

# SMD Transient Voltage Suppressor



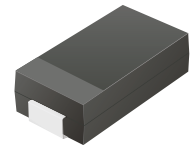
SMD Diodes Specialist

## TV50C110-G Thru. TV50C441-G

Working Peak Reverse Voltage: 11 to 440 Volts

Power Dissipation: 5000 Watts

RoHS Device

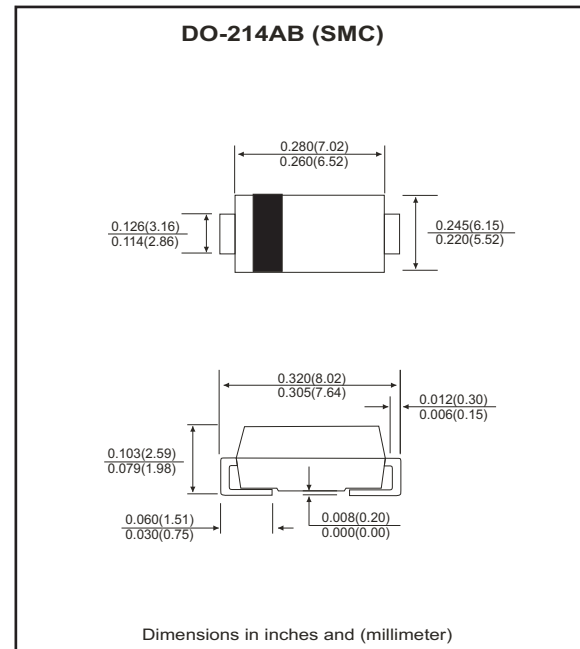


### Features

- Glass passivated chip.
- 5000W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle ): 0.01%.
- Low leakage.
- Excellent clamping capability.
- Very fast response time.

### Mechanical data

- Case: JEDEC DO-214AB, molded plastic.
- Terminals: solderable per MIL-STD-750, method 2026.
- Polarity: Color band denotes cathode end.
- Approx. weight: 0.21 grams



### Maximum Ratings and Electrical Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.  
Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitive load, derate current by 20%.

| Characteristics                                                                       | Symbol           | Value          | Units |
|---------------------------------------------------------------------------------------|------------------|----------------|-------|
| Peak power dissipation with a 10/1000 $\mu$ S waveform                                | P <sub>PP</sub>  | 5000           | Watts |
| Peak pulse current on 10/1000 $\mu$ S waveform                                        | I <sub>PP</sub>  | See Next Table | A     |
| Power dissipation on infinite heatsink at T <sub>L</sub> =75 °C                       | P <sub>D</sub>   | 6.5            | Watts |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only (Note 2) | I <sub>FSM</sub> | 300            | A     |
| Maximum instantaneous forward voltage at 100A for uni-directional only (Note 3)       | V <sub>F</sub>   | 3.5/5.0        | V     |
| Operating junction temperature                                                        | T <sub>J</sub>   | -55 to +150    | °C    |
| Storage temperature range                                                             | T <sub>STG</sub> | -55 to +150    | °C    |

Notes:

1. Non-Repetitive Current pulse per Fig.5 and derated above T<sub>A</sub>=25°C per Fig .1
2. Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per maximum per minute maximum.
3. V<sub>F</sub><3.5V for devices of V<sub>BR</sub> <200V and V<sub>F</sub> <5.0V for devices of V<sub>BR</sub>>201V

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## RATING AND CHARACTERISTIC CURVES (TV50C110-G thru TV50C441-G)

