGT4.7 / 10RM7500 | 0.5 | 7500 |
| 4.7                    | R | CGT4.7 / 10RM6000 | 0.5 | 6000 |
| 4.7                    | R | CGT4.7 / 10RM5000 | 0.5 | 5000 |
| 6.8                    | R | CGT6.8 / 10RM7500 | 0.7 | 7500 |
| 10.0                   | R | CGT10 / 10RM7500  | 1.0 | 7500 |
| 10.0                   | R | CGT10 / 10RM4000  | 1.0 | 4000 |
| 15.0                   | R | CGT15 / 10RM7500  | 1.5 | 7500 |
| 22.0                   | R | CGT22 / 10RM7500  | 2.2 | 7500 |
| <b>16 V DC @ 40°C</b>  |   |                   |     |      |
| 0.33                   | R | CGT.33 / 16RM7500 | 0.5 | 7500 |
| 0.47                   | R | CGT.47 / 16RM7500 | 0.5 | 7500 |
| 0.68                   | R | CGT.68 / 16RM7500 | 0.5 | 7500 |
| 1.0                    | R | CGT1 / 16RM7500   | 0.5 | 7500 |
| 2.2                    | R | CGT2.2 / 16RM7500 | 0.5 | 7500 |
| 3.3                    | R | CGT3.3 / 16RM7500 | 0.5 | 7500 |
| <b>20 V DC @ 40°C</b>  |   |                   |     |      |
| 1.0                    | R | CGT1.0 / 20RM7500 | 0.5 | 7500 |
| 2.2                    | R | CGT2.2 / 20RM7500 | 0.5 | 7500 |
| <b>25 V DC @ 40°C</b>  |   |                   |     |      |
| 0.33                   | R | CGT.33 / 25RM7500 | 0.5 | 7500 |
| 1.0                    | R | CGT1.0 / 25RM7500 | 0.5 | 7500 |

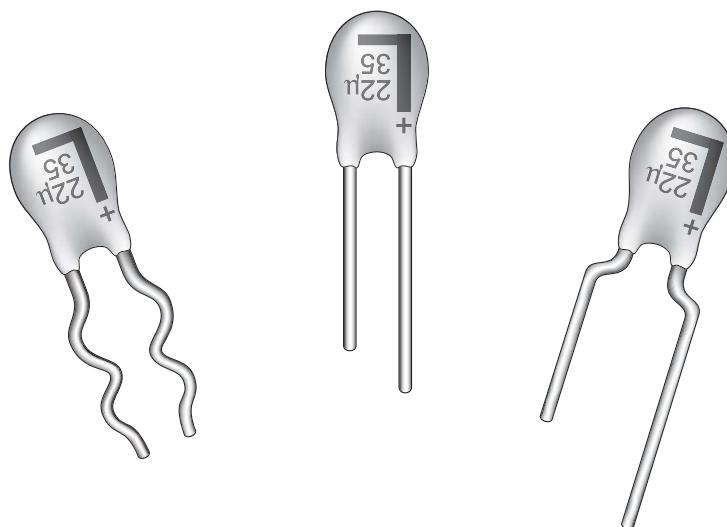
Available in M ( $\pm 20\%$ ) tolerance only.

NEMCO reserves the right to supply a higher voltage rating, tighter tolerance and / or lower ESR in the same case size, to the same reliability standards.

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## Dipped Tantalum Capacitors



### FEATURES

- Reliable, solid tantalum construction
- Small size per C/V combination
- Capacitance range: 0.1  $\mu\text{f}$  to 330  $\mu\text{f}$
- Voltage range: 6.3 to 50 WVDC
- Surge tested for maximum robustness
- Operating temperature range -55°C to +125°C, 2/3 x Vr (linear derating) above +85°C
- Meniscus control eliminates thru-hole plugging for excellent top side solder joints
- Laser marking and bold polarity stripe
- Supplied bulk or available packaged for auto insertion
- Flame retardant, self extinguishing epoxy coating meets UL94 VO
- Lead cutting and forming is available
- Lead-free and RoHS compliant
- MSL (moisture sensitivity level) per IPC/Jedec J-STD-020B is level 1

**Lead Free****RoHS  
compliant**

## PART NUMBERS & SPECIFICATIONS

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | tan $\delta$<br>max.<br>(%) | ESR<br>@ 100Khz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|

