

### TRANSIENT VOLTAGE SUPPRESSOR

**BREAKDOWN VOLTAGE: 5.0 --- 188 V**  
**PEAK PULSE POWER: 600 W**

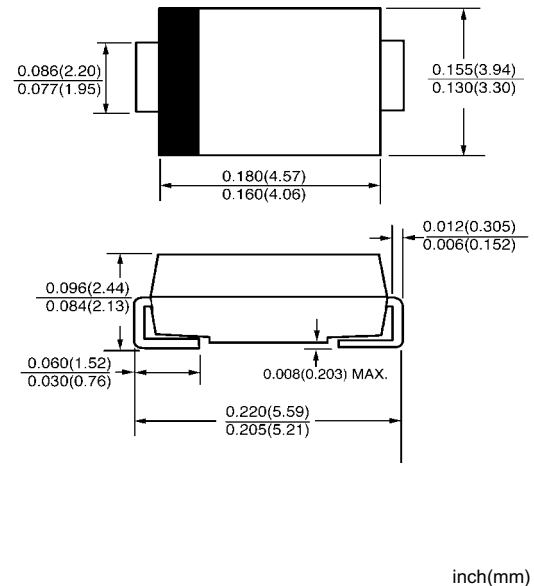
#### FEATURES

- ◇ Underwriters Laboratory Recognition under UL standard for safety 497B: Isolated Loop Circuit Protection
- ◇ Low profile package with built-in strain relief for surface mounted applications
- ◇ Glass passivated junction
- ◇ Low incremental surge resistance, excellent clamping capability
- ◇ 600W peak pulse power capability with a 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- ◇ Very fast response time
- ◇ High temperature soldering guaranteed: 250°C/10 seconds at terminals

#### MECHANICAL DATA

- ◇ Case: JEDEC DO-214AA molded plastic over passivated junction
- ◇ Terminals: Solder plated, solderable per MIL-STD-750, method 2026
- ◇ Polarity: For uni-directional types the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation
- ◇ Weight: 0.003 ounces, 0.093 grams
- ◇ Flammability: Epoxy is rated UL 94V-0

#### DO-214AA(SMB)



#### Devices for Bidirectional Applications

For bi-directional devices, use suffix C or CA (e.g. SMBJ10C, SMBJ10CA). Electrical characteristics apply in both directions.

#### MAXIMUM RATINGS AND CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

|                                                                                        | SYMBOL                            | VALUE           | UNIT |
|----------------------------------------------------------------------------------------|-----------------------------------|-----------------|------|
| Peak power dissipation with a 10/1000 $\mu$ s waveform (NOTE 1,2, FIG.1)               | P <sub>PPM</sub>                  | Minimum 600     | W    |
| Peak pulse current with a 10/1000 $\mu$ s waveform (NOTE 1)                            | I <sub>PPM</sub>                  | See Table Below | A    |
| Peak forward surge current, 8.3ms single half sine-wave uni-directional only ( NOTE 2) | I <sub>FSM</sub>                  | 100.0           | A    |
| Typical thermal resistance, junction to ambient ( NOTE 3)                              | R <sub>θJA</sub>                  | 100.0           | °C/W |
| Typical thermal resistance, junction to lead                                           | R <sub>θJL</sub>                  | 20              | °C/W |
| Operating junction and storage temperature range                                       | T <sub>J</sub> , T <sub>STG</sub> | -55---+150      | °C   |

NOTES: (1) Non-repetitive current pulses, per Fig. 3 and derated above T<sub>A</sub>=25°C per Fig. 2.

(2) Mounted on 0.2 x 0.2" (5.0 x 5.0mm) copper pads to each terminal.

