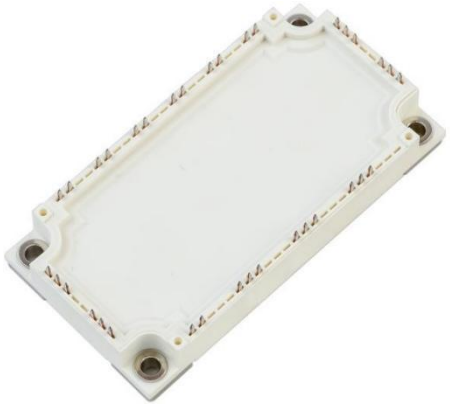
Trench Field-stop IGBT Module

V_{CES} = 1700V, I_C = 75A, $V_{CE(sat)}$ = 1.9V

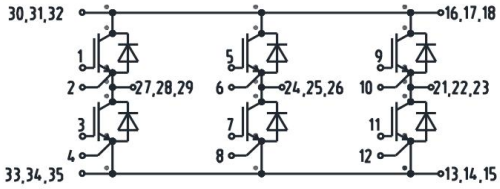
Features:

- Low collector to emitter saturation voltage
- Switching-Loss rating includes all “tail” losses
- Optimized for Fast Switching
- Short circuit withstands time (10us min.)
- Vcesat with positive Temperature Coefficient



Applications:

- Inverter for motor drive
- Static var generator
- High power converter



IGBT, Inverter

Absolute Maximum Ratings (T_J=25°C, unless otherwise specified)

Symbol	Parameter	Conditions	Value	Unit
V_{CES}	Collector to Emitter Voltage		1700	V
V_{GES}	Continuous Gate to Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C=100℃	75	A
		T_C=25℃	150	A
I_{CM}	Pulse Collector Current	t_p=1ms	150	A
P_D	Maximum Power Dissipation (per IGBT)	T_C=25℃, T_J=175℃	555	W
t_{sc}	Short Circuit Withstand Time	V_{CC}=900V, V_{GE}≤15V	10	us

Diode, Inverter

Absolute Maximum Ratings (T_J=25°C, unless otherwise specified)

V_{RRM}	Repetitive peak reverse voltage		1700	V
I_F	Diode Continuous Forward Current	T_C=100℃	75	A
I_{FM}	Peak FWD Current Repetitive	t_p=1ms	150	A

Electrical Characteristics of IGBT, Inverter (T_J = 25℃, unless otherwise specified)

Static characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=1mA, V_{CE}=V_{GE} , T_J=25℃		5.0	6.0	7.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=75A, V_{GE}=15V	T_J=25℃		1.90		V
			T_J=125℃		2.16		
			T_J=150℃		2.26		
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V,V_{CE}=V_{CES},T_J=25℃				1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=±20V,V_{CE}=0V,T_J=25℃				100	nA
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V ,f=1MHz			7.6		nF
C_{res}	Reverse Transfer Capacitance				0.22		
R_{gint}					8.1		Ω

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC}=900V, I_c=75A, V_{GE}=±15V, L=525uH, R_g=5.6Ω	T_J=25℃		155		ns
			T_J=125℃		175		
			T_J=150℃		175		
t_r	Rise Time		T_J=25℃		61		ns
			T_J=125℃		64		
			T_J=150℃		64		
$t_{d(off)}$	Turn-off Delay Time		T_J=25℃		265		ns
			T_J=125℃		290		
			T_J=150℃		306		
t_f	Fall Time		T_J=25℃		568		ns
			T_J=125℃		822		
			T_J=150℃		881		
E_{on}	Turn-on Switching Loss		T_J=25℃		18.2		mJ
			T_J=125℃		22.8		
			T_J=150℃		24.8		
E_{off}	Turn-off Switching Loss		T_J=25℃		14.8		mJ
			T_J=125℃		20.9		
			T_J=150℃		22.9		

Electrical Characteristics of Diode, Inverter (T_J = 25℃, unless otherwise specified)

Static characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
VFM	Forward Voltage	IF=75A,VGE=0V	TJ=25℃		1.6		V
			TJ=125℃		1.7		
			TJ=150℃		1.7		

Switching Characteristics

Irr	Peak Reverse Recovery Current	IF=75A, VCC=900V, VGE=-15V, L=525uH, Rg=5.6Ω	TJ=25℃		131		A
			TJ=125℃		137		
			TJ=150℃		143		
Qrr	Reverse Recovery Charge		TJ=25℃		21.0		μC
			TJ=125℃		30.6		
			TJ=150℃		34.6		
Erec	Reverse Recovery Energy		TJ=25℃		13.3		mJ
			TJ=125℃		19.8		
			TJ=150℃		22.4		

