



Micro Commercial Components



Micro Commercial Components  
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# MMSZ5221B THRU MMSZ5259B(C)

## Features

- Lead Free Finish/RoHS Compliant("P" Suffix designates RoHS Compliant. See ordering information)
- Planar Die construction
- Zener Voltages from 2.4V - 39V and 500mW Power Dissipation
- Ideally Suited for Automated Assembly Processes
- ESD Rating of 16kV per Human Body Model

## Mechanical Data

- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Approx. Weight: 0.009 grams
- Mounting Position: Any
- Halogen free available upon request by adding suffix "-HF"
- Storage & Operating Temperature: -55°C to +150°C

### Maximum Ratings @ 25°C Unless Otherwise Specified

|                                             |            |     |       |
|---------------------------------------------|------------|-----|-------|
| Maximum Forward Voltage @ $I_F=10\text{mA}$ | $V_F$      | 0.9 | V     |
| Power Dissipation (Notes A)                 | $P_{(AV)}$ | 500 | mWatt |

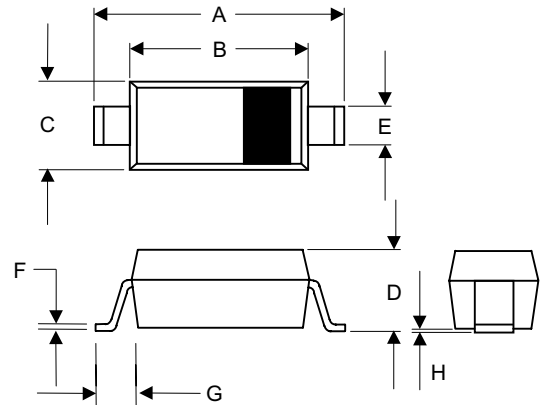
#### NOTES:

A. Mounted on 5.0mm<sup>2</sup>(.013mm thick) land areas.

500 mW

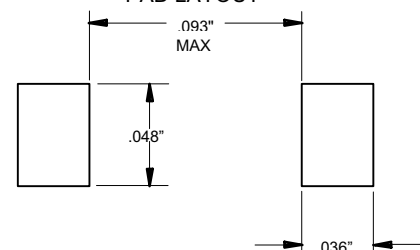
Zener Diodes  
2.4 to 39 Volts

## SOD123



| DIMENSIONS |        |      |      |      | NOTE |
|------------|--------|------|------|------|------|
| DIM        | INCHES |      | MM   |      |      |
|            | MIN    | MAX  | MIN  | MAX  |      |
| A          | .141   | .154 | 3.60 | 3.90 |      |
| B          | .098   | .110 | 2.50 | 2.80 |      |
| C          | .055   | .071 | 1.40 | 1.80 |      |
| D          | .037   | .053 | 0.95 | 1.35 |      |
| E          | .019   | .028 | 0.50 | 0.70 |      |
| F          | ---    | .008 | ---  | 0.20 |      |
| G          | .016   | ---  | 0.40 | ---  |      |
| H          | ---    | .005 | ---  | 0.12 |      |

