Features

- High Speed Smooth Switching Device for Hard and Soft 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 (Note 2)("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

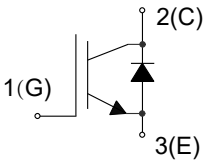
- Operating Junction Temperature Range : -40°C to +175°C
- Storage Temperature Range: -55°C to +150°C
- IGBT Thermal Resistance: 0.35°C/W Junction to Case
- Diode Thermal Resistance: 0.65°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter		Symbol	Rating	Unit
Collector-Emitter Voltage		V_{CE}	1200	V
DC Collector Current(3)	T_C=25°C	I_C	80	A
	T_C=100°C		40	
Pulsed Collector Current,V_{GE}=15V(4)		$I_{C,pluse}$	160	A
Diode Forward Current (3)	T_C=25°C	I_F	80	A
	T_C=100°C		40	
Diode Pulsed Current (4)		$I_{F,pluse}$	160	A
Gate-Emitter Voltage		V_{GE}	±20	V
Transient Gate-Emitter Voltage(5)			±30	
Short Circuit Withstand Time, V_{GE}= 15V, V_{CC}=900V, V_{CEM}≤1200V		t_{SC}	10	μs
Power Dissipation	T_C=25°C	P_D	428	W
	T_C=100°C		214	

Note:

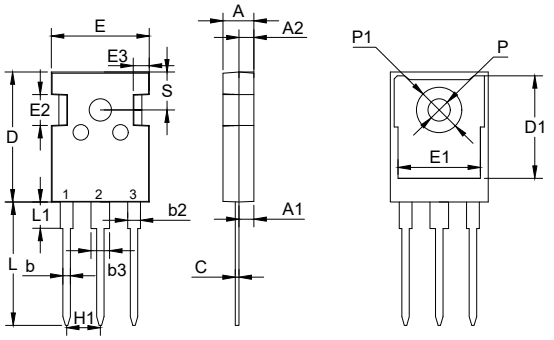
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Limited by T_{Jmax}.
4. T_p limited by T_{Jmax}.
5. T_p≤10us, Duty Cycle<1%

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 @ 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=250μA	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=40A, T_J=25℃		1.85	2.40	V
		V_{GE}=15V, I_C=40A, T_J=125℃		2.20		
		V_{GE}=15V, I_C=40A, T_J=150℃		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℃			0.25	mA
		V_{CE}=1200V, V_{GE}=0V, T_J=150℃			5	
G-E Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V			100	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		uC
Short Circuit Collector Current	I_{sc}	V_{GE}=15V, tsc≤10us, V_{cc}=900V,T_j≤150°C		140		A
IGBT Switching Characteristics						
Turn-On Delay Time	$td_{(on)}$	V_{CC}=600V, I_C=40A, V_{GE}=-15/15V, R_G=12Ω,T_J=25℃		45		ns
Rise Time	t_r			56		
Turn-Off Delay Time	$td_{(off)}$			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	$td_{(on)}$	V_{CC}=600V, I_C=40A, V_{GE}=-15/15V, R_G=12Ω,T_J=125℃		50		ns
Rise Time	t_r			58		
Turn-Off Delay Time	$td_{(off)}$			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	$td_{(on)}$	V_{CC}=600V, I_C=40A, V_{GE}=-15/15V, R_G=12Ω,T_J=150℃		53		ns
Rise Time	t_r			60		
Turn-Off Delay Time	$td_{(off)}$			260		
Fall Time	t_f			90		
Turn-On Energy	E_{on}			5.8		mJ
Turn-Off Energy	E_{off}			3.0		

Electrical Characteristics @ 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℃		2.0		V
		V_{GE}=0V, I_F=40A, T_J=125℃		1.8		
		V_{GE}=0V, I_F=40A, T_J=150℃		1.7		
Reverse Recovery Current	I_{rr}	V_R=600V, I_F=40A, di_F/dt=-1800A/μs, T_J=25℃		21		A
Reverse Recovery Charge	Q_{rr}			2.4		μC
Reverse Recovery Energy	E_{rec}			1.0		mJ
Reverse Recovery Current	I_{rr}	V_R=600V, I_F=40A, di_F/dt=-1800A/μs, T_J=125℃		25		A
Reverse Recovery Charge	Q_{rr}			4.8		μC
Reverse Recovery Energy	E_{rec}			1.95		mJ
Reverse Recovery Current	I_{rr}	V_R=600V, I_F=40A, di_F/dt=-1800A/μs, T_J=150℃		28		A
Reverse Recovery Charge	Q_{rr}			5.4		μC
Reverse Recovery Energy	E_{rec}			2.25		mJ

