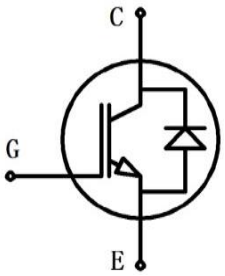
Trench Field-stop IGBT Discretes

VCES	VCEsat		I_{cnom}/I_{RM}
1200V	T_{vj}=25℃	2.1V	40A/50A
	Tvj= 150℃	2.5V	



G C E TO-3PN

FEATURES

- Trench and Field-stop technology
- Low collector to emitter saturation voltage
- Optimized for Fast Switching
- Easy parallel switching capability

APPLICATIONS

- Uninterruptible Power Supply
- Induction Heating
- Electric welding machine
- Soft switching application

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

Symbol	Parameter	Conditions	Value	Unit
VCES	Collector to Emitter Voltage		1200	V
VGES	Continuous Gate to Emitter Voltage		±20	V
IC	Continuous Collector Current	TC = 100℃	40	A
		TC = 25℃	80	A
ICM	Pulse Collector Current	tp=1ms	160	A
PD	Maximum Power Dissipation (IGBT)	TC = 25℃, TJ = 175℃	535	W

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

VRRM	Repetitive peak reverse voltage	TC = 25℃	1200	V
IF	Diode Continuous Forward Current	TC = 100℃	40	A
IFM	Peak FWD Current Repetitive	tp=1ms	160	A

Module Characteristics

TJ	Maximum Junction Temperature			175	℃
TJOP	Maximum Operating Junction Temperature Range	-40		+150	℃
Tstg	Storage Temperature	-40		+150	℃

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

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 = 40A, VGE = 15V	TJ = 25℃	-	2.1	-	V
			TJ= 150℃	-	2.5	-	
ICES	Collector-Emitter Leakage Current	V GE = 0V, VCE = VCES, TJ = 25℃		-	-	1.0	mA
IGES	Gate-Emitter Leakage Current	V GE = ±20V VCE = 0V, TJ = 25℃		-100	-	100	nA
Ciss	Input capacitance	VCE=25V, VGE=0V , f=1MHz		-	5.0	-	nF
Crss	Reverse transfer capacitance			-	0.08	-	
Rg					2.5		Ω

Switching Characteristics

td(on)	Turn-on Delay Time	VCC=600V, IC=40A, VGE=±15V, L=525uH, RG=10Ω	TJ = 25℃		21		ns
			TJ = 150℃		20		
tr	Rise Time		TJ = 25℃		48		ns
			TJ = 150℃		48		
td(off)	Turn-off Delay Time		TJ = 25℃		203		ns
			TJ = 150℃		214		
tf	Fall Time		TJ = 25℃		149		ns
			TJ = 150℃		404		
Eon	Turn-on Switching Loss		TJ = 25℃		2.9		mJ
			TJ = 150℃		3.4		
Eoff	Turn-off Switching Loss		TJ = 25℃		1.2		mJ
			TJ = 150℃		1.7		
RθJC	Junction-To-Case (IGBT)				0.28		K/W

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

Static characteristics

Symbol	Parameter	Conditions			Min	Typ	Max	Unit
VFM	Forward Voltage	IF=40A,VGE=0V	TJ = 25℃			2.3		V
			TJ = 150℃			1.8		

Switching Characteristics

IRM	Peak Reverse Recovery Current	IF=40A, VCC=600V, VGE=-15V, L=525uH,	TJ = 25℃		32		A
			TJ = 150℃		50		
Qrr	Reverse Recovery Charge		TJ = 25℃		3.0		μC
			TJ = 150℃		6.5		
Erec	Reverse Recovery Energy	RG=10Ω	TJ = 25℃		1.1		mJ
			TJ = 150℃		2.6		
RθJC	Junction-To-Case (Diode)					0.55	K/W

CHARACTERISTICS DIAGRAMS

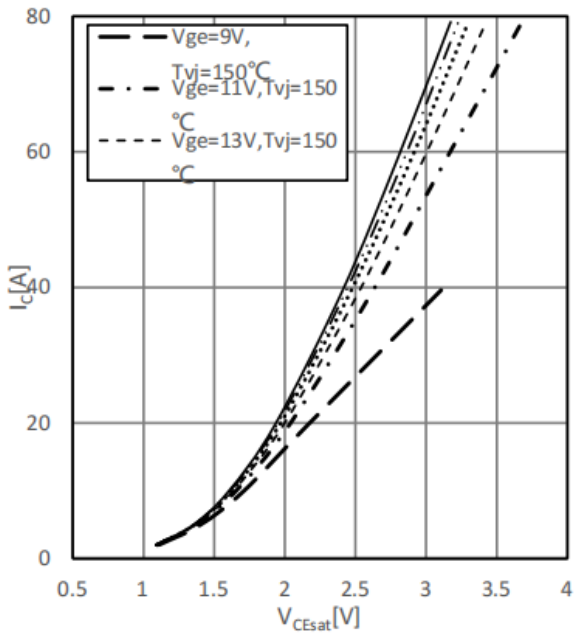


Fig.1 output characteristic IGBT Inverter (typical)

