



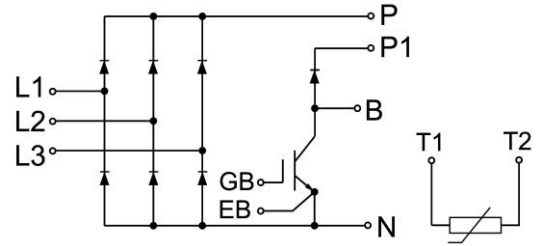
RD75RCU180B3H

Rectifier Diode Module

Preliminary Data

Features:

- Small Temperature Coefficient
- High Surge Capacity
- Heat Transfer Through Aluminum Oxide DBC Ceramic
Isolated Metal Baseplate
- Low Inductance
- Lead Free, Compliant with RoHS Requirement



Applications:

- Input Bridge Rectifier
- AC/DC Motor Control
- Power Supply

Diode, Rectifier

Maximum Rated Values ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^{\circ}\text{C}$	1900			V
I_{FRMSM}	Maximum RMS Forward Current Per Chip	$T_J=80^{\circ}\text{C}$			78	A
I_{RMSM}	Maximum RMS Current at Rectifier Output	$T_J=80^{\circ}\text{C}$			135	A
I_{FSM}	Surge Current @ $t_p=10$ ms	$t_p=10\text{ms}$, $T_J=25^{\circ}\text{C}$			900	A
I^2t	I^2t - value	$t_p=10\text{ms}$, $T_J=25^{\circ}\text{C}$			4000	A^2s
V_F	Forward Voltage	$I_F=50\text{A}$, $T_J=25^{\circ}\text{C}$		1.10		V
		$I_F=50\text{A}$, $T_J=125^{\circ}\text{C}$		1.05		V
I_R	Reverse Current	$V_{RD}=1800\text{V}$, $T_J=25^{\circ}\text{C}$			1	mA
P_{tot}	Total Power Dissipation	$T_J=25^{\circ}\text{C}$			384	W
$R_{\theta JC}$	Diode Thermal Resistance: Junction-to-Case				0.39	$^{\circ}\text{C/W}$



IGBT, Chopper

Maximum Rated Values ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		± 20	V
I_C	Continuous Collector Current	$T_C=100^{\circ}\text{C}$	50	A
		$T_C=25^{\circ}\text{C}$	100	A
I_{CM}	Peak Collector Current Repetitive	$t_p=1\text{ms}$	100	A
P_D	Maximum Power Dissipation (IGBT)	$T_C=25^{\circ}\text{C}$ $T_{Jmax}=175^{\circ}\text{C}$	472	W

Electrical Characteristics of IGBT ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=1.7\text{mA}$, $V_{CE}=V_{GE}$	5.0	5.6	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=50\text{A}$, $V_{GE}=15\text{V}$	$T_J=25^{\circ}\text{C}$	1.75	2.10	V
			$T_J=125^{\circ}\text{C}$	2.20		V
			$T_J=150^{\circ}\text{C}$	2.30		V
I_{CES}	Collector-Emitter Leakage Current	$V_{GE}=0\text{V}$, $V_{CE}=V_{CES}$, $T_J=25^{\circ}\text{C}$			1	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=\pm 20\text{V}$, $V_{CE}=0\text{V}$, $T_J=25^{\circ}\text{C}$			± 200	nA
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=100\text{kHz}$		5.32		nF
C_{oes}	Output Capacitance			0.81		nF
C_{res}	Reveres Transfer Capacitance			0.34		nF



Switching Characteristics

t _{d(on)}	Turn-on Delay Time	V _{CC} =600V, I _C =50A, R _{Gon} =15Ω, V _{GE} =±15V, Inductive Load	T _J =25℃		58		ns
			T _J =125℃		62		
			T _J =150℃		66		
t _r	Rise Time		T _J =25℃		36		ns
			T _J =125℃		38		
			T _J =150℃		40		
t _{d(off)}	Turn-off Delay Time		T _J =25℃		262		ns
			T _J =125℃		288		
			T _J =150℃		302		
t _f	Fall Time	T _J =25℃		170		ns	
		T _J =125℃		218			
		T _J =150℃		244			
E _{on}	Turn-on Switching Loss	T _J =25℃		2.7		mJ	
		T _J =125℃		3.8			
		T _J =150℃		3.9			
E _{off}	Turn-off Switching Loss	T _J =25℃		3.7		mJ	
		T _J =125℃		5.1			
		T _J =150℃		5.3			
Q _g	Total Gate Charge	V _{GE} =+15V...-15V	T _J =25℃		2850		nC
R _{g internal}	Internal Gate Resistor		T _J =25℃		3.0		Ω
I _{SC}	V _{CC} =600V, V _{GE} =+/-15V, t _p =10μs, T _J =150℃				209		A
R _{θJC}	Thermal Resistance: Junction-to-Case (per IGBT)					0.32	℃/W

