

# 3-Level NPC Inverter Module

## NXH600N65L4Q2F2

The NXH600N65L4Q2F2SG/PG is a power module containing a I-type neutral point clamped three-level inverter. The integrated field stop trench IGBTs and FRDs provide lower conduction losses and switching losses, enabling designers to achieve high efficiency and superior reliability.

### Features

- Neutral Point Clamped Three-level Inverter Module
- 650 V Field Stop 4 IGBTs
- Low Inductive layout
- Solderable Pins/Press-fit Pins
- Thermistor
- Pb-Free, Halogen Free/BFR Free and RoHS Compliant

### Typical Applications

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

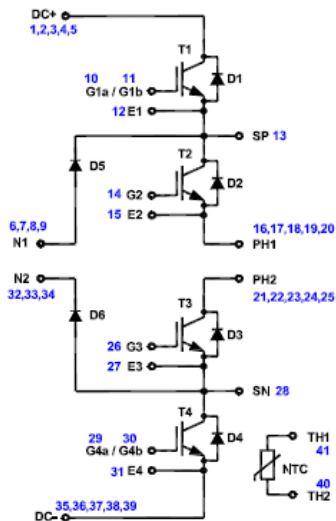
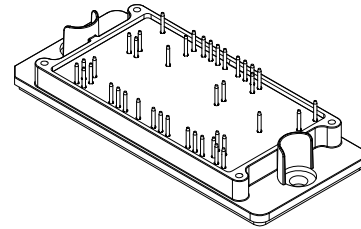
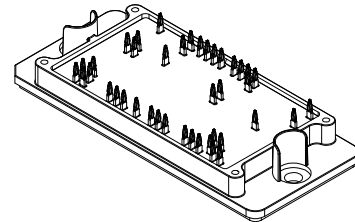


Figure 1. NXH600N65L4Q2F2 Schematic Diagram

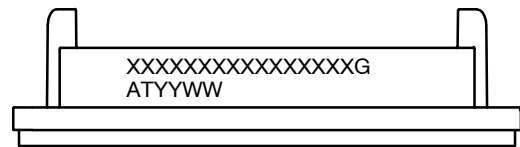


PIM41, 93x47 (SOLDER PIN)  
CASE 180BC



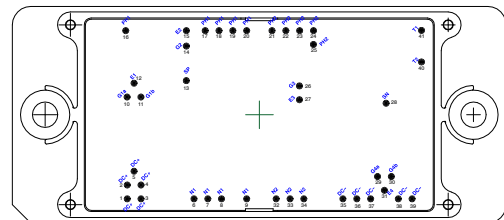
PIM41, 93x47 (PRESS FIT)  
CASE 180HD

### 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 16 of this data sheet.

# NXH600N65L4Q2F2

## MAXIMUM RATINGS

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

Collector–Emitter Voltage	$V_{CES}$	650	V
Gate–Emitter Voltage Positive Transient Gate – Emitter Voltage (tpulse = 5 $\mu$ s, D < 0.10)	$V_{GE}$	$\pm 20$ 30	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	483	A
Pulsed Collector Current ( $T_J = 175^\circ\text{C}$ )	$I_{Cpulse}$	1449	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	931	W
Minimum Operating Junction Temperature	$T_{JMIN}$	–40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	175	$^\circ\text{C}$

### INNER IGBT (T2, T3)

Collector–Emitter Voltage	$V_{CES}$	650	V
Gate–Emitter Voltage Positive Transient Gate – Emitter Voltage (tpulse = 5 $\mu$ s, D < 0.10)	$V_{GE}$	$\pm 20$ 30	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	314	A
Pulsed Collector Current ( $T_J = 175^\circ\text{C}$ )	$I_{Cpulse}$	942	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	679	W
Minimum Operating Junction Temperature	$T_{JMIN}$	–40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	175	$^\circ\text{C}$

### NEUTRAL POINT DIODE (D5, D6)

Peak Repetitive Reverse Voltage	$V_{RRM}$	650	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	201	A
Repetitive Peak Forward Current ( $T_J = 175^\circ\text{C}$ )	$I_{FRM}$	603	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	477	W
Minimum Operating Junction Temperature	$T_{JMIN}$	–40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	175	$^\circ\text{C}$

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

Peak Repetitive Reverse Voltage	$V_{RRM}$	650	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	129	A
Repetitive Peak Forward Current (Tp = 1 ms)	$I_{FRM}$	387	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	298	W
Minimum Operating Junction Temperature	$T_{JMIN}$	–40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	175	$^\circ\text{C}$

### THERMAL PROPERTIES

Storage Temperature Range	$T_{stg}$	–40 to 150	$^\circ\text{C}$
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### INSULATION PROPERTIES

Isolation Test Voltage, t = 1 s, 50Hz	$V_{is}$	4000	$V_{RMS}$
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.

### RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Module Operating Junction Temperature	$T_J$	–40	175	$^\circ\text{C}$

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.

# NXH600N65L4Q2F2

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

Parameter	Test Conditions	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> = 650 V	I <sub>CES</sub>	–	–	100	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>	–	1.61	2.2	V	
	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 600 A, T <sub>J</sub> = 175°C		–	1.90	–		
Gate–Emitter Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 2 mA	V <sub>GE(TH)</sub>	3.1	3.94	5.2	V	
Gate Leakage Current	V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0 V	I <sub>GES</sub>	–	–	15	μA	
Turn–on Delay Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 350 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = –9 V to +15 V, R <sub>Gon</sub> = 15 Ω, R <sub>Goff</sub> = 23 Ω	t <sub>d(on)</sub>	–	153.91	–	ns	
Rise Time		t <sub>r</sub>	–	45.54	–		
Turn–off Delay Time		t <sub>d(off)</sub>	–	721.80	–		
Fall Time		t <sub>f</sub>	–	10.25	–		
Turn–on Switching Loss per Pulse		E <sub>on</sub>	–	3.04	–		mJ
Turn off Switching Loss per Pulse		E <sub>off</sub>	–	6.58	–		
Turn–on Delay Time		T <sub>J</sub> = 125°C V <sub>CE</sub> = 350 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = –9 V to +15 V, R <sub>Gon</sub> = 15 Ω, R <sub>Goff</sub> = 23 Ω	t <sub>d(on)</sub>	–	139.84		–
Rise Time	t <sub>r</sub>		–	49.03	–		
Turn–off Delay Time	t <sub>d(off)</sub>		–	778.28	–		
Fall Time	t <sub>f</sub>		–	31.00	–		
Turn–on Switching Loss per Pulse	E <sub>on</sub>		–	4.43	–	mJ	
Turn off Switching Loss per Pulse	E <sub>off</sub>		–	8.18	–		
Input Capacitance	V <sub>CE</sub> = 20 V, V <sub>GE</sub> = 0 V, f = 10 kHz		C <sub>ies</sub>	–	37100	–	pF
Output Capacitance		C <sub>oes</sub>	–	1010	–		
Reverse Transfer Capacitance		C <sub>res</sub>	–	172	–		
Total Gate Charge	V <sub>CE</sub> = 600 V, I <sub>C</sub> = 40 A, V <sub>GE</sub> = ±15 V	Q <sub>g</sub>	–	2180	–	nC	
Thermal Resistance – Chip–to–heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	–	0.176	–	°C/W	
Thermal Resistance – Chip–to–case		R <sub>thJC</sub>	–	0.102	–	°C/W	

## NEUTRAL POINT DIODE (D5, D6)

Diode Forward Voltage	I <sub>F</sub> = 250 A, T <sub>J</sub> = 25°C	V <sub>F</sub>	–	2.47	3.1	V	
	I <sub>F</sub> = 250 A, T <sub>J</sub> = 175°C		–	1.91	–		
Reverse Recovery Time	T <sub>J</sub> = 25°C V <sub>CE</sub> = 350 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = –9 V to +15 V, R <sub>G</sub> = 15 Ω	t <sub>rr</sub>	–	19	–	ns	
Reverse Recovery Charge		Q <sub>rr</sub>	–	480	–	nC	
Peak Reverse Recovery Current		I <sub>RRM</sub>	–	32.5	–	A	
Peak Rate of Fall of Recovery Current		di/dt	–	3571.45	–	A/μs	
Reverse Recovery Energy		E <sub>rr</sub>	–	110.56	–	μJ	
Reverse Recovery Time		T <sub>J</sub> = 125°C V <sub>CE</sub> = 350 V, I <sub>C</sub> = 200 A V <sub>GE</sub> = –9 V to +15 V, R <sub>G</sub> = 15 Ω	t <sub>rr</sub>	–	55.62	–	ns
Reverse Recovery Charge			Q <sub>rr</sub>	–	3801.07	–	nC
Peak Reverse Recovery Current	I <sub>RRM</sub>		–	108.38	–	A	
Peak Rate of Fall of Recovery Current	di/dt		–	3387.11	–	A/μs	
Reverse Recovery Energy	E <sub>rr</sub>		–	722.83	–	μJ	
Thermal Resistance – Chip–to–heatsink	Thermal grease, Thickness = 2 Mil ±2%, λ = 2.87 W/mK	R <sub>thJH</sub>	–	0.279	–	°C/W	
Thermal Resistance – Chip–to–case		R <sub>thJC</sub>	–	0.199	–	°C/W	

## INNER IGBT (T2,T3)

Collector–Emitter Cutoff Current	V <sub>GE</sub> = 0 V, V <sub>CE</sub> = 650 V	I <sub>CES</sub>	–	–	100	μA
Collector–Emitter Saturation Voltage	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 450 A, T <sub>J</sub> = 25°C	V <sub>CE(sat)</sub>	–	1.59	2.2	V
	V <sub>GE</sub> = 15 V, I <sub>C</sub> = 450 A, T <sub>J</sub> = 175°C		–	1.75	–	
Gate–Emitter Threshold Voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1.5 mA	V <sub>GE(TH)</sub>	3.1	4.02	5.2	V
Gate Leakage Current	V <sub>GE</sub> = 20 V, V <sub>CE</sub> = 0 V	I <sub>GES</sub>	–	–	15	μA

