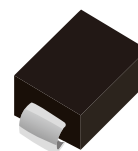
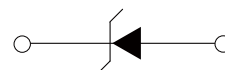


## FEATURES

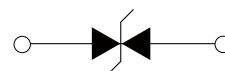
- | Low profile package
- | Ideal for automated placement
- | 600 Watt peak pulse power capability with a 10/1000µs waveform
- | For surface mounted applications to optimize board space
- | Excellent clamping capability
- | Very fast response time
- | Low incremental surge resistance



DO-214AA(SMB)



Uni-directional



Bi-directional

## APPLICATIONS

- | Power supply protection
- | Automotive application
- | Industrial application
- | Power management

## APPROVALS

|             |                                    |
|-------------|------------------------------------|
| <b>RoHS</b> | Compliance with 2011/65/EU         |
| <b>HF</b>   | Compliance with IEC61249-2-21:2003 |

## MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ )

| Parameter                                                           | Symbol    | Value | Unit  |
|---------------------------------------------------------------------|-----------|-------|-------|
| Peak Pulse Power Dissipation on 10/1000µs waveform (Note1, Note2).  | $P_{PPM}$ | 600   | Watts |
| Steady State Power Dissipation at $T_A=50^{\circ}\text{C}$ (Note2). | $P_D$     | 5.0   | Watts |

**Notes :** 1.Non-repetitive current pulse,  $T_A=25^{\circ}\text{C}$ .  
 2.Mounted on 5.0mm\*5.0mm (0.03mm thick) Copper Pads to each terminal.

## THERMAL CONSIDERATIONS

| Parameter                              | Symbol          | Value       | Unit                 |
|----------------------------------------|-----------------|-------------|----------------------|
| Operating Junction Temperature         | $T_J$           | -55 to +150 | $^{\circ}\text{C}$   |
| Storage Temperature Range              | $T_{STG}$       | -55 to +150 | $^{\circ}\text{C}$   |
| Junction to Ambient on printed circuit | $R_{\theta JA}$ | 90          | $^{\circ}\text{C/W}$ |

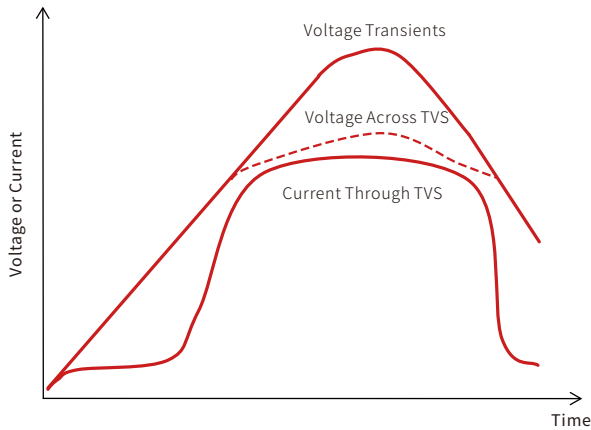
## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

