

NCD20A65P

Silicon Carbide Schottky Diode



Voltage: 650 Volts

Current: 20 A

Package: TO-247AC

Features

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

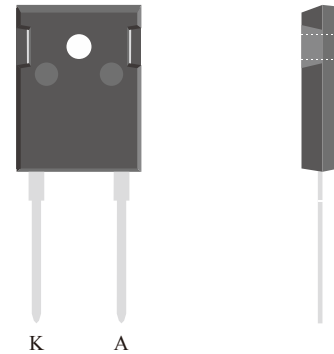
Mechanical Data

- **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	$T_C = 25^\circ C$ $T_C = 110^\circ C$ $T_C = 150^\circ C$	$I_{F(AV)}$	51 30 20	A
Non-Repetitive Peak Forward Surge Current Sine Half-Wave	$T_C = 25^\circ C, T_P = 10ms$ $T_C = 110^\circ C, T_P = 10ms$	I_{FSM}	130 120	A
Repetitive Peak Forward Surge Current Sine Half-Wave	$T_C = 25^\circ C, T_P = 10ms$ $T_C = 110^\circ C, T_P = 10ms$	I_{FRM}	120 110	A
Maximum Power Dissipation Power	$T_C = 25^\circ C$	P_{tot}	158	W
Dissipation Derating Factor Above 25°C	$T_C = 100^\circ C$		79	
Current Squared Time	$t < 8.3ms$	$I^2 t$	70.1	A ² sec
Avalanche Current, Single Pulse (Note 1)	$L = 0.5 mH$	I_{AS}	12.5	A
Single Pulse Avalanche Energy (Note 1)	$L = 0.5 mH, I_{PK} = 12.5 A$	E_{AS}	39	mJ
Test Circuit & Waveform See Fig.16				
	Starting $T_J = 25^\circ C, V_{DD} = 50.0 V$			

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

Parameter	Test Conditions	Symbol	Ratings			Unit
			Min.	Typ.	Max.	
Instantaneous Forward Voltage Per Diode	$T_a = 25^\circ C$ $T_a = 175^\circ C$ $I_F = 20.0 A$	V_F	--	1.35 1.61	1.65 --	V
Maximum DC Reverse Current at Rated DC Blocking Voltage	$T_a = 25^\circ C$ $V_R = V_{RRM}$ $T_a = 175^\circ C$ $V_R = 80\% * V_{RRM}$	I_{RRM}	--	1.5 8.0	60.0 --	uA
Capacitance stored energy	$V_R = 400.0 V$	E_C	--	10.0	--	uJ
Total Capacitive Charge	$Q_C = \int_0^{t_{VR}} C * dV$ $V_R = 400.0 V$	Q_C	--	62	-	nC
Typical Junction Capacitance Per Diode	1 V, 1MHz	C_J	--	845	--	pF
	200 V, 1MHz		--	120	--	
	400 V, 1MHz		--	85	--	

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

Parameter	Test Conditions	Symbol	Ratings	Unit
Operating Junction Temperature Range		T_J	-55 to 175	°C
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.	$R_{\theta JC}$	0.95	°C/W

NCD20A65P

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Typical Characteristics Curves

