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November 2014

# SMBJ5V0(C)A - SMBJ170(C)A 600 Watt Transient Voltage Suppressors

## Features

- Glass-Passivated Junction
- 600 W Peak Pulse Power Capability on 10/1000  $\mu$ s Waveform.
- Excellent Clamping Capability
- Low-Incremental Surge Resistance
- Fast Response Time: Typically Less than 1.0 ps from 0 V to BV minimum for Unidirectional and 5.0 ns for Bidirectional
- Typical  $I_R$  Less than 1.0  $\mu$ A Above 10 V
- UL Certificate #E258596



**SMB/DO-214AA**

Band denotes cathode on unidirectional devices only. No band on bi-directional devices. Bi-directional types have CA suffix where electrical characteristics apply in both directions suitable for bi-directional applications.

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol    | Parameter  | Value      | Unit             |
|-----------|--|------------|------------------|
| $P_{PPM}$ | Peak Pulse Power Dissipation on 10/1000 $\mu$ s Waveform   | 600        | W                |
| $I_{PPM}$ | Peak Pulse Current on 10/1000 $\mu$ s Waveform   | See Table  | A                |
| $I_{FSM}$ | Non-Repetitive Peak Forward Surge Current Superimposed on Rated Load (JEDEC Method) <sup>(1)</sup> | 100        | A                |
| $T_{STG}$ | Storage Temperature Range  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$     | Operating Junction Temperature Range   | -55 to 150 | $^\circ\text{C}$ |