Diode, Chopper

Maximum Rated Values ($T_C=25^\circ C$ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	$T_J=25^\circ C$	1200	V
I_F	Diode Continuous Forward Current	$T_C=100^\circ C$	15	A
I_{FM}	Repetitive Peak Forward Current	$t_p=1ms$	30	A



Electrical Characteristics of Diode ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
V _{FM}	Forward Voltage	I _F =15A	T _J =25°C		1.90		V
			T _J =125°C		2.00		
			T _J =150°C		2.00		
t _{rr}	Reverse Recovery Time	I _F =15A, -diF/dt=174A/μs(T _J =150°C), V _R =600V, V _{GE} =-15V	T _J =25°C		15.6		ns
			T _J =125°C		16.3		
			T _J =150°C		20.6		
I _{rr}	Peak Reverse Recovery Current		T _J =25°C		241		A
			T _J =125°C		249		
			T _J =150°C		276		
Q _{rr}	Reverse Recovery Charge		T _J =25°C		0.89		μC
			T _J =125°C		1.34		
			T _J =150°C		1.38		
E _{rec}	Reverse Recovery Energy		T _J =25°C		0.13		mJ
			T _J =125°C		0.14		
			T _J =150°C		0.16		
R _{θJC}	Diode Thermal Resistance: Junction-to-Case					1.13	°C/W

Internal NTC-Thermistor Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
R_{25}	$T_C=25^{\circ}\text{C}$		5		$\text{k}\Omega$
$\Delta R/R$	$T_C=100^{\circ}\text{C}, R_{100}=493\Omega$	-5		5	%
P_{25}	$T_C=25^{\circ}\text{C}$			20	mW
$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\text{K}))]$		3375		K
$B_{25/80}$	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\text{K}))]$		3411		K
$B_{25/100}$	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15\text{K}))]$		3433		K



Module

Symbol	Description	Min.	Typ.	Max.	Units
V _{iso}	Isolation Voltage (All Terminals Shorted)	AC, 30s		4500	V
T _J	Maximum Junction Temperature			175	°C
T _{JOP}	Maximum Operating Junction Temperature Range	-40		+150	°C
T _{stg}	Storage Temperature	-40		+125	°C
CTI	Comparative Tracking Index	200			
R _{θCS}	Case-to-Sink Thermally (Conductive Grease Applied)			0.08	°C/W
T	Mounting Screw:M4	1.0		1.2	N·m
G	Weight		25		g

Ordering Information Table

Device code	RD	75	RCU	180	B3	H
	①	②	③	④	⑤	⑥

- ① - Rectifier Module
- ② - Rated Current (75=75A)
- ③ - Circuit Configuration (RCU=Chopper+Rectifier)
- ④ - Rated Voltage (180=1800V)
- ⑤ - Package Type
- ⑥ - Test Level (Pass the Important Reliability Test-Industrial Grade)

