

Silicon Trench NPT IGBT

Description

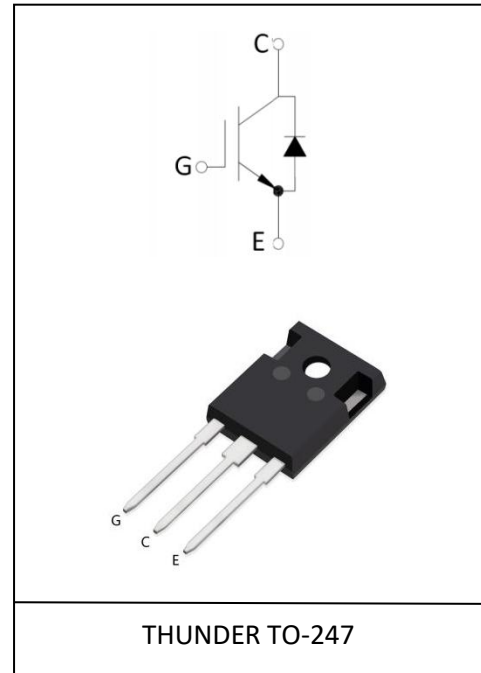
The THG60T65NQK is use advanced trench NPT technology. The 650V trench NPT IGBT offers superior conduction and switching performances.

General Features

- 650V Breakdown Voltage
- Low saturation voltage: $V_{CE(sat),typ}=1.95V$
@ $I_C=50A$ and $T_C=25^{\circ}C$
- Trench NPT Technology, Positive temperature coefficient

Application

- Driver Converters
- Welding Converters
- UPS



Electrical Characteristics @ $T_C=25^{\circ}C$ (unless otherwise specified)

a) Limited Parameters:

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	+/-20	V
I_C	Collector Current	120	A
	Collector Current @ $T_C=100^{\circ}C$	60	A
I_{CM}	Pulsed Collector Current	180	A
I_F	Diode Continuous Forward Current @ $T_C=100^{\circ}C$	60	A
I_{FM}	Diode Maximum Forward Current	180	A
P_D	Total Dissipation at @ $T_C = 25^{\circ}C$	652	W
	Total Dissipation at @ $T_C = 100^{\circ}C$	326	
T_J	Operating Junction and Storage Temperature Range	-55 to +175	$^{\circ}C$
T_L	Max Temperature For Soldering	260	$^{\circ}C$
T_{SC}	Short circuit withstand time $V_{GE}=15V$, $V_{CC} \leq 400V$, Allowed number of short circuits<1000Time between short circuits: $\geq 1.0s$, $T_J \leq 150^{\circ}C$	5	us

b) Electrical Parameters:

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{CES}	Collector-Emitter Voltage	$V_{GE}=0V, I_{CE}=250\mu A$	650			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=60A$		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	μA
$I_{GES(F)}$	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	$V_{CE}=400V$		165		nC
Q_{ge}	Gate to Emitter Charge	$I_C=60A$		15		nC
Q_{gc}	Gate to Collector Charge	$V_{GE}=15V$		96		nC

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{CE}=400V, I_C=60A$ $V_{GE}=15V, R_G=10\Omega$		42		nS
t_r	Rise Time			50		nS
$t_{d(off)}$	Turn-off Delay Time			218		nS
t_f	Fall Time			57		nS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I _F	Diode Continuous Forward Current	TC=100℃	60			A
I _{FM}	Diode Maximum Forward Current	TC=100℃	180			A
V _F	Diode Forward Voltage	I _F =60A		1.4	3.0	V
t _{rr}	Reverse Recovery Time	T _J =25℃, I _F =60A 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	Units
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT	--	0.23	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction to case for Diode	--	1.25	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	40	$^\circ C/W$

