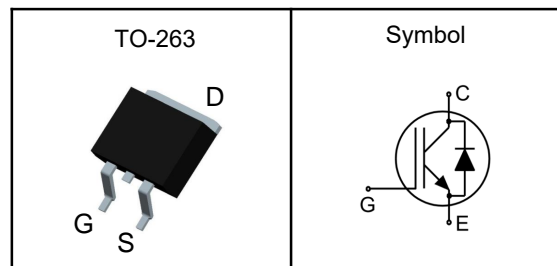


600V/15A Field Stop Trench IGBT
Features

- Trench FS II Technology
- Very low $V_{CE(sat)}$
- High speed switching
- ROHS Compliant

Applications

- Inverter welding machine
- Motor drives
- UPS

Pin Description


V_{CES}	600	V
$V_{CE(sat)-Typ}$	1.7	V
I_C	15	A

Absolute Maximum Ratings ($T_C=25^{\circ}C$, Unless Otherwise Noted)

Parameter	Symbol	Rating	Units
Collector-Emitter Voltage	V_{CES}	600	V
Gate- Emitter Voltage	V_{GES}	± 30	V
Collector Current ¹	$T_C=25^{\circ}C$ I_C	30	A
Collector Current ¹	$T_C=100^{\circ}C$ I_C	15	A
Pulsed Collector Current ²	I_{CM}	45	A
Diode Continuous Forward Current	$T_C=25^{\circ}C$ I_F	30	A
Diode Continuous Forward Current	$T_C=100^{\circ}C$ I_F	15	A
Diode Pulsed Forward Current	I_{FM}	60	A
Power Dissipation	$T_C=25^{\circ}C$ P_D	105	W
Power Dissipation	$T_C=100^{\circ}C$ P_D	42	W
Storage Temperature Range	T_{STG}	-55 to 150	$^{\circ}C$
Operating Junction Temperature Range	T_J	-55 to 150	$^{\circ}C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	---	62	$^{\circ}C/W$
Thermal Resistance Junction to case for IGBT	$R_{\theta JC}$	---	1.19	$^{\circ}C/W$



600V/15A Field Stop Trench IGBT

Electrical Characteristics (T_J=25°C, unless otherwise noted)

