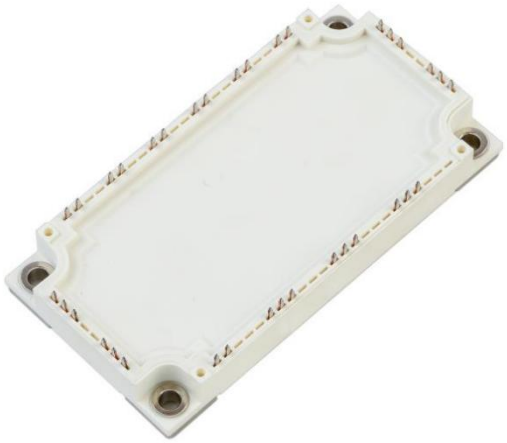
Trench Field-stop IGBT Module

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

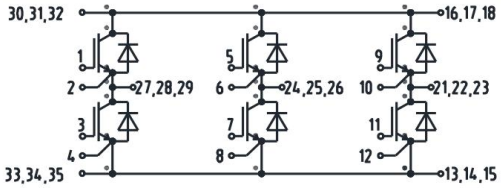


FEATURES

- 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

- Static var generator
- Inverter for motor drive
- High Power Converters



IGBT Inverter

Absolute Maximum Ratings of IGBT (TJ= 25°C unless otherwise noted)

Symbol	Parameter	Conditions	Value	Unit
VCES	Collector to Emitter Voltage		1700	V
VGES	Continuous Gate to Emitter Voltage		±20	V
IC	Continuous Collector Current	TC = 100°C	75	A
		TC = 25°C	150	A
ICM	Pulse Collector Current	tp=1ms	150	A
PD	Maximum Power Dissipation (per IGBT)	TC = 25°C, TJ = 175°C	555	W
tsc	Short Circuit Withstand Time	VCC = 900V, VGE≤15V	10	us

Diode, Inverter

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

IF	Diode Continuous Forward Current	TC = 100°C	75	A
IFM	Peak FWD Current Repetitive	tp=1ms	150	A

Electrical Characteristics of IGBT(T=25℃)
Static characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
VGE(th)	Gate-Emitter Threshold Voltage	IC = 1mA, VCE = VGE TJ = 25℃		5.0	6.0	7.0	V
VCE(sat)	Collector-Emitter Saturation Voltage	IC = 75A, VGE = 15V	TJ = 25℃		1.90		V
			TJ = 125℃		2.16		
			TJ= 150℃		2.26		
ICES	Collector-Emitter Leakage Current	VGE = 0V, VCE = VCES, TJ = 25℃				1.0	mA
IGES	Gate-Emitter Leakage Current	VGE = ±20V, VCE = 0V, TJ = 25℃				100	nA
Cies	Input Capacitance	VCE=25V, VGE=0V ,f=1MHz			7.6		nF
Cres	Reverse Transfer Capacitance				0.22		
Rgint					8.1		Ω

Switching Characteristics

td(on)	Turn-on Delay Time	VCC=900V, Ic=75A, VGE=±15V, L=525uH, Rg=5.6Ω	TJ = 25℃		155		ns
			TJ = 125℃		175		
			TJ = 150℃		175		
tr	Rise Time		TJ = 25℃		61		ns
			TJ = 125℃		64		
			TJ = 150℃		64		
td(off)	Turn-off Delay Time		TJ = 25℃		265		ns
			TJ = 125℃		290		
			TJ = 150℃		306		
tf	Fall Time		TJ = 25℃		568		ns
			TJ = 125℃		822		
			TJ = 150℃		881		
Eon	Turn-on Switching Loss		TJ = 25℃		18.2		mJ
			TJ = 125℃		22.8		
			TJ = 150℃		24.8		
Eoff	Turn-off Switching Loss		TJ = 25℃		14.8		mJ
			TJ = 125℃		20.9		
			TJ = 150℃		22.9		

Electrical Characteristics of Diode (TJ = 25°C unless otherwise noted)