| Part Number |           | Device Marking Code |      | Reverse Stand-off Voltage | Breakdown Voltage Min.@I <sub>T</sub> | Breakdown Voltage Max.@I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|-----------|---------------------|------|---------------------------|---------------------------------------|---------------------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni-Polar   | Bi-Polar  | Uni                 | Bi   | V <sub>RWM</sub> (V)      | V <sub>BR</sub> (V)                   | V <sub>BR</sub> (V)                   | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (uA)               |
| SMBJ3.3A    | SMBJ3.3CA | 3V3                 | 3V3C | 3.3                       | 4.60                                  | 5.60                                  | 100                 | 8.2                                       | 50.0                | 2000                              |
| SMBJ5.0A    | SMBJ5.0CA | KE                  | AE   | 5.0                       | 6.40                                  | 7.00                                  | 10                  | 9.2                                       | 65.3                | 800                               |
| SMBJ6.0A    | SMBJ6.0CA | KG                  | AG   | 6.0                       | 6.67                                  | 7.37                                  | 10                  | 10.3                                      | 58.3                | 800                               |
| SMBJ6.5A    | SMBJ6.5CA | KK                  | AK   | 6.5                       | 7.22                                  | 7.98                                  | 10                  | 11.2                                      | 53.6                | 500                               |
| SMBJ7.0A    | SMBJ7.0CA | KM                  | AM   | 7.0                       | 7.78                                  | 8.60                                  | 10                  | 12.0                                      | 50.0                | 200                               |
| SMBJ7.5A    | SMBJ7.5CA | KP                  | AP   | 7.5                       | 8.33                                  | 9.21                                  | 1                   | 12.9                                      | 46.6                | 100                               |
| SMBJ8.0A    | SMBJ8.0CA | KR                  | AR   | 8.0                       | 8.89                                  | 9.83                                  | 1                   | 13.6                                      | 44.2                | 50                                |
| SMBJ8.5A    | SMBJ8.5CA | KT                  | AT   | 8.5                       | 9.44                                  | 10.4                                  | 1                   | 14.4                                      | 41.7                | 20                                |
| SMBJ9.0A    | SMBJ9.0CA | KV                  | AV   | 9.0                       | 10.0                                  | 11.1                                  | 1                   | 15.4                                      | 39.0                | 10                                |
| SMBJ10A     | SMBJ10CA  | KX                  | AX   | 10.0                      | 11.1                                  | 12.3                                  | 1                   | 17.0                                      | 35.3                | 5                                 |
| SMBJ11A     | SMBJ11CA  | KZ                  | AZ   | 11.0                      | 12.2                                  | 13.5                                  | 1                   | 18.2                                      | 33.0                | 1                                 |
| SMBJ12A     | SMBJ12CA  | LE                  | BE   | 12.0                      | 13.3                                  | 14.7                                  | 1                   | 19.9                                      | 30.2                | 1                                 |
| SMBJ13A     | SMBJ13CA  | LG                  | BG   | 13.0                      | 14.4                                  | 15.9                                  | 1                   | 21.5                                      | 28.0                | 1                                 |
| SMBJ14A     | SMBJ14CA  | LK                  | BK   | 14.0                      | 15.6                                  | 17.2                                  | 1                   | 23.2                                      | 25.9                | 1                                 |
| SMBJ15A     | SMBJ15CA  | LM                  | BM   | 15.0                      | 16.7                                  | 18.5                                  | 1                   | 24.4                                      | 24.6                | 1                                 |