Fig.1 Pulse Derating Curve

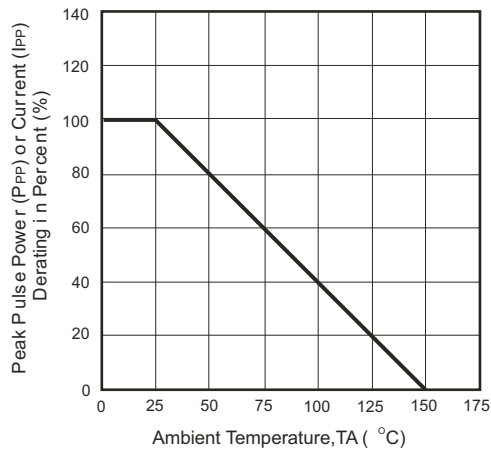


Fig.2 Maximum Non-Repetitive Surge Current

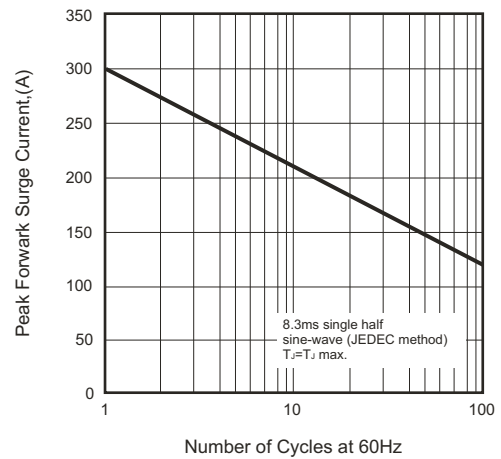


Fig.4 Steady State Power Derating Curve

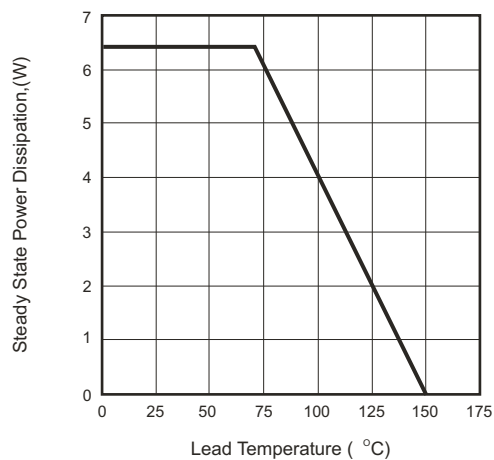


Fig.4 Peak Pulse Power Rating Curve

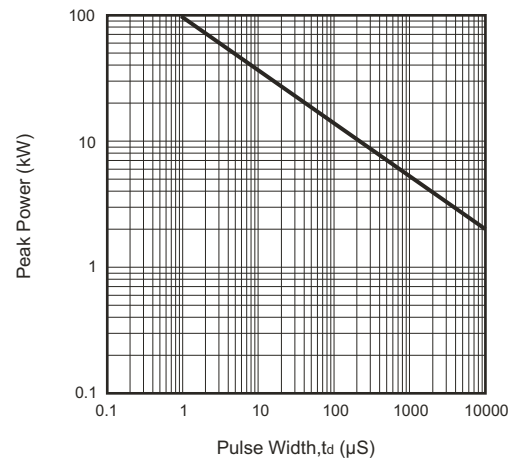


Fig.5 Pulse Waveform

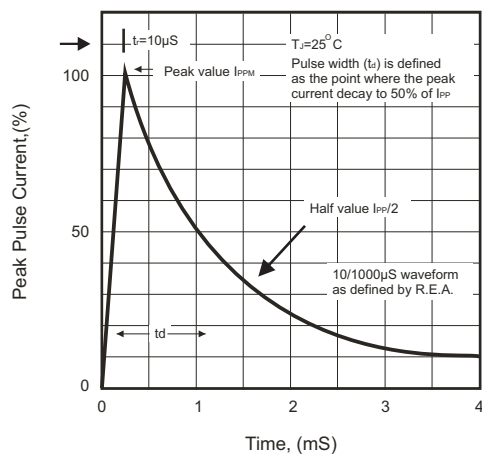
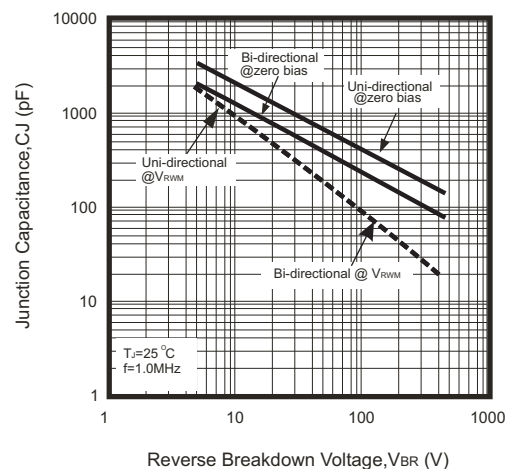


