

# 3-Level NPC Inverter Module

## Product Preview

### NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

The NXH600N105L7F5S2HG/P2HG is a power module in F5BP package containing an I-type neutral point clamped three-level inverter. The integrated field stop trench IGBTs and FRDs provide lower conduction and switching losses, enabling designers to achieve high efficiency, high power density and superior reliability.

#### Features

- I-type Neutral Point Clamped Three-level Inverter Module
- 1050 V Field Stop 7 IGBTs
- Low Inductive Layout
- Solder Pins and Press Fit Pins
- Integrated NTC Thermistor
- This is a Pb-Free and Halide Free Device

#### Typical Applications

- Energy Storage System
- Solar Inverters
- Uninterruptable Power Supplies Systems

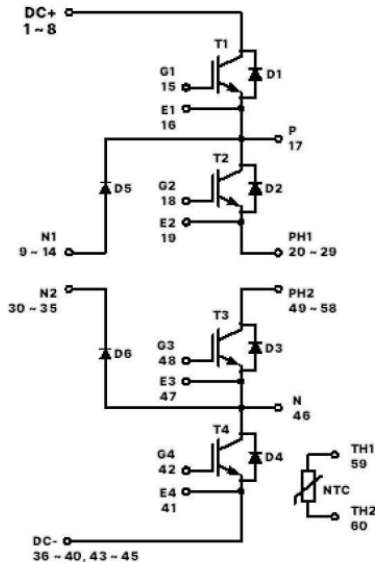
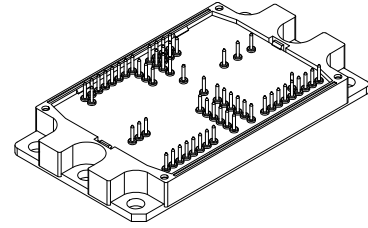
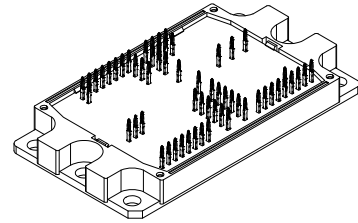


Figure 1. NXH600N105L7F5S2HG/P2HG Schematic

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

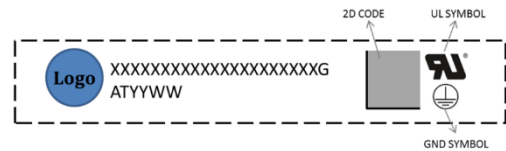


PIM60 112x62 (SOLDER PIN)  
CASE 180CY



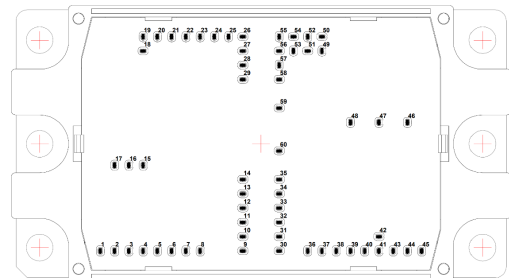
PIM60 112x62 (PRESS FIT PIN)  
CASE 180HY

#### MARKING DIAGRAM



XXXXXX = 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 5 of this data sheet.

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## MODULE CHARACTERISTICS

Parameter	Symbol	Value	Unit
Operating Temperature under Switching Condition	$T_{VJOP}$	-40 to 150	°C
Storage Temperature Range	$T_{stg}$	-40 to 125	°C
Isolation Test Voltage, t = 2 sec, 50 Hz (Note 1)	$V_{is}$	4800	$V_{RMS}$
Stray Inductance	$L_{s CE}$	15	nH
Terminal Connection Torque (M5, Screw)	M	3 to 5	Nm
Weight	G	245	g
Creepage Distance (terminal to heatsink)		17.46	mm
Creepage Distance (terminal to terminal)		6.48	mm
Clearance Distance (terminal to heatsink)		15.62	mm
Clearance Distance (terminal to terminal)		5.05	mm
Comparative Tracking Index	CTI	>600	

1. 4800  $V_{ACRMS}$  for 2 second duration is equivalent to 4000  $V_{ACRMS}$  for 1 minute duration.

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

Parameter	Symbol	Max	Unit
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### OUTER IGBT (T1, T4)

Collector-Emitter Voltage	$V_{CES}$	1050	V
Gate-Emitter Voltage Positive Transient Gate-emitter Voltage ( $T_{pulse} = 5 \mu\text{s}$ , $D < 0.10$ )	$V_{GE}$	$\pm 20$ 30	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	429	A
Pulsed Peak Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ ) @ $T_{pulse} = 1 \text{ ms}$	$I_{C(Pulse)}$	1287	A
Power Dissipation ( $T_J = 175^\circ\text{C}$ , $T_c = 80^\circ\text{C}$ )	$P_{tot}$	1080	W
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	°C
Maximum Operating Junction Temperature	$T_{JMAX}$	175	°C

### INNER IGBT (T2, T3)

Collector-Emitter Voltage	$V_{CES}$	1050	V
Gate-Emitter Voltage Positive Transient Gate-emitter Voltage ( $T_{pulse} = 5 \mu\text{s}$ , $D < 0.10$ )	$V_{GE}$	$\pm 20$ 30	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	433	A
Pulsed Peak Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ ) @ $T_{pulse} = 1 \text{ ms}$	$I_{C(Pulse)}$	1299	A
Power Dissipation ( $T_J = 175^\circ\text{C}$ , $T_c = 80^\circ\text{C}$ )	$P_{tot}$	1080	W
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	°C
Maximum Operating Junction Temperature	$T_{JMAX}$	175	°C

### NEUTRAL POINT DIODE (D5, D6)

Peak Repetitive Reverse Voltage	$V_{RRM}$	1050	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	180	A
Repetitive Peak Forward Current ( $T_J = 175^\circ\text{C}$ ) $T_{pulse} = 1 \text{ ms}$	$I_{FRM}$	540	A
Maximum Power Dissipation @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	426	W
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	°C
Maximum Operating Junction Temperature	$T_{JMAX}$	175	°C

### INVERSE DIODES (D1, D2, D3, D4)

Peak Repetitive Reverse Voltage	$V_{RRM}$	1050	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	196	A

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

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

Parameter	Symbol	Max	Unit
<b>INVERSE DIODES (D1, D2, D3, D4)</b>			
Repetitive Peak Forward Current (T <sub>J</sub> = 175°C) @ T <sub>pulse</sub> = 1 ms	I <sub>FRM</sub>	588	A
Maximum Power Dissipation @ T <sub>c</sub> = 80°C (T <sub>J</sub> = 175°C)	P <sub>tot</sub>	434	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 Operating parameters.

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit	
<b>OUTER IGBT (T1, T4)</b>							
Collector-Emitter Cutoff Current	V <sub>GE</sub> = 0 V, V <sub>CE</sub> = 1050 V	I <sub>CES</sub>	-	-	500	μA	
Collector-Emitter Saturation Voltage	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 600 A, T <sub>J</sub> = 25°C	V <sub>CE(SAT)</sub>	-	1.6	2.3	V	
	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 600 A, T <sub>J</sub> = 150°C		-	2.0	-		
Gate-Emitter Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 600 mA	V <sub>GE(TH)</sub>	4.0	5.5	6.9	V	
Gate Leakage Current	V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0 V	I <sub>GES</sub>	-	-	1	μA	
Internal Gate Resistor		R <sub>g</sub>	-	0.58	-	Ω	
Turn-off safe operating area	V <sub>CC</sub> < 800 V, R <sub>G,off</sub> ≥ 30 Ω, T <sub>vj</sub> < 150°C		-	800	-	A	
Turn-on Delay Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω, R <sub>G,off</sub> = 23 Ω	t <sub>d(on)</sub>	-	230	-	ns	
Rise Time		t <sub>r</sub>	-	46	-		
Turn-off Delay Time		t <sub>d(off)</sub>	-	1582	-		
Fall Time		t <sub>f</sub>	-	16.7	-		
Turn-on Switching Loss per Pulse		E <sub>on</sub>	-	8810	-		μJ
Turn off Switching Loss per Pulse		E <sub>off</sub>	-	8550	-		
Turn-on Delay Time	T <sub>J</sub> = 125°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω, R <sub>G,off</sub> = 23 Ω	t <sub>d(on)</sub>	-	206	-	ns	
Rise Time		t <sub>r</sub>	-	50	-		
Turn-off Delay Time		t <sub>d(off)</sub>	-	1702	-		
Fall Time		t <sub>f</sub>	-	15.6	-		
Turn-on Switching Loss per Pulse		E <sub>on</sub>	-	13390	-	μJ	
Turn off Switching Loss per Pulse		E <sub>off</sub>	-	10990	-		
Input Capacitance	V <sub>CE</sub> = 20 V, V <sub>GE</sub> = 0 V, f = 100 kHz	C <sub>ies</sub>	-	48843	-	pF	
Output Capacitance		C <sub>oes</sub>	-	1767	-		
Reverse Transfer Capacitance		C <sub>res</sub>	-	281	-		
Total Gate Charge	V <sub>CE</sub> = 600 V, I <sub>C</sub> = 57 A, V <sub>GE</sub> = -15/+20 V	Q <sub>g</sub>	-	2988	-	nC	
Thermal Resistance - Chip-to-heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	-	0.139	-	°C/W	
Thermal Resistance - Chip-to-case		R <sub>thJC</sub>	-	0.088	-	°C/W	
<b>NEUTRAL POINT DIODE (D5, D6)</b>							
Diode Forward Voltage	I <sub>F</sub> = 300 A, T <sub>J</sub> = 25°C	V <sub>F</sub>	-	2.6	3.4	V	
	I <sub>F</sub> = 300 A, T <sub>J</sub> = 150°C		-	2.4	-		

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
<b>NEUTRAL POINT DIODE (D5, D6)</b>						
Reverse Recovery Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω	t <sub>rr</sub>	-	93	-	ns
Reverse Recovery Charge		Q <sub>rr</sub>	-	6321	-	nC
Peak Reverse Recovery Current		I <sub>RRM</sub>	-	161	-	A
Peak Rate of Fall of Recovery Current		di/dt	-	3.56	-	A/μs
Reverse Recovery Energy		E <sub>rr</sub>	-	1724	-	μJ
Reverse Recovery Time	T <sub>J</sub> = 125°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω	t <sub>rr</sub>	-	169	-	ns
Reverse Recovery Charge		Q <sub>rr</sub>	-	17552	-	nC
Peak Reverse Recovery Current		I <sub>RRM</sub>	-	245	-	A
Peak Rate of Fall of Recovery Current		di/dt	-	3.32	-	A/μs
Reverse Recovery Energy		E <sub>rr</sub>	-	7229	-	μJ
Thermal Resistance - Chip-to-heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	-	0.327	-	°C/W
Thermal Resistance - Chip-to-case		R <sub>thJC</sub>	-	0.223	-	°C/W

