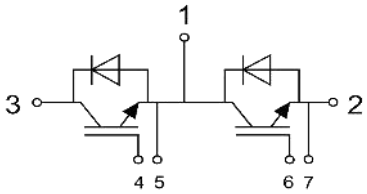
V_{CES} = 1200V
I_C = 35A at T_C = 80ºC
t_{SC} ≥ 10µsec
$V_{CE(ON)}$ = 2.30V at I_C = 35A

IGBT Half-Bridge
POWIR 34™ Package



Applications:

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

Features	**Benefits**
Low $V_{CE(ON)}$ and Switching Losses	High Efficiency in a Wide Range of Applications
100% RBSOA Tested	Rugged Transient Performance
10µsec Short Circuit Safe Operating Area	
POWIR 34™ Package	Industry Standard
Lead Free	RoHS Compliant, Environmental Friendly

Base Part Number	**Package Type**	**Standard Pack**	**Quantity**	**Orderable Part Number**
IRG5K35HF12A	***POWIR 34™***	Box	80	IRG5K35HF12A

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	35	A
		T_C = 25°C	70	A
I_{CM}	Pulse Collector Current	T_J = 150°C	70	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25°C, T_J = 150°C	280	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 = 1mA	
$V_{GE(th)}$	Gate Threshold Voltage	4.5	5.3	6.0	V	I_C = 0.25mA, V_{CE} = V_{GE}	
$V_{CE(ON)}$	Collector to Emitter Saturation Voltage		2.30	2.60	V	T_J = 25°C	I_C = 35A, V_{GE} = 15V
			2.60		V	T_J = 125°C	
I_{CES}	Collector to Emitter Leakage Current			1	mA	V_{GE} = 0V, V_{CE} = V_{CES}	
I_{GES}	Gate to Emitter Leakage Current			400	nA	V_{GE} = ±20V, V_{CE} = 0	

Switching Characteristics of IGBT

Parameter		Min.	Typ.	Max.	Unit	Test Conditions	
$t_{d(on)}$	Turn-on Delay Time		190		ns	T_J = 25°C	V_{CC}=600V, I_C = 35A, R_G = 15Ω, V_{GE}=±15V, Inductive Load
			185			T_J = 125°C	
t_r	Rise Time		40		ns	T_J = 25°C	
			50			T_J = 125°C	
$t_{d(off)}$	Turn-off Delay Time		215		ns	T_J = 25°C	
			225			T_J = 125°C	
t_f	Fall Time		170		ns	T_J = 25°C	
			325			T_J = 125°C	
E_{on}	Turn-on Switching Loss		2.51		mJ	T_J = 25°C	
			2.88			T_J = 125°C	
E_{off}	Turn-off Switching Loss		1.85		mJ	T_J = 25°C	
			2.83			T_J = 125°C	
Q_g	Total Gate Charge		400		nC	T_J = 25°C	
C_{ies}	Input Capacitance		3.4		nF	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz, T_J = 25°C	
C_{oes}	Output Capacitance		0.28				
C_{res}	Reverse Transfer Capacitance		0.11				
RBSOA	Reverse Bias Safe Operating Area	Trapezoid				I_C = 70A,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	70	A
	Diode Continuous Forward Current, T_C = 80°C	35	
I_{FM}	Pulse Diode Current	70	A

Electrical and Switching Characteristics of Freewheeling Diode

Parameter		Typ.	Max.	Unit	Test Conditions	
V_F	Forward Voltage	1.80	2.70	V	T_J = 25°C	I_F = 35A , V_{GE} = 0V
		2.00			T_J = 125°C	
I_{rr}	Peak Reverse Recovery Current	25		A	T_J = 25°C	I_F=35A, di/dt= 960A/µs, V_{rr} = 600V, V_{GE} = -15V
		30			T_J = 125°C	
Q_{rr}	Reverse Recovery Charge	2.8		µC	T_J = 25°C	
		4.0			T_J = 125°C	
E_{rec}	Reverse Recovery Energy	0.9		mJ	T_J = 25°C	
		1.7			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)		0.44		°C/W
$R_{\theta JC}$	Junction-to-Case (Diode)		0.81		°C/W
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)		0.1		°C/W
M	Power Terminals Screw: M5	3.0		5.0	N·m
M	Mounting Screw: M6	4.0		6.0	N·m
G	Weight		165		g

