

ES1A THRU ES1M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



VOLTAGE: 50~1000 Volts

CURRENT: 1.0 Amperes

SOD-123FL

Marking and Polarity

FEATURES

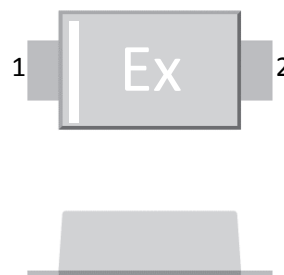
- Glass passivated chip junction
- Super fast recovery time
- Low Forward Voltage Drop for high efficiency
- Low leakage current for high reliability
- High forward surge capability for high reliability

MECHANICAL DATA

- **Terminals:** Plated Leads Solderable per MIL-STD-202, Method 208
- **Mounting Position:** Any
- **Lead Free:** Lead Free Finish, RoHS Compliant
- **Weight:** App. 0.0161 grams (0.0006 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. Ex=Module, x=A,B,D,G,J,K,M
- ③. White band denotes cathode

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

Parameter	Symbol	ES1A	ES1B	ES1D	ES1G	ES1J	ES1K	ES1M	Unit
Mark	/	EA	EB	ED	EG	EJ	EK	EM	/
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)	$I_{F(AV)}$	1.0							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}	30					20		A
Current Squared Time Per Diode ($t < 8.3ms$)	I^2t	3.74					1.66		A ² sec

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

Parameter	Test Conditions		Symbol	ES1A	ES1B	ES1D	ES1G	ES1J	ES1K	ES1M	Unit
Maximum instantaneous forward voltage (see fig.2) (Note 1)	$T_A = 25^\circ C$	$I_F = 1.0 A$	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)	$T_A = 25^\circ C$ $T_A = 125^\circ C$	$V_R = V_{RRM}$ $V_R = 80\% V_{RRM}$	I_R	5 100							μA
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	10					5		pF

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

Parameter	Symbol	ES1A	ES1B	ES1D	ES1G	ES1J	ES1K	ES1M	Unit
Operating junction	T _J	-55 to 150							°C
Storage temperature range	T _{STG}	-55 to 150							
Typical thermal resistance (Note 2)	R _{θJA}	85							°C/W
	R _{θJC}	35							