Fig.6- Typical Junction Capacitance



# SMD Transient Voltage Suppressor



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## Electrical Characteristics (TV50C110-G Thru. TV50C441-G)

| Part No        | Absolute Maximum Rating(Ta=25° C) |                     |                     |                |                  | Electrical Characteristic(Ta=25° C) |        |                                  |              |      |
|----------------|-----------------------------------|---------------------|---------------------|----------------|------------------|-------------------------------------|--------|----------------------------------|--------------|------|
|                | V <sub>RWM</sub>                  | V <sub>BR</sub> Min | V <sub>BR</sub> Max | I <sub>T</sub> | I <sub>FSM</sub> | MAX V <sub>C</sub>                  |        | I <sub>R</sub> @V <sub>RWM</sub> | Marking Code |      |
|                | (V)                               | (V)                 | (V)                 | (mA)           | (A)@8.3ms        | (V)                                 | IPP(A) | (uA)                             | UNI          | BI   |
| TV50C110K(B)-G | 11.0                              | 12.20               | 14.90               | 1              | 300              | 20.1                                | 251.24 | 800                              | 5PDW         | 5BDW |
| TV50C110J(B)-G | 11.0                              | 12.20               | 13.50               | 1              | 300              | 18.2                                | 277.47 | 800                              | 5PDX         | 5BDX |
| TV50C120K(B)-G | 12.0                              | 13.30               | 16.30               | 1              | 300              | 22.0                                | 229.55 | 800                              | 5PDY         | 5BDY |
| TV50C120J(B)-G | 12.0                              | 13.30               | 14.70               | 1              | 300              | 19.9                                | 253.77 | 800                              | 5PDZ         | 5BDZ |
| TV50C130K(B)-G | 13.0                              | 14.40               | 17.60               | 1              | 300              | 23.8                                | 212.18 | 500                              | 5PED         | 5BED |
| TV50C130J(B)-G | 13.0                              | 14.40               | 15.90               | 1              | 300              | 21.5                                | 234.88 | 500                              | 5PEE         | 5BEL |
| TV50C140K(B)-G | 14.0                              | 15.60               | 19.10               | 1              | 300              | 25.8                                | 195.74 | 200                              | 5PEF         | 5BEF |
| TV50C140J(B)-G | 14.0                              | 15.60               | 17.20               | 1              | 300              | 23.2                                | 217.67 | 200                              | 5PEG         | 5BEG |
| TV50C150K(B)-G | 15.0                              | 16.70               | 20.40               | 1              | 300              | 26.9                                | 187.73 | 100                              | 5PEH         | 5BEH |
| TV50C150J(B)-G | 15.0                              | 16.70               | 18.50               | 1              | 300              | 24.4                                | 206.97 | 100                              | 5PEK         | 5BEK |
| TV50C160K(B)-G | 16.0                              | 17.80               | 21.80               | 1              | 300              | 28.8                                | 175.35 | 50                               | 5PEL         | 5BEL |
| TV50C160J(B)-G | 16.0                              | 17.80               | 19.70               | 1              | 300              | 26.0                                | 194.23 | 50                               | 5PEM         | 5BEM |
| TV50C170K(B)-G | 17.0                              | 18.90               | 23.10               | 1              | 300              | 30.5                                | 165.57 | 20                               | 5PEN         | 5BEN |
| TV50C170J(B)-G | 17.0                              | 18.90               | 20.90               | 1              | 300              | 27.6                                | 182.97 | 20                               | 5PEP         | 5BEP |
| TV50C180K(B)-G | 18.0                              | 20.00               | 24.40               | 1              | 300              | 32.2                                | 156.83 | 10                               | 5PEQ         | 5BEQ |
| TV50C180J(B)-G | 18.0                              | 20.00               | 22.10               | 1              | 300              | 29.2                                | 172.95 | 10                               | 5PER         | 5BER |
| TV50C190K(B)-G | 19.0                              | 21.13               | 25.76               | 1              | 300              | 34.0                                | 148.49 | 10                               | 5PES         | 5BES |
| TV50C190J(B)-G | 19.0                              | 21.10               | 23.30               | 1              | 300              | 30.8                                | 164.07 | 10                               | 5PET         | 5BET |
| TV50C200K(B)-G | 20.0                              | 22.20               | 27.10               | 1              | 300              | 35.8                                | 141.06 | 5                                | 5PEU         | 5BEU |
| TV50C200J(B)-G | 20.0                              | 22.20               | 24.50               | 1              | 300              | 32.4                                | 155.86 | 5                                | 5PEV         | 5BEV |
| TV50C220K(B)-G | 22.0                              | 24.40               | 29.80               | 1              | 300              | 39.4                                | 128.17 | 5                                | 5PEW         | 5BEW |
