

NCD10A65S

Silicon Carbide Schottky Diode



Voltage: 650 Volts

Current: 10 A

Package: TO-252

Features

- NH'S Advanced Silicon Carbide Schottky Technology
- Zero Reverse Recovery
- Positive Temperature Coefficient On VF
- Extremely Fast Switching And Extremely Low Leakage Current

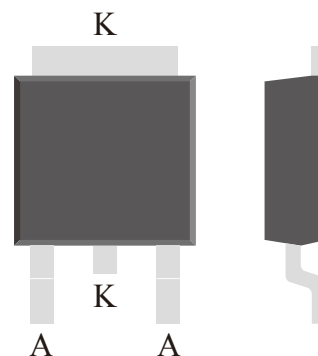
Mechanical Data

- **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

- Power Factor Correction (PFC)
- Interruptible Power Supply (UPS)
- Switch Mode Power Supply (SMPS)

Diagram:



Polarity:



Maximum Ratings (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Maximum Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Maximum DC Blocking Voltage		V_{DC}	650	V
Max Average Forward Rectified Current	$T_C = 25\text{ }^{\circ}\text{C}$	$I_{F(AV)}$	27	A
	$T_C = 110\text{ }^{\circ}\text{C}$		17	
	$T_C = 150\text{ }^{\circ}\text{C}$		10	
Non-Repetitive Peak Forward Surge Current Sine Half-Wave	$T_C = 25\text{ }^{\circ}\text{C}, T_P = 10\text{ms}$	I_{FSM}	70	A
	$T_C = 110\text{ }^{\circ}\text{C}, T_P = 10\text{ms}$		60	
Repetitive Peak Forward Surge Current Sine Half-Wave	$T_C = 25\text{ }^{\circ}\text{C}, T_P = 10\text{ms}$	I_{FRM}	65	A
	$T_C = 110\text{ }^{\circ}\text{C}, T_P = 10\text{ms}$		55	
Maximum Power Dissipation Power	$T_C = 25\text{ }^{\circ}\text{C}$	P_{tot}	71	W
Dissipation Derating Factor Above 25°C	$T_C = 100\text{ }^{\circ}\text{C}$		36	
Current Squared Time	$t < 8.3\text{ms}$	I^2t	20.3	A ² sec

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

Parameter	Test Conditions	Symbol	Ratings			Unit
			Min.	Typ.	Max.	
Instantaneous Forward Voltage Per Diode	$T_a = 25\text{ }^{\circ}\text{C}$	V_F	--	1.34	1.65	V
	$T_a = 175\text{ }^{\circ}\text{C}$		--	1.61	--	
Maximum DC Reverse Current at Rated DC Blocking Voltage	$T_a = 25\text{ }^{\circ}\text{C}$ $V_R = V_{RRM}$	I_{RRM}	--	0.5	40.0	uA
	$T_a = 175\text{ }^{\circ}\text{C}$ $V_R = 80\% * V_{RRM}$		--	7.5	--	
Capacitance stored energy	$V_R = 400\text{ V}$	E_C	--	4.2	--	uJ
Total Capacitive Charge	$Q_C = \int_0^{V_R} C * dV$ $V_R = 400\text{ V}$	Q_C	--	28	-	nC
Typical Junction Capacitance Per Diode	1 V, 1MHz	C_J	--	383	--	pF
	200 V, 1MHz		--	56	--	
	400 V, 1MHz		--	41	--	

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

Parameter	Test Conditions	Symbol	Ratings	Unit
Operating Junction Temperature Range		T_J	-55 to 175	$^{\circ}\text{C}$
Storage Temperature Range		T_{STD}	-55 to 175	
Max Thermal Resistance Junction-Case With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JC}$	2.1	$^{\circ}\text{C/W}$

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Typical Characteristics Curves

