

# NXH25T120L2Q1PG

## Q1 3-Phase TNPC Module

The NXH25T120L2Q1PG/PTG is a case power module containing a three channel T-type neutral-point clamped (TNPC) circuit. Each channel has a two 1200 V, 25 A IGBTs with inverse diodes and two 650 V, 20 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
- Press-fit Pins
- Options with Pre-applied Thermal Interface Material (TIM) and Without Pre-applied TIM
- Thermistor

### Typical Applications

- Solar Inverters
- UPS

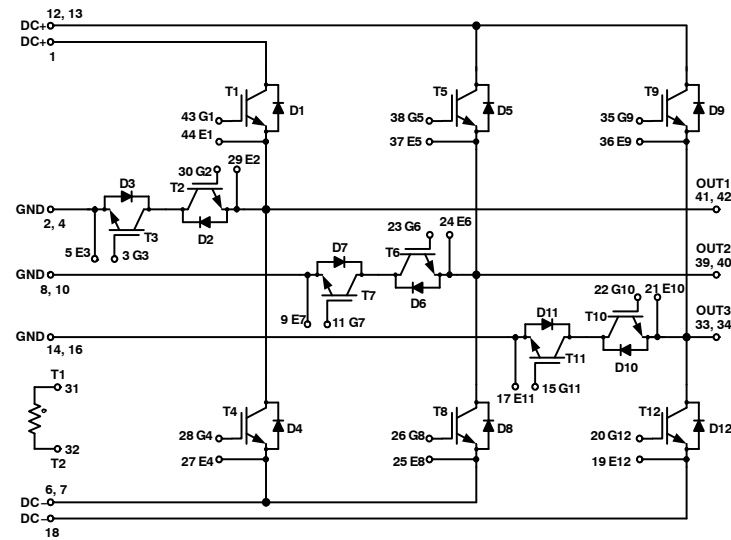
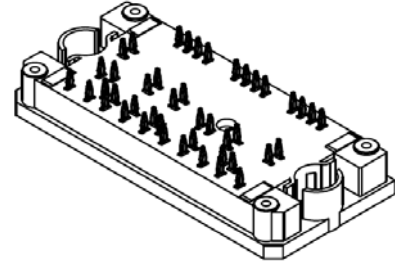


Figure 1. NXH25T120L2Q1PG/PTG Schematic Diagram



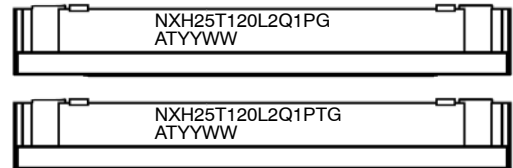
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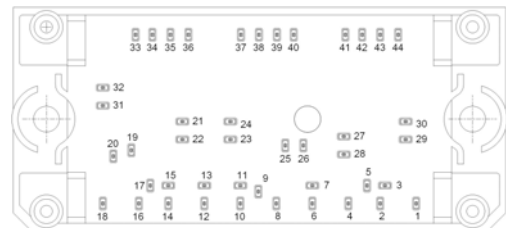
Q1 3-TNPC  
PRESS FIT  
CASE 180AS

### DEVICE MARKING



NXH25T120L2Q1P or  
NXH25T120L2Q1PT  
= Specific Device Code  
G = Pb-Free Package  
AT = Assembly & Test Site Code  
YYWW = Year and Work Week Code

### PIN ASSIGNMENTS



### ORDERING INFORMATION

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

# NXH25T120L2Q1PG

**Table 1. MAXIMUM RATINGS** (Note 1)

Rating	Symbol	Value	Unit
<b>HALF BRIDGE IGBT</b>			
Collector–Emitter Voltage	$V_{CES}$	1200	V
Gate–Emitter Voltage	$V_{GE}$	$\pm 20$	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	25	A
Pulsed Collector Current ( $T_J = 175^\circ\text{C}$ )	$I_{Cpulse}$	75	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	81	W
Short Circuit Withstand Time @ $V_{GE} = 15\text{ V}$ , $V_{CE} = 600\text{ V}$ , $T_J \leq 150^\circ\text{C}$	$T_{sc}$	5	$\mu\text{s}$
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	150	$^\circ\text{C}$
<b>NEUTRAL POINT IGBT</b>			
Collector–Emitter Voltage	$V_{CES}$	650	V
Gate–Emitter Voltage	$V_{GE}$	$\pm 20$	V
Continuous Collector Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_C$	20	A
Pulsed Collector Current ( $T_J = 175^\circ\text{C}$ )	$I_{Cpulse}$	60	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	50	W
Short Circuit Withstand Time @ $V_{GE} = 15\text{ V}$ , $V_{CE} = 400\text{ V}$ , $T_J \leq 150^\circ\text{C}$	$T_{sc}$	5	$\mu\text{s}$
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	150	$^\circ\text{C}$
<b>HALF BRIDGE DIODE</b>			
Peak Repetitive Reverse Voltage	$V_{RRM}$	1200	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	15	A
Repetitive Peak Forward Current ( $T_J = 175^\circ\text{C}$ )	$I_{FRM}$	45	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	43	W
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	150	$^\circ\text{C}$
<b>NEUTRAL POINT DIODE</b>			
Peak Repetitive Reverse Voltage	$V_{RRM}$	650	V
Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ( $T_J = 175^\circ\text{C}$ )	$I_F$	15	A
Repetitive Peak Forward Current ( $T_J = 175^\circ\text{C}$ )	$I_{FRM}$	45	A
Maximum Power Dissipation ( $T_J = 175^\circ\text{C}$ )	$P_{tot}$	39	W
Minimum Operating Junction Temperature	$T_{JMIN}$	-40	$^\circ\text{C}$
Maximum Operating Junction Temperature	$T_{JMAX}$	150	$^\circ\text{C}$
<b>THERMAL PROPERTIES</b>			
Storage Temperature range	$T_{stg}$	-40 to 125	$^\circ\text{C}$
<b>INSULATION PROPERTIES</b>			
Isolation test voltage, $t = 1\text{ sec}$ , 60Hz	$V_{is}$	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.

**Table 2. RECOMMENDED OPERATING RANGES**

Rating	Symbol	Min	Max	Unit
Module Operating Junction Temperature	$T_J$	-40	150	$^\circ\text{C}$

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.

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**Table 3. ELECTRICAL CHARACTERISTICS**  $T_J = 25^\circ\text{C}$  unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
<b>HALF BRIDGE IGBT CHARACTERISTICS</b>						
Collector–Emitter Cutoff Current	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}$	$I_{CES}$	–	–	300	$\mu\text{A}$
Collector–Emitter Saturation Voltage	$V_{GE} = 15\text{ V}, I_C = 25\text{ A}, T_J = 25^\circ\text{C}$	$V_{CE(sat)}$	–	1.90	2.50	V
	$V_{GE} = 15\text{ V}, I_C = 25\text{ A}, T_J = 125^\circ\text{C}$		–	1.96	–	
Gate–Emitter Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5\text{ mA}$	$V_{GE(TH)}$	4.90	5.49	6.50	V
Gate Leakage Current	$V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	$I_{GES}$	–	–	300	nA
Turn-on Delay Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{d(on)}$	–	59	–	ns
Rise Time		$t_r$	–	26	–	
Turn-off Delay Time		$t_{d(off)}$	–	242	–	
Fall Time		$t_f$	–	52	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	220	–	
Turn off Switching Loss per Pulse	$E_{off}$	–	240	–		
Turn-on Delay Time	$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{d(on)}$	–	48	–	ns
Rise Time		$t_r$	–	29	–	
Turn-off Delay Time		$t_{d(off)}$	–	293	–	
Fall Time		$t_f$	–	258	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	400	–	
Turn off Switching Loss per Pulse	$E_{off}$	–	710	–		
Input Capacitance	$V_{CE} = 20\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$	$C_{ies}$	–	8502	–	pF
Output Capacitance		$C_{oes}$	–	187	–	
Reverse Transfer Capacitance		$C_{res}$	–	154	–	
Total Gate Charge	$V_{CE} = 600\text{ V}, I_C = 25\text{ A}, V_{GE} = \pm 15\text{ V}$	$Q_g$	–	352	–	nC
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness $\leq 2.25\text{ Mil}$ , $\lambda = 2.9\text{ W/mK}$	$R_{thJH}$	–	1.17	–	$^\circ\text{C/W}$

### NEUTRAL POINT DIODE CHARACTERISTICS

Diode Forward Voltage	$I_F = 15\text{ A}, T_J = 25^\circ\text{C}$	$V_F$	–	2.43	–	V
	$I_F = 15\text{ A}, T_J = 125^\circ\text{C}$		–	1.60	–	
Combined IGBT + Diode Voltage Drop	$I_F = 15\text{ A}, T_J = 25^\circ\text{C}$	$V_{DT}$	–	3.76	4.60	V
Reverse Recovery Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	59	–	ns
Reverse Recovery Charge		$Q_{rr}$	–	0.21	–	$\mu\text{C}$
Peak Reverse Recovery Current		$I_{RRM}$	–	7	–	A
Peak Rate of Fall of Recovery Current		$di/dt$	–	106	–	$\text{A}/\mu\text{s}$
Reverse Recovery Energy		$E_{rr}$	–	40	–	$\mu\text{J}$
Reverse Recovery Time	$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	67	–	ns
Reverse Recovery Charge		$Q_{rr}$	–	0.69	–	$\mu\text{C}$
Peak Reverse Recovery Current		$I_{RRM}$	–	19	–	A
Peak Rate of Fall of Recovery Current		$di/dt$	–	451	–	$\text{A}/\mu\text{s}$
Reverse Recovery Energy		$E_{rr}$	–	100	–	$\mu\text{J}$
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness $\leq 2.25\text{ Mil}$ , $\lambda = 2.9\text{ W/mK}$	$R_{thJH}$	–	2.45	–	$^\circ\text{C/W}$

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**Table 3. ELECTRICAL CHARACTERISTICS**  $T_J = 25^\circ\text{C}$  unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
<b>NEUTRAL POINT IGBT CHARACTERISTICS</b>						
Collector–Emitter Cutoff Current	$V_{GE} = 0\text{ V}, V_{CE} = 650\text{ V}$	$I_{CES}$	–	–	200	$\mu\text{A}$
Collector–Emitter Saturation Voltage	$V_{GE} = 15\text{ V}, I_C = 20\text{ A}, T_J = 25^\circ\text{C}$	$V_{CE(sat)}$	–	1.49	–	V
	$V_{GE} = 15\text{ V}, I_C = 20\text{ A}, T_J = 125^\circ\text{C}$		–	1.61	–	
Gate–Emitter Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.65\text{ mA}$	$V_{GE(TH)}$	4.70	5.68	6.50	V
Gate Leakage Current	$V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	$I_{GES}$	–	–	200	nA
Turn-on Delay Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{d(on)}$	–	33	–	ns
Rise Time		$t_r$	–	18	–	
Turn-off Delay Time		$t_{d(off)}$	–	126	–	
Fall Time		$t_f$	–	43	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	250	–	
Turn off Switching Loss per Pulse	$E_{off}$	–	180	–		
Turn-on Delay Time	$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{d(on)}$	–	31	–	ns
Rise Time		$t_r$	–	19	–	
Turn-off Delay Time		$t_{d(off)}$	–	138	–	
Fall Time		$t_f$	–	72	–	
Turn-on Switching Loss per Pulse		$E_{on}$	–	390	–	
Turn off Switching Loss per Pulse	$E_{off}$	–	300	–		
Input Capacitance	$V_{CE} = 20\text{ V}, V_{GE} = 0\text{ V}, f = 10\text{ kHz}$	$C_{ies}$	–	3837	–	pF
Output Capacitance		$C_{oes}$	–	127	–	
Reverse Transfer Capacitance		$C_{res}$	–	104	–	
Total Gate Charge	$V_{CE} = 480\text{ V}, I_C = 20\text{ A}, V_{GE} = \pm 15\text{ V}$	$Q_g$	–	166	–	nC
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness $\leq 2.25\text{ Mil}$ , $\lambda = 2.9\text{ W/mK}$	$R_{thJH}$	–	1.90	–	$^\circ\text{C/W}$

