

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

Features

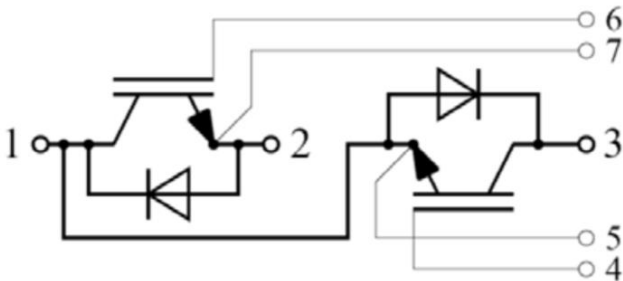
- 1700V 450A, $V_{CE(sat)}(typ.)=1.8V$
- High Short Circuit Capability, Self Limiting Short Circuit Current
- Trench+Field Stop Technology
- Low Switching Loss, Fast Switching
- Free Wheeling Diodes with Fast and Soft Reverse Recovery
- Positive Temperature Coefficient

Applications

- High Power Converters
- Wind Turbines
- Motion Control, Servo Control



Equivalent Circuit Schematic



IGBT - Inverter
Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{CES}	Collector-Emitter Voltage	$T_{vj}=25^{\circ}C$	1700	V
V_{GES}	Gate-Emitter Peak Voltage	$T_{vj}=25^{\circ}C$	± 20	V
I_C	Continuous DC Collector Current	$T_C=100^{\circ}C$	450	A
I_{CRM}	Repetitive Peak Collector Current	$t_p=1ms$	900	A
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vj\ max}=175^{\circ}C$	2500	W

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=450A, T_{vj}=25^{\circ}C$	---	1.8	2.2	V
		$V_{GE}=15V, I_C=450A, T_{vj}=125^{\circ}C$	---	2.2	---	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=2mA$	5.2	5.8	6.4	V
I_{CES}	Collector-Emitter Cut-Off Current	$V_{CE}=1700V, V_{GE}=0V$	---	---	3	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=15V, V_{CE}=0V$	---	---	400	nA
C_{ies}	Input Capacitance	$V_{CE}=25V, V_{GE}=0V, f=1MHz$	---	60	---	nF
C_{res}	Reverse Transfer Capacitance		---	0.7	---	nF
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=900V$ $V_{GE}=\pm 15V$ $I_C=450A$ $R_G=3.3\Omega$ Inductive Load $T_{vj}=25^{\circ}C$	---	260	---	ns
t_r	Turn-on Rise Time		---	140	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	640	---	ns
t_f	Turn-off Fall Time		---	405	---	ns
E_{on}	Turn-on Switching Loss		---	75	---	mJ
E_{off}	Turn-off Switching Loss		---	105	---	mJ
I_{SC}	Short Circuit Data	$V_{GE}\leq 15V, V_{CC}=1000V$ $t_p\leq 10\mu s, T_{vj}=125^{\circ}C$	---	2300	---	A
$T_{VJ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	$^{\circ}C$
R_{thJC}	Thermal Resistance, Junction to Case	Per IGBT	---	---	0.06	K/W

Diode - Inverter

Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj}=25^{\circ}C$	1700	V
I_F	Continuous DC Forward Current		450	A
I_{FRM}	Repetitive Peak Collector Current	$t_p=1ms$	900	A