### 6.3 V DC @ 85°C

|       |   |               |      |    |      |
|-------|---|---------------|------|----|------|
| 3.3   | A | TB3.3 / 6 _ 1 | 0.5  | 6  | 13.0 |
| 4.7   | A | TB4.7 / 6 _ 1 | 0.5  | 6  | 10.0 |
| 6.8   | A | TB6.8 / 6 _ 1 | 0.5  | 6  | 8.0  |
| 10.0  | B | TB10 / 6 _ 1  | 0.5  | 8  | 6.0  |
| 15.0  | C | TB15 / 6 _ 1  | 0.8  | 8  | 5.0  |
| 22.0  | D | TB22 / 6 _ 1  | 1.1  | 8  | 3.7  |
| 33.0  | E | TB33 / 6 _ 1  | 1.7  | 8  | 3.0  |
| 47.0  | F | TB47 / 6 _ 1  | 2.4  | 8  | 2.0  |
| 68.0  | G | TB68 / 6 _ 1  | 3.4  | 8  | 1.8  |
| 100.0 | H | TB100 / 6 _ 1 | 5.0  | 10 | 1.6  |
| 150.0 | K | TB150 / 6 _ 2 | 7.6  | 10 | 0.9  |
| 220.0 | M | TB220 / 6 _ 2 | 11.0 | 10 | 0.9  |
| 330.0 | N | TB330 / 6 _ 2 | 16.6 | 10 | 0.7  |

### 10 V DC @ 85°C

|       |   |                |      |    |      |
|-------|---|----------------|------|----|------|
| 2.2   | A | TB2.2 / 10 _ 1 | 0.5  | 6  | 13.0 |
| 3.3   | A | TB3.3 / 10 _ 1 | 0.5  | 6  | 10.0 |
| 4.7   | A | TB4.7 / 10 _ 1 | 0.5  | 6  | 8.0  |
| 6.8   | B | TB6.8 / 10 _ 1 | 0.5  | 6  | 6.0  |
| 10.0  | C | TB10 / 10 _ 1  | 0.8  | 8  | 5.0  |
| 15.0  | D | TB15 / 10 _ 1  | 1.2  | 8  | 3.7  |
| 22.0  | E | TB22 / 10 _ 1  | 1.7  | 8  | 2.7  |
| 33.0  | F | TB33 / 10 _ 1  | 2.6  | 8  | 2.1  |
| 47.0  | G | TB47 / 10 _ 1  | 3.7  | 8  | 1.7  |
| 68.0  | H | TB68 / 10 _ 1  | 5.4  | 8  | 1.3  |
| 100.0 | K | TB100 / 10 _ 2 | 8.0  | 10 | 1.0  |
| 150.0 | N | TB150 / 10 _ 2 | 12.0 | 10 | 0.8  |
| 220.0 | O | TB220 / 10 _ 2 | 17.6 | 10 | 0.6  |
| 330.0 | O | TB330 / 10 _ 2 | 20.0 | 10 | 0.5  |

### 16 V DC @ 85°C

|       |   |                |      |    |      |
|-------|---|----------------|------|----|------|
| 1.5   | A | TB1.5 / 16 _ 1 | 0.5  | 4  | 10.0 |
| 2.2   | A | TB2.2 / 16 _ 1 | 0.5  | 6  | 8.0  |
| 3.3   | A | TB3.3 / 16 _ 1 | 0.5  | 6  | 6.0  |
| 4.7   | B | TB4.7 / 16 _ 1 | 0.6  | 6  | 5.0  |
| 6.8   | C | TB6.8 / 16 _ 1 | 0.8  | 6  | 4.0  |
| 10.0  | D | TB10 / 16 _ 1  | 1.2  | 8  | 3.2  |
| 15.0  | E | TB15 / 16 _ 1  | 1.9  | 8  | 2.5  |
| 22.0  | F | TB22 / 16 _ 1  | 2.8  | 8  | 2.0  |
| 33.0  | F | TB33 / 16 _ 1  | 4.2  | 8  | 1.6  |
| 47.0  | H | TB47 / 16 _ 1  | 6.0  | 8  | 1.3  |
| 68.0  | L | TB68 / 16 _ 2  | 8.7  | 8  | 1.0  |
| 100.0 | M | TB100 / 16 _ 2 | 12.8 | 10 | 0.8  |
| 150.0 | N | TB150 / 16 _ 2 | 19.2 | 10 | 0.6  |
| 220.0 | O | TB220 / 16 _ 2 | 20.0 | 10 | 0.5  |

### 20 V DC @ 85°C

|      |   |                |     |   |     |
|------|---|----------------|-----|---|-----|
| 1.5  | A | TB1.5 / 20 _ 1 | 0.5 | 4 | 9.0 |
| 2.2  | A | TB2.2 / 20 _ 1 | 0.5 | 6 | 7.0 |
| 3.3  | B | TB3.3 / 20 _ 1 | 0.5 | 6 | 5.5 |
| 4.7  | C | TB4.7 / 20 _ 1 | 0.7 | 6 | 4.5 |
| 6.8  | D | TB6.8 / 20 _ 1 | 1.0 | 6 | 3.6 |
| 10.0 | E | TB10 / 20 _ 1  | 1.6 | 8 | 2.9 |
| 15.0 | F | TB15 / 20 _ 1  | 2.4 | 8 | 2.3 |

| Capacitance<br>( $\mu$ F) | Case<br>Size | Nemco Part No. | DCL<br>( $\mu$ A) max. | tan $\delta$<br>max.<br>(%) | ESR<br>@ 100Khz<br>max. ( $\Omega$ ) |
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|
|---------------------------|--------------|----------------|------------------------|-----------------------------|--------------------------------------|

