

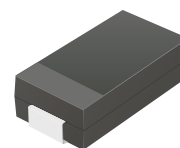
## TV04A5V0-HF Thru. TV04A441-HF

Working Peak Reverse Voltage: 5.0 to 440 Volts

Power Dissipation: 400 Watts

RoHS Device

Halogen Free

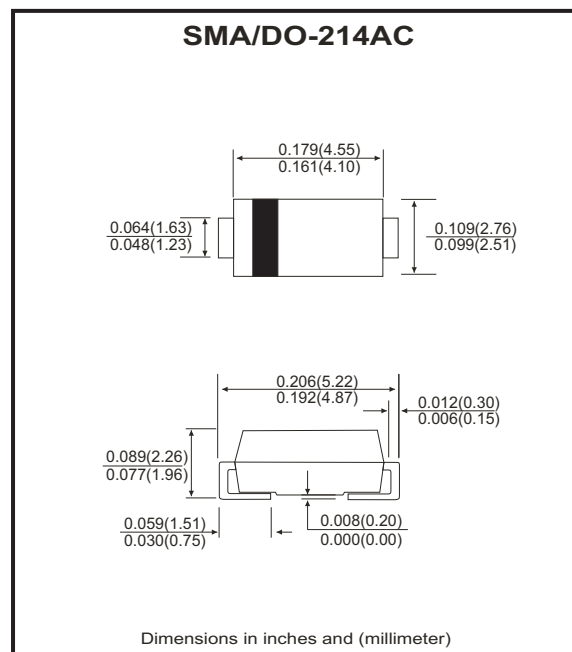


### Features

- Glass passivated chip.
- 400W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive rate (duty cycle):0.01%
- Low leakage.
- Uni and Bidirectional unit.
- Excellent clamping capability.
- Very fast response time.
- UL recognized file # E349157 
- Range: TV04A5V0J(B) thru. TV04A240J(B)

### Mechanical data

- Epoxy: UL 94V-0 rate flame retardant.
- Case: SMA/DO-214AC, molded plastic.
- Terminals: solderable per MIL-STD-750, method 2026.
- Polarity: Color band denotes cathode end except bipolar.
- Weight: 0.069 gram (approx.)



### 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 on 10/1000 $\mu$ S waveform (Note1)                           | P <sub>PP</sub>                   | 400            | W     |
| Peak pulse current on 10/1000 $\mu$ S waveform (Note 1)                              | I <sub>PP</sub>                   | See Next Table | A     |
| Steady state power dissipation at T <sub>L</sub> =75°C                               | P <sub>D</sub>                    | 1.0            | W     |
| Peak forward surge current, 8.3mS single half sine-wave unidirectional only (Note 2) | I <sub>FSM</sub>                  | 40             | A     |
| Maximum instantaneous forward voltage at 25.0A for unidirectional only (Note 3)      | V <sub>F</sub>                    | 3.5/5.0        | V     |
| Operating junction and storage temperature                                           | T <sub>J</sub> , 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 equare wave,duty cycle=4 pulses 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

Company reserves the right to improve product design , functions and reliability without notice.

