

## 1W, 6.8V - 220V Voltage Regulator Diode

### FEATURES

- Silicon zener diodes
- Low profile surface-mount package
- Zener and surge current specification
- Low leakage current
- Excellent stability
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

### KEY PARAMETERS

| PARAMETER     | VALUE      | UNIT |
|---------------|------------|------|
| $V_Z$         | 6.8 - 220  | V    |
| $P_{tot}$     | 1.0        | W    |
| $T_{J\ MAX}$  | 175        | °C   |
| Package       | Sub SMA    |      |
| Configuration | Single die |      |

### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter



### MECHANICAL DATA

- Case: Sub SMA
- Molding compound meets UL 94 V-0 flammability rating
- Part no. with suffix "H" means AEC-Q101 qualified
- Packing code with suffix "G" means green compound (halogen-free)
- Moisture sensitivity level: level 1, per J-STD-020
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: As marked
- Weight: 19mg (approximately)



Sub SMA

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| PARAMETER                                                                                                | SYMBOL         | VALUE       | UNIT  |
|----------------------------------------------------------------------------------------------------------|----------------|-------------|-------|
| Forward voltage @ $I_F = 0.2\text{A}$                                                                    | $V_F$          | 1.2         | Volts |
| Power dissipation at $T_L = 73^\circ\text{C}$<br>$T_A = 25^\circ\text{C}$ (Note 1)                       | $P_{tot}$      | 2.3         | Watts |
|                                                                                                          |                | 1.0         |       |
| Non-repetitive peak pulse power dissipation<br>100 $\mu\text{s}$ square pulse (Note 2)                   | $P_{ZSM}$      | 300         | Watts |
| Non-repetitive peak pulse power dissipation<br>10/1000 $\mu\text{s}$ waveform (BZD27C6V8P to BZD27C100P) | $P_{RSM}$      | 150         | Watts |
| Non-repetitive peak pulse power dissipation<br>10/1000 $\mu\text{s}$ waveform (BZD27C110P to BZD27C220P) | $P_{RSM}$      | 100         | Watts |
| Operating and storage temperature range                                                                  | $T_J, T_{STG}$ | -55 to +175 | °C    |

#### Notes:

1. Mounted on Cu-Pad size 5mm x 5mm
2.  $T_J = 25^\circ\text{C}$  prior to surge

**THERMAL PERFORMANCE**

| PARAMETER                              | SYMBOL          | LIMIT | UNIT |
|----------------------------------------|-----------------|-------|------|
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 44    | °C/W |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 88    | °C/W |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 48    | °C/W |

**Thermal Performance Note:** Units mounted on recommended PCB (5mm x 5mm Cu pad test board)

**ORDERING INFORMATION**

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

**Note :**

- "xx" defines voltage from 6.8V (BZD27C6V8P) to 220V (BZD27C220P)

**EXAMPLE**

| EXAMPLE P/N   | PART NO.  | PART NO.<br>SUFFIX | PACKING<br>CODE | PACKING CODE<br>SUFFIX | DESCRIPTION                          |
|---------------|-----------|--------------------|-----------------|------------------------|--------------------------------------|
| BZD27C10PHRUG | BZD27C10P | H                  | RU              | G                      | AEC-Q101 qualified<br>Green compound |