| TV50C220J(B)-G | 22.0                              | 24.40               | 26.90               | 1              | 300              | 35.5                                | 142.25 | 5                                | 5PEX         | 5BEX |
| TV50C240K(B)-G | 24.0                              | 26.70               | 32.60               | 1              | 300              | 43.0                                | 117.44 | 5                                | 5PEY         | 5BEY |
| TV50C240J(B)-G | 24.0                              | 26.70               | 29.50               | 1              | 300              | 38.9                                | 129.82 | 5                                | 5PEZ         | 5BEZ |
| TV50C260K(B)-G | 26.0                              | 28.90               | 35.30               | 1              | 300              | 46.6                                | 108.37 | 5                                | 5PFD         | 5BFD |
| TV50C260J(B)-G | 26.0                              | 28.90               | 31.90               | 1              | 300              | 42.1                                | 119.95 | 5                                | 5PFE         | 5BFE |
| TV50C280K(B)-G | 28.0                              | 31.10               | 38.00               | 1              | 300              | 50.0                                | 101.00 | 5                                | 5PFF         | 5BFF |
| TV50C280J(B)-G | 28.0                              | 31.10               | 34.40               | 1              | 300              | 45.4                                | 111.23 | 5                                | 5PFG         | 5BFG |
| TV50C300K(B)-G | 30.0                              | 33.30               | 40.70               | 1              | 300              | 53.5                                | 94.39  | 5                                | 5PFH         | 5BFH |
| TV50C300J(B)-G | 30.0                              | 33.30               | 36.80               | 1              | 300              | 48.4                                | 104.34 | 5                                | 5PFK         | 5BFK |
| TV50C330K(B)-G | 33.0                              | 36.70               | 44.90               | 1              | 300              | 59.0                                | 85.59  | 5                                | 5PFL         | 5BFL |
| TV50C330J(B)-G | 33.0                              | 36.70               | 40.60               | 1              | 300              | 53.3                                | 94.75  | 5                                | 5PFM         | 5BFM |
| TV50C360K(B)-G | 36.0                              | 40.00               | 48.90               | 1              | 300              | 64.3                                | 78.54  | 5                                | 5PFN         | 5BFN |
| TV50C360J(B)-G | 36.0                              | 40.00               | 44.20               | 1              | 300              | 58.1                                | 86.92  | 5                                | 5PFP         | 5BFP |
| TV50C400K(B)-G | 40.0                              | 44.40               | 54.30               | 1              | 300              | 71.4                                | 70.73  | 5                                | 5PFQ         | 5BFQ |
| TV50C400J(B)-G | 40.0                              | 44.40               | 49.10               | 1              | 300              | 64.5                                | 78.29  | 5                                | 5PFR         | 5BFR |
| TV50C430K(B)-G | 43.0                              | 47.80               | 58.40               | 1              | 300              | 76.7                                | 65.84  | 5                                | 5PFS         | 5BFS |
| TV50C430J(B)-G | 43.0                              | 47.80               | 52.80               | 1              | 300              | 69.4                                | 72.77  | 5                                | 5PFT         | 5BFT |
| TV50C450K(B)-G | 45.0                              | 50.00               | 61.10               | 1              | 300              | 80.3                                | 62.89  | 5                                | 5PFU         | 5BFU |
| TV50C450J(B)-G | 45.0                              | 50.00               | 55.30               | 1              | 300              | 72.7                                | 69.46  | 5                                | 5PFV         | 5BFV |
| TV50C480K(B)-G | 48.0                              | 53.30               | 65.10               | 1              | 300              | 85.5                                | 59.06  | 5                                | 5PFW         | 5BFW |
| TV50C480J(B)-G | 48.0                              | 53.30               | 58.90               | 1              | 300              | 77.4                                | 65.25  | 5                                | 5PFX         | 5BFX |
| TV50C510K(B)-G | 51.0                              | 56.70               | 69.30               | 1              | 300              | 91.1                                | 55.43  | 5                                | 5PFY         | 5BFY |
| TV50C510J(B)-G | 51.0                              | 56.70               | 62.70               | 1              | 300              | 82.4                                | 61.29  | 5                                | 5PFZ         | 5BFZ |
| TV50C540K(B)-G | 54.0                              | 60.00               | 73.30               | 1              | 300              | 96.3                                | 52.44  | 5                                | 5PGD         | 5BGD |
| TV50C540J(B)-G | 54.0                              | 60.00               | 66.30               | 1              | 300              | 87.1                                | 57.98  | 5                                | 5PGE         | 5BGE |

