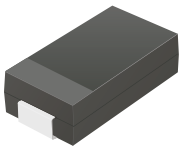
# SMD Transient Voltage Suppressor

# TV50C110-G Thru. TV50C441-G

## Working Voltage: 11 to 440 Volts
## Peak Pulse Power: 5000 Watts
## RoHS Device



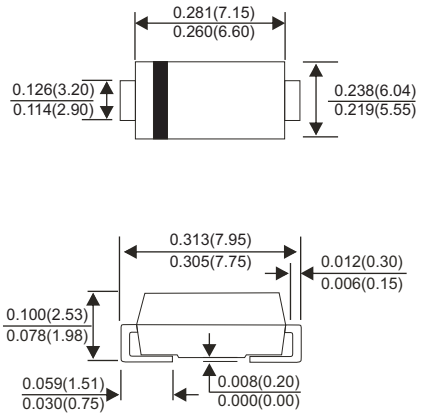
## Features

- Glass passivated chip.
- 5000W peak pulse power capability with a 10/1000μs waveform, repetitive rate (duty cycle):0.01%
- Low leakage.
- Uni and Bidirectional unit.
- Excellent clamping capability.
- Very fast response time.
- UL recognized file # E349157

## Mechanical Data

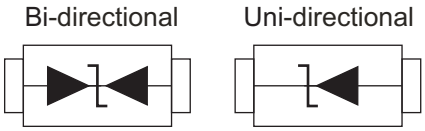
- Case: DO-214AB/SMC molded plastic.
- Epoxy: UL 94V-0 rate flame retardant
- Lead: Solderable per MIL-STD-750, method 2026.
- Polarity: Color band denoted cathode end except bipolar.
- Mounting position: Any
- Weight: 0.230 gram (approx.)

**SMC/DO-214AB**




Dimensions in inches and (millimeter)

## Circuit Diagram




## Maximum Ratings and Electrical Characteristics

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

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Peak power dissipation with a 10/1000μs waveform (Note 1) | $P_{PP}$ | 5000 | W |
| Peak pulse current with a 10/1000μs waveform (Note 1) | $I_{PP}$ | See Next Table | A |
| Power dissipation on infinite heatsink at $T_L$=75°C | $P_D$ | 6.5 | W |
| Peak forward surge current, 8.3ms single half sine-wave unidirectional only (Note 2) | $I_{FSM}$ | 300 | A |
| Maximum instantaneous forward voltage at 100A for unidirectional only (Note 3) | $V_F$ | 3.5/5.0 | V |
| Operation junction and storage temperature range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes: 1. Non-repetitive current pulse, per Fig.5 and derated above $T_A$=25°C, per Fig.1
2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.
3. $V_F$<3.5V for devices of $V_{BR}$<200V and $V_F$<5.0V for devices of $V_{BR}$>201V

