

# Flying Capacitor BOOST Module

## Product Preview

## NXH500B100H7Q2F2SHG, NXH500B100H7Q2F2PHG

The NXH500B100H7Q2F2SHG/PHG is a power module in Q2 package containing two channel flying capacitor boost. The integrated field stop trench IGBTs and Si/SiC Diodes provide lower conduction and switching losses, enabling designers to achieve high efficiency, high power density and superior reliability.

#### **Features**

- Flying Capacitor Boost Module
- 1000 V Field Stop 7 IGBTs and 1200 V SiC Diodes
- Low Inductive Layout
- Solder Pins and Press Fit Pins
- Integrated NTC Thermistor
- These Devices are Pb-Free, Halide Free and are RoHS Compliant

#### **Typical Applications**

- Solar Inverter
- Energy Storage System

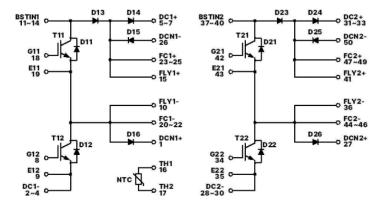
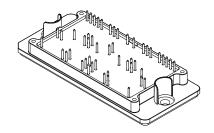


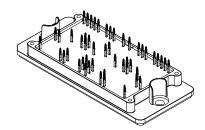
Figure 1. NXH500B100H7Q2F2SHG/PHG Schematic Diagram

This document contains information on a product under development. **onsemi** reserves the right to change or discontinue this product without notice.

1



PIM50 93.00x47.00x12.00 (SOLDER PIN) CASE 180CU



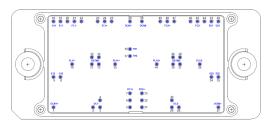
PIM50 93.00x47.00x12.00 (PRESS FIT PIN) CASE 180HZ

#### MARKING DIAGRAM



XXXXX = Device Code
G = Pb-Free Package
AT = Assembly & Test Site Code
YYWW = Year and Work Week Code

#### **PIN CONNECTIONS**



#### **ORDERING INFORMATION**

See detailed ordering and shipping information on page 4 of this data sheet.

#### **MODULE CHARACTERISTICS**

Rating	Symbol	Value	Unit
Operating Temperature under Switching Condition	T <sub>VJOP</sub>	-40 to 150	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to 125	°C
Isolation Test Voltage, t = 2 s, 50 Hz (Note 1)	V <sub>is</sub>	4800	$V_{RMS}$
Stray Inductance	L <sub>s CE</sub>	15	nH
Terminal Connection Torque (M5, Screw) Torque	М	3 to 5	Nm
Weight	G	176	g
Comparative Tracking Index	СТІ	>600	

<sup>1. 4800</sup> VAC<sub>RMS</sub> for 2 second duration is equivalent to 4000 VAC<sub>RMS</sub> for 1 minute duration.

#### **MAXIMUM RATINGS** ( $T_J = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
IGBT (T11, T12, T21, T22)			
Collector–Emitter Voltage	V <sub>CES</sub>	1000	V
Gate–Emitter Voltage Positive Transient Gate–Emitter Voltage ( $T_{pulse}$ = 5 $\mu$ s, D < 0.10)	V <sub>GE</sub>	±20 30	V
Continuous Collector Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	I <sub>C</sub>	209	А
Pulsed Peak Collector Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C), T <sub>pulse</sub> = 1 ms	I <sub>C(Pulse)</sub>	627	А
Power Dissipation (T <sub>J</sub> = 175°C, T <sub>C</sub> = 80°C)	P <sub>tot</sub>	497	W
Minimum Operating Junction Temperature	T <sub>JMIN</sub>	-40	°C
Maximum Operating Junction Temperature	T <sub>JMAX</sub>	175	°C
IGBT INVERSE DIODE (D11, D12, D21, D22)			
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	1600	V
Continuous Forward Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	IF	97	А
Repetitive Peak Forward Current (T <sub>J</sub> = 175°C), T <sub>pulse</sub> = 1 ms	I <sub>FRM</sub>	291	А
Maximum Power Dissipation @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	P <sub>tot</sub>	171	W
Minimum Operating Junction Temperature	T <sub>JMIN</sub>	-40	°C
Maximum Operating Junction Temperature	T <sub>JMAX</sub>	175	°C
BOOST SILICON CARBIDE SCHOTTKY DIODE (D13, D14, D23, D24)			
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	1200	V
Continuous Forward Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	I <sub>F</sub>	155	А
Repetitive Peak Forward Current (T <sub>J</sub> = 175°C), T <sub>pulse</sub> = 1 ms	I <sub>FRM</sub>	465	А
Maximum Power Dissipation @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	P <sub>tot</sub>	352	W
Minimum Operating Junction Temperature	T <sub>JMIN</sub>	-40	°C
Maximum Operating Junction Temperature	T <sub>JMAX</sub>	175	°C
START-UP DIODE (D15, D25)			
Peak Repetitive Reverse Voltage	$V_{RRM}$	1200	V
Continuous Forward Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	IF	34	А
Repetitive Peak Forward Current (T <sub>J</sub> = 175°C), T <sub>pulse</sub> = 1 ms	I <sub>FRM</sub>	102	А
Maximum Power Dissipation @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	P <sub>tot</sub>	88	W
Minimum Operating Junction Temperature	T <sub>JMIN</sub>	-40	°C
Maximum Operating Junction Temperature	T <sub>JMAX</sub>	175	°C