NTC Thermistor
Characteristic values

Symbol	Condition	Typ.	Max.	Unit
R25	TC=25℃	5		kΩ
△R/R	TC=100℃，R100=481Ω		±5	%
P25	TC=25℃	50		mW
B25/50	R2=R25 exp[B25/50(1/T2-1/(298.15K))]	3380		K
B25/80	R2=R25 exp[B25/80(1/T2-1/(298.15K))]	3440		K

Module Characteristics

Symbol	Parameter		Min	Typ	Max	Unit
Viso	Isolation Voltage	f=50Hz, t=1min	4000			V
TJ	Maximum Junction Temperature				175	℃
TJOP	Maximum Operating Junction Temperature Range		-40		+150	℃
Tstg	Storage Temperature		-40		+150	℃
RthJC	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.27 0.47		K/W
RthCH	Case-to-Heatsink (per IGBT) Case-to-Heatsink (per Diode) Case-to-Heatsink (per Module)			0.11 0.18 0.01		K/W
M	Power Terminals Screw:M6		3.0		6.0	N·m
G	Weight			300		g

Characteristics diagrams

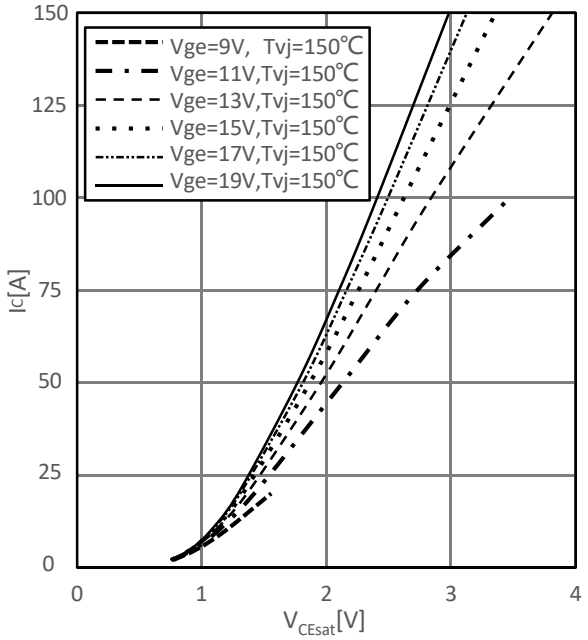


Fig.1 output characteristic IGBT Inverter (typical)

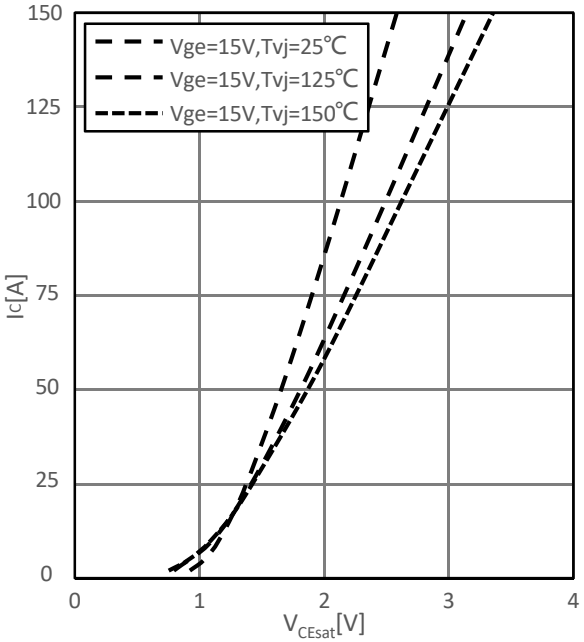


Fig.2 output characteristic IGBT Inverter (typical)

