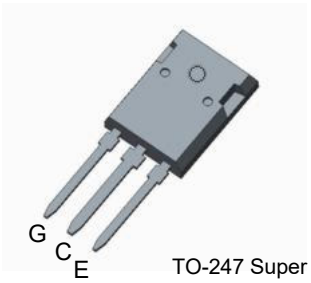
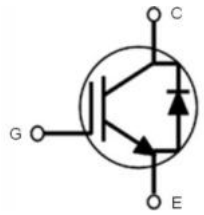
650V 100A FieldStop Trench IGBT



TO-247 Super



Description

The device is designed by advanced FieldStop Trench technology process. This IGBT offer low $V_{CE(sat)}$, high speed switching performance and excellent quality for application such as PFC,UPS, Welder, PV Inverter, Solar Inverter and other switching applications.

Features

- FieldStop Trench Technology, Positive temperature coefficient
- $V_{CE(sat)}$=1.58V@I_C=100A
- High Speed Switching & Low Power Loss
- High Input Impedance
- SiC Schottky Barrier Diode

Applications

- PFC, UPS, Welder, PV Inverter,Solar Inverter

Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		650	V
V_{GES}	Gate to Emitter Voltage		±20	V
I_C	Collector Current	T_C=25℃	180	A
		T_C=125℃	100	A
I_{CM}	Pulsed Collector Current		300	A
I_F	Diode Continuous Forward Current	T_C=125℃	30	A
I_{FSM}	Non-repetitive Peak Surge Current		150	A
P_D	Maximum Power Dissipation	T_C=25℃	428	W
		T_C=125℃	214	W
T_J	Operating Junction Temperature Range		-50~+175	℃
T_{STG}	Storage Temperature Range		-50~+150	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th\ (J-C)}$ (IGBT)	Thermal Resistance, Junction to case for IGBT	0.35	℃/W
$R_{th\ (J-C)}$ (Diode)	Thermal Resistance, Junction to case for Diode	0.75	℃/W
$R_{th\ (J-A)}$	Thermal Resistance, Junction to Ambient	40	℃/W

Electrical Characteristics of IGBT @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE}=0V, I_C=250uA	650	-	-	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=100A, V_{GE}=15V	-	1.58	1.8	V
		I_C=100A, V_{GE}=15V, T_C=125℃	-	1.90	-	V
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_C=250uA	4.0	4.5	6.0	V
I_{CES}	Zero Gate Voltage Collector Current	V_{CE}=V_{CES}, V_{GE}=0V	-	-	10	uA
I_{GES}	Gate to Emitter Leakage Current	V_{GE}=V_{GES}, V_{CE}=0V	-	-	±250	nA

Electrical Characteristics of Diode @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=60A	-	1.4	1.7	V
		I_F=60A, T_C=125℃	-	1.25	-	V
t_{rr}	Diode Reverse Recovery Time	I_F=60A, di/dt=-200A/us	-	96.0	-	ns
I_{rr}	Diode Peak Reverse Recovery Current		-	8.5	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	1.5	-	nC

Switching Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	I_C=100A, V_{CC}=325V, V_{GE}=15V, R_G=7Ω, Inductive Load, T_C=25℃	-	32.4	-	ns
t_r	Rising Time		-	39.2	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	135.6	-	ns
t_f	Falling Time		-	39.8	-	ns
E_{on}	Turn-on Switching Loss		-	1.50	-	mJ
E_{off}	Turn-off Switching Loss		-	0.69	-	mJ
E_{ts}	Total Switching Loss		-	2.17	-	mJ
$t_{d(on)}$	Turn-on Delay Time	I_C=100A, V_{CC}=325V, V_{GE}=15V, R_G=7Ω Inductive Load, T_C=125℃	-	31.8	-	ns
t_r	Rising Time		-	63.4	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	147.2	-	ns
t_f	Falling Time		-	56.0	-	ns
E_{on}	Turn-on Switching Loss		-	2.00	-	mJ
E_{off}	Turn-off Switching Loss		-	1.12	-	mJ
E_{ts}	Total Switching Loss		-	3.02	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V, V_{CE}=25V, f=1.0MHz	-	3680	-	pF
C_{res}	Reverse Transfer Capacitance		-	109	-	pF
C_{oes}	Output Capacitance		-	15	-	pF
tsc	Short Circuit With stand Time	V_{CC}=325V,V_{GE}=15V	10	-	-	us

Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

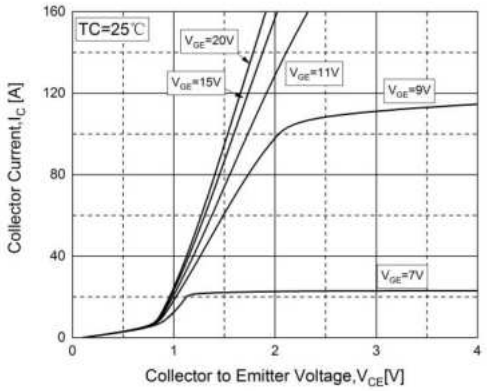


Fig. 2. Typical Saturation Voltage Characteristics

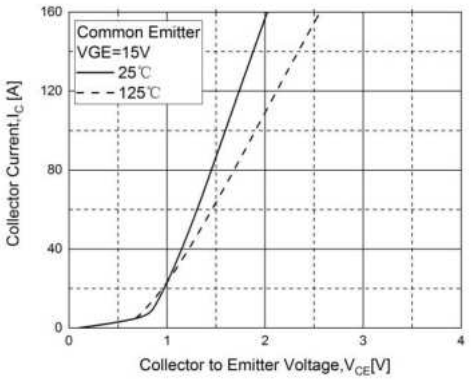


Fig. 3. Typical Saturation Voltage vs. T_C

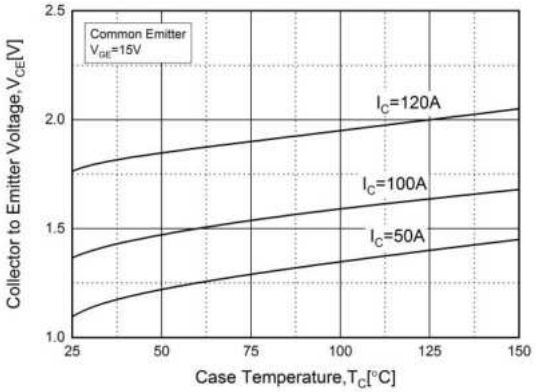


Fig. 4. Diode Forward Characteristics

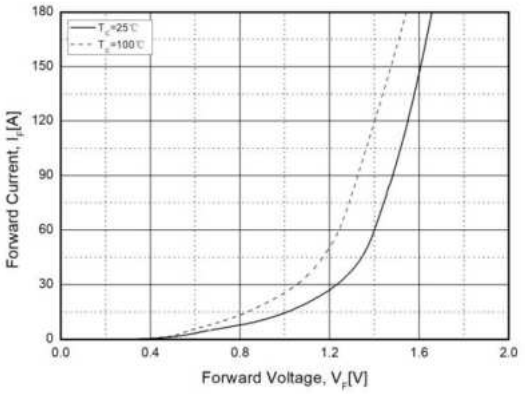


Fig. 5. Typical Capacitance Characteristics

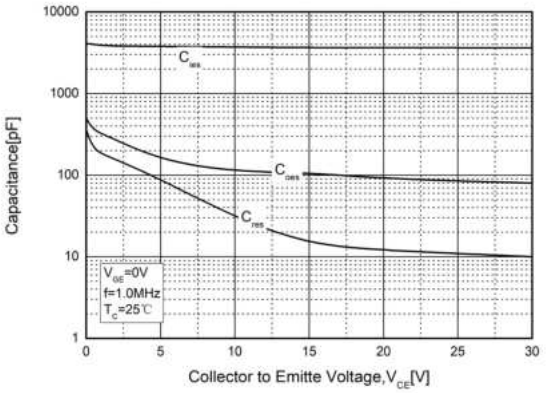
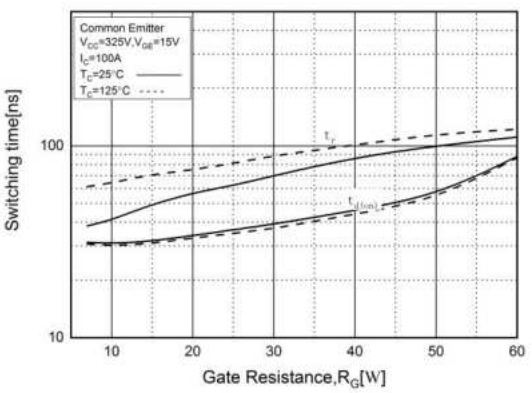