Rev. B

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## Electrical Characteristics (TV50C110-G Thru. TV50C441-G)

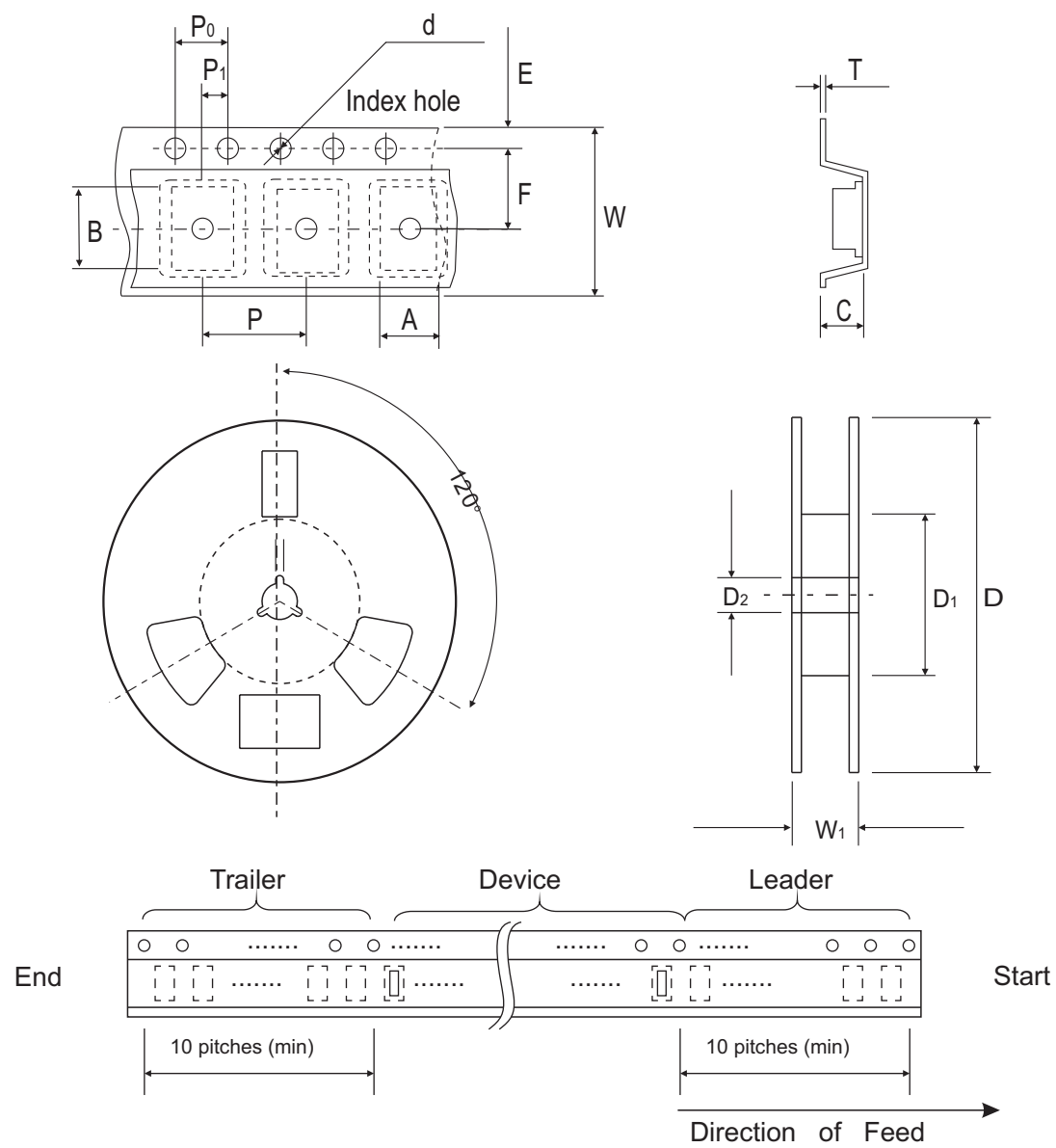
| Part No        | Absolute Maximum Rating(Ta=25° C) |                     |                     |                |                  | Electrical Characteristic(Ta=25° C) |        |                                  |              |      |
|----------------|-----------------------------------|---------------------|---------------------|----------------|------------------|-------------------------------------|--------|----------------------------------|--------------|------|
|                | V <sub>RWM</sub>                  | V <sub>BR</sub> Min | V <sub>BR</sub> Max | I <sub>T</sub> | I <sub>FSM</sub> | MAX V <sub>C</sub>                  |        | I <sub>R</sub> @V <sub>RWM</sub> | Marking Code |      |
|                | (V)                               | (V)                 | (V)                 | (mA)           | (A)@8.3ms        | (V)                                 | IPP(A) | (uA)                             | UNI          | BI   |
| TV50C580K(B)-G | 58.0                              | 64.40               | 78.70               | 1              | 300              | 103.0                               | 49.03  | 5                                | 5PGF         | 5BGF |
| TV50C580J(B)-G | 58.0                              | 64.40               | 71.20               | 1              | 300              | 93.6                                | 53.95  | 5                                | 5PGG         | 5BGG |
| TV50C600K(B)-G | 60.0                              | 66.70               | 81.50               | 1              | 300              | 107.0                               | 47.20  | 5                                | 5PGH         | 5BGH |
| TV50C600J(B)-G | 60.0                              | 66.70               | 73.70               | 1              | 300              | 96.8                                | 52.17  | 5                                | 5PGK         | 5BGK |
| TV50C640K(B)-G | 64.0                              | 71.10               | 86.90               | 1              | 300              | 114.0                               | 44.30  | 5                                | 5PGL         | 5BGL |
| TV50C640J(B)-G | 64.0                              | 71.10               | 78.60               | 1              | 300              | 103.0                               | 49.03  | 5                                | 5PGM         | 5BGM |
| TV50C700K(B)-G | 70.0                              | 77.80               | 95.10               | 1              | 300              | 125.0                               | 40.40  | 5                                | 5PGN         | 5BGN |
| TV50C700J(B)-G | 70.0                              | 77.80               | 86.00               | 1              | 300              | 113.0                               | 44.69  | 5                                | 5PGP         | 5BGP |
| TV50C750K(B)-G | 75.0                              | 83.30               | 102.00              | 1              | 300              | 134.0                               | 37.69  | 5                                | 5PGQ         | 5BGQ |
| TV50C750J(B)-G | 75.0                              | 83.30               | 92.10               | 1              | 300              | 121.0                               | 41.74  | 5                                | 5PGR         | 5BGR |
| TV50C780K(B)-G | 78.0                              | 86.70               | 106.00              | 1              | 300              | 139.0                               | 36.33  | 5                                | 5PGS         | 5BGS |
| TV50C780J(B)-G | 78.0                              | 86.70               | 95.80               | 1              | 300              | 126.0                               | 40.08  | 5                                | 5PGT         | 5BGT |
