

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	$T_C=25^\circ\text{C}$	145	A
		$T_C=80^\circ\text{C}$	100	
I_{CM}	Repetitive Peak Collector Current	$t_p=1\text{ms}$	200	
P_{tot}	Power Dissipation Per IGBT		520	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	$T_C=25^\circ\text{C}$	60	A
I_{FRM}	Repetitive Peak Forward Current	$t_p=1\text{ms}$	120	
i^2t		$T_J=125^\circ\text{C}$, $t=10\text{ms}$, $V_R=0\text{V}$	880	A^2S

**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 =4mA	5.0	5.8	6.5	V	
V _{CE(sat)}	Collector Emitter Saturation Voltage	I _C =100A, V _{GE} =15V, T _J =25°C		2.2	2.5		
		I _C =100A, V _{GE} =15V, T _J =125°C		2.5			
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	-400		400	nA	
R _{gint}	Integrated Gate Resistor			0		Ω	
Q _g	Gate Charge	V _{CE} =600V, I _C =100A, V _{GE} =15V		0.51		μC	
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f =1MHz		11.2		nF	
C _{res}	Reverse Transfer Capacitance				180		pF
t _{d(on)}	Turn on Delay Time	V _{CC} =600V, I _C =100A R _G =10Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		170		ns
			T _J =125°C		180		ns
t _r	Rise Time	Inductive Load	T _J =25°C		50		ns
			T _J =125°C		55		ns
t _{d(off)}	Turn off Delay Time	V _{CC} =600V, I _C =100A R _G =10Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		440		ns
			T _J =125°C		490		ns
t _f	Fall Time	Inductive Load	T _J =25°C		40		ns
			T _J =125°C		50		ns
E _{on}	Turn on Energy	V _{CC} =600V, I _C =100A R _G =10Ω, V _{GE} =±15V, Inductive Load	T _J =25°C		6		mJ
			T _J =125°C		11.2		mJ
E _{off}	Turn off Energy	Inductive Load	T _J =25°C		4.5		mJ
			T _J =125°C		5.5		mJ
I _{sc}	Short Circuit Current	tpsc ≤ 10μS, V _{GE} =15V T _J =125°C, V _{CC} =600V		400		A	
R _{thJC}	Junction to Case Thermal Resistance (Per IGBT)				0.24	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 =60A, V _{GE} =0V, T _J =25°C		2.6	3.2	V
		I _F =60A, V _{GE} =0V, T _J =125°C		2.1		
t _{rr}	Reverse Recovery Time	I _F =60A, V _R =600V		180		ns
I _{RRM}	Max. Reverse Recovery Current	di _F /dt=-1600A/μs		122		A
Q _{RR}	Reverse Recovery Charge	T _J =125°C		13.5		μC
E _{rec}	Reverse Recovery Energy				4.1	
R _{thJCD}	Junction to Case Thermal Resistance (Per Diode)				0.65	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	°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