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

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

Fig.1 - Pulse Derating Curve

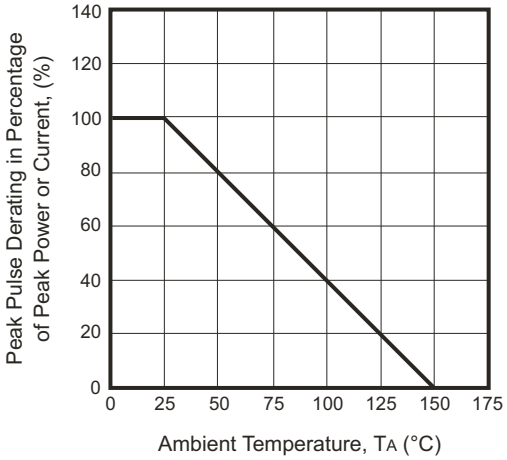



Fig.2 - Maximum Non-Repetitive Surge Current

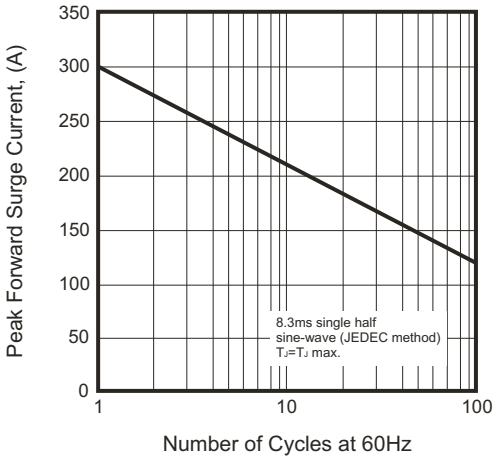



Fig.3 - Steady State Power Derating Curve

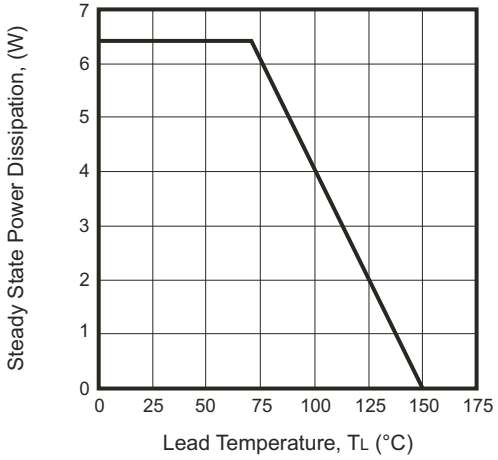



Fig.4 - Peak Pulse Power Rating Curve

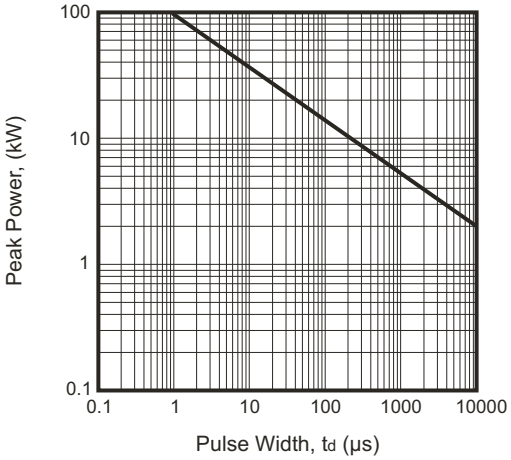



Fig.5 - Pulse Waveforem

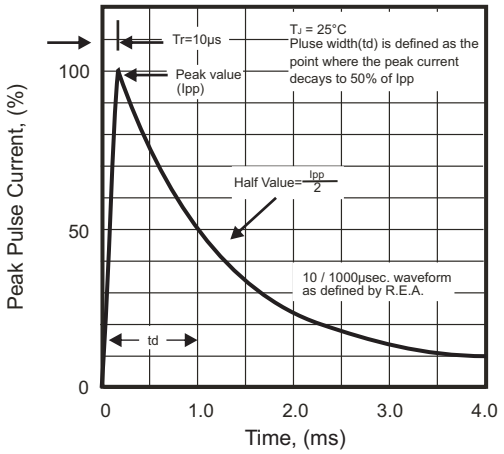
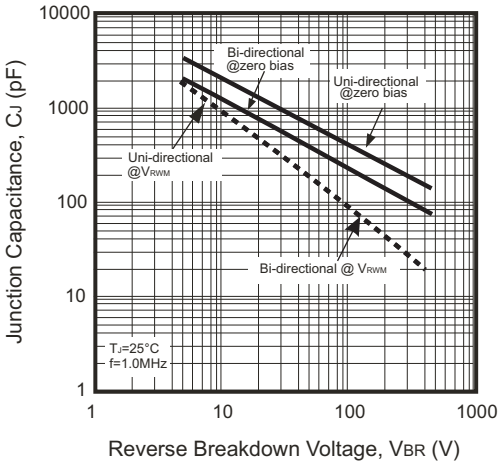