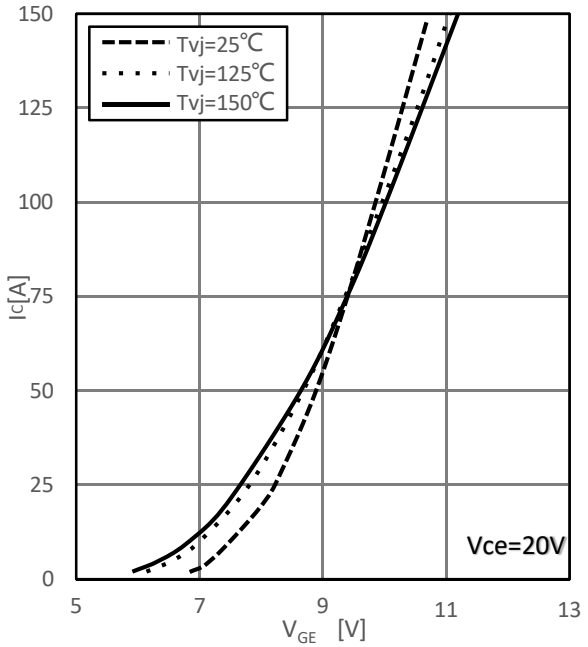


Fig.3 transfer characteristic IGBT Inverter (typical) (typical)

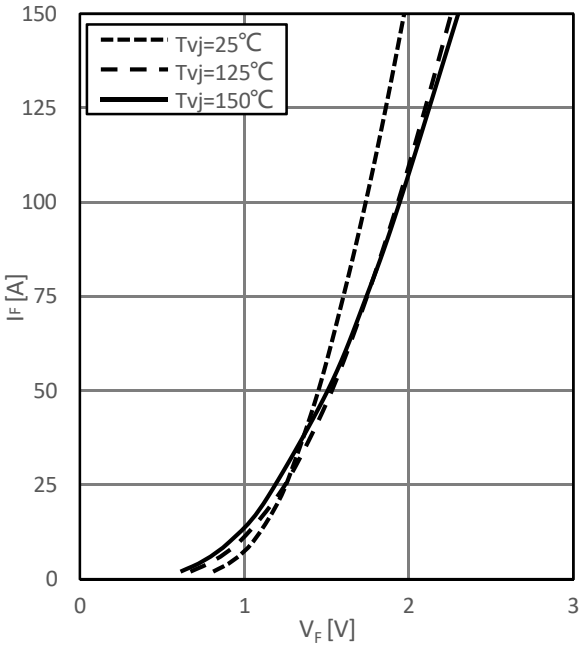


Fig.4 forward characteristic of Diode, Inverter (typical)

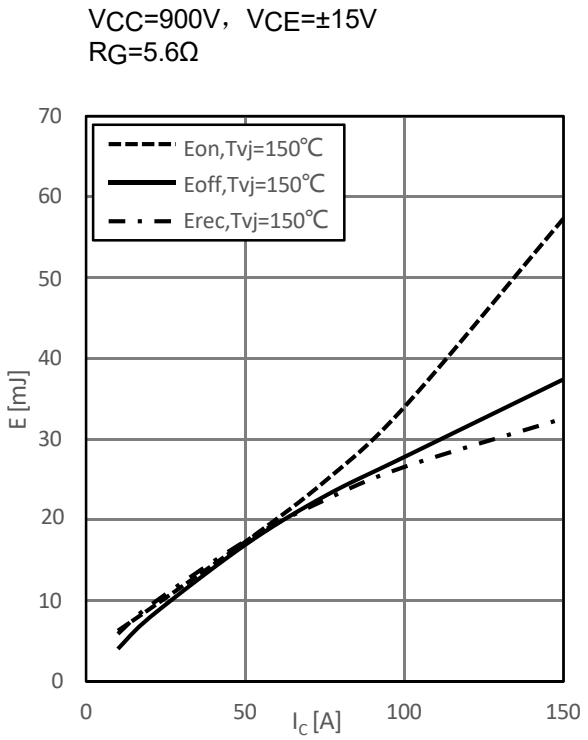


Fig.5 switching losses IGBT Inverter (typical)

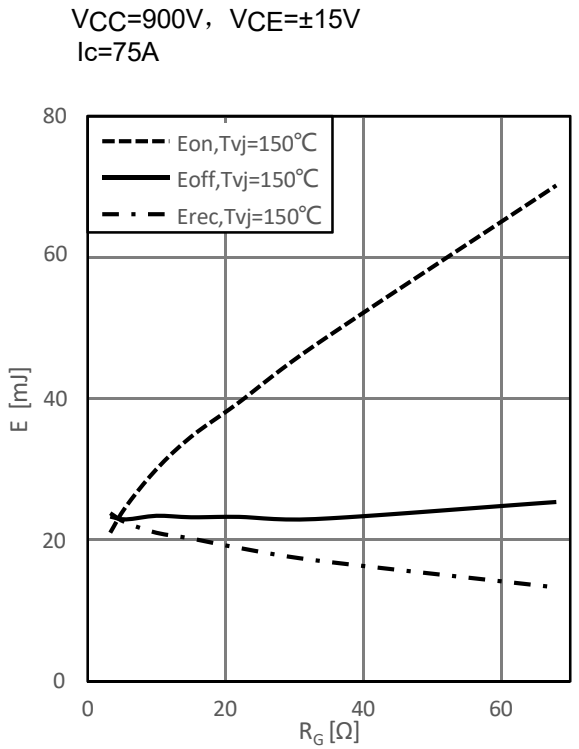


Fig.6 switching Losses vs. Gate Resistance (Typical)

