US1A, US1B, US1D, US1G, US1J, US1K, US1M

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Vishay General Semiconductor

COMPLIANT

HALOGEN

FREE

Surface Mount Ultra Fast Rectifier



SMA (DO-214AC)

PRIMARY CHARACTERISTICS								
I _{F(AV)}	1.0 A							
V _{RRM}	50 V, 100 V, 200 V, 400 V, 600 V 800 V, 1000 V							
I _{FSM}	30 A							
t _{rr}	50 ns, 75 ns							
V _F at I _F	1.0 V, 1.7 V							
T _J max.	150 °C							
Package	SMA (DO-214AC)							
Diode variations	Single							

FEATURES

- Low profile package
- Ideal for automated placement
- · Glass passivated pallet chip junction
- · 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 <u>www.vishav.com/doc?99912</u>

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: SMA (DO-214AC)

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

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)									
PARAMETER	SYMBOL	US1A	US1B	US1D	US1G	US1J	US1K	US1M	UNIT
Device marking code		UA	UB	UD	UG	UJ	UK	UM	
Maximum repetitive peak reverse voltage	V _{RRM}	50	100	200	400	600	800	1000	V
Maximum RMS voltage	V _{RMS}	35	70	140	280	420	560	700	V
Maximum DC blocking voltage	V_{DC}	50	100	200	400	600	800	1000	V
Maximum average forward rectified current at $T_L = 110 ^{\circ}\text{C}$	I _{F(AV)}	1.0						Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I _{FSM}	30					Α		
Operating and storage temperature range	T _J , T _{STG}	-55 to +150						°C	



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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)											
PARAMETER	TEST CONDITIONS		SYMBOL	US1A	US1B	US1D	US1G	US1J	US1K	US1M	UNIT
Maximum instantaneous forward voltage	1.0 A		V _F ⁽¹⁾	1.0			1.7		V		
Maximum DC reverse current		T _A = 25 °C	10								
at rated DC blocking voltage		T _A = 100 °C	IR	50						μA	
Maximum reverse recovery time	$I_F = 0.5$ $I_{rr} = 0.2$	5 A, I _R = 1.0 A, 25 A	t _{rr}	50 75				ns			
Typical junction capacitance	4.0 V,	1 MHz	CJ	C _J 15 10					рF		

Note

 $^{^{(1)}\,}$ Pulse test: 300 μs pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)									
PARAMETER	SYMBOL	DL US1A US1B US1D US1G US1J US1K US1M						UNIT	
Maximum thermal resistance	R _{0JA} (1)	75							°C/W
Maximum thermal resistance		27						C/VV	

Note

⁽¹⁾ PCB mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad area

ORDERING INFORMATION (Example)										
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE						
US1J-E3/61T	0.064	61T	1800	7" diameter plastic tape and reel						
US1J-E3/5AT	0.064	5AT	7500	13" diameter plastic tape and reel						
US1JHE3_A/H (1)	0.064	Н	1800	7" diameter plastic tape and reel						
US1JHE3_A/I (1)	0.064	I	7500	13" diameter plastic tape and reel						
US1J-M3/61T	0.064	61T	1800	7" diameter plastic tape and reel						
US1J-M3/5AT	0.064	5AT	7500	13" diameter plastic tape and reel						
US1JHM3_A/H (1)	0.064	Н	1800	7" diameter plastic tape and reel						
US1JHM3_A/I (1)	0.064		7500	13" diameter plastic tape and reel						

Note

⁽¹⁾ AEC-Q101 qualified

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

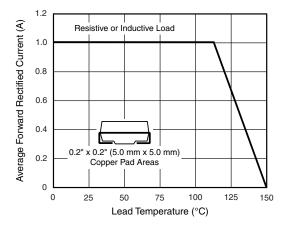


Fig. 1 - Forward Current Derating Curve

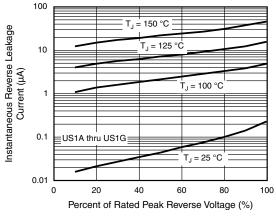


Fig. 4 - Typical Reverse Leakage Characteristics

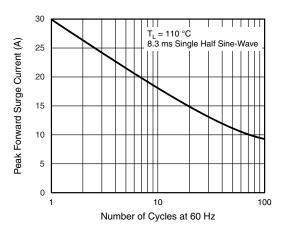


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

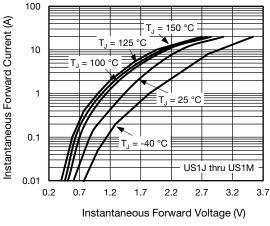


Fig. 5 - Typical Instantaneous Forward Characteristics

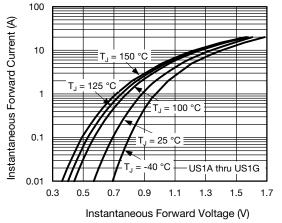


Fig. 3 - Typical Instantaneous Forward Characteristics

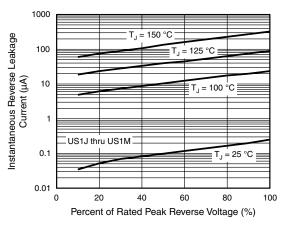


Fig. 6 - Typical Reverse Leakage Characteristics



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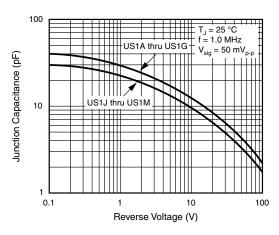


Fig. 7 - Typical Junction Capacitance

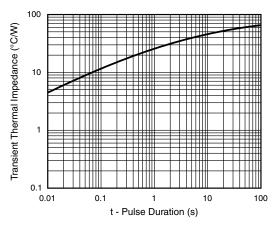
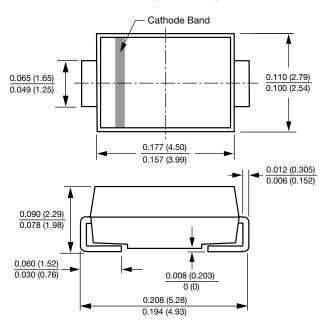


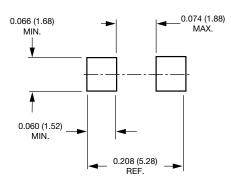
Fig. 8 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMA (DO-214AC)



Mounting Pad Layout





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