

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

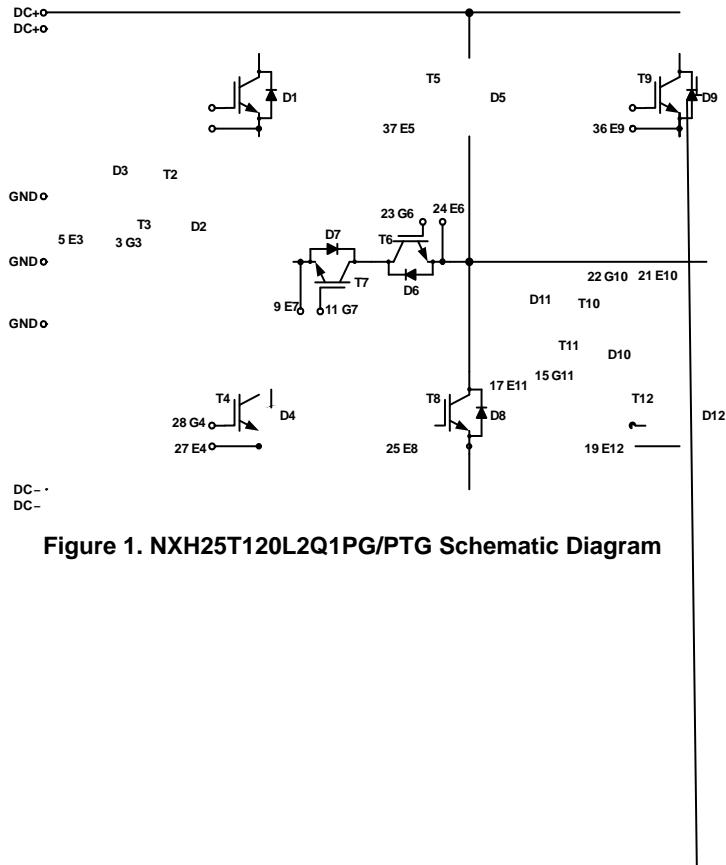


Figure 1. NXH25T120L2Q1PG/PTG Schematic Diagram

NXH25T120L2Q1PG

Table 1. MAXIMUM RATINGS (Note 1)

Rating	Symbol	Value	Unit
HALF BRIDGE IGBT			
Collector–Emitter Voltage	V_{CES}	1200	V
Gate–Emitter Voltage	V_{GE}	± 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	μs
Minimum Operating Junction Temperature	T_{JMIN}	-40	$^\circ\text{C}$
Maximum Operating Junction Temperature	T_{JMAX}	150	$^\circ\text{C}$
NEUTRAL POINT IGBT			
Collector–Emitter Voltage	V_{CES}	650	V
Gate–Emitter Voltage	V_{GE}	± 20	

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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
NEUTRAL POINT IGBT CHARACTERISTICS						
Collector–Emitter Cutoff Current	$V_{GE} = 0\text{ V}, V_{CE} = 650\text{ V}$	I_{CES}	–	–	200	μA
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	–	μJ
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	415.364	ref 43	461.764	90707 15.364 r446.343 47
Turn–off Delay Time		$t_{d(off)}$	–	138	–	
Fall Time		t_f	88375	8764 .9070947689	720 1ref5(43 461.764 .9070744665)Tj/(–4	

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

Parameter	Symbol	Min	Typ	Max	Unit
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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE

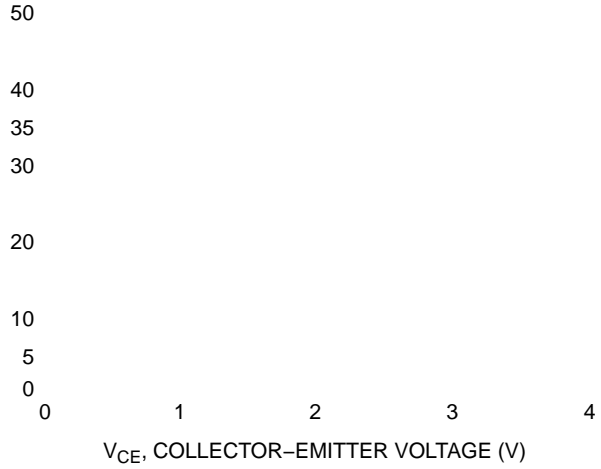


Figure 2. Typical Output Characteristics

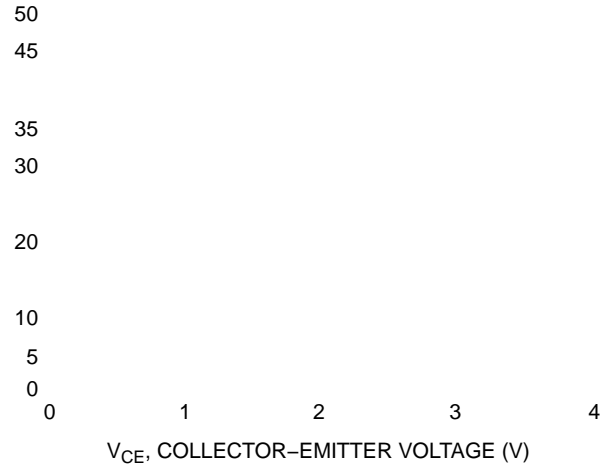


Figure 3. Typical Output Characteristics

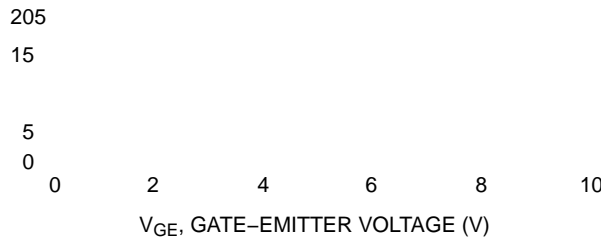


Figure 4. Typical Transfer Characteristics

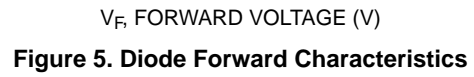
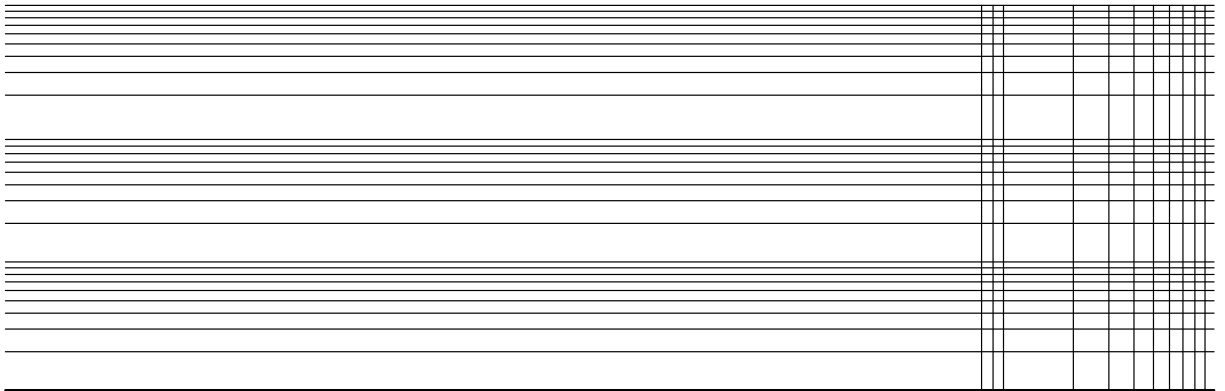
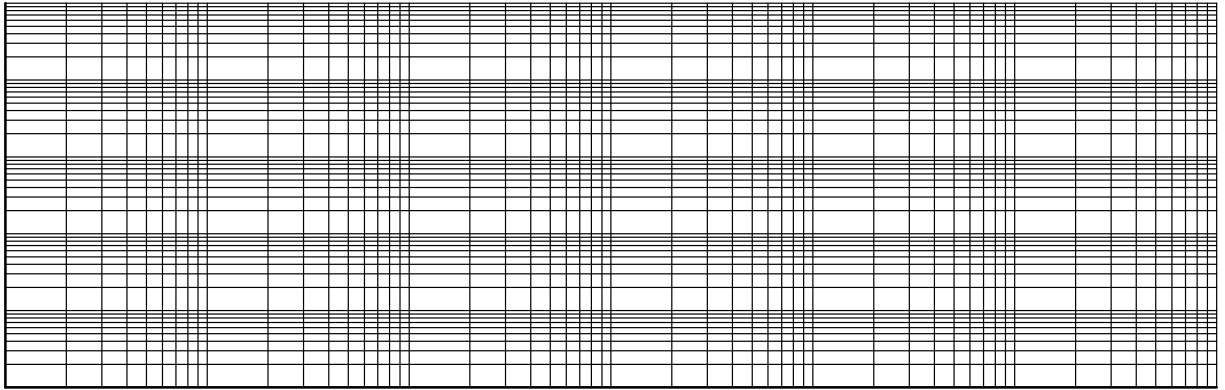


