Discrete With Trench / Field Stop IGBT,Ultra Fast Recovery Diode.

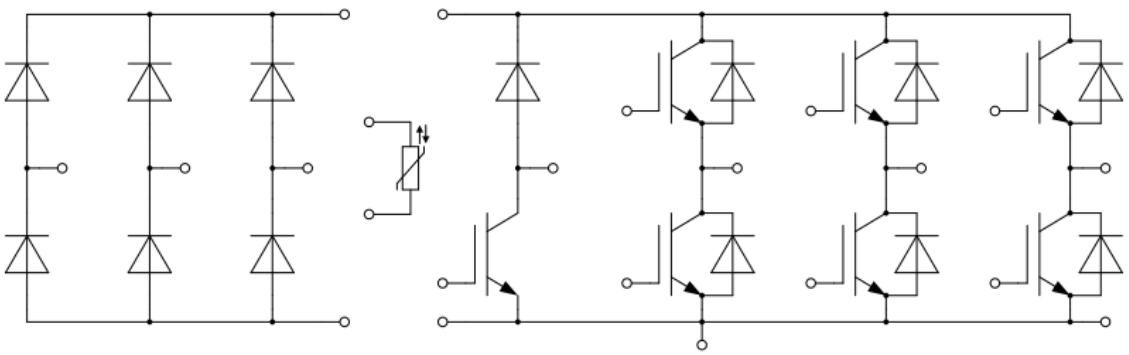
Features

- V_{CE}=1200V I_C=150A
- Low $V_{CE(sat)}$ with Positive Temperature Coefficient
- Trench+ Field Stop Technology

Applications

- Motor Drives
- Servo Drives

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℃	1250	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℃	---	1.70	---	V
		V_{GE}=15V, I_C=150A, T_{vj}=125℃	---	2.00	---	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=2mA	5.0	---	7.0	V
I_{CES}	Collector-Emitter Cut-Off Current	V_{CE}=1200V, V_{GE}=0V	---	---	1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=20V, V_{CE}=0V	---	---	600	nA
R_{Gint}	Internal gate resistor	T_{vj}=25℃	---	5	---	Ω
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz	---	10.6	---	nF
C_{res}	Reverse Transfer Capacitance		---	0.47	---	nF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=150A R_G=5.1Ω Inductive Load T_{vj}=25℃	---	340	---	ns
t_r	Turn-on Rise Time		---	61	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	390	---	ns
t_f	Turn-off Fall Time		---	145	---	ns
E_{on}	Turn-on Switching Loss		---	4.15	---	mJ
E_{off}	Turn-off Switching Loss		---	7.5	---	mJ
I_{SC}	Short Circuit data	V_{GE}≤15V, V_{CC}=600V t_P≤10μs, T_{vj}=25°C	---	600	---	A
R_{thJC}	Thermal Resistance, Junction to Case	Per IGBT	---	---	0.12	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℃	---	1.90	---	V
		I_F=150A, V_{GE}=0V, T_{vj}=125℃	---	1.80	---	V
I_{RM}	Peak Reverse Recovery Current	I_F=150A, V_R=600V, V_{GE}=-15V T_{vj}=25℃	---	167	---	A
Q_r	Recovered Charge		---	21.5	---	uC
E_{rec}	Reverse Recovery Energy		---	8.2	---	mJ
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

Diode - Rectifier

Maximum Rated Values

Symbol	Description	Conditions	Values	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}=25℃	1600	V
I_{FRMSM}	Maximum RMS Forward Current Per Chip	T_{vj}=100℃	110	A
I_{FSM}	Repetitive peak forward current	t_P=10ms, T_{vj}=150℃	1300	A
I^2t	I^2t Value	t_P=10ms, sin180°, T_j=25℃	3850	A^2s

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	I_F=110A, V_{GE}=0V, T_{vj}=25℃	---	1.1	---	V
I_R	Recovery Current	V_R=1600V, T_{vj}=25℃	---	1.0	---	mA
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

IGBT – Brake

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℃	100	A
I_{CRM}	Repetitive Peak Collector Current	t_P=1ms	200	A