# NXH600N65L4Q2F2

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
<b>INNER IGBT (T2,T3)</b>						
Turn-on Delay Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 200\text{ A}$ $V_{GE} = -9\text{ V to } +15\text{ V}, R_{Gon} = 15\ \Omega,$ $R_{Goff} = 21\ \Omega$	$t_{d(on)}$	–	211.52	–	ns
Rise Time		$t_r$	–	63.62	–	
Turn-off Delay Time		$t_{d(off)}$	–	922.97	–	
Fall Time		$t_f$	–	26	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	4.06	–	mJ
Turn off Switching Loss per Pulse		$E_{off}$	–	5.57	–	
Turn-on Delay Time	$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 200\text{ A}$ $V_{GE} = -9\text{ V to } +15\text{ V}, R_{Gon} = 15\ \Omega,$ $R_{Goff} = 21\ \Omega$	$t_{d(on)}$	–	187.15	–	ns
Rise Time		$t_r$	–	72.07	–	
Turn-off Delay Time		$t_{d(off)}$	–	991.52	–	
Fall Time		$t_f$	–	24.12	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	4.84	–	mJ
Turn off Switching Loss per Pulse		$E_{off}$	–	6.37	–	
Input Capacitance	$V_{CE} = 20\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$	$C_{ies}$	–	27600	–	pF
Output Capacitance		$C_{oes}$	–	814	–	
Reverse Transfer Capacitance		$C_{res}$	–	131	–	
Total Gate Charge	$V_{CE} = 480\text{ V}, I_C = 375\text{ A}, V_{GE} = \pm 15\text{ V}$	$Q_g$	–	1580	–	nC
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2 Mil $\pm 2\%$ , $\lambda = 2.87\text{ W/mK}$	$R_{thJH}$	–	0.224	–	$^\circ\text{C/W}$
Thermal Resistance – Chip-to-case		$R_{thJC}$	–	0.140	–	$^\circ\text{C/W}$

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

Diode Forward Voltage	$I_F = 150\text{ A}, T_J = 25^\circ\text{C}$	$V_F$	–	2.45	3.1	V
	$I_F = 150\text{ A}, T_J = 175^\circ\text{C}$		–	1.75	–	
Reverse Recovery Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 200\text{ A}$ $V_{GE} = -9\text{ V to } +15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	16.55	–	ns
Reverse Recovery Charge		$Q_{rr}$	–	178.92	–	nC
Peak Reverse Recovery Current		$I_{RRM}$	–	16.33	–	A
Peak Rate of Fall of Recovery Current		$di/dt$	–	2682.93	–	A/ $\mu\text{s}$
Reverse Recovery Energy		$E_{rr}$	–	33.93	–	$\mu\text{J}$
Reverse Recovery Time		$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 200\text{ A}$ $V_{GE} = -9\text{ V to } +15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	54.93	–
Reverse Recovery Charge	$Q_{rr}$		–	2113.76	–	nC
Peak Reverse Recovery Current	$I_{RRM}$		–	64.50	–	A
Peak Rate of Fall of Recovery Current	$di/dt$		–	2445.66	–	A/ $\mu\text{s}$
Reverse Recovery Energy	$E_{rr}$		–	459.95	–	$\mu\text{J}$
Thermal Resistance – Chip-to-heatsink	Thermal grease, Thickness = 2 Mil $\pm 2\%$ , $\lambda = 2.87\text{ W/mK}$		$R_{thJH}$	–	0.420	–
Thermal Resistance – Chip-to-case		$R_{thJC}$	–	0.319	–	$^\circ\text{C/W}$

## THERMISTOR CHARACTERISTICS

Nominal Resistance	$T = 25^\circ\text{C}$	$R_{25}$	–	5	–	$\text{k}\Omega$
Nominal Resistance	$T = 100^\circ\text{C}$	$R_{100}$	–	490.6	–	$\Omega$
Deviation of R25		$\Delta R/R$	-1	–	1	%
Power Dissipation		$P_D$	–	5	–	mW
Power Dissipation Constant			–	1.3	–	mW/K
B-value	B (25/85), tolerance $\pm 1\%$		–	3435	–	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.

# NXH600N65L4Q2F2

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

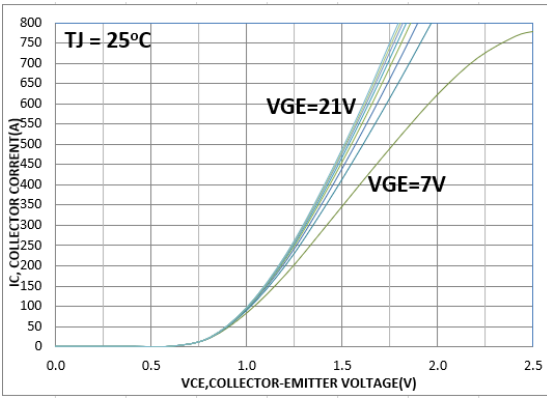


Figure 2. Typical Output Characteristics

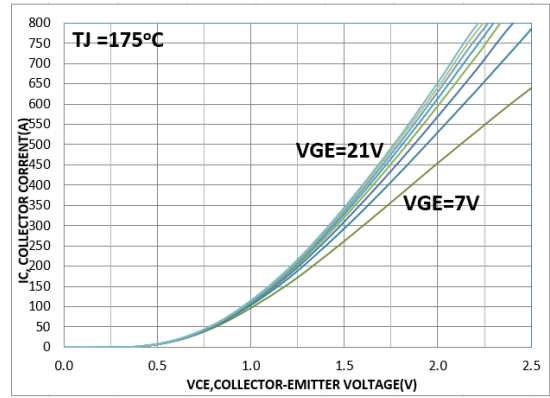


Figure 3. Typical Output Characteristics

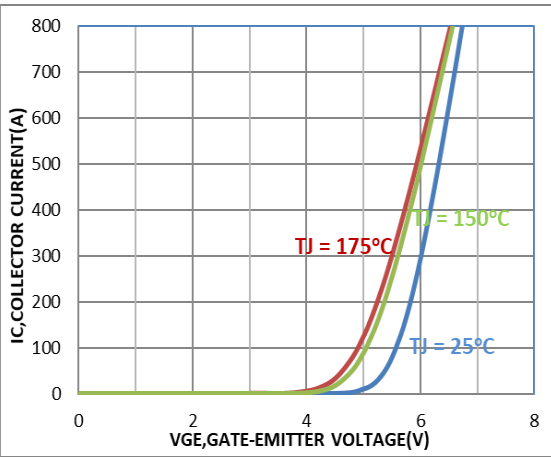


Figure 4. Typical Transfer Characteristics

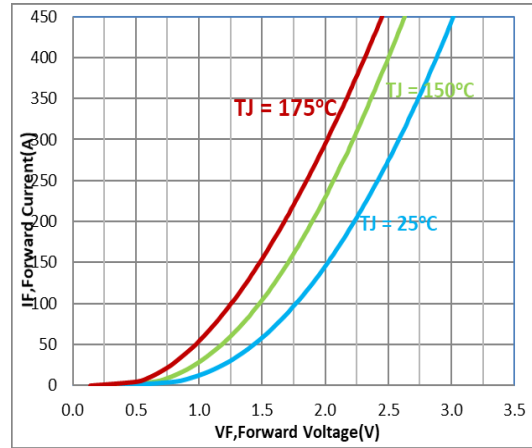


Figure 5. Diode Forward Characteristics

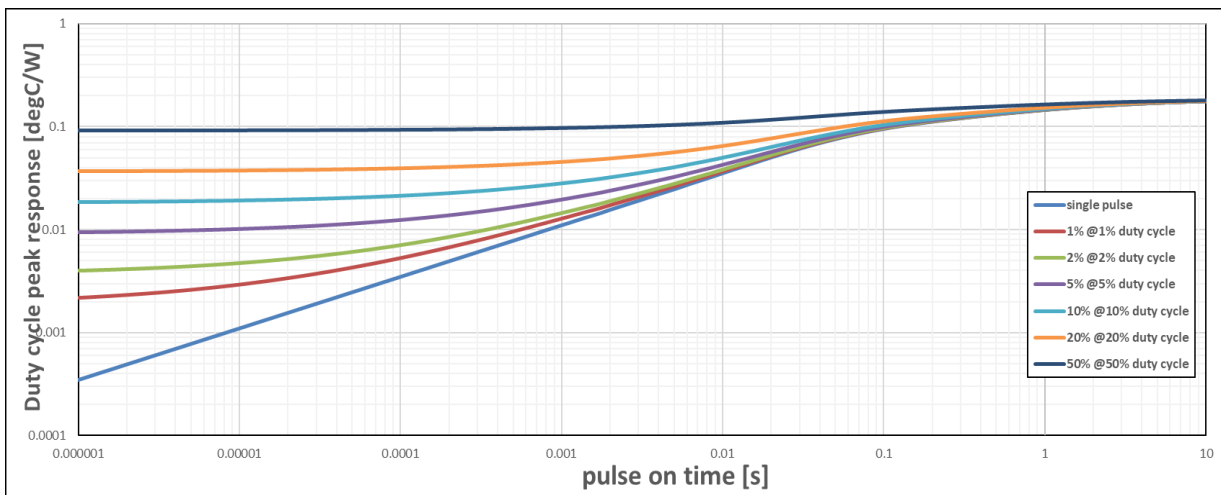


Figure 6. Transient Thermal Impedance (T1, T4)

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – IGBT T1, T4 AND DIODE D5, D6 (CONTINUED)