Curve Characteristics

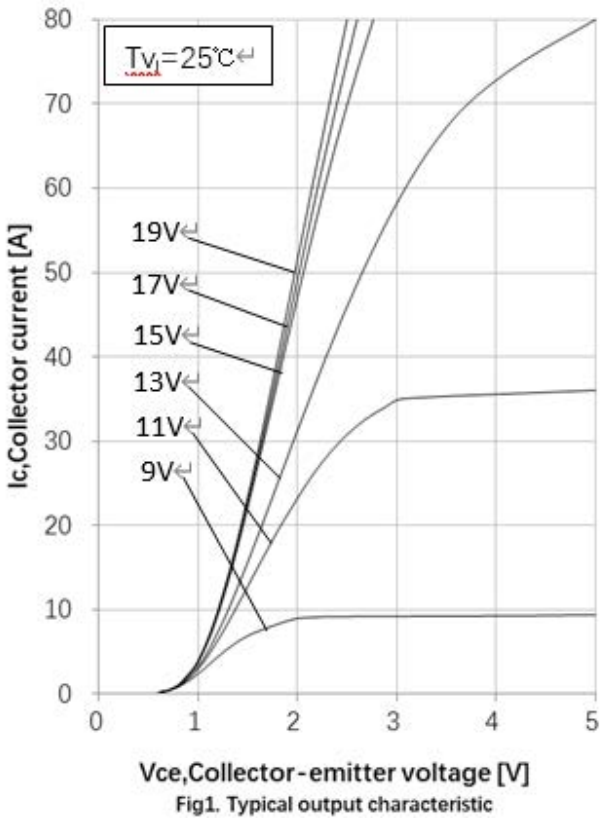


Fig1. Typical output characteristic

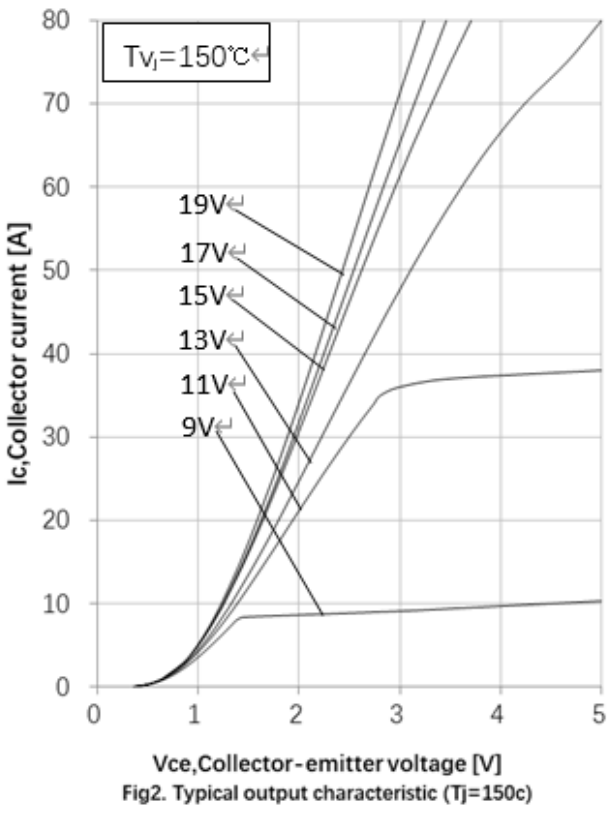


Fig2. Typical output characteristic (Tj=150c)