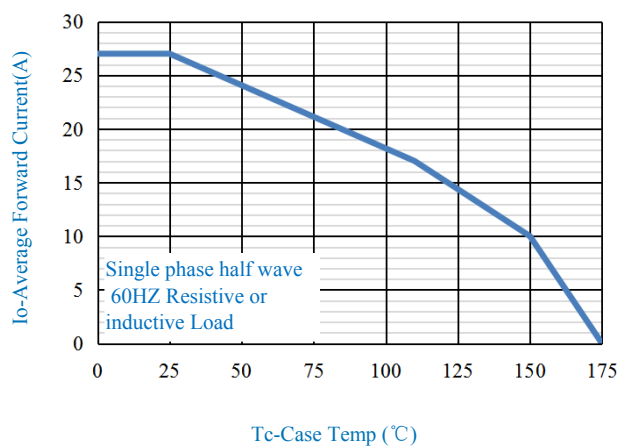


Fig.1-Forward Current Derating Curve

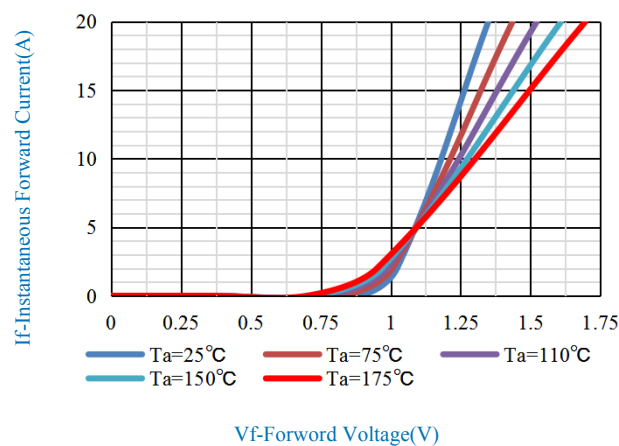


Fig.2-Typical Instantaneous Forward

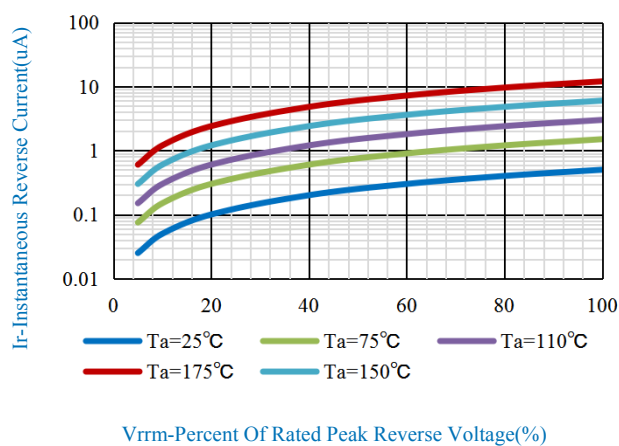


Fig.3-Typical Reverse Characteristics

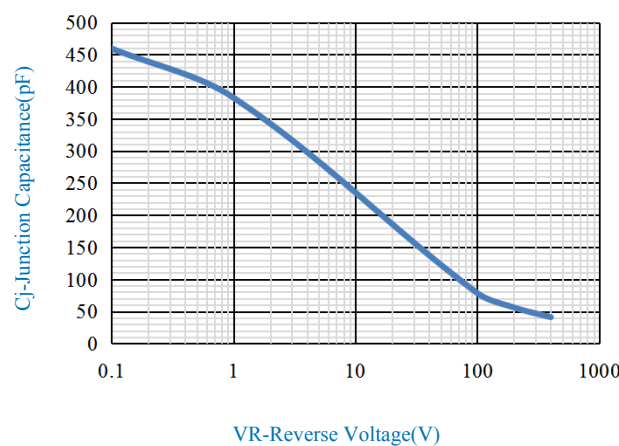


Fig.4-Typical Junction Capacitance

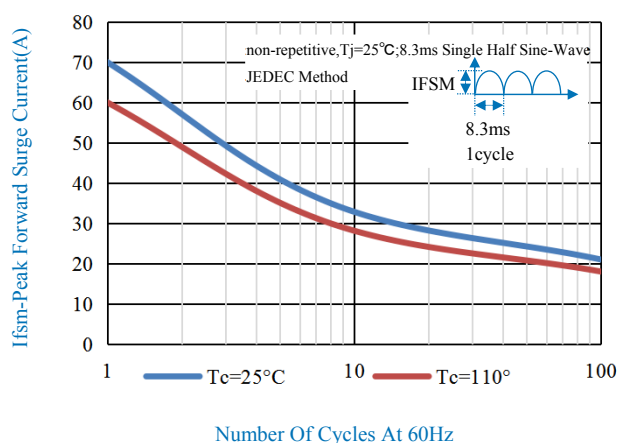


Fig.5-Max. Non-Repetitive Surge Current

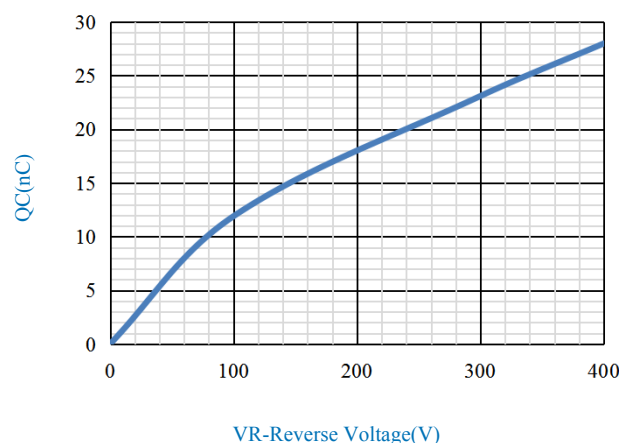


Fig.6-Total Capacitance Charge Characteristics vs. Reverse Voltage

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Typical Characteristics Curves

