PRODUCT FEATURES

☐ IGBT CHIP(1200V NPT technology)

☐ Low switching losses

☐ $V_{CE(sat)}$ with positive temperature coefficient

☐ Fast switching and short tail current

☐ Free wheeling diodes with fast and soft reverse recovery

GA Series Module

APPLICATIONS

☐ AC motor control

☐ Motion/servo control

☐ Inverter and power supplies

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector - Emitter Voltage	T_j=25°C	1200	V
V_{GES}	Gate - Emitter Voltage		±20	
I_C	DC Collector Current	T_C=25°C	60	A
		T_C=80°C	40	
I_{CM}	Repetitive Peak Collector Current	tp=1ms	80	
P_{tot}	Power Dissipation Per IGBT		150	W

Diode-inverter

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	T_j=25°C	1200	V
$I_{F(AV)}$	Average Forward Current	T_C=25°C	20	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	40	
I^2t		T_j=125°C, t=10ms, V_R=0V	150	A^2S

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IGBT-inverter
ELECTRICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}$, I_C=1.3mA		4.9	5.7	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage (terminal)	I_C=40A, V_{GE}=15V, T_j=25°C			2.4	3	
		I_C=40A, V_{GE}=15V, T_j=125°C			3.00		
I_{CES}	Collector Leakage Current	V_{CE}=1200V, V_{GE}=0V, T_j=25°C				100	μA
		V_{CE}=1200V, V_{GE}=0V, T_j=125°C				1	mA
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=±15V, T_j=125°C		-200		200	nA
Q_g	Gate Charge	V_{CE}=600V, I_C=40A , V_{GE}=15V				0.24	μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz			0.75		nF
C_{res}	Reverse Transfer Capacitance				0.35		nF
$t_{d(on)}$	Turn - on Delay Time	V_{CC}=600V,I_C=40A, R_G =30Ω, V_{GE}=±15V, Inductive Load	Tj=25°C		30		ns
			Tj=125°C		25		ns
t_r	Rise Time		Tj=25°C		50		ns
			Tj=125°C		60		ns
$t_{d(off)}$	Turn - off Delay Time	V_{CC}=600V,I_C=40A, R_G =30Ω, V_{GE}=±15V, Inductive Load	Tj=25°C		250		ns
			Tj=125°C		300		ns
t_f	Fall Time		Tj=25°C		60		ns
			Tj=125°C		100	200	ns
E_{on}	Turn - on Energy	V_{CC}=600V,I_C=40A, R_G =30Ω, V_{GE}=±15V, Inductive Load	Tj=25°C		2.8		mj
			Tj=125°C		4		mj
E_{off}	Turn - off Energy		Tj=25°C		1.9		mj
			Tj=125°C		3		mj
t_{pSC}	IGBT Short Circuit SOA	$V_{GE}\leqslant$15V,V_{CC}=800V $T_j\leqslant$125°C,$V_{CEM}\leqslant$1200V				10	μs
R_{thJC}	Junction-to-Case Thermal Resistance （Per IGBT）					0.5	K /W

Diode-inverter
ELECTRICAL CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=20A , V_{GE}=0V, T_j=25°C		1.7	2.15	V
		I_F=20A , V_{GE}=0V, T_j=125°C		1.70		
I_{RRM}	Max. Reverse Recovery Current	I_F=20A , V_R=600V diF/dt=-1350A/μs Tj =125°C		47.9		A
Q_{RR}	Reverse Recovery Charge			11.4		μC
E_{rec}	Reverse Recovery Energy			3000		mj
R_{thJCD}	Junction-to-Case Thermal Resistance （Per Diode）				0.8	K /W

MODULE CHARACTERISTICS

T_C=25°C unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$T_{j\,max}$	Max. Junction Temperature				150	°C
$T_{j\,op}$	Operating Temperature		-40		125	
T_{stg}	Storage Temperature		-40		125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute			3000	V
Torque	to heatsink	Recommended（M6）	3		5	N•m
	to terminal	Recommended（M5）	2.5		5	N•m
Weight				102		g