Static characteristics

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

Switching Characteristics

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

NTC Thermistor Characteristic values

Symbol	Condition	Typ.	Max.	Units
R25	TC=25°C	5		kΩ
△R/R	TC=100°C , R100=481Ω		±5	%
P25	TC=25°C	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	°C
TJOP	Maximum Operating Junction Temperature Range		-40		+150	°C
Tstg	Storage Temperature		-40		+150	°C
RthJC	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.27 0.47		K/W

R_{thCH}	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

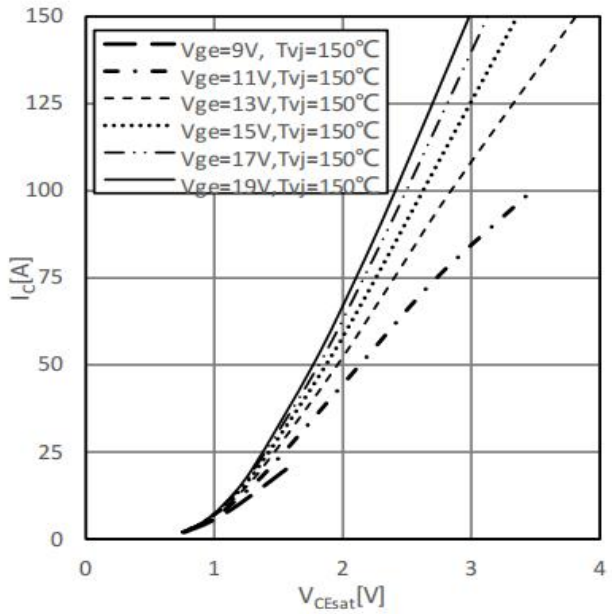


Fig.1 output characteristic IGBT Inverter(typical)

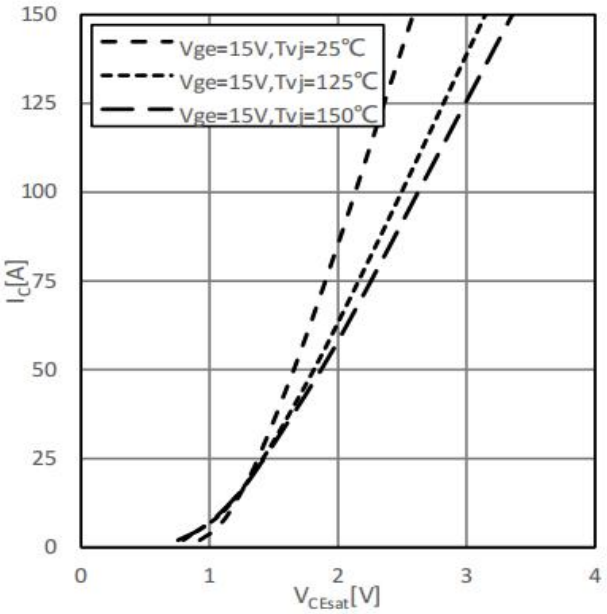


Fig.2 output characteristic IGBT Inverter(typical)

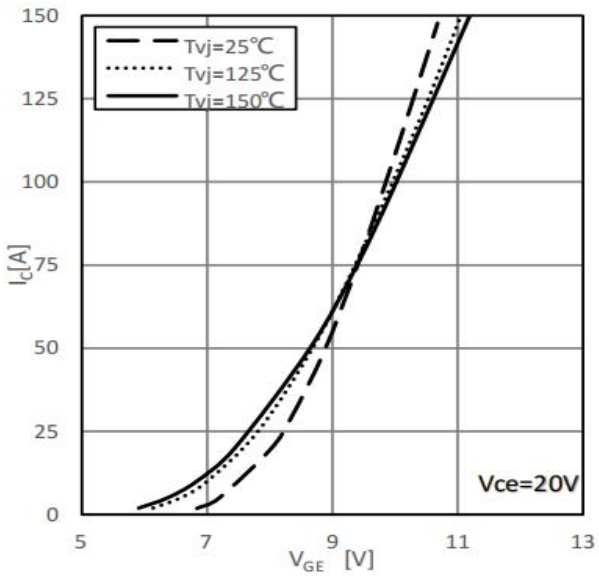


Fig.3 transfer characteristic IGBT Inverter(typical)
Vcc=900V, VCE= ±15V, RG=5.6Ω