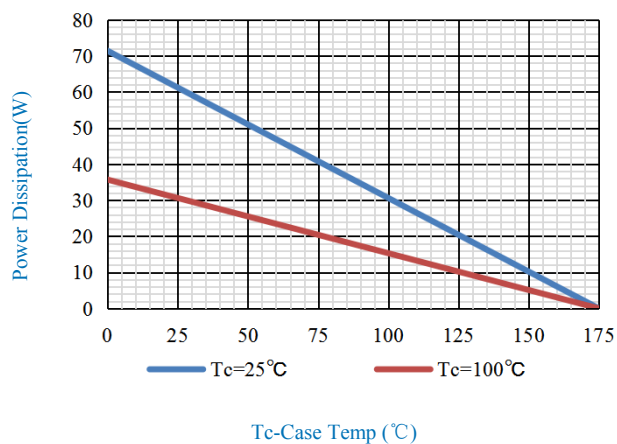


Fig.7-Power dissipation as function of case temperature

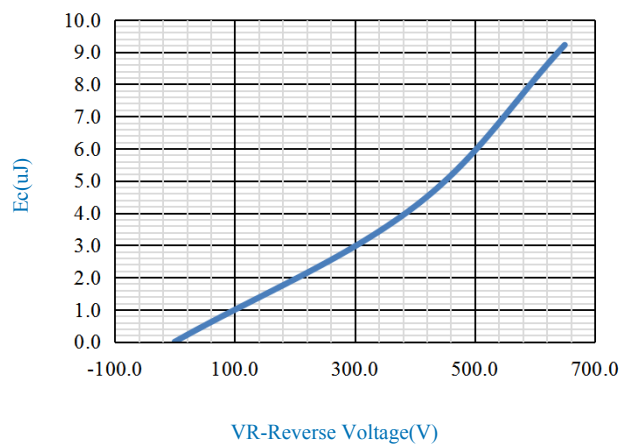


Fig.8-Capacitance Stored Energy