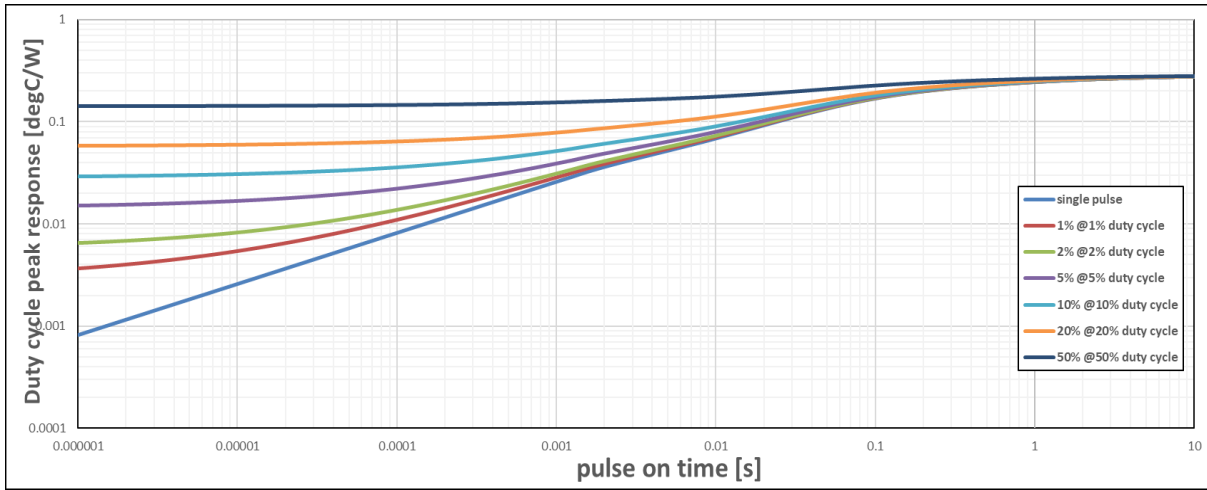


Figure 7. Transient Thermal Impedance (D5, D6)

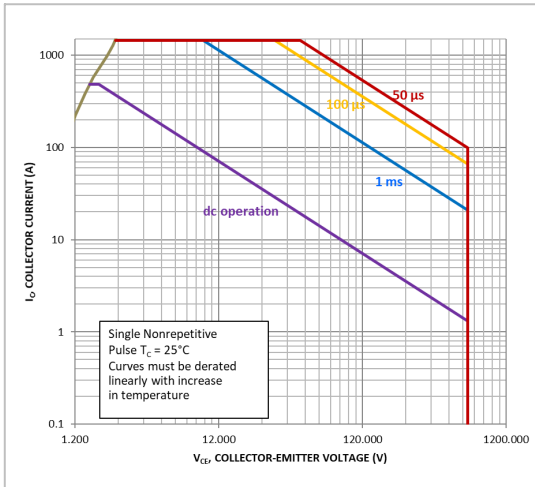


Figure 8. FBSOA (T1, T4)

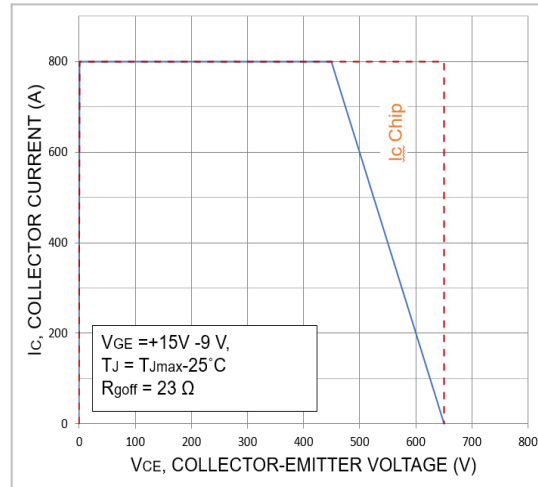


Figure 9. RBSOA (T1, T4)

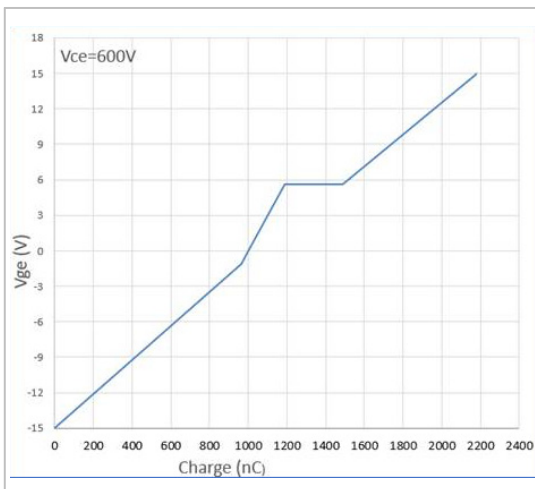


Figure 10. Gate Voltage vs. Gate Charge

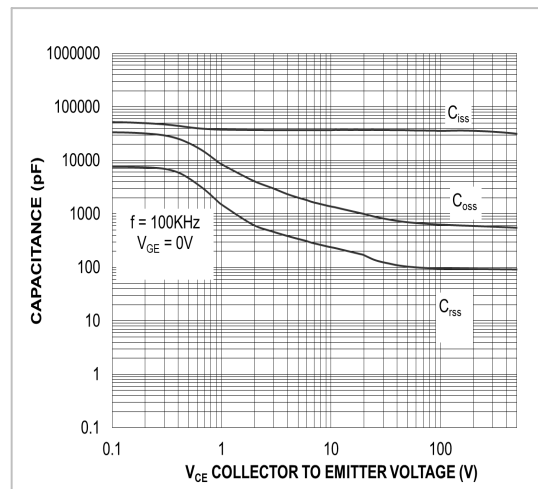


Figure 11. Capacitance

# NXH600N65L4Q2F2

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

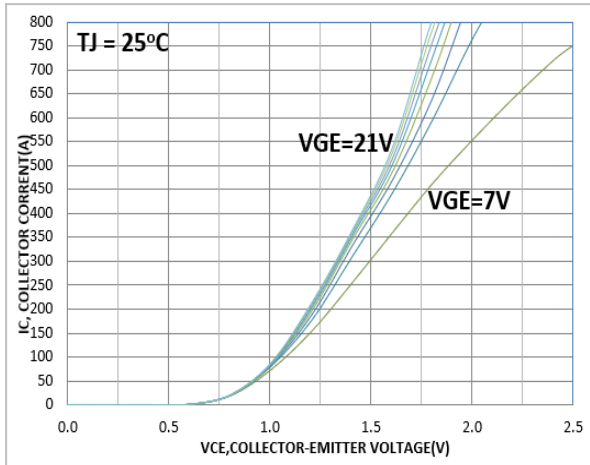


Figure 12. Typical Output Characteristics

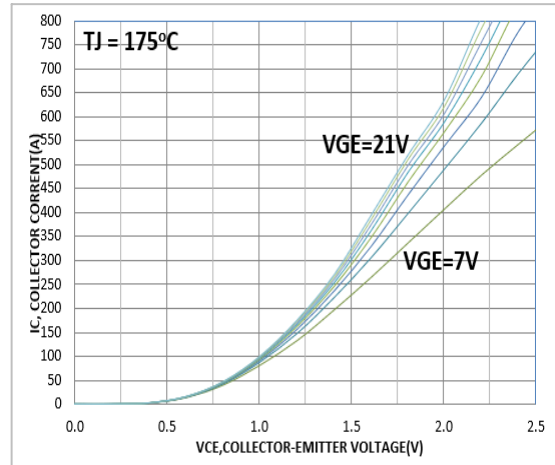


Figure 13. Typical Output Characteristics

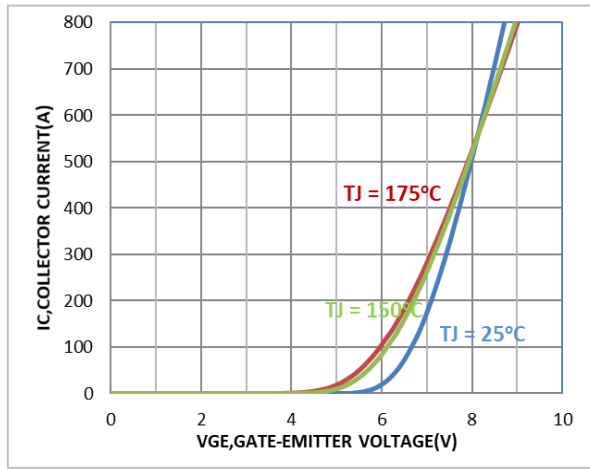


Figure 14. Typical Transfer Characteristics

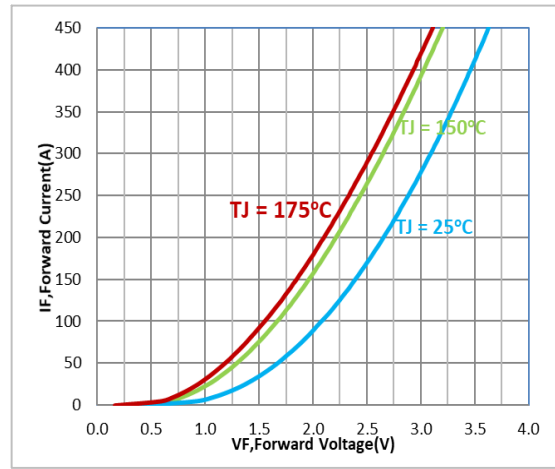


Figure 15. Diode Forward Characteristics

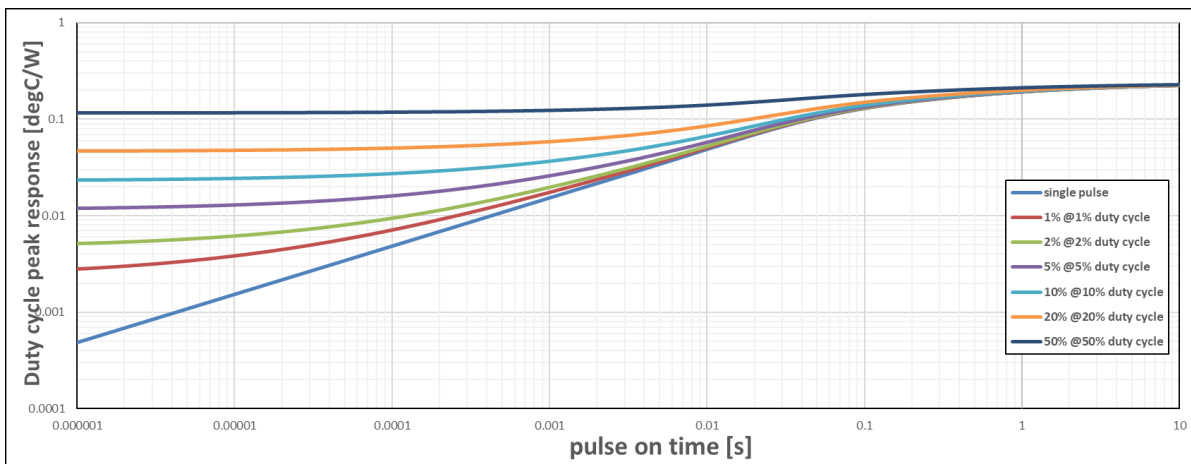


Figure 16. Transient Thermal Impedance (T2, T3)

