

## Surface Mount Silicon Zener Diodes

### FEATURES

- Built-in strain relief
- Ideal for automated placement
- Glass passivated junction
- Low inductance
- Typical IR less than 1μA above 11V
- Moisture sensitivity level : level 1, per J-STD-020
- AEC-Q101 qualified (Green compound not involved)
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



### MECHANICAL DATA

**Case:** DO-214AC (SMA)

Molding compound, UL flammability classification rating 94V-0

Base P/N with suffix "G" on packing code - halogen-free

**Terminal:** Matte tin plated leads, solderable per JESD22-B102

Meet JESD 201 class 1A whisker test

**Polarity:** Indicated by cathode band

**Weight:** 0.06 g (approximately)

**DO-214AC (SMA)**

### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER                                                                           | SYMBOL           | Value        | UNIT  |
|-------------------------------------------------------------------------------------|------------------|--------------|-------|
| Power dissipation, RTHJA<30K/W, T <sub>A</sub> =60°C                                | P <sub>D</sub>   | 1            | Watts |
| Power dissipation, RTHJA<100K/W, T <sub>A</sub> =25°C                               | P <sub>D</sub>   | 1.25         | Watts |
| Non repetitive peak power dissipation(Note 1)                                       | P <sub>ZSM</sub> | 60           | Watts |
| Peak forward surge current, 8.3 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub> | 60           | A     |
| Operating junction temperature range                                                | T <sub>J</sub>   | - 55 to +150 | °C    |
| Storage temperature range                                                           | T <sub>STG</sub> | - 55 to +150 | °C    |

Note 1: Non Repetitive Peak surge PD Test Condition: tp=100μs sq. pulse, T<sub>A</sub>=25°C prior to surge

### ORDERING INFORMATION

| PART NO.             | PACKING CODE | GREEN COMPOUND CODE | PACKAGE    | PACKING                  |
|----------------------|--------------|---------------------|------------|--------------------------|
| 1SMAxxxx<br>(Note 1) | R3           | Suffix "G"          | SMA        | 1,800 / 7" Plastic reel  |
|                      | R2           |                     | SMA        | 7,500 / 13" Paper reel   |
|                      | M2           |                     | SMA        | 7,500 / 13" Plastic reel |
|                      | F3           |                     | Folded SMA | 1,800 / 7" Plastic reel  |
|                      | F2           |                     | Folded SMA | 7,500 / 13" Paper reel   |
|                      | F4           |                     | Folded SMA | 7,500 / 13" Plastic reel |
|                      |              |                     |            |                          |

Note 1: "xxxx" defines voltage from 7.5V (1SMA4737) to 200V (1SMA200Z)

### EXAMPLE

| PREFERRED P/N | PART NO. | PACKING CODE | GREEN COMPOUND CODE | DESCRIPTION    |
|---------------|----------|--------------|---------------------|----------------|
| 1SMA4737 R3   | 1SMA4737 | R3           |                     |                |
| 1SMA4737 R3G  | 1SMA4737 | R3           | G                   | Green compound |

