

Features

- Low VCE(sat) Trench-FS IGBT technology
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD
- High short circuit capability(10us)
- 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)

Applications

- Inverter for motor drive
- AC and DC servo drive amplifier
- Uninterruptible power supply

Maximum Ratings

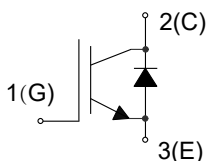
- Operating Junction Temperature Range : -40°C to +175°C
- Storage Temperature Range: -55°C to +150°C
- IGBT Thermal Resistance: 0.46°C/W Junction to Case
- Diode Thermal Resistance: 1.0°C/W Junction to Case
- Thermal Resistance: 40°C/W Junction to Ambient

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current ⁽²⁾	I_C	$T_C=25^\circ\text{C}$	50
		$T_C=100^\circ\text{C}$	25
Pulsed Collector Current ⁽³⁾	$I_{C,pluse}$	100	A
Diode Forward Current ⁽²⁾	I_F	$T_C=25^\circ\text{C}$	50
		$T_C=100^\circ\text{C}$	25
Diode Pulsed Current ⁽³⁾	$I_{F,pluse}$	100	A
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ⁽⁴⁾		± 30	
Short Circuit Withstand Time ⁽⁵⁾	t_{SC}	10	μs
$V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_J \leq 150^\circ\text{C}$			
Power Dissipation	P_D	$T_C=25^\circ\text{C}$	326
		$T_C=100^\circ\text{C}$	163

Note:

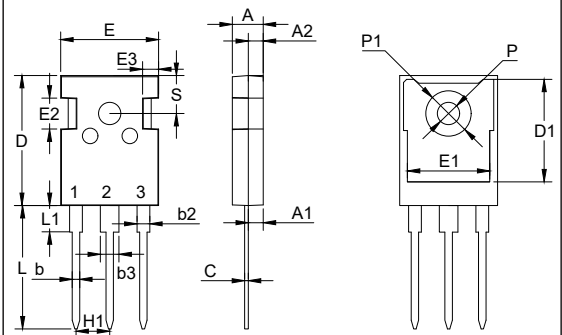
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Limited by T_{Jmax} .
3. T_p limited by T_{Jmax} .
4. $T_p \leq 10\mu\text{s}$, Duty Cycle < 1%
5. Allowed number of short circuits: < 1000;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

Internal Structure



Trench and Field Stop IGBT 1200V 25A

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	$V_{(BR)CES}$	$V_{GE}=0V, I_C=250\mu A$	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=25A, T_J=25^\circ C$		1.9	2.35	V
		$V_{GE}=15V, I_C=25A, T_J=125^\circ C$		2.2		
		$V_{GE}=15V, I_C=25A, T_J=150^\circ C$		2.3		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=250\mu A, V_{CE}=V_{GE}$	5.1	5.8	6.4	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V$			1	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=150^\circ C$			5	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			100	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		1.45		nF
Reverse Transfer Capacitance	C_{res}				0.05	
Gate Charge	Q_g	$V_{CC}=960V, I_C=25A, V_{GE}=15V$		0.2		uC
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=25A, V_{GE}=-15/15V, R_G=18\Omega, T_J=25^\circ C$		158		ns
Rise Time	t_r			32		
Turn-Off Delay Time	$t_{d(off)}$			331		
Fall Time	t_f			83		
Turn-On Energy	E_{on}				1.8	
Turn-Off Energy	E_{off}			1.4		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=25A, V_{GE}=-15/15V, R_G=18\Omega, T_J=125^\circ C$		172		ns
Rise Time	t_r			45		
Turn-Off Delay Time	$t_{d(off)}$			154		
Fall Time	t_f			212		
Turn-On Energy	E_{on}				2.4	
Turn-Off Energy	E_{off}			2.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=25A, V_{GE}=-15/15V, R_G=18\Omega, T_J=150^\circ C$		190		ns
Rise Time	t_r			48		
Turn-Off Delay Time	$t_{d(off)}$			165		
Fall Time	t_f			230		
Turn-On Energy	E_{on}				2.8	
Turn-Off Energy	E_{off}			2.4		