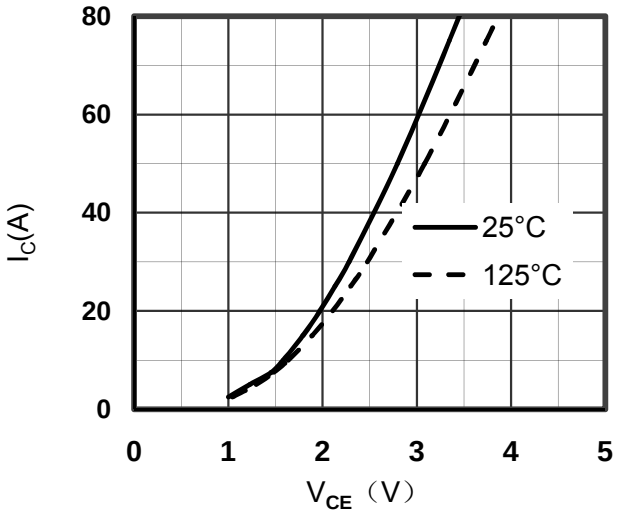


Figure1. Typical Output Characteristics IGBT-inverter

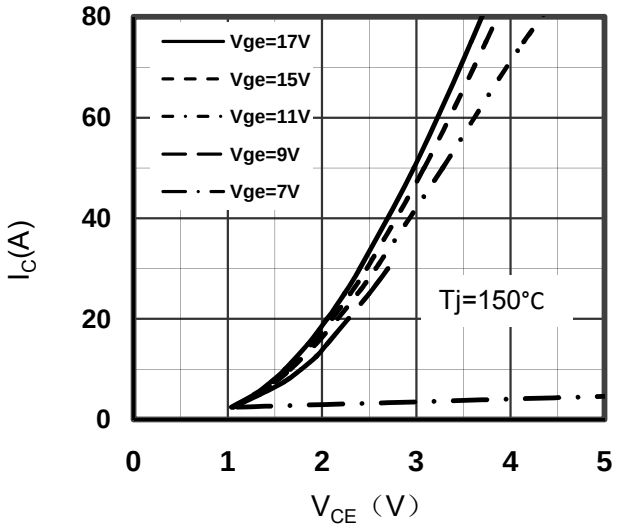


Figure2. Typical Output Characteristics IGBT-inverter

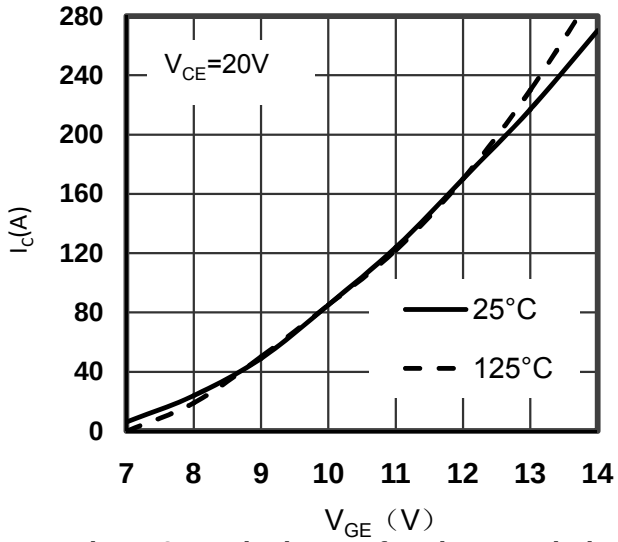


Figure3. Typical Transfer characteristics IGBT-inverter