### HALF BRIDGE DIODE CHARACTERISTICS

Diode Forward Voltage	$I_F = 15\text{ A}, T_J = 25^\circ\text{C}$	$V_F$	–	2.47	3	V
	$I_F = 15\text{ A}, T_J = 125^\circ\text{C}$		–	1.97	–	
Reverse Recovery Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	63	–	ns
Reverse Recovery Charge		$Q_{rr}$	–	0.45	–	$\mu\text{C}$
Peak Reverse Recovery Current		$I_{RRM}$	–	17	–	A
Peak Rate of Fall of Recovery Current		$di/dt$	–	313	–	$\text{A}/\mu\text{s}$
Reverse Recovery Energy		$E_{rr}$	–	70	–	$\mu\text{J}$
Reverse Recovery Time	$T_J = 125^\circ\text{C}$ $V_{CE} = 350\text{ V}, I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_G = 15\ \Omega$	$t_{rr}$	–	233	–	ns
Reverse Recovery Charge		$Q_{rr}$	–	1.55	–	$\mu\text{C}$
Peak Reverse Recovery Current		$I_{RRM}$	–	22	–	A
Peak Rate of Fall of Recovery Current		$di/dt$	–	76	–	$\text{A}/\mu\text{s}$
Reverse Recovery Energy		$E_{rr}$	–	360	–	$\mu\text{J}$
Thermal Resistance – chip-to–heatsink	Thermal grease, Thickness $\leq 2.25\text{ Mil}$ , $\lambda = 2.9\text{ W/mK}$	$R_{thJH}$	–	2.21	–	$^\circ\text{C/W}$

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**Table 3. ELECTRICAL CHARACTERISTICS**  $T_J = 25^\circ\text{C}$  unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
<b>THERMISTOR CHARACTERISTICS</b>						
Nominal resistance	$T = 25^\circ\text{C}$	$R_{25}$	-	22	-	$\text{k}\Omega$
Nominal resistance	$T = 100^\circ\text{C}$	$R_{100}$	-	1468	-	$\Omega$
Deviation of $R_{25}$		$\Delta R/R$	-5		5	%
Power dissipation		$P_D$	-	200	-	mW
Power dissipation constant			-	2	-	mW/K
B-value	$B(25/50)$ , tolerance $\pm 3\%$		-	3950	-	K
B-value	$B(25/100)$ , tolerance $\pm 3\%$		-	3998	-	K

### ORDERING INFORMATION

Orderable Part Number	Marking	Package	Shipping
NXH25T120L2Q1PG	NXH25T120L2Q1PG	Q1 3-Phase TNPC – Case 180AS Press-fit Pins (Pb – Free)	21 Units / Blister Tray
NXH25T120L2Q1PTG	NXH25T120L2Q1PTG	Q1 3-Phase TNPC – Case 180AS Press-fit Pins with pre-applied thermal interface material (TIM) (Pb – Free)	21 Units / Blister Tray

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## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE

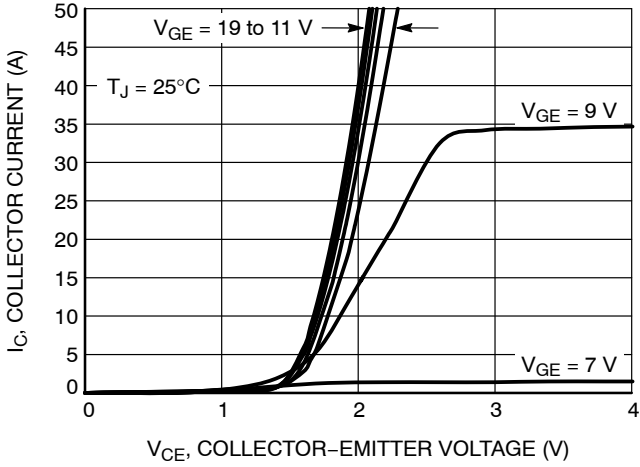


Figure 2. Typical Output Characteristics

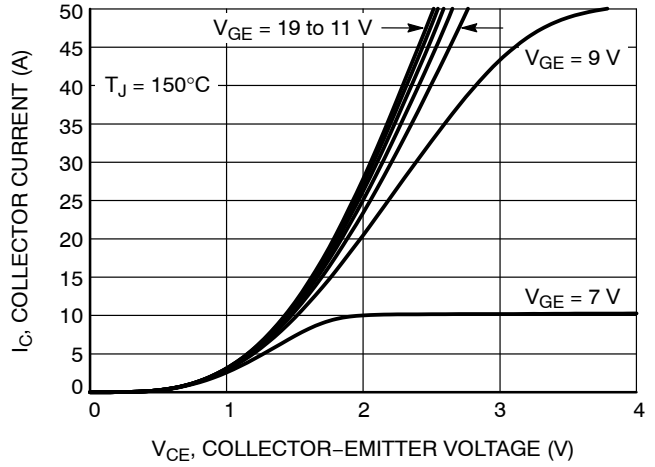


Figure 3. Typical Output Characteristics

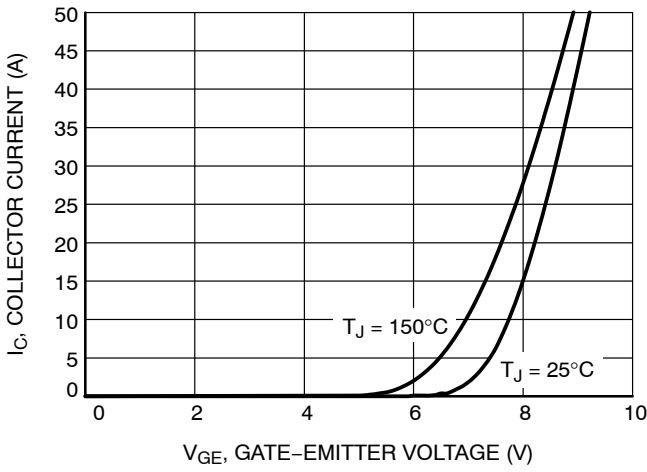


Figure 4. Typical Transfer Characteristics

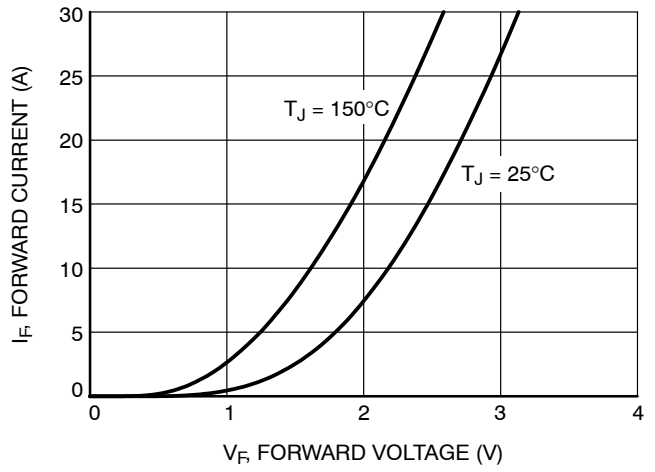


Figure 5. Diode Forward Characteristics

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## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE

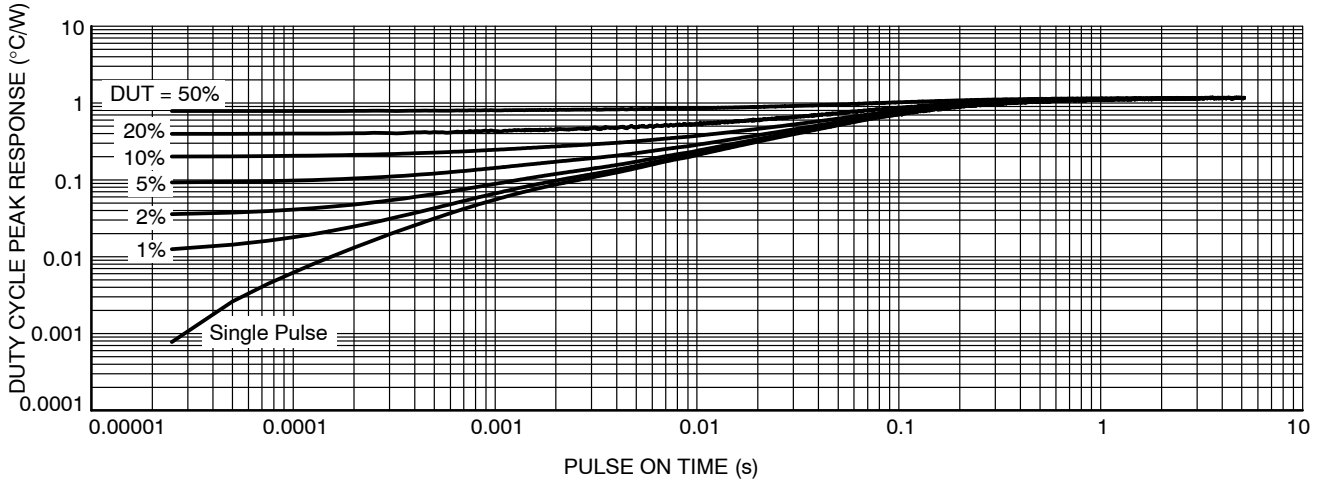


Figure 6. Transient Thermal Impedance (Half Bridge IGBT)

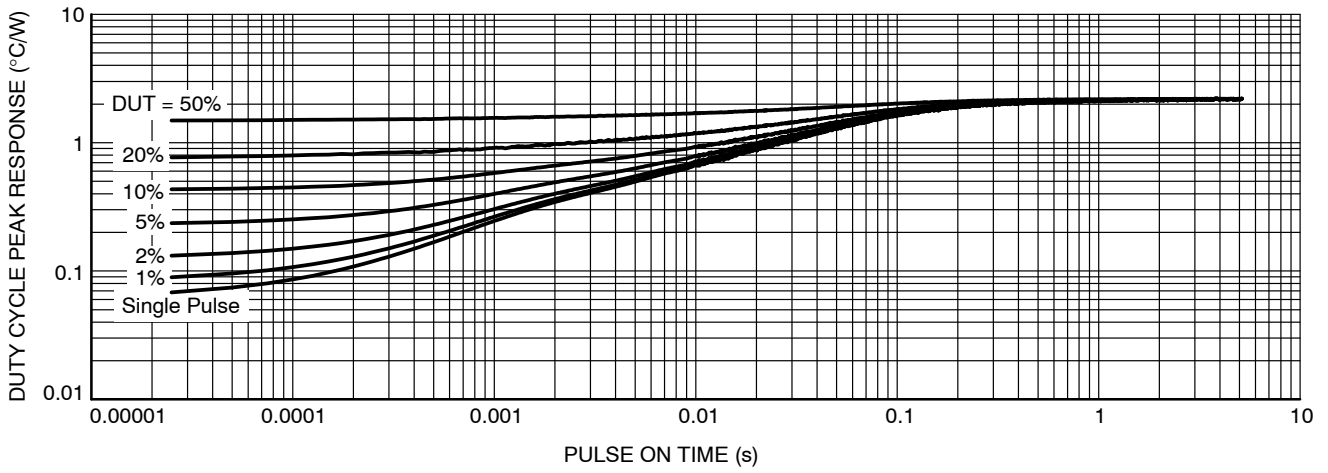


Figure 7. Transient Thermal Impedance (Half Bridge Diode)

