

Features

- Low $V_{ce(sat)}$, Fast Switching
- $V_{ce(sat)}$ with Positive Temperature Coefficient
- High Ruggedness, Good Thermal Stability
- Very Tight Parameter Distribution
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

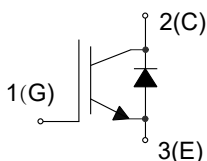
- Operating Junction Temperature Range : -55°C to $+175^{\circ}\text{C}^{(1)}$
- Storage Temperature Range: -55°C to $+150^{\circ}\text{C}$
- IGBT Thermal Resistance: 0.19°C/W Junction to Case
- Diode Thermal Resistance: 0.4°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current ⁽²⁾	I_C	$T_C=25^{\circ}\text{C}$	150
		$T_C=100^{\circ}\text{C}$	75
Pulsed Collector Current ⁽³⁾	$I_{C,pluse}$	300	A
Diode Forward Current ⁽²⁾	I_F	$T_C=25^{\circ}\text{C}$	150
		$T_C=100^{\circ}\text{C}$	75
Diode Pulsed Current ⁽³⁾	$I_{F,pluse}$	300	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ⁽⁴⁾		± 30	V
Short Circuit Withstand Time ⁽⁵⁾ $V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_J \leq 175^{\circ}\text{C}$	t_{SC}	10	μs
Power Dissipation	P_D	$T_C=25^{\circ}\text{C}$	789
		$T_C=100^{\circ}\text{C}$	395

Note:

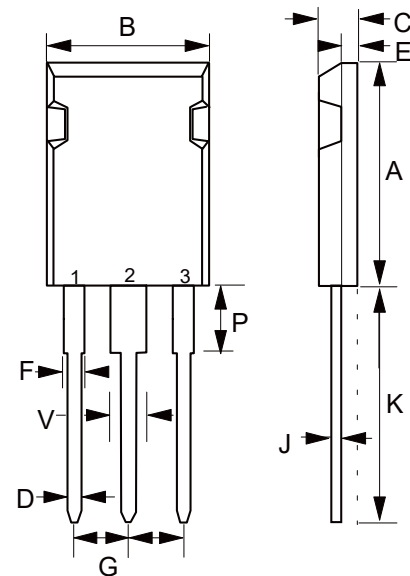
1. Device mounted on an infinite heat-sink.
2. Limited by T_{Jmax} .
3. T_p limited by T_{Jmax} .
4. $T_p \leq 10\mu\text{s}$, Duty Cycle $< 1\%$
5. Allowed number of short circuits: < 1000 ; time between short circuits: $> 1\text{s}$.

Internal Structure



Trench and Field Stop IGBT 1200V 75A

TO-247P



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.787	0.866	20.00	22.00	
B	0.598	0.638	15.20	16.20	
C	0.185	0.208	4.70	5.30	
D	0.035	0.059	0.90	1.50	
E	0.059	0.094	1.50	2.40	
F	0.067	0.091	1.70	2.30	
G	0.197	0.224	5.00	5.70	
J	0.019	0.031	0.48	0.80	
K	0.748	0.833	19.00	21.15	
P	0.122	0.189	3.10	4.80	
V	0.106	0.134	2.70	3.40	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=0.25mA$	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=75A$		1.9	2.3	V
		$V_{GE}=15V, I_C=75A, T_J=150^\circ C$		2.45		
		$V_{GE}=15V, I_C=75A, T_J=175^\circ C$		2.6		
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=75A$		2.2		V
		$V_{GE}=0V, I_F=75A, T_J=150^\circ C$		1.9		
		$V_{GE}=0V, I_F=75A, T_J=175^\circ C$		1.8		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=2.4mA, V_{CE}=V_{GE}$	5	6	7	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$			0.1	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=175^\circ C$			4	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=20V$			250	nA
Transconductance	g_{FS}	$V_{CE}=20V, I_C=75A$		30		S
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		5235		pF
Output Capacitance	C_{oes}			400		
Reverse Transfer Capacitance	C_{res}			192		
Gate Charge	Q_g	$V_{CC}=600V, I_C=75A, V_{GE}=15V$		622		nC
Short circuit collector current	$I_{C(SC)}$	$V_{GE}=15V, V_{CC}=600V, T_{SC}=10\mu s, T_J=175^\circ C$		300		A
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=75A, V_{GE}=0/15V, R_G=10\Omega,$ Inductive load		112		ns
Rise Time	t_r			160		
Turn-Off Delay Time	$t_{d(off)}$			478		
Fall Time	t_f			78		mJ
Turn-On Energy	E_{on}			11.3		
Turn-Off Energy	E_{off}			4.7		
Total Switching Energy	E_{ts}		16.0			
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=75A, V_{GE}=0/15V, R_G=10\Omega,$ Inductive load, $T_J=175^\circ C$		96		ns
Rise Time	t_r			153		
Turn-Off Delay Time	$t_{d(off)}$			538		
Fall Time	t_f			140		mJ
Turn-On Energy	E_{on}			12.0		
Turn-Off Energy	E_{off}			6.1		
Total Switching Energy	E_{ts}		18.1			
Diode Characteristics						
Reverse Recovery Time	t_{rr}	$V_R=600V, I_F=75A,$ $di_F/dt=400A/\mu s$		293		ns
Reverse Recovery Charge	Q_{rr}			3		μC
Peak Reverse Recovery Current	I_{rrm}			18		A
Reverse Recovery Time	t_{rr}	$V_R=600V, I_F=75A,$ $di_F/dt=400A/\mu s$ $T_J=175^\circ C$		492		ns
Reverse Recovery Charge	Q_{rr}			9.8		μC
Peak Reverse Recovery Current	I_{rrm}			41		A

