

## Solid Tantalum Surface Mount Chip Capacitors, Molded Case, Ultra Flat Low Profile



### PERFORMANCE / ELECTRICAL CHARACTERISTICS

**Operating Temperature:** -55 °C to +125 °C  
(above 85 °C, voltage derating is required)

**Capacitance Range:** 0.1 µF to 220 µF

**Capacitance Tolerance:** ± 10 %, ± 20 %

**Voltage Rating:** 2.5 V<sub>DC</sub> to 35 V<sub>DC</sub>

### FEATURES

- Small size, low profile
- Terminations: 100 % matte tin
- MSL level: 1 (UA case size), 3 (UB case size)
- Compatible with “high volume” automatic pick and place equipment
- Material categorization:  
for definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
Available  
**GREEN**  
(5-2008)  
Available

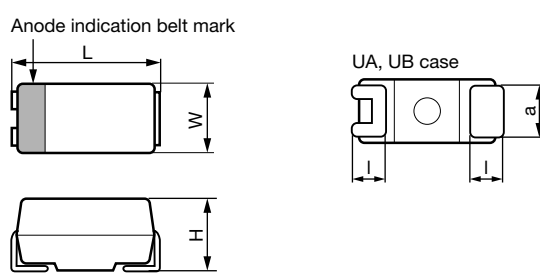
### APPLICATIONS

- Industrial
- General purpose

### ORDERING INFORMATION

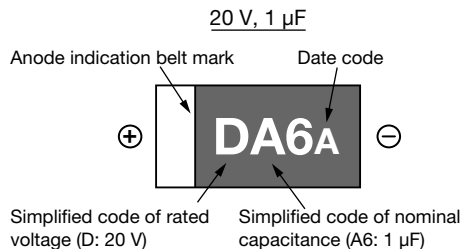
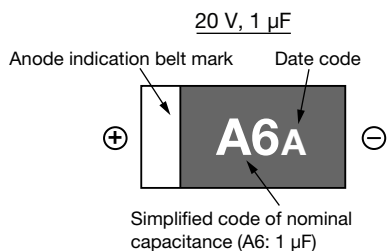
| TMCU | A                                 | 1G                                                                                                          | 107                                                                                                                            | M                        | TR                                               | (2)                          | F                               |
|------|-----------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------|------------------------------|---------------------------------|
| TYPE | CASE CODE                         | DC VOLTAGE RATING AT +85 °C                                                                                 | CAPACITANCE (µF)                                                                                                               | CAPACITANCE TOLERANCE    | PACKAGING POLARITY                               | (OPTIONAL)                   | TERMINAL CODE                   |
|      | See Ratings and Case Codes table. | 0E = 2.5 V<br>0G = 4 V<br>0J = 6.3 V (7 V)<br>1A = 10 V<br>1C = 16 V<br>1D = 20 V<br>1E = 25 V<br>1V = 35 V | This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow. | K = ± 10 %<br>M = ± 20 % | TR = 7" reel, cathodes close to perforation side | Halogen-free (special order) | F = lead (Pb)-free terminations |

### DIMENSIONS in inches [millimeters]

|  |          |                              |                              |                          |                              |                              |
|--------------------------------------------------------------------------------------|----------|------------------------------|------------------------------|--------------------------|------------------------------|------------------------------|
| CASE CODE                                                                            | EIA SIZE | L                            | W                            | H                        | I                            | a                            |
| UA                                                                                   | 3216-12  | 0.126 ± 0.008<br>[3.2 ± 0.2] | 0.063 ± 0.008<br>[1.6 ± 0.2] | 0.047 max.<br>[1.2 max.] | 0.030 ± 0.012<br>[0.8 ± 0.3] | 0.047 ± 0.008<br>[1.2 ± 0.2] |
| UB                                                                                   | 3528-12  | 0.138 ± 0.008<br>[3.5 ± 0.2] | 0.110 ± 0.008<br>[2.8 ± 0.2] | 0.047 max.<br>[1.2 max.] | 0.030 ± 0.012<br>[0.8 ± 0.3] | 0.071 ± 0.008<br>[1.8 ± 0.2] |