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## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE

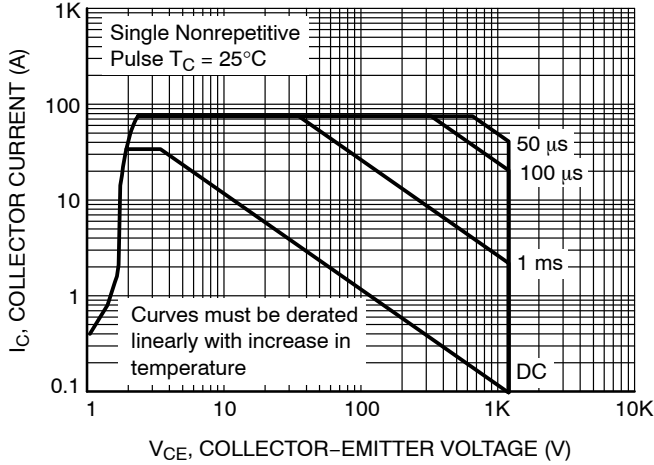


Figure 8. FBSOA

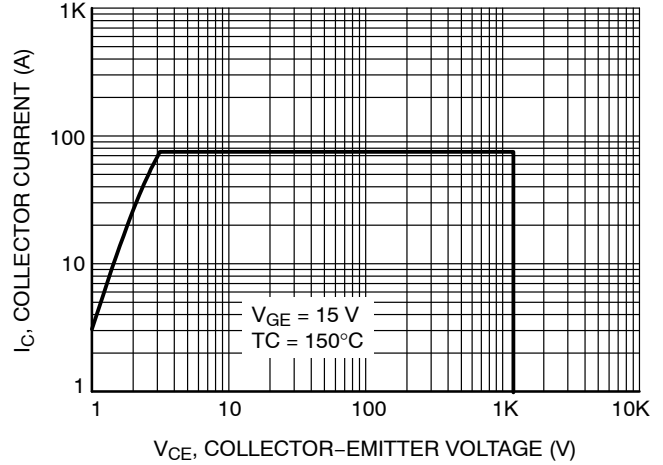


Figure 9. RBSOA

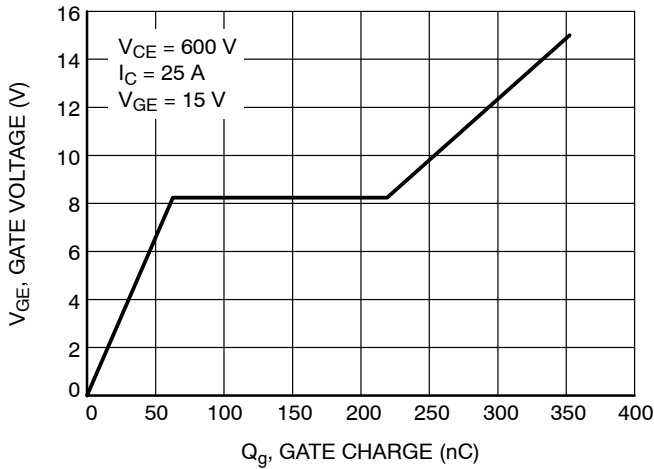


Figure 10. Gate Voltage vs. Gate Charge



TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT AND DIODE

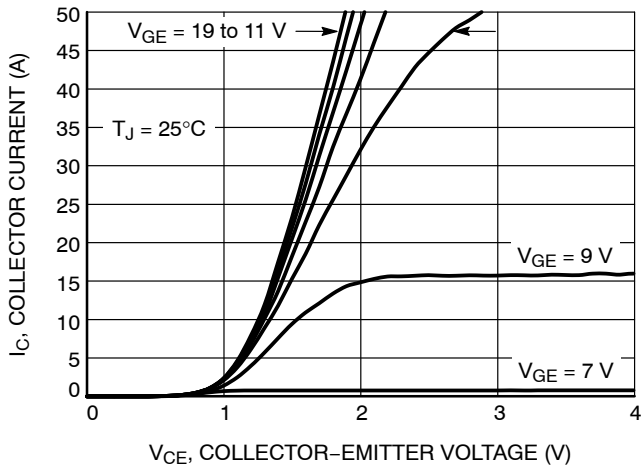


Figure 11. Typical Output Characteristics

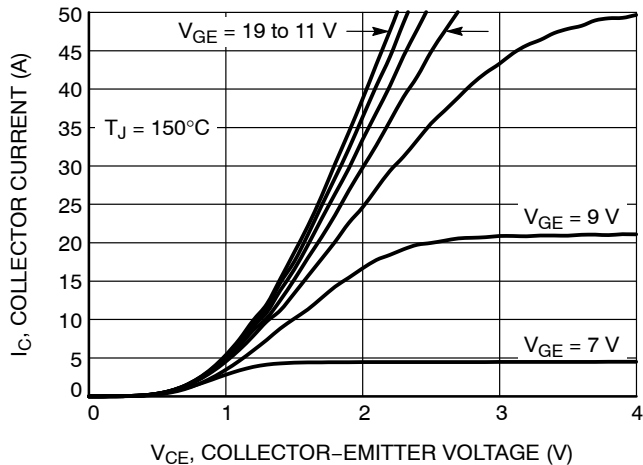


Figure 12. Typical Output Characteristics

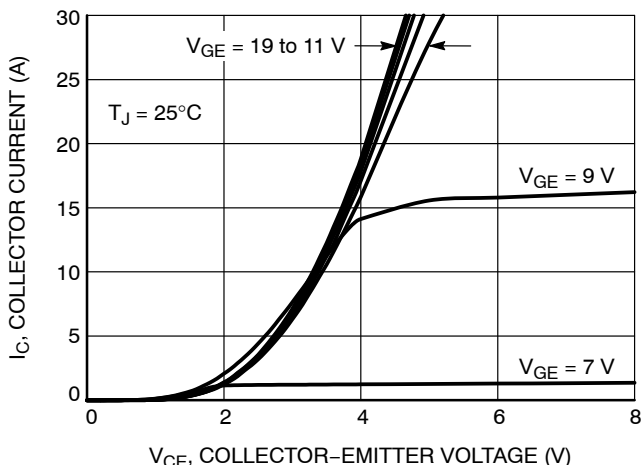


Figure 13. Typical Output Characteristics (Ic vs. V<sub>DT</sub>)

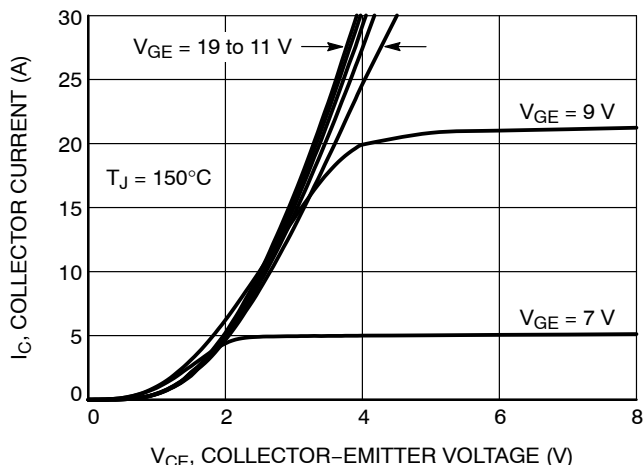


Figure 14. Typical Output Characteristics (Ic vs. V<sub>DT</sub>)

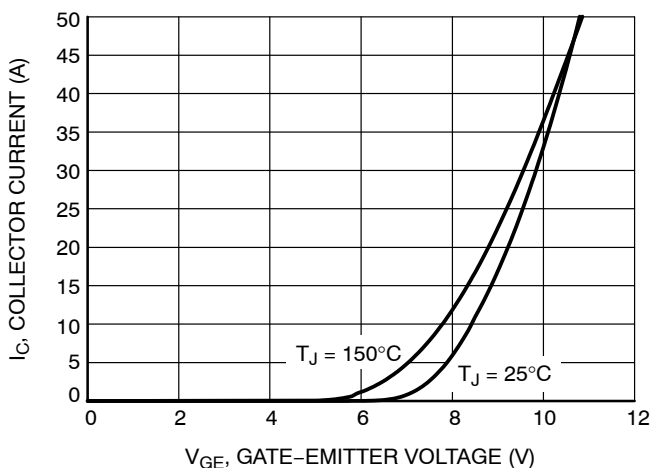


Figure 15. Typical Transfer Characteristics

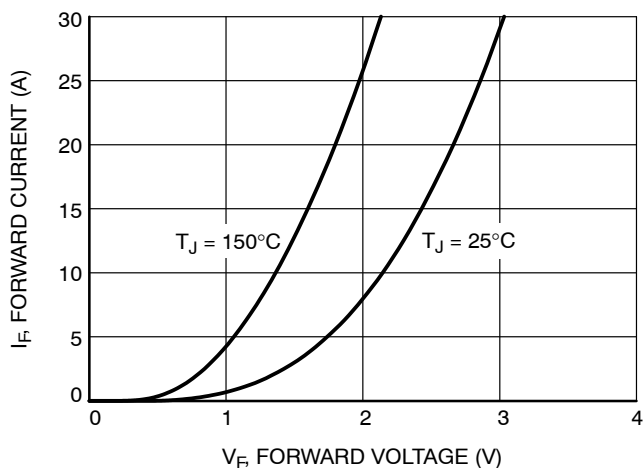


Figure 16. Diode Forward Characteristics

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## TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT AND DIODE

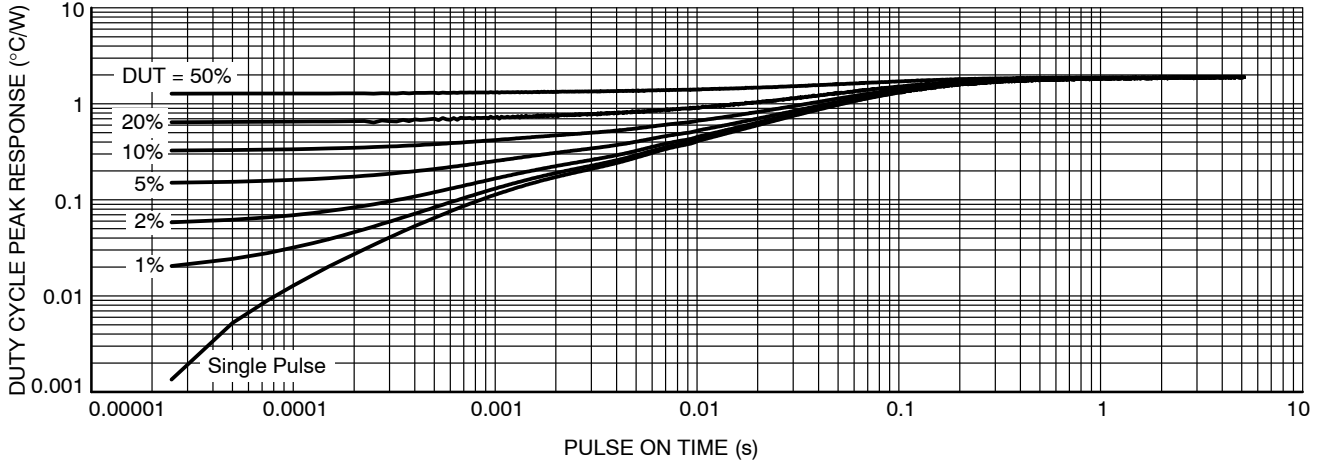


Figure 17. Transient Thermal Impedance (Neutral Point IGBT)

