

PRODUCT FEATURES

- ☐ IGBT chip in trench FS-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



APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Inverter and power supplies

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	$T_J = 25^\circ\text{C}$	1200	V
V_{GES}	Gate Emitter Voltage		± 20	
I_C	DC Collector Current	$T_C = 25^\circ\text{C}$	60	A
		$T_C = 80^\circ\text{C}$	40	
I_{CM}	Repetitive Peak Collector Current	$t_p = 1\text{ms}$	80	
P_{tot}	Power Dissipation Per IGBT		250	W

Diode-inverter

ABSOLUTE MAXIMUM RATINGS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_J = 25^\circ\text{C}$	1200	V
$I_{F(AV)}$	Average Forward Current	$T_C = 25^\circ\text{C}$	15	A
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1\text{ms}$	30	
I^2t		$T_J = 125^\circ\text{C}$, $t = 10\text{ms}$, $V_R = 0\text{V}$	60	A^2S

IGBT-inverter

ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit	
V _{GE(th)}	Gate Emitter Threshold Voltage	V _{CE} =V _{GE} , I _C =1.6mA	5.0	5.8	6.5	V	
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =40A, V _{GE} =15V, T _J =25℃		2.2	2.5		
		I _C =40A, V _{GE} =15V, T _J =125℃		2.5			
I _{CES}	Collector Leakage Current	V _{CE} =1200V, V _{GE} =0V, T _J =25℃			100	μA	
		V _{CE} =1200V, V _{GE} =0V, T _J =125℃			1	mA	
I _{GES}	Gate Leakage Current	V _{CE} =0V,V _{GE} =±15V, T _J =125℃	-400		400	nA	
R _{gint}	Integrated Gate Resistor			0		Ω	
Q _g	Gate Charge	V _{CE} =600V, I _C =40A , V _{GE} =15V		0.22		μC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		5.3		nF	
C _{res}	Reverse Transfer Capacitance			60		pF	
t _{d(on)}	Turn on Delay Time	V _{CC} =600V,I _C =40A R _G =30Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		100	ns	
			T _J =125℃		110	ns	
t _r	Rise Time		T _J =25℃		30	ns	
			T _J =125℃		35	ns	
t _{d(off)}	Turn off Delay Time		T _J =25℃		320	ns	
			T _J =125℃		360	ns	
t _f	Fall Time		T _J =25℃		50	ns	
			T _J =125℃		60	ns	
E _{on}	Turn on Energy	V _{CC} =600V,I _C =40A R _G =30Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		2.7	mJ	
			T _J =125℃		4	mJ	
E _{off}	Turn off Energy		T _J =25℃		1.5	mJ	
			T _J =125℃		1.9	mJ	
I _{sc}	Short Circuit Current		tpsc≤10μS , V _{GE} =15V T _J =125℃,V _{CC} =600V		160		A
R _{thJC}	Junction to Case Thermal Resistance （ Per IGBT ）				0.5	K /W	

