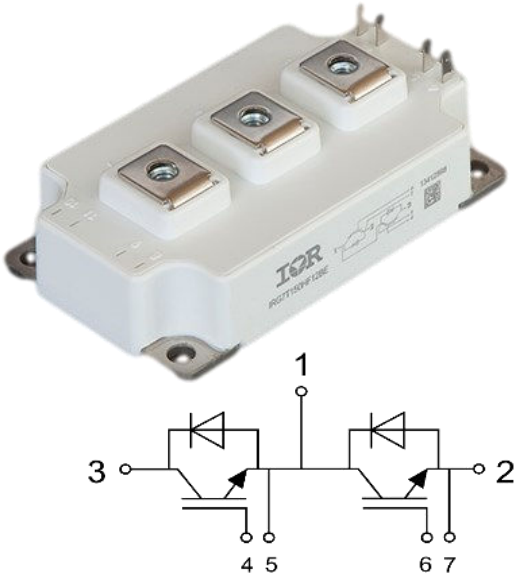
V_{CES} = 1200V
I_C = 200A at T_C = 80°C
t_{SC} ≥ 10µsec
$V_{CE(ON)}$ = 2.30V at I_C = 200A

IGBT Half-Bridge
POWIR 62mm Package



Applications:

- Industrial Motor Drive
- Uninterruptible Power Supply
- Welding and Cutting Machine
- Switched Mode Power Supply
- Induction Heating

Features	Benefits
Low $V_{CE(ON)}$ and Switching Losses	High Efficiency in a Wide Range of Applications
RBSOA Tested	Rugged Transient Performance
10µsec Short Circuit Safe Operating Area	
POWIR 62mm Package	Industry Standard
Lead Free	RoHS Compliant, Environmental Friendly

Base Part Number	Package Type	Standard Pack	Quantity	Orderable Part Number
IRG5K200HF12B	POWIR 62mm	Box	45	IRG5K200HF12B

Absolute Maximum Ratings of IGBT

V_{CES}	Collector to Emitter Voltage		1200	V
V_{GES}	Continuous Gate to Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C = 80°C	200	A
		T_C = 25°C	400	A
I_{CM}	Pulse Collector Current	T_J = 150°C	400	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	1250	W
T_J	Maximum IGBT Junction Temperature		150	°C
T_{JOP}	Maximum Operating Junction Temperature Range		-40 to +150	°C
T_{stg}	Storage Temperature		-40 to +125	°C

Electrical Characteristics of IGBT at T_J = 25°C (Unless Otherwise Specified)

Parameter		Min.	Typ.	Max.	Unit	Test Conditions	
$V_{(BR)CES}$	Collector to Emitter Breakdown Voltage	1200			V	V_{GE} = 0V, I_C = 2mA	
$V_{GE(th)}$	Gate Threshold Voltage	4.5	5.3	6.0	V	I_C = 1 mA, V_{CE} = V_{GE}	
$V_{CE(ON)}$	Collector to Emitter Saturation Voltage		2.30	2.60	V	T_J = 25°C	I_C = 200A, V_{GE} = 15V
			2.60		V	T_J = 125°C	
I_{CES}	Collector to Emitter Leakage Current			2	mA	V_{GE} = 0V, V_{CE} = V_{CES}	
I_{GES}	Gate to Emitter Leakage Current			400	nA	V_{GE} = ±20V, V_{CE} = 0	
R_{Gint}	Internal Gate Resistance		1.25		Ω		