**RATINGS AND CHARACTERISTICS CURVES** (TA=25°C unless otherwise noted)

| Device<br>(Note 1) | Device<br>Marking<br>code | Nominal<br>Zener Voltage        | Test<br>Current | Zener Impedance                  |                                  |      | Leakage Current                |       | Surge current<br>T <sub>A</sub> =25°C |
|--------------------|---------------------------|---------------------------------|-----------------|----------------------------------|----------------------------------|------|--------------------------------|-------|---------------------------------------|
|                    |                           | V <sub>Z</sub> @I <sub>ZT</sub> | I <sub>ZT</sub> | Z <sub>ZT</sub> @I <sub>ZT</sub> | Z <sub>ZK</sub> @I <sub>ZK</sub> |      | I <sub>R</sub> @V <sub>R</sub> |       | I <sub>R</sub>                        |
|                    |                           | V                               | mA              | Ω                                | Ω                                | mA   | μA                             | V     | mA                                    |
|                    |                           | (Note 2)<br>(Note 3)            |                 |                                  |                                  |      | Max.                           |       |                                       |
| 1SMA4737           | 737A                      | 7.5                             | 34              | 4                                | 700                              | 0.50 | 5                              | 5.0   | 605                                   |
| 1SMA4738           | 738A                      | 8.2                             | 31              | 4.5                              | 700                              | 0.50 | 5                              | 6.0   | 550                                   |
| 1SMA4739           | 739A                      | 9.1                             | 28              | 5                                | 700                              | 0.50 | 5                              | 7.0   | 500                                   |
| 1SMA4740           | 740A                      | 10                              | 25              | 7                                | 700                              | 0.25 | 5                              | 7.6   | 454                                   |
| 1SMA4741           | 741A                      | 11                              | 23              | 8                                | 700                              | 0.25 | 1                              | 8.4   | 414                                   |
| 1SMA4742           | 742A                      | 12                              | 21              | 9                                | 700                              | 0.25 | 1                              | 9.1   | 380                                   |
| 1SMA4743           | 743A                      | 13                              | 19              | 10                               | 700                              | 0.25 | 1                              | 9.9   | 344                                   |
| 1SMA4744           | 744A                      | 15                              | 17              | 14                               | 700                              | 0.25 | 1                              | 11.4  | 304                                   |
| 1SMA4745           | 745A                      | 16                              | 15.5            | 16                               | 700                              | 0.25 | 1                              | 12.2  | 285                                   |
| 1SMA4746           | 746A                      | 18                              | 14.0            | 20                               | 750                              | 0.25 | 1                              | 13.7  | 250                                   |
| 1SMA4747           | 747A                      | 20                              | 12.5            | 22                               | 750                              | 0.25 | 1                              | 15.2  | 225                                   |
| 1SMA4748           | 748A                      | 22                              | 11.5            | 23                               | 750                              | 0.25 | 1                              | 16.7  | 205                                   |
| 1SMA4749           | 749A                      | 24                              | 10.5            | 25                               | 750                              | 0.25 | 1                              | 18.2  | 190                                   |
| 1SMA4750           | 750A                      | 27                              | 9.5             | 35                               | 750                              | 0.25 | 1                              | 20.6  | 170                                   |
| 1SMA4751           | 751A                      | 30                              | 8.5             | 40                               | 1000                             | 0.25 | 1                              | 22.8  | 150                                   |
| 1SMA4752           | 752A                      | 33                              | 7.5             | 45                               | 1000                             | 0.25 | 1                              | 25.1  | 135                                   |
| 1SMA4753           | 753A                      | 36                              | 7.0             | 50                               | 1000                             | 0.25 | 1                              | 27.4  | 125                                   |
| 1SMA4754           | 754A                      | 39                              | 6.5             | 60                               | 1000                             | 0.25 | 1                              | 29.7  | 115                                   |
| 1SMA4755           | 755A                      | 43                              | 6.0             | 70                               | 1500                             | 0.25 | 1                              | 32.7  | 110                                   |
| 1SMA4756           | 756A                      | 47                              | 5.5             | 80                               | 1500                             | 0.25 | 1                              | 35.8  | 95                                    |
| 1SMA4757           | 757A                      | 51                              | 5.0             | 95                               | 1500                             | 0.25 | 1                              | 38.8  | 90                                    |
| 1SMA4758           | 758A                      | 56                              | 4.5             | 110                              | 2000                             | 0.25 | 1                              | 42.6  | 80                                    |
| 1SMA4759           | 759A                      | 62                              | 4.0             | 125                              | 2000                             | 0.25 | 1                              | 47.1  | 70                                    |
| 1SMA4760           | 760A                      | 68                              | 3.7             | 150                              | 2000                             | 0.25 | 1                              | 51.7  | 65                                    |
| 1SMA4761           | 761A                      | 75                              | 3.3             | 175                              | 2000                             | 0.25 | 1                              | 56.0  | 60                                    |
| 1SMA4762           | 762A                      | 82                              | 3.0             | 200                              | 3000                             | 0.25 | 1                              | 62.2  | 55                                    |
| 1SMA4763           | 763A                      | 91                              | 2.8             | 250                              | 3000                             | 0.25 | 1                              | 69.2  | 50                                    |
| 1SMA4764           | 764A                      | 100                             | 2.5             | 350                              | 3000                             | 0.25 | 1                              | 76.0  | 45                                    |
| 1SMA110Z           | 110A                      | 110                             | 2.3             | 450                              | 4000                             | 0.25 | 1                              | 83.6  | -                                     |
| 1SMA120Z           | 120A                      | 120                             | 2.0             | 550                              | 4500                             | 0.25 | 1                              | 91.2  | -                                     |
| 1SMA130Z           | 130A                      | 130                             | 1.9             | 700                              | 5000                             | 0.25 | 1                              | 98.8  | -                                     |
| 1SMA150Z           | 150A                      | 150                             | 1.7             | 1000                             | 6000                             | 0.25 | 1                              | 114.0 | -                                     |
| 1SMA160Z           | 160A                      | 160                             | 1.6             | 1100                             | 6500                             | 0.25 | 1                              | 121.6 | -                                     |
| 1SMA180Z           | 180A                      | 180                             | 1.4             | 1200                             | 7000                             | 0.25 | 1                              | 136.8 | -                                     |
| 1SMA200Z           | 200A                      | 200                             | 1.2             | 1500                             | 8000                             | 0.25 | 1                              | 152.0 | -                                     |