REV:F

## RATING AND CHARACTERISTIC CURVES (TV04A5V0-HF thru TV04A441-HF)

Fig.1 - Pulse Derating Curve

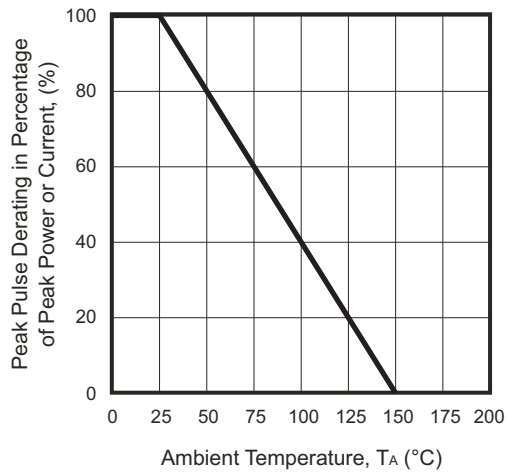


Fig.2 - Maximum Non-Repetitive Surge Current

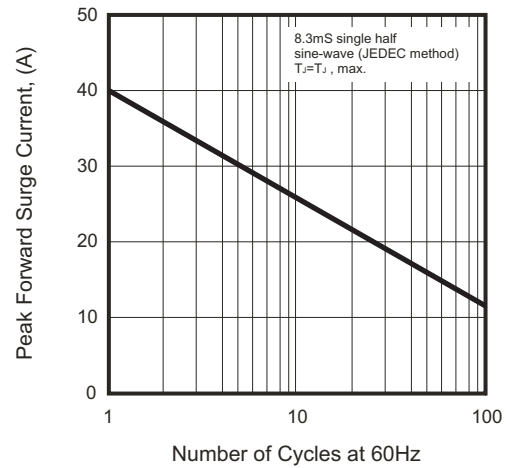


Fig.3 - Steady State Power Derating Curve

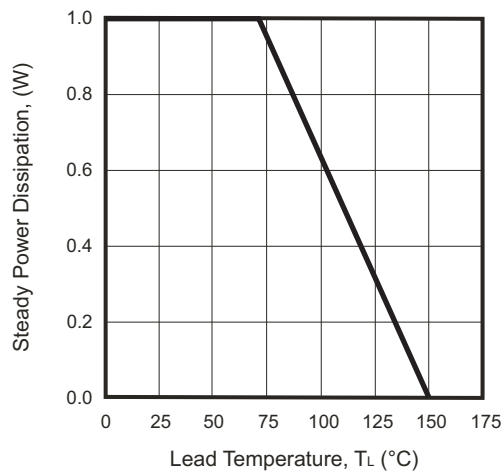


Fig.4 - Peak Pulse Power Rating Curve

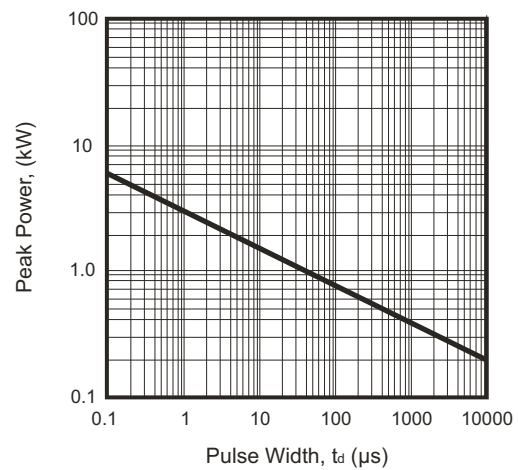


Fig.5 - Pulse Waveform

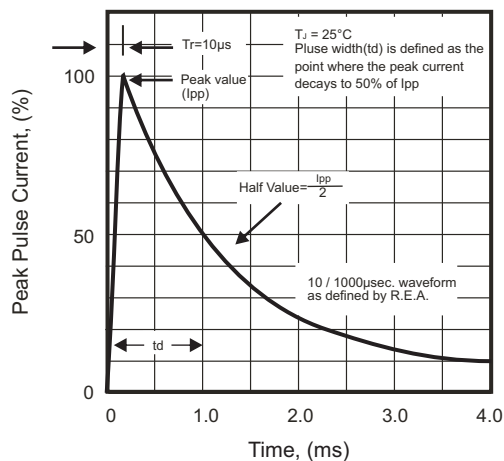
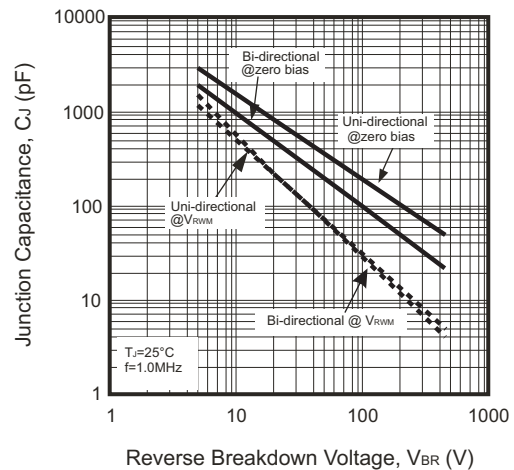


