Silicon Trench NPT IGBT

Description

The THG40T65NQH is use advanced trench NPT technology. The 650V trench NPT IGBT offers superior conduction and switching performances.

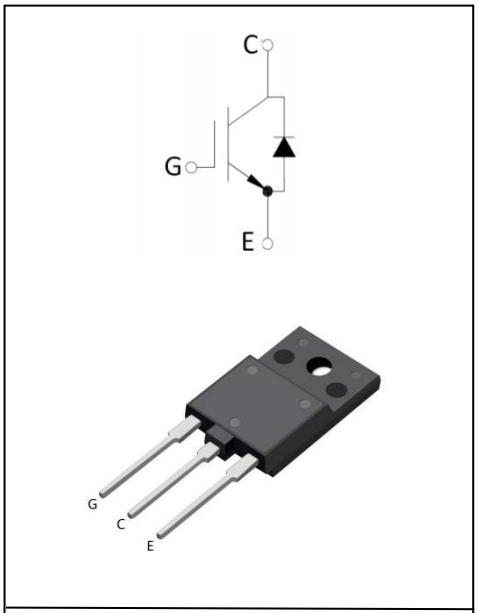
General Features

- 650V Breakdown Voltage
- Low saturation voltage:$V_{CE(sat)}$,typ=1.9V

  @I_C=40A and T_C=25℃
- Trench NPT Technology, Positive temperature coefficient

Application

- Driver Converters
- Welding Converters
- UPS



THUNDER TO-3PH

Electrical Characteristics @ Tc=25℃(unless otherwise specified)

a) Limited Parameters:

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	+/-20	V
I_C	Collector Current	80	A
	Collector Current @Tc=100℃	40	A
I_{CM}	Pulsed Collector Current	120	A
I_F	Diode Continuous Forward Current @Tc=100℃	40	A
I_{FM}	Pulsed Diode Forward Current	120	A
P_D	Total Dissipation at @Ta=25℃	187	W
	Total Dissipation at @Tc=100℃	93	
T_j	Operating Junction and Storage Temperature Range	-55 to +175	℃
T_L	Max Temperature For Soldering	260	℃
T_{SC}	Short circuit data VGE=15V, VCC ≤ 360V, Tvj=150°C	5	us

b) Electrical Parameters:

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{CES}	Collector-Emitter Voltage	V_{GE}=0V, I_{CE}=250μA	650			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=40A		1.9	2.3	V
$V_{GE(th)}$	Gated Threshold Voltage	V_{CE}= V_{GE}, I_C=1mA	4.8	5.7	6.6	V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=650V			5.0	uA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	V_{GE} = +20V,			250	nA
$I_{GES(R)}$	Gate to Emitter Reverse Leakage	V_{GE} = -20V,			-250	nA
C_{ies}	Input Capacitance	V_{GE}=0V, V_{CE}=30V, f=1.0MHZ		3070		pF
C_{oes}	Output Capacitance			123		pF
C_{res}	Reverse Transfer Capacitance			80		pF
Q_g	Total Gate Charge	V_{CE}=400V I_C=40A V_{GE}=15V		165		nC
Q_{ge}	Gate to Emitter Charge			15		nC
Q_{gc}	Gate to Collector Charge			96		nC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=400V,I_C=40A V_{GE}=15V,R_G=10Ω		42		nS
t_r	Rise Time			50		nS
$t_{d(off)}$	Turn-off Delay Time			207		nS
t_f	Fall Time			53		nS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_F	Diode Continuous Forward Current	TC=100℃	40			A
I_{FM}	Pulsed Diode Forward Current	TC=25℃	120			A
V_F	Diode Forward Voltage	I_F=40A		1.5	2.2	V
t_{rr}	Reverse Recovery Time	T_J25℃,I_F=40A di/dt=200A/us		120		nS
Q_{rr}	Reverse Recovery Charge			240		nC
*Pulse Test: Pulse Width <= 300μs, Duty Cycle< =2%						

Symbol	Paramter	Typ.	Max.	Unit
$R_{\theta JC}$	Themal Resistance,Junction to case for IGBT	--	0.8	℃/W
$R_{\theta JA}$	Themal Resistance,Junction to Ambient	--	40	℃/W

