

Features

- AEC-Q101 Qualified
- Including Fast & Soft Recovery anti-Parallel FWD
- $V_{ce(sat)}$ with Positive Temperature Coefficient
- High Short Circuit Capability (10 μ s)
- Very Tight Parameter Distribution
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note 2)("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

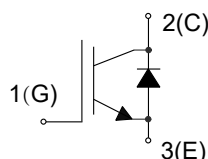
- Operating Junction Temperature Range : -40°C to +175°C
- Storage Temperature Range: -55°C to +150°C
- IGBT Thermal Resistance: 0.35°C/W Junction to Case
- Diode Thermal Resistance: 0.65°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current ^(Note 3)	I_C	$T_C=25^\circ\text{C}$ 80	A
		$T_C=100^\circ\text{C}$ 40	
Pulsed Collector Current ^(Note 4)	$I_{C,pluse}$	160	A
Diode Forward Current ^(Note 3)	I_F	$T_C=25^\circ\text{C}$ 80	A
		$T_C=100^\circ\text{C}$ 40	
Diode Pulsed Current ^(Note 4)	$I_{F,pluse}$	160	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ^(Note 5)		± 30	
Short Circuit Withstand Time ^(Note 6) $V_{GE}=15\text{V}$, $V_{CC}=600\text{V}$, $T_J \leq 150^\circ\text{C}$	t_{SC}	10	μs
Power Dissipation	P_D	$T_C=25^\circ\text{C}$ 428	W
		$T_C=100^\circ\text{C}$ 214	

Note:

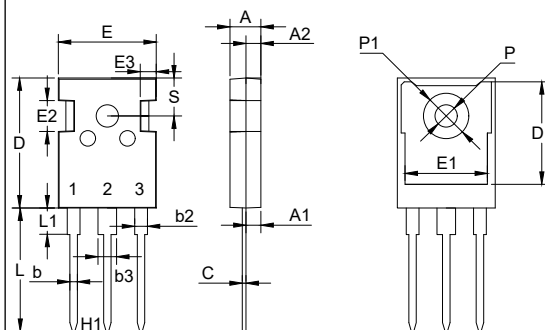
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Limited by T_{Jmax} .
4. T_p limited by T_{Jmax} .
5. $T_p \leq 10\mu\text{s}$, Duty Cycle <1%
6. Allowed number of short circuits: <1000; time between short circuits: >1s.

Internal Structure



Trench and Field Stop IGBT 1200V 40A

TO-247AB



DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.189	0.205	4.80	5.20	
A1	0.087	0.103	2.21	2.61	
A2	0.073	0.085	1.85	2.15	
b	0.039	0.055	1.00	1.40	
b2	0.075	0.087	1.91	2.21	
C	0.020	0.028	0.50	0.70	
D	0.815	0.839	20.70	21.30	
D1	0.640	0.663	16.25	16.85	
E	0.610	0.634	15.50	16.10	
E1	0.512	0.535	13.00	13.60	
E2	0.189	0.205	4.80	5.20	
E3	0.091	0.106	2.30	2.70	
L	0.772	0.796	19.62	20.22	
L1	-	0.169	-	4.30	
P	0.134	0.150	3.40	3.80	Φ
P1	-	0.287	-	7.30	Φ
S	0.242		6.15		TYP
H1	0.214		5.44		TYP
b3	0.110	0.126	2.80	3.20	

Electrical Characteristics of the IGBT @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=250\mu A$	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=40A, T_J=25^\circ C$		1.85	2.40	V
		$V_{GE}=15V, I_C=40A, T_J=125^\circ C$		2.20		
		$V_{GE}=15V, I_C=40A, T_J=150^\circ C$		2.30		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=1.4mA, V_{CE}=V_{GE}$	4.8	5.6	6.5	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_J=25^\circ C$			0.25	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=150^\circ C$			5	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			200	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		2.5		nF
Reverse Transfer Capacitance	C_{res}			0.09		
Gate Charge	Q_g	$V_{CC}=960V, I_C=40A, V_{GE}=15V$		0.33		μC
Short Circuit Collector Current	I_{SC}	$V_{GE}=15V, t_{sc}\leq 10\mu s, V_{CC}=600V, T_J\leq 150^\circ C$		150		A
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=40A, V_{GE}=\pm 15V, R_G=12\Omega, T_J=25^\circ C$		45		ns
Rise Time	t_r			56		
Turn-Off Delay Time	$t_{d(off)}$			180		
Fall Time	t_f			80		
Turn-On Energy	E_{on}			3.8		mJ
Turn-Off Energy	E_{off}			1.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=40A, V_{GE}=\pm 15V, R_G=12\Omega, T_J=125^\circ C$		50		ns
Rise Time	t_r			58		
Turn-Off Delay Time	$t_{d(off)}$			240		
Fall Time	t_f			85		
Turn-On Energy	E_{on}			5.4		mJ
Turn-Off Energy	E_{off}			2.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=40A, V_{GE}=\pm 15V, R_G=12\Omega, T_J=150^\circ C$		53		ns
Rise Time	t_r			60		
Turn-Off Delay Time	$t_{d(off)}$			260		
Fall Time	t_f			90		
Turn-On Energy	E_{on}			5.8		mJ
Turn-Off Energy	E_{off}			3.0		

