

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
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

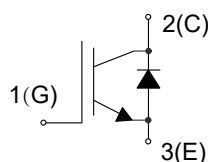
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- IGBT Thermal Resistance: 0.45°C/W Junction to Case
- Diode Thermal Resistance: 0.8°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current ⁽¹⁾	$T_C=25^\circ\text{C}$	80	A
	$T_C=100^\circ\text{C}$	40	
Pulsed Collector Current ⁽²⁾	$I_{C,pluse}$	160	A
Diode Forward Current ⁽¹⁾	$T_C=25^\circ\text{C}$	40	A
	$T_C=100^\circ\text{C}$	20	
Diode Pulsed Current ⁽²⁾	$I_{F,pluse}$	160	A
Gate-Emitter Voltage	V_{GE}	±20	V
Short Circuit Withstand Time ⁽³⁾ $V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_J \leq 150^\circ\text{C}$	t_{SC}	10	µs
Power Dissipation	$T_C=25^\circ\text{C}$	277	W
	$T_C=100^\circ\text{C}$	111	

Note:

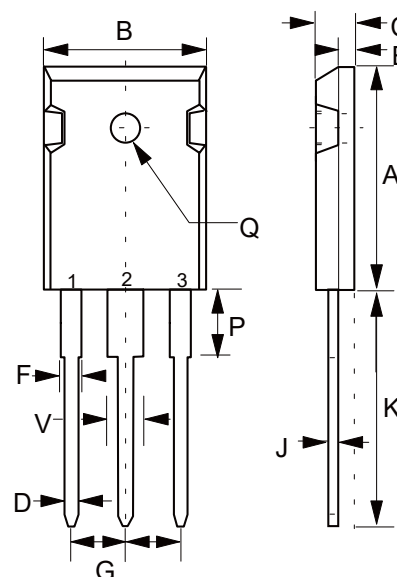
1. Limited by T_{Jmax} .
2. T_p limited by T_{Jmax} .
3. Allowed number of short circuits: <1000; time between short circuits: >1s.

Internal Structure



Trench and Field Stop IGBT 1200V 40A

TO-247



DIMENSIONS					
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	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A$		1.9	2.4	V
		$V_{GE}=15V, I_C=40A, T_J=150^{\circ}C$		2.3		
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=20A$		2.45		V
		$V_{GE}=0V, I_F=20A, T_J=150^{\circ}C$		1.9		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=1mA, V_{CE}=V_{GE}$	5.5	6	6.5	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}	$V_{CE}=20V, I_C=40A$		26.5		S
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		3823		pF
Output Capacitance	C_{oes}			170		
Reverse Transfer Capacitance	C_{res}			94		
Gate Charge	Q_g	$V_{CC}=600V, I_C=40A, V_{GE}=15V$		239		nC
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=40A, V_{GE}=0/15V, R_G=10\Omega, \text{ Inductive load}$		62		ns
Rise Time	t_r			54		
Turn-Off Delay Time	$t_{d(off)}$			265		
Fall Time	t_f			30		
Turn-On Energy	E_{on}			3.3		mJ
Turn-Off Energy	E_{off}	$V_{CC}=600V, I_C=40A, V_{GE}=0/15V, R_G=10\Omega, T_J=150^{\circ}C, \text{ Inductive load}$		1.4		
Total Switching Energy	E_{ts}			4.7		
Turn-On Delay Time	$t_{d(on)}$			55		ns
Rise Time	t_r			55		
Turn-Off Delay Time	$t_{d(off)}$			306		
Fall Time	t_f			38		
Turn-On Energy	E_{on}			3.49		mJ
Turn-Off Energy	E_{off}			1.85		
Total Switching Energy	E_{ts}			5.34		

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Characteristics						
Reverse Recovery Time	t_{rr}	$V_R=600V, I_F=20A,$ $di_F/dt=100A/\mu s$		80		ns
Reverse Recovery Charge	Q_{rr}			0.15		μC
Peak Reverse Recovery Current	I_{rrm}			5.4		A

