# Zener ESD Protection Diode

## Dual Common Anode Zeners for ESD Protection

# DF3A6.8FUT1

These dual monolithic silicon zener diodes are designed for applications requiring transient overvoltage protection capability. They are intended for use in voltage and ESD sensitive equipment such as computers, printers, business machines, communication systems, medical equipment and other applications. Their dual junction common anode design protects two separate lines using only one package. These devices are ideal for situations where board space is at a premium.

### Features

- Pb−Free Package is Available
- SC−70 Package Allows Two Separate Unidirectional Configurations
- Low Leakage < 1.0 μA @ 5.0 V
- Breakdown Voltage: 6.4−7.2 V @ 5.0 mA
- ESD Protection Meeting:16 kV Human Body Model
  30 kV Contact = IEC61000−4−2
- Peak Power: 24 W @ 1.0 ms (Unidirectional), per Figure 1
- Peak Power: 150 W @ 20 μs (Unidirectional), per Figure 2

### Mechanical Characteristics

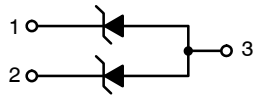
- Void Free, Transfer−Molded, Thermosetting Plastic Case
- Corrosion Resistant Finish, Easily Solderable
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications

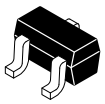
### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Steady State Power Dissipation<br>Derate above 25°C (Note 1) | $P_D$ | 200<br>1.6 | mW<br>mW/°C |
| Thermal Resistance Junction−to−Ambient | $R_{\theta JA}$ | 618 | °C/W |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{stg}$ | − 55 to +150 | °C |
| Peak Power Dissipation @ 1.0 ms (Note 2) @ $T_A$ = 25°C | $P_{PK}$ | 20 | W |
| Peak Power Dissipation @ 20 μs (Note 3) @ $T_A$ = 25°C | $P_{PK}$ | 150 | W |
| ESD Discharge<br>MIL STD 883C − Method 3015−6<br>IEC61000−4−2, Air Discharge<br>IEC61000−4−2, Contact Discharge | $V_{PP}$ | <br>16<br>30<br>30 | kV |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

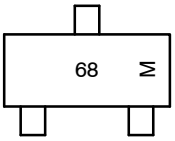
1. Mounted on FR−5 Board = 1.0 X 0.75 X 0.062 in.
2. Non−repetitive pulse per Figure 1.
3. Non−repetitive pulse per Figure 2.



**SC−70/SOT−323**
**CASE 419**
**STYLE 4**

**MARKING DIAGRAM**




68 = Specific Device Code
M = Date Code

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| DF3A6.8FUT1G | SC−70<br>(Pb−Free) | 3000 /<br>Tape & Reel |

**DISCONTINUED** (Note 1)

| | | |
|---|---|---|
| DF3A6.8FUT1 | SC−70 | 3000 /<br>Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

1. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

**Preferred** devices are recommended choices for future use and best overall value.

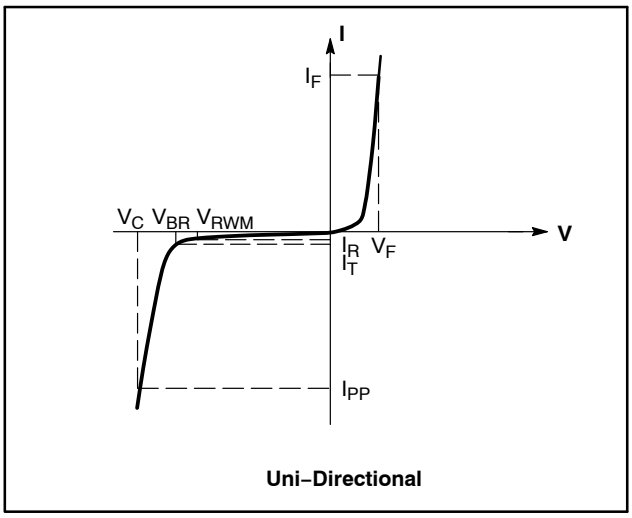
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## ELECTRICAL CHARACTERISTICS