### 20 V DC @ 85°C Continued

|     |   |                |      |    |     |
|-----|---|----------------|------|----|-----|
| 22  | H | TB22 / 20 _ 1  | 3.5  | 8  | 1.8 |
| 33  | J | TB33 / 20 _ 2  | 5.2  | 8  | 1.4 |
| 47  | K | TB47 / 20 _ 2  | 7.5  | 8  | 1.2 |
| 68  | N | TB68 / 20 _ 2  | 10.8 | 8  | 0.9 |
| 100 | N | TB100 / 20 _ 2 | 16.0 | 10 | 0.6 |

### 25 V DC @ 85°C

|      |   |                |      |   |     |
|------|---|----------------|------|---|-----|
| 1.5  | A | TB1.5 / 25 _ 1 | 0.5  | 4 | 8.0 |
| 2.2  | A | TB2.2 / 25 _ 1 | 0.5  | 6 | 6.0 |
| 3.3  | B | TB3.3 / 25 _ 1 | 0.6  | 6 | 5.0 |
| 4.7  | C | TB4.7 / 25 _ 1 | 0.9  | 6 | 4.0 |
| 6.8  | D | TB6.8 / 25 _ 1 | 1.3  | 6 | 3.1 |
| 10.0 | E | TB10 / 25 _ 1  | 2.0  | 8 | 2.5 |
| 15.0 | F | TB15 / 25 _ 1  | 3.0  | 8 | 2.0 |
| 22.0 | H | TB22 / 25 _ 1  | 4.4  | 8 | 1.5 |
| 33.0 | J | TB33 / 25 _ 2  | 6.6  | 8 | 1.2 |
| 47.0 | M | TB47 / 25 _ 2  | 9.4  | 8 | 1.0 |
| 68.0 | N | TB68 / 25 _ 2  | 13.6 | 8 | 0.8 |

### 35 V DC @ 85°C

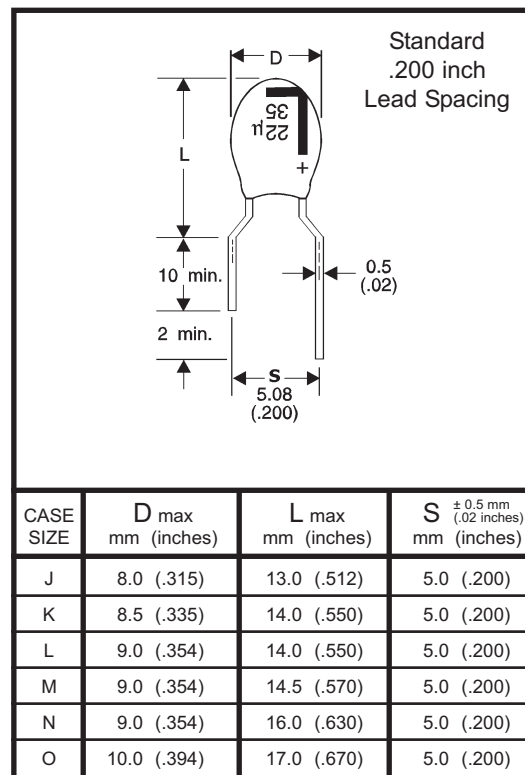
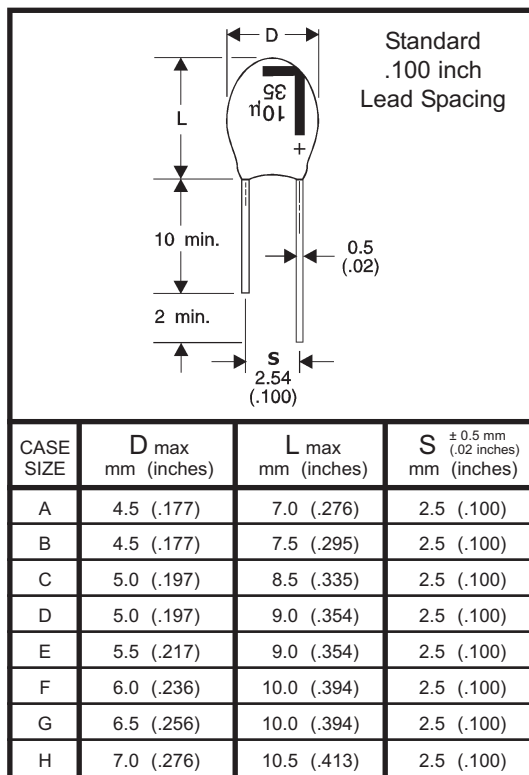
|      |   |                |      |   |      |
|------|---|----------------|------|---|------|
| 0.1  | A | TB.1 / 35 _ 1  | 0.5  | 4 | 26.0 |
| 0.15 | A | TB.15 / 35 _ 1 | 0.5  | 4 | 21.0 |
| 0.22 | A | TB.22 / 35 _ 1 | 0.5  | 4 | 17.0 |
| 0.33 | A | TB.33 / 35 _ 1 | 0.5  | 4 | 15.0 |
| 0.47 | A | TB.47 / 35 _ 1 | 0.5  | 4 | 13.0 |
| 0.68 | A | TB.68 / 35 _ 1 | 0.5  | 4 | 10.0 |
| 1.0  | A | TB1 / 35 _ 1   | 0.5  | 4 | 8.0  |
| 1.5  | A | TB1.5 / 35 _ 1 | 0.5  | 4 | 6.0  |
| 2.2  | B | TB2.2 / 35 _ 1 | 0.6  | 6 | 5.0  |
| 3.3  | C | TB3.3 / 35 _ 1 | 0.9  | 6 | 4.0  |
| 4.7  | E | TB4.7 / 35 _ 1 | 1.3  | 6 | 3.0  |
| 6.8  | F | TB6.8 / 35 _ 1 | 1.9  | 6 | 2.5  |
| 10.0 | F | TB10 / 35 _ 1  | 2.8  | 8 | 2.0  |
| 15.0 | H | TB15 / 35 _ 1  | 4.2  | 8 | 1.6  |
| 22.0 | K | TB22 / 35 _ 2  | 6.1  | 8 | 1.3  |
| 33.0 | M | TB33 / 35 _ 2  | 9.2  | 8 | 1.0  |
| 47.0 | N | TB47 / 35 _ 2  | 10.0 | 8 | 0.8  |