Fig.6 - Typical Junction Capacitance



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

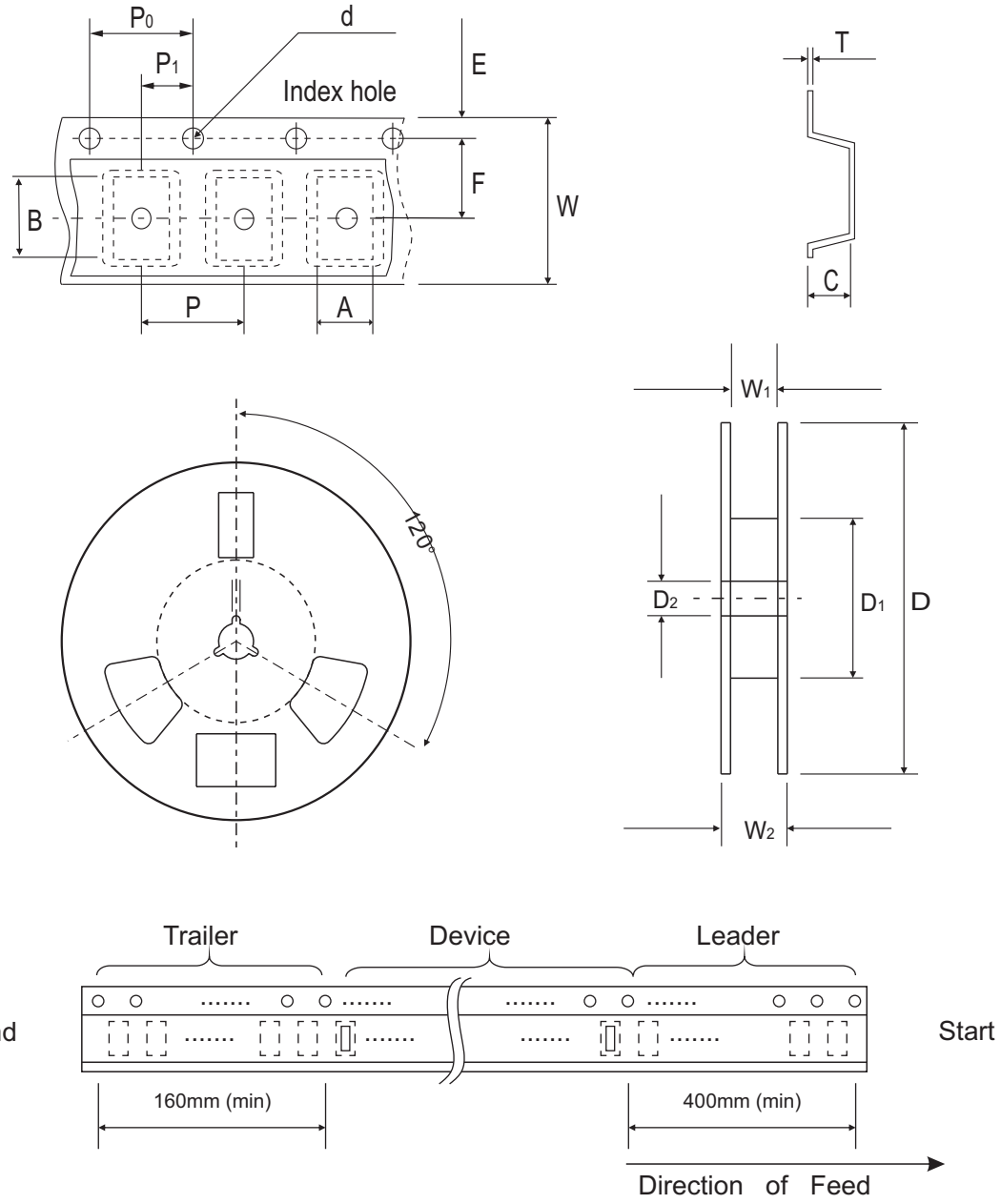
| Part No. | Breakdown voltage $V_{BR}$ @ $I_T$ | | | Maximum Reverse Leakage @$V_{RWM}$ | Working Peak Reverse Voltage | Maximum Reverse Surge Current | Maximum Clamping Voltage @$I_{PP}$ | Device Marking Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. (V) | Max. (V) | $I_T$ (mA) | $I_R$ (uA) | $V_{RWM}$ (V) | $I_{PP}$ (A) | $V_C$ (V) | UNI | BI |
| TV50C110J(B)-G | 12.20 | 13.50 | 10 | 800 | 11.0 | 274.7 | 18.2 | 5PDX | 5BDX |
| TV50C120J(B)-G | 13.30 | 14.70 | 10 | 800 | 12.0 | 251.3 | 19.9 | 5PDZ | 5BDZ |
| TV50C130J(B)-G | 14.40 | 15.90 | 10 | 500 | 13.0 | 232.6 | 21.5 | 5PEE | 5BEE |
| TV50C140J(B)-G | 15.60 | 17.20 | 10 | 200 | 14.0 | 215.5 | 23.2 | 5PEG | 5BEG |
| TV50C150J(B)-G | 16.70 | 18.50 | 1 | 100 | 15.0 | 204.9 | 24.4 | 5PEK | 5BEK |
| TV50C160J(B)-G | 17.80 | 19.70 | 1 | 50 | 16.0 | 192.3 | 26.0 | 5PEM | 5BEM |
| TV50C170J(B)-G | 18.90 | 20.90 | 1 | 20 | 17.0 | 181.2 | 27.6 | 5PEP | 5BEP |
| TV50C180J(B)-G | 20.00 | 22.10 | 1 | 10 | 18.0 | 171.2 | 29.2 | 5PER | 5BER |
| TV50C190J(B)-G | 21.10 | 23.30 | 1 | 10 | 19.0 | 162.4 | 30.8 | 5PET | 5BET |
| TV50C200J(B)-G | 22.20 | 24.50 | 1 | 5 | 20.0 | 154.3 | 32.4 | 5PEV | 5BEV |
| TV50C220J(B)-G | 24.40 | 26.90 | 1 | 5 | 22.0 | 140.8 | 35.5 | 5PEX | 5BEX |
| TV50C240J(B)-G | 26.70 | 29.50 | 1 | 5 | 24.0 | 128.5 | 38.9 | 5PEZ | 5BEZ |
| TV50C260J(B)-G | 28.90 | 31.90 | 1 | 5 | 26.0 | 118.8 | 42.1 | 5PFE | 5BFE |
| TV50C280J(B)-G | 31.10 | 34.40 | 1 | 5 | 28.0 | 110.1 | 45.4 | 5PFG | 5BFG |
| TV50C300J(B)-G | 33.30 | 36.80 | 1 | 5 | 30.0 | 103.3 | 48.4 | 5PFK | 5BFK |
| TV50C330J(B)-G | 36.70 | 40.60 | 1 | 5 | 33.0 | 93.8 | 53.3 | 5PFM | 5BFM |
| TV50C360J(B)-G | 40.00 | 44.20 | 1 | 5 | 36.0 | 86.1 | 58.1 | 5PFP | 5BFP |