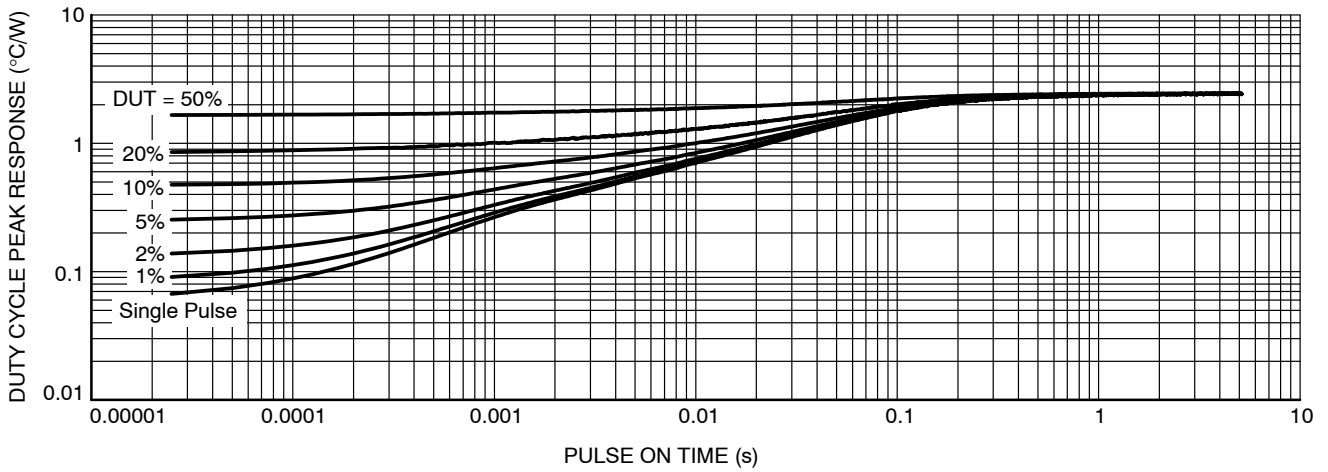


Figure 18. Transient Thermal Impedance (Neutral Point Diode)

TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT AND DIODE

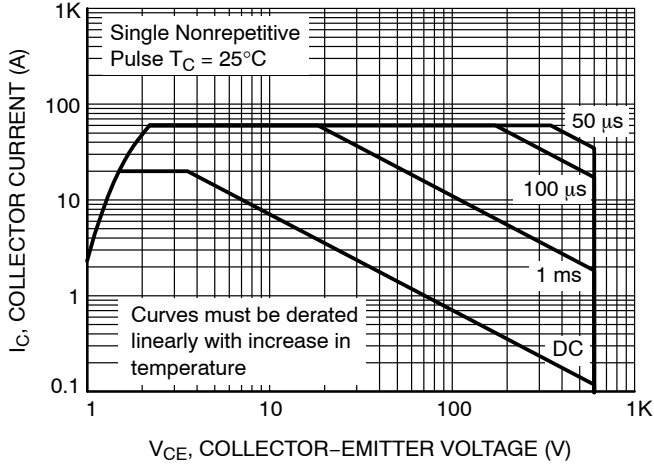


Figure 19. FBSOA

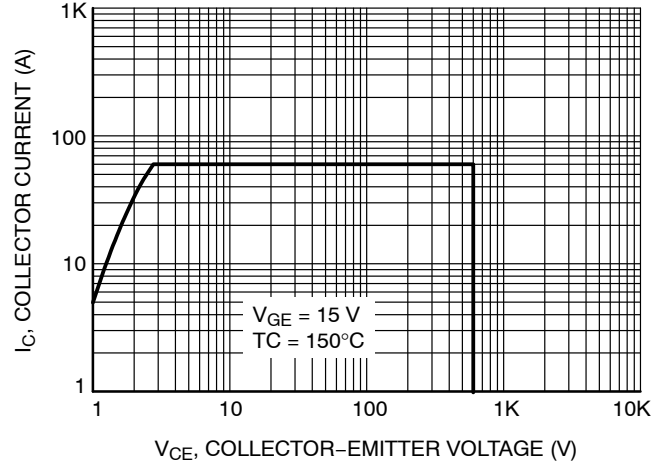


Figure 20. RBSOA

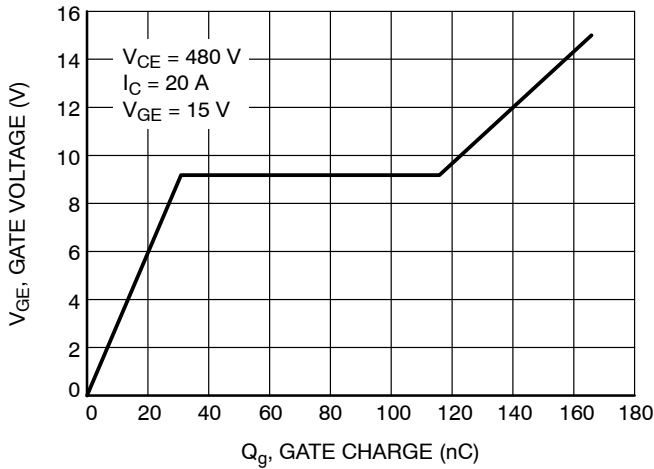


Figure 21. Gate Voltage vs. Gate Charge

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## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