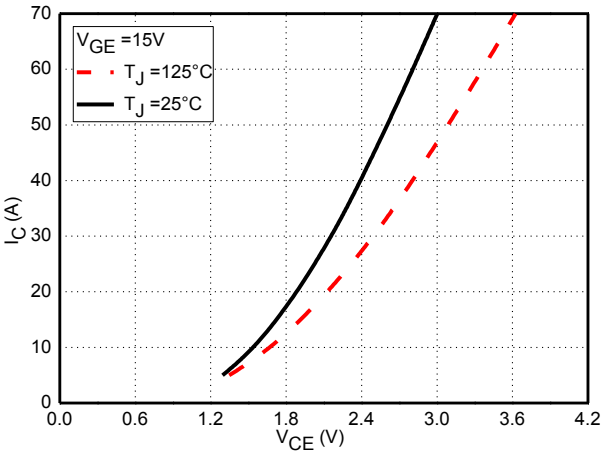


Fig.1 Typical IGBT Saturation Characteristics

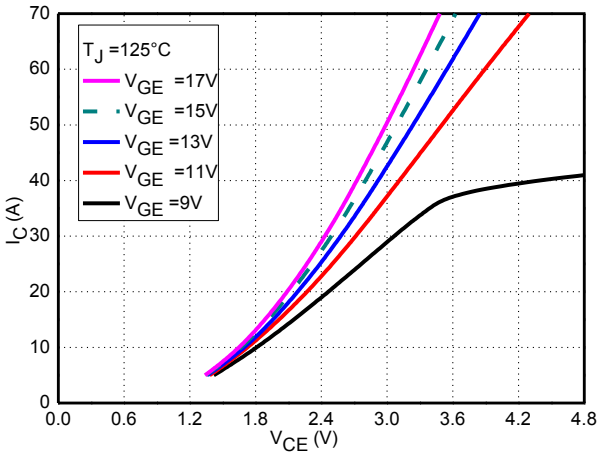


Fig.2 Typical IGBT Output Characteristics

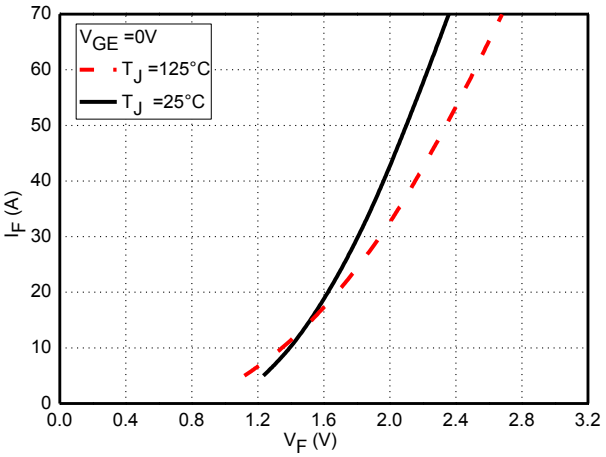


Fig.3 Typical Diode Forward Characteristics

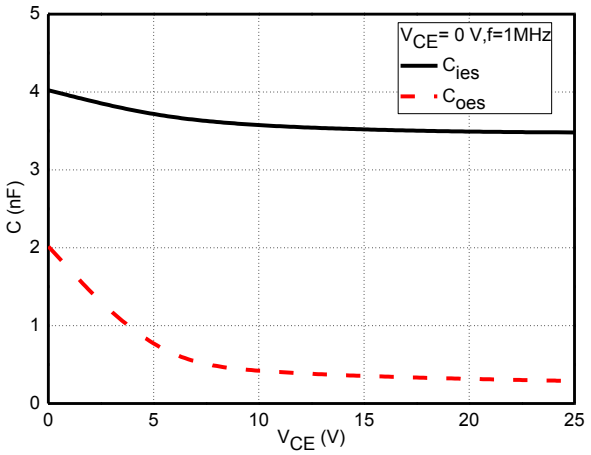


Fig. 4 Typical Capacitance Characteristics

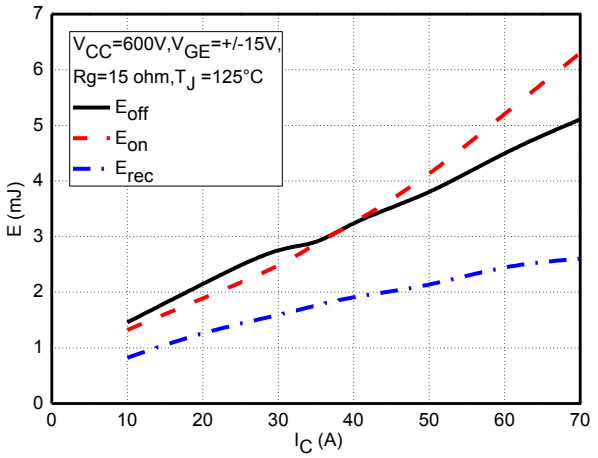