Fig.6 - Typical Junction Capacitance



## Electrical Characteristics (TV04A5V0-HF Thru. TV04A441-HF)

| Part No.        | Breakdown voltage<br>V <sub>BR</sub> @ I <sub>T</sub> |             |                        | Maximum<br>Reverse<br>Leakage<br>@V <sub>RWM</sub><br>I <sub>R</sub> (uA) | Working<br>Peak<br>Reverse<br>Voltage<br>V <sub>RWM</sub> (V) | Maximum<br>Reverse<br>Surge<br>Current<br>I <sub>PP</sub> (A) | Maximum<br>Clamping<br>Voltage<br>@I <sub>PP</sub><br>V <sub>C</sub> (V) | Device<br>Marking<br>Code |    |
|-----------------|-------------------------------------------------------|-------------|------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------|----|
|                 | Min.<br>(V)                                           | Max.<br>(V) | I <sub>T</sub><br>(mA) |                                                                           |                                                               |                                                               |                                                                          | UNI                       | BI |
| TV04A5V0J(B)-HF | 6.40                                                  | 7.00        | 10                     | 800                                                                       | 5.0                                                           | 43.48                                                         | 9.2                                                                      | AE                        | WE |
| TV04A6V0J(B)-HF | 6.67                                                  | 7.37        | 10                     | 800                                                                       | 6.0                                                           | 38.83                                                         | 10.3                                                                     | AG                        | WG |
| TV04A6V5J(B)-HF | 7.22                                                  | 7.98        | 10                     | 500                                                                       | 6.5                                                           | 35.71                                                         | 11.2                                                                     | AK                        | WK |
| TV04A7V0J(B)-HF | 7.78                                                  | 8.60        | 10                     | 200                                                                       | 7.0                                                           | 33.33                                                         | 12.0                                                                     | AM                        | WM |
| TV04A7V5J(B)-HF | 8.33                                                  | 9.21        | 1                      | 100                                                                       | 7.5                                                           | 31.01                                                         | 12.9                                                                     | AP                        | WP |
| TV04A8V0J(B)-HF | 8.89                                                  | 9.83        | 1                      | 50                                                                        | 8.0                                                           | 29.41                                                         | 13.6                                                                     | AR                        | WR |
| TV04A8V5J(B)-HF | 9.44                                                  | 10.40       | 1                      | 10                                                                        | 8.5                                                           | 27.78                                                         | 14.4                                                                     | AT                        | WT |
| TV04A9V0J(B)-HF | 10.00                                                 | 11.10       | 1                      | 5                                                                         | 9.0                                                           | 25.97                                                         | 15.4                                                                     | AV                        | WV |
| TV04A100J(B)-HF | 11.10                                                 | 12.30       | 1                      | 5                                                                         | 10.0                                                          | 23.53                                                         | 17.0                                                                     | AX                        | WX |
| TV04A110J(B)-HF | 12.20                                                 | 13.50       | 1                      | 1                                                                         | 11.0                                                          | 21.98                                                         | 18.2                                                                     | AZ                        | WZ |
| TV04A120J(B)-HF | 13.30                                                 | 14.70       | 1                      | 1                                                                         | 12.0                                                          | 20.10                                                         | 19.9                                                                     | BE                        | XE |
| TV04A130J(B)-HF | 14.40                                                 | 15.90       | 1                      | 1                                                                         | 13.0                                                          | 18.60                                                         | 21.5                                                                     | BG                        | XG |
| TV04A140J(B)-HF | 15.60                                                 | 17.20       | 1                      | 1                                                                         | 14.0                                                          | 17.24                                                         | 23.2                                                                     | BK                        | XK |
| TV04A150J(B)-HF | 16.70                                                 | 18.50       | 1                      | 1                                                                         | 15.0                                                          | 16.39                                                         | 24.4                                                                     | BM                        | XM |
| TV04A160J(B)-HF | 17.80                                                 | 19.70       | 1                      | 1                                                                         | 16.0                                                          | 15.38                                                         | 26.0                                                                     | BP                        | XP |
| TV04A170J(B)-HF | 18.90                                                 | 20.90       | 1                      | 1                                                                         | 17.0                                                          | 14.49                                                         | 27.6                                                                     | BR                        | XR |
| TV04A180J(B)-HF | 20.00                                                 | 22.10       | 1                      | 1                                                                         | 18.0                                                          | 13.70                                                         | 29.2                                                                     | BT                        | XT |
| TV04A190J(B)-HF | 21.10                                                 | 23.30       | 1                      | 1                                                                         | 19.0                                                          | 13.00                                                         | 30.8                                                                     | BB                        | XB |
| TV04A200J(B)-HF | 22.20                                                 | 24.50       | 1                      | 1                                                                         | 20.0                                                          | 12.35                                                         | 32.4                                                                     | BV                        | XV |