Diode-inverter

ELECTRICAL CHARACTERISTICS

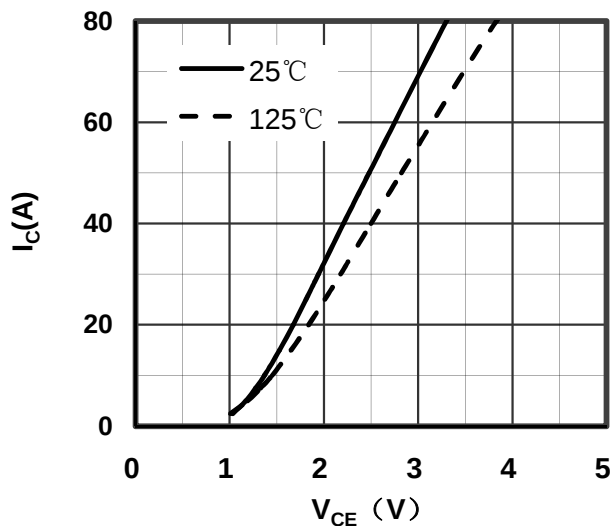
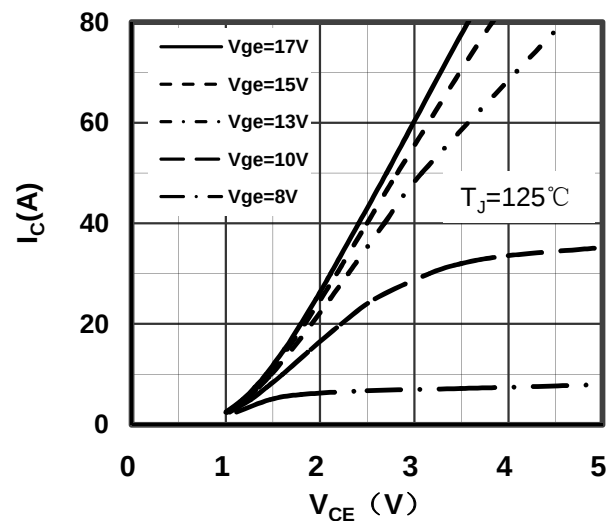
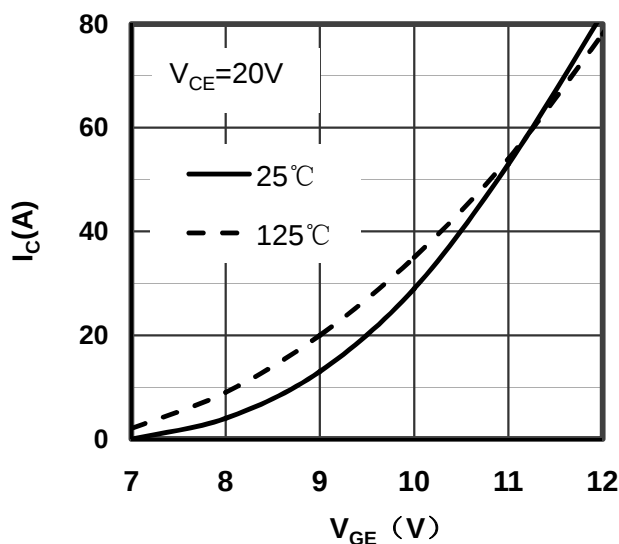
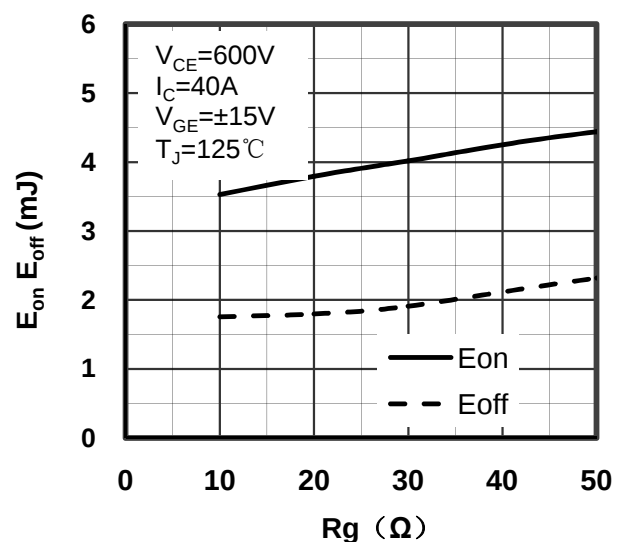
 $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V _F	Forward Voltage	I _F =15A , V _{GE} =0V, T _J =25℃		1.65	2.15	V
		I _F =15A , V _{GE} =0V, T _J =125℃		1.65		
t _{rr}	Reverse Recovery Time	I _F =15A , V _R =600V dI _F /dt=-700A/μs T _J =125℃		150		ns
I _{RRM}	Max. Reverse Recovery Current			32		A
Q _{RR}	Reverse Recovery Charge			3.6		μC
E _{rec}	Reverse Recovery Energy			1.2		mJ
R _{thJCD}	Junction to Case Thermal Resistance （ Per Diode ）				1.5	K /W

MODULE CHARACTERISTICS

 $T_C = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		150	$^\circ\text{C}$
T_{Jop}	Operating Temperature		-40~125	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
CTI	Comparative Tracking Index		> 200	
Torque	to heatsink	Recommended (M6)	3~5	Nm
	to terminal	Recommended (M5)	2.5~5	Nm
Weight			160	g

Figure 1. Typical Output Characteristics
IGBT-inverterFigure 2. Typical Output Characteristics
IGBT-inverterFigure 3. Typical Transfer characteristics
IGBT-inverterFigure 4. Switching Energy vs Gate Resistor
IGBT-inverter

