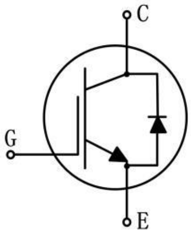
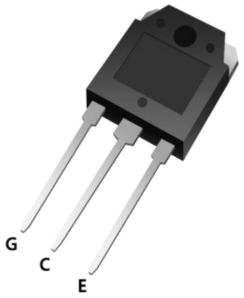
Trench Field-stop IGBT Discrete

Parameter	Value	Unit
V_{CE}	1200	V
I_C	40	A
$V_{CE(sat)}$	2.3	V





TO-3PN

Features

- Trench and Field-stop technology
- Low collector to emitter saturation voltage
- Optimized for Fast Switching
- Easy parallel switching capability
- Short circuit withstands time - 10μs

Applications

- Uninterruptible Power Supply
- Induction Heating
- Electric welding machine

Maximum Ratings(T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Value	Unit
Collector to Emitter Voltage	V_{CES}		1200	V
Continuous Gate to Emitter Voltage	V_{GES}		±20	V
Continuous Collector Current	I_C	T_C=100℃	40	A
		T_C=25℃	80	A
Pulse Collector Current	I_{CM}	tp=1ms	80	A
Maximum Power Dissipation (IGBT)	P_D	T_C=25℃, T_J=150℃	270	W
Short Circuit Withstand Time	t_{sc}	V_{CC}=600V, V_{GE}≤15V	10	us

Maximum Ratings(T_J = 25°C unless otherwise noted)

Repetitive peak reverse voltage	V_{RRM}		1200	V
Diode Continuous Forward Current	I_F	T_C=100℃	40	A
Peak FWD Current Repetitive	I_{FM}	tp=1ms	80	A

Electrical Characteristics of IGBT (T_{vj}=25℃ unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C=1mA, V_{CE}=V_{GE} ,T_J= 25℃	5.0	6.0	7.0	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=40A, V_{GE}=15V, T_J=25℃	-	2.3	-	V
		T_J=125℃	-	3.2	-	
Collector-Emitter Leakage Current	I_{CES}	V_{GE}=0V, V_{CE}=V_{CES}, TJ=25℃	-	-	1.0	mA
Gate-Emitter Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE}=0V, T_J=25℃	-100	-	100	nA

Input capacitance	C_{iss}	V_{CE}=25V, V_{GE}=0V , f=1MHz	-	3000	-	pF
Output capacitance	C_{oss}		-	250	-	
Reverse transfer capacitance	C_{rss}		-	100	-	

Switching Characteristics

Turn-on Delay Time	$t_{d(on)}$	V_{CC}=600V, I_C=40A, V_{GE}=±15V, L=525uH, Rg=10Ω	T_J=25℃	-	22	-	ns
			T_J=125℃	-	23	-	
Rise Time	t_r		T_J=25℃	-	32	-	ns
			T_J=125℃	-	37	-	
Turn-off Delay Time	$t_{d(off)}$		T_J=25℃	-	163	-	ns
			T_J=125℃	-	171	-	
Fall Time	t_f		T_J=25℃	-	144	-	ns
			T_J=125℃	-	174	-	
Turn-on Switching Loss	E_{on}		T_J=25℃	-	3.7	-	mJ
			T_J=125℃	-	6.1	-	
Turn-off Switching Loss	E_{off}		T_J=25℃	-	1.1	-	mJ
			T_J=125℃	-	1.5	-	
Junction-To-Case (IGBT)	$R_{\theta JC}$			-	0.45	-	K/W

Diode Characteristics

Static characteristics

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Forward Voltage	V_{FM}	I_F=40A,V_{GE}=0V	T_J = 25℃	-	2.0	-	V
			T_J = 125℃	-	1.7	-	

Switching Characteristics

Peak Reverse Recovery Current	I_{rr}	I_F=40A, V_{CC}=600V, V_{GE}=-15V, L=525uH, Rg=10Ω	T_J=25℃	-	42	-	A
			T_J=125℃	-	47	-	
Reverse Recovery Charge	Q_{rr}		T_J=25℃	-	3.7	-	μC
			T_J=125℃	-	8.0	-	
Reverse Recovery Energy	E_{rec}		T_J=25℃	-	1.0	-	mJ
			T_J=125℃	-	2.4	-	
Junction-To-Case (Diode)	$R_{\theta JC}$			-	0.8	-	K/W

Module Characteristics

Maximum Junction Temperature	T_J	-	-	150	℃
Maximum Operating Junction Temperature Range	T_{JOP}	-40	-	+150	℃
Storage Temperature	T_{stg}	-40	-	+125	℃

