

ES3A THRU ES3M

SUPER FAST RECOVERY DIODE



VOLTAGE: 50~1000 Volts

CURRENT: 3 Amperes

Package: SMB

Marking And Polarity

FEATURES

- Glass Passivated Chip Junction
- Low Forward Voltage Drop For High Efficiency
- Low Leakage Current For High Reliability
- High Forward Surge Capability For High Reliability

MECHANICAL DATA

- **Package:** Molding Compound Meets UL 94 V-0 Flammability Rating, RoHS-Compliant
- **Polarity:** As Marked On Case
- **Mounting Position:** Any
- **Weight: App. 0.254 Grams (0.00896 Ounce)**

TYPICAL APPLICATIONS

- General Purpose Use In AC/DC Bridge Full Waverectification For PD, Adapter, Power Supply, Monitor, LED Driver, Printer, Audio Equipment, TV And Home appliances Etc. Applications.



Remark:

- ①. NH=Niuhan Trademark
- ②. FF=Product Line Code, According To Actual Changes
YWW=Date Code, According To Actual Changes
- ③. ES3X=Module, x=A, B, D, G, J, K, M,
- ④. White band denotes cathode

Single Phase, Half Wave, 60Hz, Resistive Or Inductive Load. For Capacitive Load, Derate Current By 20%

Maximum Ratings (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	ES3 A	ES3 B	ES3 D	ES3 G	ES3 J	ES3 K	ES3 M	Unit
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	@TC= 100 °C	$I_{F(AV)}$	3							A
Peak Forward Surge Current	8.3ms Single Half Sine-wave Superimposed On Rate Load	I_{FSM}	100					80		A
Current Squared Time Per Diode	t<8.3ms	I^2t	41.5					26.6		A ² sec

Electrical Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Test Conditions	Symbol	ES3 A	ES3 B	ES3 D	ES3 G	ES3 J	ES3 K	ES3 M	Unit
Maximum Instantaneous forward voltage per diode (note1)	Ta=25℃ If= 3.0 A	VF	0.95			1.25	1.68	1.95	3.50	V
	Ta=125℃		0.86			1.19	1.60	1.88	2.97	
Maximum DC Reverse Current at Rated DC Blocking Voltage (Note 1)	Ta=25℃ VR= VRRM	IRRM	5							uA
	Ta=125℃ VR= 80%*VRRM		500							
Typical Junction Capacitance Per Diode	4.0 V,1MHz	CJ	45					20		pF
Maximum Reverse Recovery Time	IF=0.5A, IR=1.0A, IRR=0.25A	TRR	35							nS

Thermal Characteristics (Ta=25°C Unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Operating Junction Temperature Range	T_J	-55 to 150	°C
Storage Temperature Range	T_{STD}	-55 to 150	
Typical thermal resistance (Note 2)	$R_{\theta JA}$	55.0	°C/W
	$R_{\theta JC}$	17	

Notes: 1. Pulse Test: 300 Us Pulse Width, 1% Duty Cycle

2. Thermal resistance from junction to lead vertical P.C.B. mounted, 0.375"(9.5mm) lead length

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Typical Characteristics Curves

