NCD4A65

Silicon Carbide Schottky Diode

Pb-Free RoHS COMPLIANT

Voltage:	650 Volts	Current:	4 A	Package:	TO-220AC

Features

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

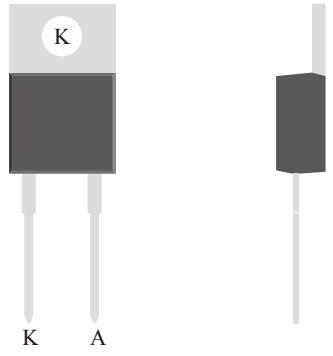
Mechanical Data

- **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)
- Unterruptible Power Supply (UPS)
- Switch Mode Power Supply (SMPS)

Diagram:



Polarity:



Maximum Ratings (Ta=25℃ 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 RectifiedCurrent	T_C= 25 ℃ T_C= 110 ℃ T_C= 150 ℃	$I_{F(AV)}$	13 7 4	A
Non-Repetitive Peak Forward Surge Current Sine Half-Wave	T_c=25°C,T_P=10ms Tc=110°C,T_P=10ms	I_{FSM}	31 29	A
Repetitive Peak Forward Surge Current Sine Half-Wave	T_C=25°C,T_P=10ms Tc=110°C,TP=10ms	I_{FRM}	15 14	A
Maximum Power Dissipation Power Dissipation Derating Factor Above 25℃	Tc= 25 ℃ Tc= 100 ℃	P_{tot}	47 24	W
Current Squared Time	t< 8.3ms	I^2t	4	A^2sec
Avalanche Current,Single Pulse (Note 1)	L= 0.5 mH	I_{AS}	7	A
Single Pulse Avalanche Energy (Note 1) Test Circuit & Waveform See Fig.16	L= 0.5 mH,I_{PK}= 7.0 A Starting Tj=25 ℃,VDD = 50.0 V	E_{AS}	12.3	mJ

Electrical Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Ratings			Unit
			Min.	Typ.	Max.	
Instaneous Forward Voltage Per Diode	Ta=25℃ I_F= 4.0 A Ta=175℃	V_F	-- --	1.35 1.65	1.65 --	V
Maximum DC Reverse Current at Rated DC Blocking Voltage	Ta=25℃ VR=VRRM Ta=175℃ VR=80%*VRRM	I_{RRM}	-- --	0.5 2.8	15 --	uA
Capacitance stored energy	VR= 400 V	E_C	--	2.2	--	uJ
Total Capacitive Charge	$Qc=\int_0^{VR} C*dV$ VR= 400 V	Q_C	--	14	-	nC
Typical Junction Capacitance Per Diode	1 V,1MHz 200 V,1MHz 400 V,1MHz	C_J	-- -- --	170 28 22	-- -- --	pF

Thermal Characteristcs (Ta=25℃ Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Ratings	Unit
Operating Junction Temperature Range		T_J	-55 to 175	℃
Storage Temperature Range		T_{STD}	-55 to 175	
Max Thermal Resistance Junction-Case With Steady-State	Device Mounted On 75mm x 45mm x 2.5mm Alu. Heat.	$R_{\theta JC}$	3.18	℃/W

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Typical Characteristics Curves

