

ES2A THRU ES2J
Super Fast Recovery Rectifiers



Voltage:	50~600 Volts	Current:	2 A	Package:	SMB
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Features

- NH'S Super Fast Recovery Rectifiers Chip Technology
- Low Switching Loss For High Efficiency
- Low Leakage Current For High Reliability
- Super Fast Switching Speed

Mechanical Data

- **Case:** Molded With UL-94 Class V-0 Recognized, RoHS-Compliant
- **Polarity:** Look At The Diagram And Polarity On The Right
- **Terminals:** Tin Plated Leads, Solderable Per J-STD-002 And JESD22-B102

Typical Applications

- Switch Mode Power Supplies (SMPS)
- Fast Chargers
- LED Driver And Monitor Lighting
- Automotive Electronics And Charging Posts

Diagram:



Polarity:



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	ES2 A	ES2 B	ES2 D	ES2 F	ES2 G	ES2 H	ES2 J	Unit
Maximum Repetitive Peak Reverse Voltage		V_{RRM}	50	100	200	300	400	500	600	V
Maximum RMS Voltage		V_{RMS}	35	70	140	210	280	350	420	V
Maximum DC Blocking Voltage		V_{DC}	50	100	200	300	400	500	600	V
Maximum Average Forward Rectified Current		$I_{F(AV)}$	2							A
Peak Forward Surge Current	8.3ms Single Half Sine-wave Superimposed On Rate Load	I_{FSM}	50							A
Current Squared Time	$t < 8.3ms$	I^2t	10.4							A ² sec

Electrical Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	ES2 A	ES2 B	ES2 D	ES2 F	ES2 G	ES2 H	ES2 J	Unit	
Maximum Instantaneous Forward Voltage	I _F = 2 A	V _F	0.95			1.30		1.70		V	
Maximum DC Reverse Current at Rated DC Blocking Voltage	Ta=25℃ ,V _R =VRRM Ta=125℃ ,V _R =VRRM*80%	I _{RRM}	5 200								uA uA
Typical Junction Capacitance	4 V,1MHz	C _J	30			17		14		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	Test Conditions	Symbol	ES2 A	ES2 B	ES2 D	ES2 F	ES2 G	ES2 H	ES2 J	Unit
Operating Junction Temperature Range		T _J	-55~150							℃
Storage Temperature Range		T _{STD}	-55~150							
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With Ta=25℃	R _{θJA}	70.0							℃/W
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	R _{θJC}	18.0							

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

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Typical Characteristics Curves