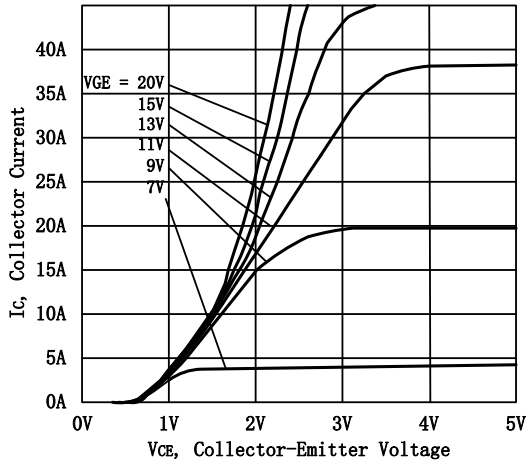
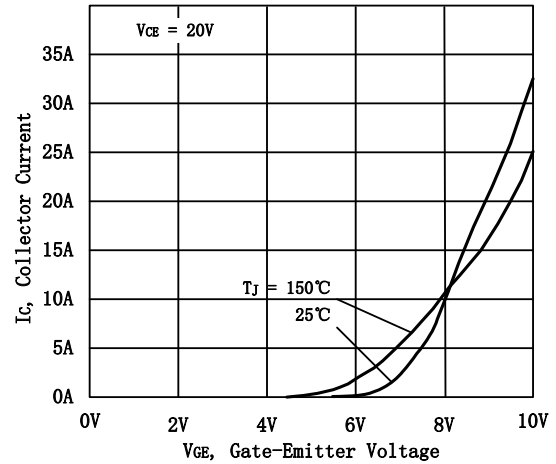
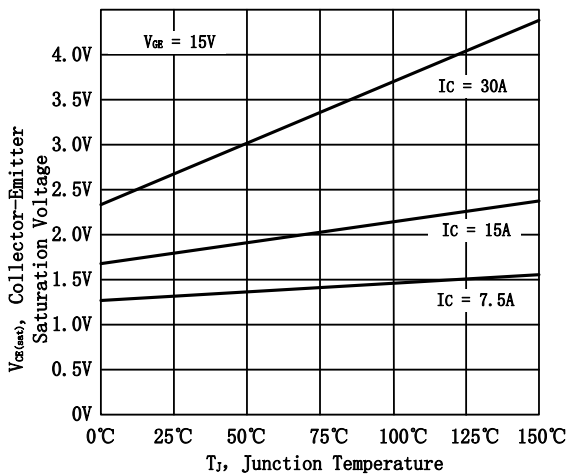
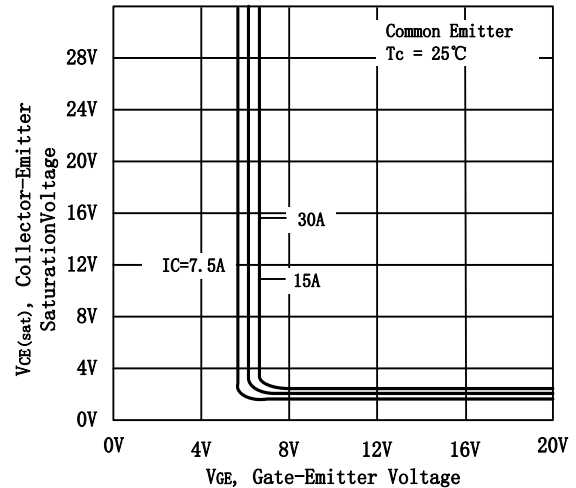
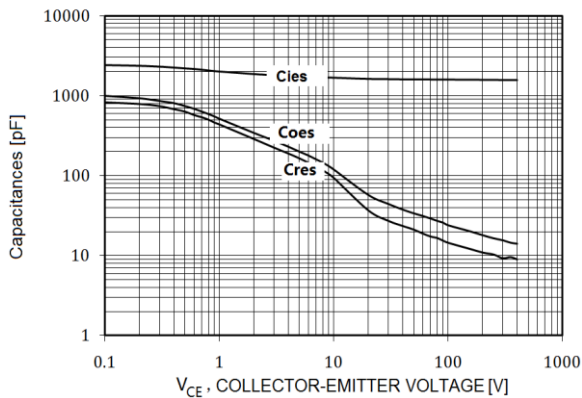
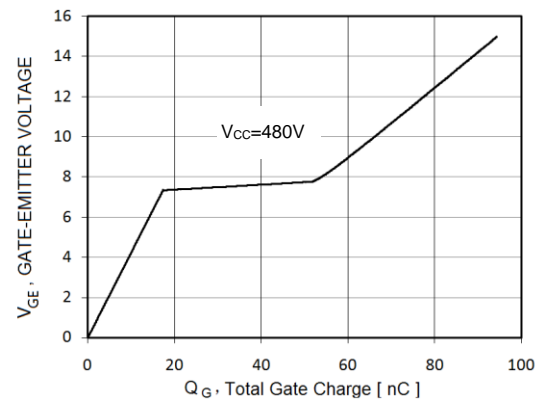
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} =0V, I _D =1mA	600	---	---	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =15A, T _J =25°C	---	1.7	1.9	V
		V _{GE} =15V, I _C =15A, T _J =100°C	---	1.9	---	V
Gate Threshold Voltage	V _{GE(th)}	V _{CE} =V _{GE} , I _C =1mA	4	---	6	V
Collector-Emitter Leakage Current	I _{CES}	V _{CE} =600V, V _{GE} =0V, T _J =25°C	---	---	0.04	mA
		V _{CE} =600V, V _{GE} =0V, T _J =150°C	---	---	1	mA
Gate to Emitter Leakage Current	I _{GES}	V _{GE} =±30V, V _{CE} =0V	---	---	±100	nA
Total Gate Charge	Q _g	V _{CC} =480V, V _{GE} =15V, I _C =15A	---	96	---	nC
Gate to Emitter Charge	Q _{ge}		---	15	---	nC
Gate to Collector Charge	Q _{gc}		---	26	---	nC
Turn-On Delay Time	t _{d(ON)}	V _{CC} =400V, V _{GE} =0/15V, R _G =5Ω, I _C =10A, T _J =25°C Inductive Load	---	16	---	ns
Rise Time	t _r		---	12	---	
Turn-Off Delay Time	t _{d(off)}		---	124	---	
Fall Time	t _f		---	12	---	mJ
Turn-On Switching Loss	E _{on}		---	0.25	---	
Turn-Off Switching Loss	E _{off}	---	0.12	---		
Total Switching Loss	E _{ts}	---	0.37	---		
Input Capacitance	C _{ies}	V _{CE} =25V, V _{GE} =0V, f=1MHz	---	1635	---	pF
Output Capacitance	C _{oes}		---	50	---	
Reverse Transfer Capacitance	C _{res}		---	30	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Diode Forward Voltage	V _F	V _{GE} =0V, I _F =20A, T _J =25°C	---	1.4	1.7	V
Reverse Recovery Time	t _{rr}	I _F =20A, V _{CC} =400V, di/dt=200A/μs, T _J =25°C	---	182	---	nS
Reverse Recovery Charge	Q _{rr}		---	0.5	---	uC
Diode Peak Reverse Recovery Current	I _{rrm}		---	5.3	---	A

