

NXH40T120L3Q1

Product Preview

Q1 3-Phase TNPC Module

The NXH40T120L3Q1 is a power module containing a three channel T-type neutral-point clamped (TNPC) circuit. Each channel has two 1200 V, 40 A IGBTs with inverse diodes and two 650 V, 25 A IGBTs with inverse diodes. The module contains an NTC thermistor.

Features

- Low Package Height
- Compact 82.5 mm x 37.4 mm x 12 mm Package
- Options with Press-fit Pins and Solder Pins
- Options with Pre-applied Thermal Interface Material (TIM) and without Pre-applied TIM
- Thermistor
- This Device is Pb-Free and is RoHS Compliant

Applications

- Solar Inverters
- UPS
- Energy Storage Systems

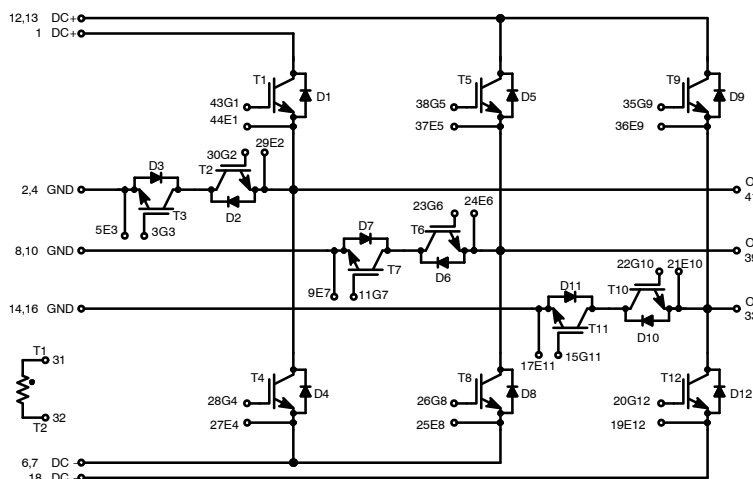
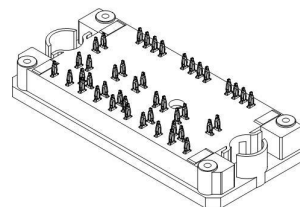


Figure 1. NXH40T120L3Q1 Schematic Diagram



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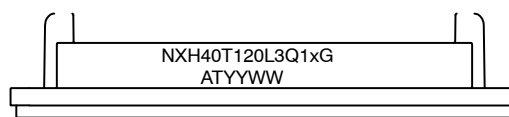
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Q1 3-TNPC
CASE 180AS

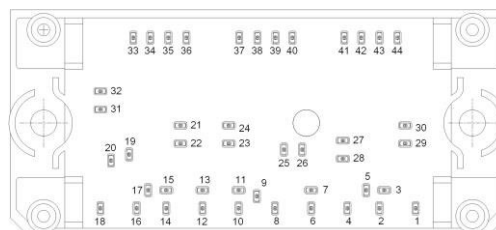
Solder pins follow similar pattern

MARKING DIAGRAM



NXH40T120L3Q1x = Device Code
A = Assembly Site Code
T = Test Site Code
YYWW = Year and Work Week Code
G = Pb-Free Package

PIN CONNECTIONS



ORDERING INFORMATION

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

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

NXH40T120L3Q1

MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
IGBT (Q1, Q4, Q5, Q8, Q9, Q12)			
Collector – Emitter Voltage	V _{CES}	1200	V
Gate – Emitter Voltage	V _{GE}	±20	V
Continuous Collector Current @ T _C = 80°C (T _J = 175°C)	I _C	40	A
Pulsed Collector Current (T _J = 175°C)	I _{Cpulse}	120	A
Maximum Power Dissipation (T _J = 175°C)	P _{tot}	145	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	175	°C

DIODE (D1, D4, D5, D8, D9, D12)

Peak Repetitive Reverse Voltage	V _{RRM}	1200	V
Continuous Forward Current @ T _C = 80°C (T _J = 175°C)	I _F	25	A
Repetitive Peak Forward Current (T _J = 175°C)	I _{FRM}	75	A
Maximum Power Dissipation (T _J = 175°C)	P _{tot}	55	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	175	°C

IGBT+DIODE (Q2+D2, Q3+D3, Q6+D6, Q7+D7, Q10+D10, Q11+D11)

Collector – Emitter Voltage	V _{CES}	650	V
Gate – Emitter Voltage	V _{GE}	±20	V
Continuous Collector Current @ T _C = 80°C (T _J = 175°C)	I _C	42	A
Pulsed Collector Current (T _J = 175°C)	I _{Cpulse}	126	A
Maximum Power Dissipation (T _J = 175°C)	P _{tot}	146	W
Minimum Operating Junction Temperature	T _{JMIN}	-40	°C
Maximum Operating Junction Temperature	T _{JMAX}	175	°C

THERMAL PROPERTIES

Storage Temperature range	T _{stg}	-40 to 150	°C
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INSULATION PROPERTIES

Isolation Test Voltage, t = 1 sec, 60 Hz	V _{is}	3000	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

Rating	Symbol	Min	Max	Unit
Module Operating Junction Temperature	T _J	-40	150	°C

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

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ELECTRICAL CHARACTERISTICS (T_J = 25°C Unless Otherwise Noted)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit	
IGBT CHARACTERISTICS (Q1, Q4, Q5, Q8, Q9, Q12)							
Collector–Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} = 1200 V	ICES	–	–	400	μA	
Collector–Emitter Saturation Voltage	V _{GE} = 15 V, I _C = 40 A, T _J = 25°C	VCE(sat)	–	1.85	2.20	V	
	V _{GE} = 15 V, I _C = 40 A, T _J = 150°C		–	2.25	–		
Gate–Emitter Threshold Voltage	V _{GE} = V _{CE} , I _C = 1.5 mA	V _{GE} (TH)	4.50	–	6.50	V	
Gate Leakage Current	V _{GE} = 20 V, V _{CE} = 0 V	IGES	–	–	800	nA	
Turn–on Delay Time	T _J = 25°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 8 Ω	t _d (on)	–	63	–	ns	
Rise Time		t _r	–	22	–		
Turn–off Delay Time		t _d (off)	–	199	–		
Fall Time		t _f	–	23	–		
Turn–on Switching Loss per Pulse		E _{on}	–	560	–		μJ
Turn off Switching Loss per Pulse		E _{off}	–	338	–		
Turn–on Delay Time	T _J = 125°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 8 Ω	t _d (on)	–	59	–	ns	
Rise Time		t _r	–	24	–		
Turn–off Delay Time		t _d (off)	–	225	–		
Fall Time		t _f	–	80	–		
Turn – on Switching Loss per Pulse		E _{on}	–	757	–		μJ
Turn off Switching Loss per Pulse		E _{off}	–	910	–		
Input Capacitance	V _{CE} = 20 V V _{GE} = 0 V, f = 1 MHz	C _{ies}	–	7753	–	pF	
Output Capacitance		C _{oes}	–	227	–		
Reverse Transfer Capacitance		C _{res}	–	127	–		
Total Gate Charge	V _{CE} = 350 V, I _C = 40 A, V _{GE} = ±15 V	Q _g	–	536	–	nC	
Thermal Resistance – chip–to–heatsink	Thermal grease, Thickness ≤ 2.25 Mil, λ = 2.9 W/mK	R _{thJH}	–	1.01	–	°C/W	

DIODE CHARACTERISTICS (D1, D4, D5, D8, D9, D12)

Diode Forward Voltage	I _F = 20 A, T _J = 25°C	V _F	–	2.4	2.7	V
	I _F = 20 A, T _J = 150°C		–	1.7	–	
Reverse Recovery Time	T _J = 25°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 16 Ω	t _{rr}	–	43	–	ns
Reverse Recovery Charge		Q _{rr}	–	756	–	μC
Peak Reverse Recovery Current		I _{RRM}	–	35	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	750	–	A/μs
Reverse Recovery Energy		E _{rr}	–	104	–	μJ
Reverse Recovery Time	T _J = 125°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 16 Ω	t _{rr}	–	129	–	ns
Reverse Recovery Charge		Q _{rr}	–	2702	–	μC
Peak Reverse Recovery Current		I _{RRM}	–	45	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	407	–	A/μs
Reverse Recovery Energy		E _{rr}	–	428	–	μJ
Thermal Resistance – chip–to–heatsink	Thermal grease, Thickness ≤ 2.25 Mil, λ = 2.9 W/mK	R _{thJH}	–	1.63	–	°C/W

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ELECTRICAL CHARACTERISTICS (T_J = 25°C Unless Otherwise Noted) (continued)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit	
IGBT CHARACTERISTICS (Q2, Q3, Q6, Q7, Q10, Q11)							
Collector-Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} = 650 V	ICES	–	–	250	μA	
Collector-Emitter Saturation Voltage	V _{GE} = 15 V, I _C = 50 A, T _J = 25°C	VCE(sat)	–	1.50	–	V	
	V _{GE} = 15 V, I _C = 50 A, T _J = 150°C		–	1.53	–		
Gate-Emitter Threshold Voltage	V _{GE} = V _{CE} , I _C = 1.65 mA	V _{GE(TH)}	2.60	4.40	6.40	V	
Gate Leakage Current	V _{GE} = 20 V, V _{CE} = 0 V	IGES	–	–	400	nA	
Turn-on Delay Time	T _J = 25°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 16 Ω	td(on)	–	54	–	ns	
Rise Time		t _r	–	15	–		
Turn-off Delay Time		td(off)	–	157	–		
Fall Time		t _f	–	12	–		
Turn-on Switching Loss per Pulse		E _{on}	–	416	–		μJ
Turn off Switching Loss per Pulse		E _{off}	–	321	–		
Turn-on Delay Time	T _J = 125°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 16 Ω	td(on)	–	52	–	ns	
Rise Time		t _r	–	16	–		
Turn-off Delay Time		td(off)	–	178	–		
Fall Time		t _f	–	18	–		
Turn – on Switching Loss per Pulse		E _{on}	–	671	–		μJ
Turn off Switching Loss per Pulse		E _{off}	–	444	–		
Input Capacitance	V _{CE} = 20 V V _{GE} = 0 V, f = 1 MHz	C _{ies}	–	3137	–	pF	
Output Capacitance		C _{oes}	–	146	–		
Reverse Transfer Capacitance		C _{res}	–	17	–		
Total Gate Charge	V _{CE} = 350 V, I _C = 40 A, V _{GE} = ±15 V	Q _g	–	180	–	nC	
Thermal Resistance – chip-to-heatsink	Thermal grease, Thickness ≤ 2.25 Mil, λ = 2.9 W/mK	R _{thJH}	–	0.995	–	°C/W	

