

PIM56, 93x47 (SOLDER PIN) CASE 180AK

MARKING DIAGRAM

NXH200T120H3Q2F2Sxx ATYYWW NXH200T120H3Q2F2Sxxx = Device Code

YYWW	= Year and Work
	Week Code
A	= Assembly Site Code
Т	= Test Side Code
G	= Pb–Free Package

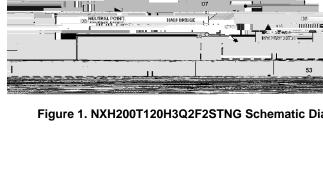
PIN CONNECTIONS

HALF BRIDGE min অসময় চালব Д., 7-10 REUTRAL POINT IGBT . 50 51 UTRA - PO P Ui iii D8-NEUTRAL POINT unum 37 0 54 53

Figure 1. NXH200T120H3Q2F2STNG Schematic Diagram

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.



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• Split T-type Neutral Point Clamped Three-level Inverter Module

Features

- 1200 V Ultra Field Stop IGBTs & 650 V FS4 IGBTs
- 650 V SiC Diodes
- Low Inductive Layout
- Solderable Pins
- Thermistor
- Pre-applied Thermal Interface Material (TIM) (optional)
- Nickel Plated DBC

Typical Applications

- Solar Inverters
- Uninterruptible Power Supplies

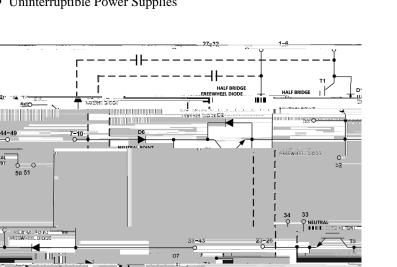


Table 1. ABSOLUTE MAXIMUM RATINGS (Note 1) ($T_J = 25^{\circ}C$ unless otherwise noted) (continued)

Rating	Symbol	Value	Unit
NEUTRAL POINT INVERSE DIODE			
Peak Repetitive Reverse Voltage	Vrrm	650	V
Continuous Forward Current @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	I _F	36	А
Repetitive Peak Forward Current (T_J = 175°C, t_p limited by T_{Jmax})	IFRM	108	А
Maximum Power Dissipation @ $T_C = 80^{\circ}C (T_J = 175^{\circ}C)$	Ptot	90	W
Minimum Operating Junction Temperature	TJMIN	-40	°C
Maximum Operating Junction Temperature	ТЈМАХ	175	°C
THERMAL PROPERTIES			
Storage Temperature range	Tstg	-40 to 125	°C
INSULATION PROPERTIES			
Isolation Test Voltage, t = 2 sec, 50 Hz	Vis	4000	Vrms
Creepage Distance		12.7	mm

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Refer to ELECTRICAL CHARACTERISTICS, RECOMMENDED OPERATING RANGES and/or APPLICATION INFORMATION for Safe Operating parameters.

Table 2. RECOMMENDED OPERATING RANGES

Rating	Symbol	Min	Max	Unit
Module Operating Junction Temperature	TJ	-40	(T _{Jmax} –25)	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

Table 3. ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Parameter

Table 3. ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise noted) (continued)

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
HALF BRIDGE IGBT CHARACTERISTICS						
Turn-on Delay Time	$T_J = 125^{\circ}C$	td(on)	-	276	-	ns
Rise Time	$V_{CE} = 350 \text{ V}, \text{ I}_{C} = 170 \text{ A}, \text{ V}_{GE} = -5/+15 \text{ V}, \text{ R}_{G} = 10 \Omega$	t _r	-	97	-	1
Turn–off Delay Time		td(off)	-	997	-	
Fall Time		t _f	-	99	_	
Turn-on Switching Loss per Pulse		Eon	-	5.4	-	mJ
Turn–off Switching Loss per Pulse	1	Eoff	-	7.9	-	1
Input Capacitance	$V_{CE} = 25 V, V_{GE} = 0 V$	Cies	-	35615	-	pF
Output Capacitance	f = 100 kHz	Coes	-	700	-	
Reverse Transfer Capacitance		Cres	-	530	-	1
Total Gate Charge	$V_{CE} = 600 \text{ V}, I_C = 200 \text{ A}, V_{GE} = 15 \text{ V}$	Qg	-	1706.4	-	nC
Thermal Resistance – chip-to-heatsink	Thermal grease, Thickness < 100 μm,	RthJH	-	0.21	-	°C/W
-	λ = 2.87 W/mK	_			1	0000

NEUTRAL POINT FREEWHEEL DIODE CHARACTERISTICS

Diode Reverse Leakage Current

Thermal Resistance – chip-to-case

V_R = 650 V

I_R –

_

0.14

RthJC

°C/W

_

Table 3. ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise noted) (continued)

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
NEUTRAL POINT IGBT CHARACTERISTICS						
Turn-on Delay Time	$T_J = 25^{\circ}C$	td(on)	-	94	_	ns
Rise Time	V_{CE} = 350 V, I_{C} = 170 A, V_{GE} = –5/+15 V, R_{G} = 10 Ω	t _r	_	45	-	
Turn–off Delay Time						

Table 3. ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise noted) (continued)

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
HALF BRIDGE INVERSE DIODE CHAP	RACTERISTICS					
Diode Forward Voltage	$I_{F} = 7 \text{ A}, T_{J} = 25^{\circ}\text{C}$	VF	1.05	1.93	2.80	V
	I _F = 7 A, T _J = 175°C		-	1.29	-	
Thermal Resistance – chip-to-heatsink	Thermal grease, Thickness < 100 μ m,	R _{thJH}	-	1.35	-	°C/W
Thermal Resistance – chip-to-case	λ = 2.87 W/mK	R _{thJC}	-	1.24	_	°C/W
NEUTRAL POINT INVERSE DIODE CH	IARACTERISTICS	•				
Diode Forward Voltage	$I_{F} = 30 \text{ A}, T_{J} = 25^{\circ}\text{C}$	VF	1.3	2.35	3.2	V
	I _F = 30 A, T _J = 175°C		-	1.50	-	
Thermal Resistance – chip-to-heatsink	Thermal grease, Thickness 100 μ m, λ = 2.87 W/mK	R _{thJH}	-	1.03	-	°C/W
Thermal Resistance – chip-to-case		R _{thJC}	-	0.91	-	°C/W
THERMISTOR CHARACTERISTICS		•				
Nominal resistance		R ₂₅	_	22	_	kQ
Nominal resistance	T = 100°C	R ₁₀₀	_	1486	-	Q
Deviation of R25		R/R	-5	-	5	%
Power dissipation		PD	-	200	-	mW
Power dissipation constant			-	2	-	mW/K
B-value	B(25/50), tolerance ±3%		-	3950	-	к
B-value	B(25/100), tolerance ±3%		_	3998	_	к

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

ORDERING INFORMATION

Device	Marking	Package	Shipping
NXH200T120H3Q2F2STNG	NXH200T120H3Q2F2STNG		

TYPICAL CHARACTERISTICS - HALF BRIDGE IGBT AND NEUTRAL POINT DIODE

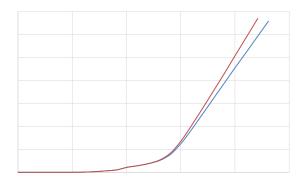


Figure 2. Typical Output Characteristics

Figure 3. Typical Output Characteristics

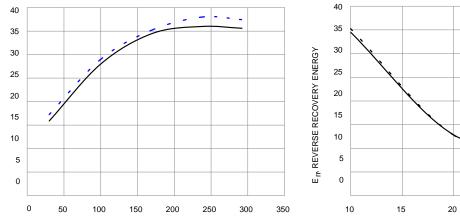
Figure 4. Typical Transfer Characteristics