## INNER IGBT (T2, T3)

Collector-Emitter Cutoff Current	V <sub>GE</sub> = 0 V, V <sub>CE</sub> = 1050 V	I <sub>CES</sub>	-	-	500	μA	
Collector-Emitter Saturation Voltage	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 600 A, T <sub>J</sub> = 25°C	V <sub>CE(sat)</sub>	-	1.6	2.3	V	
	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 600 A, T <sub>J</sub> = 150°C		-	2.0	-		
Gate-Emitter Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 600 mA	V <sub>GE(TH)</sub>	4.0	5.5	6.9	V	
Gate Leakage Current	V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0 V	I <sub>GES</sub>	-	0.02	1	μA	
Internal Gate Resistor		R <sub>g</sub>	-	0.58	-	Ω	
Turn-off safe operating area	V <sub>CC</sub> < 800 V, R <sub>G,off</sub> ≥ 35 Ω, T <sub>vj</sub> < 150°C		-	800	-	A	
Turn-on Delay Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω, R <sub>G,off</sub> = 31 Ω	t <sub>d(on)</sub>	-	233	-	ns	
Rise Time		t <sub>r</sub>	-	57	-		
Turn-off Delay Time		t <sub>d(off)</sub>	-	2200	-		
Fall Time		t <sub>f</sub>	-	17.9	-		
Turn-on Switching Loss per Pulse		E <sub>on</sub>	-	8640	-		μJ
Turn off Switching Loss per Pulse		E <sub>off</sub>	-	11800	-		
Turn-on Delay Time	T <sub>J</sub> = 125°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω, R <sub>G,off</sub> = 31 Ω	t <sub>d(on)</sub>	-	210	-	ns	
Rise Time		t <sub>r</sub>	-	62	-		
Turn-off Delay Time		t <sub>d(off)</sub>	-	2350	-		
Fall Time		t <sub>f</sub>	-	18.1	-		
Turn-on Switching Loss per Pulse		E <sub>on</sub>	-	12510	-		μJ
Turn off Switching Loss per Pulse		E <sub>off</sub>	-	14500	-		
Input Capacitance	V <sub>CE</sub> = 20 V, V <sub>GE</sub> = 0 V, f = 100 kHz	C <sub>ies</sub>	-	47927	-	pF	
Output Capacitance		C <sub>oes</sub>	-	1871	-		
Reverse Transfer Capacitance		C <sub>res</sub>	-	304	-		
Total Gate Charge	V <sub>CE</sub> = 600 V, I <sub>C</sub> = 57 A, V <sub>GE</sub> = -15/+20 V	Q <sub>g</sub>	-	2940	-	nC	
Thermal Resistance - Chip-to-heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	-	0.139	-	°C/W	
Thermal Resistance - Chip-to-case		R <sub>thJC</sub>	-	0.088	-	°C/W	

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
<b>INVERSE DIODES (D1, D2, D3, D4)</b>						
Diode Forward Voltage	I <sub>F</sub> = 300 A, T <sub>J</sub> = 25°C	V <sub>F</sub>	-	2.5	3.4	V
	I <sub>F</sub> = 300 A, T <sub>J</sub> = 150°C		-	2.3	-	
Reverse Recovery Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω	t <sub>rr</sub>	-	89	-	ns
Reverse Recovery Charge		Q <sub>rr</sub>	-	5580	-	nC
Peak Reverse Recovery Current		I <sub>RRM</sub>	-	135	-	A
Peak Rate of Fall of Recovery Current		di/dt	-	2.81	-	A/μs
Reverse Recovery Energy		E <sub>rr</sub>	-	1664	-	μJ
Reverse Recovery Time	T <sub>J</sub> = 125°C V <sub>CE</sub> = 600 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = -9 V to +15 V, R <sub>G,on</sub> = 7 Ω	t <sub>rr</sub>	-	182	-	ns
Reverse Recovery Charge		Q <sub>rr</sub>	-	16903	-	nC
Peak Reverse Recovery Current		I <sub>RRM</sub>	-	201	-	A
Peak Rate of Fall of Recovery Current		di/dt	-	2.62	-	A/μs
Reverse Recovery Energy		E <sub>rr</sub>	-	6485	-	μJ
Thermal Resistance - Chip-to-heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	-	0.277	-	°C/W
Thermal Resistance - Chip-to-case		R <sub>thJC</sub>	-	0.219	-	°C/W

## TERMISTOR 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		R/R	-1	-	1	%
Power Dissipation		P <sub>D</sub>	-	5	-	mW
Power Dissipation Constant			-	1.3	-	mW/K
B-value	B(25/85), tolerance ±1%		-	3430	-	K

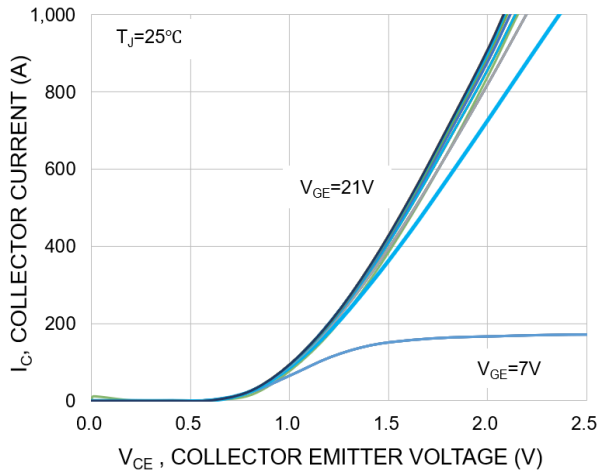
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## ORDERING INFORMATION

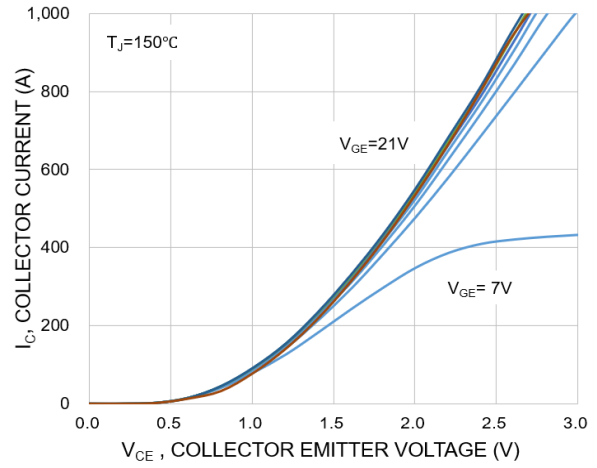
Device	Marking	Package	Shipping
NXH600N105L7F5S2HG	NXH600N105L7F5S2HG	F5 - PIM60 112x62 (SOLDER PIN) (Pb-Free and Halide-Free)	8 Units / Blister Tray
NXH600N105L7F5P2HG	NXH600N105L7F5P2HG	F5 - PIM60 112x62 (PRESS FIT PIN) (Pb-Free and Halide-Free)	8 Units / Blister Tray

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

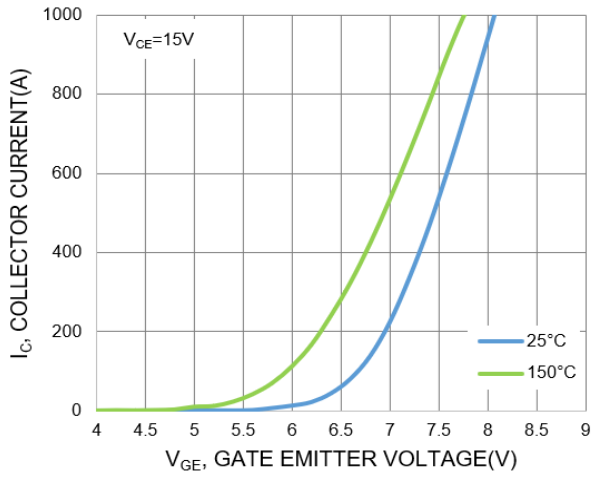
## TYPICAL CHARACTERISTICS – IGBT T1/T4 AND D5/D6 DIODE



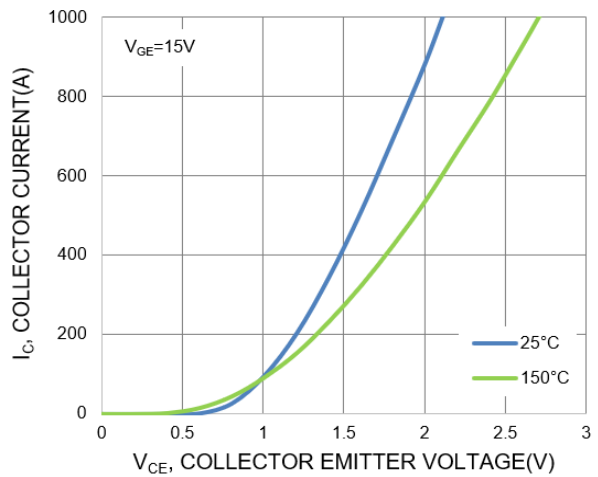
**Figure 2. Typical Output Characteristics – IGBT**



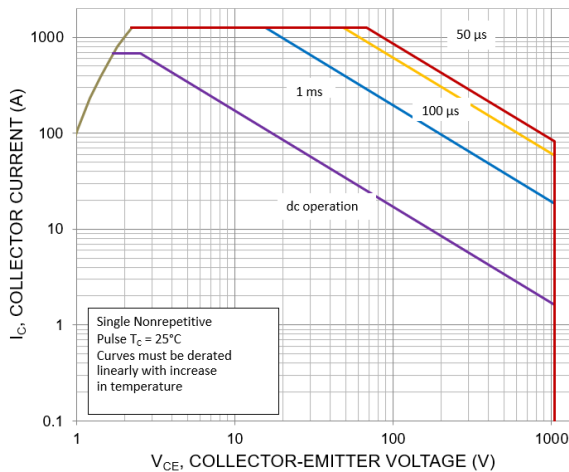
**Figure 3. Typical Output Characteristics – IGBT**



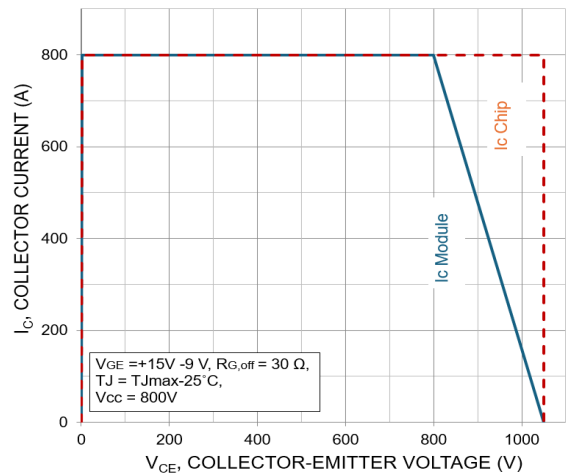
**Figure 4. Transfer Characteristics – IGBT**