Typical Performance Characteristics

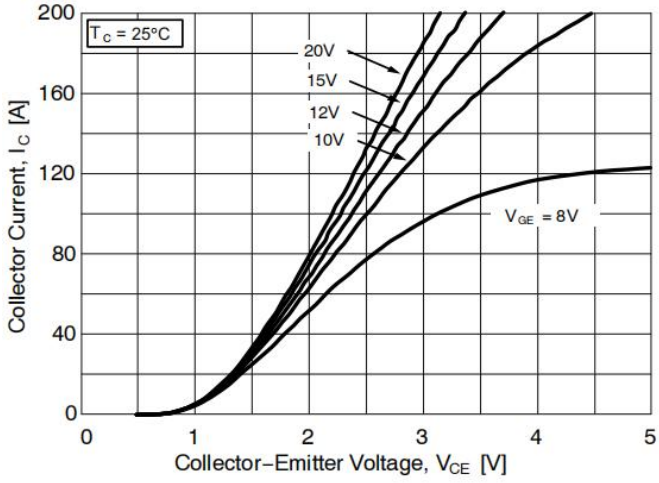


Figure 1. Typical Output Characteristics

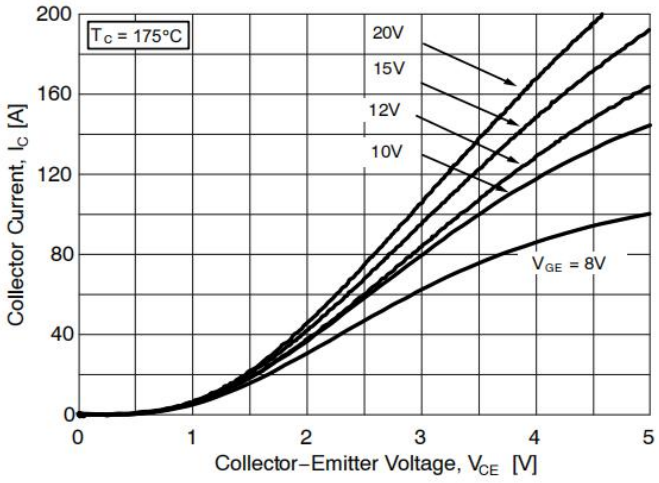


Figure 2. Typical Output Characteristics

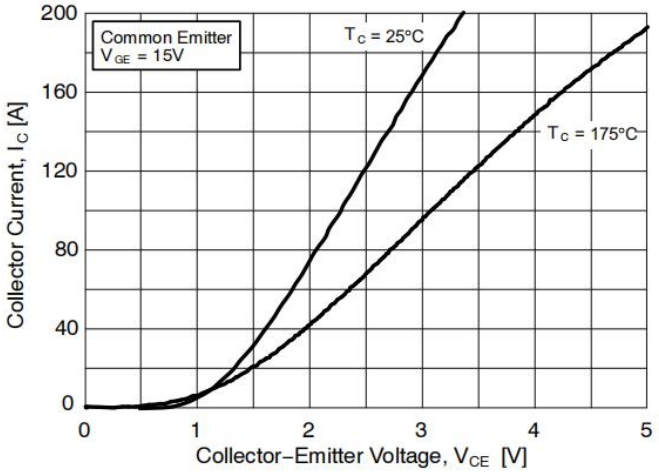


Figure 3. Typical Saturation Voltage

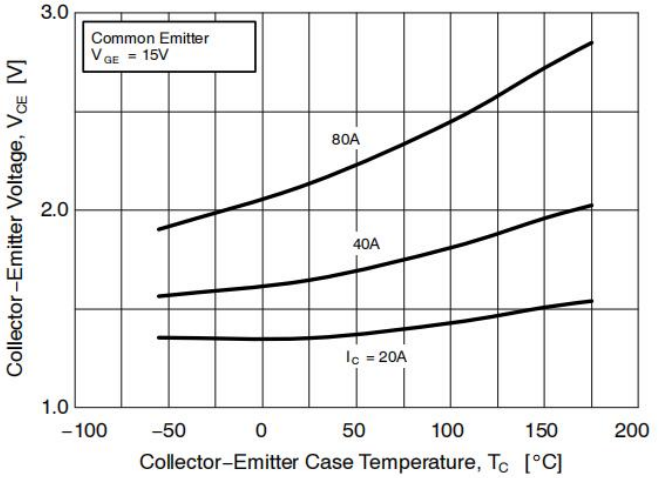


