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

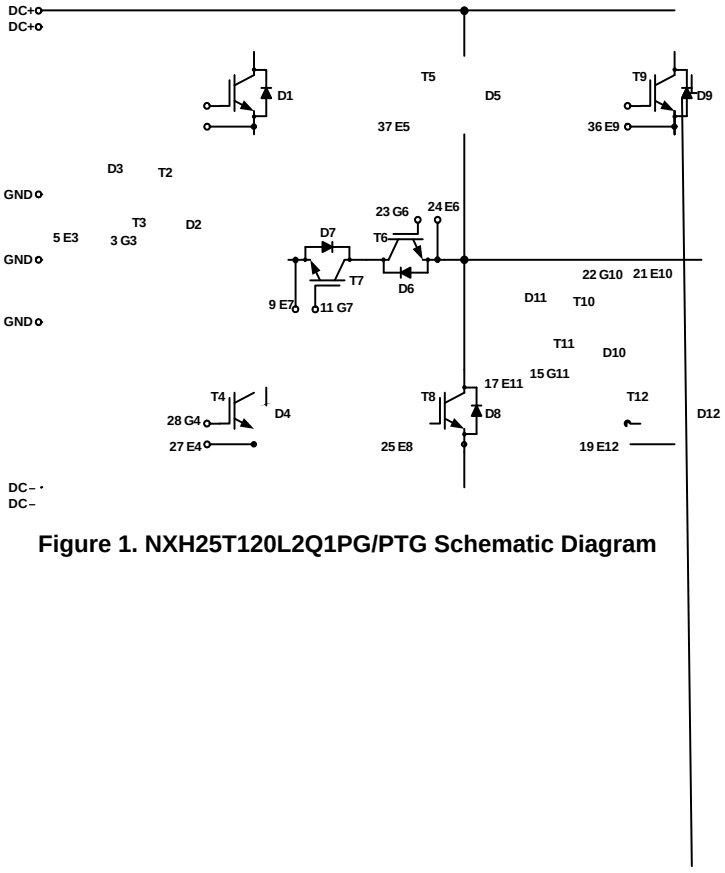


Figure 1. NXH25T120L2Q1PG/PTG Schematic Diagram

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°C (T_J = 175°C)	I_C	25	A
Pulsed Collector Current (T_J = 175°C)	I_{Cpulse}	75	A
Maximum Power Dissipation (T_J = 175°C)	P_{tot}	81	W
Short Circuit Withstand Time @ V_{GE} = 15 V, V_{CE} = 600 V, $T_J \leq$ 150°C	T_{sc}	5	μs
Minimum Operating Junction Temperature	T_{JMIN}	−40	°C
Maximum Operating Junction Temperature	T_{JMAX}	150	°C
NEUTRAL POINT IGBT			
Collector−Emitter Voltage	V_{CES}	650	V
Gate−Emitter Voltage	V_{GE}	±20	

Table 3. ELECTRICAL CHARACTERISTICS T_J = 25°C unless otherwise noted

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
NEUTRAL POINT IGBT CHARACTERISTICS						
Collector−Emitter Cutoff Current	V_{GE} = 0 V, V_{CE} = 650 V	I_{CES}	–	–	200	μA
Collector−Emitter Saturation Voltage	V_{GE} = 15 V, I_C = 20 A, T_J = 25°C	$V_{CE(sat)}$	–	1.49	–	V
	V_{GE} = 15 V, I_C = 20 A, T_J = 125°C		–	1.61	–	
Gate−Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C = 1.65 mA	$V_{GE(TH)}$	4.70	5.68	6.50	V
Gate Leakage Current	V_{GE} = 20 V, V_{CE} = 0 V	I_{GES}	–	–	200	nA
Turn−on Delay Time	T_J = 25°C V_{CE} = 350 V, I_C = 15 A V_{GE} = ±15V, R_G = 15 Ω	$t_{d(on)}$	–	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°C V_{CE} = 350 V, I_C = 15 A V_{GE} = ±15 V, R_G = 15 Ω	$t_{d(on)}$	–	31	–	ns
Rise Time		t_r	–	19	–	
Turn−off Delay Time		$t_{d(off)}$	–	138	–	
Fall Time		t_f	–	29	–	
Turn off Switching Loss per Pulse		E_{off}	–	220	–	

