

**SD SERIES**
**FEATURES: GENERAL PURPOSE RADIAL TYPE FOR  
CONSUMER ELECTRONICS MARKET.**  
**REFERENCE  
STANDARDS: IS4317/ IEC 384-4.**
**PRODUCT  
MARKING**

**ENDURANCE: +105°C, 1000 Hrs**  
**PROVIDED WITH ORANGE COLOUR  
SLEEVE AND BLACK PRINT**
**■ SPECIFICATIONS**

| PARAMETERS.   | PERFORMANCE CHARACTERISTICS  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|---|-------|----|----|-------|--------|--|---|---------|-----|-----|-----|----------|-------|------------------------|--|--|--|--|--|--|-------------------------|--|--|--|--|--|--|------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---------------|--|--|--|--|--|--|--|---|--|--|--|--|--|--|-------|---|--|--|--|--|--|--|------------------------------|--|--|--|--|--|--|---------------------|----------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Operating Temperature   | - 40° C to +105 °C for WV ≤ 250 Vdc, -25° C to +105 °C for WV > 250 Vdc.   |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Working Voltage   | 6.3 Vdc to 450 Vdc.  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Capacitance Range   | 0.10 to 22000µF (at +27° C, 100 Hz)  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Capacitance Tolerance   | ±20%, (Other tolerance on request)   |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Leakage Current (After 3mt charging through 1000 Ω resistor) IL in µA                   | IL ≤ 0.01 CV or 4 µA, whichever is greater for WV 6.3 to 100 V<br>≤ 0.02 CV+ 10µA for WV 160 to 450 V,<br>Where IL = Leakage current in µA<br>C= Capacitance( µF) , V= Working Voltage in Volt   |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Dissipation factor (Tan δ) Max (at + 27° C, 100 Hz)                                     | WV Vdc   | 6.3   | 10    | 12 | 16 | 25    | 35     | 40   | 50  | 63      | 100 | 160 | 200 | 250 ~500 |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Tan δ %  | 26  | 22    | 21 | 20 | 17    | 15     | 14   | 13  | 12      | 10  | 15  | 18  | 20       |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| For Capacitor ratings with cap value >1000µF add 2% for every 1000µF increase           |  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Low Temperature Stability   | Impedance Ratio at 100 Hz.   |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Rated Voltage (V)  | 6.3   | 10~12 | 16 | 25 | 35~40 | 50~100 | 160  | 200~350   | 400~500 |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Z -25° C/Z + 27° C   | 6   | 4     | 4  | 3  | 3     | 2      | 3  | 6   | 7       |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Z -40° C/ Z + 27° C  | 12  | 9     | 8  | 6  | 4     | 3      | 4  | -   | -       |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Add 0.5 to the Ratio for Z- 25° C, 1.0 to the Ratio Z- 40° C Per 1000µF, for Cap>1000µF |  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Life Tests  | <table border="1"> <thead> <tr> <th>Tests</th> <th colspan="7">Endurance DC Life Test</th> <th colspan="7">Storage Shelf Life Test</th> </tr> </thead> <tbody> <tr> <td>Test Condition<br/>Parameters</td> <td colspan="7">Capacitor at rated voltage<br/>At +105° C for 1000 Hrs<br/>Measurements after recovery to +27° C</td> <td colspan="7">Capacitor under no voltage<br/>At +105° C for 1000 Hrs<br/>Measurements after recovery to +27° C</td> </tr> <tr> <td>Δ Capacitance</td> <td colspan="7">                     Within ± 30% for 6.3 to 16 V<br/>                     Within ± 25% for 25 to 100 V<br/>                     Within ± 20% for 160 to 450V                 </td> <td colspan="7">                     } of initial measured Value<br/>                     Within ± 25% of initial measured Value for WV≤100<br/>                     Within ± 20% of initial measured Value for WV&gt;100                 </td> </tr> <tr> <td>Tan δ</td> <td colspan="7">                     Within 200% of initial limits for WV 6.3 ~16 V<br/>                     Within 150% of initial limits for WV 25 ~ 450 V                 </td> <td colspan="7">Within 150% of initial limit</td> </tr> <tr> <td>D.C Leakage Current</td> <td colspan="7">Within initial limit</td> <td colspan="7">                     Within 150% of initial limit for WV ≤100V<br/>                     Within 300% of initial limit for WV&gt;100                 </td> </tr> </tbody> </table> |   |       |    |    |       |        |  |   |         |     |     |     |          | Tests | Endurance DC Life Test |  |  |  |  |  |  | Storage Shelf Life Test |  |  |  |  |  |  | Test Condition<br>Parameters | Capacitor at rated voltage<br>At +105° C for 1000 Hrs<br>Measurements after recovery to +27° C |  |  |  |  |  |  | Capacitor under no voltage<br>At +105° C for 1000 Hrs<br>Measurements after recovery to +27° C |  |  |  |  |  |  | Δ Capacitance | Within ± 30% for 6.3 to 16 V<br>Within ± 25% for 25 to 100 V<br>Within ± 20% for 160 to 450V |  |  |  |  |  |  | } of initial measured Value<br>Within ± 25% of initial measured Value for WV≤100<br>Within ± 20% of initial measured Value for WV>100 |  |  |  |  |  |  | Tan δ | Within 200% of initial limits for WV 6.3 ~16 V<br>Within 150% of initial limits for WV 25 ~ 450 V |  |  |  |  |  |  | Within 150% of initial limit |  |  |  |  |  |  | D.C Leakage Current | Within initial limit |  |  |  |  |  |  | Within 150% of initial limit for WV ≤100V<br>Within 300% of initial limit for WV>100 |  |  |  |  |  |  |
|   | Tests  | Endurance DC Life Test  |       |    |    |       |        |  | Storage Shelf Life Test   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Test Condition<br>Parameters   | Capacitor at rated voltage<br>At +105° C for 1000 Hrs<br>Measurements after recovery to +27° C    |       |    |    |       |        |  | Capacitor under no voltage<br>At +105° C for 1000 Hrs<br>Measurements after recovery to +27° C  |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Δ Capacitance  | Within ± 30% for 6.3 to 16 V<br>Within ± 25% for 25 to 100 V<br>Within ± 20% for 160 to 450V      |       |    |    |       |        |  | } of initial measured Value<br>Within ± 25% of initial measured Value for WV≤100<br>Within ± 20% of initial measured Value for WV>100 |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | Tan δ  | Within 200% of initial limits for WV 6.3 ~16 V<br>Within 150% of initial limits for WV 25 ~ 450 V |       |    |    |       |        |  | Within 150% of initial limit  |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| D.C Leakage Current   | Within initial limit   |   |       |    |    |       |        | Within 150% of initial limit for WV ≤100V<br>Within 300% of initial limit for WV>100 |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| (i). Endurance Test at High Temperature +105° C at WV.                                  |  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |
| (ii). Storage Test at High Temperature +105° C at 0V.                                   |  |   |       |    |    |       |        |  |   |         |     |     |     |          |       |                        |  |  |  |  |  |  |                         |  |  |  |  |  |  |                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |               |  |  |  |  |  |  |  |   |  |  |  |  |  |  |       |   |  |  |  |  |  |  |                              |  |  |  |  |  |  |                     |                      |  |  |  |  |  |  |  |  |  |  |  |  |  |