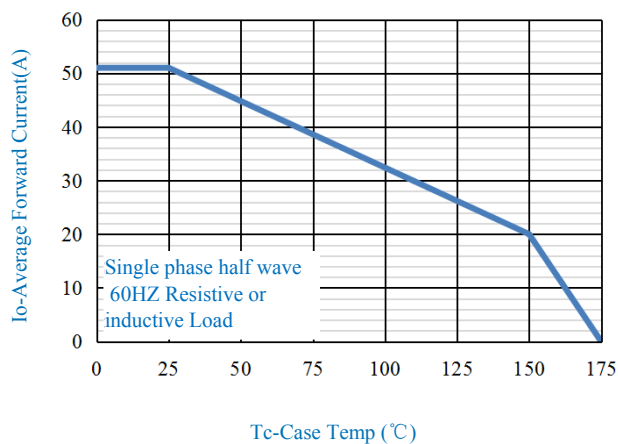


Fig.1-Forward Current Derating Curve

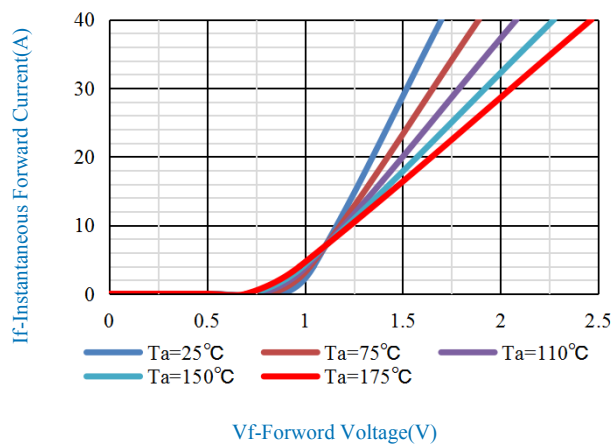


Fig.2-Typical Instantaneous Forward

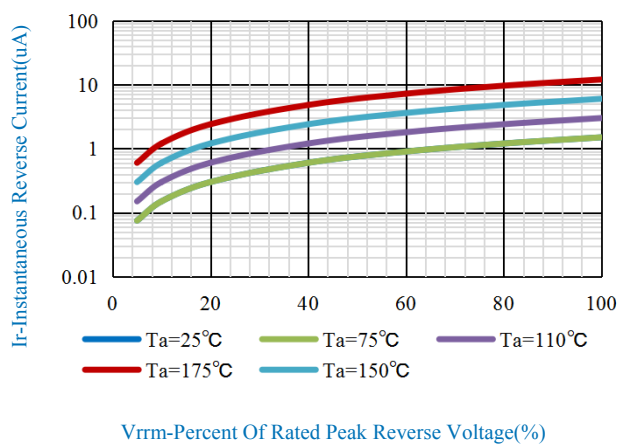


Fig.3-Typical Reverse Characteristics

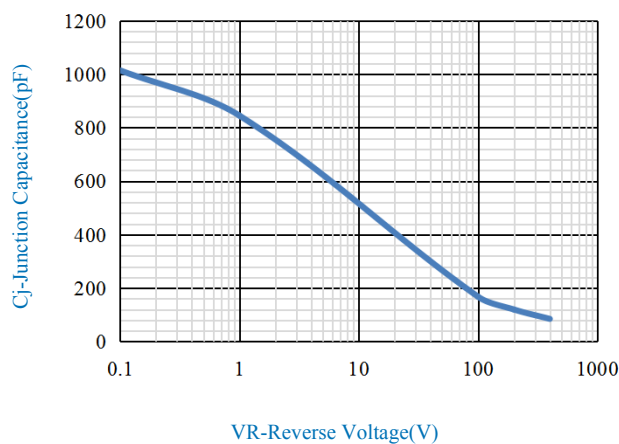


Fig.4-Typical Junction Capacitance

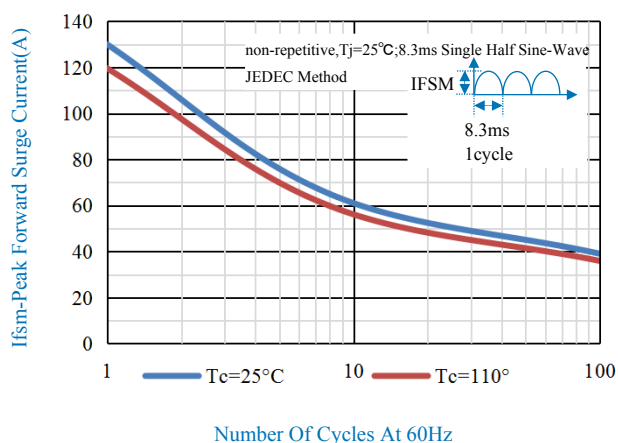


Fig.5-Max. Non-Repetitive Surge Current

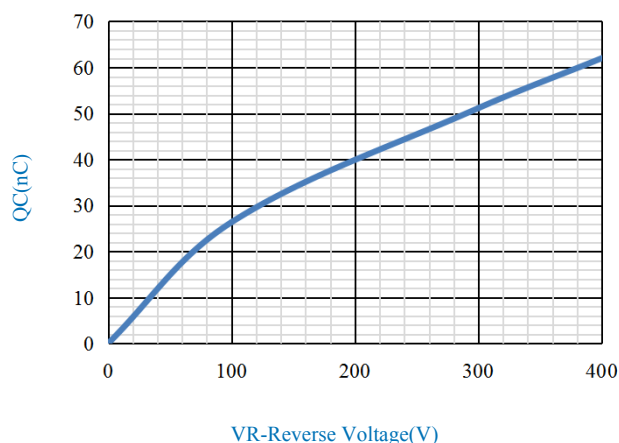


Fig.6-Total Capacitance Charge Characteristics vs. Reverse Voltage

NCD20A65P

Silicon Carbide Schottky Diode



Typical Characteristics Curves

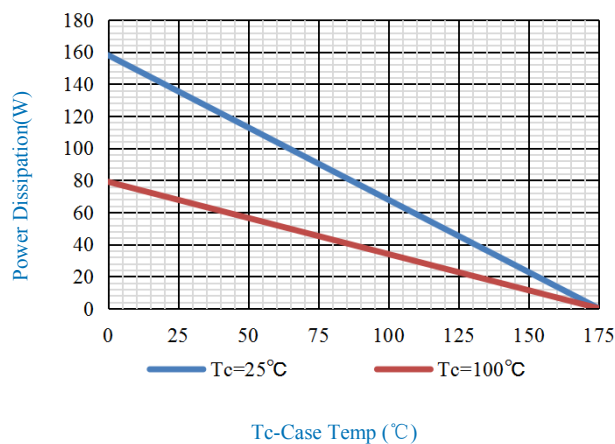


Fig.7-Power dissipation as function of case temperature

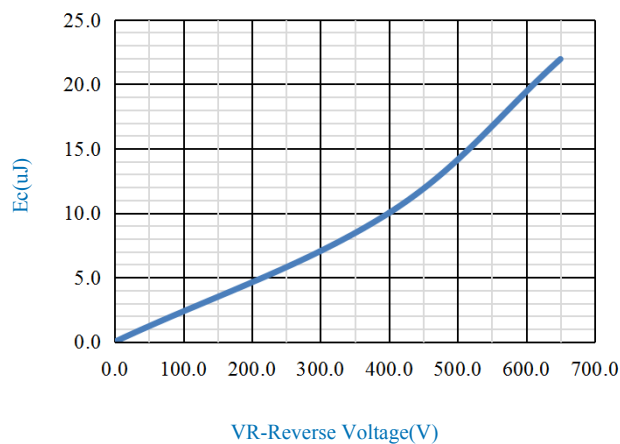


Fig.8-Capacitance Stored Energy