| SMBJ16A     | SMBJ16CA  | LP                  | BP   | 16.0                      | 17.8                                  | 19.7                                  | 1                   | 26.0                                      | 23.1                | 1                                 |
| SMBJ17A     | SMBJ17CA  | LR                  | BR   | 17.0                      | 18.9                                  | 20.9                                  | 1                   | 27.6                                      | 21.8                | 1                                 |
| SMBJ18A     | SMBJ18CA  | LT                  | BT   | 18.0                      | 20.0                                  | 22.1                                  | 1                   | 29.2                                      | 20.6                | 1                                 |
| SMBJ20A     | SMBJ20CA  | LV                  | BV   | 20.0                      | 22.2                                  | 24.5                                  | 1                   | 32.4                                      | 18.6                | 1                                 |
| SMBJ22A     | SMBJ22CA  | LX                  | BX   | 22.0                      | 24.4                                  | 26.9                                  | 1                   | 35.5                                      | 16.9                | 1                                 |
| SMBJ24A     | SMBJ24CA  | LZ                  | BZ   | 24.0                      | 26.7                                  | 29.5                                  | 1                   | 38.9                                      | 15.5                | 1                                 |
| SMBJ26A     | SMBJ26CA  | ME                  | CE   | 26.0                      | 28.9                                  | 31.9                                  | 1                   | 42.1                                      | 14.3                | 1                                 |
| SMBJ28A     | SMBJ28CA  | MG                  | CG   | 28.0                      | 31.1                                  | 34.4                                  | 1                   | 45.4                                      | 13.3                | 1                                 |
| SMBJ30A     | SMBJ30CA  | MK                  | CK   | 30.0                      | 33.3                                  | 36.8                                  | 1                   | 48.4                                      | 12.4                | 1                                 |
| SMBJ33A     | SMBJ33CA  | MM                  | CM   | 33.0                      | 36.7                                  | 40.6                                  | 1                   | 53.3                                      | 11.3                | 1                                 |
| SMBJ36A     | SMBJ36CA  | MP                  | CP   | 36.0                      | 40.0                                  | 44.2                                  | 1                   | 58.1                                      | 10.4                | 1                                 |
| SMBJ40A     | SMBJ40CA  | MR                  | CR   | 40.0                      | 44.4                                  | 49.1                                  | 1                   | 64.5                                      | 9.3                 | 1                                 |
| SMBJ43A     | SMBJ43CA  | MT                  | CT   | 43.0                      | 47.8                                  | 52.8                                  | 1                   | 69.4                                      | 8.7                 | 1                                 |
| SMBJ45A     | SMBJ45CA  | MV                  | CV   | 45.0                      | 50.0                                  | 55.3                                  | 1                   | 72.7                                      | 8.3                 | 1                                 |
| SMBJ48A     | SMBJ48CA  | MX                  | CX   | 48.0                      | 53.3                                  | 58.9                                  | 1                   | 77.4                                      | 7.8                 | 1                                 |
| SMBJ51A     | SMBJ51CA  | MZ                  | CZ   | 51.0                      | 56.7                                  | 62.7                                  | 1                   | 82.4                                      | 7.3                 | 1                                 |
| SMBJ54A     | SMBJ54CA  | NE                  | DE   | 54.0                      | 60.0                                  | 66.3                                  | 1                   | 87.1                                      | 6.9                 | 1                                 |
| SMBJ58A     | SMBJ58CA  | NG                  | DG   | 58.0                      | 64.4                                  | 71.2                                  | 1                   | 93.6                                      | 6.5                 | 1                                 |