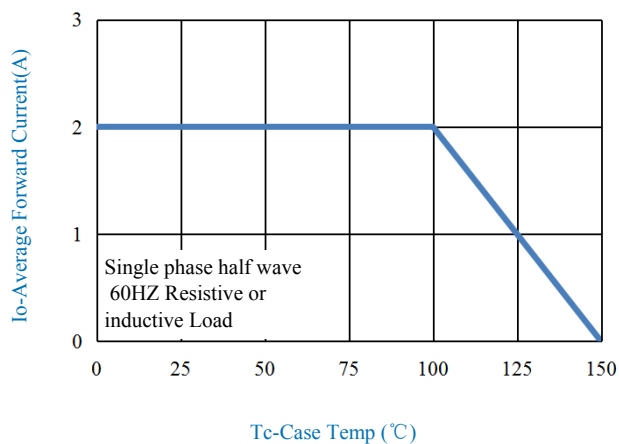


Fig.1-Forward Current Derating Curve

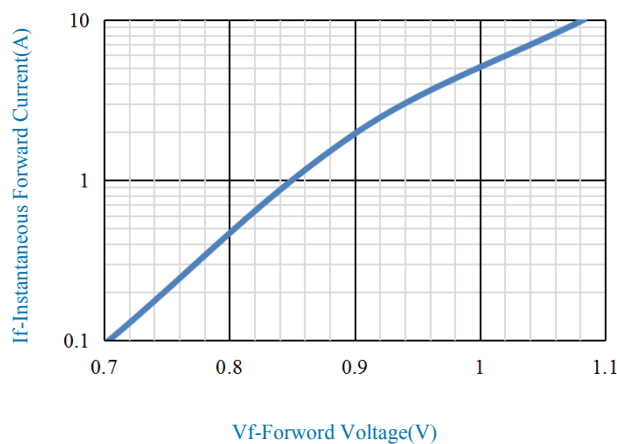


Fig.2-Typical Instantaneous Forward

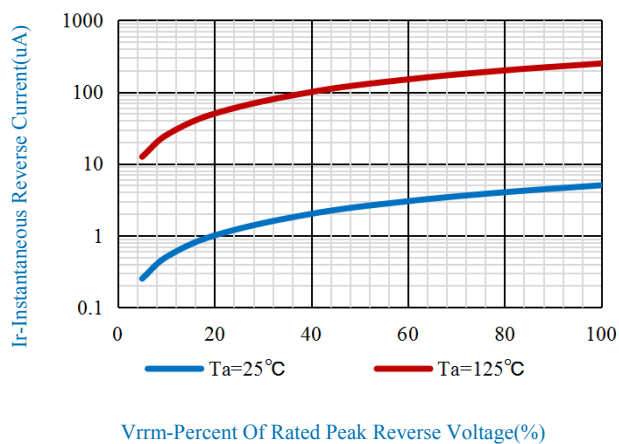


Fig.3-Typical Reverse Characteristics

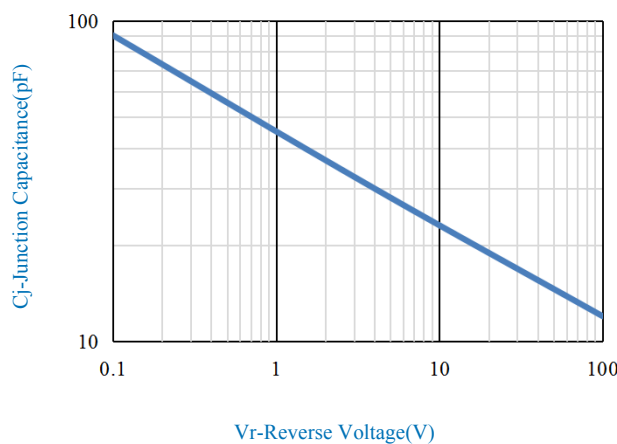


Fig.4-Typical Junction Capacitance

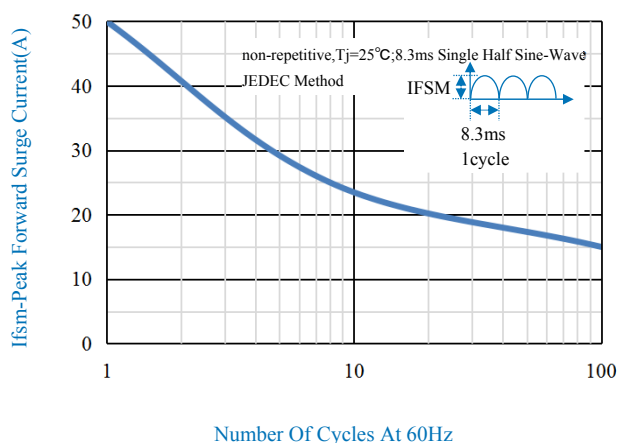


Fig.5-Max. Non-Repetitive Surge Current

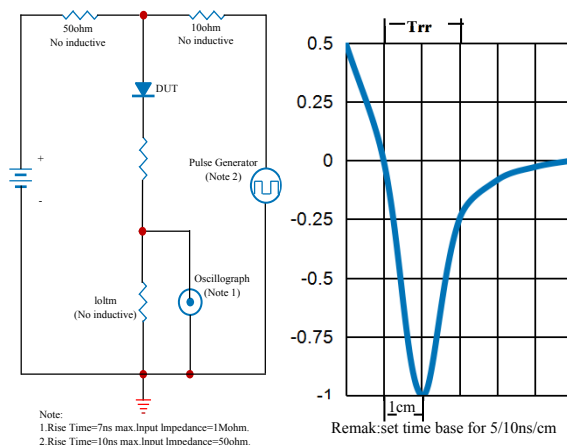
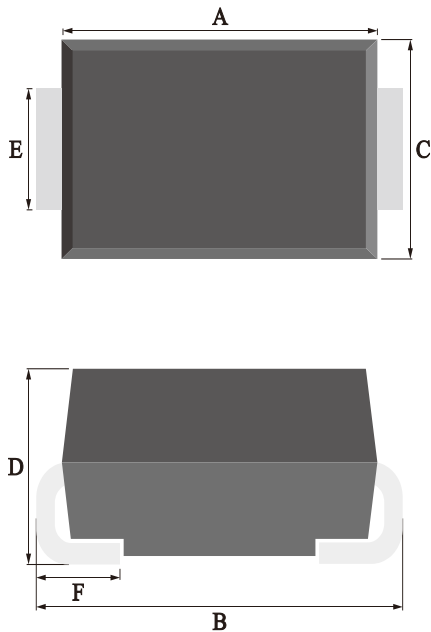