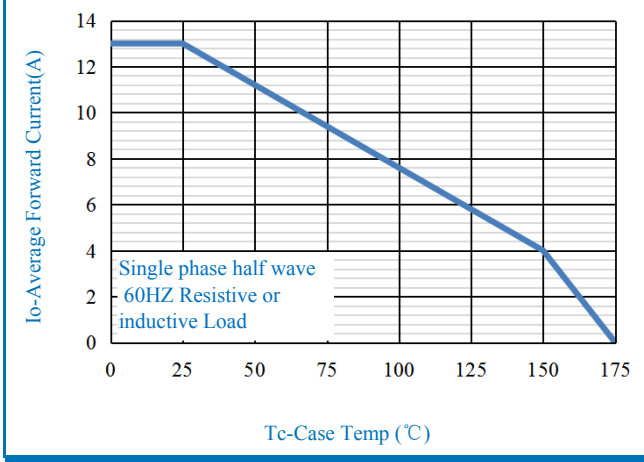


Fig.1-Forward Current Derating Curve

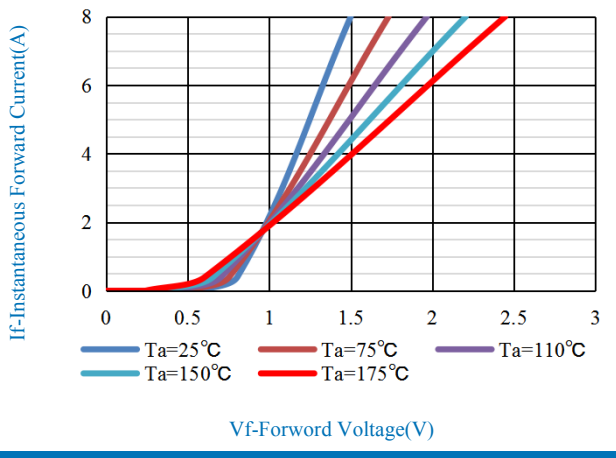


Fig.2-Typical Instantaneous Forward

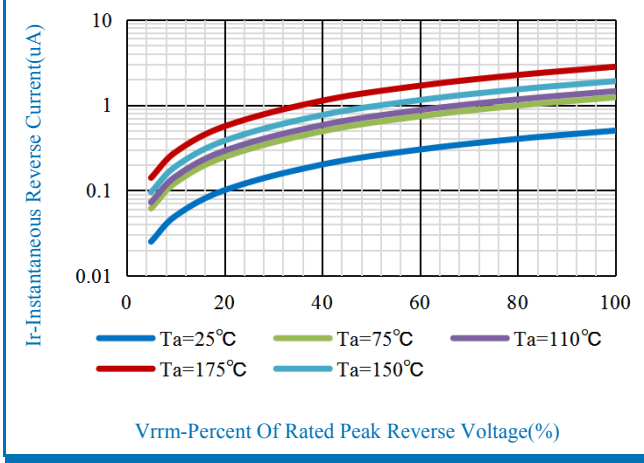


Fig.3-Typical Reverse Characteristics

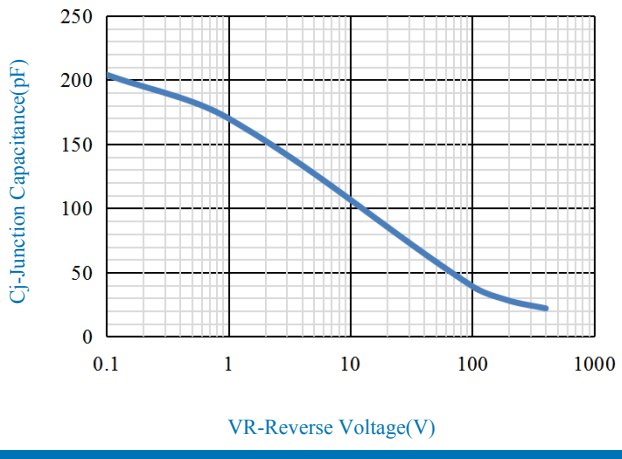


Fig.4-Typical Junction Capacitance

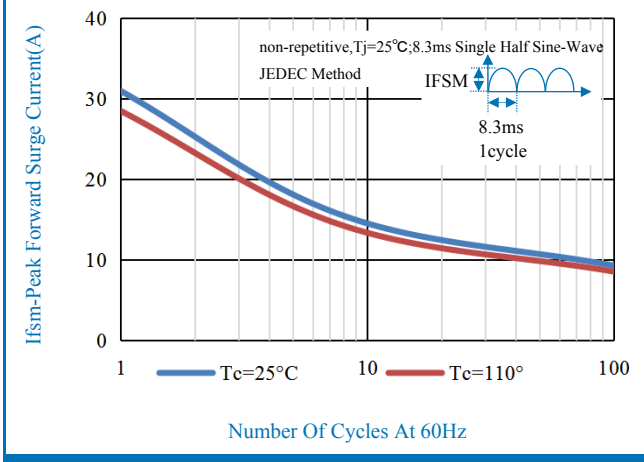


Fig.5-Max. Non-Repetitive Surge Current

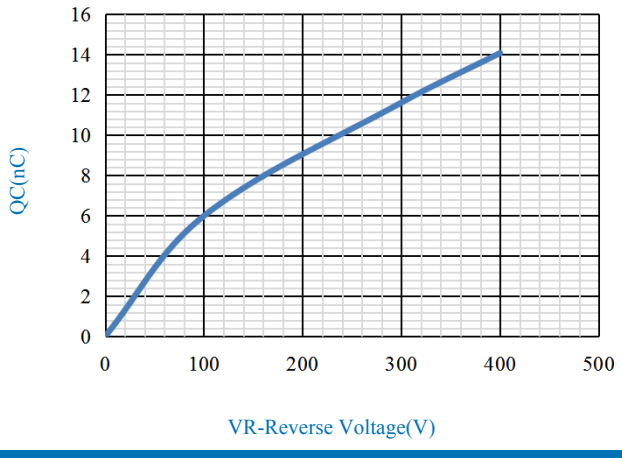


Fig.6-Total Capacitance Charge Characteristics vs. ReverseVoltage

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Typical Characteristics Curves