Fig.5 Typical Switching Loss vs. Collector Current

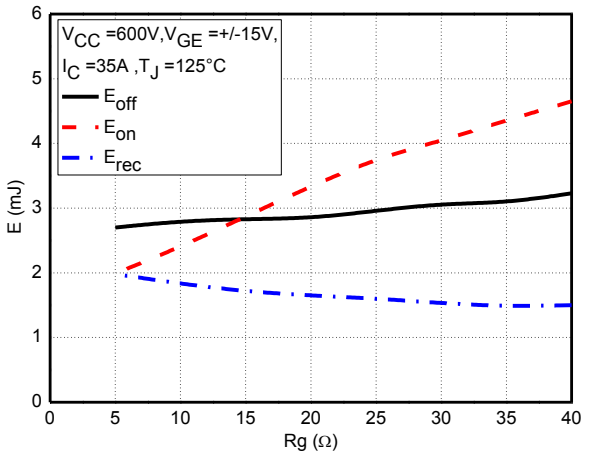


Fig.6 Typical Switching Loss vs. Gate Resistance

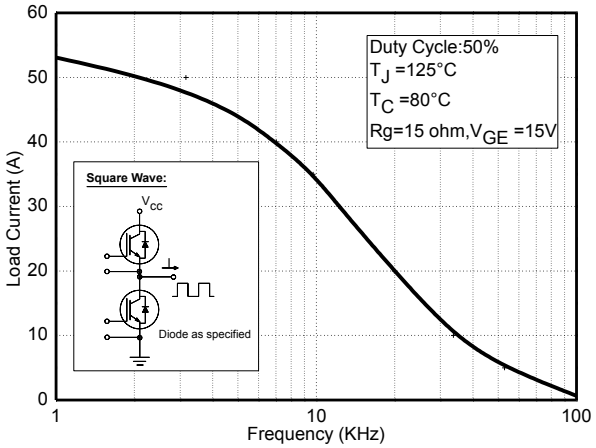


Fig.7 Typical Load Current vs. Frequency

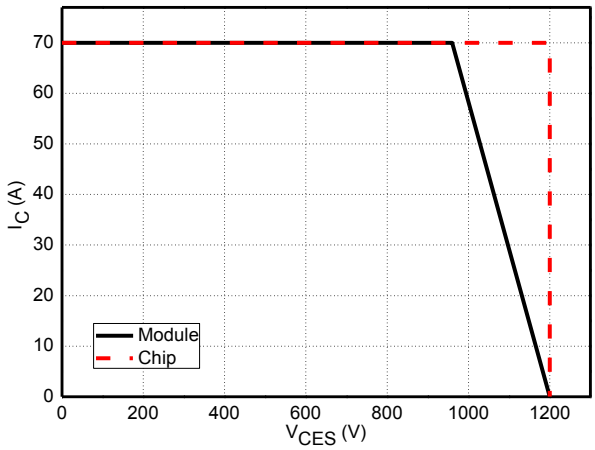
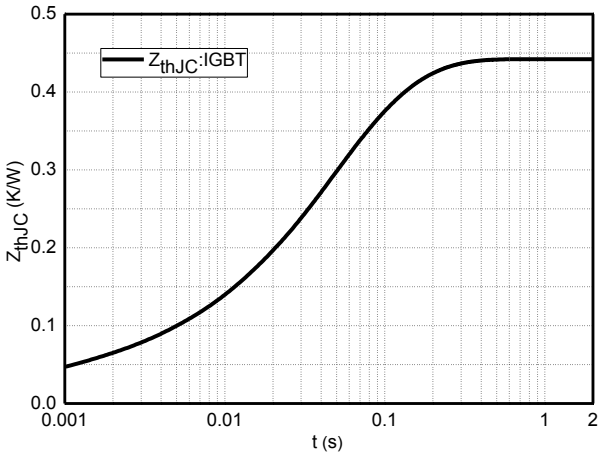


Fig.8 Reverse Bias Safe Operation Area (RBSOA)