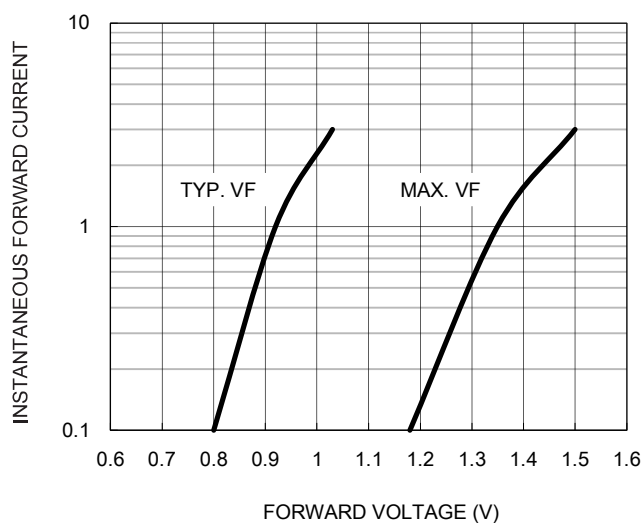
| <b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |              |                             |       |      |                         |      |                         |      |              |                                  |       |
|-------------------------------------------------------------------------------------|--------------|-----------------------------|-------|------|-------------------------|------|-------------------------|------|--------------|----------------------------------|-------|
| Part number                                                                         | Marking code | Working Voltage<br>(Note 1) |       |      | Differential Resistance |      | Temperature Coefficient |      | Test current | Reverse Current@ Reverse Voltage |       |
|                                                                                     |              | $V_Z @ I_{ZT}$              |       |      | $r_{diff} @ I_Z$        |      | $ALPH_Z @ I_Z$          |      | $I_{ZT}$     | $I_R$                            | $V_R$ |
|                                                                                     |              | V                           |       |      | $\Omega$                |      | $\%/^\circ\text{C}$     |      | mA           | $\mu\text{A}$                    | V     |
|                                                                                     |              | Min.                        | Nom.  | Max. | Typ.                    | Max. | Max.                    | Max. |              | Max.                             |       |
| BZD27C6V8P                                                                          | D7           | 6.4                         | 6.8   | 7.2  | 1                       | 3    | 0                       | 0.07 | 100          | 10                               | 3     |
| BZD27C7V5P                                                                          | D8           | 7.0                         | 7.45  | 7.9  | 1                       | 2    | 0                       | 0.07 | 100          | 50                               | 3     |
| BZD27C8V2P                                                                          | D9           | 7.7                         | 8.2   | 8.7  | 1                       | 2    | 0.03                    | 0.08 | 100          | 10                               | 3     |
| BZD27C9V1P                                                                          | E0           | 8.5                         | 9.05  | 9.6  | 2                       | 4    | 0.03                    | 0.08 | 50           | 10                               | 5     |
| BZD27C10P                                                                           | E1           | 9.4                         | 10    | 10.6 | 2                       | 4    | 0.05                    | 0.09 | 50           | 7                                | 7.5   |
| BZD27C11P                                                                           | E2           | 10.4                        | 11    | 11.6 | 4                       | 7    | 0.05                    | 0.10 | 50           | 4                                | 8.2   |
| BZD27C12P                                                                           | E3           | 11.4                        | 12.05 | 12.7 | 4                       | 7    | 0.05                    | 0.10 | 50           | 3                                | 9.1   |
| BZD27C13P                                                                           | E4           | 12.4                        | 13.25 | 14.1 | 5                       | 10   | 0.05                    | 0.10 | 50           | 2                                | 10    |
| BZD27C15P                                                                           | E5           | 13.8                        | 14.7  | 15.6 | 5                       | 10   | 0.05                    | 0.10 | 25           | 1                                | 11    |
| BZD27C16P                                                                           | E6           | 15.3                        | 16.2  | 17.1 | 6                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 12    |
| BZD27C18P                                                                           | E7           | 16.8                        | 17.95 | 19.1 | 6                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 13    |
| BZD27C20P                                                                           | E8           | 18.8                        | 20    | 21.2 | 6                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 15    |
| BZD27C22P                                                                           | E9           | 20.8                        | 22.05 | 23.3 | 6                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 16    |
| BZD27C24P                                                                           | F0           | 22.8                        | 24.2  | 25.6 | 7                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 18    |
| BZD27C27P                                                                           | F1           | 25.1                        | 27    | 28.9 | 7                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 20    |
| BZD27C30P                                                                           | F2           | 28                          | 30    | 32   | 8                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 22    |
