



# THE DATASHEET OF ES3D-E3/9AT





## Surface-Mount Ultrafast Plastic Rectifier



SMC (DO-214AB)



### LINKS TO ADDITIONAL RESOURCES



### FEATURES

- Glass passivated pellet chip junction
- Ideal for automated placement
- Ultrafast recovery times for high efficiency
- Low forward voltage, low power losses
- 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)



### 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 - halogen-free, RoHS-compliant, commercial grade  
 Base P/NHE3\_X - RoHS-compliant and 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 meets JESD 201 class 2 whisker test  
**Polarity:** color band denotes cathode end

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	3.0 A
$V_{RRM}$	50 V, 100 V, 150 V, 200 V
$I_{FSM}$	100 A
$t_{rr}$	20 ns
$V_F$	0.90 V
$T_J$ max.	150 °C
Package	SMC (DO-214AB)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	ES3A	ES3B	ES3C	ES3D	UNIT
Device marking code		EA	EB	EC	ED	
Maximum repetitive peak reverse voltage	$V_{RRM}$	50	100	150	200	V
Maximum RMS voltage	$V_{RMS}$	35	70	105	140	V
Maximum DC blocking voltage	$V_{DC}$	50	100	150	200	V
Maximum average forward rectified current at $T_L = 100\text{ °C}$	$I_{F(AV)}$	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	ES3A	ES3B	ES3C	ES3D	UNIT
Maximum instantaneous forward voltage	3.0 A	$V_F^{(1)}$	0.90				V
Maximum DC reverse current at rated DC blocking voltage		$I_R$	$T_A = 25\text{ }^\circ\text{C}$			10	$\mu\text{A}$
			$T_A = 100\text{ }^\circ\text{C}$			500	
Maximum reverse recovery time	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$	$t_{rr}$	20				ns
Maximum reverse recovery time	$I_F = 3.0\text{ A}, V_R = 30\text{ V}, dI/dt = 50\text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$			30	ns
			$T_J = 100\text{ }^\circ\text{C}$			50	
Maximum stored charge	$I_F = 3.0\text{ A}, V_R = 30\text{ V}, dI/dt = 50\text{ A}/\mu\text{s}, I_{rr} = 10\% I_{RM}$	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$			15	nC
			$T_J = 100\text{ }^\circ\text{C}$			35	
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	45				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	ES3A	ES3B	ES3C	ES3D	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)}$	47				$^\circ\text{C}/\text{W}$
	$R_{\theta JL}^{(1)}$	12				

**Note**

(1) Units mounted on PCB with 0.31" x 0.31" (8.0 mm x 8.0 mm) copper pad areas

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
ES3D-E3/57T	0.211	57T	850	7" diameter plastic tape and reel
ES3D-E3/9AT	0.211	9AT	3500	13" diameter plastic tape and reel
ES3DHE3_A/H <sup>(1)</sup>	0.211	H	850	7" diameter plastic tape and reel
ES3DHE3_A/I <sup>(1)</sup>	0.211	I	3500	13" diameter plastic tape and reel
ES3D-M3/57T	0.211	57T	850	7" diameter plastic tape and reel
ES3D-M3/9AT	0.211	9AT	3500	13" diameter plastic tape and reel
ES3DHM3_A/H <sup>(1)</sup>	0.211	H	850	7" diameter plastic tape and reel
ES3DHM3_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)