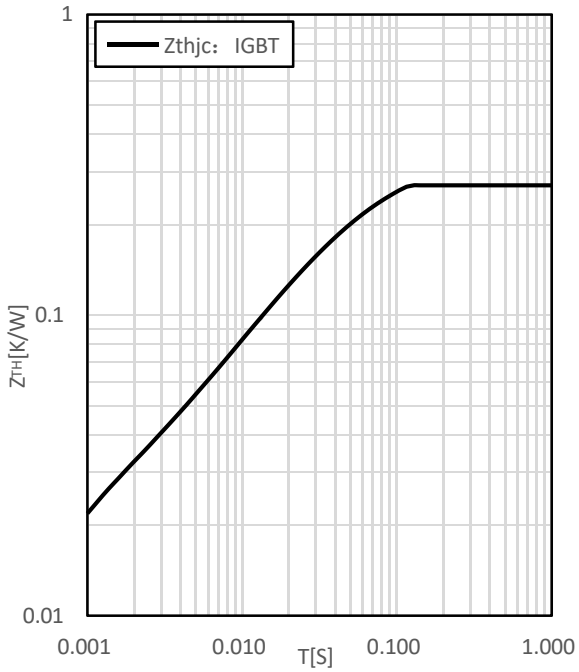


Fig.7 Transient thermal impedance IGBT

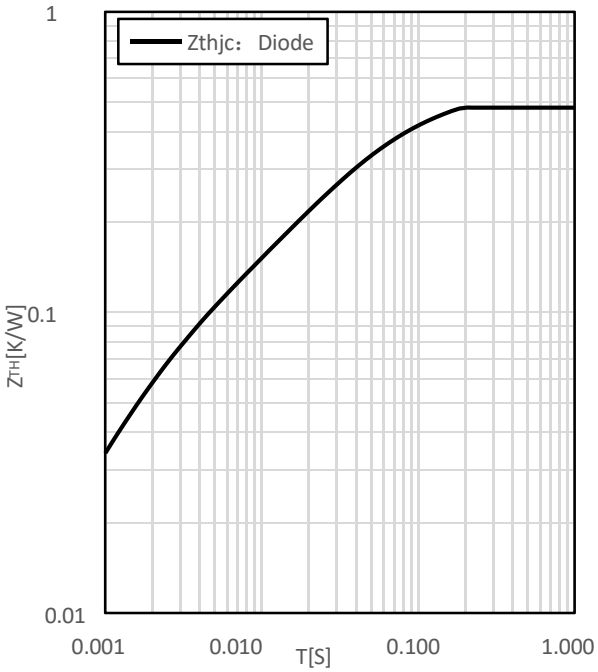


Fig.8 Transient thermal impedance Diode

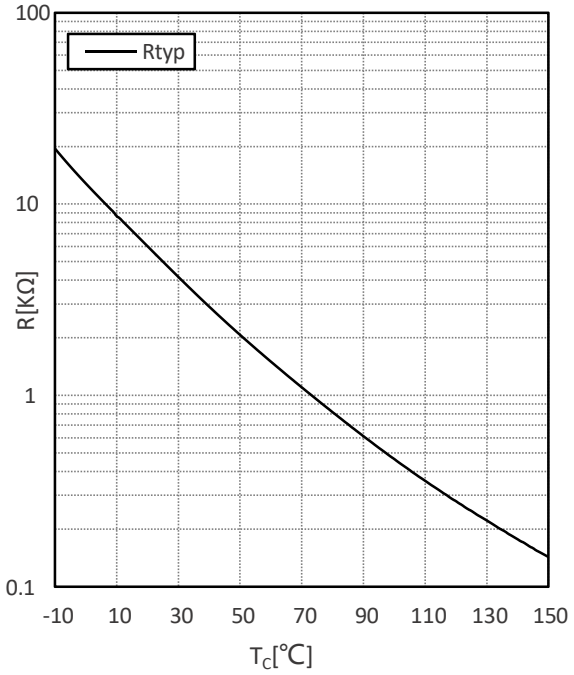