DIODE CHARACTERISTICS (D2, D3, D6, D7, D10, D11)

Diode Forward Voltage	I _F = 20 A, T _J = 25°C	V _F	–	1.28	–	V
	I _F = 20 A, T _J = 150°C		–	1.18	–	
Combined IGBT + Diode Voltage Drop	I _F = 20 A, T _J = 25°C	V _F	–	3.05	3.4	V
Reverse Recovery Time	T _J = 25°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 8 Ω	t _{rr}	–	69	–	ns
Reverse Recovery Charge		Q _{rr}	–	1267	–	μC
Peak Reverse Recovery Current		I _{RRM}	–	41	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	1599	–	A/μs
Reverse Recovery Energy		E _{rr}	–	244	–	μJ
Reverse Recovery Time	T _J = 125°C V _{CE} = 350 V, I _C = 28 A, V _{GE} = ±15 V, R _G = 8 Ω	t _{rr}	–	111	–	ns
Reverse Recovery Charge		Q _{rr}	–	2323	–	μC
Peak Reverse Recovery Current		I _{RRM}	–	40	–	A
Peak Rate of Fall of Recovery Current		di/dt	–	470	–	A/μs
Reverse Recovery Energy		E _{rr}	–	510	–	μJ

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ELECTRICAL CHARACTERISTICS (T_J = 25°C Unless Otherwise Noted) (continued)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
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THERMISTOR CHARACTERISTICS

Nominal resistance	T = 25°C	R ₂₅		22		kΩ
Nominal resistance	T = 100°C	R ₁₀₀		1468		Ω
Deviation of R ₂₅		R/R	-5		5	%
Power dissipation		P _D		200		mW
Power dissipation constant				2		mW/K
B-value	B(25/50), tolerance ±3%			3950		K
B-value	B(25/100), tolerance ±3%			3998		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
NXH40T120L3Q1PG	NXH40T120L3Q1PG	Q1 3-Phase TNPC – Case 180AS Press-fit Pins (Pb-Free)	21 Units / Blister Tray
NXH40T120L3Q1SG	NXH40T120L3Q1SG	Q1 3-Phase TNPC – Case 180BN Solder Pins (Pb-Free)	21 Units / Blister Tray

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT (Q1, Q4, Q5, Q8, Q9, Q12) AND DIODE (D1, D4, D5, D8, D9, D12)

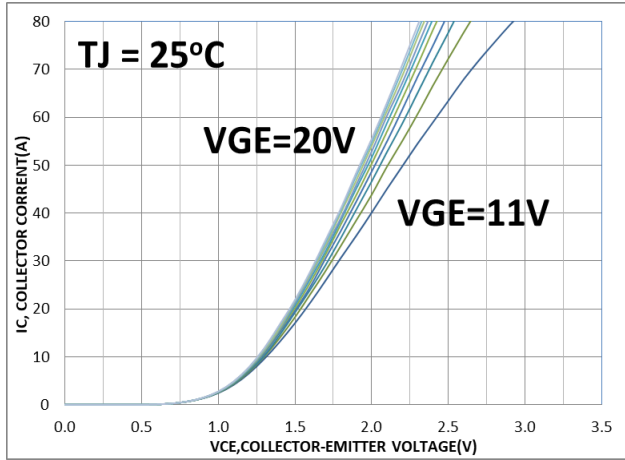


Figure 2. Typical Output Characteristics

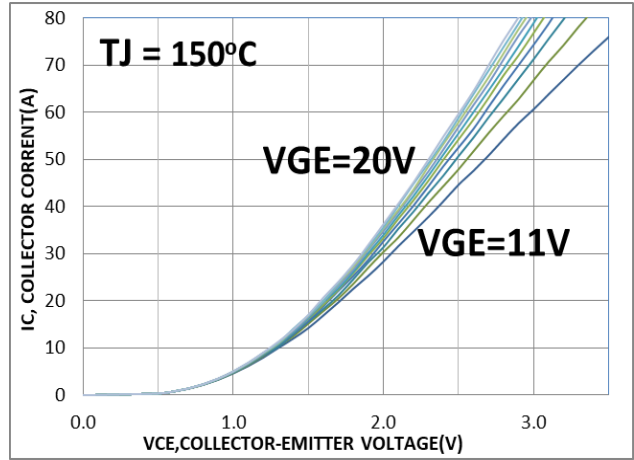


Figure 3. Typical Output Characteristics

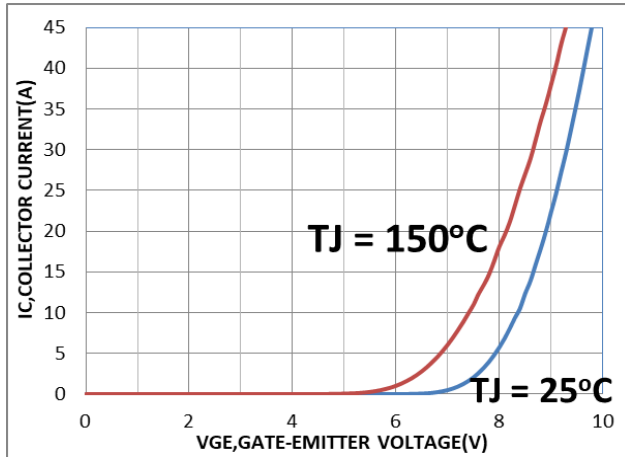


Figure 4. Typical Transfer Characteristics

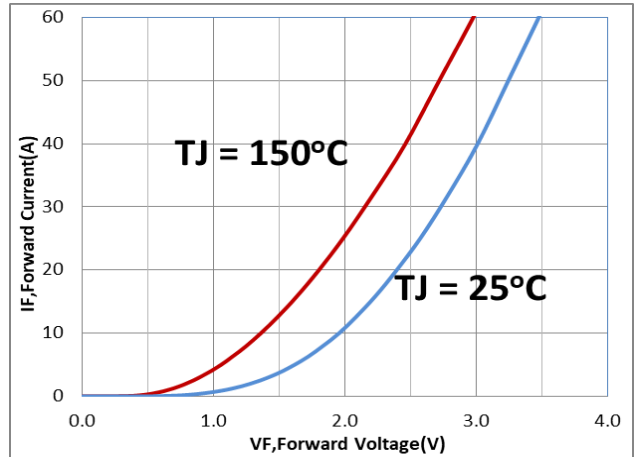


Figure 5. Diode Forward Characteristics

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT (Q1, Q4, Q5, Q8, Q9, Q12) AND DIODE (D1, D4, D5, D8, D9, D12)

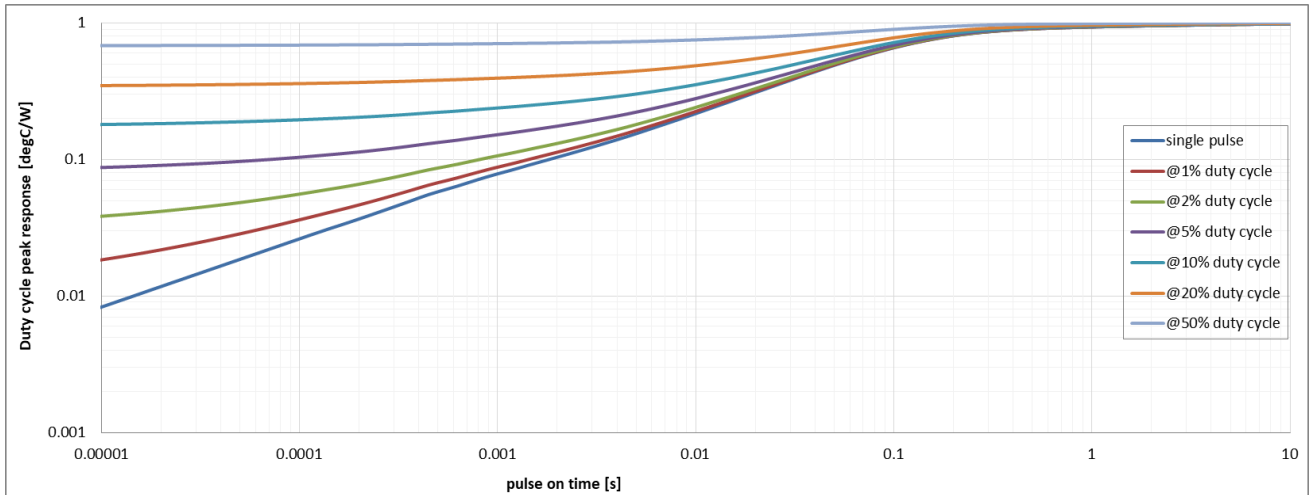


Figure 6. Transient Thermal Impedance (Half Bridge IGBT)

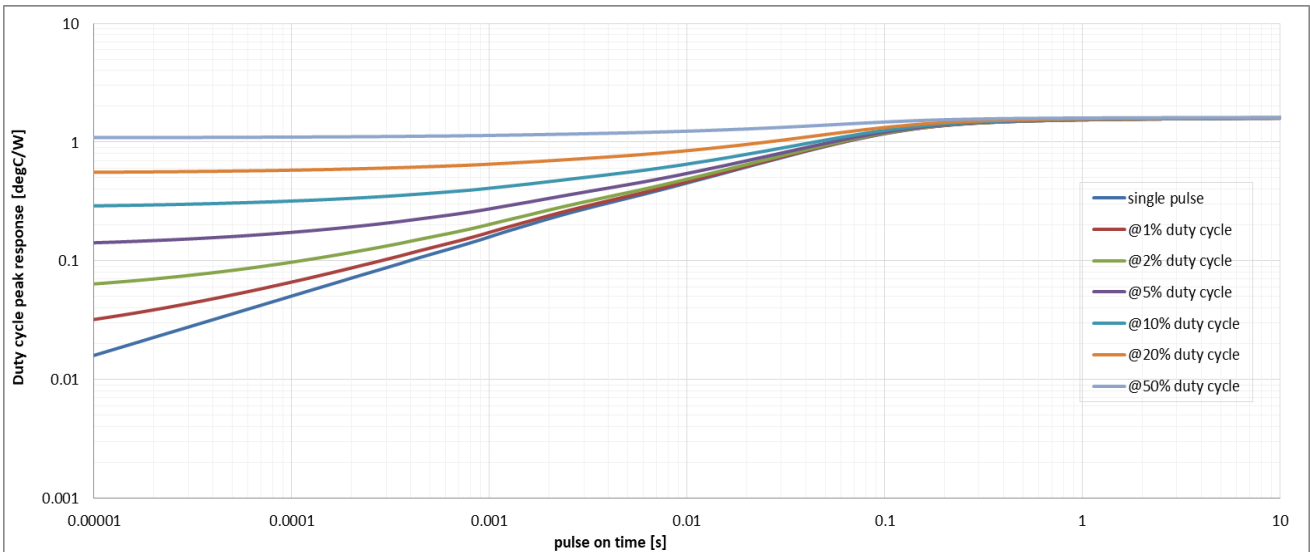


Figure 7. Transient Thermal Impedance (Half Bridge Diode)