Notes:

1. Tolerance and Type Number Designation. The type numbers listed have a standard tolerance on the nominal zener voltage of ±5%
2. Specials Available Include:
  - A. Nominal zener voltages between the voltages shown and tighter voltage tolerances
  - B. Matched sets
3. 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±1°C, from the diode body
4. Zener Impedance (Z<sub>Z</sub>) Derivation. The zener impedance is derived from the 60 cycle AC voltage, which results when an accurate 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>
5. 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 10.

FIG. 1 POWER TEMPERATURE DERATING CURVE

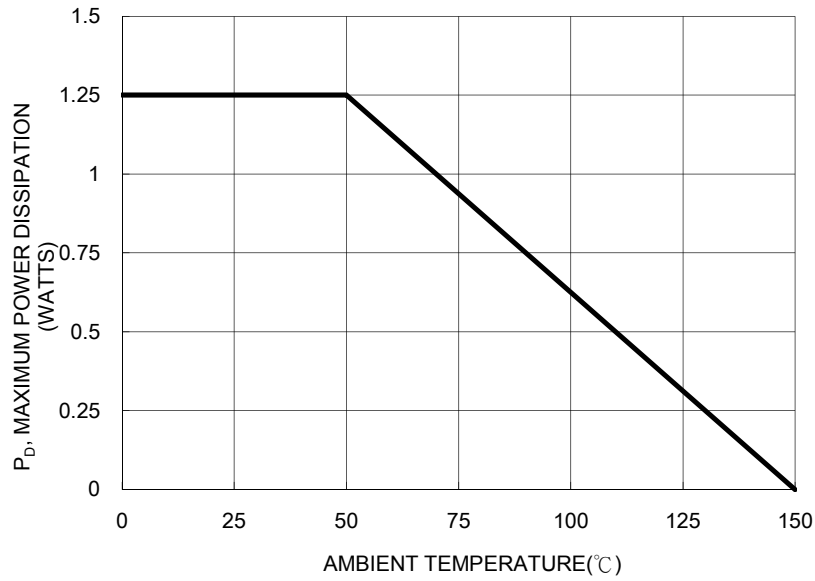


FIG. 2 TYPICAL FORWARD CHARACTERISTICS

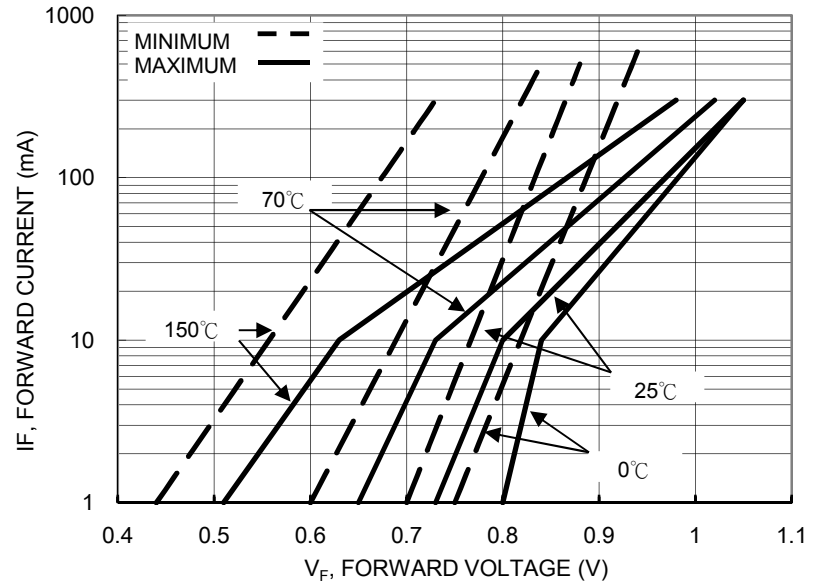


FIG.3 EFFECT OF ZENER CURRENT ON ZENER IMPEDANCE

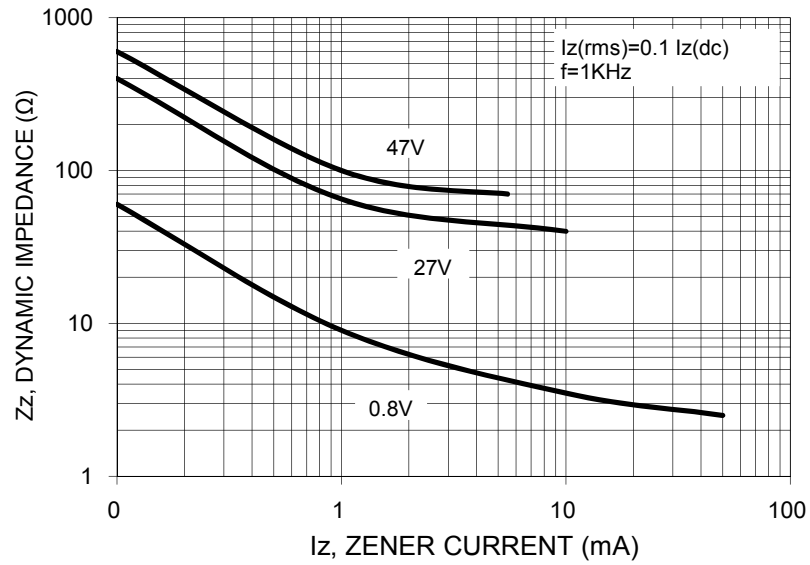