| RATINGS AND CASE CODES |         |         |             |         |         |         |      |         |
|------------------------|---------|---------|-------------|---------|---------|---------|------|---------|
| $\mu\text{F}$          | 2.5 V   | 4 V     | 6.3 V (7 V) | 10 V    | 16 V    | 20 V    | 25 V | 35 V    |
| 0.10                   |         |         |             |         |         |         |      | UA      |
| 0.15                   |         |         |             |         |         |         |      | UA      |
| 0.22                   |         |         |             |         |         |         |      | UA      |
| 0.33                   |         |         |             |         |         |         | UA   |         |
| 0.47                   |         |         |             |         |         |         | UA   |         |
| 0.68                   |         |         |             |         |         | UA      | UA   |         |
| 1.0                    |         |         |             |         |         | UA / UB | UA   | UA / UB |
| 1.5                    |         |         |             |         | UA      | UA / UB | UB   | UB      |
| 2.2                    |         |         |             |         | UA / UB | UA / UB | UB   | UB      |
| 3.3                    |         |         |             |         | UA / UB | UA / UB | UB   |         |
| 4.7                    |         |         |             | UA      | UA / UB | UB      | UB   |         |
| 6.8                    |         |         |             | UA      | UA / UB | UB      |      |         |
| 10                     |         |         | UA          | UA      | UA / UB |         |      |         |
| 15                     | UA      | UA      | UA          | UA / UB | UB      |         |      |         |
| 22                     | UA      | UA      | UA / UB     | UA / UB | UB      |         |      |         |
| 33                     | UA / UB | UA / UB | UA / UB     | UB      |         |         |      |         |
| 47                     | UA / UB | UA / UB | UA / UB     | UB      |         |         |      |         |
| 68                     | UB      | UA / UB | UB          |         |         |         |      |         |
| 100                    | UB      | UA / UB | UB          |         |         |         |      |         |
| 150                    | UB      | UB      |             |         |         |         |      |         |
| 220                    | UB      | UB      |             |         |         |         |      |         |

**MARKING**

**CAPACITANCE AND VOLTAGE MARKING**

| $\mu$ F | 2.5 V | 4 V | 6.3 V | 10 V | 16 V                                 | 20 V                                 | 25 V | 35 V |
|---------|-------|-----|-------|------|--------------------------------------|--------------------------------------|------|------|
| 0.10    |       |     |       |      |                                      |                                      |      | VA5  |
| 0.15    |       |     |       |      |                                      |                                      |      | VE5  |
| 0.22    |       |     |       |      |                                      |                                      |      | VJ5  |
| 0.33    |       |     |       |      |                                      |                                      | EN5  |      |
| 0.47    |       |     |       |      |                                      |                                      | ES5  |      |
| 0.68    |       |     |       |      |                                      | DW5                                  | EW5  |      |
| 1.0     |       |     |       |      |                                      | DA6 <sup>(1)</sup> A6 <sup>(2)</sup> | EA6  | VA6  |
| 1.5     |       |     |       |      | CE6                                  | DE6 <sup>(1)</sup> E6 <sup>(2)</sup> | EE6  | VE6  |
| 2.2     |       |     |       |      | CJ6 <sup>(1)</sup> J6 <sup>(2)</sup> | DJ6                                  | EJ6  | VJ6  |
| 3.3     |       |     |       |      | CN6                                  | DN6                                  | EN6  |      |
| 4.7     |       |     |       | AS6  | CS6                                  | DS6                                  | ES6  |      |
| 6.8     |       |     |       | AW6  | CW6                                  | DW6                                  |      |      |
| 10      |       |     | JA7   | AA7  | CA7                                  |                                      |      |      |
| 15      | eE7   | GE7 | JE7   | AE7  | CE7                                  |                                      |      |      |
| 22      | eJ7   | GJ7 | JJ7   | AJ7  | CJ7                                  |                                      |      |      |
| 33      | eN7   | GN7 | JN7   | AN7  |                                      |                                      |      |      |
| 47      | eS7   | GS7 | JS7   | AS7  |                                      |                                      |      |      |
| 68      | eW7   | GW7 | JW7   |      |                                      |                                      |      |      |
| 100     | eA8   | GA8 | JA8   |      |                                      |                                      |      |      |
| 220     | eE8   | GE8 |       |      |                                      |                                      |      |      |
| 330     | eJ8   | GJ8 |       |      |                                      |                                      |      |      |

