62mm module with fast Trench/Fieldstop IGBT and Fast Recovery Diode

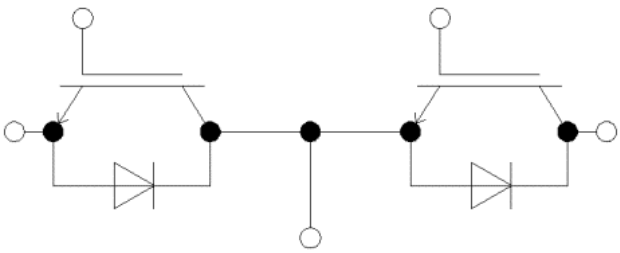
Features

- Low Switching Losses
- Low V_{CEsat}
- Low $V_{CE(sat)}$ with Positive Temperature Coefficient

Applications

- Motor Drives
- UPS Systems
- High Power Inverter

Equivalent Circuit Schematic



IGBT - Inverter

Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{CES}	Collector-Emitter Voltage	T_{vj}=25℃	1200	V
V_{GES}	Gate-Emitter Peak Voltage	T_{vj}=25℃	±20	V
I_C	Continuous DC Collector Current	T_C=100℃	150	A
I_{CRM}	Repetitive Peak Collector Current	t_P=1ms	300	A
P_{tot}	Total Power Dissipation	T_C=25℃, $T_{vj\ max}$=175℃	955	W

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=150A, T_{vj}=25℃	---	1.94	--	V
		V_{GE}=15V, I_C=150A, T_{vj}=125℃	---	2.41	--	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=6mA	5.0	5.7	6.8	V
I_{CES}	Collector-Emitter Cut-Off Current	V_{CE}=1200V, V_{GE}=0V	---	---	1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=20V, V_{CE}=0V	---	---	150	nA
R_{Gint}	Internal Gate Resistor	T_{vj}=25℃	---	3.0	---	Ω
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz	---	9.4	---	nF
C_{res}	Reverse Transfer Capacitance		---	0.4	---	nF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=150A R_G=6.8Ω Inductive Load T_{vj}=25℃	---	118	---	ns
t_r	Turn-on Rise Time		---	46	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	457	---	ns
t_f	Turn-off Fall Time		---	77.5	---	ns
E_{on}	Turn-on Switching Loss		---	13.1	---	mJ
E_{off}	Turn-off Switching Loss		---	10.4	---	mJ
I_{SC}	Short Circuit Data	V_{GE}≤15V, V_{CC}=800V t_P≤10μs, T_{vj}=25°C	---	640	---	A
R_{thJC}	Thermal Resistance, Junction to Case	Per IGBT	---	0.157	---	K/W
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

Diode - Inverter

Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}=25℃	1200	V
I_F	Continuous DC Forward Current		150	A
I_{FRM}	Repetitive Peak Collector Current	t_P=1ms	300	A

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	I_F=150A, V_{GE}=0V, T_{vj}=25℃	---	2.11	---	V
		I_F=150A, V_{GE}=0V, T_{vj}=125℃	---	1.84	---	V
I_{RM}	Peak Reverse Recovery Current	I_F=150A, V_R=600V, V_{GE}=-15V T_{vj}=25℃	---	56	---	A
Q_r	Recovered Charge		---	14.7	---	uC
E_{rec}	Reverse Recovery Energy		---	6.5	---	mJ
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