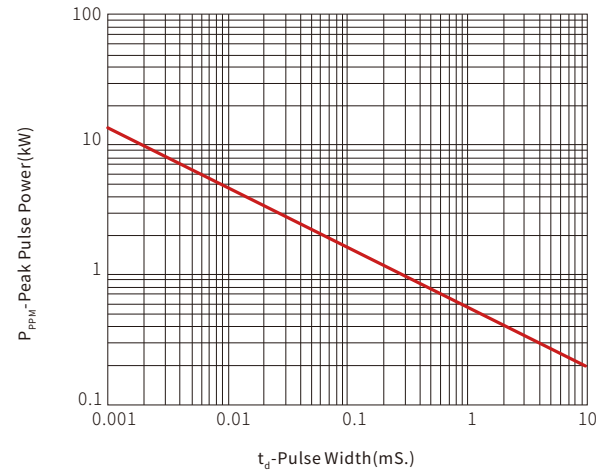
| Part Number |           | Device Marking Code |    | Reverse Stand-off Voltage | Breakdown Voltage Min.@I <sub>T</sub> | Breakdown Voltage Max.@I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|-----------|---------------------|----|---------------------------|---------------------------------------|---------------------------------------|---------------------|-------------------------------------------|---------------------|-----------------------------------|
| Uni-Polar   | Bi-Polar  | Uni                 | Bi | V <sub>RWM</sub> (V)      | V <sub>BR</sub> (V)                   | V <sub>BR</sub> (V)                   | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (uA)               |
| SMBJ60A     | SMBJ60CA  | NK                  | DK | 60.0                      | 66.7                                  | 73.7                                  | 1                   | 96.8                                      | 6.2                 | 1                                 |
| SMBJ64A     | SMBJ64CA  | NM                  | DM | 64.0                      | 71.1                                  | 78.6                                  | 1                   | 103.0                                     | 5.9                 | 1                                 |
| SMBJ70A     | SMBJ70CA  | NP                  | DP | 70.0                      | 77.8                                  | 86.0                                  | 1                   | 113.0                                     | 5.3                 | 1                                 |
| SMBJ75A     | SMBJ75CA  | NR                  | DR | 75.0                      | 83.3                                  | 92.1                                  | 1                   | 121.0                                     | 5.0                 | 1                                 |
| SMBJ78A     | SMBJ78CA  | NT                  | DT | 78.0                      | 86.7                                  | 95.8                                  | 1                   | 126.0                                     | 4.8                 | 1                                 |
| SMBJ85A     | SMBJ85CA  | NV                  | DV | 85.0                      | 94.4                                  | 104.0                                 | 1                   | 137.0                                     | 4.4                 | 1                                 |
| SMBJ90A     | SMBJ90CA  | NX                  | DX | 90.0                      | 100.0                                 | 111.0                                 | 1                   | 146.0                                     | 4.1                 | 1                                 |
| SMBJ100A    | SMBJ100CA | NZ                  | DZ | 100.0                     | 111.0                                 | 123.0                                 | 1                   | 162.0                                     | 3.7                 | 1                                 |
| SMBJ110A    | SMBJ110CA | PE                  | EE | 110.0                     | 122.0                                 | 135.0                                 | 1                   | 177.0                                     | 3.4                 | 1                                 |
| SMBJ120A    | SMBJ120CA | PG                  | EG | 120.0                     | 133.0                                 | 147.0                                 | 1                   | 193.0                                     | 3.1                 | 1                                 |
| SMBJ130A    | SMBJ130CA | PK                  | EK | 130.0                     | 144.0                                 | 159.0                                 | 1                   | 209.0                                     | 2.9                 | 1                                 |
| SMBJ150A    | SMBJ150CA | PM                  | EM | 150.0                     | 167.0                                 | 185.0                                 | 1                   | 243.0                                     | 2.5                 | 1                                 |
| SMBJ160A    | SMBJ160CA | PP                  | EP | 160.0                     | 178.0                                 | 197.0                                 | 1                   | 259.0                                     | 2.3                 | 1                                 |
| SMBJ170A    | SMBJ170CA | PR                  | ER | 170.0                     | 189.0                                 | 209.0                                 | 1                   | 275.0                                     | 2.2                 | 1                                 |
| SMBJ180A    | SMBJ180CA | PT                  | ET | 180.0                     | 201.0                                 | 222.0                                 | 1                   | 292.0                                     | 2.1                 | 1                                 |
| SMBJ200A    | SMBJ200CA | PV                  | EV | 200.0                     | 224.0                                 | 247.0                                 | 1                   | 324.0                                     | 1.9                 | 1                                 |
| SMBJ210A    | SMBJ210CA | PB                  | ED | 210.0                     | 231.0                                 | 269.0                                 | 1                   | 340.0                                     | 1.8                 | 1                                 |
| SMBJ220A    | SMBJ220CA | PX                  | EX | 220.0                     | 246.0                                 | 272.0                                 | 1                   | 356.0                                     | 1.7                 | 1                                 |
| SMBJ250A    | SMBJ250CA | PZ                  | EZ | 250.0                     | 279.0                                 | 309.0                                 | 1                   | 405.0                                     | 1.5                 | 1                                 |
| SMBJ300A    | SMBJ300CA | QE                  | FE | 300.0                     | 335.0                                 | 371.0                                 | 1                   | 486.0                                     | 1.3                 | 1                                 |
| SMBJ350A    | SMBJ350CA | QG                  | FG | 350.0                     | 391.0                                 | 432.0                                 | 1                   | 567.0                                     | 1.1                 | 1                                 |
| SMBJ400A    | SMBJ400CA | QK                  | FK | 400.0                     | 447.0                                 | 494.0                                 | 1                   | 648.0                                     | 0.9                 | 1                                 |
| SMBJ440A    | SMBJ440CA | QM                  | FM | 440.0                     | 492.0                                 | 543.0                                 | 1                   | 713.0                                     | 0.9                 | 1                                 |
| SMBJ480A    | SMBJ480CA | QP                  | FP | 480.0                     | 536.0                                 | 593.0                                 | 1                   | 750.0                                     | 0.8                 | 1                                 |
| SMBJ500A    | SMBJ500CA | QV                  | FV | 500.0                     | 558.0                                 | 618.0                                 | 1                   | 762.0                                     | 0.8                 | 1                                 |
| SMBJ510A    | SMBJ510CA | QX                  | FX | 510.0                     | 570.0                                 | 630.0                                 | 1                   | 762.0                                     | 0.8                 | 1                                 |
| SMBJ520A    | SMBJ520CA | QR                  | FR | 520.0                     | 578.0                                 | 640.0                                 | 1                   | 762.0                                     | 0.8                 | 1                                 |
| SMBJ550A    | SMBJ550CA | QT                  | FT | 550.0                     | 615.0                                 | 680.0                                 | 1                   | 860.0                                     | 0.7                 | 1                                 |