Curve Characteristics

Fig. 1 - FBSOA

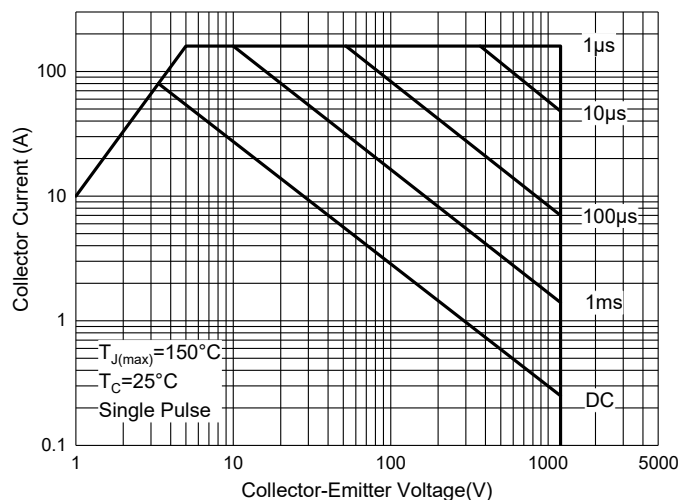


Fig. 2 - RBSOA

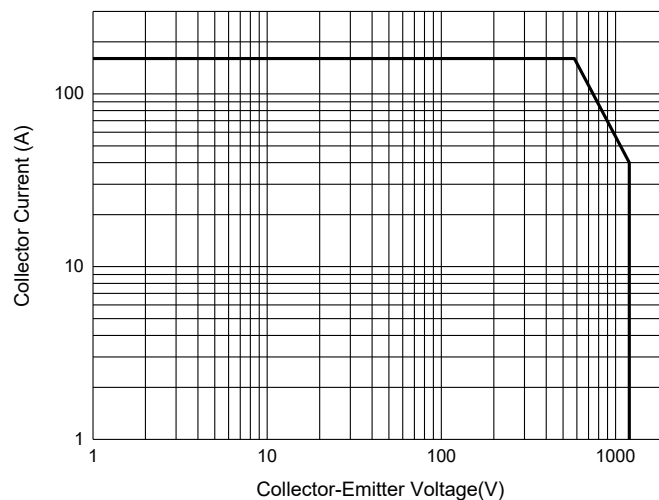


Fig. 3 - Typical Output Characteristics

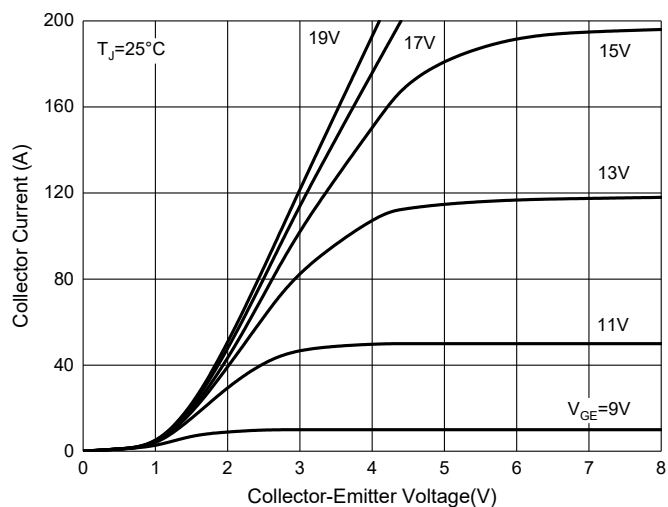