Figure 5. Diode Forward Characteristics

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE



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TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT AND DIODE

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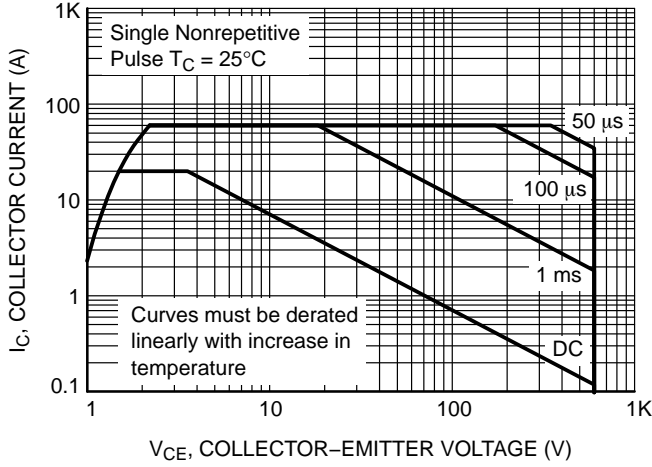


Figure 19. FBSOA

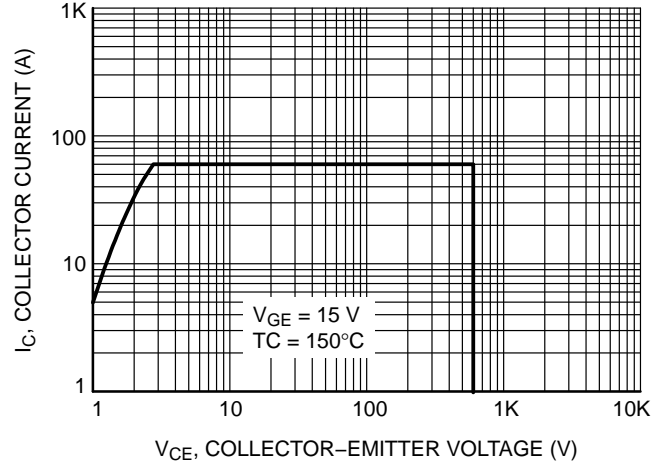


Figure 20. RBSOA

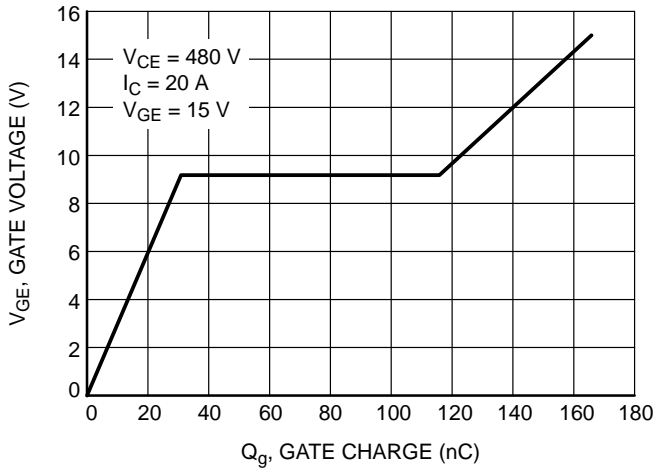
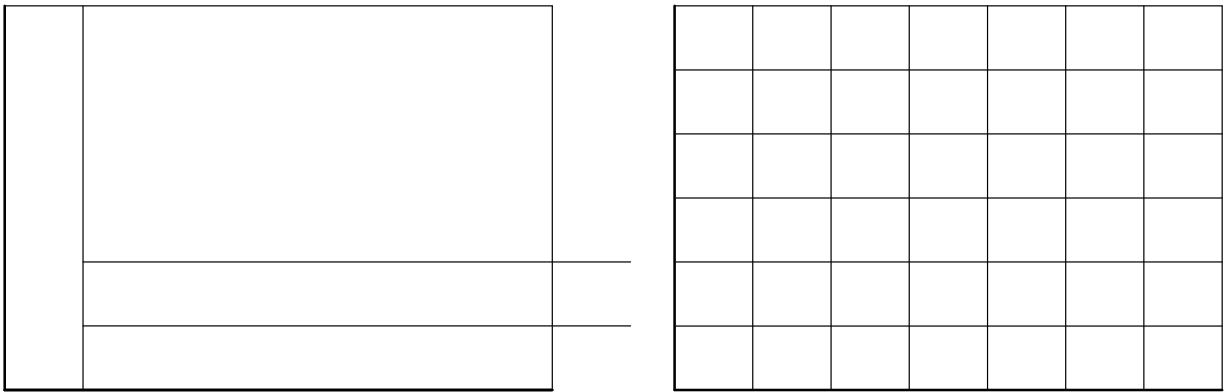


