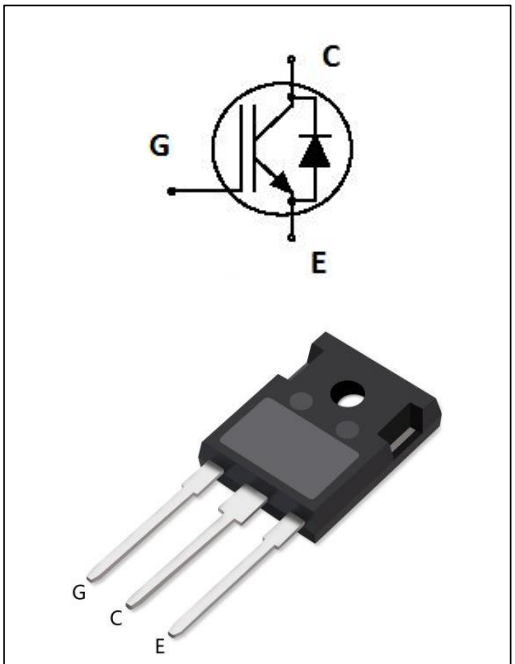
Thunder High speed FS IGBT Products

Silicon Field Stop(FS) Planar IGBT

Description

The THG15N120FQKH is use advanced field stop(FS) technology.

The 1200V FS IGBT offers superior conduction and switching performances.



THUNDER TO-247H

General Features

- 1200V Breakdown Voltage
- Low saturation voltage:$V_{CE(sat)}$,typ=2.3V@I_C=15A
- FS Planar Technology,Positive temperature coefficient
- High speed switch & Low power loss

Application

- Solar Converters
- Welding Converters
- UPS

Product Summary

V_{CE}	1200V
$V_{CE(sat)}$	2.3V
I_C	15A

MAXIMUM RATINGS (T_J = 25℃ unless otherwise noted)

Parameter		Symbol	Value	Unit
Collector–to–Emitter Voltage		V_{CE}	1200	V
Gate–to–Emitter Voltage		V_{GE}	±30	V
Collector Current	T_C=25℃	I_C	30	A
	T_C=100℃		15	
Power Dissipation	T_C=25℃	P_D	300	W
	T_C=100℃		150	

Pulsed Collector Current	T_C=25℃ t_p=10μs (Note 1)	I_{CM}	45	A
Diode Forward Current	T_C=25℃	I_F	30	
	T_C=100℃		15	
Pulsed Diode Forward Current	T_C=25℃ t_p=10μs (Note 1)	I_{FM}	45	
Short Circuit Withstand Time V_{GE} = 15 V, V_{CC} = 800 V, T_C = 150℃		T_{SC}	10	μs
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To +175	℃
Lead Temperature for Soldering Purposes		T_L	270	

THERMAL CHARACTERISTICS

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction−to−Case for IGBT	R_{thJC}	0.5	℃/W
Thermal Resistance, Junction−to−Ambient	R_{thJA}	62.5	

ELECTRICAL CHARACTERISTICS (T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
OFF CHARACTERISTICS						
Collector−to−Emitter Breakdown Voltage	BV_{CES}	1200	-	-	V	V_{GE}=0V,I_C=1mA
Zero Gate Voltage Collector Current	I_{CES}	-	-	40	μA	V_{GE}=0V,V_{CE}=V_{CES}
Gate−to−Emitter leakage Current	I_{GES}	-	-	±400	nA	V_{GE}=±30V,V_{CE}=0V
ON CHARACTERISTICS						
Gate−to−Emitter Threshold Voltage	$V_{GE(th)}$	4.8	-	6.6	V	V_{GE}=V_{CE},I_C=1mA, T_J=25℃
Collector−to−Emitter Saturation Voltage	$V_{CE(sat)}$	-	2.3	2.8	V	V_{GE}=15V,I_C=15A, T_J=25℃

