

ES3A THRU ES3M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



VOLTAGE: 50~1000 Volts

CURRENT: 3.0 Amperes

SMB(DO-214AA)

Marking and Polarity

FEATURES

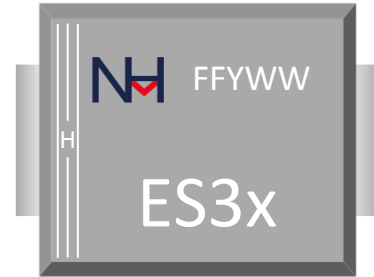
- Glass passivated chip junction
- Super fast recovery time
- Low Forward Voltage Drop for high efficiency
- Low leakage current for high reliability
- High forward surge capability for high reliability

MECHANICAL DATA

- **Terminals:** Plated Leads Solderable per MIL-STD-202, Method 208
- **Mounting Position:** Any
- **Lead Free:** Lead Free Finish, RoHS Compliant
- **Weight:** App. 0.095 grams (0.0034 ounce)

TYPICAL APPLICATIONS

- For use in high frequency inverter, AC/DC converter, DC/DC converter, LED driver etc. applications



Remark:

- ①. NH=niuhang trademark
- ②. FF=Product line, According to actual changes;  
YWW=Periodic code, According to actual changes;
- ③. ES3x=Model, x=A, B, D, G, J, K, M
- ④. White band denotes cathode

Maximum Ratings (Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Symbol	ES3A	ES3B	ES3D	ES3G	ES3J	ES3K	ES3M	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 (see fig.1)	$I_{F(AV)}$	3.0							A
Peak forward surge current 8.3ms single half sine-wave superimposed on rated load (JEDEC method at rated TL)(see fig.5)	$I_{FSM}$	100					80		A
Current Squared Time Per Diode ( $t < 8.3ms$ )	$I^2t$	41.50					26.56		A <sup>2</sup> sec

Electrical Characteristics (Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Test Conditions		Symbol	ES3A	ES3B	ES3D	ES3G	ES3J	ES3K	ES3M	Unit
Maximum instantaneous forward voltage (see fig.2) (Note 1)	$T_A=25^\circ C$	$I_F=3.0 A$	$V_F$	0.95			1.25	1.68	1.95	3.50	V
Maximum instantaneous reverse current at rated DC blocking voltage (see fig.3)(Note 1)	$T_A=25^\circ C$	$V_R=V_{RRM}$	$I_R$	5							uA
	$T_A=125^\circ C$	$V_R=80\% \cdot V_{RRM}$		100							
Maximum Reverse Recovery Time	$I_F=0.5A, I_R=1.0A, I_{RR}=0.25A$		$T_{RR}$	35							ns
Typical junction capacitance (see fig.4)	4V, 1MHz		$C_J$	45					20		pF

Thermal Characteristics (Ratings at 25°C ambient temperature unless otherwise specified)

Parameter	Symbol	ES3A	ES3B	ES3D	ES3G	ES3J	ES3K	ES3M	Unit	
Operating junction	$T_J$	-55 to 150								°C
Storage temperature range	$T_{STG}$	-55 to 150								
Typical thermal resistance (Note 2)	$R_{\theta JA}$	55							°C/W	
	$R_{\theta JC}$	17								

Note: 1. Pulse width < 300 uS, Duty cycle < 2%  
2. Mounted on P.C.B. with 0.3" x 0.3" (7.62 mm x 7.62 mm) copper pad areas

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RATING AND CHARACTERISTIC CURVES

