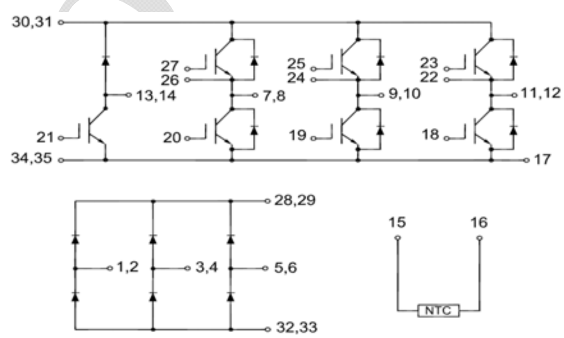
GSID100A120T2P2

IGBT PIM Module

Features：

- Short Circuit Rated 10µs
- Low Saturation Voltage: $V_{CE\ (sat)}$ = 1.90V @ I_C = 100A ,T_C=25℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement



Applications：

- Industrial Inverters
- Servo Applications

IGBT, Inverter

Maximum Rated Values (T_C=25℃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 = 80℃	100	A
		T_C = 25℃	200	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175℃	200	A
t_{SC}	Short Circuit Withstand Time		>10	µs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	710	W

Electrical Characteristics of IGBT (T_C=25℃Unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 1 mA, V_{CE} = V_{GE}		5.0	5.5	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 A, V_{GE} = 15V	T_J = 25℃		1.90	2.10	V
			T_J = 125℃		2.20		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}, T_J = 25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20V, V_{CE} = 0V, T_J = 25℃				100	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f ＝1MHz			13.7		nF
C_{oes}	Output Capacitance				0.78		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 100A, R_G = 15 Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		245		ns
			T_J = 125℃		225		
t_r	Rise Time		T_J = 25℃		145		ns
			T_J = 125℃		145		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		420		ns
			T_J = 125℃		450		
t_f	Fall Time		T_J = 25℃		170		ns
			T_J = 125℃		230		
E_{on}	Turn-on Switching Loss		T_J = 25℃		9.1		mJ
			T_J = 125℃		11.7		
E_{off}	Turn-off Switching Loss		T_J = 25℃		5.5		mJ
			T_J = 125℃		7.9		
Q_g	Total Gate Charge		T_J = 25℃		945		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=200A,V_{CC}=960V,Vp=1200V, Rg = 15Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{θJC}$	IGBT Thermal Resistance: Junction-To-Case				0.21		℃/W

Diode, Inverter
Maximum Rated Values (T_C=25℃Unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current	200	A

Electrical Characteristics of FWD (T_C=25℃Unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 100 A , V_{GE} = 0V	T_J = 25℃		2.20	2.50	V
			T_J = 125℃		2.40		
I_{rr}	Peak Reverse Recovery Current	I_F=100A, di/dt =660A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		40		A
			T_J = 125℃		55		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		4.7		μC
			T_J = 125℃		10.6		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		1.5		mJ
			T_J = 125℃		3.9		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.34		℃/W

IGBT, Brake-Chopper
Maximum Rated Values (T_C=25℃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 = 80℃,	50	A
		T_C = 25℃	100	A
I_{CM}	Peak Collector Current Repetitive	T_J = 175℃	100	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25℃ T_{Jmax}=175℃	390	W

Electrical Characteristics of IGBT (T_C=25℃Unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 1 mA, V_{CE} = V_{GE}		3.0	4.5	5.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 50 A, V_{GE} = 15V	T_J = 25℃		1.90	2.20	V
			T_J = 125℃		2.20		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0V, V_{CE} = V_{CES}, T_J = 25℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20V, V_{CE} = 0V, T_J = 25℃				100	nA
C_{ies}	Input Capacitance	V_{CE} = 25V, V_{GE} = 0V , f ＝1MHz			6.7		nF
C_{oes}	Output Capacitance				0.38		nF