**Notes**

- <sup>(1)</sup> Marking on UA case  
<sup>(2)</sup> Marking on UB case

**DATE CODE**

| YEAR | MONTH |   |   |   |   |   |   |   |   |    |    |    |
|------|-------|---|---|---|---|---|---|---|---|----|----|----|
|      | 1     | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2013 | A     | B | C | D | E | F | G | H | J | K  | L  | M  |
| 2014 | N     | P | Q | R | S | T | U | V | W | X  | Y  | Z  |
| 2015 | a     | b | c | d | e | f | g | h | j | k  | l  | m  |
| 2016 | n     | p | q | r | s | t | u | v | w | x  | y  | z  |



| STANDARD RATINGS                                                                 |              |                  |                                     |                                     |                                                |                                          |
|----------------------------------------------------------------------------------|--------------|------------------|-------------------------------------|-------------------------------------|------------------------------------------------|------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                                        | CASE<br>CODE | PART NUMBER      | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C, 120 Hz<br>(%) | MAX. ESR<br>AT +25 °C, 100 kHz<br>( $\Omega$ ) | MAX. RIPPLE,<br>100 kHz $I_{RMS}$<br>(A) |
| 2.5 V <sub>DC</sub> AT +85 °C; 1.6 V <sub>DC</sub> AT +125 °C                    |              |                  |                                     |                                     |                                                |                                          |
| 15                                                                               | UA           | TMCUA0E156(1)TRF | 0.5                                 | 8                                   | 3.0                                            | 0.161                                    |
| 22                                                                               | UA           | TMCUA0E226(1)TRF | 0.6                                 | 8                                   | 1.8                                            | 0.208                                    |
| 33                                                                               | UA           | TMCUA0E336(1)TRF | 1.7                                 | 12                                  | 1.8                                            | 0.208                                    |
| 33                                                                               | UB           | TMCUB0E336(1)TRF | 0.8                                 | 12                                  | 1.7                                            | 0.238                                    |
| 47                                                                               | UA           | TMCUA0E476(1)TRF | 2.4                                 | 18                                  | 1.8                                            | 0.208                                    |
| 47                                                                               | UB           | TMCUB0E476(1)TRF | 1.2                                 | 12                                  | 1.7                                            | 0.238                                    |
| 68                                                                               | UB           | TMCUB0E686(1)TRF | 1.7                                 | 15                                  | 1.7                                            | 0.238                                    |
| 100                                                                              | UB           | TMCUB0E107(1)TRF | 5.0                                 | 20                                  | 1.1                                            | 0.295                                    |
| 150                                                                              | UB           | TMCUB0E157(1)TRF | 7.5                                 | 30                                  | 1.1                                            | 0.295                                    |
| 220                                                                              | UB           | TMCUB0E227(1)TRF | 11.0                                | 30                                  | 1.1                                            | 0.295                                    |
| 4 V <sub>DC</sub> AT +85 °C; 2.5 V <sub>DC</sub> AT +125 °C                      |              |                  |                                     |                                     |                                                |                                          |
| 15                                                                               | UA           | TMCUA0G156(1)TRF | 0.6                                 | 8                                   | 3.0                                            | 0.161                                    |
| 22                                                                               | UA           | TMCUA0G226(1)TRF | 0.9                                 | 8                                   | 1.8                                            | 0.208                                    |
| 33                                                                               | UA           | TMCUA0G336(1)TRF | 2.6                                 | 12                                  | 1.8                                            | 0.208                                    |
| 33                                                                               | UB           | TMCUB0G336(1)TRF | 1.3                                 | 12                                  | 1.7                                            | 0.238                                    |
| 47                                                                               | UA           | TMCUA0G476(1)TRF | 3.8                                 | 18                                  | 1.8                                            | 0.208                                    |
| 47                                                                               | UB           | TMCUB0G476(1)TRF | 1.9                                 | 12                                  | 1.7                                            | 0.238                                    |
| 68                                                                               | UA           | TMCUA0G686(1)TRF | 5.4                                 | 30                                  | 4.0                                            | 0.140                                    |
| 68                                                                               | UB           | TMCUB0G686(1)TRF | 2.7                                 | 15                                  | 1.7                                            | 0.238                                    |
| 100                                                                              | UA           | TMCUA0G107MTRF   | 20.0                                | 30                                  | 2.9                                            | 0.164                                    |
| 100                                                                              | UB           | TMCUB0G107(1)TRF | 8.0                                 | 20                                  | 1.1                                            | 0.295                                    |
| 150                                                                              | UB           | TMCUB0G157(1)TRF | 12.0                                | 30                                  | 1.1                                            | 0.295                                    |
| 220                                                                              | UB           | TMCUB0G227MTRF   | 17.6                                | 30                                  | 1.1                                            | 0.295                                    |