# CHARACTERISTIC CURVES

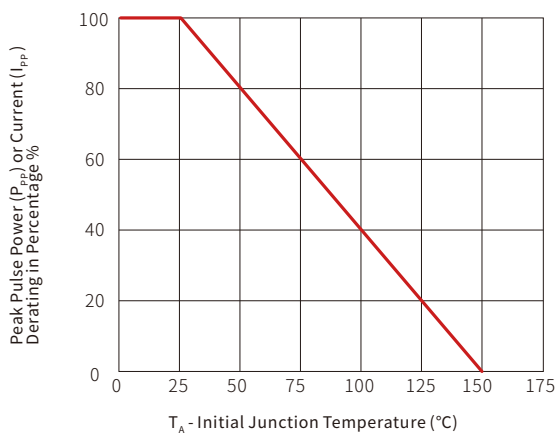
TVS Transients Clamping Waveform



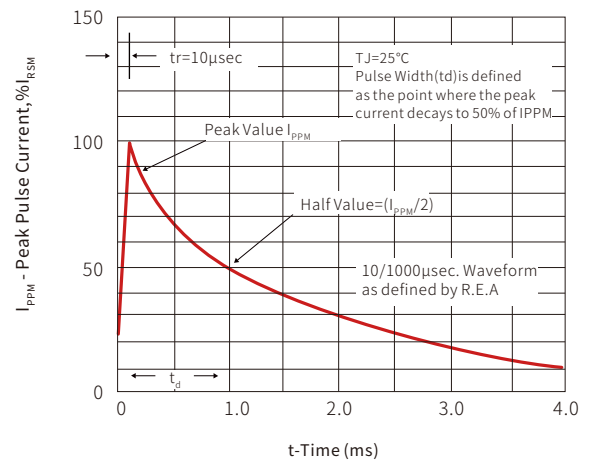
Peak Pulse Power Rating Curve



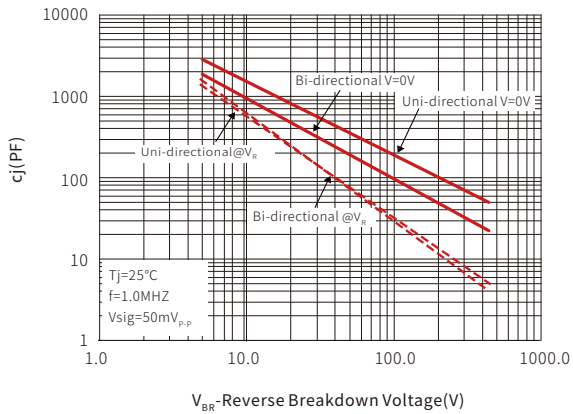
Pulse Derating Curve



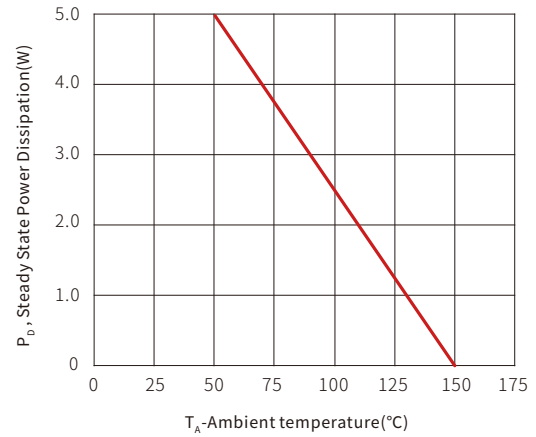
Pulse Waveform



Typical Junction Capacitance

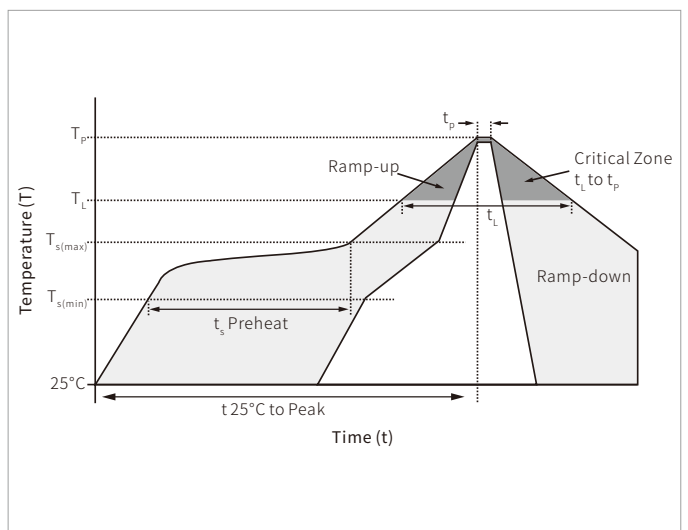


Steady State Power Dissipation Derating Curve

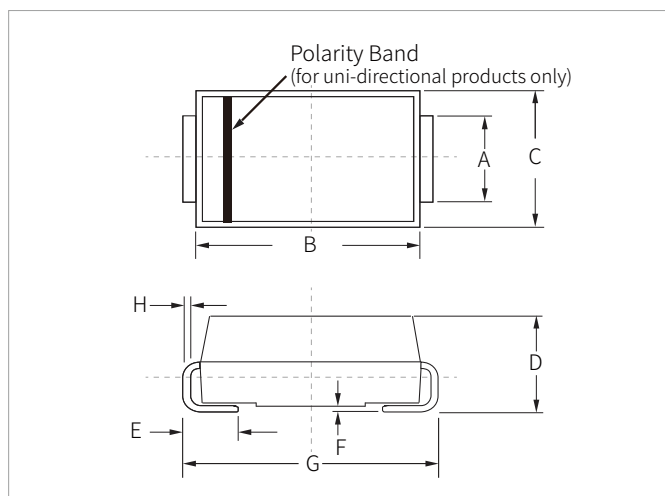


## SOLDERING PARAMETERS

| Reflow Condition                                                    |                                  | Lead-free assembly                   |
|---------------------------------------------------------------------|----------------------------------|--------------------------------------|
| Pre Heat                                                            | Temperature Max ( $T_{s(min)}$ ) | 150 $^\circ\text{C}$                 |
|                                                                     | Temperature Max ( $T_{s(max)}$ ) | 200 $^\circ\text{C}$                 |
|                                                                     | Time (min to max) ( $t_s$ )      | 60 – 180 secs                        |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)              |                                  | 3 $^\circ\text{C}/\text{second}$ max |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                                |                                  | 3 $^\circ\text{C}/\text{second}$ max |
| Reflow                                                              | Temperature ( $T_L$ ) (Liquidus) | 217 $^\circ\text{C}$                 |
|                                                                     | Time (min to max) ( $t_L$ )      | 60 – 150 seconds                     |
| Peak Temperature ( $T_p$ )                                          |                                  | 260 $^\circ\text{C}$                 |