Figure 4. Saturation Voltage vs. Case Temperature

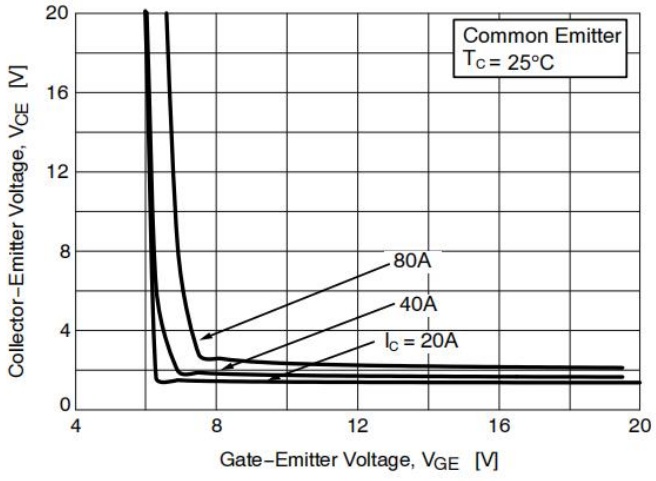


Figure 5. Saturation Voltage vs. V_{GE}

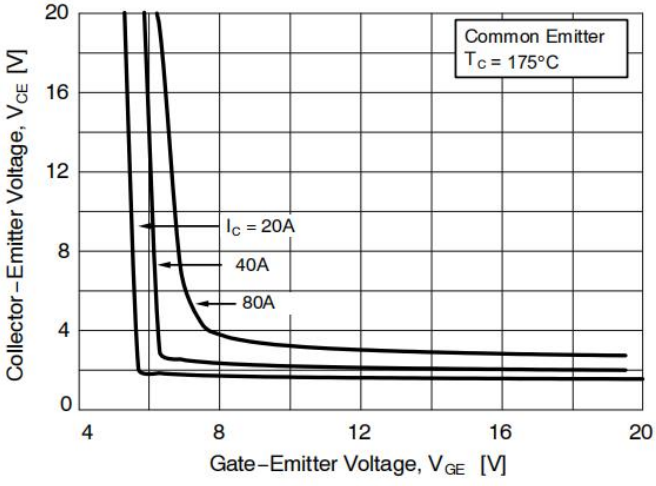


Figure 6. Saturation Voltage vs. V_{GE}

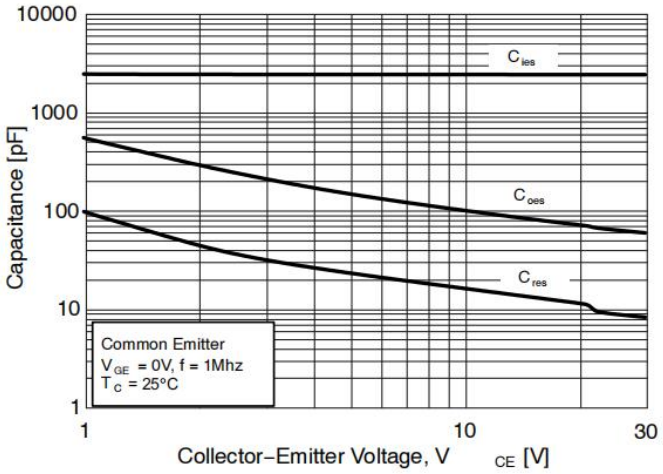


Figure 7. Capacitance Characteristics

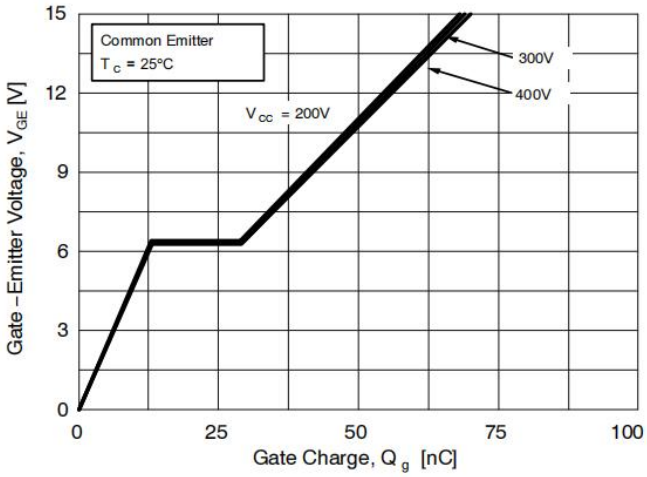


