Silicon Trench NPT IGBT

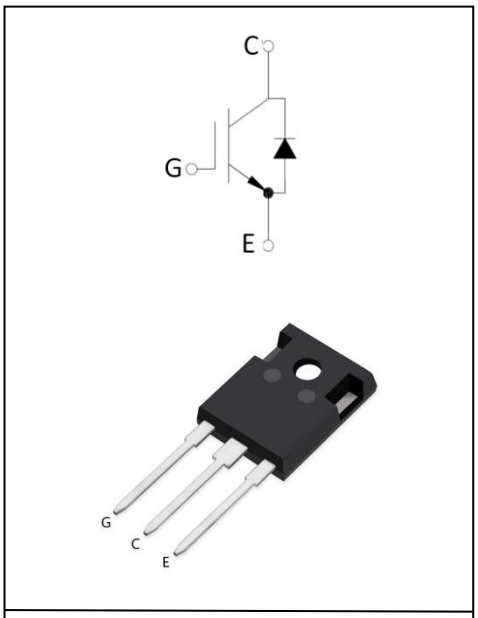
Description

The THG30T65NQK is use advanced trench NPT technology and integrated with Free Wheeling. 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=30A and T_C=25℃
- Tench NPT Technology, Positive temperature coefficient



THUNDER TO-247

Application

- Driver Converters
- Welding Converters
- UPS

Electrical Characteristics @ Tc=25℃(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	60	A
	Collector Current @Tc=100℃	30	A
I_{CM}	Pulsed Collector Current	90	A
I_F	Diode Continuous Forward Current @Tc=100℃	30	A
I_{FM}	Pulsed Diode Forward Current	90	A
P_D	Total Dissipation at Ta=25℃	150	W
	Total Dissipation at @Tc=100℃	75	
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=30A		1.95	2.5	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		2370		pF
C_{oes}	Output Capacitance			59		pF
C_{res}	Reverse Transfer Capacitance			43		pF
Q_g	Total Gate Charge	V_{CE}=480V I_C=30A V_{GE}=15V		142		nC
Q_{ge}	Gate to Emitter Charge			23		nC
Q_{gc}	Gate to Collector Charge			75		nC

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=400V,I_C=30A V_{GE}=15V,R_G=10Ω		34		nS
t_r	Rise Time			36		nS
$t_{d(off)}$	Turn-off Delay Time			198		nS
t_f	Fall Time			75		nS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_F	Diode Continuous Forward Current	TC=100℃	30			A
I_{FM}	Pulsed Diode Forward Current	TC=25℃	90			A
V_F	Diode Forward Voltage	I_F=30A		1.7	2.5	V

Symbol	Paramter	Typ	MAX	Units
$R_{\theta JC}$	Themal Resistance,Junction to case for IGBT	--	1	℃/W
$R_{\theta JA}$	Themal Resistance,Junction to Ambient	--	40	℃/W