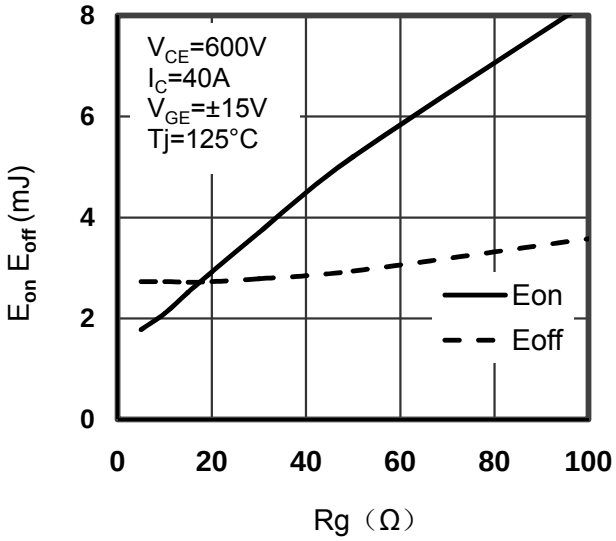


Figure4. Switching Energy vs. Gate Resistor IGBT-inverter

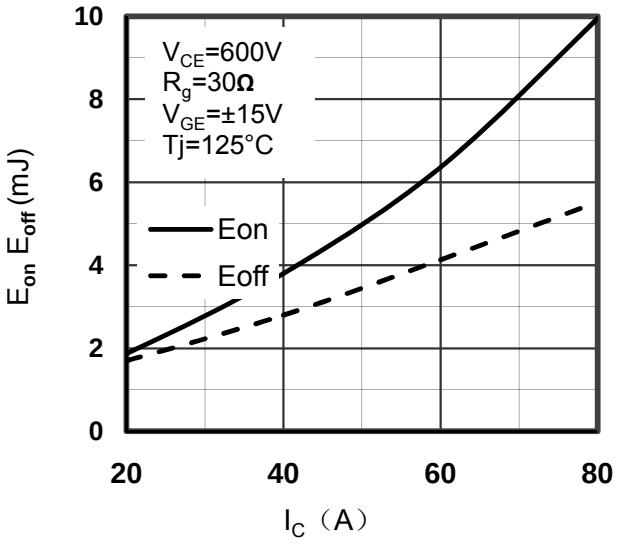


Figure5. Switching Energy vs. Collector Current IGBT-inverter

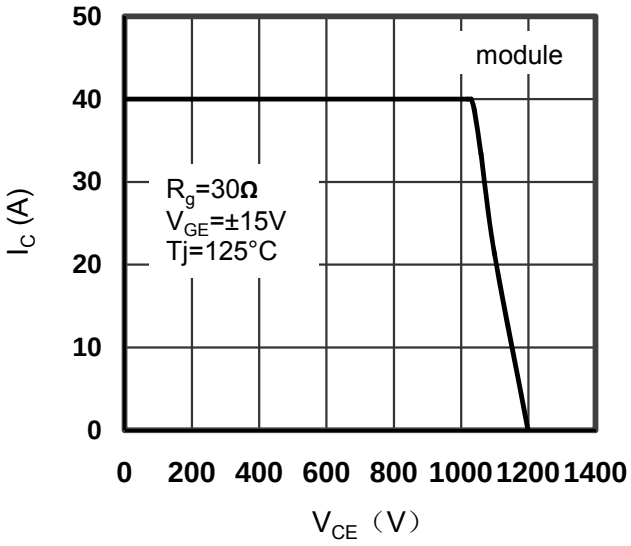


Figure6. Reverse Biased Safe Operating Area IGBT-inverter