Table 3. ELECTRICAL CHARACTERISTICS T_J = 25°C unless otherwise noted

Parameter	Symbol	Min	Typ	Max	Unit

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE

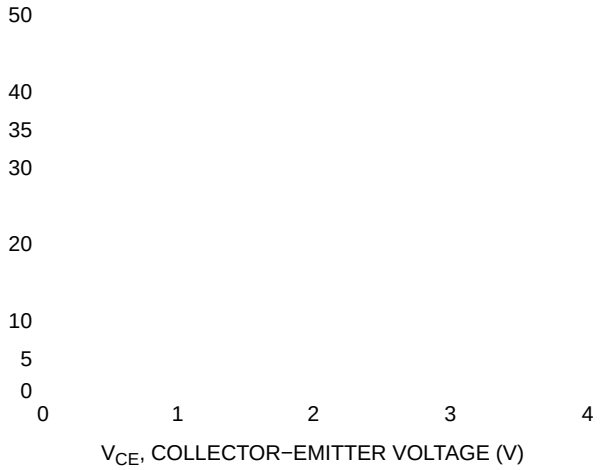


Figure 2. Typical Output Characteristics

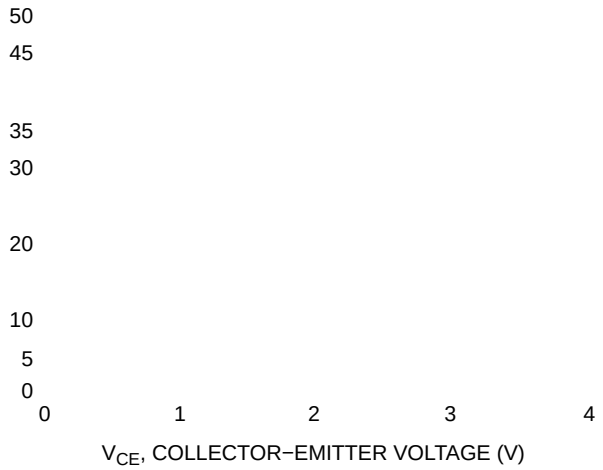


Figure 3. Typical Output Characteristics

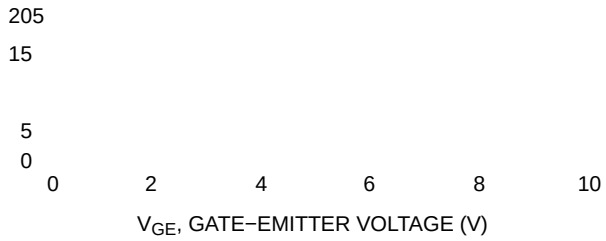
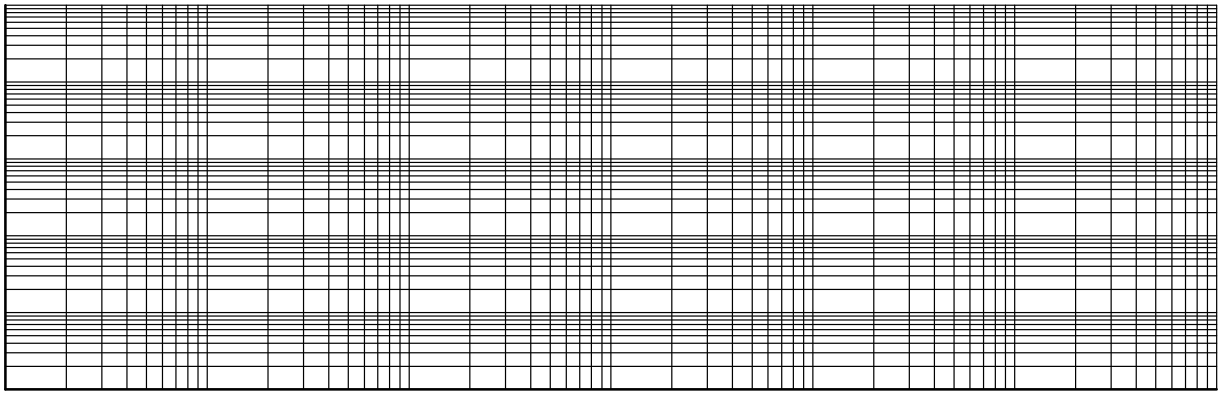
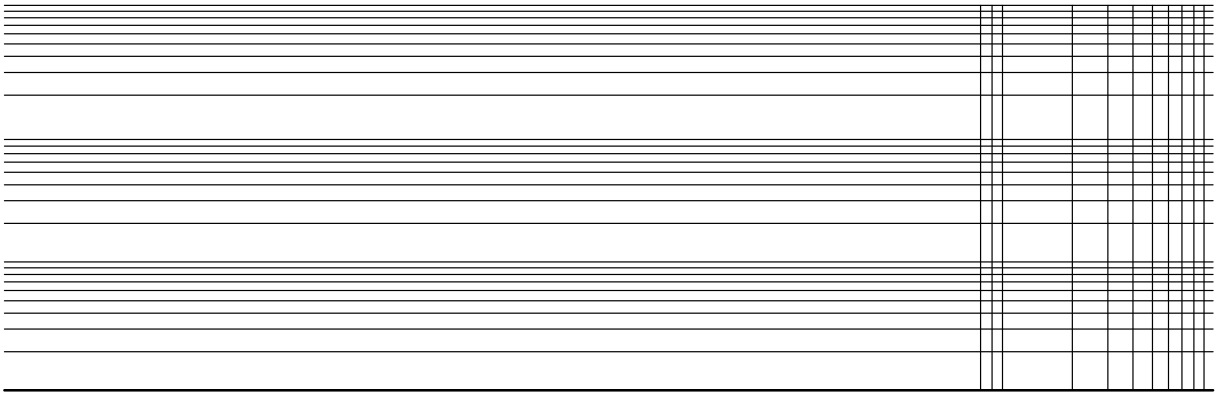