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=100A, T_{vj}=25℃	---	2.2	--	V
		V_{GE}=15V, I_C=100A, T_{vj}=125℃	---	2.5	--	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=2mA	5.0	---	7.0	V
I_{CES}	Collector-Emitter Cut-Off Current	V_{CE}=1200V, V_{GE}=0V	---	---	1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=15V, V_{CE}=0V	---	---	600	nA
R_{Gint}	Internal gate resistor	T_{vj}=25℃	---	7.5	---	Ω
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f=1MHz	---	6.67	---	nF
C_{res}	Reverse Transfer Capacitance		---	0.16	---	nF
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=±15V I_C=100A R_G=5.6Ω Inductive Load T_{vj}=25℃	---	171	---	ns
t_r	Turn-on Rise Time		---	90	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	380	---	ns
t_f	Turn-off Fall Time		---	85	---	ns
E_{on}	Turn-on Switching Loss		---	6.2	---	mJ
E_{off}	Turn-off Switching Loss		---	5.7	---	mJ
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

Diode - Brake

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		75	A
I_{FRM}	Repetitive Peak Collector Current	t_P=1ms	150	A

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
V_F	Forward Voltage	I_F=75A, V_{GE}=0V, T_{vj}=25℃	---	1.90	---	V
		I_F=75A, V_{GE}=0V, T_{vj}=125℃	---	1.80	---	V
I_{RM}	Peak Reverse Recovery Current	I_F=75A, V_R=600V, V_{GE}=-15V T_{vj}=25℃	---	100	---	A
Q_r	Recovered Charge		---	5.7	---	uC
E_{rec}	Reverse Recovery Energy		---	2.0	---	mJ
$T_{VJ\ OP}$	Virtual Junction Temperature	Under Switching	-40	---	150	℃

NTC-Thermistor

Characteristic Values

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
R_{25}	Rated Resistance	T_C=25℃	---	5	---	KΩ
$B_{25/50}$	B Value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 – 1/(298\ K))]$	---	3380	---	K

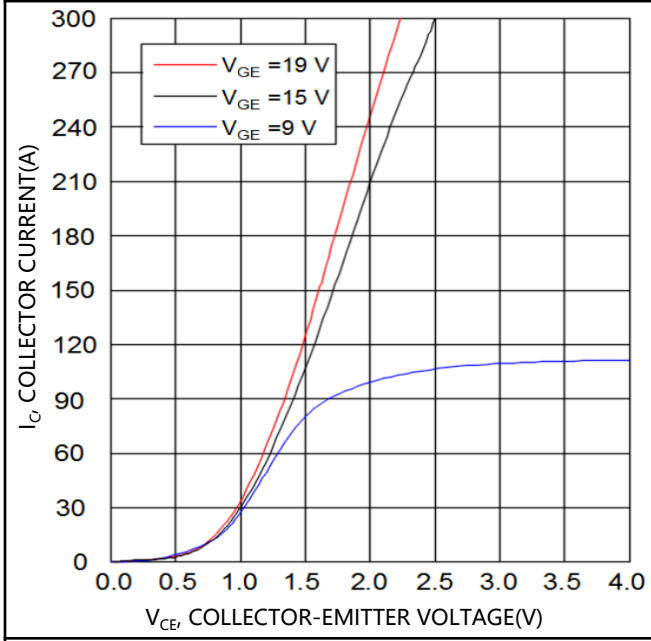
Module

Symbol	Description	Conditions	Values	Unit
V_{ISOL}	Isolation Test Voltage	RMS, f=50Hz, t=1min	4	KV
	Internal Isolation	Basic Insulation (Class 1, IEC 61140)	Al_2O_3	
	Creepage Distance	Terminal to Heatsink Terminal to Terminal	10	mm
	Clearance	Terminal to Heatsink Terminal to Terminal	7.5	mm

Symbol	Description	Conditions	Values			Unit
			Min.	Typ.	Max.	
L_{sCE}	Stray Inductance Module		---	25	---	nH
T_{stg}	Storage Temperature		-40	---	125	℃
G	Weight		---	310	---	g