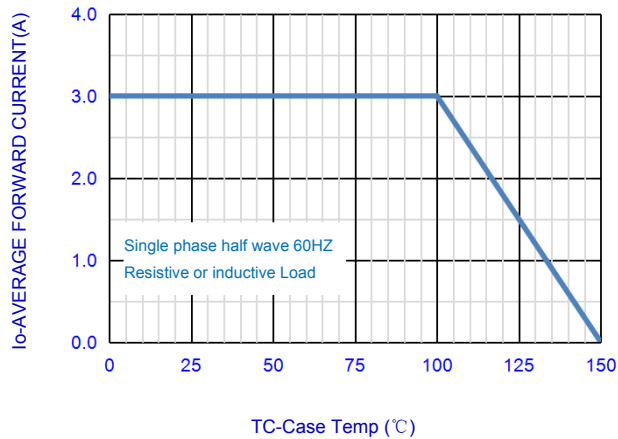


Fig.1-FORWARD CURRENT DERATING CURVE

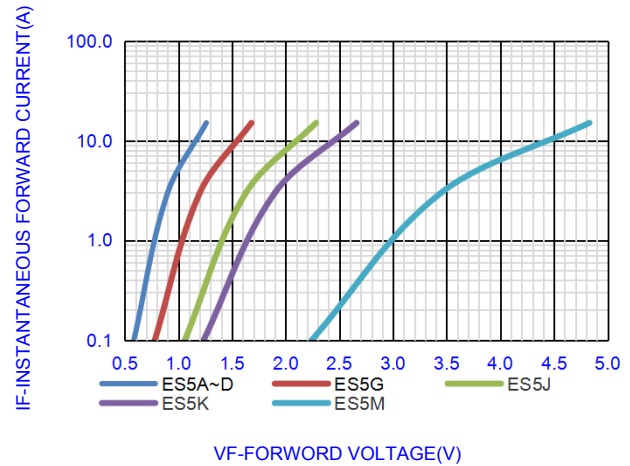


Fig.2- TYPICAL INSTANTANEOUS FORWARD

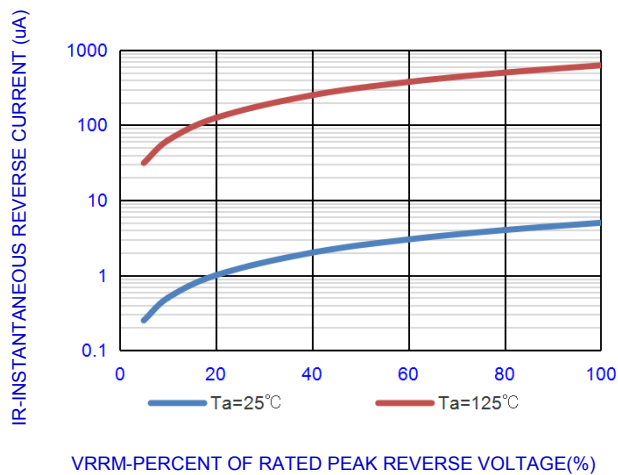


Fig.3- TYPICAL REVERSE CHARACTERISTICS

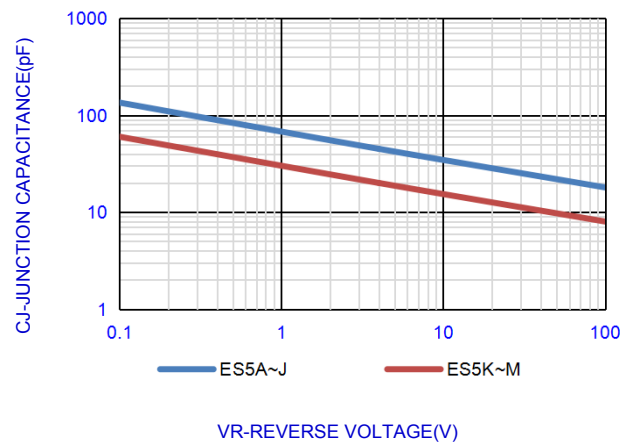


Fig.4- TYPICAL JUNCTION CAPACITANCE

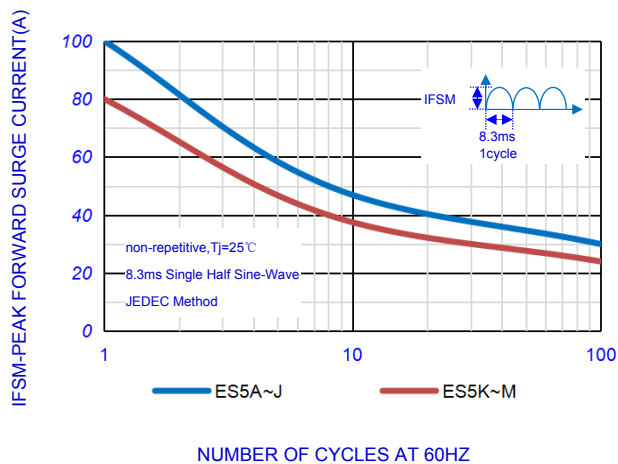


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

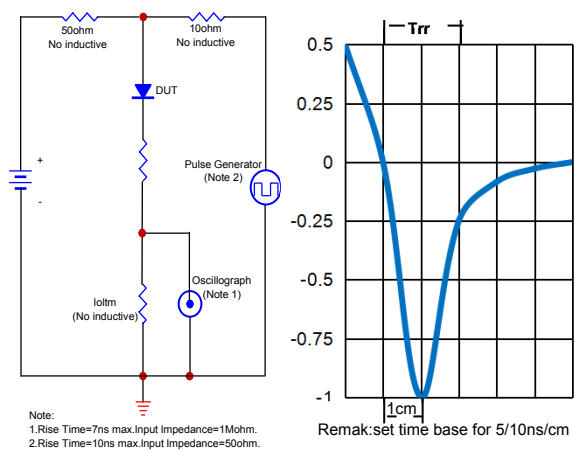
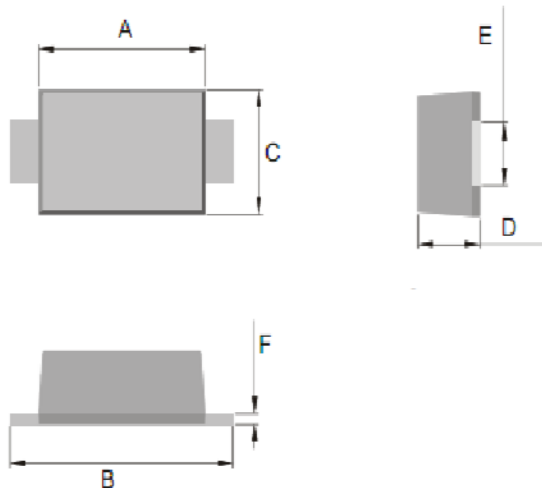


Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

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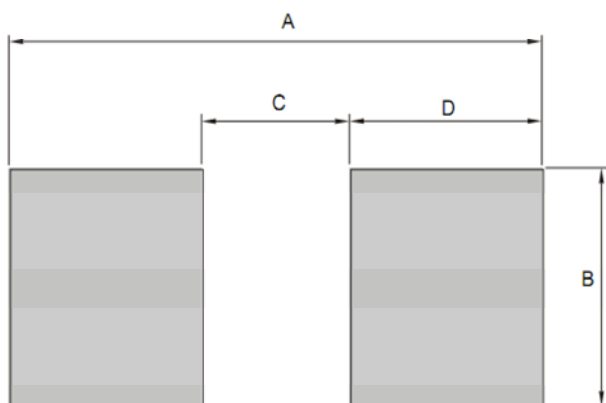
OUTLINE DRAWINGS



SMB

OUTLINE DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.000	-	4.700	1.575	-	1.850
B	5.000	-	5.590	1.969	-	2.201
C	3.300	-	3.940	1.299	-	1.551