Figure 4. Typical Transfer Characteristics

Figure 5. Diode Forward Characteristics

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT AND DIODE





TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT AND DIODE

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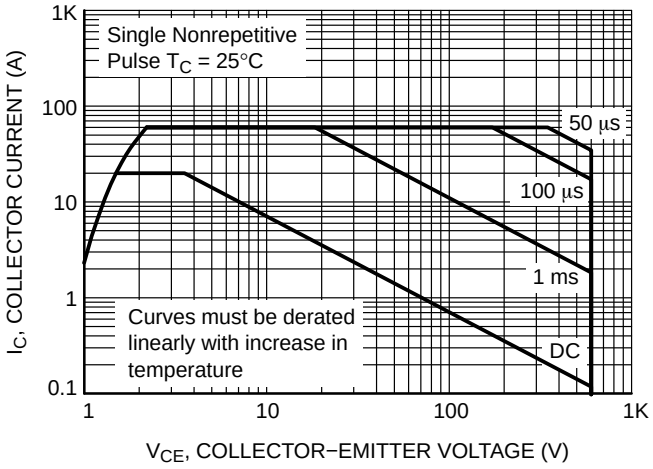


Figure 19. FBSOA

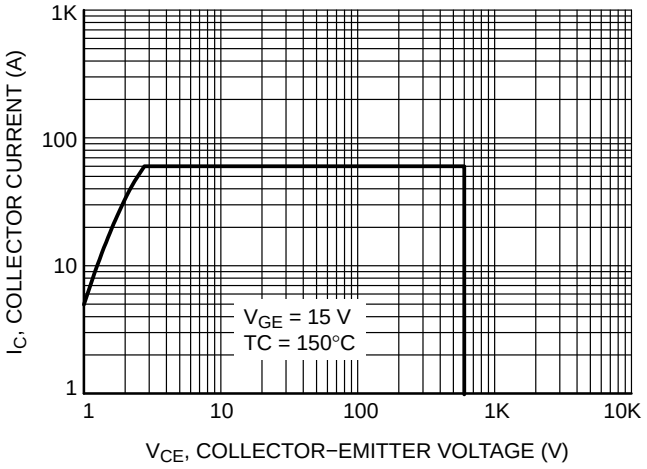


Figure 20. RBSOA

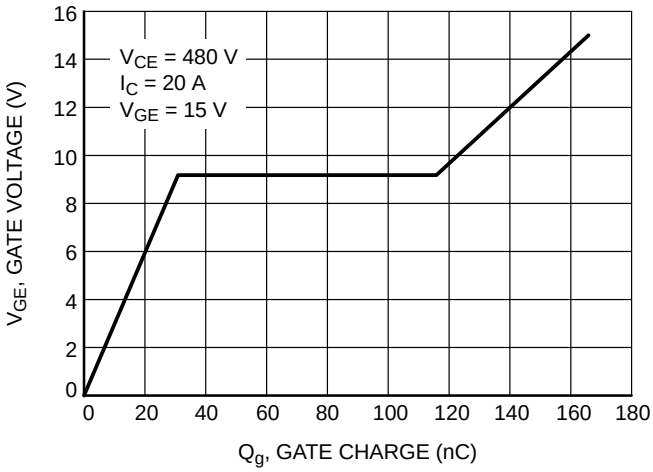
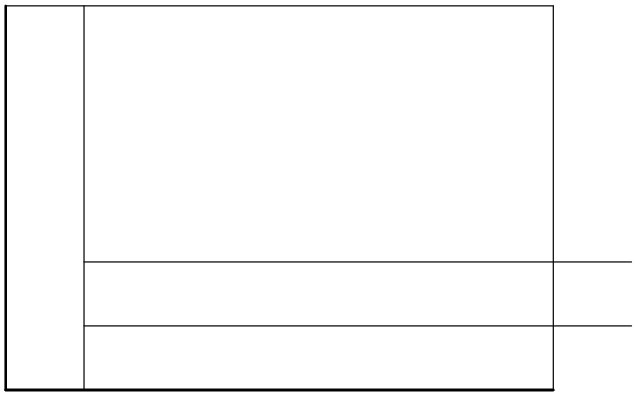
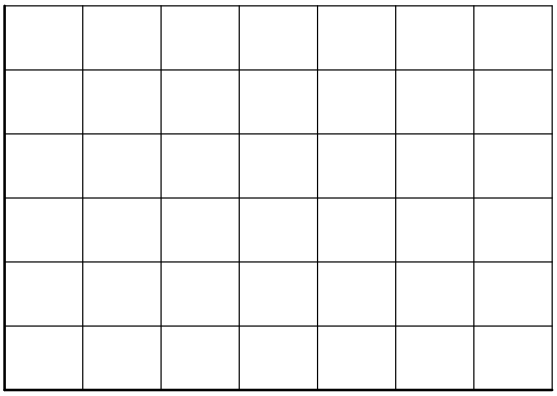