**Figure 5. Saturation Voltage Characteristic – IGBT**



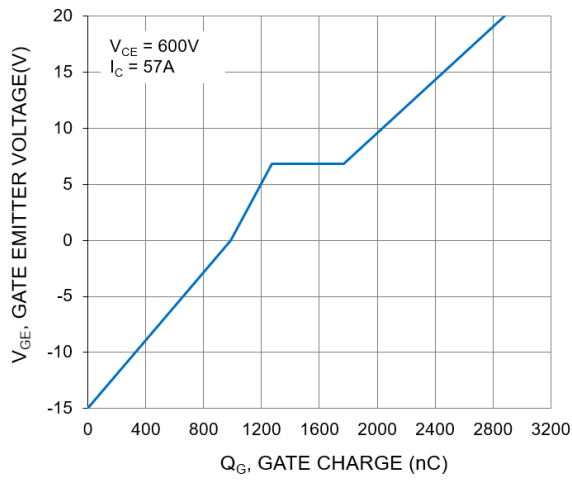
**Figure 6. FBSOA**



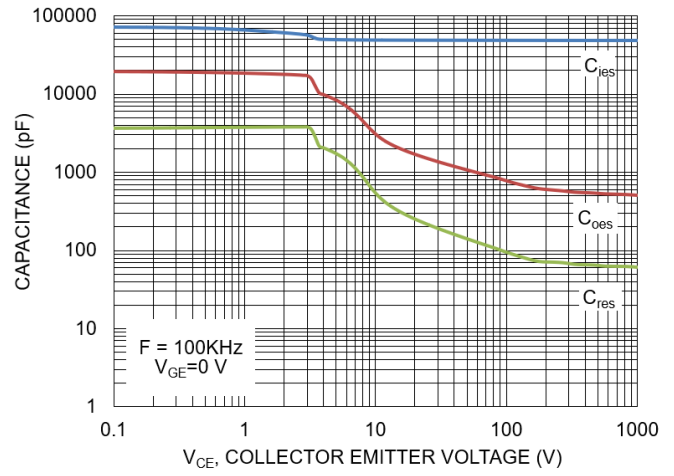
**Figure 7. RBSOA**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

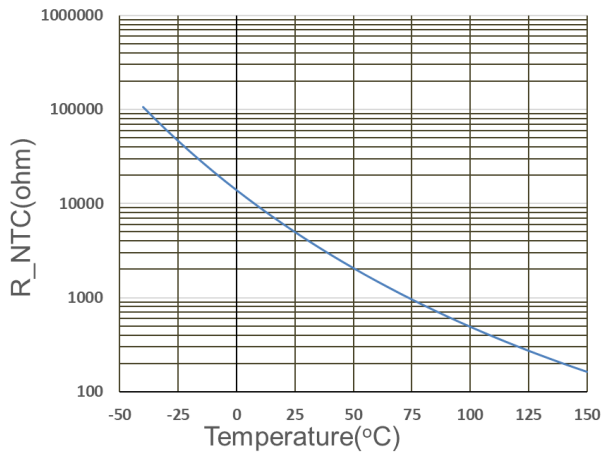
## TYPICAL CHARACTERISTICS – IGBT T1/T4 AND D5/D6 DIODE



**Figure 8. Gate Voltage vs. Gate Charge**



**Figure 9. Capacitance**



**Figure 10. Temperature vs. NTC Value**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## TYPICAL CHARACTERISTICS – IGBT T2/T3 AND D3/D4, D1/D2 DIODE

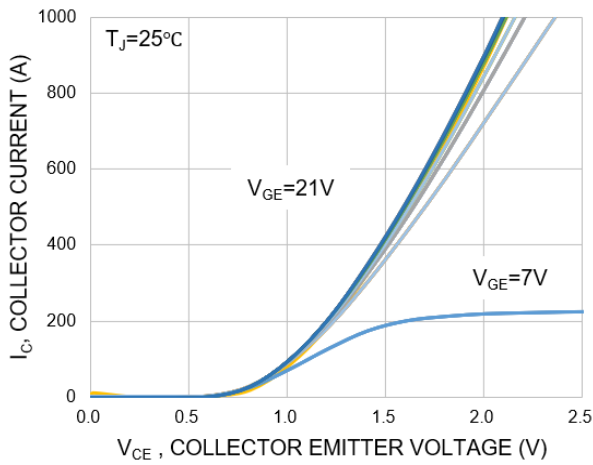


Figure 11. Typical Output Characteristics

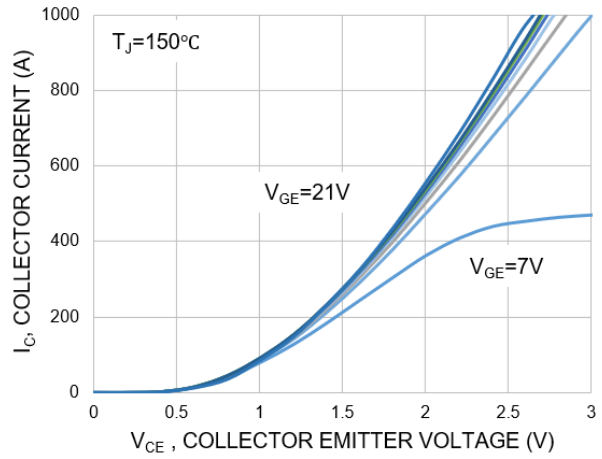


Figure 12. Typical Output Characteristics

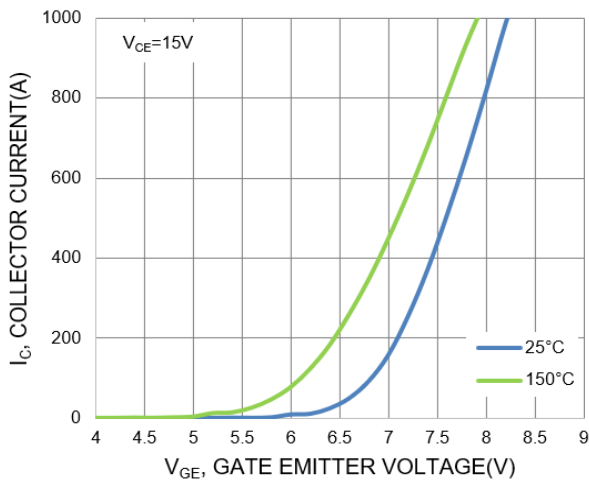


Figure 13. Transfer Characteristics – IGBT

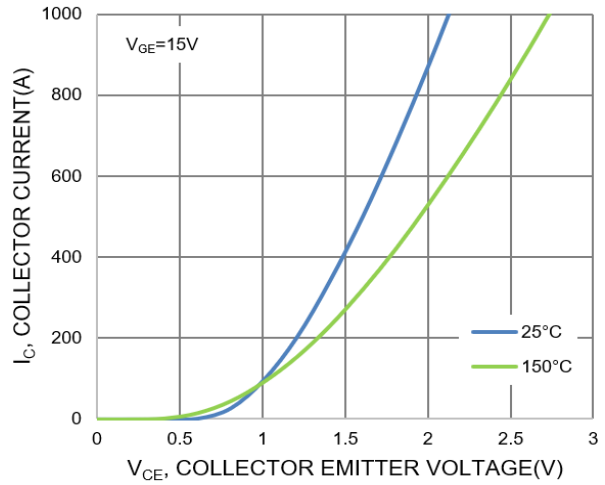


Figure 14. Saturation Voltage Characteristic – IGBT

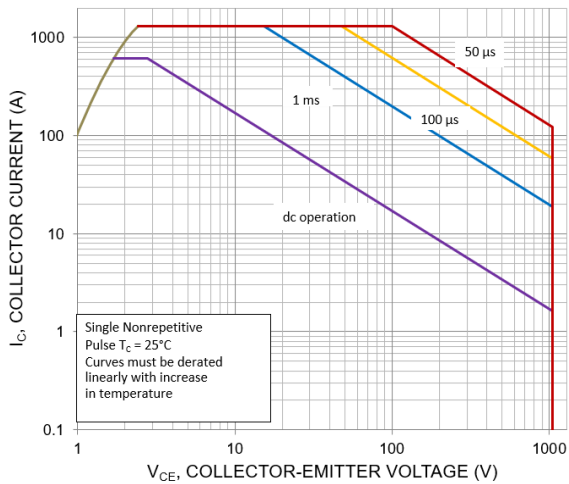


Figure 15. FBSOA

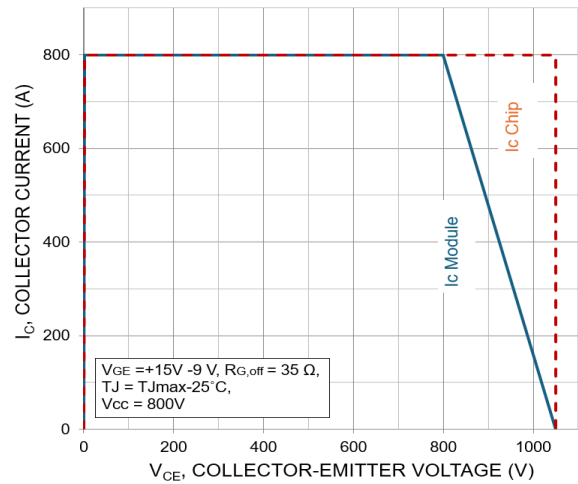
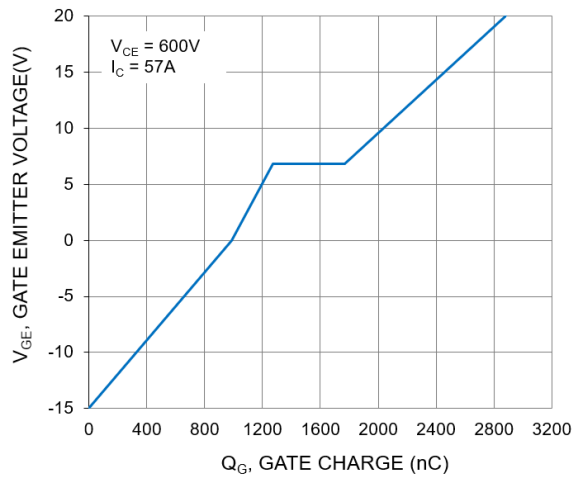


Figure 16. RBSOA

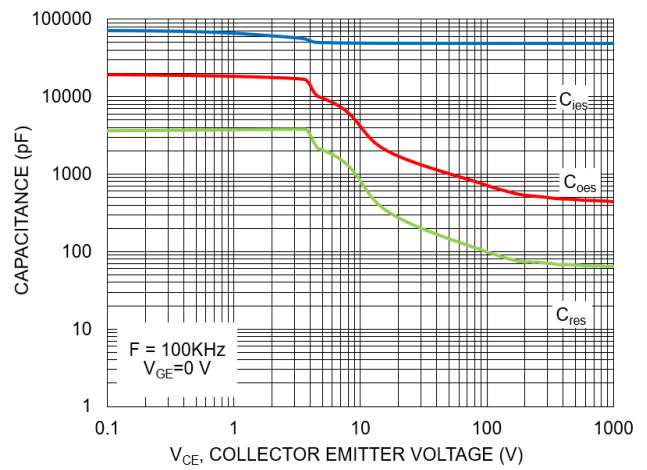


# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

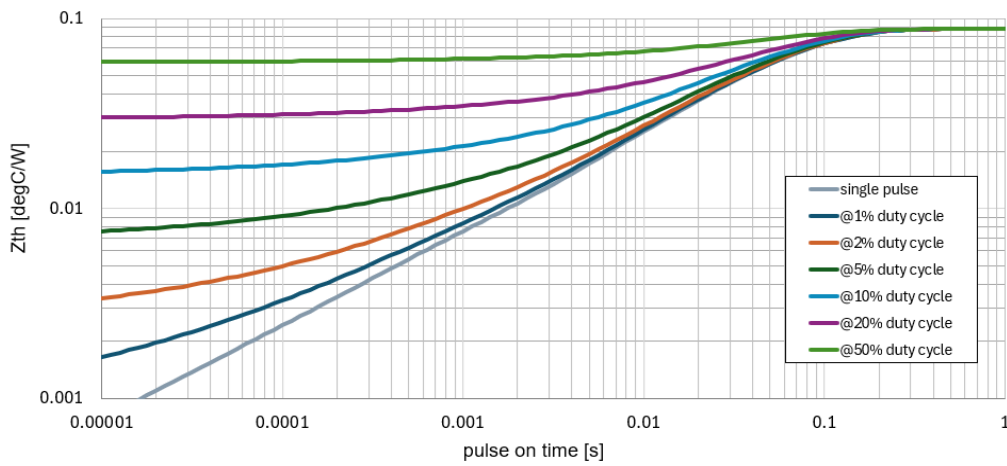
## TYPICAL CHARACTERISTICS – IGBT T2/T3 AND D3/D4, D1/D2 DIODE