#### SUGGESTED SOLDER PAD LAYOUT



# MMSZ5221B thru MMSZ5259B(C)

## Electrical Characteristics @ 25°C Unless Otherwise Specified

| MCC PART NUMBER | Marking | NORMAL ZENER VOLTAGE<br>V <sub>z</sub> @ I <sub>zt</sub> | TEST CURRENT I <sub>zt</sub> | MAXIMUM ZENER IMPEDANCE<br>Z <sub>zt</sub> @ I <sub>zt</sub> Z <sub>zk</sub> @ I <sub>zk</sub> =0.25mA |      | MAXIMUM REVERSE LEAKAGE CURRENT<br>I <sub>r</sub> @ V <sub>r</sub> |       | MAXIMUM ZENER VOLTAGE TEMP |
|-----------------|---------|----------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------|-------|----------------------------|
|                 |         | VOLTS                                                    | mA                           | OHMS                                                                                                   | OHMS | uA                                                                 | VOLTS | %/°C                       |
| MMSZ5221B       | C1      | 2.4                                                      | 20                           | 30                                                                                                     | 1200 | 100                                                                | 1.0   | -0.085                     |
| MMSZ5222B       | C2      | 2.5                                                      | 20                           | 30                                                                                                     | 1250 | 100                                                                | 1.0   | -0.085                     |
| MMSZ5223B       | C3      | 2.7                                                      | 20                           | 30                                                                                                     | 1300 | 75                                                                 | 1.0   | -0.080                     |
| MMSZ5225B       | C5      | 3.0                                                      | 20                           | 29                                                                                                     | 1600 | 50                                                                 | 1.0   | -0.075                     |
| MMSZ5226B       | G1/D1   | 3.3                                                      | 20                           | 28                                                                                                     | 1600 | 25                                                                 | 1.0   | -0.070                     |
| MMSZ5227B       | G2/D2   | 3.6                                                      | 20                           | 24                                                                                                     | 1700 | 15                                                                 | 1.0   | -0.065                     |
| MMSZ5228B       | G3/D3   | 3.9                                                      | 20                           | 23                                                                                                     | 1900 | 10                                                                 | 1.0   | -0.060                     |
| MMSZ5229B       | G4/D4   | 4.3                                                      | 20                           | 22                                                                                                     | 2000 | 5.0                                                                | 1.0   | ±0.055                     |
| MMSZ5230B       | G5/D5   | 4.7                                                      | 20                           | 19                                                                                                     | 1900 | 5.0                                                                | 2.0   | ±0.030                     |
| MMSZ5231B       | E1      | 5.1                                                      | 20                           | 17                                                                                                     | 1600 | 5.0                                                                | 2.0   | ±0.030                     |
| MMSZ5232B       | E2      | 5.6                                                      | 20                           | 11                                                                                                     | 1600 | 5.0                                                                | 3.0   | +0.038                     |
| MMSZ5233B       | E3      | 6.0                                                      | 20                           | 7.0                                                                                                    | 1600 | 5.0                                                                | 3.5   | +0.040                     |
| MMSZ5234B       | E4      | 6.2                                                      | 20                           | 7.0                                                                                                    | 1000 | 5.0                                                                | 4.0   | +0.045                     |
| MMSZ5235B       | E5      | 6.8                                                      | 20                           | 5.0                                                                                                    | 750  | 3.0                                                                | 5.0   | +0.050                     |
| MMSZ5236B       | F1      | 7.5                                                      | 20                           | 6.0                                                                                                    | 500  | 3.0                                                                | 6.0   | +0.058                     |
| MMSZ5237B       | F2      | 8.2                                                      | 20                           | 8.0                                                                                                    | 500  | 3.0                                                                | 6.5   | +0.062                     |
| MMSZ5238B       | F3      | 8.7                                                      | 20                           | 8.0                                                                                                    | 600  | 3.0                                                                | 6.5   | +0.065                     |
| MMSZ5239B       | F4      | 9.1                                                      | 20                           | 10                                                                                                     | 600  | 3.0                                                                | 7.0   | +0.068                     |
| MMSZ5240B       | F5      | 10                                                       | 20                           | 17                                                                                                     | 600  | 3.0                                                                | 8.0   | +0.075                     |
| MMSZ5241B       | H1      | 11                                                       | 20                           | 22                                                                                                     | 600  | 2.0                                                                | 8.4   | +0.076                     |
| MMSZ5242B       | H2      | 12                                                       | 20                           | 30                                                                                                     | 600  | 1.0                                                                | 9.1   | +0.077                     |
| MMSZ5243B       | H3      | 13                                                       | 9.5                          | 13                                                                                                     | 600  | 0.5                                                                | 9.9   | +0.079                     |
| MMSZ5244B       | H4      | 14                                                       | 9.0                          | 15                                                                                                     | 600  | 0.1                                                                | 10.5  | +0.081                     |
| MMSZ5245B       | H5      | 15                                                       | 8.5                          | 16                                                                                                     | 600  | 0.1                                                                | 11    | +0.082                     |
| MMSZ5246B       | J1      | 16                                                       | 7.8                          | 17                                                                                                     | 600  | 0.1                                                                | 12    | +0.083                     |
| MMSZ5248B       | J3      | 18                                                       | 7.0                          | 21                                                                                                     | 600  | 0.1                                                                | 14    | +0.085                     |
| MMSZ5250B       | J5      | 20                                                       | 6.2                          | 25                                                                                                     | 600  | 0.1                                                                | 15    | +0.086                     |
| MMSZ5251B       | K1      | 22                                                       | 5.6                          | 29                                                                                                     | 600  | 0.1                                                                | 17    | +0.087                     |
| MMSZ5252B       | K2      | 24                                                       | 5.2                          | 33                                                                                                     | 600  | 0.1                                                                | 18    | +0.088                     |
| MMSZ5254B       | K4      | 27                                                       | 4.6                          | 41                                                                                                     | 600  | 0.1                                                                | 21    | +0.090                     |
| MMSZ5255B       | K5      | 28                                                       | 4.5                          | 44                                                                                                     | 600  | 0.1                                                                | 21    | +0.091                     |
| MMSZ5256B       | M1      | 30                                                       | 4.2                          | 49                                                                                                     | 600  | 0.1                                                                | 23    | +0.091                     |
| MMSZ5257B       | M2      | 33                                                       | 3.8                          | 58                                                                                                     | 700  | 0.1                                                                | 25    | +0.092                     |
| MMSZ5258B       | M3      | 36                                                       | 3.4                          | 70                                                                                                     | 700  | 0.1                                                                | 27    | +0.093                     |
| MMSZ5259B       | M4      | 39                                                       | 3.2                          | 80                                                                                                     | 800  | 0.1                                                                | 30    | +0.094                     |