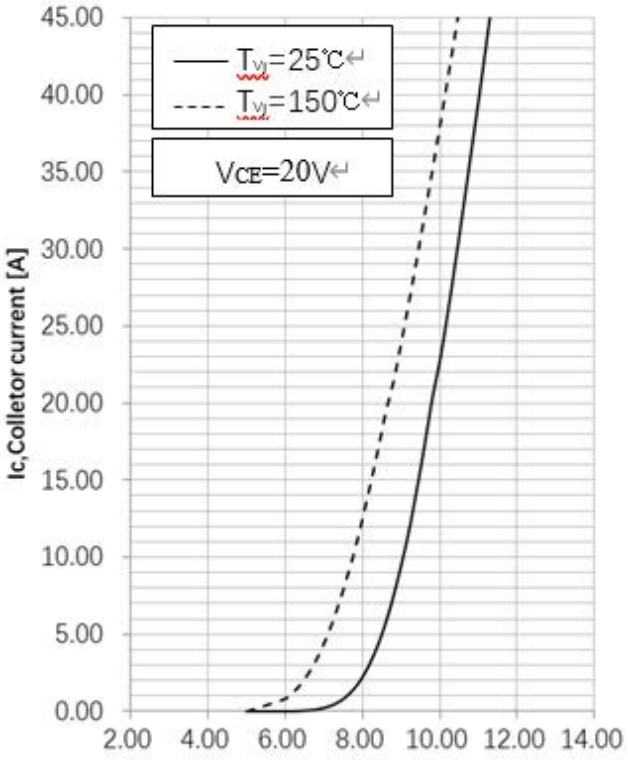


Fig3. Typical transfer characteristic

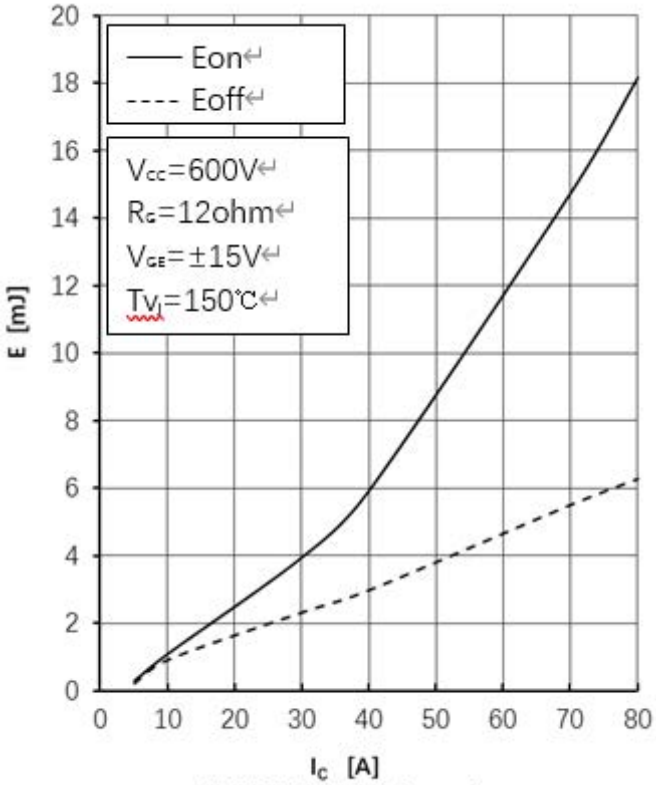


Fig4.IGBT Switching Loss vs.Ic

Curve Characteristics