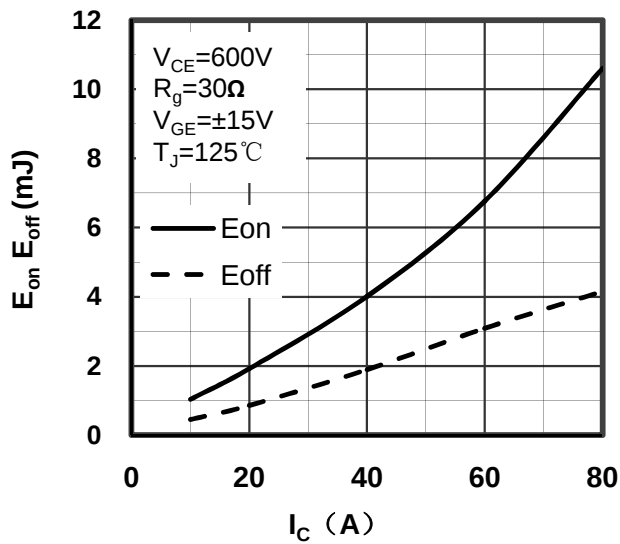


Figure 5. Switching Energy vs Collector Current
IGBT-inverter

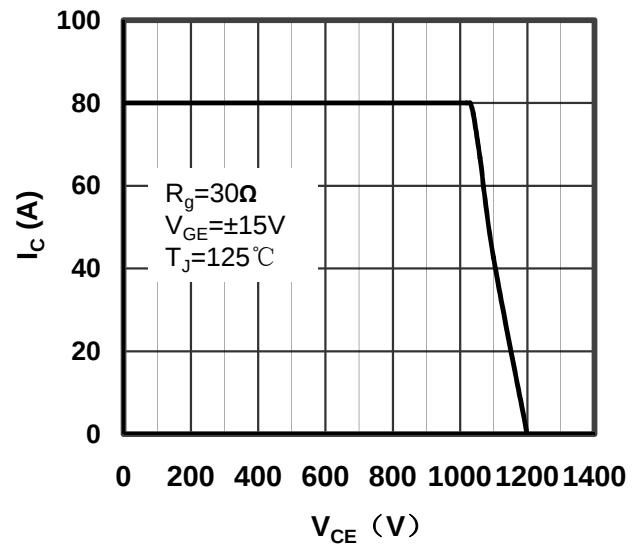


Figure 6. Reverse Biased Safe Operating Area
IGBT-inverter

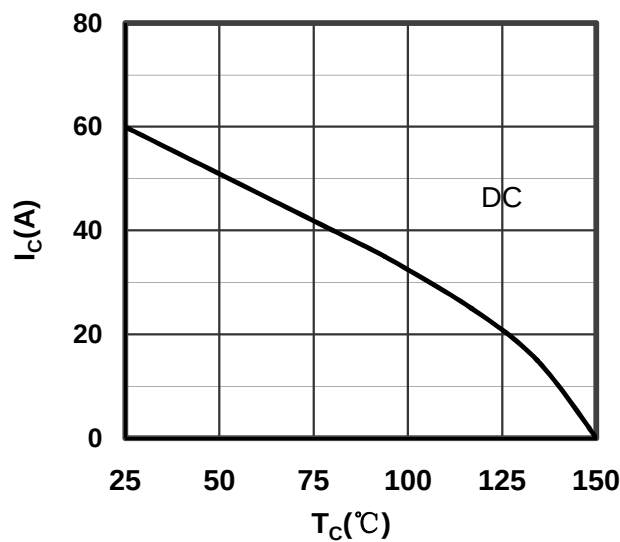


Figure 7. Collector Current vs Case temperature
IGBT -inverter

