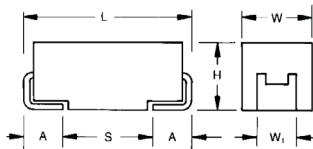
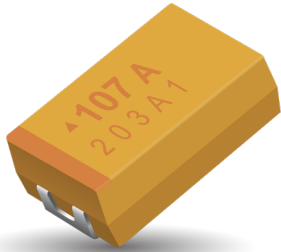


# TPS Automotive Range

## Low ESR - Automotive Product Range



### FEATURES

- Low ESR Series of Robust MnO<sub>2</sub> Solid Electrolyte Capacitors
- 100% Surge Current Tested
- CV Range: 0.22-680μF / 6.3-50V
- 5 Case Sizes Available
- Power Supply Applications

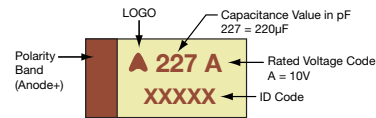
### APPLICATIONS

- Power Supply
- Electric Window Control
- Battery Management Systems
- DC / DC Converter



### MARKING

#### A, B, C, D, E CASE



### CASE DIMENSIONS:

millimeters (inches)

| Code | EIA Code | EIA Metric | L±0.20 (0.008) | W±0.20 (0.008)<br>-0.10 (0.004) | H±0.20 (0.008)<br>-0.10 (0.004) | W <sub>1</sub> ±0.20 (0.008) | A±0.30 (0.012)<br>-0.20 (0.008) | S Min.       |
|------|----------|------------|----------------|---------------------------------|---------------------------------|------------------------------|---------------------------------|--------------|
| A    | 1206     | 3216-18    | 3.20 (0.126)   | 1.60 (0.063)                    | 1.60 (0.063)                    | 1.20 (0.047)                 | 0.80 (0.031)                    | 1.10 (0.043) |
| B    | 1210     | 3528-21    | 3.50 (0.138)   | 2.80 (0.110)                    | 1.90 (0.075)                    | 2.20 (0.087)                 | 0.80 (0.031)                    | 1.40 (0.055) |
| C    | 2312     | 6032-28    | 6.00 (0.236)   | 3.20 (0.126)                    | 2.60 (0.102)                    | 2.20 (0.087)                 | 1.30 (0.051)                    | 2.90 (0.114) |
| D    | 2917     | 7343-31    | 7.30 (0.287)   | 4.30 (0.169)                    | 2.90 (0.114)                    | 2.40 (0.094)                 | 1.30 (0.051)                    | 4.40 (0.173) |
| E    | 2917     | 7343-43    | 7.30 (0.287)   | 4.30 (0.169)                    | 4.10 (0.162)                    | 2.40 (0.094)                 | 1.30 (0.051)                    | 4.40 (0.173) |

W<sub>1</sub> dimension applies to the termination width for A dimensional area only.

### HOW TO ORDER

| TPS  | C                            | 107                                                                                                                                    | M                                 | 010                                                                                                                        | T                                                                                  | 0150      | V                                             |
|------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------|-----------------------------------------------|
| Type | Case Size<br>See table above | Capacitance Code<br>pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow) | Tolerance<br>K = ±10%<br>M = ±20% | Rated DC Voltage<br>006 = 6.3Vdc<br>010 = 10Vdc<br>016 = 16Vdc<br>020 = 20Vdc<br>025 = 25Vdc<br>035 = 35Vdc<br>050 = 50Vdc | Packaging<br>T = Automotive Lead Free 7" Reel<br>U = Automotive Lead Free 13" Reel | ESR in mΩ | Dry Pack Option<br>(D,E case sizes mandatory) |

### TECHNICAL SPECIFICATIONS

|                                    |                                                                                              |     |    |    |    |    |    |    |
|------------------------------------|----------------------------------------------------------------------------------------------|-----|----|----|----|----|----|----|
| Technical Data:                    | All technical data relate to an ambient temperature of +25°C                                 |     |    |    |    |    |    |    |
| Capacitance Range:                 | 0.22 μF to 680 μF                                                                            |     |    |    |    |    |    |    |
| Capacitance Tolerance:             | ±10%; ±20%                                                                                   |     |    |    |    |    |    |    |
| Rated Voltage (V <sub>R</sub> )    | ≤ +85°C:                                                                                     | 6.3 | 10 | 16 | 20 | 25 | 35 | 50 |
| Category Voltage (V <sub>C</sub> ) | ≤ +125°C:                                                                                    | 4   | 7  | 10 | 13 | 17 | 23 | 33 |
| Surge Voltage (V <sub>S</sub> )    | ≤ +85°C:                                                                                     | 8   | 13 | 20 | 26 | 32 | 46 | 65 |
| Surge Voltage (V <sub>S</sub> )    | ≤ +125°C:                                                                                    | 5   | 8  | 13 | 16 | 20 | 28 | 40 |
| Temperature Range:                 | -55°C to +125°C                                                                              |     |    |    |    |    |    |    |
| Environmental Classification:      | 55/125/56 (IEC 68-2)                                                                         |     |    |    |    |    |    |    |
| Reliability:                       | 1% per 1000 hours at 85°C, V <sub>R</sub> with 0.1Ω/V series impedance, 60% confidence level |     |    |    |    |    |    |    |
| Termination Finished:              | Sn Plating (standard), Gold and SnPb Plating upon request                                    |     |    |    |    |    |    |    |
|                                    | Meets requirements of AEC-Q200                                                               |     |    |    |    |    |    |    |

