

## Voltage Regulator Diodes

### FEATURES

- Silicon zener diodes
- Low profile surface-mount package
- Zener and surge current specification
- Low leakage current
- Excellent stability
- Moisture sensitivity level: level 1, per J-STD-020
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



Sub SMA

### MECHANICAL DATA

**Case:** Sub SMA

Molding compound, UL flammability classification rating 94V-0

Base P/N with suffix "G" on packing code - green compound (halogen-free)

Base P/N with prefix "H" on packing code - AEC-Q101 qualified

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

Meet JESD 201 class 1A whisker test

with prefix "H" on packing code meet JESD 201 class 2 whisker test

**Polarity:** Indicated by cathode band

**Weight:** 0.019g (approximately)

| MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS (T <sub>A</sub> =25°C unless otherwise noted)             |                                   |             |       |
|----------------------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------|
| PARAMETER                                                                                                | SYMBOL                            | VALUE       | UNIT  |
| Forward voltage @ I <sub>F</sub> =0.2A                                                                   | V <sub>F</sub>                    | 1.2         | Volts |
| Power dissipation at T <sub>L</sub> =80°C<br>T <sub>A</sub> =25°C (Note 1)                               | P <sub>tot</sub>                  | 2.3<br>1.0  | Watts |
| Non-repetitive peak pulse power dissipation<br>100µs square pulse (Note 2)                               | P <sub>ZSM</sub>                  | 300         | Watts |
| Non-repetitive peak pulse power dissipation<br>10/1000µs waveform (BZD27C6V8P to BZD27C100P)<br>(Note 2) | P <sub>RSM</sub>                  | 150         | Watts |
| Non-repetitive peak pulse power dissipation<br>10/1000µs waveform (BZD27C110P to BZD27C220P)<br>(Note 2) | P <sub>RSM</sub>                  | 100         | Watts |
| Thermal resistance junction to ambient (Note 1)                                                          | R <sub>θJA</sub>                  | 180         | °C/W  |
| Thermal resistance junction to lead                                                                      | R <sub>θJL</sub>                  | 30          | °C/W  |
| Operating and storage temperature range                                                                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 | °C    |

Note 1: Mounted on Cu-Pad size 5mm x 5mm

Note 2: T<sub>J</sub>=25°C prior to surge

| ORDERING INFORMATION  |                    |              |                     |         |                                       |
|-----------------------|--------------------|--------------|---------------------|---------|---------------------------------------|
| PART NO.              | AEC-Q101 QUALIFIED | PACKING CODE | GREEN COMPOUND CODE | PACKAGE | PACKING                               |
| BZD27CxxP<br>(Note 1) | Prefix "H"         | RU           | Suffix "G"          | Sub SMA | 1,800 / 7" Plastic reel (8mm tape)    |
|                       |                    | RV           |                     | Sub SMA | 3,000 / 7" Plastic reel (8mm tape)    |
|                       |                    | RT           |                     | Sub SMA | 7,500 / 13" Paper reel (8mm tape)     |
|                       |                    | MT           |                     | Sub SMA | 7,500 / 13" Plastic reel (8mm tape)   |
|                       |                    | RQ           |                     | Sub SMA | 10,000 / 13" Paper reel (8mm tape)    |
|                       |                    | MQ           |                     | Sub SMA | 10,000 / 13" Plastic reel (8mm tape)  |
|                       |                    | R3           |                     | Sub SMA | 1,800 / 7" Plastic reel (12mm tape)   |
|                       |                    | RF           |                     | Sub SMA | 3,000 / 7" Plastic reel (12mm tape)   |
|                       |                    | R2           |                     | Sub SMA | 7,500 / 13" Paper reel (12mm tape)    |
|                       |                    | M2           |                     | Sub SMA | 7,500 / 13" Plastic reel (12mm tape)  |
|                       |                    | RH           |                     | Sub SMA | 10,000 / 13" Paper reel (12mm tape)   |
|                       |                    | MH           |                     | Sub SMA | 10,000 / 13" Plastic reel (12mm tape) |