Electrical Characteristics of the Diode @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Characteristics						
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=40A, T_J=25^{\circ}C$	1.6	2.0	2.6	V
		$V_{GE}=0V, I_F=40A, T_J=125^{\circ}C$		1.8		
		$V_{GE}=0V, I_F=40A, T_J=150^{\circ}C$		1.7		
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=40A,$ $di_F/dt=-520A/\mu s, T_J=25^{\circ}C$		14		A
Diode Reverse Recovery Time	t_{rr}			439		ns
Reverse Recovery Charge	Q_{rr}			2.55		μC
Reverse Recovery Energy	E_{rec}			0.9		mJ
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=40A,$ $di_F/dt=-520A/\mu s, T_J=125^{\circ}C$		18		A
Diode Reverse Recovery Time	t_{rr}			628		ns
Reverse Recovery Charge	Q_{rr}			6.33		μC
Reverse Recovery Energy	E_{rec}			2.05		mJ
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=40A,$ $di_F/dt=-520A/\mu s, T_J=150^{\circ}C$		20		A
Diode Reverse Recovery Time	t_{rr}			773		ns
Reverse Recovery Charge	Q_{rr}			7.05		μC
Reverse Recovery Energy	E_{rec}			2.25		mJ

Curve Characteristics

Fig. 1 - Typical Output Characteristic($T_J=25^\circ\text{C}$)

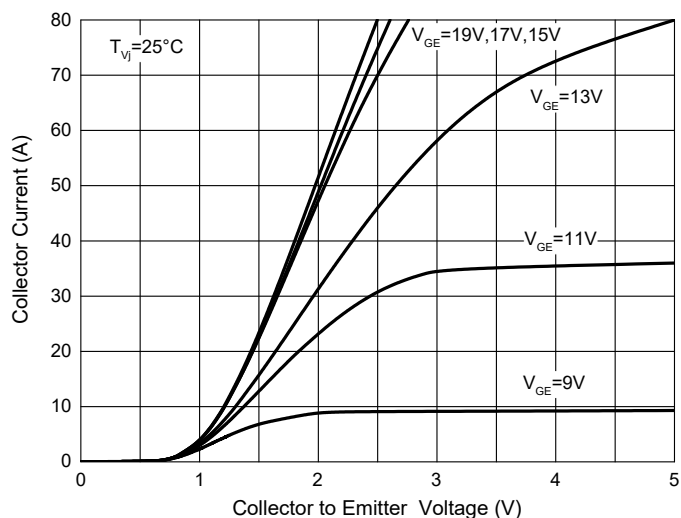


Fig. 2 - Typical Output Characteristic ($T_J=150^\circ\text{C}$)