FIG.4 EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

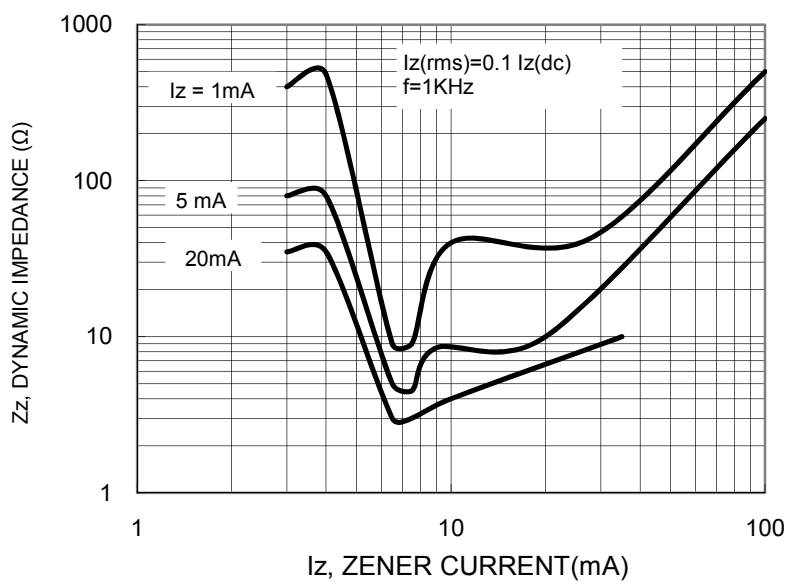


FIG.5 TYPICAL LEAKAGE CURRENT

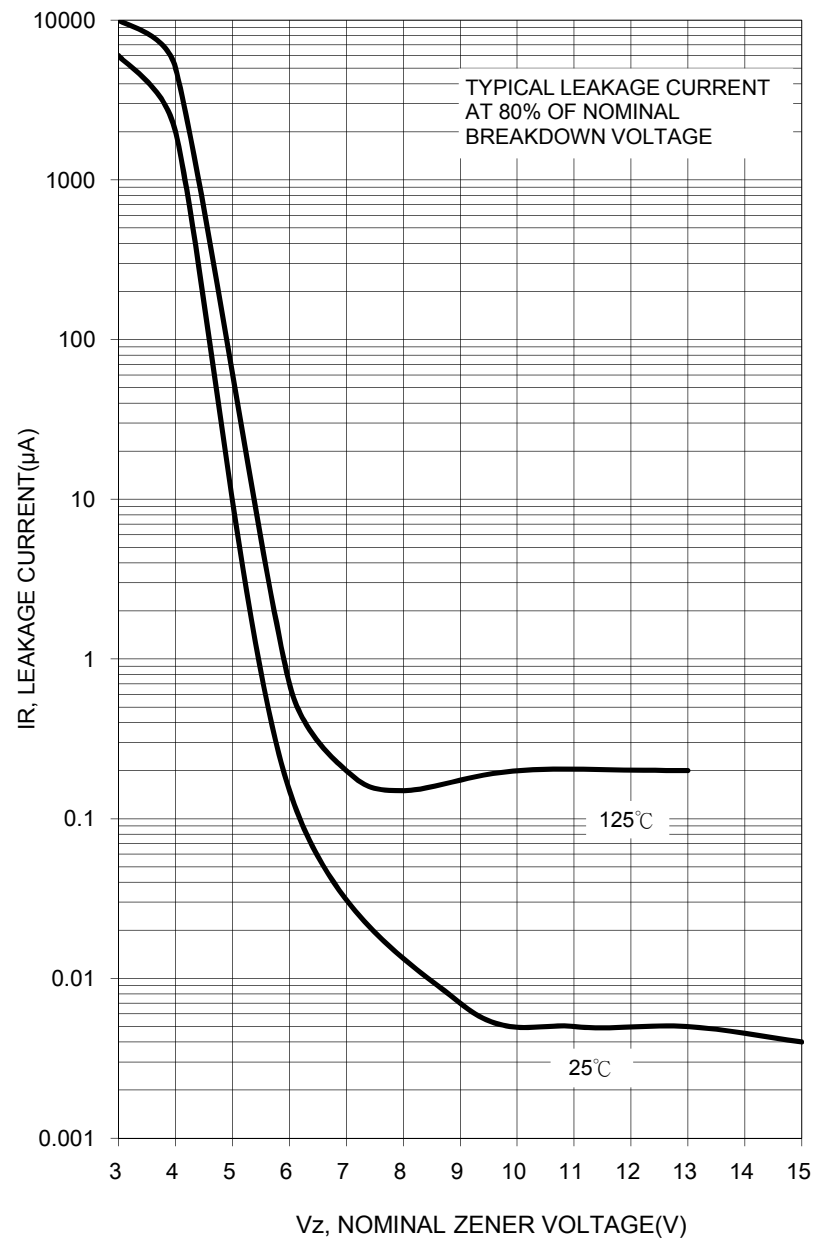


FIG.6 TYPICAL CAPACITANCE versus  $V_z$

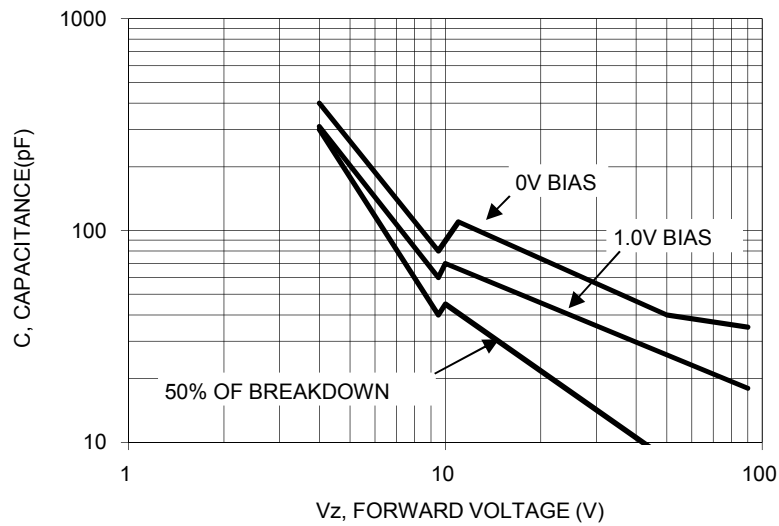


FIG. 7 TEMPERATURE COEFFICIENTS