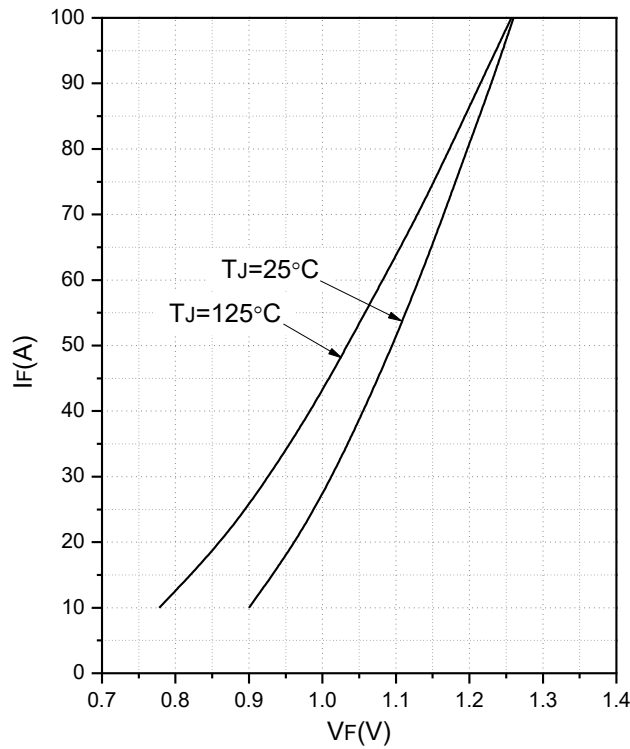


Fig.1 Forward Characteristics
(Rectifier Diode)

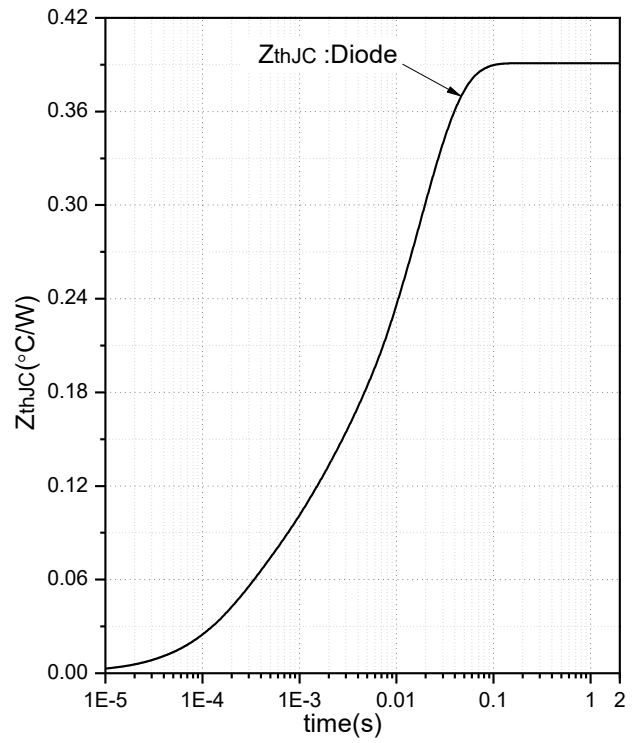


Fig.2 Transient Thermal Impedance
(Rectifier Diode)

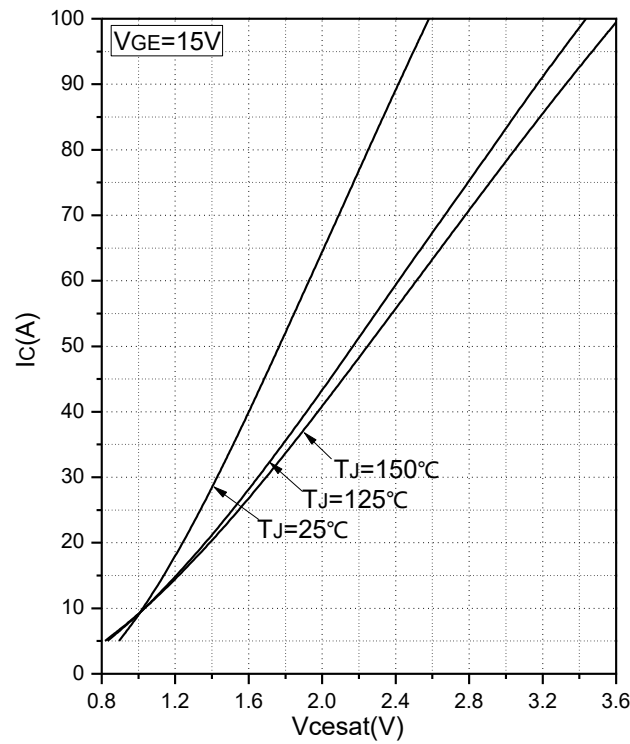


Fig.3 Typical Saturation Voltage Characteristics
(Chopper IGBT)