| TV50C800K(B)-G | 80.0                              | 88.96               | 108.80              | 1              | 300              | 143.2                               | 35.27  | 5                                | 5PGA         | 5BGA |
| TV50C800J(B)-G | 80.0                              | 88.80               | 97.60               | 1              | 300              | 129.6                               | 38.97  | 5                                | 5PGB         | 5BGB |
| TV50C850K(B)-G | 85.0                              | 94.40               | 115.00              | 1              | 300              | 151.0                               | 33.44  | 5                                | 5PGU         | 5BGU |
| TV50C850J(B)-G | 85.0                              | 94.40               | 104.00              | 1              | 300              | 137.0                               | 36.86  | 5                                | 5PGV         | 5BGV |
| TV50C900K(B)-G | 90.0                              | 100.00              | 122.00              | 1              | 300              | 160.0                               | 31.56  | 5                                | 5PGW         | 5BGW |
| TV50C900J(B)-G | 90.0                              | 100.00              | 111.00              | 1              | 300              | 146.0                               | 34.59  | 5                                | 5PGX         | 5BGX |
| TV50C101K(B)-G | 100.0                             | 111.00              | 136.00              | 1              | 300              | 179.0                               | 28.21  | 5                                | 5PGY         | 5BGY |
| TV50C101J(B)-G | 100.0                             | 111.00              | 123.00              | 1              | 300              | 162.0                               | 31.17  | 5                                | 5PGZ         | 5BGZ |
| TV50C111K(B)-G | 110.0                             | 122.00              | 149.00              | 1              | 300              | 196.0                               | 25.77  | 5                                | 5PHD         | 5BHF |
| TV50C111J(B)-G | 110.0                             | 122.00              | 135.00              | 1              | 300              | 177.0                               | 28.53  | 5                                | 5PHE         | 5BHR |
| TV50C121K(B)-G | 120.0                             | 133.00              | 163.00              | 1              | 300              | 214.0                               | 23.60  | 5                                | 5PHF         | 5BHF |
| TV50C121J(B)-G | 120.0                             | 133.00              | 147.00              | 1              | 300              | 193.0                               | 26.17  | 5                                | 5PHG         | 5BHG |
| TV50C131K(B)-G | 130.0                             | 144.00              | 176.00              | 1              | 300              | 231.0                               | 21.86  | 5                                | 5PHH         | 5BHH |
| TV50C131J(B)-G | 130.0                             | 144.00              | 159.00              | 1              | 300              | 209.0                               | 24.16  | 5                                | 5PHK         | 5BHK |
| TV50C141K(B)-G | 140.0                             | 155.68              | 190.40              | 1              | 300              | 250.6                               | 20.15  | 5                                | 5PHA         | 5BHA |
| TV50C141J(B)-G | 140.0                             | 155.00              | 171.00              | 1              | 300              | 226.8                               | 22.27  | 5                                | 5PHB         | 5BHB |