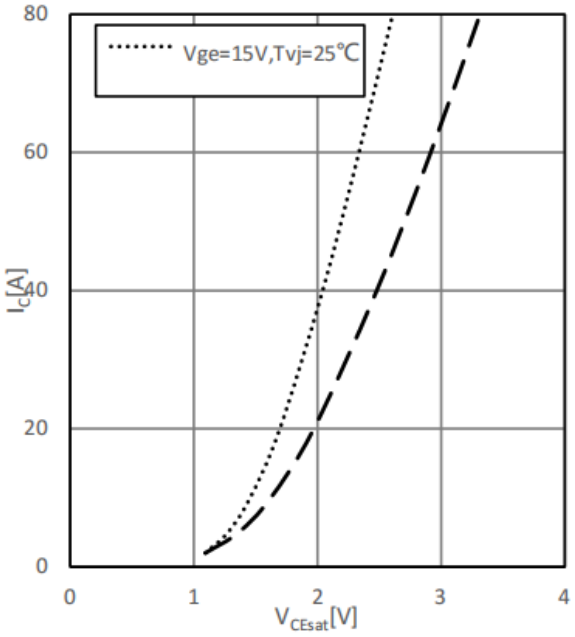


Fig.2 output characteristic IGBT Inverter (typical)

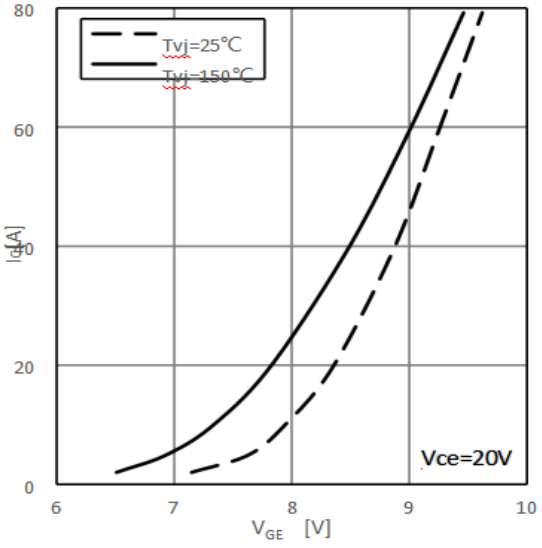


Fig.3 transfer characteristic IGBT Inverter (typical)

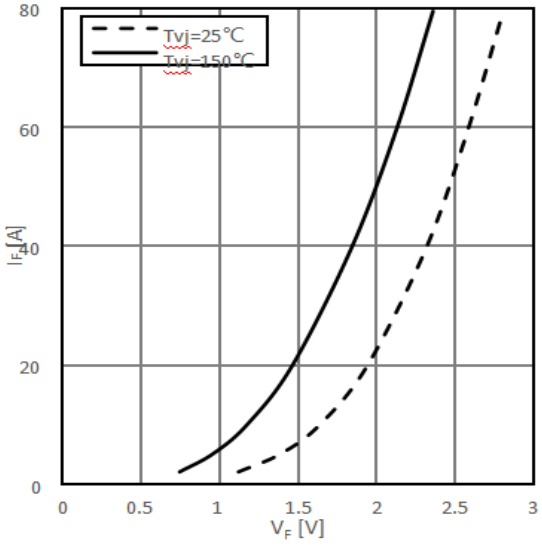


Fig.4 forward characteristic ofDiode, Inverter (typical)