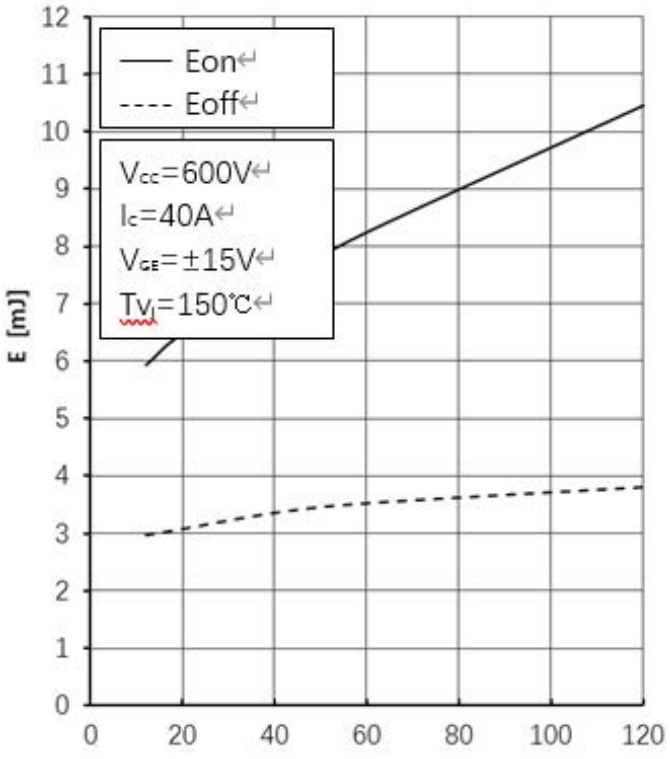


Fig5.IGBT Switching Loss vs.Rg

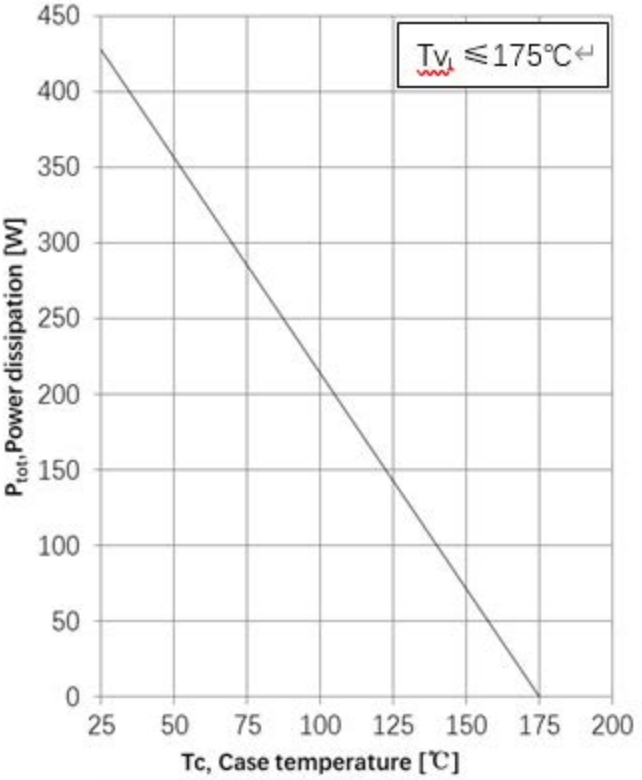


Fig6. Power dissipation as a function of case temperature (Tj＜175℃)

