

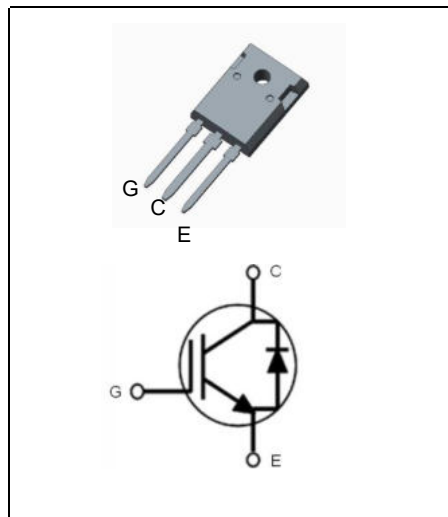
650V 80A FieldStop Trench IGBT

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
- $V_{CE(sat)}=1.45V@I_C=80A$
- $t_{rr}=50ns$ (typ.)
- High Speed Switching & Low Power Loss
- High Input Impedance



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	$T_C=25^\circ C$	160	A
		$T_C=100^\circ C$	80	A
I_{CM}	Pulsed Collector Current		240	A
I_F	Diode Continuous Forward Current	$T_C=100^\circ C$	80	A
I_{FM}	Diode Maximum Forward Current		400	A
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	428	W
		$T_C=100^\circ C$	214	W
T_J	Operating Junction Temperature Range		-50~+175	$^\circ C$
T_{STG}	Storage Temperature Range		-50~+150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$ (IGBT)	Thermal Resistance, Junction to case for IGBT	0.35	$^\circ C/W$
$R_{th(J-C)}$ (Diode)	Thermal Resistance, Junction to case for Diode	0.45	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

Electrical Characteristics of IGBT @T_C=25 °C 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 =80A, V _{GE} =15V	-	1.45	1.8	V
		I _C =80A, V _{GE} =15V, T _C =125°C	-	1.7	-	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 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _F	Diode Forward Voltage	I _F =80A	-	1.66	1.9	V
		I _F =80A, T _C =125°C	-	1.5	-	V
t _{rr}	Diode Reverse Recovery Time	I _F =80A, di/dt=-200A/us	-	50.0	75.0	ns
I _{rr}	Diode Peak Reverse Recovery Current		-	9.0	-	A
Q _{rr}	Diode Reverse Recovery Charge		-	1.4	-	nC

Switching Characteristics @T_C=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t _{d(on)}	Turn-on Delay Time	I _C =80A, V _{CC} =325V, V _{GE} =15V, R _G =7Ω, Inductive Load, T _C =25°C	-	31.4	-	ns
t _r	Rising Time		-	38.2	-	ns
t _{d(off)}	Turn-off Delay Time		-	133.6	-	ns
t _f	Falling Time		-	38.8	-	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 =80A, V _{CC} =325V, V _{GE} =15V, R _G =7Ω, Inductive Load, T _C =125°C	-	30.8	-	ns
t _r	Rising Time		-	61.4	-	ns
t _{d(off)}	Turn-off Delay Time		-	144.2	-	ns
t _f	Falling Time		-	54.0	-	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