| BZD27C33P                                                                           | F3           | 31                          | 33    | 35   | 8                       | 15   | 0.06                    | 0.11 | 25           | 1                                | 24    |
| BZD27C36P                                                                           | F4           | 34                          | 36    | 38   | 21                      | 40   | 0.06                    | 0.11 | 10           | 1                                | 27    |
| BZD27C39P                                                                           | F5           | 37                          | 39    | 41   | 21                      | 40   | 0.06                    | 0.11 | 10           | 1                                | 30    |
| BZD27C43P                                                                           | F6           | 40                          | 43    | 46   | 24                      | 45   | 0.07                    | 0.12 | 10           | 1                                | 33    |
| BZD27C47P                                                                           | F7           | 44                          | 47    | 50   | 24                      | 45   | 0.07                    | 0.12 | 10           | 1                                | 36    |
| BZD27C51P                                                                           | F8           | 48                          | 51    | 54   | 25                      | 60   | 0.07                    | 0.12 | 10           | 1                                | 39    |
| BZD27C56P                                                                           | F9           | 52                          | 56    | 60   | 25                      | 60   | 0.07                    | 0.12 | 10           | 1                                | 43    |
| BZD27C62P                                                                           | G0           | 58                          | 62    | 66   | 25                      | 80   | 0.08                    | 0.13 | 10           | 1                                | 47    |
| BZD27C68P                                                                           | G1           | 64                          | 68    | 72   | 25                      | 80   | 0.08                    | 0.13 | 10           | 1                                | 51    |
| BZD27C75P                                                                           | G2           | 70                          | 74.5  | 79   | 30                      | 100  | 0.08                    | 0.13 | 10           | 1                                | 56    |
| BZD27C82P                                                                           | G3           | 77                          | 82    | 87   | 60                      | 200  | 0.08                    | 0.13 | 10           | 1                                | 62    |
| BZD27C91P                                                                           | G4           | 85                          | 90.5  | 96   | 60                      | 200  | 0.08                    | 0.13 | 5            | 1                                | 68    |
| BZD27C100P                                                                          | G5           | 94                          | 100   | 106  | 60                      | 200  | 0.09                    | 0.13 | 5            | 1                                | 75    |
| BZD27C110P                                                                          | G6           | 104                         | 110   | 116  | 80                      | 250  | 0.09                    | 0.13 | 5            | 1                                | 82    |
| BZD27C120P                                                                          | G7           | 114                         | 120.5 | 127  | 150                     | 300  | 0.09                    | 0.13 | 5            | 1                                | 91    |
| BZD27C130P                                                                          | G            | 124                         | 132.5 | 141  | 150                     | 300  | 0.09                    | 0.13 | 5            | 1                                | 100   |
| BZD27C150P                                                                          | G9           | 138                         | 147   | 156  | 150                     | 300  | 0.09                    | 0.13 | 5            | 1                                | 110   |
| BZD27C160P                                                                          | H0           | 153                         | 162   | 171  | 150                     | 350  | 0.09                    | 0.13 | 5            | 1                                | 120   |
| BZD27C180P                                                                          | H1           | 168                         | 179.5 | 191  | 280                     | 450  | 0.09                    | 0.13 | 5            | 1                                | 130   |
| BZD27C200P                                                                          | H2           | 188                         | 200   | 212  | 350                     | 750  | 0.09                    | 0.13 | 5            | 1                                | 150   |
| BZD27C220P                                                                          | H3           | 208                         | 220.5 | 233  | 430                     | 900  | 0.09                    | 0.13 | 5            | 1                                | 160   |