Typical Characteristics

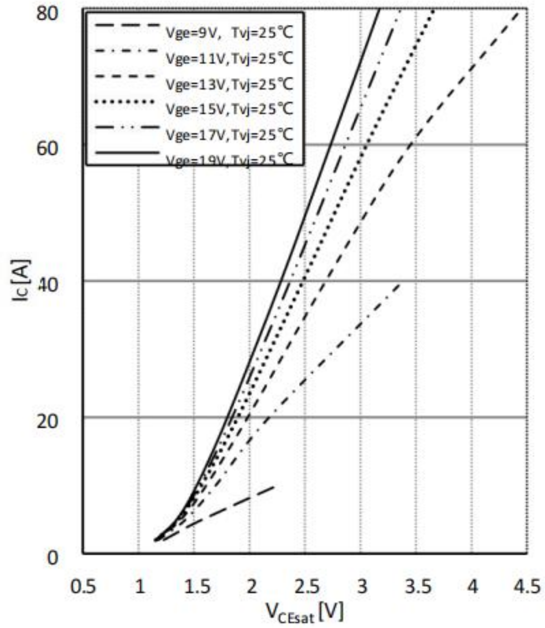


Fig.1 output characteristic IGBT Inverter (typical)

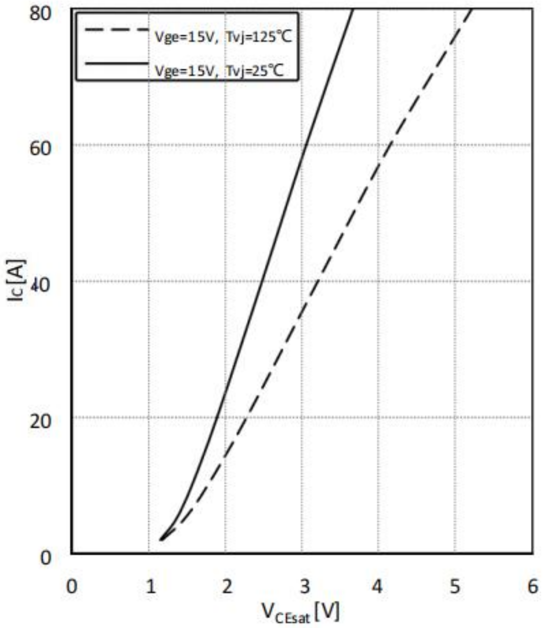


Fig.2 output characteristic IGBT Inverter (typical)

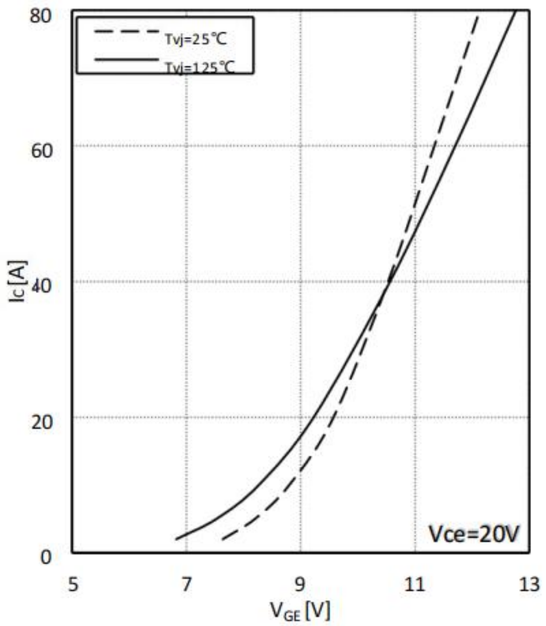


Fig.3 transfer characteristic IGBT Inverter (typical)

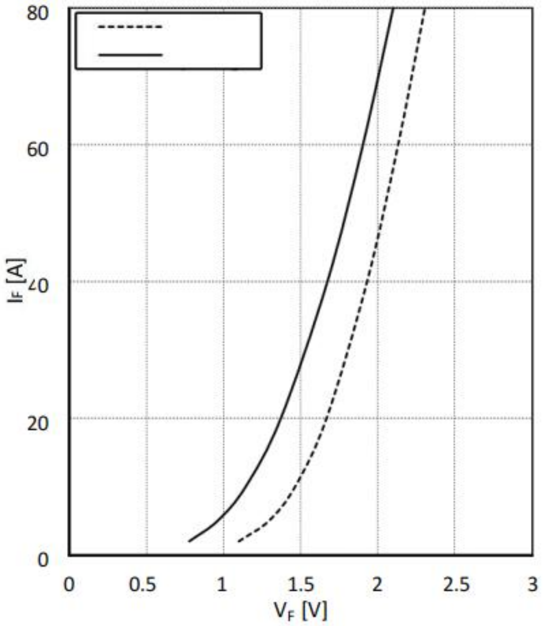


Fig.4 forward characteristic of Diode, Inverter (typical)

