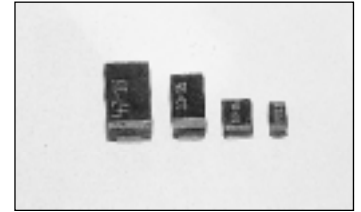


### FEATURES

- MOLDED CONSTRUCTION FOR HIGH SOLDERING HEAT RESISTANCE
- NINE CASE SIZES WITH MANY NEW EXTENDED RANGE RATINGS
- BOTH FLOW AND REFLOW SOLDERING APPLICABLE
- TAPE AND REEL PACKAGING COMPATIBLE WITH AUTOMATIC PICK AND PLACE EQUIPMENT



### SPECIFICATIONS AND PERFORMANCE CHARACTERISTICS

|  |  |     |     |         |    |    |         |    |    |
|--|--|-----|-----|---------|----|----|---------|----|----|
| Capacitance Range  | 0.1μF to 470μF   |     |     |         |    |    |         |    |    |
| Capacitance Tolerance                                      | ±20%(M), ±10%(K)   |     |     |         |    |    |         |    |    |
| Rated Voltage Range @ 85°C (Vdc)                           | 2.5  | 4.0 | 6.3 | 10      | 16 | 20 | 25      | 35 | 50 |
| Surge Voltage Rating @ 85°C (Vdc)                          | 3.3  | 5.2 | 8.0 | 13      | 20 | 26 | 33      | 46 | 65 |
| Derated Voltage @ 125°C (Vdc)                              | 1.6  | 2.5 | 4.0 | 6.3     | 10 | 13 | 16      | 22 | 32 |
| Operating Temperature Range                                | -55°C to +85°C (to +125°C With Derating)   |     |     |         |    |    |         |    |    |
| Dissipation Factor   | See Case Size and Specifications Table   |     |     |         |    |    |         |    |    |
| Leakage Current @ +25°C (After 5 Minutes at Rated Voltage) | Not More Than 0.01 CV or 0.5μA, whichever is greater   |     |     |         |    |    |         |    |    |
| Capacitance Change With Temperature                        | -55°C  |     |     | +85°C   |    |    | +125°C  |    |    |
| A2, A, B2, B, C, D & E Case Size                           | ΔC -12%  |     |     | ΔC ±12% |    |    | ΔC ±15% |    |    |
| J & P Case Size  | ΔC -20%  |     |     | ΔC ±20% |    |    | ΔC ±20% |    |    |
| Soldering Heat Resistance (+260°C for 5 Seconds)           | ΔC ±5%* Max., LC = Less than initial specification.<br>DF = Less than initial specification. |     |     |         |    |    |         |    |    |
| Moisture Resistance (500 hours; 90~95% RH @ 40°C)          | ΔC ±5%* Max., LC = Less than initial specification.<br>DF = 150% of initial specification    |     |     |         |    |    |         |    |    |
| Temperature Cycling (5 cycles; -55°C ~ +125°C)             | ΔC ±5%* Max, LC = Less than initial specification.<br>DF = Less than initial specification   |     |     |         |    |    |         |    |    |
| Load Life (At Rated Voltage) (2000 hours @ +85°C)          | ΔC ±10%* Max, LC = 125% of initial specification.<br>DF = Less than initial specification    |     |     |         |    |    |         |    |    |
| Base Failure Rate (1.0Ω/Volt)                              | 1%/1000 hours at 60% confidence level. (+85°C)   |     |     |         |    |    |         |    |    |

\*±12% ~ ±15% for extended values, ±20% for J & P case size values

### RIPPLE CURRENT CORRECTION FACTOR:

| Ambient Temperature | +25°C | +55°C | +85°C | +105°C | +125°C |
|---------------------|-------|-------|-------|--------|--------|
| Correction Factor   | 1.0   | 0.90  | 0.80  | 0.40   | 0.15   |

### POWER DISSIPATION @ 25°C (FREE AIR) & EQUIVALENT SERIES INDUCTANCE (ESL)

| Case Code | Pd MAX. (W) | ESL (nH) |
|-----------|-------------|----------|
| P         | 0.025       | 1.00     |
| A2        | 0.050       | 1.20     |
| A         | 0.070       | 1.20     |
| B2        | 0.070       | 1.50     |
| B         | 0.080       | 1.50     |
| C         | 0.110       | 2.70     |
| D         | 0.150       | 3.00     |
| E         | 0.165       | 3.00     |