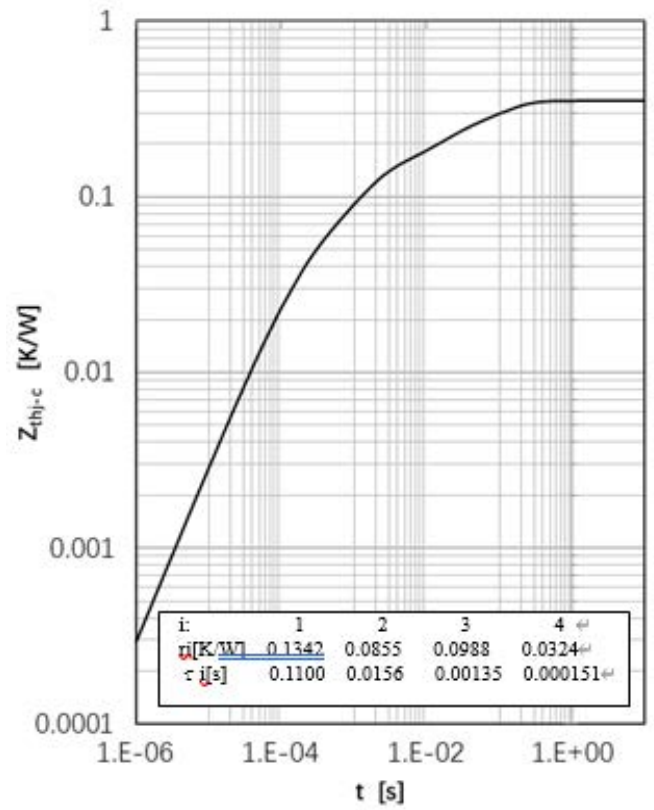


Fig 7. IGBT Transient Thermal Impedance

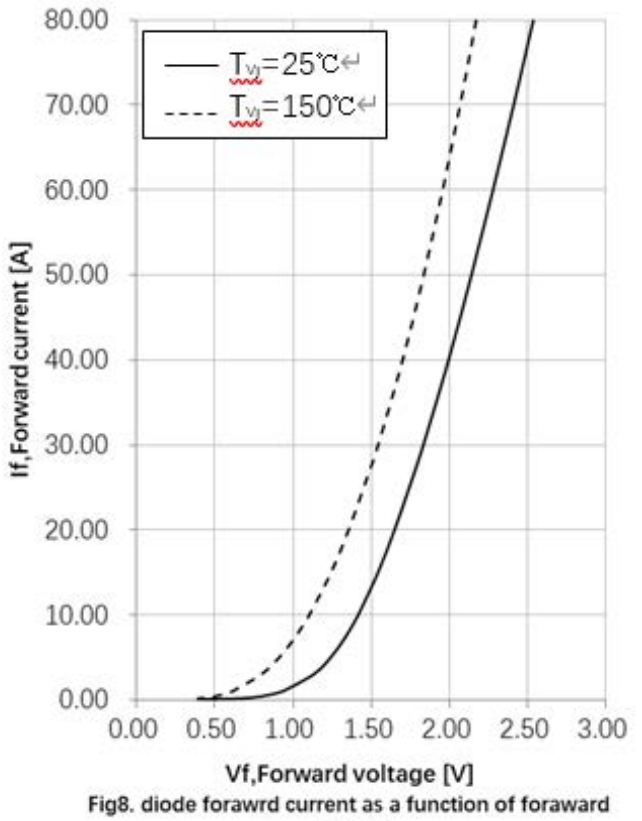


Fig8. diode forawrd current as a function of foraward voltage

Curve Characteristics

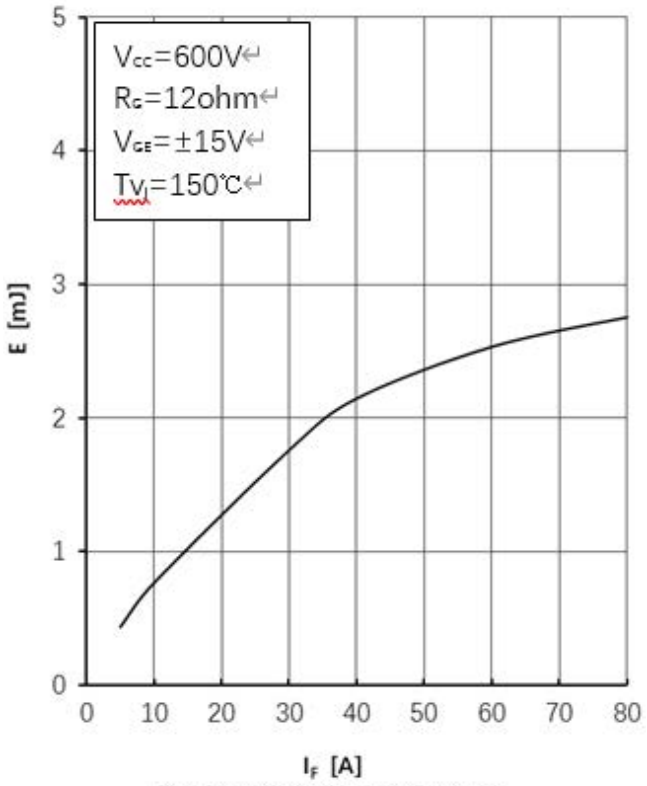


Fig9.Diode Switching Loss(Erec) vs.I_F

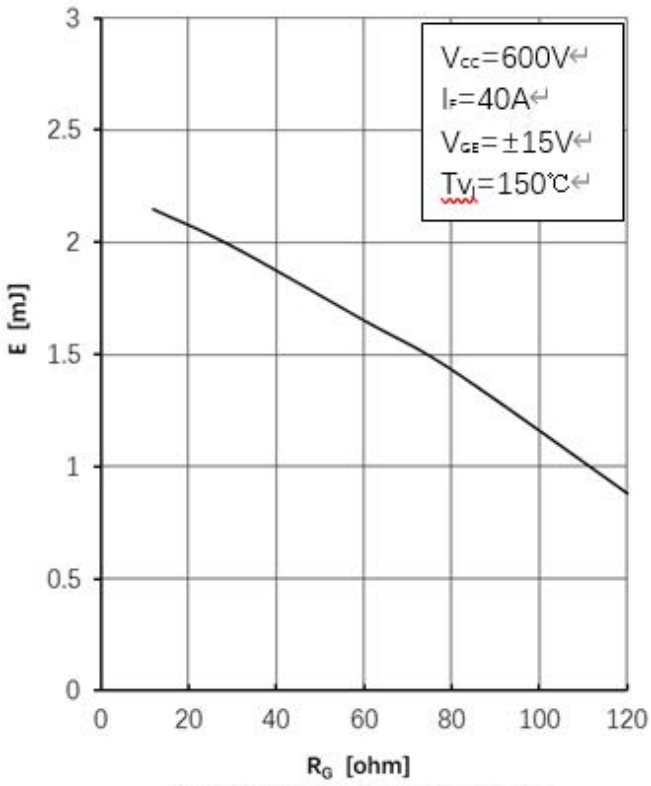


