



Micro Commercial Components

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## TSMBJ050 5C-064

### Features

- Oxide-Glass passivated Junction
- Bi-Directional protection in a single device
- Surge capabilities up to 80A@10/1000us or 250A@8/20us
- High Off-State impedance and Low On-State voltage
- Plastic material has UL flammability classification 94V-0

### Transient Voltage Protection Device 58 Volts

### Mechanical Data

- Case : Molded plastic
- Polarity : None cathode band denotes
- Approx Weight : 0.093grams

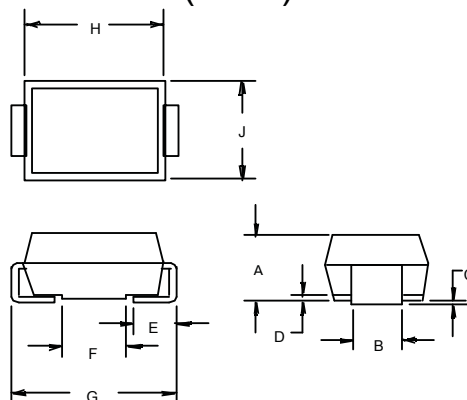
### Maximum Ratings

| Characteristic                         | Symbol         | Value     | Unit                  |
|----------------------------------------|----------------|-----------|-----------------------|
| Non-repetitive peak impulse current    | $I_{PP}$       | 80A       | 10/1000us             |
| Non-repetitive peak On-state current   | $I_{TSM}$      | 30A       | 8.3ms, one-half cycle |
| Operating temperature range            | $T_{OP}$       | -40~150°C |                       |
| Junction and storage temperature range | $T_J, T_{STG}$ | -55~150°C |                       |

### Thermal Resistance

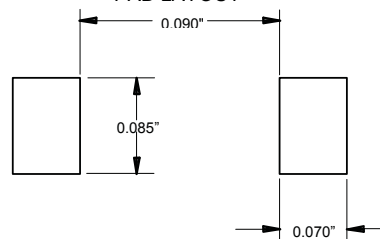
| Characteristic                                                 | Symbol                     | Value   | Unit                      |
|----------------------------------------------------------------|----------------------------|---------|---------------------------|
| Thermal Resistance junction to lead                            | $R_{\theta JL}$            | 20°C/W  |                           |
| Thermal Resistance junction to ambient                         | $R_{\theta JA}$            | 100°C/W | On recommended pad layout |
| Typical positive temperature coefficient for breakdown voltage | $\Delta V_{BR}/\Delta T_J$ | 0.1%/°C |                           |

### DO-214AA (SMB)



| DIM | INCHES |      | MM   |      | NOTE |
|-----|--------|------|------|------|------|
|     | MIN    | MAX  | MIN  | MAX  |      |
| A   | .078   | .096 | 2.00 | 2.44 |      |
| B   | .077   | .083 | 1.96 | 2.10 |      |
| C   | .002   | .008 | .05  | .20  |      |
| D   | —      | .02  | —    | .51  |      |
| E   | .030   | .060 | .76  | 1.52 |      |
| F   | .065   | .091 | 1.65 | 2.32 |      |
| G   | .205   | .220 | 5.21 | 5.59 |      |
| H   | .160   | .180 | 4.06 | 4.57 |      |
| J   | .130   | .155 | 3.30 | 3.94 |      |