**Figure 17. Gate Voltage vs. Gate Charge**



**Figure 18. Capacitance**



**Figure 19. Transient Thermal Impedance (IGBT Zthjc)**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## TYPICAL CHARACTERISTICS – D1/D2/D3/D4 (INVERSE DIODE)

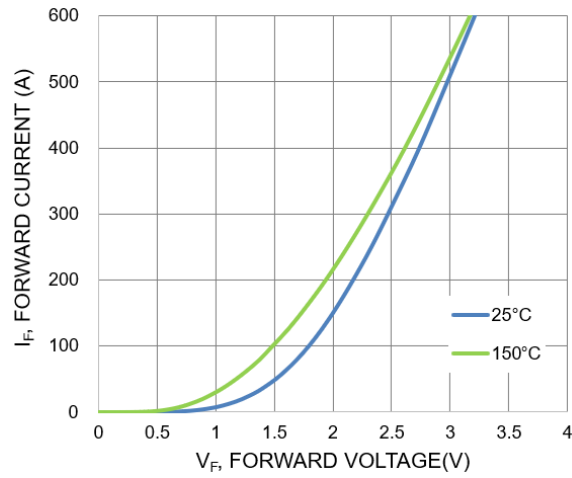


Figure 20. Inverse Diode Forward Characteristics

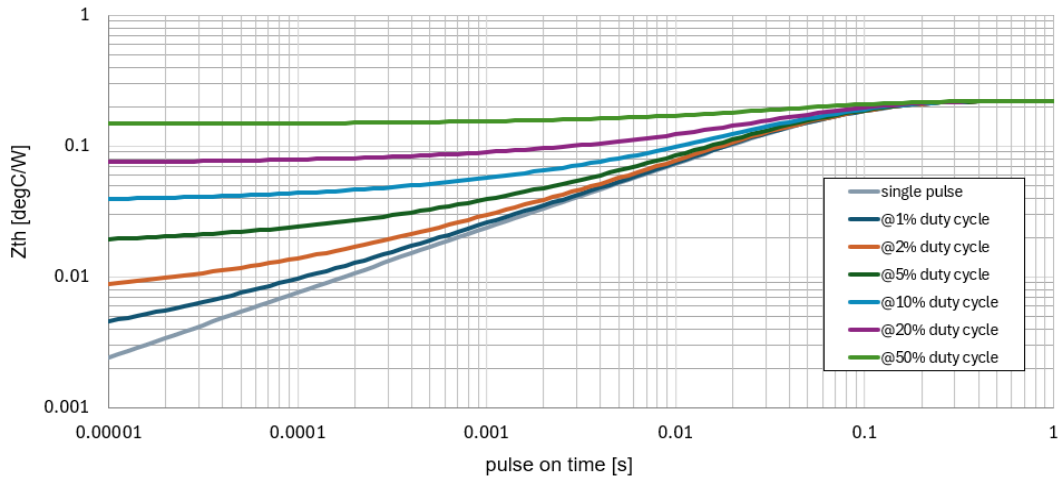


Figure 21. Transient Thermal Impedance (Inverse Diode  $Z_{thjc}$ )

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## TYPICAL CHARACTERISTICS – D5, D6 (NEUTRAL POINT DIODE)

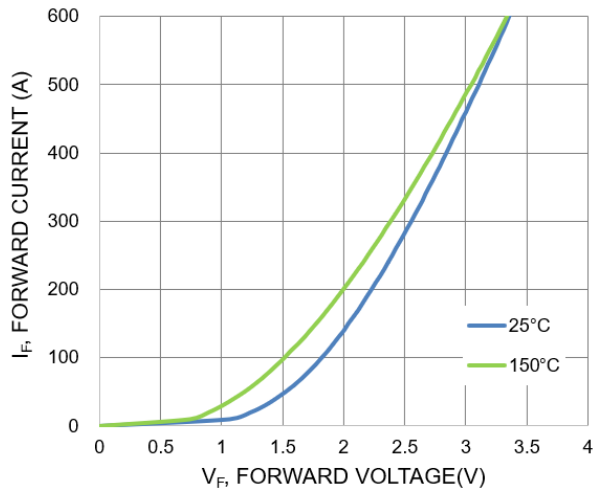


Figure 22. Neutral Point Diode Forward Characteristics

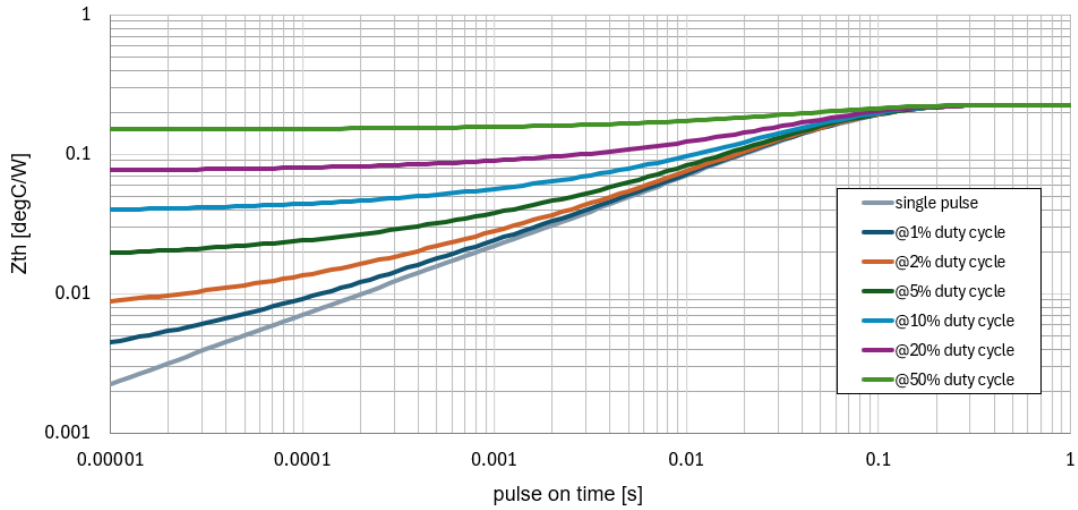


Figure 23. Transient Thermal Impedance (Neutral Point Diode  $Z_{thjc}$ )

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## TYPICAL CHARACTERISTICS – T1 || D5 OR T4 || D6