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT (Q1, Q4, Q5, Q8, Q9, Q12) AND DIODE (D1, D4, D5, D8, D9, D12)

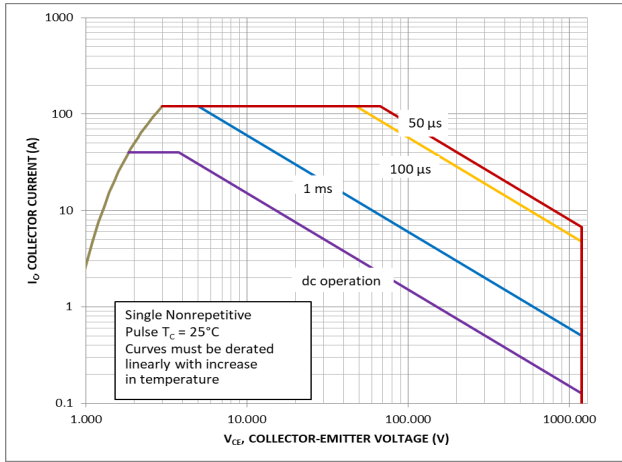


Figure 8. FBSOA

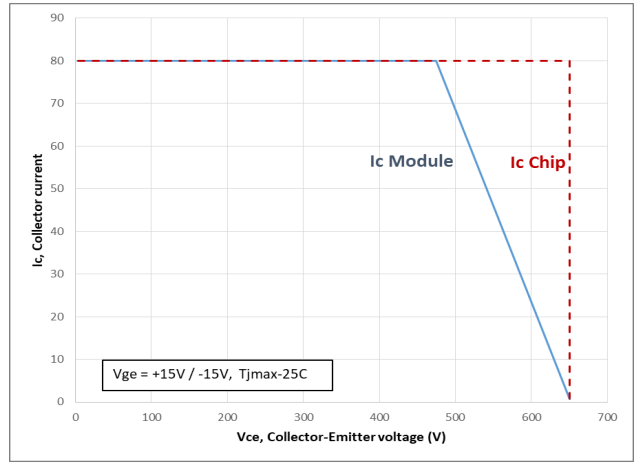


Figure 9. RBSOA

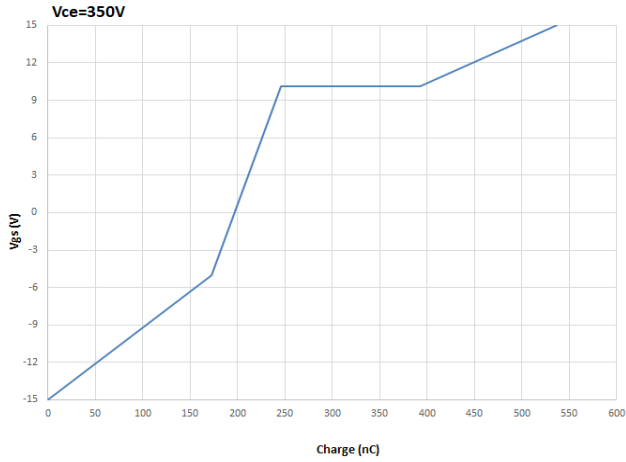


Figure 10. Gate Voltage vs. Gate Charge

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TYPICAL CHARACTERISTICS – NP IGBT + DIODE (Q2+D2, Q3+D3, Q6+D6, Q7+D7, Q10+D10, Q11+D11)

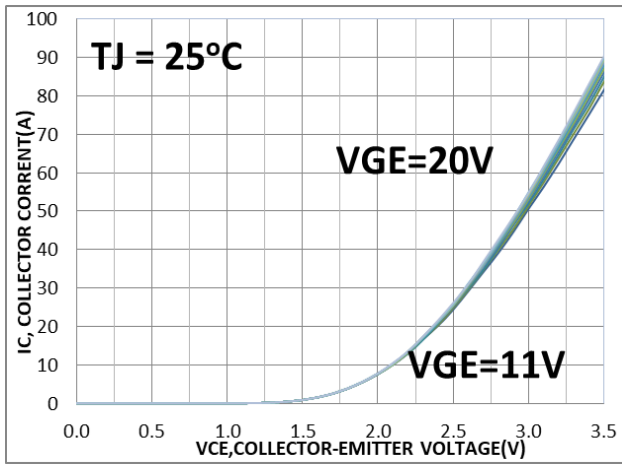


Figure 11. Typical Output Characteristics
(I_C versus V_{DT})

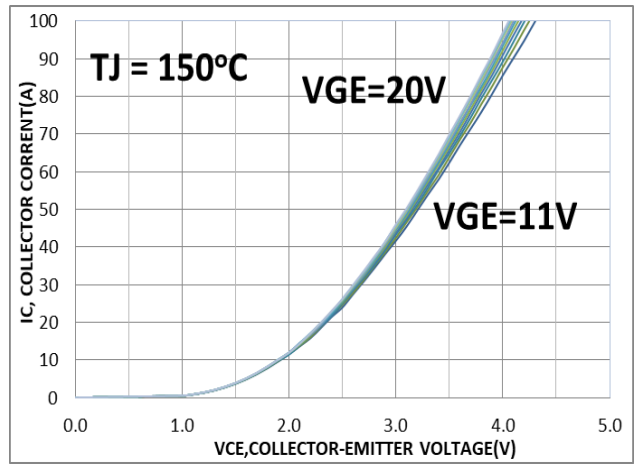


Figure 12. Typical Output Characteristics
(I_C versus V_{DT})

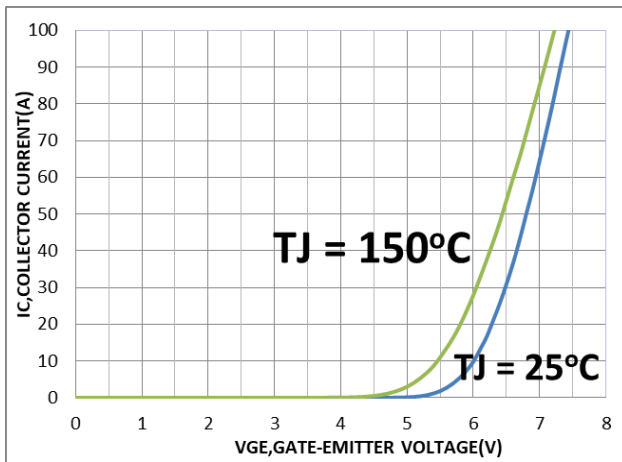


Figure 13. Typical Transfer Characteristics



Figure 14. Diode Forward Characteristics

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

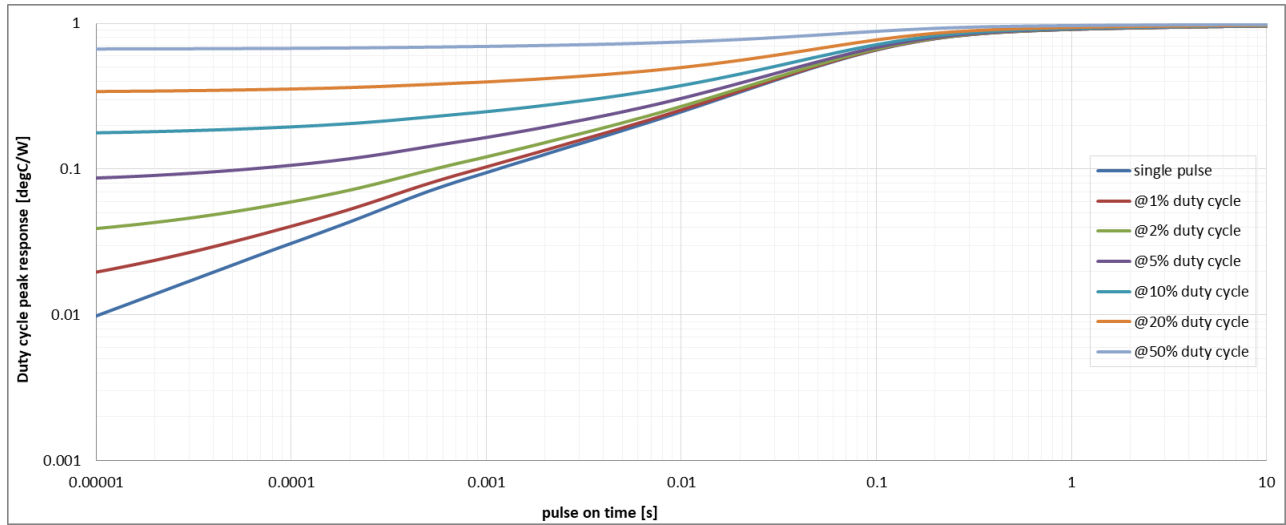


Figure 15. Transient Thermal Impedance (Neutral Point IGBT + Diode)