| TV04A220J(B)-HF | 24.40                                                 | 26.90       | 1                      | 1                                                                         | 22.0                                                          | 11.27                                                         | 35.5                                                                     | BX                        | XX |
| TV04A240J(B)-HF | 26.70                                                 | 29.50       | 1                      | 1                                                                         | 24.0                                                          | 10.28                                                         | 38.9                                                                     | BZ                        | XZ |
| TV04A260J(B)-HF | 28.90                                                 | 31.90       | 1                      | 1                                                                         | 26.0                                                          | 9.50                                                          | 42.1                                                                     | CE                        | YE |
| TV04A280J(B)-HF | 31.10                                                 | 34.40       | 1                      | 1                                                                         | 28.0                                                          | 8.81                                                          | 45.4                                                                     | CG                        | YG |
| TV04A300J(B)-HF | 33.30                                                 | 36.80       | 1                      | 1                                                                         | 30.0                                                          | 8.26                                                          | 48.4                                                                     | CK                        | YK |
| TV04A330J(B)-HF | 36.70                                                 | 40.60       | 1                      | 1                                                                         | 33.0                                                          | 7.50                                                          | 53.3                                                                     | CM                        | YM |
| TV04A360J(B)-HF | 40.00                                                 | 44.20       | 1                      | 1                                                                         | 36.0                                                          | 6.88                                                          | 58.1                                                                     | CP                        | YP |
| TV04A400J(B)-HF | 44.40                                                 | 49.10       | 1                      | 1                                                                         | 40.0                                                          | 6.20                                                          | 64.5                                                                     | CR                        | YR |
| TV04A430J(B)-HF | 47.80                                                 | 52.80       | 1                      | 1                                                                         | 43.0                                                          | 5.76                                                          | 69.4                                                                     | CT                        | YT |
| TV04A450J(B)-HF | 50.00                                                 | 55.30       | 1                      | 1                                                                         | 45.0                                                          | 5.50                                                          | 72.7                                                                     | CV                        | YV |
| TV04A480J(B)-HF | 53.30                                                 | 58.90       | 1                      | 1                                                                         | 48.0                                                          | 5.17                                                          | 77.4                                                                     | CX                        | YX |
| TV04A510J(B)-HF | 56.70                                                 | 62.70       | 1                      | 1                                                                         | 51.0                                                          | 4.85                                                          | 82.4                                                                     | CZ                        | YZ |
| TV04A540J(B)-HF | 60.00                                                 | 66.30       | 1                      | 1                                                                         | 54.0                                                          | 4.59                                                          | 87.1                                                                     | RE                        | ZE |
| TV04A580J(B)-HF | 64.40                                                 | 71.20       | 1                      | 1                                                                         | 58.0                                                          | 4.27                                                          | 93.6                                                                     | RG                        | ZG |
| TV04A600J(B)-HF | 66.70                                                 | 73.70       | 1                      | 1                                                                         | 60.0                                                          | 4.13                                                          | 96.8                                                                     | RK                        | ZK |
| TV04A640J(B)-HF | 71.10                                                 | 78.60       | 1                      | 1                                                                         | 64.0                                                          | 3.88                                                          | 103.0                                                                    | RM                        | ZM |
| TV04A700J(B)-HF | 77.80                                                 | 86.00       | 1                      | 1                                                                         | 70.0                                                          | 3.54                                                          | 113.0                                                                    | RP                        | ZP |
| TV04A750J(B)-HF | 83.30                                                 | 92.10       | 1                      | 1                                                                         | 75.0                                                          | 3.31                                                          | 121.0                                                                    | RR                        | ZR |
| TV04A780J(B)-HF | 86.70                                                 | 95.80       | 1                      | 1                                                                         | 78.0                                                          | 3.17                                                          | 126.0                                                                    | RT                        | ZT |
| TV04A800J(B)-HF | 88.80                                                 | 97.60       | 1                      | 1                                                                         | 80.0                                                          | 3.09                                                          | 129.6                                                                    | RB                        | ZB |
| TV04A850J(B)-HF | 94.40                                                 | 104.00      | 1                      | 1                                                                         | 85.0                                                          | 2.92                                                          | 137.0                                                                    | RV                        | ZV |