DYNAMIC CHARACTERISTICS

Input Capacitance	C_{IES}	-	1213	-	pF	V_{CE} = 15 V, V_{GE} = 0 V, f = 1 MHz
Output Capacitance	C_{OES}	-	81	-		
Reverse Transfer Capacitance	C_{RES}	-	29	-		
Total Gate Charge	Q_G	-	80	-	nC	V_{CE} = 600 V, V_{GE} = 15 V, I_C = 15 A

SWITCHING CHARACTERISTICS

Turn−On Delay Time	$t_{d(on)}$	-	85	-	ns	V_{CE} = 600 V V_{GE} = 0/15 V I_C = 15 A R_G = 30 Ω T_J = 25°C
Turn−Off Delay Time	$t_{d(off)}$	-	109	-		
Rise time	t_r	-	28	-		
Fall time	t_f	-	220	-		
Turn−On Switching Loss	E_{on}	-	3.0	-	mJ	
Turn−Off Switching Loss	E_{off}	-	0.4	-		
Total Switching Loss	E_{ts}	-	3.4	-		

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified) (continued)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
SWITCHING CHARACTERISTICS						
DIODE CHARACTERISTICS						
Diode Forward Voltage	V_F	-	2.2	3.3	-	I_F = 15 A, T_J = 25°C
DIODE SWITCHING CHARACTERISTICS, INDUCTIVE LOAD						
Reverse Recovery Time	t_{rr}	-	30	-	ns	VR = 600 V, IF = 15 A, dIF/dt = 200 A/μs TJ = 25°C
Reverse Recovery Charge	Q_{rr}	-	2250	-	nC	
Reverse Recovery Energy	E_{rec}	-	0.02	-	mJ	
Peak Reverse Recovery Current	I_{RRM}	-	12	-	A	