| 6.3 V <sub>DC</sub> (7 V <sub>DC</sub> ) AT +85 °C; 4 V <sub>DC</sub> AT +125 °C |              |                  |                                     |                                     |                                                |                                          |
| 10                                                                               | UA           | TMCUA0J106(1)TRF | 0.7                                 | 8                                   | 4.0                                            | 0.140                                    |
| 15                                                                               | UA           | TMCUA0J156(1)TRF | 1.1                                 | 8                                   | 2.9                                            | 0.164                                    |
| 22                                                                               | UA           | TMCUA0J226(1)TRF | 2.8                                 | 12                                  | 2.9                                            | 0.164                                    |
| 22                                                                               | UB           | TMCUB0J226(1)TRF | 1.4                                 | 10                                  | 1.7                                            | 0.238                                    |
| 33                                                                               | UA           | TMCUA0J336(1)TRF | 4.2                                 | 20                                  | 2.9                                            | 0.164                                    |
| 33                                                                               | UB           | TMCUB0J336(1)TRF | 2.3                                 | 10                                  | 1.7                                            | 0.238                                    |
| 47                                                                               | UA           | TMCUA0J476MTRF   | 5.9                                 | 20                                  | 2.9                                            | 0.164                                    |
| 47                                                                               | UB           | TMCUB0J476(1)TRF | 3.3                                 | 12                                  | 1.7                                            | 0.238                                    |
| 68                                                                               | UB           | TMCUB0J686(1)TRF | 8.6                                 | 20                                  | 1.7                                            | 0.238                                    |
| 100                                                                              | UB           | TMCUB0J107MTRF   | 12.6                                | 20                                  | 1.1                                            | 0.295                                    |
| 10 V <sub>DC</sub> AT +85 °C; 6.3 V <sub>DC</sub> AT +125 °C                     |              |                  |                                     |                                     |                                                |                                          |
| 4.7                                                                              | UA           | TMCUA1A475(1)TRF | 0.5                                 | 6                                   | 4.0                                            | 0.140                                    |
| 6.8                                                                              | UA           | TMCUA1A685(1)TRF | 0.7                                 | 6                                   | 4.0                                            | 0.140                                    |
| 10                                                                               | UA           | TMCUA1A106(1)TRF | 1.0                                 | 8                                   | 4.0                                            | 0.140                                    |
| 15                                                                               | UA           | TMCUA1A156(1)TRF | 3.0                                 | 12                                  | 2.9                                            | 0.164                                    |
| 15                                                                               | UB           | TMCUB1A156(1)TRF | 1.5                                 | 10                                  | 2.8                                            | 0.185                                    |
| 22                                                                               | UA           | TMCUA1A226MTRF   | 4.4                                 | 18                                  | 2.9                                            | 0.164                                    |
| 22                                                                               | UB           | TMCUB1A226(1)TRF | 2.2                                 | 10                                  | 1.7                                            | 0.238                                    |
| 33                                                                               | UB           | TMCUB1A336(1)TRF | 6.6                                 | 12                                  | 1.7                                            | 0.238                                    |
| 47                                                                               | UB           | TMCUB1A476MTRF   | 9.4                                 | 30                                  | 1.7                                            | 0.238                                    |
| 16 V <sub>DC</sub> AT +85 °C; 10 V <sub>DC</sub> AT +125 °C                      |              |                  |                                     |                                     |                                                |                                          |
| 1.5                                                                              | UA           | TMCUA1C155(1)TRF | 0.5                                 | 6                                   | 8.8                                            | 0.094                                    |
| 2.2                                                                              | UA           | TMCUA1C225(1)TRF | 0.5                                 | 6                                   | 7.7                                            | 0.101                                    |
| 2.2                                                                              | UB           | TMCUB1C225(1)TRF | 0.5                                 | 6                                   | 6.6                                            | 0.121                                    |
| 3.3                                                                              | UA           | TMCUA1C335(1)TRF | 0.5                                 | 6                                   | 7.7                                            | 0.101                                    |
| 3.3                                                                              | UB           | TMCUB1C335(1)TRF | 0.5                                 | 6                                   | 4.0                                            | 0.155                                    |
| 4.7                                                                              | UA           | TMCUA1C475(1)TRF | 0.8                                 | 8                                   | 4.0                                            | 0.140                                    |
| 4.7                                                                              | UB           | TMCUB1C475(1)TRF | 0.8                                 | 6                                   | 4.0                                            | 0.155                                    |