| TV50C400J(B)-G | 44.40 | 49.10 | 1 | 5 | 40.0 | 77.5 | 64.5 | 5PFR | 5BFR |
| TV50C430J(B)-G | 47.80 | 52.80 | 1 | 5 | 43.0 | 72.0 | 69.4 | 5PFT | 5BFT |
| TV50C450J(B)-G | 50.00 | 55.30 | 1 | 5 | 45.0 | 68.8 | 72.7 | 5PFV | 5BFV |
| TV50C480J(B)-G | 53.30 | 58.90 | 1 | 5 | 48.0 | 64.6 | 77.4 | 5PFX | 5BFX |
| TV50C510J(B)-G | 56.70 | 62.70 | 1 | 5 | 51.0 | 60.7 | 82.4 | 5PFZ | 5BFZ |
| TV50C540J(B)-G | 60.00 | 66.30 | 1 | 5 | 54.0 | 57.4 | 87.1 | 5PGE | 5BGE |
| TV50C580J(B)-G | 64.40 | 71.20 | 1 | 5 | 58.0 | 53.4 | 93.6 | 5PGG | 5BGG |
| TV50C600J(B)-G | 66.70 | 73.70 | 1 | 5 | 60.0 | 51.7 | 96.8 | 5PGK | 5BGK |
| TV50C640J(B)-G | 71.10 | 78.60 | 1 | 5 | 64.0 | 48.5 | 103.0 | 5PGM | 5BGM |
| TV50C700J(B)-G | 77.80 | 86.00 | 1 | 5 | 70.0 | 44.2 | 113.0 | 5PGP | 5BGP |
| TV50C750J(B)-G | 83.30 | 92.10 | 1 | 5 | 75.0 | 41.3 | 121.0 | 5PGR | 5BGR |
| TV50C780J(B)-G | 86.70 | 95.80 | 1 | 5 | 78.0 | 39.7 | 126.0 | 5PGT | 5BGT |
| TV50C800J(B)-G | 88.80 | 97.60 | 1 | 5 | 80.0 | 38.6 | 129.6 | 5PGB | 5BGB |
| TV50C850J(B)-G | 94.40 | 104.0 | 1 | 5 | 85.0 | 36.5 | 137.0 | 5PGV | 5BGV |
| TV50C900J(B)-G | 100.0 | 111.0 | 1 | 5 | 90.0 | 34.2 | 146.0 | 5PGX | 5BGX |
| TV50C101J(B)-G | 111.0 | 123.0 | 1 | 5 | 100.0 | 30.9 | 162.0 | 5PGZ | 5BGZ |
| TV50C111J(B)-G | 122.0 | 135.0 | 1 | 5 | 110.0 | 28.2 | 177.0 | 5PHE | 5BHE |
| TV50C121J(B)-G | 133.0 | 147.0 | 1 | 5 | 120.0 | 25.9 | 193.0 | 5PHG | 5BHG |
| TV50C131J(B)-G | 144.0 | 159.0 | 1 | 5 | 130.0 | 23.9 | 209.0 | 5PHK | 5BHK |
| TV50C141J(B)-G | 155.0 | 171.0 | 1 | 5 | 140.0 | 22.0 | 226.8 | 5PHB | 5BHB |
| TV50C151J(B)-G | 167.0 | 185.0 | 1 | 5 | 150.0 | 20.6 | 243.0 | 5PHM | 5BHM |
| TV50C161J(B)-G | 178.0 | 197.0 | 1 | 5 | 160.0 | 19.3 | 259.0 | 5PHP | 5BHP |
| TV50C171J(B)-G | 189.0 | 209.0 | 1 | 5 | 170.0 | 18.2 | 275.0 | 5PHR | 5BHR |