Typical Performance Characteristics

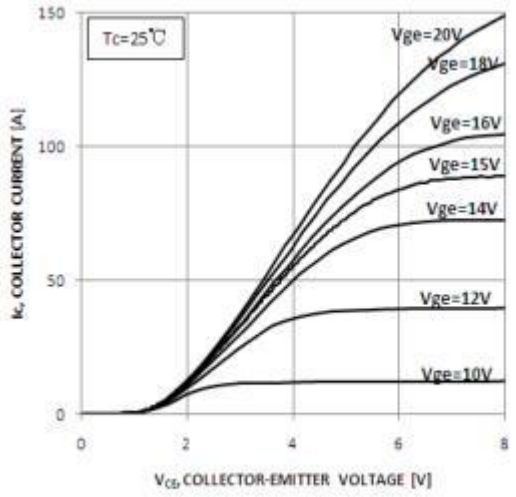


Figure 1. Typical Output Characteristics

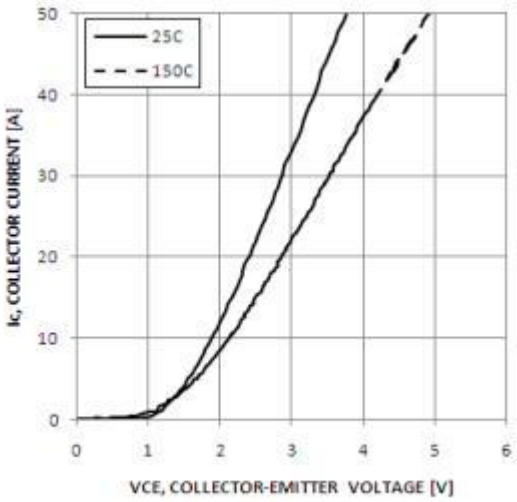


Figure 2. Typical Output Characteristics

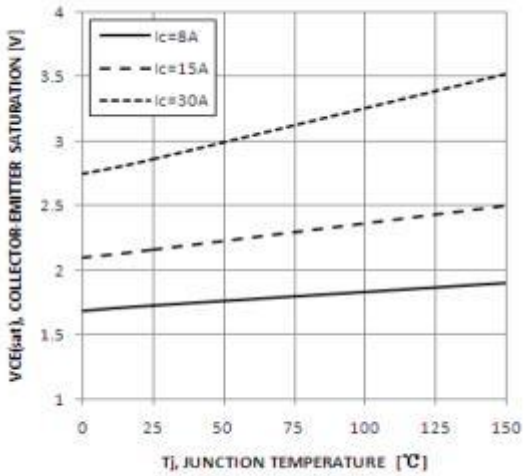


Figure 3. Typical Saturation Voltage vs.Junction Temperature

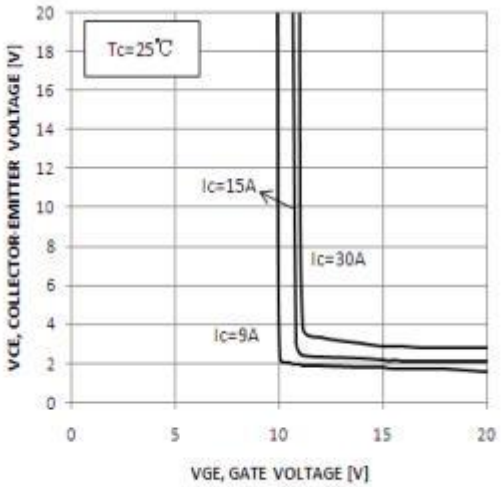


Figure 4. Typical Saturation Voltage vs. Gate- Emitter Voltage

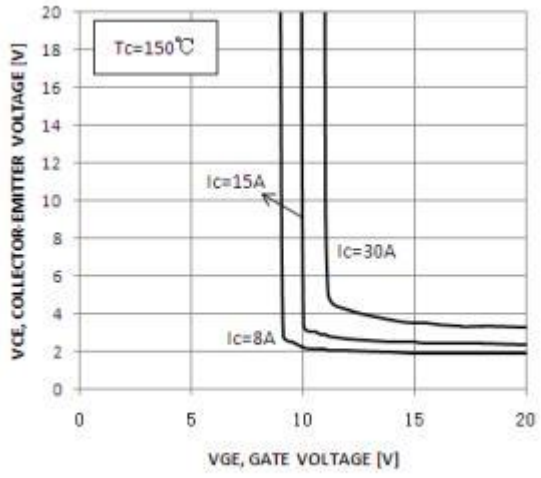


Figure 5. Typical Saturation Voltage vs. Gate-Emitter Voltage

