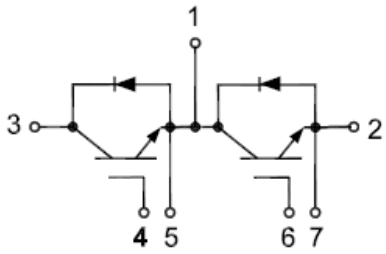
GK200HF60T1VH

IGBT Module

Preliminary Data

Features：



- Non Punch Through (NPT) Technology
- Short Circuit Rated>10μs
- Low Saturation Voltage
- Low Switching Loss
- 100% RBSOA Tested(2×Ic)
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：

- Welding Machine、Cutting Machine
- Plating Power Supply、Induction Heating
- SMPS、UPS

IGBT, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		600	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=80℃	200	A
		T_C=25℃	235	A
I_{CM}	Repetitive Peak Collector Current	tp=1ms	400	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C=25℃ T_{Jmax}=150℃	933	W

Electrical Characteristics of IGBT (T_C=25℃ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=8mA, V_{CE}=V_{GE}, T_J=25℃		4.0	5.0	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=200A, V_{GE}=15V	T_J=25℃		2.10	2.40	V
			T_J=125℃		2.30		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V, V_{CE}=V_{CES}, T_J=25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V, V_{CE}=0V, T_J=25℃				200	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=100kHz, T_J=25℃			7.52		nF
C_{oes}	Output Capacitance				1.19		nF
C_{res}	Reverse Transfer Capacitance				0.75		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=300V, I_C=200A, R_{Gon}=29Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		838		ns
			T_J=125℃		584		
t_r	Rise Time		T_J=25℃		207		ns
			T_J=125℃		289		
$t_{d(off)}$	Turn-off Delay Time	V_{CC}=300V, I_C=200A, R_{Goff}=29Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		1045		ns
			T_J=125℃		1020		
t_f	Fall Time		T_J=25℃		115		ns
			T_J=125℃		109		
E_{on}	Turn-on Switching Loss	V_{CC}=300V, I_C=200A, R_{Gon}=29Ω, V_{GE}=±15V, di/dt=610A/μs (T_J=125℃) Inductive Load	T_J=25℃		5.76		mJ
			T_J=125℃		9.30		
E_{off}	Turn-off Switching Loss	V_{CC}=300V, I_C=200A, R_{Goff}=29Ω, V_{GE}=±15V, du/dt=1304V/μs (T_J=125℃) Inductive Load	T_J=25℃		10.82		mJ
			T_J=125℃		11.79		
Q_g	Total Gate Charge	V_{GE}=+15V…-15V	T_J=25℃		1.13		μC
R_G	Internal Gate Resistance		T_J=25℃		2.35		Ω
RBSOA	I_C=400A, V_{CC}=480V, Vp=600V, R_G=29Ω, V_{GE}=+15V to 0V, T_J=150°C			Trapezoid			
SCSOA	V_{CC}=300V, V_{GE}=15V, T_J=150℃			10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case (per IGBT)					0.134	℃/W

Diode, Inverter

Maximum Rated Values (T_C=25℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	600	V
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current	400	A

Electrical Characteristics of Diode (T_C=25℃ unless otherwise specified)

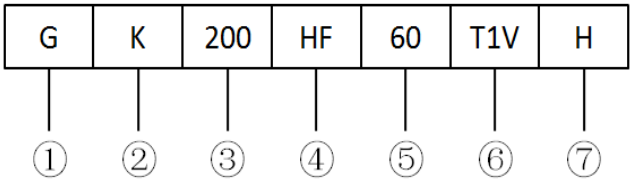
Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V_{FM}	Forward Voltage	I_F=200A	T_J=25℃		1.70	2.00	V
			T_J=125℃		1.80		
t_{rr}	Reverse Recovery Time	I_F=200A, -diF/dt=780A/μs(T_J=125℃), V_R=300V, V_{GE}=-15V	T_J=25℃		119		ns
			T_J=125℃		170		
I_{rr}	Peak Reverse Recovery Current		T_J=25℃		48.4		A
			T_J=125℃		67.2		
Q_{rr}	Reverse Recovery Charge		T_J=25℃		3.62		μC
			T_J=125℃		7.19		
E_{rec}	Reverse Recovery Energy		T_J=25℃		0.33		mJ
			T_J=125℃		1.20		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case (per Diode)					0.306	℃/W

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{iso}	Isolation Voltage (All Terminals Shorted)	RMS, f=50Hz, 30s		4500		V
T_J	Maximum Junction Temperature				150	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index			200		
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)				0.07	℃/W
T	Power Terminals Screw:M5		3.0		5.0	N·m
T	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			165		g