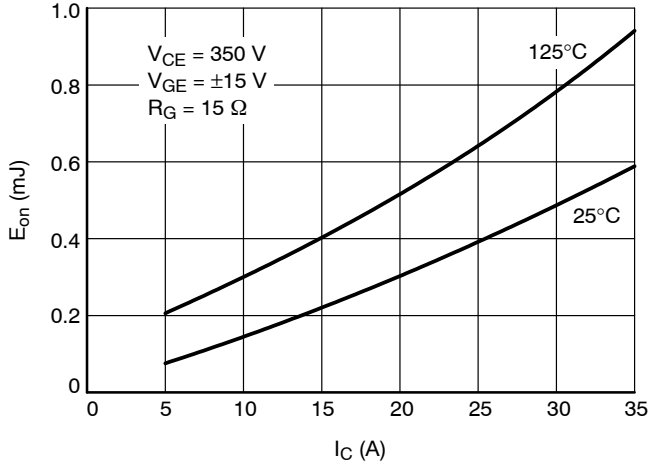


Figure 22. Typical Switching Loss  $E_{on}$  vs.  $I_C$

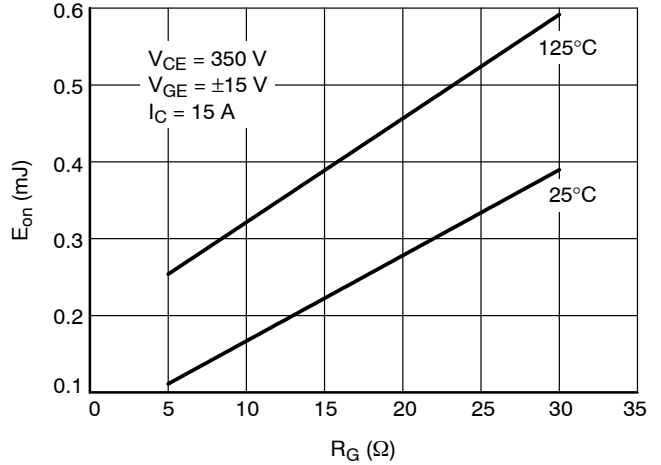


Figure 23. Typical Switching Loss  $E_{on}$  vs.  $R_G$

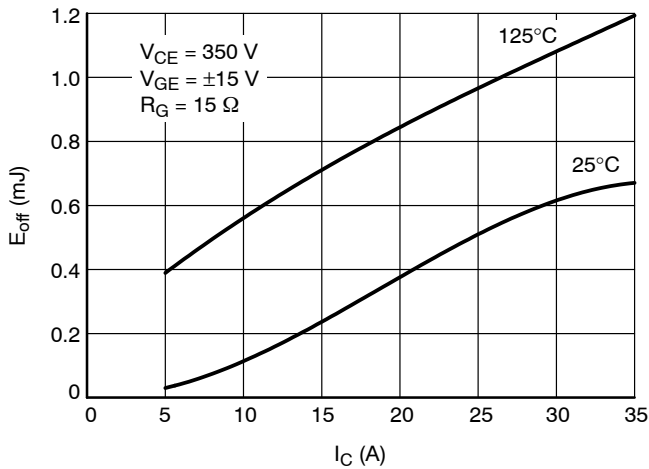


Figure 24. Typical Switching Loss  $E_{off}$  vs.  $I_C$

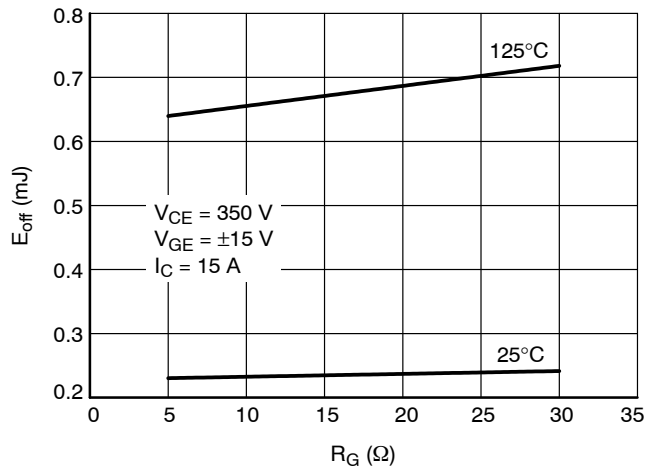


Figure 25. Typical Switching Loss  $E_{off}$  vs.  $R_G$

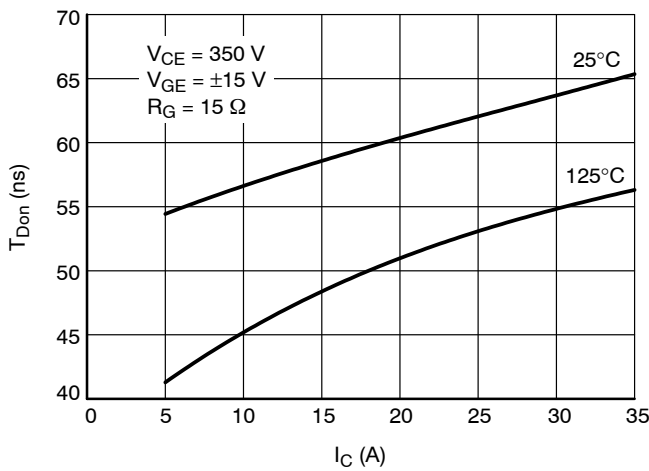


Figure 26. Typical Switching Time  $T_{Don}$  vs.  $I_C$

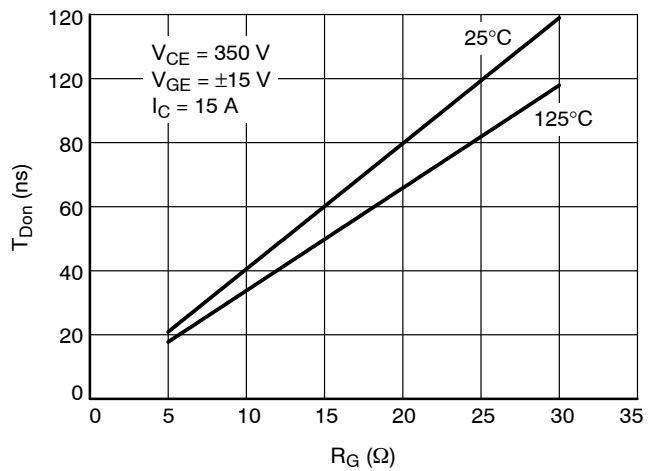


Figure 27. Typical Switching Time  $T_{Don}$  vs.  $R_G$

# NXH25T120L2Q1PG

## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

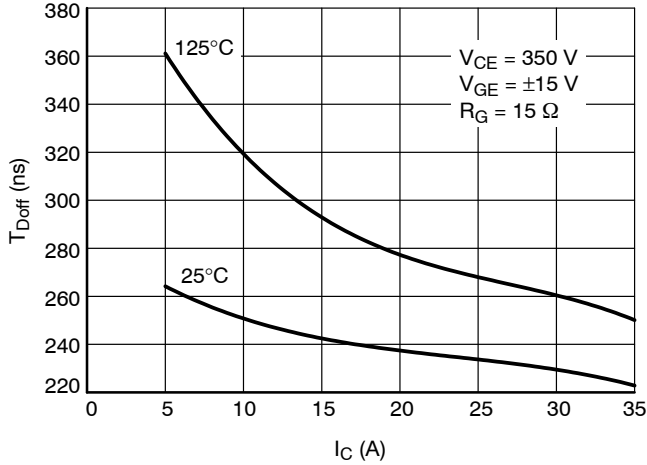


Figure 28. Typical Switching Time  $T_{Doff}$  vs.  $I_C$

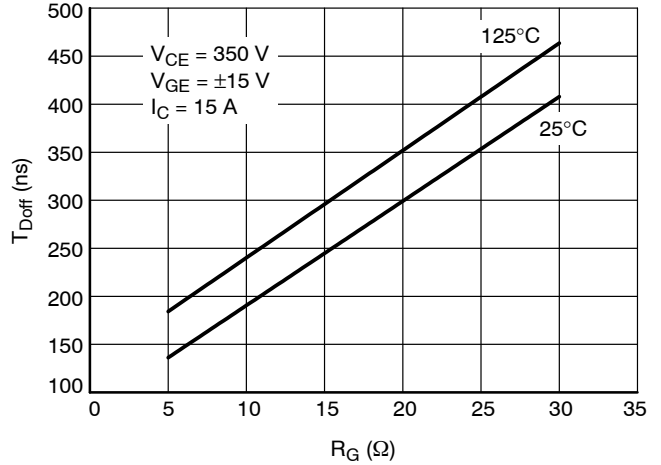


Figure 29. Typical Switching Time  $T_{Doff}$  vs.  $R_G$

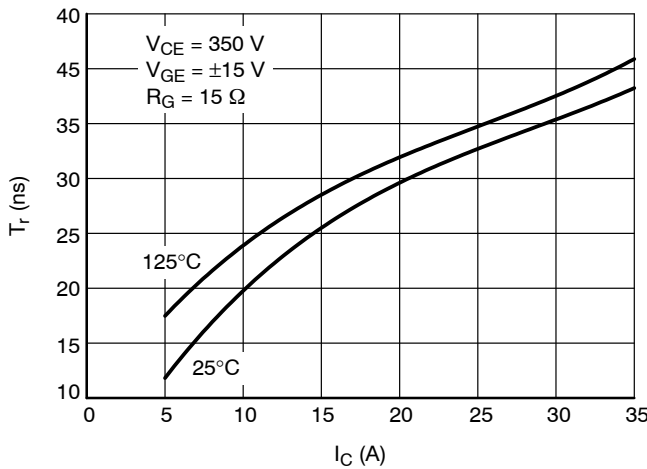


Figure 30. Typical Switching Time  $T_r$  vs.  $I_C$

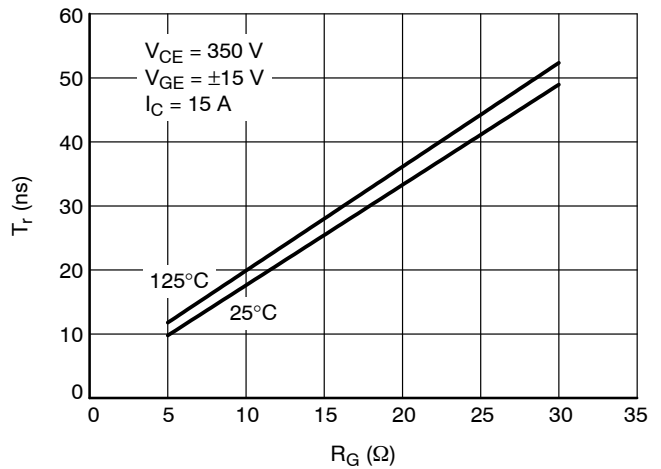


Figure 31. Typical Switching Time  $T_r$  vs.  $R_G$

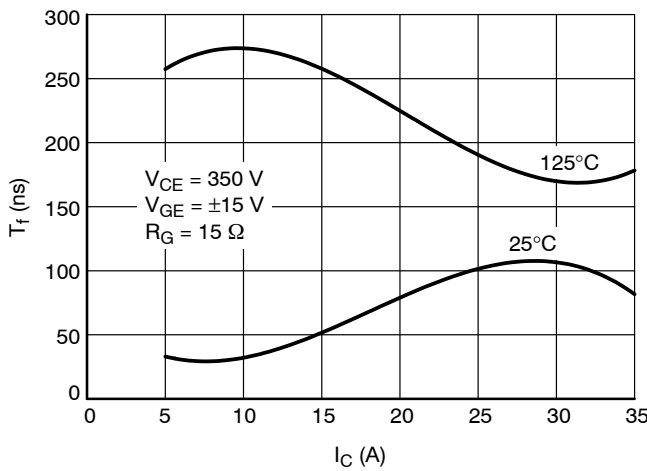


Figure 32. Typical Switching Time  $T_f$  vs.  $I_C$

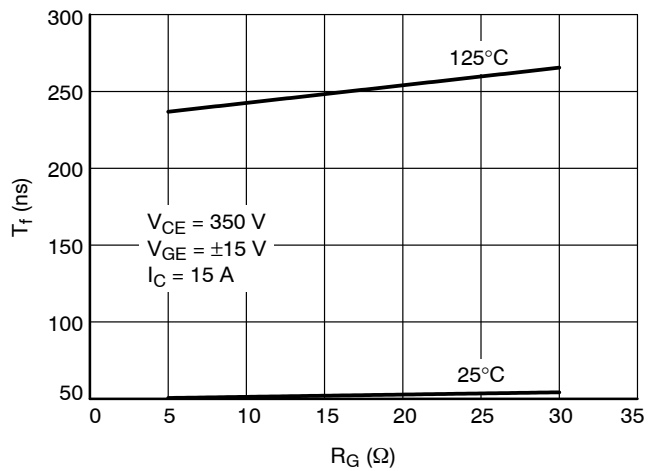


Figure 33. Typical Switching Time  $T_f$  vs.  $R_G$

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

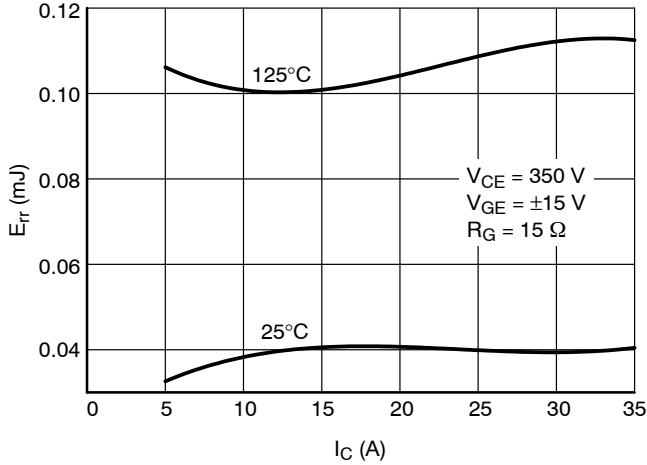


Figure 34. Typical Reverse Recovery Energy vs.  $I_C$

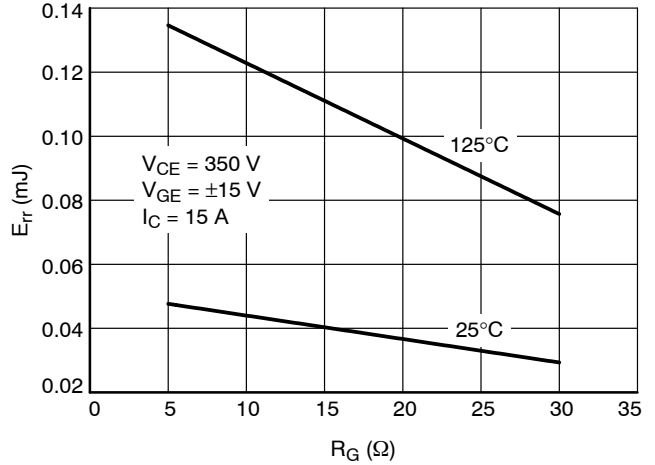


Figure 35. Typical Reverse Recovery Energy vs.  $R_G$