Note: 1. Pulse width $< 300 \mu s$, Duty cycle $< 2\%$

2. P. C. B mounted with 0.1×0.1 (2.54 x 2.54) mm copper Pad Areas.

ES1A THRU ES1M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



RATING AND CHARACTERISTIC CURVES

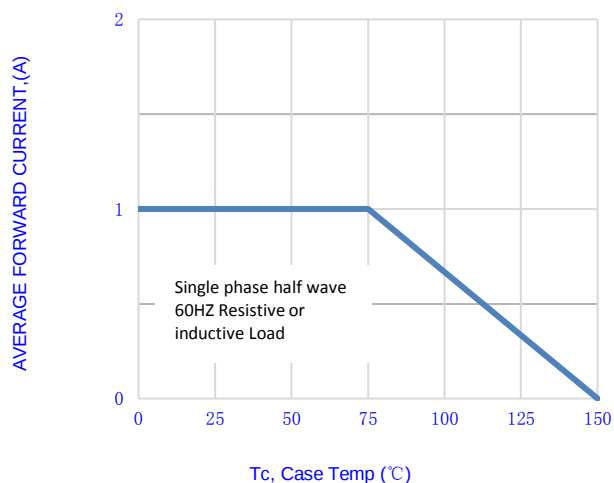


Fig.1- FORWARD CURRENT DERATING CURVE

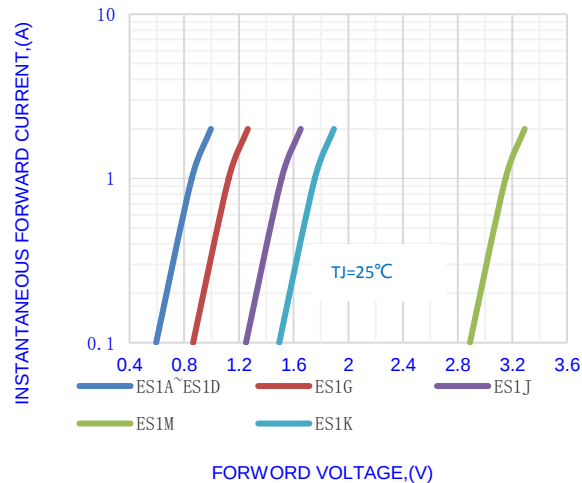


Fig.2-TYPICAL INSTANTANEOUS FORWARD

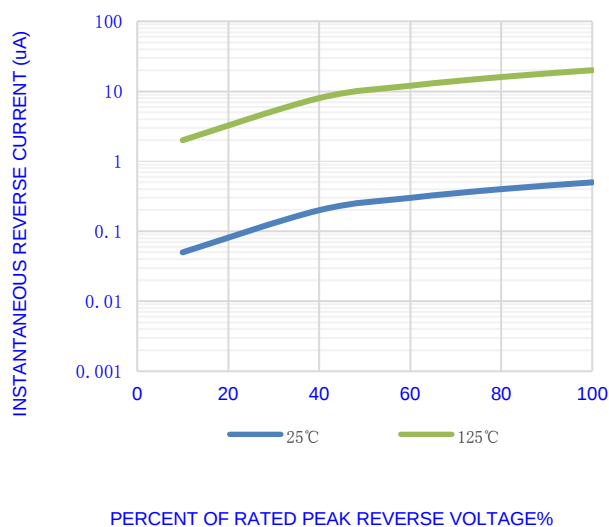


Fig.3-TYPICAL REVERSE CHARACTERISTICS

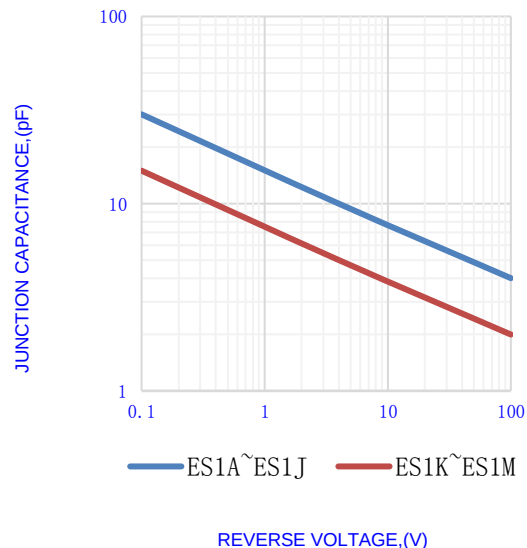


Fig.4- TYPICAL JUNCTION CAPACITANCE

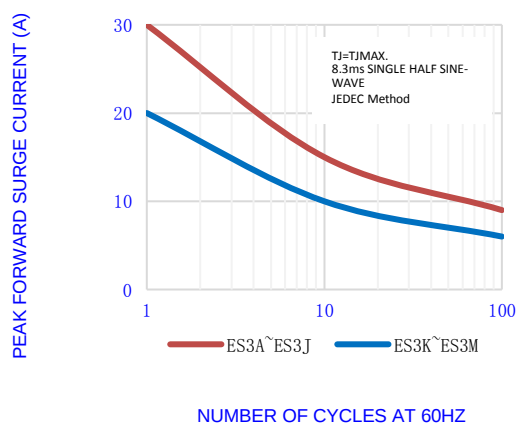
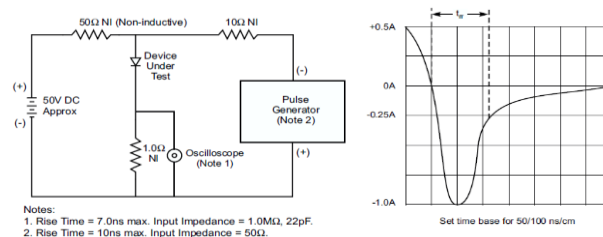


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT



Notes:
1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
2. Rise Time = 10ns max. Input Impedance = 50Ω.

Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

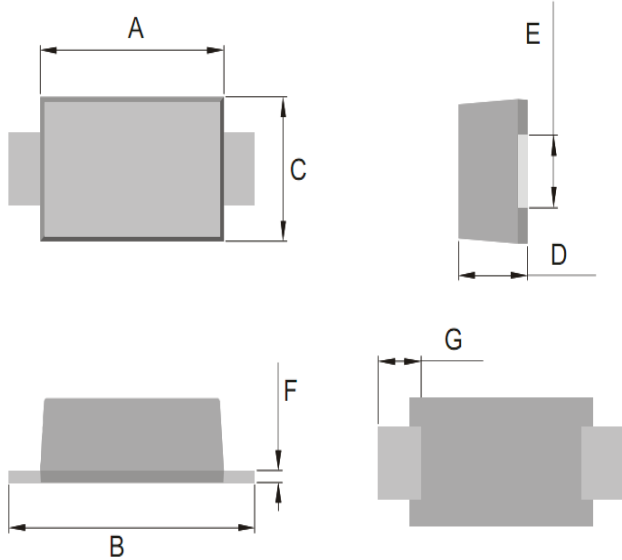
ES1A THRU ES1M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



OUTLINE DRAWINGS

SOD-123FL

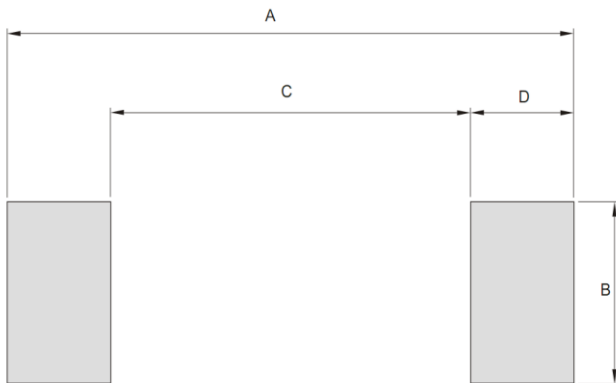


OUTLINE DIMENSIONS

Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.650	-	2.900	0.1043	-	0.1142
B	3.500	-	3.800	0.1378	-	0.1496
C	1.700	-	1.900	0.0669	-	0.0748
D	0.900	-	1.300	0.0354	-	0.0512
E	0.800	-	1.100	0.0315	-	0.0433
F	0.100	-	0.250	0.0039	-	0.0098
G	0.450	-	0.750	0.0177	-	0.0295

RECOMMENDED LAYOUT DRAWINGS

SOD-123FL



RECOMMENDED MOUNTING PAD DIMENSIONS

Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	4.250	-	-	0.1673	-
B	-	1.220	-	-	0.0480	-
C	-	2.700	-	-	0.1063	-
D	-	0.780	-	-	0.0307	-

PACKING INFORMATION

SOD-123FL

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	Φ180	3000	185×185×90	21000	400×400×300	252000

ES1A THRU ES1M

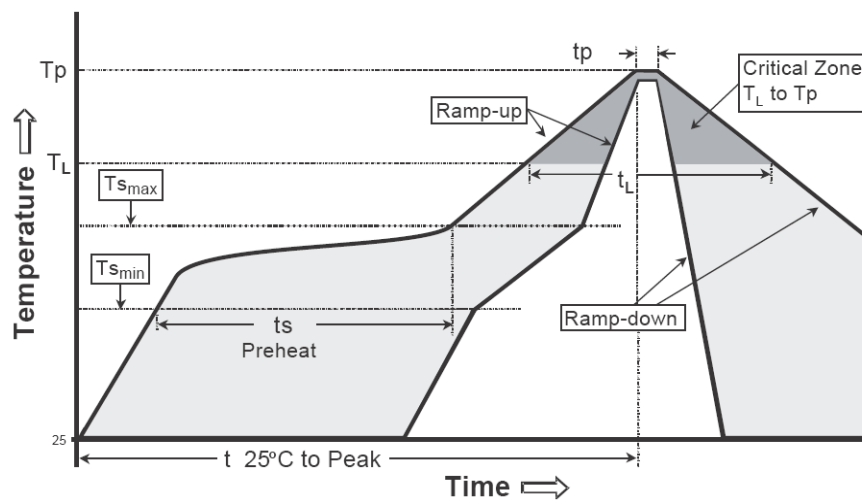
SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



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.

ES1A THRU ES1M

SURFACE MOUNT SUPER FAST RECOVERY RECTIFIERS



Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from niuhang Electronics co., LTD
- Niuhan Electronics co., LTD. reserves the rights to make changes of the content herein the document anytime without notification.
- Niuhan Electronics co., LTD. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Niuhan Electronics co., LTD. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Niuhan Electronics co., LTD. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Niuhan Electronics co., LTD. for any damages resulting from such improper use or sale.
- When the appearance of the product and chip size does not change, in order to product the customer quality, change the internal structure and the production process Niuhan can not notify