Ordering Information Table

Device code



① - IGBT Module
② - Non Punch Through (NPT) Technology
③ - Rated Current (200=200A)
④ - Circuit Configuration (HF=Half Bridge)
⑤ - Rated Voltage (60=600V)
⑥ - Package Type
⑦ - Test Level (Pass the Important Reliability Test-Industrial Grade)

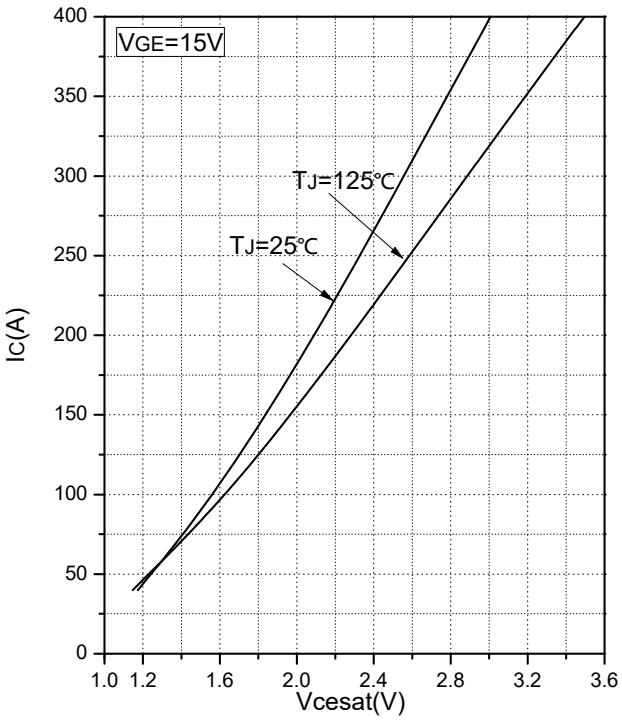