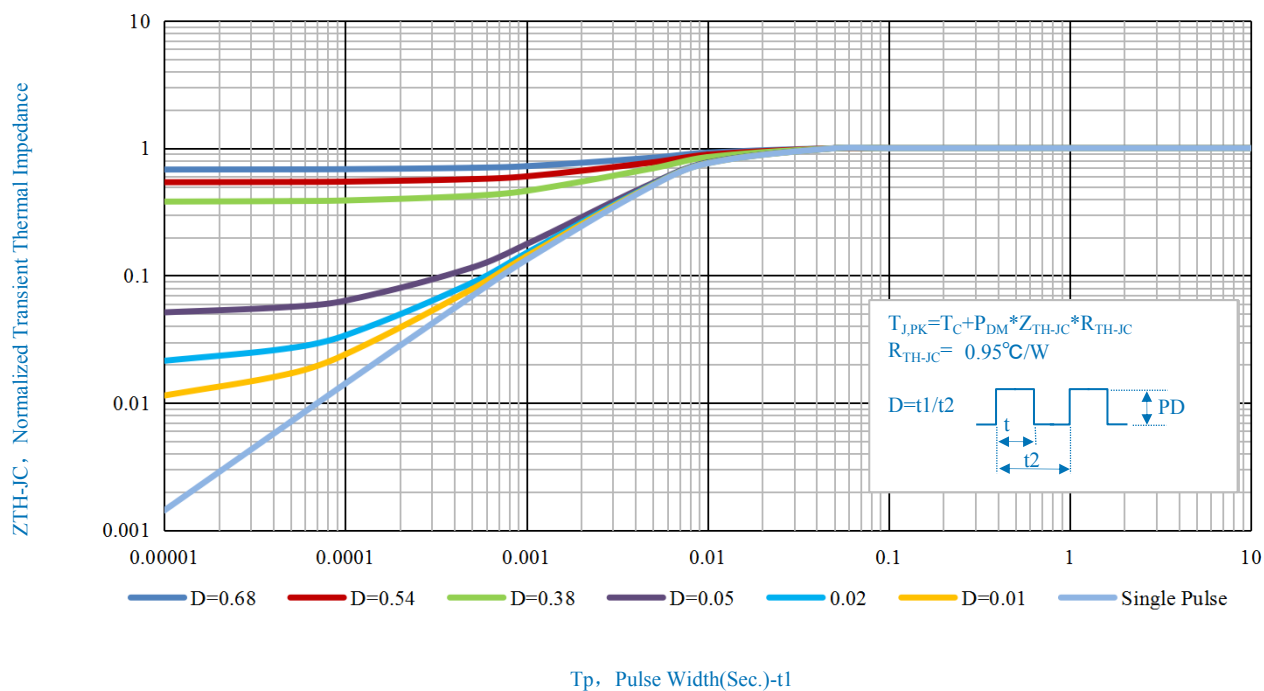


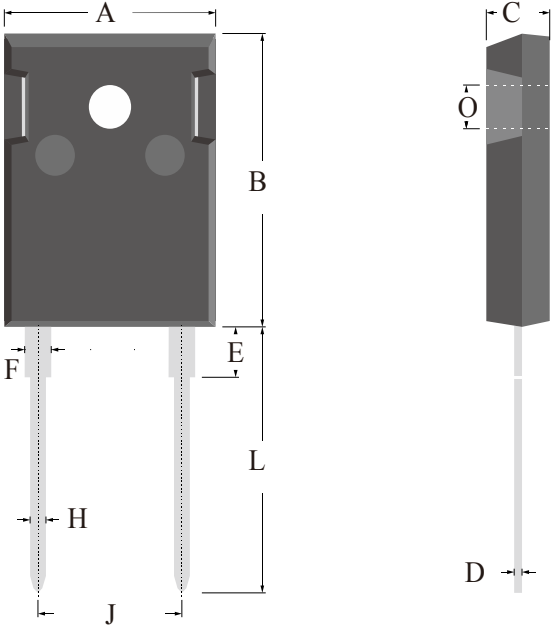
Fig.9- Normalized Maximum Transient Thermal Impedance Vs.Pulse Width

NCD20A65P

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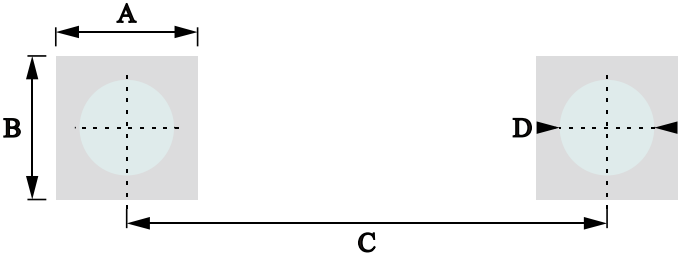
OUTLINE DRAWINGS



TO-247AC

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.25	-	16.75	0.6004	-	0.6594
B	20.50	-	22.50	0.8071	-	0.8858
C	4.50	-	5.10	0.1772	-	0.2008
D	0.40	-	0.80	0.0157	-	0.0315
E	3.40	-	4.00	0.1339	-	0.1575
F	1.80	-	2.20	0.0709	-	0.0866
H	1.00	-	1.40	0.0394	-	0.0551
J	5.15	-	5.75	0.2028	-	0.2264
L	18.50	-	20.50	0.7283	-	0.8071
O	2.85	-	3.15	0.1122	-	0.1240

RECOMMEDND LAYOUT DRAWINGS



TO-247AC

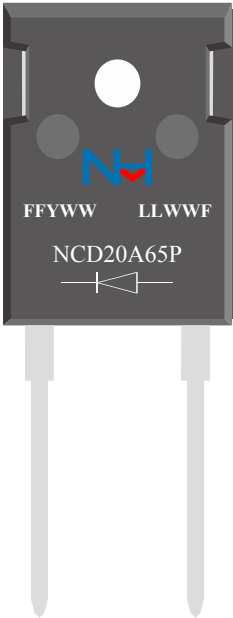
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	2.00	-	-	0.0787	-
B	-	2.00	-	-	0.0787	-
C	-	11.00	-	-	0.4331	-
D	-	1.40	-	-	0.0551	-

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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
LLWWF=Inernal Code,According To Actual Changes
NCD20A65P=Model

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-247AC	P1	5.4	Tube	30	450	2250

NCD20A65P

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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 _s max to T _p)	3°C/second max.	3°C/second max.
	Preheat-Temperature Min (T _S min) -Temperature Max (T _S max) -Time(t _s min to t _s 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 (t _p)	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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