#### **MAXIMUM RATINGS** (T<sub>J</sub> = 25°C unless otherwise noted) (continued)

Parameter	Symbol	Value	Unit
START-UP DIODE (D16, D26)			•
Peak Repetitive Reverse Voltage	V <sub>RRM</sub>	1200	V
Continuous Forward Current @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	I <sub>F</sub>	78	А
Repetitive Peak Forward Current (T <sub>J</sub> = 175°C), T <sub>pulse</sub> = 1 ms	I <sub>FRM</sub>	234	А
Maximum Power Dissipation @ T <sub>C</sub> = 80°C (T <sub>J</sub> = 175°C)	P <sub>tot</sub>	203	W
Minimum Operating Junction Temperature	T <sub>JMIN</sub>	-40	°C
Maximum Operating Junction Temperature	T <sub>JMAX</sub>	175	°C

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.

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

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
IGBT (T11, T12, T21, T22)						
Collector–Emitter Cutoff Current	V <sub>GE</sub> = 0 V, V <sub>CE</sub> = 1000 V	I <sub>CES</sub>	_	_	500	μΑ
Collector–Emitter Saturation Voltage	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 240 A, T <sub>C</sub> = 25°C	V <sub>CE(SAT)</sub>	-	1.6	2.3	V
	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 240 A, T <sub>C</sub> = 150°C		-	1.9	-	1
Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}$ , $I_C = 240 \text{ mA}$	V <sub>GE(TH)</sub>	4.5	5.7	6.9	V
Gate Leakage Current	$V_{GE} = \pm 20 \text{ V}, V_{CE} = 0 \text{ V}$	I <sub>GES</sub>	-	-	1	μΑ
Internal Gate Resistor		Rg	-	1.5	_	Ω
Turn-off Safe Operating Area	$V_{CC}$ < 800V, $R_{G, off} \ge 30 \Omega$ , $T_{vj}$ < 150°C		-	200	_	Α
Turn-On Delay Time	T <sub>j</sub> = 25°C	t <sub>d(on)</sub>	_	132	_	ns
Rise Time	$V_{CE}$ = 600 V, I <sub>C</sub> = 100 A V <sub>GE</sub> = -9 V, +15 V, R <sub>G, on</sub> = 7 Ω,	t <sub>r</sub>	_	30	_	1
Turn-Off Delay Time	$R_{G, \text{ off}} = 22 \Omega$	t <sub>d(off)</sub>	-	400	_	1
Fall Time		t <sub>f</sub>	_	29	_	1
Turn On Switching Loss		E <sub>on</sub>	-	1070	_	μJ
Turn Off Switching Loss		E <sub>off</sub>	-	3500	_	1
Turn-On Delay Time	T <sub>j</sub> = 125°C	t <sub>d(on)</sub>	-	127	_	ns
Rise Time	$V_{CE} = 600 \text{ V}, I_{C} = 100 \text{ A}$ $V_{GE} = -9 \text{ V}, +15 \text{ V}, R_{G, \text{ on}} = 7 \Omega,$	t <sub>r</sub>	-	33	_	1
Turn-Off Delay Time	$R_{G, \text{ off}} = 22 \Omega$	t <sub>d(off)</sub>	-	460	-	1
Fall Time		t <sub>f</sub>	-	40	_	1
Turn On Switching Loss		E <sub>on</sub>	-	1280	_	μJ
Turn Off Switching Loss		E <sub>off</sub>	-	5000	_	1
Input Capacitance	V <sub>CE</sub> = 20 V, V <sub>GE</sub> = 0 V, f = 100 kHz	C <sub>ies</sub>	-	18488	-	pF
Output Capacitance		C <sub>oes</sub>	-	797	-	1
Reverse Transfer Capacitance		C <sub>res</sub>	_	116	_	1
Gate Charge	$V_{CE} = 600 \text{ V}, V_{GE} = -15/+20 \text{ V}, I_{C} = 40 \text{ A}$	Qg	-	1094	_	nC
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil ±2%,	R <sub>thJH</sub>	_	0.309	_	K/W
Thermal Resistance - Chip-to-case	$\lambda = 2.9 \text{ W/mK}$	R <sub>thJC</sub>	-	0.197	_	K/W
IGBT INVERSE DIODE (D11, D12, D21, D	022)					
Diode Forward Voltage	I <sub>F</sub> = 50 A, T <sub>J</sub> = 25°C	$V_{F}$	_	1.15	1.5	V
	I <sub>F</sub> = 50 A, T <sub>J</sub> = 150°C		_	1.0	-	1
Thermal Resistance - Chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%$ ,	R <sub>thJH</sub>	_	0.670	-	K/W
	$\lambda = 2.9 \text{ W/mK}$	R <sub>thJC</sub>	_	0.562	_	K/W

Operating parameters.