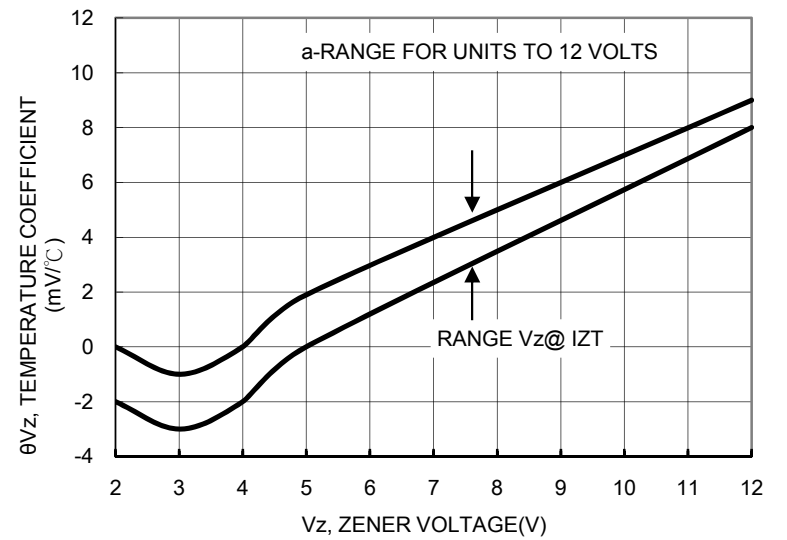


FIG.8 TEMPERATURE COEFFICIENTS

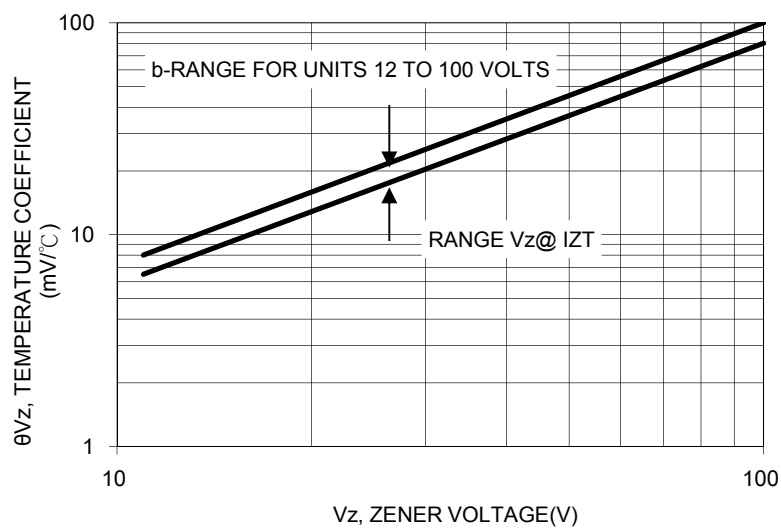


FIG. 9 EFFECT OF ZENER CURRENT

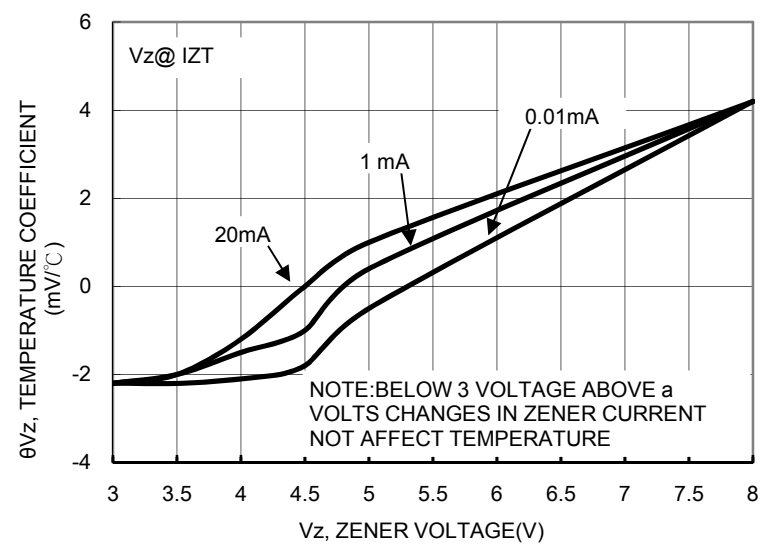
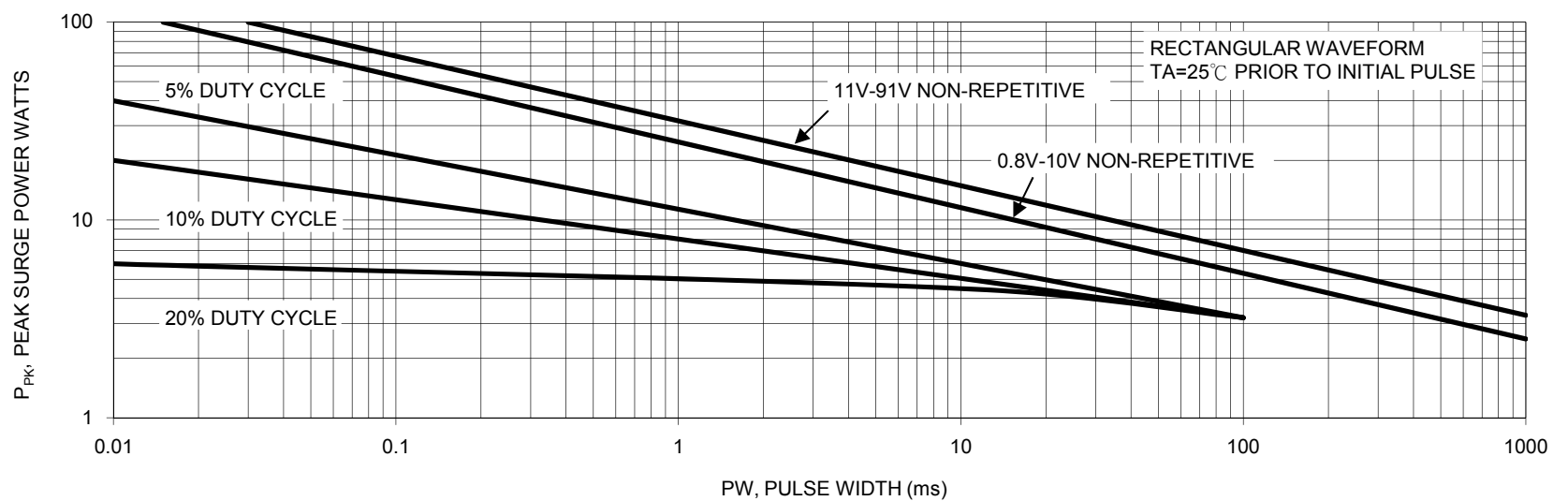
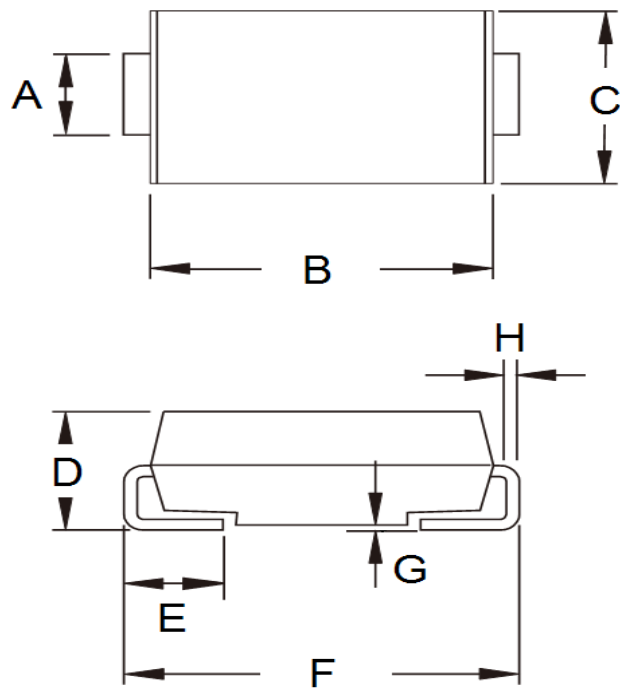


