

1200V 30A FieldStop Trench IGBT

Description

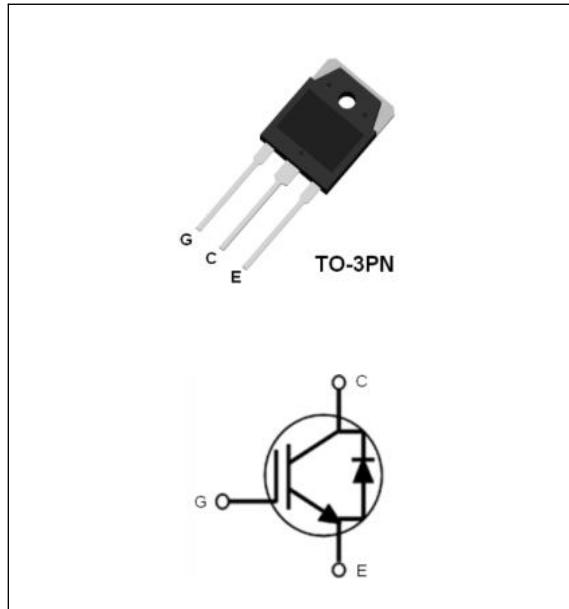
The device is designed by advanced FieldStop Trench technology process. This IGBT offer low $V_{CE(sat)}$, high speed switching performance and excellent quality for application such as PFC,UPS, Welder, PV Inverter and other switching applications.

Features

- FieldStop Trench Technology, Positive temperature coefficient
- $V_{CE(sat)}=2.14V@I_C=30A$
- $t_{rr}=290ns$ (typ.)
- High Speed Switching & Low Power Loss
- High Input Impedance

Applications

- PFC, UPS, Welder, PV Inverter



Absolute Maximum Ratings

Symbol	Parameter		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		1200	V
V_{GES}	Gate to Emitter Voltage		± 20	V
I_C	Collector Current	$T_C=25^\circ C$	55	A
		$T_C=100^\circ C$	30	A
I_{CM}	Pulsed Collector Current		100	A
I_F	Diode Continuous Forward Current	$T_C=100^\circ C$	30	A
I_{FM}	Diode Maximum Forward Current		180	A
P_D	Maximum Power Dissipation	$T_C=25^\circ C$	325	W
		$T_C=100^\circ C$	175	W
T_J	Operating Junction Temperature Range		-40~+175	°C
T_{STG}	Storage Temperature Range		-50~+150	°C

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th(J-C)}$ (IGBT)	Thermal Resistance, Junction to case for IGBT	0.5	°C/W
$R_{th(J-C)}$ (Diode)	Thermal Resistance, Junction to case for Diode	1.7	°C/W
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	°C/W

Electrical Characteristics of IGBT @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector to Emitter Breakdown Voltage	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	1200	-	-	V
$V_{CE(\text{sat})}$	Collector to Emitter Saturation Voltage	$I_C=30\text{A}, V_{GE}=15\text{V}$	-	2.14	2.8	V
		$I_C=30\text{A}, V_{GE}=15\text{V}, T_C=150\text{ }^\circ\text{C}$	-	2.65	-	V
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{CE}=V_{GE}, I_C=250\mu\text{A}$	5.0	5.9	7.0	V
I_{CES}	Zero Gate Voltage Collector Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}$	-	-	1	μA
I_{GES}	Gate to Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}$	-	-	± 250	nA

Electrical Characteristics of Diode @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=30\text{A}$	-	2.8	3.3	V
		$I_F=30\text{A}, T_C=150\text{ }^\circ\text{C}$	-	2.6	-	V
t_{rr}	Diode Reverse Recovery Time		-	290	-	ns
I_{rr}	Diode Peak Reverse Recovery Current	$I_F=30\text{A}, \frac{dI}{dt}=-200\text{A/us}$	-	8.8	-	A
Q_{rr}	Diode Reverse Recovery Charge		-	1080	-	nC