### 50 V DC @ 85°C

|      |   |                |     |   |      |
|------|---|----------------|-----|---|------|
| 0.1  | A | TB.1 / 50 _ 1  | 0.5 | 4 | 26.0 |
| 0.15 | A | TB.15 / 50 _ 1 | 0.5 | 4 | 21.0 |
| 0.22 | A | TB.22 / 50 _ 1 | 0.5 | 4 | 17.0 |
| 0.33 | A | TB.33 / 50 _ 1 | 0.5 | 4 | 15.0 |
| 0.47 | A | TB.47 / 50 _ 1 | 0.5 | 4 | 13.0 |
| 0.68 | B | TB.68 / 50 _ 1 | 0.5 | 4 | 10.0 |
| 1.0  | C | TB1 / 50 _ 1   | 0.5 | 4 | 8.0  |
| 1.5  | D | TB1.5 / 50 _ 1 | 0.6 | 4 | 5.0  |
| 2.2  | E | TB2.2 / 50 _ 1 | 0.8 | 6 | 3.5  |
| 3.3  | F | TB3.3 / 50 _ 1 | 1.3 | 6 | 3.0  |
| 4.7  | G | TB4.7 / 50 _ 1 | 1.8 | 6 | 2.5  |
| 6.8  | H | TB6.8 / 50 _ 1 | 2.7 | 6 | 2.0  |
| 10.0 | J | TB10 / 50 _ 2  | 4.0 | 8 | 1.6  |
| 15.0 | K | TB15 / 50 _ 2  | 6.0 | 8 | 1.2  |

\_ Insert tolerance M ( $\pm 20\%$ ) or K ( $\pm 10\%$ ) to complete the Nemco part number

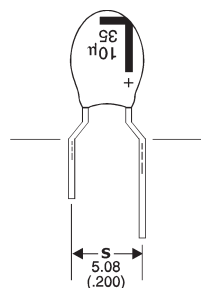
## Standard Dimensions and Lead Spacings



NOTE: Industry standard lead spacings and lead styles shown above are a function of physical case size. Case sizes are determined by the capacitance value and voltage combination.

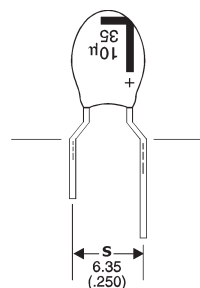
## Optional Lead Styles

.200 inch Lead Spacing



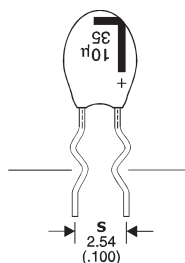
Available in  
Case Sizes A - H  
P/N Suffix Code 2

.250 inch Lead Spacing



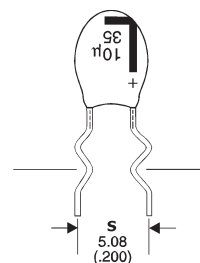
Available in  
Case Sizes A - O  
P/N Suffix Code 250

.100 inch Lead Spacing  
Snap-In



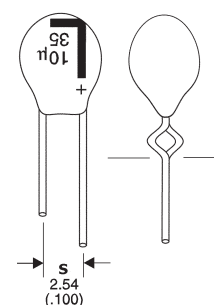
Available in  
Case Sizes A - H  
P/N Suffix Code E1  
Available in Bulk Only

.200 inch Lead Spacing  
Snap-In



Available in  
Case Sizes A - H  
P/N Suffix Code E2  
Available in Bulk Only

.100 inch Lead Spacing  
Back to Back form



Available in  
Case Sizes A - H  
P/N Suffix Code F

NOTE: Seated component heights for optional lead styles will vary based on case size. Contact your Nemco sales representative for samples of optional lead styles.