Figure 8. Gate Charge

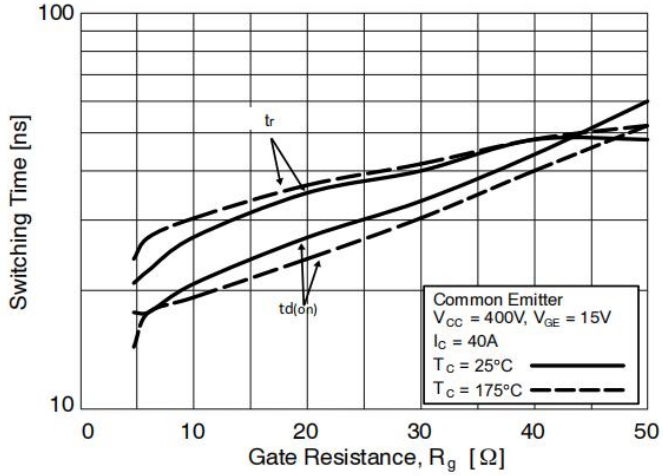


Figure 9. Turn–On Characteristics vs. Gate Resistance

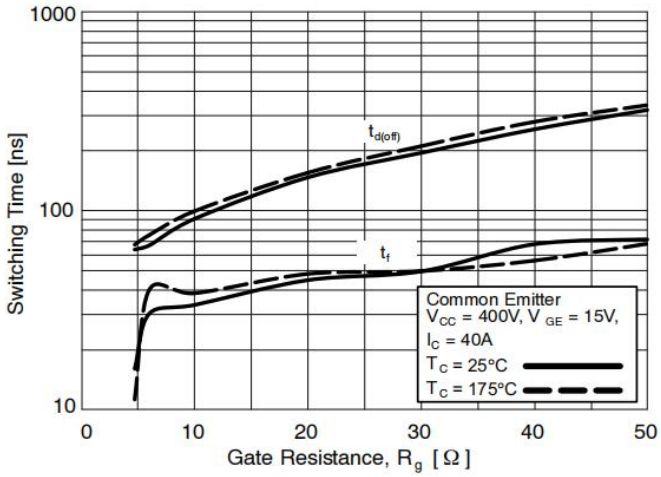


Figure 10. Turn–Off Characteristics vs. Gate Resistance

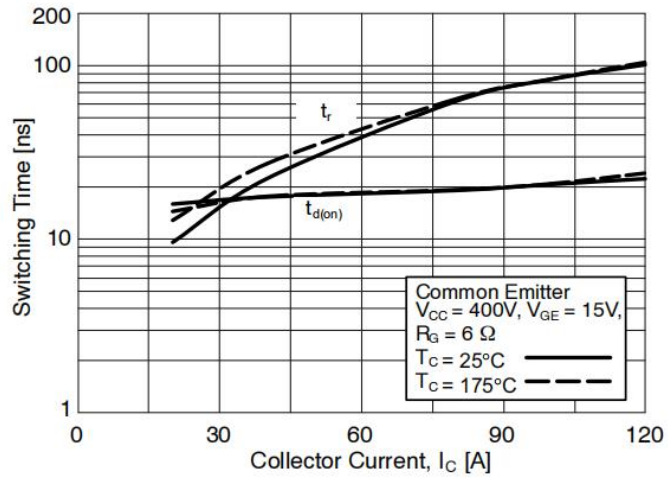


Figure 11. Turn–On Characteristics vs. Collector Current

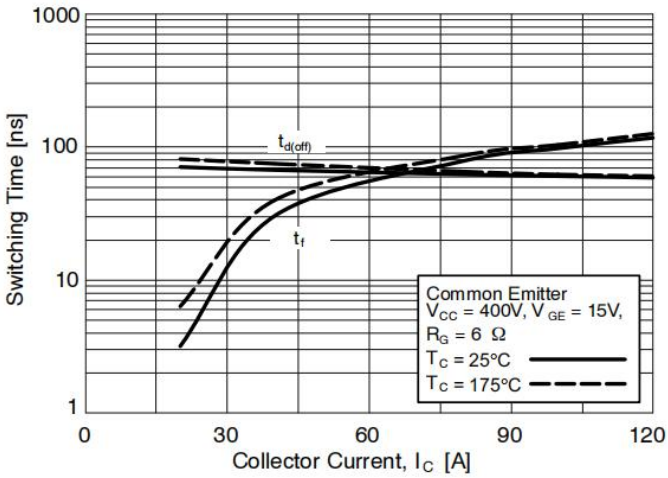