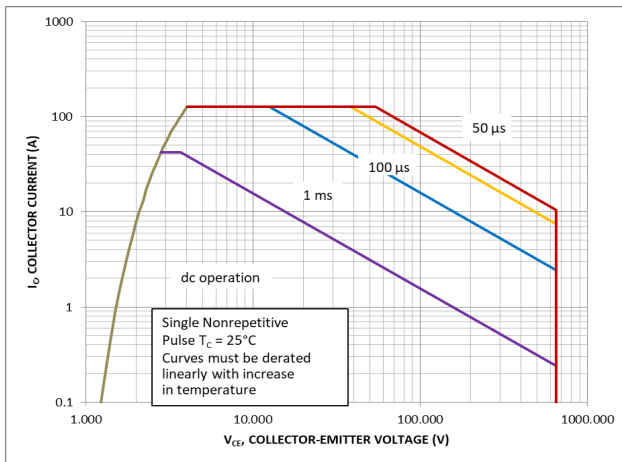


Figure 16. FBSOA (NP IGBT + Diode)

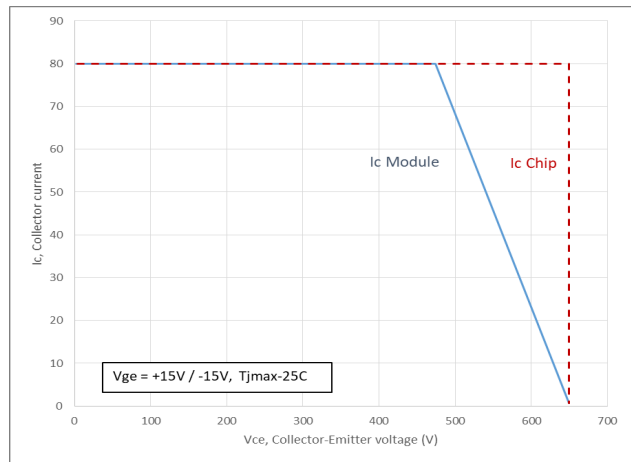


Figure 17. RBSOA (NP IGBT + Diode)