Characteristic Values

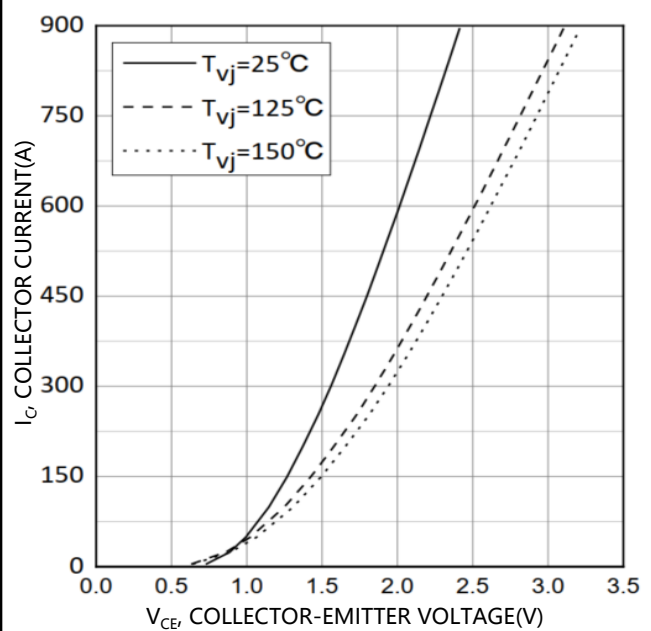
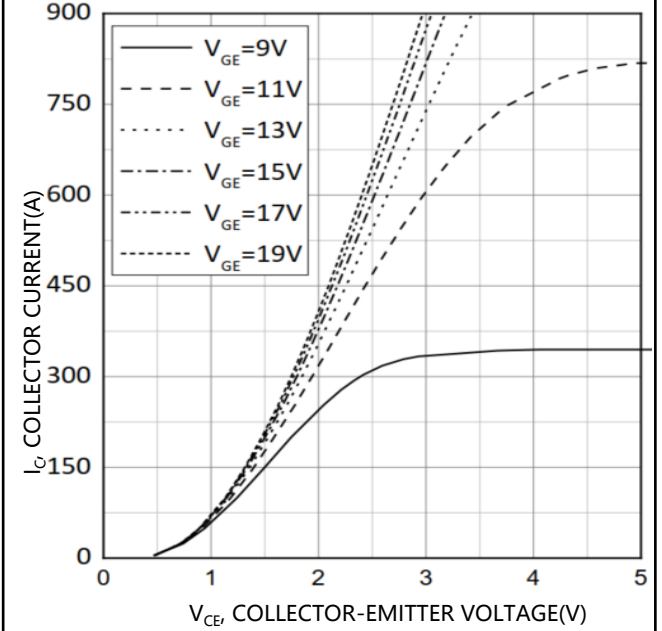
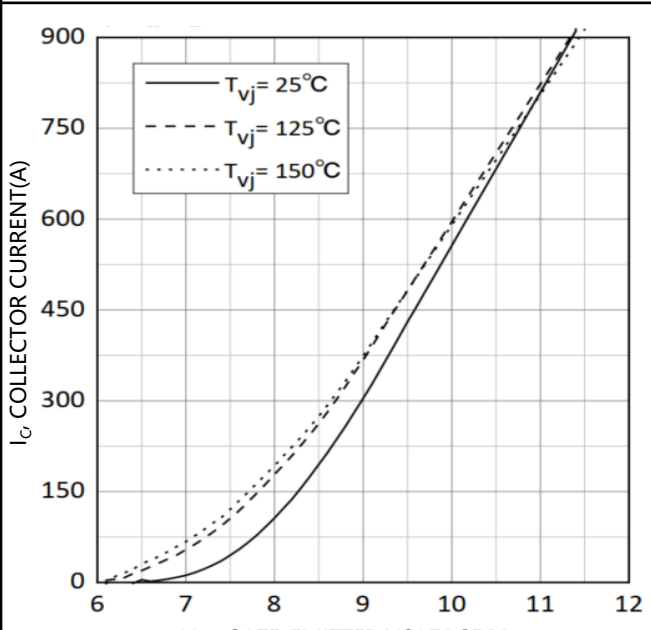
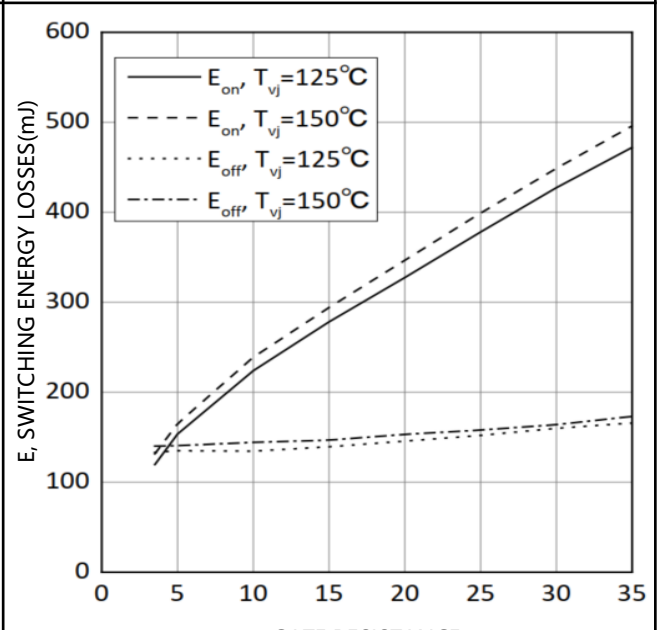
Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	$I_F=450A, V_{GE}=0V, T_{vj}=25^{\circ}C$	---	2.0	2.4	V
		$I_F=450A, V_{GE}=0V, T_{vj}=125^{\circ}C$	---	2.2	---	V
I_{rr}	Reverse Recovery Current	$I_F=450A, V_R=900V, V_{GE}=-15V$ $T_{vj}=25^{\circ}C, di/dt=-2800A/us$	---	245	---	A
Q_r	Recovered Charge		---	60	---	uC
E_{rec}	Reverse Recovery Energy		---	40	---	mJ
R_{thJC}	Thermal Resistance, Junction to Case	Per Diode	---	---	0.1	K/W