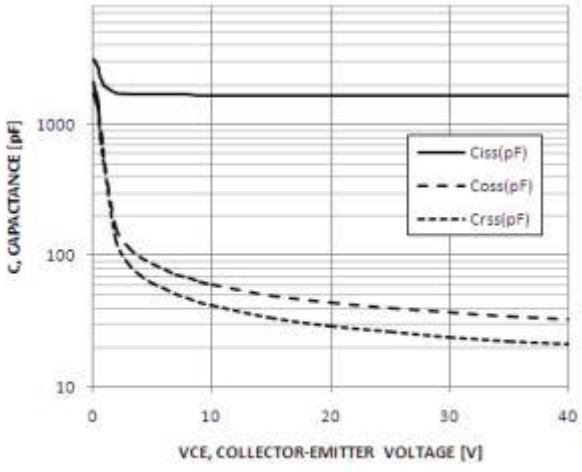


Figure 6. Typical Capacitance Characteristics

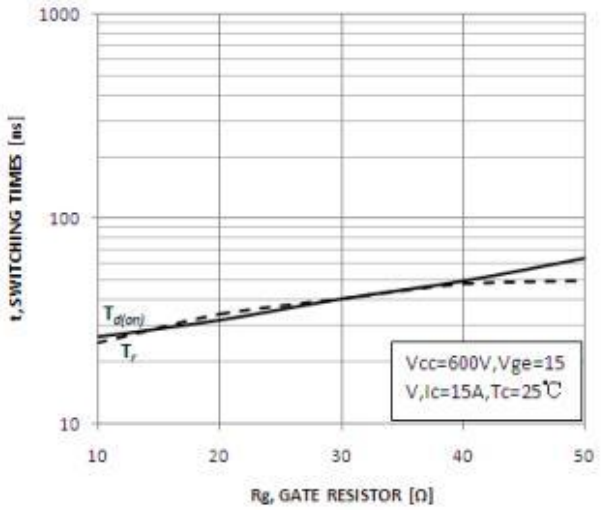


Figure 7. Typical Turn-On Characteristics vs. Gate Resistance

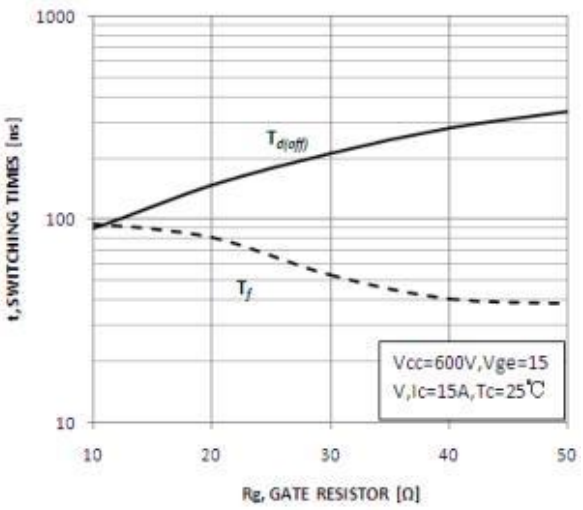


Figure 8. Typical Turn-Off Characteristics vs.Gate

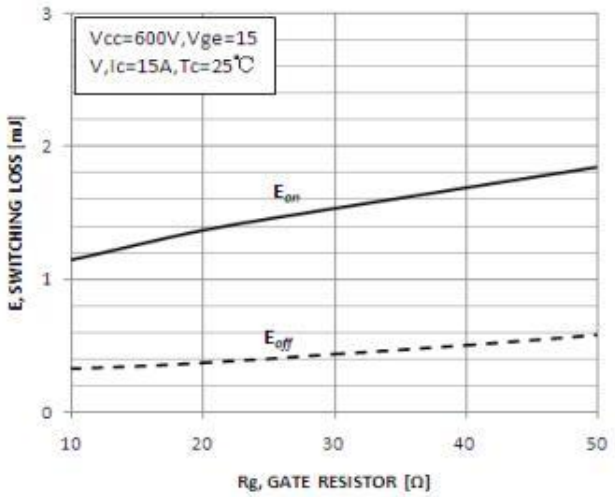


Figure 9. Typical Switching Losses vs. Gate Resistance

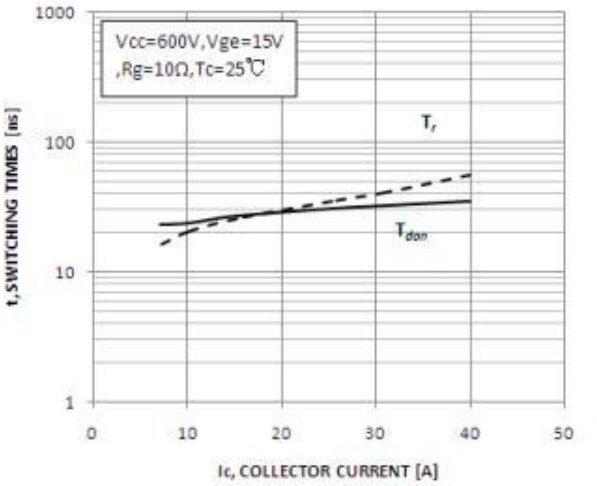


Figure 10. Typical Turn-On Characteristics vs. Collector Current