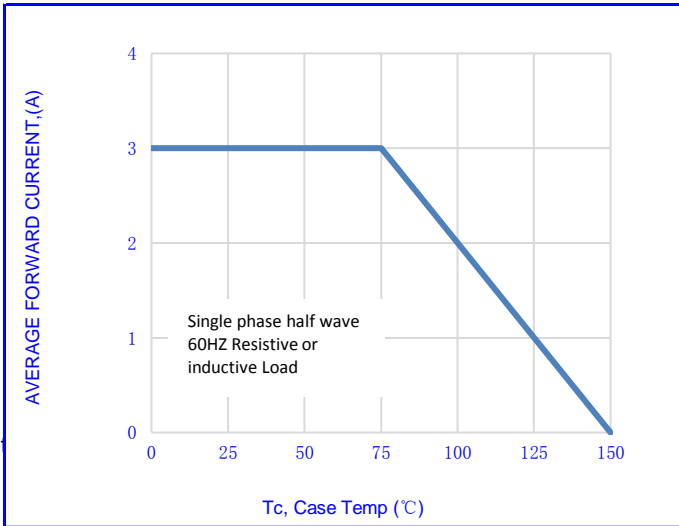


Fig.1- FORWARD CURRENT DERATING CURVE

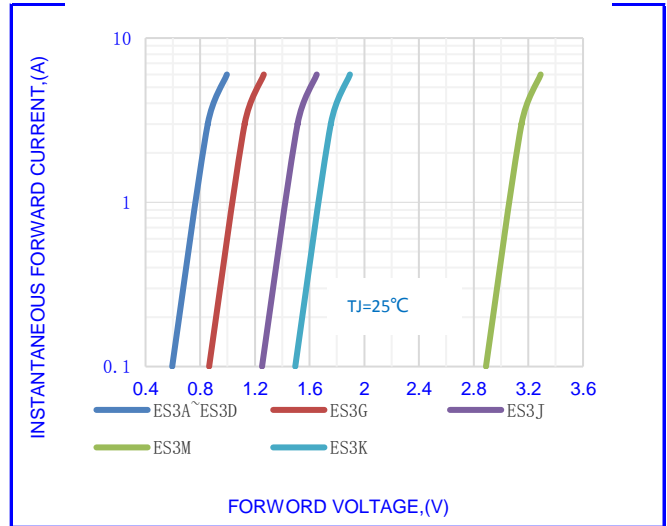


Fig.2-TYPICAL INSTANTANEOUS FORWARD

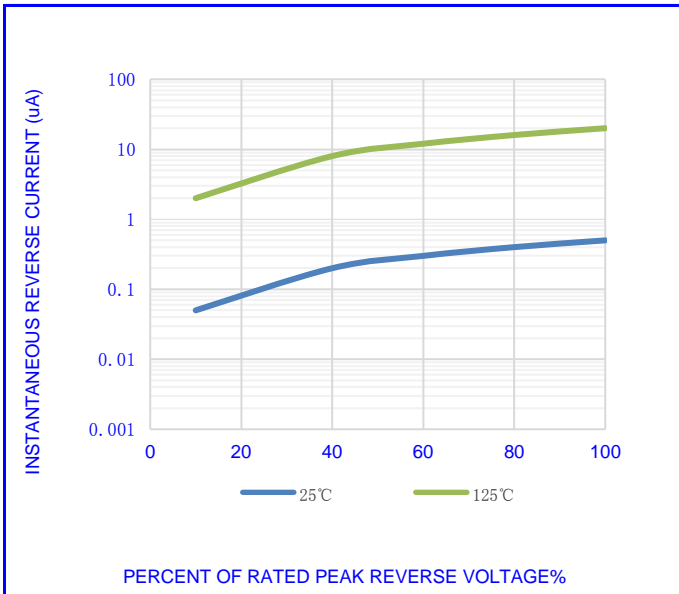


Fig.3-TYPICAL REVERSE CHARACTERISTICS

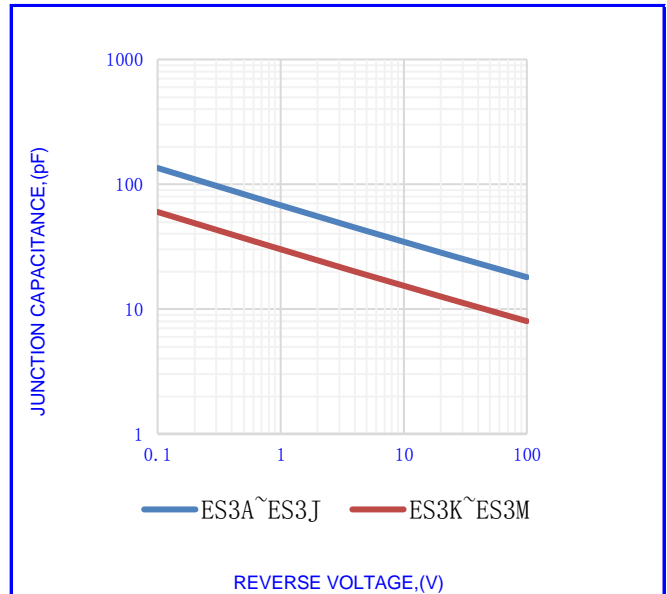


Fig.4- TYPICAL JUNCTION CAPACITANCE