| Time within 5 $^\circ\text{C}$ of actual peak Temperature ( $t_p$ ) |                                  | 20 – 40 seconds                      |
| Ramp-down Rate                                                      |                                  | 6 $^\circ\text{C}/\text{second}$ max |
| Time 25 $^\circ\text{C}$ to peak Temperature ( $T_p$ )              |                                  | 8 minutes max.                       |
| Do not exceed                                                       |                                  | 260 $^\circ\text{C}$                 |

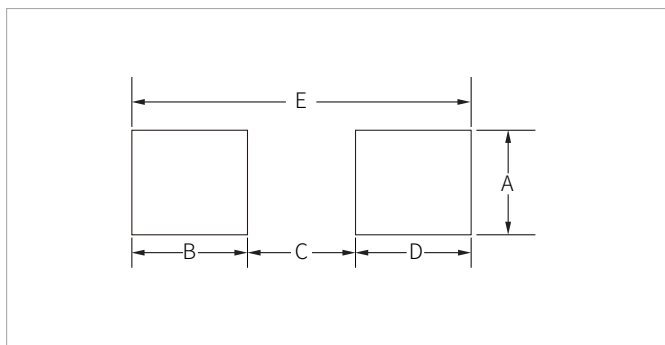


## DO-214AA(SMB) PACKAGE INFORMATION



| Ref. | Millimeters |      | Inches |       |
|------|-------------|------|--------|-------|
|      | Min.        | Max. | Min.   | Max.  |
| A    | 1.80        | 2.20 | 0.071  | 0.087 |
| B    | 4.30        | 4.70 | 0.170  | 0.185 |
| C    | 3.40        | 3.90 | 0.134  | 0.153 |
| D    | 2.15        | 2.75 | 0.085  | 0.108 |
| E    | 1.00        | 1.50 | 0.039  | 0.059 |
| F    | 0.02        | 0.20 | 0.001  | 0.008 |
| G    | 5.10        | 5.50 | 0.200  | 0.216 |
| H    | 0.15        | 0.30 | 0.006  | 0.012 |

## RECOMMENDED PAD LAYOUT DIMENSIONS



| Ref. | Millimeters |      | Inches   |       |
|------|-------------|------|----------|-------|
|      | Min.        | Max. | Min.     | Max.  |
| A    | 2.20        | -    | 0.087    | -     |
| B    | 1.45        | -    | 0.057    | -     |
| C    | -           | 2.55 | -        | 0.010 |
| D    | 1.45        | -    | 0.057    | -     |
| E    | 5.60REF     |      | 0.220REF |       |

## ORDERING INFORMATION

| Part Number | Component Package | QTY/Reel | Reel Size |
|-------------|-------------------|----------|-----------|
| SMBJxx(C)A  | DO-214AA(SMB)     | 3000PCS  | 13"       |

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