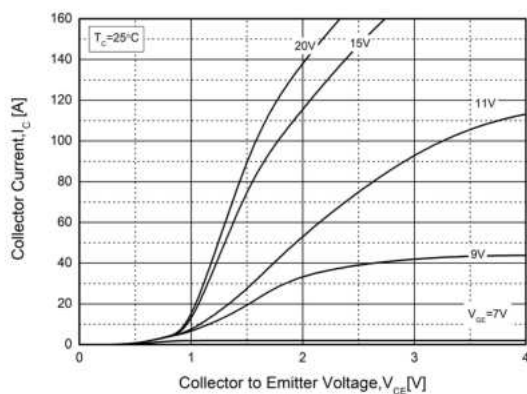


Fig. 2. Typical Saturation Voltage Characteristics

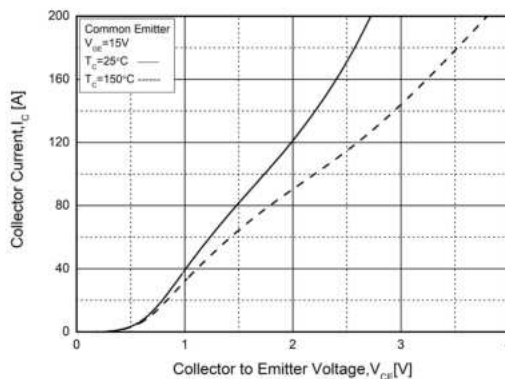


Fig. 3. Typical Saturation Voltage vs. T_C

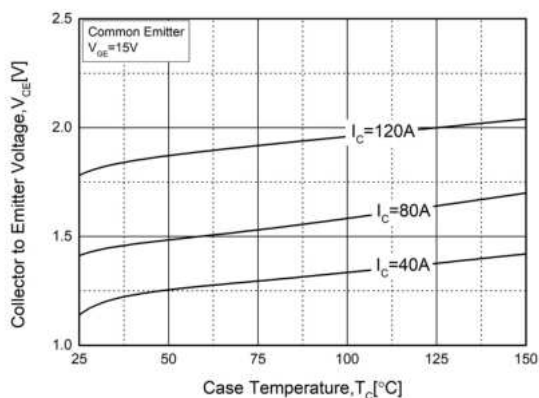


Fig. 4. Diode Forward Characteristics

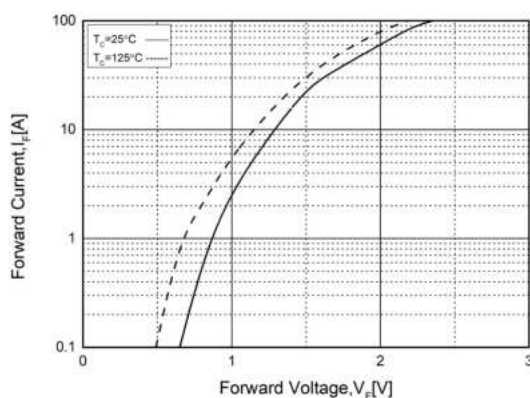


Fig. 5. Typical Capacitance Characteristics

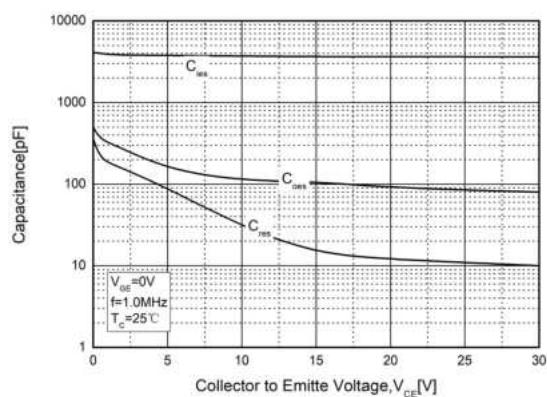
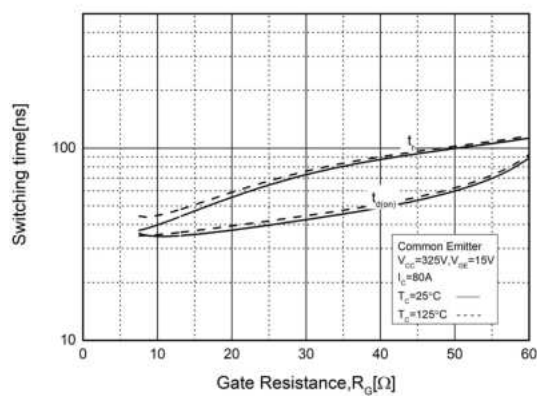