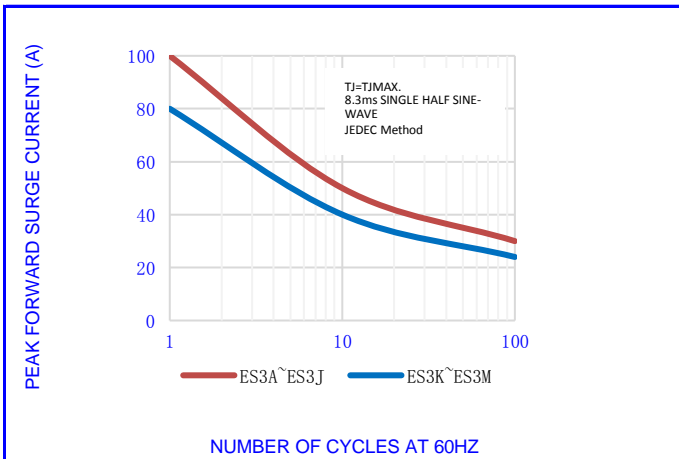


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

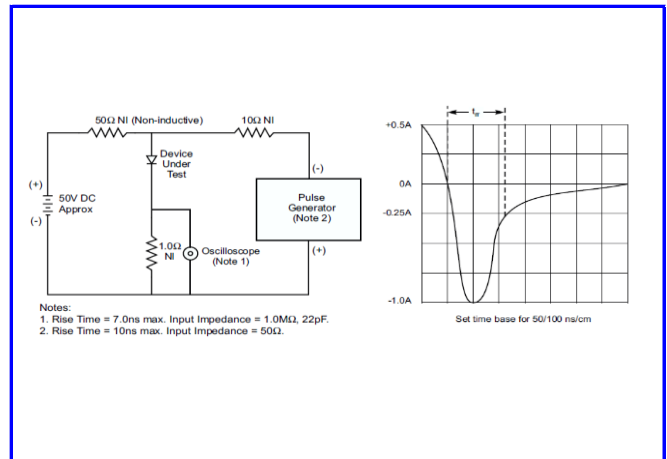


Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

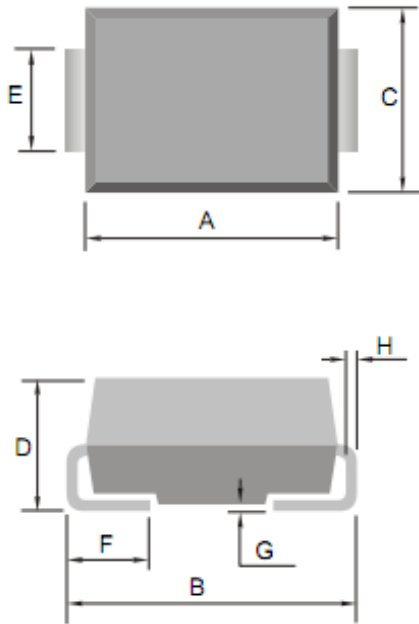
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**OUTLINE DRAWINGS**

