


ES5A THRU ES5M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



<b>VOLTAGE:</b> 50~1000 Volts	<b>CURRENT:</b> 5.0 Amperes	<b>SMB(DO-214AA)</b>	<b>Marking and Polarity</b>
<b>FEATURES</b>			
<ul style="list-style-type: none"> <li>▪ Glass passivated chip junction</li> <li>▪ Super fast recovery time</li> <li>▪ Low Forward Voltage Drop for high efficiency</li> <li>▪ Low leakage current for high reliability</li> <li>▪ High forward surge capability for high reliability</li> </ul>			
<b>MECHANICAL DATA</b>		<p>Remark:</p> <ul style="list-style-type: none"> <li>①. NH=niuhang trademark</li> <li>②. FF=Product line,According to actual changes; YWW=Periodic code,According to actual changes;</li> <li>③. ES5x=Modle,x=A,B,D,G,J,K,M</li> <li>④. White band denotes cathode</li> </ul>	
<ul style="list-style-type: none"> <li>▪ <b>Terminals:</b> Plated Leads Solderable per MIL-STD-202, Method 208</li> <li>▪ <b>Mounting Position:</b> Any</li> <li>▪ <b>Lead Free:</b> Lead Free Finish, RoHS Compliant</li> <li>▪ <b>Weight:</b>App. 0.095 grams ( 0.0034 ounce)</li> </ul>			
<b>TYPICAL APPLICATIONS</b>			
<ul style="list-style-type: none"> <li>▪ For use in high frequency inverters ,AC/DC converters, DC/DC converter, LED driver etc. applications</li> </ul>			

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

Parameter	Symbol	ES5A	ES5B	ES5D	ES5G	ES5J	ES5K	ES5M	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)	$I_{F(AV)}$	5.0							A
Peak forward surge current 8.3ms single half sine-wave superimposed on rated load (JEDEC method at rated TL)(see fig.5)	$I_{FSM}$	120					100		A
Current Squared Time Per Diode( $t < 8.3ms$ )	$I^2t$	59.76					41.50		A <sup>2</sup> sec

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

Parameter	Test Conditions	Symbol	ES5A	ES5B	ES5D	ES5G	ES5J	ES5K	ES5M	Unit
Maximum instantaneous forward voltage (see fig.2) (Note 1)	$T_A=25^\circ C$ IF= 5.0 A	$V_F$	0.95			1.25	1.68	1.95	3.50	V
	$T_A=125^\circ C$ IF= 5.0 A		0.90			1.20	1.60	1.90	3.40	
Maximum instantaneous reverse current at rated DC blocking voltage (see fig.3)(Note 1)	$T_A=25^\circ C$ VR= $V_{RRM}$	$I_R$	5							uA
	$T_A=125^\circ C$ VR= 80%* $V_{RRM}$		100							
Maximum Reverse Recovery Time	IF=0.5A, IR=1.0A, IRR=0.25A	$T_{RR}$	50				25		ns	
Typical junction capacitance(see fig.4)	4V,1MHz	$C_J$	50							pF

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

Parameter	Symbol	ES5A	ES5B	ES5D	ES5G	ES5J	ES5K	ES5M	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