# TPS Automotive Range

## Low ESR - Automotive Product Range



### TPS AUTOMOTIVE RANGE CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

| Capacitance |      | Rated Voltage DC (VR) to 85°C           |                                              |                                             |                                  |                               |                               |                              |
|-------------|------|-----------------------------------------|----------------------------------------------|---------------------------------------------|----------------------------------|-------------------------------|-------------------------------|------------------------------|
| µF          | Code | 6.3V (J)                                | 10V (A)                                      | 16V (C)                                     | 20V (D)                          | 25V (E)                       | 35V (V)                       | 50V (T)                      |
| 0.15        | 154  |                                         |                                              |                                             |                                  |                               |                               |                              |
| 0.22        | 224  |                                         |                                              |                                             |                                  |                               |                               | A(7000)                      |
| 0.33        | 334  |                                         |                                              |                                             |                                  |                               | A(6000)                       | A(7000)                      |
| 0.47        | 474  |                                         |                                              |                                             |                                  | A(7000)                       | A(6000)                       | A(6500), B(6000)             |
| 0.68        | 684  |                                         |                                              |                                             |                                  | A(6000)                       | A(6000)                       | B(4000)                      |
| 1.0         | 105  |                                         |                                              | A(6200)                                     | A(3000)                          | A(4000)                       | A(3000), B(2000)              | B(3000), C(2500)             |
| 1.5         | 155  |                                         |                                              |                                             | A(3000)                          | A(3000)                       | A(3000), B(2500)              | C(1500,2000)                 |
| 2.2         | 225  |                                         | A(1800)                                      | A(1800,3500)                                | A(3000)<br>B(1700)               | A(2500)<br>B(900,1200,2500)   | B(750,1500,2000)<br>C(1000)   | C(1500)<br>D(1200)           |
| 3.3         | 335  | A(2100)                                 |                                              | A(3500), B(2500)                            | A(2500), B(1300)                 | B(750,1500,2000)              | B(1000), C(700)               | C(1000), D(800)              |
| 4.7         | 475  |                                         | A(1400)<br>B(1400)                           | A(2000)<br>B(800,1500)                      | A(1800)<br>B(750,1000)           | B(700,900)<br>C(700)          | B(700,1500), C(600)<br>D(700) | C(800)<br>D(250,500,700)     |
| 6.8         | 685  |                                         | A(1800), B(1300)                             | A(1500),<br>B(600,1200)                     | B(600,1000), C(700)              | B(700),<br>C(500,600,700)     | C(350), D(400,500)            | D(500,600)                   |
| 10          | 106  | A(1500), B(1500)                        | A(900,1800), B(1000)                         | A(1000), B(500,800)<br>C(500)               | B(500,1000)<br>C(500,700)        | B(1800), C(300,500)<br>D(500) | C(600)<br>D(300)<br>E(250)    | D(500)<br>E(250,300,400,500) |
| 15          | 156  | A(700,1500)                             | A(1000), B(450,600)<br>C(700)                | B(500,800)<br>C(300,700)                    | B(500)<br>C(400,450)             | C(220,300)<br>D(300)          | D(300)                        | E(250)                       |
| 22          | 226  | A(300,500,900)<br>B(375,600), C(500)    | A(900), B(400,500,700)<br>C(180,300)         | B(400,600),<br>C(300,375) D(500),<br>D(700) | B(400,600), C(400)<br>D(200,300) | C(275,400)<br>D(200,300)      | D(200,300,400)<br>E(200,300)  |                              |
| 33          | 336  | A(600)<br>B(250,350,450,600)            | B(250,425,500,650)<br>C(375,500)             | B(500), C(150,<br>225,300)<br>D(200)        | C(300)<br>D(160,200)             | D(200,300)                    | D(200,300)<br>E(250,300)      |                              |
| 47          | 476  | B(250,350,500)<br>C(300)                | B(250,350,500,650)<br>C(200,350), D(100,300) | C(350)<br>D(100,200)                        | D(200)                           | D(125,150,250)<br>E(125)      | E(200,250)                    |                              |
| 68          | 686  | B(250,350,500)<br>C(150,200)            | C(200,300)<br>D(150)                         | C(200)<br>D(150)                            | D(150,200,300)<br>E(125,150,200) | E(200)                        |                               |                              |
| 100         | 107  | B(250,400)<br>C(150), D(300)            | C(100,150,200)<br>D(100,125,150)             | D(80,100,125,150)<br>E(100,125,150)         | E(100,150,200)                   | E(150)                        |                               |                              |
| 150         | 157  | C(100,150,200,250)<br>D(125)            | D(85,100)<br>E(100)                          | E(100)                                      |                                  |                               |                               |                              |
| 220         | 227  | D(100,125)                              | D(100,150)<br>E(70,100,125,150)              | E(100,150)                                  |                                  |                               |                               |                              |
| 330         | 337  | D(45,50,70,100)<br>E(100,125,150)       | E(50,60,100)                                 |                                             |                                  |                               |                               |                              |
| 470         | 477  | D(45,60,100,200)<br>E(45,50,60,100,200) |                                              |                                             |                                  |                               |                               |                              |
| 680         | 687  | E(45,60,100)                            |                                              |                                             |                                  |                               |                               |                              |

Released ratings, (ESR ratings in mOhms in parentheses)

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher voltage ratings in the same case size, to the same reliability standards.