Fig. 6. Turn-on Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs. R_G

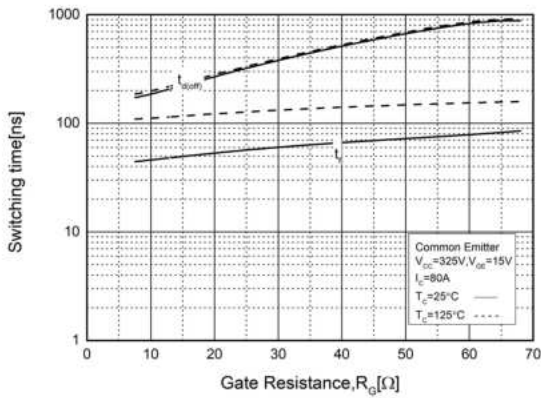


Fig. 8. Switching Loss vs. R_G

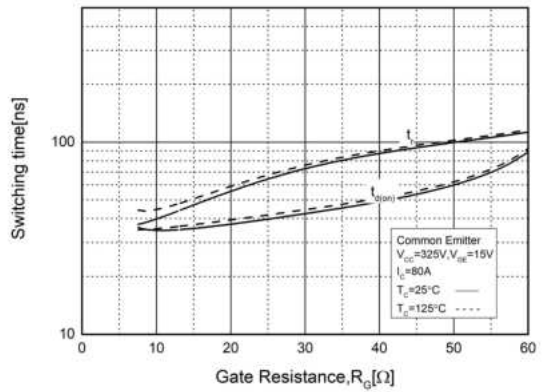


Fig. 9. Turn-on Characteristics vs. I_C

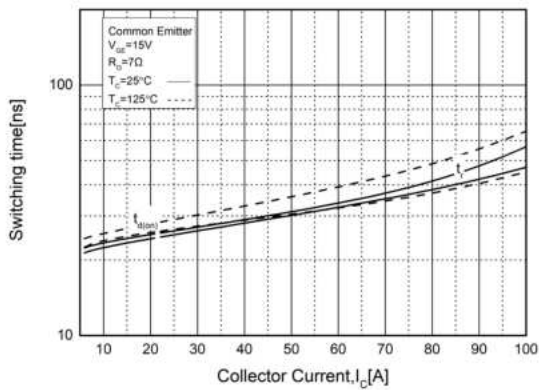


Fig. 10. Turn-off Characteristics vs. I_C

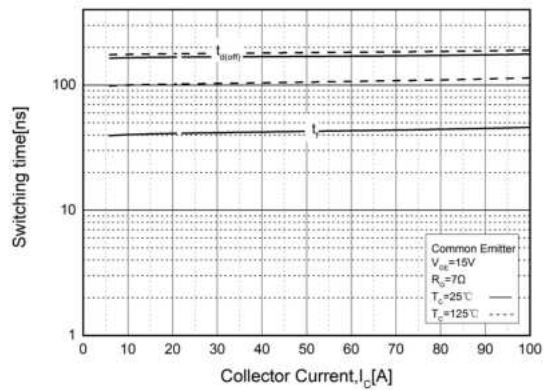
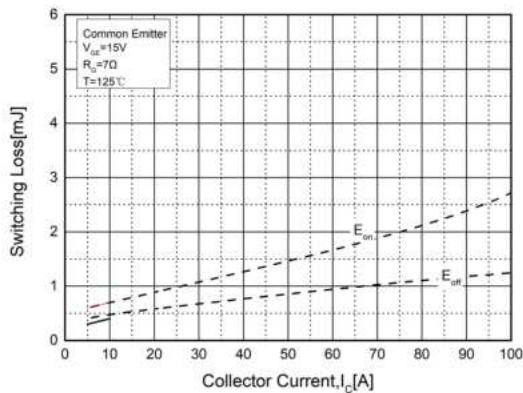


Fig. 11. Switching Loss vs. I_C



Package Dimensions

TO-247

(Dimensions in Millimeters)