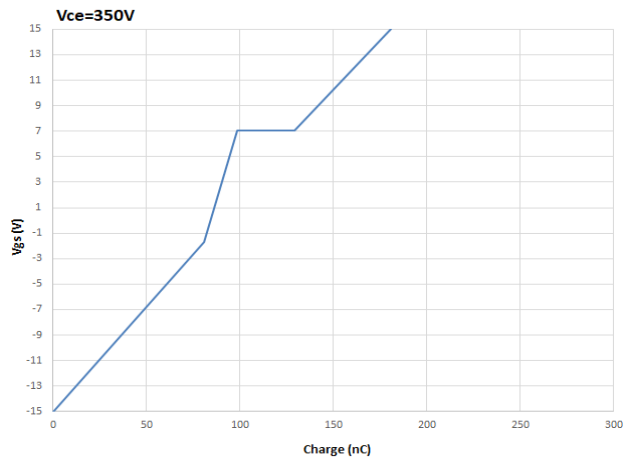


Figure 18. Gate Voltage vs. Gate Charge

NXH40T120L3Q1

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

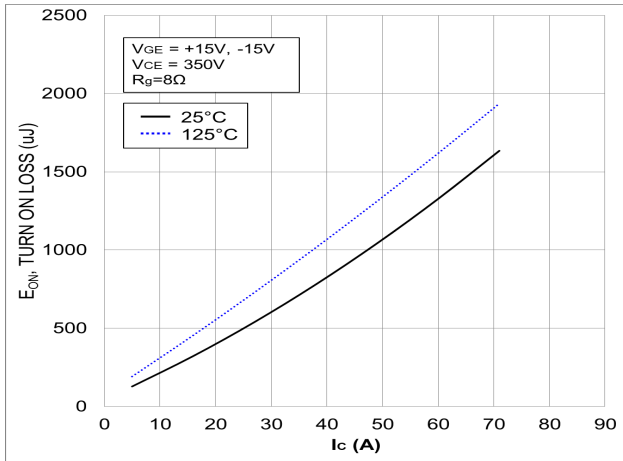


Figure 19. Typical Switching Loss E_{ON} vs. I_C

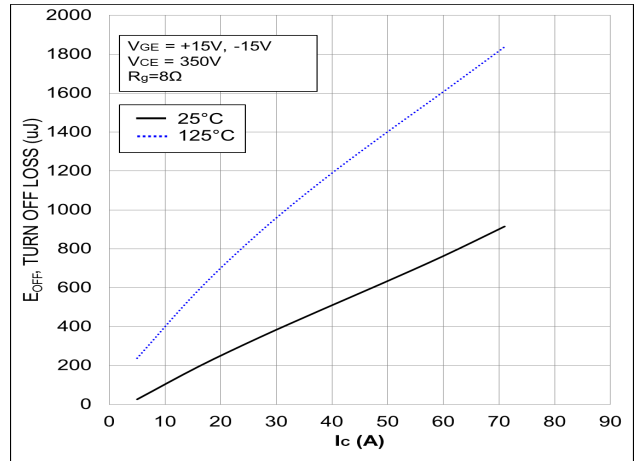


Figure 20. Typical Switching Loss E_{OFF} vs. I_C

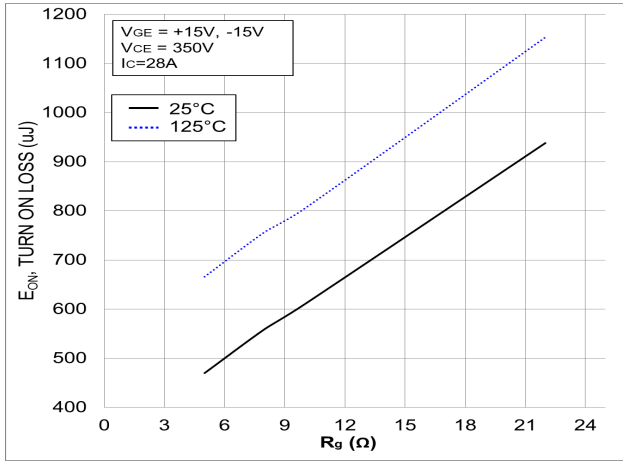


Figure 21. Typical Switching Loss E_{ON} vs. R_g

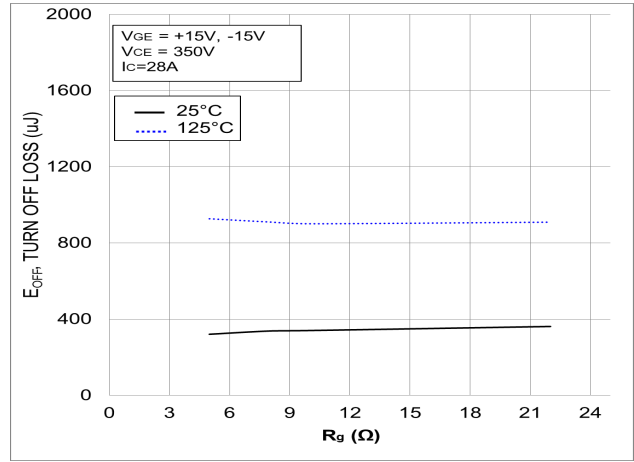


Figure 22. Typical Switching Loss E_{OFF} vs. R_g

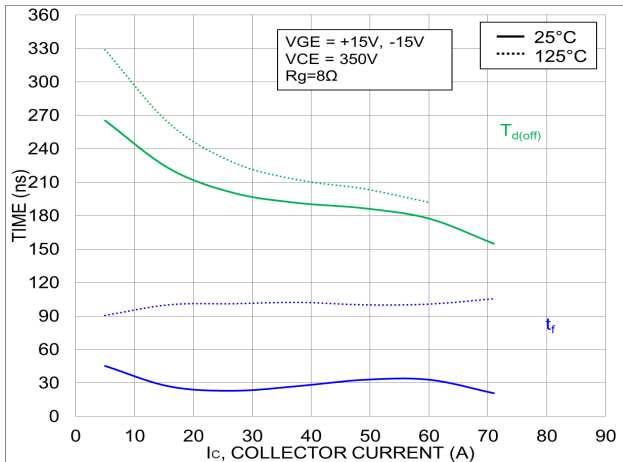


Figure 23. Typical Switching Time T_{DOFF} vs. I_C

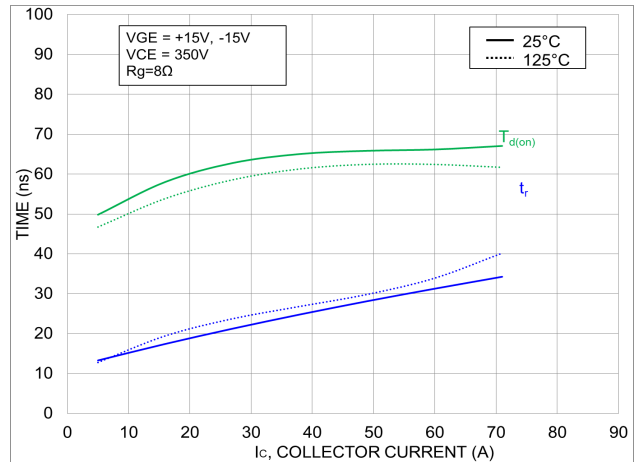


Figure 24. Typical Switching Time T_{DON} vs. I_C

NXH40T120L3Q1

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

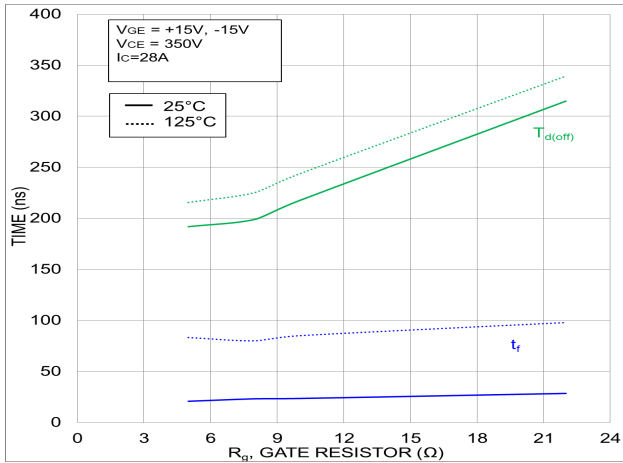


Figure 25. Typical Switching Time T_{DOFF} vs. R_G

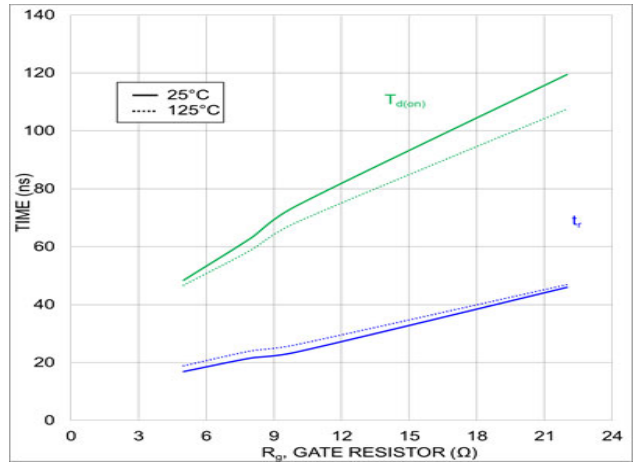


Figure 26. Typical Switching Time T_{DON} vs. R_G

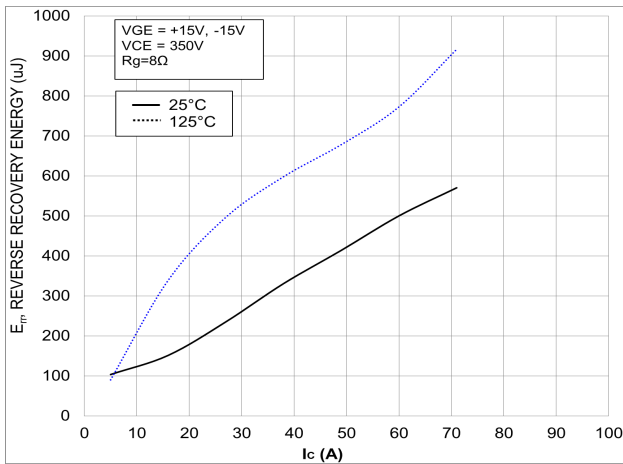


Figure 27. Typical Reverse Recovery Energy Loss vs. I_C

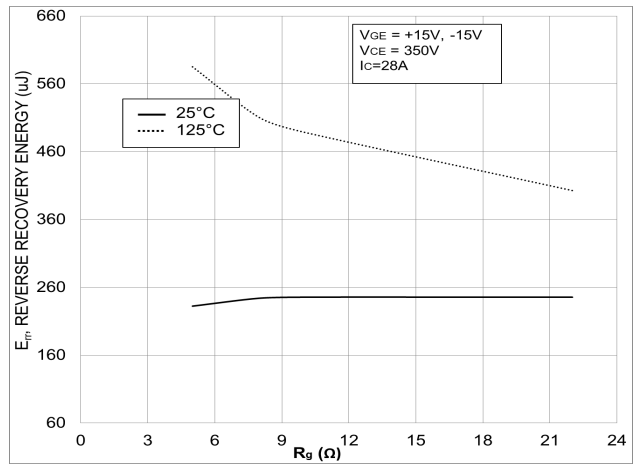


Figure 28. Typical Reverse Recovery Energy Loss vs. R_G

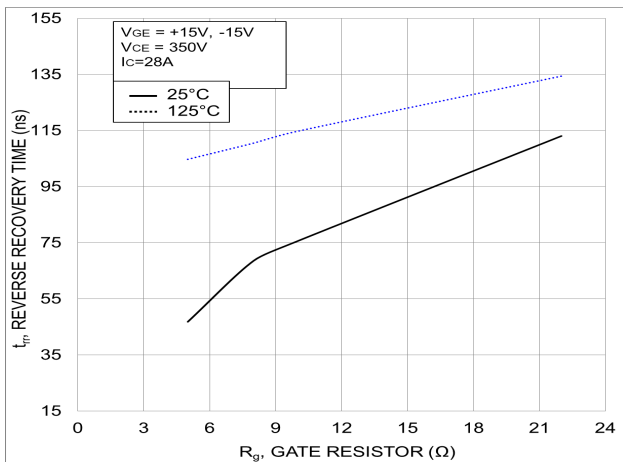


Figure 29. Typical Reverse Recovery Time vs. R_G