Switching Characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600V,I_C = 50A, R_G =15 Ω,V_{GE} = ±15V, Inductive Load	T_J = 25℃		240		ns
			T_J = 125℃		235		
t_r	Rise Time		T_J = 25℃		75		ns
			T_J = 125℃		75		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		235		ns
			T_J = 125℃		250		
t_f	Fall Time		T_J = 25℃		165		ns
			T_J = 125℃		280		
E_{on}	Turn-on Switching Loss		T_J = 25℃		3.72		mJ
			T_J = 125℃		4.48		
E_{off}	Turn-off Switching Loss		T_J = 25℃		2.25		mJ
			T_J = 125℃		3.54		
Q_g	Total Gate Charge		T_J = 25℃		260		nC
RBSOA	Reverse Bias Safe Operation Area	I_C=100A,V_{CC}=960V,Vp=1200V, Rg = 15Ω, V_{GE}=+15V to 0V, T_J =150°C		Trapezoid			
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 600V, V_{GE} = 15V, T_J = 150℃		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case				0.39		℃/W

Diode, Brake-Chopper

Maximum Rated Values (T_C=25℃Unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	50	A
I_{FM}	Diode Maximum Forward Current	100	A

Electrical Characteristics of FWD (T_C=25℃Unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_{FM}	Forward Voltage	I_F = 50 A , V_{GE} = 0V	T_J = 25℃		2.00	2.20	V
			T_J = 125℃		2.00		
I_{rr}	Peak Reverse Recovery Current	I_F = 50A, di/dt =700A/µs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		25		A
			T_J = 125℃		40		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		3.03		µC
			T_J = 125℃		6.08		
E_{rec}	Reverse Recovery Energy		T_J = 25℃		1.34		mJ
			T_J = 125℃		2.73		
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.49		℃/W

Diode, Rectifier (T_C=25℃Unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	T_J =25℃	1800	V
I_{FRMSM}	Maximum RMS Forward Current per Chip	T_J =80℃	100	A
I_{RMSM}	Maximum RMS Current at Rectifier Output	T_J =80℃	150	A
I_{FSM}	Surge Current @t_p=10 ms	T_J =25℃	1200	A
		T_J =150℃	900	
I^2t	I^2t - value	T_J =25℃	6700	A^2s
		T_J =150℃	3900	

Electrical Characteristics of Diode (T_C=25℃Unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_F	Forward voltage	I_F = 100 A ,	T_J =25℃		1.15		V
			T_J =150℃		1.10		
I_R	Reverse current	V_R=1200V	T_J =25℃			1	mA
$R_{\theta JC}$	Diode Thermal Resistance: Junction-To-Case				0.34		℃/W

Internal NTC-Thermistor Characteristic

Symbol	Description	Min	Typ	Max	Unit
R_{25}	T_C =25℃		5		kΩ
△R/R	T_C =100℃，R_{100} =481Ω			±5	%
P_{25}	T_C =25℃		50		mW
$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$		3380		K
$B_{25/80}$	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$		3440		K

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage(All Terminals Shorted)	f = 50Hz, 1minute			2500	V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.1		℃/W
T	Mounting Screw:M5		4.0		6.0	N·m
G	Weight			300		g

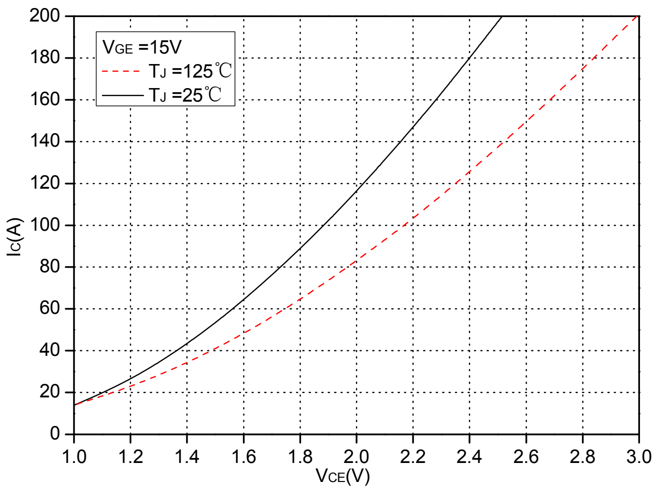


Fig.1 Typical Saturation Voltage Characteristics (Inverter)