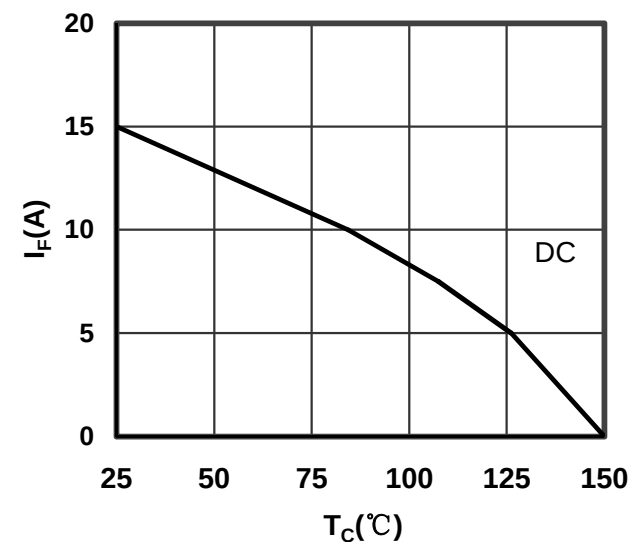


Figure 8. Forward current vs Case temperature
Diode -inverter

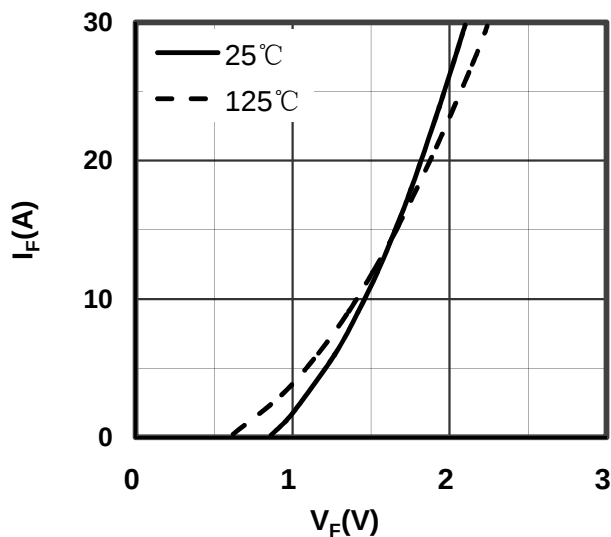


Figure 9. Diode Forward Characteristics
Diode -inverter

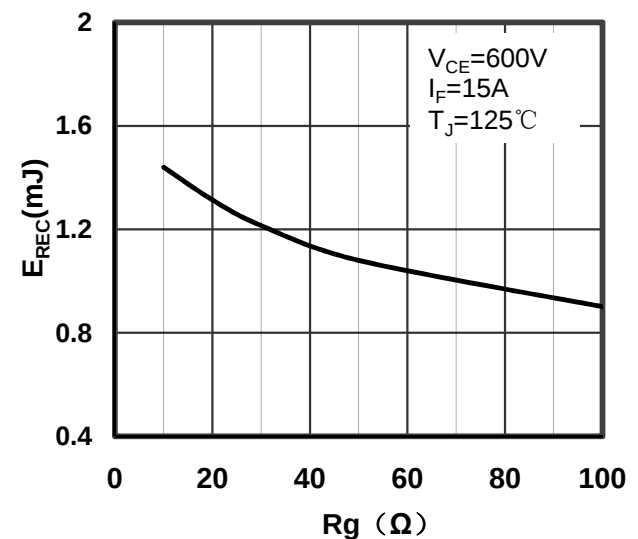


Figure 10. Switching Energy vs Gate Resistor
Diode -inverter

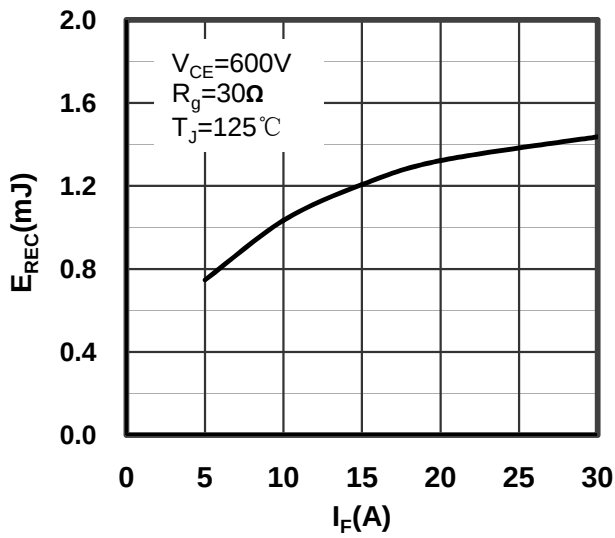