Switching Characteristics of IGBT

Parameter		Min.	Typ.	Max.	Unit	Test Conditions	
$t_{d(on)}$	Turn-on Delay Time		280		ns	T_J = 25°C	V_{CC}=600V, I_C = 200A, R_G = 10Ω, V_{GE}=±15V, Inductive Load
			260			T_J = 125°C	
t_r	Rise Time		185		ns	T_J = 25°C	
			185			T_J = 125°C	
$t_{d(off)}$	Turn-off Delay Time		850		ns	T_J = 25°C	
			900			T_J = 125°C	
t_f	Fall Time		115		ns	T_J = 25°C	
			125			T_J = 125°C	
E_{on}	Turn-on Switching Loss		20.0		mJ	T_J = 25°C	
			28.4			T_J = 125°C	
E_{off}	Turn-off Switching Loss		16.9		mJ	T_J = 25°C	
			21.1			T_J = 125°C	
Q_g	Total Gate Charge		2370		nC	T_J = 25°C	
C_{ies}	Input Capacitance		26.0		nF	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz, T_J = 25°C	
C_{oes}	Output Capacitance		1.80				
C_{res}	Reverse Transfer Capacitance		0.72				
RBSOA	Reverse Bias Safe Operating Area	Trapezoid				I_C = 400A, V_{CC} = 960V, V_P =1200V, R_G = 15Ω, V_{GE} = +15V to 0V, T_J = 150°C	
SCSOA	Short Circuit Safe Operating Area	10			µs	V_{CC} = 600V, V_{GE} = 15V, T_J = 150°C	

Absolute Maximum Ratings of Freewheeling Diode

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current, T_C = 25°C	400	A
	Diode Continuous Forward Current, T_C = 80°C	200	
I_{FM}	Pulse Diode Current	400	A

Electrical and Switching Characteristics of Freewheeling Diode

Parameter		Typ.	Max.	Unit	Test Conditions	
V_F	Forward Voltage	2.00	2.70	V	T_J = 25°C	I_F = 200A , V_{GE} = 0V
		2.20			T_J = 125°C	
I_{rr}	Peak Reverse Recovery Current	90		A	T_J = 25°C	I_F=200A, di/dt=1290A/µs, V_{rr} = 600V, V_{GE} = -15V
		130			T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	9.7		µC	T_J = 25°C	
		22.5			T_J = 125°C	
E_{rec}	Reverse Recovery Energy	3.8		mJ	T_J = 25°C	
		8.7			T_J = 125°C	

Module Characteristics

Parameter		Min.	Typ.	Max.	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted), f = 50Hz, 1minute			2500	V
$R_{\theta JC}$	Junction-to-Case (IGBT)		0.100		°C/W
$R_{\theta JC}$	Junction-to-Case (Diode)		0.204		°C/W
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)		0.1		°C/W
M	Power Terminals Screw: M6	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		230		g