## Electrical Characteristics (TV04A5V0-HF Thru. TV04A441-HF)

| Part No.        | Breakdown voltage<br>V <sub>BR</sub> @ I <sub>T</sub> |             |                        | Maximum<br>Reverse<br>Leakage<br>@V <sub>RWM</sub><br>I <sub>R</sub> (uA) | Working<br>Peak<br>Reverse<br>Voltage<br>V <sub>RWM</sub> (V) | Maximum<br>Reverse<br>Surge<br>Current<br>I <sub>PP</sub> (A) | Maximum<br>Clamping<br>Voltage<br>@I <sub>PP</sub><br>V <sub>C</sub> (V) | Device<br>Marking<br>Code |    |
|-----------------|-------------------------------------------------------|-------------|------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------|----|
|                 | Min.<br>(V)                                           | Max.<br>(V) | I <sub>T</sub><br>(mA) |                                                                           |                                                               |                                                               |                                                                          | UNI                       | BI |
| TV04A900J(B)-HF | 100.0                                                 | 111.0       | 1                      | 1                                                                         | 90.0                                                          | 2.74                                                          | 146.0                                                                    | RX                        | ZX |
| TV04A101J(B)-HF | 111.0                                                 | 123.0       | 1                      | 1                                                                         | 100.0                                                         | 2.47                                                          | 162.0                                                                    | RZ                        | ZZ |
| TV04A111J(B)-HF | 122.0                                                 | 135.0       | 1                      | 1                                                                         | 110.0                                                         | 2.26                                                          | 177.0                                                                    | SE                        | VE |
| TV04A121J(B)-HF | 133.0                                                 | 147.0       | 1                      | 1                                                                         | 120.0                                                         | 2.07                                                          | 193.0                                                                    | SG                        | VG |
| TV04A131J(B)-HF | 144.0                                                 | 159.0       | 1                      | 1                                                                         | 130.0                                                         | 1.91                                                          | 209.0                                                                    | SK                        | VK |
| TV04A141J(B)-HF | 155.0                                                 | 171.0       | 1                      | 1                                                                         | 140.0                                                         | 1.76                                                          | 226.8                                                                    | SB                        | VB |
| TV04A151J(B)-HF | 167.0                                                 | 185.0       | 1                      | 1                                                                         | 150.0                                                         | 1.65                                                          | 243.0                                                                    | SM                        | VM |
| TV04A161J(B)-HF | 178.0                                                 | 197.0       | 1                      | 1                                                                         | 160.0                                                         | 1.54                                                          | 259.0                                                                    | SP                        | VP |
| TV04A171J(B)-HF | 189.0                                                 | 209.0       | 1                      | 1                                                                         | 170.0                                                         | 1.45                                                          | 275.0                                                                    | SR                        | VR |
| TV04A181J(B)-HF | 200.0                                                 | 220.0       | 1                      | 1                                                                         | 180.0                                                         | 1.37                                                          | 291.6                                                                    | ST                        | VT |
| TV04A191J(B)-HF | 211.0                                                 | 232.0       | 1                      | 1                                                                         | 190.0                                                         | 1.30                                                          | 307.8                                                                    | SV                        | VV |
| TV04A201J(B)-HF | 224.0                                                 | 247.0       | 1                      | 1                                                                         | 200.0                                                         | 1.23                                                          | 324.0                                                                    | SW                        | VW |
| TV04A221J(B)-HF | 246.0                                                 | 272.0       | 1                      | 1                                                                         | 220.0                                                         | 1.12                                                          | 356.0                                                                    | SX                        | VX |
| TV04A251J(B)-HF | 279.0                                                 | 309.0       | 1                      | 1                                                                         | 250.0                                                         | 0.99                                                          | 405.0                                                                    | SZ                        | VZ |
| TV04A301J(B)-HF | 335.0                                                 | 371.0       | 1                      | 1                                                                         | 300.0                                                         | 0.82                                                          | 486.0                                                                    | DE                        | HE |
| TV04A351J(B)-HF | 391.0                                                 | 432.0       | 1                      | 1                                                                         | 350.0                                                         | 0.71                                                          | 567.0                                                                    | DG                        | HG |
| TV04A401J(B)-HF | 447.0                                                 | 494.0       | 1                      | 1                                                                         | 400.0                                                         | 0.62                                                          | 648.0                                                                    | DK                        | HK |
| TV04A441J(B)-HF | 492.0                                                 | 543.0       | 1                      | 1                                                                         | 440.0                                                         | 0.56                                                          | 713.0                                                                    | DM                        | HM |