**■ OTHER INFORMATION**

|   |  |
|---|--|
| Standard rating size, Ripple current, Temperature multiplier and Frequency multiplier | For details refer to page no. 2 & 3.   |
| Capacitor Codification System   | For details refer to page no. 4  |
| Dimensional Specification   | For details refer to page no. 5  |
| Marking Specification   | For details refer to page no. 6  |
| Type of Packing and Lead Configuration.   | (1) Bulk Packing - Straight Lead / Lead Formed and Cut / Kinking and Cut.<br>(2) Taped Ammo Pack – 5mm Pitch / 2.5mm Pitch.<br>For details refer to page no. 7,8&9 |

**SD SERIES**

**STANDARD RATING TABLE: -**

Provides detailed information regarding applicable case size and the appropriate ripple current handling capability of the defined case size.

| WV<br>SV<br>Cap(µF) | 6.3 |      | 10 |      | 12 |      | 16 |      | 25 |      | 35 |      | 40 |      | 50 |      | 63 |      |      |     |
|---------------------|-----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|----|------|------|-----|
|                     | CC  | RC   | CC | RC   | CC | RC   | CC | RC   | CC | RC   | CC | RC   | CC | RC   | CC | RC   | CC | RC   |      |     |
| 0.1                 |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 5    | HS | 5    |      |     |
| 0.22                |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 7    | HS | 8    |      |     |
| 0.33                |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 9    | HS | 9    |      |     |
| 0.47                |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 10   | HS | 11   |      |     |
| 1.0                 |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 15   | HS | 16   |      |     |
| 2.2                 |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 22   | HS | 23   |      |     |
| 3.3                 |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 27   | HS | 28   |      |     |
| 4.7                 |     |      |    |      |    |      |    |      |    |      |    |      |    |      | HS | 32   | HS | 34   |      |     |
| 10                  |     |      |    |      |    |      |    |      |    |      |    |      |    | HS   | 45 | HS   | 47 | HS   | 49   |     |
| 22                  |     |      |    |      |    |      |    |      | HS | 61   | HS | 65   | HS | 67   | HS | 70   | AS | 83   |      |     |
| 33                  |     |      |    |      |    |      | HS | 68   | HS | 74   | HS | 80   | AS | 94   | AS | 97   | AS | 94   | 125  |     |
| 47                  |     |      | HS | 78   | HS | 80   | HS | 82   | HS | 89   | HS | 98   | AS | 115  | AS | 120  | BB | 150  |      |     |
| 68                  | HS  | 90   | HS | 94   | HS | 98   | HS | 98   | HS | 111  | AS | 130  | BB | 165  | BB | 170  | BB | 180  |      |     |
| 100                 | HS  | 105  | HS | 115  | HS | 120  | HS | 120  | AS | 150  | AS | 160  | BB | 200  | BB | 205  | BB | 215  | 245  |     |
| 150                 | HS  | 130  | HS | 134  | AS | 165  | AS | 170  | AS | 178  | BB | 235  | BB | 245  | CB | 280  | CD | 310  | 325  |     |
| 220                 | AS  | 180  | AS | 195  | AS | 200  | AS | 205  | BB | 270  | BB | 285  | CB | 330  | CB | 340  | CD | 375  | 395  | 430 |
| 330                 | BB  | 265  | BB | 290  | BB | 295  | BB | 300  | BB | 330  | CB | 400  | CD | 445  | CG | 505  | DG | 605  |      |     |
| 470                 | BB  | 315  | BB | 345  | BB | 355  | BB | 360  | CB | 440  | CD | 515  | CG | 530  | CG | 600  | DG | 720  | 775  |     |
| 680                 | BB  | 402  | BB | 422  | CB | 505  | CD | 535  | CD | 580  | CG | 675  | CG | 695  | DG | 835  | EK | 1060 |      |     |
| 1000                | CB  | 520  | CB | 590  | CD | 640  | CD | 645  | CG | 765  | CK | 895  | DG | 1045 | DK | 1085 | EK | 1290 | 1395 |     |
| 1500                | CD  | 615  | CD | 665  | CG | 790  | CG | 805  | DG | 950  | DK | 1105 |    | 1265 | EK | 1360 | EU | 1570 | 1695 |     |
| 2200                | CG  | 830  | CG | 860  | CK | 940  | CK | 965  | DG | 1025 | EK | 1400 | ER | 1565 | EU | 1715 | SJ | 2000 | 2105 |     |
| 3300                | DG  | 1070 | DG | 1100 | DK | 1250 | DK | 1275 | DK | 1420 | ER | 1765 | EU | 1925 | SH | 2135 | TH | 2420 | 2545 |     |
| 4700                | DK  | 1305 | EK | 1585 | EK | 1620 | EK | 1640 | ER | 1885 | SH | 2250 | SJ | 2415 | TJ | 2730 | TJ | 2800 | 3080 |     |
| 6800                | EK  | 1695 | EK | 1850 | ER | 1990 | ER | 2005 | EU | 2235 | TH | 2755 | TJ | 2955 | TM | 3315 |    |      |      |     |
| 10000               | ER  | 2075 | EU | 2310 | EU | 2420 | EU | 2410 | SJ | 2730 | TM | 3480 |    |      |    |      |    |      |      |     |
| 15000               | SH  | 2625 | SJ | 2860 | SJ | 2820 | SJ | 2900 | TM | 3510 |    |      |    |      |    |      |    |      |      |     |
| 22000               | SJ  | 2970 | TJ | 3385 | TJ | 3300 | TJ | 3335 |    |      |    |      |    |      |    |      |    |      |      |     |