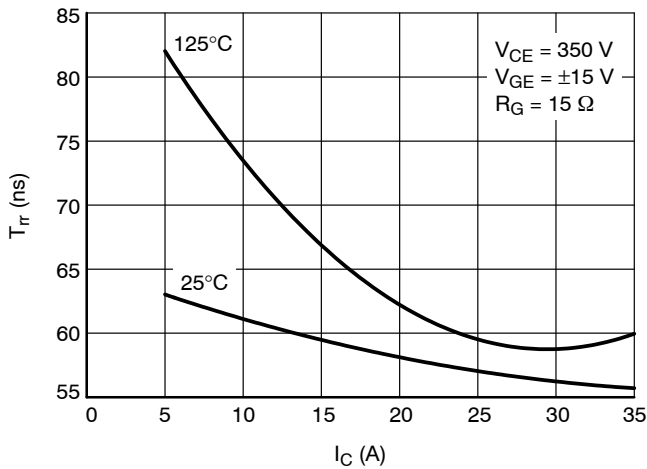


Figure 36. Typical Reverse Recovery Time vs.  $I_C$

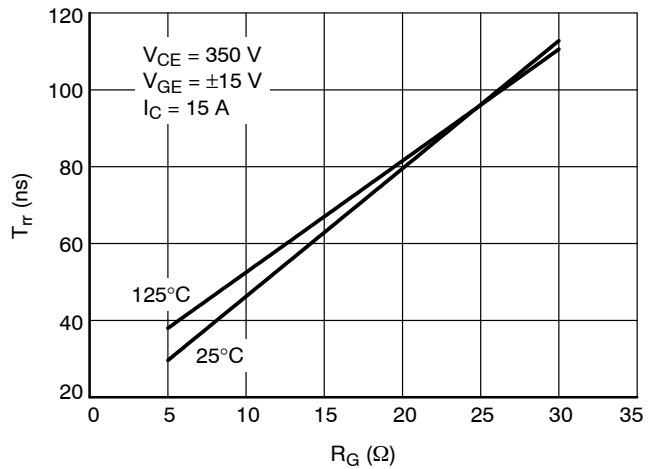


Figure 37. Typical Reverse Recovery Time vs.  $R_G$

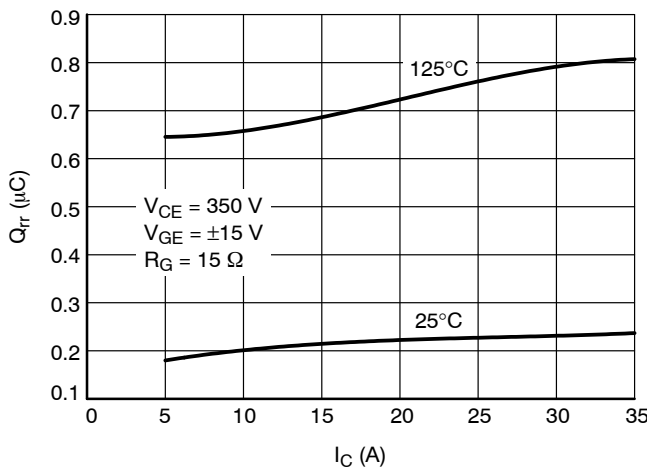


Figure 38. Typical Reverse Recovery Charge vs.  $I_C$

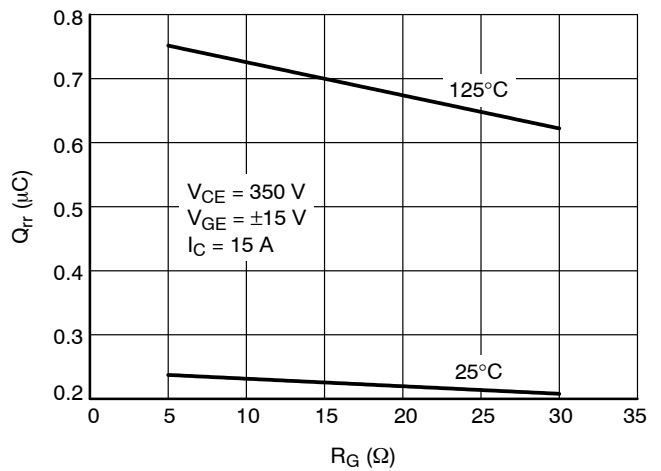


Figure 39. Typical Reverse Recovery Charge vs.  $R_G$

# NXH25T120L2Q1PG

## TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

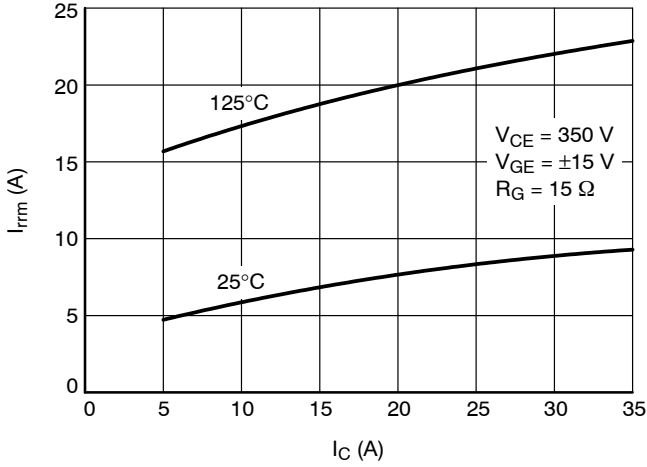


Figure 40. Typical Reverse Recovery Current vs.  $I_C$

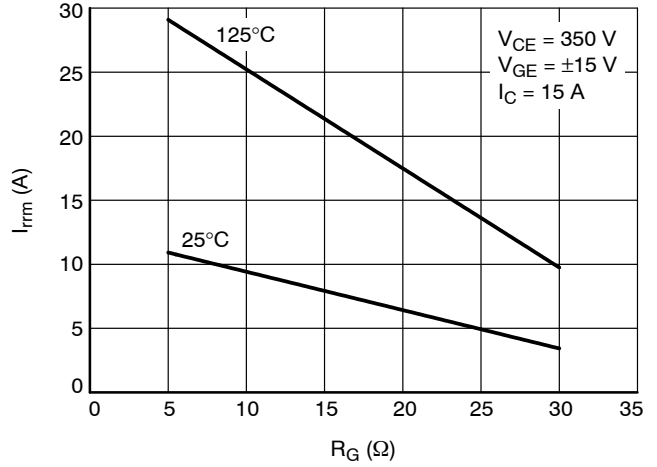


Figure 41. Typical Reverse Recovery Current vs.  $R_G$

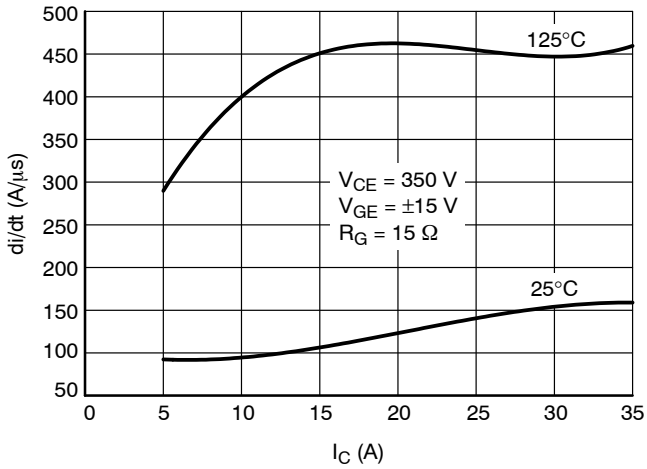


Figure 42. Typical  $di/dt$  vs.  $I_C$

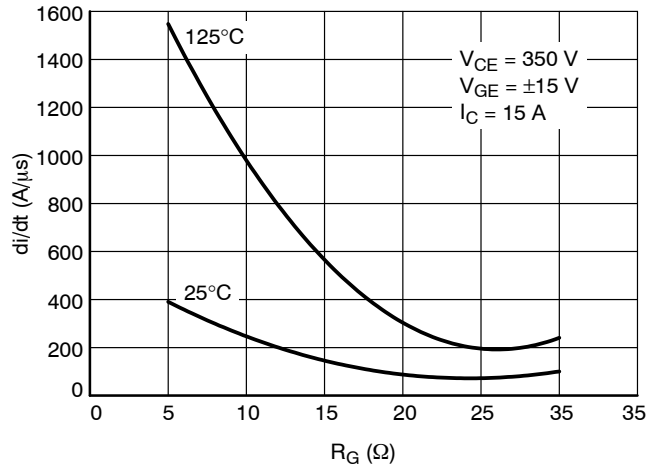


Figure 43. Typical  $di/dt$  vs.  $R_G$

TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

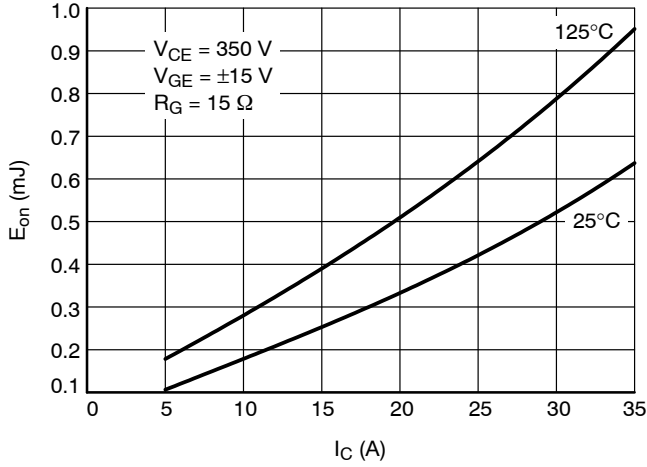


Figure 44. Typical Switching Energy  $E_{on}$  vs.  $I_C$

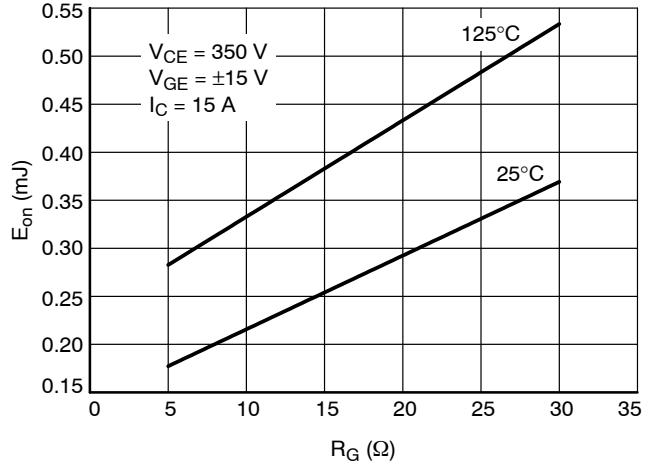


Figure 45. Typical Switching Energy  $E_{on}$  vs.  $R_G$

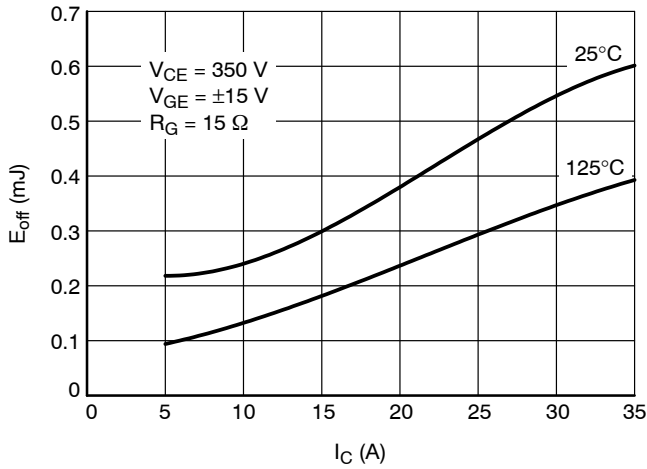


Figure 46. Typical Switching Energy  $E_{off}$  vs.  $I_C$

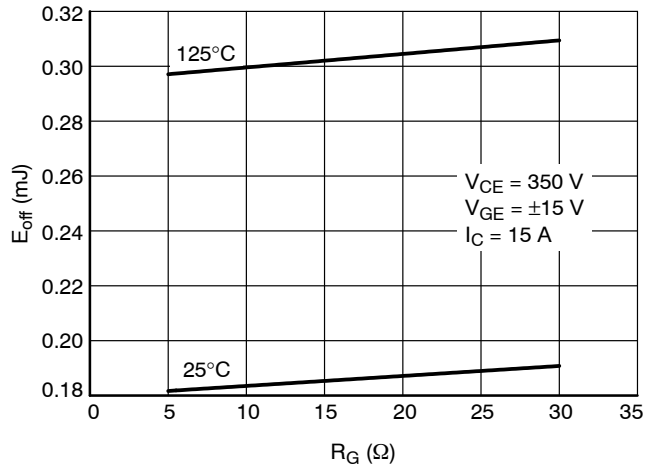


Figure 47. Typical Switching Energy  $E_{off}$  vs.  $R_G$

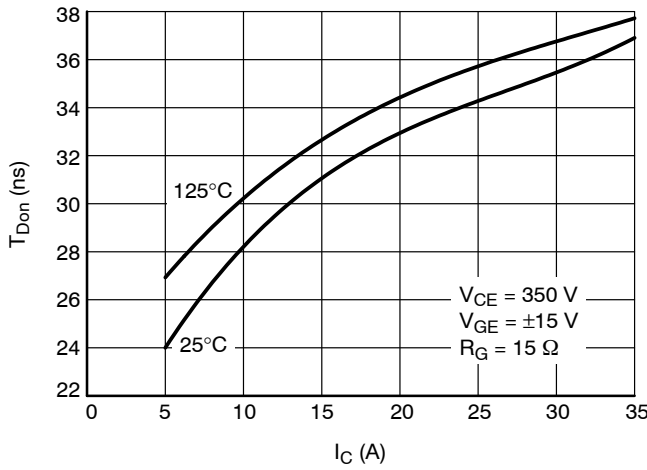


Figure 48. Typical Switching Time  $T_{Don}$  vs.  $I_C$

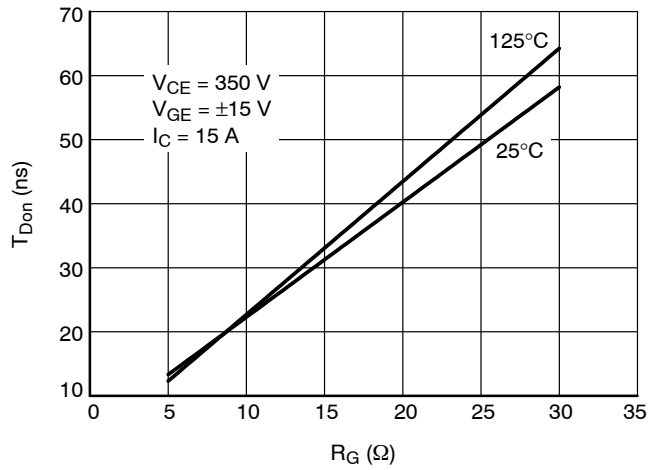