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

Parameter	Test Conditions	Symbol	Min	Тур	Max	Unit
BOOST SILICON CARBIDE SCHOTTKY	DIODE (D13, D14, D23, D24)					
Diode Forward Voltage	I <sub>F</sub> = 120 A, T <sub>J</sub> = 25°C	V <sub>F</sub>	_	1.45	1.7	V
	I <sub>F</sub> = 120 A, T <sub>J</sub> = 150°C		_	1.75	-	
Reverse Recovery Time	T <sub>J</sub> = 25°C	t <sub>rr</sub>	_	25.5	-	ns
Reverse Recovery Charge	$V_R = 600 \text{ V}, I_C = 100 \text{ A}$ $V_{GE} = -9 \text{ V}, 15 \text{ V}, R_{G, on} = 7 \Omega$	Q <sub>rr</sub>	_	575	-	nC
Peak Reverse Recovery Current	- · GE - · · · · · · · · · · · · · · · · · ·	I <sub>RRM</sub>	_	33	-	Α
Peak Rate of Fall of Recovery Current	1	di/dt	-	2800	-	A/μs
Reverse Recovery Energy	1	E <sub>rr</sub>	_	270	-	μJ
Reverse Recovery Time	T <sub>J</sub> = 125°C	t <sub>rr</sub>	_	26	-	ns
Reverse Recovery Charge	$V_R = 600 \text{ V}, I_C = 100 \text{ A}$ $V_{GE} = -9 \text{ V}, 15 \text{ V}, R_{G, \text{ on}} = 7 \Omega$	Q <sub>rr</sub>	_	615	-	nC
Peak Reverse Recovery Current	- rge = 0 1, 10 1, r.g., on	I <sub>RRM</sub>	_	36	-	А
Peak Rate of Fall of Recovery Current	1	di/dt	_	2550	-	A/μs
Reverse Recovery Energy	1	E <sub>rr</sub>	_	279	-	μJ
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil ±2%,	R <sub>thJH</sub>	_	0.416	-	K/W
Thermal Resistance – Chip-to-case	$\lambda = 2.9 \text{ W/mK}$	R <sub>thJC</sub>	_	0.288	-	K/W
START-UP DIODE (D15, D25)	•			•		•
Diode Forward Voltage	I <sub>F</sub> = 30 A, T <sub>J</sub> = 25°C	V <sub>F</sub>	_	2.2	2.9	V
	I <sub>F</sub> = 30 A, T <sub>J</sub> = 150°C		_	1.5	-	
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil ±2%,	R <sub>thJH</sub>	_	1.225	-	K/W
Thermal Resistance - Chip-to-case	$\lambda = 2.9 \text{ W/mK}$	R <sub>thJC</sub>	_	1.085	-	K/W
START-UP DIODE (D16, D26)	•			•		
Diode Forward Voltage	I <sub>F</sub> = 75 A, T <sub>J</sub> = 25°C	$V_{F}$	_	2.6	3.5	V
	I <sub>F</sub> = 75 A, T <sub>J</sub> = 150°C		_	1.9	-	
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2.1 Mil $\pm 2\%$ ,	R <sub>thJH</sub>	_	0.61	-	K/W
Thermal Resistance - Chip-to-case	$\lambda = 2.9 \text{ W/mK}$	R <sub>thJC</sub>	-	0.47	-	K/W
THERMISTOR CHARACTERISTICS						
Nominal Resistance	T = 25°C	R <sub>25</sub>	_	5	-	kΩ
Nominal Resistance	T = 100°C	R <sub>100</sub>	_	492.2	-	Ω
Deviation of R25		ΔR/R	-1	-	1	%
Power Dissipation		$P_{D}$	-	5	-	mW
Power Dissipation Constant			-	1.3	-	mW/K
B-value	B(25/85), tolerance ±1%		_	3430	_	K

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**

Orderable Part Number	Marking	Package	Shipping
NXH500B100H7Q2F2SHG	G NXH500B100H7Q2F2SHG Q2 – PIM50 93x47 (SOLDER PIN) (Pb–Free / Halide Free)		12 Units / Blister Tray
NXH500B100H7Q2F2PHG	NXH500B100H7Q2F2PHG	Q2 – PIM50 93x47 (PRESS FIT PIN) (Pb-Free / Halide Free)	12 Units / Blister Tray