V_{CC}=600V， V_{CE}=±15V
R_G=10Ω

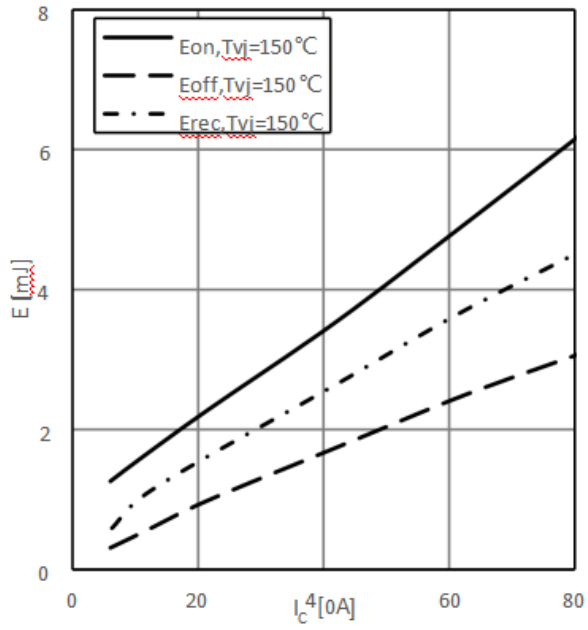


Fig.5 switching losses, Inverter (typical)

V_{CC}=600V， V_{CE}=±15V
I_C=40A

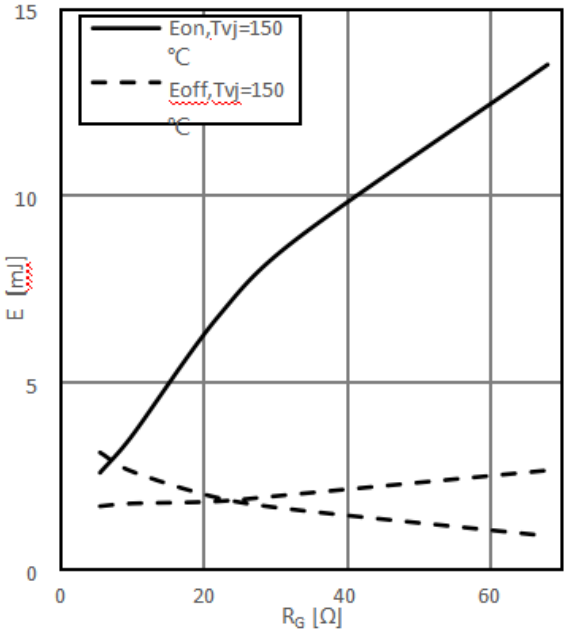


Fig.6 switching Losses vs. Gate Resistance (Typical)