Typical Performance Characteristics

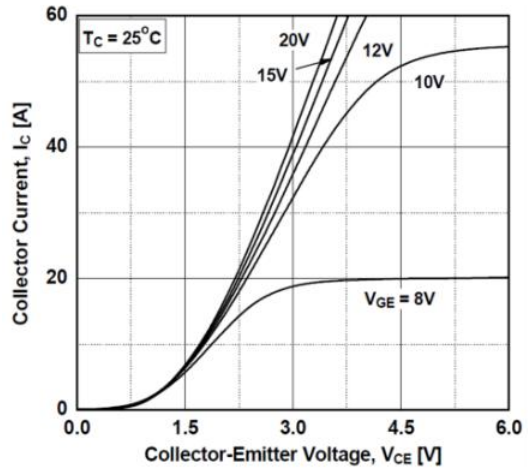


Fig 1. Output characteristics

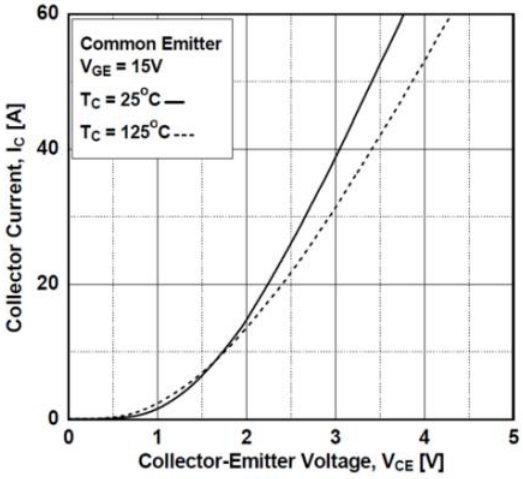


Fig 2. Typical Saturation Voltage Characteristics

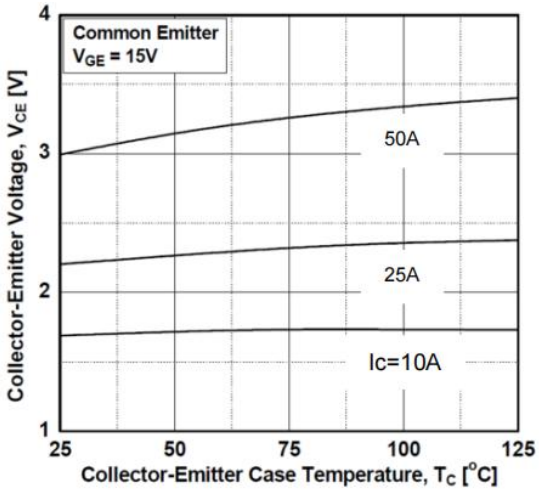


Figure 3. Saturation Voltage vs. Case Temperature at Variant Current Level

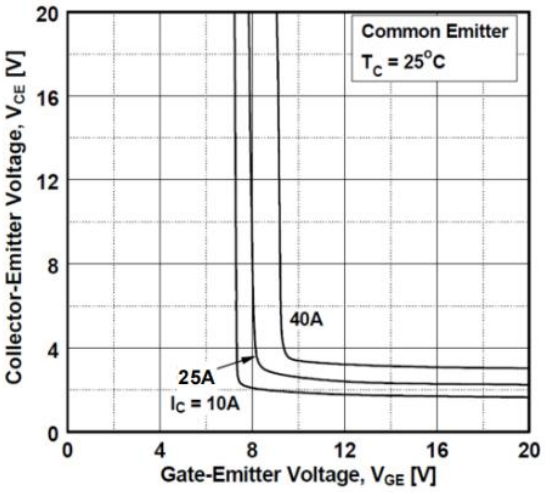