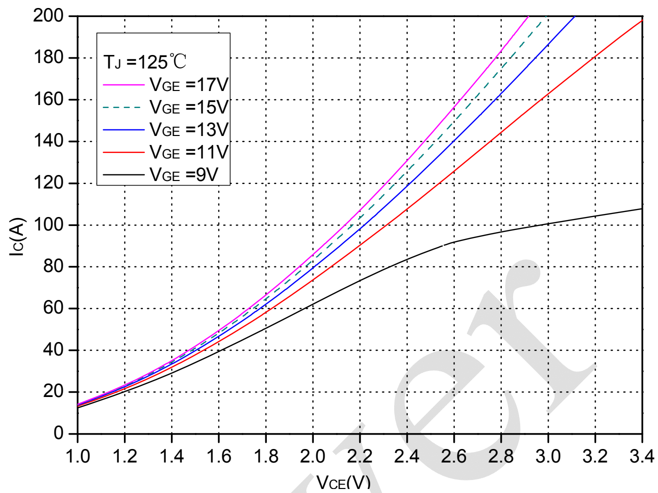


Fig.2 Typical Output Characteristics (Inverter)

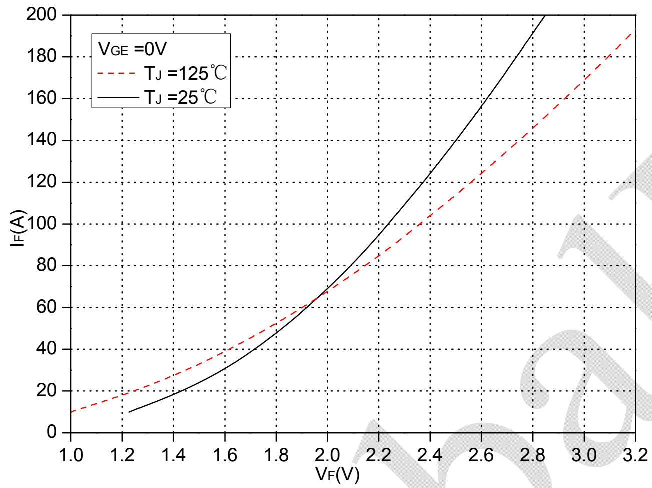


Fig.3 Forward Characteristics of FWD (Inverter)

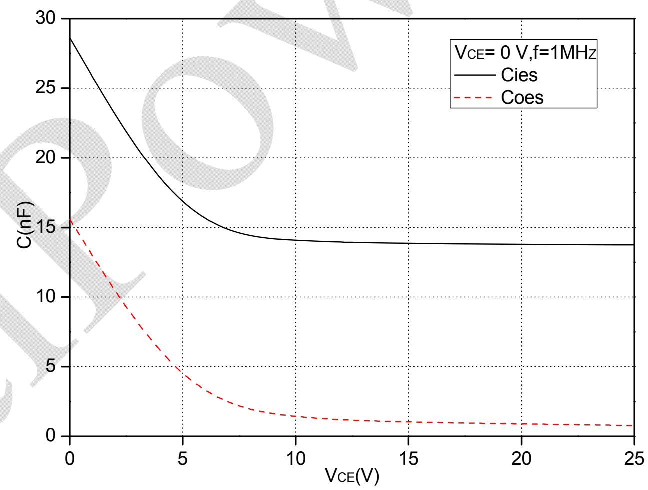


Fig.4 Capacitance Characteristics

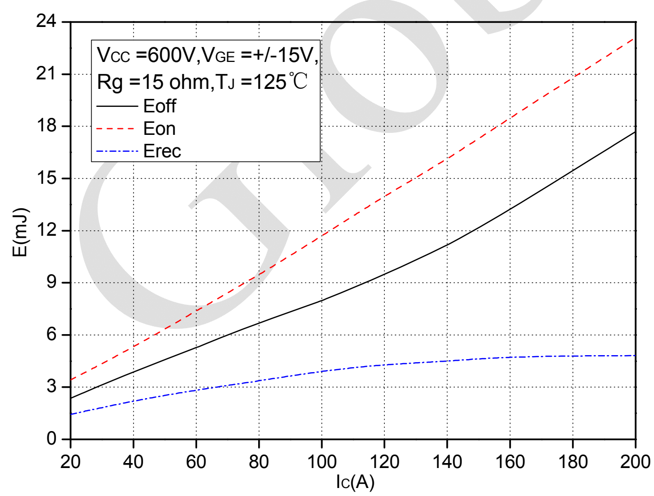


Fig.5 Typical Switching Loss vs. Collector Current (Inverter)