Fig.1 Typical Saturation Voltage Characteristics

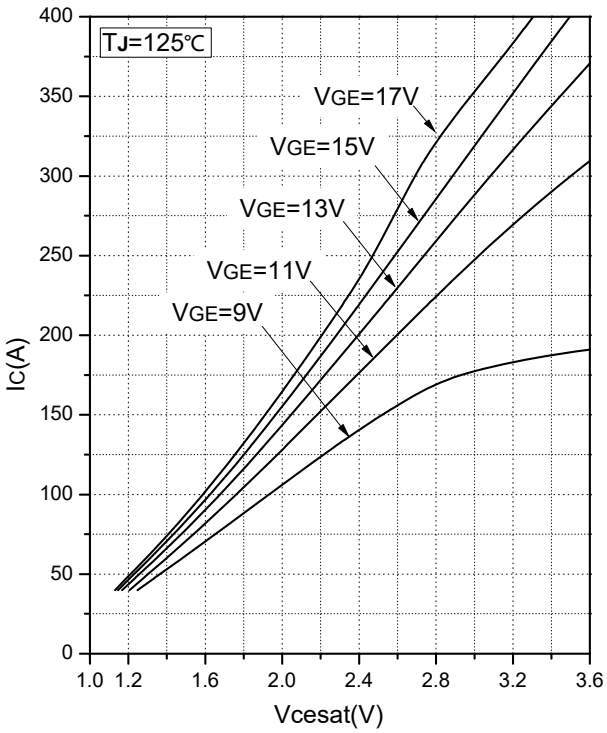


Fig.2 Typical Output Characteristics

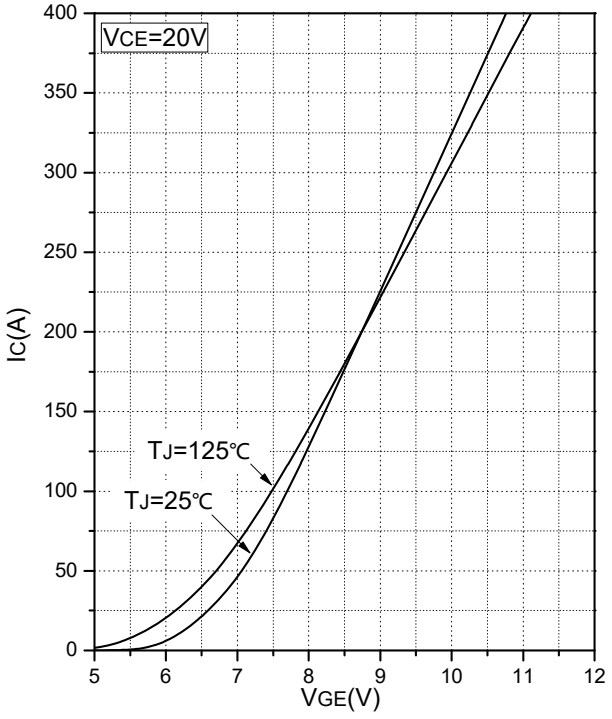


Fig.3 Transfer Characteristic

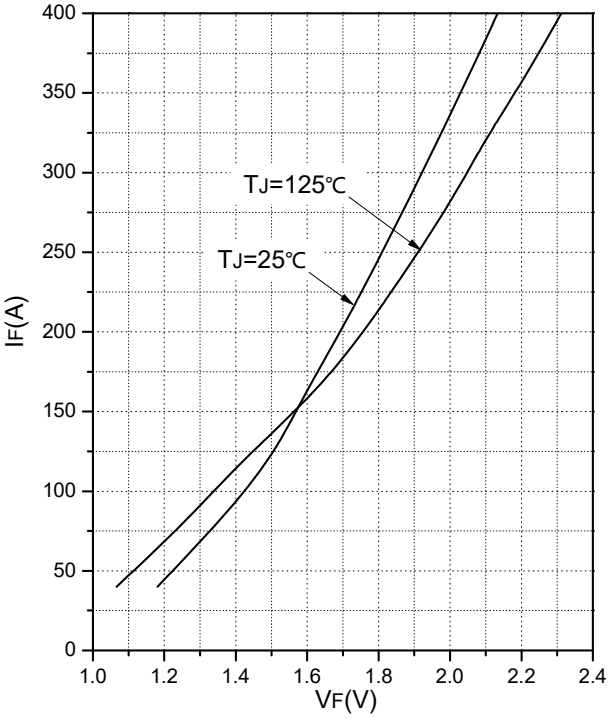


Fig.4 Forward Characteristics of Diode

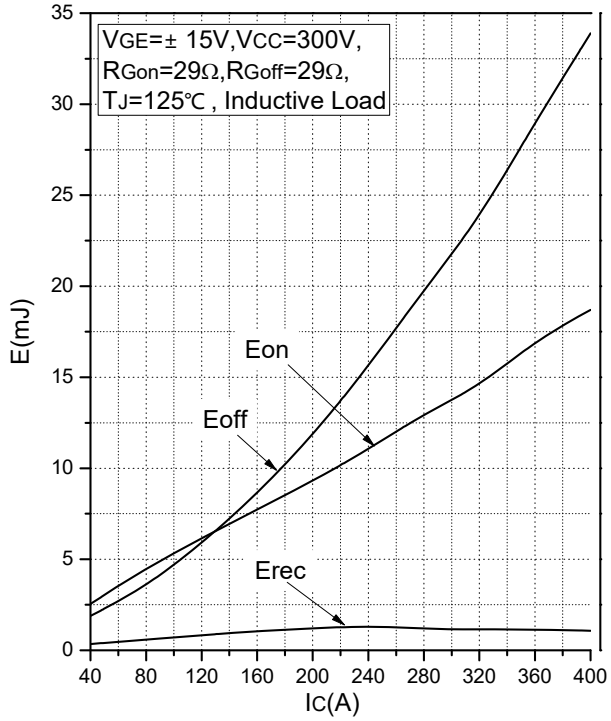