(3) Mounted on minimum recommended pad layout.

www.galaxycn.com

# ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.  $V_F=3.5V$  at  $I_F=50A$  (uni-directional only)

| Device Type<br>Modified<br>"J" Bend Lead | Device<br>Marking<br>Code |    | Breakdown Voltage<br>$V_{(BR)}$ at $I_T^{(1)}$<br>(V) |      | Test<br>Current<br>$I_T$ (mA) | Stand-off<br>Voltage<br>$V_{WM}$ (V) | Maximum<br>Reverse Leakage<br>at $V_{WM}$<br>$I_D$ ( $\mu A$ ) <sup>(3)</sup> | Maximum<br>Peak Pulse Surge<br>Current $I_{PPM}$<br>(A) <sup>(2)</sup> | Maximum<br>Clamping<br>Voltage at $I_{PPM}$<br>$V_C$ (V) |
|------------------------------------------|---------------------------|----|-------------------------------------------------------|------|-------------------------------|--------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------|
|                                          | Uni                       | Bi | Min                                                   | Max  |                               |                                      |                                                                               |                                                                        |                                                          |
| +SMBJ5.0                                 | KD                        | KD | 6.40                                                  | 7.82 | 10                            | 5.0                                  | 800                                                                           | 62.5                                                                   | 9.6                                                      |
| +SMBJ5.0A                                | KE                        | KE | 6.40                                                  | 7.07 | 10                            | 5.0                                  | 800                                                                           | 65.2                                                                   | 9.2                                                      |
| +SMBJ6.0                                 | KF                        | KF | 6.67                                                  | 8.15 | 10                            | 6.0                                  | 800                                                                           | 52.6                                                                   | 11.4                                                     |
| +SMBJ6.0A                                | KG                        | KG | 6.67                                                  | 7.37 | 10                            | 6.0                                  | 800                                                                           | 58.3                                                                   | 10.3                                                     |
| +SMBJ6.5                                 | KH                        | AH | 7.22                                                  | 8.82 | 10                            | 6.5                                  | 500                                                                           | 48.8                                                                   | 12.3                                                     |
| +SMBJ6.5A                                | KK                        | AK | 7.22                                                  | 7.98 | 10                            | 6.5                                  | 500                                                                           | 53.6                                                                   | 11.2                                                     |
| +SMBJ7.0                                 | KL                        | KL | 7.78                                                  | 9.51 | 10                            | 7.0                                  | 200                                                                           | 45.1                                                                   | 13.3                                                     |
| +SMBJ7.0A                                | KM                        | KM | 7.78                                                  | 8.60 | 10                            | 7.0                                  | 200                                                                           | 50.0                                                                   | 12.0                                                     |
| +SMBJ7.5                                 | KN                        | AN | 8.33                                                  | 10.2 | 1.0                           | 7.5                                  | 100                                                                           | 42.0                                                                   | 14.3                                                     |
| +SMBJ7.5A                                | KP                        | AP | 8.33                                                  | 9.21 | 1.0                           | 7.5                                  | 100                                                                           | 46.5                                                                   | 12.9                                                     |
| +SMBJ8.0                                 | KQ                        | AQ | 8.89                                                  | 10.9 | 1.0                           | 8.0                                  | 50                                                                            | 40.0                                                                   | 15.0                                                     |
| +SMBJ8.0A                                | KR                        | AR | 8.89                                                  | 9.83 | 1.0                           | 8.0                                  | 50                                                                            | 44.1                                                                   | 13.6                                                     |
| +SMBJ8.5                                 | KS                        | AS | 9.44                                                  | 11.5 | 1.0                           | 8.5                                  | 20                                                                            | 37.7                                                                   | 15.9                                                     |
| +SMBJ8.5A                                | KT                        | AT | 9.44                                                  | 10.4 | 1.0                           | 8.5                                  | 20                                                                            | 41.7                                                                   | 14.4                                                     |
| +SMBJ9.0                                 | KU                        | AU | 10.0                                                  | 12.2 | 1.0                           | 9.0                                  | 10                                                                            | 35.5                                                                   | 16.9                                                     |
| +SMBJ9.0A                                | KV                        | AV | 10.0                                                  | 11.1 | 1.0                           | 9.0                                  | 10                                                                            | 39.0                                                                   | 15.4                                                     |
| +SMBJ10                                  | KW                        | AW | 11.1                                                  | 13.6 | 1.0                           | 10                                   | 5.0                                                                           | 31.9                                                                   | 18.8                                                     |
| +SMBJ10A                                 | KX                        | AX | 11.1                                                  | 12.3 | 1.0                           | 10                                   | 5.0                                                                           | 35.3                                                                   | 17.0                                                     |
| +SMBJ11                                  | KY                        | KY | 12.2                                                  | 14.9 | 1.0                           | 11                                   | 5.0                                                                           | 29.9                                                                   | 20.1                                                     |
| +SMBJ11A                                 | KZ                        | KZ | 12.2                                                  | 13.5 | 1.0                           | 11                                   | 5.0                                                                           | 33.0                                                                   | 18.2                                                     |
| +SMBJ12                                  | LD                        | BD | 13.3                                                  | 16.3 | 1.0                           | 12                                   | 5.0                                                                           | 27.3                                                                   | 22.0                                                     |
| +SMBJ12A                                 | LE                        | BE | 13.3                                                  | 14.7 | 1.0                           | 12                                   | 5.0                                                                           | 30.2                                                                   | 19.9                                                     |