#### TYPICAL CHARACTERISTIC - T11, T12, T21, T22 (IGBT)

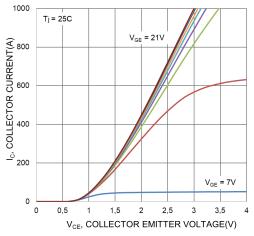


Figure 2. Typical Output Characteristics – IGBT

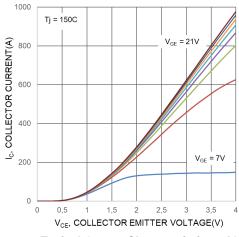


Figure 3. Typical Output Characteristics - IGBT

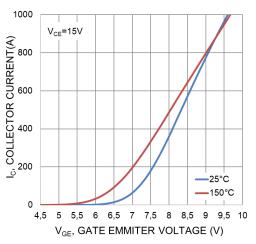


Figure 4. Transfer Characteristics - IGBT

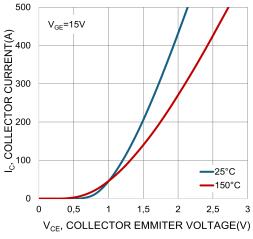


Figure 5. Saturation Voltage Characteristic - IGBT

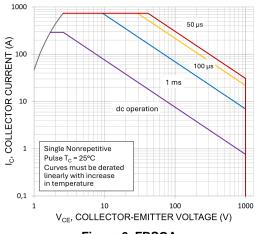


Figure 6. FBSOA

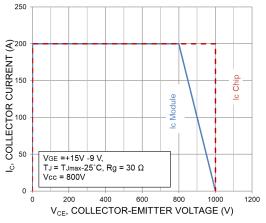


Figure 7. RBSOA

#### TYPICAL CHARACTERISTIC - T11, T12, T21, T22 (IGBT) (CONTINUED)

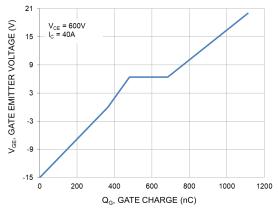


Figure 8. Gate Voltage vs. Gate Charge

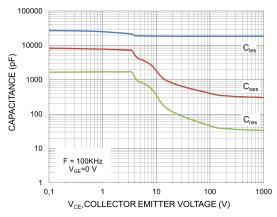


Figure 9. Capacitance vs. V<sub>CE</sub>

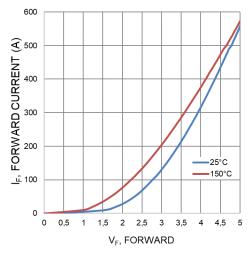


Figure 10. Start-up Diode Forward Characteristics

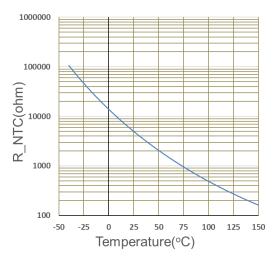


Figure 11. Thermistor Characteristic

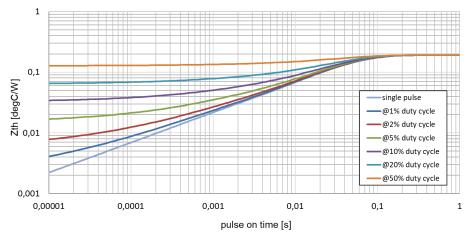


Figure 12. Transient Thermal Impedance (IGBT Zthjc)

#### TYPICAL CHARACTERISTIC - D11, D12, D21, D22 (INVERSE DIODE)

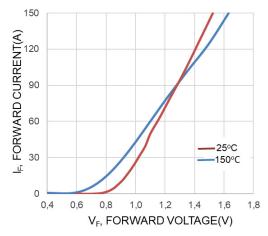


Figure 13. Inverse Diode Forward Characteristics

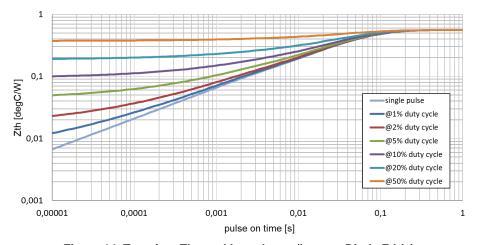


Figure 14. Transient Thermal Impedance (Inverse Diode Zthjc)

#### TYPICAL CHARACTERISTIC - D13, D14, D23, D24 (SiC SCHOTTKY DIODE)

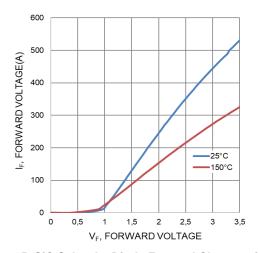


Figure 15. SiC Schottky Diode Forward Characteristics

#### TYPICAL CHARACTERISTIC - D13, D14, D23, D24 (SiC SCHOTTKY DIODE) (CONTINUED)

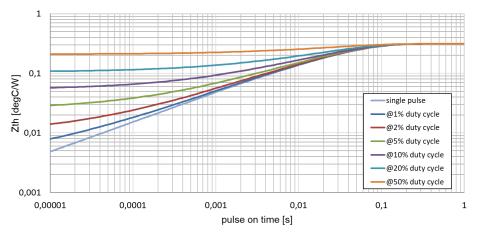


Figure 16. Transient Thermal Impedance (SiC Schottky Diode Zthjc)

#### TYPICAL CHARACTERISTIC - D15, D25 (START-UP DIODE)

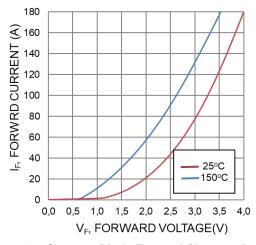


Figure 17. Start-up Diode Forward Characteristics

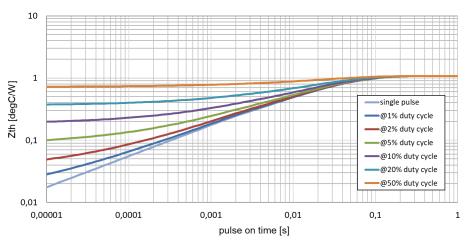


Figure 18. Transient Thermal Impedance (Start-up Diode Zthjc)