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – IGBT T2, T3 AND DIODE D1, D2, D3, D4 (CONTINUED)

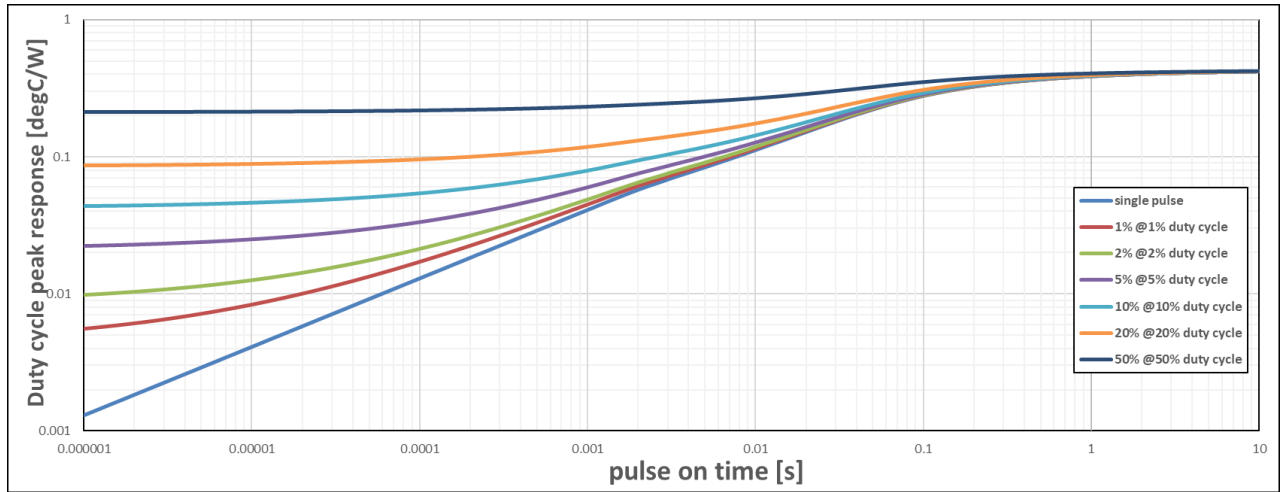


Figure 17. Transient Thermal Impedance (D1, D2, D3, D4)

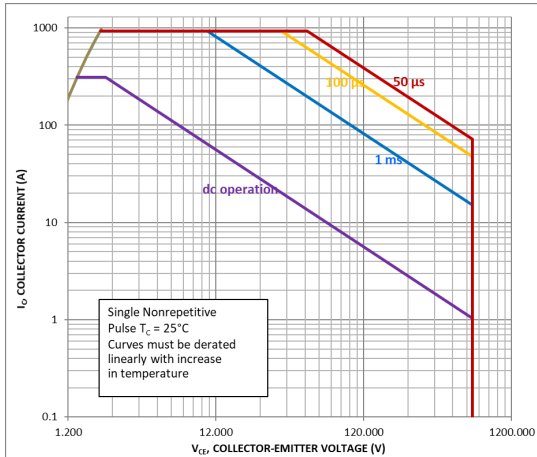


Figure 18. FBSOA (T2, T3)

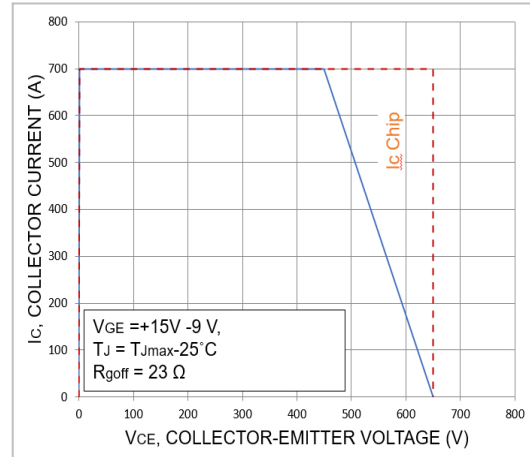


Figure 19. RBSOA (T2, T3)

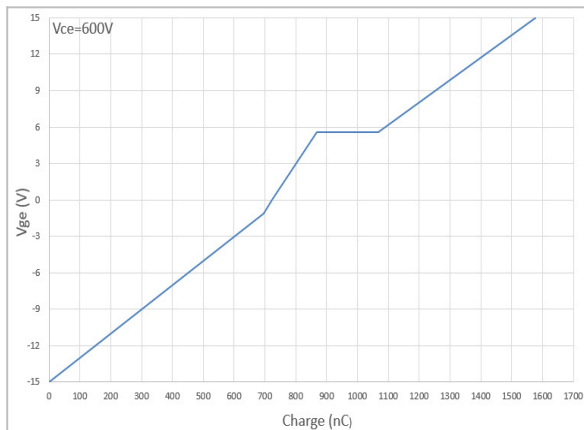


Figure 20. Gate Voltage vs. Gate Charge

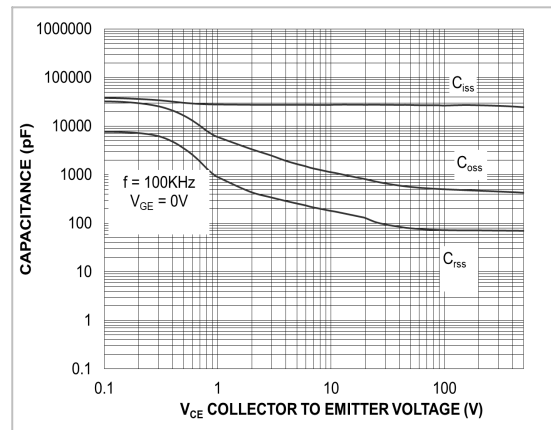
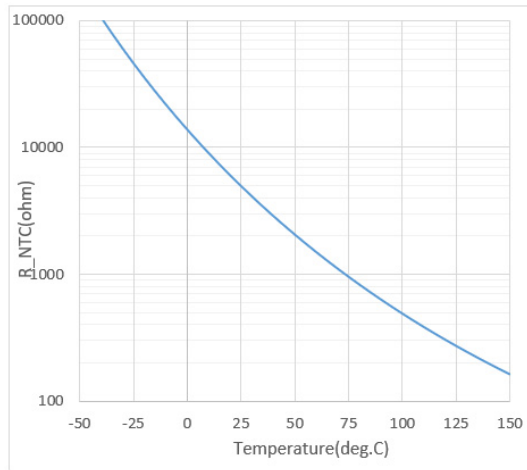


Figure 21. Capacitance



# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – IGBT T2, T3 AND DIODE D1, D2, D3, D4 (CONTINUED)