### NOTE:

- Standard Zener voltage tolerance is ±5% with a "B" suffix (e.g.: MMSZ5225B), suffix "C" is ±2% tolerance
- Specials Available Include:
  - Nominal zener voltages between the voltages shown and tighter voltage tolerances.
  - Matched sets.
- Zener Voltage (V<sub>z</sub>) Measurement. Guarantees the zener voltage when measured at 90 seconds while maintaining the lead temperature (T<sub>L</sub>) at 30°C, from the diode body.
- Zener Impedance (Z<sub>z</sub>) Derivation. The zener impedance is derived from the 60 cycle ac voltage, which results when an AC current having an rms value equal to 10% of the dc zener current (I<sub>zt</sub> or I<sub>zk</sub>) is superimposed on I<sub>zt</sub> or I<sub>zk</sub>.
- Surge Current (I<sub>r</sub>) Non-Repetitive. The rating listed in the electrical characteristics table is maximum peak, non-repetitive, reverse surge current of 1/2 square wave or equivalent sine wave pulse of 1/120 second duration superimposed on the test current, I<sub>zt</sub>, per JEDEC registration; however, actual device capability is as described in Figure 5.

# MMSZ5221B thru MMSZ5259B(C)

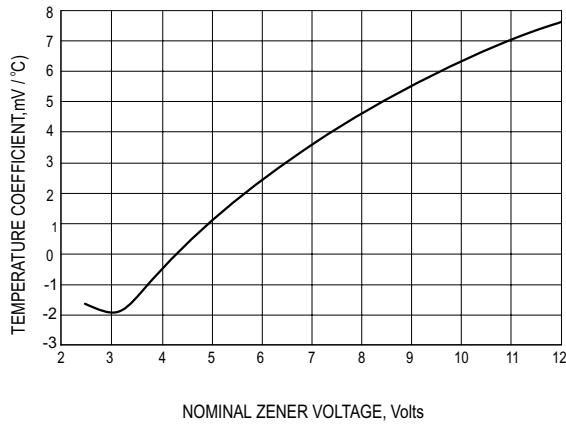
## Electrical Characteristics @ 25°C Unless Otherwise Specified