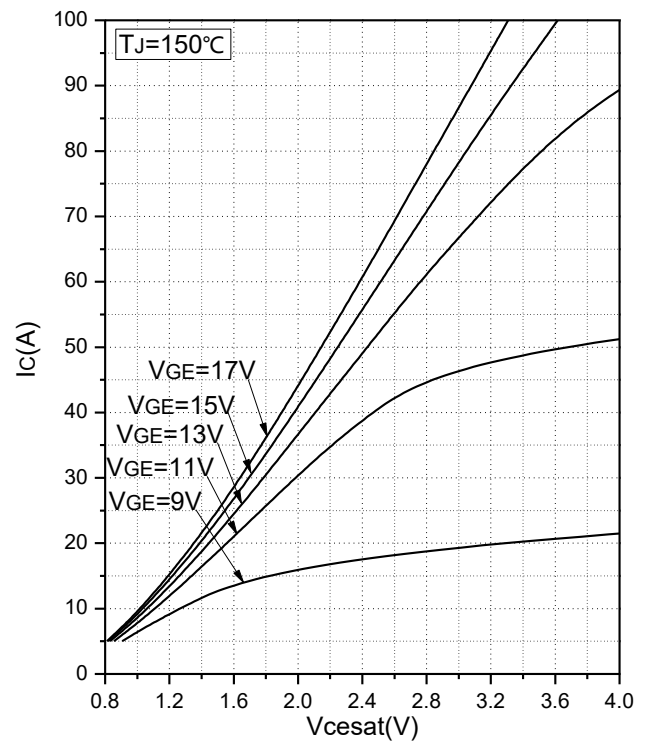


Fig.4 Typical Output Characteristics
(Chopper IGBT)

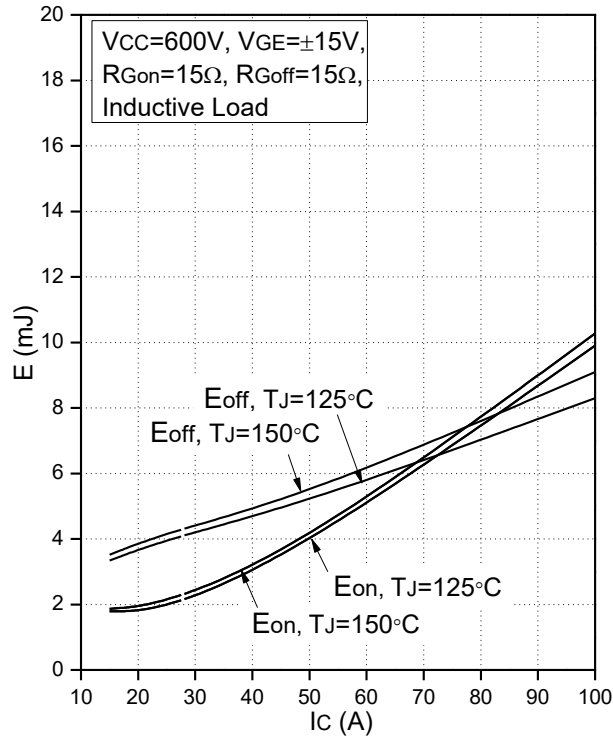


Fig.5 Typical Switching Loss vs. Collector Current (Chopper IGBT)

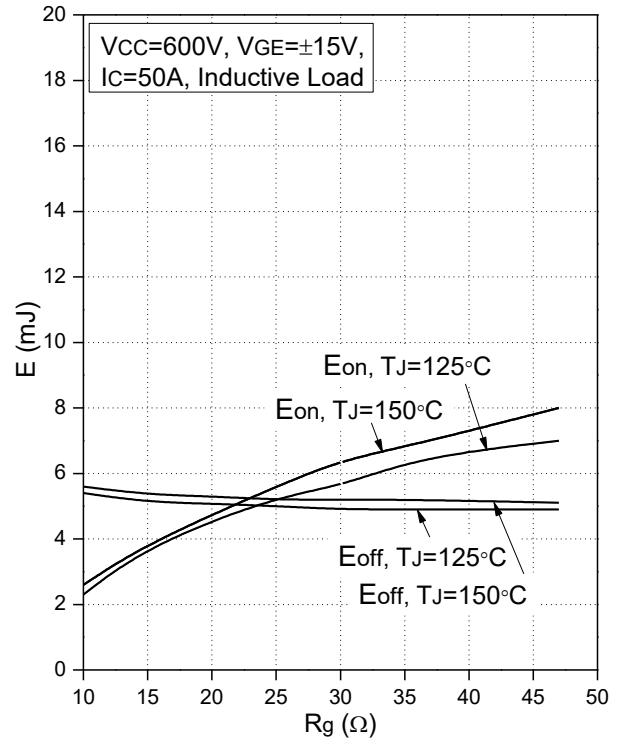


Fig.6 Typical Switching Loss vs. Gate Resistance (Chopper IGBT)