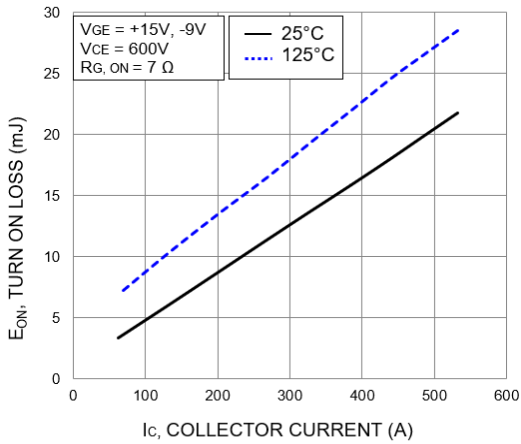


Figure 24. Typical Turn On Loss vs.  $I_c$

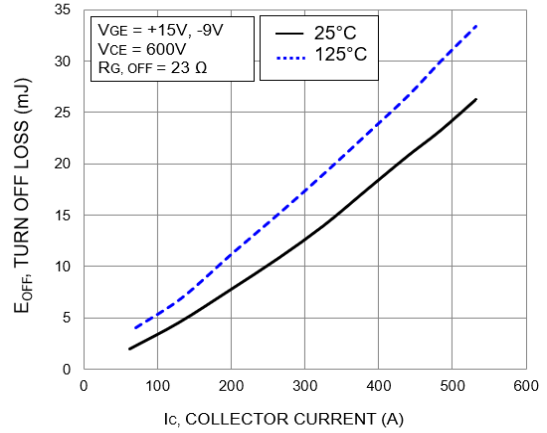


Figure 25. Typical Turn Off Loss vs.  $I_c$

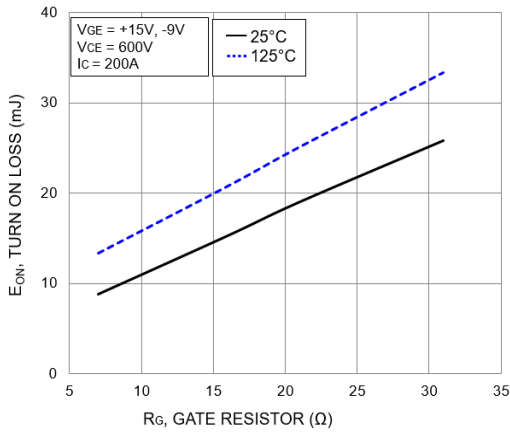


Figure 26. Typical Turn On Loss vs.  $R_G$

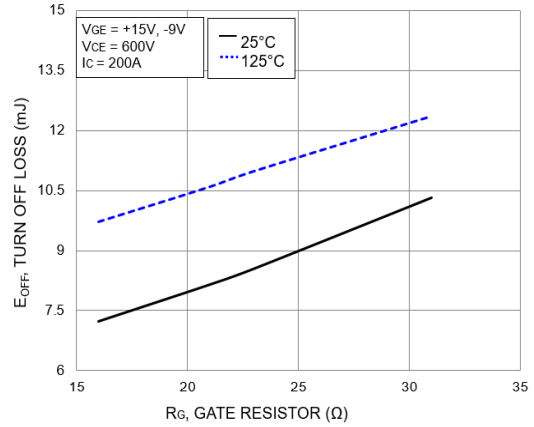


Figure 27. Typical Turn Off Loss vs.  $R_G$

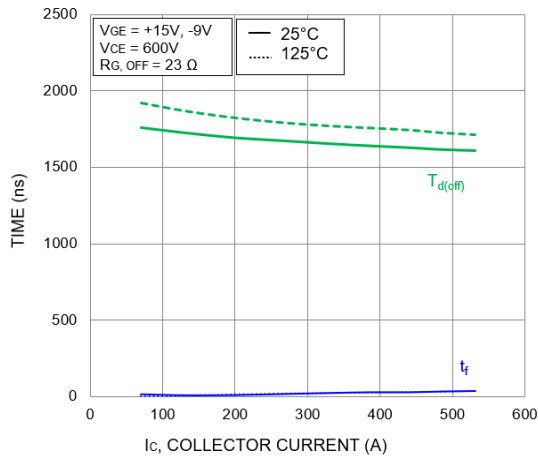


Figure 28. Typical Turn-Off Switching Time vs.  $I_c$

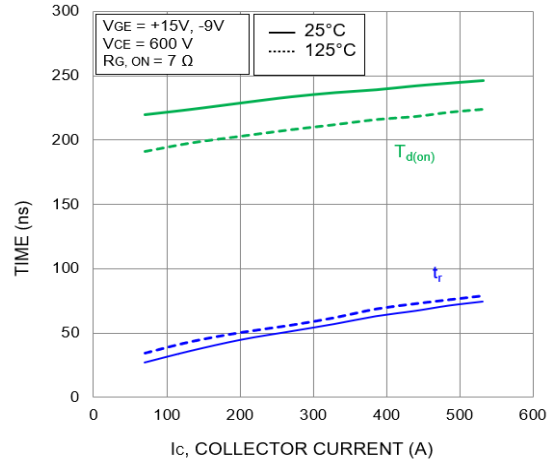
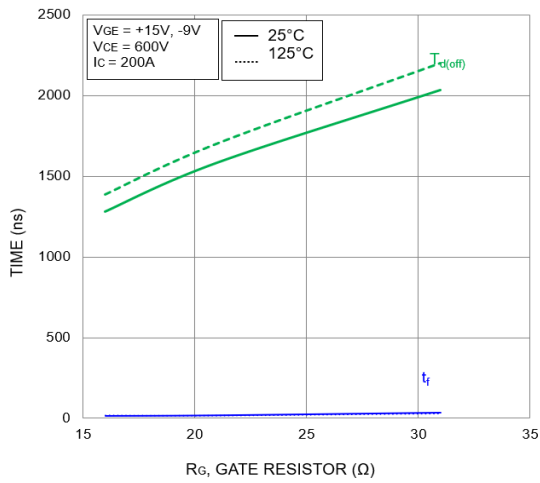


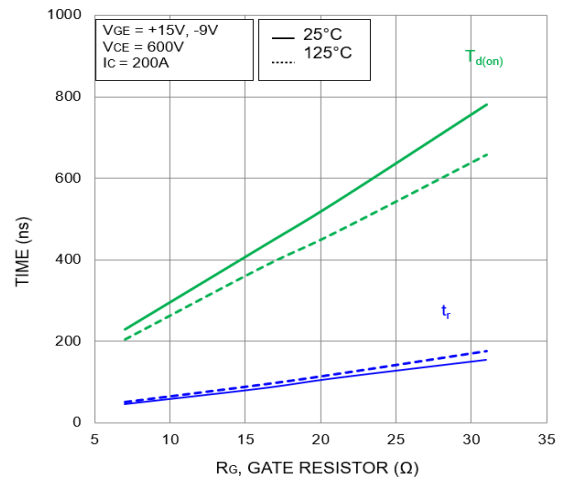
Figure 29. Typical Turn-On Switching Time vs.  $I_c$

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

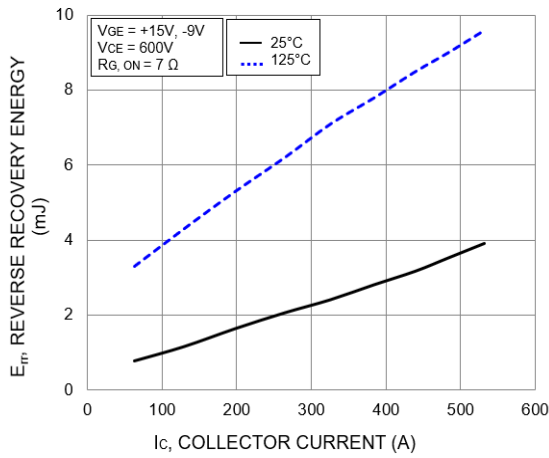
## TYPICAL CHARACTERISTICS – T1 || D5 OR T4 || D6



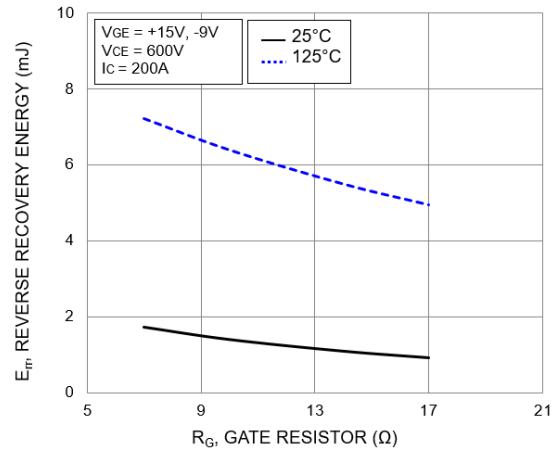
**Figure 30. Typical Turn-Off Switching Time vs.  $R_G$**



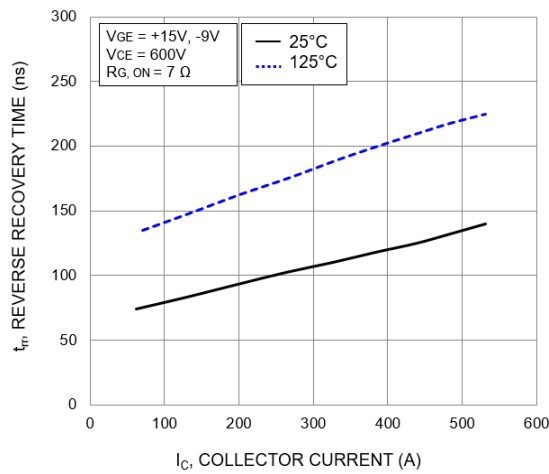
**Figure 31. Typical Turn-On Switching Time vs.  $R_G$**



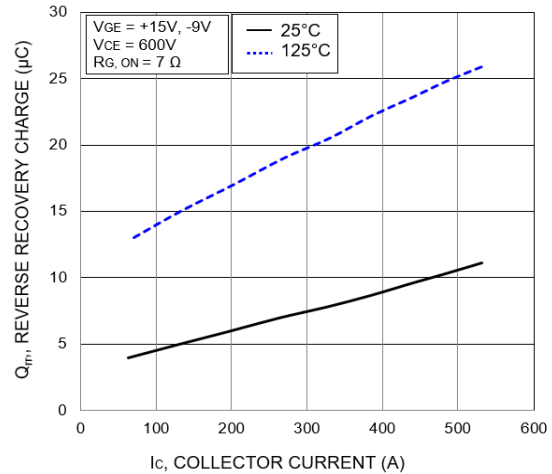
**Figure 32. Typical Reverse Recovery Energy Loss vs.  $I_C$**



**Figure 33. Typical Reverse Recovery Energy Loss vs.  $R_G$**



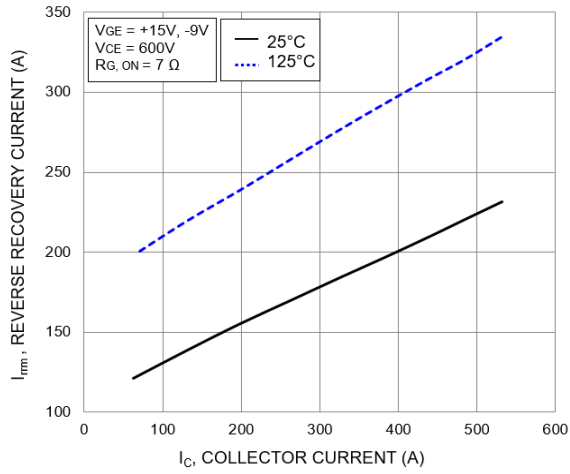
**Figure 34. Typical Reverse Recovery Time vs.  $I_C$**



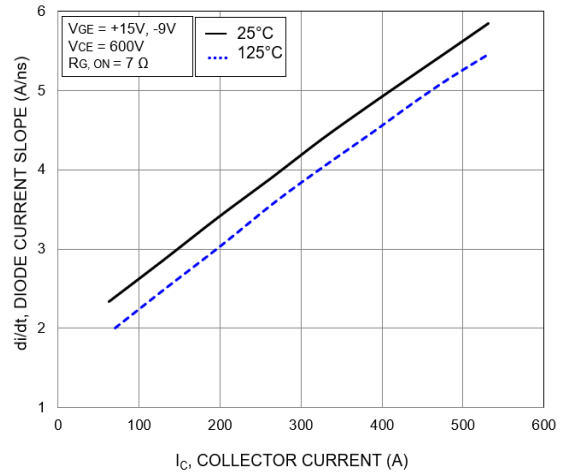
**Figure 35. Typical Reverse Recovery Charge vs.  $I_C$**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

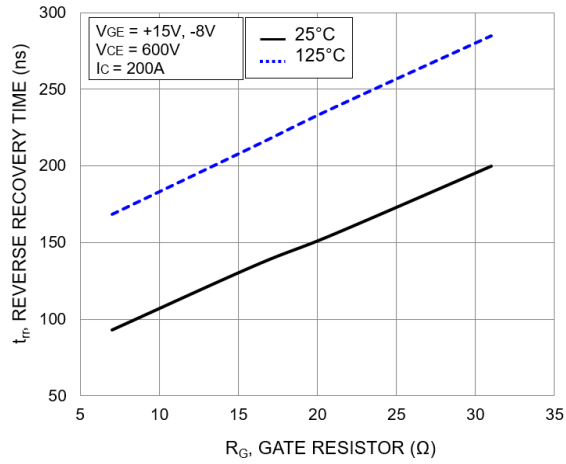
## TYPICAL CHARACTERISTICS – T1 || D5 OR T4 || D6



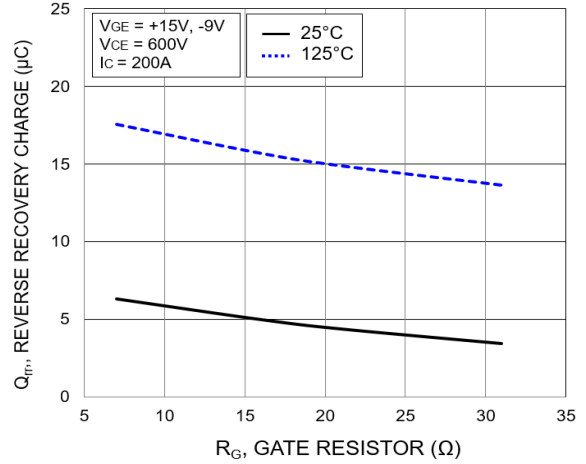
**Figure 36. Typical Reverse Recovery Current vs.  $I_c$**



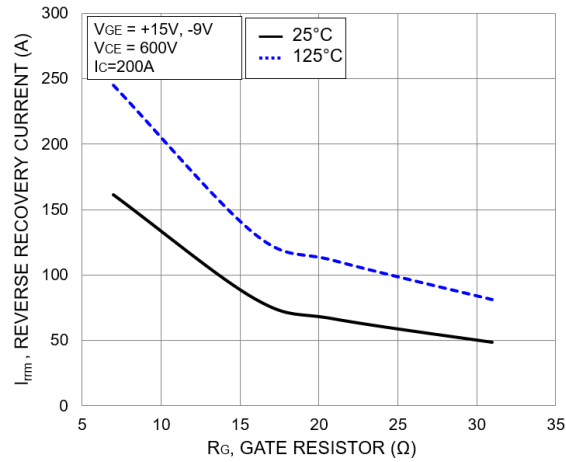
**Figure 37. Typical  $di/dt$  vs.  $I_c$**