### RIPPLE CURRENT/VOLTAGE RATINGS:

$$I_{max.} = \sqrt{\frac{Pd}{ESR}} \quad V_{max.} = Z \cdot \sqrt{\frac{Pd}{ESR}}$$

I<sub>max.</sub> = Ripple Current rating (Arms)

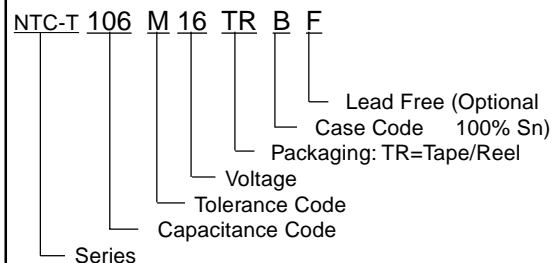
Pd = Power dissipation (watt)

ESR = Equivalent series resistance (ohm)

V<sub>max.</sub> = Ripple voltage rating (Vrms)

Z = The capacitors impedance (ohm) =  $\sqrt{(ESR)^2 + (XL-XC)^2}$

### PART NUMBERING SYSTEM



## STANDARD AND EXTENDED PRODUCT SPECIFICATIONS TABLE

\* Extended Case Sizes

Chart shows Case Size, Max Tan δ @ 120Hz/+20°C, Max. ESR @ 100KHz/+20°C

| Cap. (μF) | Code | Working Voltage (Vdc)               |  |  |   |   |                                     |                        |                                     |           |
|-----------|------|-------------------------------------|--|--|---|---|-------------------------------------|------------------------|-------------------------------------|-----------|
|           |      | 2.5                                 | 4.0  | 6.3  | 10  | 16  | 20                                  | 25                     | 35                                  | 50        |
| 0.1       | 104  |                                     |  |  |   |   | A2*6%/40Ω                           |                        | A 4%/18Ω                            |           |
| 0.15      | 154  |                                     |  |  |   |   | A2*6%/325Ω                          |                        | A 4%/18Ω                            | A 4%/19Ω  |
| 0.22      | 224  |                                     |  |  |   |   | A2*6%/35Ω                           |                        | A 4%/18Ω                            | B 4%/14Ω  |
| 0.33      | 334  |                                     |  |  |   | P 10%/40Ω   | A2*6%/30Ω                           |                        | A 4%/15Ω                            | B 4%/10Ω  |
| 0.47      | 474  |                                     |  |  |   | P 10%/35Ω   | A2*6%/27Ω                           | A 4%/14Ω               | A*6%/12Ω<br>B 4%/8.0Ω               | B 4%/9.0Ω |
| 0.68      | 684  |                                     |  |  | P 10%/25Ω   | P 10%/25Ω<br>A2*6%/25Ω  | A2*6%/15Ω<br>A 4%/12Ω               | A*6%/10Ω               | A*6%/9.0Ω<br>B 4%/5.4Ω              | C 4%/7.0Ω |
| 1.0       | 105  |                                     |  | P 10%/25Ω  | P 10%/25Ω<br>A2*8%/25Ω  | J 10%/30Ω<br>P 20%/25Ω<br>A2*6%/16Ω<br>A 4%/10Ω                 | A2*6%/13Ω<br>A*6%/9.0Ω              | A*6%/8.0Ω              | A*6%/8.0Ω<br>B 4%/4.8Ω              | C 4%/5.5Ω |
| 1.5       | 155  |                                     | P 10%/25Ω  | P 10%/25Ω<br>A2*8%/25Ω                                       | J 20%/30Ω<br>P 20%/25Ω<br>A2*8%/20Ω<br>A 4%/8.0Ω                | A2*6%/13Ω<br>A 4%/8.0Ω  | A2*6%/13Ω<br>A*6%/6.5Ω              | A*6%/8.0Ω<br>B 4%/4.6Ω | A*6%/8.0Ω<br>B*6%/4.0Ω<br>C 4%/3.0Ω | C 4%/4.0Ω |