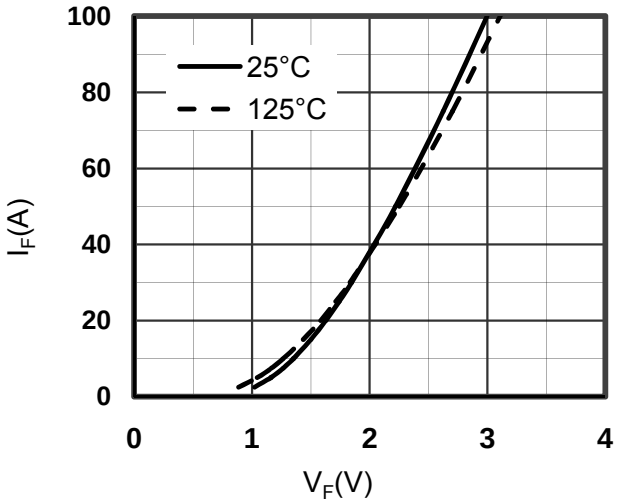


Figure7. Diode Forward Characteristics Diode -inverter

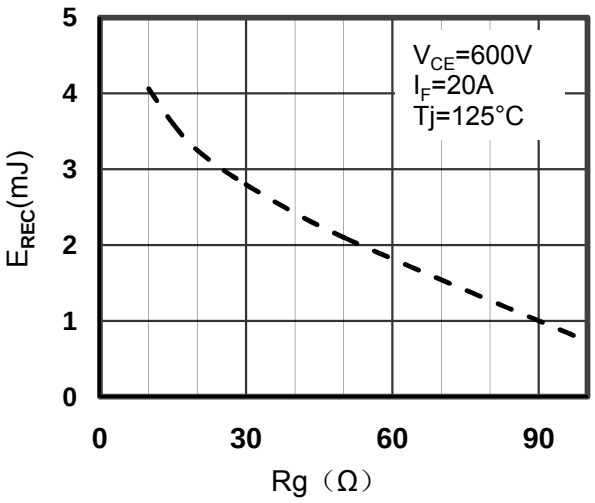


Figure8. Switching Energy vs. Gate Resistor Diode -inverter

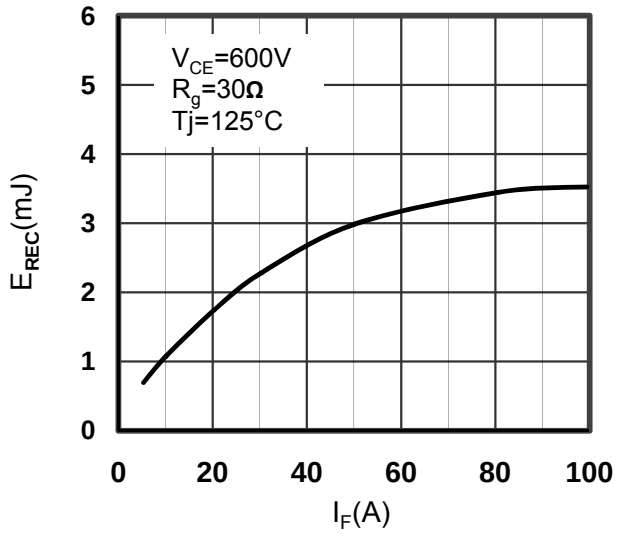


Figure9. Switching Energy vs. Forward Current Diode-inverter