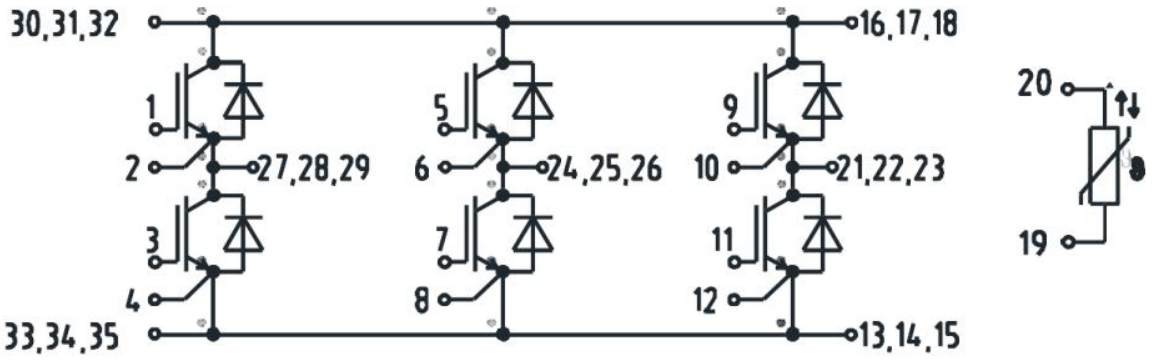
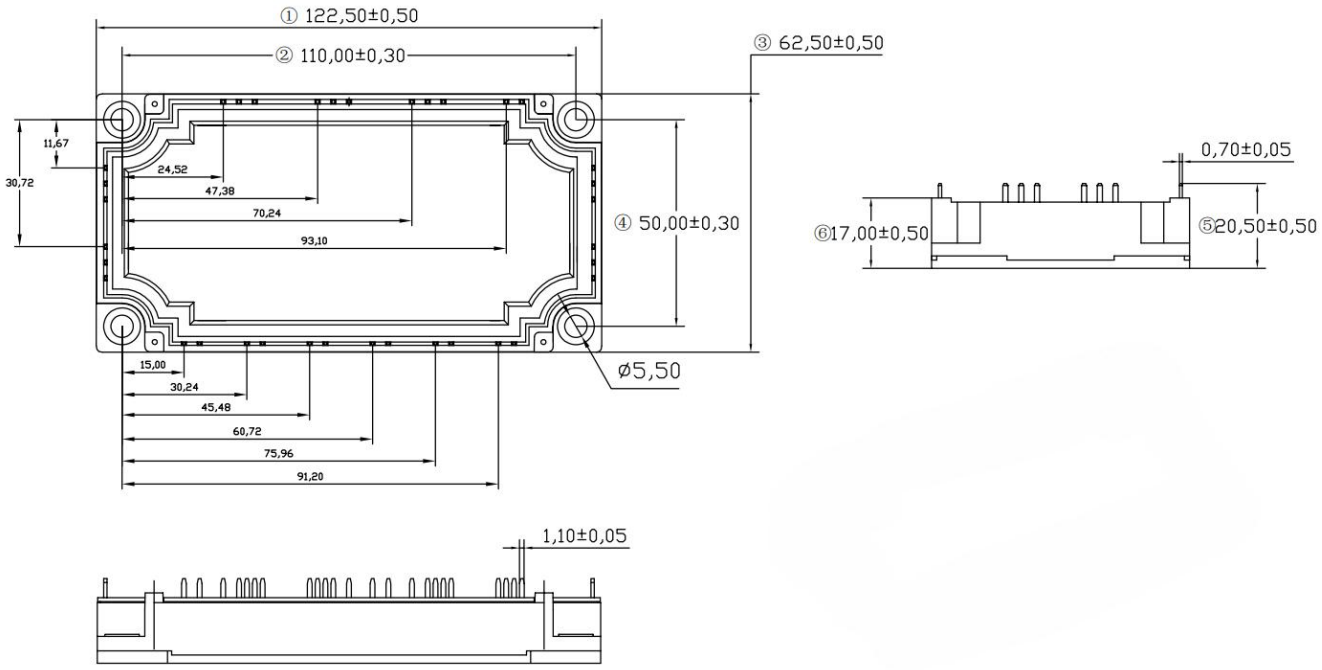


Fig.9 NTC Temperature characteristics

Internal Circuit :



Package Outline (Unit：mm)



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