Figure 21. Gate Voltage vs. Gate Charge

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE



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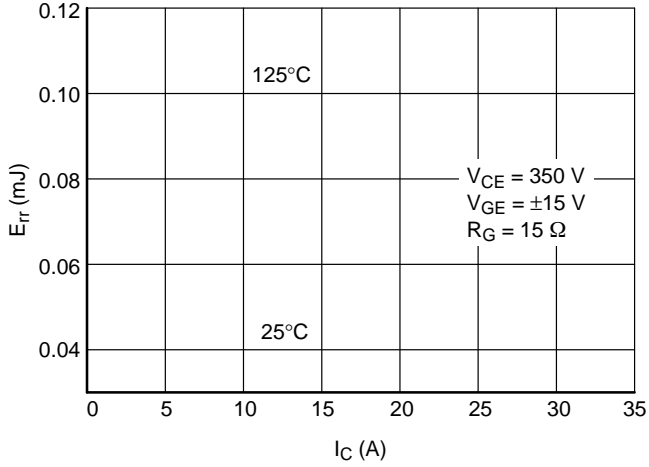


Figure 34. Typical Reverse Recovery Energy vs. I_C

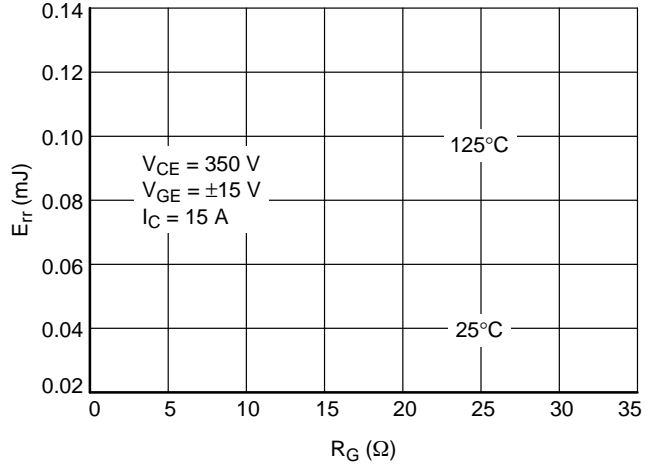


Figure 35. Typical Reverse Recovery Energy vs. R_G

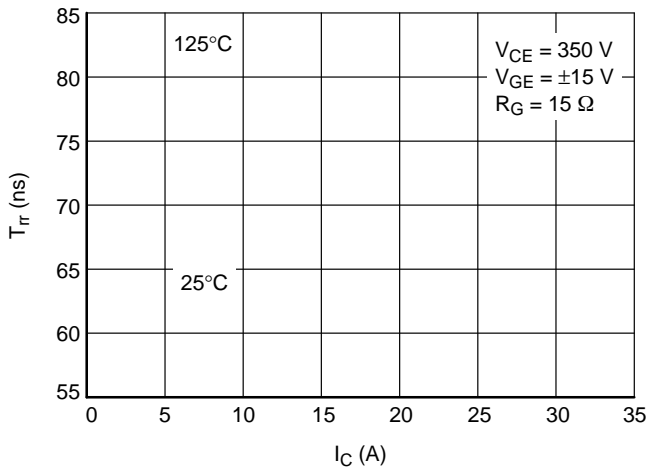


Figure 36. Typical Reverse Recovery Time vs. I_C

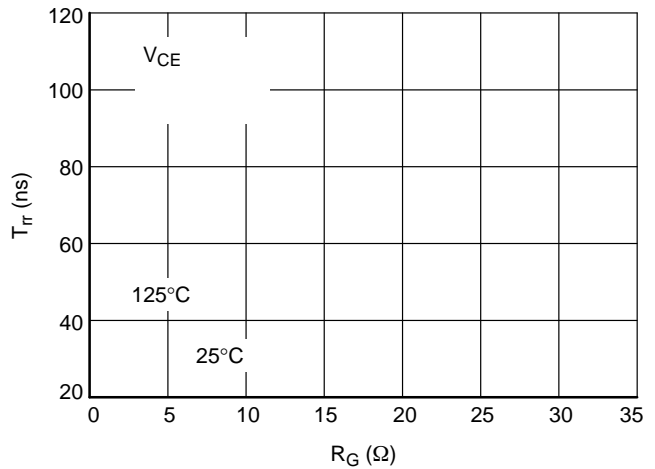


Figure 37. Typical Reverse Recovery Time vs. R_G

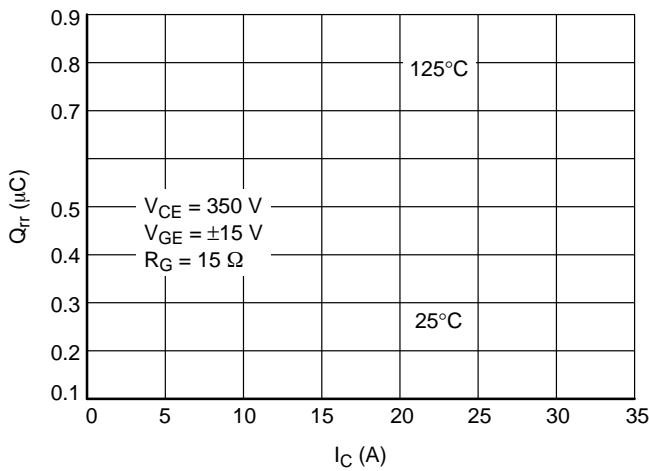


Figure 38. Typical Reverse Recovery Charge vs. I_C

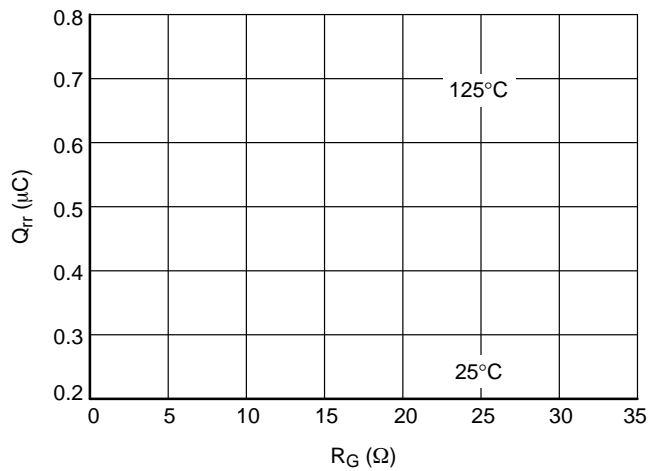


Figure 39. Typical Reverse Recovery Charge vs. R_G

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TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

I_C (A)

Figure 40. Typical Reverse Recovery Current
vs. I_C

R_G

Figure 41. Typical Reverse Recovery Current
vs. R_G

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TYPICAL CHARACTERISTICS –

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TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

0.8	0.45
0.7	0.40
0.6	0.35
0.5	0.25
0.4	0.20
	0.15
0.2	
0.1	0.05
0	0

I_C (A)
Figure 56. Typical Reverse Recovery Energy vs. I_C

R_G (Ω)
Figure 57. Typical Reverse Recovery Energy vs. R_G

600	400
500	350
400	300
300	250
200	200
100	150
	50
0	0

I_C (A)
Figure 58. Typical Reverse Recovery Time vs. I_C

R_G (Ω)
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

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TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