| 2.2       | 225  | P 10%/25Ω                           | P 10%/25Ω<br>A2*8%/25Ω   | J 20%/20Ω<br>P 20%/20Ω<br>A2*8%/18Ω<br>A 4%/8.0Ω             | J 20%/30Ω<br>P 20%/20Ω<br>A2*8%/12Ω<br>A 4%/7.0Ω                | A2*6%/13Ω<br>A*6%/6.0Ω  | A*6%/6.0Ω<br>B 4%/3.5Ω              | A*6%/8.0Ω<br>B*6%/4.0Ω | B*6%/4.2Ω<br>C 4%/3.0Ω              | D 4%/1.8Ω |
| 3.3       | 335  | P 10%/25Ω                           | P 20%/20Ω<br>A2*8%/18Ω<br>A 4%/8.0Ω  | J 20%/20Ω<br>P 20%/20Ω<br>A2*8%/9.0Ω<br>A 4%/7.5Ω            | P 20%/20Ω<br>A2*8%/12Ω<br>A*8%/5.5Ω                             | A*6%/5.0Ω<br>B 4%/3.5Ω  | A*6%/5.0Ω<br>B*6%/3.0Ω              | B*6%/3.5Ω<br>C 4%/2.5Ω | B*6%/4.0Ω<br>C 4%/2.5Ω<br>D 4%/2.0Ω | D 4%/1.4Ω |
| 4.7       | 475  | P 20%/20Ω<br>A2*8%/18Ω              | P 20%/12Ω<br>A2*8%/10Ω<br>A 4%/7.5Ω  | J 20%/15Ω<br>P 20%/12Ω<br>A2*8%/7.5Ω<br>A*8%/6.0Ω            | P 20%/10Ω<br>A2*8%/8.0Ω<br>A*8%/5.0Ω<br>B 4%/3.5Ω               | A*6%/5.0Ω<br>B*6%/3.0Ω  | A*6%/5.0Ω<br>B*6%/3.0Ω<br>C 4%/2.4Ω | B*6%/3.0Ω<br>C 4%/2.4Ω | C*6%/2.2Ω<br>D 4%/1.5Ω              | D 4%/1.4Ω |
| 6.8       | 685  | P 20%/20Ω<br>A2*8%/16Ω              | J 20%/15Ω<br>P 20%/12Ω<br>A2*8%/8.0Ω<br>A*8%/6.0Ω                              | P 20%/12Ω<br>A2*8%/7.5Ω<br>A*8%/5.0Ω<br>B 6%/3.5Ω            | A*8%/4.5Ω<br>B 8%/3.0Ω  | A2*6%/5.0Ω<br>A*6%/5.0Ω<br>B2 6%/5.0Ω<br>B*6%/2.5Ω<br>C 6%/1.9Ω | B*6%/2.8Ω<br>C 6%/1.9Ω              | C*6%/1.9Ω<br>D6%/1.4Ω  | C*6%/1.9Ω<br>D 6%/1.3Ω              |           |
| 10        | 106  | J 20%/12Ω<br>P 20%/12Ω<br>A2*8%/15Ω | J 20%/12Ω<br>P 20%/12Ω<br>A2*12%/8.0Ω<br>A*8%/5.0Ω<br>B 6%/3.5Ω                | P 20%/12Ω<br>A2*8%/10Ω<br>A*8%/4.0Ω<br>B 6%/3.0Ω             | A2 8%/5.0Ω<br>A*8%/3.2Ω<br>B2*8%/3.2Ω<br>B*8%/2.5Ω<br>C 6%/1.8Ω | A 8%/5.0Ω<br>B2 8%/4.0Ω<br>B*6%/2.4Ω<br>C 6%/1.8Ω               | B*6%/2.5Ω<br>C*6%/1.8Ω<br>D 6%/1.3Ω | C*6%/1.8Ω<br>D 6%/1.2Ω | D*6%/1.0Ω                           |           |
| 15        | 156  | A2*12%/10Ω<br>A*8%/5.0Ω             | P 20%/<br>A2*12%/8.0Ω<br>A*8%/4.0Ω<br>B*8%/3.0Ω                                | A2 12%/<br>A*8%/3.5Ω<br>B2*8%/3.5Ω<br>B*8%/2.5Ω<br>C 6%/1.8Ω | B2*8%/2.5Ω<br>C 6%/1.8Ω   | B2*6%/2.5Ω<br>C*6%/1.8Ω<br>D 6%/1.8Ω                            | C*6%/1.7Ω<br>D 6%/0.8Ω              | D*6%/1.0Ω              | D*6%/0.9Ω                           |           |
| 22        | 226  | A2*12%/10Ω<br>A*8%/4.0Ω             | P 20%/5.0Ω<br>A2 12%/4.0Ω<br>A*8%/3.5Ω<br>B2*8%/3.5Ω<br>B*8%/2.8Ω<br>C 6%/1.8Ω | A*10%/4.5Ω<br>B2 12%/4.5Ω<br>B*8%/2.3Ω<br>C 6%/1.8Ω          | B2 12%/4.0Ω<br>B*8%/2.4Ω<br>C*8%/1.8Ω<br>D 6%/1.5Ω              | B*6%/2.5Ω<br>C*6%/1.6Ω<br>D 6%/0.8Ω                             | C*6%/1.5Ω<br>D*6%/0.8Ω              | D*6%/0.8Ω              |                                     |           |

