



# THE DATASHEET OF ES3F-E3/9AT



## Surface-Mount Ultrafast Plastic Rectifier


**SMC (DO-214AB)**

 Cathode  Anode

### LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
$V_{RRM}$	300 V, 400 V
$I_{FSM}$	100 A
$t_{rr}$	35 ns
$V_F$ at $I_F$	1.1 V
$T_J$ max.	150 °C
Package	SMC (DO-214AB)
Circuit configuration	Single

### FEATURES

- Glass passivated pellet chip junction
- Ideal for automated placement
- Ultrafast reverse recovery time
- Low switching losses, high efficiency
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, and telecommunication.

### MECHANICAL DATA

**Case:** SMC (DO-214AB)

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-E3 - RoHS-compliant, commercial grade  
 Base P/N-M3 - haloge-free, RoHS-compliant, and commercial grade  
 Base P/NHE3\_X - RoHS-compliant, AEC-Q101 qualified  
 Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified  
 (“\_X” denotes revision code e.g. A, B, .....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
 E3, M3, HE3, and HM3 suffix meet JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)				
PARAMETER	SYMBOL	ES3F	ES3G	UNIT
Device marking code		EF	EG	
Maximum repetitive peak reverse voltage	$V_{RRM}$	300	400	V
Working peak reverse voltage	$V_{RWM}$	225	300	V
Maximum RMS voltage	$V_{RMS}$	210	280	V
Maximum average forward rectified current at $T_L = 110\text{ °C}$	$I_{F(AV)}$	3.0		A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100		A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +150		°C



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	TEST CONDITIONS	SYMBOL	ES3F	ES3G	UNIT
Maximum instantaneous forward voltage	3.0 A	$V_F^{(1)}$	1.1		V
Maximum DC reverse current at working peak reverse voltage	$T_A = 25\text{ }^\circ\text{C}$	$I_R$	10		$\mu\text{A}$
	$T_A = 100\text{ }^\circ\text{C}$		350		
Maximum reverse recovery time	$I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$	$t_{rr}$	35		ns
Maximum reverse recovery time	$I_F = 1.0\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $I_{rr} = 0.1 I_{RM}$	$t_{rr}$	50		ns
Maximum reverse recovery current	$I_F = 1.0\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $I_{rr} = 0.1 I_{RM}$	$I_{RM}$	3.0		A
Maximum stored charge	$I_F = 1.0\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $I_{rr} = 0.1 I_{RM}$	$Q_{rr}$	50		nC
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	30		pF

**Note**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	ES3F	ES3G	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	50		$^\circ\text{C}/\text{W}$
	$R_{\theta JL}^{(1)}$	15		

**Note**

(1) Units mounted on PCB 5.0 mm x 5.0 mm (0.013 mm thick) land areas

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ES3G-E3/57T	0.211	57T	850	7" diameter plastic tape and reel
ES3G-E3/9AT	0.211	9AT	3500	13" diameter plastic tape and reel
ES3GHE3_A/H <sup>(1)</sup>	0.211	H	850	7" diameter plastic tape and reel
ES3GHE3_A/I <sup>(1)</sup>	0.211	I	3500	13" diameter plastic tape and reel
ES3G-M3/57T	0.211	57T	850	7" diameter plastic tape and reel
ES3G-M3/9AT	0.211	9AT	3500	13" diameter plastic tape and reel
ES3GHM3_A/H <sup>(1)</sup>	0.211	H	850	7" diameter plastic tape and reel
ES3GHM3_A/I <sup>(1)</sup>	0.211	I	3500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