**Abbreviations used:**

WV: Working voltage of the capacitor in Volts.

Cap: Capacitance in microfarad.

RC : Maximum Ripple current allowed in milli ampere at 100 Hz/ +105°C

SV: Surge voltage in volts.

CC: Case code.

**SD SERIES**

**STANDARD RATING TABLE (Contd.)**

| WV<br>SV<br>Cap<br>(µF) | 100            |                   | 160      |            | 200      |            | 250      |            | 315 |     | 350      |            | 400      |          | 450            |                   | 500      |            |
|-------------------------|----------------|-------------------|----------|------------|----------|------------|----------|------------|-----|-----|----------|------------|----------|----------|----------------|-------------------|----------|------------|
|                         | CC             | RC                | CC       | RC         | CC       | RC         | CC       | RC         | CC  | RC  | CC       | RC         | CC       | RC       | CC             | RC                | CC       | RC         |
| 0.1                     | HS             | 5                 |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 0.22                    | HS             | 8                 |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 0.33                    | HS             | 10                |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 0.47                    | HS             | 12                |          |            |          |            |          |            |     |     |          |            |          | BB       | 12             |                   |          |            |
| 1.0                     | HS             | 17                | HS       | 14         | AS       | 14         | AS       | 14         | AS  | 14  | AS       | 14         | AS<br>BB | 14<br>17 | BB             | 17                | CB       | 19         |
| 2.2                     | HS             | 25                | HS<br>AS | 19<br>23   | AS       | 21         | AS       | 20         | BB  | 25  | BB       | 25         | CB       | 28       | CB<br>CD       | 28<br>30          | CD       | 30         |
| 3.3                     | HS             | 31                | AS       | 29         | AS<br>BB | 28<br>32   | BB       | 30         | BB  | 30  | CB       | 34         | CB<br>CD | 32<br>37 | CD             | 37                | CD       | 37         |
| 4.7                     | HS             | 37                | AS       | 34         | BB       | 38         | BB       | 36         | BB  | 36  | CB       | 40         | CD       | 44       | CD<br>CG       | 44<br>48          | CG       | 48         |
| 6.8                     | HS<br>AS       | 43<br>50          | BB       | 50         | BB<br>CB | 46<br>51   | CB       | 49         | CB  | 49  | CD<br>CG | 50<br>58   | CG       | 58       | CG<br>DG       | 58<br>67          | DG       | 67         |
| 10                      | AS             | 61                | CB<br>CD | 68<br>75   | CB<br>CD | 60<br>68   | CD       | 65         | CG  | 70  | CG       | 70         | CG<br>DG | 70<br>81 | CG<br>DK       | 70<br>87          | DK       | 87         |
| 22                      | BB             | 110               | CD       | 115        | CG       | 115        | CK<br>DG | 110<br>125 | DG  | 125 | DK       | 125        | EK       | 150      | DK<br>EK<br>ER | 130<br>150<br>160 | ER<br>EU | 160<br>170 |
| 33                      | CB             | 155               | CG       | 150        | CK<br>DG | 140<br>155 | DG<br>DK | 145<br>160 | EK  | 185 | EK<br>ER | 190<br>200 | ER       | 200      | ER             | 200               | EU       | 210        |
| 47                      | CB<br>CD       | 185<br>200        | CK<br>DG | 190<br>205 | DG<br>DK | 190<br>200 | DK       | 190        | EK  | 220 | ER       | 235        | EU       | 250      | EU<br>SR<br>SH | 230<br>255<br>270 |          |            |
| 68                      | CD<br>CG       | 242<br>260        | DG<br>DK | 250<br>265 | EK       | 275        | EK       | 260        | ER  | 285 | EU       | 300        | SH       | 325      | SH             | 325               |          |            |
| 100                     | CG<br>CK<br>DG | 315<br>330<br>365 | EK       | 365        | EK<br>EU | 360<br>385 | EU       | 365        | SH  | 395 | SJ       | 405        | TH       | 435      | TJ             | 455               |          |            |
| 150                     | DG<br>DK       | 465<br>480        | EU<br>EU | 485<br>515 | EU<br>SH | 475<br>510 | SH       | 480        | TH  | 530 | TM       | 580        |          |          |                |                   |          |            |
| 220                     | DK<br>EK       | 525<br>660        | EU<br>SH | 565<br>670 | SJ<br>TH | 620<br>685 | TH       | 640        |     |     |          |            |          |          |                |                   |          |            |
| 330                     | EK<br>ER       | 820<br>880        | SJ<br>TH | 810<br>905 | TJ       | 870        | TJ       | 825        |     |     |          |            |          |          |                |                   |          |            |
| 470                     | ER<br>EU       | 1020<br>1115      | TJ       | 1135       |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 680                     | SH             | 1445              |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 1000                    | TH             | 1930              |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |
| 1500                    | TJ             | 2135              |          |            |          |            |          |            |     |     |          |            |          |          |                |                   |          |            |

