

SF51Q THRU SF58Q
Super Fast Recovery Rectifiers



Voltage: 50~600 Volts	Current: 5 Amperes	Package: TO-277
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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 ClassV-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	SF	SF	SF	SF	SF	SF	SF	Unit
			51Q	52Q	54Q	55Q	56Q	57Q	58Q	
Maximum Repetitive Peak Reverse Voltage		V_{RRM}	50	100	200	300	400	500	600	V
Maximum RMS Voltag		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		$I_{F(AV)}$	5							A
Peak Forward Surge Current	8.3ms Single Half Sine-wave Superimposed On Rate Load	I_{FSM}	150							A
Current Squared Time	$t < 8.3ms$	I^2t	93.4							A ² sec

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

Parameter	Test Conditions	Symbol	SF	SF	SF	SF	SF	SF	SF	Unit
			51Q	52Q	54Q	55Q	56Q	57Q	58Q	
Maximum Instaneous Forward Voltage	$I_F = 5.0 A$	V_F	0.95			1.30		1.70		V
Maximum DC Reverse Current at Rated DC Blocking Voltage	Ta=25°C, $V_R = V_{RRM}$ Ta=125°C, $V_R = V_{RRM} * 80%$	I_{RRM}	5 200							uA uA
Typical Junction Capacitance	4 V,1MHz	C_J	80			40		35		pF
Maximum Reverse Recovery Time	IF=0.5A, IR=1.0A, IRR=0.25A	T_{rr}	35							nS

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

Parameter	Test Conditions	Symbol	SF	SF	SF	SF	SF	SF	SF	Unit
			51Q	52Q	54Q	55Q	56Q	57Q	58Q	
Operating Junction Temperature Range		T_J	-55~150							°C
Storage Temperature Range		T_{STD}	-55~150							
Thermal Resistance Junction To Ambient With Steady-State	Still Air Environment With Ta=25°C	$R_{\theta JA}$	60.0							°C/W
Thermal Resistance Junction-Case With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JC}$	18.0							

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

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Typical Characteristics Curves