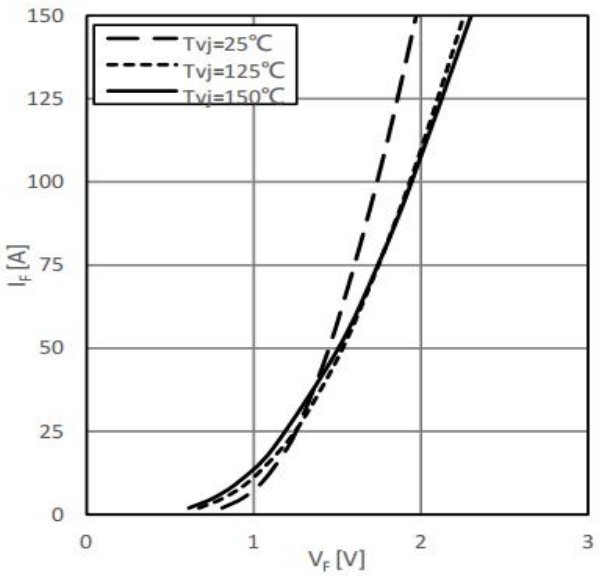


Fig.4 forward characteristic of Diode Inverter(typical)
Vcc=900V, VCE= ±15V, Ic=75A

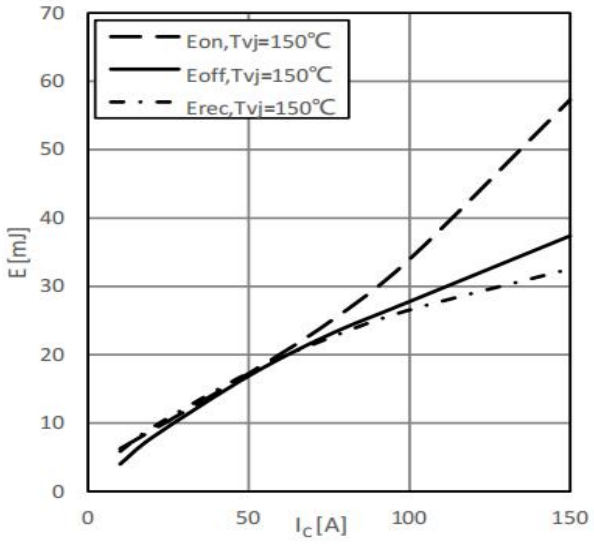


Fig.5 switching losses IGBT Inverter (typical)

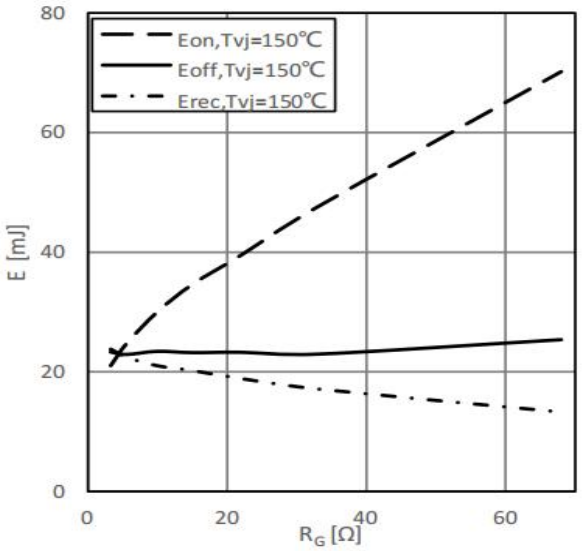


Fig.6 switching Losses vs. Gate Resistance (typical)