SURFACE MOUNT



## STANDARD AND EXTENDED PRODUCT SPECIFICATION TABLE

\* Extended Case Sizes

Chart shows Case Size, Max Tan δ @ 120Hz/+20°C, Max. ESR @ 100Khz/+20°C

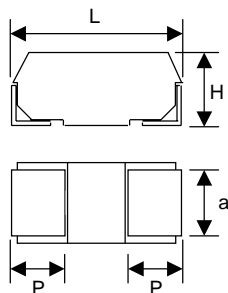
**SURFACE MOUNT**

| Cap. (μF) | Code | Working Voltage (Vdc)                              |  |  |                                     |                        |    |    |    |    |  |
|-----------|------|--|--|--|-------------------------------------|------------------------|----|----|----|----|--|
|           |      | 2.5  | 4.0  | 6.3  | 10                                  | 16                     | 20 | 25 | 35 | 50 |  |
| 33        | 336  | P 20%/5.0Ω<br>A*8%/3.5Ω<br>B2*8%/3.5Ω<br>B*8%/3.0Ω | A*10%/4.5Ω<br>B2*12%/4.5Ω<br>B*8%/2.4Ω<br>C 6%/1.8Ω              | A 12%/5.0Ω<br>B*8%/2.0Ω<br>C*8%/1.8Ω<br>D 6%/1.5Ω  | B*8%/2.0Ω<br>C*8%/1.6Ω<br>D 6%/0.8Ω | C*6%/1.2Ω<br>D*6%/0.8Ω |    |    |    |    |  |
| 47        | 476  | A*12%/4.5Ω<br>B2*12%/4.5Ω<br>B*8%/2.4Ω             | A 12%/5.0Ω<br>B2 12%/3.0Ω<br>B*8%/2.0Ω<br>C*8%/1.8Ω<br>D 6%/1.2Ω | B2 12%/3.0Ω<br>B*8%/2.0Ω<br>C*8%/1.6Ω<br>D 6%/0.8Ω | B 8%/3.0Ω<br>C*8%/1.6Ω<br>D*8%/0.8Ω | C*6%/1.2Ω<br>D*6%/0.8Ω |    |    |    |    |  |
| 68        | 686  | A 18%/3.0Ω<br>B*8%/2.0Ω                            | B2 15%/3.0Ω<br>B*8%/2.0Ω<br>C*8%/1.6Ω<br>D 6%/0.8Ω               | B*10%/1.8Ω<br>C*8%/1.2Ω<br>D*8%/0.8Ω               | C*8%/1.2Ω<br>D*8%/0.8Ω              | D*6%/0.7Ω              |    |    |    |    |  |
| 100       | 107  | B2 18%/2.0Ω<br>B*8%/2.0Ω                           | B*12%/2.0Ω<br>C*8%/1.2Ω<br>D*8%/0.8Ω                             | B 12%/1.2Ω<br>C*10%/0.9Ω<br>D*8%/0.8Ω              | C 10%/1.2Ω<br>D*8%/0.7Ω             | D*10%/1.0Ω             |    |    |    |    |  |
| 150       | 157  | B*16%/5.0Ω   | B 18%/2.0Ω<br>C*10%/1.0<br>D*8%/0.7Ω                             | C 10%/1.2Ω<br>D*8%/0.7Ω                            | D*10%/0.7Ω                          | D*6%/0.9               |    |    |    |    |  |
| 220       | 227  | B 18%/2.0Ω<br>C*12%/1.0Ω                           | C 12%/1.2Ω<br>D*8%/0.7Ω  | C 14%/1.2Ω<br>D*12%/0.8Ω                           | D 12%/1.0Ω<br>E*8%/0.9Ω             |                        |    |    |    |    |  |
| 330       | 337  | C 16%/1.2Ω   | C 14%/1.2Ω<br>D*14%/0.7Ω   | D 14%/1.0Ω   |                                     |                        |    |    |    |    |  |
| 470       | 477  | C 18%/1.2Ω<br>D*14%/0.7Ω                           | D 16%/1.0Ω   |  |                                     |                        |    |    |    |    |  |

