

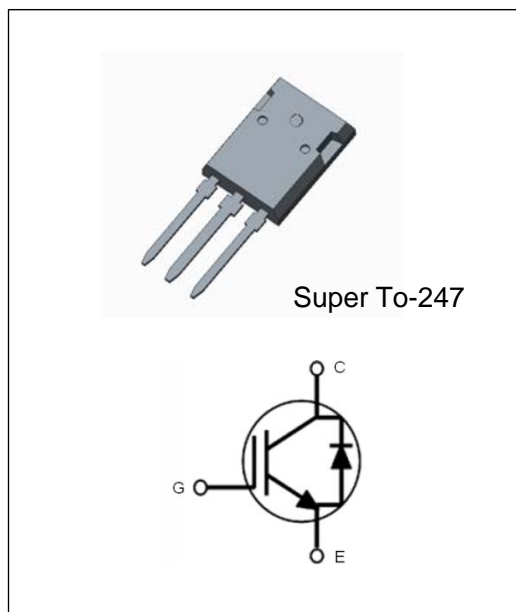
## 1200V 75A Field Stop Trench IGBT

### Description

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

### Features

- Field Stop Trench Technology
- $V_{CE(sat)}=1.89V@I_C=75A$
- High Speed Switching & Low Power Loss
- High Input Impedance



### Applications

- UPS, Inverter, Welder, Solar Inverter

### Absolute Maximum Ratings

Symbol	Parameter	Ratings	Unit	
$V_{CES}$	Collector to Emitter Voltage	1200	V	
$V_{GES}$	Gate to Emitter Voltage	$\pm 20$	V	
$I_C$	Collector Current	$T_C=25^\circ C$	120	A
		$T_C=125^\circ C$	75	A
$I_{CM}$	Pulsed Collector Current	225	A	
$I_F$	Diode Continuous Forward Current	$T_C=125^\circ C$	50	A
$I_{FM}$	Diode Maximum Forward Current	250	A	
$P_D$	Maximum Power Dissipation	$T_C=25^\circ C$	830	W
		$T_C=125^\circ C$	415	W
$T_J$	Operating Junction Temperature Range	-40~+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	0.18	$^\circ C/W$
$R_{th(J-C)}(Diode)$	Thermal Resistance, Junction to case for Diode	0.78	$^\circ C/W$
$R_{th(J-A)}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

## Electrical Characteristics of IGBT @T<sub>C</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>CES</sub>	Collector to Emitter Breakdown Voltage	V <sub>GE</sub> =0V, I <sub>C</sub> =250uA	1200	-	-	V
V <sub>CE(sat)</sub>	Collector to Emitter Saturation Voltage	I <sub>C</sub> =75A, V <sub>GE</sub> =15V	-	1.89	-	V
		I <sub>C</sub> =75A, V <sub>GE</sub> =15V, T <sub>C</sub> =125°C	-	2.35	-	V
V <sub>GE(th)</sub>	Gate Threshold Voltage	V <sub>CE</sub> =V <sub>GE</sub> , I <sub>C</sub> =250uA	4.5	5.75	6.5	V
I <sub>CES</sub>	Zero Gate Voltage Collector Current	V <sub>CE</sub> =V <sub>CES</sub> , V <sub>GE</sub> =0V	-	-	1	mA
I <sub>GES</sub>	Gate to Emitter Leakage Current	V <sub>GE</sub> =V <sub>GES</sub> , V <sub>CE</sub> =0V	-	-	± 250	nA

## Electrical Characteristics of Diode @T<sub>C</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> =50A	-	2.90	3.6	V
		I <sub>F</sub> =50A, T <sub>C</sub> =125°C	-	2.35	-	V
t <sub>rr</sub>	Diode Reverse Recovery Time	I <sub>F</sub> =50A, di/dt=-220A/us	-	60	-	ns
I <sub>rr</sub>	Diode Peak Reverse Recovery Current		-	9.5	-	A
Q <sub>rr</sub>	Diode Reverse Recovery Charge		-	270	-	nC