Module

Symbol	Description	Conditions	Values	Unit
V_{ISOL}	Isolation Test Voltage	RMS, f=50Hz, t=1min	3.0	KV

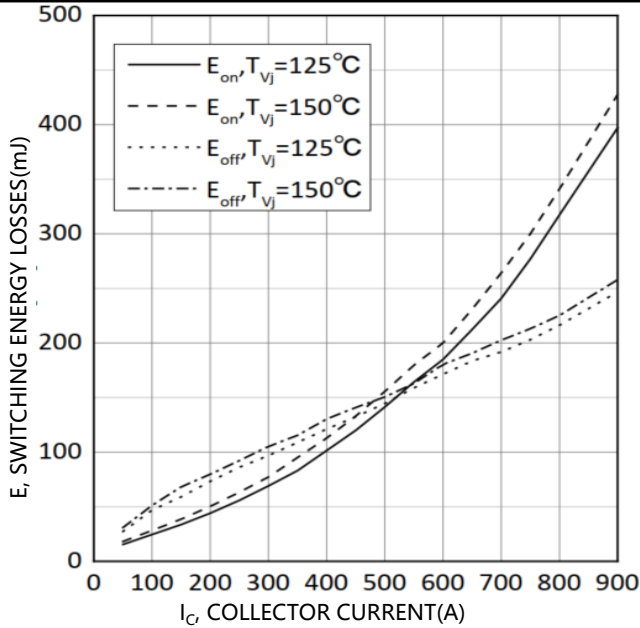
Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
T_{stg}	Storage Temperature		-40	---	125	$^{\circ}C$
M	Mounting Torque for Modul Mounting		3.0	---	6.0	Nm
G	Weight		---	323	---	g

Typical Characteristics

Fig. 1  Output characteristic IGBT-Inverter (typical) $I_C = f(V_{CE})$ at $V_{GE} = 15V$	Fig. 2  Output characteristic IGBT-Inverter (typical) $I_C = f(V_{CE})$ at $T_{vj} = 150^\circ C$
Fig. 3  Transfer characteristic IGBT-Inverter (typical) $I_C = f(V_{CE})$ at $V_{CE} = 20V$	Fig. 4  Switching losses IGBT-Inverter (typical) $E_{on} = f(r_G)$, $E_{off} = f(r_G)$ at $V_{GE} = \pm 15V$, $I_C = 450A$ and $V_{CE} = 900V$

