SGH80T60SMD

600V 80A FieldStop Trench IGBT

Features

- FieldStop Trench Technology, Positive temperature coefficient
- $V_{CE(sat)}$=1.45V@I_C=80A
- t_{rr}=75ns (typ.)
- High Speed Switching & Low Power Loss
- High Input Impedance

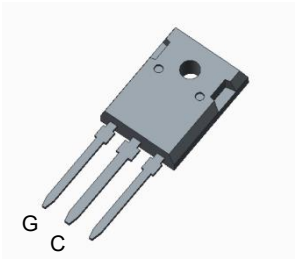
Applications

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

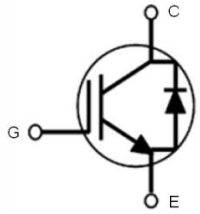
Description

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.

Package Type & Internal Circuit



TO-247



Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		600	V
V_{GES}	Gate to Emitter Voltage		±20	V
I_C	Collector Current	T_C=25℃	160	A
		T_C=100℃	80	A
I_{CM}	Pulsed Collector Current		240	A
I_F	Diode Continuous Forward Current	T_C=100℃	80	A
I_{FM}	Diode Maximum Forward Current		400	A
P_D	Maximum Power Dissipation	T_C=25℃	428	W
		T_C=100℃	214	W
T_J	Operating Junction Temperature Range		-50~+175	℃
T_{STG}	Storage Temperature Range		-50~+175	℃

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	0.46	℃/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	600	-	-	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℃	-	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 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=80A	-	1.65	2.0	V
		I_F=80A, T_C=125℃	-	1.5	-	V
t_{rr}	Diode Reverse Recovery Time	I_F=80A, di/dt=-200A/us	-	75.0	90.0	ns
I_{rr}	Diode Peak Reverse Recovery Current		-	9.5	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	1.4	-	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=80A, V_{CC}=300V, V_{GE}=15V, R_G=7Ω, Inductive Load, T_C=25℃	-	36.7	-	ns
t_r	Rising Time		-	37.0	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	171.0	-	ns
t_f	Falling Time		-	44.0	-	ns
E_{on}	Turn-on Switching Loss		-	1.52	-	mJ
E_{off}	Turn-off Switching Loss		-	0.71	-	mJ
E_{ts}	Total Switching Loss		-	2.19	-	mJ
$t_{d(on)}$	Turn-on Delay Time	I_C=80A, V_{CC}=300V, V_{GE}=15V, R_G=7Ω Inductive Load, T_C=125℃	-	35.0	-	ns
t_r	Rising Time		-	44.7	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	185.0	-	ns
t_f	Falling Time		-	109.0	-	ns
E_{on}	Turn-on Switching Loss		-	2.01	-	mJ
E_{off}	Turn-off Switching Loss		-	1.13	-	mJ
E_{ts}	Total Switching Loss		-	3.05	-	mJ
C_{ies}	Input Capacitance	V_{GE}=0V, V_{CE}=25V, f=1.0MHz	-	3650	-	pF
C_{res}	Reverse Transfer Capacitance		-	14	-	pF
C_{oes}	Output Capacitance		-	108	-	pF
tsc	Short Circuit With stand Time	V_{CC}=300V,V_{GE}=15V	10	-	-	us

Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

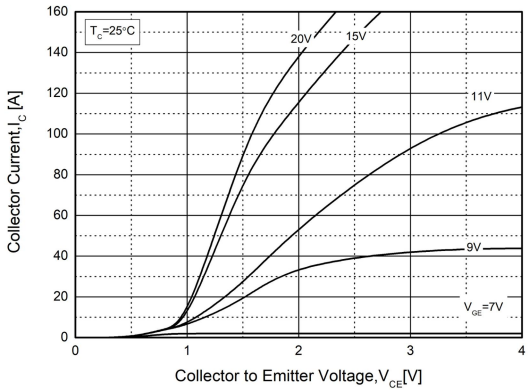


Fig. 2. Typical Saturation Voltage Characteristics

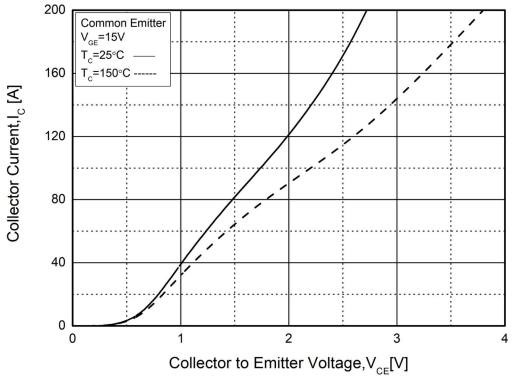


Fig. 3. Typical Saturation Voltage vs. T_C

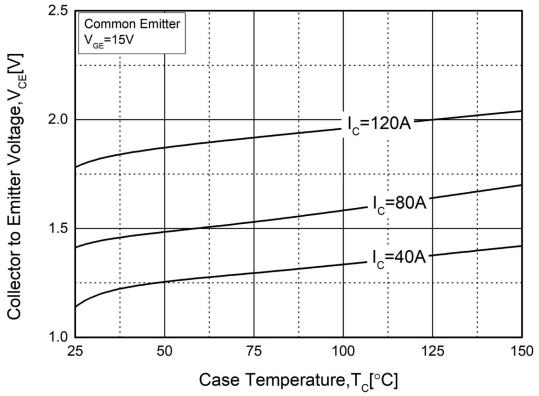


Fig. 4. Diode Forward Characteristics

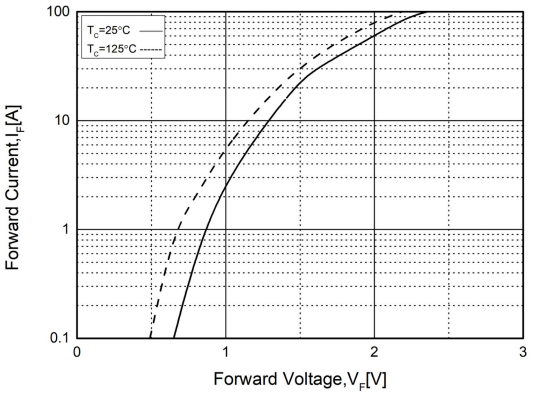


Fig. 5. Typical Capacitance Characteristics

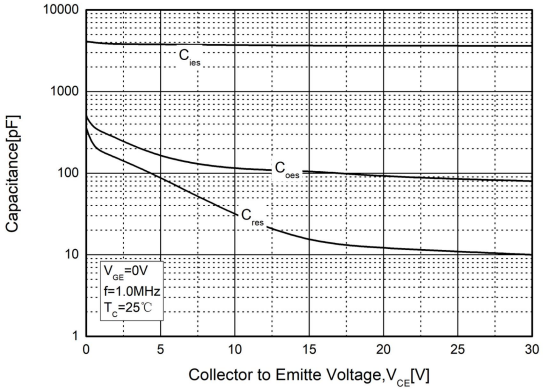
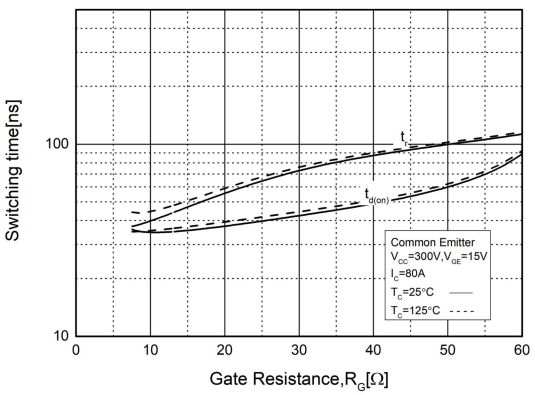