**Figure 22. NTC vs. Temperature Curve**

# NXH600N65L4Q2F2

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

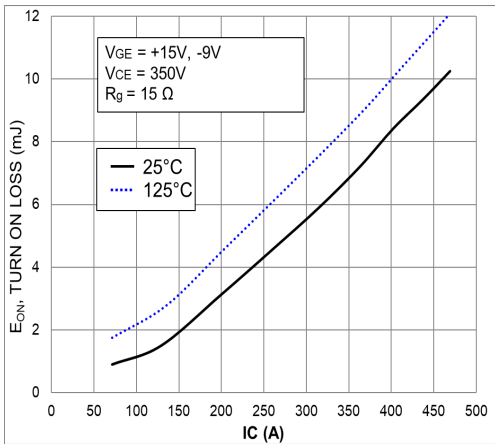


Figure 23. Typical Switching Loss Eon vs. IC

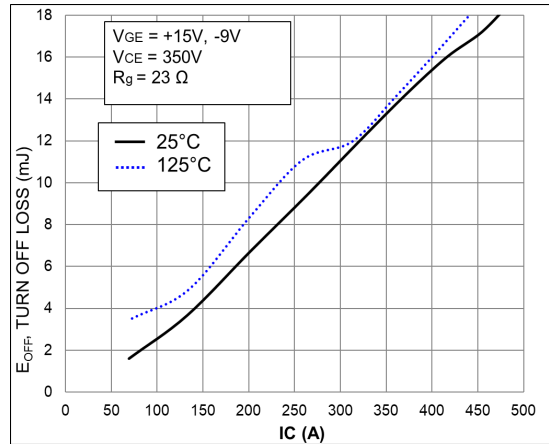


Figure 24. Typical Switching Loss Eoff vs. IC

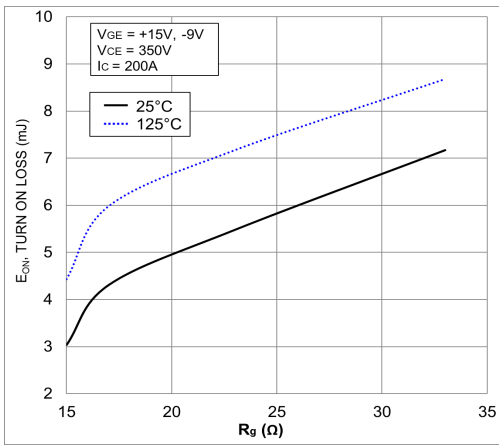


Figure 25. Typical Switching Loss Eon vs. R<sub>G</sub>

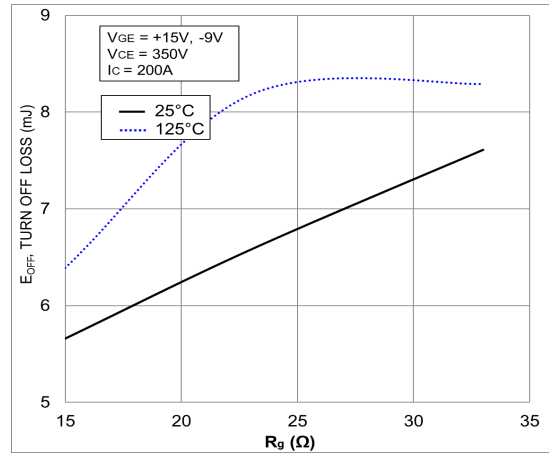


Figure 26. Typical Switching Loss Eoff vs. R<sub>G</sub>

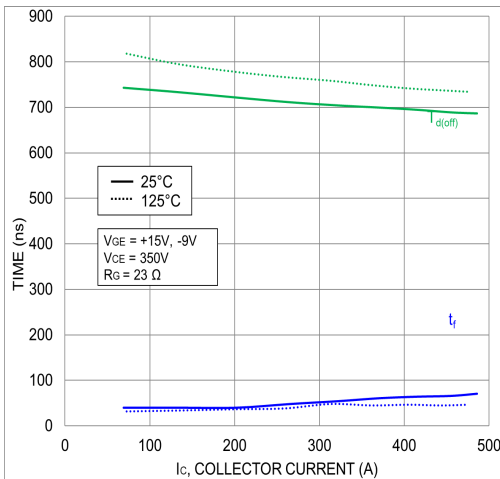


Figure 27. Typical Switching Time vs. IC

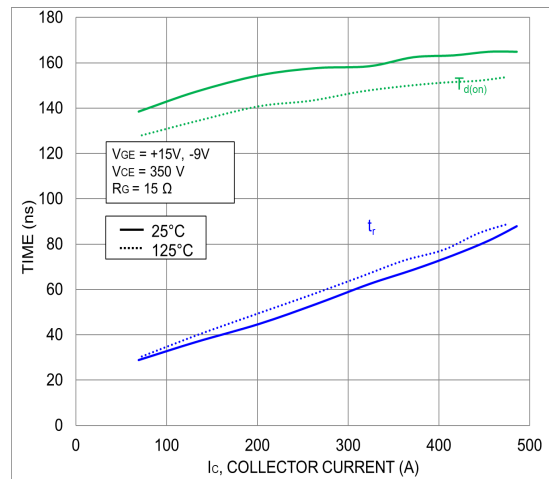


Figure 28. Typical Switching Time vs. IC

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – T1/T4 IGBT COMUTATES D5/D6 DIODE (CONTINUED)

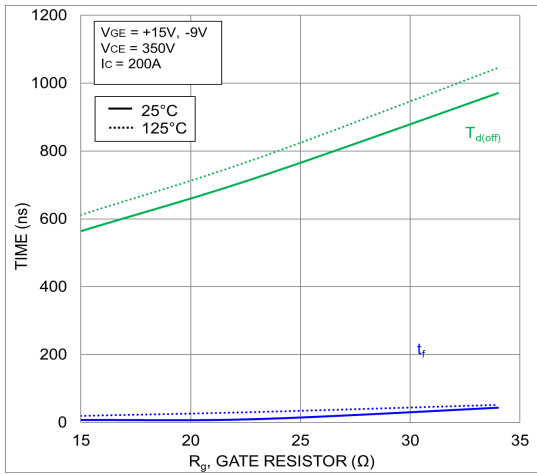


Figure 29. Typical Switching Time vs.  $R_G$

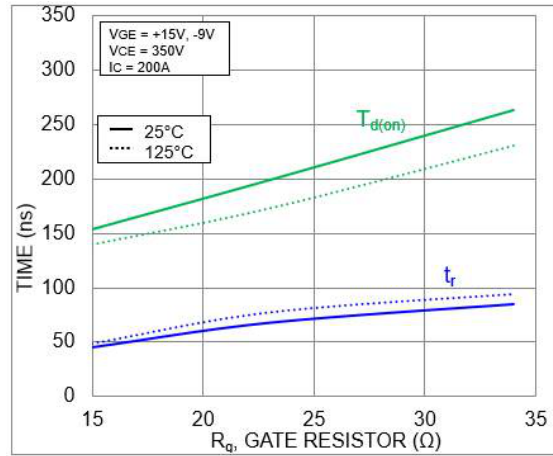


Figure 30. Typical Switching Time vs.  $R_G$

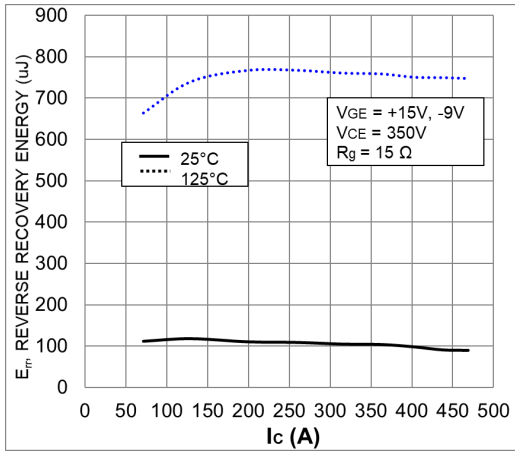


Figure 31. Typical Reverse Recovery Energy vs.  $I_C$

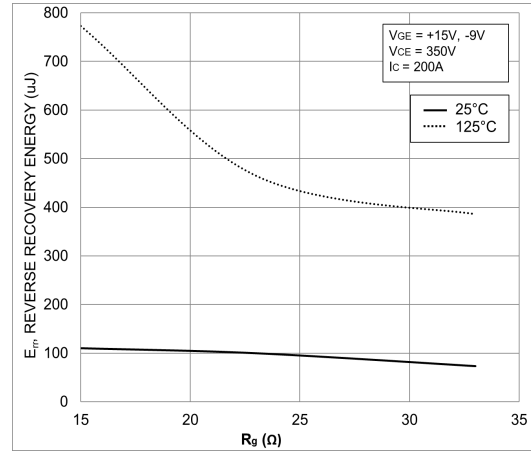


Figure 32. Typical Reverse Recovery Energy vs.  $R_g$

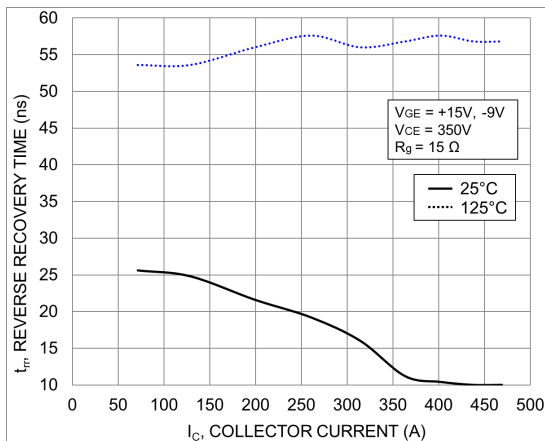


Figure 33. Typical Reverse Recovery Time vs.  $I_C$

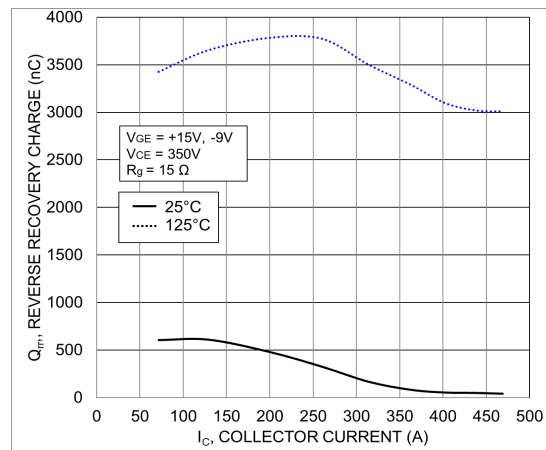


Figure 34. Typical Reverse Recovery Charge vs.  $I_C$

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – T1/T4 IGBT COMUTATES D5/D6 DIODE (CONTINUED)