### SUGGESTED SOLDER PAD LAYOUT



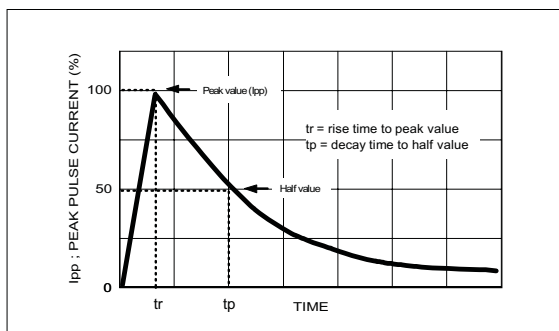
# TSMBJ0505C-064

## ELECTRICAL CHARACTERISTIC @25°C Unless otherwise specified

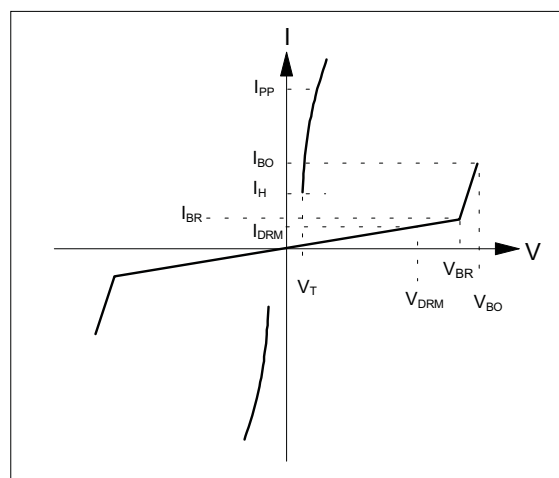
| Parameter      | Rated Repetitive Off-state Voltage | Off-state Leakage Current@ $V_{DRM}$ | Breakover Voltage | On-State Voltage @ $I_T=1.0A$ | Breakover Current | Holding Current | Off-State Capacitance |
|----------------|------------------------------------|--------------------------------------|-------------------|-------------------------------|-------------------|-----------------|-----------------------|
| Symbol         | $V_{DRM}$                          | $I_{DRM}$                            | $V_{BO}$          | $V_T$                         | $I_{BO+}$         | $I_H$           | $C_J$                 |
| Units          | Volts                              | uA                                   | Volts             | Volts                         | mA                | mA              | pF                    |
| Limit          | Max                                | Max                                  | Max               | Max                           | Max               | Min             | Typ.                  |
| TSMBJ0505C-064 | 58                                 | 5                                    | 77                | 5                             | 800               | 150             | 140                   |

## MAXIMUM RATED SURGE WAVEFORM

| Waveform   | Standard      | Ipp (A) |
|------------|---------------|---------|
| 2/10 us    | GR-1089-CORE  | 250     |
| 8/20 us    | IEC 61000-4-5 | 250     |
| 10/160 us  | FCC Part 68   | 150     |
| 10/700 us  | ITU-T K20/21  | 100     |
| 10/560 us  | FCC Part 68   | 100     |
| 10/1000 us | GR-1089-CORE  | 80      |



| Symbol    | Parameter                            |
|-----------|--------------------------------------|
| $V_{DRM}$ | Stand-off voltage                    |
| $I_{DRM}$ | Leakage current at stand-off voltage |
| $V_{BR}$  | Breakdown voltage                    |
| $I_{BR}$  | Breakdown current                    |
| $V_{BO}$  | Breakover voltage                    |
| $I_{BO}$  | Breakover current                    |
| $I_H$     | Holding current NOTE: 1              |
| $V_T$     | On state voltage                     |
| $I_{PP}$  | Peak pulse current                   |
| $C_O$     | Off-state capacitance NOTE: 2        |



NOTE :

1.  $I_H > (V_L / R_L)$  If this criterion is not obeyed, the TSPD triggers but does not return correctly to high-resistance state.  
The surge recovery time. It does not exceed 30ms.
2. Off-state capacitance measured at  $f=1.0MHz$ ,  $1.0Vrms$  signal,  $V_R=2Vdc$  bias.