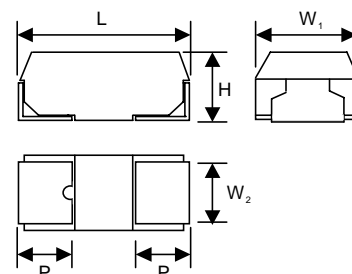
### DIMENSIONS (mm)

| Case Code | Metric Code | English Code | L         | W          | H         | P          | a         |
|-----------|-------------|--------------|-----------|------------|-----------|------------|-----------|
| J         | 1608        | 0603         | 1.6 ± 0.1 | 0.8 ± 0.1  | 0.8 ± 0.1 | 0.3 ± 0.15 | 0.6 ± 0.1 |
| P         | 2012        | 0805         | 2.0 ± 0.2 | 1.25 ± 0.2 | 1.2 MAX.  | 0.5 ± 0.2  | 0.9 ± 0.1 |
| A         | 3216        | 1206         | 3.2 ± 0.2 | 1.6 ± 0.2  | 1.6 ± 0.2 | 0.8 ± 0.3  | 1.2 ± 0.1 |
| A2        | 3216        | 1206         | 3.2 ± 0.2 | 1.6 ± 0.2  | 1.2 MAX.  | 0.8 ± 0.3  | 1.2 ± 0.1 |
| B         | 3528        | 1411         | 3.5 ± 0.2 | 2.8 ± 0.2  | 1.9 ± 0.2 | 0.8 ± 0.3  | 2.2 ± 0.1 |
| B2        | 3528        | 1411         | 3.5 ± 0.2 | 2.8 ± 0.2  | 1.2 MAX.  | 0.8 ± 0.3  | 2.3 ± 0.1 |
| C         | 6032        | 2412         | 6.0 ± 0.3 | 3.2 ± 0.3  | 2.6 ± 0.3 | 1.3 ± 0.3  | 2.2 ± 0.1 |
| D         | 7343        | 2916         | 7.3 ± 0.2 | 4.3 ± 0.2  | 2.9 ± 0.3 | 1.3 ± 0.3  | 2.4 ± 0.1 |
| E         | 7343H       | 2917         | 7.3 ± 0.2 | 4.3 ± 0.2  | 4.1 ± 0.2 | 1.3 ± 0.3  | 2.4 ± 0.1 |