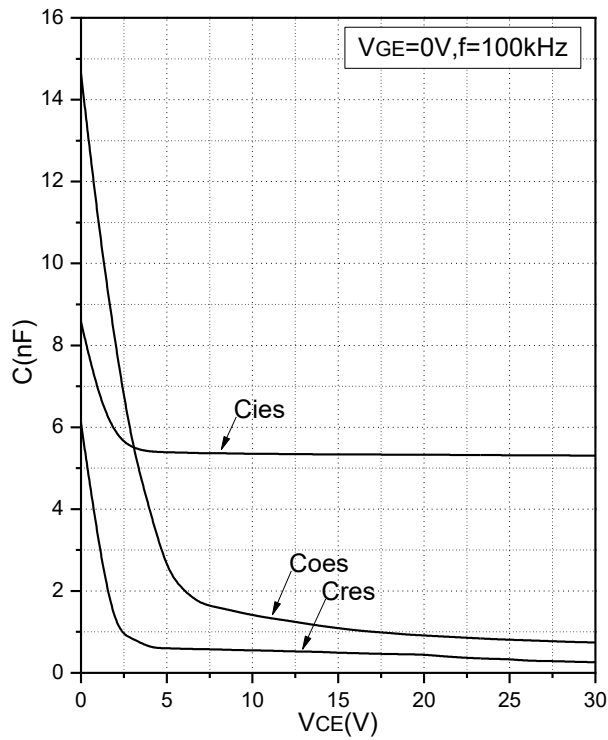


Fig.7 Capacitance Characteristics (Chopper IGBT)