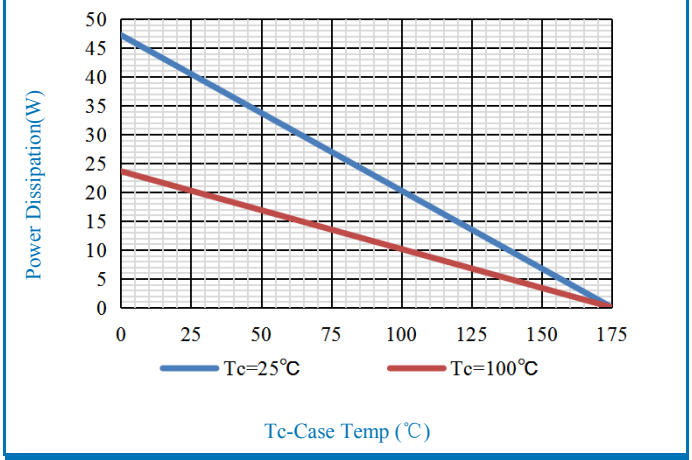


Fig.7-Power dissipation as function of case temperature

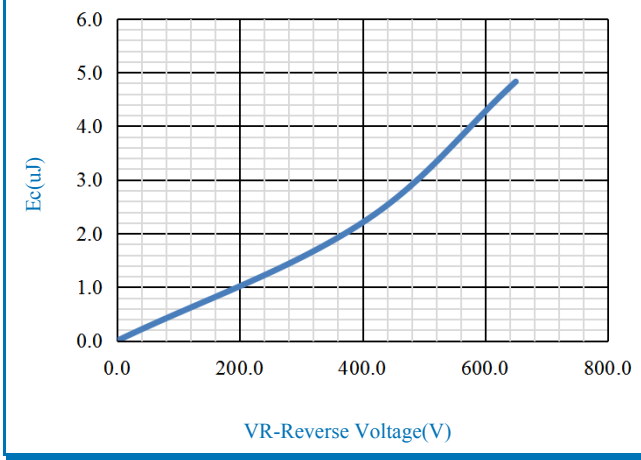


Fig.8-Capacitance Stored Energy

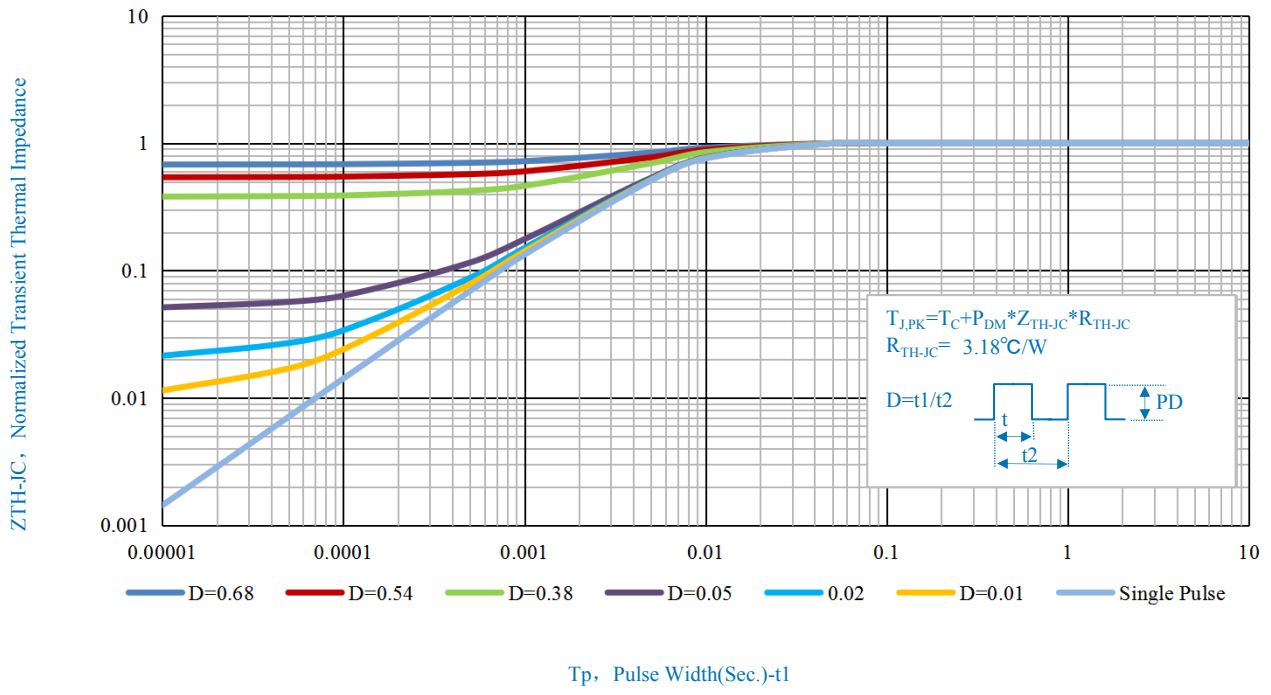


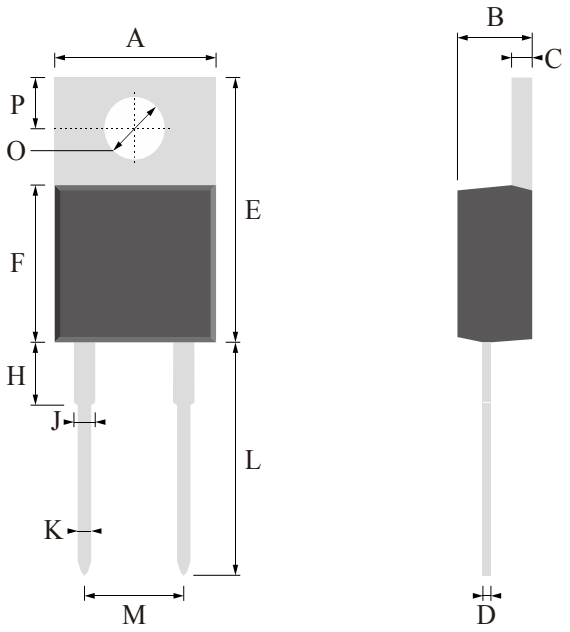
Fig.9- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

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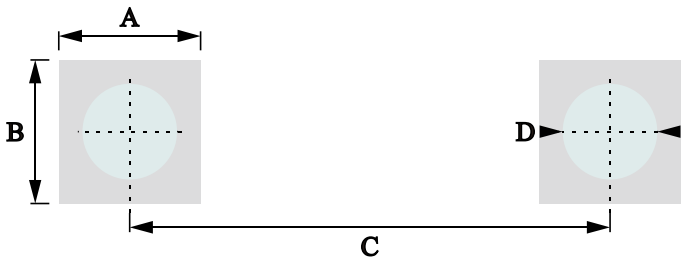
OUTLINE DRAWINGS



TO-220AC

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.25	-	10.75	0.3642	-	0.4232
B	4.15	-	4.75	0.1634	-	0.1870
C	1.10	-	1.50	0.0433	-	0.0591
D	0.30	-	0.50	0.0118	-	0.0197
E	14.20	-	16.20	0.5591	-	0.6378
F	8.00	-	9.50	0.3150	-	0.3740
L	12.10	-	14.10	0.4764	-	0.5551
H	2.20	-	2.80	0.0866	-	0.1102
J	1.15	-	1.55	0.0453	-	0.0610
K	0.70	-	1.00	0.0276	-	0.0394
M	4.70	-	5.20	0.1850	-	0.2047
O	3.45	-	4.15	0.1358	-	0.1634
P	2.40	-	3.40	0.0945	-	0.1339

RECOMMEDNED LAYOUT DRAWINGS



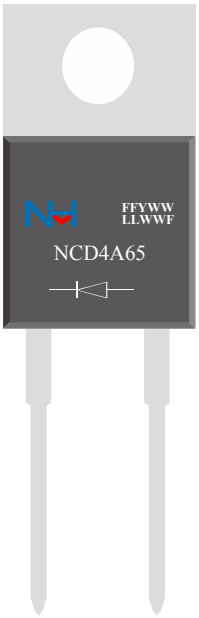
TO-220AC