Switching Characteristics @ $T_C=25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$I_C=30\text{A}, V_{CC}=600\text{V}, V_{GE}=15\text{V}, R_G=10\Omega, \text{Inductive Load, } T_C=25\text{ }^\circ\text{C}$	-	25	-	ns
t_r	Rising Time		-	21	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	145	-	ns
t_f	Falling Time		-	45	-	ns
E_{on}	Turn-on Switching Loss		-	1.08	-	mJ
E_{off}	Turn-off Switching Loss		-	0.36	-	mJ
E_{ts}	Total Switching Loss		-	1.44	-	mJ
$t_{d(on)}$	Turn-on Delay Time		-	22	-	ns
t_r	Rising Time	$I_C=30\text{A}, V_{CC}=600\text{V}, V_{GE}=15\text{V}, R_G=10\Omega, \text{Inductive Load, } T_C=150\text{ }^\circ\text{C}$	-	22	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	172	-	ns
t_f	Falling Time		-	114	-	ns
E_{on}	Turn-on Switching Loss		-	1.96	-	mJ
E_{off}	Turn-off Switching Loss		-	0.62	-	mJ
E_{ts}	Total Switching Loss		-	2.58	-	mJ
C_{ies}	Input Capacitance	$V_{GE}=0\text{V}, V_{CE}=25\text{V}, f=1.0\text{MHz}$	-	3942	-	pF
C_{res}	Reverse Transfer Capacitance		-	72	-	pF
C_{oes}	Output Capacitance		-	72	-	pF
Q_g	Total Gate Charge	$I_C=30\text{A}, V_{CC}=960\text{V}, V_{GE}=15\text{V}$	-	204	-	nC
Q_{ge}	Gate to Emitter Charge		-	34	-	nC
Q_{gc}	Gate to Collector Charge		-	94	-	nC
tsc	Short Circuit With stand Time	$V_{CC}=600\text{V}, V_{GE}=15\text{V}$	6	-	-	us