Figure 21. Gate Voltage vs. Gate Charge

TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE





TYPICAL CHARACTERISTICS – HALF BRIDGE IGBT COMUTATES NEUTRAL POINT DIODE

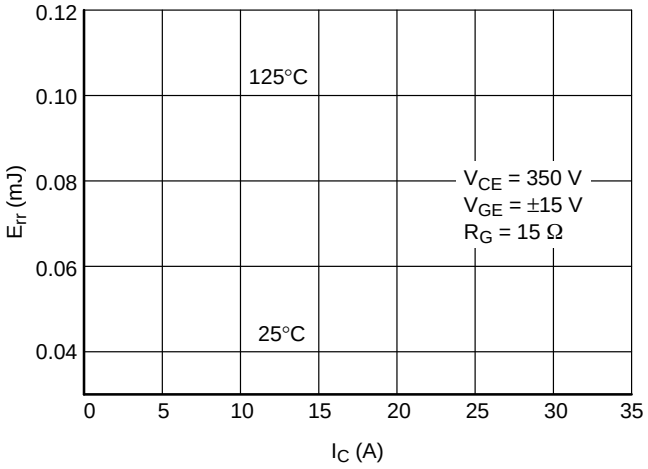


Figure 34. Typical Reverse Recovery Energy vs. I_C

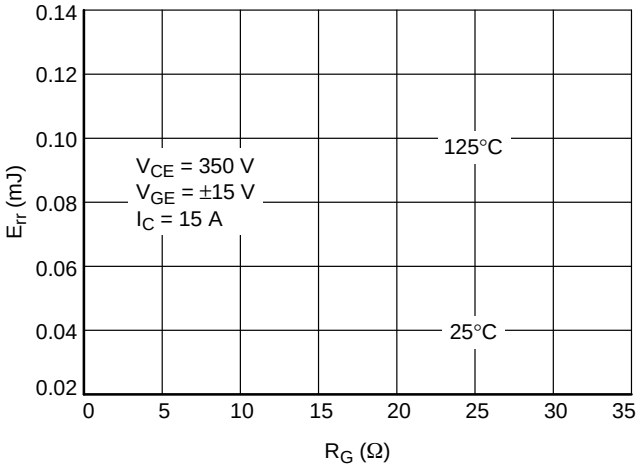


Figure 35. Typical Reverse Recovery Energy vs. R_G

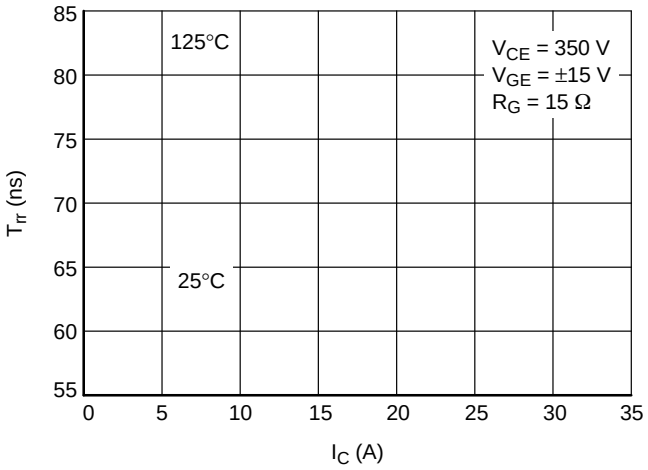


Figure 36. Typical Reverse Recovery Time vs. I_C

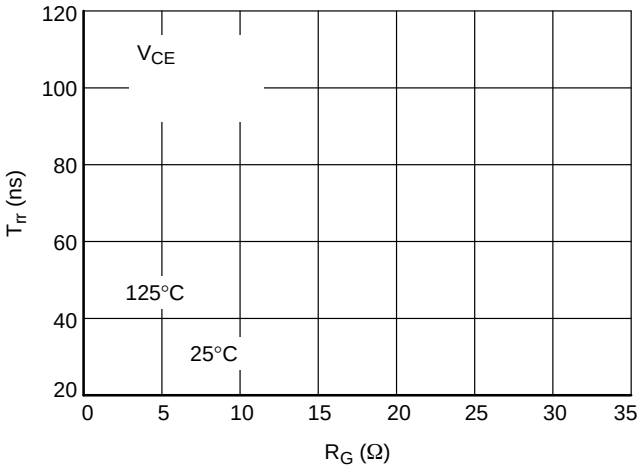