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	1.60	-	-	0.0630	-
B	-	1.60	-	-	0.0630	-
C	-	5.08	-	-	0.2000	-
D	-	1.00	-	-	0.0394	-

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MARKING	MARKING INSTRUCTION
	**NH=Niuhang Trademark** **FF=Product Line Code,According To Actual Changes** **YWW=Date Code,According To Actual Changes** **LLWWF=Inernal Code,According To Actual Changes** **NCD4A65=Model**

PACKING INFORMATION

Package Type	Package Code	Productor Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
TO-220AC	P1	1.834	Tube	50	1000	5000

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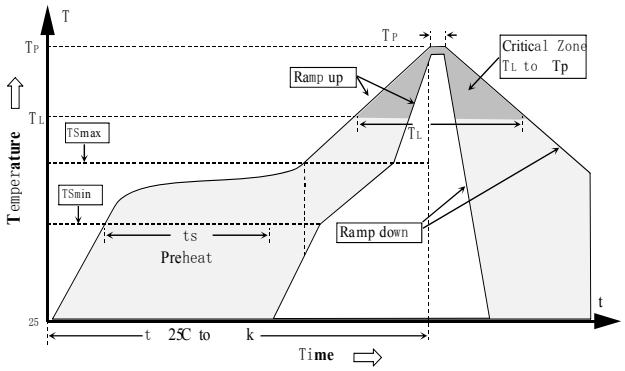
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Recommended wave soldering condition

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 (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.

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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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