#### TYPICAL CHARACTERISTICS - T11, T12, T21, T22 (IGBT)

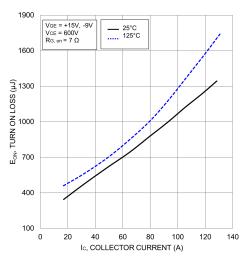


Figure 19. Typical Turn On Loss vs. I<sub>C</sub>

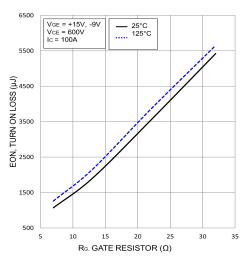


Figure 21. Typical Turn On Loss vs. R<sub>G</sub>

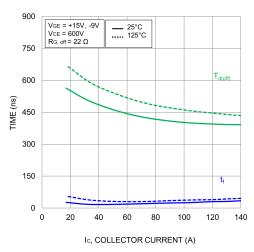


Figure 23. Typical Turn-Off Switching Time vs. I<sub>C</sub>

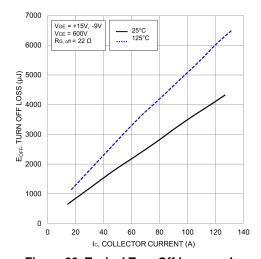


Figure 20. Typical Turn Off Loss vs. I<sub>C</sub>

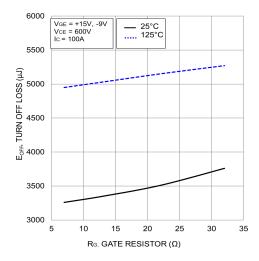


Figure 22. Typical Turn Off Loss vs. R<sub>G</sub>

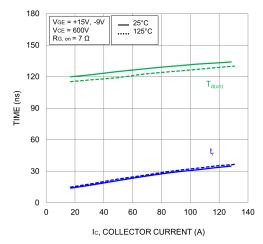


Figure 24. Typical Turn-On Switching Time vs. I<sub>C</sub>

#### TYPICAL CHARACTERISTICS - T11, T12, T21, T22 (IGBT) (CONTINUED)

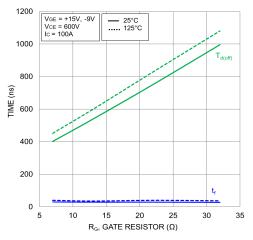


Figure 25. Typical Turn-Off Switching Time vs.  $R_{\mbox{\scriptsize G}}$ 

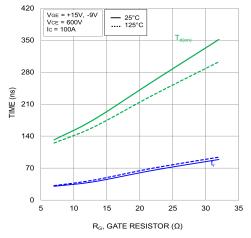


Figure 26. Typical Turn-On Switching Time vs. R<sub>G</sub>

#### TYPICAL CHARACTERISTICS - SiC SCHOTTKY DIODE (D13, D14, D23, D24)

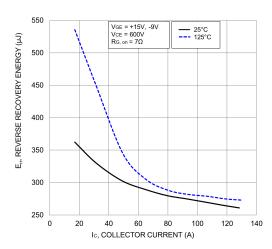


Figure 27. Typical Reverse Recovery Energy Loss vs. I<sub>C</sub>

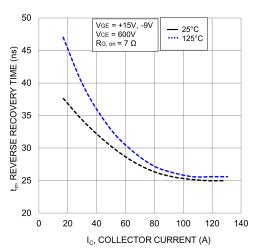


Figure 29. Typical Reverse Recovery Time vs. I<sub>C</sub>

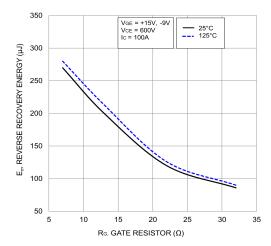


Figure 28. Typical Reverse Recovery Energy Loss vs. R<sub>G</sub>

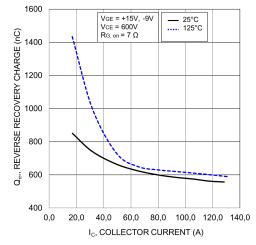


Figure 30. Typical Reverse Recovery Charge vs. I<sub>C</sub>

#### TYPICAL CHARACTERISTICS - SiC SCHOTTKY DIODE (D13, D14, D23, D24) (CONTINUED)

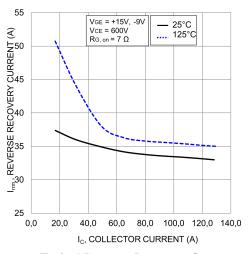


Figure 31. Typical Reverse Recovery Current vs. I<sub>C</sub>

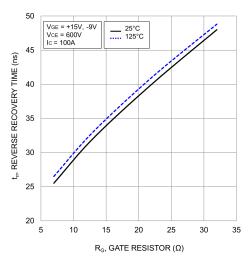


Figure 33. Typical Reverse Recovery Time vs. R<sub>G</sub>

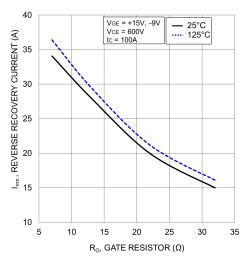


Figure 35. Typical Reverse Recovery Current vs. R<sub>G</sub>

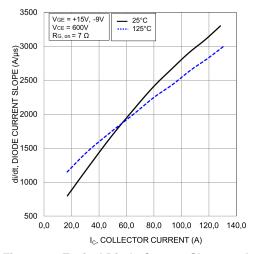


Figure 32. Typical Diode Current Slope vs. I<sub>C</sub>

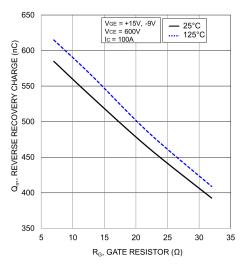


Figure 34. Typical Reverse Recovery Charge vs. R<sub>G</sub>

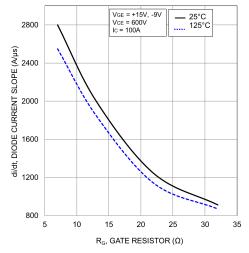


Figure 36. Typical Diode Current Slope vs. R<sub>G</sub>

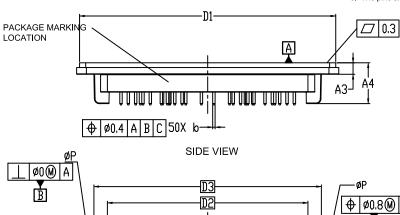
#### **PACKAGE DIMENSIONS**

#### PIM50 93.00x47.00x12.00

CASE 180CU ISSUE O

#### NOTES:

- 1. Dimensioning and tolerancing conform to ASME Y14.5
- 2. All dimensions are in millimeters.
- 3. Dimensions b and b1 apply to the plated terminals and are measured at dimension A1
- 4. Pin position tolerance is ± 0.4mm
- 5. Package marking is located on the side opposite the package orientation feature.
- 6. The pins are Gold plated solder pin

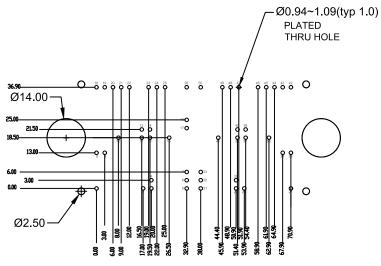


DIM         MIN.         NOM.         MAX.           A         16.80         17.20         17.60           A2         11.70         12.00         12.30           A3         4.40         4.70         5.00           A4         16.40         16.70         17.00           b         0.95         1.00         1.05           D         106.90         107.20         107.50           D1         104.45         104.75         105.05           D2         82.00 BSC           D3         93.00 BSC           E         46.70         47.00         47.30           E1         44.10         44.40         44.70           E2         39.00 BSC           E3         18.45 BSC           E4         19.50 BSC           P         5.40         5.50         5.60           P1         10.60         10.70         10.80           P2         1.80         2.00         2.20					