Fig.6-Reverse Recovery Time Characteristic And Test Circuit

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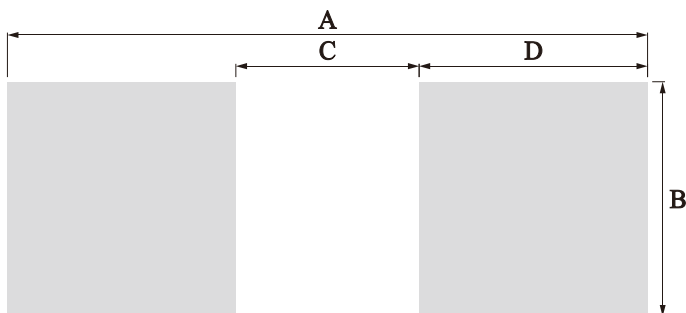
OUTLINE DRAWINGS



SMB

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.00	-	4.70	0.1575	-	1.8504
B	5.00	-	5.59	1.9685	-	2.2008
C	3.30	-	3.94	1.2992	-	1.5512
D	2.10	-	2.45	0.8268	-	0.9646
E	1.90	-	2.11	0.7480	-	0.8307
F	0.76	-	1.50	0.2992	-	0.5906

RECOMMEDND LAYOUT DRAWINGS



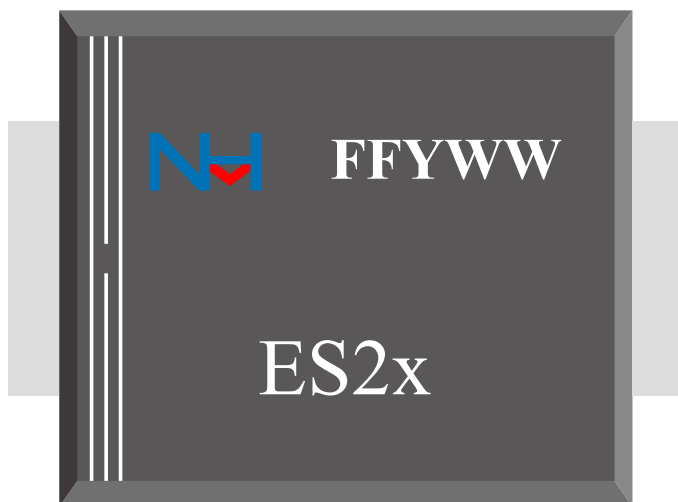
SMB

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.34	-	-	2.4961	-
B	-	2.72	-	-	1.0709	-
C	-	1.76	-	-	0.6929	-
D	-	2.29	-	-	0.9016	-

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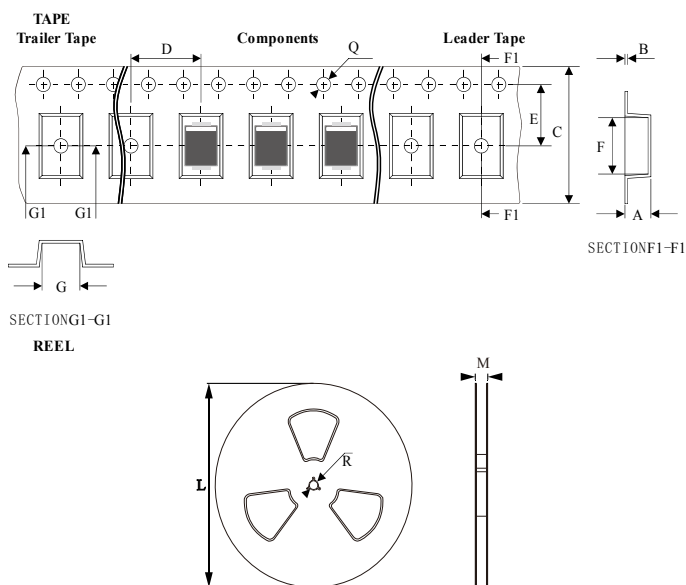
MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
ES2x=mark,x=A,B,D,F,G,H,J
White band denotes cathode

PACKAGING



SMB

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
TAPE						
A	2.60	-	2.80	0.1024	-	0.1102
B	0.15	-	0.35	0.0059	-	0.0138
C	11.70	-	12.30	0.4606	-	0.4843
D	7.70	-	8.30	0.3031	-	0.3268
E	5.30	-	5.70	0.2087	-	0.2244
F	5.49	-	5.89	0.2161	-	0.2319
G	3.66	-	3.86	0.1441	-	0.1520
Q Φ	1.40	-	1.60	0.0551	-	0.0630
REEL						
L	328.00	-	332.00	12.913	-	13.071
R	12.00	-	14.00	0.4724	-	0.5512
M	15.00	-	17.00	0.5906	-	0.6693

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SMB	P1	0.095	13" Reel	3000	6000	48000
SMB	P1	0.095	13" Reel	3000	6000	60000

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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 (T _S min) -Temperature Max (T _S 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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Specification Revision History

Rev.	Date	Changed Items	Pre-Changed Content	Changed Content
A/1	2014-10-20	First Issue		
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