Note:

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%

600V/15A Field Stop Trench IGBT
Typical Characteristics
Figure 1 Output Characteristics

Figure 2 Transfer Characteristics

Figure 3 $V_{ce(sat)}$ vs. Case Temperature

Figure 4 Saturation Voltage vs. V_{ge}

Figure 5 Capacitance Characteristics

Figure 6 Gate charge waveform


600V/15A Field Stop Trench IGBT

Figure 7 Gate-emitter Threshold Voltage as a Function of Junction Temperature

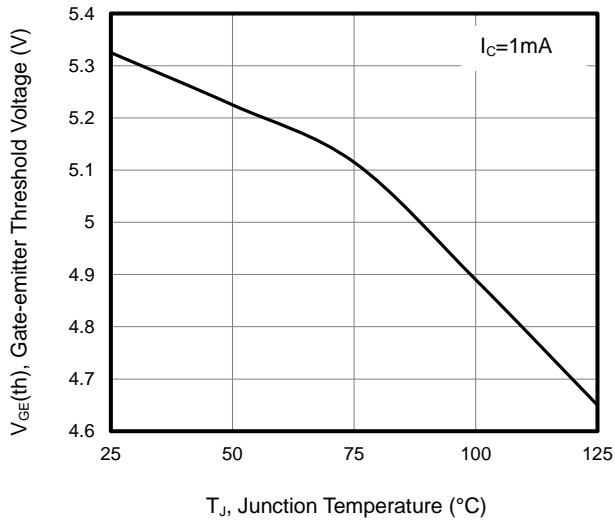