| +SMBJ13                                  | LF                        | LF | 14.4                                                  | 17.6 | 1.0                           | 13                                   | 5.0                                                                           | 25.2                                                                   | 23.8                                                     |
| +SMBJ13A                                 | LG                        | LG | 14.4                                                  | 15.9 | 1.0                           | 13                                   | 5.0                                                                           | 27.9                                                                   | 21.5                                                     |
| +SMBJ14                                  | LH                        | BH | 15.6                                                  | 19.1 | 1.0                           | 14                                   | 5.0                                                                           | 23.3                                                                   | 25.8                                                     |
| +SMBJ14A                                 | LK                        | BK | 15.6                                                  | 17.2 | 1.0                           | 14                                   | 5.0                                                                           | 25.9                                                                   | 23.2                                                     |
| +SMBJ15                                  | LL                        | BL | 16.7                                                  | 20.4 | 1.0                           | 15                                   | 5.0                                                                           | 22.3                                                                   | 26.9                                                     |
| +SMBJ15A                                 | LM                        | BM | 16.7                                                  | 18.5 | 1.0                           | 15                                   | 5.0                                                                           | 24.6                                                                   | 24.4                                                     |
| +SMBJ16                                  | LN                        | LN | 17.8                                                  | 21.8 | 1.0                           | 16                                   | 5.0                                                                           | 20.8                                                                   | 28.8                                                     |
| +SMBJ16A                                 | LP                        | LM | 17.8                                                  | 19.7 | 1.0                           | 16                                   | 5.0                                                                           | 23.1                                                                   | 26.0                                                     |
| +SMBJ17                                  | LQ                        | LQ | 18.9                                                  | 23.1 | 1.0                           | 17                                   | 5.0                                                                           | 19.7                                                                   | 30.5                                                     |
| +SMBJ17A                                 | LR                        | LR | 18.9                                                  | 20.9 | 1.0                           | 17                                   | 5.0                                                                           | 21.7                                                                   | 27.6                                                     |
| +SMBJ18                                  | LS                        | BS | 20.0                                                  | 24.4 | 1.0                           | 18                                   | 5.0                                                                           | 18.6                                                                   | 32.2                                                     |
| +SMBJ18A                                 | LT                        | BT | 20.0                                                  | 22.1 | 1.0                           | 18                                   | 5.0                                                                           | 20.5                                                                   | 29.2                                                     |
| +SMBJ20                                  | LU                        | LU | 22.2                                                  | 27.1 | 1.0                           | 20                                   | 5.0                                                                           | 16.8                                                                   | 35.8                                                     |
| +SMBJ20A                                 | LV                        | LV | 22.2                                                  | 24.5 | 1.0                           | 20                                   | 5.0                                                                           | 18.5                                                                   | 32.4                                                     |
| +SMBJ22                                  | LW                        | BW | 24.4                                                  | 29.8 | 1.0                           | 22                                   | 5.0                                                                           | 15.2                                                                   | 39.4                                                     |
| +SMBJ22A                                 | LX                        | BX | 24.4                                                  | 26.9 | 1.0                           | 22                                   | 5.0                                                                           | 16.9                                                                   | 35.5                                                     |
| +SMBJ24                                  | LY                        | BY | 26.7                                                  | 32.6 | 1.0                           | 24                                   | 5.0                                                                           | 14.0                                                                   | 43.0                                                     |
| +SMBJ24A                                 | LZ                        | BZ | 26.7                                                  | 29.5 | 1.0                           | 24                                   | 5.0                                                                           | 15.4                                                                   | 38.9                                                     |
| +SMBJ26                                  | MD                        | CD | 28.9                                                  | 35.3 | 1.0                           | 26                                   | 5.0                                                                           | 12.9                                                                   | 46.6                                                     |
| +SMBJ26A                                 | ME                        | CE | 28.9                                                  | 31.9 | 1.0                           | 26                                   | 5.0                                                                           | 14.3                                                                   | 42.1                                                     |
| +SMBJ28                                  | MF                        | MF | 31.1                                                  | 38.0 | 1.0                           | 28                                   | 5.0                                                                           | 12.0                                                                   | 50.0                                                     |
| +SMBJ28A                                 | MG                        | MG | 31.1                                                  | 34.4 | 1.0                           | 28                                   | 5.0                                                                           | 13.2                                                                   | 45.4                                                     |
| +SMBJ30                                  | MH                        | CH | 33.3                                                  | 40.7 | 1.0                           | 30                                   | 5.0                                                                           | 11.2                                                                   | 53.5                                                     |
| +SMBJ30A                                 | MK                        | CK | 33.3                                                  | 36.8 | 1.0                           | 30                                   | 5.0                                                                           | 12.4                                                                   | 48.4                                                     |