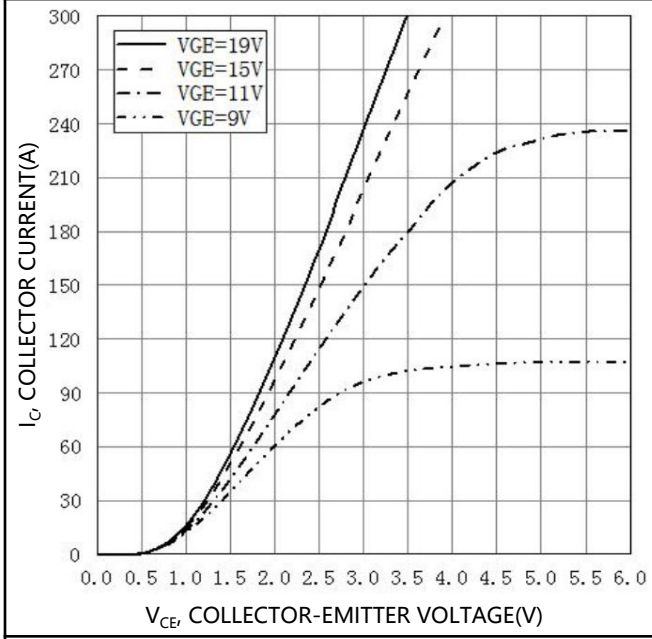
Module

Symbol	Description	Conditions	Values	Unit
V_{ISOL}	Isolation Test Voltage	RMS, f=50Hz, t=1min	4.0	KV
	Material of Module Baseplate		Cu	
	Internal Isolation	Basic Insulation (Class 1, IEC 61140)	Al_2O_3	
	Creepage Distance	Terminal to Terminal	23.1	mm
	Clearance	Terminal to Terminal	11	mm
CTI	Comparative Tracking Index		＞400	

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
L_{sCE}	Stray inductance module		---	22	---	nH
$R_{CC'+EE'}$	Module lead resistance, terminals-chip	Per switch, T_C=25℃	---	0.8	---	mΩ
T_{stg}	Storage Temperature		-40	---	125	℃
M	Mounting Torque for Modul Mounting		3.0	---	6.0	Nm
G	Weight		---	324	---	g

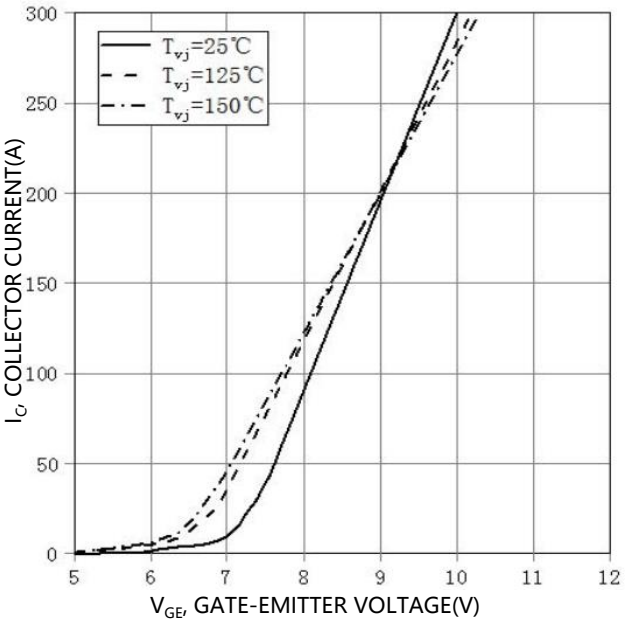
Typical Characteristics

Fig. 1



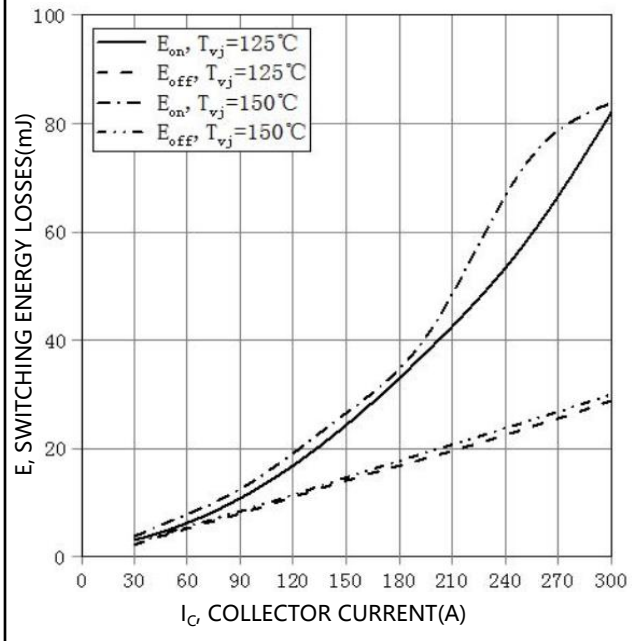
Output characteristic IGBT-Inverter (typical)
$I_C=f(V_{CE})$ at T_{vj}=150℃