**Note**

- Part number definition:  
(1) Tolerance: For 10 % tolerance, specify "K"; for 20 % tolerance, change to "M"



| STANDARD RATINGS                                            |              |                  |                                     |                                     |                                                |                                          |
|-------------------------------------------------------------|--------------|------------------|-------------------------------------|-------------------------------------|------------------------------------------------|------------------------------------------|
| CAPACITANCE<br>( $\mu$ F)                                   | CASE<br>CODE | PART NUMBER      | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C, 120 Hz<br>(%) | MAX. ESR<br>AT +25 °C, 100 kHz<br>( $\Omega$ ) | MAX. RIPPLE,<br>100 kHz $I_{RMS}$<br>(A) |
| 16 V <sub>DC</sub> AT +85 °C; 10 V <sub>DC</sub> AT +125 °C |              |                  |                                     |                                     |                                                |                                          |
| 6.8                                                         | UA           | TMCUA1C685(1)TRF | 1.1                                 | 12                                  | 4.0                                            | 0.140                                    |
| 6.8                                                         | UB           | TMCUB1C685(1)TRF | 1.1                                 | 6                                   | 4.0                                            | 0.155                                    |
| 10                                                          | UA           | TMCUA1C106MTRF   | 1.6                                 | 18                                  | 3.3                                            | 0.154                                    |
| 10                                                          | UB           | TMCUB1C106(1)TRF | 1.6                                 | 8                                   | 2.8                                            | 0.185                                    |
| 15                                                          | UB           | TMCUB1C156(1)TRF | 4.8                                 | 12                                  | 2.8                                            | 0.185                                    |
| 22                                                          | UB           | TMCUB1C226MTRF   | 7.0                                 | 18                                  | 1.7                                            | 0.238                                    |
| 20 V <sub>DC</sub> AT +85 °C; 13 V <sub>DC</sub> AT +125 °C |              |                  |                                     |                                     |                                                |                                          |
| 0.68                                                        | UA           | TMCUA1D684(1)TRF | 0.5                                 | 4                                   | 19.8                                           | 0.063                                    |
| 1.0                                                         | UA           | TMCUA1D105(1)TRF | 0.5                                 | 4                                   | 16.5                                           | 0.069                                    |
| 1.0                                                         | UB           | TMCUB1D105(1)TRF | 0.5                                 | 4                                   | 8.8                                            | 0.104                                    |
| 1.5                                                         | UA           | TMCUA1D155(1)TRF | 0.5                                 | 6                                   | 16.5                                           | 0.069                                    |
| 1.5                                                         | UB           | TMCUB1D155(1)TRF | 0.5                                 | 6                                   | 8.8                                            | 0.104                                    |
| 2.2                                                         | UA           | TMCUA1D225(1)TRF | 0.5                                 | 6                                   | 7.7                                            | 0.101                                    |
| 2.2                                                         | UB           | TMCUB1D225(1)TRF | 0.5                                 | 6                                   | 6.6                                            | 0.121                                    |
| 3.3                                                         | UA           | TMCUA1D335MTRF   | 0.7                                 | 6                                   | 7.7                                            | 0.101                                    |
| 3.3                                                         | UB           | TMCUB1D335(1)TRF | 0.7                                 | 6                                   | 4.0                                            | 0.155                                    |
| 4.7                                                         | UB           | TMCUB1D475(1)TRF | 0.9                                 | 6                                   | 4.0                                            | 0.155                                    |
| 6.8                                                         | UB           | TMCUB1D685MTRF   | 1.4                                 | 6                                   | 2.8                                            | 0.185                                    |