**Abbreviations used:**

WV: Working voltage of the capacitor in Volts.

Cap: Capacitance in microfarad.

RC : Maximum Ripple current allowed in milli ampere at 100 Hz/ +105°C.

SV: Surge voltage in volts.

CC: Case code.

**Frequency Multiplier for Ripple Current**

| Voltage | Freq<br>Cap range | 50   | 100 | 120  | 300  | 1K   | 10K or more |
|---------|-------------------|------|-----|------|------|------|-------------|
|         |                   | 0    | 0   | 0    | 0    | 0    | 0           |
| 6.3-100 | <47               | 0.81 | 1   | 1.07 | 1.44 | 1.68 | 2.14        |
|         | 100-470           | 0.85 | 1   | 1.06 | 1.30 | 1.42 | 1.59        |
|         | 1000-22000        | 0.89 | 1   | 1.05 | 1.15 | 1.18 | 1.20        |
| 160-450 | 0.47-220          | 0.85 | 1   | 1.06 | 1.32 | 1.48 | 1.70        |
|         | 330-1500          | 0.93 | 1   | 1.05 | 1.15 | 1.18 | 1.20        |

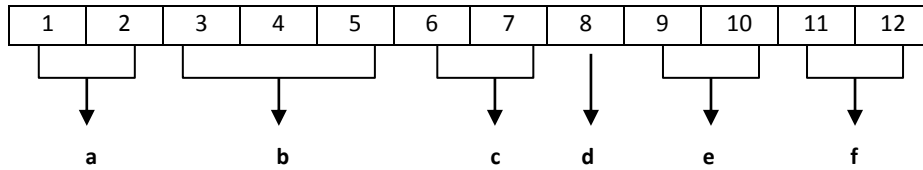
**Temperature Multiplier for Ripple Current**

| Temp (°C)   | 40  | 60   | 70   | 85 |
|-------------|-----|------|------|----|
| Multipliers | 1.3 | 1.28 | 1.15 | 1  |

# SD SERIES

## 1. CAPACITOR ORDERING INFORMATION:

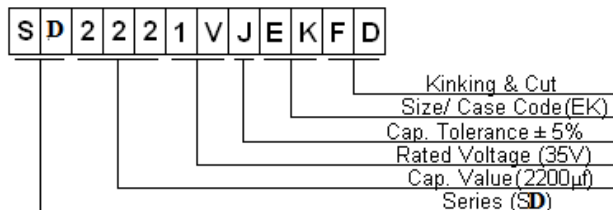
Capacitors are identified with the help of 12-digit code. Expansion of Part Nos. for SD series capacitors are detailed below.