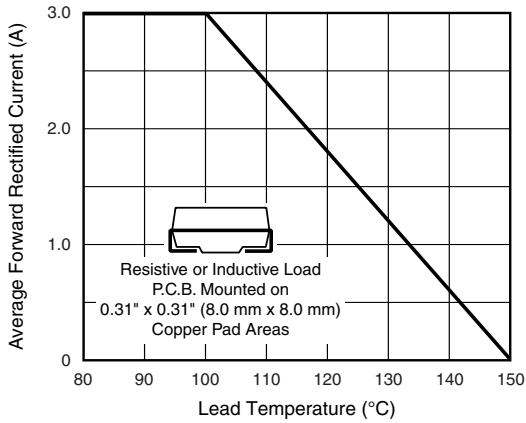


Fig. 1 - Maximum Forward Current Derating Curve

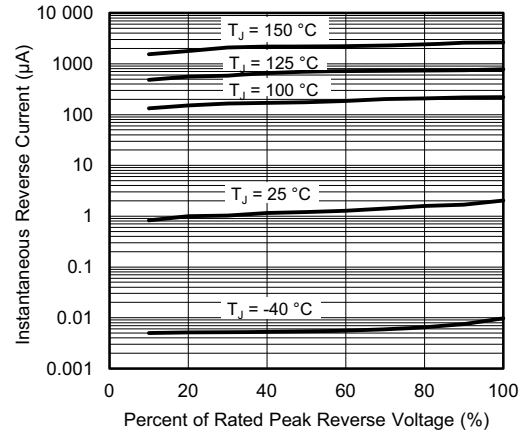


Fig. 4 - Typical Reverse Leakage Characteristics

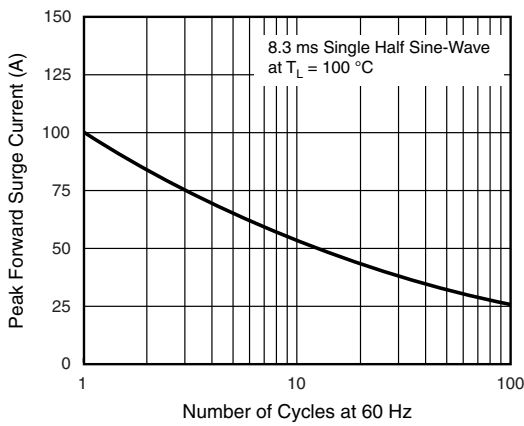


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

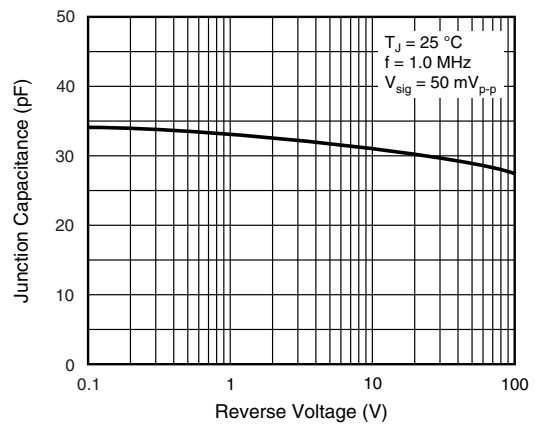


Fig. 5 - Typical Junction Capacitance

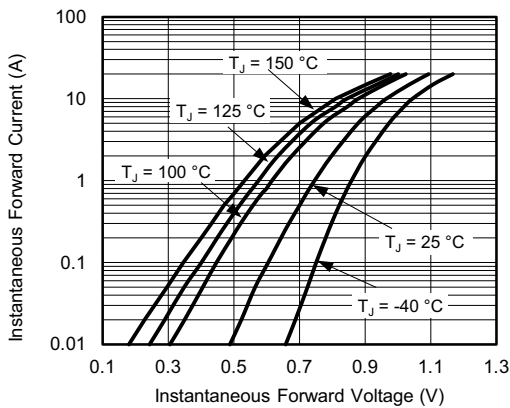
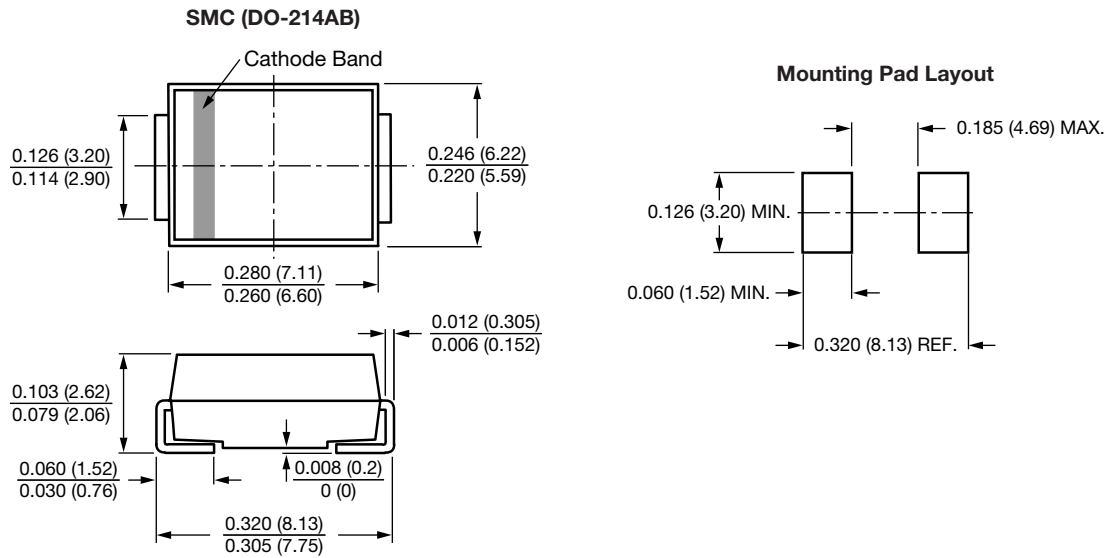


Fig. 3 - Typical Instantaneous Forward Characteristics



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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