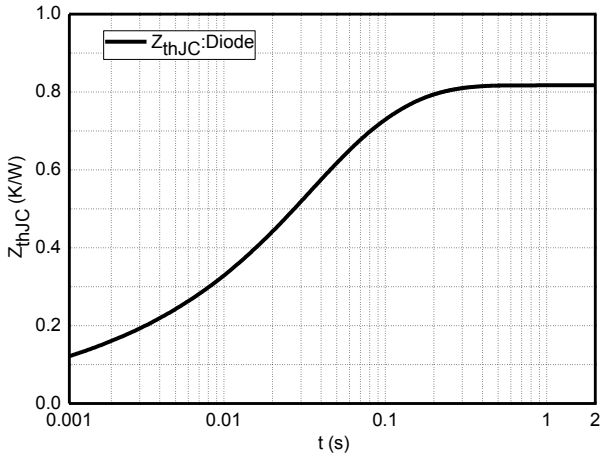
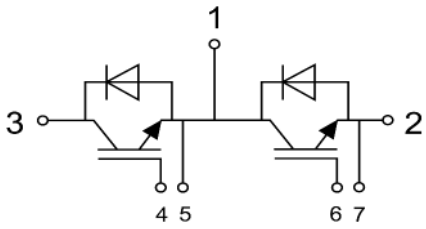


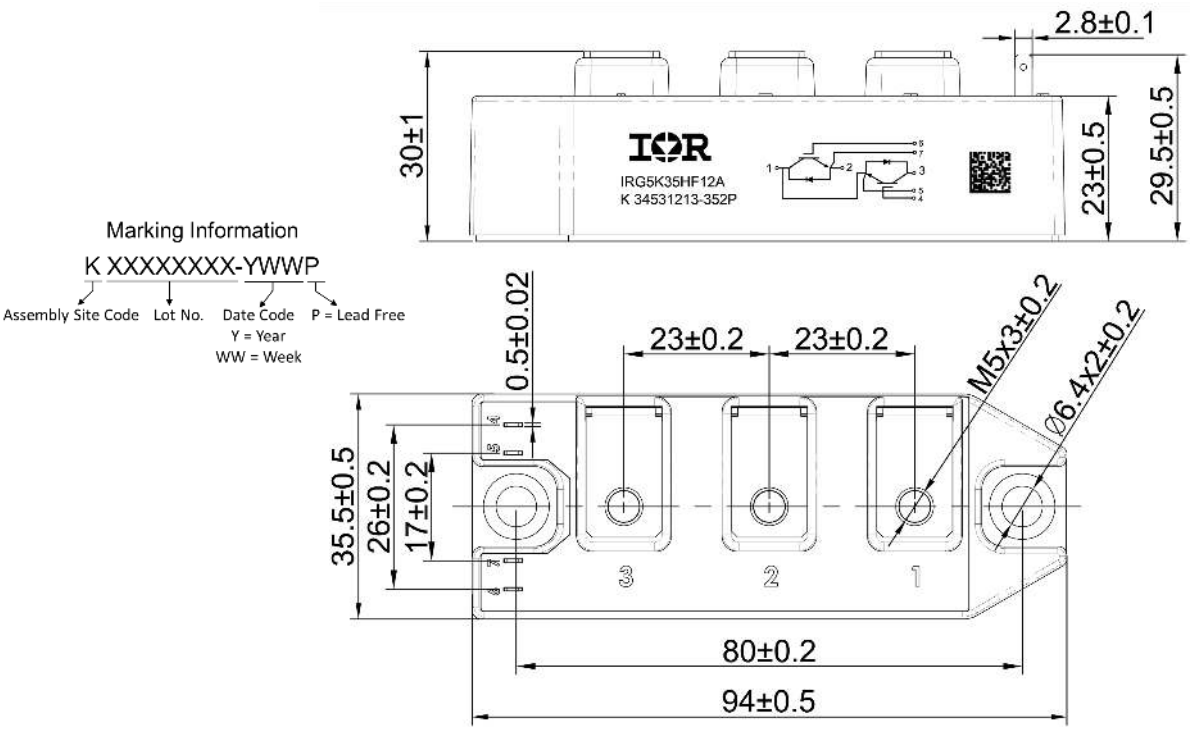
Fig.9 Typical Transient Thermal Impedance (IGBT)

Fig.10 Typical Transient Thermal Impedance (Diode)

Internal Circuit:



Package Outline (Unit: mm):



Qualification Information†

Qualification Level	Industrial
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/

International
IOR Rectifier

IR WORLD HEADQUARTERS: 101 North Sepulveda Blvd, El Segundo, California, 90245, USA
To contact International Rectifier, please visit: http://www.irf.com/whoto-call/