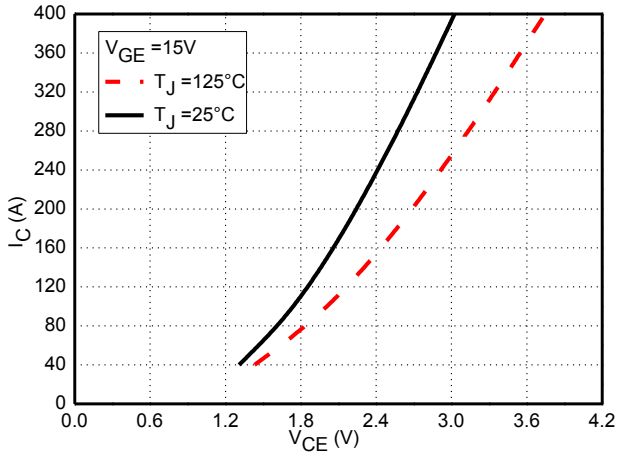


Fig.1 Typical IGBT Saturation Characteristics

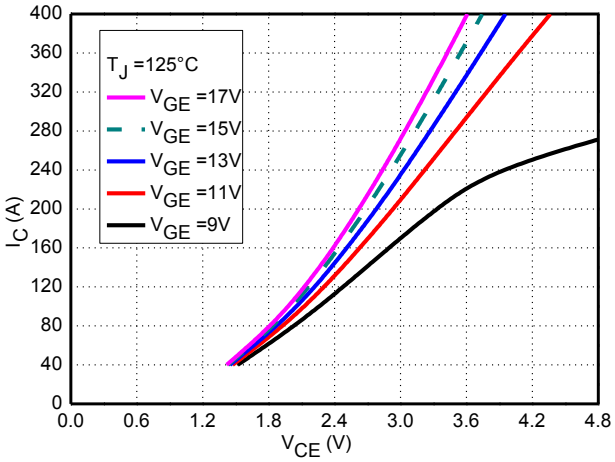


Fig.2 Typical IGBT Output Characteristics

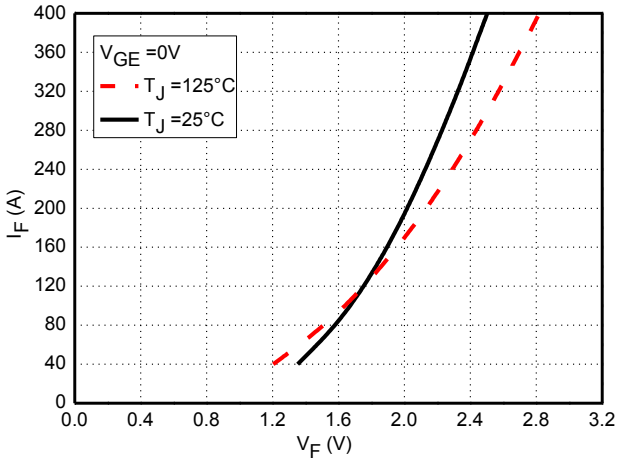


Fig.3 Typical Freewheeling Diode Characteristics

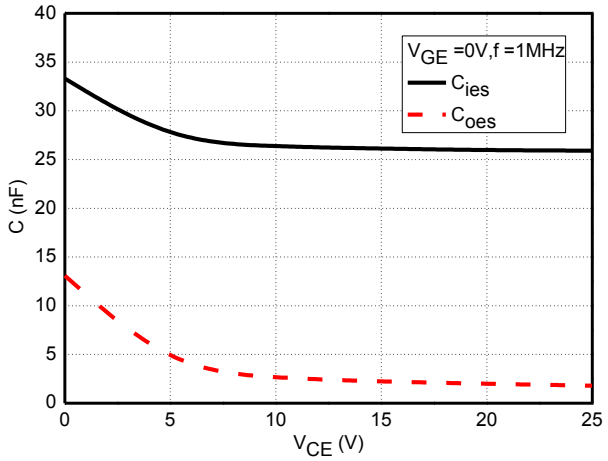


Fig. 4 Typical Capacitance Characteristics

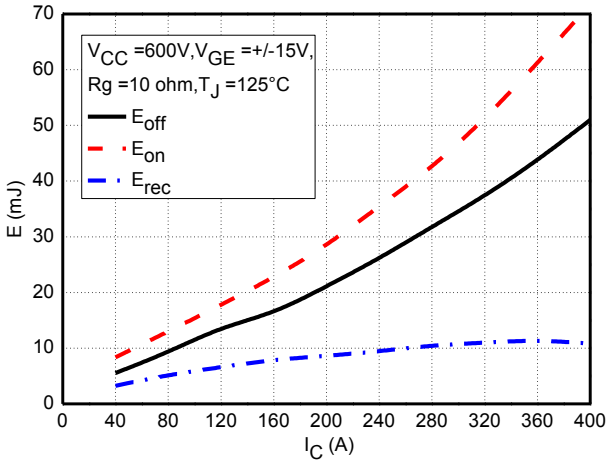