Typical Performance Characteristics

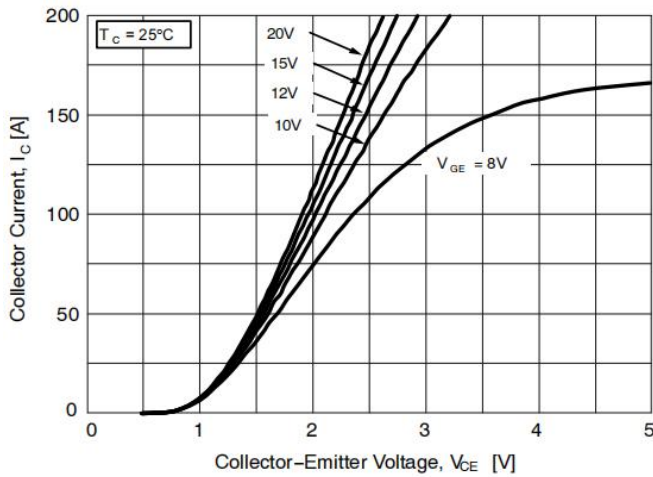


Figure 1. Typical Output Characteristics

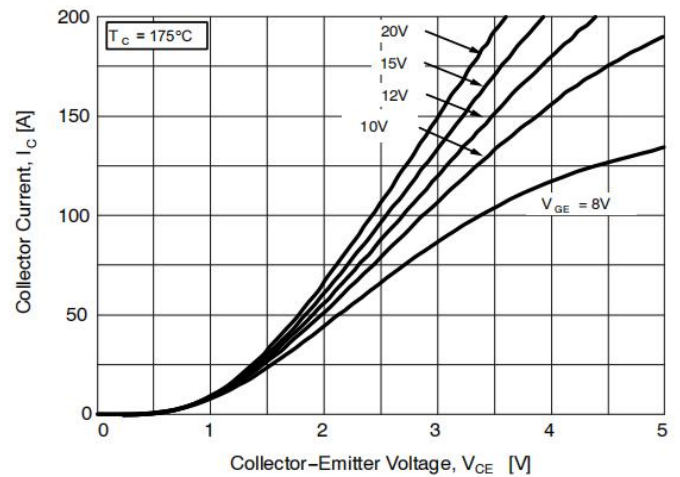


Figure 2. Typical Output Characteristics

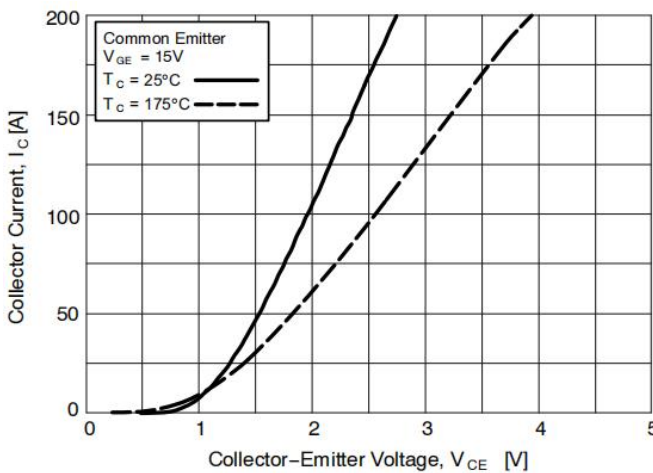


Figure 3. Typical Saturation Voltage

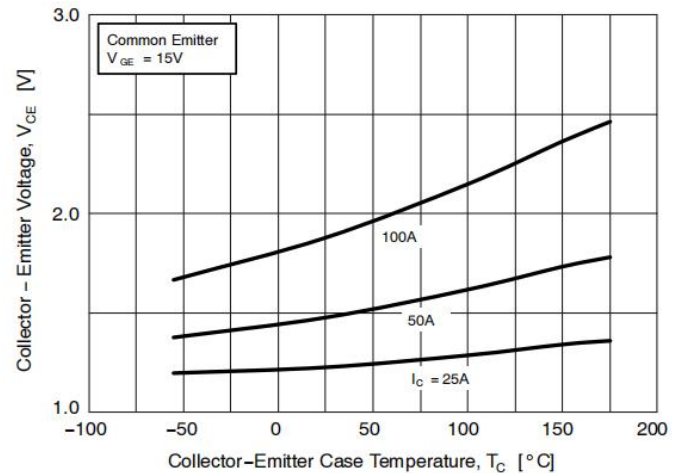


Figure 4. Saturation Voltage vs. Case Temperature

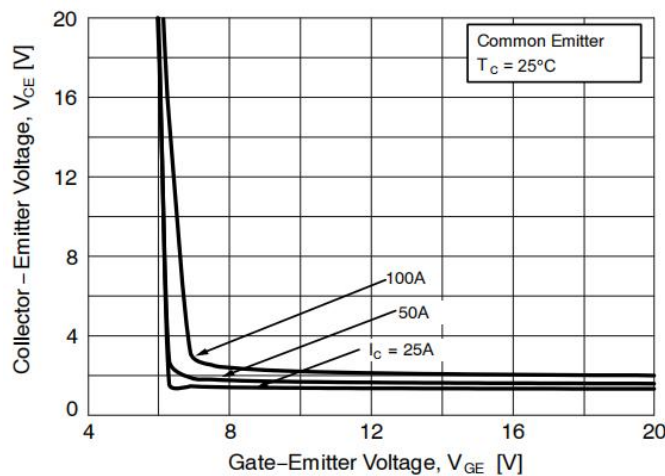