# Tips for Design and Use

Catalog data relates to an ambient temperature of +25°C measured at 125 Hz, 0.5V RMS unless otherwise specified.

**Substitutions** of higher voltage ratings, lower ESR values, tighter capacitance tolerances and higher temperature rated devices will increase performance and reliability.

## Advantages of tantalum capacitors are:

- High volumetric efficiency.
- Stable electrical performance over temperature (T.C. 12%).
- Operating temperature range –55°C to +125°C, 2/3 Vr (linear derating) above +85°C, CGT series is derated above +40°C.
- Better frequency characteristics than aluminum electrolytics.
- Self-Healing, no wear out mechanism. No degradation in performance or reliability.
- No limitation on shelf life.

**Surge voltages** may be applied up to ten times in an hour for periods up to 30 seconds at a time. They are not intended for continuous operation and should not be used as a parameter for design. See table below.

| Rated Working Voltage +85°C | Surge Voltage +85°C | Derated DC Voltage +125°C | Surge Voltage +125°C |
|-----------------------------|---------------------|---------------------------|----------------------|
| 2                           | 2.7                 | 1.3                       | 1.7                  |
| 3                           | 3.9                 | 2.0                       | 2.6                  |
| 4                           | 5.2                 | 2.7                       | 3.2                  |
| 5                           | 6.5                 | 3.3                       | 4.0                  |
| 6                           | 8                   | 4                         | 5                    |
| 10                          | 13                  | 7                         | 8                    |
| 16                          | 20                  | 10                        | 12                   |
| 20                          | 26                  | 13                        | 16                   |
| 25                          | 32                  | 17                        | 20                   |
| 35                          | 46                  | 23                        | 28                   |
| 50                          | 65                  | 33                        | 40                   |

**Voltage derating improves the operating reliability of a tantalum capacitor.** Select a higher voltage rated part (30% to 70%) than the maximum line voltage. In the case of low impedance circuits, the tantalum capacitor is likely to be stressed by current surges. In circuits which undergo rapid charge/discharge, a protective resistor of 1.0 ohm per applied volt is recommended. If this is impossible, a voltage-derating factor of up to 70% is recommended. A combination of tantalum capacitors can be connected in series to increase working voltage of the equivalent capacitor. In many power supply topologies where the di/dt through the capacitor is limited, such as most implementations of buck (current mode), forward converter and flyback, the requirement for series resistance is decreased to 0.1 ohm per applied volt. This level of resistance is used as a basis for the series resistance variable in a 1%/1000 hours 60% confidence level reference. This is what steady state life tests are based on. Certain test circuits such as ICT are likely to subject the capacitor to large voltage and current transients, which will not be seen in normal use. This should be taken into account when considering the capacitors rated voltage.

A small amount of reverse voltage is permissible for short periods. It is not intended to cover continuous operation.

## Maximum reverse voltages are:

|        |                                             |
|--------|---------------------------------------------|
| +25°C  | 10% of rated voltage not exceeding 1.0 volt |
| +85°C  | 3% of rated voltage not exceeding 0.5 volt  |
| +125°C | 1% of rated voltage not exceeding 0.1 volt  |

**Tantalum capacitors are polar devices.** A non-polar effect can be created by connecting two devices, arranged back-to-back (- to -). The capacitance value of each part should be twice the required capacitance value, equal tolerance and rated voltage. For example, two PCT10/35DK devices connected in a back-to-back configuration would result in a non-polar 5uF, 35volt device.

**In DC-DC converters**, the input side is typically fed from voltage sources, which are not regulated and are of nominally low impedance. This type of application severely stresses the capacitor. A higher than normal failure rate level may be experienced. Maximum voltage derating and use of low ESR devices is recommended.

## Higher capacitances and even lower ESR

Values can be achieved by connecting tantalum capacitors in parallel.

## Electrostatic Discharge

Tantalum capacitors demonstrate no sensitivity to ESD.

**Flammability** UL Rating UL94 VO, Oxygen Index 35%. Epoxy, Hysol MG 33.

**Ripple current ratings** for all devices can be calculated. For 25°C ripple current ratings, take the square root of the part's free air maximum power dissipation in watts (from the table below) divided by the maximum ESR rating of the component listed in the catalog in ohms (where applicable, convert milliohm values to ohms). Apply the temperature correction factor for temperature above 25°C.