| MCC PART NUMBER | Marking | NORMAL ZENER VOLTAGE<br>V <sub>z</sub> @ I <sub>zt</sub> | TEST CURRENT I <sub>zt</sub> | MAXIMUM ZENER IMPEDANCE<br>Z <sub>zt</sub> @ I <sub>zt</sub> Z <sub>zk</sub> @ I <sub>zk</sub> =0.25mA |      | MAXIMUM REVERSE LEAKAGE CURRENT<br>I <sub>r</sub> @ V <sub>r</sub> |       | MAXIMUM ZENER VOLTAGE TEMP |
|-----------------|---------|----------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------|-------|----------------------------|
|                 |         | VOLTS                                                    | mA                           | OHMS                                                                                                   | OHMS | uA                                                                 | VOLTS | %/°C                       |
| MMSZ5229C       | 2G4/D4  | 4.3                                                      | 20                           | 22                                                                                                     | 2000 | 5.0                                                                | 1.0   | ±0.055                     |
| MMSZ5230C       | 2G5/D5  | 4.7                                                      | 20                           | 19                                                                                                     | 1900 | 5.0                                                                | 2.0   | ±0.030                     |
| MMSZ5231C       | 2E1/E1  | 5.1                                                      | 20                           | 17                                                                                                     | 1600 | 5.0                                                                | 2.0   | ±0.030                     |
| MMSZ5232C       | 2E2/E2  | 5.6                                                      | 20                           | 11                                                                                                     | 1600 | 5.0                                                                | 3.0   | +0.038                     |
| MMSZ5233C       | 2E3/E3  | 6.0                                                      | 20                           | 7.0                                                                                                    | 1600 | 5.0                                                                | 3.5   | +0.040                     |
| MMSZ5234C       | 2E4/E4  | 6.2                                                      | 20                           | 7.0                                                                                                    | 1000 | 5.0                                                                | 4.0   | +0.045                     |
| MMSZ5235C       | 2E5/E5  | 6.8                                                      | 20                           | 5.0                                                                                                    | 750  | 3.0                                                                | 5.0   | +0.050                     |
| MMSZ5236C       | 2F1/F1  | 7.5                                                      | 20                           | 6.0                                                                                                    | 500  | 3.0                                                                | 6.0   | +0.058                     |
| MMSZ5237C       | 2F2/F2  | 8.2                                                      | 20                           | 8.0                                                                                                    | 500  | 3.0                                                                | 6.0   | +0.062                     |
| MMSZ5238C       | 2F3/F3  | 8.7                                                      | 20                           | 8.0                                                                                                    | 600  | 3.0                                                                | 6.5   | +0.065                     |
| MMSZ5239C       | 2F4/F4  | 9.1                                                      | 20                           | 10                                                                                                     | 600  | 3.0                                                                | 6.5   | +0.068                     |
| MMSZ5240C       | 2F5/F5  | 10                                                       | 20                           | 17                                                                                                     | 600  | 3.0                                                                | 8.0   | +0.075                     |
| MMSZ5241C       | 2H1/H1  | 11                                                       | 20                           | 22                                                                                                     | 600  | 3.0                                                                | 8.4   | +0.076                     |
| MMSZ5242C       | 2H2/H2  | 12                                                       | 20                           | 30                                                                                                     | 600  | 2.0                                                                | 9.1   | +0.077                     |
| MMSZ5243C       | 2H3/H3  | 13                                                       | 9.5                          | 13                                                                                                     | 600  | 1.0                                                                | 9.9   | +0.079                     |
| MMSZ5244C       | 2H4/H4  | 14                                                       | 9.0                          | 15                                                                                                     | 600  | 0.5                                                                | 10.5  | +0.081                     |
| MMSZ5245C       | 2H5/H5  | 15                                                       | 8.5                          | 16                                                                                                     | 600  | 0.5                                                                | 11    | +0.082                     |
| MMSZ5246C       | 2J1/J1  | 16                                                       | 7.8                          | 17                                                                                                     | 600  | 0.1                                                                | 12    | +0.083                     |
| MMSZ5248C       | 2J3/J3  | 18                                                       | 7.0                          | 21                                                                                                     | 600  | 0.1                                                                | 14    | +0.085                     |
| MMSZ5250C       | 2J5/J5  | 20                                                       | 6.2                          | 25                                                                                                     | 600  | 0.1                                                                | 15    | +0.086                     |
| MMSZ5251C       | 2K1/K1  | 22                                                       | 5.6                          | 29                                                                                                     | 600  | 0.1                                                                | 17    | +0.087                     |
| MMSZ5252C       | 2K2/K2  | 24                                                       | 5.2                          | 33                                                                                                     | 600  | 0.1                                                                | 18    | +0.088                     |
| MMSZ5254C       | 2K4/K4  | 27                                                       | 4.6                          | 41                                                                                                     | 600  | 0.1                                                                | 21    | +0.090                     |
| MMSZ5255C       | 2K5/K5  | 28                                                       | 4.5                          | 44                                                                                                     | 600  | 0.1                                                                | 21    | +0.091                     |
| MMSZ5256C       | 2M1/M1  | 30                                                       | 4.2                          | 49                                                                                                     | 600  | 0.1                                                                | 23    | +0.091                     |
| MMSZ5257C       | 2M2/M2  | 33                                                       | 3.8                          | 58                                                                                                     | 700  | 0.1                                                                | 25    | +0.092                     |
| MMSZ5258C       | 2M3/M3  | 36                                                       | 3.4                          | 70                                                                                                     | 700  | 0.1                                                                | 27    | +0.093                     |
| MMSZ5259C       | 2M4/M4  | 39                                                       | 3.2                          | 80                                                                                                     | 800  | 0.1                                                                | 30    | +0.094                     |