Curve Characteristics

Fig. 1 - Typical Output Characteristics

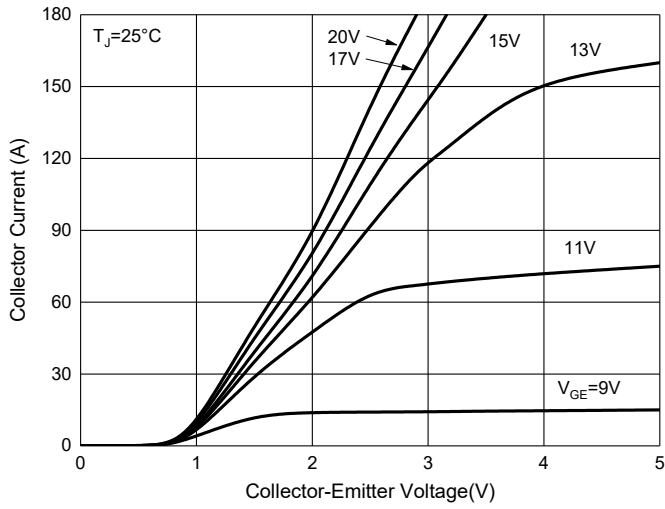


Fig. 2 - Typical Output Characteristics

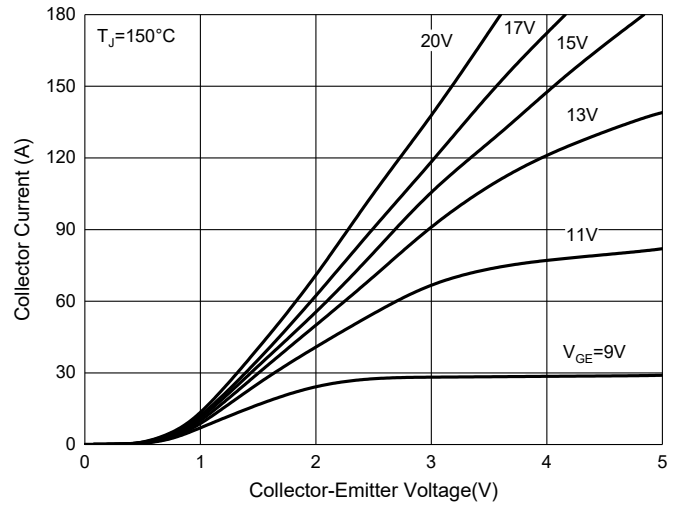


Fig. 3 - $V_{CE(sat)} - I_C$