Fig. 2



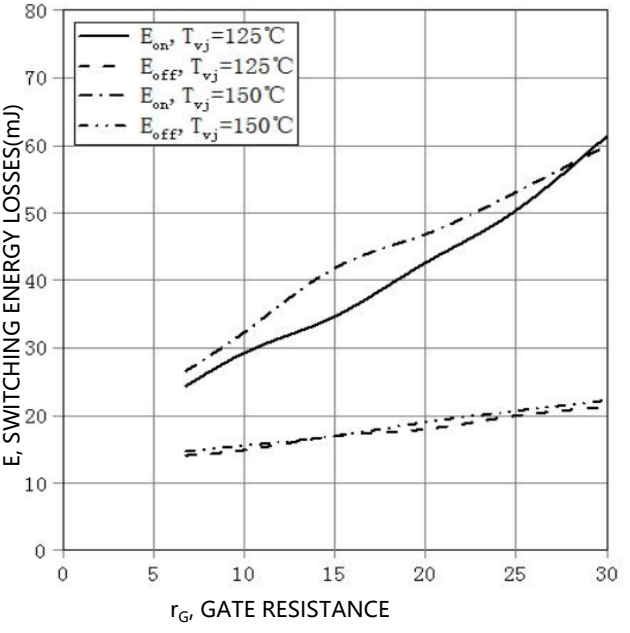
Transfer characteristic IGBT-Inverter (typical)
$I_C=f(V_{GE})$ at V_{CE}=20V

Fig. 3



Switching losses IGBT-Inverter (typical)
$E_{on}=f(I_C)$, $E_{off}=f(I_C)$ at $V_{GE}=\pm15V$, R_G=6.8Ω and V_{CE}=600V

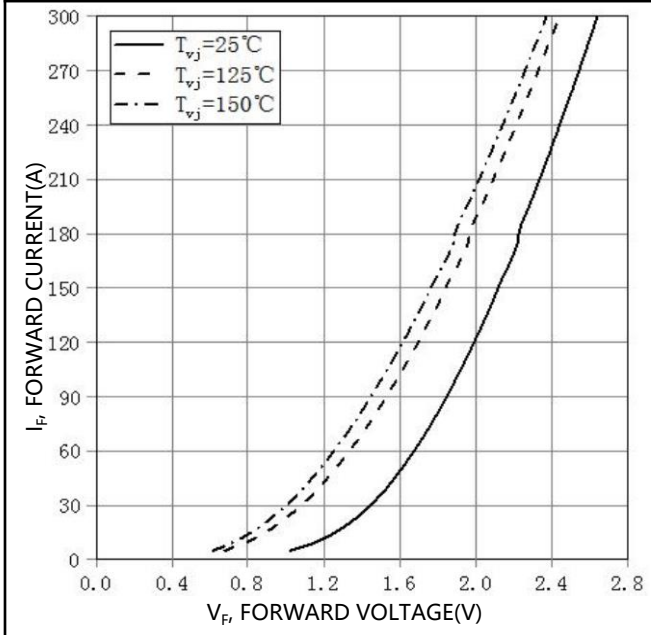
Fig. 4



Switching losses IGBT-Inverter (typical)
$E_{on}=f(R_G)$, $E_{off}=f(R_G)$ at $V_{GE}=\pm15V$, I_C=150A and V_{CE}=600V