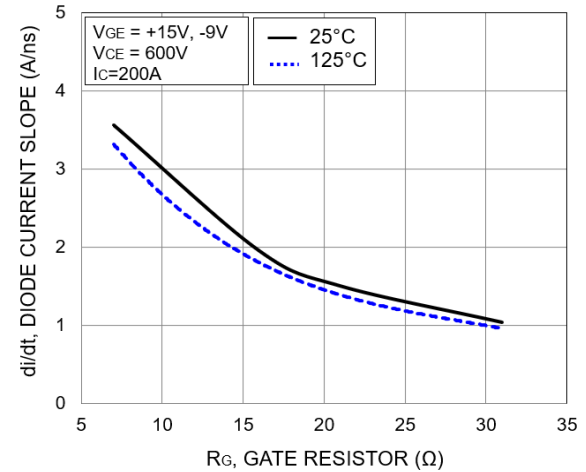
**Figure 38. Typical Reverse Recovery Time vs.  $R_G$**



**Figure 39. Typical Reverse Recovery Charge vs.  $R_G$**



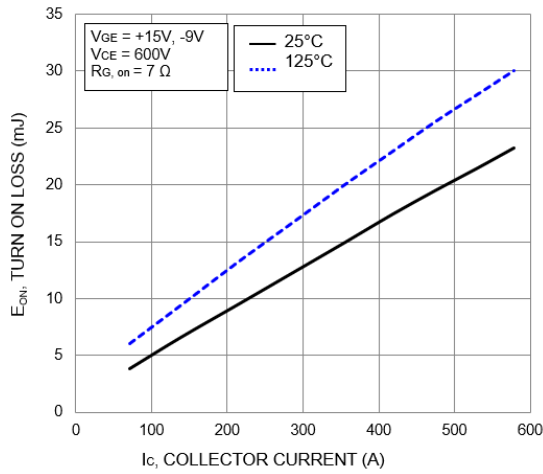
**Figure 40. Typical Reverse Recovery Peak Current vs.  $R_G$**



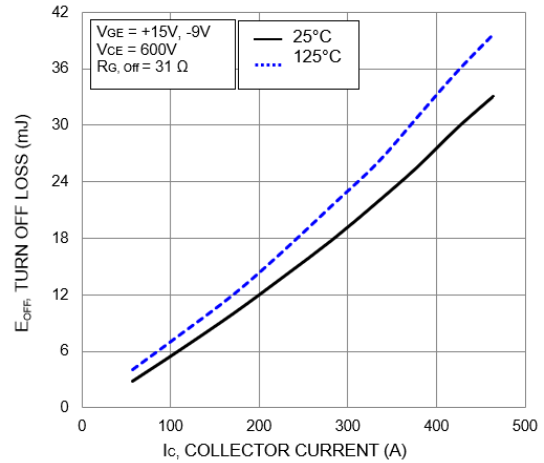
**Figure 41. Typical  $di/dt$  vs.  $R_G$**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

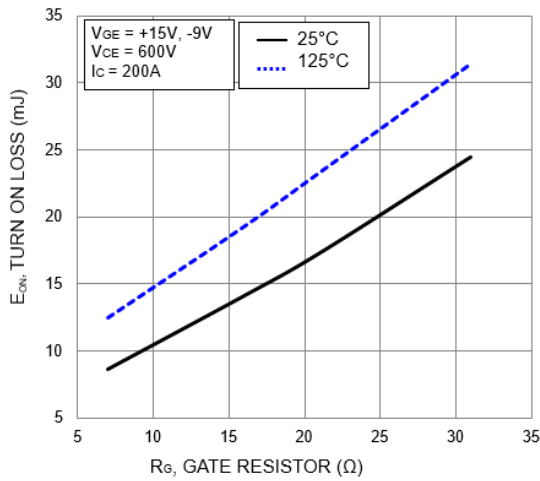
## TYPICAL CHARACTERISTICS – T2 || D3 + D4 OR T3 || D1 + D2



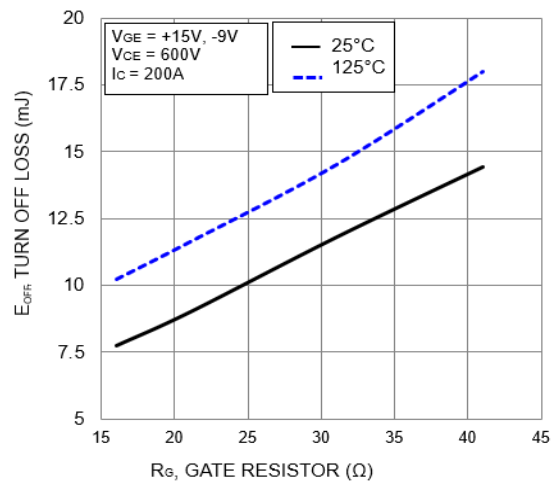
**Figure 42. Typical Turn On Loss vs.  $I_c$**



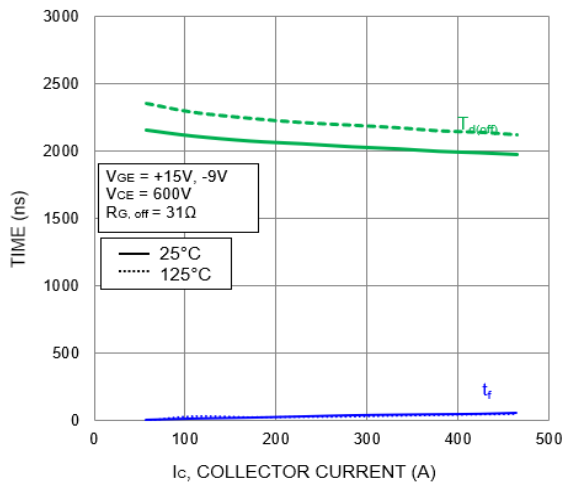
**Figure 43. Typical Turn Off Loss vs.  $I_c$**



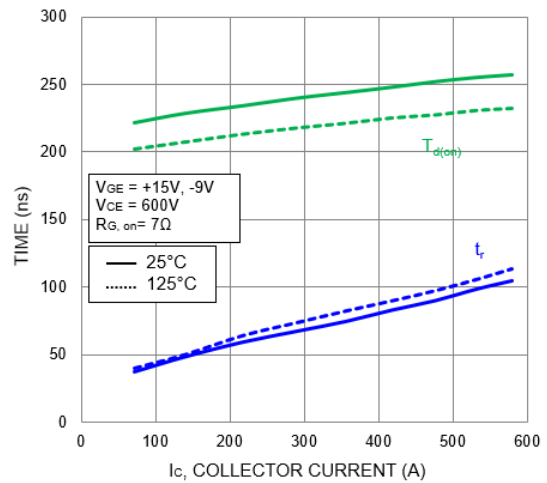
**Figure 44. Typical Turn On Loss vs.  $R_G$**



**Figure 45. Typical Turn Off Loss vs.  $R_G$**



**Figure 46. Typical Turn-Off Switching Time vs.  $I_c$**



**Figure 47. Typical Turn-On Switching Time vs.  $I_c$**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## TYPICAL CHARACTERISTICS – T2 || D3 + D4 OR T3 || D1 + D2