Fig. 6. Turn-on Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs. R_G

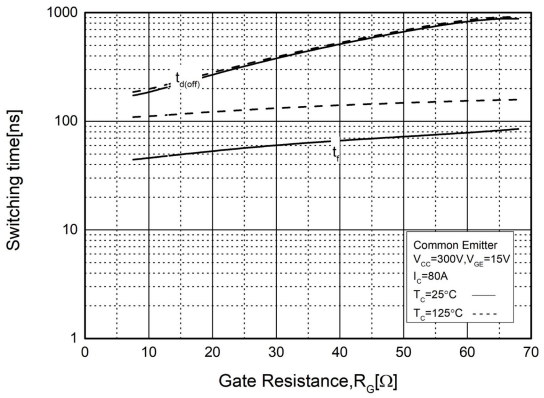


Fig. 8. Switching Loss vs. R_G

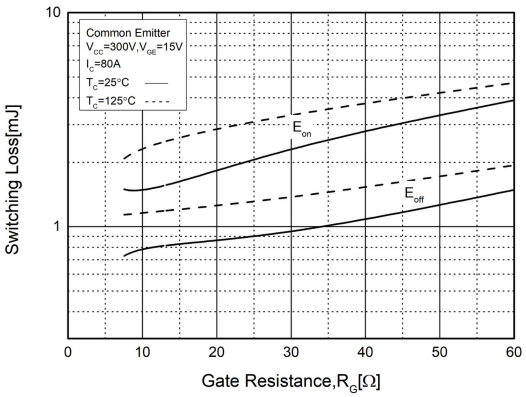


Fig. 9. Turn-on Characteristics vs. I_C

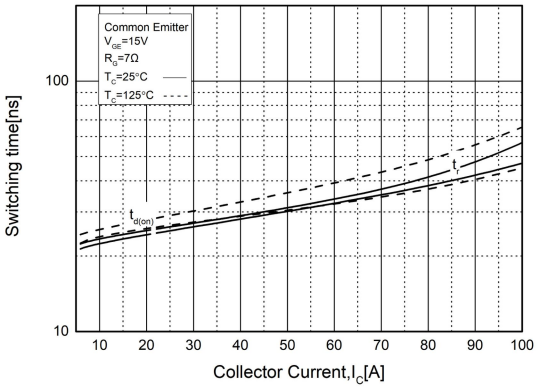


Fig. 10. Turn-off Characteristics vs. I_C

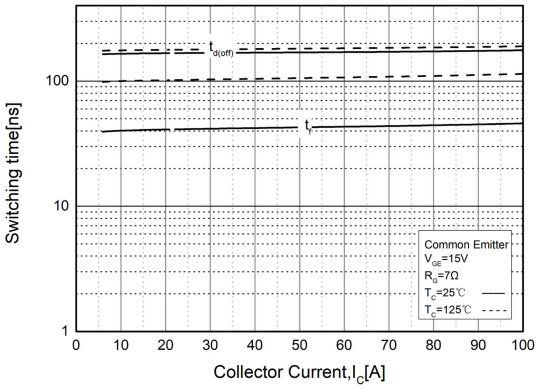
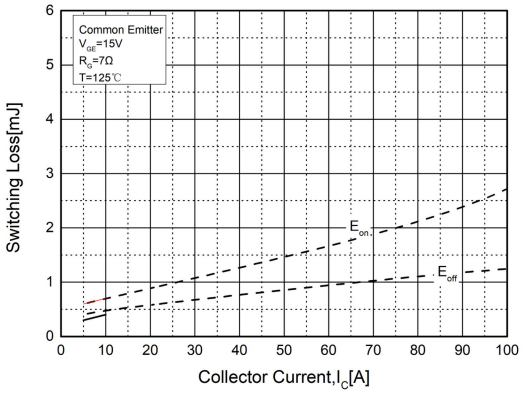


Fig. 11. Switching Loss vs. I_C



Package Dimensions

TO-247

(Dimensions in Millimeters)