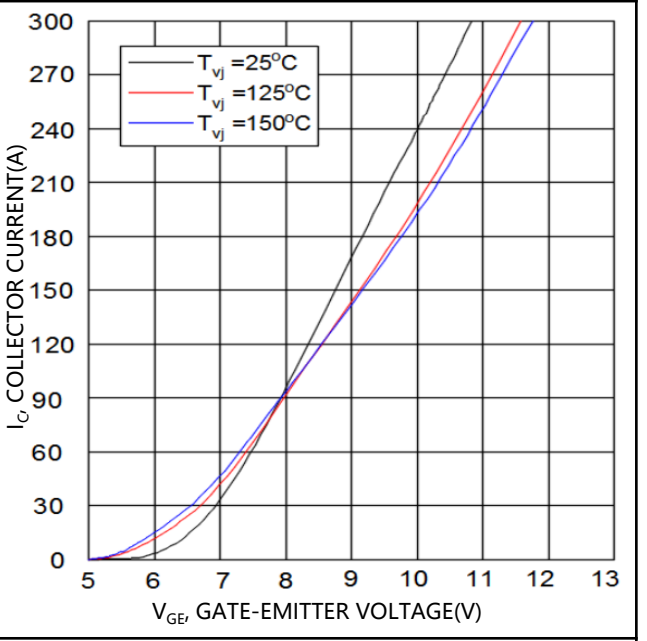
Typical Characteristics

Fig. 1



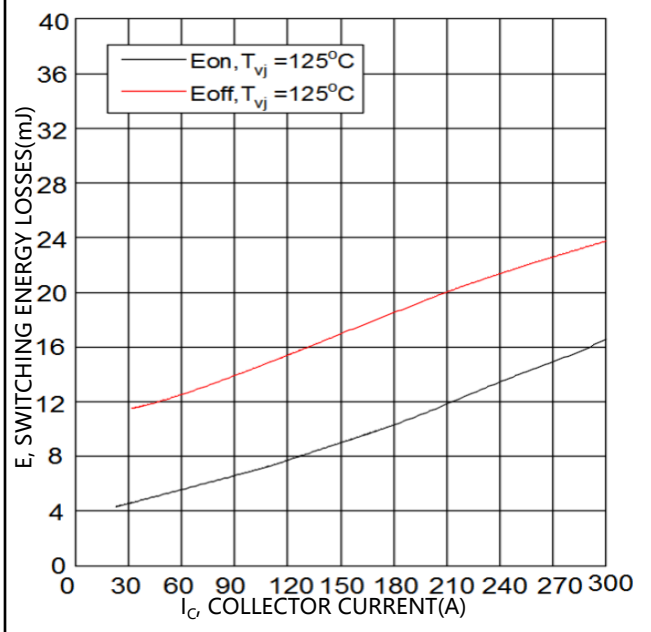
Output characteristic IGBT-Inverter (typical)
$I_C=f(V_{CE})$ at $T_{vj}=25℃$

Fig. 2



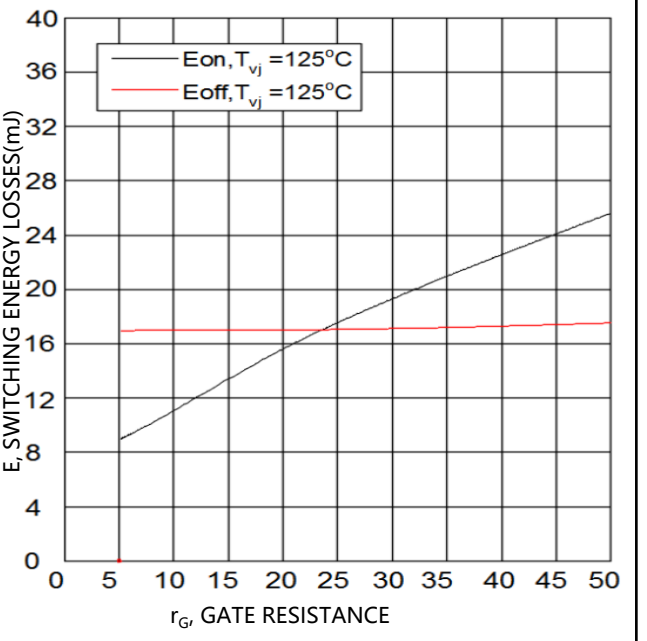
Transfer characteristic IGBT-Inverter (typical)
$I_C=f(V_{GE})$ at $V_{CE}=20V$