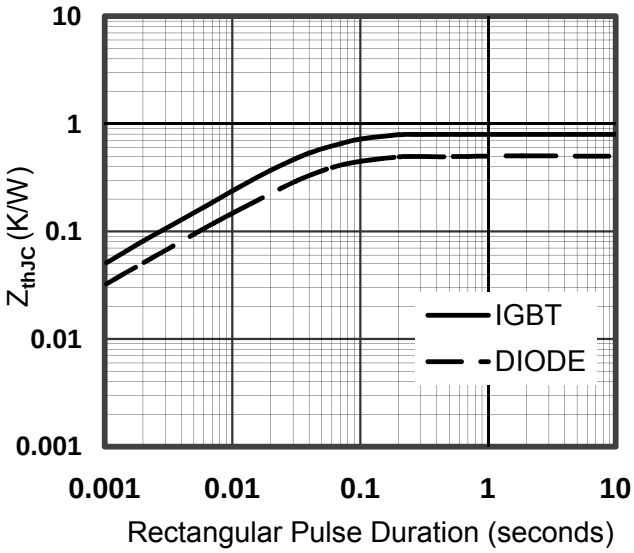


Figure10. Transient Thermal Impedance of Diode and IGBT-inverter

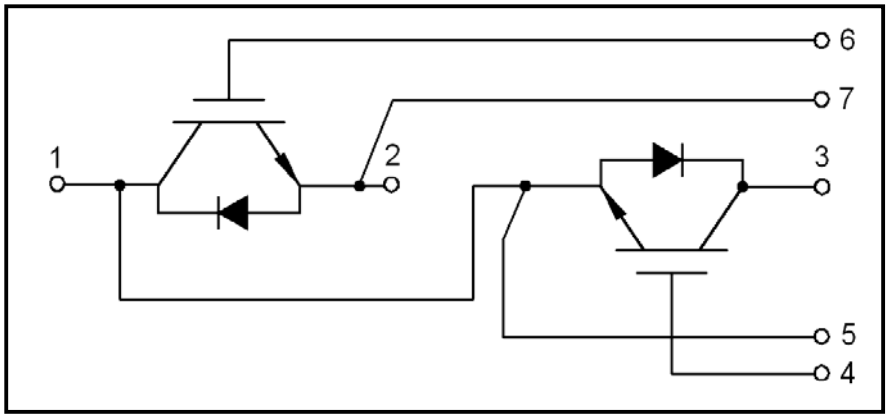
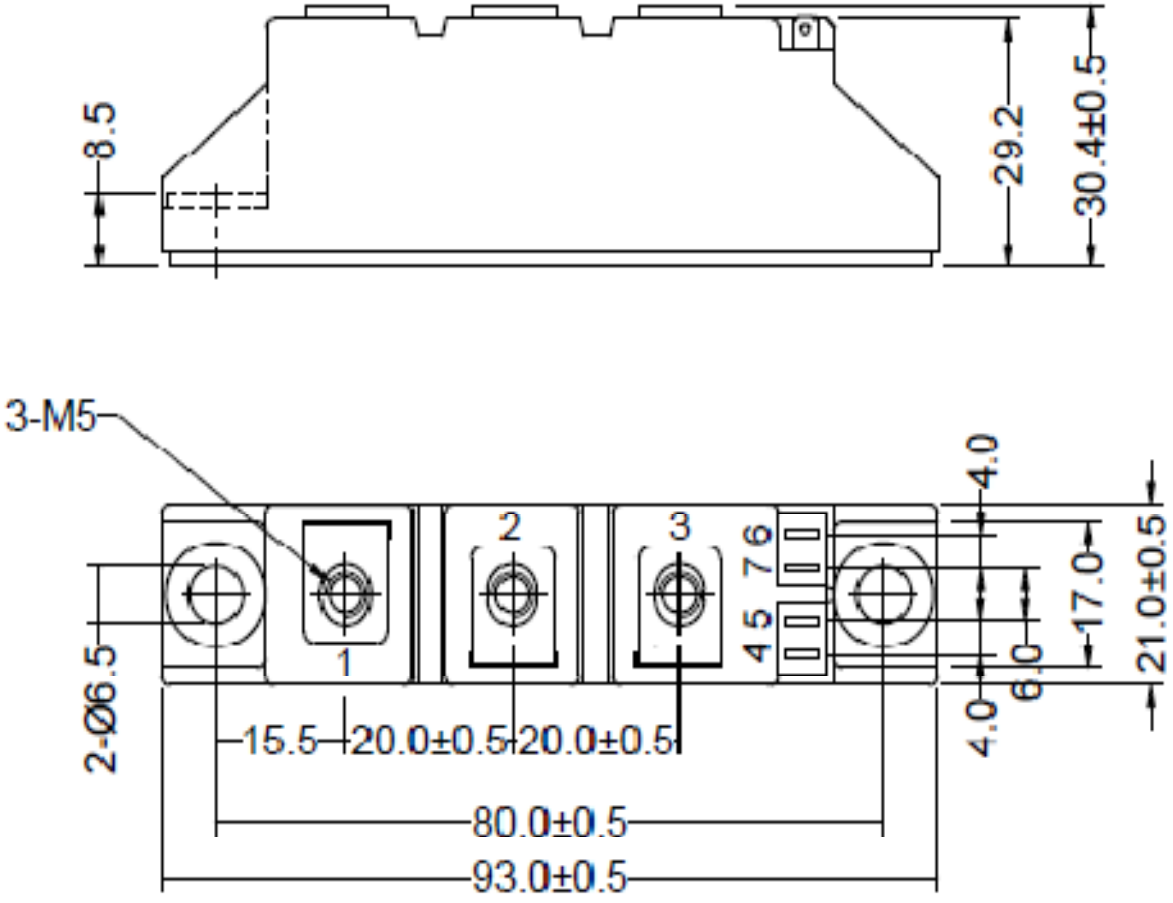


Figure11. Circuit Diagram



Dimensions in Millimeters

Figure12. Package Outline