# TPS Automotive Range

## Low ESR - Automotive Product Range



### RATINGS & PART NUMBER REFERENCE

| Part Number       | Case Size | Capacitance (µF) | Rated Voltage (V) | Rated Temperature (°C) | Category Voltage (V) | Category Temperature (°C) | DCL Max. (µA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (A) |       |       | MSL |
|-------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-------------|------------------------|------------------------|-------|-------|-----|
|                   |           |                  |                   |                        |                      |                           |               |             |                        | 25°C                   | 85°C  | 125°C |     |
| 6.3 Volt @ 85°C   |           |                  |                   |                        |                      |                           |               |             |                        |                        |       |       |     |
| TPSA335*006T2100  | A         | 3.3              | 6.3               | 85                     | 4                    | 125                       | 0.5           | 6           | 2100                   | 0.189                  | 0.170 | 0.076 | 1   |
| TPSA106*006T1500  | A         | 10               | 6.3               | 85                     | 4                    | 125                       | 0.6           | 6           | 1500                   | 0.224                  | 0.201 | 0.089 | 1   |
| TPSB106*006T1500  | B         | 10               | 6.3               | 85                     | 4                    | 125                       | 0.6           | 6           | 1500                   | 0.238                  | 0.214 | 0.095 | 1   |
| TPSA156*006T0700  | A         | 15               | 6.3               | 85                     | 4                    | 125                       | 0.9           | 6           | 700                    | 0.327                  | 0.295 | 0.131 | 1   |
| TPSA156*006T1500  | A         | 15               | 6.3               | 85                     | 4                    | 125                       | 0.9           | 6           | 1500                   | 0.224                  | 0.201 | 0.089 | 1   |
| TPSA226*006T0300  | A         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 300                    | 0.500                  | 0.450 | 0.200 | 1   |
| TPSA226*006T0500  | A         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 500                    | 0.387                  | 0.349 | 0.155 | 1   |
| TPSA226*006T0900  | A         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 900                    | 0.289                  | 0.260 | 0.115 | 1   |
| TPSB226*006T0375  | B         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 375                    | 0.476                  | 0.428 | 0.190 | 1   |
| TPSB226*006T0600  | B         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSC226*006T0500  | C         | 22               | 6.3               | 85                     | 4                    | 125                       | 1.4           | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSA336*006T0600  | A         | 33               | 6.3               | 85                     | 4                    | 125                       | 2.1           | 8           | 600                    | 0.354                  | 0.318 | 0.141 | 1   |
| TPSB336*006T0250  | B         | 33               | 6.3               | 85                     | 4                    | 125                       | 2.1           | 6           | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB336*006T0350  | B         | 33               | 6.3               | 85                     | 4                    | 125                       | 2.1           | 6           | 350                    | 0.493                  | 0.444 | 0.197 | 1   |
| TPSB336*006T0450  | B         | 33               | 6.3               | 85                     | 4                    | 125                       | 2.1           | 6           | 450                    | 0.435                  | 0.391 | 0.174 | 1   |
| TPSB336*006T0600  | B         | 33               | 6.3               | 85                     | 4                    | 125                       | 2.1           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSB476*006T0250  | B         | 47               | 6.3               | 85                     | 4                    | 125                       | 3             | 6           | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB476*006T0350  | B         | 47               | 6.3               | 85                     | 4                    | 125                       | 3             | 6           | 350                    | 0.493                  | 0.444 | 0.197 | 1   |
| TPSB476*006T0500  | B         | 47               | 6.3               | 85                     | 4                    | 125                       | 3             | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSC476*006T0300  | C         | 47               | 6.3               | 85                     | 4                    | 125                       | 3             | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSB686*006T0250  | B         | 68               | 6.3               | 85                     | 4                    | 125                       | 4             | 8           | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB686*006T0350  | B         | 68               | 6.3               | 85                     | 4                    | 125                       | 4             | 8           | 350                    | 0.493                  | 0.444 | 0.197 | 1   |
| TPSB686*006T0500  | B         | 68               | 6.3               | 85                     | 4                    | 125                       | 4             | 8           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSC686*006T0150  | C         | 68               | 6.3               | 85                     | 4                    | 125                       | 4.3           | 6           | 150                    | 0.856                  | 0.771 | 0.343 | 1   |
| TPSC686*006T0200  | C         | 68               | 6.3               | 85                     | 4                    | 125                       | 4.3           | 6           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSB107*006T0250  | B         | 100              | 6.3               | 85                     | 4                    | 125                       | 6.3           | 10          | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB107*006T0400  | B         | 100              | 6.3               | 85                     | 4                    | 125                       | 6.3           | 10          | 400                    | 0.461                  | 0.415 | 0.184 | 1   |
| TPSC107*006T0150  | C         | 100              | 6.3               | 85                     | 4                    | 125                       | 6.3           | 6           | 150                    | 0.856                  | 0.771 | 0.343 | 1   |
| TPSD107*006T0300V | D         | 100              | 6.3               | 85                     | 4                    | 125                       | 6.3           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSC157*006T0100  | C         | 150              | 6.3               | 85                     | 4                    | 125                       | 9.5           | 6           | 100                    | 1.049                  | 0.944 | 0.420 | 1   |
| TPSC157*006T0150  | C         | 150              | 6.3               | 85                     | 4                    | 125                       | 9.5           | 6           | 150                    | 0.856                  | 0.771 | 0.343 | 1   |
| TPSC157*006T0200  | C         | 150              | 6.3               | 85                     | 4                    | 125                       | 9.5           | 6           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSC157*006T0250  | C         | 150              | 6.3               | 85                     | 4                    | 125                       | 9.5           | 6           | 250                    | 0.663                  | 0.597 | 0.265 | 1   |
| TPSD157*006T0125V | D         | 150              | 6.3               | 85                     | 4                    | 125                       | 9.5           | 6           | 125                    | 1.095                  | 0.986 | 0.438 | 3   |
| TPSD227*006T0100V | D         | 220              | 6.3               | 85                     | 4                    | 125                       | 13.9          | 8           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD227*006T0125V | D         | 220              | 6.3               | 85                     | 4                    | 125                       | 13.9          | 8           | 125                    | 1.095                  | 0.986 | 0.438 | 3   |
| TPSD337*006T0045V | D         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 45                     | 1.826                  | 1.643 | 0.730 | 3   |
| TPSD337*006T0050V | D         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 50                     | 1.732                  | 1.559 | 0.693 | 3   |
| TPSD337*006T0070V | D         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 70                     | 1.464                  | 1.317 | 0.586 | 3   |
| TPSD337*006T0100V | D         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSE337*006T0100V | E         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSE337*006T0125V | E         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 125                    | 1.149                  | 1.034 | 0.460 | 3   |
| TPSE337*006T0150V | E         | 330              | 6.3               | 85                     | 4                    | 125                       | 20.8          | 8           | 150                    | 1.049                  | 0.944 | 0.420 | 3   |
| TPSD477*006T0045V | D         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 12          | 45                     | 1.826                  | 1.643 | 0.730 | 3   |
| TPSD477*006T0060V | D         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 12          | 60                     | 1.581                  | 1.423 | 0.632 | 3   |
| TPSD477*006T0100V | D         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 12          | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD477*006T0200V | D         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 12          | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSE477*006T0045V | E         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 10          | 45                     | 1.915                  | 1.723 | 0.766 | 3   |
| TPSE477*006T0050V | E         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 10          | 50                     | 1.817                  | 1.635 | 0.727 | 3   |
| TPSE477*006T0060V | E         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 10          | 60                     | 1.658                  | 1.492 | 0.663 | 3   |
| TPSE477*006T0100V | E         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 10          | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSE477*006T0200V | E         | 470              | 6.3               | 85                     | 4                    | 125                       | 28            | 10          | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSE687*006T0045V | E         | 680              | 6.3               | 85                     | 4                    | 125                       | 42.8          | 10          | 45                     | 1.915                  | 1.723 | 0.766 | 3   |
| TPSE687*006T0060V | E         | 680              | 6.3               | 85                     | 4                    | 125                       | 42.8          | 10          | 60                     | 1.658                  | 1.492 | 0.663 | 3   |
| TPSE687*006T0100V | E         | 680              | 6.3               | 85                     | 4                    | 125                       | 42.8          | 10          | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| 10 Volt @ 85°C    |           |                  |                   |                        |                      |                           |               |             |                        |                        |       |       |     |
| TPSA225*010T1800  | A         | 2.2              | 10                | 85                     | 7                    | 125                       | 0.5           | 6           | 1800                   | 0.204                  | 0.184 | 0.082 | 1   |
| TPSA475*010T1400  | A         | 4.7              | 10                | 85                     | 7                    | 125                       | 0.5           | 6           | 1400                   | 0.231                  | 0.208 | 0.093 | 1   |
| TPSB475*010T1400  | B         | 4.7              | 10                | 85                     | 7                    | 125                       | 0.5           | 6           | 1400                   | 0.246                  | 0.222 | 0.099 | 1   |
| TPSA685*010T1800  | A         | 6.8              | 10                | 85                     | 7                    | 125                       | 0.7           | 6           | 1800                   | 0.204                  | 0.184 | 0.082 | 1   |
| TPSB685*010T1300  | B         | 6.8              | 10                | 85                     | 7                    | 125                       | 0.7           | 6           | 1300                   | 0.256                  | 0.230 | 0.102 | 1   |
| TPSA106*010T0900  | A         | 10               | 10                | 85                     | 7                    | 125                       | 1             | 6           | 900                    | 0.289                  | 0.260 | 0.115 | 1   |
| TPSA106*010T1800  | A         | 10               | 10                | 85                     | 7                    | 125                       | 1             | 6           | 1800                   | 0.204                  | 0.184 | 0.082 | 1   |
| TPSB106*010T1000  | B         | 10               | 10                | 85                     | 7                    | 125                       | 1             | 6           | 1000                   | 0.292                  | 0.262 | 0.117 | 1   |
| TPSA156*010T1000  | A         | 15               | 10                | 85                     | 7                    | 125                       | 1.5           | 6           | 1000                   | 0.274                  | 0.246 | 0.110 | 1   |
| TPSB156*010T0450  | B         | 15               | 10                | 85                     | 7                    | 125                       | 1.5           | 6           | 450                    | 0.435                  | 0.391 | 0.174 | 1   |
| TPSB156*010T0600  | B         | 15               | 10                | 85                     | 7                    | 125                       | 1.5           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020

\*Please use "U" instead of "T" in the suffix letter for 13" reel packaging

Please use specific PN for automotive version – see "HOW TO ORDER". All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting. For typical weight and composition see page 259.

NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at [www.kyocera-avx.com/disclaimer/](http://www.kyocera-avx.com/disclaimer/) by reference and should be reviewed in full before placing any order.