Fig. 3



Switching losses IGBT-Inverter (typical)
$E_{on}=f(I_C)$, $E_{off}=f(I_C)$ at $V_{GE}=\pm15V$, $R_G=5.1\Omega$ and $V_{CE}=600V$

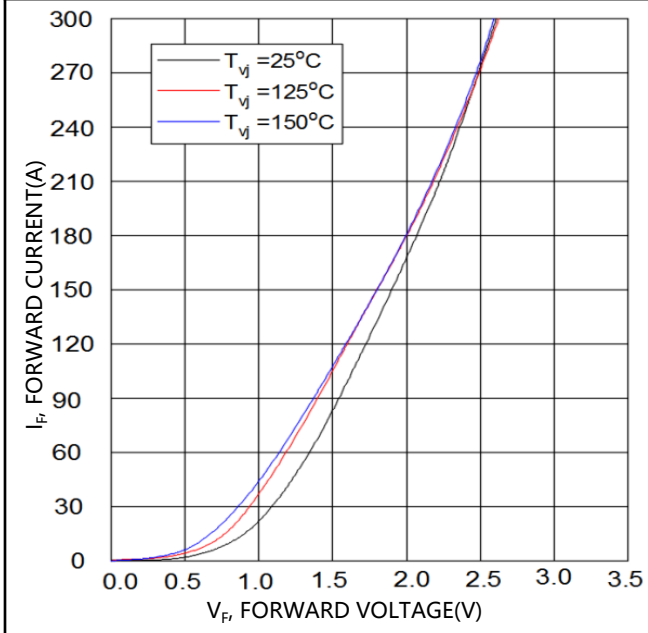
Fig. 4



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

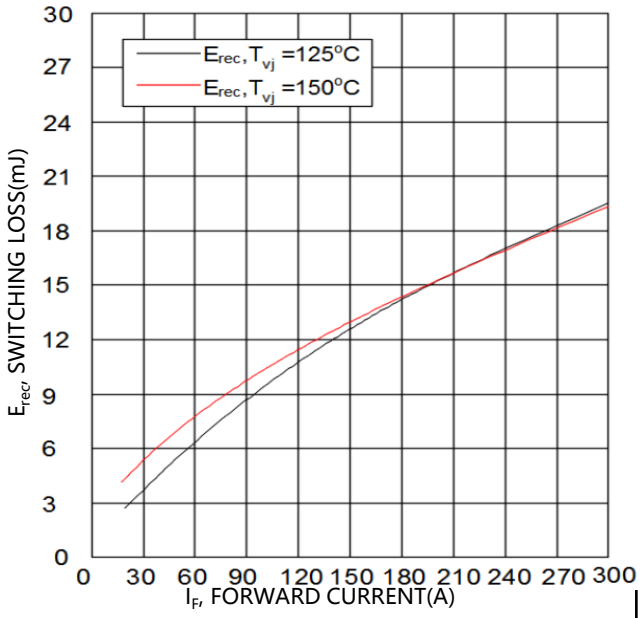
Typical Characteristics

Fig. 5



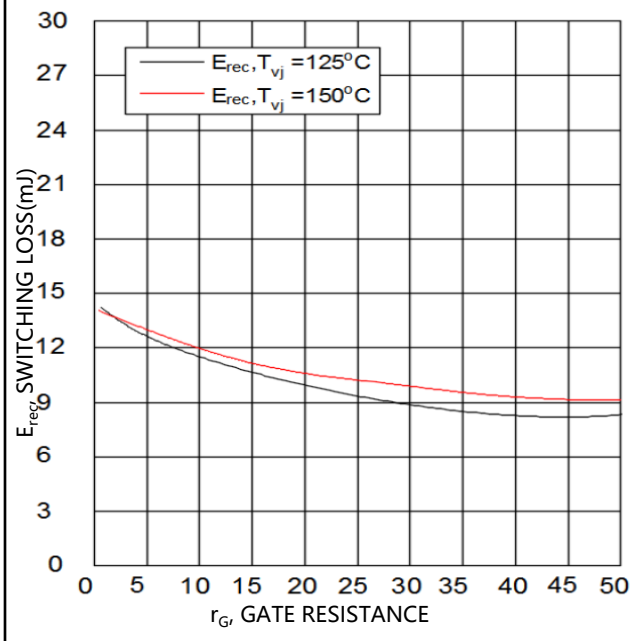
Forward characteristic of Diode-Inverter (typical)