Figure 8 Typical Switching Times as a Function of Gate Resistor

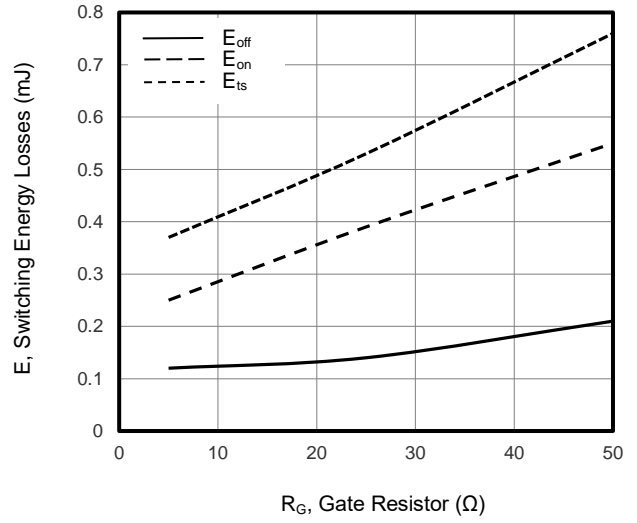


Figure 9 Typical Switching Times as a Function of Junction Temperature

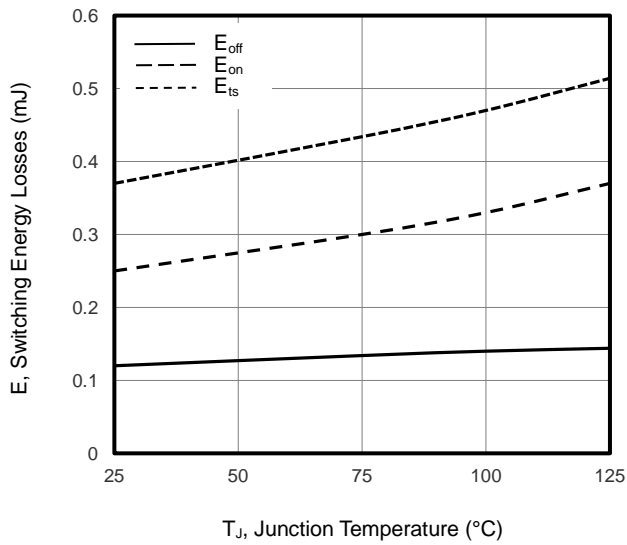


Figure 10 Power Dissipation as a Function of Case Temperature

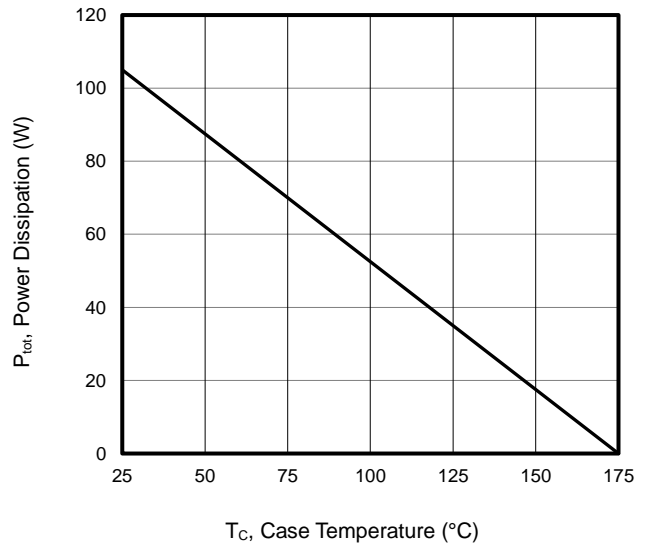


Figure 11 Reverse Bias SOA

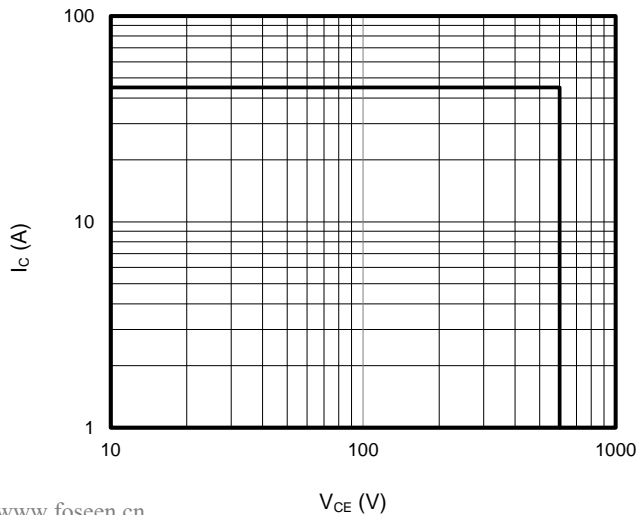
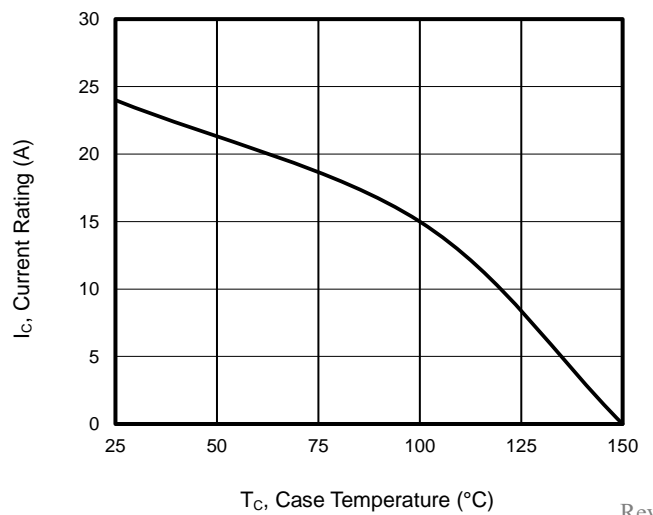


Figure 12 Current De-rating



600V/15A Field Stop Trench IGBT
TO-263 Package Outline Data