## Switching Characteristics @T<sub>C</sub>=25 °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
t <sub>d(on)</sub>	Turn-on Delay Time	I <sub>C</sub> =75A, V <sub>CC</sub> =600V, V <sub>GE</sub> =15V, R <sub>G</sub> =14Ω Inductive Load, T <sub>C</sub> =25°C	-	49.0	-	ns	
t <sub>r</sub>	Rising Time		-	40.0	-	ns	
t <sub>d(off)</sub>	Turn-off Delay Time		-	149	-	ns	
t <sub>f</sub>	Falling Time		-	45.1	-	ns	
E <sub>on</sub>	Turn-on Switching Loss		-	6.2	-	mJ	
E <sub>off</sub>	Turn-off Switching Loss		-	3.6	-	mJ	
E <sub>ts</sub>	Total Switching Loss		-	9.8	-	mJ	
t <sub>d(on)</sub>	Turn-on Delay Time		I <sub>C</sub> =75A, V <sub>CC</sub> =600V, V <sub>GE</sub> =15V, R <sub>G</sub> =14Ω Inductive Load, T <sub>C</sub> =125°C	-	46.6	-	ns
t <sub>r</sub>	Rising Time			-	47.7	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time			-	162.5	-	ns
t <sub>f</sub>	Falling Time	-		79.2	-	ns	
E <sub>on</sub>	Turn-on Switching Loss	-		10.5	-	mJ	
E <sub>off</sub>	Turn-off Switching Loss	-		6.2	-	mJ	
E <sub>ts</sub>	Total Switching Loss	-		16.7	-	mJ	
C <sub>ies</sub>	Input Capacitance	V <sub>GE</sub> =0V, V <sub>CE</sub> =30V, f=1.0MHz		-	6023	-	pF
C <sub>res</sub>	Reverse Transfer Capacitance		-	57	-	pF	
C <sub>oes</sub>	Output Capacitance		-	446	-	pF	
Q <sub>g</sub>	Total Gate Charge	I <sub>C</sub> =75A, V <sub>CC</sub> =600V V <sub>GE</sub> =15V	-	261	-	nC	
Q <sub>ge</sub>	Gate to Emitter Charge		-	33	-	nC	
Q <sub>gc</sub>	Gate to Collector Charge		-	157	-	nC	
t <sub>sc</sub>	Short Circuit Withstand Time	V <sub>CC</sub> =600V, V <sub>GE</sub> =15V	6	-	-	us	