### Note:

1. Measured on 8.3 ms single half-sine wave or equivalent square wave: duty cycle = 4 pulses per minute maximum.

SMBJ5V0(C)A - SMBJ170(C)A — 600 Watt Transient Voltage Suppressors

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Uni-Directional<br>Bi-Directional (C)<br>Device | Part<br>Marking <sup>(2)</sup> | Reverse<br>Stand-Off<br>Voltage<br>$V_{RWM}$ (V) | Breakdown<br>Voltage<br>$V_{BR}$ (V) |      | Test<br>Current<br>$I_T$ (mA) | Clamping<br>Voltage<br>at $I_{PPM}$<br>$V_C$ (V) | Peak Pulse<br>Current<br>$I_{PPM}$ (A) | Reverse<br>Leakage<br>at $V_{RWM}$<br>$I_R$ ( $\mu\text{A}$ ) <sup>(3)</sup> |
|---|--------------------------------|--|--------------------------------------|------|-------------------------------|--|--|--|
|   |                                |  | Min.                                 | Max. |                               |  |  |  |
| SMBJ5V0(C)A                                     | KE                             | 5.0  | 6.40                                 | 7.00 | 10                            | 9.2  | 65.2                                   | 800  |
| SMBJ6V0(C)A                                     | KG                             | 6.0  | 6.67                                 | 7.37 | 10                            | 10.3   | 58.3                                   | 800  |
| SMBJ6V5(C)A                                     | KK                             | 6.5  | 7.22                                 | 7.98 | 10                            | 11.2   | 53.6                                   | 500  |
| SMBJ7V0(C)A                                     | KM                             | 7.0  | 7.78                                 | 8.60 | 10                            | 12.0   | 50.0                                   | 200  |
| SMBJ7V5(C)A                                     | KP                             | 7.5  | 8.33                                 | 9.21 | 1                             | 12.9   | 46.5                                   | 100  |
| SMBJ8V0(C)A                                     | KR                             | 8.0  | 8.89                                 | 9.83 | 1                             | 13.6   | 44.1                                   | 50   |
| SMBJ8V5(C)A                                     | KT                             | 8.5  | 9.44                                 | 10.4 | 1                             | 14.4   | 41.7                                   | 20   |
| SMBJ9V0(C)A                                     | KV                             | 9.0  | 10.0                                 | 11.1 | 1                             | 15.4   | 39.0                                   | 10   |
| SMBJ10(C)A                                      | KX                             | 10   | 11.1                                 | 12.8 | 1                             | 17.0   | 35.3                                   | 5  |
| SMBJ11(C)A                                      | KZ                             | 11   | 12.2                                 | 13.5 | 1                             | 18.2   | 33.0                                   | 5  |
| SMBJ12(C)A                                      | LE                             | 12   | 13.3                                 | 14.7 | 1                             | 19.9   | 30.2                                   | 5  |
| SMBJ13(C)A                                      | LG                             | 13   | 14.4                                 | 15.9 | 1                             | 21.5   | 27.9                                   | 5  |
| SMBJ14(C)A                                      | LK                             | 14   | 15.6                                 | 17.2 | 1                             | 23.2   | 25.9                                   | 5  |
| SMBJ15(C)A                                      | LM                             | 15   | 16.7                                 | 18.5 | 1                             | 24.4   | 24.6                                   | 5  |
| SMBJ16(C)A                                      | LP                             | 16   | 17.8                                 | 19.7 | 1                             | 26.0   | 23.1                                   | 5  |
| SMBJ17(C)A                                      | LR                             | 17   | 18.9                                 | 20.9 | 1                             | 27.6   | 21.7                                   | 5  |
| SMBJ18(C)A                                      | LT                             | 18   | 20.0                                 | 22.1 | 1                             | 29.2   | 20.5                                   | 5  |
| SMBJ20(C)A                                      | LV                             | 20   | 22.2                                 | 24.5 | 1                             | 32.4   | 18.5                                   | 5  |
| SMBJ22(C)A                                      | LX                             | 22   | 24.4                                 | 26.9 | 1                             | 35.5   | 16.9                                   | 5  |
| SMBJ24(C)A                                      | LZ                             | 24   | 26.7                                 | 29.5 | 1                             | 38.9   | 15.4                                   | 5  |
| SMBJ26(C)A                                      | ME                             | 26   | 28.9                                 | 31.9 | 1                             | 42.1   | 14.3                                   | 5  |
| SMBJ28(C)A                                      | MG                             | 28   | 31.1                                 | 34.4 | 1                             | 45.4   | 13.2                                   | 5  |
| SMBJ30(C)A                                      | MK                             | 30   | 33.3                                 | 36.8 | 1                             | 48.4   | 12.4                                   | 5  |
| SMBJ33(C)A                                      | MM                             | 33   | 36.7                                 | 40.6 | 1                             | 53.3   | 11.3                                   | 5  |
| SMBJ36(C)A                                      | MP                             | 36   | 40.0                                 | 44.2 | 1                             | 58.1   | 10.3                                   | 5  |
| SMBJ40(C)A                                      | MR                             | 40   | 44.4                                 | 49.1 | 1                             | 64.5   | 9.3                                    | 5  |
| SMBJ43(C)A                                      | MT                             | 43   | 47.8                                 | 52.8 | 1                             | 69.4   | 8.6                                    | 5  |
| SMBJ45(C)A                                      | MV                             | 45   | 50.0                                 | 55.3 | 1                             | 72.7   | 8.3                                    | 5  |
| SMBJ48(C)A                                      | MX                             | 48   | 53.3                                 | 58.9 | 1                             | 77.4   | 7.8                                    | 5  |
| SMBJ51(C)A                                      | MZ                             | 51   | 56.7                                 | 62.7 | 1                             | 82.4   | 7.3                                    | 5  |
| SMBJ54(C)A                                      | NE                             | 54   | 60.0                                 | 66.3 | 1                             | 87.1   | 6.9                                    | 5  |
| SMBJ58(C)A                                      | NG                             | 58   | 64.4                                 | 71.2 | 1                             | 93.6   | 6.4                                    | 5  |
| SMBJ60(C)A                                      | NK                             | 60   | 66.7                                 | 73.7 | 1                             | 96.8   | 6.2                                    | 5  |
| SMBJ64(C)A                                      | NM                             | 64   | 71.1                                 | 78.6 | 1                             | 103.0  | 5.8                                    | 5  |
| SMBJ70(C)A                                      | NP                             | 70   | 77.8                                 | 86.0 | 1                             | 113.0  | 5.3                                    | 5  |
| SMBJ75(C)A                                      | NR                             | 75   | 83.3                                 | 92.1 | 1                             | 121.0  | 5.0                                    | 5  |
| SMBJ78(C)A                                      | NT                             | 78   | 86.7                                 | 95.8 | 1                             | 126.0  | 4.8                                    | 5  |

### Notes:

2. Color band denotes cathode on unidirectional devices only. No color band on bidirectional devices.
3. For bidirectional parts with  $V_{RWM} < 10$  V, the  $I_R$  max limit is doubled.