Figure 49. Typical Switching Time  $T_{Don}$  vs.  $R_G$



# NXH25T120L2Q1PG

## TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

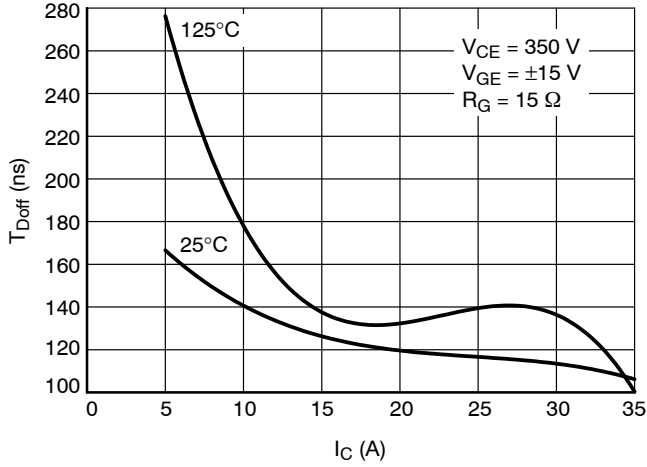


Figure 50. Typical Switching Time  $T_{Doff}$  vs.  $I_C$

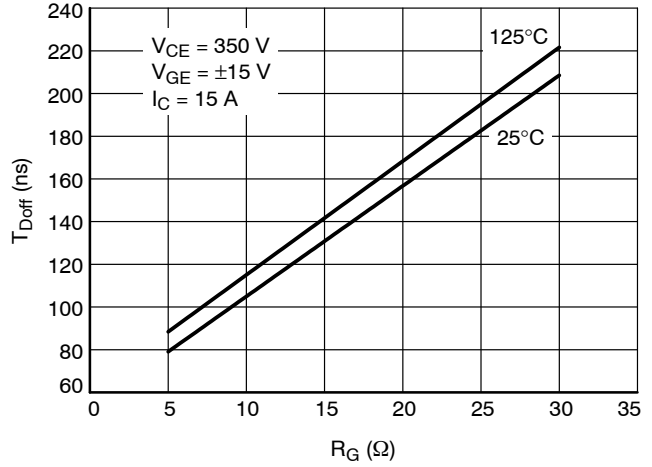


Figure 51. Typical Switching Time  $T_{Doff}$  vs.  $R_G$

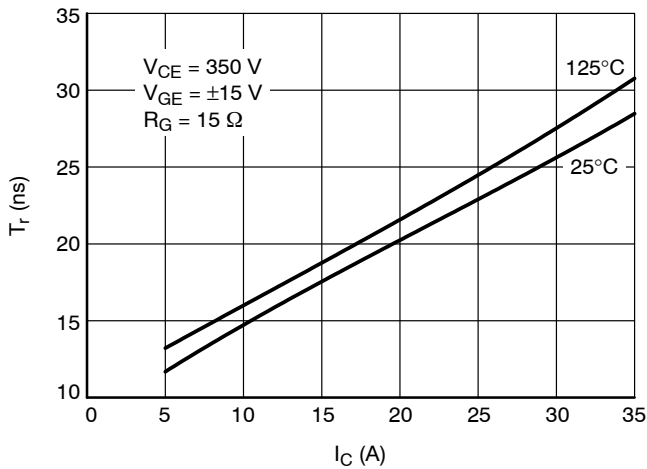


Figure 52. Typical Switching Time  $T_r$  vs.  $I_C$

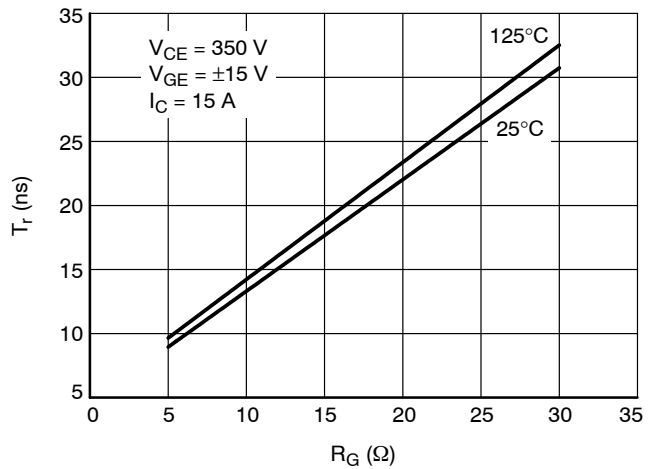


Figure 53. Typical Switching Time  $T_r$  vs.  $R_G$

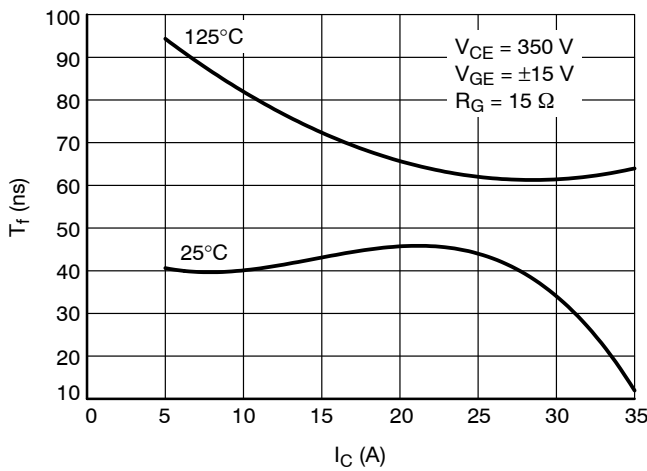


Figure 54. Typical Switching Time  $T_f$  vs.  $I_C$

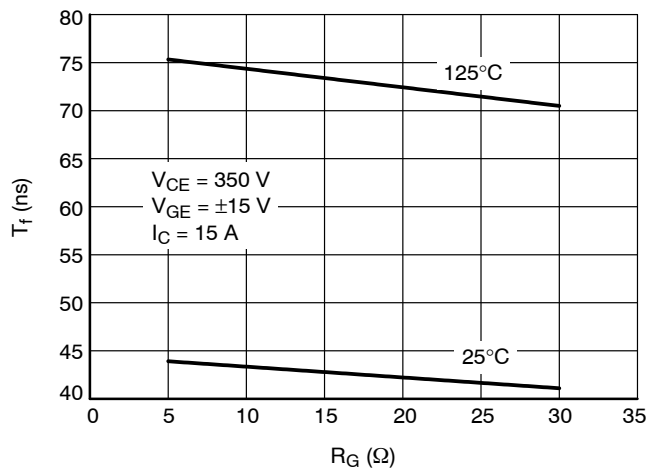


Figure 55. Typical Switching Time  $T_f$  vs.  $R_G$

TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

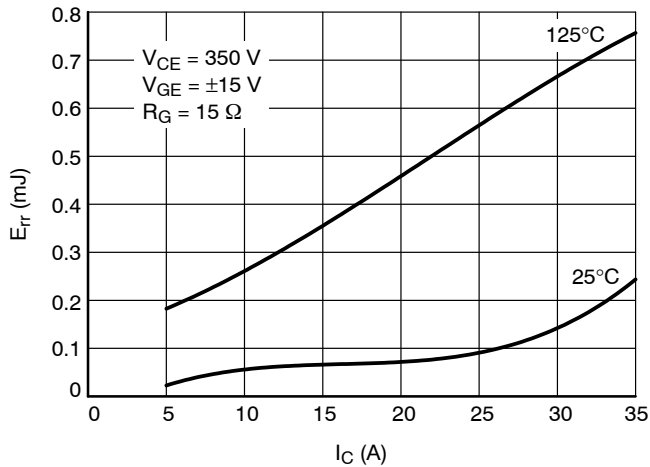


Figure 56. Typical Reverse Recovery Energy vs.  $I_C$

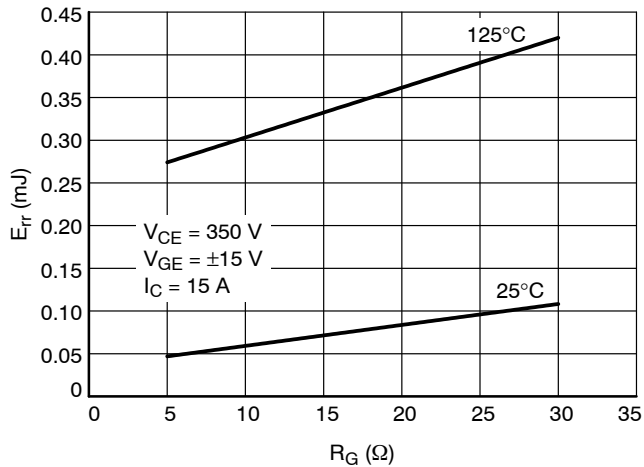


Figure 57. Typical Reverse Recovery Energy vs.  $R_G$

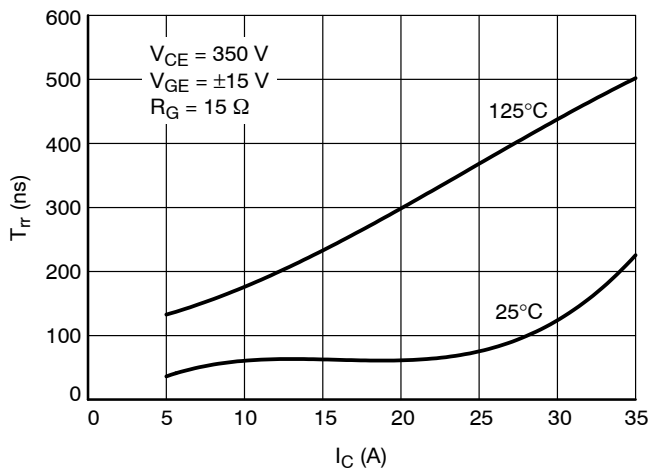


Figure 58. Typical Reverse Recovery Time vs.  $I_C$

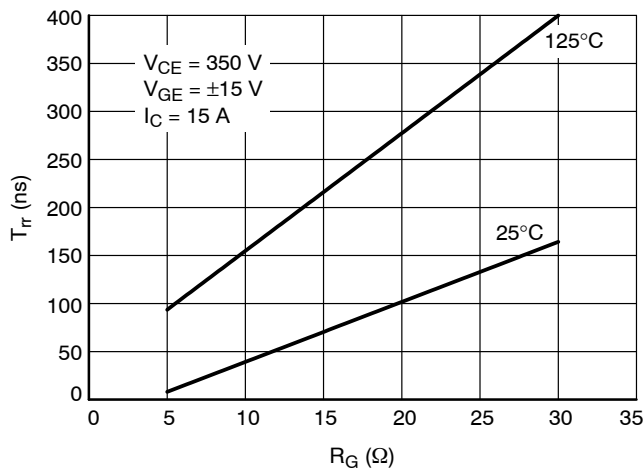


Figure 59. Typical Reverse Recovery Time vs.  $R_G$

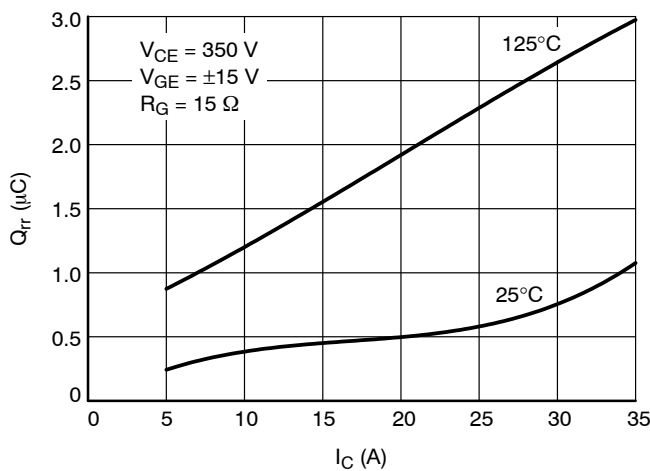


Figure 60. Typical Reverse Recovery Charge vs.  $I_C$

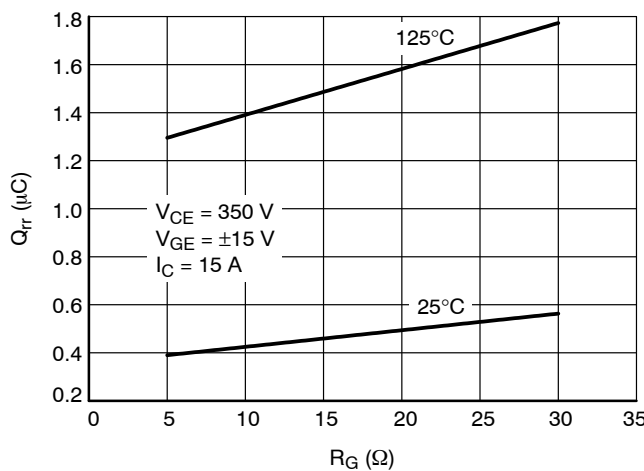


Figure 61. Typical Reverse Recovery Charge vs.  $R_G$

# NXH25T120L2Q1PG

## TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

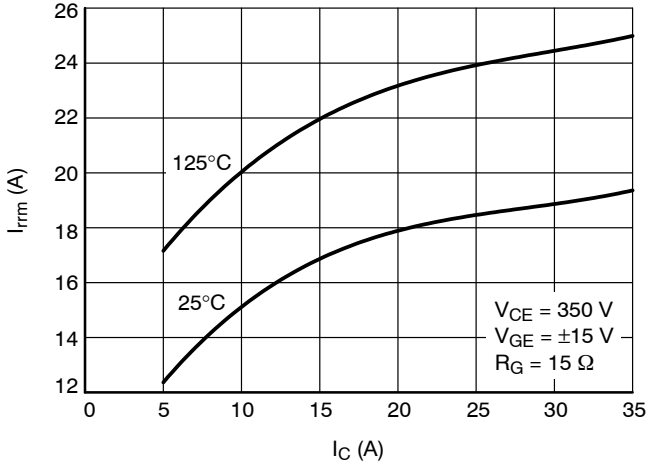


Figure 62. Typical Reverse Recovery Current vs.  $I_C$