Note 1: Pulse test:  $t_p \leq 5\text{ms}$ .

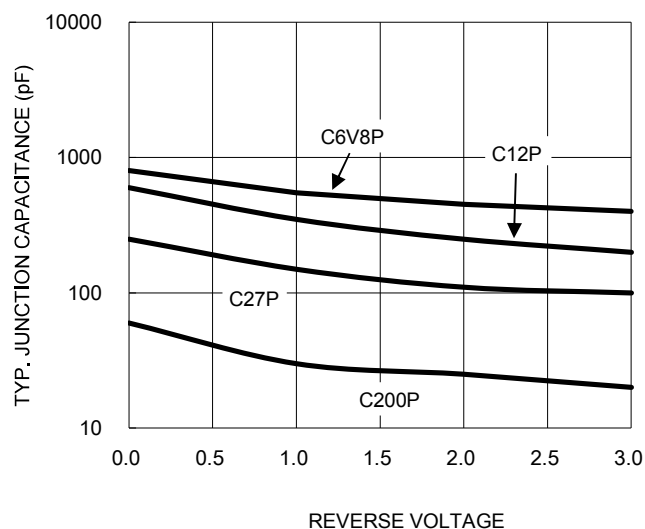
## CHARACTERISTICS CURVES

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

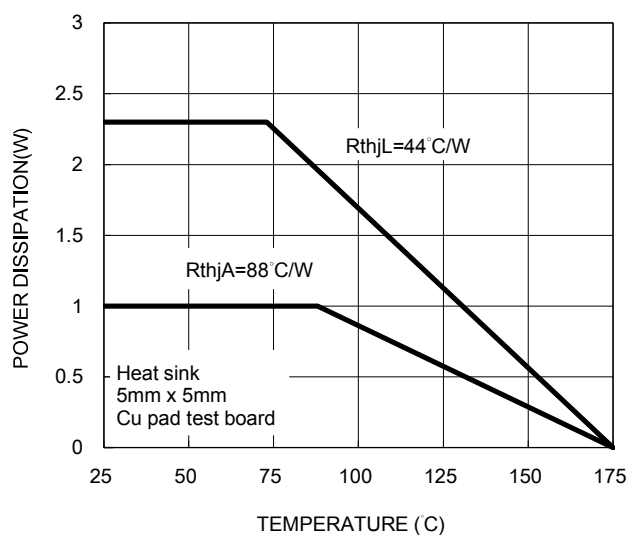
**Fig.1 TYPICAL FORWARD CHARACTERISTICS**



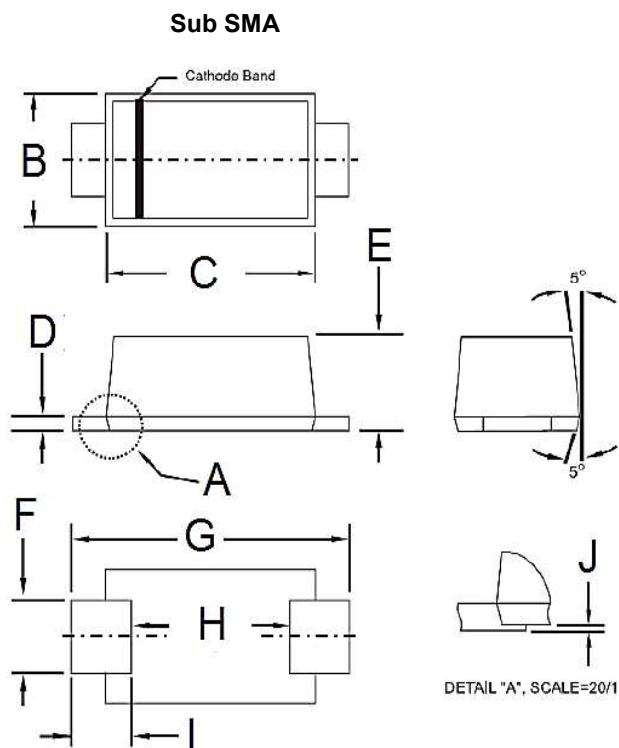
**Fig.2 TYP. DIODE CAPACITANCE vs REVERSE VOLTAGE**



**Fig.3 POWER DISSIPATION v.s TEMPERATURE**

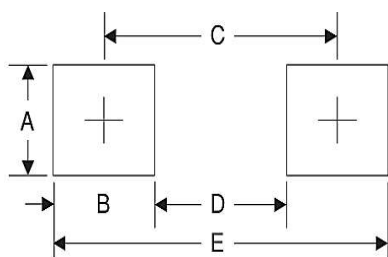


## PACKAGE OUTLINE DIMENSIONS



| 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 Code  
 YW = Date Code  
 F = Factory Code

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