Notes: (1) Pulse test:  $t_p \leq 50ms$

www.galaxycn.com

(2) Surge current waveform per Fig.3 and derate per Fig.2

(3) For bi-directional types having  $V_{WM}$  of 10 Volts and less, the  $I_D$  limit is doubled

(4) All terms and symbols are consistent with ANSI/IEEE C62.35

+Underwriters Laboratory Recognition for the classification of protectors (QVG2) under the UL standard for safety 497B and file number E239431 for both uni-directional and bi-directional devices

# ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.  $V_F=3.5V$  at  $I_F=50A$  (uni-directional only)

| Device Type<br>Modified<br>"J" Bend Lead | Device Marking Code |    | Breakdown Voltage<br>$V_{(BR)}$ at $I_T^{(1)}$<br>(V) |      | Test Current<br>$I_T$ (mA) | Stand-off Voltage<br>$V_{WM}$ (V) | Maximum Reverse Leakage<br>at $V_{WM}$<br>$I_D$ ( $\mu A$ ) <sup>(3)</sup> | Maximum Peak Pulse Surge Current $I_{PPM}$<br>(A) <sup>(2)</sup> | Maximum Clamping Voltage at $I_{PPM}$<br>$V_C$ (V) |
|------------------------------------------|---------------------|----|-------------------------------------------------------|------|----------------------------|-----------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------------------|
|                                          | Uni                 | Bi | Min                                                   | Max  |                            |                                   |                                                                            |                                                                  |                                                    |
| +SMBJ33                                  | ML                  | CL | 36.7                                                  | 44.9 | 1.0                        | 33                                | 5.0                                                                        | 10.2                                                             | 59.0                                               |
| +SMBJ33A                                 | MM                  | CM | 36.7                                                  | 40.6 | 1.0                        | 33                                | 5.0                                                                        | 11.3                                                             | 53.3                                               |
| +SMBJ36                                  | MN                  | CN | 40.0                                                  | 48.9 | 1.0                        | 36                                | 5.0                                                                        | 9.3                                                              | 64.3                                               |
| +SMBJ36A                                 | MP                  | CP | 40.0                                                  | 44.2 | 1.0                        | 36                                | 5.0                                                                        | 10.3                                                             | 58.1                                               |
| +SMBJ40                                  | MQ                  | CQ | 44.4                                                  | 54.3 | 1.0                        | 40                                | 5.0                                                                        | 8.4                                                              | 71.4                                               |
| +SMBJ40A                                 | MR                  | CR | 44.4                                                  | 49.1 | 1.0                        | 40                                | 5.0                                                                        | 9.3                                                              | 64.5                                               |
| +SMBJ43                                  | MS                  | CS | 47.8                                                  | 58.4 | 1.0                        | 43                                | 5.0                                                                        | 7.8                                                              | 76.7                                               |
| +SMBJ43A                                 | MT                  | CT | 47.8                                                  | 52.8 | 1.0                        | 43                                | 5.0                                                                        | 8.6                                                              | 69.4                                               |
| +SMBJ45                                  | MU                  | MU | 50.0                                                  | 61.1 | 1.0                        | 45                                | 5.0                                                                        | 7.5                                                              | 80.3                                               |
| +SMBJ45A                                 | MV                  | MV | 50.0                                                  | 55.3 | 1.0                        | 45                                | 5.0                                                                        | 8.3                                                              | 72.7                                               |
| +SMBJ48                                  | MW                  | MW | 53.3                                                  | 65.1 | 1.0                        | 48                                | 5.0                                                                        | 7.0                                                              | 85.5                                               |
| +SMBJ48A                                 | MX                  | MX | 53.3                                                  | 58.9 | 1.0                        | 48                                | 5.0                                                                        | 7.8                                                              | 77.4                                               |
| +SMBJ51                                  | MY                  | MY | 56.7                                                  | 69.3 | 1.0                        | 51                                | 5.0                                                                        | 6.6                                                              | 91.1                                               |
