

# DF3A6.8FUT1

Preferred Device

## Zener ESD Protection Diode

### Dual Common Anode Zeners for ESD Protection

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  $\mu$ A @ 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  $\mu$ s (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 Derate above 25°C (Note 1)	$P_D$	200 1.6	mW 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) @ $T_A = 25^\circ\text{C}$	$P_{PK}$	20	W
Peak Power Dissipation @ 20 $\mu$ s (Note 3) @ $T_A = 25^\circ\text{C}$	$P_{PK}$	150	W
ESD Discharge MIL STD 883C – Method 3015-6 IEC61000-4-2, Air Discharge IEC61000-4-2, Contact Discharge	$V_{PP}$	16 30 30	kV

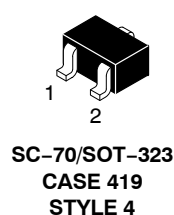
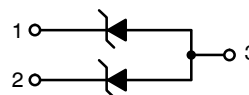
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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.

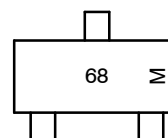


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#### MARKING DIAGRAM



68 = Specific Device Code  
M = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping†
DF3A6.8FUT1	SC-70	3000/Tape & Reel
DF3A6.8FUT1G	SC-70 (Pb-Free)	3000/Tape & Reel

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

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

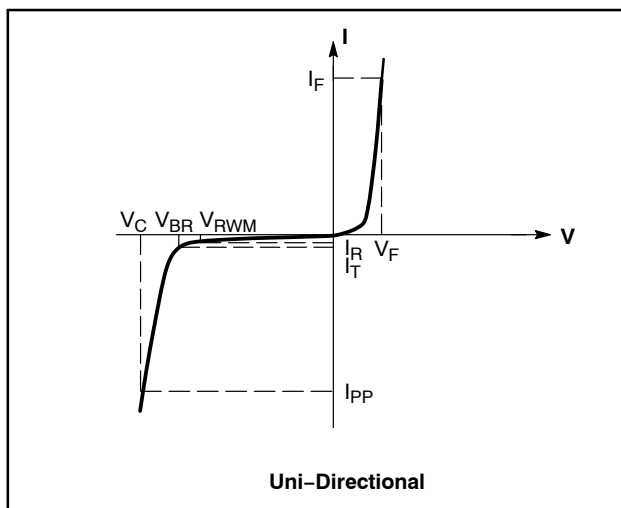
# DF3A6.8FUT1

## ELECTRICAL CHARACTERISTICS

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

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

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

4.  $V_Z$  measured at pulse test current  $I_{ZT}$  at an ambient temperature of  $25^\circ\text{C}$ .