Typical Performance Characteristics

Fig. 1. Typical Output Characteristics

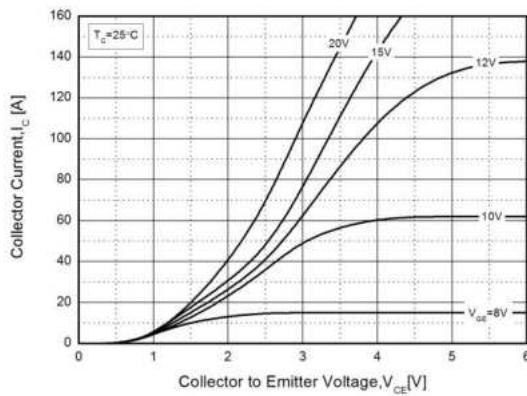


Fig. 2. Typical Saturation Voltage Characteristics

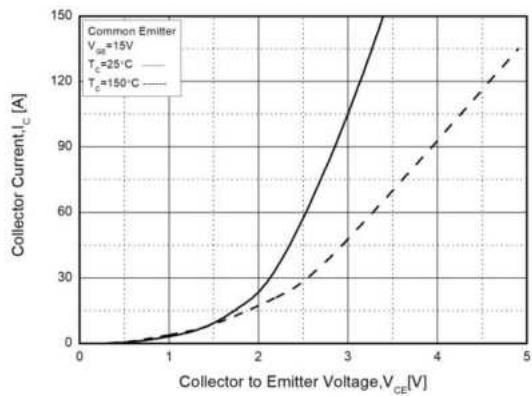


Fig. 3. Typical Saturation Voltage vs. T_c

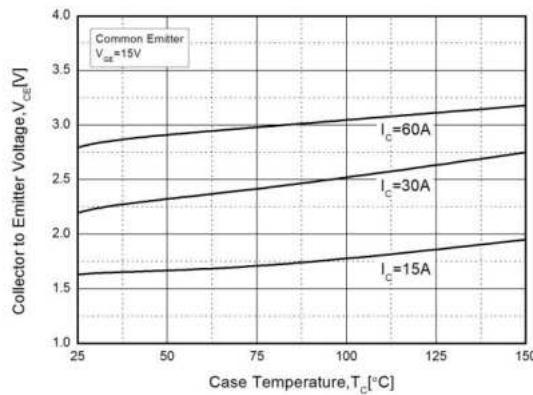


Fig. 4. Diode Forward Characteristics

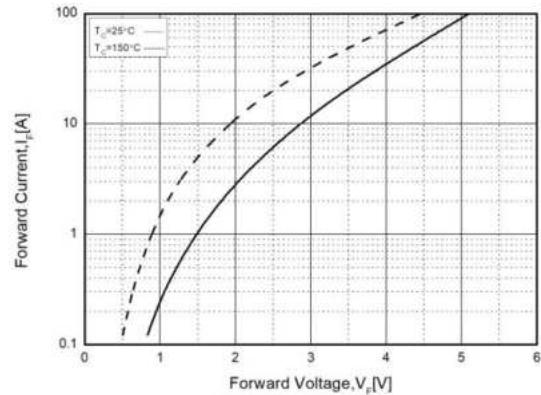


Fig. 5. Typical Capacitance Characteristics

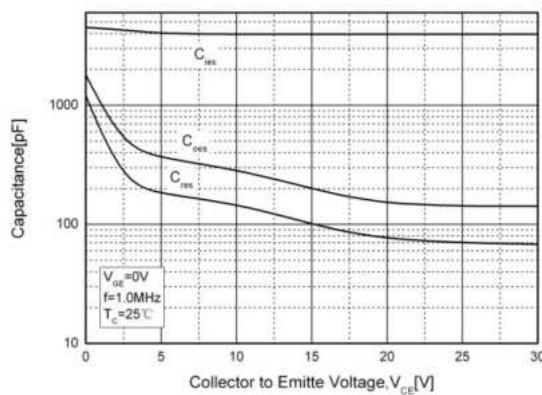
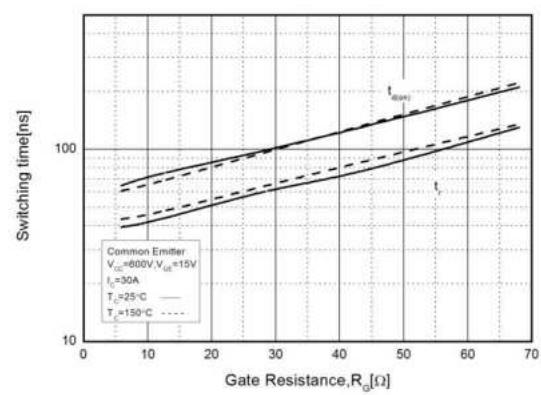


Fig. 6. Turn-on Characteristics vs. R_G



Typical Performance Characteristics

Fig. 7. Turn-off Characteristics vs. R_G

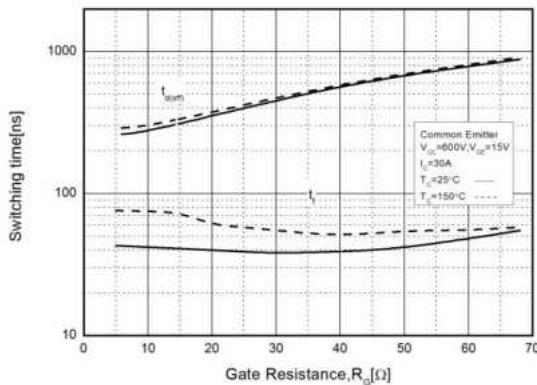


Fig. 8. Switching Loss vs. R_G

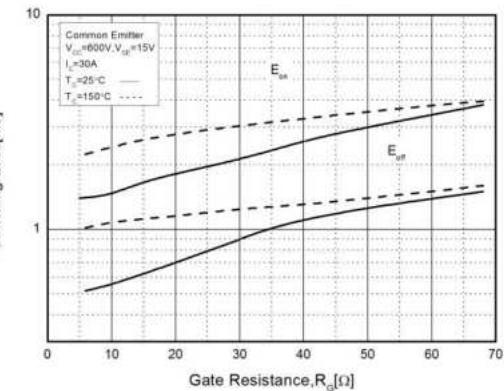


Fig. 9. Turn-on Characteristics vs. I_C

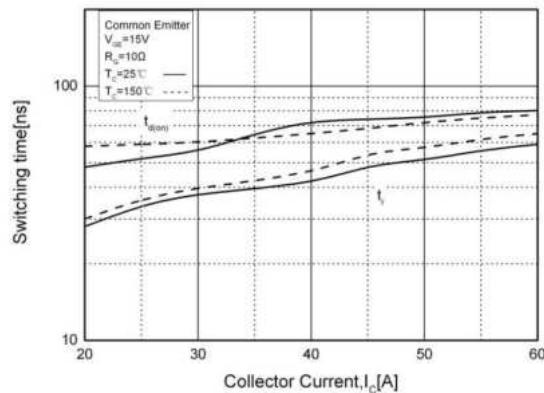


Fig. 10. Turn-off Characteristics vs. I_C

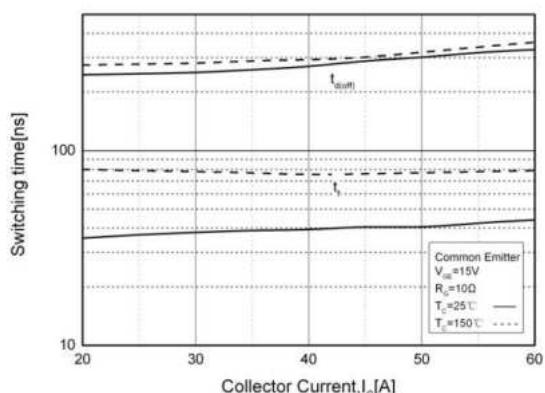
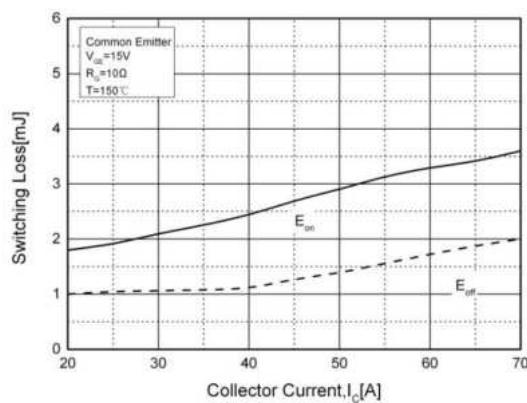


Fig. 11. Switching Loss vs. I_C



Package Dimensions

TO-3PN

(Dimensions in Millimeters)