**J, P, A, A2, C, D & E CASE SIZE**



**B & B2 CASE SIZE**



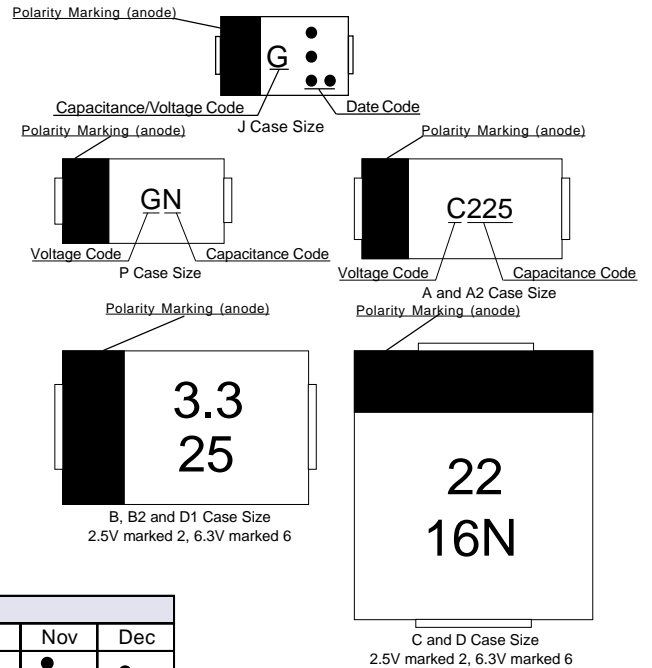
## CAPACITANCE CODES

| Cap. (μF) | STD EIA Code | EIA Code 198D | Code for P Case Size | Code for J Case Size |      |        |
|-----------|--------------|---------------|----------------------|----------------------|------|--------|
|           |              |               |                      | 2.5Vdc               | 4Vdc | 6.3Vdc |
| 0.1       | 104          | A5            | -                    | -                    | -    | -      |
| 0.15      | 154          | E5            | -                    | -                    | -    | -      |
| 0.22      | 224          | J5            | -                    | -                    | -    | -      |
| 0.33      | 334          | N5            | N                    | -                    | -    | -      |
| 0.47      | 474          | S5            | S                    | -                    | -    | -      |
| 0.68      | 684          | W5            | W                    | -                    | -    | -      |
| 1.0       | 105          | A6            | A                    | -                    | -    | -      |
| 1.5       | 155          | E6            | E                    | -                    | -    | -      |
| 2.2       | 225          | J6            | J                    | -                    | -    | ∩      |
| 3.3       | 335          | N6            | N                    | -                    | -    | ↵      |
| 4.7       | 475          | S6            | S                    | -                    | ⊙    | J      |
| 6.8       | 685          | W6            | W                    | -                    | G    | -      |
| 10        | 106          | A7            | a                    | e                    | ⊙    | -      |
| 22        | 226          | J7            | -                    | -                    | -    | -      |

## VOLTAGE CODES

| Volts | Code |
|-------|------|
| 2.5   | e    |
| 4     | G    |
| 6.3   | J    |
| 10    | A    |
| 16    | C    |
| 20    | D    |
| 25    | E    |
| 35    | V    |
| 50    | H    |

## COMPONENT MARKING

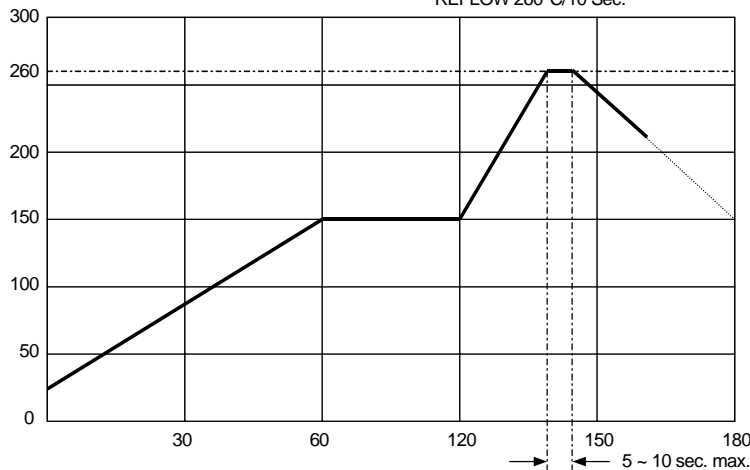


SURFACE MOUNT

## PRODUCTION CODE

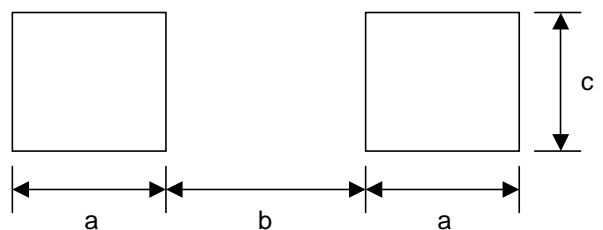
| 2000 |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| •    | ••  | •   | ••  | ••  | ••  | ••  | ••  | •   | •   | ••  | ••  |
| 2001 |     |     |     |     |     |     |     |     |     |     |     |
| Jan  | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| ••   | ••  | ••  | ••  | ••  | ••  | ••  | ••  | ••  | ••  | ••  | ••  |

FLOW/REFLOW SOLDERING  
 MAXIMUM TEMPERATURE/TIME: FLOW 260°C/5 Sec.  
 REFLOW 260°C/10 Sec.