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Diode Characteristics						
Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=25A, T_J=25^\circ C$		2.1		V
		$V_{GE}=0V, I_F=25A, T_J=125^\circ C$		2.2		
		$V_{GE}=0V, I_F=25A, T_J=150^\circ C$		2.2		
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=25A,$ $di_F/dt=-1700A/\mu s, T_J=25^\circ C$		48.5		A
Reverse Recovery Charge	Q_{rr}			2.52		μC
Reverse Recovery Energy	E_{rec}			0.94		mJ
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=25A,$ $di_F/dt=-1700A/\mu s, T_J=125^\circ C$		50		A
Reverse Recovery Charge	Q_{rr}			5.08		μC
Reverse Recovery Energy	E_{rec}			1.75		mJ
Reverse Recovery Current	I_{rr}	$V_R=600V, I_F=25A,$ $di_F/dt=-1700A/\mu s, T_J=150^\circ C$		51		A
Reverse Recovery Charge	Q_{rr}			5.25		μC
Reverse Recovery Energy	E_{rec}			1.96		mJ

Curve Characteristics

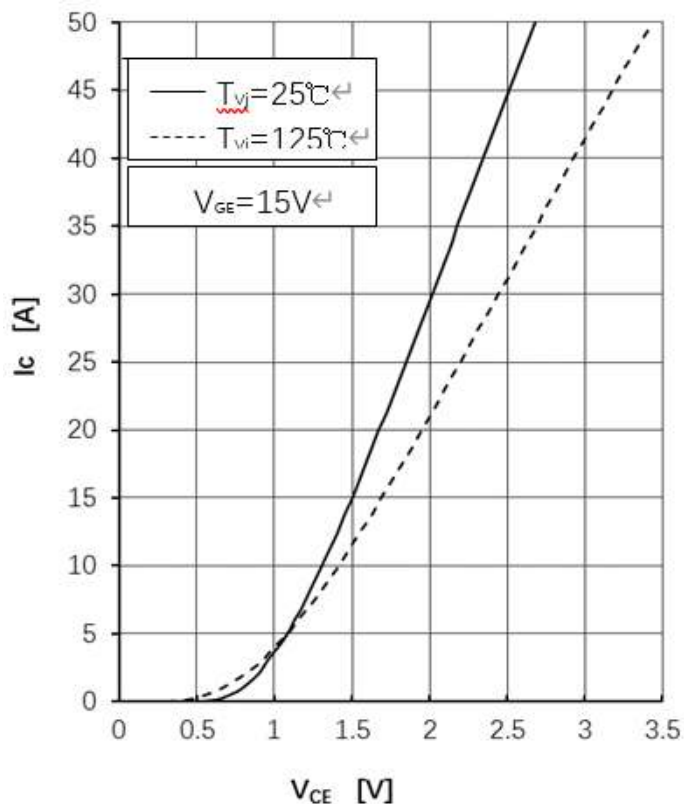


Fig1.IGBT Output Characteristics

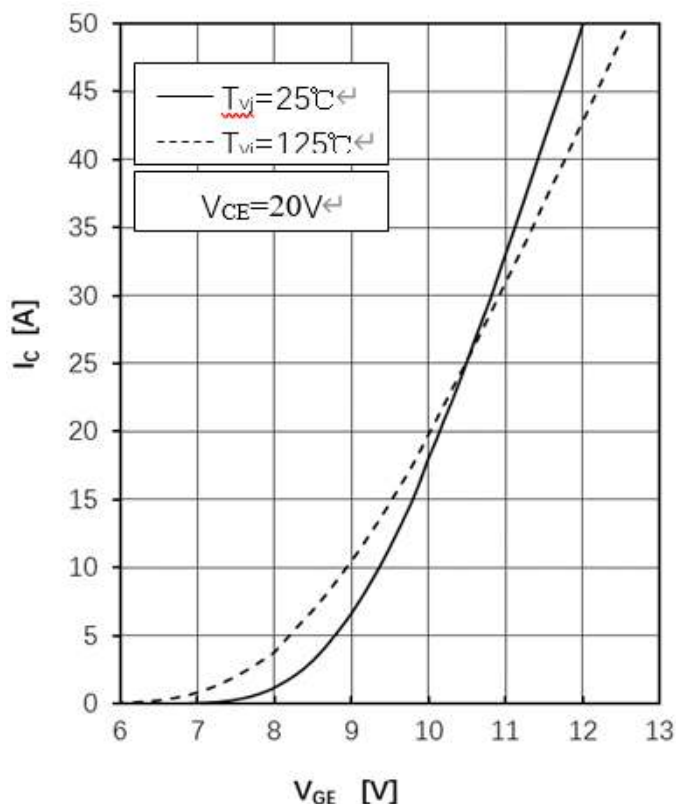