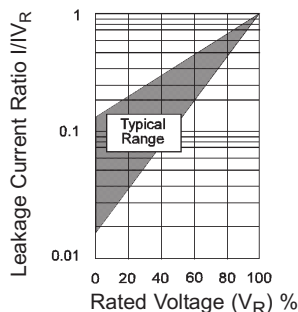
$$I_{RMS} = \sqrt{\frac{\text{Power Rating (MAX Watts)}}{\text{ESR (MAX Ohms)}}} \cdot \text{Temperature Correction Factor}$$

85°C = 0.90  
125°C = 0.40

| Surface Mount Tantalums |                                    |                                                                                                                                           |        |
|-------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Case Size               | Free Air Max Power Dissipation (W) | Temperature Derating Factors for power dissipation by case size                                                                           |        |
| A                       | 0.075                              | Do not use these derating factors when calculating ripple current ratings. Use temperature correction factors shown in the formula above. |        |
| B                       | 0.085                              |                                                                                                                                           |        |
| C                       | 0.110                              |                                                                                                                                           |        |
| D                       | 0.150                              |                                                                                                                                           |        |
| H                       | 0.165                              |                                                                                                                                           |        |
| Z                       | 0.250                              |                                                                                                                                           |        |
|                         |                                    | Temp °C                                                                                                                                   | Factor |
|                         |                                    | +25                                                                                                                                       | 1.00   |
|                         |                                    | +85                                                                                                                                       | 0.80   |
|                         |                                    | +125                                                                                                                                      | 0.16   |
| XL                      | 0.055                              |                                                                                                                                           |        |
| AL                      | 0.065                              |                                                                                                                                           |        |
| BL                      | 0.080                              |                                                                                                                                           |        |
| CL                      | 0.090                              |                                                                                                                                           |        |
| DL                      | 0.125                              |                                                                                                                                           |        |
| P                       | 0.015                              |                                                                                                                                           |        |
| R                       | 0.025                              |                                                                                                                                           |        |

| Dipped Radial |                                    |                                                                                                                                           |        |
|---------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Case Size     | Free Air Max Power Dissipation (W) | Temperature Derating Factors for power dissipation by case size                                                                           |        |
| A             | 0.045                              | Do not use these derating factors when calculating ripple current ratings. Use temperature correction factors shown in the formula above. |        |
| B             | 0.050                              |                                                                                                                                           |        |
| C             | 0.055                              |                                                                                                                                           |        |
| D             | 0.060                              |                                                                                                                                           |        |
| E             | 0.065                              |                                                                                                                                           |        |
| F             | 0.075                              |                                                                                                                                           |        |
|               |                                    | Temp °C                                                                                                                                   | Factor |
| G             | 0.080                              | +25                                                                                                                                       | 1.00   |
| H             | 0.085                              | +85                                                                                                                                       | 0.40   |
| J             | 0.090                              | +125                                                                                                                                      | 0.09   |
| K             | 0.100                              |                                                                                                                                           |        |
| L             | 0.110                              |                                                                                                                                           |        |
| M             | 0.120                              |                                                                                                                                           |        |
| N             | 0.130                              |                                                                                                                                           |        |
| O             | 0.140                              |                                                                                                                                           |        |

**DC Leakage current** is dependent on the voltage applied, elapsed time of voltage applied and temperature. Leakage current is measured after 3-5 minutes application of the rated voltage at +20°C. Leakage current increases with higher temperatures and can be mitigated by increasing the voltage rating of the part. Leakage current drops rapidly below the parts initial value when reduced voltages are applied. Voltage derating of the component has the effect of decreasing leakage as shown in the graph below. This will also give a significant increase in the reliability of the part for any application.



### Self Inductance Value (ESL) for surface mount devices

The self inductance value can be important for resonance frequency evaluation. This table shows typical ESL values per case size.

| Self Inductance Value (ESL) |                                    |
|-----------------------------|------------------------------------|
| Case Size                   | Typical Self Inductance Value (nH) |
| A                           | 1.8                                |
| B                           | 1.8                                |
| C                           | 2.2                                |
| D                           | 2.4                                |
| H                           | 2.5                                |
| Z                           | 2.4                                |
| XL                          | 1.4                                |
| AL                          | 1.8                                |
| BL                          | 1.8                                |
| CL                          | 2.2                                |
| DL                          | 2.4                                |
| P                           | 1.1                                |
| R                           | 1.2                                |

**There are several important general soldering considerations for tantalum capacitors.**

- Soldering temperature and time should be the minimum for a good connection.
- Recommended soldering profiles are designed to insure that the temperature of the internal construction of the capacitors does not exceed +220°C.
- Positioning capacitors near components radiating heat such as power transistors should be avoided.
- Allow for an increase to ESR ratings of 1.25 x catalog limit post PCB assembly.