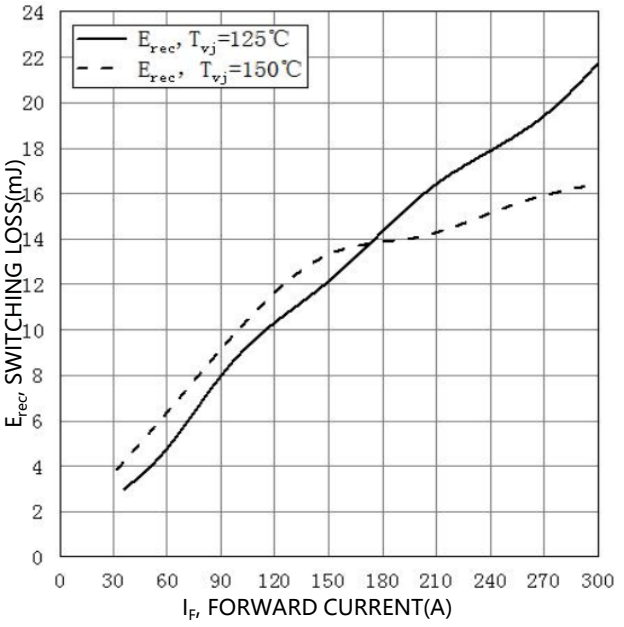
Typical Characteristics

Fig. 5



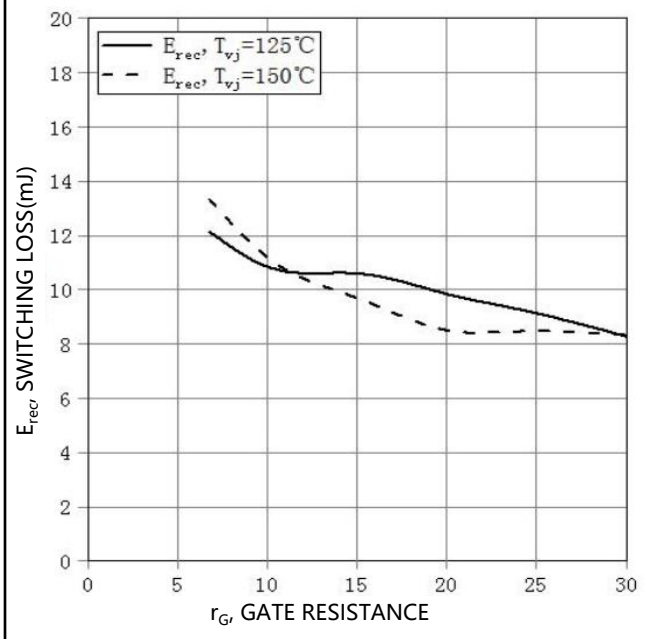
Forward characteristic of Diode-Inverter (typical)
$I_F=f(V_F)$

Fig. 6



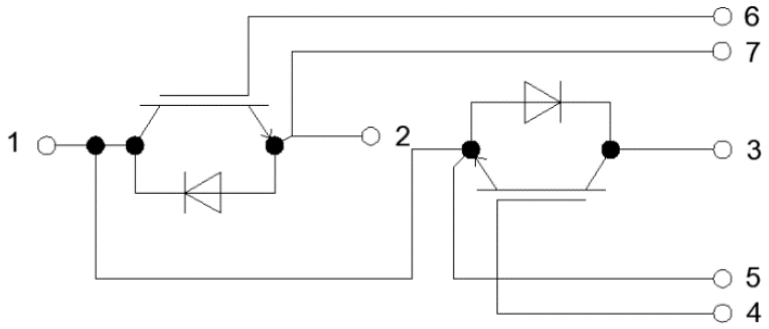
Switching losses Diode-Inverter (typical)
$E_{rec}=f(I_F)$ at R_G=6.8Ω and V_{CE}=600V

Fig. 7



Switching Losses Diode-Inverter (typical)
$E_{rec}=f(R_G)$ at I_F=150A and V_{CE}=600V

Circuit Diagram



Package Outlines (mm)