Figure 5. Saturation Voltage vs. V_{GE}

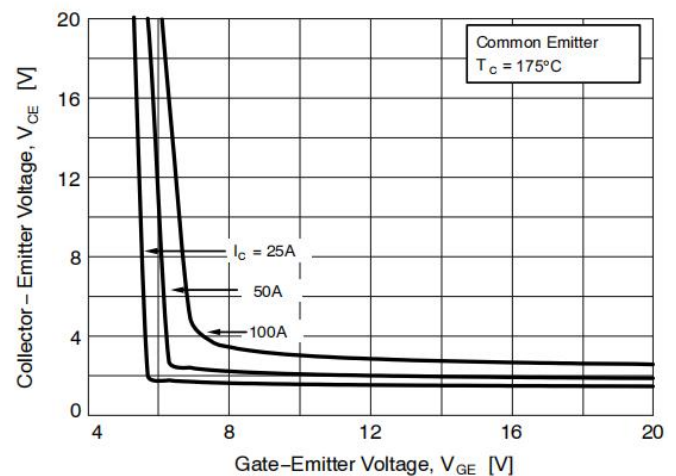


Figure 6. Saturation Voltage vs. V_{GE}

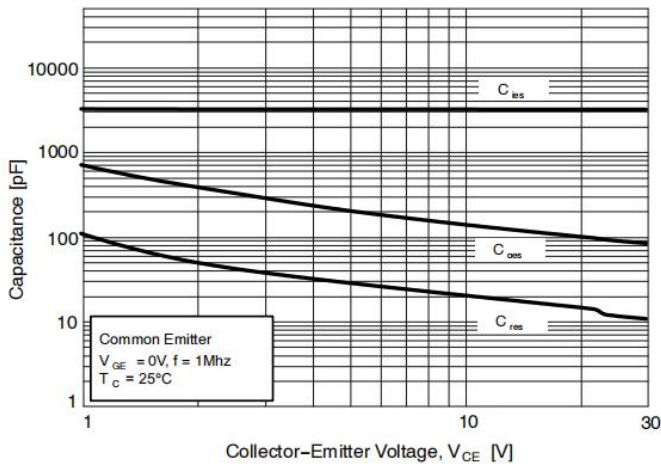


Figure 7. Capacitance Characteristics

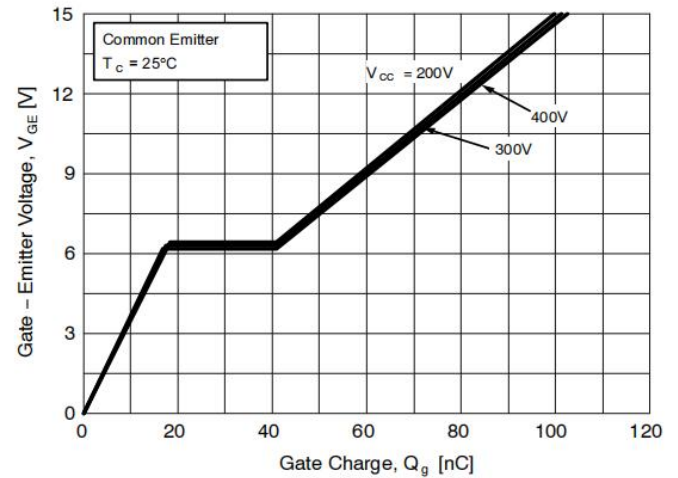


Figure 8. Gate Charge

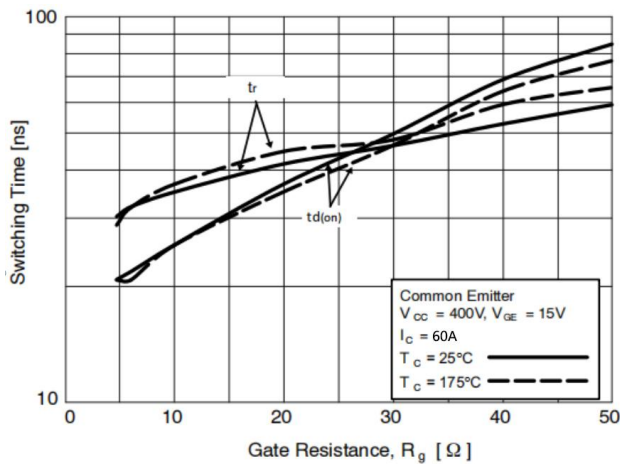


Figure 9. Turn-On Characteristics vs. Gate Resistance

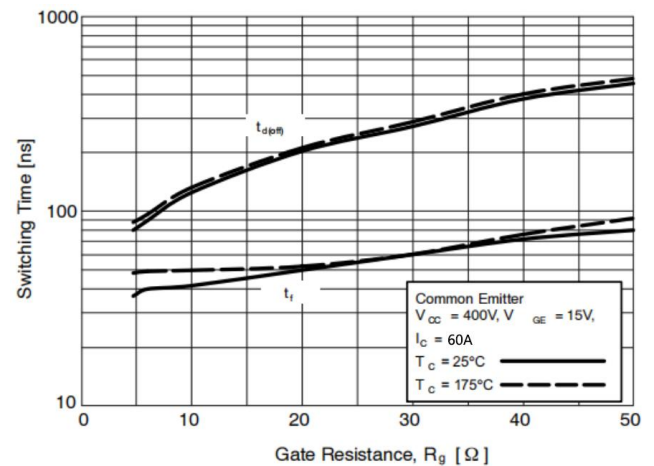