Fig. 6. Turn-on Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs. R_G

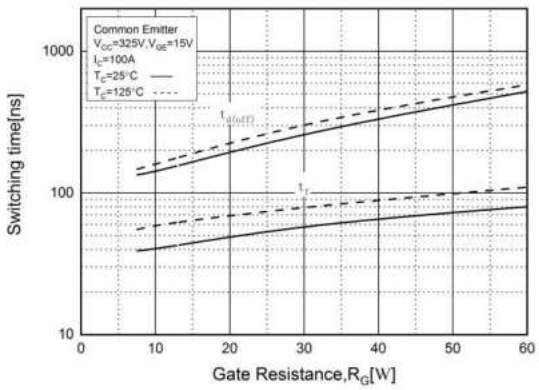


Fig. 8. Switching Loss vs. R_G

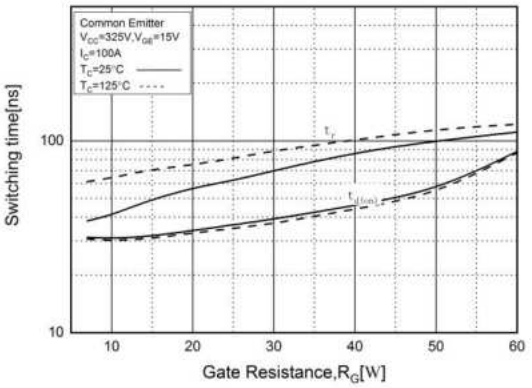


Fig. 9. Turn-on Characteristics vs. I_C

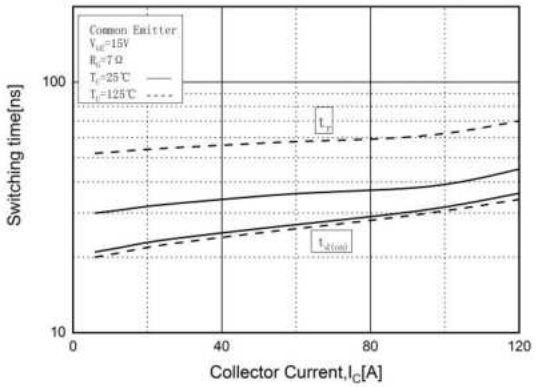


Fig. 10. Turn-off Characteristics vs. I_C

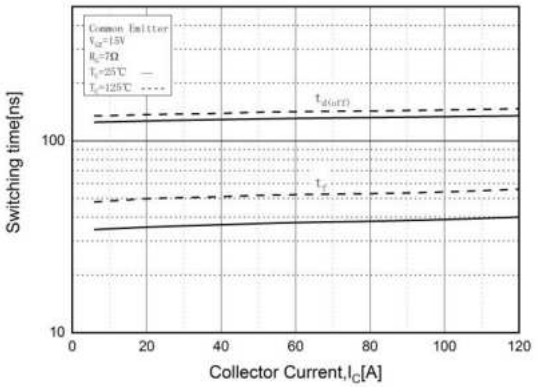
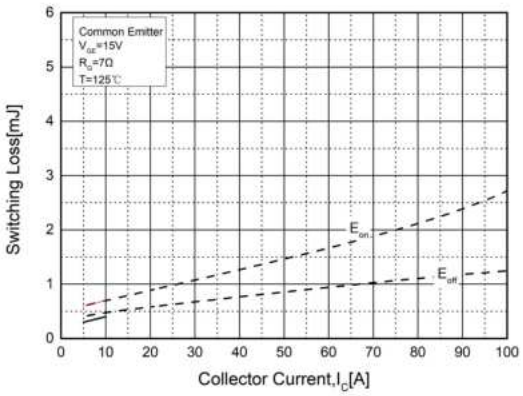


Fig. 11. Switching Loss vs. I_C



Package Dimensions

TO-247-Super

(Dimensions in Millimeters)