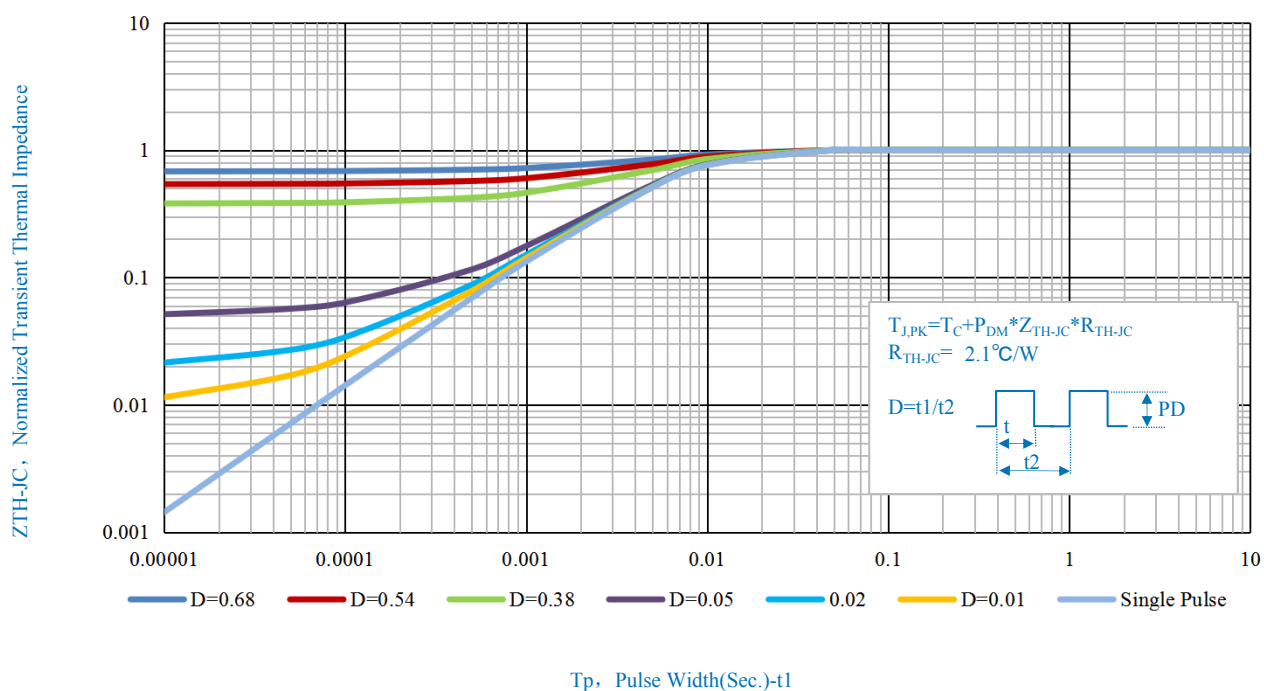


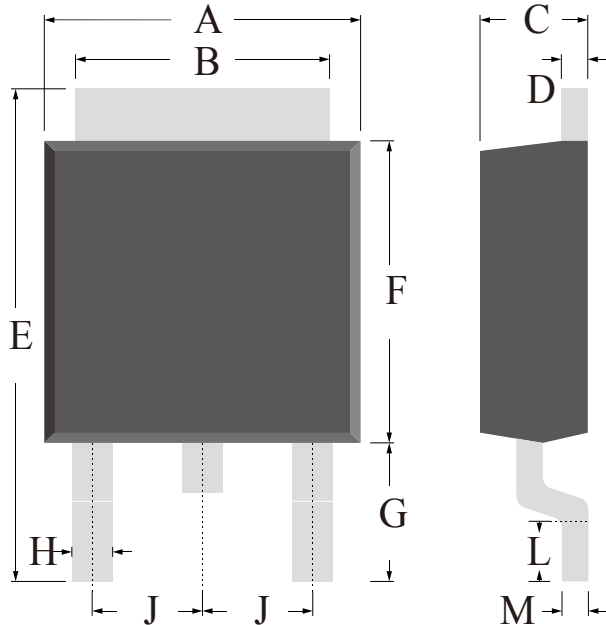
Fig.9- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