Fig. 4 - Typical Output Characteristics

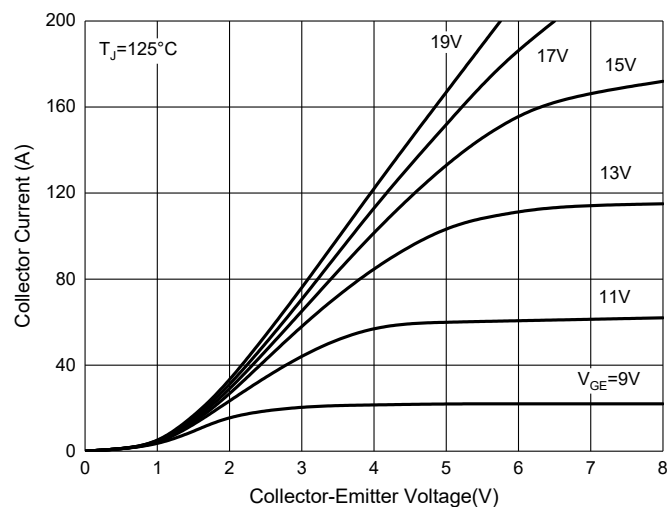


Fig. 5 - $V_{CE(sat)} - I_C$

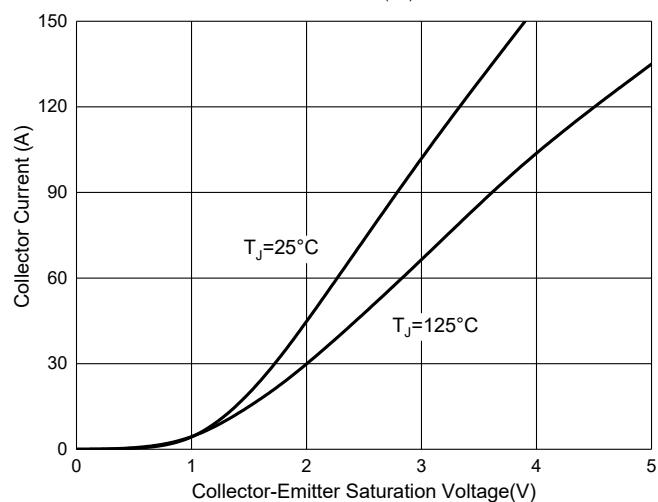
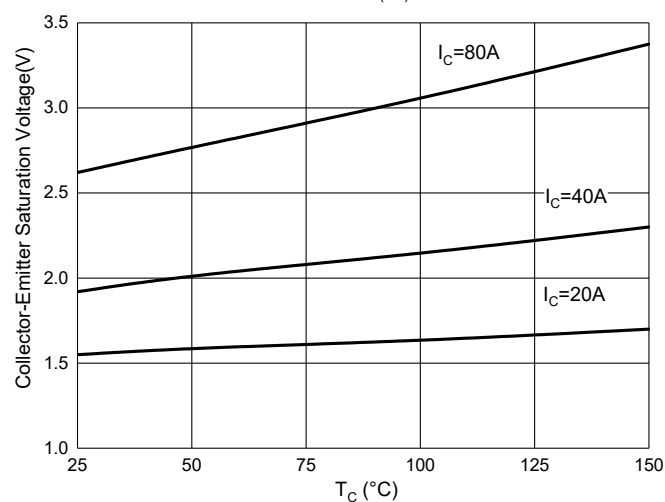