Figure 12. Turn–Off Characteristics vs. Collector Current

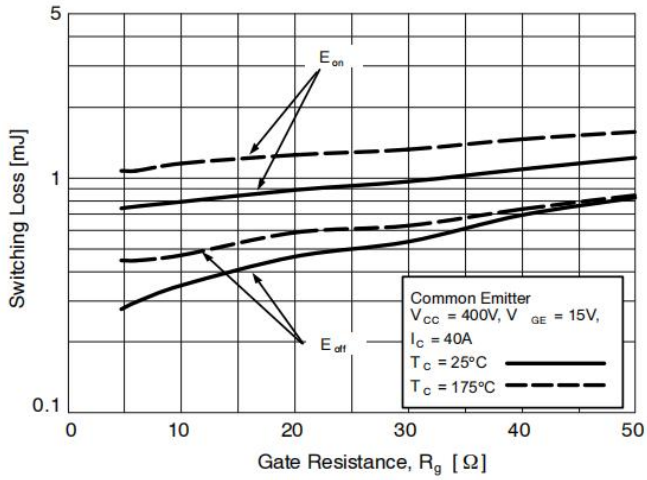


Figure 13. Switching Loss vs. Gate Resistance

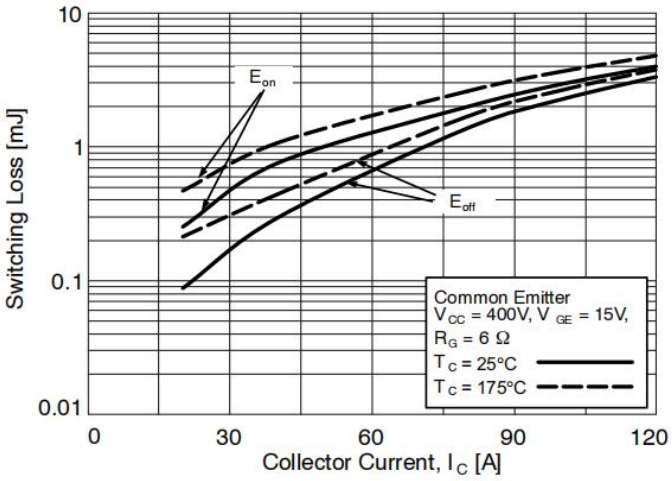


Figure 14. Switching Loss vs. Collector Current

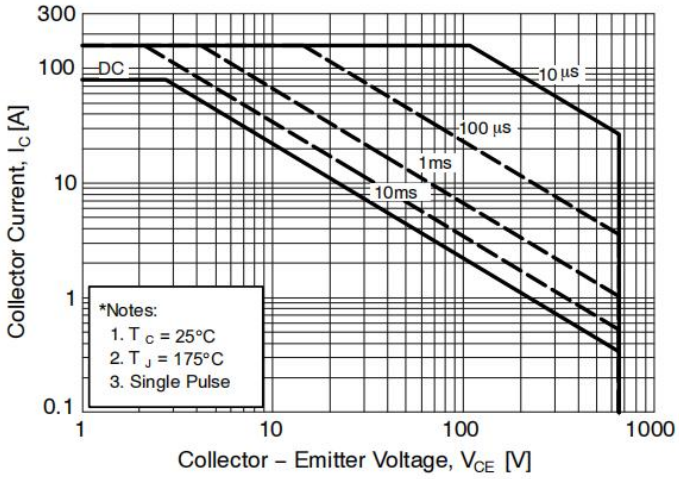


Figure 15. SOA Characteristics