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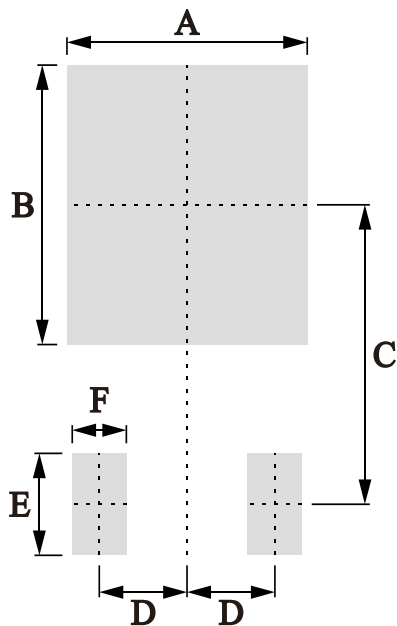
OUTLINE DRAWINGS



TO-252

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.10	-	7.10	0.2402	-	0.2795
B	4.80	-	5.80	0.1890	-	0.2283
C	1.95	-	2.55	0.0768	-	0.1004
D	0.35	-	0.75	0.0138	-	0.0295
E	9.25	-	10.75	0.3642	-	0.4232
F	5.60	-	6.60	0.2205	-	0.2598
G	2.50	-	3.10	0.0984	-	0.1220
H	0.55	-	0.85	0.0217	-	0.0335
J	2.10	-	2.50	0.0827	-	0.0984
L	1.00	-	1.40	0.0394	-	0.0551
M	0.35	-	0.75	0.0138	-	0.0295

RECOMMENDED LAYOUT DRAWINGS



TO-252

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.09	-	-	0.2398	-
B	-	7.57	-	-	0.2980	-
C	-	6.64	-	-	0.2614	-
D	-	2.30	-	-	0.0906	-
E	-	2.76	-	-	0.1087	-
F	-	1.42	-	-	0.0559	-

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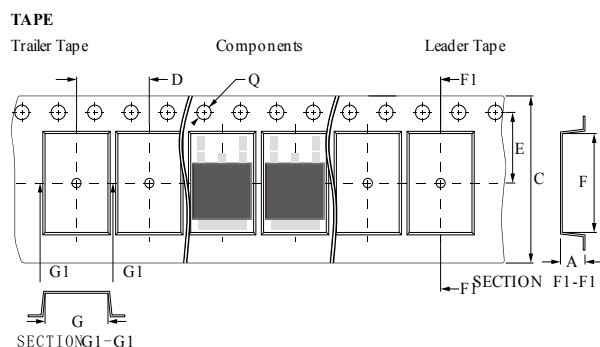
MARKING



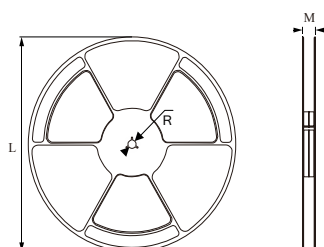
MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
LLWWF=Internal Code,According To Actual Changes
NCD10A65S=Model

PACKAGING



REEL



TO-252

OUTLINE DIMENSIONS

Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
TAPE						
A	2.60	-	2.80	0.1024	-	0.1102
C	15.60	-	16.40	0.6142	-	0.6457
D	7.70	-	8.30	0.3031	-	0.3268
E	7.30	-	7.70	0.2874	-	0.3031
F	10.20	-	10.80	0.4016	-	0.4252
G	6.70	-	7.10	0.2638	-	0.2795
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	19.40	-	23.40	0.7638	-	0.9213

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-252	P1	0.321	13" Reel	2500	5000	30000
TO-252	P2	0.321	13" Reel	2500	2500	25000

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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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