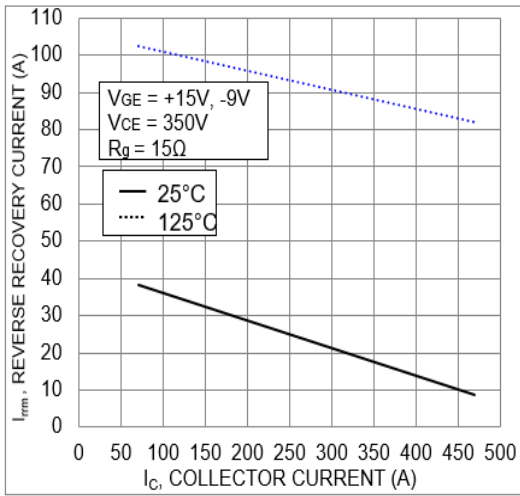


Figure 35. Typical Reverse Recovery Current vs. IC

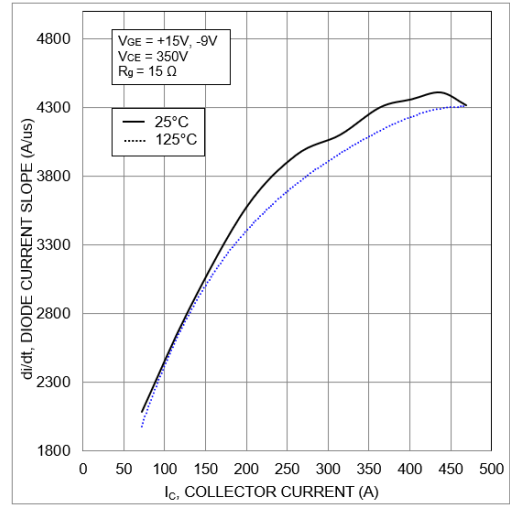


Figure 36. Typical di/dt vs. IC

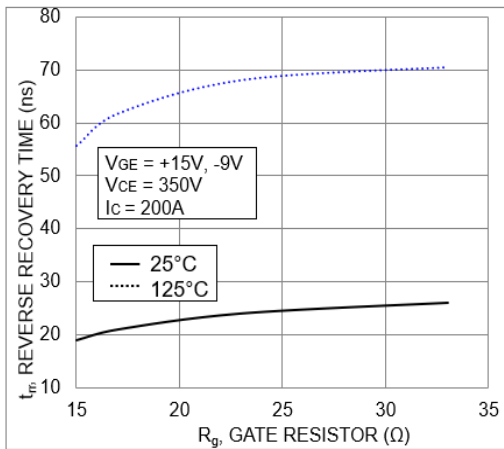


Figure 37. Typical Reverse Recovery Time vs. Rg

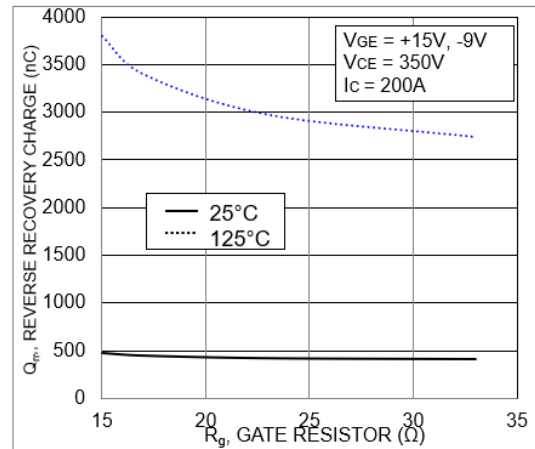


Figure 38. Typical Reverse Recovery Charge vs. Rg

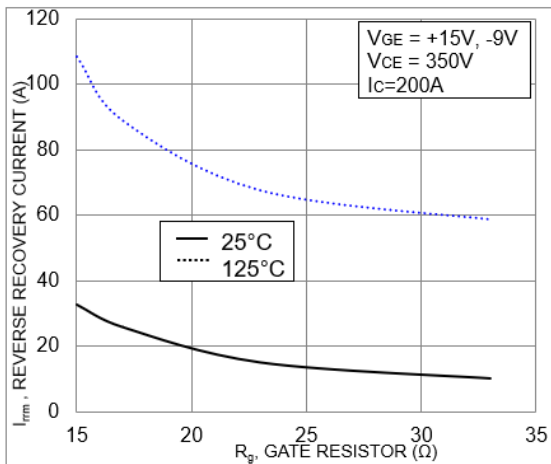


Figure 39. Typical Reverse Recovery Current vs. Rg

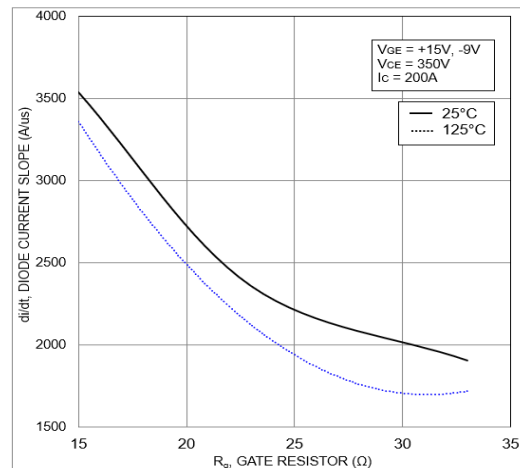


Figure 40. Typical di/dt vs. Rg

TYPICAL CHARACTERISTICS – T2/T3 IGBT COMUTATES D1/D4 DIODE

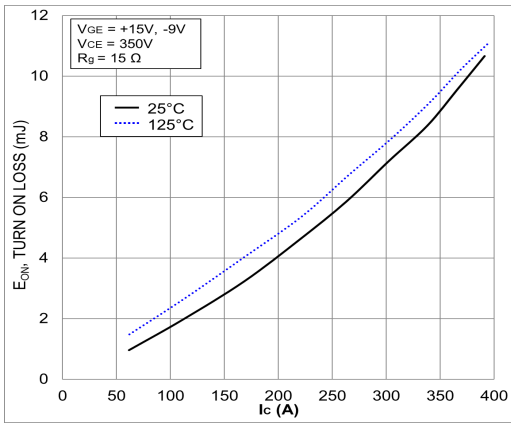


Figure 41. Typical Switching Loss Eon vs. IC

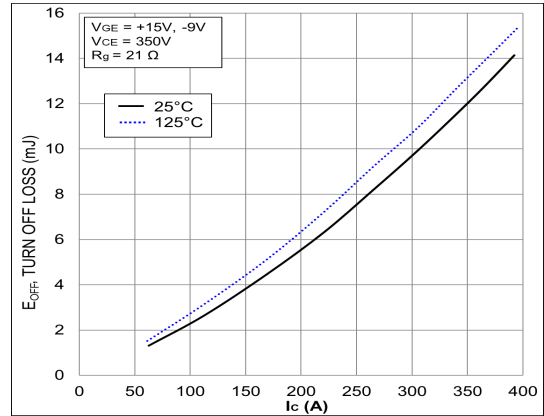


Figure 42. Typical Switching Loss Eoff vs. IC

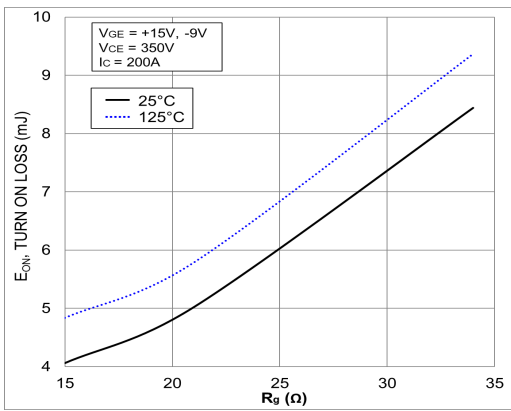


Figure 43. Typical Switching Loss Eon vs. Rg

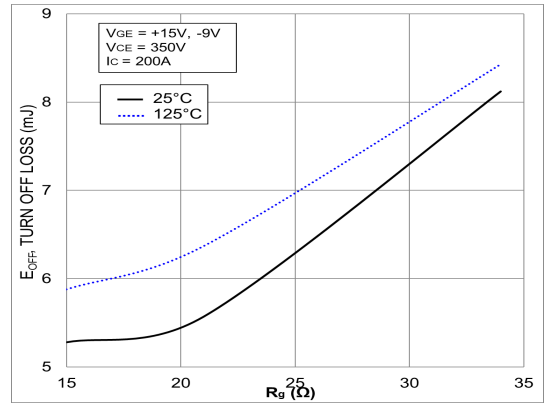


Figure 44. Typical Switching Loss Eoff vs. Rg

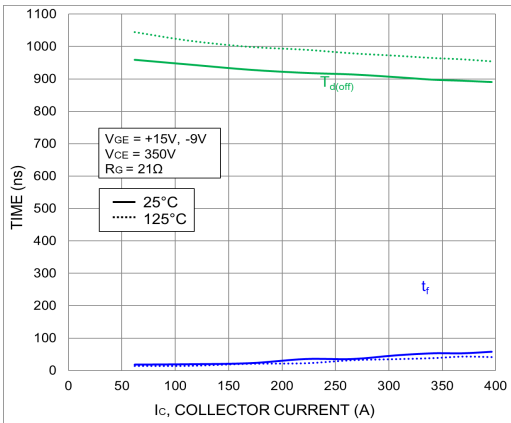


Figure 45. Typical Turn-Off Switching Time vs. IC

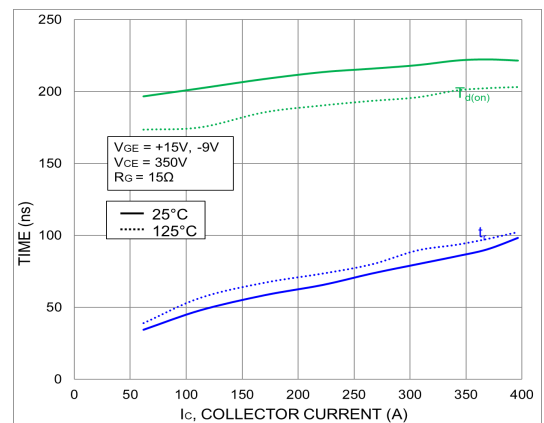


Figure 46. Typical Turn-On Switching Time vs. IC

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – T2/T3 IGBT COMUTATES D1/D4 DIODE (CONTINUED)