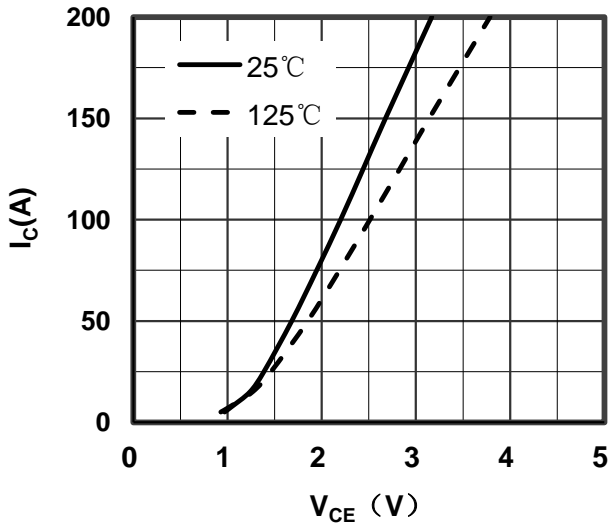


Figure 1. Typical Output Characteristics IGBT-inverter

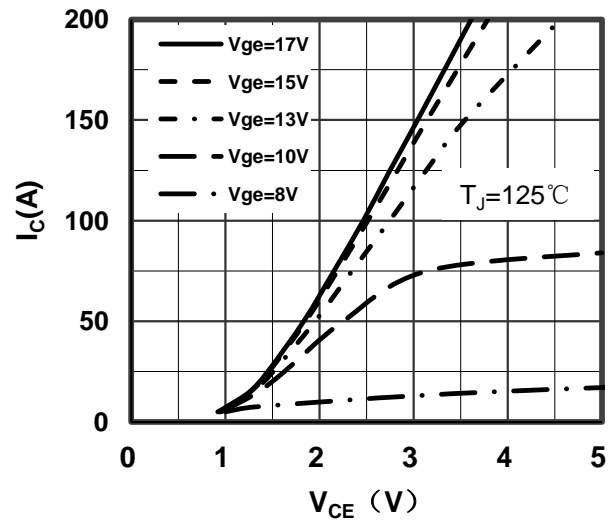


Figure 2. Typical Output Characteristics IGBT-inverter

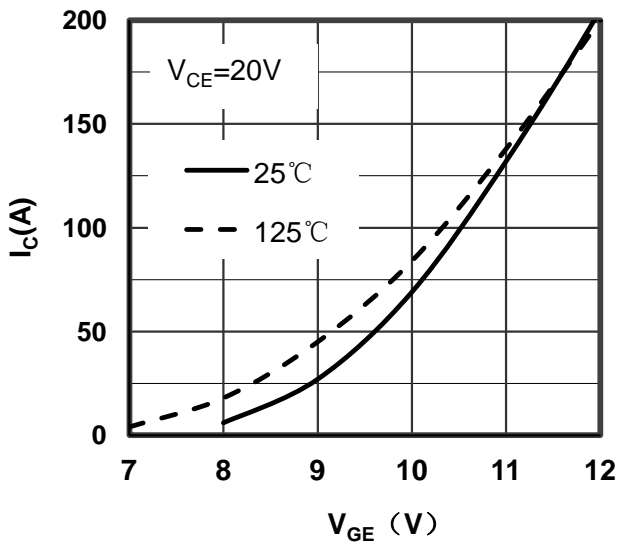


Figure 3. Typical Transfer characteristics IGBT-inverter

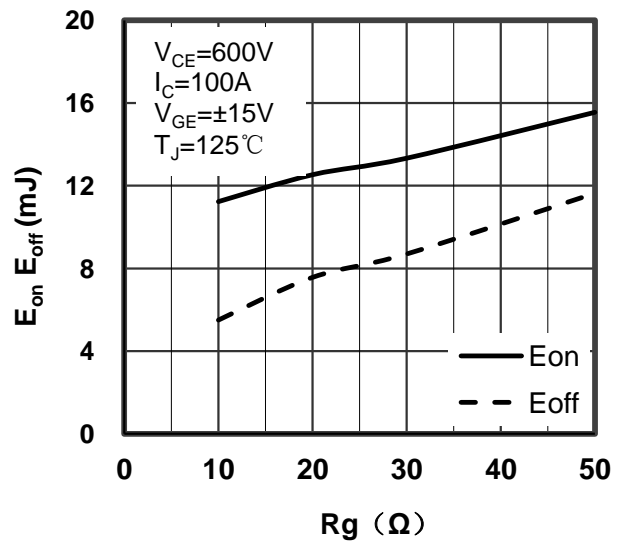