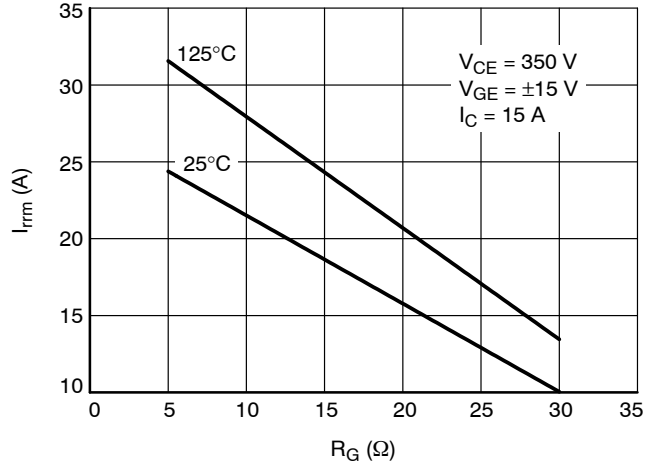


Figure 63. Typical Reverse Recovery Current vs.  $R_G$

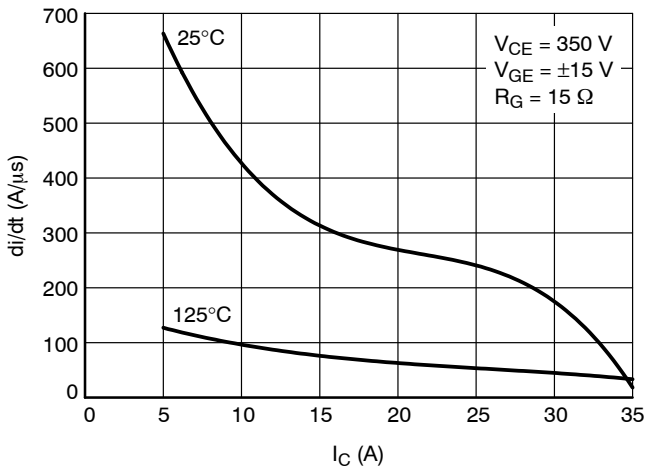


Figure 64. Typical  $di/dt$  vs.  $I_C$

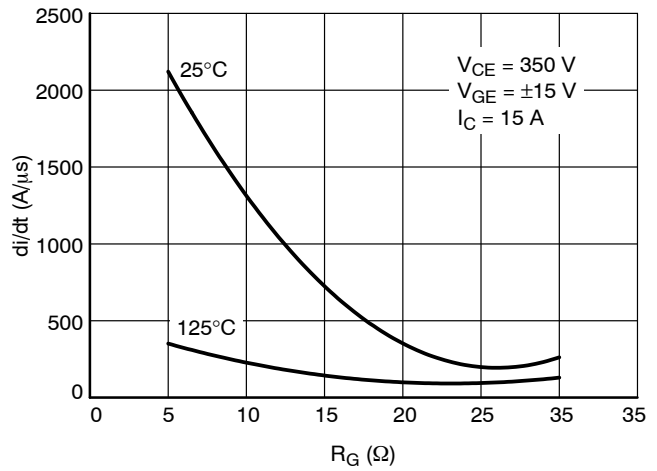


Figure 65. Typical  $di/dt$  vs.  $R_G$

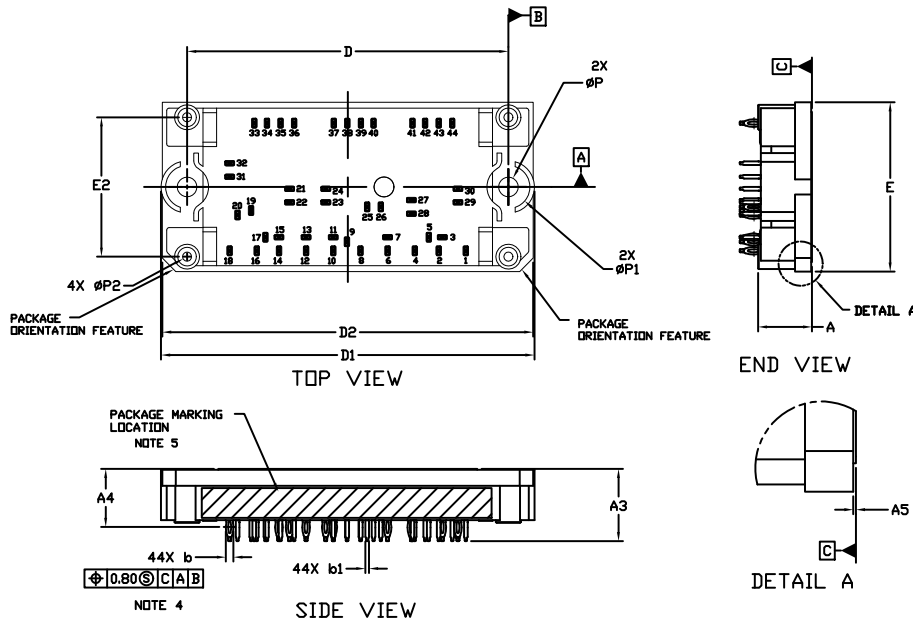
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®



PIM44, 71x37.4  
CASE 180AS  
ISSUE 0

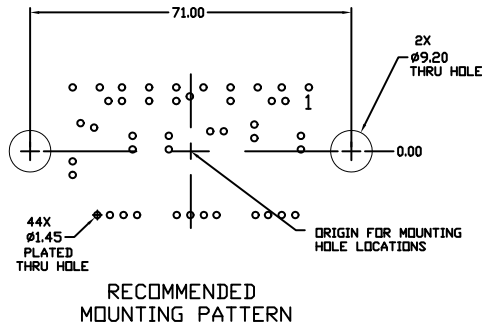
DATE 25 JUN 2018



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.	NDM.	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:

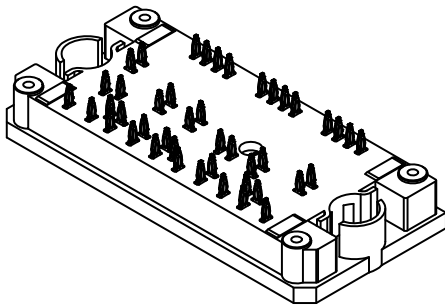
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
- CONTROLLING DIMENSION: MILLIMETERS
- DIMENSIONS b AND b1 APPLY TO THE PLATED TERMINALS AND ARE MEASURED AT DIMENSION A4.
- POSITION OF THE CENTER OF THE TERMINALS IS DETERMINED FROM DATUM B THE CENTER OF DIMENSION D, X DIRECTION, AND FROM DATUM 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.

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DESCRIPTION:	PIM44, 71x37.4	PAGE 1 OF 2

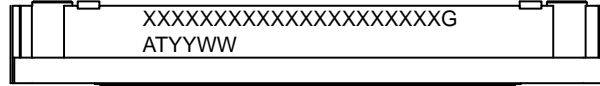
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**PIM44, 71x37.4**  
**CASE 180AS**  
**ISSUE 0**

DATE 15 JUN 2018




**GENERIC  
MARKING DIAGRAM\***



XXXXX = Specific Device Code  
G = Pb-Free Package  
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>PIM44, 71x37.4</b>	<b>PAGE 2 OF 2</b>

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