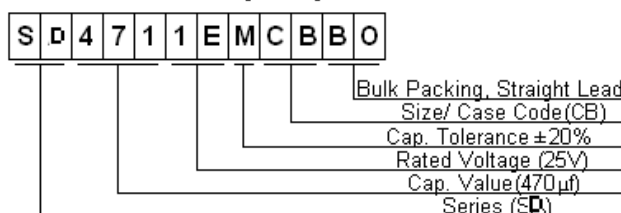
|  |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
|--|-----------------------|------|------|------|-----------|---|-----------------------|------------------------|--------------|---------------|----------------------------|-----|-----|-----|-----|-----|-----|-----|
| <b>a</b>   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Series Code. Eg: SD  |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| <b>b</b>   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Capacitance Value Code   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Capacitance (µF)   | 0.1                   | 1    | 0.22 | 2.2  | 22        | 220   | 2200                  | 22000                  |              |               |                            |     |     |     |     |     |     |     |
| Code   | R10                   | 010  | R22  | 2R2  | 220       | 221   | 222                   | 223                    |              |               |                            |     |     |     |     |     |     |     |
| <b>c</b>   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Voltage Code   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Working Voltage (V)  | 6.3                   | 10   | 12   | 16   | 25        | 35  | 40                    | 50                     | 63           | 100           | 160                        | 200 | 250 | 315 | 350 | 400 | 420 | 450 |
| Code   | 0J                    | 1A   | 1B   | 1C   | 1E        | 1V  | 1G                    | 1H                     | 1J           | 2A            | 2C                         | 2D  | 2E  | 2P  | 2V  | 2G  | 2U  | 2W  |
| <b>d</b>   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Tolerance Code   |                       |      |      |      |           |   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Tolerance  | Capacitance Tolerance |      |      |      |           |   | Spec'l. Cap Tolerance | Spec'l. Tanδ Tolerance |              |               |                            |     |     |     |     |     |     |     |
|  | ±5%                   | ±10% | ±20% | ±30% | -10% +30% | -10% +50%   |                       |                        | A            | S             |                            |     |     |     |     |     |     |     |
| Code   | J                     | K    | M    | N    | Q         | T   |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| <b>e</b>   |                       |      |      |      |           | <b>f</b>  |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Size Code  |                       |      |      |      |           | Capacitor Lead wire Termination Code                        |                       |                        |              |               |                            |     |     |     |     |     |     |     |
| Follow respective Dimensional specification. Eg: HS, AS, BB etc. |                       |      |      |      |           | Provided by the factory based on customer requirements. Eg: |                       |                        |              |               |                            |     |     |     |     |     |     |     |
|  |                       |      |      |      |           | Item  | Taped 5mm pitch       | Taped 2.5mm pitch      | Formed & cut | Kinking & cut | Bulk packing straight lead |     |     |     |     |     |     |     |
|  |                       |      |      |      |           | Code  | T0                    | T2                     | F0           | FD            | B0                         |     |     |     |     |     |     |     |

### Capacitor Codification System:-

Example (ii) 2200µf / 35V: S. Series  
Kinking & Cut



Example (iv) 470µf / 25V: S. Series  
Bulk Packing - Straight Lead



**SD SERIES**

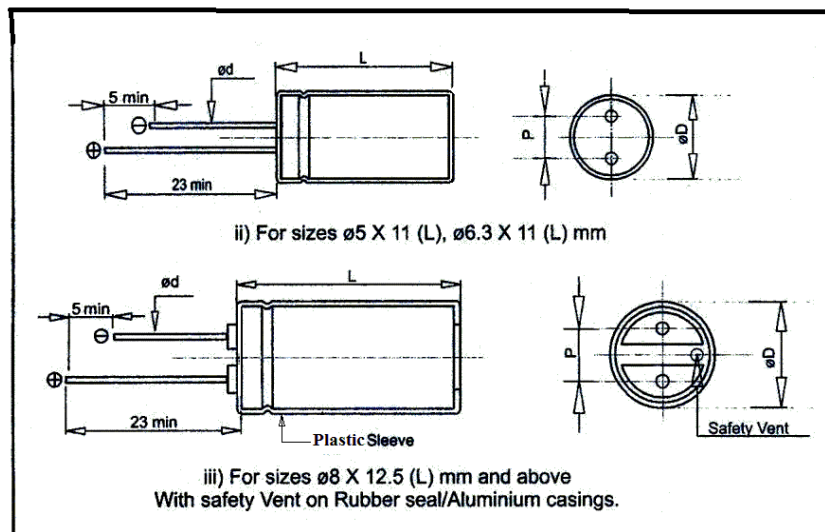
**2. DIMENSIONAL SPECIFICATION FOR RADIAL LEAD TYPE CAPACITORS**

Dimensions of SD series capacitors are detailed below.

| Case Code | Diameter<br>$\varnothing D \pm 0.5$<br>(mm) | Length<br>$L \pm 1.0$<br>(mm) | Pitch<br>$P \pm 0.5$<br>(mm) | Lead Dia<br>$\varnothing d \pm 0.05$<br>(mm) |
|-----------|---|-------------------------------|------------------------------|--|
| HS        | 5   | 11                            | 2                            | 0.5  |
| AS        | 6.3   | 11                            | 2.5                          | 0.5  |
| BB        | 8   | 12.5                          | 3.5                          | 0.6  |
| CB        | 10  | 12.5                          | 5                            | 0.6  |
| CD        | 10  | 16                            | 5                            | 0.6  |
| CG        | 10  | 21                            | 5                            | 0.6  |
| CK        | 10  | 25                            | 5                            | 0.6  |
| DG        | 12.5  | 21                            | 5                            | 0.6  |
| DK        | 12.5  | 25                            | 5                            | 0.6  |
| EK        | 16  | 25                            | 7.5                          | 0.8  |
| ER        | 16  | 31                            | 7.5                          | 0.8  |
| EU        | 16  | 36                            | 7.5                          | 0.8  |
| SR        | 18  | 31                            | 7.5                          | 0.8  |
| SH        | 18  | 37                            | 7.5                          | 0.8  |
| SJ        | 18  | 41                            | 7.5                          | 0.8  |
| TH        | 22  | 37                            | 10                           | 0.8  |
| TJ        | 22  | 41                            | 10                           | 0.8  |
| TM        | 22  | 52                            | 10                           | 0.8  |

(All Dimensions in mm)


**PHYSICAL OUTLINES**



# SD SERIES

### 3. MARKING ON THE CAPACITOR

Marking specifications of SD series capacitors are detailed below. Below mentioned details are printed on orange colored vinyl sleeve with black print.