**Lead-free RoHS compliant, 100% Sn termination finish**

Legislation is being developed worldwide to reduce the lead content and other hazardous substances in electronic products. This will reduce the environmental impact when such products are discarded. Nemco products are lead-free devices which meet RoHS requirements. Optional suffix codes have been added to our part numbering system so either 90/10 Sn/Pb or 100% Sn (lead-free) can be specified. The following general information applies to lead-free surface mount devices.

**IR reflow**

Pre-heating: 150°C +/- 15°C / 60-90s

Maximum peak temperature: 240°C - 260°C, 250°C max recommended, 10 seconds maximum time at peak, 3 reflow cycles.

Ramp rate: 2-3°C/sec.

Maximum time (cumulative) above 230°C 40 seconds.

Cool down should not be forced. 6°C/sec. is recommended.

**Wave soldering**

**PCT, LSR, MCT and CGT:** Maximum peak temperature: 250°C - 260°C for 3-5 seconds max (250°C max recommended)

**TB:** Maximum peak temperature: 230°C - 250°C for 3-5 seconds max (240°C max recommended)

All other parameters remain the same as for IR reflow.

**Hand soldering**

Soldering iron tip diameter: select to fit application

Maximum tip temperature: +370°C

Maximum exposure time: 3 seconds

Apply heat to pad, not the terminations.

**Recommended solder alloy for reflow: SnAgCu**

lead-free (100% Sn) termination finish is compatible with all common lead-free solder pastes including SnCu, SnCuAgBi, etc.

**Recommended solder alloy for wave soldering: SnCu****Recommended solder alloy for hand soldering: SnAgCu****Forward compatibility**

Parts with Sn/Pb can be used in a lead-free process depending on the solder and solder temperature.

Solders with Bi are not compatible.

**Backward compatibility**

Lead-free parts (100% Sn termination finish) can be used in a Sn/Pb process. The 100% Sn (Tin) termination finish is compatible with existing Sn/Pb solder pastes / systems in use today.

**RoHS**

Nemco lead-free product complies with EU Directive 2002/95/EC on the Restriction of Hazardous Substances requirements.

**JEDEC Standard JESD97**

Nemco lead-free surface mount devices are in accordance with category e3 terminations.

**MSL**

PCT, LSR, MCT and TB series moisture sensitivity level per IPC/Jedec J-STD-020B is level 1.

CGT series moisture sensitivity level per IPC/Jedec J-STD-020B is level 3.

**Visual standard**

Lead-free solder joints are not as bright as tin-lead pastes and the fillet may not be as large.

**Resin color**

The encapsulant resin color may darken due to the increase in temperature required for the paste.

**Self alignment**

lead-free solder pastes do not allow the same self alignment as lead containing systems, Standard mounting pads are acceptable, but machine set up may need to be modified.

**Reliability**

PCT, LSR, MCT and TB series are 1% per 1,000 hours at 85°C,  $V_f$  with 0.1Ω / V series impedance, 60% confidence level.

CGT series is 0.2% per 1,000 hours at 85°C, 0.5x $V_f$  with 0.1Ω / V series impedance, 60% confidence level.

**Soldering conditions**

Fluxes containing acids must not be used.

**Cooling**

After soldering, the assembly should preferably be allowed to cool naturally to room temperature. In the event that assisted cooling is used, the rate of change in temperature should not exceed that used in reflow.

**Contact your local Nemco distributor or sales representative for complete data books or visit Nemco on the Internet. Nemco is not linked to franchised distributors.**

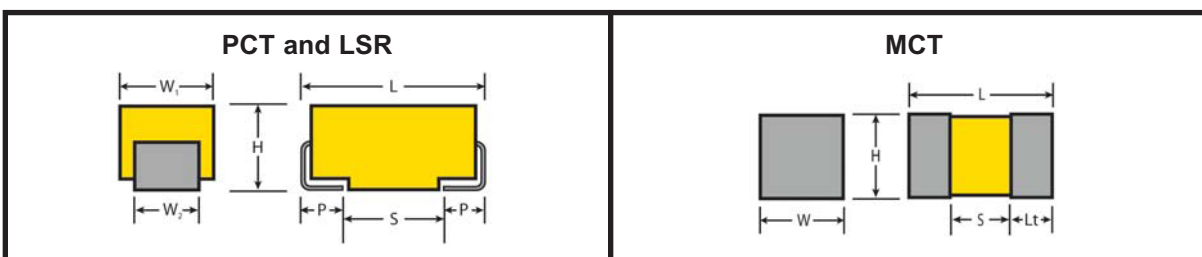
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**NOTICE:**

**Higher voltage ratings, lower ESR and tighter capacitance tolerances may be substituted within the same case size at Nemco's option. Such substitutions will improve operating reliability.**

**All information and data are believed to be accurate, but are presented without guarantee, warranty or responsibility of any kind. Specifications are subject to change without notice. Nemco reserves the right to modify minor details at any time in the interest of product improvement or technical necessity. Nemco does not assume the responsibility for infringement that might result from the use of Nemco capacitors in potential circuit designs.**