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

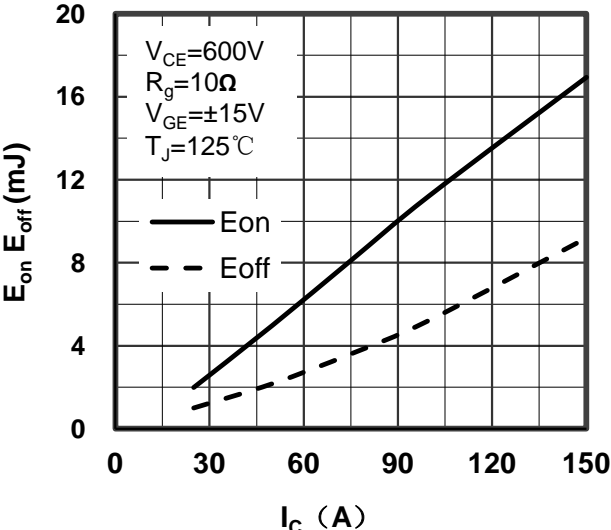


Figure 5. Switching Energy vs Collector Current IGBT-inverter

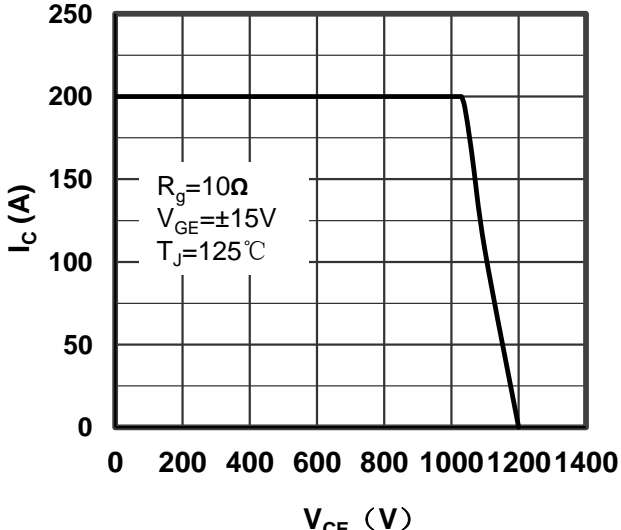


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

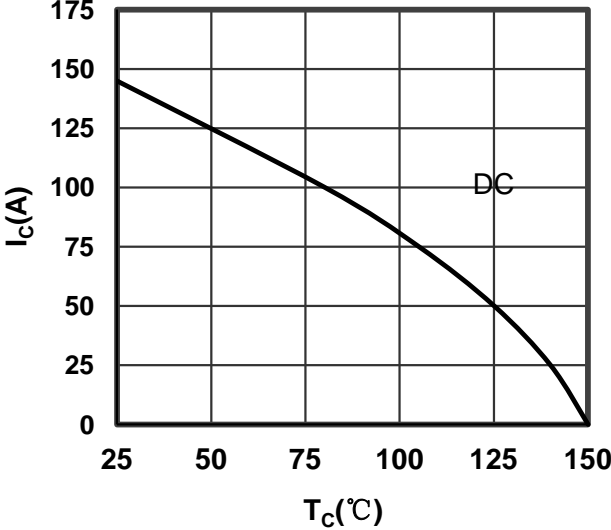


Figure 7. Collector Current vs Case temperature IGBT-inverter