| +SMBJ51A                                 | MZ                  | MZ | 56.7                                                  | 62.7 | 1.0                        | 51                                | 5.0                                                                        | 7.3                                                              | 82.4                                               |
| +SMBJ54                                  | ND                  | ND | 60.0                                                  | 73.3 | 1.0                        | 54                                | 5.0                                                                        | 6.2                                                              | 96.3                                               |
| +SMBJ54A                                 | NE                  | NE | 60.0                                                  | 66.3 | 1.0                        | 54                                | 5.0                                                                        | 6.9                                                              | 87.1                                               |
| +SMBJ58                                  | NF                  | NF | 64.4                                                  | 78.7 | 1.0                        | 58                                | 5.0                                                                        | 5.8                                                              | 103                                                |
| +SMBJ58A                                 | NG                  | NG | 64.4                                                  | 71.2 | 1.0                        | 58                                | 5.0                                                                        | 6.4                                                              | 93.6                                               |
| +SMBJ60                                  | NH                  | NH | 66.7                                                  | 81.5 | 1.0                        | 60                                | 5.0                                                                        | 5.6                                                              | 107                                                |
| +SMBJ60A                                 | NK                  | NK | 66.7                                                  | 73.7 | 1.0                        | 60                                | 5.0                                                                        | 6.2                                                              | 96.8                                               |
| +SMBJ64                                  | NL                  | NL | 71.1                                                  | 86.9 | 1.0                        | 64                                | 5.0                                                                        | 5.3                                                              | 114                                                |
| +SMBJ64A                                 | NM                  | NM | 71.1                                                  | 78.6 | 1.0                        | 64                                | 5.0                                                                        | 5.8                                                              | 103                                                |
| +SMBJ70                                  | NN                  | NN | 77.8                                                  | 95.1 | 1.0                        | 70                                | 5.0                                                                        | 4.8                                                              | 125                                                |
| +SMBJ70A                                 | NP                  | NP | 77.8                                                  | 86.0 | 1.0                        | 70                                | 5.0                                                                        | 5.3                                                              | 113                                                |
| +SMBJ75                                  | NQ                  | NQ | 83.3                                                  | 102  | 1.0                        | 75                                | 5.0                                                                        | 4.5                                                              | 134                                                |
| +SMBJ75A                                 | NR                  | NR | 83.3                                                  | 92.1 | 1.0                        | 75                                | 5.0                                                                        | 5.0                                                              | 121                                                |
| +SMBJ78                                  | NS                  | NS | 86.7                                                  | 106  | 1.0                        | 78                                | 5.0                                                                        | 4.3                                                              | 139                                                |
| +SMBJ78A                                 | NT                  | NT | 86.7                                                  | 95.8 | 1.0                        | 78                                | 5.0                                                                        | 4.8                                                              | 126                                                |
| +SMBJ85                                  | NU                  | NU | 94.4                                                  | 115  | 1.0                        | 85                                | 5.0                                                                        | 4.0                                                              | 151                                                |
| +SMBJ85A                                 | NV                  | NV | 94.4                                                  | 104  | 1.0                        | 85                                | 5.0                                                                        | 4.4                                                              | 137                                                |
| +SMBJ90                                  | NW                  | NW | 100                                                   | 122  | 1.0                        | 90                                | 5.0                                                                        | 3.8                                                              | 160                                                |