| 25 V <sub>DC</sub> AT +85 °C; 16 V <sub>DC</sub> AT +125 °C |              |                  |                                     |                                     |                                                |                                          |
| 0.33                                                        | UA           | TMCUA1E334(1)TRF | 0.5                                 | 4                                   | 26.4                                           | 0.054                                    |
| 0.47                                                        | UA           | TMCUA1E474(1)TRF | 0.5                                 | 4                                   | 22.0                                           | 0.060                                    |
| 0.68                                                        | UA           | TMCUA1E684(1)TRF | 0.5                                 | 8                                   | 19.8                                           | 0.063                                    |
| 1.0                                                         | UA           | TMCUA1E105(1)TRF | 0.5                                 | 8                                   | 16.5                                           | 0.069                                    |
| 1.5                                                         | UB           | TMCUB1E155(1)TRF | 0.5                                 | 6                                   | 8.8                                            | 0.104                                    |
| 2.2                                                         | UB           | TMCUB1E225(1)TRF | 0.6                                 | 6                                   | 6.6                                            | 0.121                                    |
| 3.3                                                         | UB           | TMCUB1E335(1)TRF | 0.8                                 | 6                                   | 4.0                                            | 0.155                                    |
| 4.7                                                         | UB           | TMCUB1E475MTRF   | 1.2                                 | 6                                   | 4.0                                            | 0.155                                    |
| 35 V <sub>DC</sub> AT +85 °C; 22 V <sub>DC</sub> AT +125 °C |              |                  |                                     |                                     |                                                |                                          |
| 0.10                                                        | UA           | TMCUA1V104(1)TRF | 0.5                                 | 4                                   | 40.0                                           | 0.044                                    |
| 0.15                                                        | UA           | TMCUA1V154(1)TRF | 0.5                                 | 4                                   | 40.0                                           | 0.044                                    |
| 0.22                                                        | UA           | TMCUA1V224(1)TRF | 0.5                                 | 4                                   | 40.0                                           | 0.044                                    |
| 1.0                                                         | UA           | TMCUA1V105MTRF   | 0.5                                 | 8                                   | 16.5                                           | 0.069                                    |
| 1.0                                                         | UB           | TMCUB1V105(1)TRF | 0.5                                 | 6                                   | 8.8                                            | 0.104                                    |
| 1.5                                                         | UB           | TMCUB1V155(1)TRF | 0.5                                 | 6                                   | 8.8                                            | 0.104                                    |
| 2.2                                                         | UB           | TMCUB1V225MTRF   | 0.8                                 | 6                                   | 6.6                                            | 0.121                                    |

**Note**

- Part number definition:  
(1) Tolerance: For 10 % tolerance, specify "K"; for 20 % tolerance, change to "M"

| RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperature below +85 °C) |                   |
|------------------------------------------------------------------------|-------------------|
| CAPACITOR VOLTAGE RATING                                               | OPERATING VOLTAGE |
| 2.5                                                                    | 1.2               |
| 4.0                                                                    | 2.0               |
| 6.3 (7.0)                                                              | 3.1 (3.5)         |
| 10                                                                     | 5.0               |
| 16                                                                     | 8.0               |
| 20                                                                     | 10.0              |
| 25                                                                     | 12.5              |
| 35                                                                     | 17.5              |

**POWER DISSIPATION**

| CASE CODE | MAXIMUM PERMISSIBLE POWER DISSIPATION AT +25 °C (W) IN FREE AIR |
|-----------|-----------------------------------------------------------------|
| UA        | 0.078                                                           |
| UB        | 0.096                                                           |