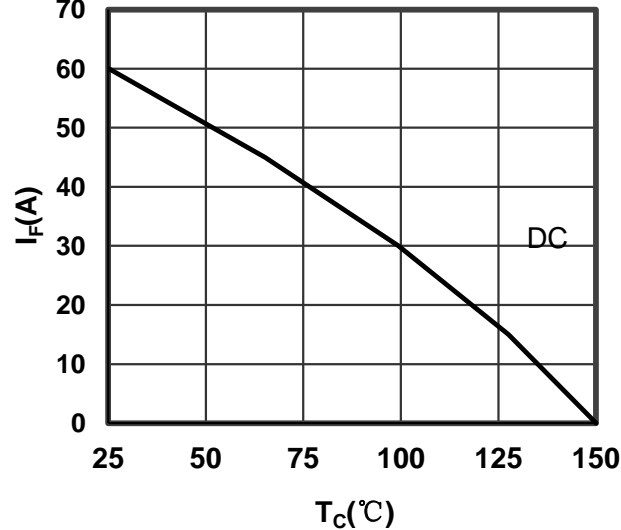


Figure 8. Forward current vs Case temperature Diode-inverter

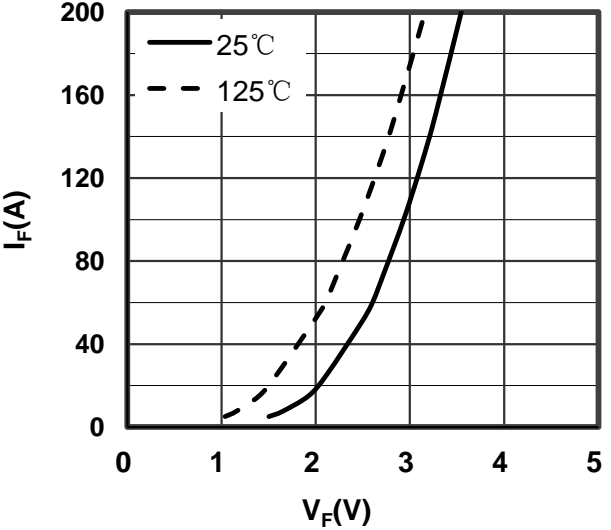


Figure 9. Diode Forward Characteristics Diode-inverter

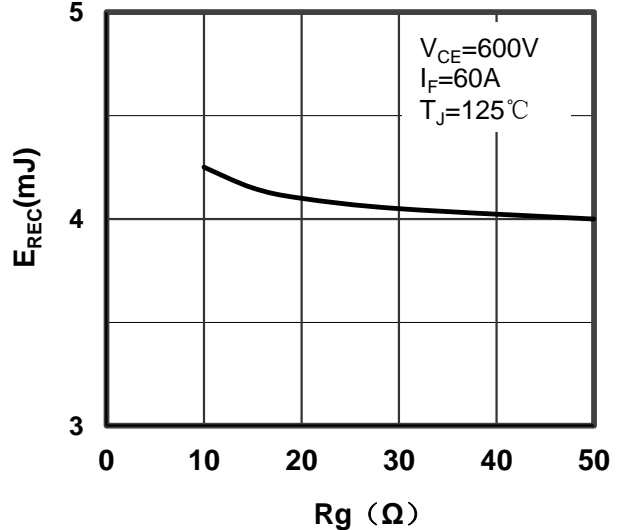


Figure 10. Switching Energy vs Gate Resistor Diode-inverter

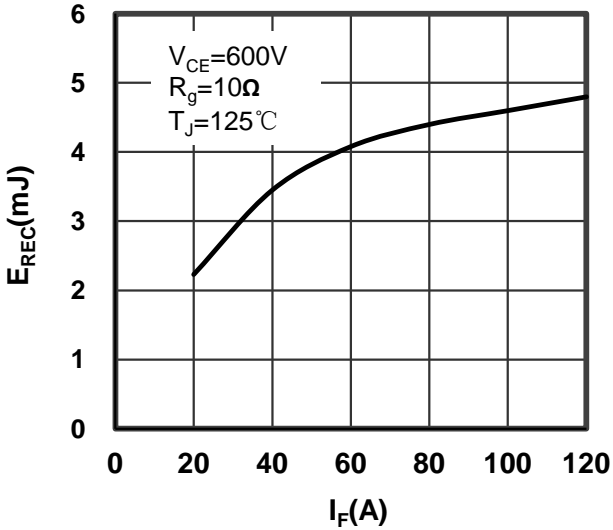