($T_A$ = 25°C unless otherwise noted)

**UNIDIRECTIONAL** (Circuit tied to Pins 1 and 3 or 2 and 3)

| Symbol | Parameter |
|---|---|
| $V_{RWM}$ | Working Peak Reverse Voltage |
| $I_R$ | Maximum Reverse Leakage Current @ $V_{RWM}$ |
| $V_{BR}$ | Breakdown Voltage @ $I_T$ |
| $I_T$ | Test Current |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |
| $Z_{ZT}$ | Maximum Zener Impedance @ $I_{ZT}$ |
| $Z_{ZK}$ | Maximum Zener Impedance @ $I_{ZK}$ |




## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise noted)

**UNIDIRECTIONAL** (Circuit tied to Pins 1 and 3 or 2 and 3)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | $I_F$ = 10 mA | – | 0.8 | 0.9 | V |
| Zener Voltage (Note 4) | $V_Z$ | $I_{ZT}$ = 5 mA | 6.4 | 6.8 | 7.2 | V |
| Operating Resistance (Note 5) | $Z_{ZK}$ | $I_{ZK}$ = 0.5 mA | – | – | 200 | Ω |
| | $Z_{ZT}$ | $I_{ZT}$ = 5 mA | – | – | 50 | Ω |
| Reverse Current | $I_{R1}$ | $V_{RWM}$ = 5 V | – | – | 0.5 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 2.0 A (Figure 1)<br>$I_{PP}$ = 9.37 A (Figure 2) | – | – | 9.6<br>16 | V<br>V |
| ESD Protection<br>Human Body Model (HBM)<br>Contact – IEC61000−4−2<br>Air Discharge | | | <br>–<br>–<br>– | <br>–<br>–<br>– | <br>16<br>30<br>30 | kV |

4. $V_Z$ measured at pulse test current $I_{ZT}$ at an ambient temperature of 25°C.
5. $Z_{ZT}$ and $Z_{ZK}$ is measured by dividing the AC voltage drop across the device by the AC current supplied. AC frequency = 1.0 kHz.