Figure 11. Switching Energy vs Forward Current Diode-inverter

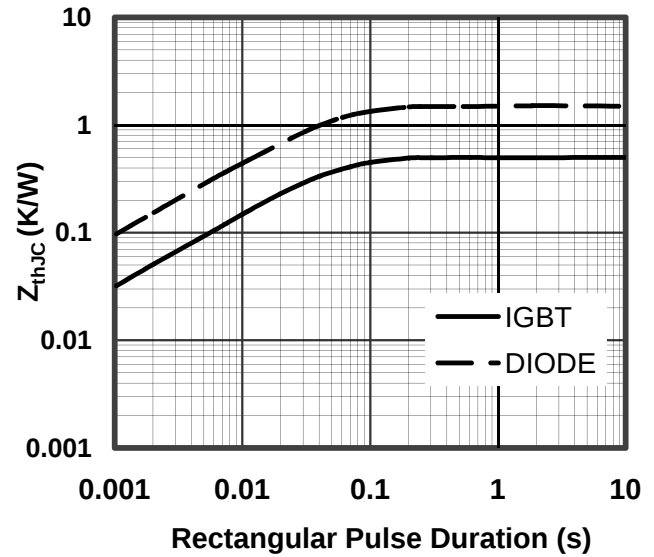


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

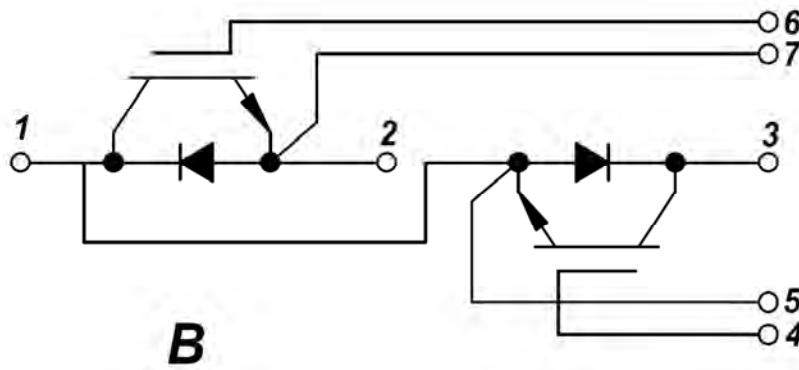
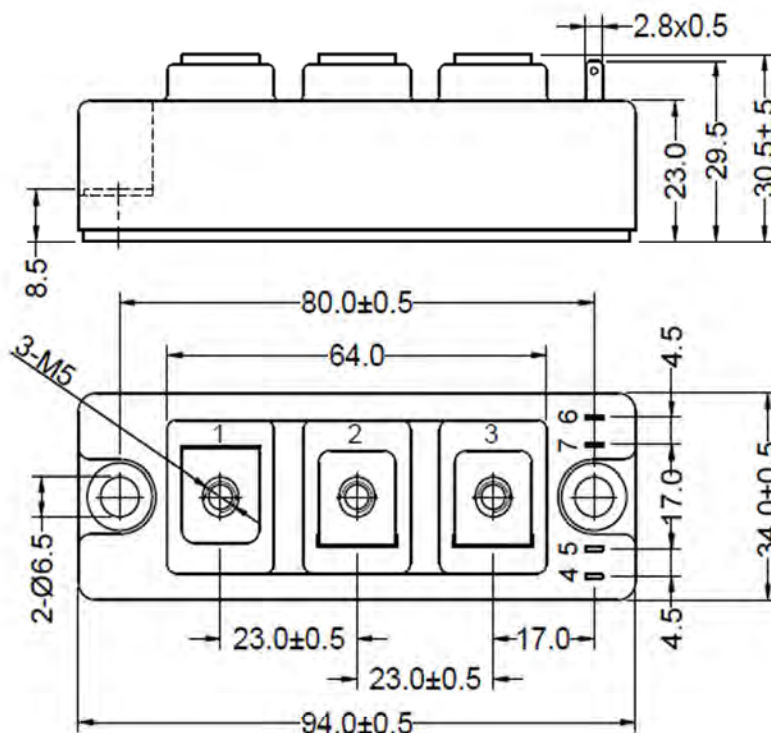


Figure 13. Circuit Diagram



Dimensions in (mm)
Figure 14. Package Outline