Fig.5 Typical Switching Loss vs. Collector Current

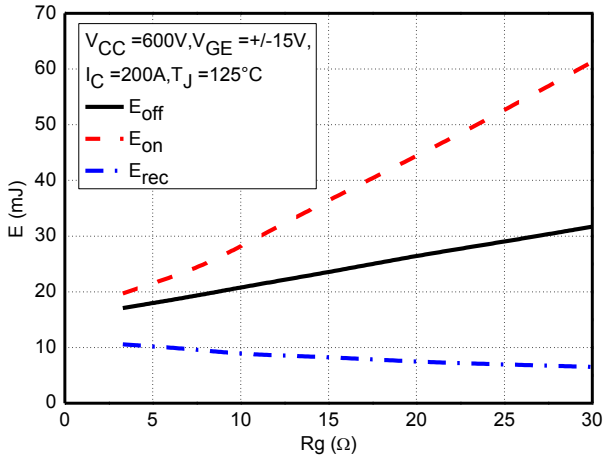


Fig.6 Typical Switching Loss vs. Gate Resistance

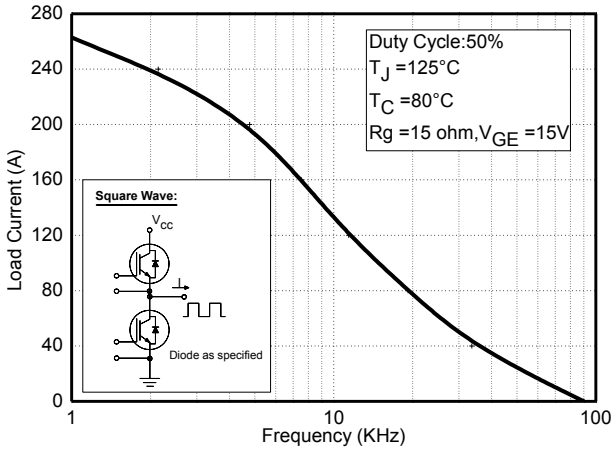


Fig.7 Typical Load Current vs. Frequency

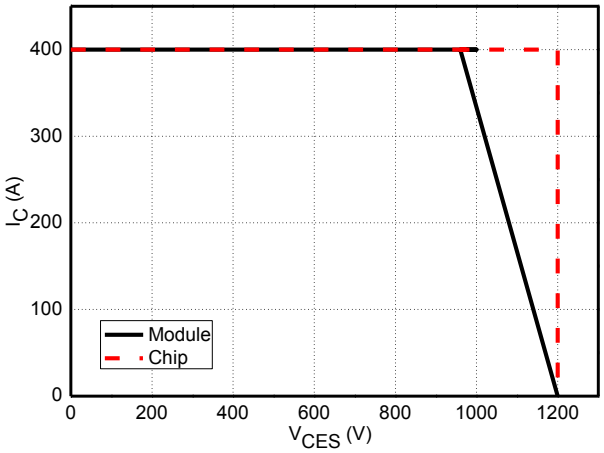


Fig.8 Reverse Bias Safe Operation Area (RBSOA)

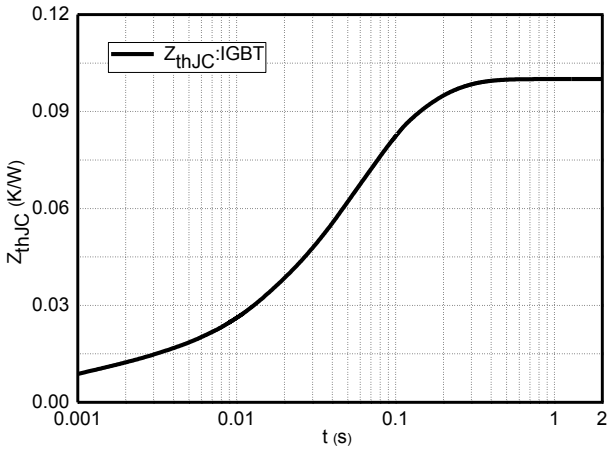


Fig.9 Typical Transient Thermal Impedance (IGBT)