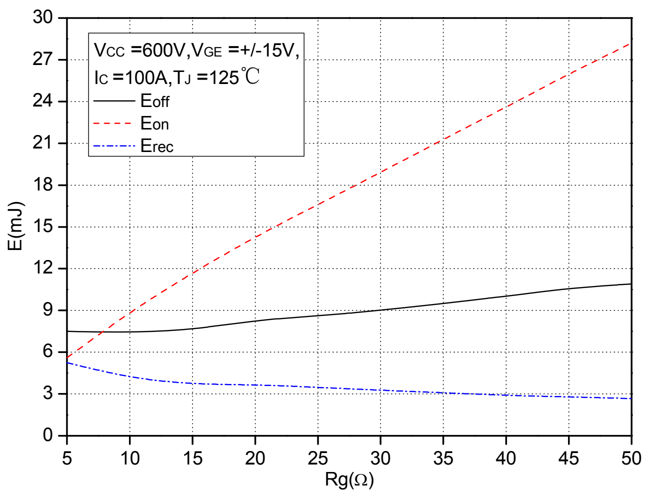


Fig.6 Typical Switching Loss vs. Gate Resistance (Inverter)

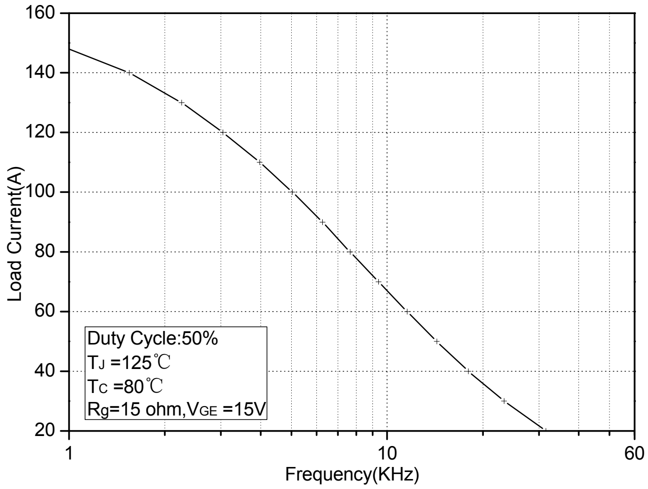


Fig.7 Typical Load Current vs. Frequency (Inverter)

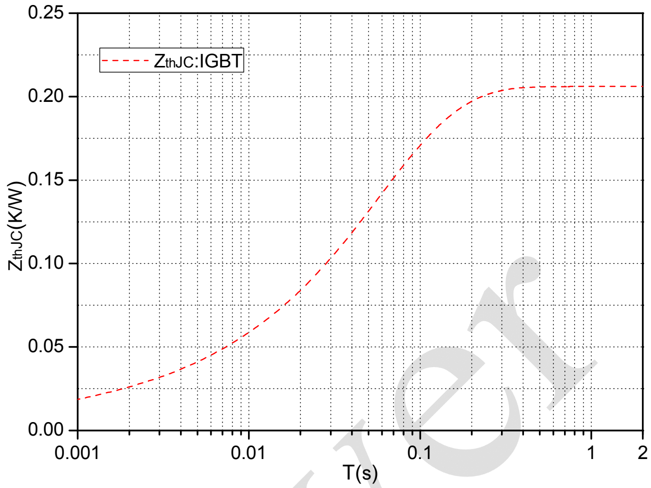


Fig.8 Transient Thermal Impedance IGBT (Inverter)