Note 1: "xx" defines voltage from 6.8V (BZD27C6V8P) to 220V (BZD27C220P)

| EXAMPLE       |           |                    |              |                     |                    |
|---------------|-----------|--------------------|--------------|---------------------|--------------------|
| PREFERRED P/N | PART NO.  | AEC-Q101 QUALIFIED | PACKING CODE | GREEN COMPOUND CODE | DESCRIPTION        |
| BZD27C10P RU  | BZD27C10P |                    | RU           |                     |                    |
| BZD27C10P RUG | BZD27C10P |                    | RU           | G                   | Green compound     |
| BZD27C10PHRU  | BZD27C10P | H                  | RU           |                     | AEC-Q101 qualified |

## RATINGS AND CHARACTERISTICS CURVES

(TA=25°C unless otherwise noted)

FIG. 1 TYPICAL FORWARD CHARACTERISTICS

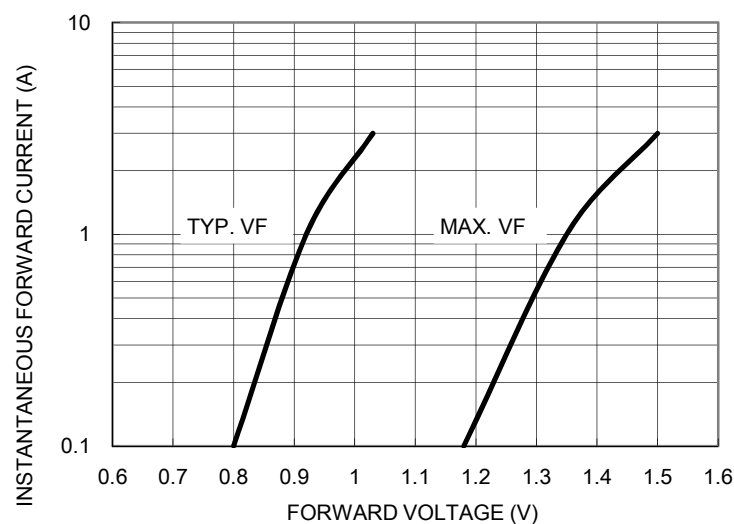


FIG. 2 TYP. DIODE CAPACITANCE vs REVERSE VOLTAGE

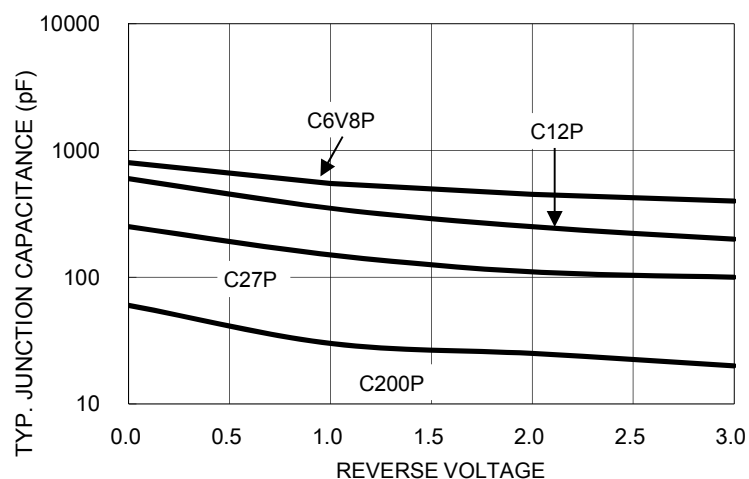


FIG.3 POWER DISSIPATION vs AMBIENT TEMPERATURE

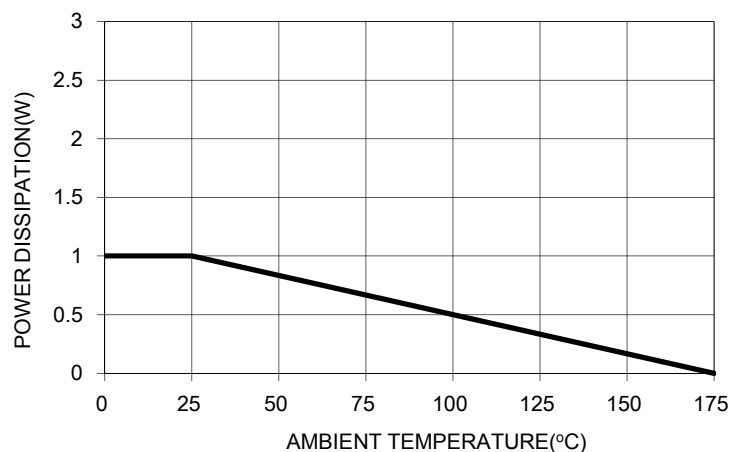
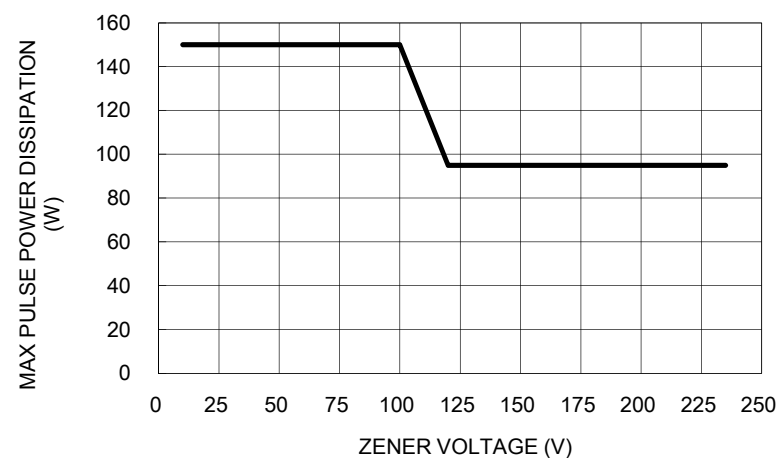