Note:

- 1) 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.

## Reel Taping Specification



| SMA/DO-214AC | SYMBOL | A                 | B                 | C           | d                 | D        | D1         | D2                |
|--------------|--------|-------------------|-------------------|-------------|-------------------|----------|------------|-------------------|
|              | (mm)   | $2.79 \pm 0.10$   | $5.33 \pm 0.10$   | 4.50 (max)  | $1.75 \pm 0.10$   | 330MAX   | 50.0 MIN.  | $13.0 \pm 0.2$    |
|              | (inch) | $0.110 \pm 0.004$ | $0.210 \pm 0.004$ | 0.177 (max) | $0.069 \pm 0.004$ | 13.00MAX | 1.969 MIN. | $0.512 \pm 0.008$ |

| SMA/DO-214AC | SYMBOL | E                 | F                 | P                 | P0                | P1                | W                 | W1         |
|--------------|--------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|
|              | (mm)   | $1.75 \pm 0.10$   | $5.50 \pm 0.05$   | $4.00 \pm 0.10$   | $4.00 \pm 0.10$   | $2.00 \pm 0.05$   | $12.0 \pm 0.30$   | 18.4 MAX.  |
|              | (inch) | $0.069 \pm 0.004$ | $0.216 \pm 0.002$ | $0.157 \pm 0.004$ | $0.157 \pm 0.004$ | $0.079 \pm 0.002$ | $0.472 \pm 0.012$ | 0.724 MAX. |

## Marking Code

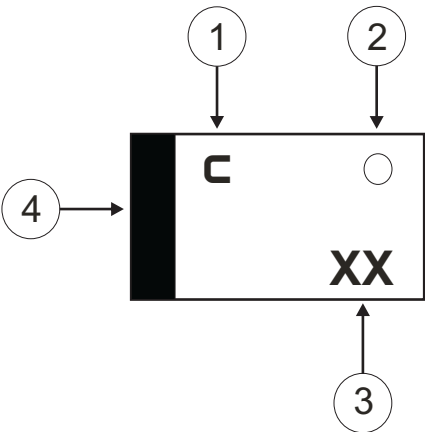
1. **C**: COMCHIP

2. **○**: Package

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

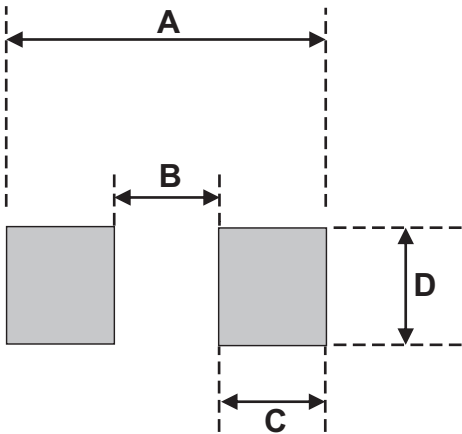
3. **XX**: Marking code (see Page. 3~4)

4. **■**: Cathod Band



## Suggested PAD Layout

| SIZE | DO-214AC(SMA) |           |
|------|---------------|-----------|
|      | (mm)          | (inch)    |
| A    | 5.28          | 0.208     |
| B    | 1.88 MAX      | 0.074 MAX |
| C    | 1.52 MIN      | 0.060 MIN |
| D    | 1.68 MIN      | 0.066 MIN |



## Standard Packaging

| Case Type    | REEL PACK       |                     |
|--------------|-----------------|---------------------|
|              | REEL<br>( pcs ) | Reel Size<br>(inch) |
| SMA/DO-214AC | 5,000           | 13                  |