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

| Part No. | Breakdown voltage $V_{BR}$ @ $I_T$ | | | Maximum Reverse Leakage @$V_{RWM}$ | Working Peak Reverse Voltage | Maximum Reverse Surge Current | Maximum Clamping Voltage @$I_{PP}$ | Device Marking Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. (V) | Max. (V) | $I_T$ (mA) | $I_R$ (uA) | $V_{RWM}$ (V) | $I_{PP}$ (A) | $V_C$ (V) | UNI | BI |
| TV50C181J(B)-G | 200.0 | 220.0 | 1 | 5 | 180.0 | 17.1 | 291.6 | 5PHT | 5BHT |
| TV50C191J(B)-G | 211.0 | 232.0 | 1 | 5 | 190.0 | 16.2 | 307.8 | 5PHV | 5BHV |
| TV50C201J(B)-G | 224.0 | 247.0 | 1 | 5 | 200.0 | 15.4 | 324.0 | 5PHW | 5BHW |
| TV50C221J(B)-G | 246.0 | 272.0 | 1 | 5 | 220.0 | 14.0 | 356.0 | 5PHX | 5BHX |
| TV50C251J(B)-G | 279.0 | 309.0 | 1 | 5 | 250.0 | 12.3 | 405.0 | 5PHZ | 5BHZ |
| TV50C301J(B)-G | 335.0 | 371.0 | 1 | 5 | 300.0 | 10.3 | 486.0 | 5PJE | 5BJE |
| TV50C351J(B)-G | 391.0 | 432.0 | 1 | 5 | 350.0 | 8.8 | 567.0 | 5PJG | 5BJG |
| TV50C401J(B)-G | 447.0 | 494.0 | 1 | 5 | 400.0 | 7.7 | 648.0 | 5PJK | 5BJK |
| TV50C441J(B)-G | 492.0 | 543.0 | 1 | 5 | 440.0 | 7.0 | 713.0 | 5PJM | 5BJM |

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 $V_R$ of 20 volts and under, the $I_R$ limit is double.