# TPS Automotive Range

## Low ESR - Automotive Product Range



### RATINGS & PART NUMBER REFERENCE

| Part Number       | Case Size | Capacitance (µF) | Rated Voltage (V) | Rated Temperature (°C) | Category Voltage (V) | Category Temperature (°C) | DCL Max. (µA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (A) |       |       | MSL |
|-------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-------------|------------------------|------------------------|-------|-------|-----|
|                   |           |                  |                   |                        |                      |                           |               |             |                        | 25°C                   | 85°C  | 125°C |     |
| TPSC156*010T0700  | C         | 15               | 10                | 85                     | 7                    | 125                       | 1.5           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSA226*010T0900  | A         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 8           | 900                    | 0.289                  | 0.260 | 0.115 | 1   |
| TPSB226*010T0400  | B         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 6           | 400                    | 0.461                  | 0.415 | 0.184 | 1   |
| TPSB226*010T0500  | B         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB226*010T0700  | B         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 6           | 700                    | 0.348                  | 0.314 | 0.139 | 1   |
| TPSC226*010T0180  | C         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 6           | 180                    | 0.782                  | 0.704 | 0.313 | 1   |
| TPSC226*010T0300  | C         | 22               | 10                | 85                     | 7                    | 125                       | 2.2           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSB336*010T0250  | B         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB336*010T0425  | B         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 425                    | 0.447                  | 0.402 | 0.179 | 1   |
| TPSB336*010T0500  | B         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB336*010T0650  | B         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 650                    | 0.362                  | 0.325 | 0.145 | 1   |
| TPSC336*010T0375  | C         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 375                    | 0.542                  | 0.487 | 0.217 | 1   |
| TPSC336*010T0500  | C         | 33               | 10                | 85                     | 7                    | 125                       | 3.3           | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSB476*010T0250  | B         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 8           | 250                    | 0.583                  | 0.525 | 0.233 | 1   |
| TPSB476*010T0350  | B         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 8           | 350                    | 0.493                  | 0.444 | 0.197 | 1   |
| TPSB476*010T0500  | B         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 8           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB476*010T0650  | B         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 8           | 650                    | 0.362                  | 0.325 | 0.145 | 1   |
| TPSC476*010T0200  | C         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 6           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSC476*010T0350  | C         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 6           | 350                    | 0.561                  | 0.505 | 0.224 | 1   |
| TPSD476*010T0100V | D         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 6           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD476*010T0300V | D         | 47               | 10                | 85                     | 7                    | 125                       | 4.7           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSC686*010T0200  | C         | 68               | 10                | 85                     | 7                    | 125                       | 6.8           | 6           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSC686*010T0300  | C         | 68               | 10                | 85                     | 7                    | 125                       | 6.8           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSD686*010T0150V | D         | 68               | 10                | 85                     | 7                    | 125                       | 6.8           | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSC107*010T0100  | C         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 8           | 100                    | 1.049                  | 0.944 | 0.420 | 1   |
| TPSC107*010T0150  | C         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 8           | 150                    | 0.856                  | 0.771 | 0.343 | 1   |
| TPSC107*010T0200  | C         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 8           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSD107*010T0100V | D         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 6           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD107*010T0125V | D         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 6           | 125                    | 1.095                  | 0.986 | 0.438 | 3   |
| TPSD107*010T0150V | D         | 100              | 10                | 85                     | 7                    | 125                       | 10            | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSD157*010T0085V | D         | 150              | 10                | 85                     | 7                    | 125                       | 15            | 8           | 85                     | 1.328                  | 1.196 | 0.531 | 3   |
| TPSD157*010T0100V | D         | 150              | 10                | 85                     | 7                    | 125                       | 15            | 8           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSE157*010T0100V | E         | 150              | 10                | 85                     | 7                    | 125                       | 15            | 8           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSD227*010T0100V | D         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD227*010T0150V | D         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSE227*010T0070V | E         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 70                     | 1.535                  | 1.382 | 0.614 | 3   |
| TPSE227*010T0100V | E         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSE227*010T0125V | E         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 125                    | 1.149                  | 1.034 | 0.460 | 3   |
| TPSE227*010T0150V | E         | 220              | 10                | 85                     | 7                    | 125                       | 22            | 8           | 150                    | 1.049                  | 0.944 | 0.420 | 3   |
| TPSE337*010T0050V | E         | 330              | 10                | 85                     | 7                    | 125                       | 33            | 8           | 50                     | 1.817                  | 1.635 | 0.727 | 3   |
| TPSE337*010T0060V | E         | 330              | 10                | 85                     | 7                    | 125                       | 33            | 8           | 60                     | 1.658                  | 1.492 | 0.663 | 3   |
| TPSE337*010T0100V | E         | 330              | 10                | 85                     | 7                    | 125                       | 33            | 8           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| 16 Volt @ 85°C    |           |                  |                   |                        |                      |                           |               |             |                        |                        |       |       |     |
| TPSA105*016T6200  | A         | 1.0              | 16                | 85                     | 10                   | 125                       | 0.5           | 4           | 6200                   | 0.110                  | 0.099 | 0.044 | 1   |
| TPSA225*016T1800  | A         | 2.2              | 16                | 85                     | 10                   | 125                       | 0.5           | 6           | 1800                   | 0.204                  | 0.184 | 0.082 | 1   |
| TPSA225*016T3500  | A         | 2.2              | 16                | 85                     | 10                   | 125                       | 0.5           | 6           | 3500                   | 0.146                  | 0.132 | 0.059 | 1   |
| TPSA335*016T3500  | A         | 3.3              | 16                | 85                     | 10                   | 125                       | 0.5           | 6           | 3500                   | 0.146                  | 0.132 | 0.059 | 1   |
| TPSB335*016T2500  | B         | 3.3              | 16                | 85                     | 10                   | 125                       | 0.5           | 6           | 2500                   | 0.184                  | 0.166 | 0.074 | 1   |
| TPSA475*016T2000  | A         | 4.7              | 16                | 85                     | 10                   | 125                       | 0.8           | 6           | 2000                   | 0.194                  | 0.174 | 0.077 | 1   |
| TPSB475*016T0800  | B         | 4.7              | 16                | 85                     | 10                   | 125                       | 0.8           | 6           | 800                    | 0.326                  | 0.293 | 0.130 | 1   |
| TPSB475*016T1500  | B         | 4.7              | 16                | 85                     | 10                   | 125                       | 0.8           | 6           | 1500                   | 0.238                  | 0.214 | 0.095 | 1   |
| TPSA685*016T1500  | A         | 6.8              | 16                | 85                     | 10                   | 125                       | 1.1           | 6           | 1500                   | 0.224                  | 0.201 | 0.089 | 1   |
| TPSB685*016T0600  | B         | 6.8              | 16                | 85                     | 10                   | 125                       | 1.1           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSB685*016T1200  | B         | 6.8              | 16                | 85                     | 10                   | 125                       | 1.1           | 6           | 1200                   | 0.266                  | 0.240 | 0.106 | 1   |
| TPSA106*016T1000  | A         | 10               | 16                | 85                     | 10                   | 125                       | 1.6           | 6           | 1000                   | 0.274                  | 0.246 | 0.110 | 1   |
| TPSB106*016T0500  | B         | 10               | 16                | 85                     | 10                   | 125                       | 1.6           | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB106*016T0800  | B         | 10               | 16                | 85                     | 10                   | 125                       | 1.6           | 6           | 800                    | 0.326                  | 0.293 | 0.130 | 1   |
| TPSC106*016T0500  | C         | 10               | 16                | 85                     | 10                   | 125                       | 1.6           | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSB156*016T0500  | B         | 15               | 16                | 85                     | 10                   | 125                       | 2.4           | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB156*016T0800  | B         | 15               | 16                | 85                     | 10                   | 125                       | 2.4           | 6           | 800                    | 0.326                  | 0.293 | 0.130 | 1   |
| TPSC156*016T0300  | C         | 15               | 16                | 85                     | 10                   | 125                       | 2.4           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSC156*016T0700  | C         | 15               | 16                | 85                     | 10                   | 125                       | 2.4           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB226*016T0400  | B         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 400                    | 0.461                  | 0.415 | 0.184 | 1   |
| TPSB226*016T0600  | B         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSC226*016T0300  | C         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSC226*016T0375  | C         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 375                    | 0.542                  | 0.487 | 0.217 | 1   |
| TPSD226*016T0500V | D         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSD226*016T0700V | D         | 22               | 16                | 85                     | 10                   | 125                       | 3.5           | 6           | 700                    | 0.463                  | 0.417 | 0.185 | 3   |
| TPSB336*016T0500  | B         | 33               | 16                | 85                     | 10                   | 125                       | 5.3           | 8           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSC336*016T0150  | C         | 33               | 16                | 85                     | 10                   | 125                       | 5.3           | 6           | 150                    | 0.856                  | 0.771 | 0.343 | 1   |
| TPSC336*016T0225  | C         | 33               | 16                | 85                     | 10                   | 125                       | 5.3           | 6           | 225                    | 0.699                  | 0.629 | 0.280 | 1   |
| TPSC336*016T0300  | C         | 33               | 16                | 85                     | 10                   | 125                       | 5.3           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020

\*Please use "U" instead of "T" in the suffix letter for 13" reel packaging

Please use specific PN for automotive version – see "HOW TO ORDER". All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting. For typical weight and composition see page 259.

NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.

# TPS Automotive Range

## Low ESR - Automotive Product Range



### RATINGS & PART NUMBER REFERENCE

| Part Number       | Case Size | Capacitance (µF) | Rated Voltage (V) | Rated Temperature (°C) | Category Voltage (V) | Category Temperature (°C) | DCL Max. (µA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (A) |       |       | MSL |
|-------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-------------|------------------------|------------------------|-------|-------|-----|
|                   |           |                  |                   |                        |                      |                           |               |             |                        | 25°C                   | 85°C  | 125°C |     |
| TPSD336*016T0200V | D         | 33               | 16                | 85                     | 10                   | 125                       | 5.3           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSC476*016T0350  | C         | 47               | 16                | 85                     | 10                   | 125                       | 7.5           | 6           | 350                    | 0.561                  | 0.505 | 0.224 | 1   |
| TPSD476*016T0100V | D         | 47               | 16                | 85                     | 10                   | 125                       | 7.5           | 6           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD476*016T0200V | D         | 47               | 16                | 85                     | 10                   | 125                       | 7.5           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSC686*016T0200  | C         | 68               | 16                | 85                     | 10                   | 125                       | 10.9          | 6           | 200                    | 0.742                  | 0.667 | 0.297 | 1   |
| TPSD686*016T0150V | D         | 68               | 16                | 85                     | 10                   | 125                       | 10.9          | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSD107*016T0080V | D         | 100              | 16                | 85                     | 10                   | 125                       | 16            | 6           | 80                     | 1.369                  | 1.232 | 0.548 | 3   |
| TPSD107*016T0100V | D         | 100              | 16                | 85                     | 10                   | 125                       | 16            | 6           | 100                    | 1.225                  | 1.102 | 0.490 | 3   |
| TPSD107*016T0125V | D         | 100              | 16                | 85                     | 10                   | 125                       | 16            | 6           | 125                    | 1.095                  | 0.986 | 0.438 | 3   |
| TPSD107*016T0150V | D         | 100              | 16                | 85                     | 10                   | 125                       | 16            | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSE107*016T0100V | E         | 100              | 16                | 85                     | 10                   | 125                       | 16            | 6           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSA105*020T3000  | A         | 1                | 20                | 85                     | 13                   | 125                       | 0.5           | 4           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSA155*020T3000  | A         | 1.5              | 20                | 85                     | 13                   | 125                       | 0.5           | 6           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSA225*020T3000  | A         | 2.2              | 20                | 85                     | 13                   | 125                       | 0.5           | 6           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSB225*020T1700  | B         | 2.2              | 20                | 85                     | 13                   | 125                       | 0.5           | 6           | 1700                   | 0.224                  | 0.201 | 0.089 | 1   |
| TPSA335*020T2500  | A         | 3.3              | 20                | 85                     | 13                   | 125                       | 0.7           | 6           | 2500                   | 0.173                  | 0.156 | 0.069 | 1   |
| TPSB335*020T1300  | B         | 3.3              | 20                | 85                     | 13                   | 125                       | 0.7           | 6           | 1300                   | 0.256                  | 0.230 | 0.102 | 1   |
| TPSA475*020T1800  | A         | 4.7              | 20                | 85                     | 13                   | 125                       | 0.9           | 6           | 1800                   | 0.204                  | 0.184 | 0.082 | 1   |
| TPSB475*020T0750  | B         | 4.7              | 20                | 85                     | 13                   | 125                       | 0.9           | 6           | 750                    | 0.337                  | 0.303 | 0.135 | 1   |
| TPSB475*020T1000  | B         | 4.7              | 20                | 85                     | 13                   | 125                       | 0.9           | 6           | 1000                   | 0.292                  | 0.262 | 0.117 | 1   |
| TPSB685*020T0600  | B         | 6.8              | 20                | 85                     | 13                   | 125                       | 1.4           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSB685*020T1000  | B         | 6.8              | 20                | 85                     | 13                   | 125                       | 1.4           | 6           | 1000                   | 0.292                  | 0.262 | 0.117 | 1   |
| TPSC685*020T0700  | C         | 6.8              | 20                | 85                     | 13                   | 125                       | 1.4           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB106*020T0500  | B         | 10               | 20                | 85                     | 13                   | 125                       | 2             | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSB106*020T1000  | B         | 10               | 20                | 85                     | 13                   | 125                       | 2             | 6           | 1000                   | 0.292                  | 0.262 | 0.117 | 1   |
| TPSC106*020T0500  | C         | 10               | 20                | 85                     | 13                   | 125                       | 2             | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSC106*020T0700  | C         | 10               | 20                | 85                     | 13                   | 125                       | 2             | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB156*020T0500  | B         | 15               | 20                | 85                     | 13                   | 125                       | 3             | 6           | 500                    | 0.412                  | 0.371 | 0.165 | 1   |
| TPSC156*020T0400  | C         | 15               | 20                | 85                     | 13                   | 125                       | 3             | 6           | 400                    | 0.524                  | 0.472 | 0.210 | 1   |
| TPSC156*020T0450  | C         | 15               | 20                | 85                     | 13                   | 125                       | 3             | 6           | 450                    | 0.494                  | 0.445 | 0.198 | 1   |
| TPSB226*020T0400  | B         | 22               | 20                | 85                     | 13                   | 125                       | 4.4           | 6           | 400                    | 0.461                  | 0.415 | 0.184 | 1   |
| TPSB226*020T0600  | B         | 22               | 20                | 85                     | 13                   | 125                       | 4.4           | 6           | 600                    | 0.376                  | 0.339 | 0.151 | 1   |
| TPSC226*020T0400  | C         | 22               | 20                | 85                     | 13                   | 125                       | 4.4           | 6           | 400                    | 0.524                  | 0.472 | 0.210 | 1   |
| TPSD226*020T0200V | D         | 22               | 20                | 85                     | 13                   | 125                       | 4.4           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD226*020T0300V | D         | 22               | 20                | 85                     | 13                   | 125                       | 4.4           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSC336*020T0300  | C         | 33               | 20                | 85                     | 13                   | 125                       | 6.6           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSD336*020T0160V | D         | 33               | 20                | 85                     | 13                   | 125                       | 6.6           | 6           | 160                    | 0.968                  | 0.871 | 0.387 | 3   |
| TPSD336*020T0200V | D         | 33               | 20                | 85                     | 13                   | 125                       | 6.6           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD476*020T0200V | D         | 47               | 20                | 85                     | 13                   | 125                       | 9.4           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD686*020T0150V | D         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSD686*020T0200V | D         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD686*020T0300V | D         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSE686*020T0125V | E         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 125                    | 1.149                  | 1.034 | 0.460 | 3   |
| TPSE686*020T0150V | E         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 150                    | 1.049                  | 0.944 | 0.420 | 3   |
| TPSE686*020T0200V | E         | 68               | 20                | 85                     | 13                   | 125                       | 13.6          | 6           | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSE107*020T0100V | E         | 100              | 20                | 85                     | 13                   | 125                       | 20            | 6           | 100                    | 1.285                  | 1.156 | 0.514 | 3   |
| TPSE107*020T0150V | E         | 100              | 20                | 85                     | 13                   | 125                       | 20            | 6           | 150                    | 1.049                  | 0.944 | 0.420 | 3   |
| TPSE107*020T0200V | E         | 100              | 20                | 85                     | 13                   | 125                       | 20            | 6           | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSA474*025T7000  | A         | 0.47             | 25                | 85                     | 17                   | 125                       | 0.5           | 4           | 7000                   | 0.104                  | 0.093 | 0.041 | 1   |
| TPSA684*025T6000  | A         | 0.68             | 25                | 85                     | 17                   | 125                       | 0.5           | 4           | 6000                   | 0.112                  | 0.101 | 0.045 | 1   |
| TPSA105*025T4000  | A         | 1.0              | 25                | 85                     | 17                   | 125                       | 0.5           | 4           | 4000                   | 0.137                  | 0.123 | 0.055 | 1   |
| TPSA155*025T3000  | A         | 1.5              | 25                | 85                     | 17                   | 125                       | 0.5           | 6           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSA225*025T2500  | A         | 2.2              | 25                | 85                     | 17                   | 125                       | 0.6           | 6           | 2500                   | 0.173                  | 0.156 | 0.069 | 1   |
| TPSB225*025T0900  | B         | 2.2              | 25                | 85                     | 17                   | 125                       | 0.6           | 6           | 900                    | 0.307                  | 0.277 | 0.123 | 1   |
| TPSB225*025T1200  | B         | 2.2              | 25                | 85                     | 17                   | 125                       | 0.6           | 6           | 1200                   | 0.266                  | 0.240 | 0.106 | 1   |
| TPSB225*025T2500  | B         | 2.2              | 25                | 85                     | 17                   | 125                       | 0.6           | 6           | 2500                   | 0.184                  | 0.166 | 0.074 | 1   |
| TPSB335*025T0750  | B         | 3.3              | 25                | 85                     | 17                   | 125                       | 0.8           | 6           | 750                    | 0.337                  | 0.303 | 0.135 | 1   |
| TPSB335*025T1500  | B         | 3.3              | 25                | 85                     | 17                   | 125                       | 0.8           | 6           | 1500                   | 0.238                  | 0.214 | 0.095 | 1   |
| TPSB335*025T2000  | B         | 3.3              | 25                | 85                     | 17                   | 125                       | 0.8           | 6           | 2000                   | 0.206                  | 0.186 | 0.082 | 1   |
| TPSB475*025T0700  | B         | 4.7              | 25                | 85                     | 17                   | 125                       | 1.2           | 6           | 700                    | 0.348                  | 0.314 | 0.139 | 1   |
| TPSB475*025T0900  | B         | 4.7              | 25                | 85                     | 17                   | 125                       | 1.2           | 6           | 900                    | 0.307                  | 0.277 | 0.123 | 1   |
| TPSC475*025T0700  | C         | 4.7              | 25                | 85                     | 17                   | 125                       | 1.2           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB685*025T0700  | B         | 6.8              | 25                | 85                     | 17                   | 125                       | 1.7           | 6           | 700                    | 0.348                  | 0.314 | 0.139 | 1   |
| TPSC685*025T0500  | C         | 6.8              | 25                | 85                     | 17                   | 125                       | 1.7           | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSC685*025T0600  | C         | 6.8              | 25                | 85                     | 17                   | 125                       | 1.7           | 6           | 600                    | 0.428                  | 0.385 | 0.171 | 1   |
| TPSC685*025T0700  | C         | 6.8              | 25                | 85                     | 17                   | 125                       | 1.7           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB106*025T1800  | B         | 10               | 25                | 85                     | 17                   | 125                       | 2.5           | 6           | 1800                   | 0.217                  | 0.196 | 0.087 | 1   |
| TPSC106*025T0300  | C         | 10               | 25                | 85                     | 17                   | 125                       | 2.5           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSC106*025T0500  | C         | 10               | 25                | 85                     | 17                   | 125                       | 2.5           | 6           | 500                    | 0.469                  | 0.422 | 0.188 | 1   |
| TPSD106*025T0500V | D         | 10               | 25                | 85                     | 17                   | 125                       | 2.5           | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSC156*025T0220  | C         | 15               | 25                | 85                     | 17                   | 125                       | 3.8           | 6           | 220                    | 0.707                  | 0.636 | 0.283 | 1   |
| TPSC156*025T0300  | C         | 15               | 25                | 85                     | 17                   | 125                       | 3.8           | 6           | 300                    | 0.606                  | 0.545 | 0.242 | 1   |
| TPSD156*025T0300V | D         | 15               | 25                | 85                     | 17                   | 125                       | 3.8           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020