Figure 37. Typical Reverse Recovery Time vs. R_G

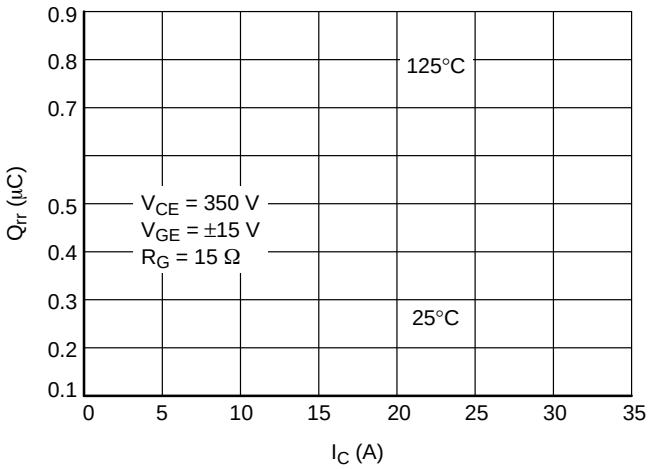


Figure 38. Typical Reverse Recovery Charge vs. I_C

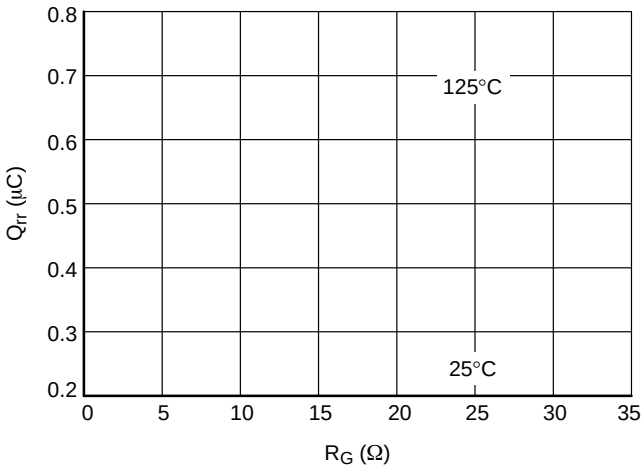


Figure 39. Typical Reverse Recovery Charge vs. R_G

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

TYPICAL CHARACTERISTICS –

TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

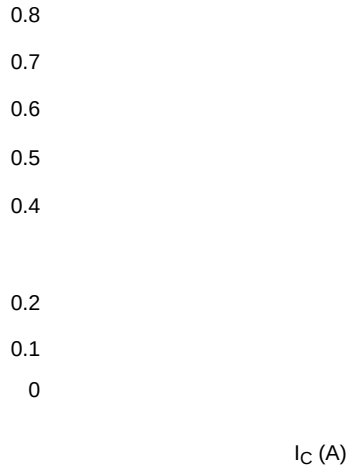


Figure 56. Typical Reverse Recovery Energy vs. I_C