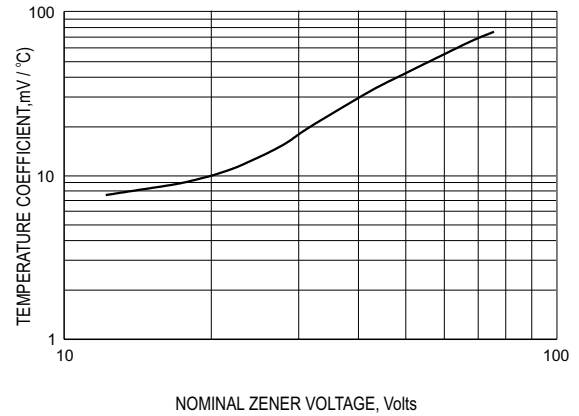
### NOTE:

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  - Nominal zener voltages between the voltages shown and tighter voltage tolerances.
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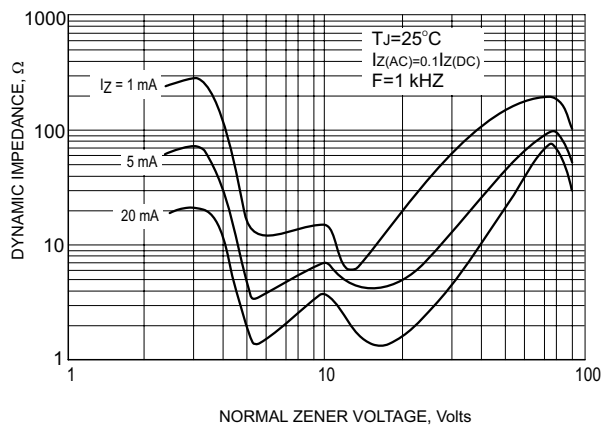
# MMSZ5221B thru MMSZ5259B(C)