Fig2.IGBT Transfer Characteristics

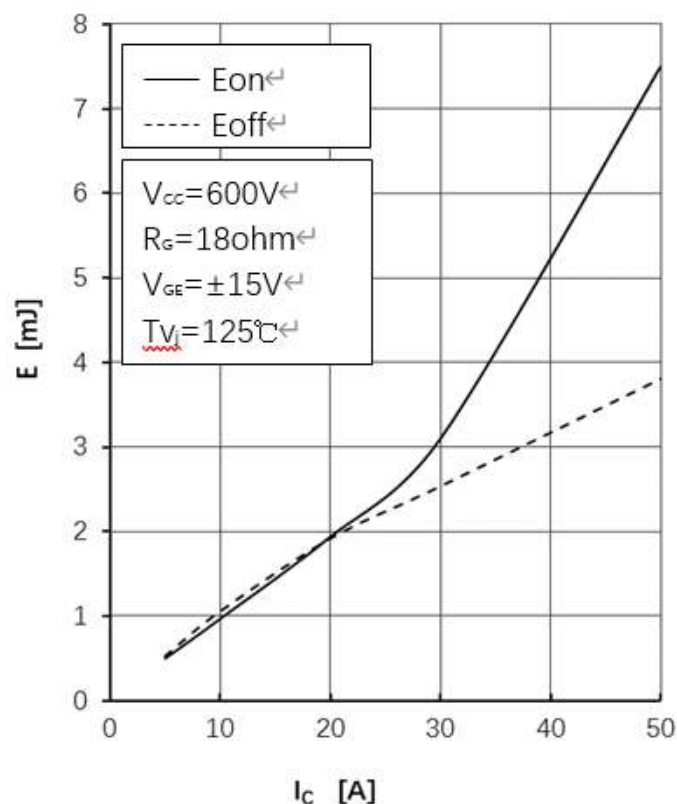


Fig3.IGBT Switching Loss vs.Ic

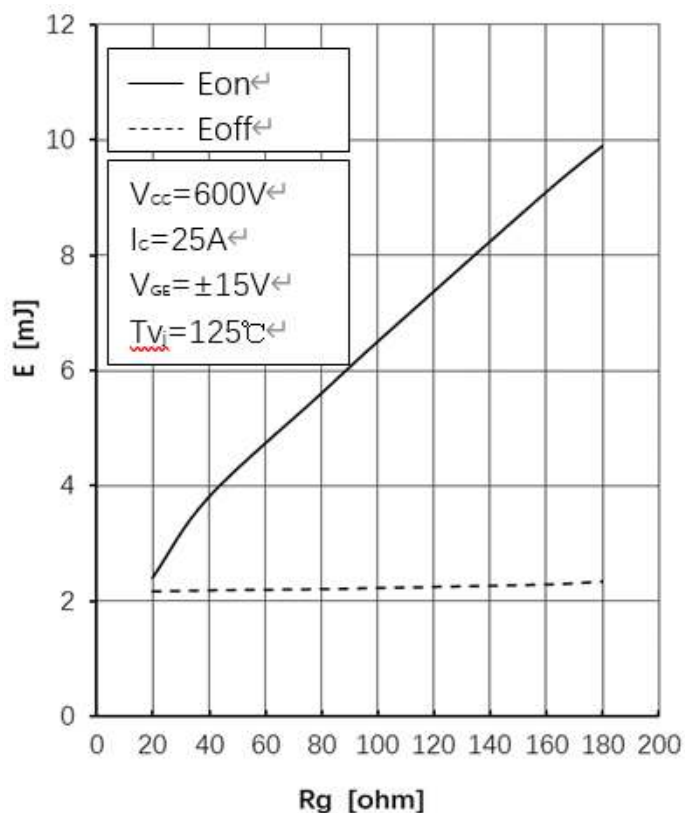
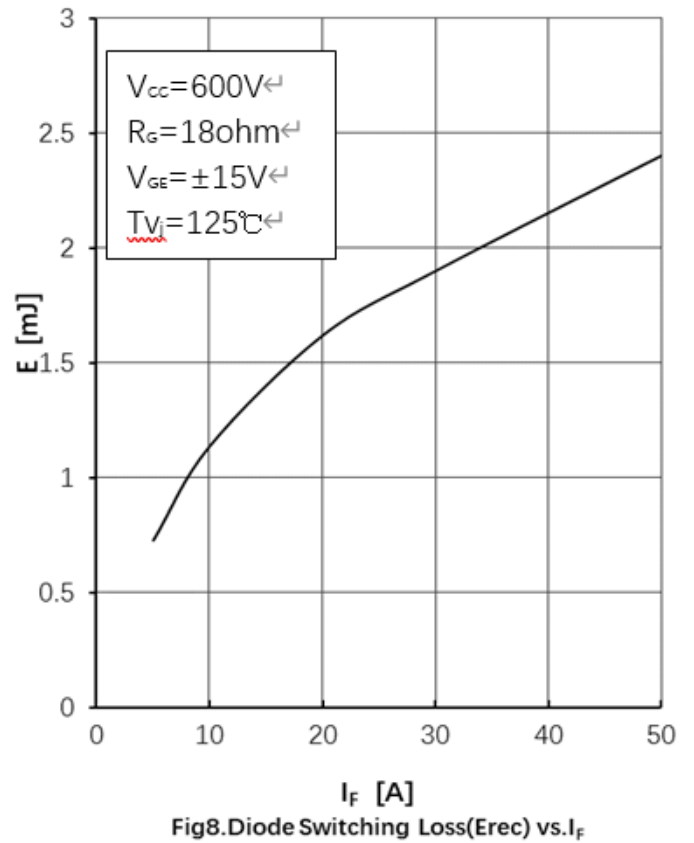
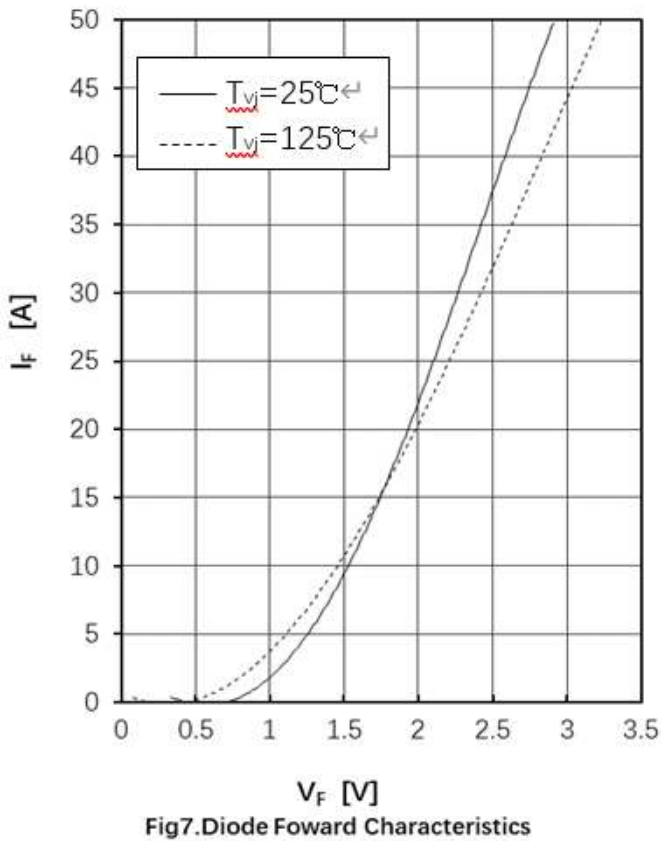
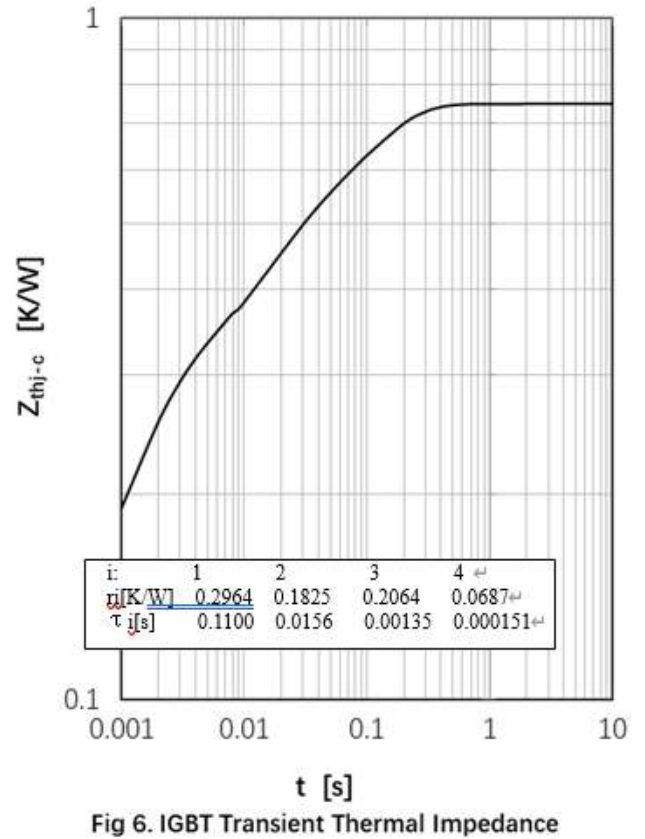
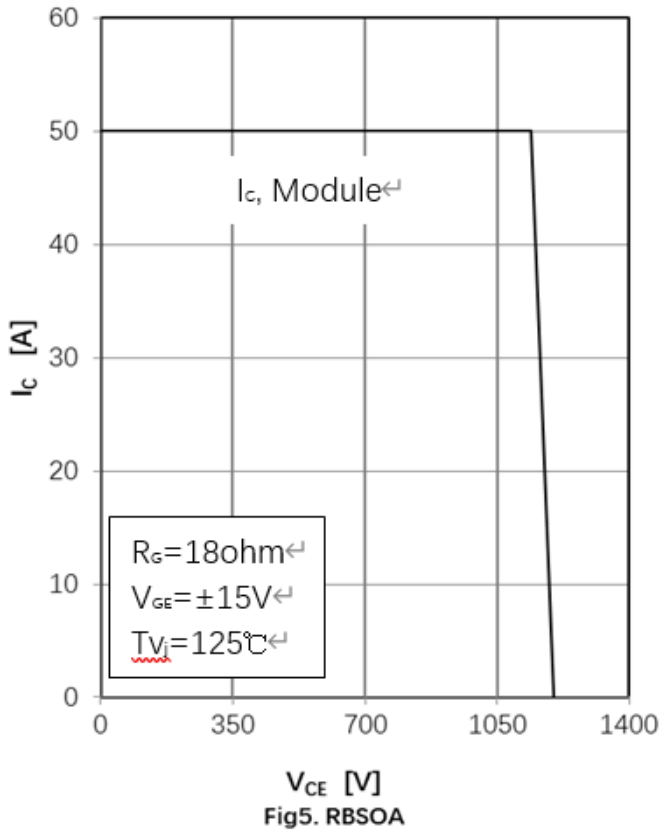