- |  |  |
|--|--|
| a) Manufacturer's name and logo<br> | b) Capacitor series & upper category temperature |
| c) Nominal capacitance value in $\mu\text{F}$  | d) Capacitance tolerance code                    |
| e) Rated working voltage in V  | f) Date code (Year-Month)                        |
| g) Negative terminals are indicated on the sleeve  |  |

Note: Manufacturer's logo, capacitor series, upper category temperature and date code are marked only for sizes  $\varnothing$  8mm and above.

#### Date Code:

Date code is provided on the capacitor sleeve in Year – Month format for sizes  $\varnothing$  8mm and above. Year & Month code of SD capacitor of diameter  $\varnothing$  8mm & above are detailed below.

#### Year code

|             |      |      |      |      |      |      |      |      |      |      |
|-------------|------|------|------|------|------|------|------|------|------|------|
| Year        | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
| Letter Code | M    | N    | P    | R    | S    | T    | U    | V    | W    | X    |

|             |      |      |      |      |      |      |      |      |      |      |
|-------------|------|------|------|------|------|------|------|------|------|------|
| Year        | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Letter Code | A    | B    | C    | D    | E    | F    | H    | J    | K    | L    |

Year codes repeats after each cycle of 20 years.

#### Month Code

|       |      |      |      |      |     |      |      |     |      |      |     |      |
|-------|------|------|------|------|-----|------|------|-----|------|------|-----|------|
| Month | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug | Sep. | Oct. | Nov | Dec. |
| Code  | 1    | 2    | 3    | 4    | 5   | 6    | 7    | 8   | 9    | O    | N   | D    |

# SD SERIES

## 4. LEAD CONFIGURATION AND PRIMARY PACKING STANDARD FOR RADIAL ALUMINIUM ELECTROLYTIC CAPACITORS

### LEAD CONFIGURATION

SD capacitors are available in the following lead configuration.

1. STRAIGHT LEAD – Applicable to case code starting from HS(Size  $\Phi 5 \times 11$ mm) to TM (Size  $\Phi 22 \times 52$  mm).
2. LEAD FORMED AND CUT – Applicable to case code starting from CB (Size  $\Phi 10 \times 12.5$ mm) to SJ (Size  $\Phi 18 \times 41$  mm).
3. LEAD KINKED AND CUT – Applicable to case code starting from CB (Size  $\Phi 10 \times 12.5$ mm) to SJ (Size  $\Phi 18 \times 41$  mm).
4. TAPED FORM (5mm lead pitch) – Applicable to case code HS, AS, BB, CB and CD.
5. TAPED FORM (2.5 mm lead pitch) – Applicable to case code HS and AS.

### PRIMARY PACKING STANDARD BULK PACKING

SD series capacitors are generally BULK PACKED in thick polythene bags which are heat sealed to avoid direct atmospheric exposure. Individual primary packing in polythene bag is provided with a LABEL which carries outgoing Inspection Report No, Work Order No, Capacitor Series, Capacitance Value, Working Voltage, Capacitor tolerance, Capacitor size, Capacitor Part No, Temperature, Quantity and Date of packing. **IT IS CUSTOMARY TO RETURN THE PACKING LABEL TO THE FACTORY IN CASE OF QUANTITY/QUALITY NON-CONFORMANCE.**

### BULK PACKING QUANTITY DETAILS

| Size<br>( $\Phi$ D x Lmm)     | 5x11 | 6.3x11 | 8x12.5 | 10x12.5 | 10x16 | 10x21 | 10x25 | 12.5x21 |
|-------------------------------|------|--------|--------|---------|-------|-------|-------|---------|
| Case code                     | HS   | AS     | BB     | CB      | CD    | CG    | CK    | DG      |
| Nos/ Bag                      | 500  | 500    | 500    | 300     | 300   | 300   | 200   | 200     |
| Nos/ Carton                   | 5000 | 4000   | 2500   | 1800    | 1500  | 1200  | 1000  | 800     |
| Wt. (Kg) 1000 Nos<br>(Approx) | 2.2  | 2.6    | 2.6    | 3.3     | 3.0   | 2.9   | 3.3   | 3.2     |

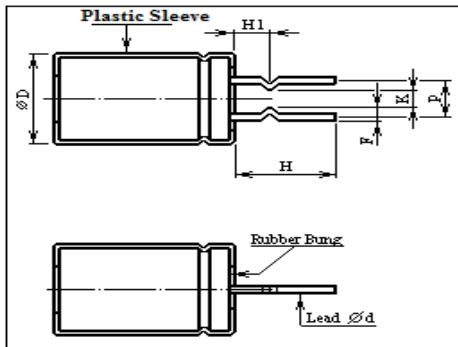
| Size<br>( $\Phi$ D x Lmm)     | 12.5x25 | 16x25 | 16x31 | 16x36 | 18x31 | 18x37 | 18x41 | 22x37 | 22x41 | 22x52 |
|-------------------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Case code                     | DK      | EK    | ER    | EU    | SR    | SH    | SJ    | TH    | TJ    | TM    |
| Nos/ Bag                      | 200     | 100   | 100   | 100   | 50    | 50    | 50    | 50    | 25    | 25    |
| Nos/ Carton                   | 600     | 400   | 300   | 300   | 200   | 200   | 200   | 150   | 125   | 75    |
| Wt. (Kg) 1000<br>Nos (Approx) | 2.8     | 2.7   | 2.9   | 3.3   | 2.4   | 2.8   | 3.2   | 3.1   | 2.8   | 2.2   |