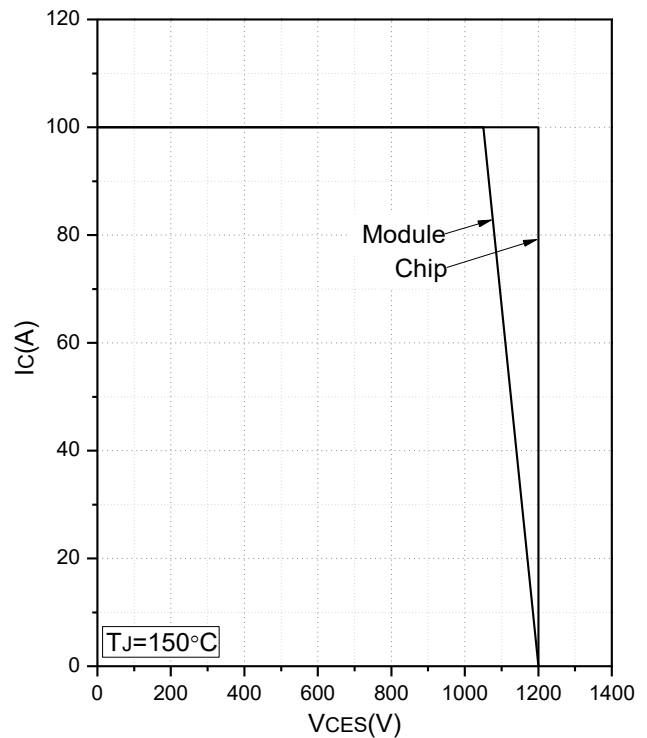
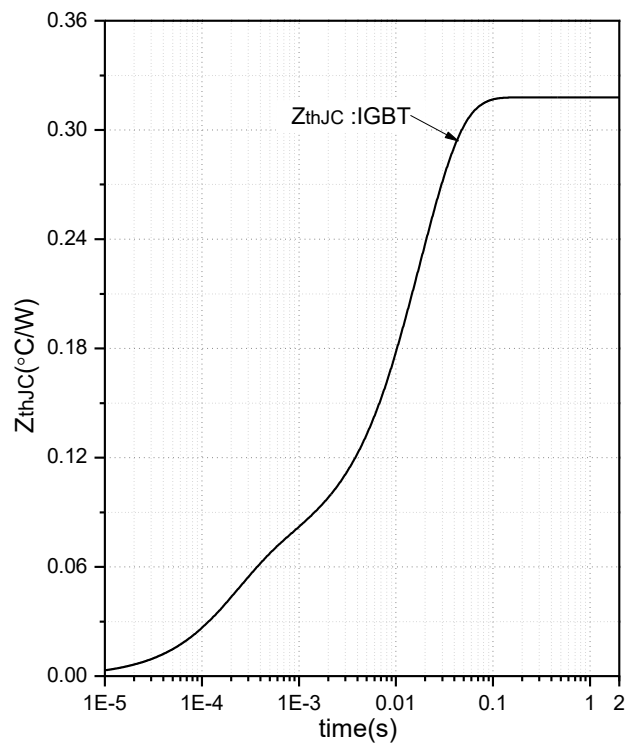
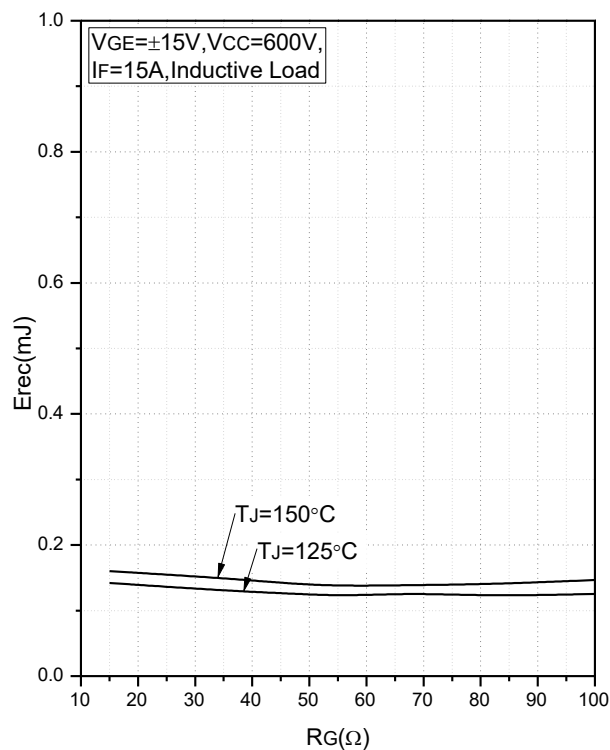
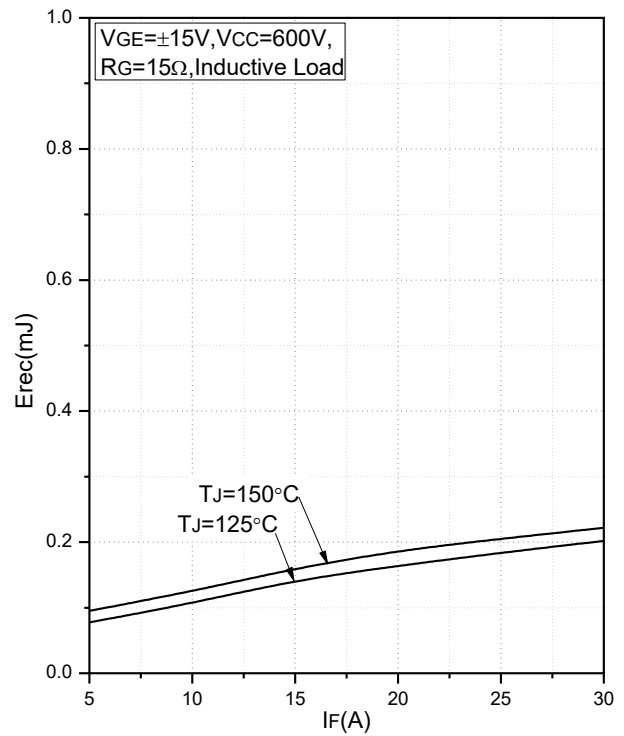
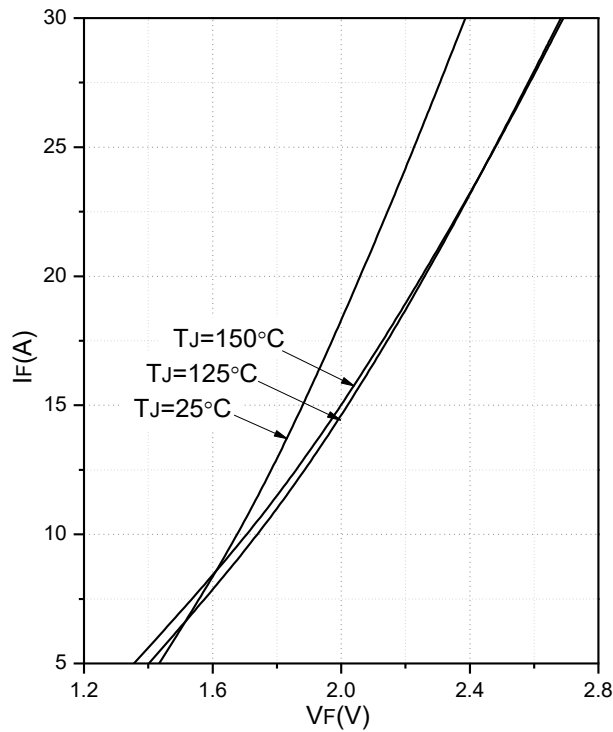