Fig4.IGBT Switching Loss vs.Rg

Curve Characteristics



Curve Characteristics

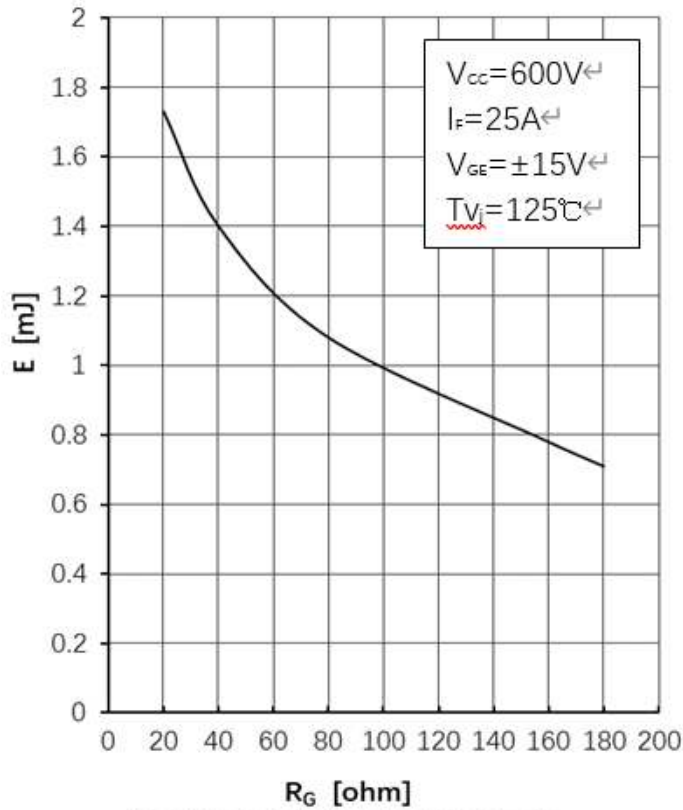


Fig9.Diode Switching Loss(E_{rec}) vs. R_g

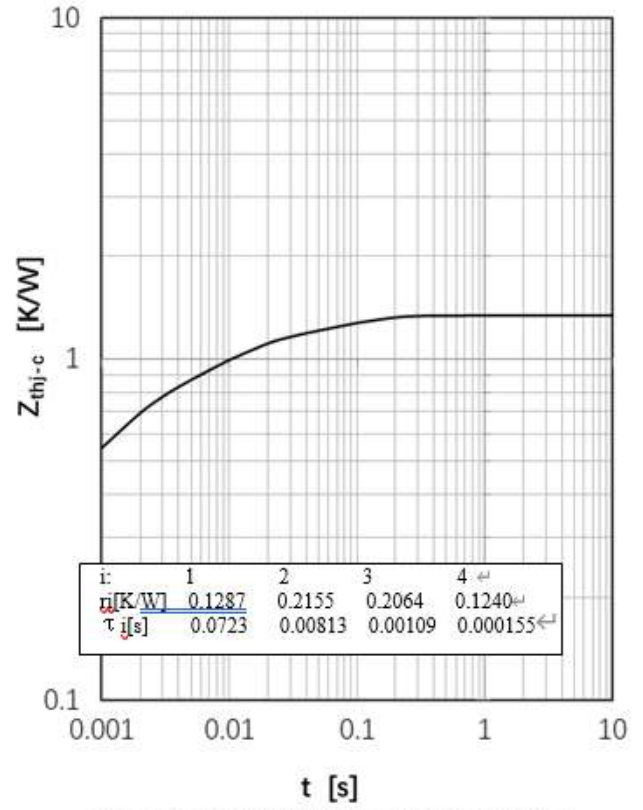


Fig10.Diode Transient Thermal Impedance

Ordering Information

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

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