Figure 4. Saturation Voltage vs. VGE

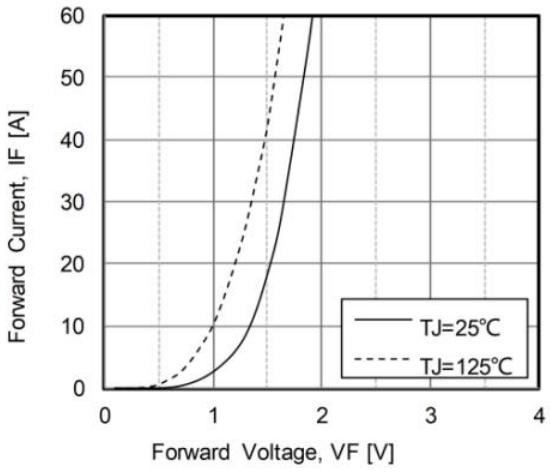


Figure 5. Forward Characteristics

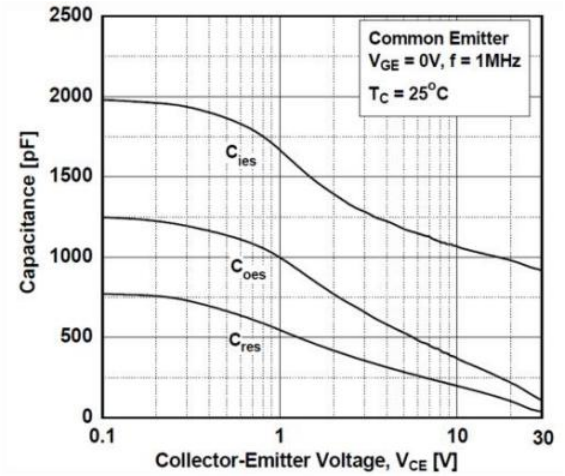


Figure 6. Capacitance Characteristics

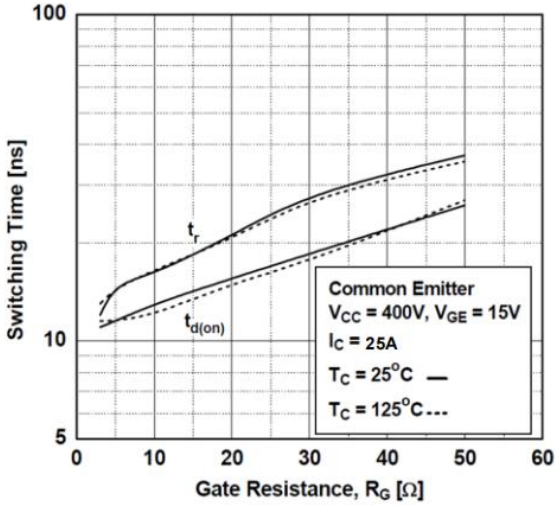


Figure 7. Turn-On Characteristics vs. Gate Resistance

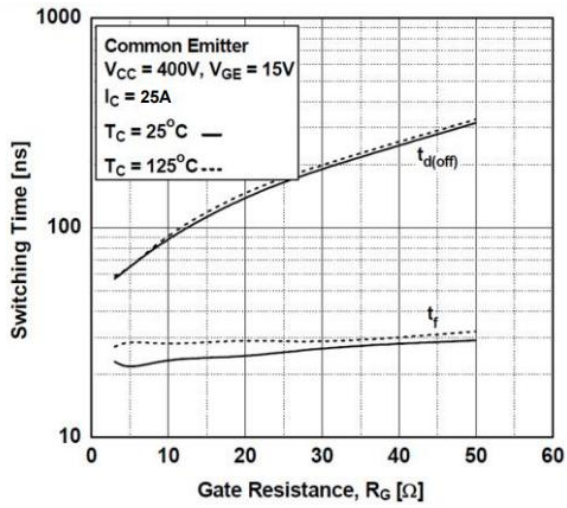


Figure 8. Turn-Off Characteristics vs. Gate Resistance