FIG. 4 MAXIMUM PULSE POWER DISSIPATION vs ZENER VOLTAGE



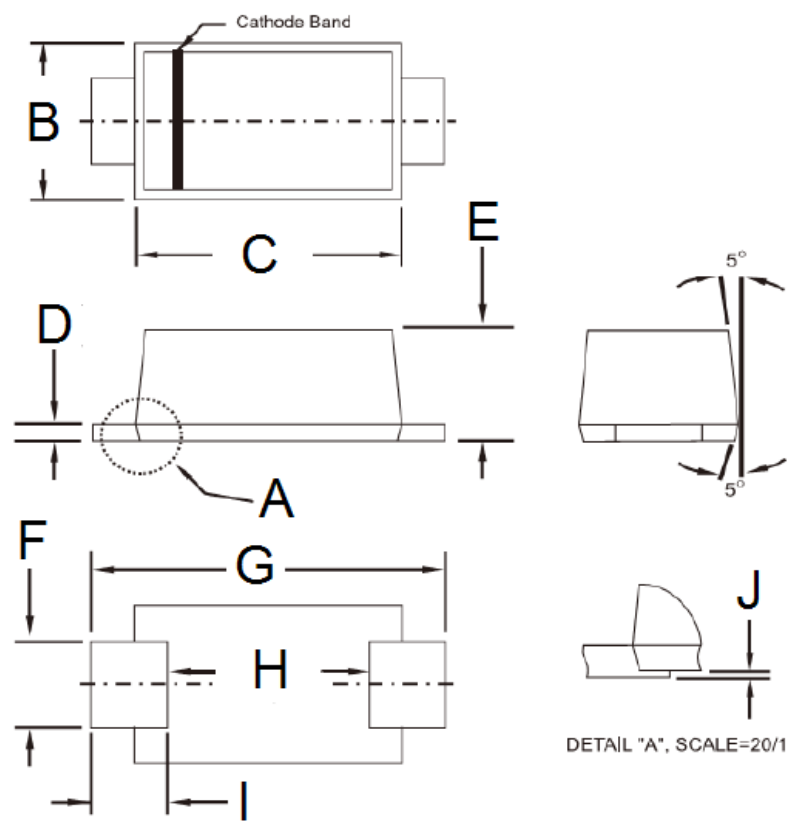
| Device     | Device<br>Marking<br>Code | Working Voltage<br>(Note 1) |      | Differential<br>Resistance |      | Temperature<br>Coefficient |      | Test<br>Current | Reverse Current@<br>Reverse Voltage |       |
|------------|---------------------------|-----------------------------|------|----------------------------|------|----------------------------|------|-----------------|-------------------------------------|-------|
|            |                           | $V_Z @ I_{ZT}$              |      | $r_{dif} @ I_Z$            |      | $ALPH_Z @ I_Z$             |      | $I_{ZT}$        | $I_R$                               | $V_R$ |
|            |                           | V                           |      | $\Omega$                   |      | $\%/^{\circ}C$             |      | mA              | $\mu A$                             | V     |
|            |                           | Min.                        | Max. | Typ.                       | Max. | Min.                       | Max. |                 | Max.                                |       |
| BZD27C6V8P | D7                        | 6.4                         | 7.2  | 1                          | 3    | 0                          | 0.07 | 100             | 10                                  | 3     |
| BZD27C7V5P | D8                        | 7.0                         | 7.9  | 1                          | 2    | 0                          | 0.07 | 100             | 50                                  | 3     |
| BZD27C8V2P | D9                        | 7.7                         | 8.7  | 1                          | 2    | 0.03                       | 0.08 | 100             | 10                                  | 3     |
| BZD27C9V1P | E0                        | 8.5                         | 9.6  | 2                          | 4    | 0.03                       | 0.08 | 50              | 10                                  | 5     |
| BZD27C10P  | E1                        | 9.4                         | 10.6 | 2                          | 4    | 0.05                       | 0.09 | 50              | 7                                   | 7.5   |
| BZD27C11P  | E2                        | 10.4                        | 11.6 | 4                          | 7    | 0.05                       | 0.10 | 50              | 4                                   | 8.2   |
| BZD27C12P  | E3                        | 11.4                        | 12.7 | 4                          | 7    | 0.05                       | 0.10 | 50              | 3                                   | 9.1   |
| BZD27C13P  | E4                        | 12.4                        | 14.1 | 5                          | 10   | 0.05                       | 0.10 | 50              | 2                                   | 10    |
| BZD27C15P  | E5                        | 13.8                        | 15.6 | 5                          | 10   | 0.05                       | 0.10 | 25              | 1                                   | 11    |
| BZD27C16P  | E6                        | 15.3                        | 17.1 | 6                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 12    |
| BZD27C18P  | E7                        | 16.8                        | 19.1 | 6                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 13    |
| BZD27C20P  | E8                        | 18.8                        | 21.2 | 6                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 15    |
| BZD27C22P  | E9                        | 20.8                        | 23.3 | 6                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 16    |
| BZD27C24P  | F0                        | 22.8                        | 25.6 | 7                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 18    |
| BZD27C27P  | F1                        | 25.1                        | 28.9 | 7                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 20    |
| BZD27C30P  | F2                        | 28                          | 32   | 8                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 22    |
| BZD27C33P  | F3                        | 31                          | 35   | 8                          | 15   | 0.06                       | 0.11 | 25              | 1                                   | 24    |