Fig.5 Typical Switching Loss vs. Collector Current

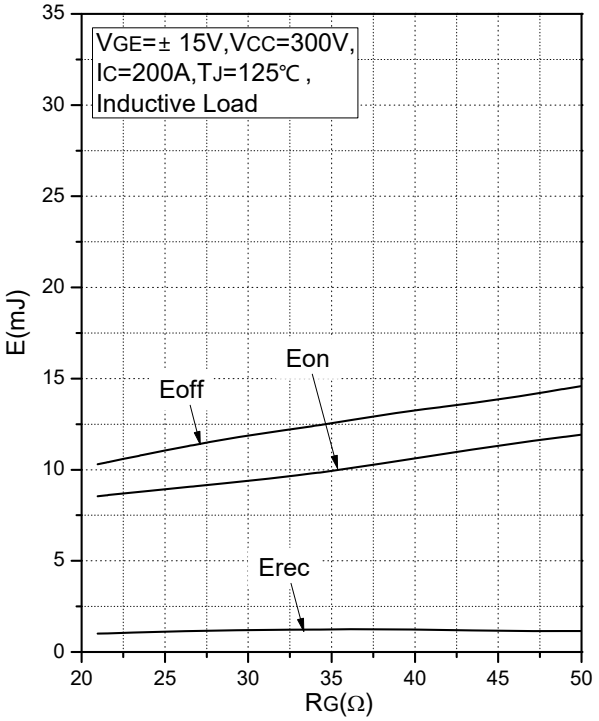


Fig.6 Typical Switching Loss vs. Gate Resistance

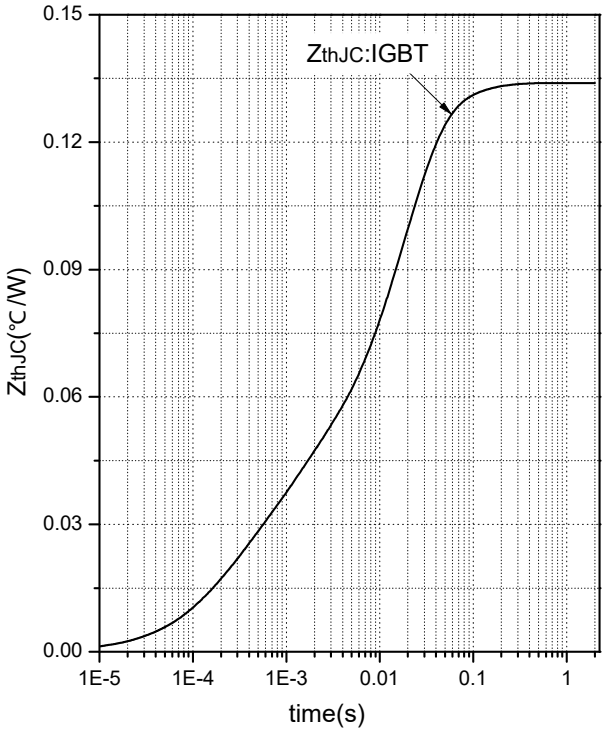


Fig.7 Transient Thermal Impedance (IGBT)

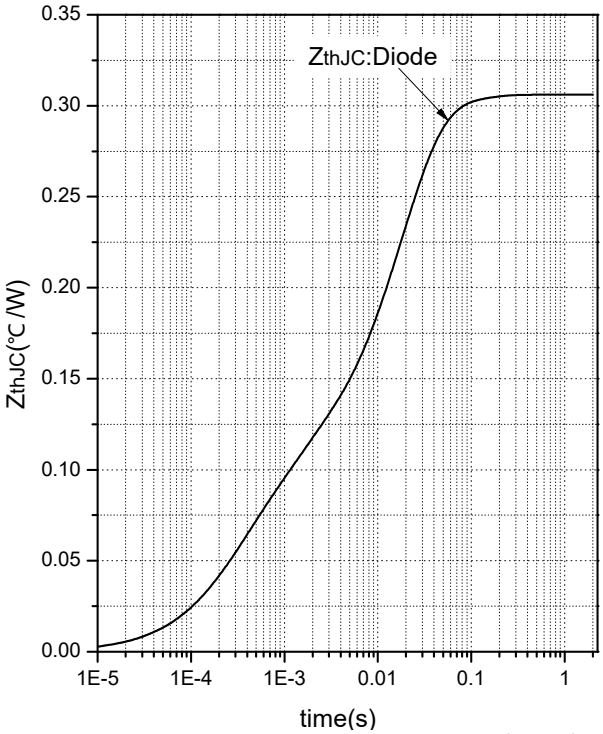


Fig.8 Transient Thermal Impedance (Diode)