# SD SERIES

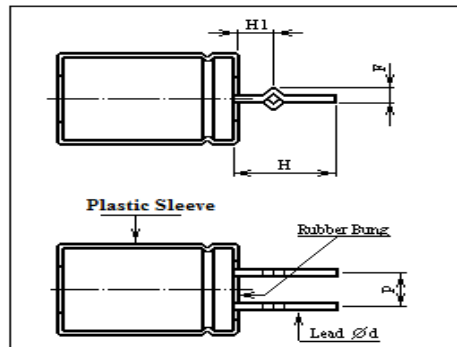
**LEAD FORMED & CUT AND KINKING & CUT CAPACITORS.**

Radial capacitors of size  $\varnothing$  10mm and above are also available in lead formed and lead kinked and cut configuration for direct insertion in PCB to facilitate wave soldering.

**LEAD FORMED & CUT CAPACITORS**



**KINKING & CUT CAPACITORS**



**PHYSICAL DIMENSIONS; UNIT (mm)**

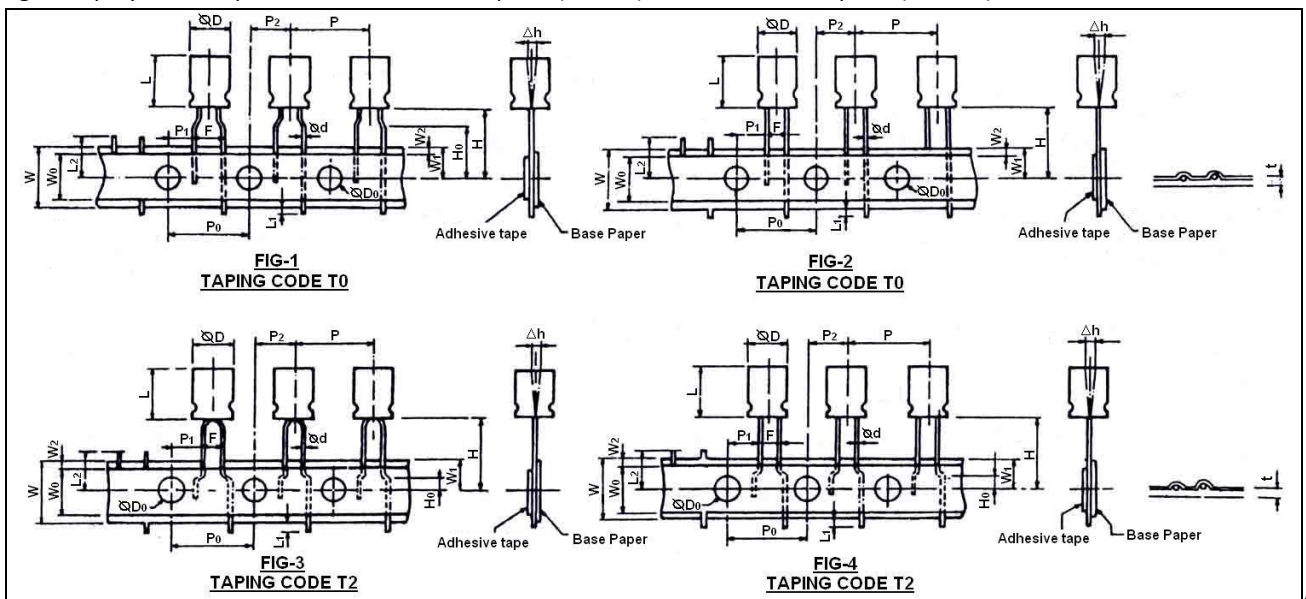
| Case Diameter | H ± 0.5 | H1  | F ± 0.3 | P ± 0.5 | Ød ± 0.05 | K (min) |
|---------------|---------|-----|---------|---------|-----------|---------|
| Ø10           | 5.0     | 2.7 | 1.3     | 5.0     | 0.6       | 2.8     |
| Ø12.5         | 5.0     | 2.7 | 1.3     | 5.0     | 0.6       | 2.8     |
| Ø16           | 5.0     | 2.7 | 1.3     | 7.5     | 0.8       | 5.5     |
| Ø18           | 5.0     | 2.7 | 1.3     | 7.5     | 0.8       | 5.5     |

**Packing Methods of Lead Formed & Cut Capacitors and Kinking & Cut Capacitors**

Capacitors are packed in primary cardboard carton using separators and then filled into appropriate Mother & Master carton for despatch.

**TAPING SPECIFICATIONS FOR RADIAL LEAD TYPE CAPACITORS**

Taping is employed for capacitors with 5mm lead pitch (Table I) and 2.5 mm lead pitch (Table II)