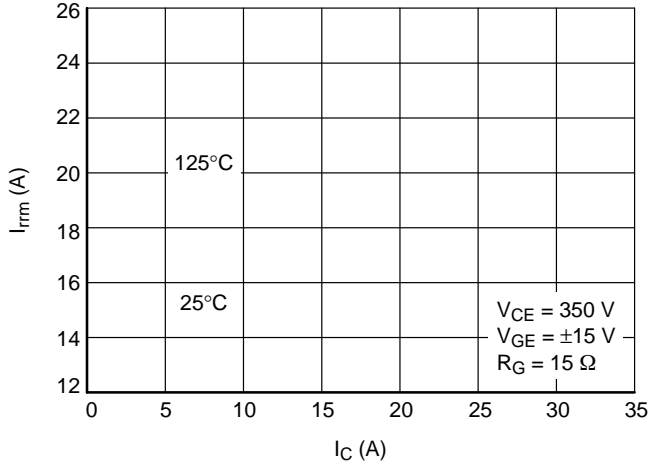


Figure 62. Typical Reverse Recovery Current vs. I_C

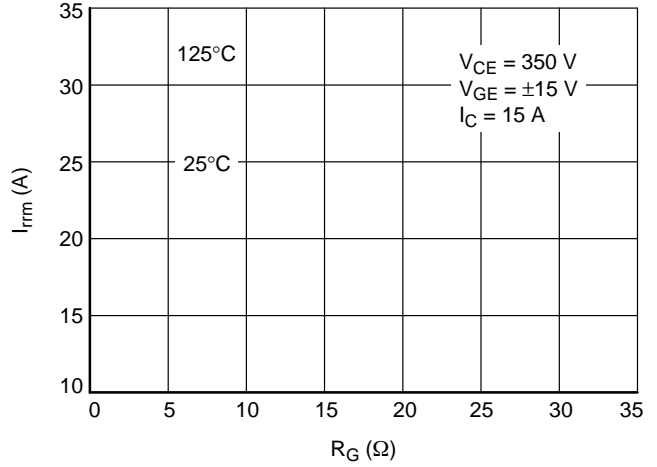


Figure 63. Typical Reverse Recovery Current vs. R_G

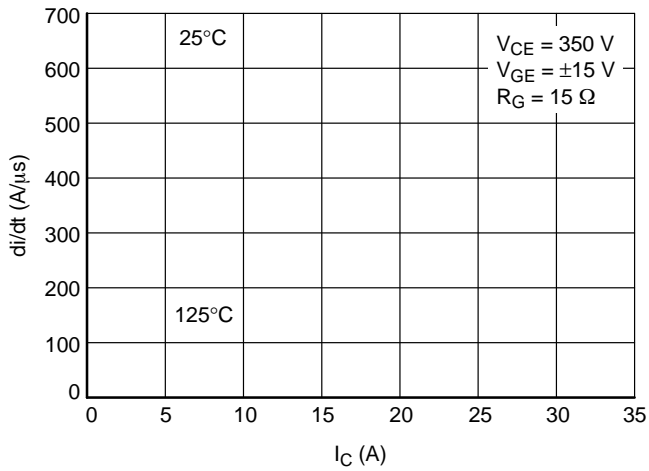


Figure 64. Typical di/dt vs. I_C

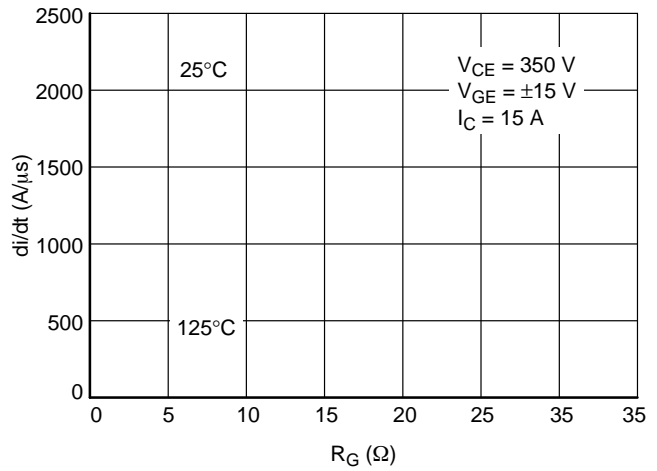
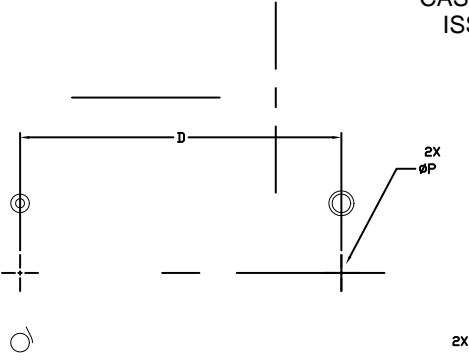


Figure 65. Typical di/dt vs. R_G

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

DATE 25 JUN 2018



TOP VIEW

TERMINALS AND AP_{RES.}



PIM44, 71x37.4
CASE 180AS
ISSUE O

DATE 15 JUN 2018

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