Fig.8 Reverse Bias Safe Operation Area (RBSOA) (Chopper IGBT)



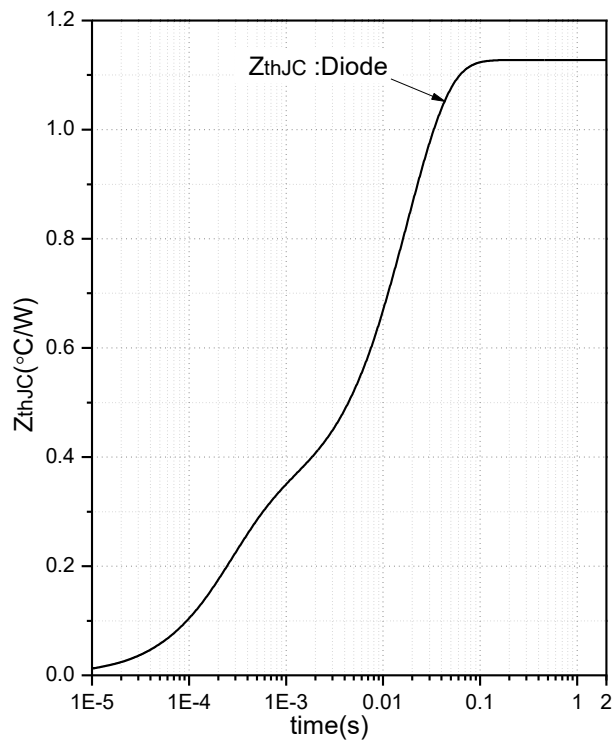


Fig.13 Transient Thermal Impedance
(Chopper Diode)

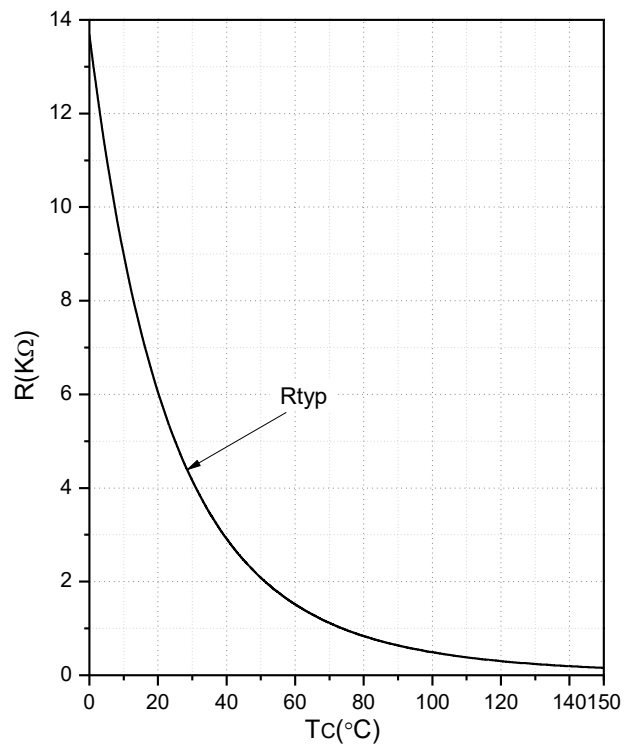
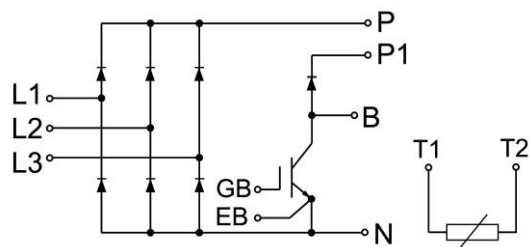