**Electrical Characteristics** (Continued)Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Uni-Directional<br>Bi-Directional (C)<br>Device | Part<br>Marking <sup>(2)</sup> | Reverse<br>Stand-Off<br>Voltage<br>$V_{RWM}$ (V) | Breakdown<br>Voltage<br>$V_{BR}$ (V) |       | Test<br>Current<br>$I_T$ (mA) | Clamping<br>Voltage<br>at $I_{PPM}$<br>$V_C$ (V) | Peak Pulse<br>Current<br>$I_{PPM}$ (A) | Reverse<br>Leakage<br>at $V_{RWM}$<br>$I_R$ ( $\mu\text{A}$ ) <sup>(3)</sup> |
|---|--------------------------------|--|--------------------------------------|-------|-------------------------------|--|--|--|
|   |                                |  | Min.                                 | Max.  |                               |  |  |  |
| SMBJ85(C)A                                      | NV                             | 85   | 94.4                                 | 104.0 | 1                             | 137.0  | 4.4                                    | 5  |
| SMBJ90(C)A                                      | NX                             | 90   | 100.0                                | 111.0 | 1                             | 146.0  | 4.1                                    | 5  |
| SMBJ100(C)A                                     | NZ                             | 100  | 111.0                                | 123.0 | 1                             | 162.0  | 3.7                                    | 5  |
| SMBJ110(C)A                                     | PE                             | 110  | 122.0                                | 135.0 | 1                             | 177.0  | 3.4                                    | 5  |
| SMBJ120(C)A                                     | PG                             | 120  | 133.0                                | 147.0 | 1                             | 193.0  | 3.1                                    | 5  |
| SMBJ130(C)A                                     | PK                             | 130  | 144.0                                | 159.0 | 1                             | 209.0  | 2.9                                    | 5  |
| SMBJ150(C)A                                     | PM                             | 150  | 167.0                                | 185.0 | 1                             | 243.0  | 2.5                                    | 5  |
| SMBJ160(C)A                                     | PP                             | 160  | 178.0                                | 197.0 | 1                             | 259.0  | 2.3                                    | 5  |
| SMBJ170(C)A                                     | PR                             | 170  | 189.0                                | 209.0 | 1                             | 275.0  | 2.2                                    | 5  |

**Notes:**

- Color band denotes cathode on unidirectional devices only. No color band on bidirectional devices.
- For bidirectional parts with  $V_{RWM} < 10$  V, the  $I_R$  max limit is doubled.

## Typical Performance Characteristics

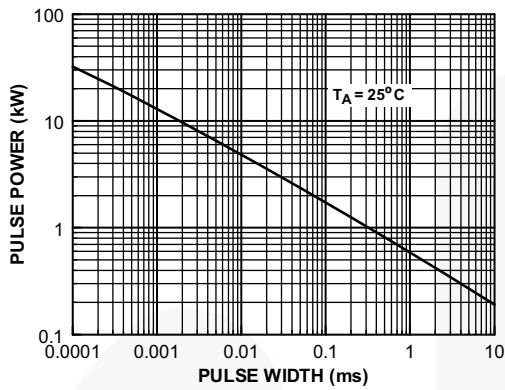


Figure 1. Peak Pulse Power Rating Curve



Figure 2. Pulse Derating Curve

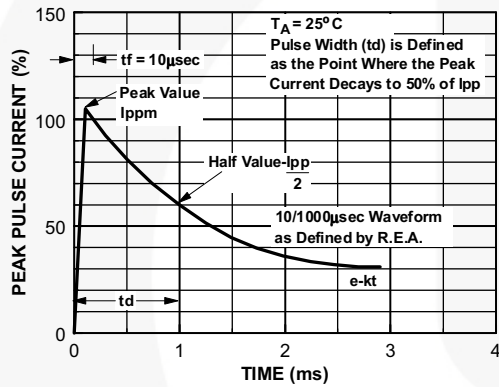


Figure 3. Pulse Waveform



Figure 4. Junction Capacitance



Figure 5. Non-Repetitive Surge Current



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