Dimensions are in mm  
Not to scale



**SD SERIES**

**TABLE I - 5mm LEAD PITCH (Taping Code T0)**

| CASE SIZE                                      |                |      | LEAD WIRE PITCH 2.5 mm |        |                    |
|--|----------------|------|------------------------|--------|--------------------|
|  |                |      | 5 x 11<br>6.3x11       | 8x12.5 | 10x12.5<br>10 x 16 |
| DESCRIPTION                                    | TOLERANCE      |      |                        |        |                    |
| Figure. no. Ref                                |                | 1    | 1                      | 2      |                    |
| ∅d Lead wire dia.                              | ± 0.02         | 0.5  | 0.6                    | 0.6    |                    |
| F Lead to lead Center                          | + 0.8<br>- 0.2 | 5    | 5                      | 5      |                    |
| P Pitch of Components                          | ± 1.0          | 12.7 | 12.7                   | 12.7   |                    |
| P <sub>0</sub> Feed hole Pitch*                | ± 0.3          | 12.7 | 12.7                   | 12.7   |                    |
| P <sub>1</sub> Feed hole Centre to lead        | ± 0.7          | 3.85 | 3.85                   | 3.85   |                    |
| P <sub>2</sub> Feedhole Centre to Comp. Centre | ± 1.3          | 6.35 | 6.35                   | 6.35   |                    |
| Δh Component alignment deviation               | ± 2.0          | 0    | 0                      | 0      |                    |
| W Base Paper Width                             | ± 0.2          | 18   | 18                     | 18     |                    |
| W <sub>0</sub> Adhesive Tape Width             | +2.0<br>-0.0   | 13   | 13                     | 13     |                    |
| W <sub>1</sub> Feed hole Position              | +0.75<br>-0.50 | 9    | 9                      | 9      |                    |
| W <sub>2</sub> Adhesive Tape Position          | Max            | 3    | 3                      | 3      |                    |
| H Comp. Base height from Centre                | ± 0.75         | 18.5 | 20                     | 20     |                    |
| H <sub>0</sub> Lead Wire Clinch height         | ± 0.5          | 16   | 16                     | 0      |                    |
| L <sub>1</sub> Lead Wire Protrusion            | Max            | 0    | 0                      | 0      |                    |
| ∅D <sub>0</sub> Feed hole diameters            | ± 0.3          | 4    | 4                      | 4      |                    |
| t Total Tape thickness                         | ± 0.2          | 0.7  | 0.7                    | 0.7    |                    |
| L <sub>2</sub> Length of Snapped Lead          | Max            | 11   | 11                     | 11     |                    |

**TABLE II - 2.5mm LEAD PITCH (Taping Code T2)**

| CASE SIZE                                      |                |      | LEAD WIRE PITCH 2.5 mm |        |
|--|----------------|------|------------------------|--------|
|  |                |      | 5x11                   | 6.3x11 |
| DESCRIPTION                                    | TOLERANCE      |      |                        |        |
| Figure. no. Ref                                |                | 3    | 4                      |        |
| ∅d Lead wire dia.                              | ± 0.02         | 0.5  | 0.5                    |        |
| F Lead to lead Center                          | + 0.8<br>- 0.2 | 2.5  | 2.5                    |        |
| P Pitch of Components                          | ± 1.0          | 12.7 | 12.7                   |        |
| P <sub>0</sub> Feed hole Pitch*                | ± 0.3          | 12.7 | 12.7                   |        |
| P <sub>1</sub> Feed hole Centre to lead        | ± 0.7          | 5.1  | 5.1                    |        |
| P <sub>2</sub> Feedhole Centre to Comp. Centre | ± 1.3          | 6.35 | 6.35                   |        |
| Δh Component alignment deviation               | ± 2.0          | 0    | 0                      |        |
| W Base Paper Width                             | ± 0.2          | 18   | 18                     |        |
| W <sub>0</sub> Adhesive Tape Width             | +2.0<br>-0.0   | 13   | 13                     |        |
| W <sub>1</sub> Feed hole Position              | +0.75<br>-0.50 | 9    | 9                      |        |
| W <sub>2</sub> Adhesive Tape Position          | Max            | 3    | 3                      |        |
| H Comp. Base height from Centre                | ± 0.75         | 18.5 | 18.5                   |        |
| H <sub>0</sub> Lead Wire Clinch height         | Approx         | 6.0  | 6.0                    |        |
| L <sub>1</sub> Lead Wire Protrusion            | Max            | 0    | 0                      |        |
| ∅D <sub>0</sub> Feed hole diameters            | ± 0.3          | 4    | 4                      |        |
| t Total Tape thickness                         | ± 0.2          | 0.7  | 0.7                    |        |
| L <sub>2</sub> Length of Snapped Lead          | Max            | 11   | 11                     |        |

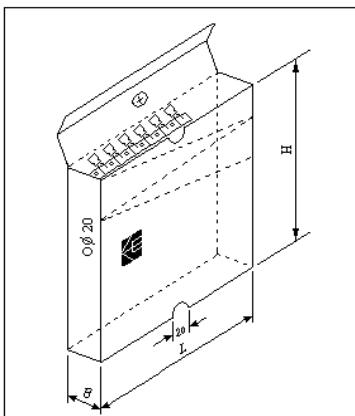
**TAPED AMMO PACKING**

Radial capacitors are available in Taped Ammo Pack for auto insertion in printed circuit boards.

**Taped Ammo Packing Quantity Details: -**

| CAPACITOR SIZE<br>(∅D x L mm) | 5x11 | 6.3x11 | 8x12.5 | 10x12.5 | 10x16 |
|-------------------------------|------|--------|--------|---------|-------|
| Case Code                     | HS   | AS     | BB     | CB      | CD    |
| Nos/ Carton                   | 2000 | 1500   | 1000   | 600     | 600   |

All Dimensions in mm



**Tape Ammo Box Spec:**

| Applicable case code    | HS, AS, BB, CB | CD  |
|-------------------------|----------------|-----|
| Box Dimensions          |                |     |
| L ± 2 (mm)              | 335            | 335 |
| B ± 1 <sub>0</sub> (mm) | 46             | 50  |
| H ± 2 (mm)              | 230            | 230 |