| +SMBJ90A                                 | NX                  | NX | 100                                                   | 111  | 1.0                        | 90                                | 5.0                                                                        | 4.1                                                              | 146                                                |
| +SMBJ100                                 | NY                  | NY | 111                                                   | 136  | 1.0                        | 100                               | 5.0                                                                        | 3.4                                                              | 179                                                |
| +SMBJ100A                                | NZ                  | NZ | 111                                                   | 123  | 1.0                        | 100                               | 5.0                                                                        | 3.7                                                              | 162                                                |
| +SMBJ110                                 | PD                  | PD | 122                                                   | 149  | 1.0                        | 110                               | 5.0                                                                        | 3.1                                                              | 196                                                |
| +SMBJ110A                                | PE                  | PE | 122                                                   | 135  | 1.0                        | 110                               | 5.0                                                                        | 3.4                                                              | 177                                                |
| +SMBJ120                                 | PF                  | PF | 133                                                   | 163  | 1.0                        | 120                               | 5.0                                                                        | 2.8                                                              | 214                                                |
| +SMBJ120A                                | PG                  | PG | 133                                                   | 147  | 1.0                        | 120                               | 5.0                                                                        | 3.1                                                              | 193                                                |
| +SMBJ130                                 | PH                  | PH | 144                                                   | 176  | 1.0                        | 130                               | 5.0                                                                        | 2.6                                                              | 231                                                |
| +SMBJ130A                                | PK                  | PK | 144                                                   | 159  | 1.0                        | 130                               | 5.0                                                                        | 2.9                                                              | 209                                                |
| +SMBJ150                                 | PL                  | PL | 167                                                   | 204  | 1.0                        | 150                               | 5.0                                                                        | 2.2                                                              | 268                                                |
| +SMBJ150A                                | PM                  | PM | 167                                                   | 185  | 1.0                        | 150                               | 5.0                                                                        | 2.5                                                              | 243                                                |
| +SMBJ160                                 | PN                  | PN | 178                                                   | 218  | 1.0                        | 160                               | 5.0                                                                        | 2.1                                                              | 287                                                |
| +SMBJ160A                                | PP                  | PP | 178                                                   | 197  | 1.0                        | 160                               | 5.0                                                                        | 2.3                                                              | 259                                                |
| +SMBJ170                                 | PQ                  | PQ | 189                                                   | 231  | 1.0                        | 170                               | 5.0                                                                        | 2.0                                                              | 304                                                |
| +SMBJ170A                                | PR                  | PR | 189                                                   | 209  | 1.0                        | 170                               | 5.0                                                                        | 2.2                                                              | 275                                                |
| +SMBJ188                                 | PT                  | PT | 209                                                   | 255  | 1.0                        | 188                               | 5.0                                                                        | 1.7                                                              | 344                                                |
| +SMBJ188A                                | PS                  | PS | 209                                                   | 231  | 1.0                        | 188                               | 5.0                                                                        | 2.0                                                              | 328                                                |