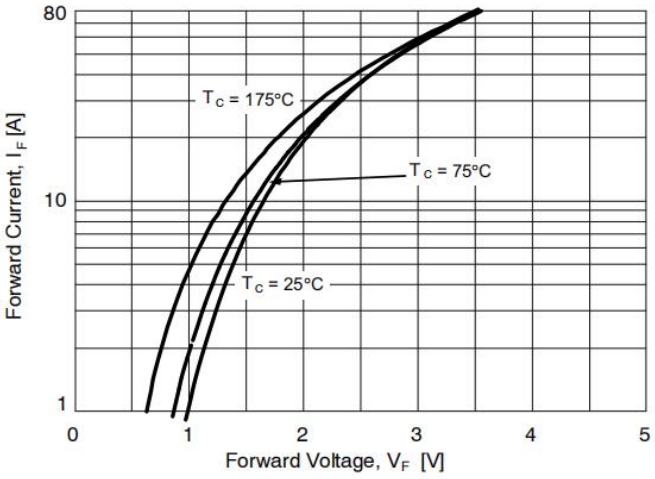


Figure 16. Forward Characteristics

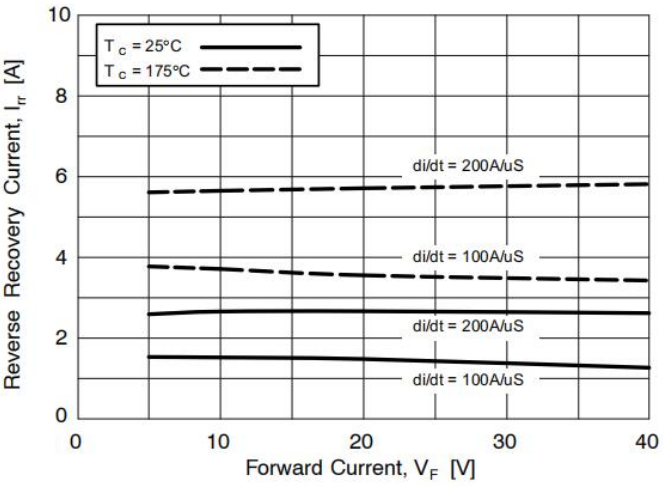


Figure 17. Reverse Recovery Current

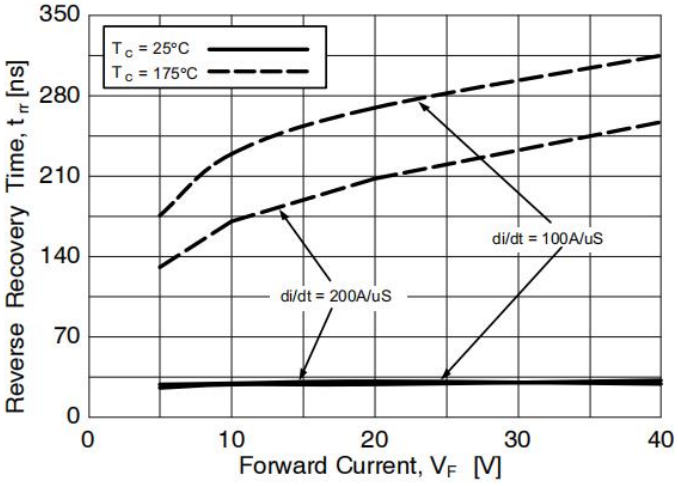


Figure 18. Reverse Recovery Time

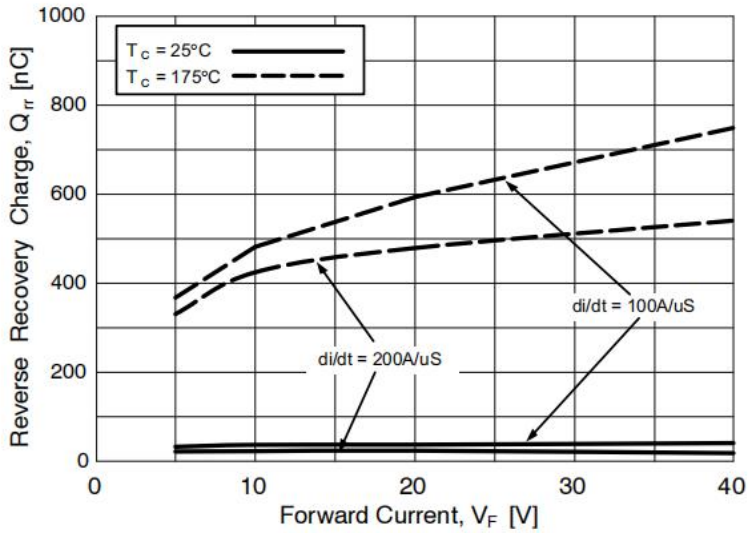


Figure 19. Stored Charge

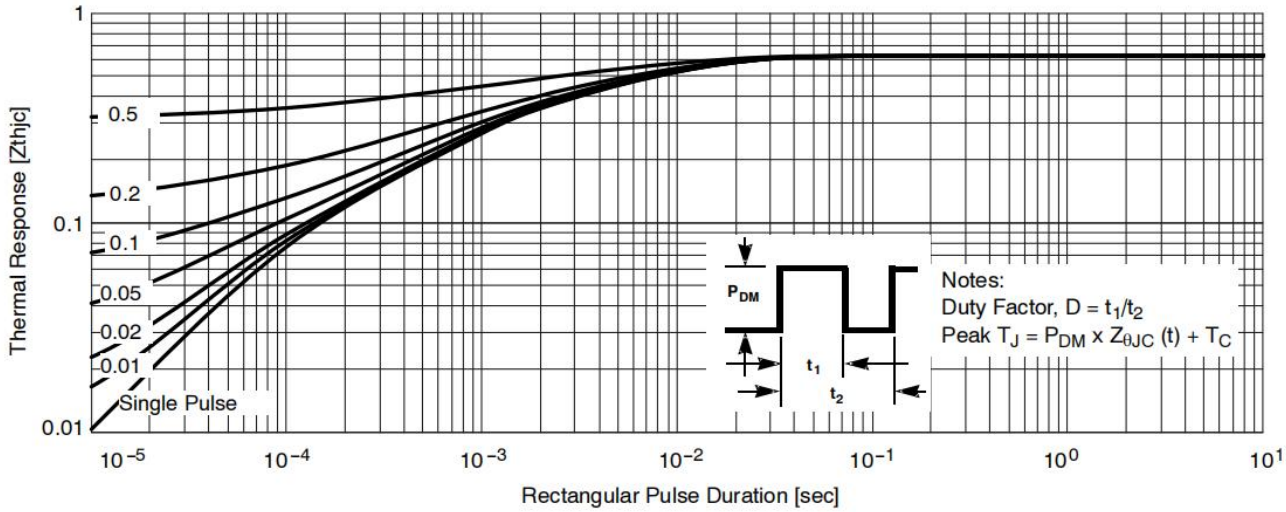