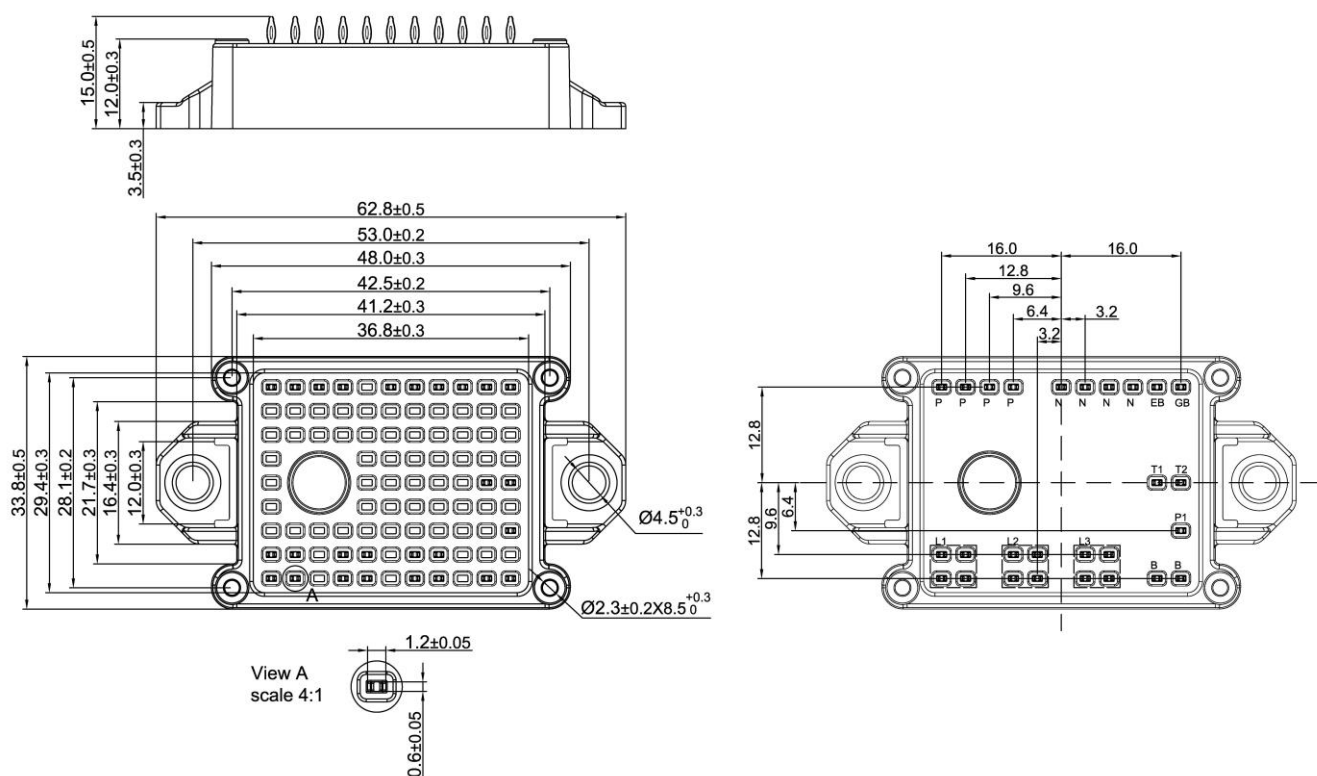
Fig.14 NTC Temperature Characteristics



Internal Circuit:



Package Outline (Unit: mm):





Revision	Notes
01	Initial Release
02	Updated Electrical Characteristics

Announcement

Information in this document is believed to be accurate and reliable. However, NJSME does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

NJSME reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

The released datasheet would be issued with “REV.” + “alphabet characters”.