| TV50C151K(B)-G | 150.0                             | 167.00              | 204.00              | 1              | 300              | 268.0                               | 18.84  | 5                                | 5PHL         | 5BHL |
| TV50C151J(B)-G | 150.0                             | 167.00              | 185.00              | 1              | 300              | 243.0                               | 20.78  | 5                                | 5PHM         | 5BHM |
| TV50C161K(B)-G | 160.0                             | 178.00              | 218.00              | 1              | 300              | 287.0                               | 17.60  | 5                                | 5PHN         | 5BHN |
| TV50C161J(B)-G | 160.0                             | 178.00              | 197.00              | 1              | 300              | 259.0                               | 19.50  | 5                                | 5PHP         | 5BHP |
| TV50C171K(B)-G | 170.0                             | 189.00              | 231.00              | 1              | 300              | 304.0                               | 16.61  | 5                                | 5PHQ         | 5BHQ |
| TV50C171J(B)-G | 170.0                             | 189.00              | 209.00              | 1              | 300              | 275.0                               | 18.36  | 5                                | 5PHR         | 5BHR |
| TV50C181K(B)-G | 180.0                             | 200.16              | 244.80              | 1              | 300              | 322.2                               | 15.67  | 5                                | 5PHS         | 5BHS |
| TV50C181J(B)-G | 180.0                             | 200.00              | 220.00              | 1              | 300              | 291.6                               | 17.32  | 5                                | 5PHT         | 5BHT |
| TV50C191K(B)-G | 190.0                             | 211.28              | 258.40              | 1              | 300              | 340.1                               | 14.85  | 5                                | 5PHU         | 5BHU |
| TV50C191J(B)-G | 190.0                             | 211.00              | 232.00              | 1              | 300              | 307.8                               | 16.41  | 5                                | 5PHV         | 5BHV |
| TV50C201J(B)-G | 200.0                             | 224.00              | 247.00              | 1              | 300              | 324.0                               | 9.26   | 5                                | 5PHW         | 5BHW |
| TV50C221J(B)-G | 220.0                             | 246.00              | 272.00              | 1              | 300              | 356.0                               | 8.43   | 5                                | 5PHX         | 5BHX |
| TV50C251J(B)-G | 250.0                             | 279.00              | 309.00              | 1              | 300              | 405.0                               | 7.41   | 5                                | 5PHZ         | 5BHZ |
| TV50C301J(B)-G | 300.0                             | 335.00              | 371.00              | 1              | 300              | 486.0                               | 6.17   | 5                                | 5PJE         | 5BJE |
| TV50C351J(B)-G | 350.0                             | 391.00              | 432.00              | 1              | 300              | 567.0                               | 5.29   | 5                                | 5PJG         | 5BJG |
| TV50C401J(B)-G | 400.0                             | 447.00              | 494.00              | 1              | 300              | 648.0                               | 4.63   | 5                                | 5PJK         | 5BJK |
| TV50C441J(B)-G | 440.0                             | 492.00              | 543.00              | 1              | 300              | 713.0                               | 4.21   | 5                                | 5PJM         | 5BJM |