| BZD27C36P  | F4                        | 34                          | 38   | 21                         | 40   | 0.06                       | 0.11 | 10              | 1                                   | 27    |
| BZD27C39P  | F5                        | 37                          | 41   | 21                         | 40   | 0.06                       | 0.11 | 10              | 1                                   | 30    |
| BZD27C43P  | F6                        | 40                          | 46   | 24                         | 45   | 0.07                       | 0.12 | 10              | 1                                   | 33    |
| BZD27C47P  | F7                        | 44                          | 50   | 24                         | 45   | 0.07                       | 0.12 | 10              | 1                                   | 36    |
| BZD27C51P  | F8                        | 48                          | 54   | 25                         | 60   | 0.07                       | 0.12 | 10              | 1                                   | 39    |
| BZD27C56P  | F9                        | 52                          | 56   | 25                         | 60   | 0.07                       | 0.12 | 10              | 1                                   | 43    |
| BZD27C62P  | G0                        | 58                          | 66   | 25                         | 80   | 0.08                       | 0.13 | 10              | 1                                   | 47    |
| BZD27C68P  | G1                        | 64                          | 72   | 25                         | 80   | 0.08                       | 0.13 | 10              | 1                                   | 51    |
| BZD27C75P  | G2                        | 70                          | 79   | 30                         | 100  | 0.08                       | 0.13 | 10              | 1                                   | 56    |
| BZD27C82P  | G3                        | 77                          | 82   | 60                         | 200  | 0.08                       | 0.13 | 10              | 1                                   | 62    |
| BZD27C91P  | G4                        | 85                          | 91   | 60                         | 200  | 0.08                       | 0.13 | 5               | 1                                   | 68    |
| BZD27C100P | G5                        | 94                          | 106  | 60                         | 200  | 0.09                       | 0.13 | 5               | 1                                   | 75    |
| BZD27C110P | G6                        | 104                         | 116  | 80                         | 250  | 0.09                       | 0.13 | 5               | 1                                   | 82    |
| BZD27C120P | G7                        | 114                         | 127  | 150                        | 300  | 0.09                       | 0.13 | 5               | 1                                   | 91    |
| BZD27C130P | G                         | 124                         | 141  | 150                        | 300  | 0.09                       | 0.13 | 5               | 1                                   | 100   |
| BZD27C150P | G9                        | 138                         | 156  | 150                        | 300  | 0.09                       | 0.13 | 5               | 1                                   | 110   |
| BZD27C160P | H0                        | 153                         | 171  | 150                        | 350  | 0.09                       | 0.13 | 5               | 1                                   | 120   |
| BZD27C180P | H1                        | 168                         | 191  | 280                        | 450  | 0.09                       | 0.13 | 5               | 1                                   | 130   |
| BZD27C200P | H2                        | 188                         | 212  | 350                        | 750  | 0.09                       | 0.13 | 5               | 1                                   | 150   |
| BZD27C220P | H3                        | 208                         | 233  | 430                        | 900  | 0.09                       | 0.13 | 5               | 1                                   | 160   |