Fig.1 - Off-State Current v.s Junction Temperature

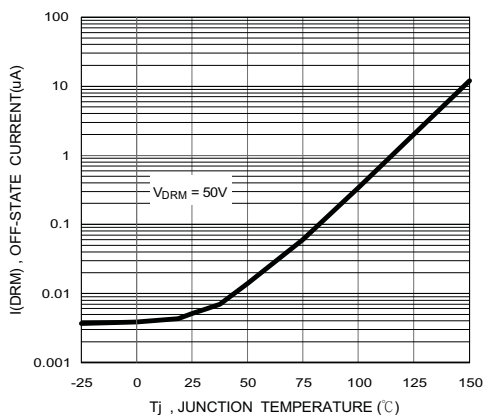


Fig.2 - Relative Variation of Breakdown Voltage v.s Junction Temperature

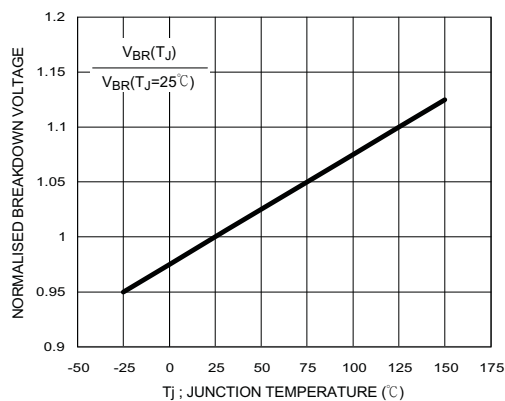


Fig.3 - Relative Variation of Breakover Voltage v.s Junction Temperature

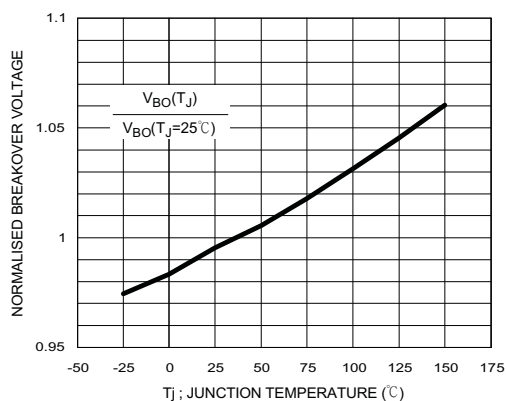


Fig.4 - On-State Current v.s On-State Voltage

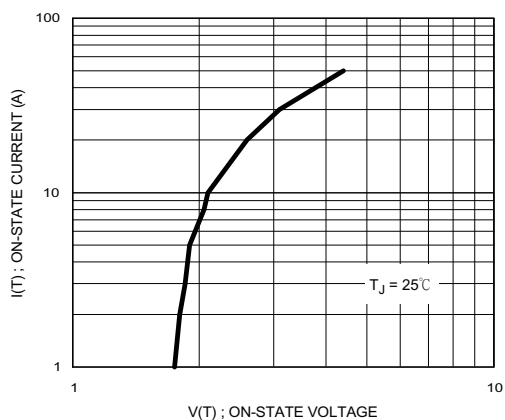


Fig.5 - Relative Variation of Holding Current v.s Junction Temperature

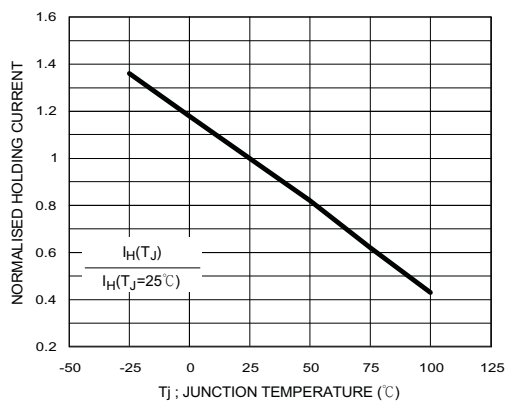
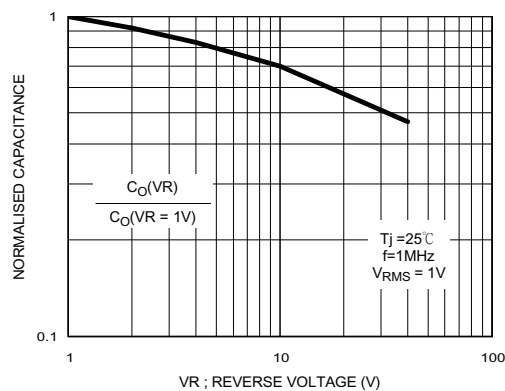
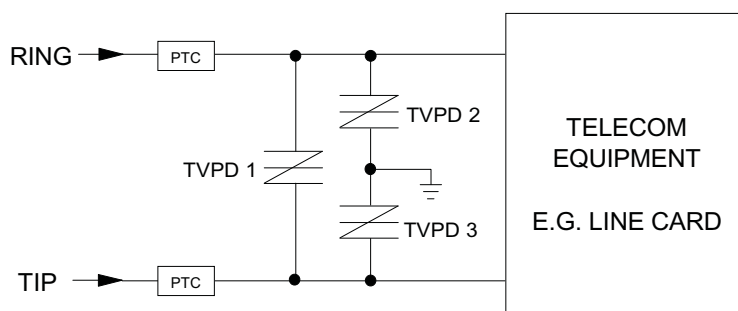
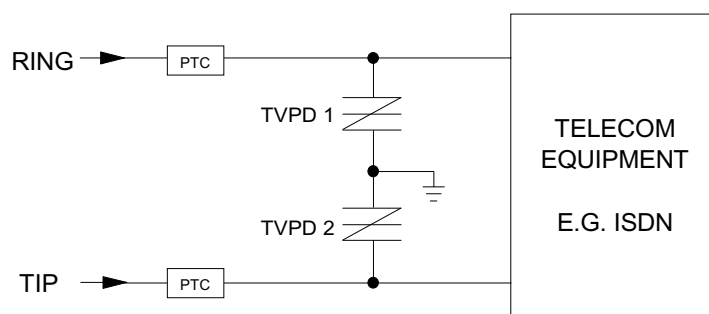
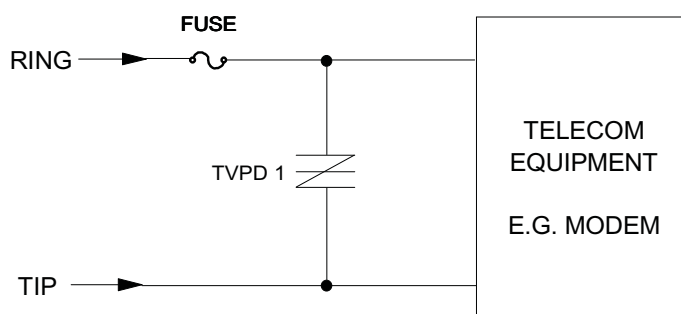


Fig.6 - Relative Variation of Junction Capacitance v.s Reverse Voltage Bias



# TSMBJ0505C-064

## TYPICAL APPLICATION CIRCUITS



The PTC (Positive Temperature Coefficient) is an overcurrent protection device.