Figure 10. Turn-Off Characteristics vs. Gate Resistance

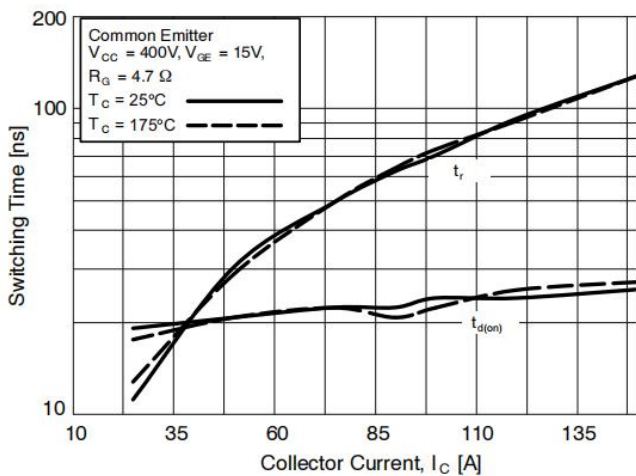


Figure 11. Turn-On Characteristics vs. Collector Current

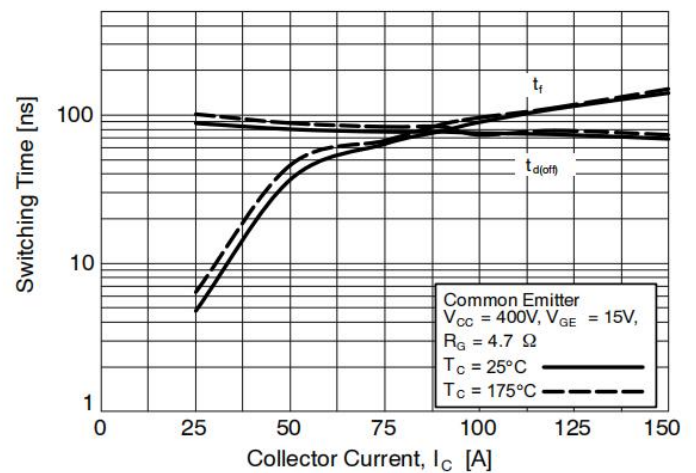


Figure 12. Turn-Off Characteristics vs. Collector Current

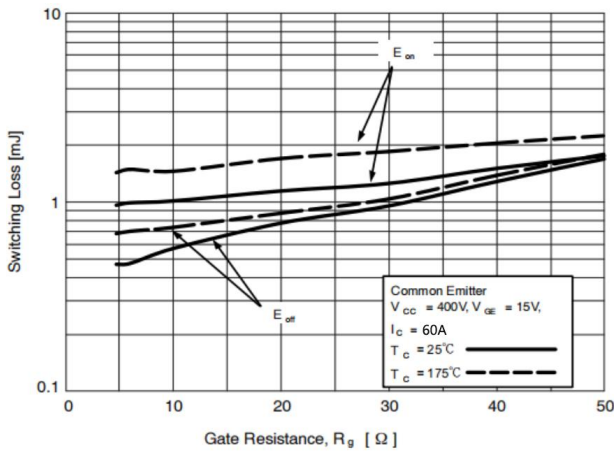


Figure 13. Switching Loss vs. Gate Resistance

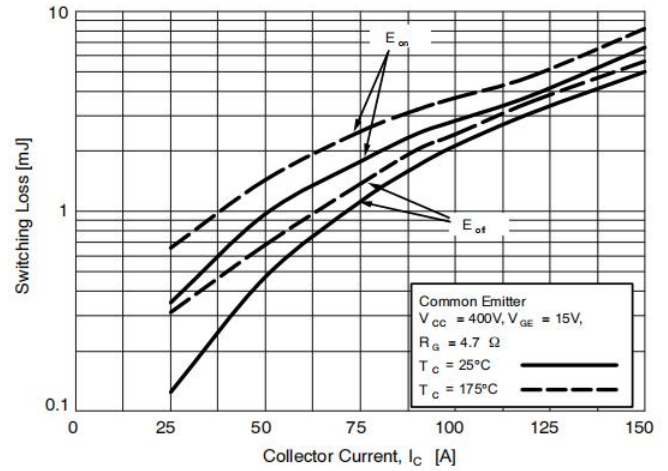


Figure 14. Switching Loss vs. Collector Current