Fig. 6 - $V_{CE(sat)} - T_C$



Curve Characteristics

Fig. 7 - Gate Charge

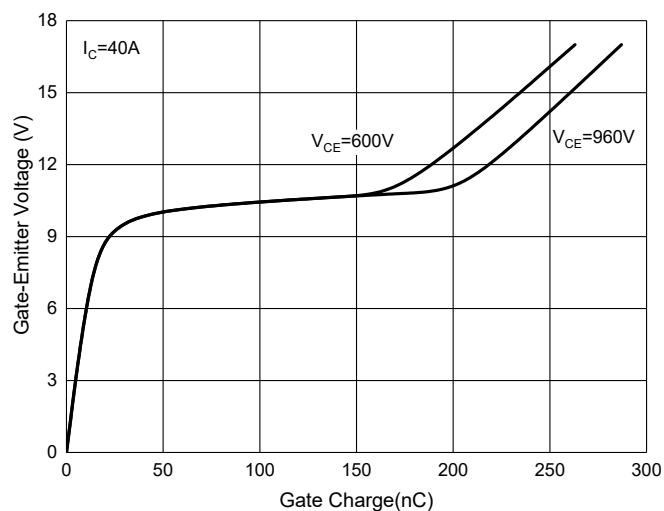


Fig. 8 - Capacitance Characteristics

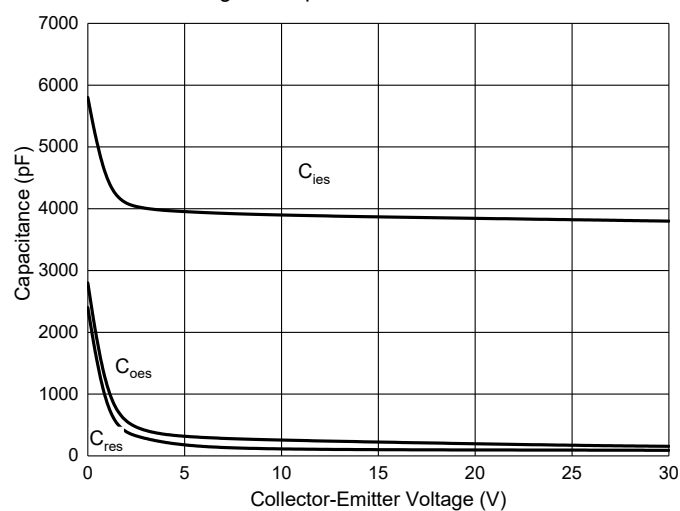


Fig. 9 - Power Derating Curve

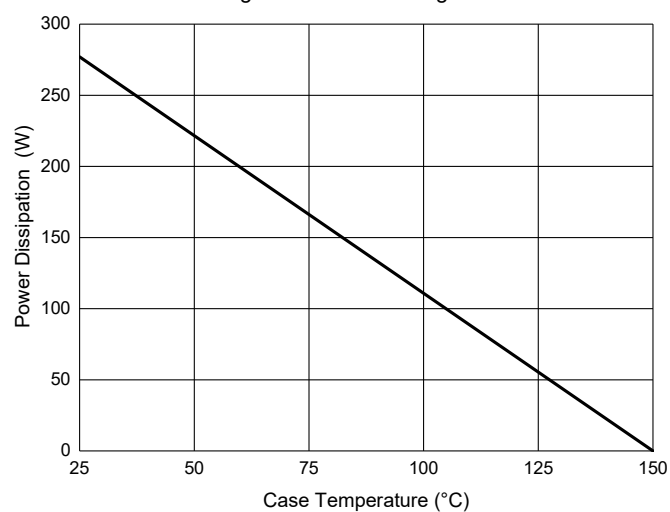
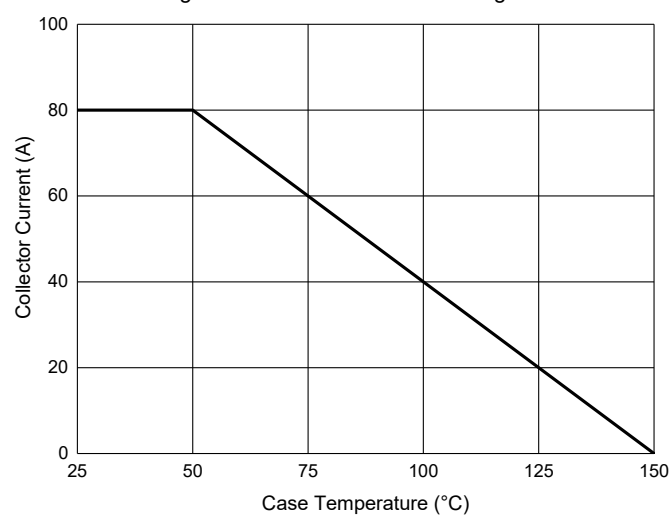


Fig. 10 - Collector Current Derating Curve



Ordering Information

Device	Packing
Part Number-BP	Tube:30pcs/Tube, 360pcs/Box,1.8K/Ctn;

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-BP-HF

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