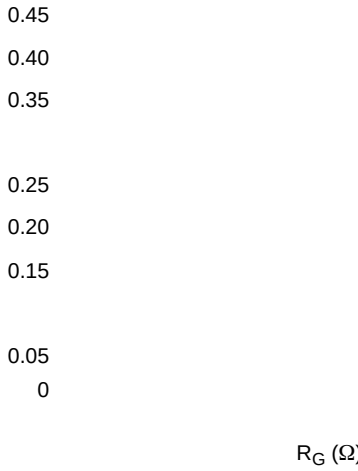


Figure 57. Typical Reverse Recovery Energy vs. R_G

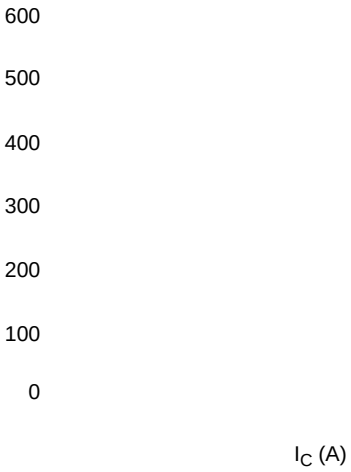


Figure 58. Typical Reverse Recovery Time vs. I_C

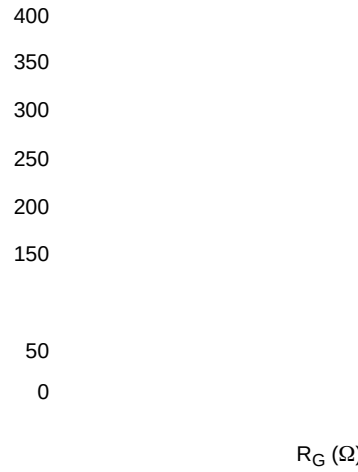


Figure 59. Typical Reverse Recovery Time vs. R_G

Figure 60. Typical Reverse Recovery Charge vs. I_C

Figure 61. Typical Reverse Recovery Charge vs. R_G

TYPICAL CHARACTERISTICS – NEUTRAL POINT IGBT COMUTATES HALF BRIDGE DIODE

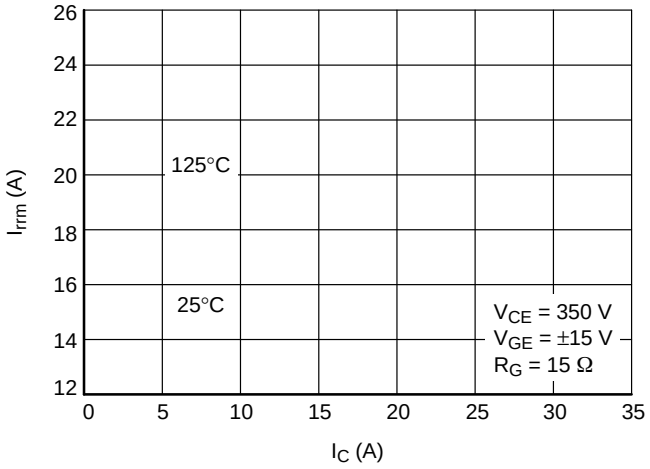