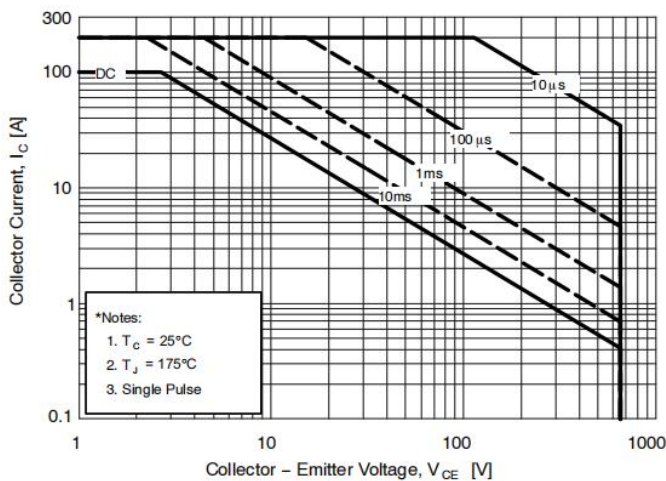


Figure 15. SOA Characteristics

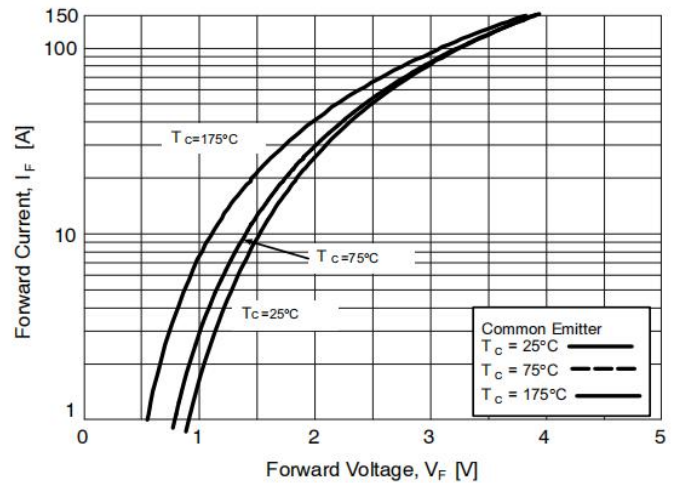


Figure 16. Forward Characteristics

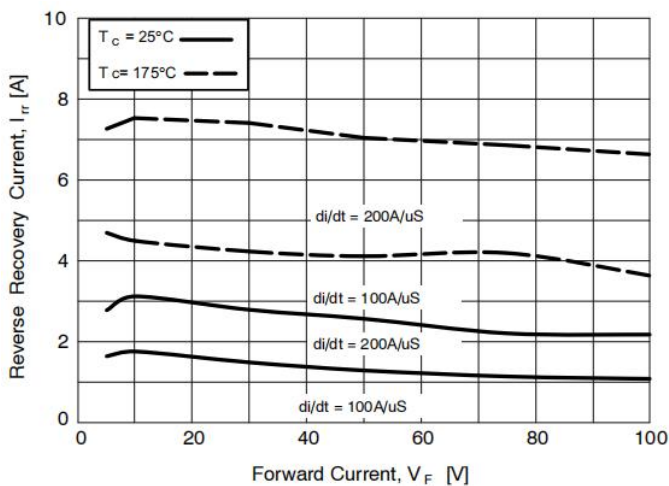


Figure 17. Reverse Recovery Current

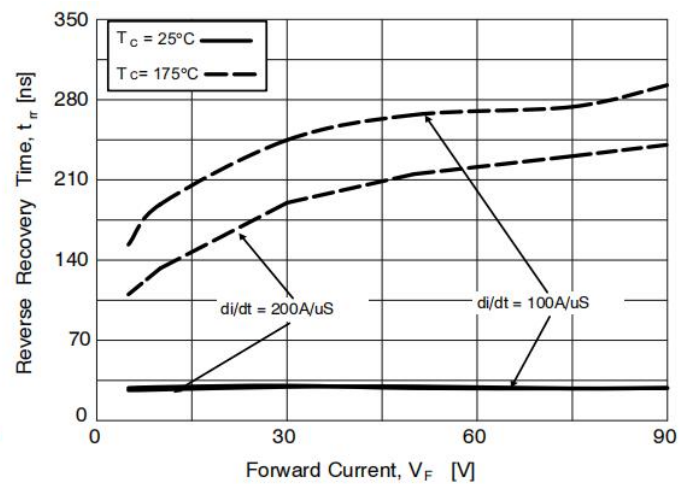


Figure 18. Reverse Recovery Time

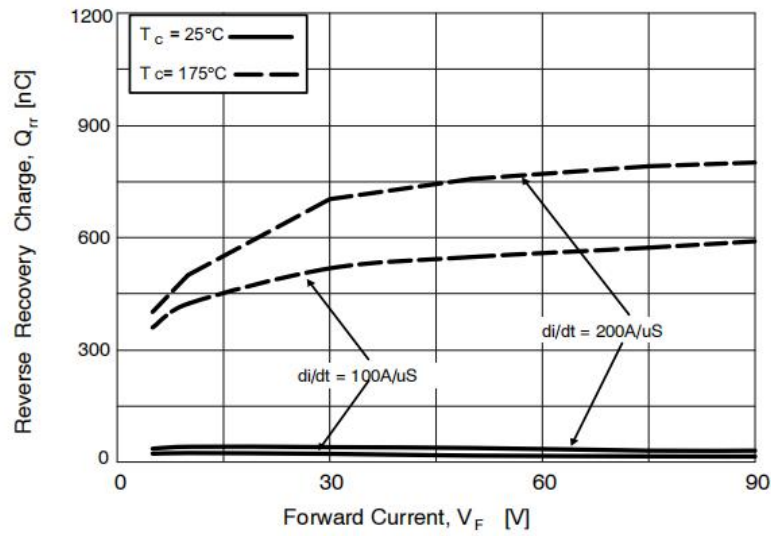


Figure 19. Stored Charge

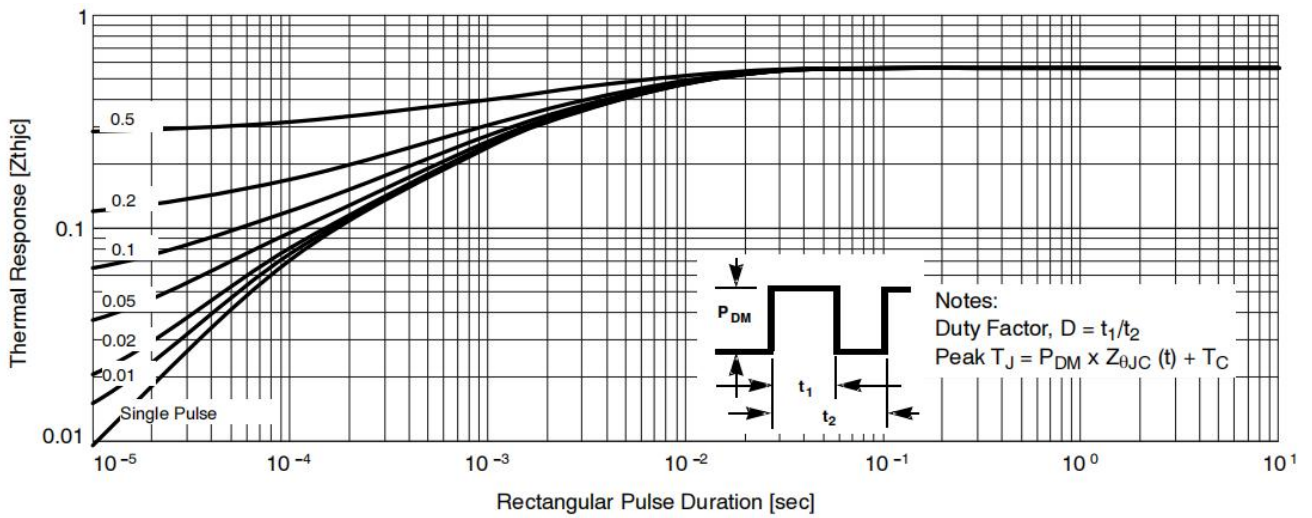


Figure 20. Transient Thermal Impedance of IGBT