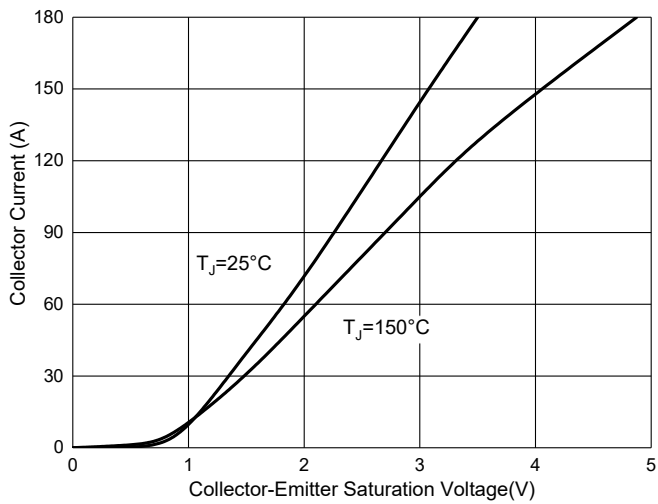


Fig. 4 - $V_{CE(sat)} - T_J$

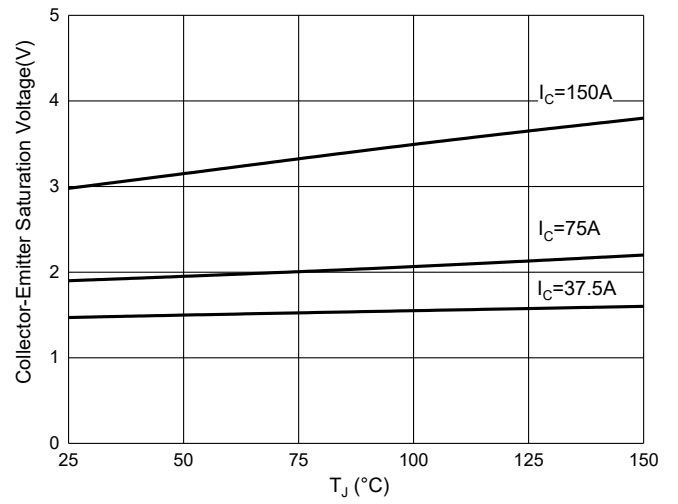


Fig. 5 - Capacitance Characteristics

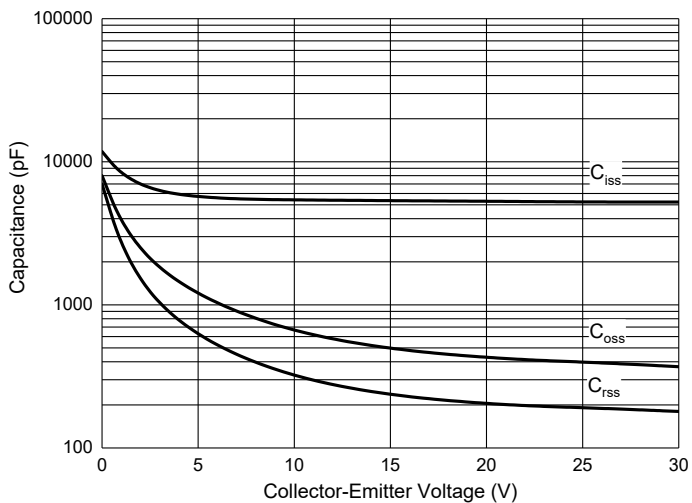
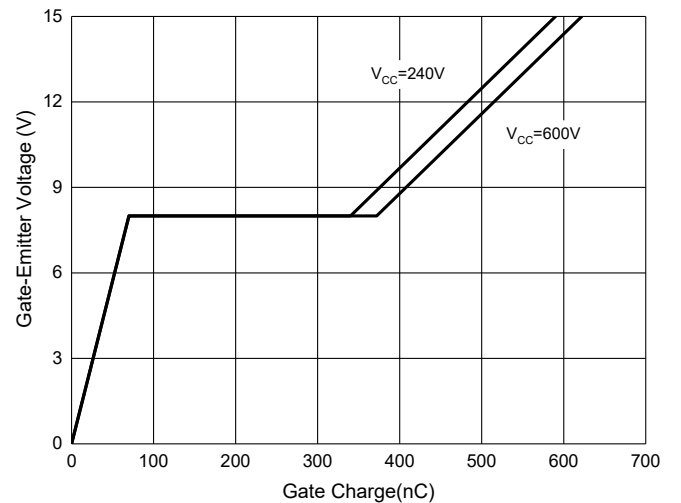