**STANDARD PACKAGING QUANTITY**

| CASE CODE | UNITS PER 7" REEL |
|-----------|-------------------|
| UA        | 3000              |
| UB        | 3000              |

**PERFORMANCE CHARACTERISTICS**

| ITEM                        | CONDITION                                                                                                                                         | POST TEST PERFORMANCE           |                                                   |                                        |             |             |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------|----------------------------------------|-------------|-------------|
| Temperature characteristics | Measure the specified characteristics in each stage                                                                                               |                                 | Specified initial value                           | -55 °C                                 | +85 °C      | +125 °C     |
|                             |                                                                                                                                                   | Capacitance change              | -                                                 | -12 % to 0 %                           | 0 % to 10 % | 0 % to 12 % |
|                             |                                                                                                                                                   | Dissipation factor (%), maximum | 4                                                 | 5                                      | 4           | 5           |
|                             |                                                                                                                                                   |                                 | 6                                                 | 8                                      | 6           | 6           |
|                             |                                                                                                                                                   |                                 | 8                                                 | 12                                     | 10          | 12          |
|                             |                                                                                                                                                   |                                 | 10                                                | 14                                     | 12          | 14          |
|                             |                                                                                                                                                   |                                 | 12                                                | 16                                     | 14          | 16          |
|                             |                                                                                                                                                   |                                 | 18                                                | 34                                     | 20          | 22          |
|                             |                                                                                                                                                   |                                 | 20                                                | 38                                     | 22          | 24          |
|                             |                                                                                                                                                   | 30                              | 60                                                | 30                                     | 40          |             |
| Leakage current             | Refer to Standard Ratings table                                                                                                                   | -                               | 1000 % specified initial value or less            | 1250 % specified initial value or less |             |             |
| Solder heat resistance      | Solder Dip<br>260 °C ± 5 °C, 10 s ± 1 s<br>Reflow<br>260 °C, 10 s ± 1 s                                                                           | Capacitance change              | Within ± 5 % of initial value                     |                                        |             |             |
|                             |                                                                                                                                                   | Dissipation factor              | Initial specified value or less                   |                                        |             |             |
|                             |                                                                                                                                                   | Leakage current                 | Initial specified value or less                   |                                        |             |             |
| Moisture resistance no load | Leave at 40 °C and 90 % to 95 % RH for 500 h                                                                                                      | Capacitance change              | Within ± 10 % of initial value                    |                                        |             |             |
|                             |                                                                                                                                                   | Dissipation factor              | Initial specified value or less                   |                                        |             |             |
|                             |                                                                                                                                                   | Leakage current                 | Initial specified value or less                   |                                        |             |             |
| High temperature load       | 85 °C. The rated voltage is applied for 2000 h                                                                                                    | Capacitance change              | Within ± 10 % of initial value                    |                                        |             |             |
|                             |                                                                                                                                                   | Dissipation factor              | Initial specified value or less                   |                                        |             |             |
|                             |                                                                                                                                                   | Leakage current                 | Shall not exceed 125 % of initial specified value |                                        |             |             |
| Thermal shock               | Leave at -55 °C, normal temperature, 125 °C, and normal temperature for 30 min., 3 min, 30 min, and 3 min. Repeat this operation 5 times running. | Capacitance change              | Within ± 5 % of initial value                     |                                        |             |             |
|                             |                                                                                                                                                   | Dissipation factor              | Initial specified value or less                   |                                        |             |             |
|                             |                                                                                                                                                   | Leakage current                 | Initial specified value or less                   |                                        |             |             |
| Moisture resistance load    | Leave at 40 °C and 90 % to 95 % RH. The rated voltage applied for 500 h                                                                           | Capacitance change              | Within ± 10 % of initial value                    |                                        |             |             |
|                             |                                                                                                                                                   | Dissipation factor              | Shall not exceed 150 % of initial specified value |                                        |             |             |
|                             |                                                                                                                                                   | Leakage current                 | Shall not exceed 200 % of initial specified value |                                        |             |             |
| Failure rate                | 85 °C. The rated voltage is applied through a protective resistor of 1 Ω/V.                                                                       | 1 % / 1000 h                    |                                                   |                                        |             |             |

**Note**

- Test conditions per JIS C5101-1



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**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331