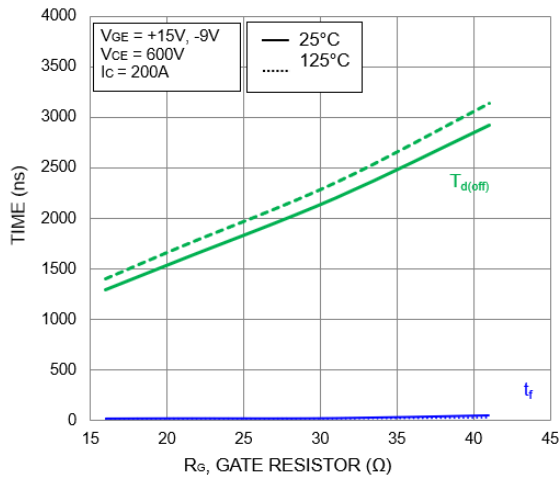


Figure 48. Typical Turn-Off Switching Time vs.  $R_G$

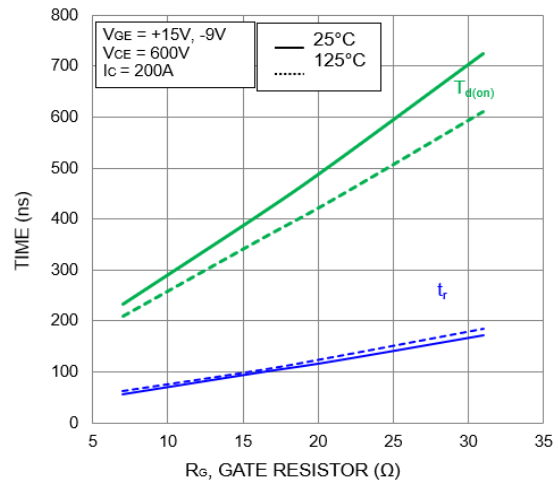


Figure 49. Typical Turn-On Switching Time vs.  $R_G$

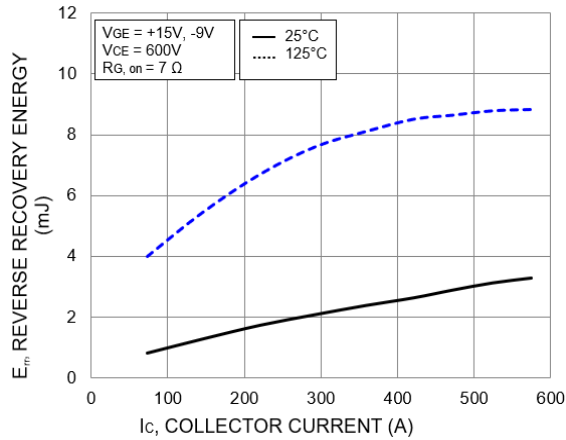


Figure 50. Typical Reverse Recovery Energy Loss vs.  $I_C$

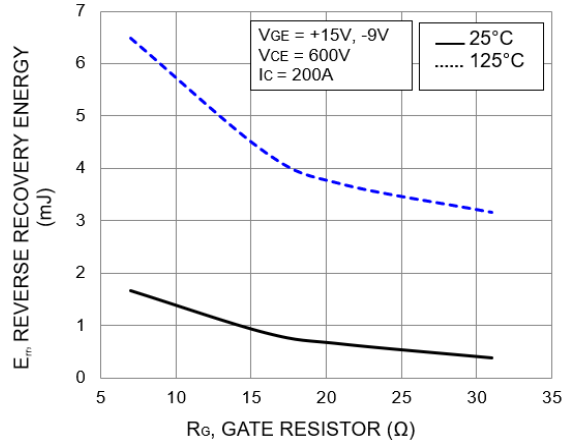


Figure 51. Typical Reverse Recovery Energy Loss vs.  $R_G$

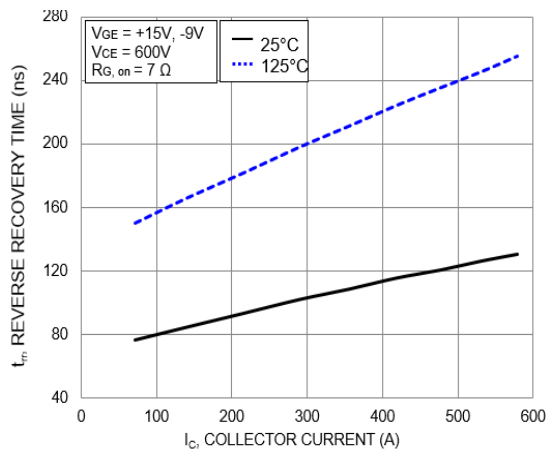


Figure 52. Typical Reverse Recovery Time vs.  $I_C$

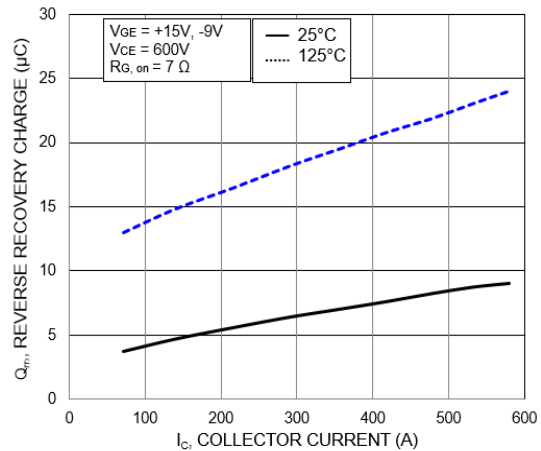
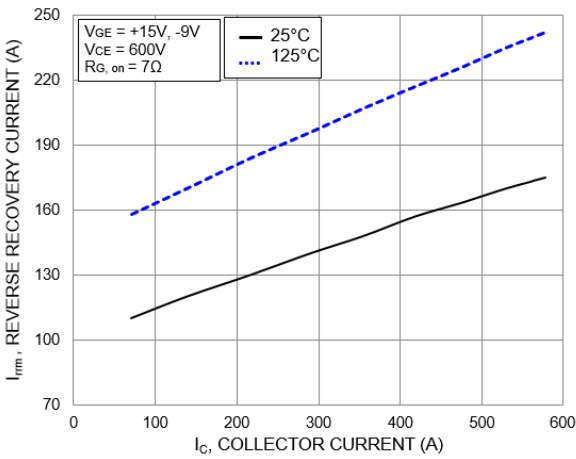


Figure 53. Typical Reverse Recovery Charge vs.  $I_C$

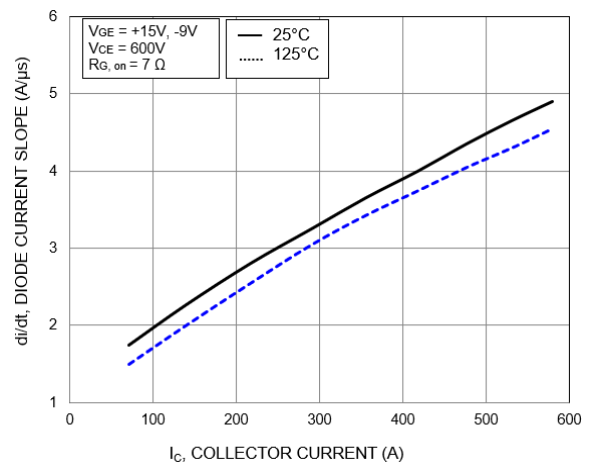


# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

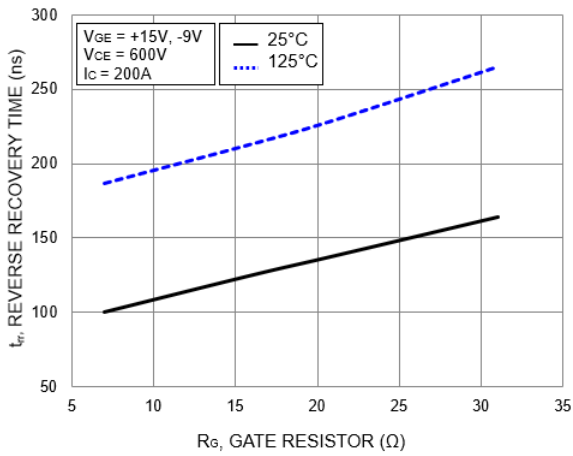
## TYPICAL CHARACTERISTICS – T2 || D3 + D4 OR T3 || D1 + D2



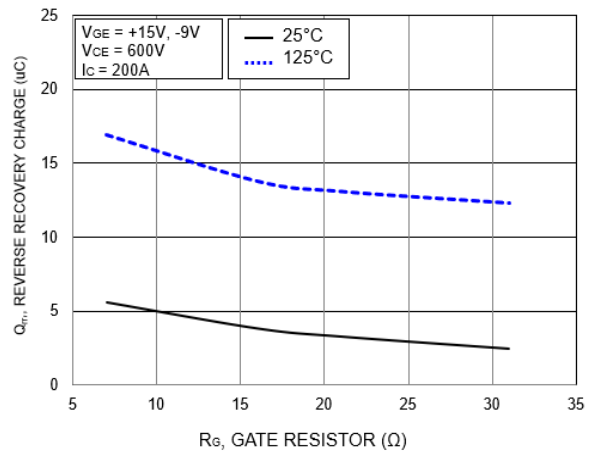
**Figure 54. Typical Reverse Recovery Current vs.  $I_c$**



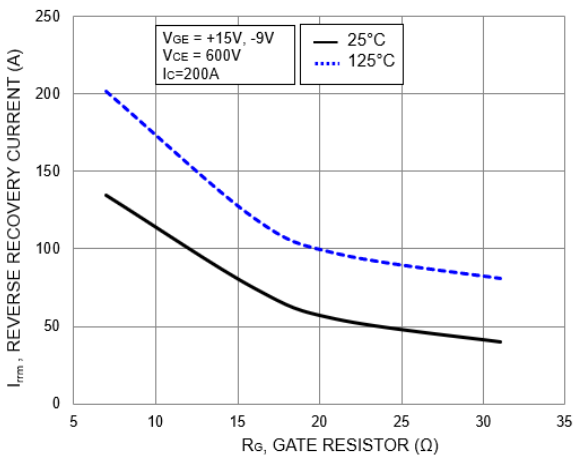
**Figure 55. Typical di/dt vs.  $I_c$**



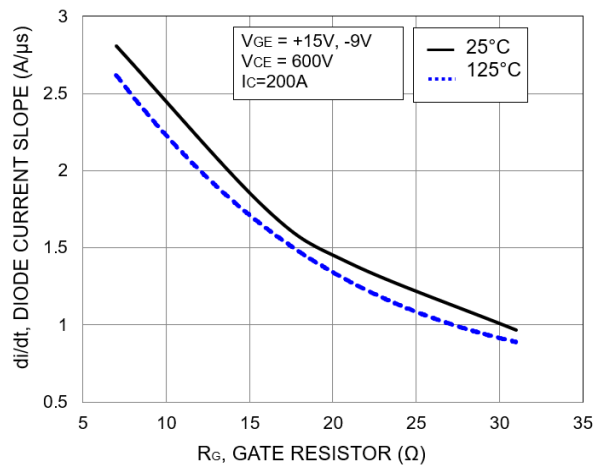
**Figure 56. Typical Reverse Recovery Time vs.  $R_G$**



**Figure 57. Typical Reverse Recovery Charge vs.  $R_G$**



**Figure 58. Typical Reverse Recovery Peak Current vs.  $R_G$**



**Figure 59. Typical di/dt vs.  $R_G$**

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

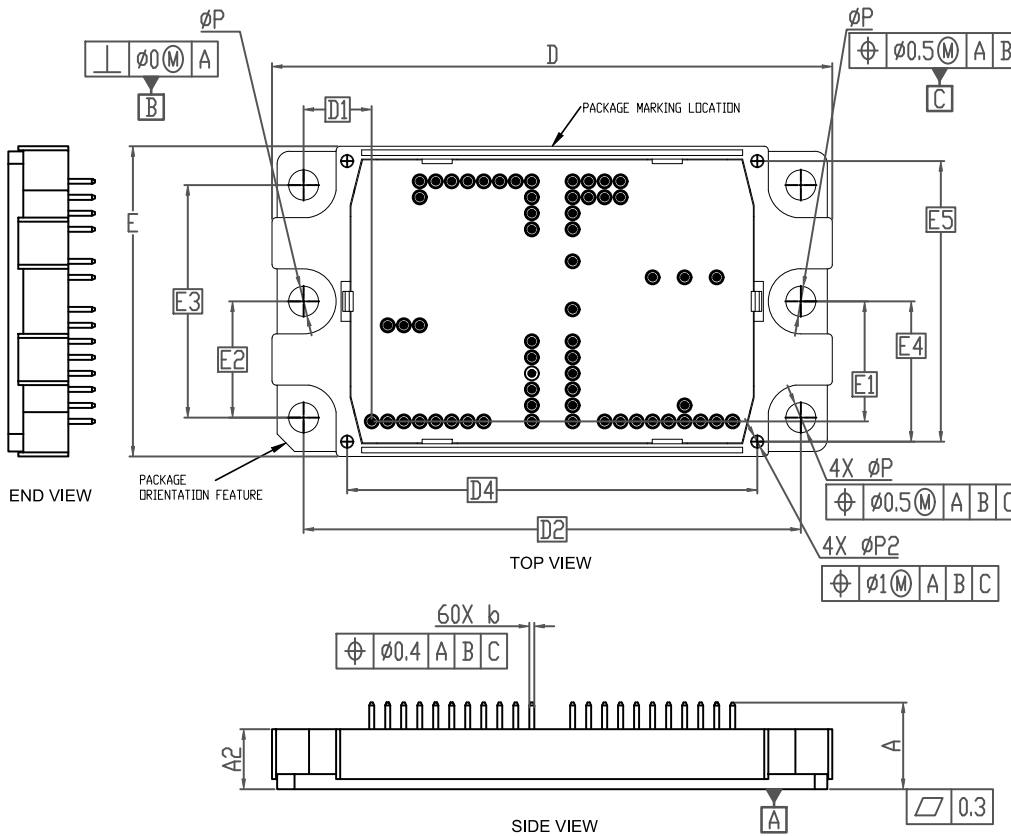
## PACKAGE DIMENSIONS

PIM60 112.00x62.00x12.00  
CASE 180CY  
ISSUE O

DATE 30 JUL 2024

NOTES:

1. Dimensioning and tolerancing conform to ASME Y14.5
2. All dimensions are in millimeters.
3. Pin-grid is 3.2mm.
4. Package marking is located on the side opposite the package orientation feature.
5. The pins are gold-plated solder pin.