Figure 62. Typical Reverse Recovery Current vs. I_C

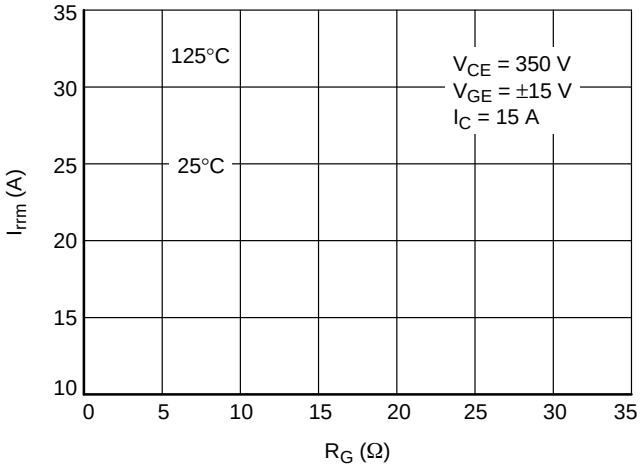


Figure 63. Typical Reverse Recovery Current vs. R_G

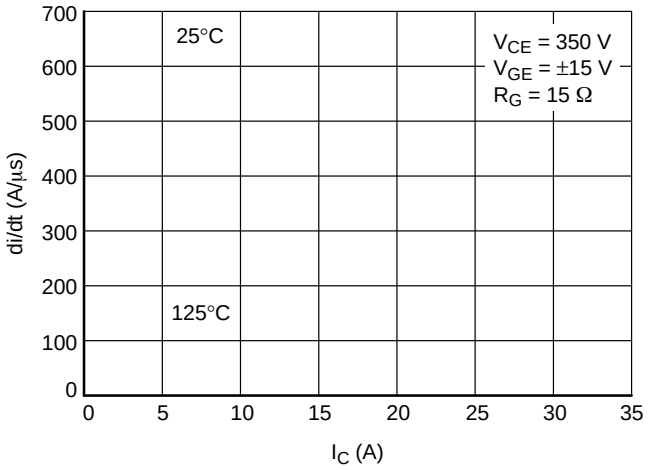


Figure 64. Typical di/dt vs. I_C

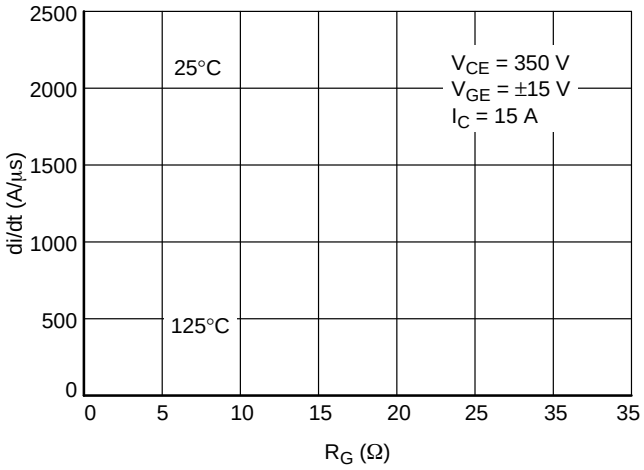


Figure 65. Typical di/dt vs. R_G

PIM44, 71x37.4 (PRESSFIT PINS)

CASE 180AS

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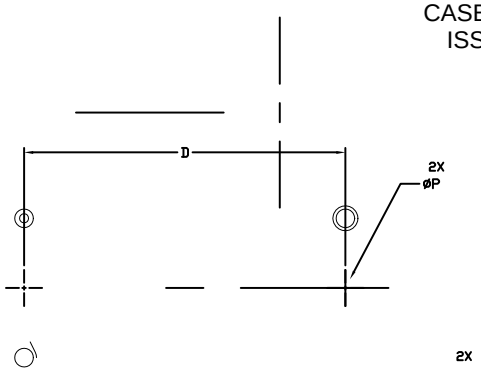
DATE 25 JUN 2018



TOP VIEW

TERMINALS AND AP$_{RES.}$