# Reel Taping Specification




| | SYMBOL | A | B | C | d | T | D | $D_1$ | $D_2$ |
|---|---|---|---|---|---|---|---|---|---|
| DO-214AB (SMC) | (mm) | See Note 1 | | | 1.55 ± 0.05 | 0.40 (Max.) | 330.00 | 50.00 (Min.) | $13.00^{+0.50}_{-0.20}$ |
| | (inch) | | | | 0.061 ± 0.002 | 0.016 (Max.) | 13.000 | 1.969 (Min.) | $0.512^{+0.020}_{-0.008}$ |

| | SYMBOL | E | F | P | $P_0$ | $P_1$ | W | $W_1$ | $W_2$ |
|---|---|---|---|---|---|---|---|---|---|
| DO-214AB (SMC) | (mm) | 1.75 ± 0.10 | 7.50 ± 0.05 | 8.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 16.00 ± 0.10 | $16.40^{+2.00}_{-0.00}$ | 22.40 (Max.) |
| | (inch) | 0.069 ± 0.004 | 0.295 ± 0.002 | 0.315 ± 0.004 | 0.157 ± 0.004 | 0.079 ± 0.002 | 0.630 ± 0.004 | $0.646^{+0.079}_{-0.000}$ | 0.882 (Max.) |

Notes: 1. A, B, and C the clearance between the component and the cavity must be within 0.5 mm max. for 8 mm tape and 12 mm tape, 1.0 mm max. for 16mm tape and 24 mm tape.

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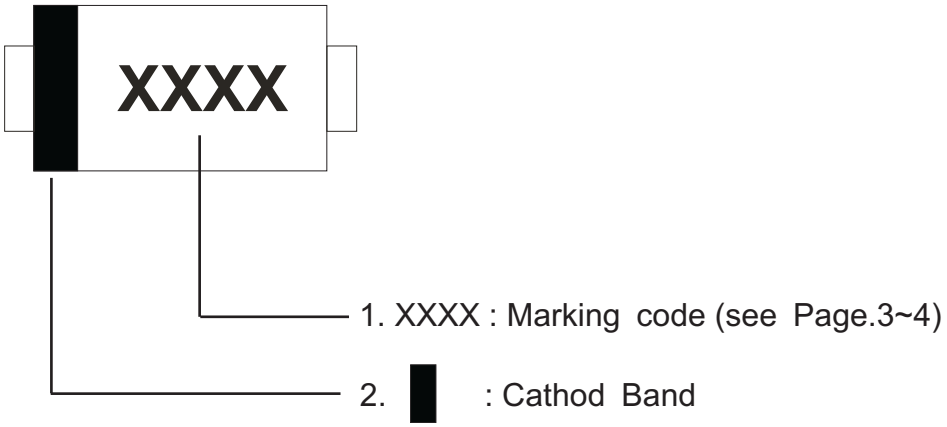
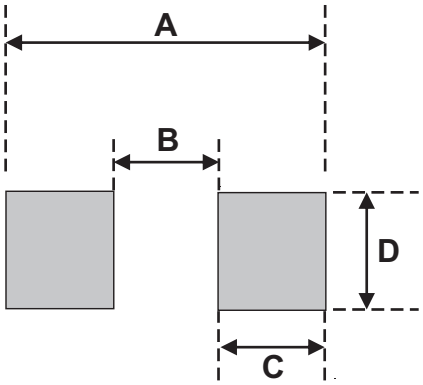
## Marking Code




## Suggested PAD Layout

| SIZE | DO-214AB(SMC) | |
|---|---|---|
| | (mm) | (inch) |
| A | 8.13 | 0.320 |
| B | 4.69 MAX | 0.185 MAX |
| C | 1.52 MIN | 0.06 MIN |
| D | 3.20 MIN | 0.126 MIN |




## Standard Packaging

| Case Type | REEL PACK | |
|---|---|---|
| | REEL ( pcs ) | Reel Size (inch) |
| DO-214AB (SMC) | 3,000 | 13 |

LifeElectronics
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