**SMB(DO-214AA)**

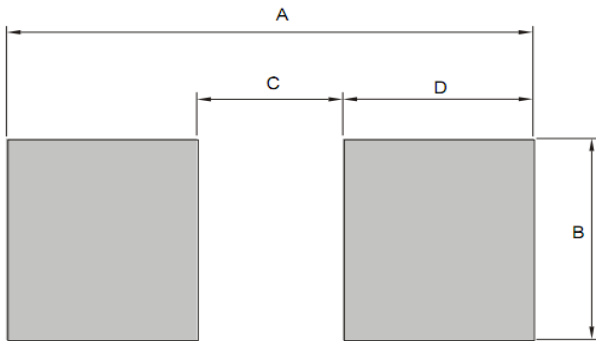


**OUTLINE DIMENSIONS**

Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.060	-	4.700	0.160	-	0.185
B	5.080	-	5.590	0.200	-	0.220
C	3.300	-	3.940	0.130	-	0.155
D	2.130	-	2.440	0.083	-	0.096
E	1.910	-	2.110	0.075	-	0.083
F	0.760	-	1.270	0.030	-	0.050
G	0.051	-	0.203	0.002	-	0.008
H	0.152	-	0.305	0.006	-	0.012

**RECOMMENDED LAYOUT DRAWINGS**

**SMB(DO-214AA)**



**RECOMMENDED MOUNTING PAD DIMENSIONS**

Dim.	Milimeters			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**

**SMB(DO-214AA)**

Package Method	Reel Size (mm)	Quantity (pcs/reel)	Inner Box Size LxWxH(mm)	Quantity (pcs/Inner Box)	Carton Size LxWxH(mm)	Quantity (pcs/carton)
Tape Reel	Φ330	3000	340x340x45	6000	360x360x470	60000

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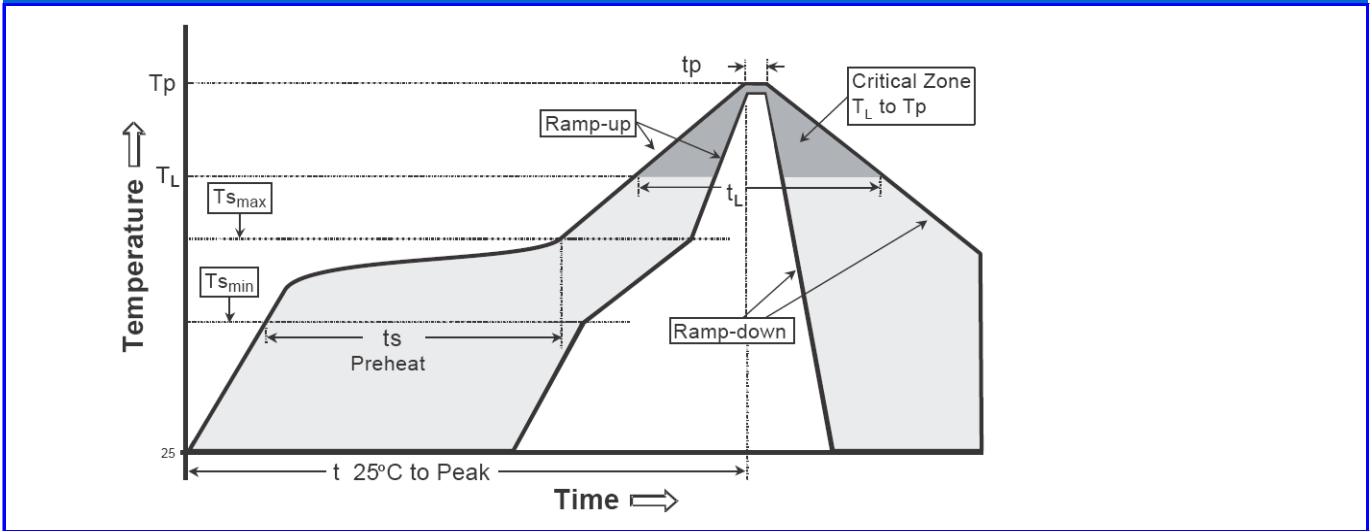
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**Recommended wave soldering condition**

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 (Tsmax to Tp)	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 (TL) - Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	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.

[Http://www.nh-semicon.com](http://www.nh-semicon.com)

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Rev.:B/1

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