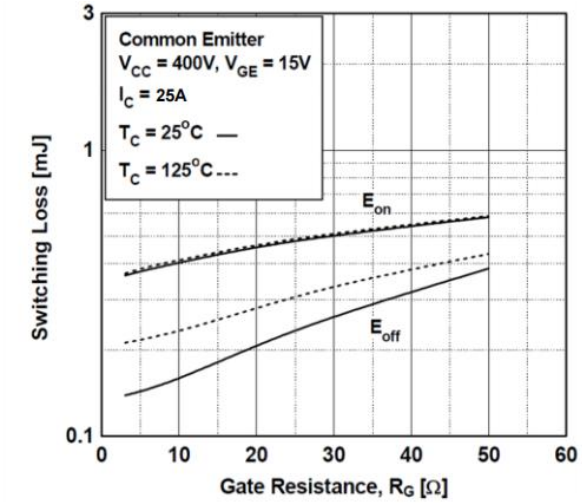


Figure 9. Switching Loss vs. Gate Resistance

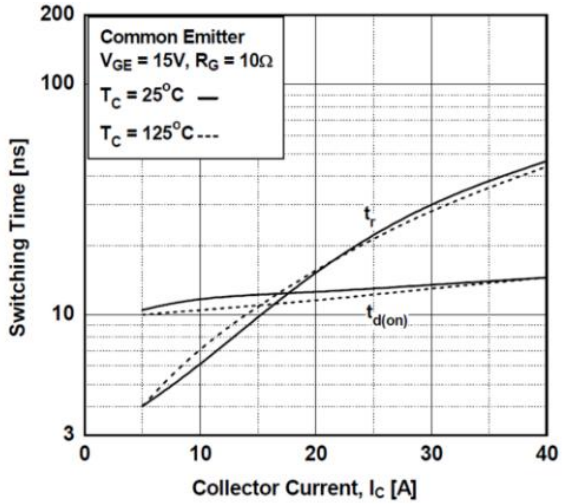


Figure 10. Turn-On Characteristics vs. Collector Current

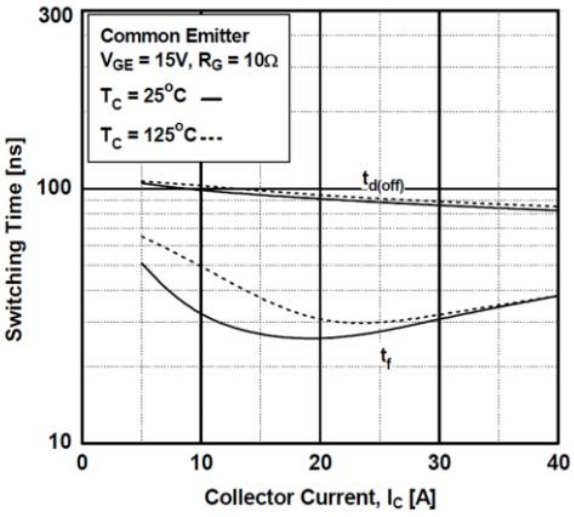


Figure 11. Turn-Off Characteristics vs. Collector Current

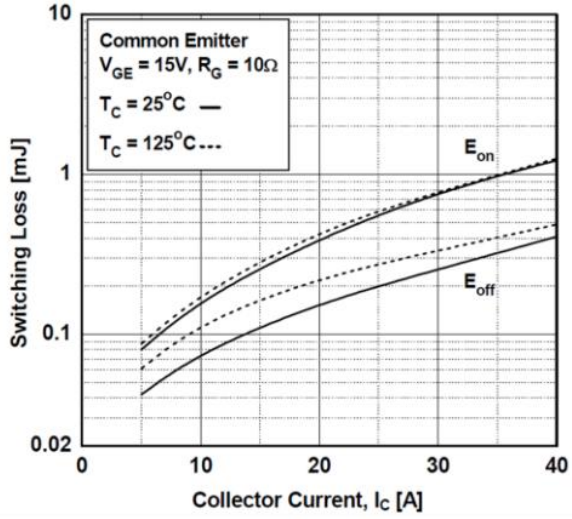


Figure 12. Switching Loss vs. Collector Current