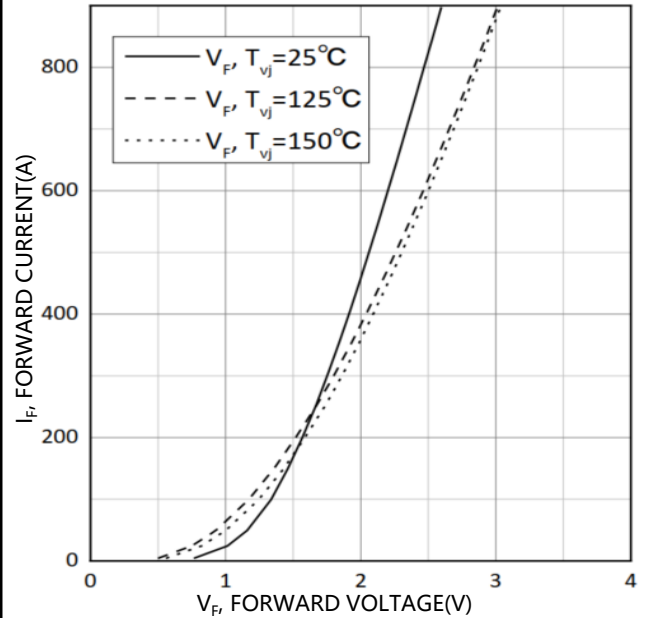
Typical Characteristics

Fig. 5



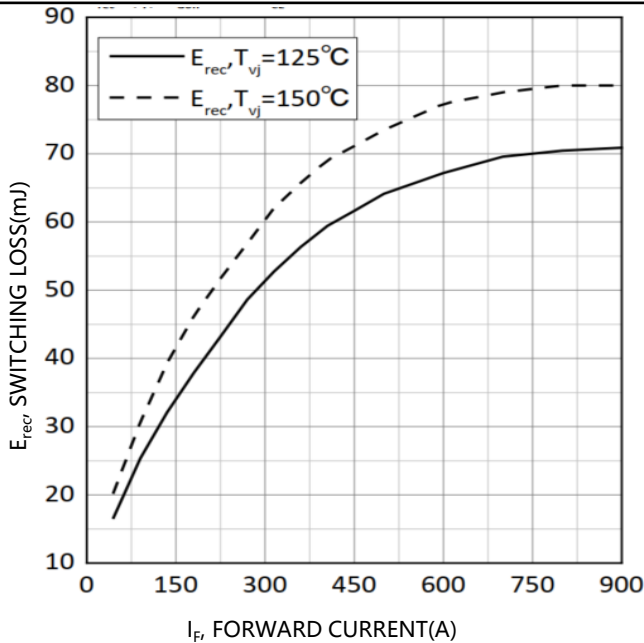
Switching losses IGBT-Inverter (typical)
 $E_{on}=f(I_C)$, $E_{off}=f(I_C)$ at $V_{GE}=\pm 15V$, $R_G=3.3\Omega$ and $V_{CE}=900V$

Fig. 6



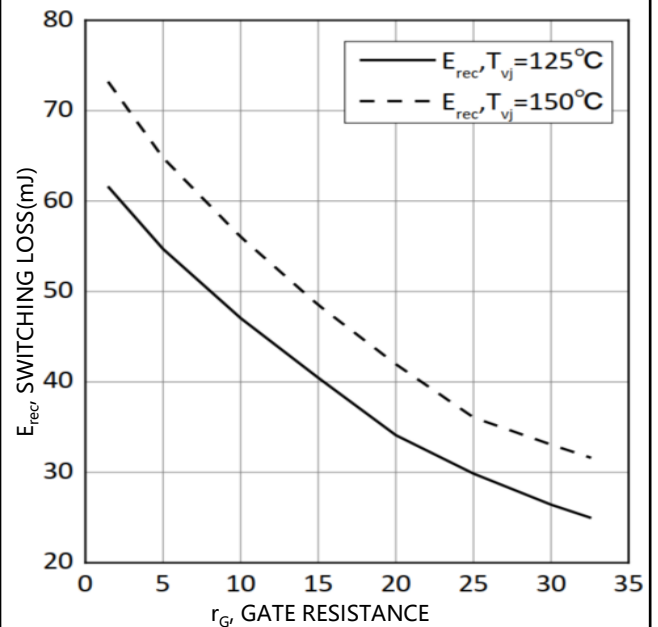
Forward characteristic of Diode-Inverter (typical)
 $I_F=f(V_F)$

Fig. 7



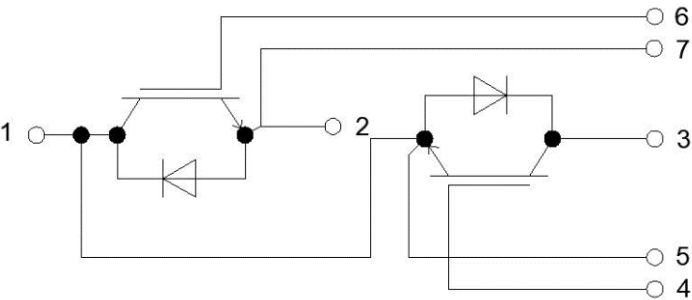
Switching losses Diode-Inverter (typical)
 $E_{recr}=f(I_F)$ at $R_G=3.3\Omega$ and $V_{CE}=900V$

Fig. 8



Switching Losses Diode-Inverter (typical)
 $E_{recr}=f(R_G)$ at $I_F=450A$ and $V_{CE}=900V$

Circuit Diagram



Package Outlines (mm)

