NXH027B120MNF2P

Product Preview

27 mΩ, 1200 V SiC Boost Module

The NXH027B120MNF2PTG Silicon Boost module contains three parallel 80 mΩ, 1200 V SiC MOSFETs, five parallel 50 A, 1200 V SiC boost diodes, one 75 A, 1200 V bypass diode, one 75 A, 1200 V protection diode for the MOSFETs and an NTC thermistor. The device is packaged in an F2 package with pre−applied phase−change material and press−fit pins.

Features

- Pre−applied Phase−change Material
- Press−fit Pins
- Pin Compatible with Full Si Boost Module

Typical Applications

- Solar Inverter

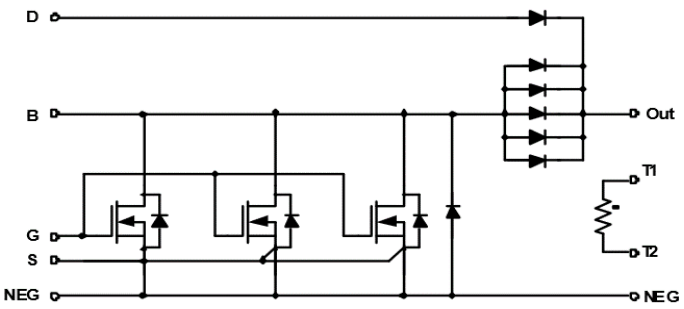

Figure 1. Application Schematic

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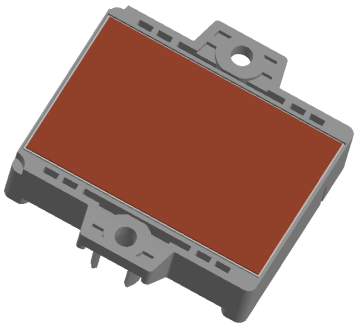


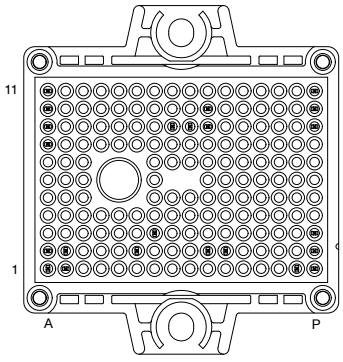
F2 BOOST
CASE TBD

MARKING DIAGRAM

XXXXXXXXXXXXXXX
XXXXX NNNN
ZZZZZZZZZZ ATYWW

XXXX = Specific Device Code
NNN = Serial Number
ZZZ = Lot ID
AT = Assembly & Test Location
Y = Year
W = Work Week

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

Table 1. PIN FUNCTION DESCRIPTION

Pin	Name	Description
A1	NEG	Power Ground
A2	NEG	Power Ground
A8	OUT	Output of Boost
A9	OUT	Output of Boost
A10	OUT	Output of Boost
A11	OUT	Output of Boost
B1	NEG	Power Ground
B2	NEG	Power Ground
F2	G	SiC MOSFET Gate
G3	S	SiC MOSFET Source
H9	D	Bypass Diode Anode
I9	D	Bypass Diode Anode
J2	TH1	Thermistor connection 1
J9	D	Bypass Diode Anode
J10	D	Bypass Diode Anode
K2	TH2	Thermistor connection 2
O1	B	Boost Switching Node
P1	B	Boost Switching Node
P2	B	Boost Switching Node
P3	B	Boost Switching Node
P9	NEG	Power Ground
P10	NEG	Power Ground
P11	NEG	Power Ground

Table 2. MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
BOOST MOSFET			
Drain−Source Voltage	V_{DSS}	1200	V
Gate−Source Voltage	V_{GSS}	+22 to −6	V
Continuous Drain Current @ T_c = 80°C (T_J = 150°C)	I_D	84	A
Maximum Power Dissipation (T_J = 150°C)	P_{tot}	134	W
Minimum Operating Junction Temperature	T_{JMIN}	−40	°C
Maximum Operating Junction Temperature	T_{JMAX}	175	°C
BOOST DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Continuous Forward Current @ T_c = 80°C (T_J = 150°C)	I_F	85	A
Surge Forward Current, tp = 10 ms	I_{FSM}	270	A
Power Dissipation Per Diode (T_J = 150°C,T_h = 80°C)	P_{tot}	159	W
Minimum Operating Junction Temperature	T_{JMIN}	−40	°C
Maximum Operating Junction Temperature	T_{JMAX}	150	°C
BYPASS DIODE/ PROTECTION DIODE			
Peak Repetitive Reverse Voltage	V_{RRM}	1200	V
Continuous Forward Current @ T_c = 80°C (T_J = 150°C)	I_F	112	A
Surge Forward Current, tp = 10 ms	I_{FSM}	400	A
Power Dissipation Per Diode (T_J = 150°C,T_h = 80°C)	P_{tot}	111	W
I^2t − value (Surge applied at rated load conditions halfwave, tp = 10 ms, T_j = 150°C)	I^2t	1600	A^2s
Minimum Operating Junction Temperature	T_{JMIN}	−40	°C
Maximum Operating Junction Temperature	T_{JMAX}	150	°C
THERMAL PROPERTIES			
Storage Temperature range	T_{stg}	−40 to 125	°C
MODULE			
Isolation test voltage, @AC 1 minute	V_{iso}	2500	V_{RMS}
Mounting Torque	T_{MOUNT}	2.0 − 5.0	Nm
Creepage distance: Terminal to Heatsink		11.5	mm
Creepage distance: Terminal to Terminal		6.3	mm
Clearance distance: Terminal to Heatsink		10.0	mm
Clearance distance: Terminal to Terminal		5.0	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 3. RECOMMENDED OPERATING RANGES