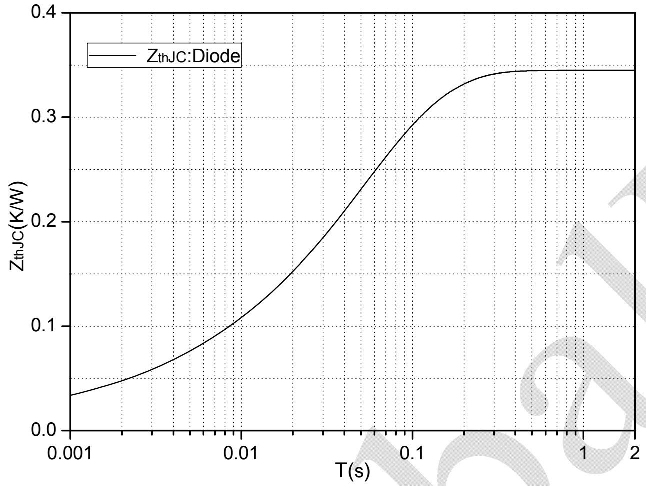


Fig.9 Transient thermal impedance Diode (Inverter)

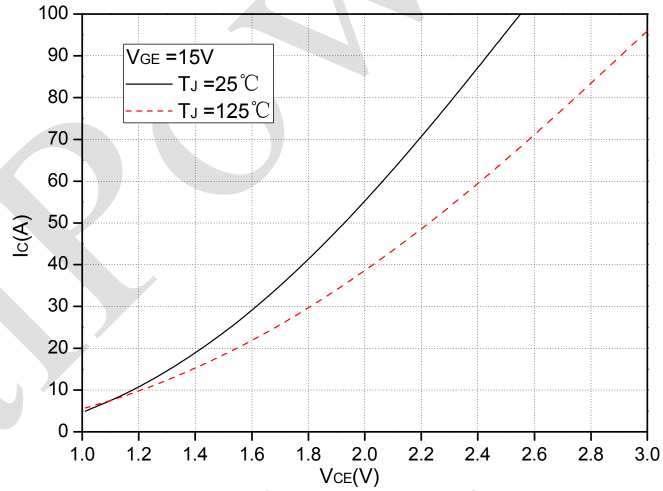


Fig.10 Typical Saturation Voltage Characteristics (Brake-Chopper)

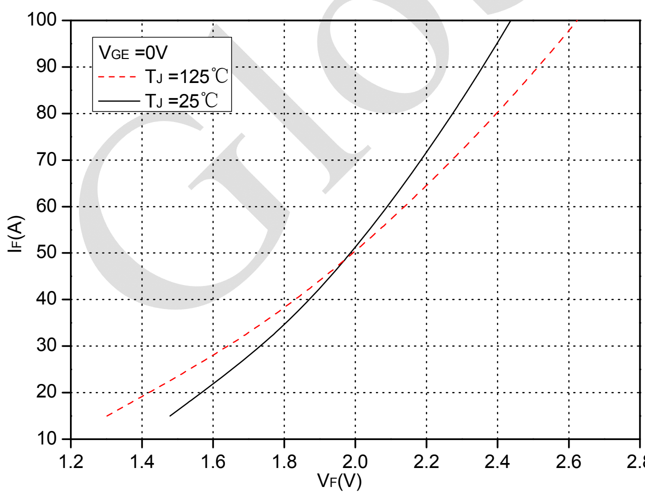


Fig.11 Forward Characteristics of FWD (Brake-Chopper)

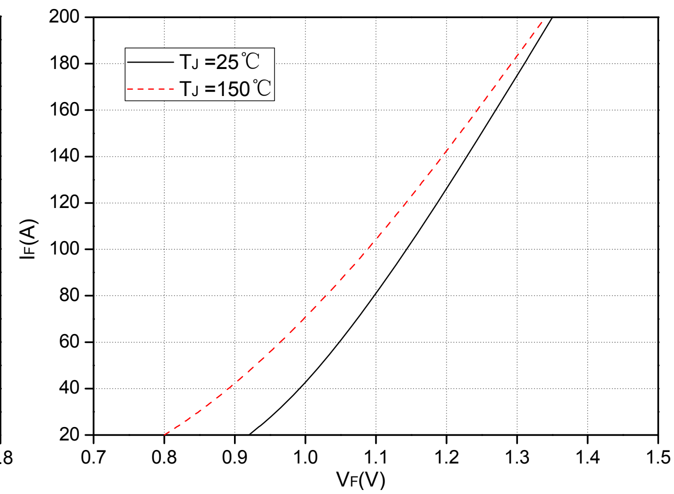


Fig.12 Forward Characteristics of Diode (Rectifier)

