

Features

- Low $V_{ce(sat)}$, Fast Switching
- $V_{ce(sat)}$ with Positive Temperature Coefficient
- High Ruggedness, Good Thermal Stability
- Very Tight Parameter Distribution
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

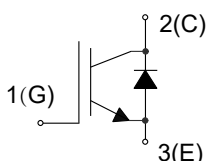
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- IGBT Thermal Resistance: 0.45°C/W Junction to Case
- Diode Thermal Resistance: 0.6°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current ⁽²⁾	I_C	$T_C=25^\circ\text{C}$	80
		$T_C=100^\circ\text{C}$	40
Pulsed Collector Current ⁽³⁾	$I_{C,pluse}$	160	A
Diode Forward Current ⁽²⁾	I_F	$T_C=25^\circ\text{C}$	80
		$T_C=100^\circ\text{C}$	40
Diode Pulsed Current ⁽³⁾	$I_{F,pluse}$	160	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ⁽⁴⁾		± 30	
Short Circuit Withstand Time ⁽⁵⁾ $V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_J \leq 150^\circ\text{C}$	t_{SC}	10	μs
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	277
		$T_C=100^\circ\text{C}$	111

Note:

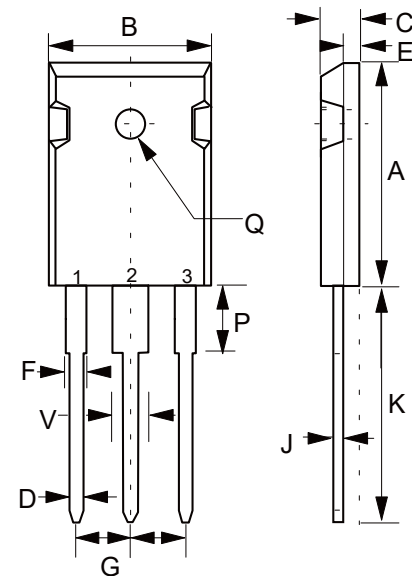
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Limited by T_{Jmax} .
3. T_p limited by T_{Jmax} .
4. $T_p \leq 10\mu\text{s}$, Duty Cycle <1%
5. Allowed number of short circuits: <1000; time between short circuits: >1s.

Internal Structure



Trench and Field Stop IGBT 1200V 40A

TO-247



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	
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	
Q	0.118	0.150	3.00	3.80	Φ
V	0.106	0.134	2.70	3.40	
G	0.197	0.224	5.00	5.70	

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	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$		1.85	2.2	V
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=20A$		2.3		V
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=1mA, V_{CE}=V_{GE}$	5	6	7	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$			0.1	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=150^\circ C$			4	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=20V$			250	nA
Transconductance	g_{FS}	$V_{CE}=20V, I_C=40A$		20		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{CE}=30V, V_{GE}=0V, f=1MHz$		3129		pF
Output Capacitance	C_{oss}			166		
Reverse Transfer Capacitance	C_{riss}			93		
Gate Charge	Q_g	$V_{CC}=600V, I_C=40A, V_{GE}=15V$		240		nC
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=40A, V_{GE}=-15/15V, R_G=10\Omega, \text{Inductive load}$		160		ns
Rise Time	t_r			84		
Turn-Off Delay Time	$t_{d(off)}$			237		
Fall Time	t_f			164		
Turn-On Energy	E_{on}			5.02		mJ
Turn-Off Energy	E_{off}			2.72		
Total Switching Energy	E_{ts}			7.74		
Diode Characteristics						
Reverse Recovery Time	t_{rr}	$V_R=600V, I_F=40A, di_F/dt=292A/\mu s$		367		ns
Reverse Recovery Charge	Q_{rr}			1.79		μC
Peak Reverse Recovery Current	I_{rrm}			10.4		A

Curve Characteristics

Fig. 1 - Typical Output Characteristics

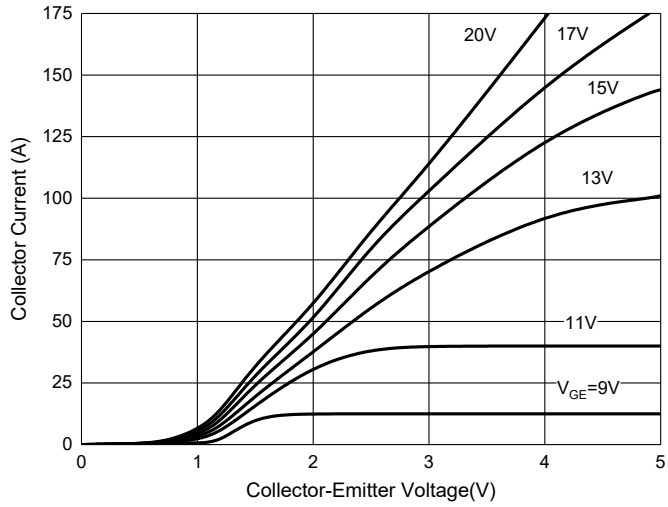


Fig. 2 - Gate Charge

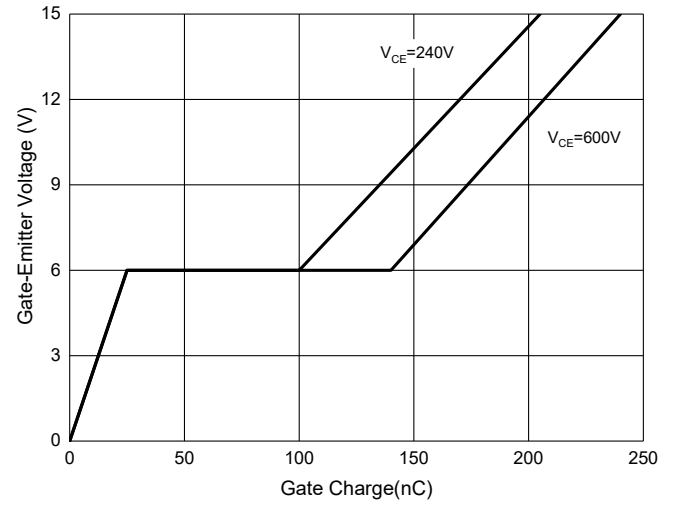


Fig. 3 - Capacitance Characteristics

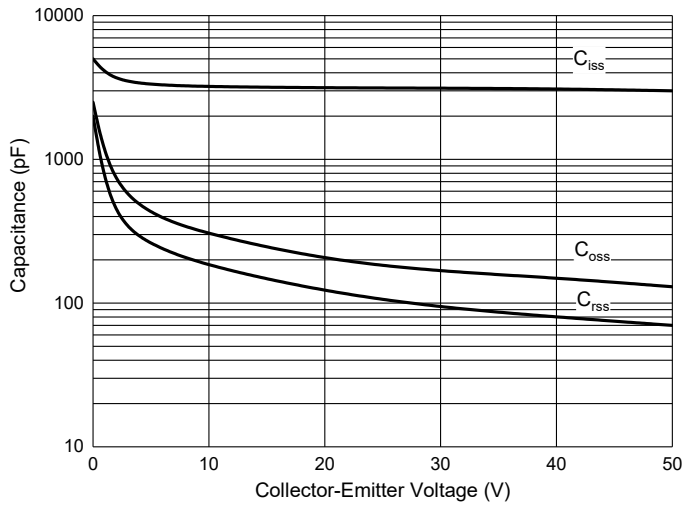


Fig. 4 - Power Derating Curve