Notes: (1) Pulse test:  $t_p \leq 50ms$

www.galaxyen.com

(2) Surge current waveform per Fig.3 and derate per Fig.2

(3) For bi-directional types having  $V_{WM}$  of 10 Volts and less, the  $I_D$  limit is doubled

(4) All terms and symbols are consistent with ANSI/IEEE C62.35

(5) For the bidirectional SMBG/SMBJ5.0CA, the maximum  $V_{(BR)}$  is 7.25V

+Underwriters Laboratory Recognition for the classification of protectors (QVG2) under the UL standard for safety 497B and file number E239431 for both uni-directional and bi-directional devices

FIG.1 -- PEAK PULSE POWER RATING CURVE

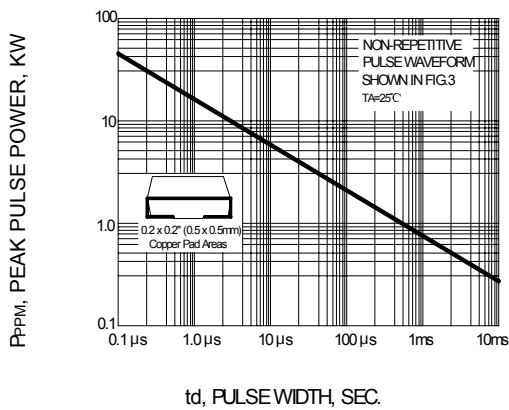


FIG.2 -- PULSE DERATING CURVE

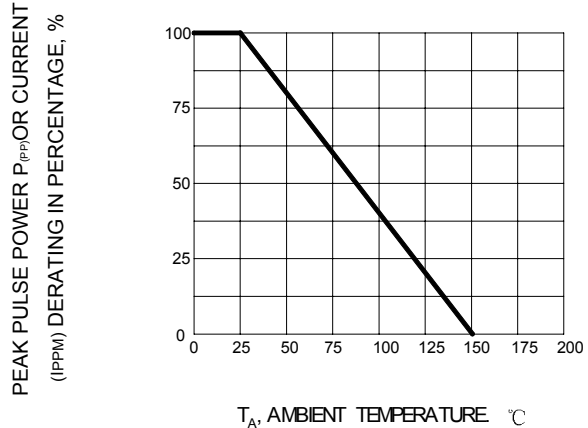


FIG.3 -- PULSE WAVEFORM

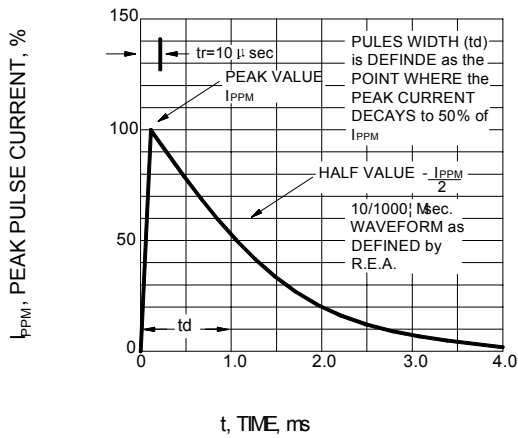


FIG.4 -- TYPICAL JUNCTION CAPACITANCE UNIDIRECTIONAL

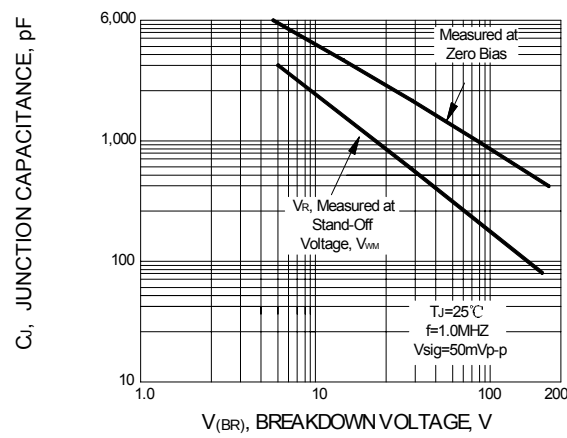


FIG.5 -- TYPICAL TRANSIENT THERMAL IMPEDANCE

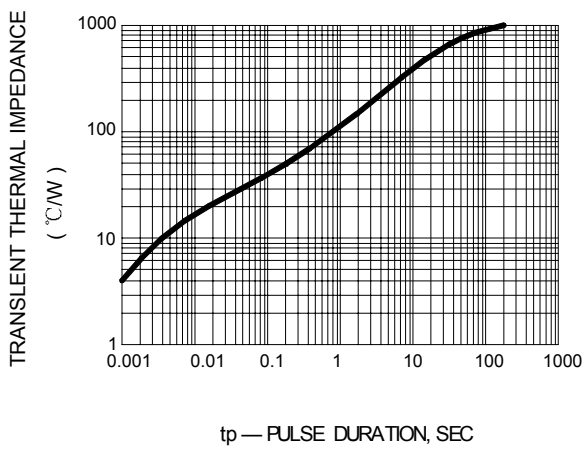


FIG.6 -- MAXIMUM NON-REPETITIVE PEAK FORWARD SURGE CURRENT