# Surface Mount Tantalum Case Dimensions



## Standard PCT and LSR

millimeters (inches)

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L<br>$\pm 0.2 (\pm 0.008)$ | $W_1$<br>$\pm 0.2 (\pm 0.008)$ | H<br>$\pm 0.2 (\pm 0.008)$          | $W_2$<br>$\pm 0.1 (\pm 0.004)$ | P<br>$\pm 0.3 (\pm 0.012)$ | S<br>Min.    |
|--------------------|-------------------------|----------------------------|--------------------------------|-------------------------------------|--------------------------------|----------------------------|--------------|
| A <sub>(4)</sub>   | 3216-18                 | 3.2 (.126)                 | 1.6 (.063)                     | 1.6 (.063)                          | 1.2 (.047)                     | 0.8 (.031)                 | 1.10 (0.043) |
| B                  | 3528-21                 | 3.5 (.138)                 | 2.8 (.110)                     | 1.9 (.075)                          | 2.2 (.087)                     | 0.8 (.031)                 | 1.40 (0.055) |
| C                  | 6032-28                 | 6.0 (.236)                 | 3.2 (.126)                     | 2.6 (.102)                          | 2.2 (.087)                     | 1.3 (.051)                 | 2.90 (0.114) |
| D                  | 7343-31                 | 7.3 (.287)                 | 4.3 (.169)                     | 2.9 (.114)                          | 2.4 (.094)                     | 1.3 (.051)                 | 4.40 (0.173) |
| H                  | 7343-43                 | 7.3 (.287)                 | 4.3 (.169)                     | 4.1 (.162)                          | 2.4 (.094)                     | 1.3 (.051)                 | 4.40 (0.173) |
| Z                  | 7361-38                 | 7.3 (.287)                 | 6.1 (.240)                     | 3.45 $\pm$ 0.3<br>(.136 $\pm$ .012) | 3.1 (.120)                     | 1.4 (.055)                 | 4.40 (0.173) |



## Low Profile PCT and LSR

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L<br>$\pm 0.2 (\pm 0.008)$ | $W_1$<br>$\pm 0.2 (\pm 0.008)$ | H<br>(MAX) | $W_2$<br>$\pm 0.1 (\pm 0.004)$ | P<br>$\pm 0.3 (\pm 0.012)$ | S<br>Min.    |
|--------------------|-------------------------|----------------------------|--------------------------------|------------|--------------------------------|----------------------------|--------------|
| XL <sub>(3)</sub>  | 2012-12                 | 2.05 (.080)                | 1.3 (.050)                     | 1.2 (.047) | 1.2 (.047)                     | 0.5 (.020)                 | 0.85 (0.033) |
| AL <sub>(4)</sub>  | 3216-12                 | 3.2 (.126)                 | 1.6 (.063)                     | 1.2 (.047) | 1.2 (.047)                     | 0.8 (.031)                 | 1.10 (0.043) |
| BL                 | 3528-12                 | 3.5 (.138)                 | 2.8 (.110)                     | 1.2 (.047) | 2.2 (.087)                     | 0.8 (.031)                 | 1.40 (0.055) |
| CL                 | 6032-15                 | 6.0 (.236)                 | 3.2 (.126)                     | 1.5 (.059) | 2.2 (.087)                     | 1.3 (.051)                 | 2.90 (0.114) |
| DL                 | 7343-20                 | 7.3 (.287)                 | 4.3 (.169)                     | 2.0 (.079) | 2.4 (.094)                     | 1.3 (.051)                 | 4.40 (0.173) |



## MCT and CGT

| NEMCO<br>Case Size | EIA / IECQ<br>Case Size | L                                             | W                                              | H                                              | S<br>Minimum | Lt<br>Minimum |
|--------------------|-------------------------|-----------------------------------------------|------------------------------------------------|------------------------------------------------|--------------|---------------|
| P <sub>(1)</sub>   | 1005-07                 | 1.00 (.039)<br>+ 0.2, - 0.0<br>(+0.008, -0.0) | 0.50 (.020)<br>+ 0.2, - 0.0<br>(+0.008, -0.0)  | 0.50 (.020)<br>+ 0.2, - 0.0<br>(+0.008, -0.0)  | 0.40 (.016)  | 0.10 (.004)   |
| R <sub>(2)</sub>   | 1608-10                 | 1.60 (.063)<br>+ 0.2, - 0.0<br>(+0.008, -0.0) | 0.85 (.033)<br>+ 0.15, - 0.0<br>(+0.006, -0.0) | 0.85 (.033)<br>+ 0.15, - 0.0<br>(+0.006, -0.0) | 0.65 (.0255) | 0.15 (.006)   |

(1) 0402 Footprint Compatible

(2) 0603 Footprint Compatible

(3) 0805 Footprint Compatible

(4) 1206 Footprint Compatible