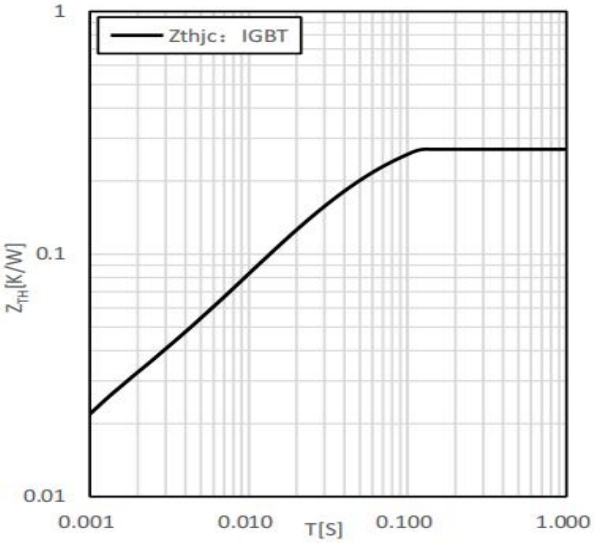


Fig.7 transient thermal impedance IGBT

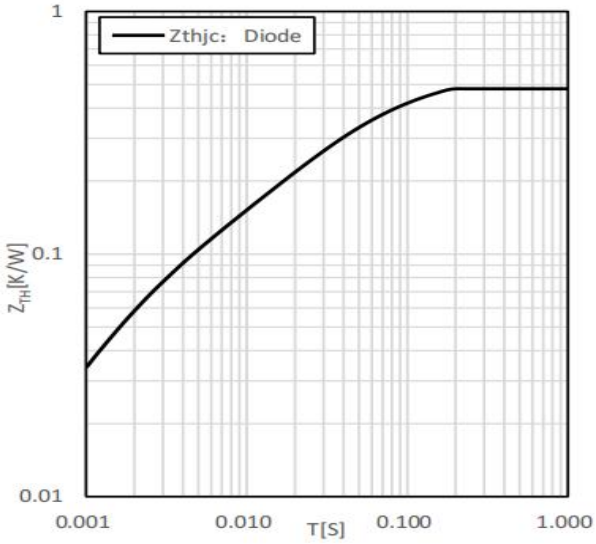


Fig.8 transient thermal impedance Diode

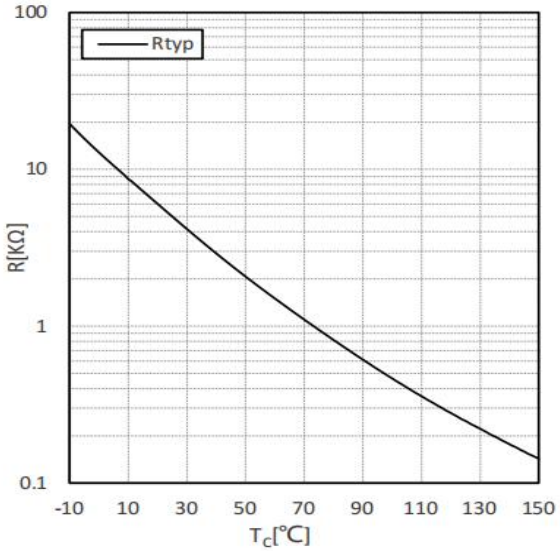