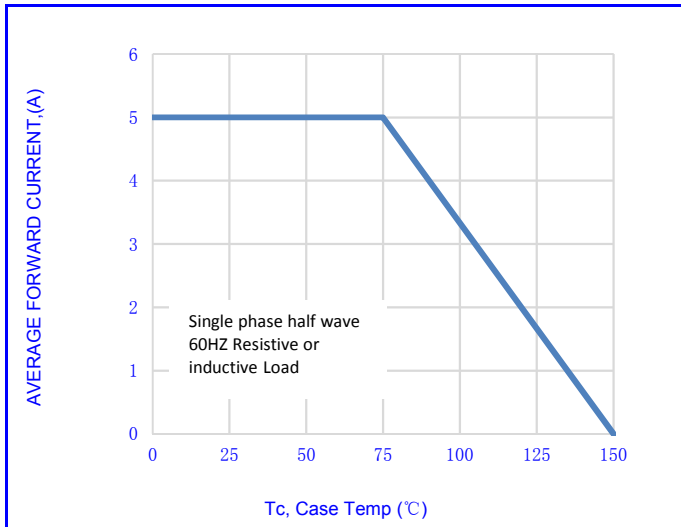


Fig.1- FORWARD CURRENT DERATING CURVE

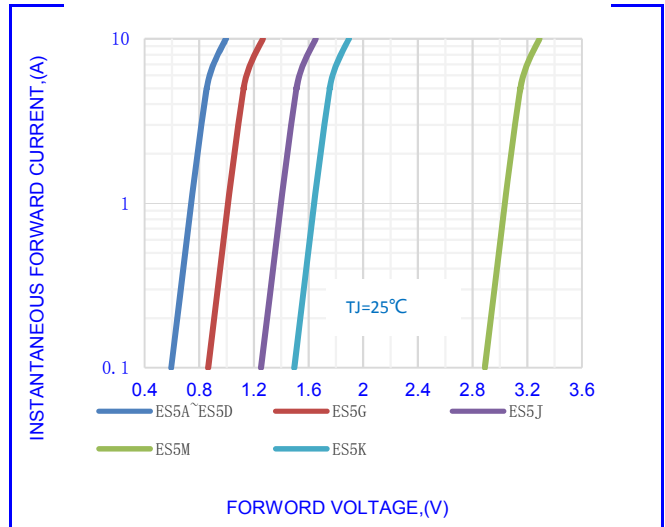


Fig.2-TYPICAL INSTANTANEOUS FORWARD

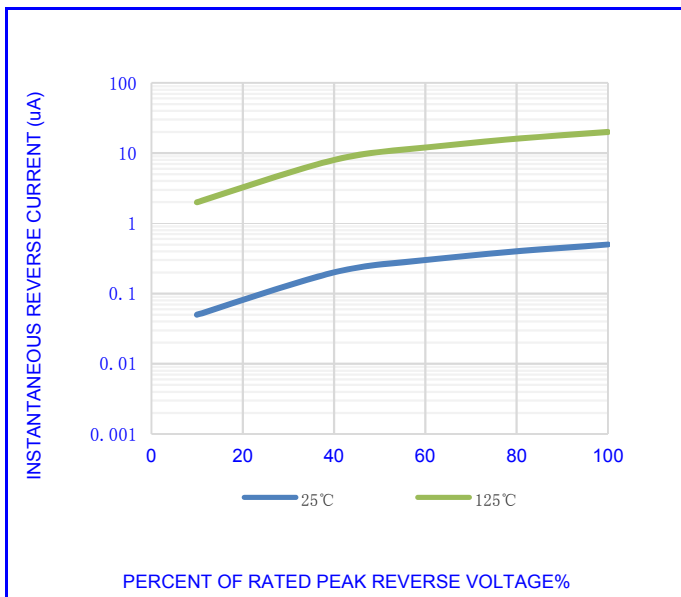


Fig.3-TYPICAL REVERSE CHARACTERISTICS

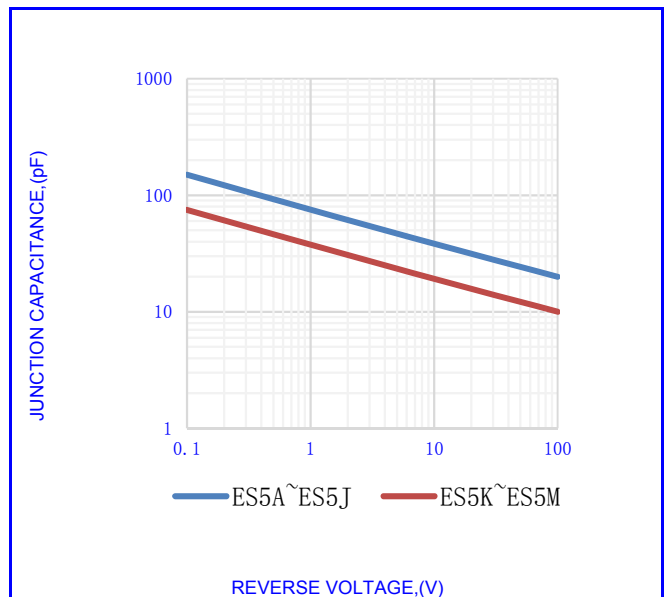


Fig.4- TYPICAL JUNCTION CAPACITANCE

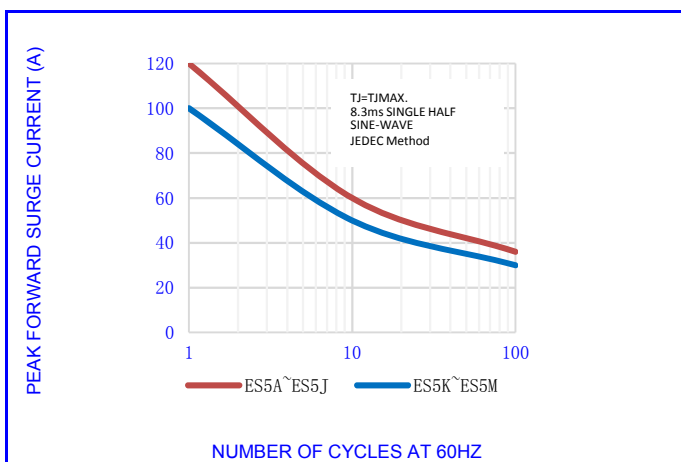


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

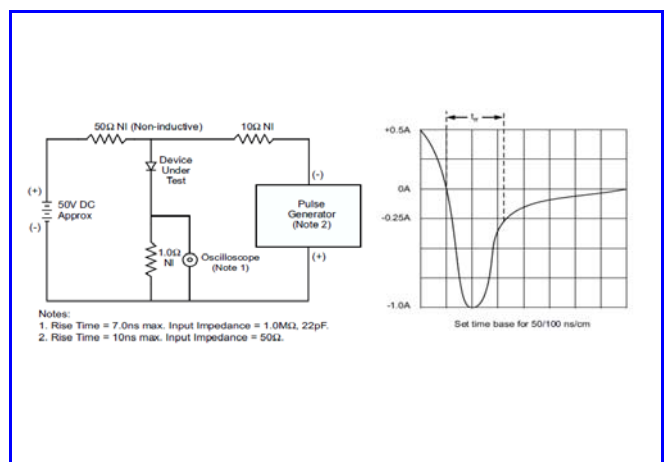


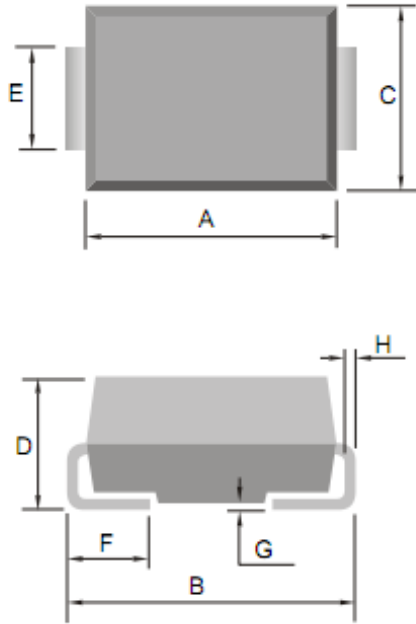
Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

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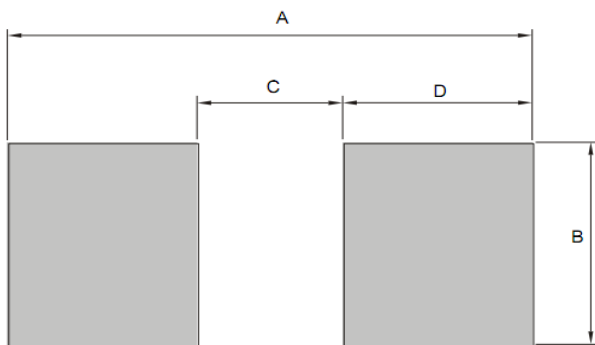


**OUTLINE DRAWINGS** **SMB(DO-214AA)**



OUTLINE DIMENSIONS						