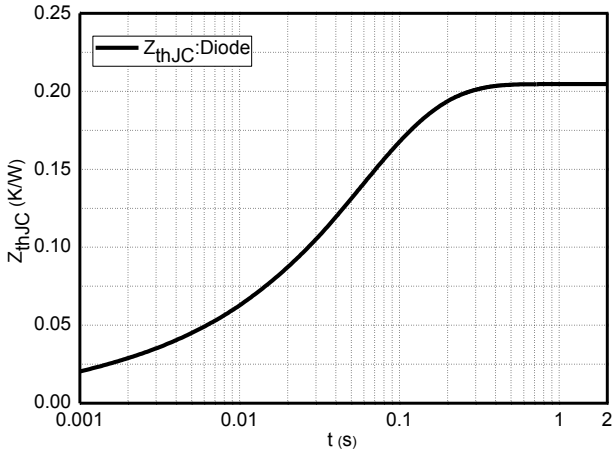
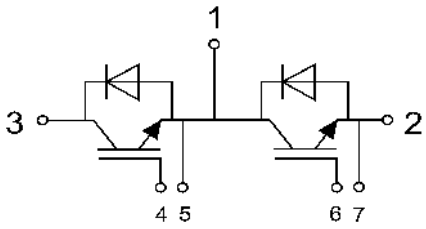
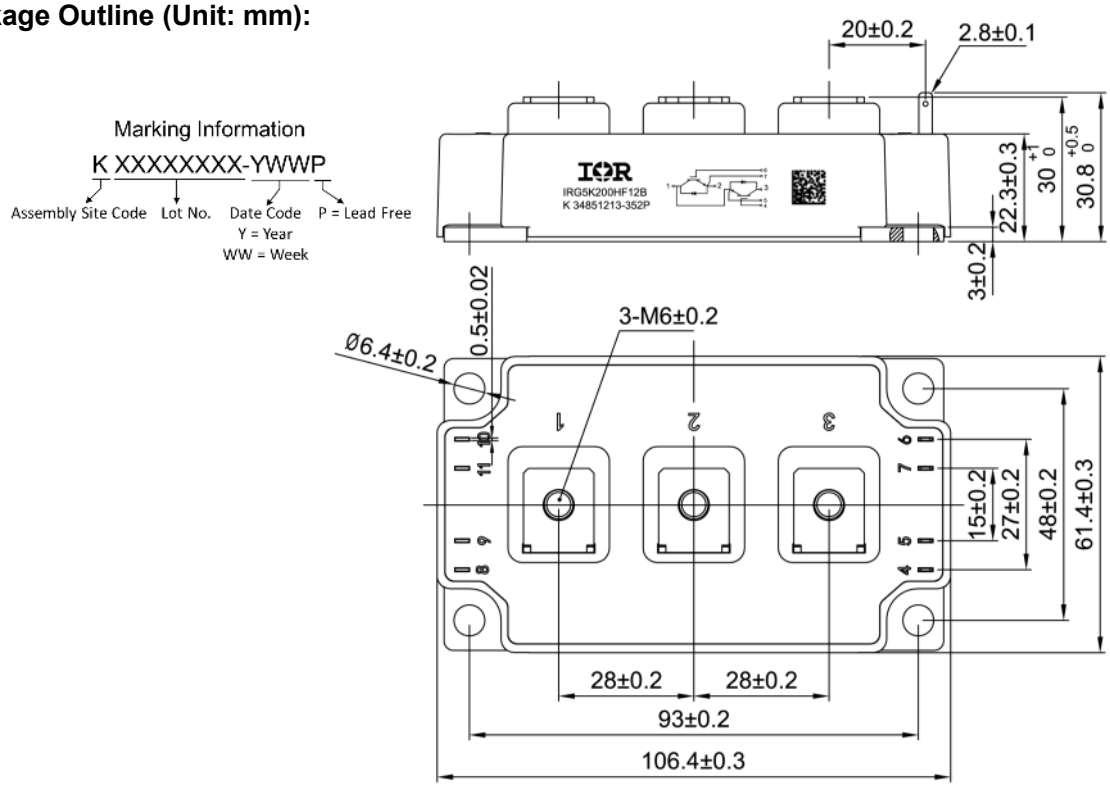


Fig.10 Typical Transient Thermal Impedance (Diode)

Internal Circuit:



Package Outline (Unit: mm):



Qualification Information†

Qualification Level	Industrial (link to qualification report)
Moisture Sensitivity Level	Not Applicable
RoHS Compliant	Yes

† Qualification standards can be found at International Rectifier's web site: http://www.irf.com/product-info/reliability/

†† Applicable version of JEDEC and MIL standards at the time of product release.

International
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