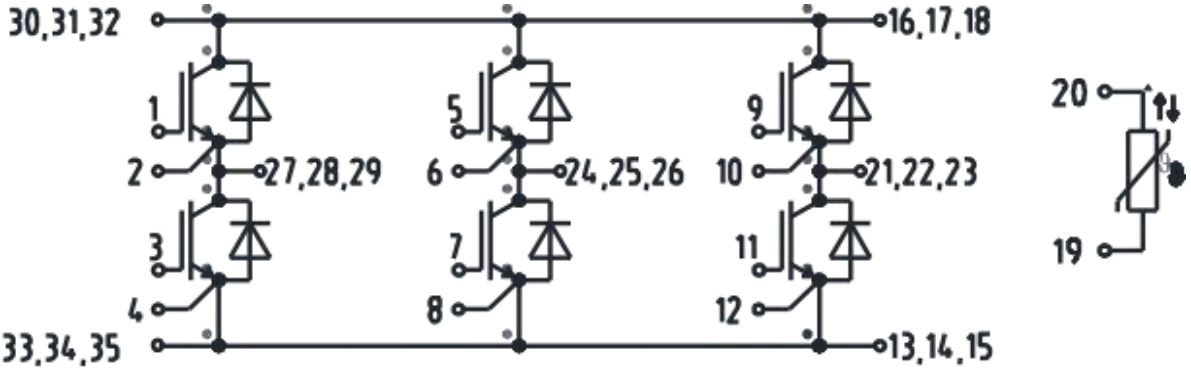
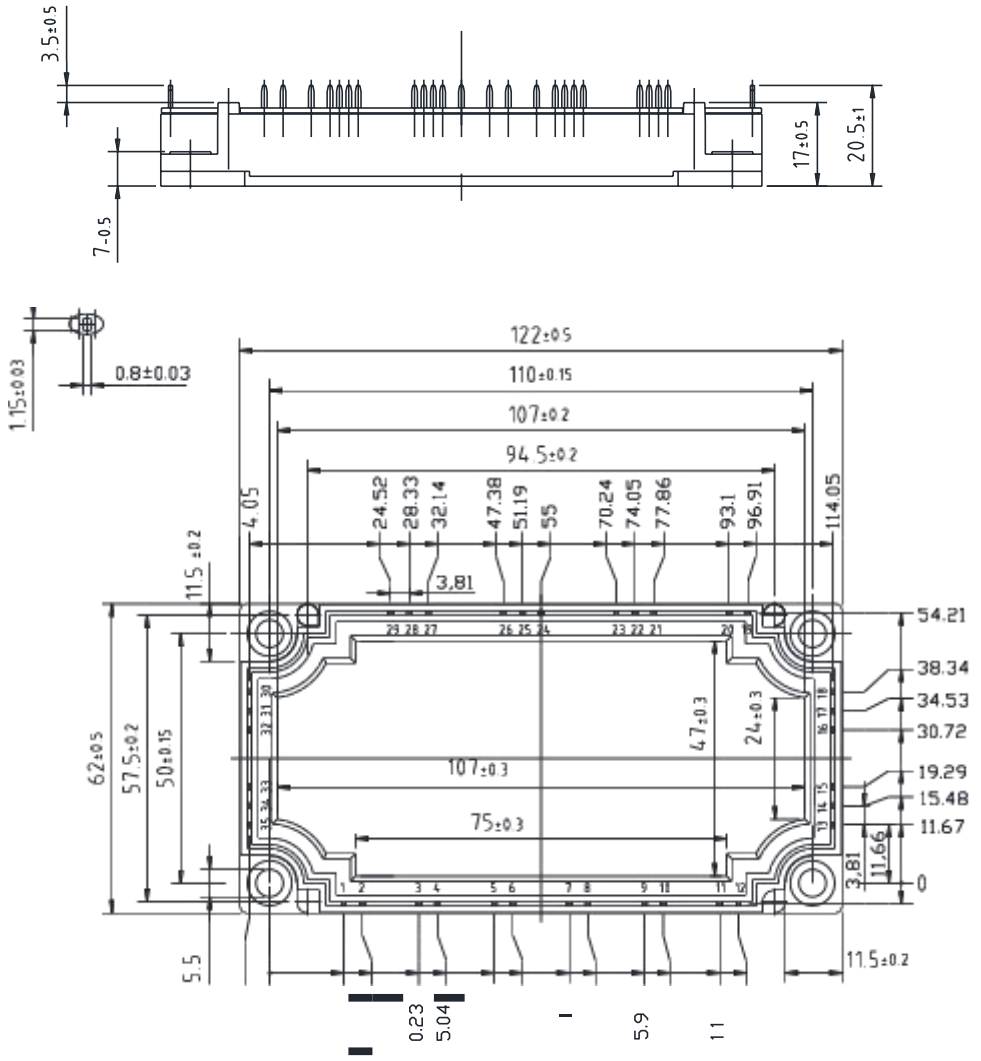


Fig.9 NTC Temperature characteristics

Internal Circuit Diagram



Package Outline (Unit：mm)



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