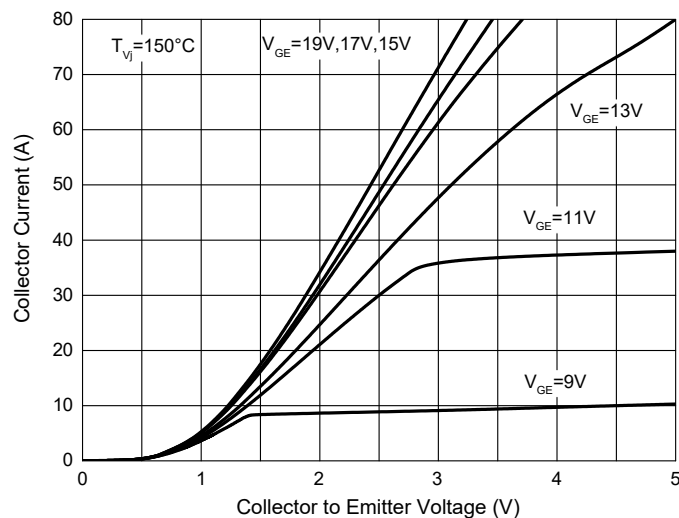


Fig. 3 - Typical Transfer Characteristic

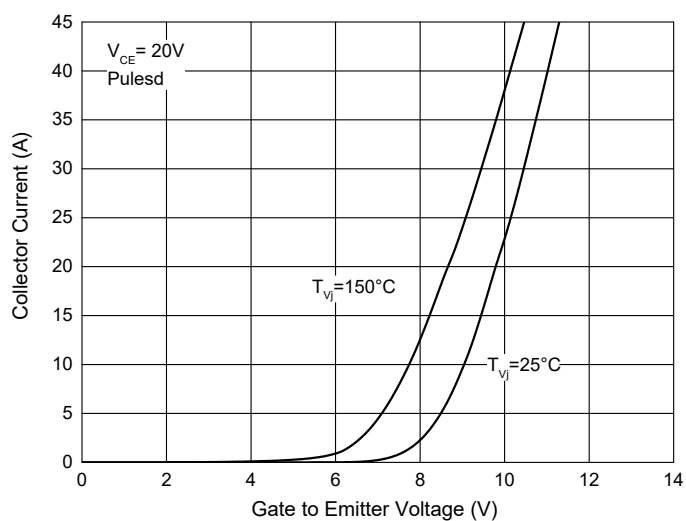


Fig. 4 - Diode Forward Current as a function of Forward Voltage

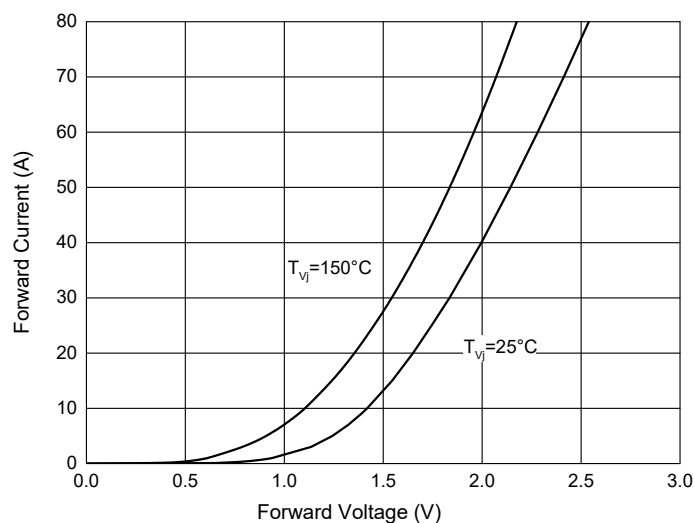


Fig. 5 - IGBT Transient Thermal Impedance

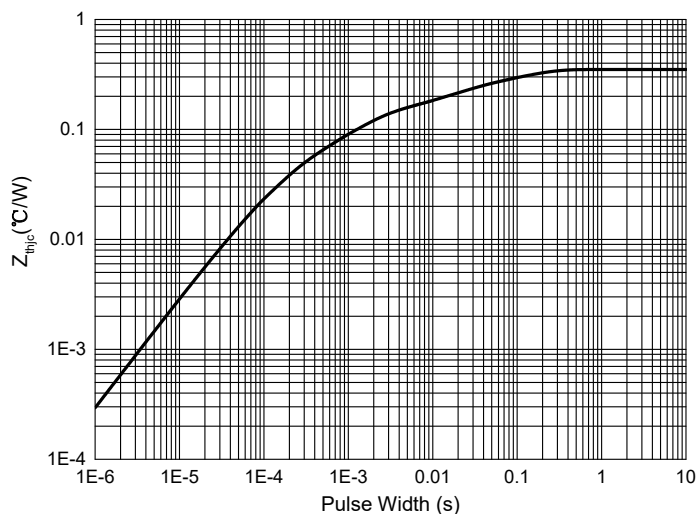
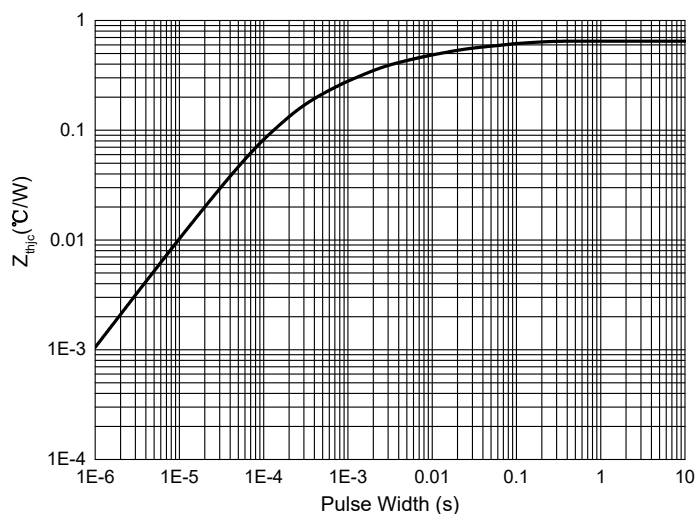