Rating	Symbol	Min	Max	Unit
Module Operating Junction Temperature	T_J	−40	150	°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 4. ELECTRICAL CHARACTERISTICS T_J = 25°C unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
BOOST MOSFET CHARACTERISTICS						
Drain−Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA	BV_{DSS}	1200			V
Drain−Source Cutoff Current	V_{GS} = 0 V, V_{DS} = 1200 V	I_{DSS}			50	μA
Drain−Source Saturation Voltage	V_{GS} = 20 V, I_D = 60 A, T_J = 25°C	$R_{DS(ON)}$		28.5	38	mohm
	V_{GS} = 20 V, I_D = 60 A, T_J = 150°C			(TBD)		
Gate−Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 13.2 mA	$V_{GS(TH)}$	1.4	3.13	4.9	V
Gate Leakage Current	V_{GS} = −6 V/20 V, V_{DS} = 0 V	I_{GSS}	−0.4		0.4	μA
Turn−on Delay Time	T_J = 25°C V_{DS} = 600 V, I_D = 60 A V_{GS} = 18 V/0 V, R_G = 4.7 Ω	$t_{d(on)}$	–	(TBD)	–	ns
Rise Time		t_r	–	(TBD)	–	
Turn−off Delay Time		$t_{d(off)}$	–	(TBD)	–	
Fall Time		t_f	–	(TBD)	–	
Turn−on Switching Loss per Pulse		E_{on}	–	(TBD)	–	μJ
Turn off Switching Loss per Pulse		E_{off}	–	(TBD)	–	
Turn−on Delay Time	T_J = 125°C V_{DS} = 600 V, I_D = 60 A V_{GS} = 18 V/0 V, R_G = 4.7 Ω	$t_{d(on)}$	–	(TBD)	–	ns
Rise Time		t_r	–	(TBD)	–	
Turn−off Delay Time		$t_{d(off)}$	–	(TBD)	–	
Fall Time		t_f	–	(TBD)	–	
Turn−on Switching Loss per Pulse		E_{on}	–	(TBD)	–	μJ
Turn off Switching Loss per Pulse		E_{off}	–	(TBD)	–	
Input Capacitance	V_{DS} = 20 V, V_{GS} = 0 V, f = 10 kHz	C_{iss}	–	(TBD)	–	pF
Output Capacitance		C_{oss}	–	(TBD)	–	
Reverse Transfer Capacitance		C_{rss}	–	(TBD)	–	
Total Gate Charge	V_{DS} = 600 V, I_D = 60 A, V_{GS} = 18 V/0 V	Q_g	–	(TBD)	–	nC
Thermal Resistance − chip−to−heatsink		R_{thJH}	–	(TBD)	–	°C/W
BOOST DIODE CHARACTERISTICS						
Diode Reverse Leakage Current	V_R = 1200 V	I_R			1000	μA
Diode Forward Voltage	I_F = 50 A, T_J = 25°C	V_F	–	1.43	1.70	V
	I_F = 50 A, T_J = 150°C		–	(TBD)	–	
Reverse Recovery Time	T_J = 25°C V_{DS} = 600 V, I_D = 60 A V_{GS} = 18 V/0 V, R_G = 4.7 Ω	t_{rr}	–	(TBD)	–	ns
Reverse Recovery Charge		Q_{rr}	–	(TBD)	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	(TBD)	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	(TBD)	–	A/μs
Reverse Recovery Energy		E_{rr}	–	(TBD)	–	μJ
Reverse Recovery Time	T_J = 125°C V_{DS} = 600 V, I_D = 60 A V_{GS} = 18 V/0 V, R_G = 4.7 Ω	t_{rr}	–	(TBD)	–	ns
Reverse Recovery Charge		Q_{rr}	–	(TBD)	–	μC
Peak Reverse Recovery Current		I_{RRM}	–	(TBD)	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	(TBD)	–	A/μs
Reverse Recovery Energy		E_{rr}	–	(TBD)	–	μJ
Thermal Resistance − chip−to−heatsink		R_{thJH}	–	(TBD)	–	°C/W
BYPASS DIODE CHARACTERISTICS						
Diode Reverse Leakage Current	V_R = 1200 V, T_J = 25°C	I_R			20	μA