Note:

- 1) Suffix K denotes 10% tolerance devices, suffix J denotes 5% tolerance devices.
- 2) Suffix B after part number to specify Bi-directional devices.
- 3) For Bi-Directional devices having V<sub>R</sub> of 10 volts and under, the I<sub>R</sub> limit is double.

Rev. B

## Reel Taping Specification



| DO-214AB (SMC) | SYMBOL | A           | B           | C           | d             | D     | D <sub>1</sub> | D <sub>2</sub> |
|----------------|--------|-------------|-------------|-------------|---------------|-------|----------------|----------------|
|                | (mm)   | 6.05±0.10   | 8.31±0.10   | 4.50 (max)  | 1.55±0.10-0.0 | 330   | 50.0 MIN.      | 13.0±0.20      |
|                | (inch) | 0.256±0.004 | 0.327±0.004 | 0.177 (max) | 0.061±0.004   | 13.00 | 1.969 MIN.     | 0.512±0.008    |

| DO-214AB (SMC) | SYMBOL | E           | F           | P           | P <sub>0</sub> | P <sub>1</sub> | W           | W <sub>1</sub> |
|----------------|--------|-------------|-------------|-------------|----------------|----------------|-------------|----------------|
|                | (mm)   | 1.75±0.10   | 7.50±0.05   | 4.00±0.10   | 4.00±0.10      | 2.00±1.00      | 16.0±0.30   | 22.4 MAX.      |
|                | (inch) | 0.069±0.004 | 0.295±0.002 | 0.157±0.004 | 0.157±0.004    | 0.079±0.040    | 0.630±0.012 | 0.882 MAX.     |

## Marking Code

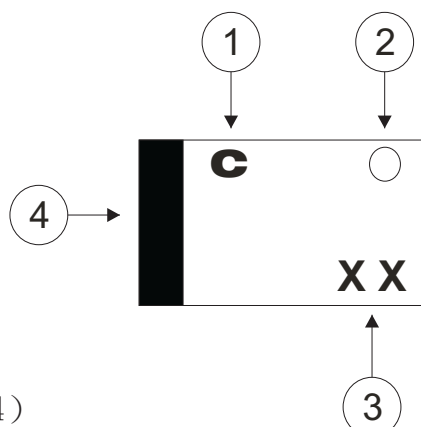
1. C: COMCHIP

2. ○: Package

|   |     |
|---|-----|
| ○ | PKG |
| A | SMA |
| B | SMB |
| C | SMC |

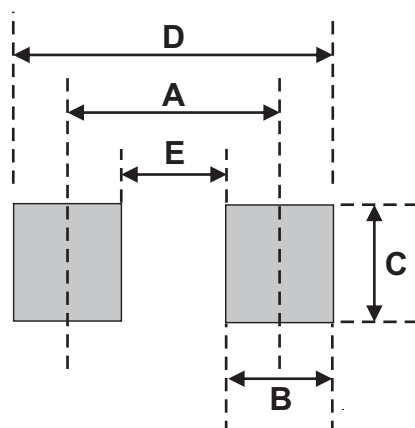
3. XX: Marking code(see Page. 3~4)

4. : Cathod Band



## Suggested PAD Layout

| SIZE | DO-214AB(SMC) |        |
|------|---------------|--------|
|      | (mm)          | (inch) |
| A    | 6.20          | 0.244  |
| B    | 1.60          | 0.063  |
| C    | 4.80          | 0.189  |
| D    | 7.80          | 0.307  |
| E    | 4.60          | 0.181  |



## Standard Package

| Case Type      | Qty per Reel | Reel Size |
|----------------|--------------|-----------|
|                | (Pcs)        | (inch)    |
| DO-214AB (SMC) | 3000         | 13        |