FIG.10 MAXIMUM SURGE POWER

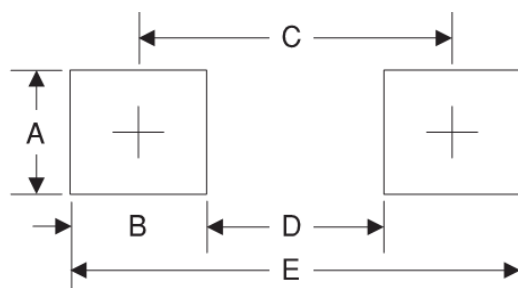


**PACKAGE OUTLINE DIMENSIONS**



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| A    | 1.27      | 1.58 | 0.050       | 0.062 |
| B    | 4.06      | 4.60 | 0.160       | 0.181 |
| C    | 2.29      | 2.83 | 0.090       | 0.111 |
| D    | 1.99      | 2.50 | 0.078       | 0.098 |
| E    | 0.90      | 1.41 | 0.035       | 0.056 |
| F    | 4.95      | 5.33 | 0.195       | 0.210 |
| G    | 0.10      | 0.20 | 0.004       | 0.008 |
| H    | 0.15      | 0.31 | 0.006       | 0.012 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.68      | 0.066       |
| B      | 1.52      | 0.060       |
| C      | 3.93      | 0.155       |
| D      | 2.41      | 0.095       |
| E      | 5.45      | 0.215       |

**MARKING DIAGRAM**



P/N = Device Marking Code  
G = Green Compound  
YW = Date Code  
F = Factory Code

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