## TYPICAL CHARACTERISTICS

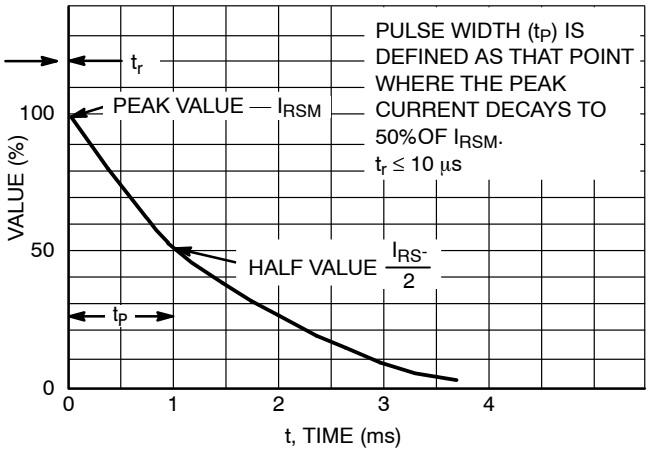



**Figure 1. 10 × 1000 μs Pulse Waveform**

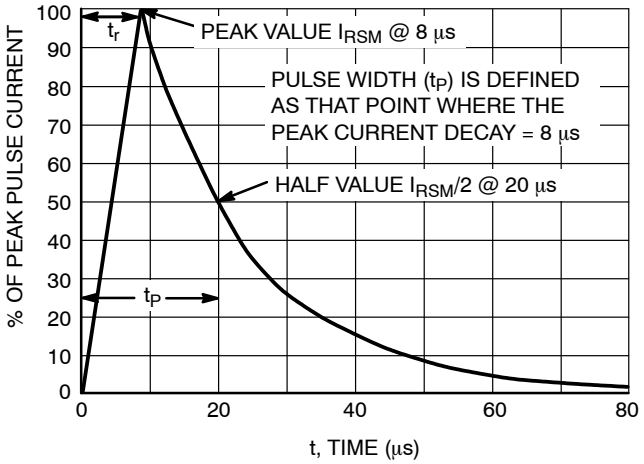



**Figure 2. 8 × 20 μs Pulse Waveform**

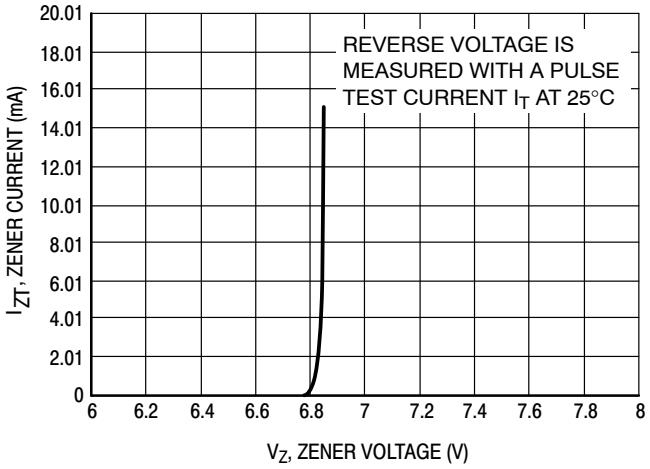



**Figure 3. Zener Voltage vs. Zener Current**

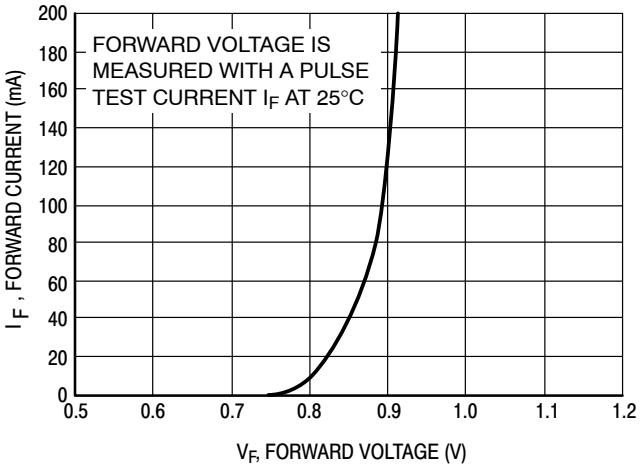



**Figure 4. Forward Voltage vs. Forward Current**

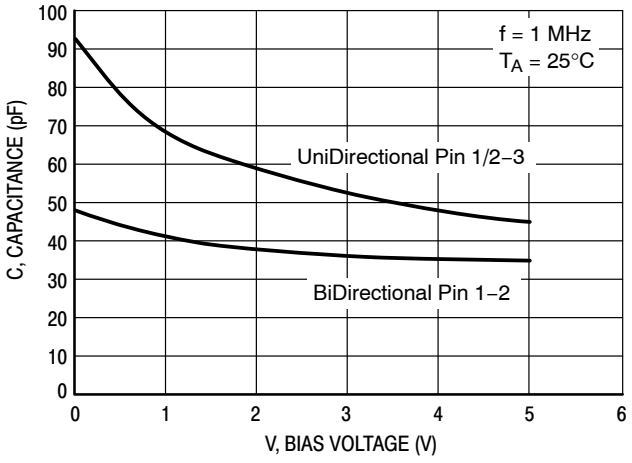



**Figure 5. Capacitance vs. Bias Voltage**

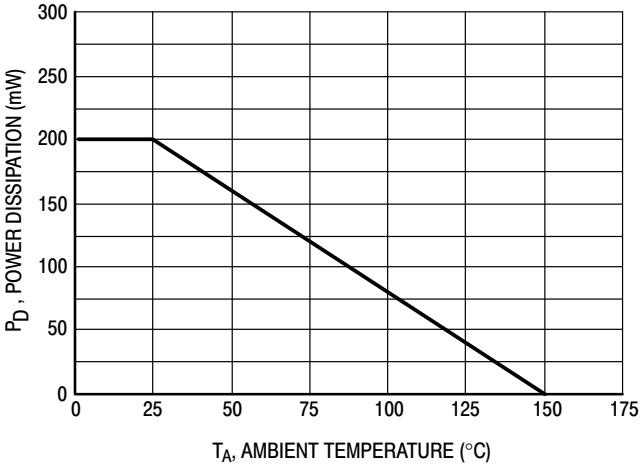
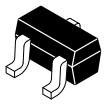


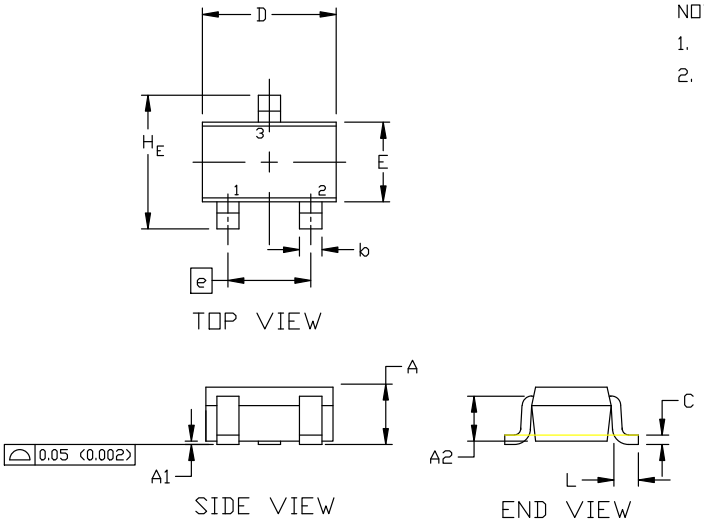

**Figure 6. Steady State Power Derating Curve**



**SCALE 4:1**

**SC−70 (SOT−323)**
CASE 419
ISSUE R

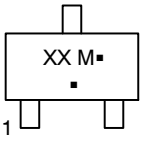
DATE 11 OCT 2022




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH

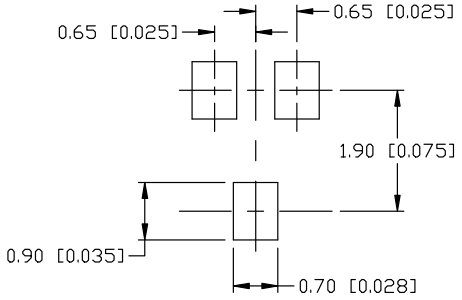
| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.80 | 0.90 | 1.00 | 0.032 | 0.035 | 0.040 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A2 | 0.70 REF | | | 0.028 BSC | | |
| b | 0.30 | 0.35 | 0.40 | 0.012 | 0.014 | 0.016 |
| c | 0.10 | 0.18 | 0.25 | 0.004 | 0.007 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.071 | 0.080 | 0.087 |
| E | 1.15 | 1.24 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 1.20 | 1.30 | 1.40 | 0.047 | 0.051 | 0.055 |
| e1 | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.20 | 0.38 | 0.56 | 0.008 | 0.015 | 0.022 |
| $H_E$ | 2.00 | 2.10 | 2.40 | 0.079 | 0.083 | 0.095 |

## GENERIC MARKING DIAGRAM




XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.




* For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

SOLDERING FOOTPRINT

STYLE 1:
CANCELLED

STYLE 2:
PIN 1. ANODE
2. N.C.
3. CATHODE

STYLE 3:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 6:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 7:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 8:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. ANODE−CATHODE

STYLE 11:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

| | | |
|---|---|---|
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| **DESCRIPTION:** | **SC−70 (SOT−323)** | **PAGE 1 OF 1** |

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