A2 11.70 12.00 12.30 A3 4.40 4.70 5.00 A4 16.40 16.70 17.00 b 0.95 1.00 1.05 D 106.90 107.20 107.50 D1 104.45 104.75 105.05 D2 82.00 BSC D3 93.00 BSC D4 11.05 BSC E 46.70 47.00 47.30 E1 44.10 44.40 44.70 E2 39.00 BSC E3 18.45 BSC E4 19.50 BSC P 5.40 5.50 5.60 P1 10.60 10.70 10.80	DIM	MIN.	NOM	MAX.	
A3	Α	16.80	17.20	17.60	
A4 16.40 16.70 17.00 b 0.95 1.00 1.05 D 106.90 107.20 107.50 D1 104.45 104.75 105.05 D2 82.00 BSC D3 93.00 BSC D4 11.05 BSC E 46.70 47.00 47.30 E1 44.10 44.40 44.70 E2 39.00 BSC E3 18.45 BSC E4 19.50 BSC P 5.40 5.50 5.60 P1 10.60 10.70 10.80	A2	11.70	12.00	12.30	
b       0.95       1.00       1.05         D       106.90       107.20       107.50         D1       104.45       104.75       105.05         D2       82.00 BSC         D3       93.00 BSC         D4       11.05 BSC         E       46.70       47.00       47.30         E1       44.10       44.40       44.70         E2       39.00 BSC         E3       18.45 BSC         E4       19.50 BSC         P       5.40       5.50       5.60         P1       10.60       10.70       10.80	A3	4.40	4.70	5.00	
D         106.90         107.20         107.50           D1         104.45         104.75         105.05           D2         82.00 BSC           D3         93.00 BSC           D4         11.05 BSC           E         46.70         47.00         47.30           E1         44.10         44.40         44.70           E2         39.00 BSC           E3         18.45 BSC           E4         19.50 BSC           P         5.40         5.50         5.60           P1         10.60         10.70         10.80	A4	16.40	16.70	17.00	
D1 104.45 104.75 105.05  D2 82.00 BSC  D3 93.00 BSC  D4 11.05 BSC  E 46.70 47.00 47.30  E1 44.10 44.40 44.70  E2 39.00 BSC  E3 18.45 BSC  E4 19.50 BSC  P 5.40 5.50 5.60  P1 10.60 10.70 10.80	b	0.95	1.00	1.05	
D2 82.00 BSC  D3 93.00 BSC  D4 11.05 BSC  E 46.70 47.00 47.30  E1 44.10 44.40 44.70  E2 39.00 BSC  E3 18.45 BSC  E4 19.50 BSC  P 5.40 5.50 5.60  P1 10.60 10.70 10.80	D	106.90	107.20	107.50	
D3 93.00 BSC  D4 11.05 BSC  E 46.70 47.00 47.30  E1 44.10 44.40 44.70  E2 39.00 BSC  E3 18.45 BSC  E4 19.50 BSC  P 5.40 5.50 5.60  P1 10.60 10.70 10.80	D1	104.45	104.75	105.05	
D4     11.05 BSC       E     46.70     47.00     47.30       E1     44.10     44.40     44.70       E2     39.00 BSC       E3     18.45 BSC       E4     19.50 BSC       P     5.40     5.50     5.60       P1     10.60     10.70     10.80	D2	82.00 BSC			
E 46.70 47.00 47.30 E1 44.10 44.40 44.70 E2 39.00 BSC E3 18.45 BSC E4 19.50 BSC P 5.40 5.50 5.60 P1 10.60 10.70 10.80	D3	93.00 BSC			
E1 44.10 44.40 44.70 E2 39.00 BSC E3 18.45 BSC E4 19.50 BSC P 5.40 5.50 5.60 P1 10.60 10.70 10.80	D4	11	.05 BSC		
E2     39.00 BSC       E3     18.45 BSC       E4     19.50 BSC       P     5.40     5.50     5.60       P1     10.60     10.70     10.80	E	46.70	47.00	47.30	
E3 18.45 BSC  E4 19.50 BSC  P 5.40 5.50 5.60  P1 10.60 10.70 10.80	E1	44.10	44.40	44.70	
E4 19.50 BSC P 5.40 5.50 5.60 P1 10.60 10.70 10.80	E2	39	0.00 BSC		
P 5.40 5.50 5.60 P1 10.60 10.70 10.80	E3	18	3.45 BSC		
P1 10.60 10.70 10.80	E4	19	9.50 BSC		
	Р	5.40	5.50	5.60	
P2 1.80 2.00 2.20	P1	10.60	10.70	10.80	
	P2	1.80	2.00	2.20	