Table 4. ELECTRICAL CHARACTERISTICS T_J = 25°C unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
BYPASS DIODE CHARACTERISTICS						
Diode Forward Voltage	I_F = 75 A, T_J = 25°C	V_F		1.08	1.6	V
	I_F = 75 A, T_J = 150°C			0.99		
Thermal Resistance – chip–to–heatsink		R_{thJH}		0.63		°C/W
PROTECTION DIODE CHARACTERISTICS						
Diode Reverse Leakage Current	V_R = 1200 V, T_J = 25°C	I_R			20	μA
Diode Forward Voltage	I_F = 75 A, T_J = 25°C	V_F		0.97	1.6	V
	I_F = 75 A, T_J = 150°C			(TBD)		
Thermal Resistance – chip–to–heatsink		R_{thJH}		(TBD)		°C/W
THERMISTOR CHARACTERISTICS						
Nominal resistance	T = 25°C	R		10		kΩ
Nominal resistance	T = 100°C	R		(TBD)		Ω
Deviation of R25		ΔR/R	–3		3	%
Power dissipation		P_D			(TBD)	mW
B–value	B(25/50), tolerance ±2%			3450	3519	K
NTC reference					B	

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†
NXH027B120MNF2P2TG F2BOOST	NXH027B120MNF2P2TG	F2 BOOST Case TBD (Pb – Free and Halide–Free)	14 Units / Blister Tray

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

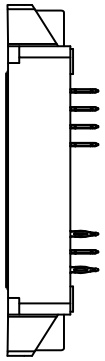
NXH027B120MNF2P

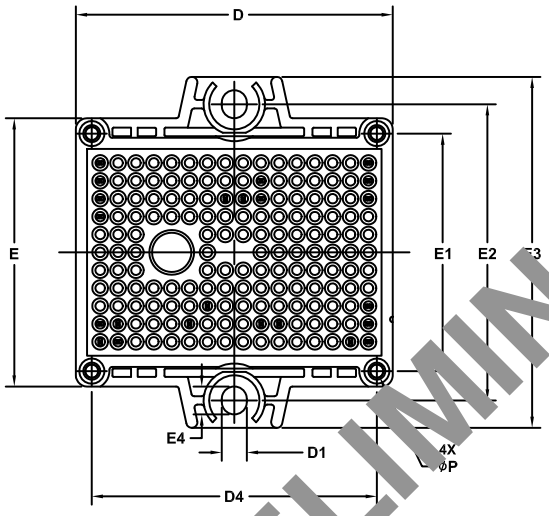
PACKAGE DIMENSIONS

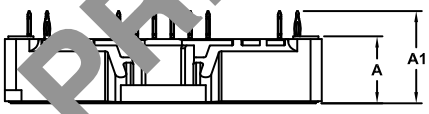
PIM23 56.7X42.5 (PRESS FIT)
CASE MODxx
ISSUE O

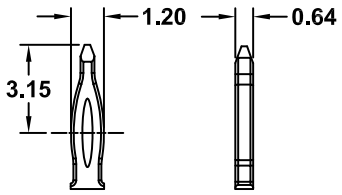
NOTES:
1. CONTROLLING DIMENSION: MILLIMETERS

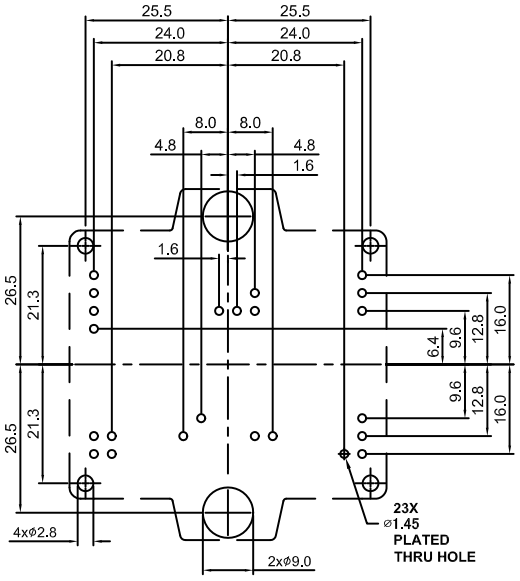
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A		12.00	12.35
	16.00	16.50	17.00
D	56.40	56.70	57.00
	4.40	4.50	4.60
D4	50.85	51.00	51.15
	47.70	48.00	48.30
E1	42.35	42.50	42.65
E2	52.90	53.00	53.10
E3	62.30	62.80	63.30
E4	4.90	5.00	5.10
P	2.20	2.30	2.40











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