$I_F=f(V_F)$

Fig. 6



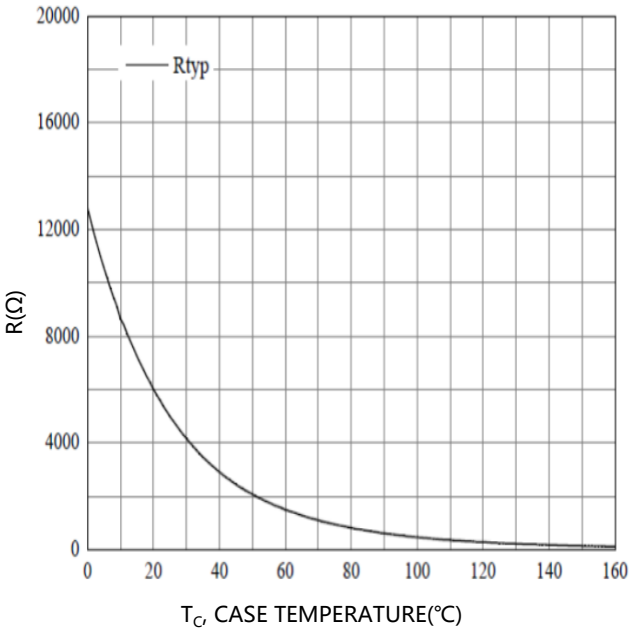
Switching losses Diode-Inverter (typical)
$E_{rec}=f(I_F)$ at R_G=5.1Ω and V_{CE}=600V

Fig. 7



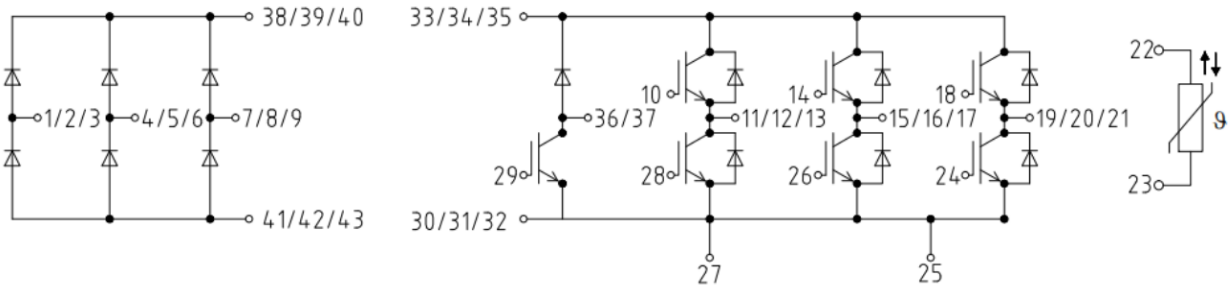
Switching losses Diode-Inverter (typical)
$E_{rec}=f(I_F)$ at I_F=150A and V_{CE}=600V

Fig. 8



NTC-Thermistor-Temperature Characteristic (typical), R=f(T)

Circuit Diagram



Package Outlines (mm)