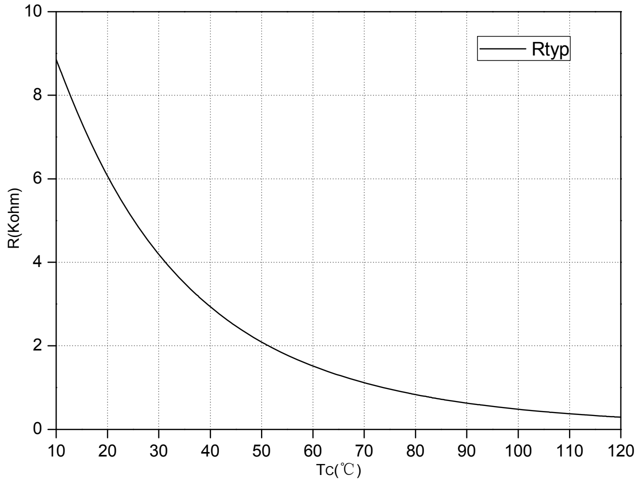


Fig.13 NTC Temperature characteristics

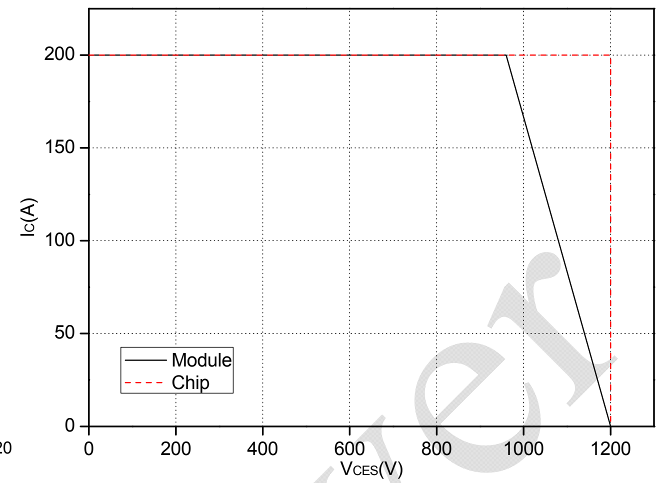
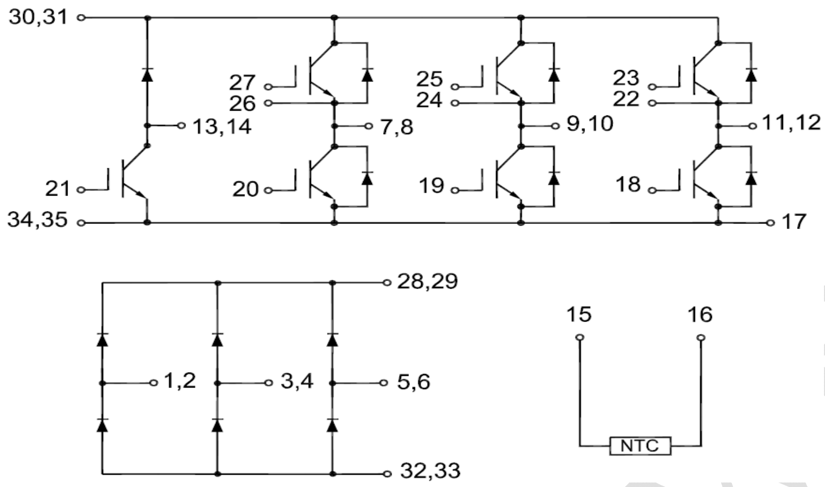
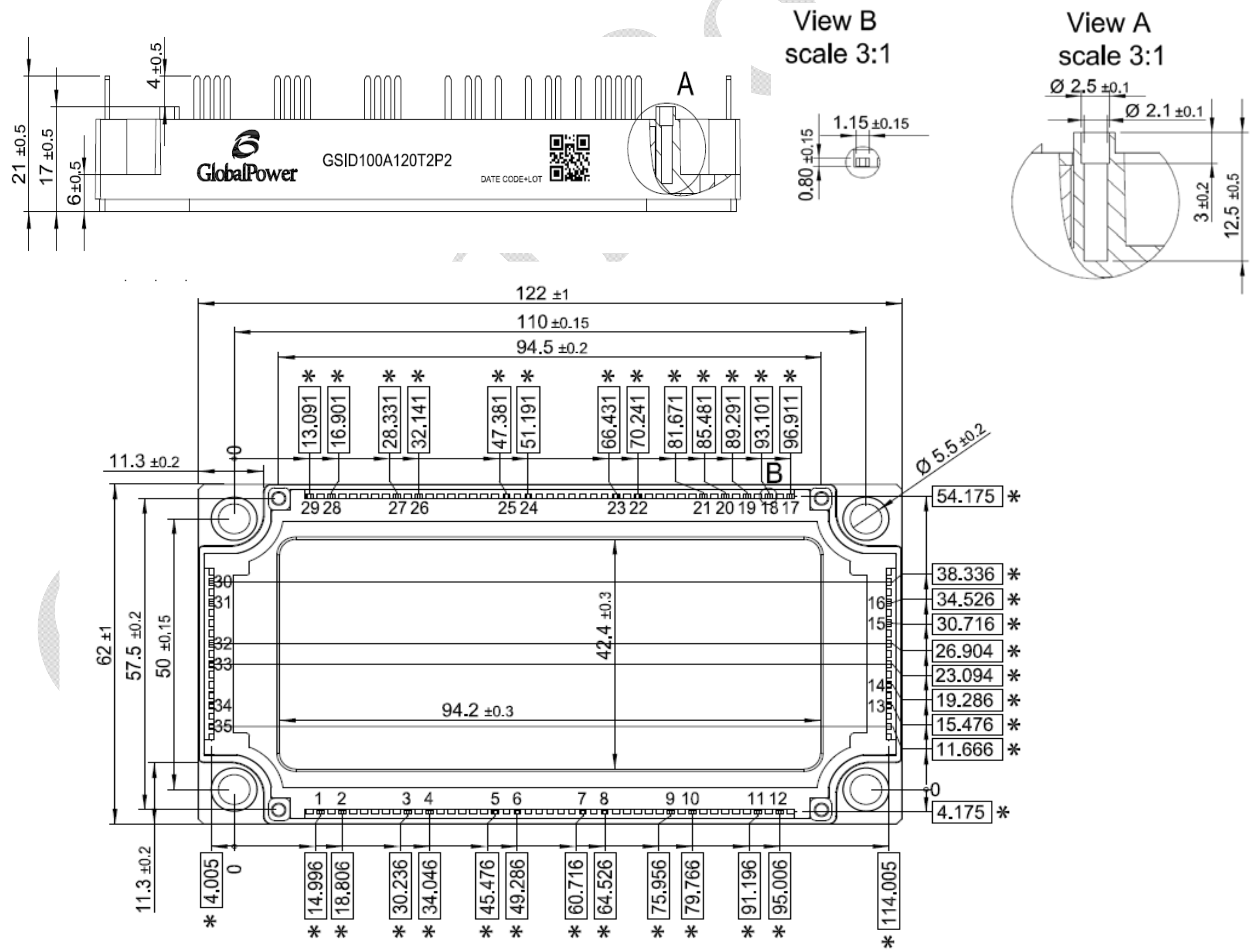


Fig.14 Reverse Bias Safe Operation Area (RBSOA)

Internal Circuit:



Package Outline (Unit: mm):



Revision History

Date	Revision	Notes
4/13/2015	1.0	Initial release

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Notes

- **RoHS Compliance**
  The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of www.gptechgroup.com.

- **REACh Compliance**
  REACh substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact our office at GPTG Headquarters in Lake Forest, California to insure you get the most up-to-date REACh SVHC Declaration.
  REACh banned substance information (REACh Article 67) is also available upon request.

- This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control.

- To obtain additional technical information or to place an order for this product, please contact us. The information in this datasheet is provided by Global Power Technologies Group. GPTG reserves the right to make changes, corrections, modifications, and improvements of datasheet without notice.