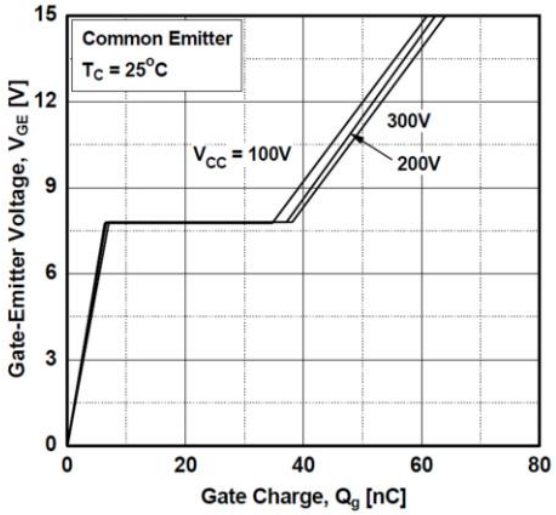


Figure 13. Gate Charge Characteristics

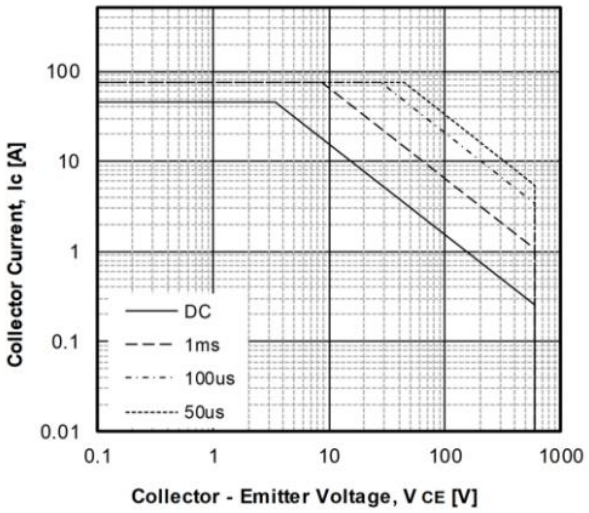


Figure 14. SOA Characteristics

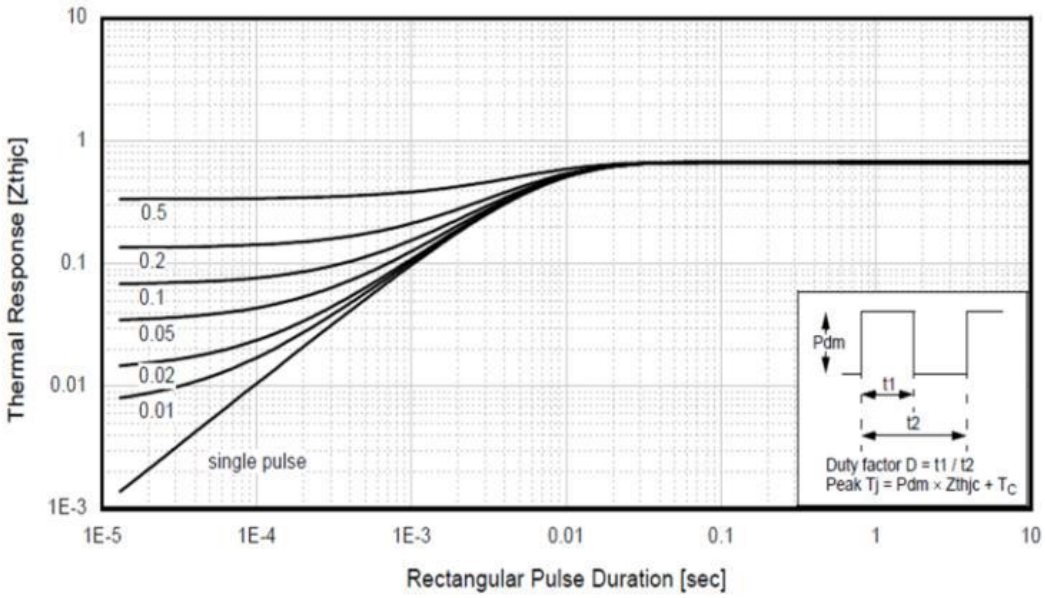
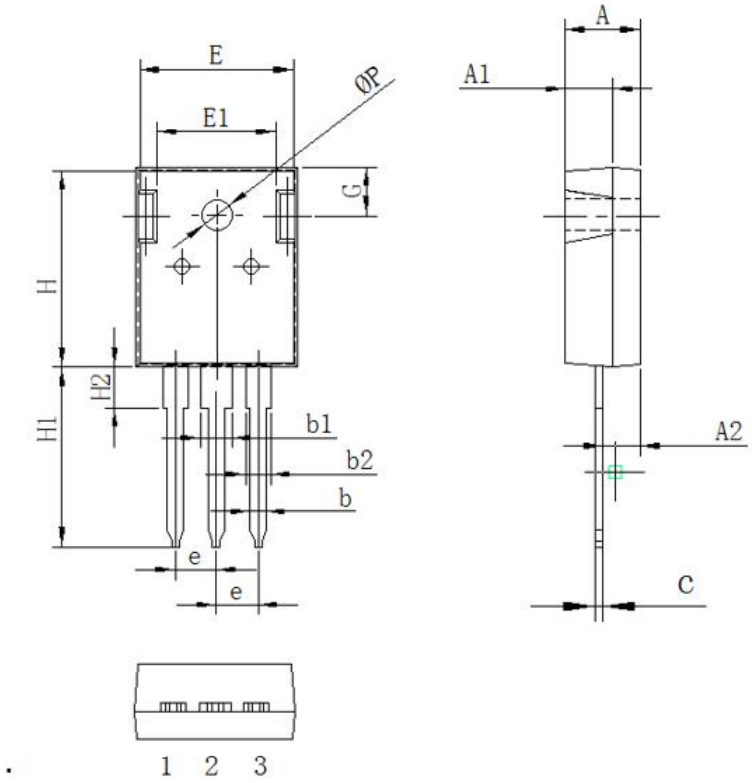


Figure 15. Transient Thermal Impedance of IGBT

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

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