Fig. 6 - Diode Transient Thermal Impedance



Curve Characteristics

Fig. 7 - IGBT Switching Loss vs I_C

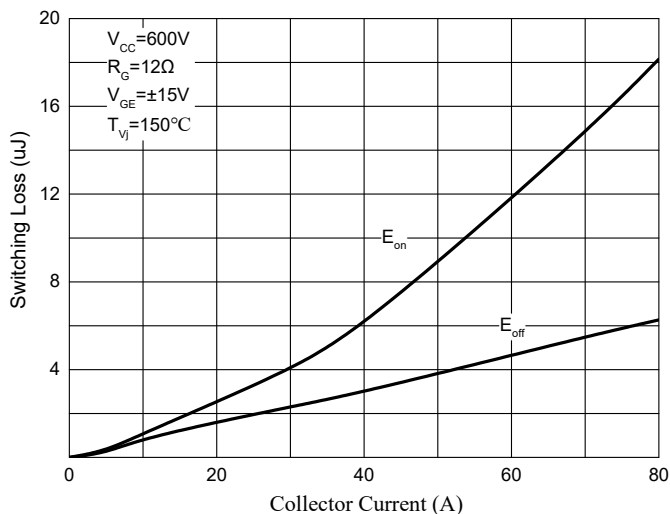


Fig. 8- IGBT Switching Loss vs R_G

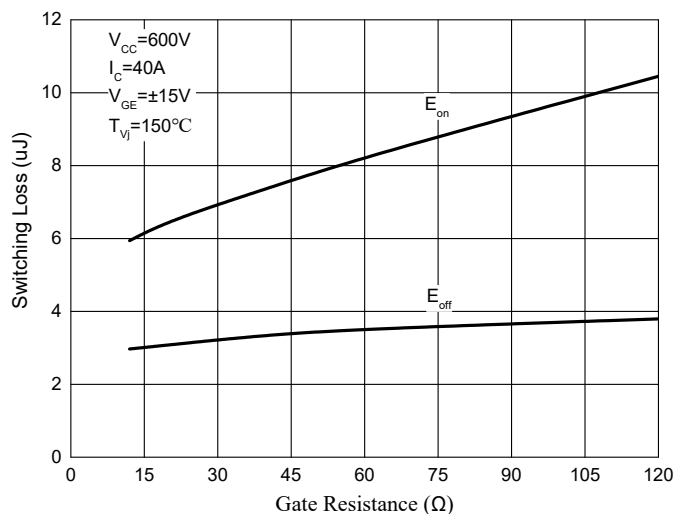


Fig. 9 - Diode Switching Loss (E_{rec}) vs I_F

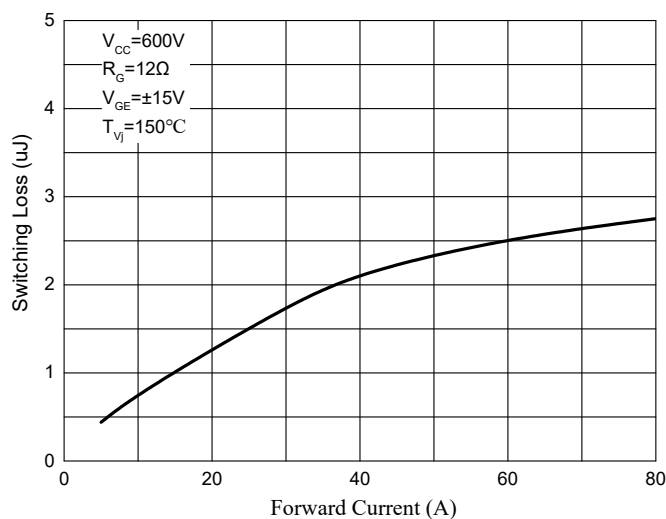


Fig. 10- Diode Switching Loss (E_{rec}) vs R_G

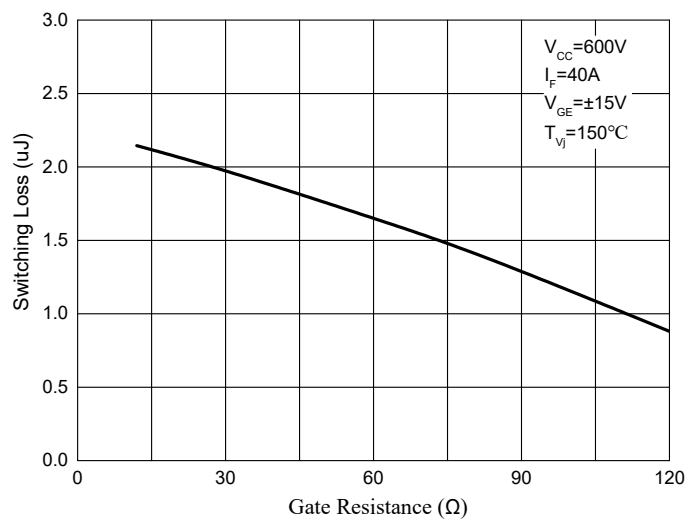
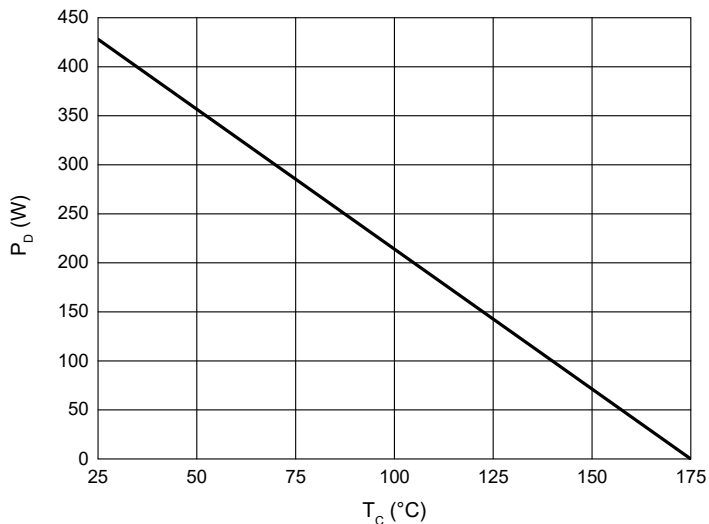


Fig. 11 - Power Dissipation as a function of Case Temperature



Ordering Information

Device	Packing
Part Number-BP	Tube: 30pcs/Tube, 360pcs/Box, 1800pcs/Ctn

IMPORTANT NOTICE

Micro Commercial Components Corp. reserves the right to make changes without further notice to any product herein to make corrections, modifications , enhancements , improvements , or other changes . **Micro Commercial Components Corp** . does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights ,nor the rights of others . The user of products in such applications shall assume all risks of such use and will agree to hold **Micro Commercial Components Corp** . and all the companies whose products are represented on our website, harmless against all damages. **Micro Commercial Components Corp.** products are sold subject to the general terms and conditions of commercial sale, as published at <https://www.mccsemi.com/Home/TermsAndConditions>.

LIFE SUPPORT

MCC's products are not authorized for use as critical components in life support devices or systems without the express written approval of Micro Commercial Components Corporation.

CUSTOMER AWARENESS

Counterfeiting of semiconductor parts is a growing problem in the industry. Micro Commercial Components (MCC) is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. MCC strongly encourages customers to purchase MCC parts either directly from MCC or from Authorized MCC Distributors who are listed by country on our web page cited below. Products customers buy either from MCC directly or from Authorized MCC Distributors are genuine parts, have full traceability, meet MCC's quality standards for handling and storage. **MCC will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources.** MCC is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.