Dim.	Millimeters			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.	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** **SMB(DO-214AA)**

Package Method	Reel Size (mm)	Quantity (pcs/reel)	Inner Box Size L×W×H(mm)	Quantity (pcs/Inner Box)	Carton Size L×W×H(mm)	Quantity (pcs/carton)
Tape Reel	Φ330	3000	340×340×45	6000	360×360×470	60000

**ES5A THRU ES5M**

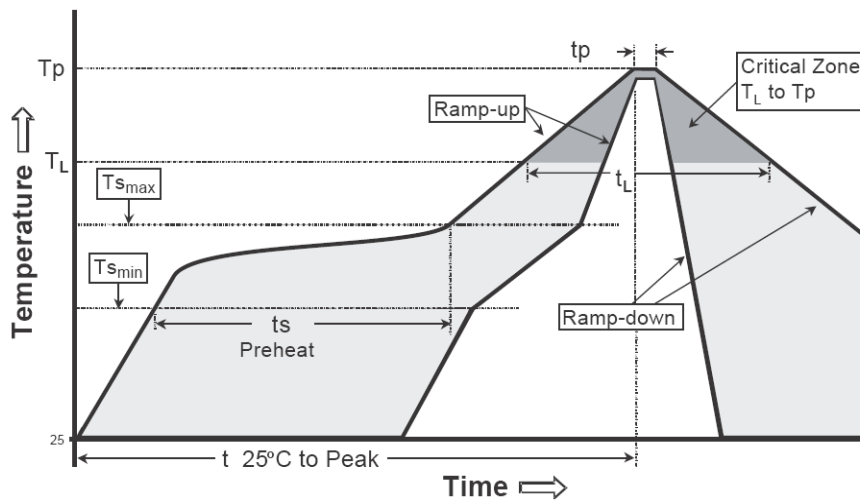
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**Recommended wave soldering condition**

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 (Tsmmax 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.

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