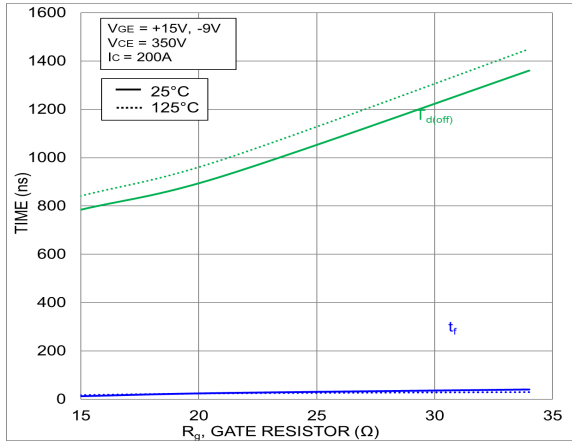


Figure 47. Typical Turn-Off Switching Time vs. Rg

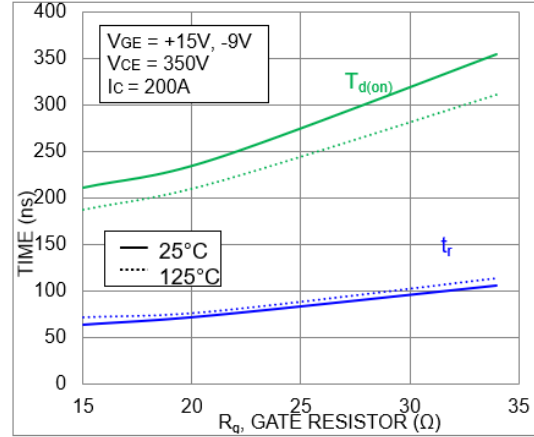


Figure 48. Typical Turn-On Switching Time vs. Rg

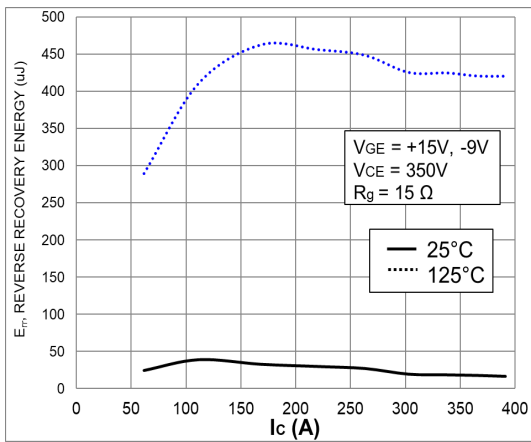


Figure 49. Typical Reverse Recovery Energy Loss vs. IC

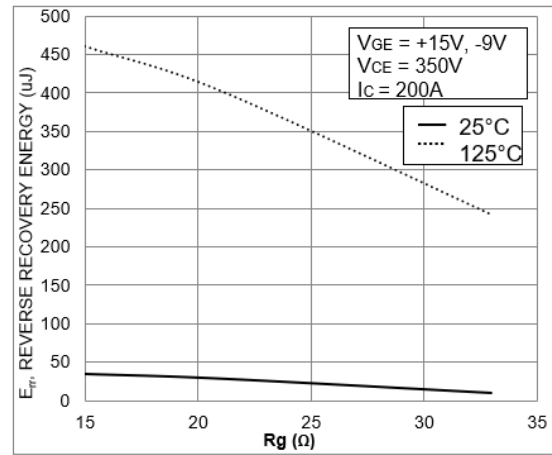


Figure 50. Typical Reverse Recovery Energy Loss vs. Rg

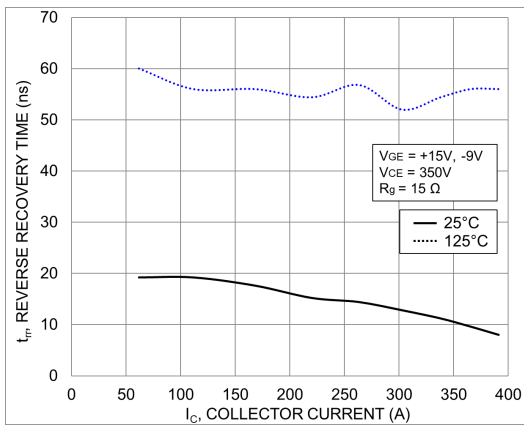


Figure 51. Typical Reverse Recovery Time vs. IC

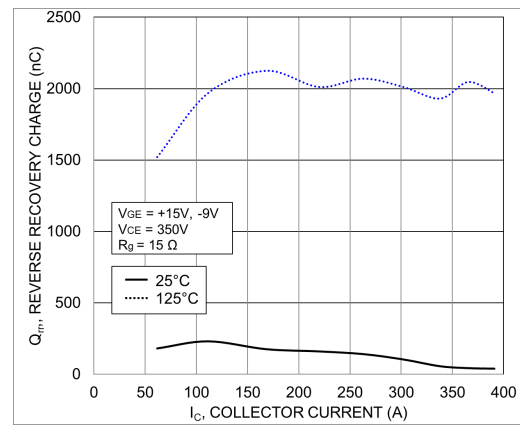


Figure 52. Typical Reverse Recovery Charge vs. IC

# NXH600N65L4Q2F2

## TYPICAL CHARACTERISTICS – T2/T3 IGBT COMUTATES D1/D4 DIODE (CONTINUED)

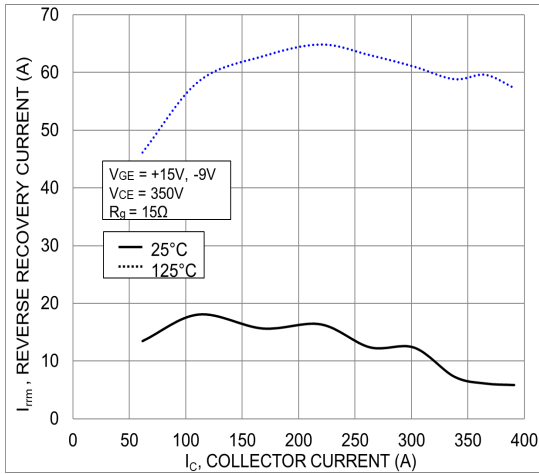


Figure 53. Typical Reverse Recovery Current vs. IC

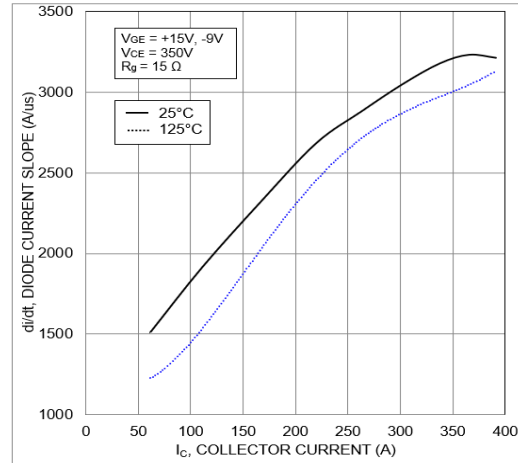


Figure 54. Typical di/dt Current Slope vs. IC

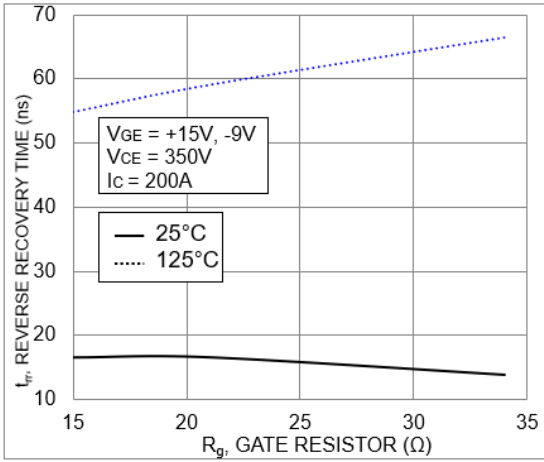


Figure 55. Typical Reverse Recovery Time vs. Rg

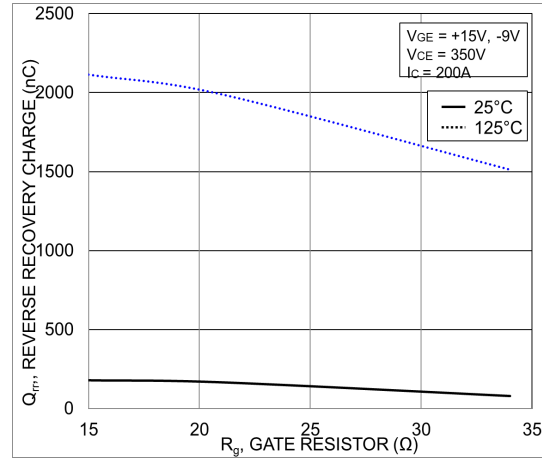


Figure 56. Typical Reverse Recovery Charge vs. Rg

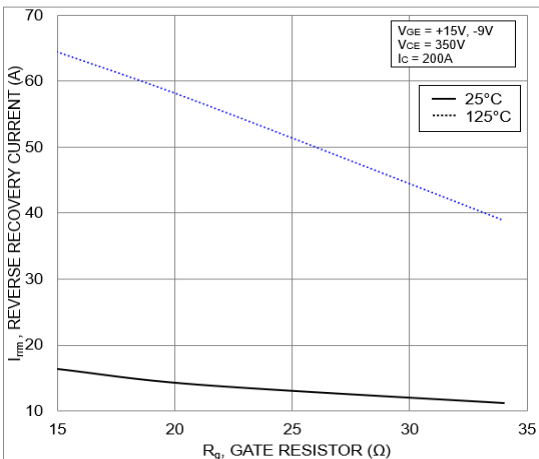


Figure 57. Typical Reverse Recovery Peak Current vs. Rg

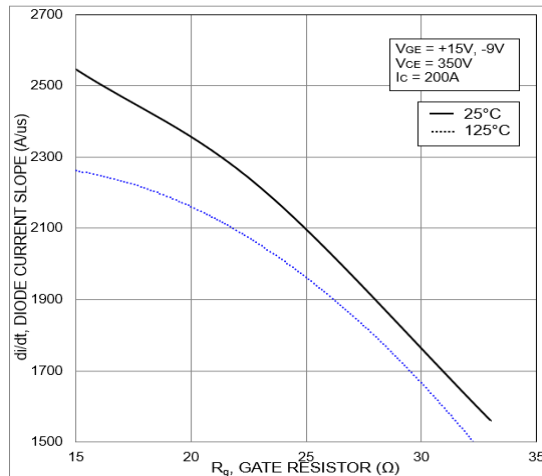


Figure 58. Typical di/dt vs. Rg

# NXH600N65L4Q2F2

## ORDERING INFORMATION

Device Order Number	Marking	Package	Shipping
NXH600N65L4Q2F2SG	NXH600N65L4Q2F2SG	Q2PACK (Pb – Free and Halide – Free)	12 Units / Blister Tray
NXH600N65L4Q2F2PG	NXH600N65L4Q2F2PG	Q2PACK (Pb – Free and Halide – Free)	12 Units / Blister Tray



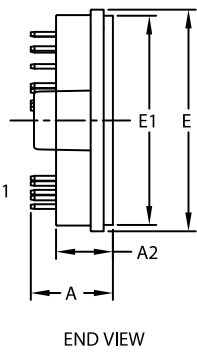
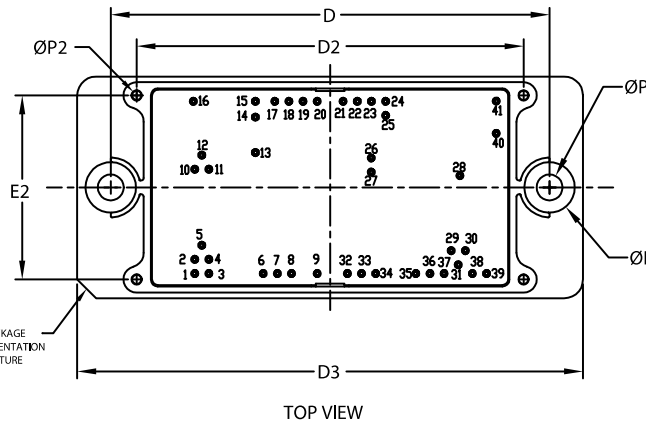
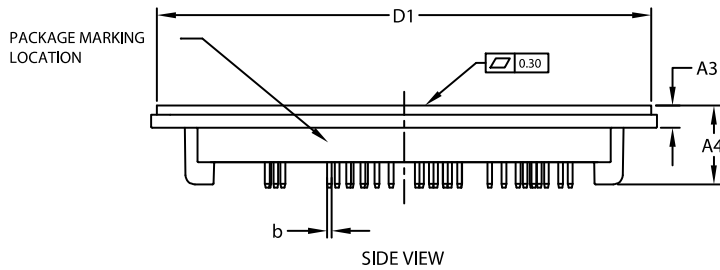
# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS



### PIM41, 93x47 (SOLDER PIN) CASE 180BC ISSUE O

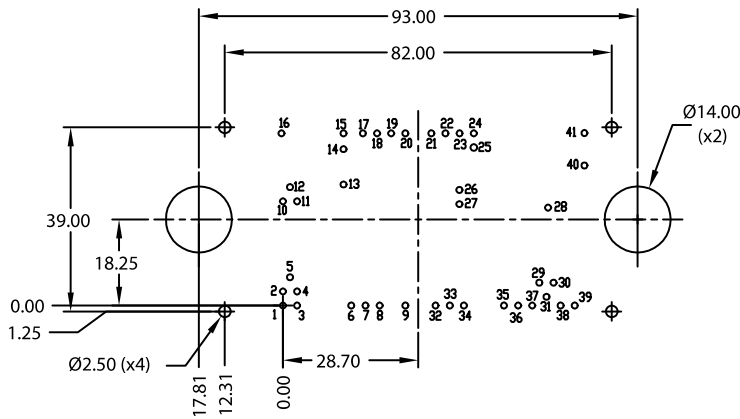
DATE 27 SEP 2021



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009
2. CONTROLLING DIMENSION : 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 AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	16.90	17.30	17.70
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	92.90	93.00	93.10
D1	104.45	104.75	105.05
D2	81.80	82.00	82.20
D3	106.90	107.20	107.50
E	46.70	47.00	47.30
E1	44.10	44.40	44.70
E2	38.80	39.00	39.20
P	5.40	5.50	5.60
P1	10.60	10.70	10.80
P2	1.80	2.00	2.20



RECOMMENDED  
MOUNTING PATTERN

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

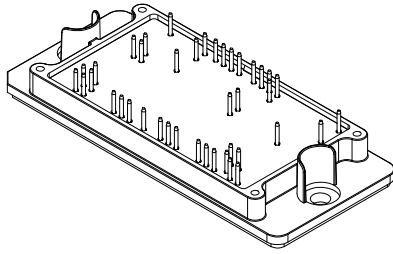
NOTE 4

PIN	PIN POSITION		PIN	PIN POSITION	
	X	Y		X	Y
1	0.00	0.00	23	37.45	36.50
2	0.00	3.00	24	40.45	36.50
3	3.00	0.00	25	40.45	33.50
4	3.00	3.00	26	37.40	24.50
5	1.50	6.00	27	37.40	21.50
6	14.50	0.00	28	56.20	20.75
7	17.50	0.00	29	54.35	4.85
8	20.50	0.00	30	57.35	4.85
9	25.95	0.00	31	55.85	1.85
10	0.00	22.10	32	32.35	0.00
11	3.00	22.10	33	35.35	0.00
12	1.50	25.10	34	38.35	0.00
13	12.85	25.65	35	46.85	0.00
14	12.85	33.15	36	49.85	0.00
15	12.85	36.50	37	52.85	0.00
16	-0.30	36.50	38	58.85	0.00
17	16.95	36.50	39	61.85	0.00
18	19.95	36.50	40	63.90	29.70
19	22.95	36.50	41	63.90	36.55
20	25.95	36.50			
21	31.45	36.50			
22	34.45	36.50			

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DESCRIPTION:	PIM41, 93x47 (SOLDER PIN)	PAGE 1 OF 2

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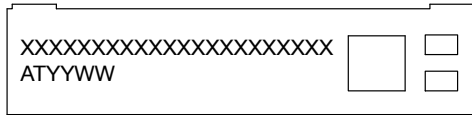
**MECHANICAL CASE OUTLINE**  
**PACKAGE DIMENSIONS**



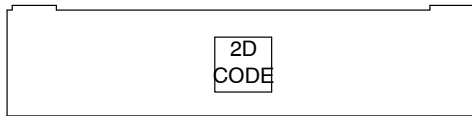
**PIM41, 93x47 (SOLDER PIN)**  
CASE 180BC  
ISSUE O

DATE 27 SEP 2021

**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.

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<b>DESCRIPTION:</b>	<b>PIM41, 93x47 (SOLDER PIN)</b>	<b>PAGE 2 OF 2</b>

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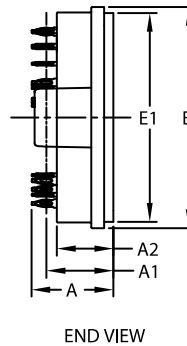
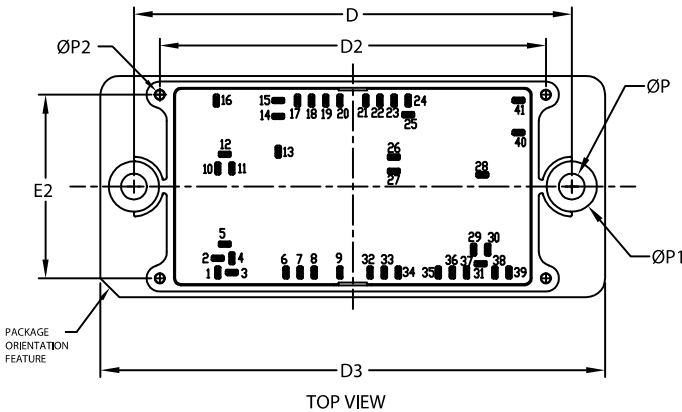
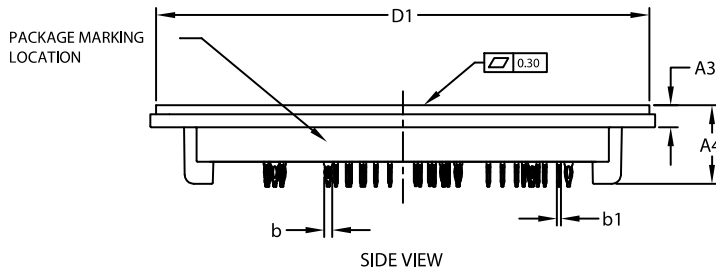
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# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



## PIM41, 93x47 (PRESS FIT) CASE 180HD ISSUE O

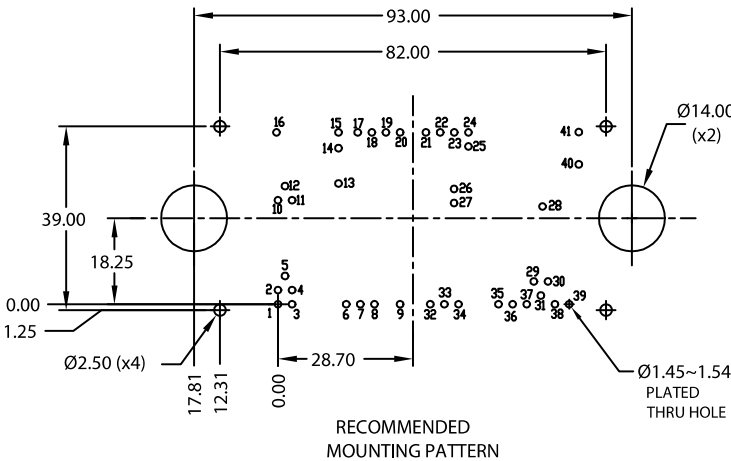
DATE 22 SEP 2021



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009
2. CONTROLLING DIMENSION : 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 AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	16.90	17.30	17.70
A1	14.18 (REF)		
A2	11.70	12.00	12.30
A3	4.40	4.70	5.00
A4	16.40	16.70	17.00
b	1.61	1.66	1.71
b1	0.75	0.80	0.85
D	92.90	93.00	93.10
D1	104.45	104.75	105.05
D2	81.80	82.00	82.20
D3	106.90	107.20	107.50
E	46.70	47.00	47.30
E1	44.10	44.40	44.70
E2	38.80	39.00	39.20
P	5.40	5.50	5.60
P1	10.60	10.70	10.80
P2	1.80	2.00	2.20



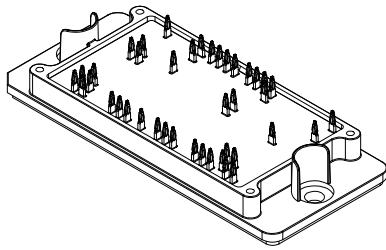
NOTE 4

PIN	PIN POSITION		PIN	PIN POSITION	
	X	Y		X	Y
1	0.00	0.00	23	37.45	36.50
2	0.00	3.00	24	40.45	36.50
3	3.00	0.00	25	40.45	33.50
4	3.00	3.00	26	37.40	24.50
5	1.50	6.00	27	37.40	21.50
6	14.50	0.00	28	56.20	20.75
7	17.50	0.00	29	54.35	4.85
8	20.50	0.00	30	57.35	4.85
9	25.95	0.00	31	55.85	1.85
10	0.00	22.10	32	32.35	0.00
11	3.00	22.10	33	35.35	0.00
12	1.50	25.10	34	38.35	0.00
13	12.85	25.65	35	46.85	0.00
14	12.85	33.15	36	49.85	0.00
15	12.85	36.50	37	52.85	0.00
16	-0.30	36.50	38	58.85	0.00
17	16.95	36.50	39	61.85	0.00
18	19.95	36.50	40	63.90	29.70
19	22.95	36.50	41	63.90	36.55
20	25.95	36.50			
21	31.45	36.50			
22	34.45	36.50			

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<b>DESCRIPTION:</b>	<b>PIM41, 93x47 (PRESS FIT)</b>	<b>PAGE 1 OF 2</b>

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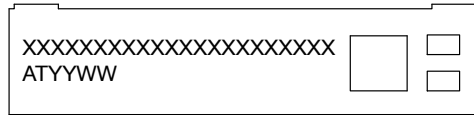
**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



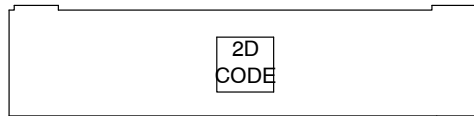
**PIM41, 93x47 (PRESS FIT)**  
CASE 180HD  
ISSUE O

DATE 22 SEP 2021

**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.

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<b>DESCRIPTION:</b>	<b>PIM41, 93x47 (PRESS FIT)</b>	<b>PAGE 2 OF 2</b>

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