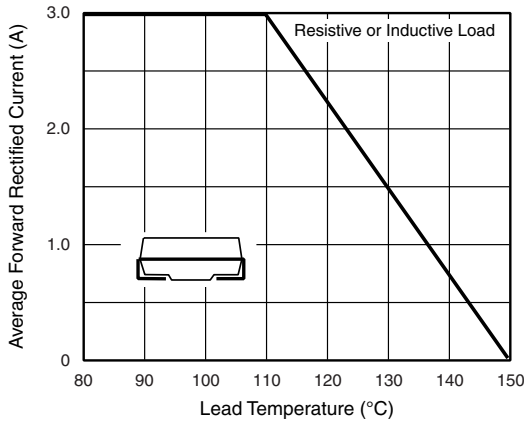


Fig. 1 - Maximum Forward Current Derating Curve

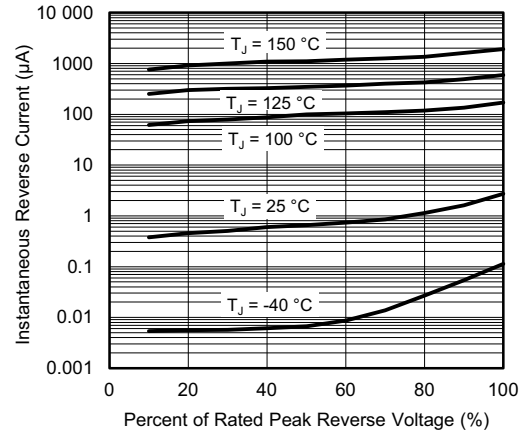


Fig. 4 - Typical Reverse Leakage Characteristics

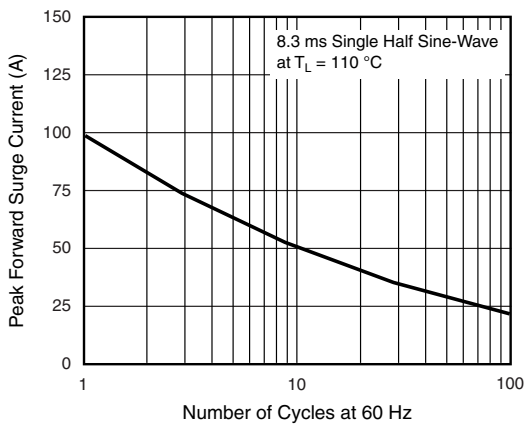


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

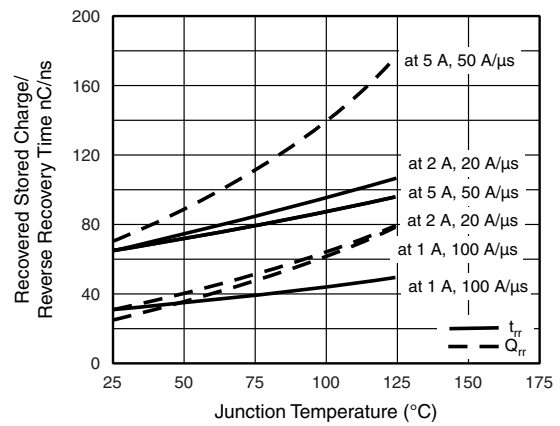


Fig. 5 - Reverse Switching Characteristics

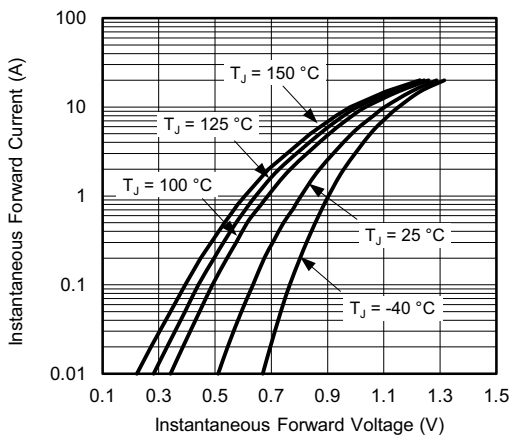


Fig. 3 - Typical Instantaneous Forward Characteristics

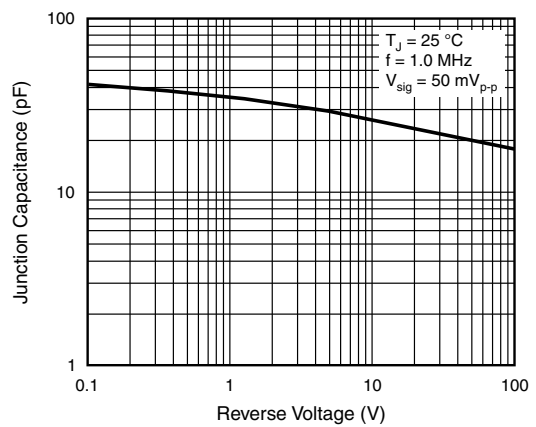


Fig. 6 - Typical Junction Capacitance

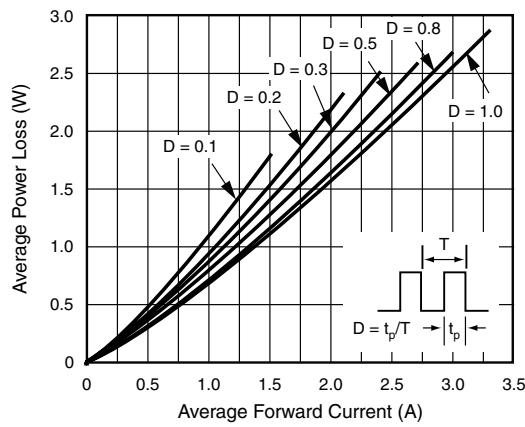
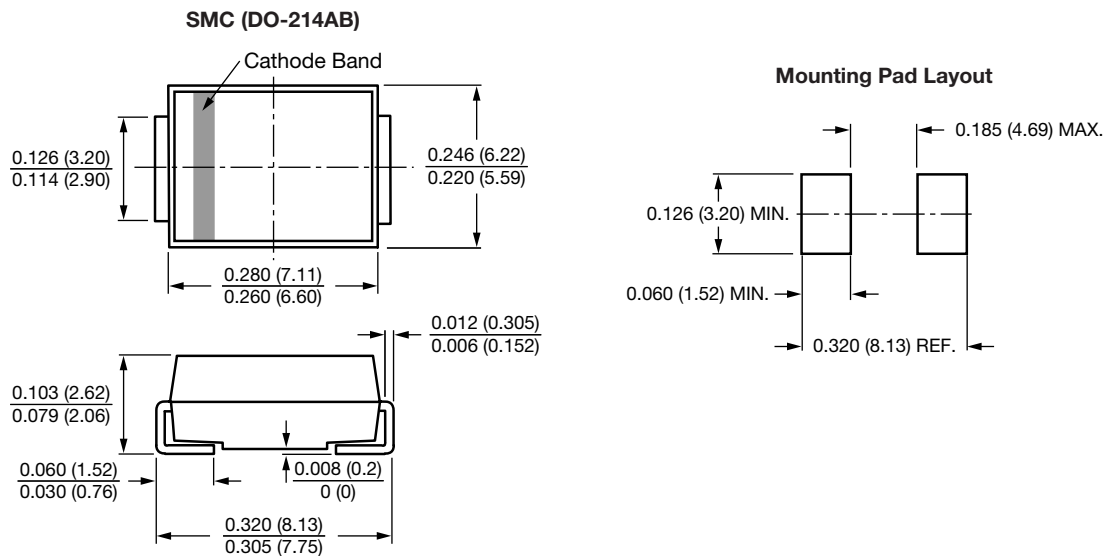


Fig. 7 - Forward Power Loss Characteristics

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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