Figure 11. Switching Energy vs Forward Current Diode-inverter

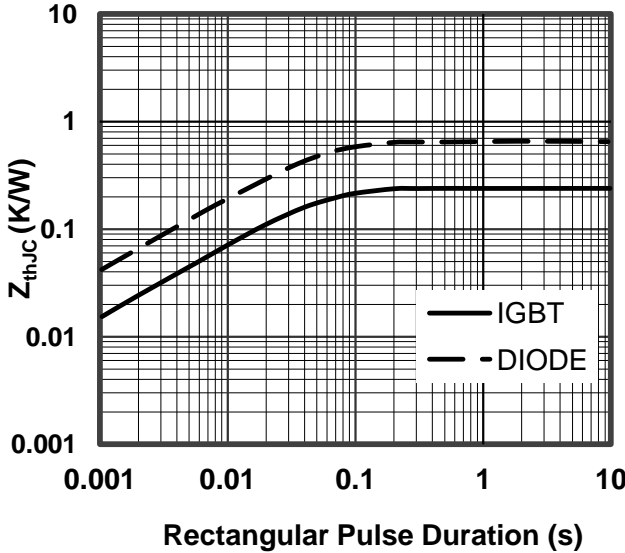


Figure 12. Transient Thermal Impedance of Diode and IGBT-inverter

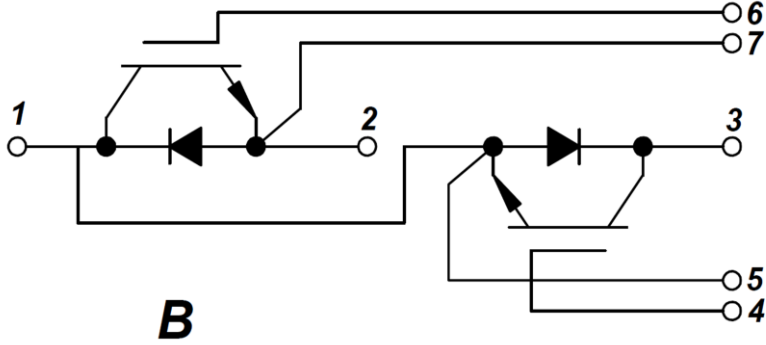
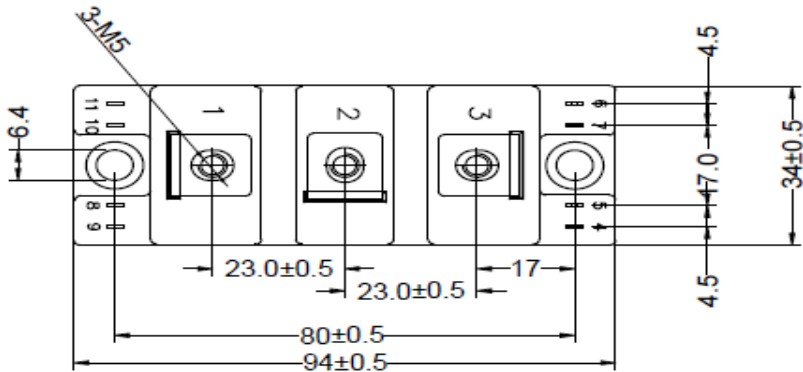
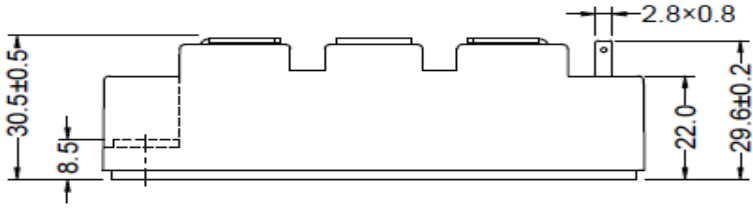


Figure 13. Circuit Diagram



Dimensions in (mm)
Figure 14. Package Outline