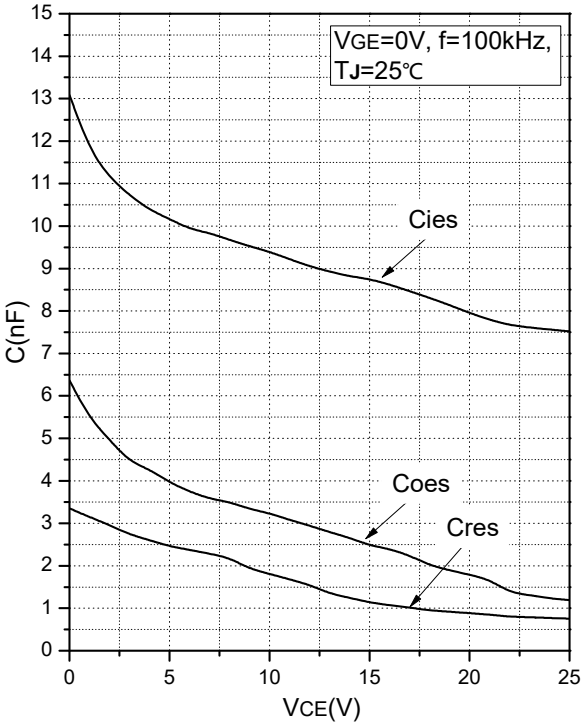


Fig.9 Capacitance Characteristics

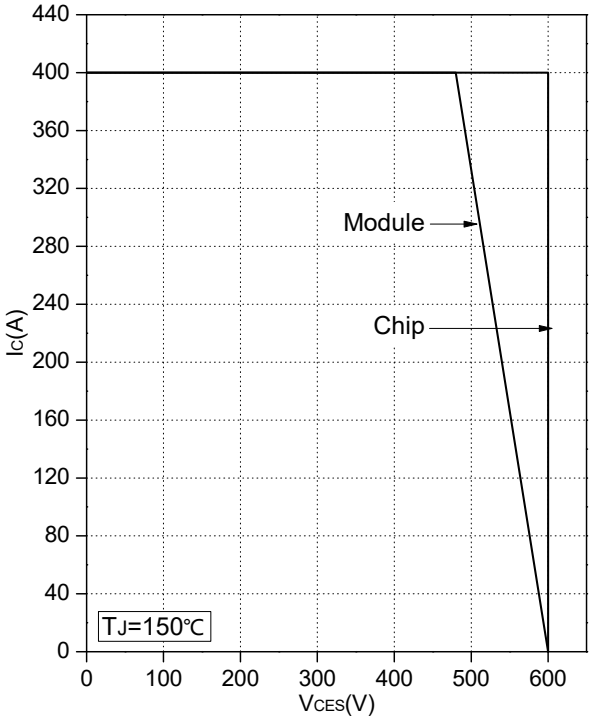
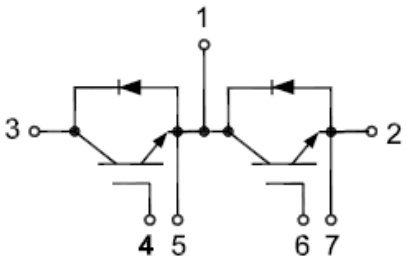
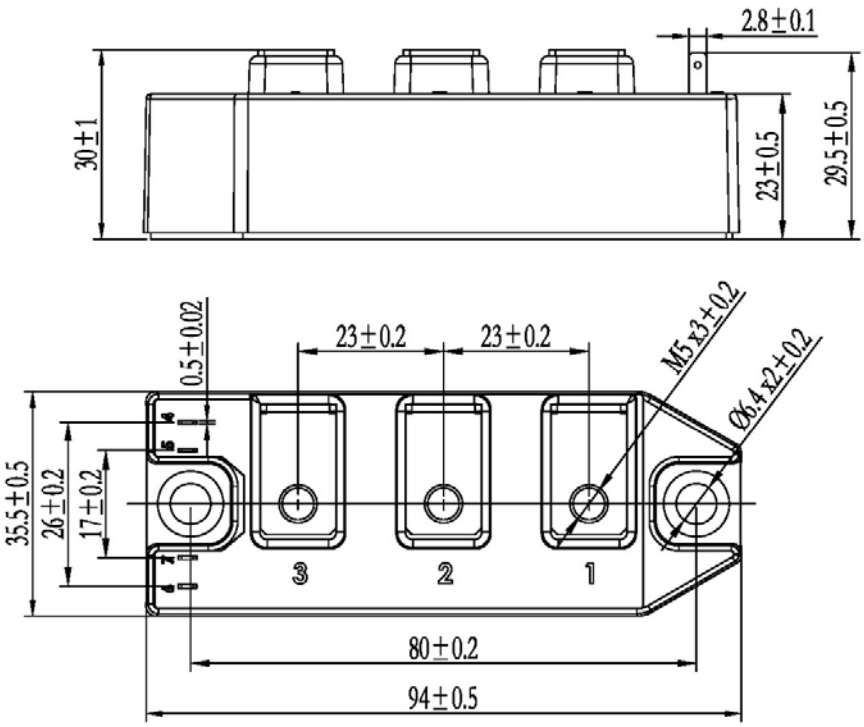


Fig.10 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit



Package Outline (Unit: mm):



Date	Revision	Notes
09/04/2023	01	Initial Release

Announcement

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The released datasheet would be issued with “REV.” + “alphabet characters”.