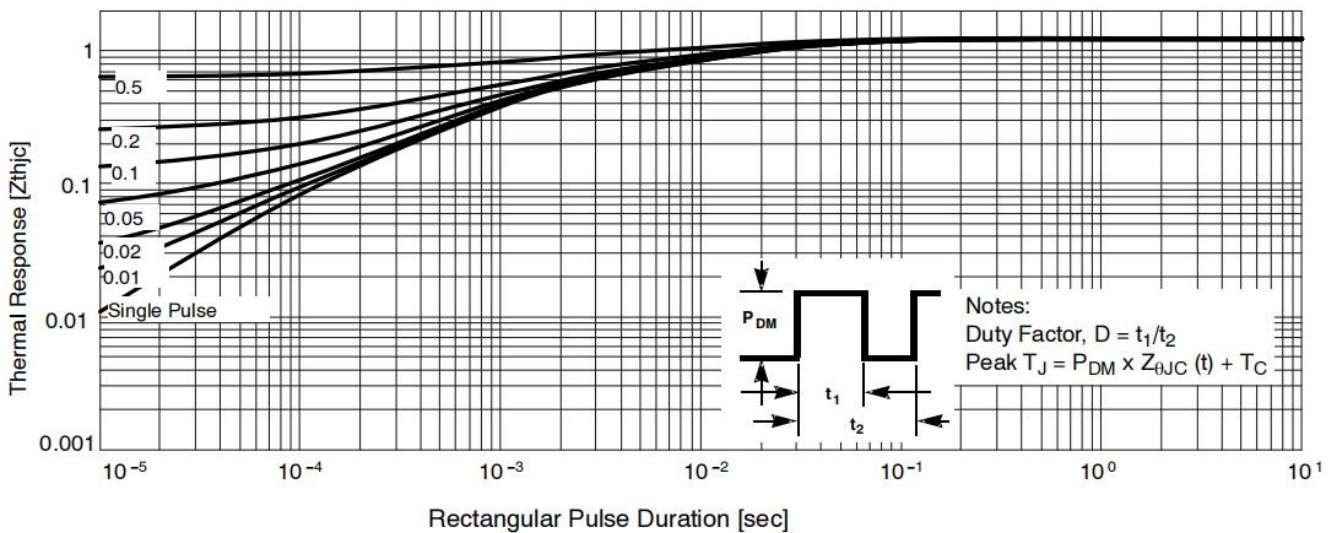
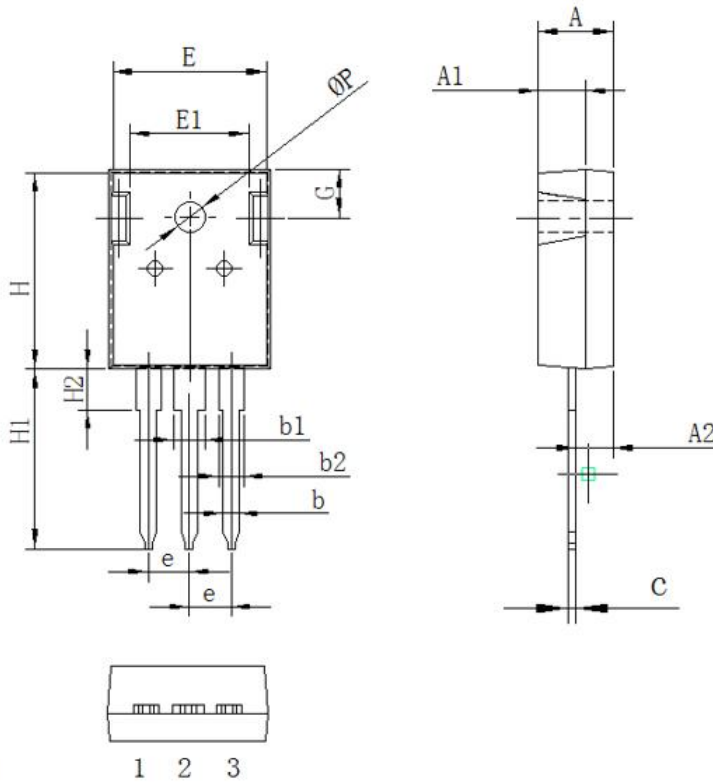


Figure 21. Transient Thermal Impedance of Diode

Package Information

TO-247 PACKAGE

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.8	5.00	5.20
A1	3.3	3.5	3.7
A2	2.20	2.40	2.60
b	1.00	1.2	1.40
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
e	5.25	5.45	5.65
E	15.2	15.7	16.2
E1	10.2	10.7	11.2
H	20.8	21	21.2
H1	19.5	20.0	20.5
H2	4.00	4.20	4.40
G	5.60	5.80	600
ΦP	3.50	3.70	3.90

Notice

Thunder Microelectronics Incorporated Limited reserves the right to make changes without further notice to any products or specifications herein. When use the product, be sure to obtain the latest specification.

Thunder Microelectronics Incorporated Limited does not assume any liability arising out of the application or any product described herein. When using Thunder Microelectronics Incorporated Limited products in your equipment, you are requested to take adequate safety measures to prevent the equipment from causing a physical injury ,fire or other problem if any of the products become faulty.

-Headquarters

WuXi Thunder Microelectronics Incorporated Limited

Building E1-9L, No.200 LingHu Road, XinWu district, WuXi, China 214135

Tel:+86-510-85160109

Fax:+86-510-85160109