Figure 5. Typical Diode Forward Characteristics

Figure 6. Typical Turn ON Loss vs. I_C

Figure 7. Typical Turn OFF Loss vs. I_{C}

TYPICAL CHARACTERISTICS - HALF BRIDGE IGBT AND NEUTRAL POINT DIODE





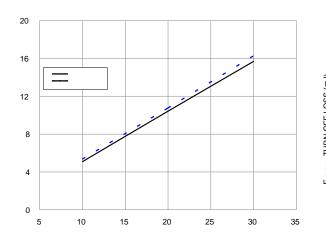


Figure 16. Typical Turn ON Loss vs. R_G

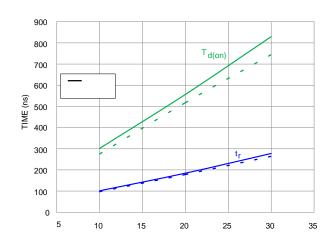


Figure 18. Typical Turn ON Switching Time vs. $\ensuremath{\mathsf{R}_{\mathsf{G}}}$

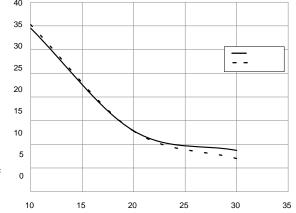


Figure 15. Typical Reverse Recovery Energy Loss vs. R_G

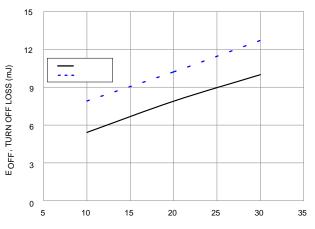


Figure 17. Typical Turn OFF vs. R_G

Figure 19. Typical Turn OFF Switching Time vs. R_G

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND NEUTRAL POINT DIODE

TYPICAL CHARACTERISTICS - NEUTRAL POINT IGBT AND HALF BRIDGE DIODE

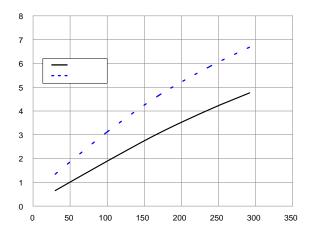


Figure 33. Typical Turn ON Loss vs. I_C



Figure 34. Typical Turn OFF Loss vs. I_C

Figure 35. Typical Turn ON Switching Time vs. I_C

Figure 36. Typical Turn OFF Switching Time vs. I_C

Figure 37. Typical Reverse Recovery Time vs. I_C

Figure 38. Typical Reverse Recovery Charge vs. I_C

TYPICAL CHARACTERISTICS - NEUTRAL POINT IGBT AND HALF BRIDGE DIODE

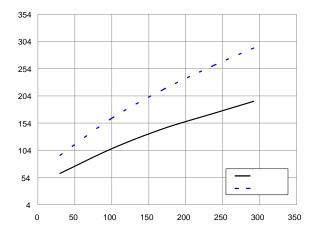


Figure 39. Typical Turn ON Loss vs. I_C



Figure 40. Typical Turn OFF Loss vs. I_C

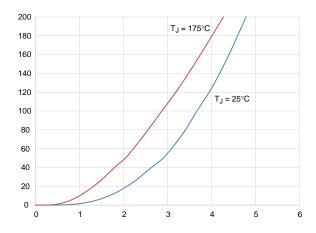
Figure 41. Typical Turn ON Switching Time vs. I_C

Figure 42. Typical Turn OFF Switching Time vs. I_C

Figure 43. Typical Turn ON Loss vs. R_G

Figure 44. Typical Turn OFF vs. R_G

TYPICAL CHARACTERISTICS – NEUTRAL POINT INVERSE DIODE





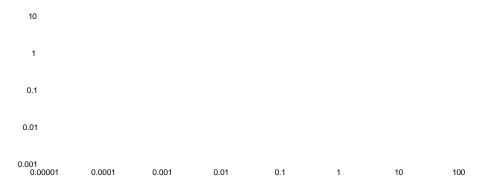
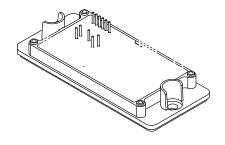


Figure 59. Diode Transient Thermal Impedance



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