**Typical Performance Characteristics**

Fig. 1. Typical Output Characteristics

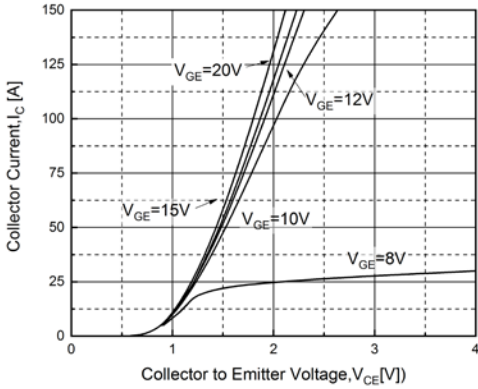


Fig. 2. Typical Saturation Voltage Characteristics

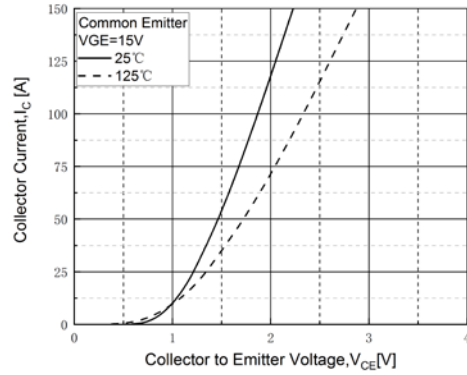


Fig. 3. Typical Saturation Voltage vs.  $T_C$

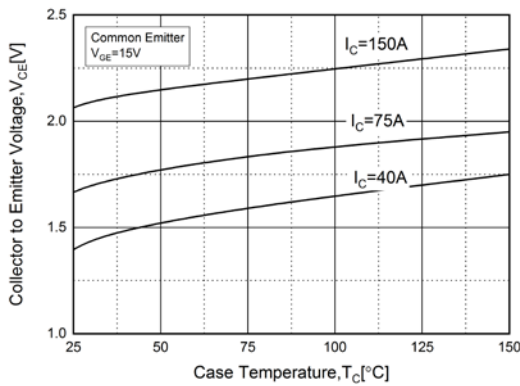


Fig. 4. Diode Forward Characteristics

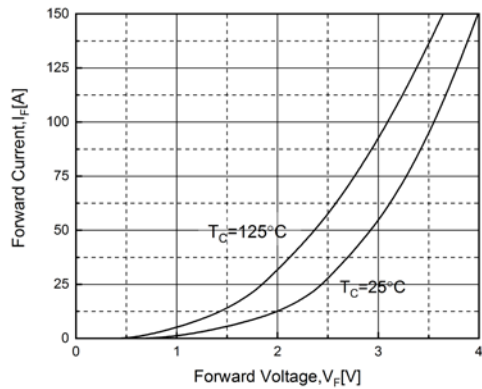


Fig. 5. Typical Capacitance Characteristics

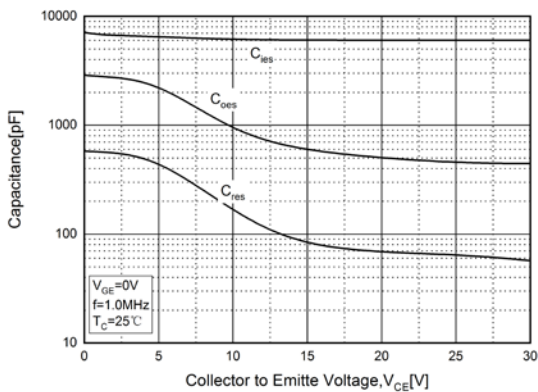
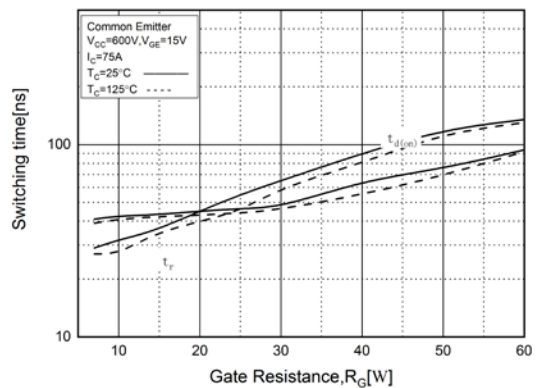


Fig. 6. Turn-on Characteristics vs.  $R_G$



**Typical Performance Characteristics**

Fig. 7. Turn-off Characteristics vs.  $R_G$

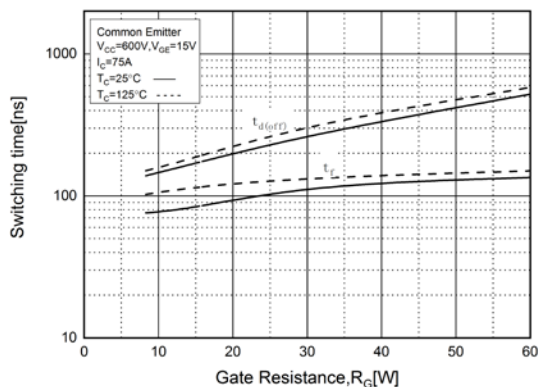


Fig. 8. Switching Loss vs.  $R_G$

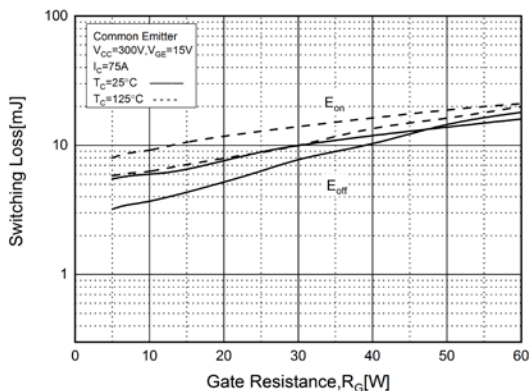


Fig. 9. Turn-on Characteristics vs.  $I_C$

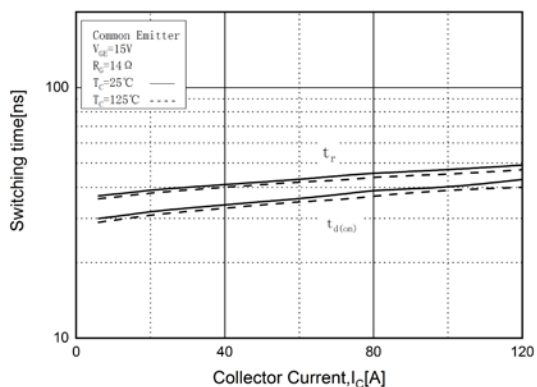


Fig. 10. Turn-off Characteristics vs.  $I_C$

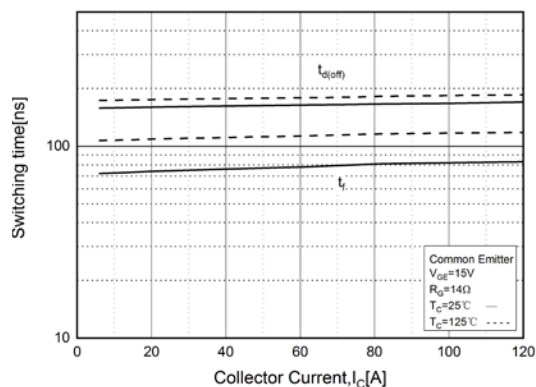
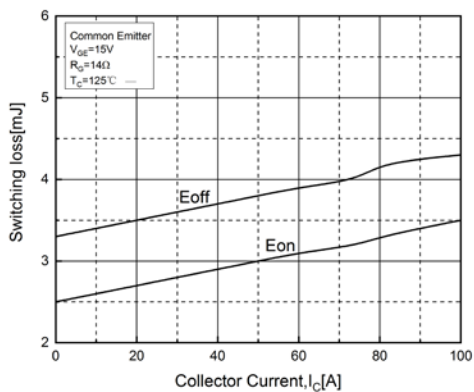


Fig. 11. Switching Loss vs.  $I_C$



**Package Dimensions**

**TO-247-Super**

(Dimensions in Millimeters)