\*Please use "U" instead of "T" in the suffix letter for 13" reel packaging

Please use specific PN for automotive version – see "HOW TO ORDER". All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting. For typical weight and composition see page 259.

NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.



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TDS-PTNO-0041 | Rev 2

– POLYMER, TANTALUM AND NIOBIUM OXIDE CAPACITORS –

# TPS Automotive Range

## Low ESR - Automotive Product Range



### RATINGS & PART NUMBER REFERENCE

| Part Number       | Case Size | Capacitance (µF) | Rated Voltage (V) | Rated Temperature (°C) | Category Voltage (V) | Category Temperature (°C) | DCL Max. (µA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (A) |       |       | MSL |
|-------------------|-----------|------------------|-------------------|------------------------|----------------------|---------------------------|---------------|-------------|------------------------|------------------------|-------|-------|-----|
|                   |           |                  |                   |                        |                      |                           |               |             |                        | 25°C                   | 85°C  | 125°C |     |
| TPSC226*025T0275  | C         | 22               | 25                | 85                     | 17                   | 125                       | 5.5           | 6           | 275                    | 0.632                  | 0.569 | 0.253 | 1   |
| TPSC226*025T0400  | C         | 22               | 25                | 85                     | 17                   | 125                       | 5.5           | 6           | 400                    | 0.524                  | 0.472 | 0.210 | 1   |
| TPSD226*025T0200V | D         | 22               | 25                | 85                     | 17                   | 125                       | 5.5           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD226*025T0300V | D         | 22               | 25                | 85                     | 17                   | 125                       | 5.5           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSD336*025T0200V | D         | 33               | 25                | 85                     | 17                   | 125                       | 8.3           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD336*025T0300V | D         | 33               | 25                | 85                     | 17                   | 125                       | 8.3           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSD476*025T0125V | D         | 47               | 25                | 85                     | 17                   | 125                       | 11.8          | 6           | 125                    | 1.095                  | 0.986 | 0.438 | 3   |
| TPSD476*025T0150V | D         | 47               | 25                | 85                     | 17                   | 125                       | 11.8          | 6           | 150                    | 1.000                  | 0.900 | 0.400 | 3   |
| TPSD476*025T0250V | D         | 47               | 25                | 85                     | 17                   | 125                       | 11.8          | 6           | 250                    | 0.775                  | 0.697 | 0.310 | 3   |
| TPSE476*025T0125V | E         | 47               | 25                | 85                     | 17                   | 125                       | 11.8          | 6           | 125                    | 1.149                  | 1.034 | 0.460 | 3   |
| TPSE686*025T0200V | E         | 68               | 25                | 85                     | 17                   | 125                       | 17            | 6           | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSE107*025T0150V | E         | 100              | 25                | 85                     | 17                   | 125                       | 25            | 10          | 150                    | 1.049                  | 0.944 | 0.420 | 3   |
| 35 Volt @ 85°C    |           |                  |                   |                        |                      |                           |               |             |                        |                        |       |       |     |
| TPSA334*035T6000  | A         | 0.33             | 35                | 85                     | 23                   | 125                       | 0.5           | 4           | 6000                   | 0.112                  | 0.101 | 0.045 | 1   |
| TPSA474*035T6000  | A         | 0.47             | 35                | 85                     | 23                   | 125                       | 0.5           | 4           | 6000                   | 0.112                  | 0.101 | 0.045 | 1   |
| TPSA684*035T6000  | A         | 0.68             | 35                | 85                     | 23                   | 125                       | 0.5           | 4           | 6000                   | 0.112                  | 0.101 | 0.045 | 1   |
| TPSA105*035T3000  | A         | 1                | 35                | 85                     | 23                   | 125                       | 0.5           | 4           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSB105*035T2000  | B         | 1                | 35                | 85                     | 23                   | 125                       | 0.5           | 4           | 2000                   | 0.206                  | 0.186 | 0.082 | 1   |
| TPSA155*035T3000  | A         | 1.5              | 35                | 85                     | 23                   | 125                       | 0.5           | 6           | 3000                   | 0.158                  | 0.142 | 0.063 | 1   |
| TPSB155*035T2500  | B         | 1.5              | 35                | 85                     | 23                   | 125                       | 0.5           | 6           | 2500                   | 0.184                  | 0.166 | 0.074 | 1   |
| TPSB225*035T0750  | B         | 2.2              | 35                | 85                     | 23                   | 125                       | 0.8           | 6           | 750                    | 0.337                  | 0.303 | 0.135 | 1   |
| TPSB225*035T1500  | B         | 2.2              | 35                | 85                     | 23                   | 125                       | 0.8           | 6           | 1500                   | 0.238                  | 0.214 | 0.095 | 1   |
| TPSB225*035T2000  | B         | 2.2              | 35                | 85                     | 23                   | 125                       | 0.8           | 6           | 2000                   | 0.206                  | 0.186 | 0.082 | 1   |
| TPSC225*035T1000  | C         | 2.2              | 35                | 85                     | 23                   | 125                       | 0.8           | 6           | 1000                   | 0.332                  | 0.298 | 0.133 | 1   |
| TPSB335*035T1000  | B         | 3.3              | 35                | 85                     | 23                   | 125                       | 1.2           | 6           | 1000                   | 0.292                  | 0.262 | 0.117 | 1   |
| TPSC335*035T0700  | C         | 3.3              | 35                | 85                     | 23                   | 125                       | 1.2           | 6           | 700                    | 0.396                  | 0.357 | 0.159 | 1   |
| TPSB475*035T0700  | B         | 4.7              | 35                | 85                     | 23                   | 125                       | 1.6           | 6           | 700                    | 0.348                  | 0.314 | 0.139 | 1   |
| TPSB475*035T1500  | B         | 4.7              | 35                | 85                     | 23                   | 125                       | 1.6           | 6           | 1500                   | 0.238                  | 0.214 | 0.095 | 1   |
| TPSC475*035T0600  | C         | 4.7              | 35                | 85                     | 23                   | 125                       | 1.6           | 6           | 600                    | 0.428                  | 0.385 | 0.171 | 1   |
| TPSD475*035T0700V | D         | 4.7              | 35                | 85                     | 23                   | 125                       | 1.6           | 6           | 700                    | 0.463                  | 0.417 | 0.185 | 3   |
| TPSC685*035T0350  | C         | 6.8              | 35                | 85                     | 23                   | 125                       | 2.4           | 6           | 350                    | 0.561                  | 0.505 | 0.224 | 1   |
| TPSD685*035T0400V | D         | 6.8              | 35                | 85                     | 23                   | 125                       | 2.4           | 6           | 400                    | 0.612                  | 0.551 | 0.245 | 3   |
| TPSD685*035T0500V | D         | 6.8              | 35                | 85                     | 23                   | 125                       | 2.4           | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSC106*035T0600  | C         | 10               | 35                | 85                     | 23                   | 125                       | 3.5           | 6           | 600                    | 0.428                  | 0.385 | 0.171 | 1   |