 Notes: 1. Pulse test:  $t_p \leq 5ms$ .

| Device     | Rev.<br>Breakdown<br>Voltage | Test<br>Current | Temperature<br>Coefficient |      | Clamping Voltage |                     | Reverse Current@<br>Stand-Off Voltage |           |
|------------|------------------------------|-----------------|----------------------------|------|------------------|---------------------|---------------------------------------|-----------|
|            | $V_{(BR)}@I_{test}$          | $I_{test}$      | $ALPHz@I_{test}$           |      | $V_c$            | $@I_{RSM}$ (Note 1) | $I_R$                                 | $@V_{WM}$ |
|            | V                            | mA              | %/ $^{\circ}C$             |      | V                | A                   | $\mu A$                               | V         |
|            | Min.                         |                 | Min.                       | Max  | Max.             |                     | Max.                                  |           |
| BZD27C7V5P | 7                            | 100             | 0                          | 0.07 | 11.3             | 13.3                | 1500                                  | 6.2       |
| BZD27C8V2P | 7.7                          | 100             | 0.03                       | 0.08 | 12.3             | 12.2                | 1200                                  | 6.8       |
| BZD27C9V1P | 8.5                          | 50              | 0.03                       | 0.08 | 13.3             | 11.3                | 100                                   | 7.5       |
| BZD27C10P  | 9.4                          | 50              | 0.05                       | 0.09 | 14.8             | 10.1                | 20                                    | 8.2       |
| BZD27C11P  | 10.4                         | 50              | 0.05                       | 0.10 | 15.7             | 9.6                 | 5                                     | 9.1       |
| BZD27C12P  | 11.4                         | 50              | 0.05                       | 0.10 | 17               | 8.8                 | 5                                     | 10        |
| BZD27C13P  | 12.4                         | 50              | 0.05                       | 0.10 | 18.9             | 7.9                 | 5                                     | 11        |
| BZD27C15P  | 13.8                         | 50              | 0.05                       | 0.10 | 20.9             | 7.2                 | 5                                     | 12        |
| BZD27C16P  | 15.3                         | 25              | 0.06                       | 0.11 | 22.9             | 6.6                 | 5                                     | 13        |
| BZD27C18P  | 16.8                         | 25              | 0.06                       | 0.11 | 25.6             | 5.9                 | 5                                     | 15        |
| BZD27C20P  | 18.8                         | 25              | 0.06                       | 0.11 | 28.4             | 5.3                 | 5                                     | 16        |
| BZD27C22P  | 20.8                         | 25              | 0.06                       | 0.11 | 31               | 4.8                 | 5                                     | 18        |
| BZD27C24P  | 22.8                         | 25              | 0.06                       | 0.11 | 33.8             | 4.4                 | 5                                     | 20        |
| BZD27C27P  | 25.1                         | 25              | 0.06                       | 0.11 | 38.1             | 3.9                 | 5                                     | 22        |
| BZD27C30P  | 28                           | 25              | 0.06                       | 0.11 | 42.2             | 3.6                 | 5                                     | 24        |
| BZD27C33P  | 31                           | 25              | 0.06                       | 0.11 | 46.2             | 3.2                 | 5                                     | 27        |
| BZD27C36P  | 34                           | 10              | 0.06                       | 0.11 | 50.1             | 3                   | 5                                     | 30        |
| BZD27C39P  | 37                           | 10              | 0.06                       | 0.11 | 54.1             | 2.8                 | 5                                     | 33        |
| BZD27C43P  | 40                           | 10              | 0.07                       | 0.12 | 60.7             | 2.5                 | 5                                     | 36        |
| BZD27C47P  | 44                           | 10              | 0.07                       | 0.12 | 65.5             | 2.3                 | 5                                     | 39        |
| BZD27C51P  | 48                           | 10              | 0.07                       | 0.12 | 70.8             | 2.1                 | 5                                     | 43        |
| BZD27C56P  | 52                           | 10              | 0.07                       | 0.12 | 78.6             | 1.9                 | 5                                     | 47        |
| BZD27C62P  | 58                           | 10              | 0.08                       | 0.13 | 86.5             | 1.7                 | 5                                     | 51        |
| BZD27C68P  | 64                           | 10              | 0.08                       | 0.13 | 94.4             | 1.6                 | 5                                     | 56        |
| BZD27C75P  | 70                           | 10              | 0.08                       | 0.13 | 103.5            | 1.5                 | 5                                     | 62        |
| BZD27C82P  | 77                           | 10              | 0.08                       | 0.13 | 114              | 1.3                 | 5                                     | 68        |
| BZD27C91P  | 85                           | 5               | 0.09                       | 0.13 | 126              | 1.2                 | 5                                     | 75        |
| BZD27C100P | 94                           | 5               | 0.09                       | 0.13 | 139              | 1.1                 | 5                                     | 82        |
| BZD27C110P | 104                          | 5               | 0.09                       | 0.13 | 150              | 1                   | 5                                     | 91        |
| BZD27C120P | 114                          | 5               | 0.09                       | 0.13 | 152              | 0.9                 | 5                                     | 100       |
| BZD27C130P | 124                          | 5               | 0.09                       | 0.13 | 185              | 0.81                | 5                                     | 110       |
| BZD27C150P | 138                          | 5               | 0.09                       | 0.13 | 205              | 0.73                | 5                                     | 120       |
| BZD27C160P | 153                          | 5               | 0.09                       | 0.13 | 224              | 0.67                | 5                                     | 130       |
| BZD27C180P | 168                          | 5               | 0.09                       | 0.13 | 229              | 0.6                 | 5                                     | 150       |
| BZD27C200P | 188                          | 5               | 0.09                       | 0.13 | 254              | 0.54                | 5                                     | 160       |
| BZD27C220P | 208                          | 5               | 0.09                       | 0.13 | 279              | 0.35                | 5                                     | 176       |