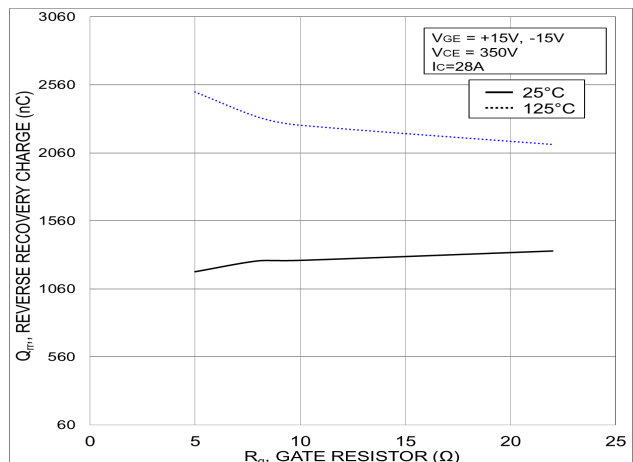


Figure 30. Typical Reverse Recovery Charge vs. R_G

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

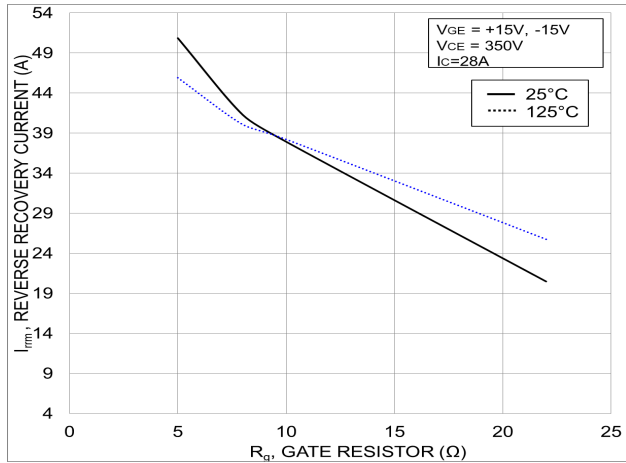


Figure 31. Typical Reverse Recovery Peak Current vs. R_G

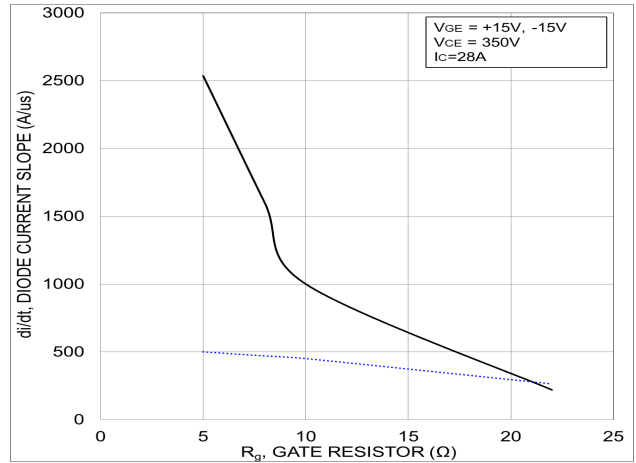


Figure 32. Typical di/dt vs. R_G

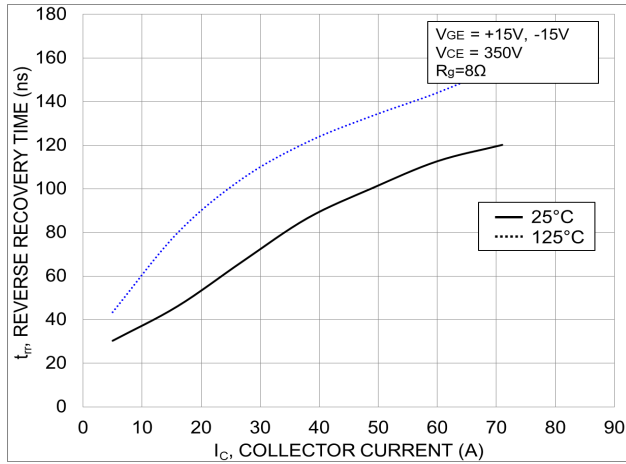


Figure 33. Typical Reverse Recovery Time vs. I_C

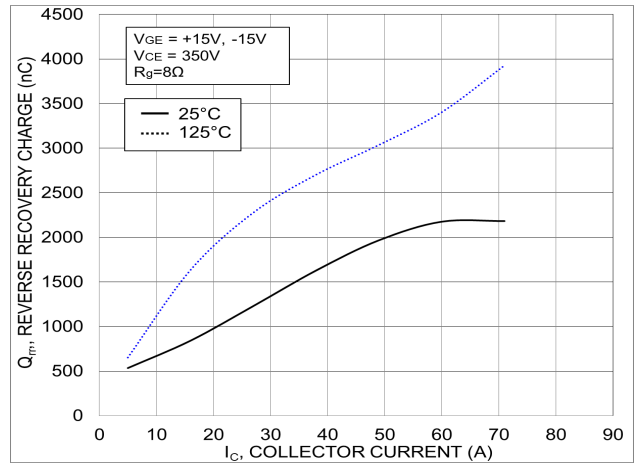


Figure 34. Typical Reverse Recovery Charge vs. I_C

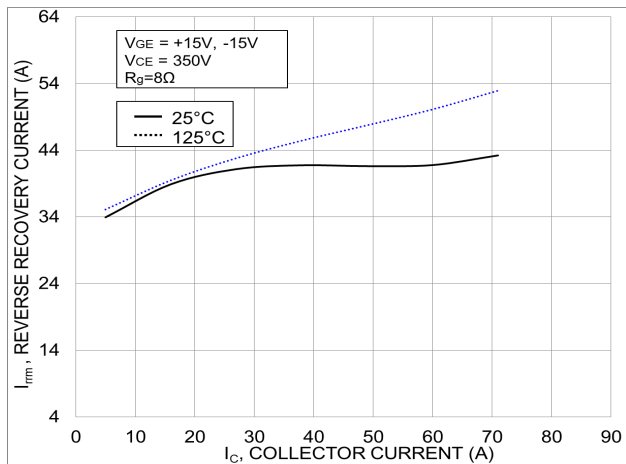


Figure 35. Typical Reverse Recovery Current vs. I_C

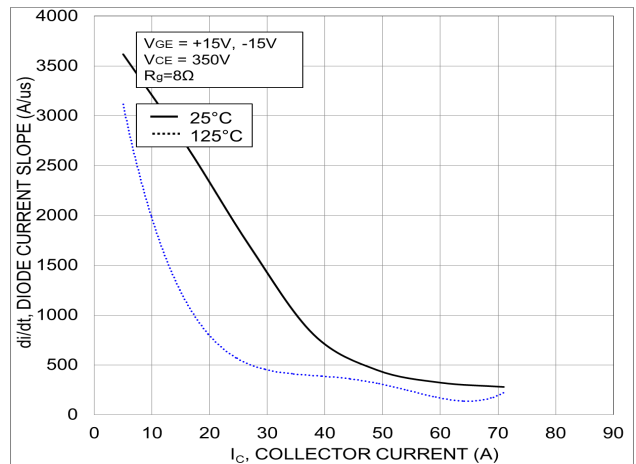


Figure 36. Typical di/dt Current Slope vs. I_C

NXH40T120L3Q1

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

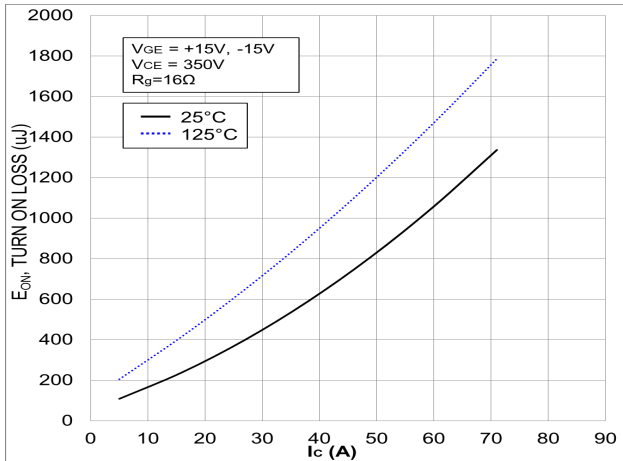


Figure 37. Typical Turn ON Loss vs. I_c

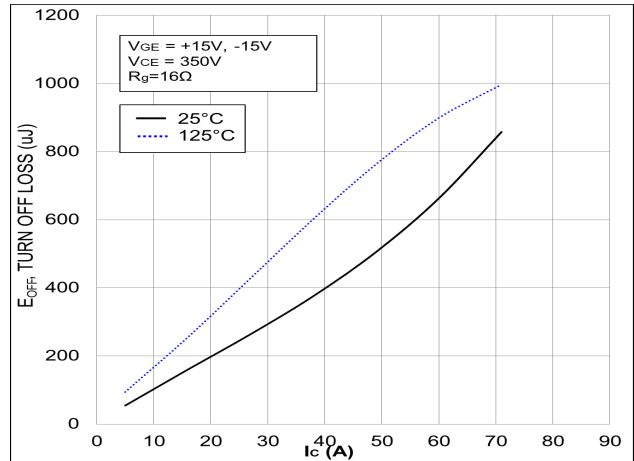


Figure 38. Typical Turn OFF Loss vs. I_c

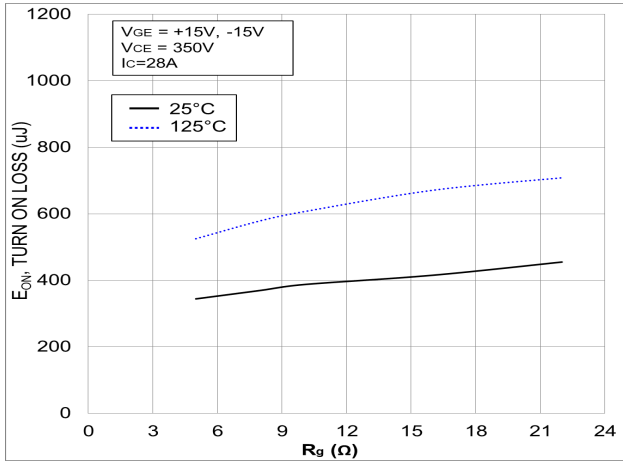


Figure 39. Typical Turn ON Loss vs. R_g

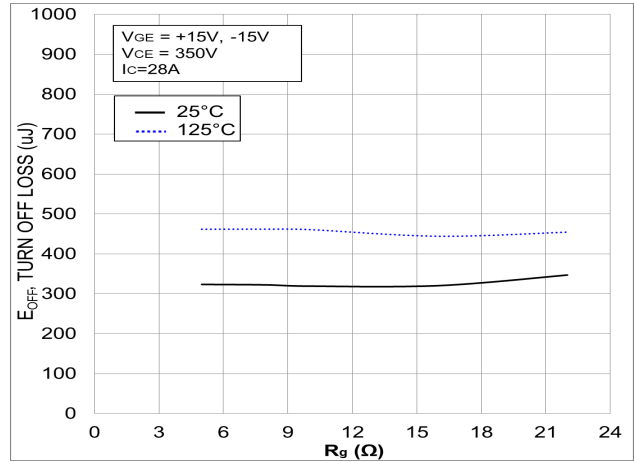


Figure 40. Typical Turn OFF Loss vs. R_g

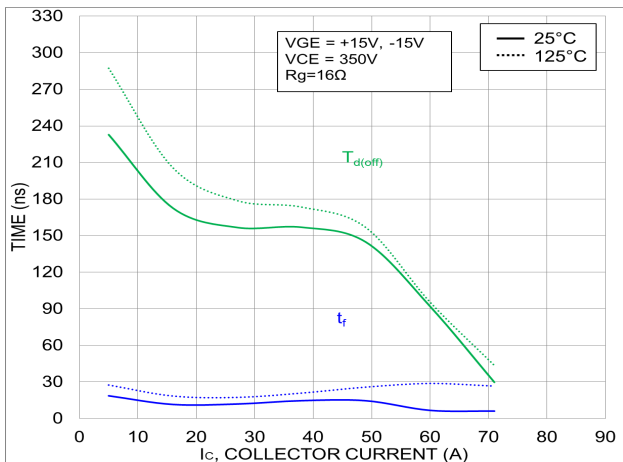


Figure 41. Typical Turn-Off Switching Time vs. I_c

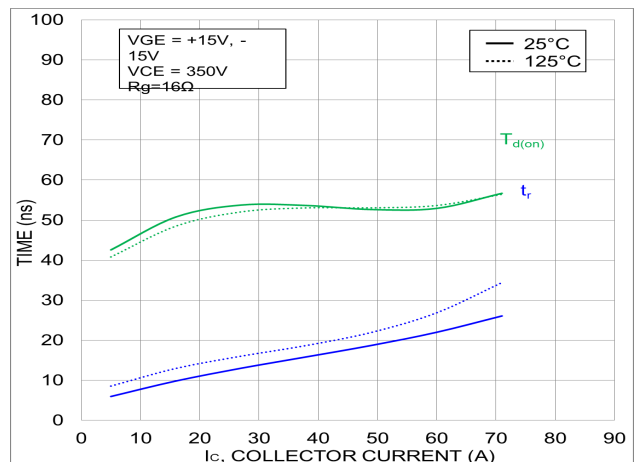


Figure 42. Typical Turn-On Switching Time vs. I_c