| TPSD106*035T0300V | D         | 10               | 35                | 85                     | 23                   | 125                       | 3.5           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSE106*035T0250V | E         | 10               | 35                | 85                     | 23                   | 125                       | 3.5           | 6           | 250                    | 0.812                  | 0.731 | 0.325 | 3   |
| TPSD156*035T0300V | D         | 15               | 35                | 85                     | 23                   | 125                       | 5.3           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSD226*035T0200V | D         | 22               | 35                | 85                     | 23                   | 125                       | 7.7           | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD226*035T0300V | D         | 22               | 35                | 85                     | 23                   | 125                       | 7.7           | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSD226*035T0400V | D         | 22               | 35                | 85                     | 23                   | 125                       | 7.7           | 6           | 400                    | 0.612                  | 0.551 | 0.245 | 3   |
| TPSE226*035T0200V | E         | 22               | 35                | 85                     | 23                   | 125                       | 7.7           | 6           | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSE226*035T0300V | E         | 22               | 35                | 85                     | 23                   | 125                       | 7.7           | 6           | 300                    | 0.742                  | 0.667 | 0.297 | 3   |
| TPSD336*035T0200V | D         | 33               | 35                | 85                     | 23                   | 125                       | 11.6          | 6           | 200                    | 0.866                  | 0.779 | 0.346 | 3   |
| TPSD336*035T0300V | D         | 33               | 35                | 85                     | 23                   | 125                       | 11.6          | 6           | 300                    | 0.707                  | 0.636 | 0.283 | 3   |
| TPSE336*035T0250V | E         | 33               | 35                | 85                     | 23                   | 125                       | 11.6          | 6           | 250                    | 0.812                  | 0.731 | 0.325 | 3   |
| TPSE336*035T0300V | E         | 33               | 35                | 85                     | 23                   | 125                       | 11.6          | 6           | 300                    | 0.742                  | 0.667 | 0.297 | 3   |
| TPSE476*035T0200V | E         | 47               | 35                | 85                     | 23                   | 125                       | 16.5          | 6           | 200                    | 0.908                  | 0.817 | 0.363 | 3   |
| TPSE476*035T0250V | E         | 47               | 35                | 85                     | 23                   | 125                       | 16.5          | 6           | 250                    | 0.812                  | 0.731 | 0.325 | 3   |
| 50 Volt @ 85°C    |           |                  |                   |                        |                      |                           |               |             |                        |                        |       |       |     |
| TPSA224*050T7000  | A         | 0.22             | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 7000                   | 0.104                  | 0.093 | 0.041 | 1   |
| TPSA334*050T7000  | A         | 0.33             | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 7000                   | 0.104                  | 0.093 | 0.041 | 1   |
| TPSA474*050T6500  | A         | 0.47             | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 6500                   | 0.107                  | 0.097 | 0.043 | 1   |
| TPSB474*050T6000  | B         | 0.47             | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 6000                   | 0.119                  | 0.107 | 0.048 | 1   |
| TPSB684*050T4000  | B         | 0.68             | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 4000                   | 0.146                  | 0.131 | 0.058 | 1   |
| TPSB105*050T3000  | B         | 1                | 50                | 85                     | 33                   | 125                       | 0.5           | 6           | 3000                   | 0.168                  | 0.151 | 0.067 | 1   |
| TPSC105*050T2500  | C         | 1                | 50                | 85                     | 33                   | 125                       | 0.5           | 4           | 2500                   | 0.210                  | 0.189 | 0.084 | 1   |
| TPSC155*050T1500  | C         | 1.5              | 50                | 85                     | 33                   | 125                       | 0.8           | 6           | 1500                   | 0.271                  | 0.244 | 0.108 | 1   |
| TPSC155*050T2000  | C         | 1.5              | 50                | 85                     | 33                   | 125                       | 0.8           | 6           | 2000                   | 0.235                  | 0.211 | 0.094 | 1   |
| TPSC225*050T1500  | C         | 2.2              | 50                | 85                     | 33                   | 125                       | 1.1           | 8           | 1500                   | 0.271                  | 0.244 | 0.108 | 1   |
| TPSD225*050T1200V | D         | 2.2              | 50                | 85                     | 33                   | 125                       | 1.1           | 6           | 1200                   | 0.354                  | 0.318 | 0.141 | 3   |
| TPSC335*050T1000  | C         | 3.3              | 50                | 85                     | 33                   | 125                       | 1.6           | 6           | 1000                   | 0.332                  | 0.298 | 0.133 | 1   |
| TPSD335*050T0800V | D         | 3.3              | 50                | 85                     | 33                   | 125                       | 1.7           | 6           | 800                    | 0.433                  | 0.390 | 0.173 | 3   |
| TPSC475*050T0800  | C         | 4.7              | 50                | 85                     | 33                   | 125                       | 2.4           | 6           | 800                    | 0.371                  | 0.334 | 0.148 | 1   |
| TPSD475*050T0250V | D         | 4.7              | 50                | 85                     | 33                   | 125                       | 2.4           | 6           | 250                    | 0.775                  | 0.697 | 0.310 | 3   |
| TPSD475*050T0500V | D         | 4.7              | 50                | 85                     | 33                   | 125                       | 2.4           | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSD475*050T0700V | D         | 4.7              | 50                | 85                     | 33                   | 125                       | 2.4           | 6           | 700                    | 0.463                  | 0.417 | 0.185 | 3   |
| TPSD685*050T0500V | D         | 6.8              | 50                | 85                     | 33                   | 125                       | 3.4           | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSD685*050T0600V | D         | 6.8              | 50                | 85                     | 33                   | 125                       | 3.4           | 6           | 600                    | 0.500                  | 0.450 | 0.200 | 3   |
| TPSD106*050T0500V | D         | 10               | 50                | 85                     | 33                   | 125                       | 5             | 6           | 500                    | 0.548                  | 0.493 | 0.219 | 3   |
| TPSE106*050T0250V | E         | 10               | 50                | 85                     | 33                   | 125                       | 5             | 6           | 250                    | 0.812                  | 0.731 | 0.325 | 3   |
| TPSE106*050T0300V | E         | 10               | 50                | 85                     | 33                   | 125                       | 5             | 6           | 300                    | 0.742                  | 0.667 | 0.297 | 3   |
| TPSE106*050T0400V | E         | 10               | 50                | 85                     | 33                   | 125                       | 5             | 6           | 400                    | 0.642                  | 0.578 | 0.257 | 3   |
| TPSE106*050T0500V | E         | 10               | 50                | 85                     | 33                   | 125                       | 5             | 6           | 500                    | 0.574                  | 0.517 | 0.230 | 3   |
| TPSE156*050T0250V | E         | 15               | 50                | 85                     | 33                   | 125                       | 7.5           | 6           | 250                    | 0.812                  | 0.731 | 0.325 | 3   |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020