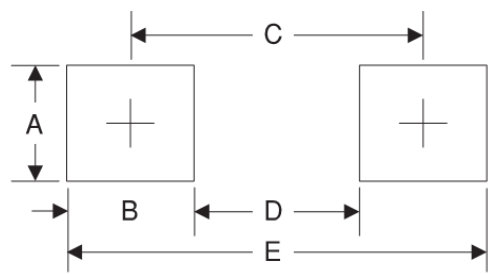
Notes: 1. Non-repetitive peak reverse current in accordance with "IEC 60-1, Section 8" (10/1000  $\mu s$  pulse)

PACKAGE OUTLINE DIMENSIONS



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| B    | 1.70      | 1.90 | 0.067       | 0.075 |
| C    | 2.70      | 2.90 | 0.106       | 0.114 |
| D    | 0.16      | 0.30 | 0.006       | 0.012 |
| E    | 1.23      | 1.43 | 0.048       | 0.056 |
| F    | 0.80      | 1.20 | 0.031       | 0.047 |
| G    | 3.40      | 3.80 | 0.134       | 0.150 |
| H    | 2.45      | 2.60 | 0.096       | 0.102 |
| I    | 0.35      | 0.85 | 0.014       | 0.033 |
| J    | 0.00      | 0.10 | 0.000       | 0.004 |

SUGGESTED PAD LAYOUT



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.4       | 0.055       |
| B      | 1.2       | 0.047       |
| C      | 3.1       | 0.122       |
| D      | 1.9       | 0.075       |
| E      | 4.3       | 0.169       |

MARKING DIAGRAM



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

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