## RECOMMENDED LAND PATTERN DIMENSIONS (mm)

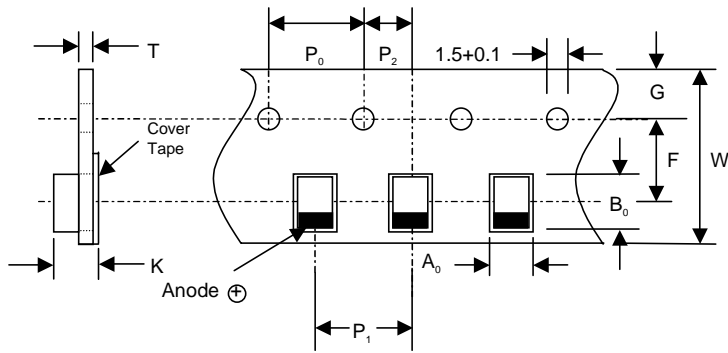
| Case Size | a    | b    | c    |
|-----------|------|------|------|
| J         | 0.90 | 0.70 | 1.00 |
| P         | 1.05 | 0.50 | 1.20 |
| A & A2    | 1.35 | 1.10 | 1.50 |
| B & B2    | 1.35 | 1.40 | 2.70 |
| C         | 2.00 | 2.90 | 2.70 |
| D1        | 2.00 | 2.70 | 2.90 |
| D         | 2.05 | 4.10 | 2.90 |



### TAPE DIMENSIONS (mm)

| Metric Code | Case Code | $A_0 \pm 0.2$ | $B_0 \pm 0.2$ | $W \pm .30$ | $F \pm .05$ | $P_0 \pm 0.1$ | $P_1 \pm 0.1$ | $P_2 \pm 0.05$ | $G \pm 0.1$ | $K \pm 0.2$ | T   | 7" Reel |
|-------------|-----------|---------------|---------------|-------------|-------------|---------------|---------------|----------------|-------------|-------------|-----|---------|
| 1608        | J         | 1.0           | 1.8           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 1.1         | 0.2 | 4000    |
| 2012        | P         | 1.4           | 2.2           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 1.4         | 0.2 | 3000    |
| 3216        | A2        | 1.9           | 3.5           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 1.4         | 0.2 | 3000    |
| 3216        | A         | 1.9           | 3.5           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 1.9         | 0.2 | 2000    |
| 3528        | B2        | 3.2           | 3.8           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 1.4         | 0.2 | 3000    |
| 3528        | B         | 3.2           | 3.8           | 8.0         | 3.5         | 4.0           | 4.0           | 2.0            | 1.75        | 2.1         | 0.2 | 2000    |
| 6032        | C         | 3.7           | 6.4           | 12.0        | 5.65        | 4.0           | 8.0           | 2.0            | 1.5         | 3.0         | 0.3 | 500     |
| 7343        | D         | 4.8           | 7.7           | 12.0        | 5.65        | 4.0           | 8.0           | 2.0            | 1.5         | 3.3         | 0.3 | 500     |
| 7343H       | E         | 4.7           | 7.7           | 12.0        | 5.5         | 4.0           | 8.0           | 2.0            | 1.5         | 4.5         | 0.6 | 500     |

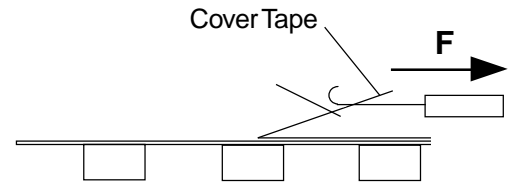
SURFACE MOUNT



### Cover tape peel-off specification

1. Peel-off speed : 300 mm/min.
2. Peel-off force :  $F = 30 - 75g$
3. Peel-off angle :  $\Theta = 0 - 15^\circ$

Peel-off speed  
(F) = 50mm/Sec.



### REEL DIMENSIONS (mm)

| Tape Width | A             | C            | D            | E             | N       | W1             | W2       |
|------------|---------------|--------------|--------------|---------------|---------|----------------|----------|
| 8mm        | $178 \pm 2.0$ | $13 \pm 0.5$ | $21 \pm 0.5$ | $2.0 \pm 0.5$ | 50 min. | $10 \pm 2.0$   | 14.5 max |
| 12mm       | $178 \pm 2.0$ | $13 \pm 0.5$ | $21 \pm 0.5$ | $2.0 \pm 0.5$ | 50 min. | $14.5 \pm 2.0$ | 18.5 max |