\*Please use "U" instead of "T" in the suffix letter for 13" reel packaging

Please use specific PN for automotive version – see "HOW TO ORDER". All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting. For typical weight and composition see page 259.

NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.

# TPS Automotive Range

## Low ESR - Automotive Product Range

### QUALIFICATION TABLE

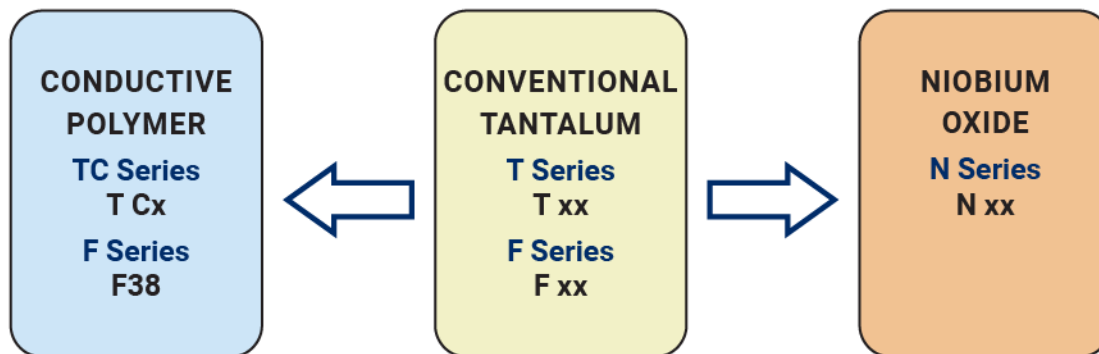
| TEST                  | TPS automotive series (Temperature range -55°C to +125°C)                                                                                                                                     |               |               |                    |                              |           |         |           |            |          |          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|--------------------|------------------------------|-----------|---------|-----------|------------|----------|----------|
|                       | Condition                                                                                                                                                                                     |               |               | Characteristics    |                              |           |         |           |            |          |          |
| Endurance             | Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring. |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | 1.25 x initial limit         |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±10% of initial value |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Storage Life          | Store at 125°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.                                                                             |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | 1.25 x initial limit         |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±10% of initial value |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Humidity              | Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.                                    |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | 1.5 x initial limit          |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±10% of initial value |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | 1.2 x initial limit          |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Biased Humidity       | Apply rated voltage (Ur) at 85°C, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for 1-2 hours before measuring.                                            |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | 2 x initial limit            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±10% of initial value |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | 1.2 x initial limit          |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Temperature Stability | Step                                                                                                                                                                                          | Temperature°C | Duration(min) |                    | +20°C                        | -55°C     | +20°C   | +85°C     | +125°C     | +20°C    |          |
|                       | 1                                                                                                                                                                                             | +20           | 15            | DCL                | IL*                          | n/a       | IL*     | 10 x IL*  | 12.5 x IL* | IL*      |          |
|                       | 2                                                                                                                                                                                             | -55           | 15            |                    | ΔC/C                         | n/a       | +0/-10% | ±5%       | +10/-0%    | +12/-0%  | ±5%      |
|                       | 3                                                                                                                                                                                             | +20           | 15            | DF                 | IL*                          | 1.5 x IL* | IL*     | 1.5 x IL* | 2 x IL*    | IL*      |          |
|                       | 4                                                                                                                                                                                             | +85           | 15            |                    | ESR                          | 1.25xIL*  | 25xIL*  | 1.25xIL*  | 1.25xIL*   | 1.25xIL* | 1.25xIL* |
|                       | 5                                                                                                                                                                                             | +125          | 15            |                    |                              |           |         |           |            |          |          |
|                       | 6                                                                                                                                                                                             | +20           | 15            |                    |                              |           |         |           |            |          |          |
| Surge Voltage         | Apply 1.3x category voltage (Uc) at 125°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000Ω                          |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±5% of initial value  |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Mechanical Shock      | MIL-STD-202, Method 213, Condition F                                                                                                                                                          |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±5% of initial value  |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |
| Vibration             | MIL-STD-202, Method 204, Condition D                                                                                                                                                          |               |               | Visual examination | no visible damage            |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DCL                | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ΔC/C               | within ±5% of initial value  |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | DF                 | initial limit                |           |         |           |            |          |          |
|                       |                                                                                                                                                                                               |               |               | ESR                | 1.25 x initial limit         |           |         |           |            |          |          |

\*Initial Limit

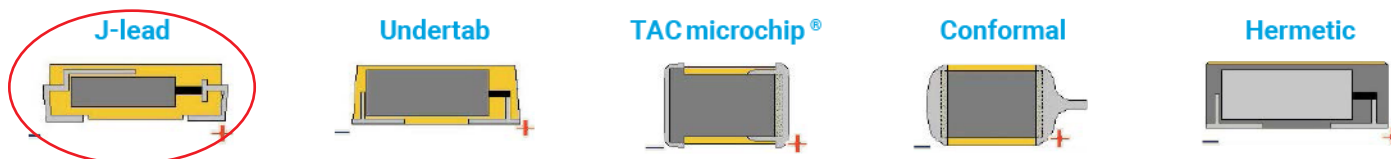
# TPS Automotive Range

## Low ESR - Automotive Product Range

### SOLID ELECTROLYTIC CAPACITOR ROADMAP



### FIVE CAPACITOR CONSTRUCTION STYLES



### SERIES LINE UP : CONVENTIONAL SMD $MnO_2$