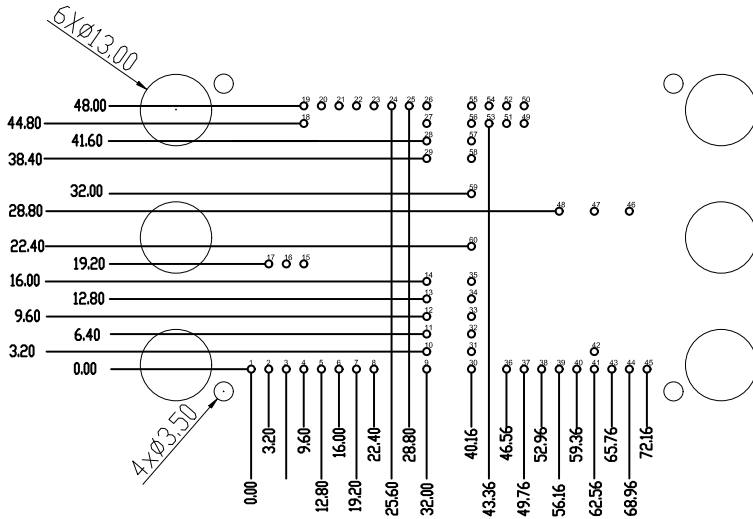
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	17.00	17.40	17.80
A2	11.70	12.00	12.30
b	0.95	1.00	1.05
D	111.60	112.00	112.40
D1	13.62 BSC		
D2	99.40 BSC		
D4	82.00 BSC		
E	61.60	62.00	62.40
E1	24.00 BSC		
E2	23.25 BSC		
E3	46.50 BSC		
E4	28.05 BSC		
E5	56.10 BSC		
P	5.90	6.00	6.10
P2	2.20	2.30	2.40

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## PACKAGE DIMENSIONS

PIM60 112.00x62.00x12.00  
CASE 180CY  
ISSUE O

DATE 30 JUL 2024



### 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.

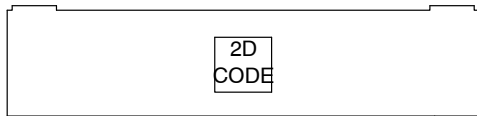
NOTE 2:

Pin POSITION								
Pin	X	Y	Pin	X	Y	Pin	X	Y
1	0.00	0.00	24	25.60	48.00	47	62.56	28.80
2	3.20	0.00	25	28.80	48.00	48	56.16	28.80
3	6.40	0.00	26	32.00	48.00	49	49.76	44.80
4	9.60	0.00	27	32.00	44.80	50	49.76	48.00
5	12.80	0.00	28	32.00	41.60	51	46.56	44.80
6	16.00	0.00	29	32.00	38.40	52	46.56	48.00
7	19.20	0.00	30	40.16	0.00	53	43.36	44.80
8	22.40	0.00	31	40.16	3.20	54	43.36	48.00
9	32.00	0.00	32	40.16	6.40	55	40.16	48.00
10	32.00	3.20	33	40.16	9.60	56	40.16	44.80
11	32.00	6.40	34	40.16	12.80	57	40.16	41.60
12	32.00	9.60	35	40.16	16.00	58	40.16	38.40
13	32.00	12.80	36	46.56	0.00	59	40.16	32.00
14	32.00	16.00	37	49.76	0.00	60	40.16	22.40
15	9.60	19.20	38	52.96	0.00			
16	6.40	19.20	39	56.16	0.00			
17	3.20	19.20	40	59.36	0.00			
18	9.60	44.80	41	62.56	0.00			
19	9.60	48.00	42	62.56	3.20			
20	12.80	48.00	43	65.76	0.00			
21	16.00	48.00	44	68.96	0.00			
22	19.20	48.00	45	72.16	0.00			
23	22.40	48.00	46	68.96	28.80			

### GENERIC MARKING DIAGRAM\*



FRONTSIDE MARKING



BACKSIDE MARKING

XXXXX = Specific Device Code  
AT = Assembly & Test Site Code  
YYWW = Year and Work Week Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

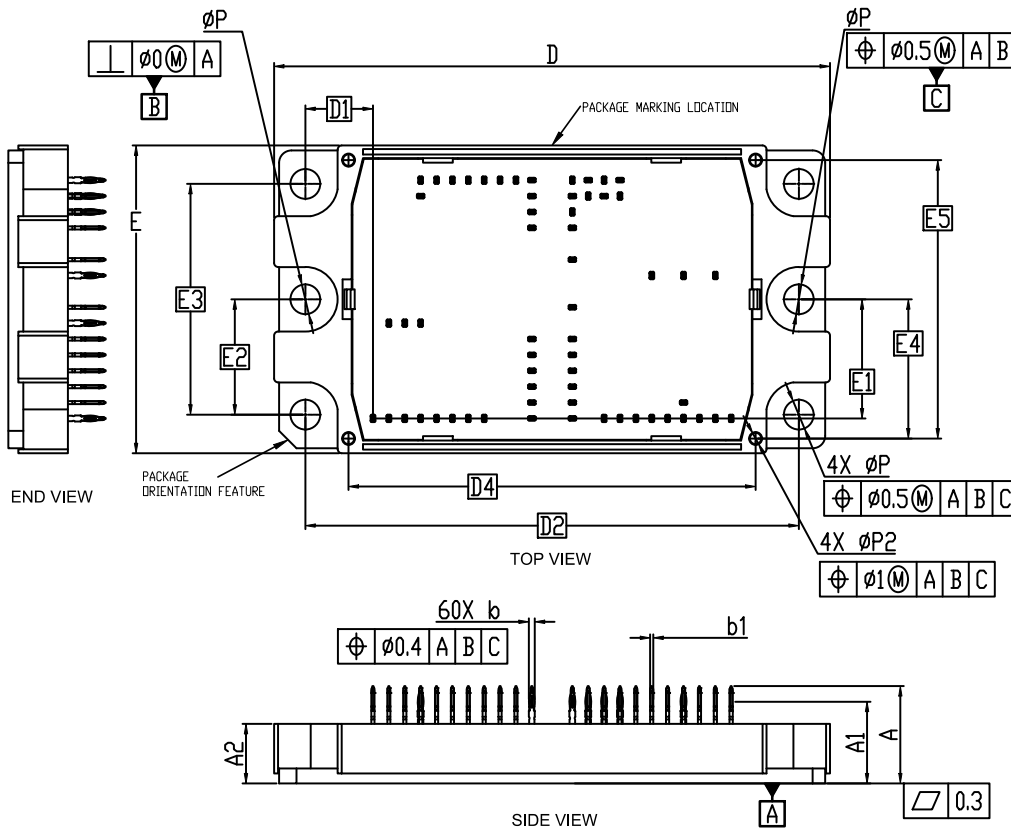
## PACKAGE DIMENSIONS

PIM60 112.00x62.00x12.00  
CASE 180HY  
ISSUE O

DATE 30 JUL 2024

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-grid is 3.2mm.
5. Package marking is located on the side opposite the package orientation feature.
6. The pins are Sn plated press fit pin.



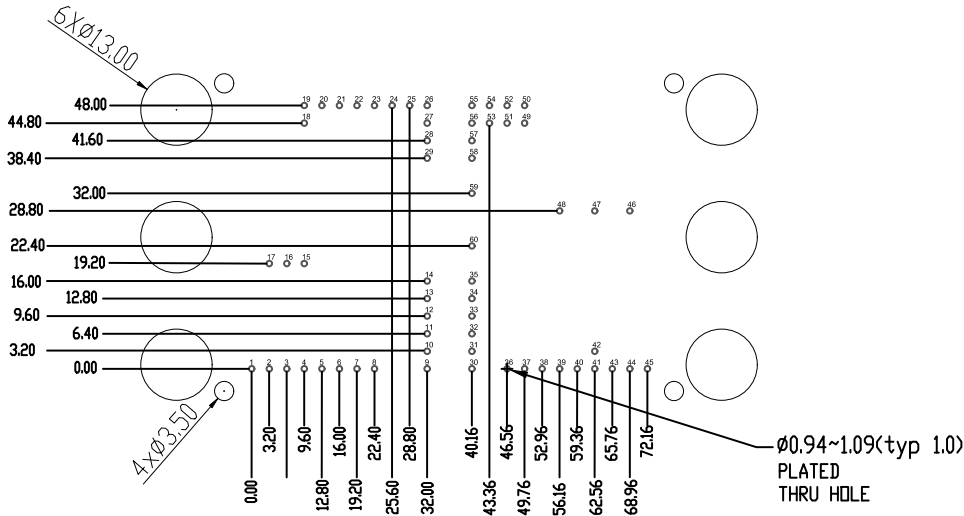
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	19.20	19.60	20.00
A1	16.25	16.45	16.65
A2	11.70	12.00	12.30
b	1.15	1.20	1.25
b1	0.59	0.64	0.69
D	111.60	112.00	112.40
D1	13.62 BSC		
D2	99.40 BSC		
D4	82.00 BSC		
E	61.60	62.00	62.40
E1	24.00 BSC		
E2	23.25 BSC		
E3	46.50 BSC		
E4	28.05 BSC		
E5	56.10 BSC		
P	5.90	6.00	6.10
P2	2.20	2.30	2.40

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

## PACKAGE DIMENSIONS

PIM60 112.00x62.00x12.00  
CASE 180HY  
ISSUE O

DATE 30 JUL 2024



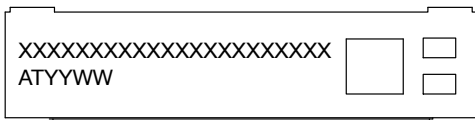
### RECOMMENDED MOUNTING PATTERN

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

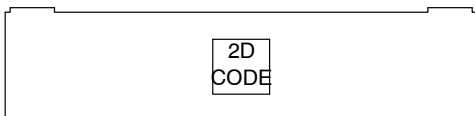
NOTE 2:

Pin POSITION								
Pin	X	Y	Pin	X	Y	Pin	X	Y
1	0.00	0.00	24	25.60	48.00	47	62.56	28.80
2	3.20	0.00	25	28.80	48.00	48	56.16	28.80
3	6.40	0.00	26	32.00	48.00	49	49.76	44.80
4	9.60	0.00	27	32.00	44.80	50	49.76	48.00
5	12.80	0.00	28	32.00	41.60	51	46.56	44.80
6	16.00	0.00	29	32.00	38.40	52	46.56	48.00
7	19.20	0.00	30	40.16	0.00	53	43.36	44.80
8	22.40	0.00	31	40.16	3.20	54	43.36	48.00
9	32.00	0.00	32	40.16	6.40	55	40.16	48.00
10	32.00	3.20	33	40.16	9.60	56	40.16	44.80
11	32.00	6.40	34	40.16	12.80	57	40.16	41.60
12	32.00	9.60	35	40.16	16.00	58	40.16	38.40
13	32.00	12.80	36	46.56	0.00	59	40.16	32.00
14	32.00	16.00	37	49.76	0.00	60	40.16	22.40
15	9.60	19.20	38	52.96	0.00			
16	6.40	19.20	39	56.16	0.00			
17	3.20	19.20	40	59.36	0.00			
18	9.60	44.80	41	62.56	0.00			
19	9.60	48.00	42	62.56	3.20			
20	12.80	48.00	43	65.76	0.00			
21	16.00	48.00	44	68.96	0.00			
22	19.20	48.00	45	72.16	0.00			
23	22.40	48.00	46	68.96	28.80			

### GENERIC MARKING DIAGRAM\*



FRONTSIDE MARKING



BACKSIDE MARKING

XXXXX = Specific Device Code  
AT = Assembly & Test Site Code  
YYWW = Year and Work Week Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

# NXH600N105L7F5S2HG, NXH600N105L7F5P2HG

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