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

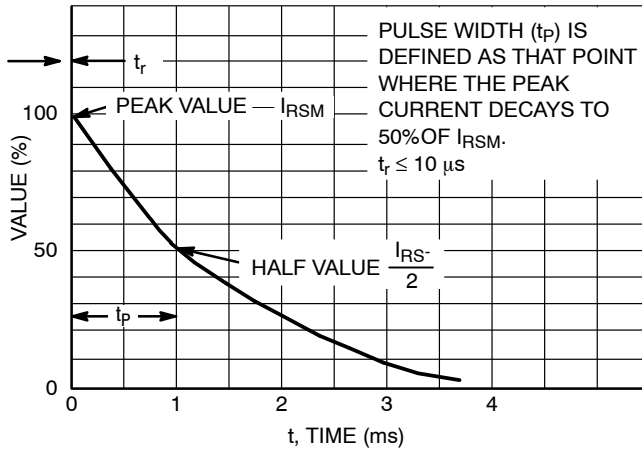


Figure 1. 10 × 1000 μs Pulse Waveform

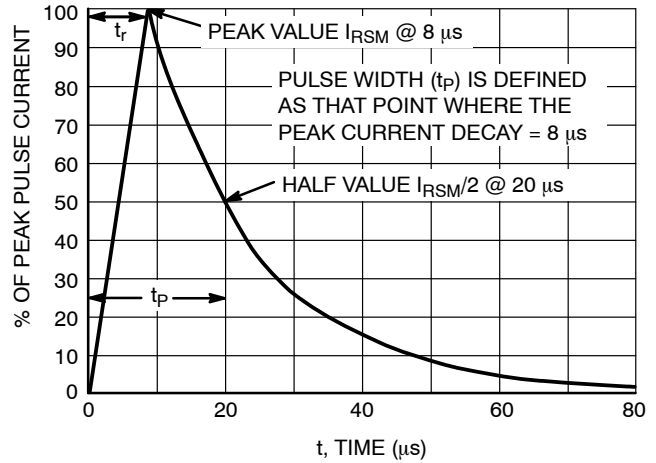


Figure 2. 8 × 20 μs Pulse Waveform

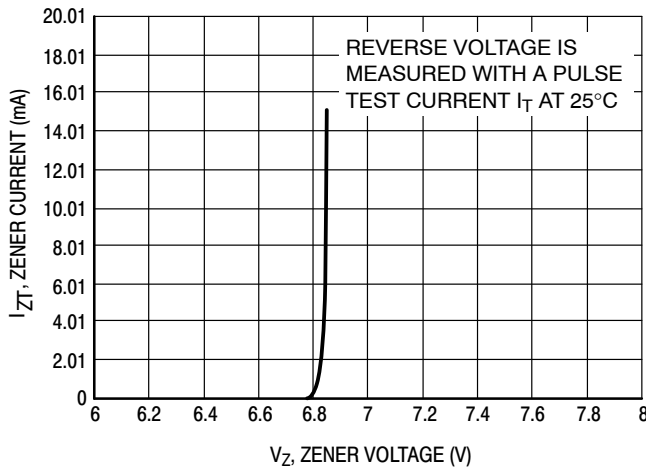


Figure 3. Zener Voltage vs. Zener Current

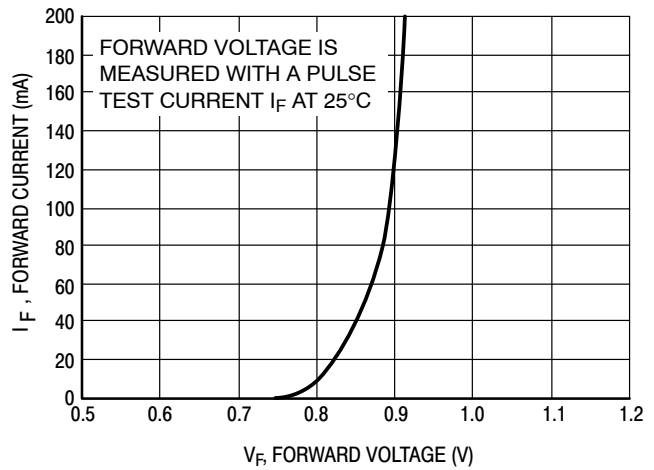


Figure 4. Forward Voltage vs. Forward Current

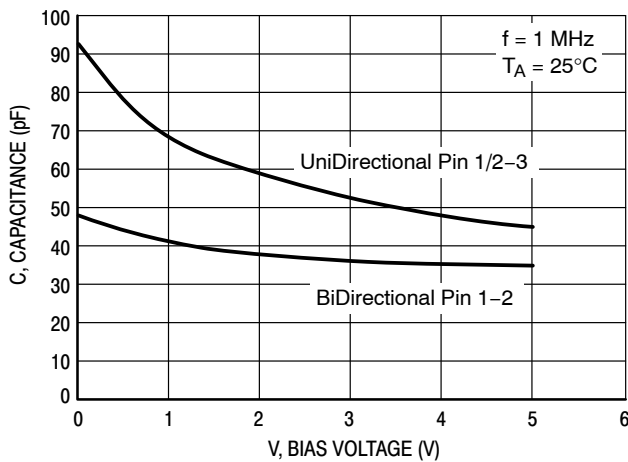


Figure 5. Capacitance vs. Bias Voltage

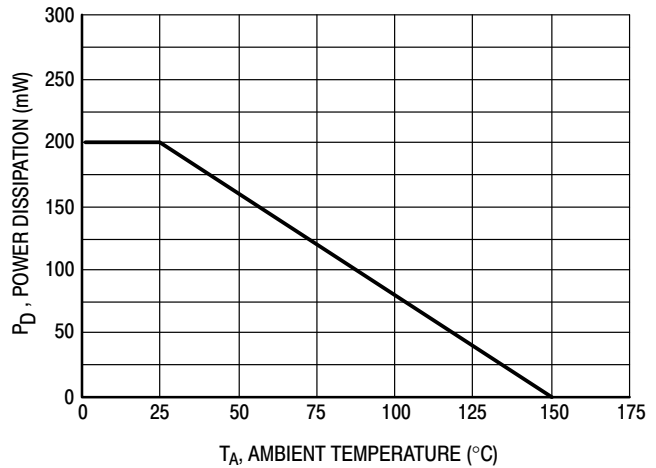
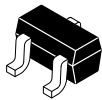


Figure 6. Steady State Power Derating Curve

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

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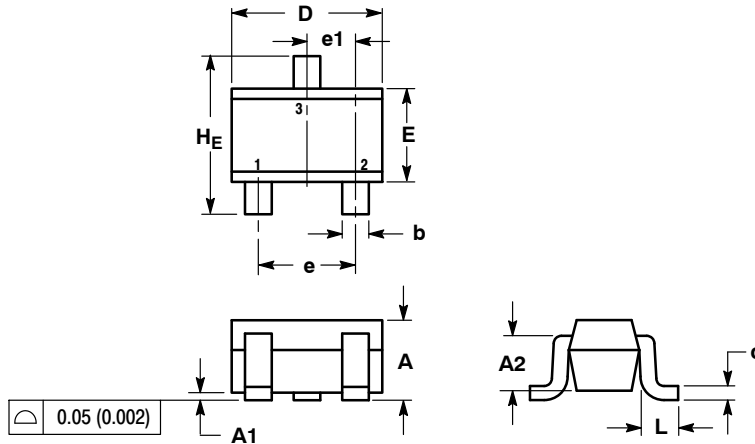
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### SC-70 (SOT-323)

#### CASE 419-04

#### ISSUE N

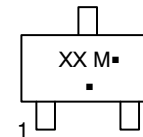
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NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	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 REF		
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	2.10	2.20	0.071	0.083	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

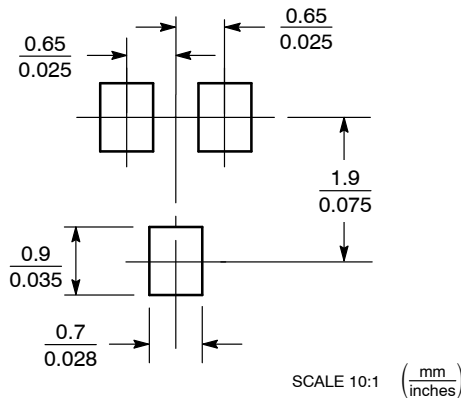
### GENERIC MARKING DIAGRAM



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.

### SOLDERING FOOTPRINT\*



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

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)

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