NXH40T120L3Q1

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

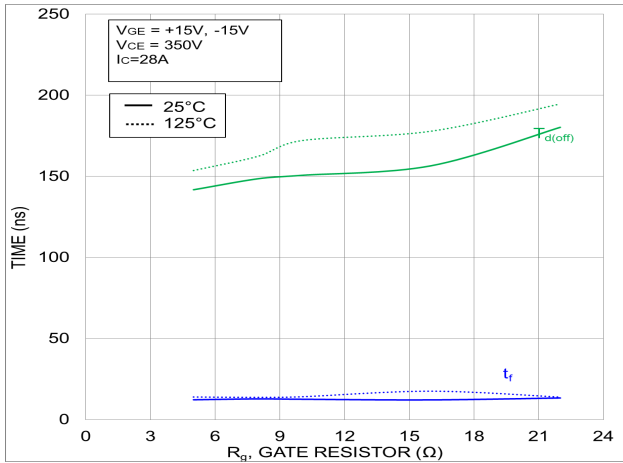


Figure 43. Typical Turn-Off Switching Time vs. R_G

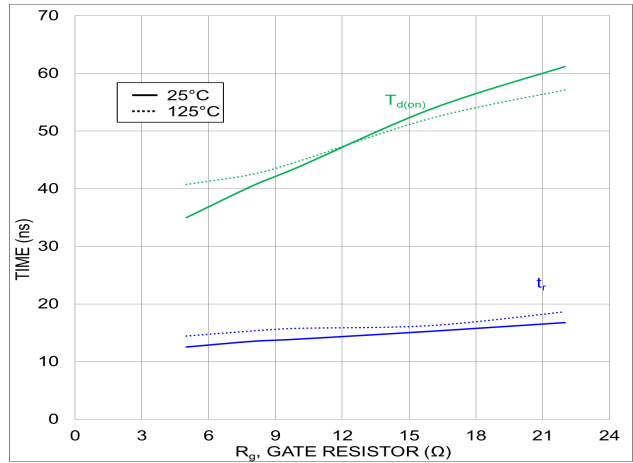


Figure 44. Typical Turn-On Switching Time vs. R_G

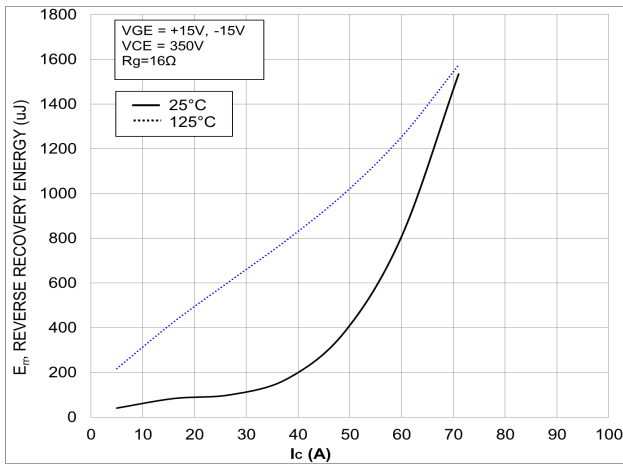


Figure 45. Typical Reverse Recovery Energy Loss vs. I_C

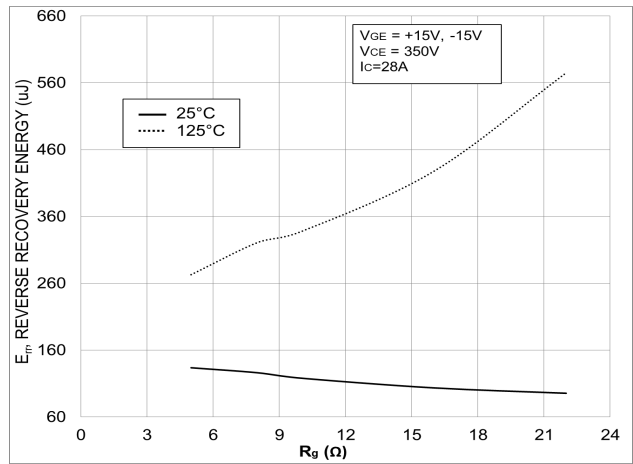


Figure 46. Typical Reverse Recovery Energy Loss vs. R_G

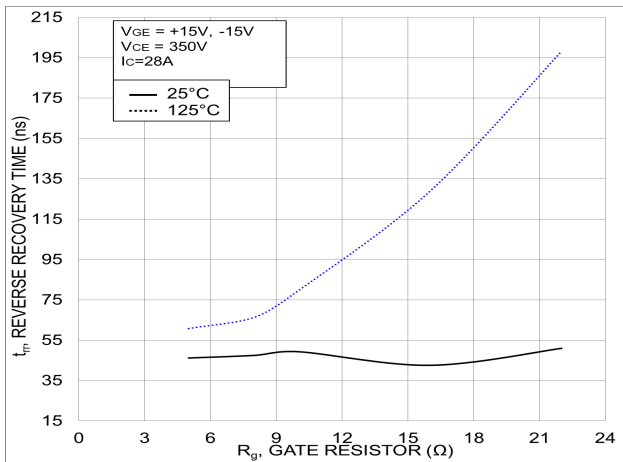


Figure 47. Typical Reverse Recovery Time vs. R_G

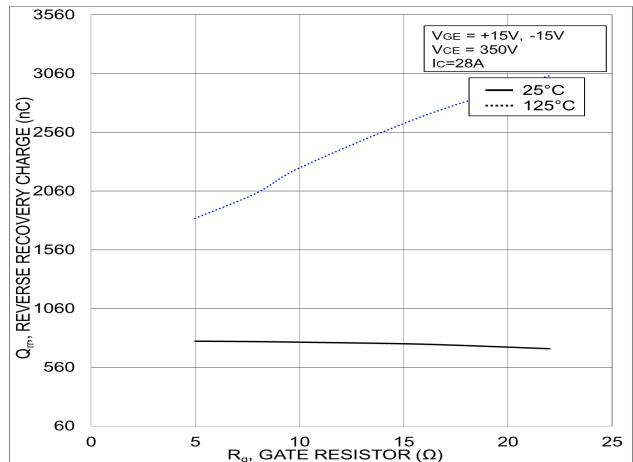


Figure 48. Typical Reverse Recovery Charge vs. R_G

NXH40T120L3Q1

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMMUTATES NEUTRAL POINT DIODE

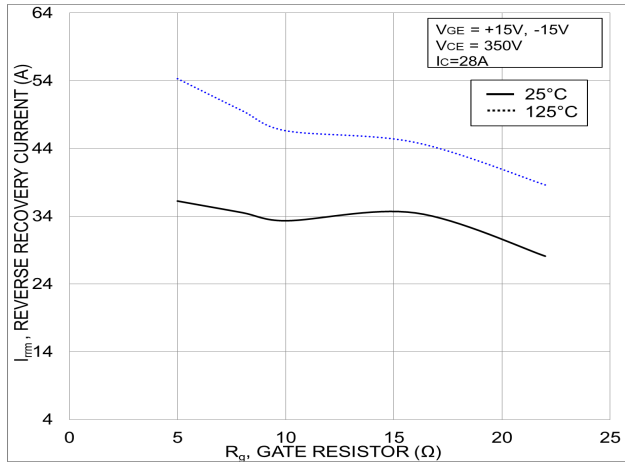


Figure 49. Typical Reverse Recovery Peak Current vs. R_G

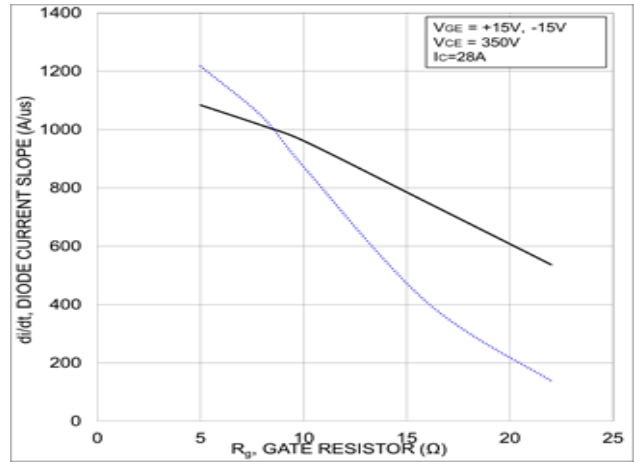


Figure 50. Typical di/dt vs. R_G

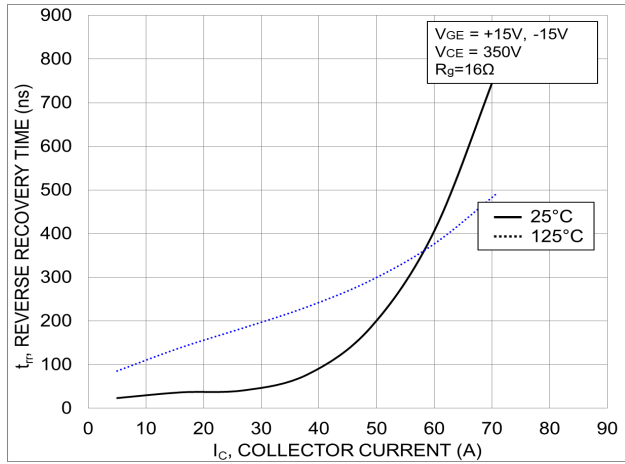


Figure 51. Typical Reverse Recovery Time vs. I_C

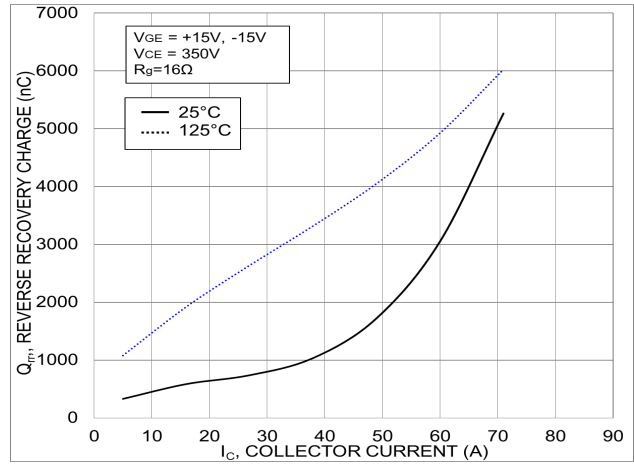


Figure 52. Typical Reverse Recovery Charge vs. I_C

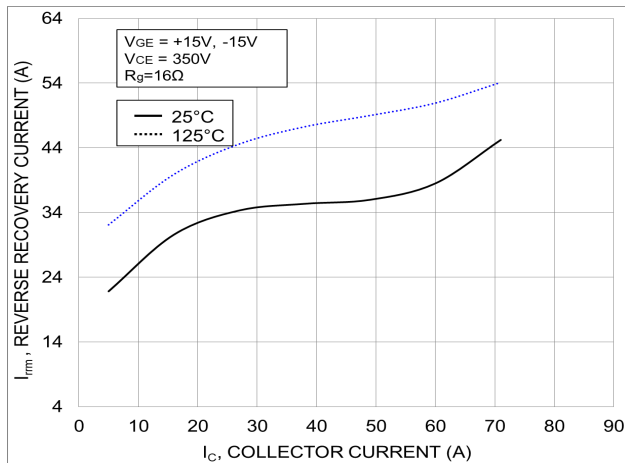


Figure 53. Typical Reverse Recovery Current vs. I_C

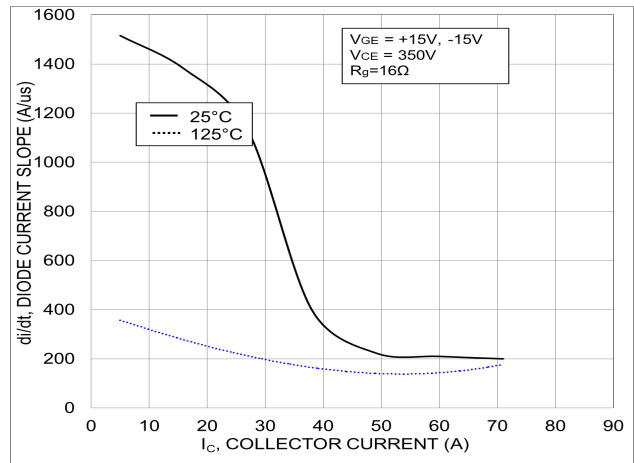
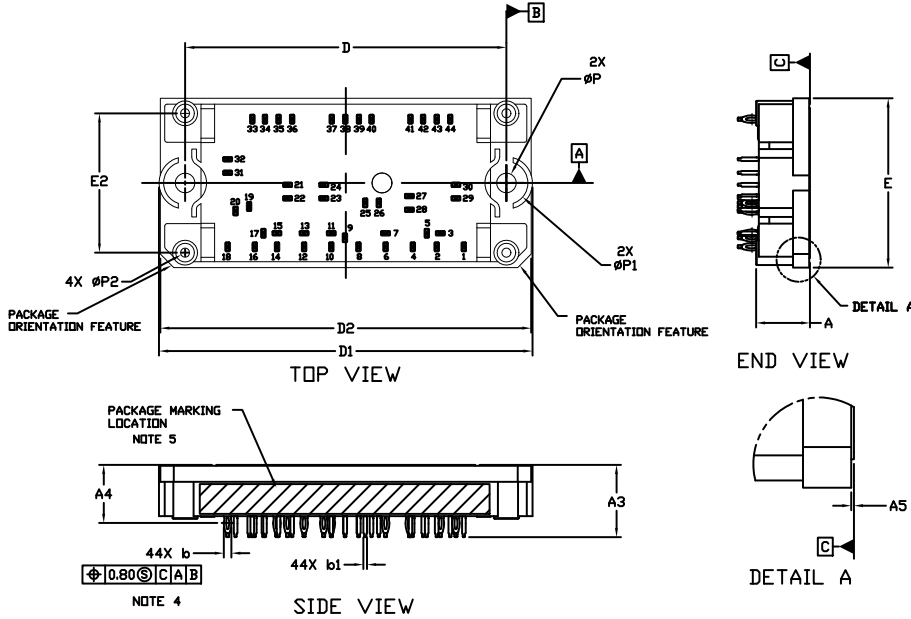


