

## Surface Mount Ultrafast Plastic Rectifier



**SMC (DO-214AB)**

### 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)



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

### 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)
Diode variations	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



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)								
PARAMETER	TEST CONDITIONS		SYMBOL	ES3A	ES3B	ES3C	ES3D	UNIT
Maximum instantaneous forward voltage	3.0 A		V <sub>F</sub> <sup>(1)</sup>	0.90				V
Maximum DC reverse current at rated DC blocking voltage		T <sub>A</sub> = 25 °C	I <sub>R</sub>	10				μA
		T <sub>A</sub> = 100 °C		500				
Maximum reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	20				ns
Maximum reverse recovery time	I <sub>F</sub> = 3.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 25 °C	t <sub>rr</sub>	30				ns
		T <sub>J</sub> = 100 °C		50				
Maximum stored charge	I <sub>F</sub> = 3.0 A, V <sub>R</sub> = 30 V, dI/dt = 50 A/μs, I <sub>rr</sub> = 10 % I <sub>RM</sub>	T <sub>J</sub> = 25 °C	Q <sub>rr</sub>	15				nC
		T <sub>J</sub> = 100 °C		35				
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	45				pF

**Note**

<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	ES3A	ES3B	ES3C	ES3D	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	47				°C/W
	R <sub>θJL</sub> <sup>(1)</sup>	12				

**Note**

<sup>(1)</sup> 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**

<sup>(1)</sup> AEC-Q101 qualified

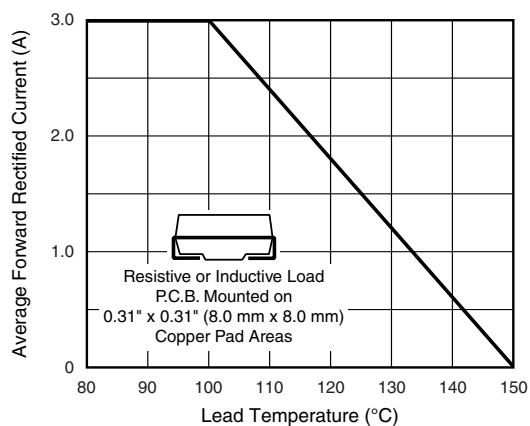
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

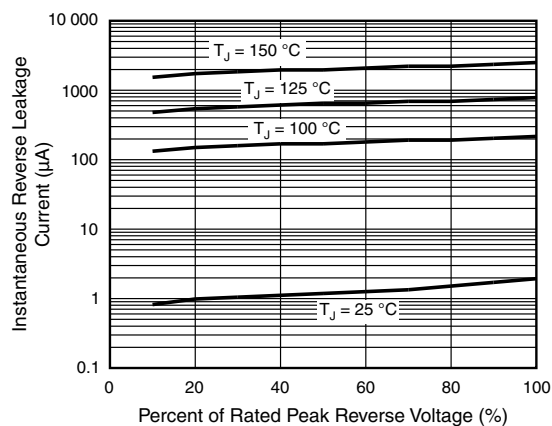


Fig. 4 - Typical Reverse Leakage Characteristics

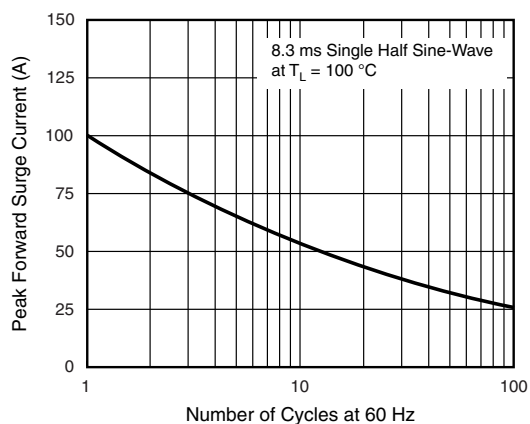


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

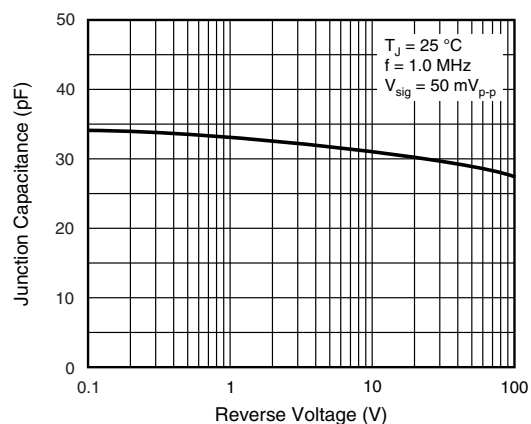


Fig. 5 - Typical Junction Capacitance

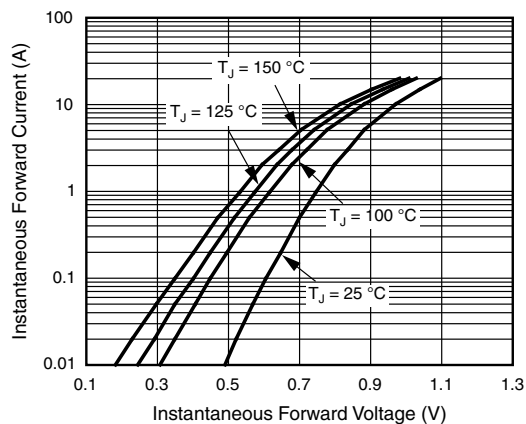
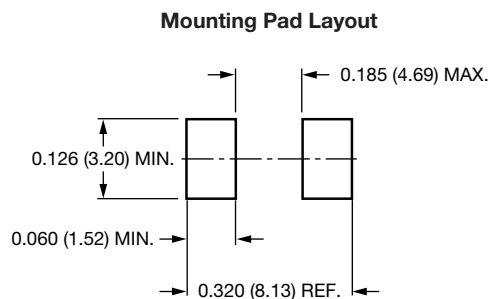
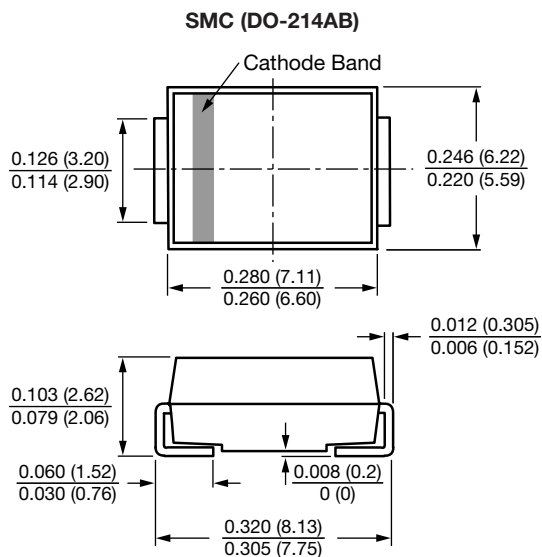


Fig. 3 - Typical Instantaneous Forward Characteristics



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





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