D	2.100	-	2.450	0.827	-	0.965
E	1.900	-	2.110	0.748	-	0.831
F	0.760	-	1.500	0.299	-	0.591

OUTLINE DRAWINGS



SMB

OUTLINE DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.340	-	-	0.250	-
B	-	2.720	-	-	0.107	-
C	-	1.760	-	-	0.069	-
D	-	2.290	-	-	0.090	-

PACKING INFORMATION

Package	Pack	Inner Box Size L×W×H(mm)	Quantity (pcs/Inner Box)	Outer Carton Size L×W×H(mm)	Quantity (pcs/carton)
SMB	T/R	340×340×45	3000	360×360×470	60000

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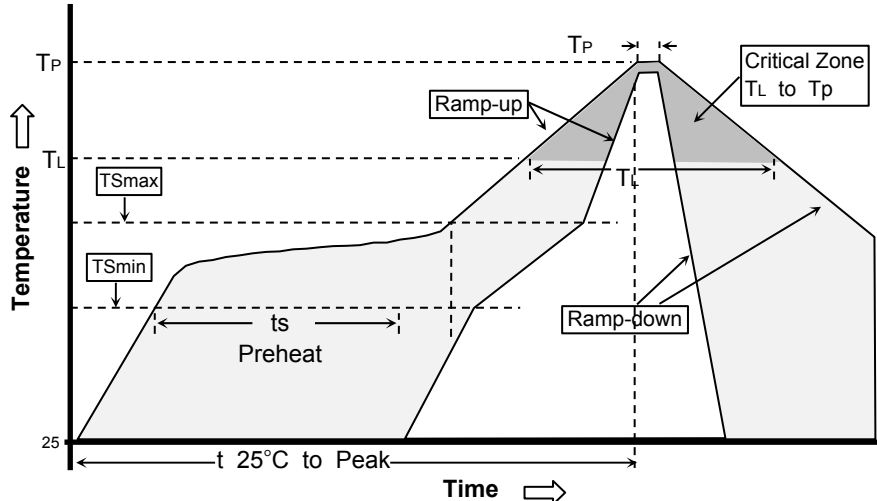
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Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T _L) - Time (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T _P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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