Figure 54. Typical di/dt Current Slope vs. I_C

NXH40T120L3Q1

PACKAGE DIMENSIONS

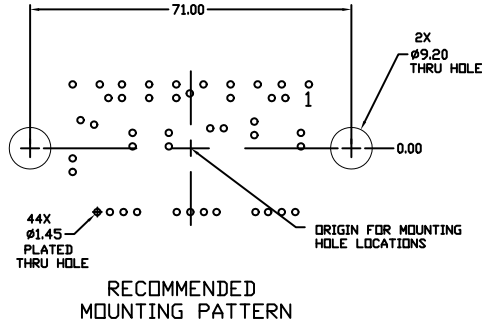
PIM44, 71x37.4 (PRESSFIT PINS)
CASE 180AS
ISSUE 0



PIN	PIN POSITION		PIN	PIN POSITION	
	X	Y		X	Y
1	26.10	14.10	23	-4.85	3.40
2	20.10	14.10	24	-4.85	0.40
3	20.90	11.10	25	4.30	4.40
4	14.80	14.10	26	7.30	4.40
5	17.90	11.10	27	14.05	2.90
6	8.80	14.10	28	14.05	5.90
7	8.80	11.10	29	24.35	3.40
8	2.80	14.10	30	24.35	0.40
9	-0.20	12.10	31	-26.10	-2.25
10	-3.20	14.10	32	-26.10	-5.25
11	-3.20	11.10	33	-20.65	-14.10
12	-9.20	14.10	34	-17.85	-14.10
13	-9.20	11.10	35	-14.85	-14.10
14	-15.20	14.10	36	-11.85	-14.10
15	-15.20	11.10	37	-3.10	-14.10
16	-20.10	14.10	38	-0.10	-14.10
17	-18.20	11.10	39	2.90	-14.10
18	-26.10	14.10	40	5.70	-14.10
19	-21.35	5.20	41	14.30	-14.10
20	-24.35	6.20	42	17.10	-14.10
21	-12.85	0.40	43	20.10	-14.10
22	-12.85	3.40	44	23.10	-14.10

NOTE 4

PIN	PIN POSITION		PIN	PIN POSITION	
	X	Y		X	Y
1	26.10	-14.10	23	-4.85	-3.40
2	20.10	-14.10	24	-4.85	-0.40
3	20.90	-11.10	25	4.30	-4.40
4	14.80	-14.10	26	7.30	-4.40
5	17.90	-11.10	27	14.05	-2.90
6	8.80	-14.10	28	14.05	-5.90
7	8.80	-11.10	29	24.35	-3.40
8	2.80	-14.10	30	24.35	-0.40
9	-0.20	-12.10	31	-26.10	2.25
10	-3.20	-14.10	32	-26.10	5.25
11	-3.20	-11.10	33	-20.65	14.10
12	-9.20	-14.10	34	-17.85	14.10
13	-9.20	-11.10	35	-14.85	14.10
14	-15.20	-14.10	36	-11.85	14.10
15	-15.20	-11.10	37	-3.10	14.10
16	-20.10	-14.10	38	-0.10	14.10
17	-18.20	-11.10	39	2.90	14.10
18	-26.10	-14.10	40	5.70	14.10
19	-21.35	-5.20	41	14.30	14.10
20	-24.35	-6.20	42	17.10	14.10
21	-12.85	-0.40	43	20.10	14.10
22	-12.85	-3.40	44	23.10	14.10



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	11.50	12.00	12.50
A3	15.50	16.00	16.50
A4	12.83 BSC		
A5	0.10	0.20	0.30
b	1.61	1.66	1.71
b1	0.75	0.80	0.85
D	70.50	71.00	71.50
D1	82.00	82.50	83.00
D2	81.50	82.00	82.50
E	36.90	37.40	37.90
E2	30.30	30.80	31.30
P	4.10	4.30	4.50
P1	9.30	9.50	9.70
P2	1.80	2.00	2.20

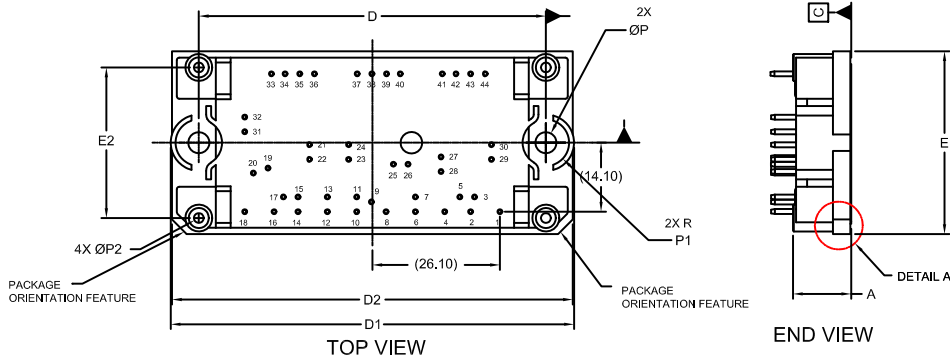
NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
- CONTROLLING DIMENSION: MILLIMETERS
- DIMENSIONS b AND b1 APPLY TO THE PLATED TERMINALS AND ARE MEASURED AT DIMENSION A4.
- POSITION OF THE CENTER OF THE TERMINALS IS DETERMINED FROM DATUM B THE CENTER OF DIMENSION D, X DIRECTION, AND FROM DATUM A, Y DIRECTION. POSITIONAL TOLERANCE, AS NOTED IN DRAWING, APPLIES TO EACH TERMINAL IN BOTH DIRECTIONS.
- PACKAGE MARKING IS LOCATED AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES.

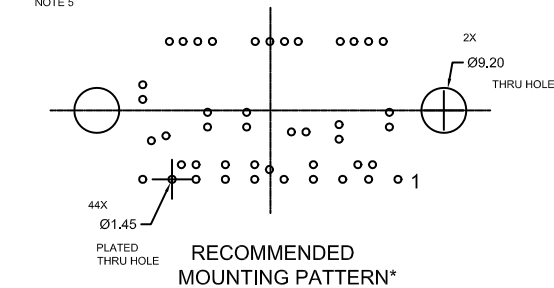
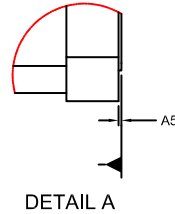
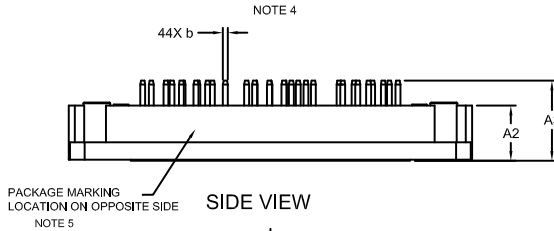
NXH40T120L3Q1

PACKAGE DIMENSIONS

PIM44, 71x37.4 (SOLDER PINS)
CASE 180BN
ISSUE O



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	11.50	12.00	12.50
A2	10.90	11.40	11.90
A3	15.90	16.40	16.90
A5	0.00	0.30	0.60
b	0.90	1.00	1.10
D	70.50	71.00	71.50
D1	82.00	82.50	83.00
D2	81.50	82.00	82.50
E	36.90	37.40	37.90
E2	30.30	30.80	31.30
P	4.30	4.40	4.50
P1	4.55	4.75	4.95
P2	2.00 REF		



*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	26.10	-14.10	23	-4.85	-3.40
2	20.10	-14.10	24	-4.85	-0.40
3	20.90	-11.10	25	4.30	-4.40
4	14.80	-14.10	26	7.30	-4.40
5	17.90	-11.10	27	14.05	-2.90
6	8.80	-14.10	28	14.05	-5.90
7	8.80	-11.10	29	24.35	-3.40
8	2.80	-14.10	30	24.35	-0.40
9	-0.20	-12.10	31	-26.10	2.25
10	-3.20	-14.10	32	-26.10	5.25
11	-3.20	-11.10	33	-20.65	14.10
12	-9.20	-14.10	34	-17.85	14.10
13	-9.20	-11.10	35	-14.85	14.10
14	-15.20	-14.10	36	-11.85	14.10
15	-15.20	-11.10	37	-3.10	14.10
16	-20.10	-14.10	38	-0.10	14.10
17	-18.20	-11.10	39	2.90	14.10
18	-26.10	-14.10	40	5.70	14.10
19	-21.35	-5.20	41	14.30	14.10
20	-24.35	-6.20	42	17.10	14.10
21	-12.85	-0.40	43	20.10	14.10
22	-12.85	-3.40	44	23.10	14.10

NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
- CONTROLLING DIMENSION: MILLIMETERS
- DIMENSIONS b APPLIES TO THE PLATED TERMINALS AND IS MEASURED BETWEEN 1.00 AND 3.00 FROM THE TERMINAL TIP.
- POSITION OF THE CENTER OF THE TERMINALS AND MOUNTING HOLES IS DETERMINED FROM DATUM B THE CENTER OF DIMENSION D, X DIRECTION, AND FROM DATUM A, Y DIRECTION. POSITIONAL TOLERANCE, AS NOTED IN THE DRAWING, APPLIES TO EACH TERMINAL IN BOTH DIRECTIONS.
- PACKAGE MARKING IS LOCATED AS SHOWN ON THE SIDE OPPOSITE THE PACKAGE ORIENTATION FEATURES.

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