Fig10.Diode Switching Loss(Erec) vs.Rg

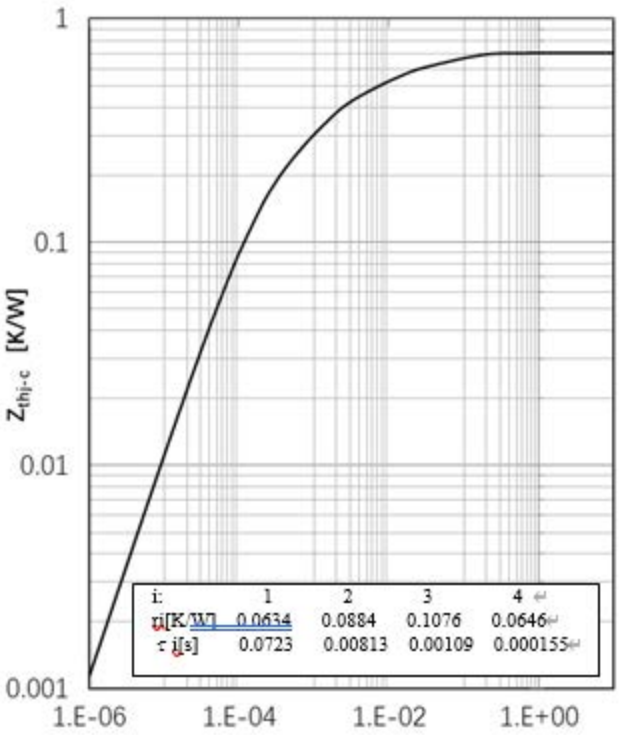


Fig11.Diode Transient Thermal Impedance

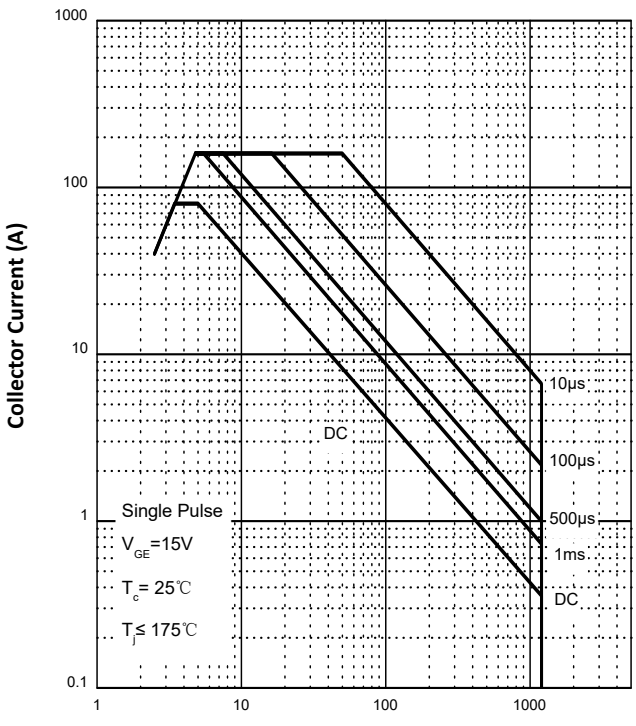


Fig. 12 -FBSOA

Ordering Information

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

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