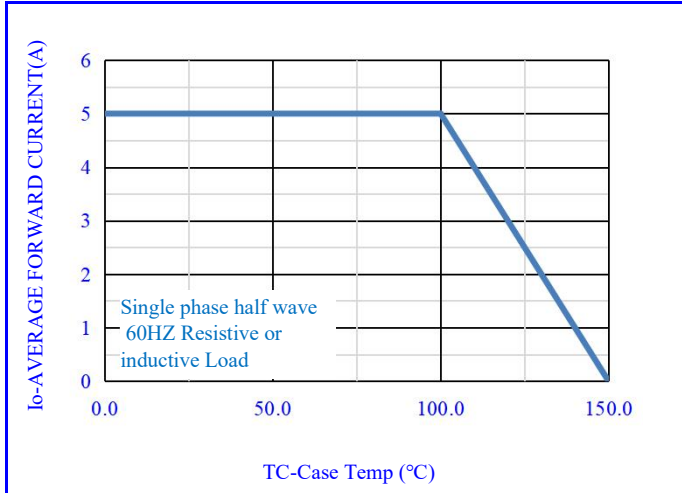


Fig.1-FORWARD CURRENT DERATING CURVE

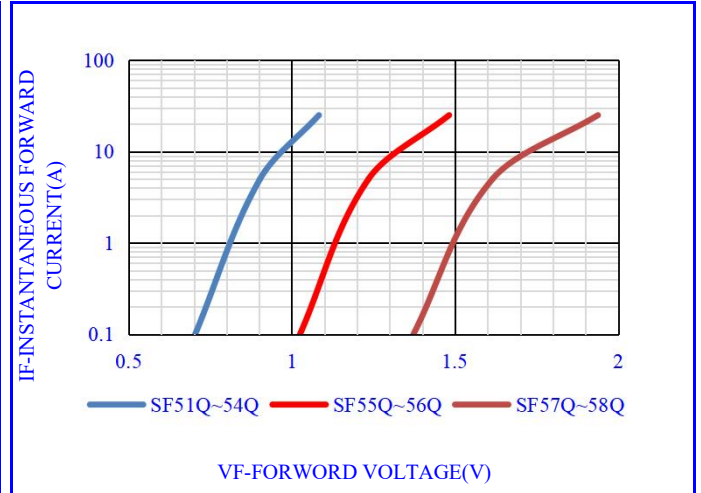


Fig.2- TYPICAL INSTANTANEOUS FORWARD

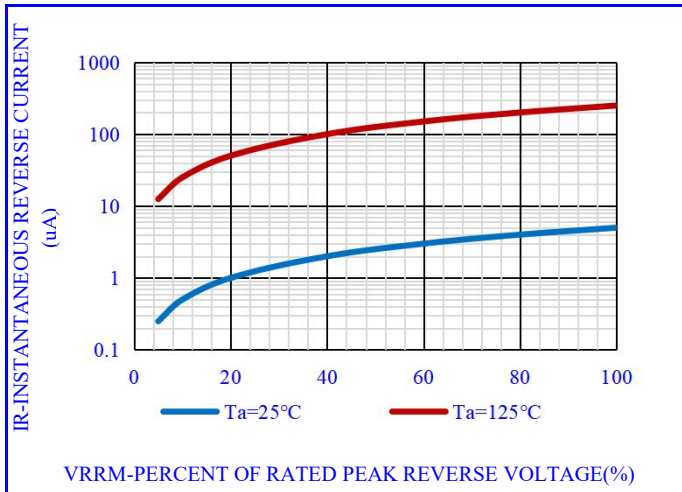


Fig.3- TYPICAL REVERSE CHARACTERISTICS

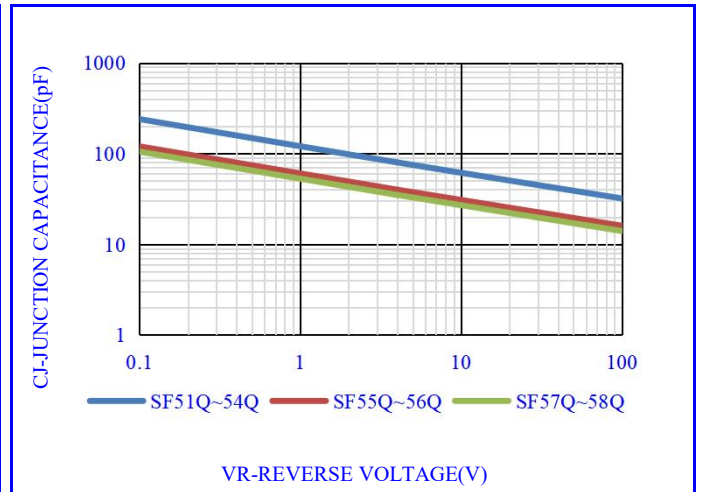


Fig.4- TYPICAL JUNCTION CAPACITANCE

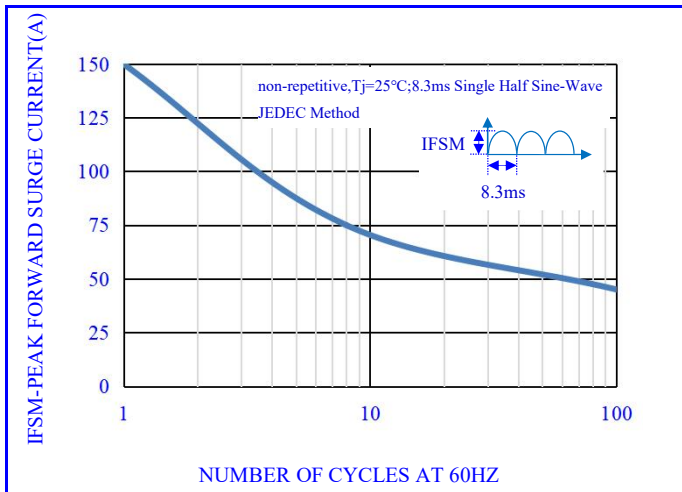


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

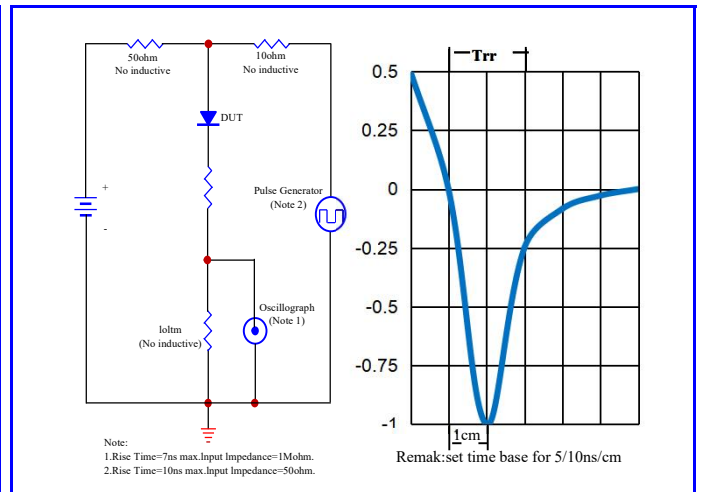
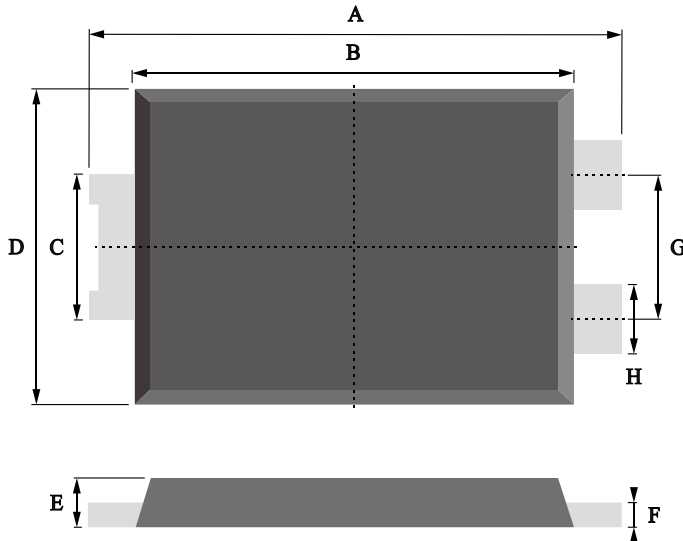


Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

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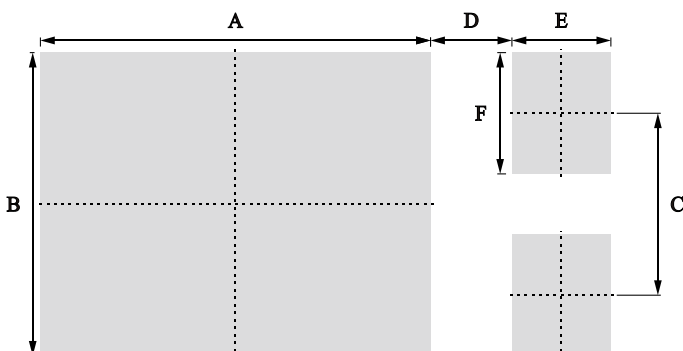
OUTLINE DRAWINGS



TO-277

OUTLINE DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.99	-	7.00	0.2358	-	0.2756
B	4.87	-	6.10	0.1917	-	0.2402
C	1.70	-	2.12	0.0669	-	0.0835
D	3.44	-	4.63	0.1354	-	0.1823
E	0.98	-	1.29	0.0386	-	0.0508
F	0.16	-	0.40	0.0063	-	0.0157
G	1.62	-	2.07	0.0638	-	0.0815
H	0.78	-	0.98	0.0307	-	0.0386

RECOMMENDED LAYOUT DRAWINGS



TO-277

OUTLINE DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	4.65	-	-	0.1831	-
B	-	3.50	-	-	0.1378	-
C	-	2.10	-	-	0.0827	-
D	-	0.97	-	-	0.0382	-
E	-	1.18	-	-	0.0465	-
F	-	1.40	-	-	0.0551	-

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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
 EDDK=Inernal Code,According To Actual Changes
 SF5xQ=Model,x=1,2,4,5,6,7,8
 White band denotes cathode

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-277	P1	0.1	13" Reel	5000	10000	80000
TO-277	P2	0.1	13" Reel	5000	10000	100000

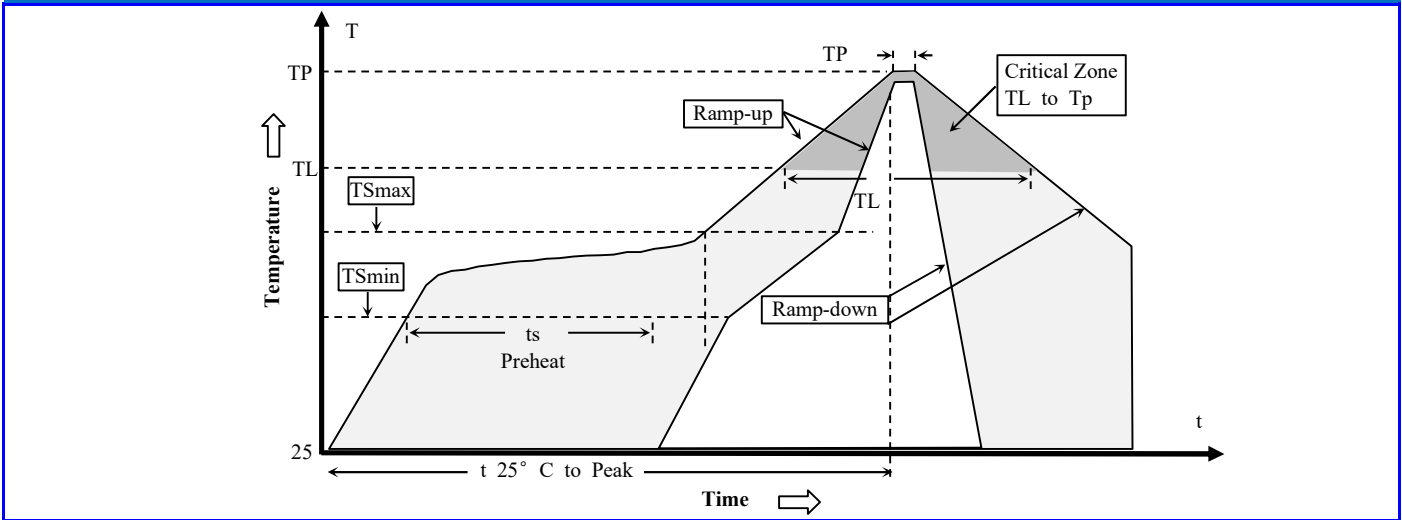
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Recommended wave soldering condition

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 (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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