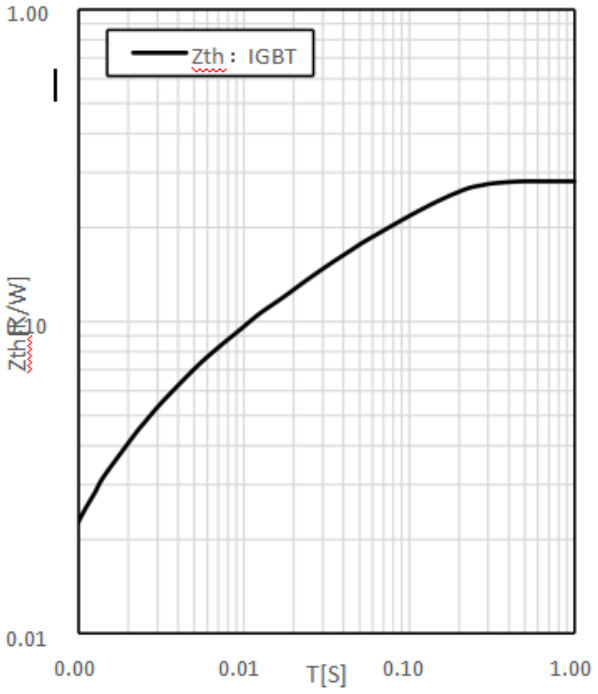


Fig.7 Transient thermal impedance IGBT

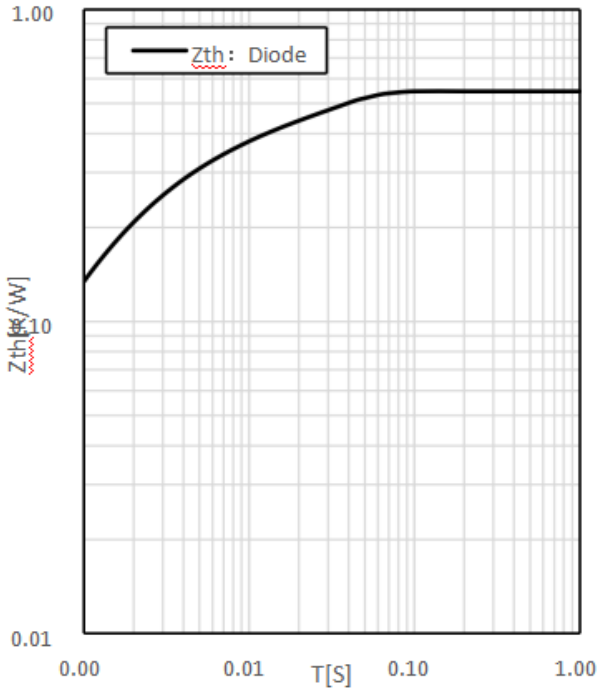
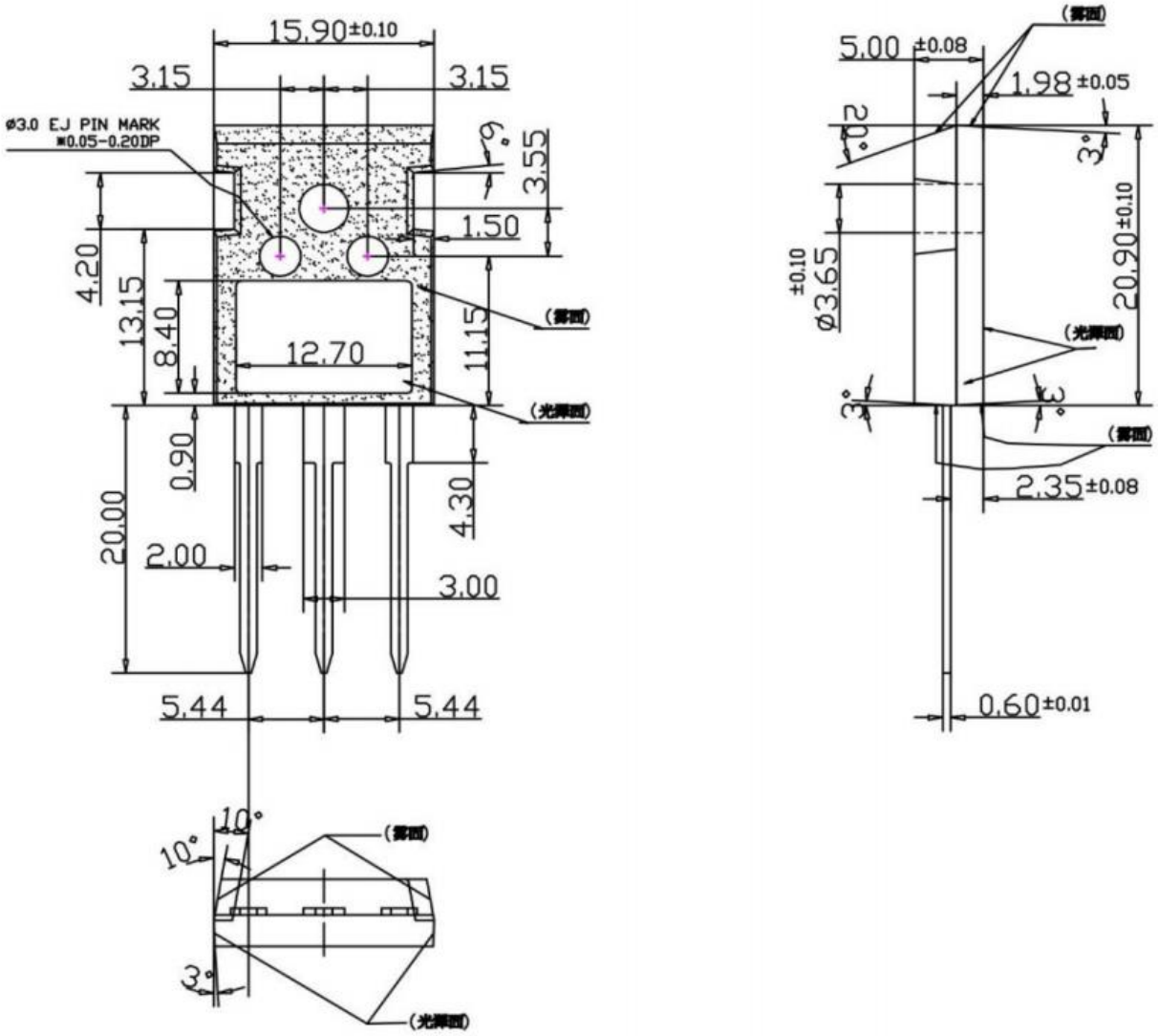


Fig.8 Transient thermal impedance Diode

PACKAGE OUTLINES(mm)



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Date of change	Rev #	revise content
2020/9/11	A/0	First edition release