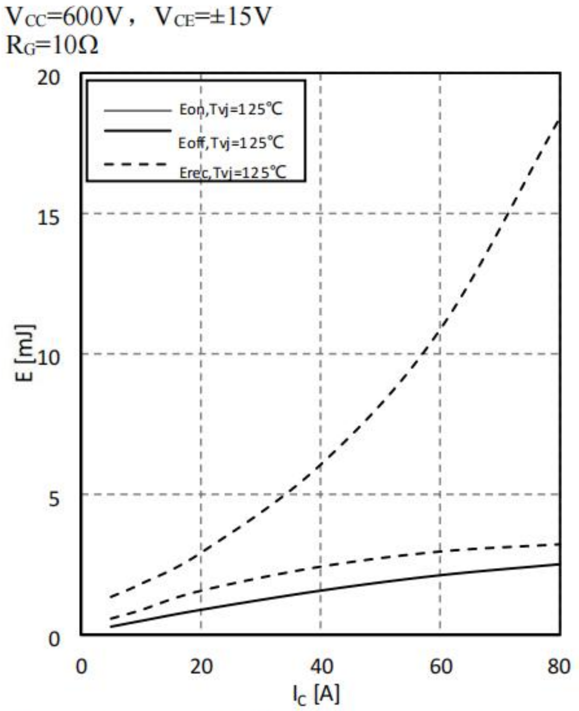


Fig.5 switching losses IGBT Inverter (typical)

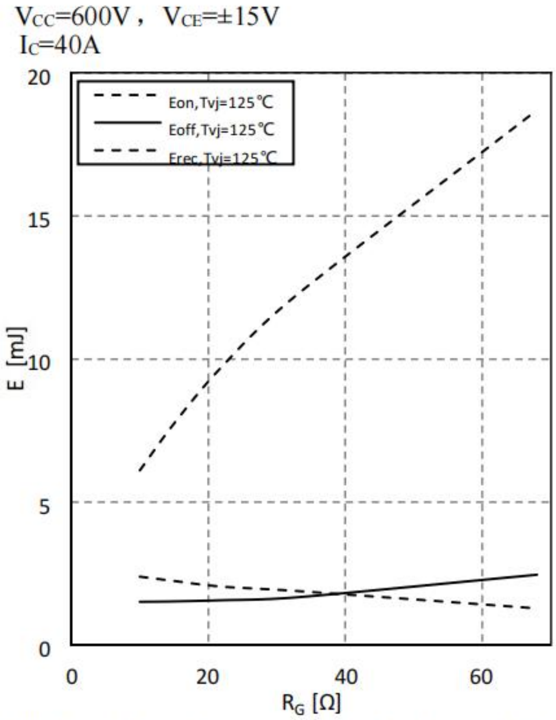
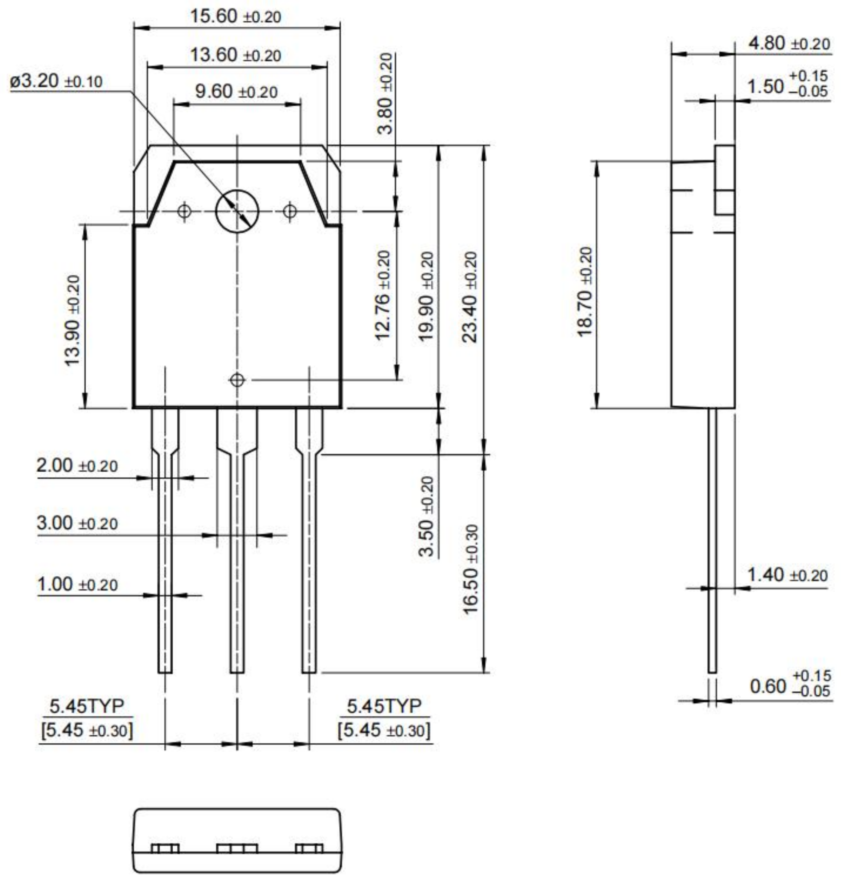


Fig.6 switching Losses vs. Gate Resistance (Typical)

Package Outlines (Unit：mm)

TO-3PN



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