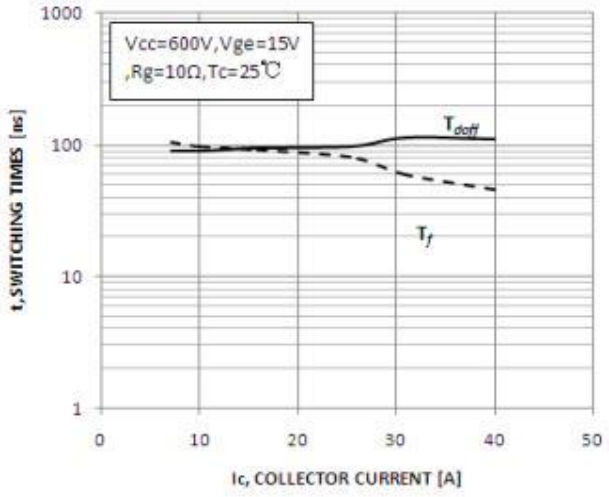


Figure 11. Typical Turn-Off Characteristicsvs. Collector Current

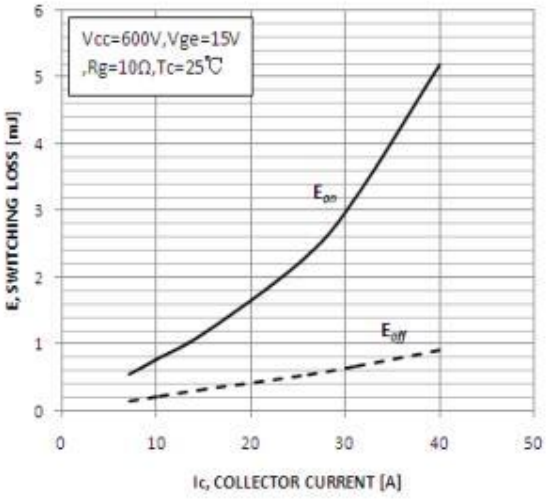


Figure 12. Typical Switching Losses vs. Collector Current

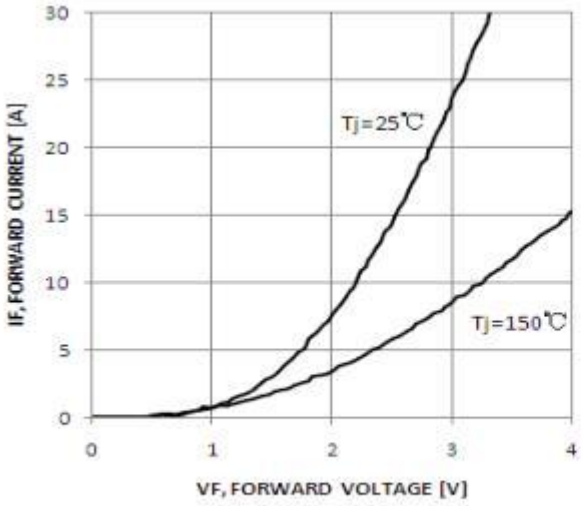


Figure 13. Typical Diode Forward Characteristics

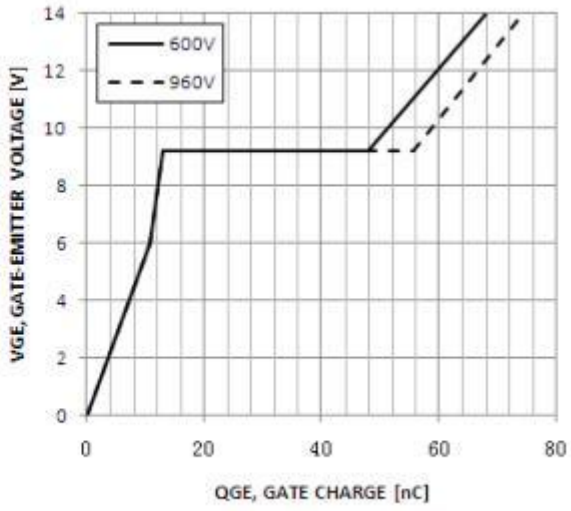


Figure 14. Typical Gate Charge

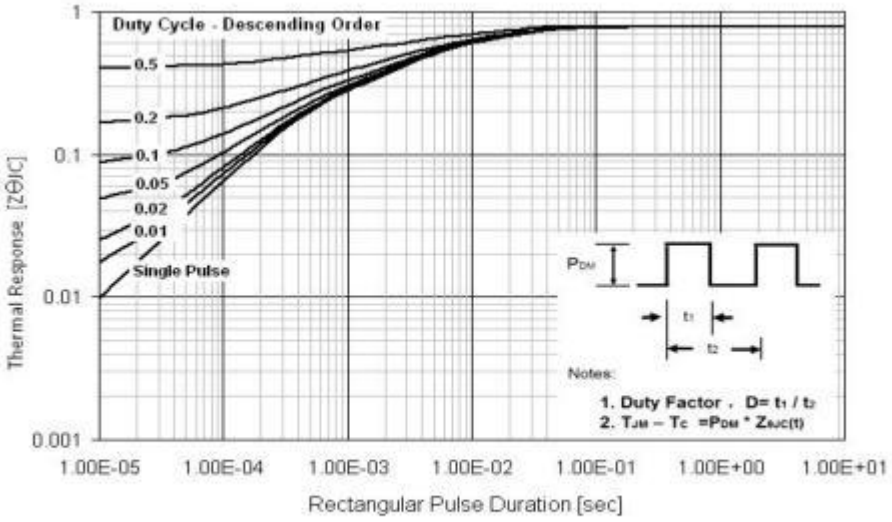
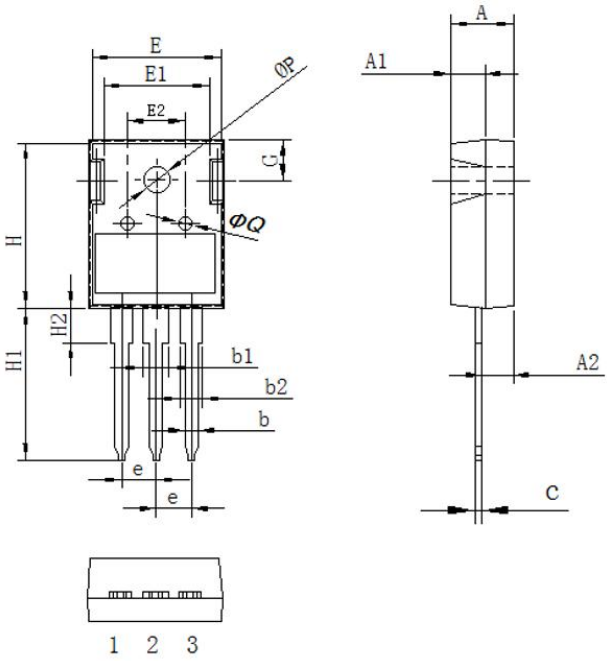


Figure 15. Transient Thermal Impedance of IGBT

Package Information

TO-247H PACKAGE



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	4.80	5.00	5.20
A1	2.80	3.00	3.20
A2	2.20	2.40	2.60
b	1.05	1.20	1.35
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
e	5.35	5.45	5.75
E	15.6	15.80	16.0
E1	12.3	12.50	12.7
E2	6.00	6.20	6.40
H	20.5	21.0	21.5
H1	19.0	20.0	21.0
H2	3.00	4.00	5.00
G	5.70	5.90	6.10
ΦP	3.30	3.50	3.50
ΦQ	2.30	2.50	2.70

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