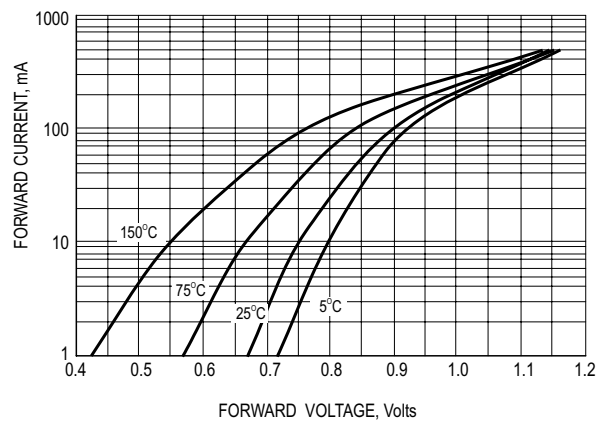
TEMPERATURE COEFFICIENTS



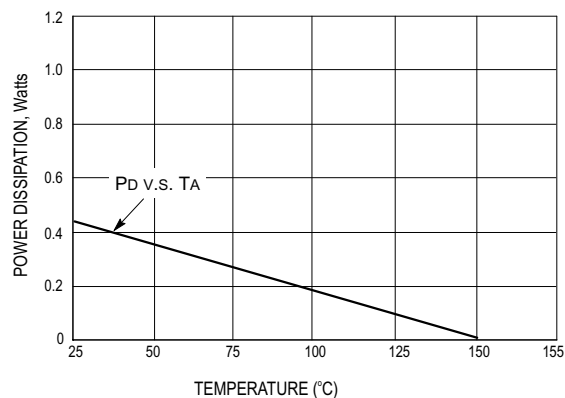
TEMPERATURE COEFFICIENTS



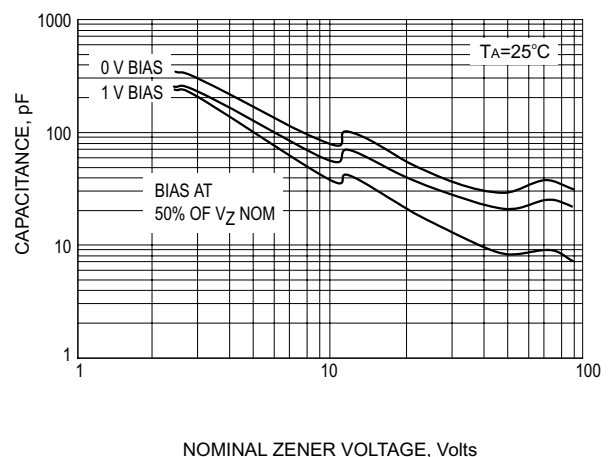
EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE



TYPICAL FORWARD VOLTAGE

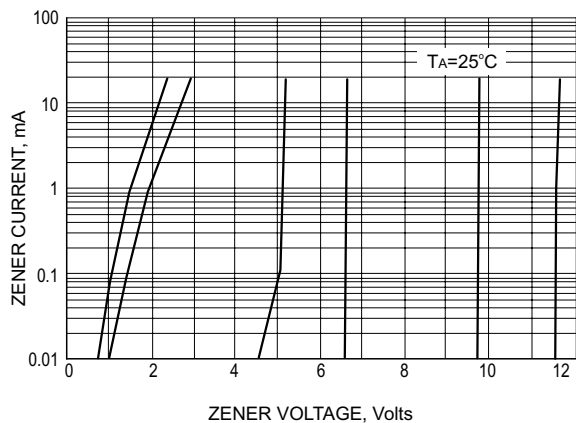


STEADY STATE POWER DERATING

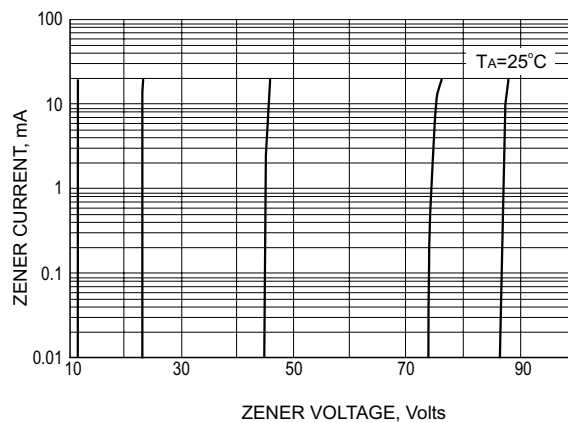


TYPICAL CAPACITANCE

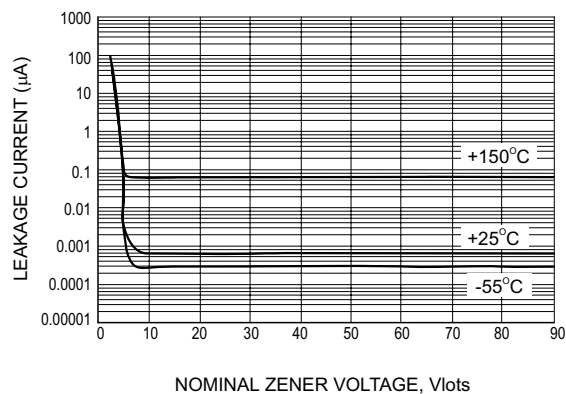
# MMSZ5221B thru MMSZ5259B(C)



ZENER VOLTAGE V.S. ZENER CURRENT



ZENER VOLTAGE V.S. ZENER CURRENT



TYPICAL LEAKGE CURRENT

## Ordering Information :

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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