Fig. 6 - Gate Charge



Curve Characteristics

Fig. 7 - Forward Voltage

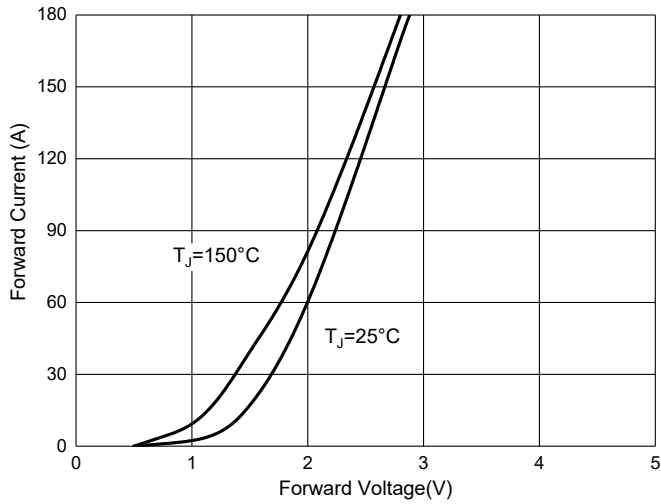


Fig. 8 - $V_F - T_J$

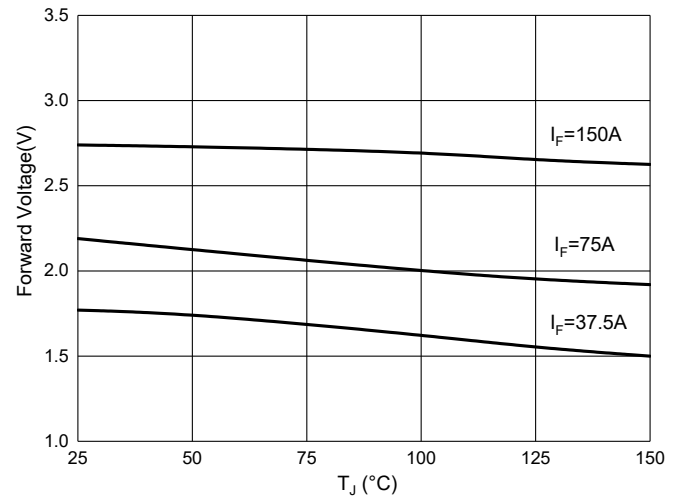


Fig. 9 - Switching Times — I_C

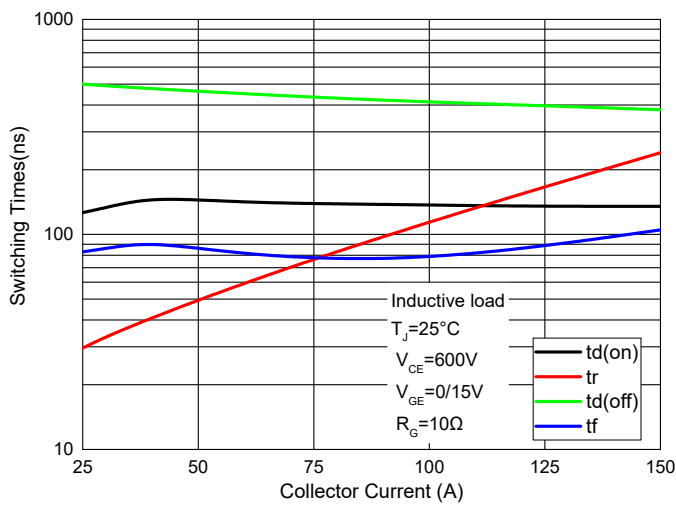


Fig. 10 - Switching Times — I_C

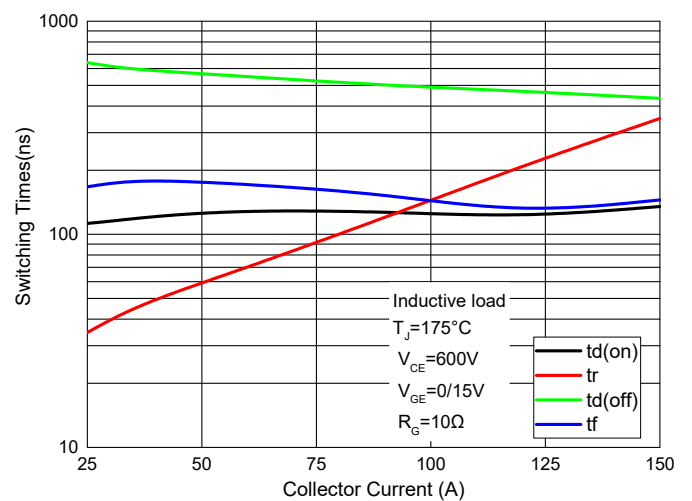


Fig. 11 - Switching Energy Losses — I_C

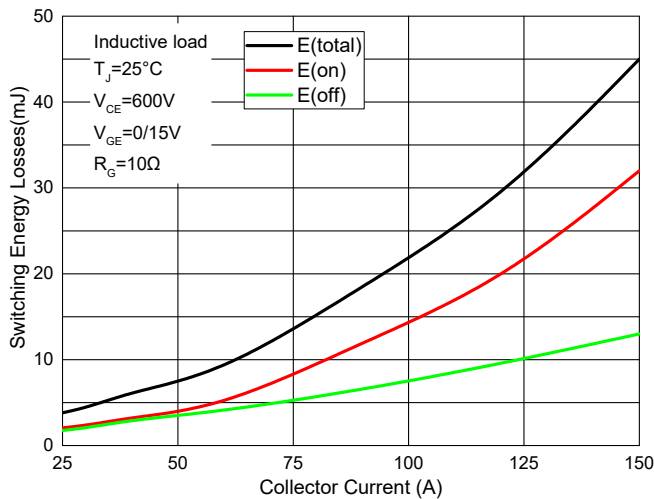


Fig. 12 - Switching Energy Losses — I_C