MILLIMETERS

	$ \Phi $   $\phi$ 0.4   A   B   C   50	X b <del>11</del>		
øР		SIDE VIEW		
⊥ Ø0M A	1	(TO)	ďΩ	
B		— <u>D3</u> —D2	—————————————————————————————————————	D A B
				<u> </u>
<del>1                                    </del>	\\ <b>\(\cdot\)</b>	• • • • • • • • • • • • • • • • • • • •		
	\L		∭	
E3		• • • • • • • • • • • • • • • • • • • •		<del>-</del>
	<b>~~~</b>			<b>└</b> ┤
	<b>│</b>	::		
'				
PACKAGE	<u>D4</u>	ı	\	<del>  </del> A2
ORIENTATION FEATURE	יי <u>ן 4ען</u> יי	n		A
		TOD \ (15)A(	\4x ØP2	END VIEW
		TOP VIEW		LIND VILVV

#### PIM50 93.00x47.00x12.00 CASE 180CU ISSUE O



## RECOMMENDED MOUNTING PATTERN

\* For additional Information on our Pb—Free strategy and soldering details, please download the Onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Pin table						
pin	Х	Υ	Pin	Х	Υ	
1 2 3 4 5 6 7 8 9 10	0 17	0 0 3 0 3 6 13 13 18.50 18.50	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	32.90	36.90	
2	17	0	27	70.90	0	
3	20 20 32.90 32.90 32.90 32.90 3	0	28	53.90 50.90 50.90 38 38 38 67.90 70.90 62.90	0	
4	20	3	29	50.90	0 3 0	
5	32.90	0	30	50.90	3	
6	32 90	3	31	38	0	
7	32.90	6	32	38	3 6 13 13 18.50 18.50 21.50	
8	3	13	33	38	6	
9	0	13	34	67.90	13	
10	8	18.50	35	70.90	13	
11	16.50 16.50 19.50 19.50 26.50	18.50	36	62.90	18.50	
12	16.50	21.50	37	54.40 54.40 51.40	18.50	
13	19.50	21.50	38	54.40	21.50 18.50	
14	19.50	18.50	39	51.40	10 50 1	
15	26.50	18.50	40	51.40	21.50	
16	32.90 32.90 0 3	25.00	41	51.40 44.40 70.90 67.90 64.90	18.50	
17	32.90	22	42	70.90	36.90	
18	0	36.90	43	67.90	36.90	
19	3	36.90	44	64.90	36.90	
20	6	36.90	45	161.90	36.90	
21	9	21.50 21.50 18.50 18.50 25.00 22 36.90 36.90 36.90 36.90	46 47	58.90	21.50 18.50 36.90 36.90 36.90 36.90 36.90	
22	12	l 36.90 l	47	51.90	1.30.9U I	
23	19	36.90	48	48.90	36.90	
12 13 14 15 16 17 18 19 20 21 22 23 24 25	9 12 19 22 25	36.90 36.90	49 50	45.90 38	36.90	
25	25	36.90	50	38	36.90 36.90 36.90	