Figure 20. Transient Thermal Impedance of IGBT

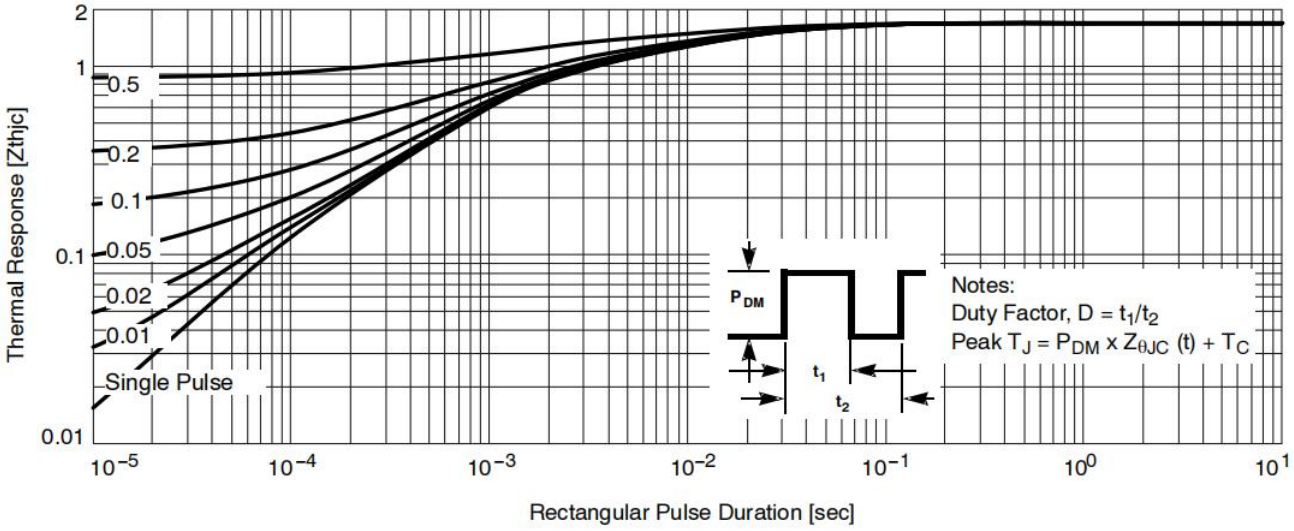
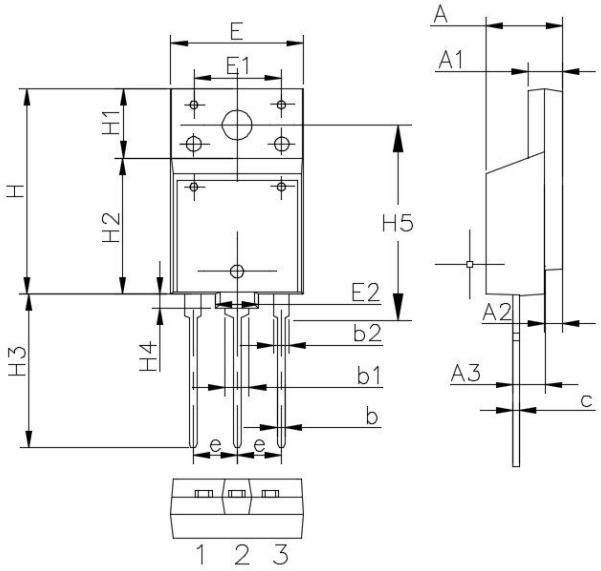


Figure 21. Transient Thermal Impedance of Diode

Package Information

TO-3PH PACKAGE



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	5.35	5.55	5.75
A1	2.80	3.00	3.20
A2	1.90	2.10	2.30
A3	1.00	1.20	1.40
b	0.80	0.90	1.00
b1	1.80	2.00	2.20
b2	1.80	2.00	2.20
c	0.70	0.90	1.10
e	5.25	5.45	5.65
E	15.2	15.4	15.6
E1	9.80	10.0	10.2
E2	3.80	4.00	4.20
H	24.3	24.5	24.7
H1	9.80	10.0	10.2
H2	14.3	14.5	14.7
H3	18.5	19.0	19.5
H4	2.00	2.20	2.40
H5	24.0	24.5	25.0
G	4.3	4.5	4.7
ΦP	3.30	3.50	3.70

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