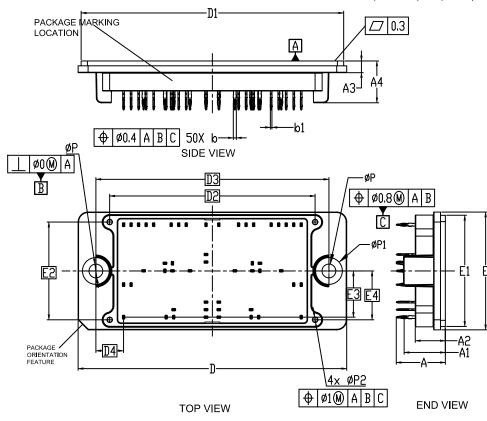
#### **PACKAGE DIMENSIONS**

#### PIM50 93.00x47.00x12.00

CASE 180HZ ISSUE O

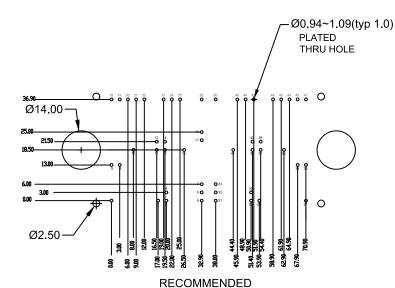
#### NOTES:

- 1. Dimensioning and tolerancing conform to ASME Y14.5
- 2. All dimensions are in millimeters.
- 3. Dimensions b and b1 apply to the plated terminals and are measured at dimension A1
- 4. Pin position tolerance is ± 0.4mm
- 5. Package marking is located on the side opposite the package orientation feature.
- 6. The pins are Sn plated press fit pin.



	MIL	LIMETER	S	
DIM	MIN.	NOM.	MAX.	
Α	19.20	19.60	20.00	
A1	16.25	16.45	16.65	
A2	11.70	12.00	12.30	
A3	4.40	4.70	5.00	
A4	16.40	16.70	17.00	
b	1.15	1.20	1.25	
b1	0.59	0.64	0.69	
D	106.90	107.20	107.50	
D1	104.45	104.75	105.05	
D2	82	.00 BSC		
D3	93	.00 BSC		
D4	11	.05 BSC		
Е	46.70	47.00	47.30	
E1	44.10	44.40	44.70	
E2	39	0.00 BSC		
E3	18	3.45 BSC		
E4	19.50 BSC			
Р	5.40	5.50	5.60	
P1	10.60	10.70	10.80	
P2	1.80	2.00	2.20	

#### PIM50 93.00x47.00x12.00 CASE 180HZ ISSUE O



\* For additional Information on our Pb-Free strategy and soldering

details, please download the Onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Pin table						
pin	X	Υ	Pin	Х	Υ	
1	X 0 17 20	0	26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	32.90	36.90	
1 2 3 4 5 6 7 8	17	0	27	32.90 70.90 53.90 50.90 50.90 38 38 67.90 70.90 62.90 54.40	0	
3	17 20 20	0 3 0 3 6 13 13 18.50 18.50 21.50	28	53.90	0	
4	20	3	29	50.90	0	
5	32.90	0	30	50.90	3	
6	32.90	3	31	38	0	
7	20 32.90 32.90 32.90 3 0	6	32	38	3 0 3 6 13 18.50 18.50	
8	3	13	33	38	6	
9	0	13	34	67.90	13	
10	8	18.50	35	70.90	13	
11	16.50	18.50	36	62.90	18.50	
12 13 14 15 16 17 18 19 20	16.50 16.50	21.50	37	54.40	18.50	
13	119.50	21 50	38	54.40	124 50 1	
14	19.50	18.50	39	151.40	18.50	
15	19.50 26.50	18.50	40	51.40	21.50	
16	132.90	18.50 18.50 25.00	41	44.40	18.50	
17	32.90		42	70.90	36.90	
18	0	36.90	43	67.90	36.90	
19	0 3 6	36.90	42 43 44	64.90	21.30 18.50 21.50 18.50 36.90 36.90 36.90	
20	6	36.90	45	61.90	36.90	
21	9	36.90	46	58.90	36.90	
22	12	36.90 36.90 36.90 36.90 36.90	47	58.90 51.90	36.90 36.90 36.90	
23	19	36.90	48	48.90	36.90	
20 21 22 23 24 25	12 19 22 25	36.90	49	45.90	36.90	
25	25	36.90 36.90	50	38	36.90 36.90	

onsemi, ONSEMI, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at <a href="www.onsemi.com/site/pdf/Patent-Marking.pdf">www.onsemi.com/site/pdf/Patent-Marking.pdf</a>. Onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any EDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer pu

#### ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:

Technical Library: www.onsemi.com/design/resources/technical-documentation

onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support

For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales