STARPOWER

SEMICONDUCTOR **IGBT**

GD100FFT120C6S_G8

Molding Type Module

1200V/100A 6 in one-package

General Description

STARPOWER IGBT Power Module provides ultra low conduction loss as well as short circuit ruggedness. They are designed for the applications such as general inverters and UPS.

Features

- Low $V_{CE(sat)}$ Trench IGBT technology
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Maximum junction temperature 175℃
- Low inductance case
- Fast & soft reverse recovery anti-parallel FWD
- Isolated copper baseplate using DBC technology

Typical Applications

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

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Description	GD100FFT120C6S_G8	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±30	V
I_C	Collector Current @ T_C=25℃ @ T_C=100℃	160 100	A
I_{CM}	Pulsed Collector Current t_p=1ms	200	A
I_F	Diode Continuous Forward Current	100	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	200	A
P_D	Maximum Power Dissipation @ T_j=175℃	534	W
T_{jmax}	Maximum Junction Temperature	175	℃
T_{jop}	Operating Junction Temperature	-40 to +150	℃
T_{STG}	Storage Temperature Range	-40 to +125	℃
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	4000	V
M	Mounting Torque, Screw M6	3.0 to 6.0	N.m

Electrical Characteristics of IGBT T_C=25℃ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	T_j=25℃	1200			V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25℃			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25℃			400	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=4.0mA,V_{CE}=V_{GE}, T_j=25℃	5.0	5.7	6.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=100A,V_{GE}=15V, T_j=25℃		1.70	2.15	V
		I_C=100A,V_{GE}=15V, T_j=125℃		1.95		

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=4.7Ω,V_{GE}=±15V, T_j=25℃		280		ns
t_r	Rise Time			54		ns
$t_{d(off)}$	Turn-Off Delay Time			31		ns
t_f	Fall Time			232		ns
E_{on}	Turn-On Switching Loss			3.50		mJ
E_{off}	Turn-Off Switching Loss			7.35		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=100A, R_G=4.7Ω,V_{GE}=±15V, T_j=125℃		281		ns
t_r	Rise Time			56		ns
$t_{d(off)}$	Turn-Off Delay Time			33		ns
t_f	Fall Time			379		ns
E_{on}	Turn-On Switching Loss			5.15		mJ
E_{off}	Turn-Off Switching Loss			11.3		mJ
C_{ies}	Input Capacitance	V_{CE}=30V,f=1Mhz, V_{GE}=0V		9.10		nF
C_{res}	Reverse Transfer Capacitance			0.28		nF
Q_G	Gate Charge	V_{CC}=600V,I_C=100A, V_{GE}=15V		0.60		μC
R_{Gint}	Internal Gate Resistor			2.0		Ω
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=125℃,V_{CC}=900V, V_{CEM}≤1200V		400		A
L_{CE}	Stray Inductance			21		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip			1.80		mΩ

Electrical Characteristics of Diode T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=100A, V_{GE}=0V	T_j=25℃		1.65	2.10	V
			T_j=125℃		1.65		
Q_r	Recovered Charge	I_F=100A, V_R=600V, R_G=4.7Ω, V_{GE}=-15V	T_j=25℃		7.7		μC
			T_j=125℃		14.6		
I_{RM}	Peak Reverse Recovery Current		T_j=25℃		98		A
			T_j=125℃		117		
E_{rec}	Reverse Recovery Energy		T_j=25℃		4.36		mJ
			T_j=125℃		7.74		

Electrical Characteristics of NTC T_C=25℃ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
R_{25}	Rated Resistance			5.0		kΩ
ΔR/R	Deviation of R_{100}	R_{100}=493.3Ω	-5		5	%
P_{25}	Power Dissipation				20.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (per IGBT)		0.281	K/W
$R_{\theta JC}$	Junction-to-Case (per Diode)		0.452	K/W
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied)	0.009		K/W
Weight	Weight of Module	300		g

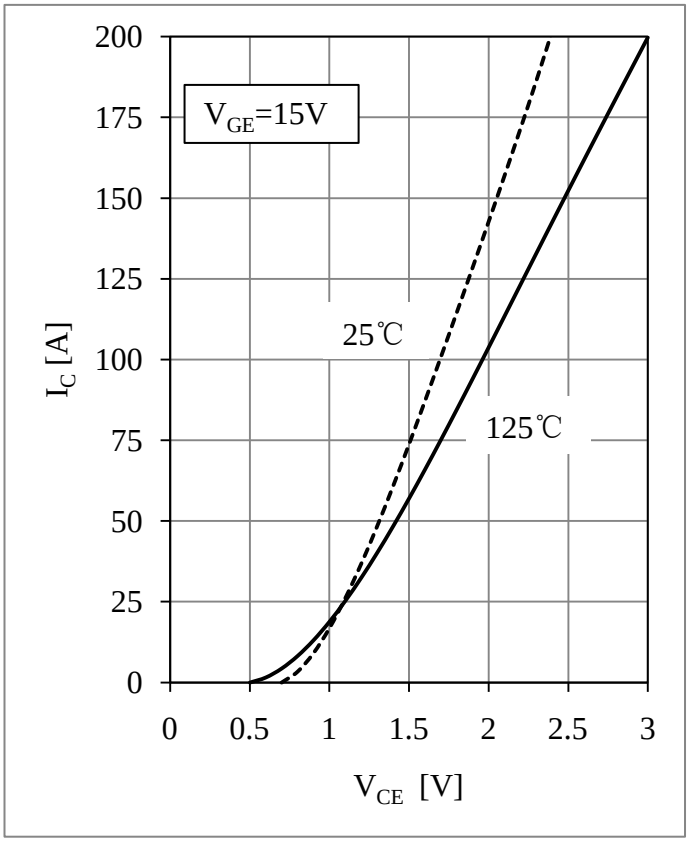


Fig 1. IGBT Output Characteristics

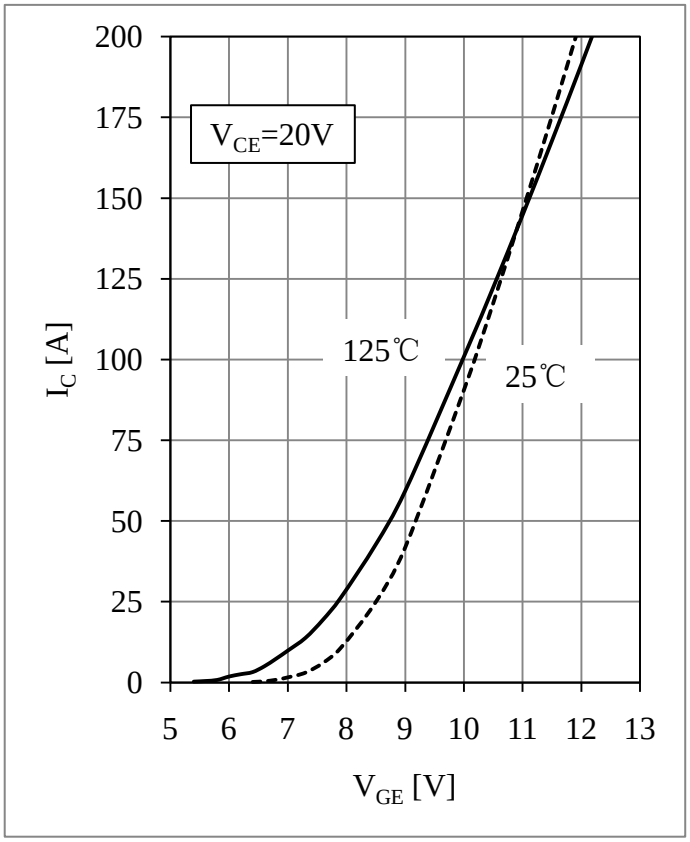


Fig 2. IGBT Transfer Characteristics

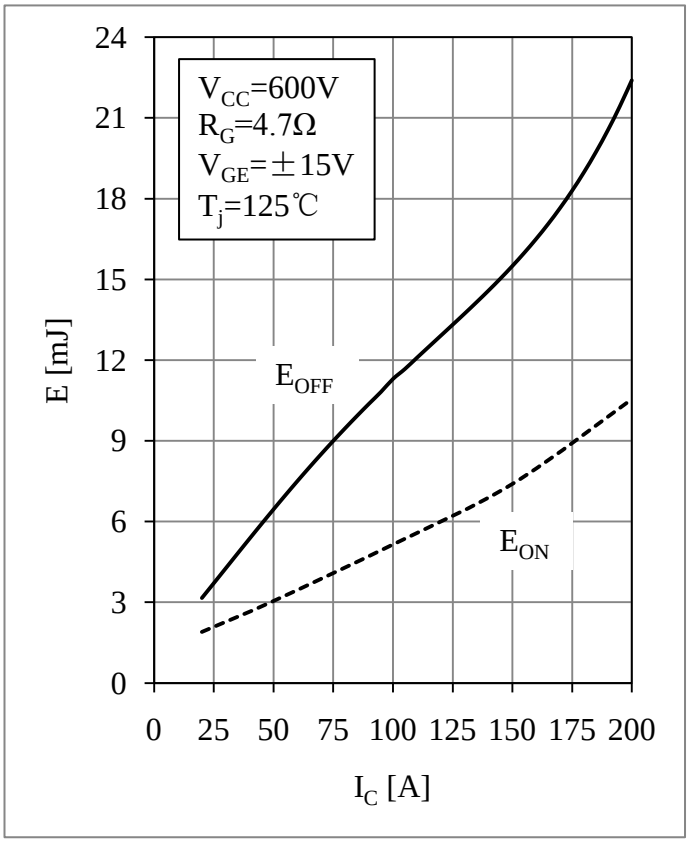


Fig 3. IGBT Switching Loss vs. I_C

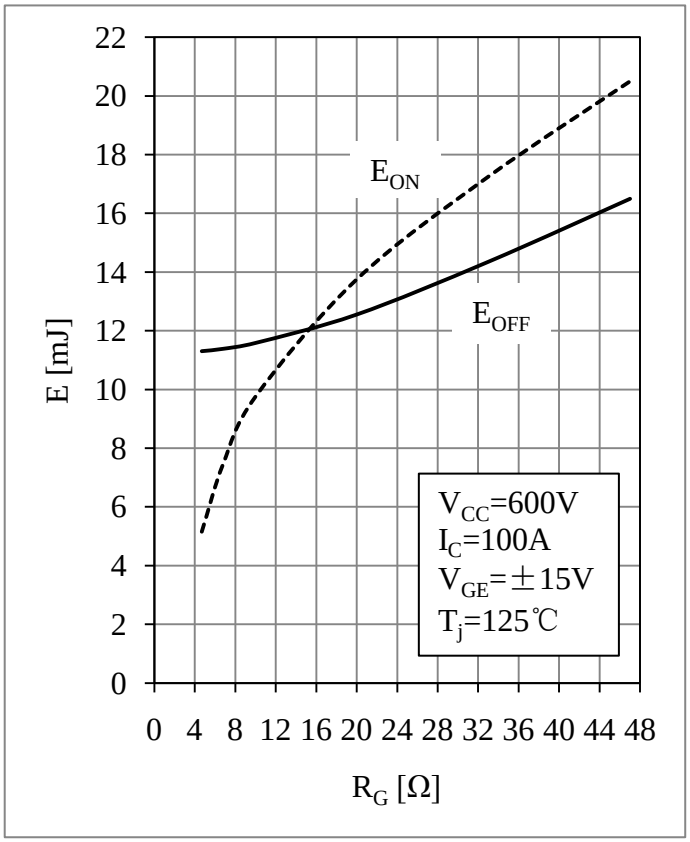


Fig 4. IGBT Switching Loss vs. R_G

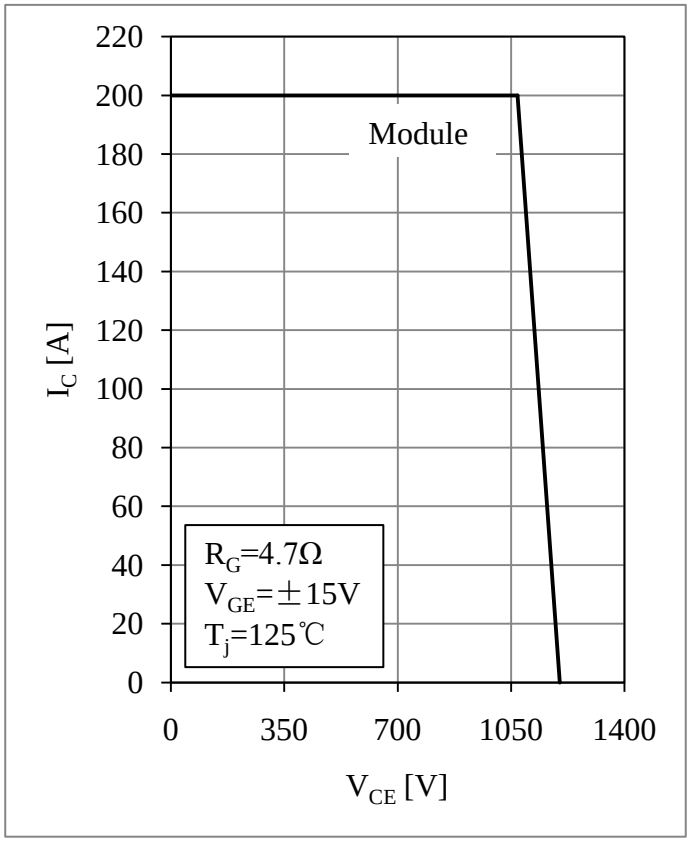


Fig 5. RBSOA

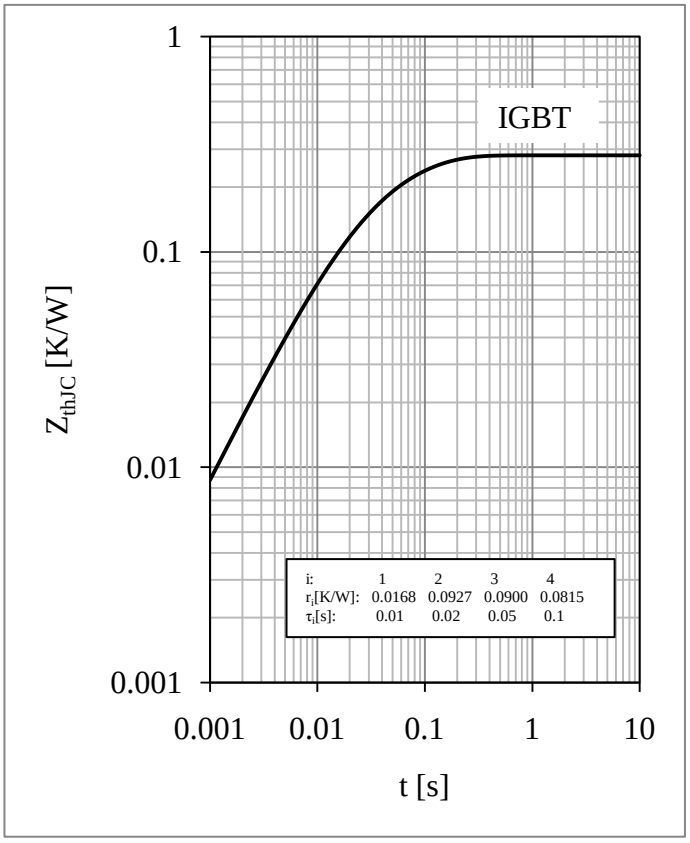


Fig 6. IGBT Transient Thermal Impedance

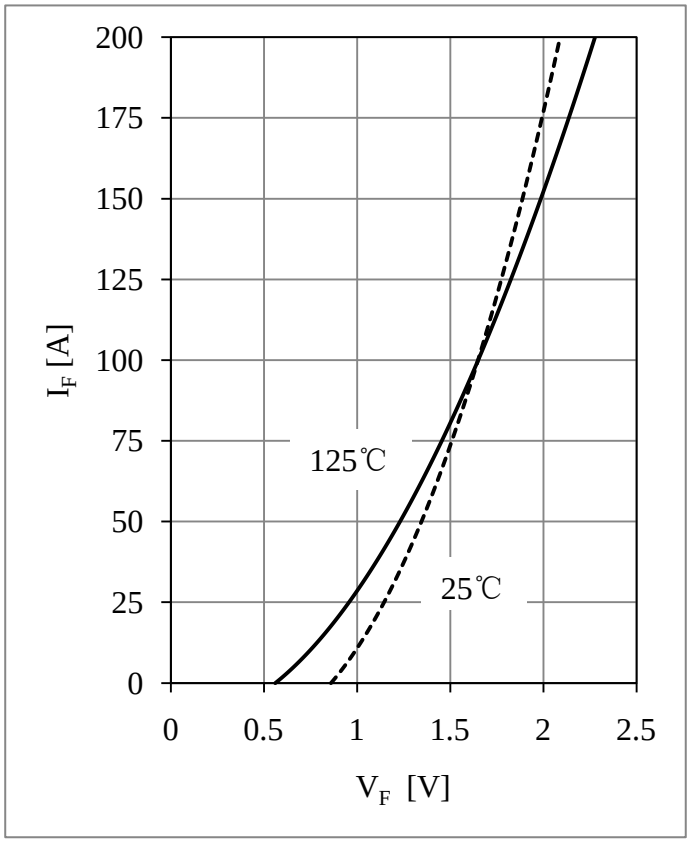


Fig 7. Diode Forward Characteristics

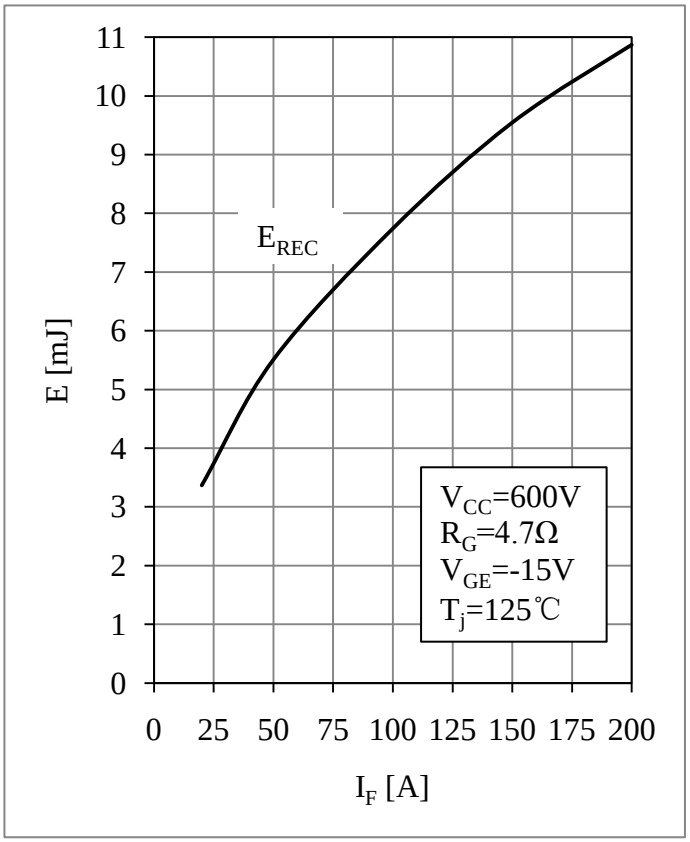


Fig 8. Diode Switching Loss vs. I_F

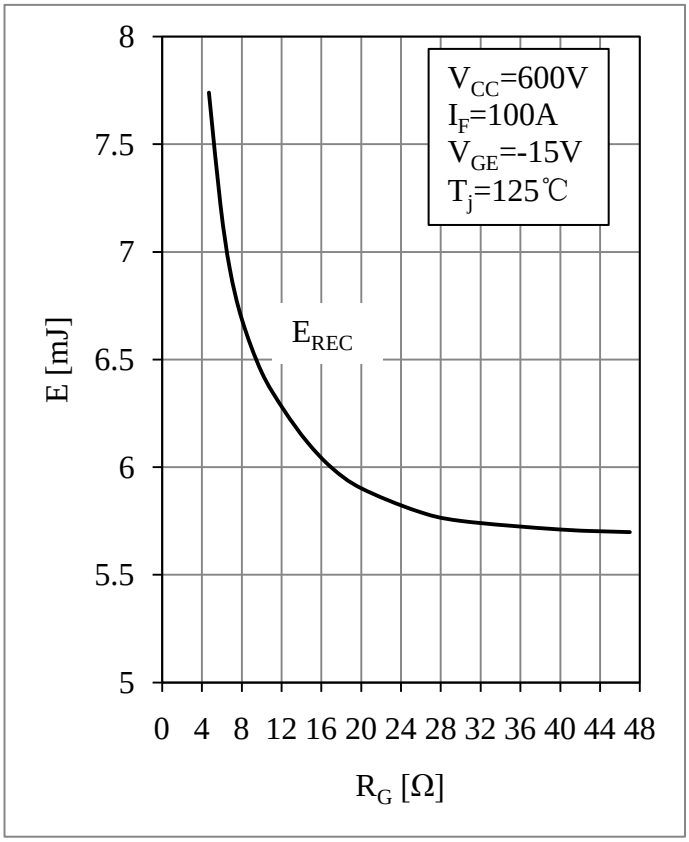


Fig 9. Diode Switching Loss vs. R_G

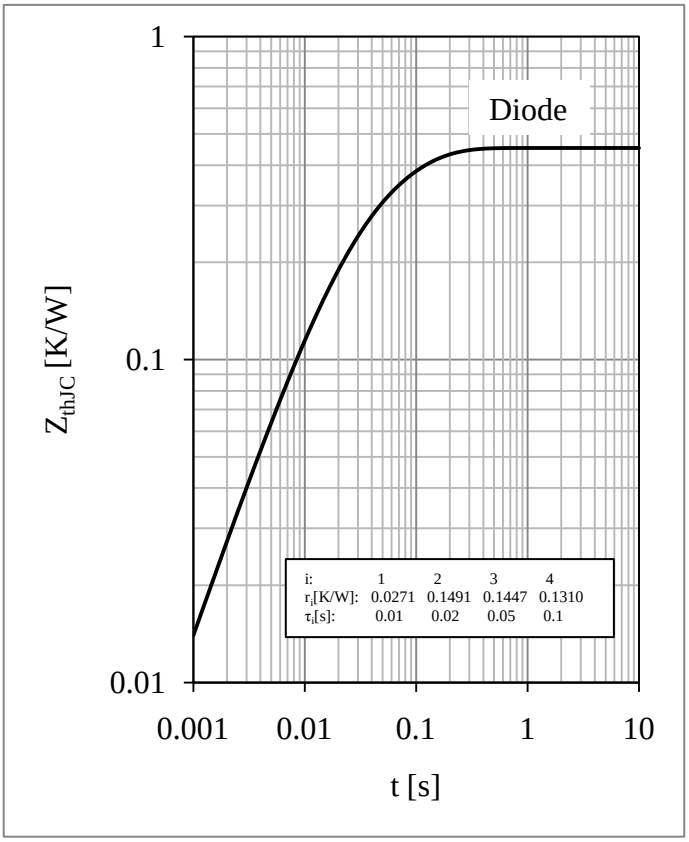


Fig 10. Diode Transient Thermal Impedance

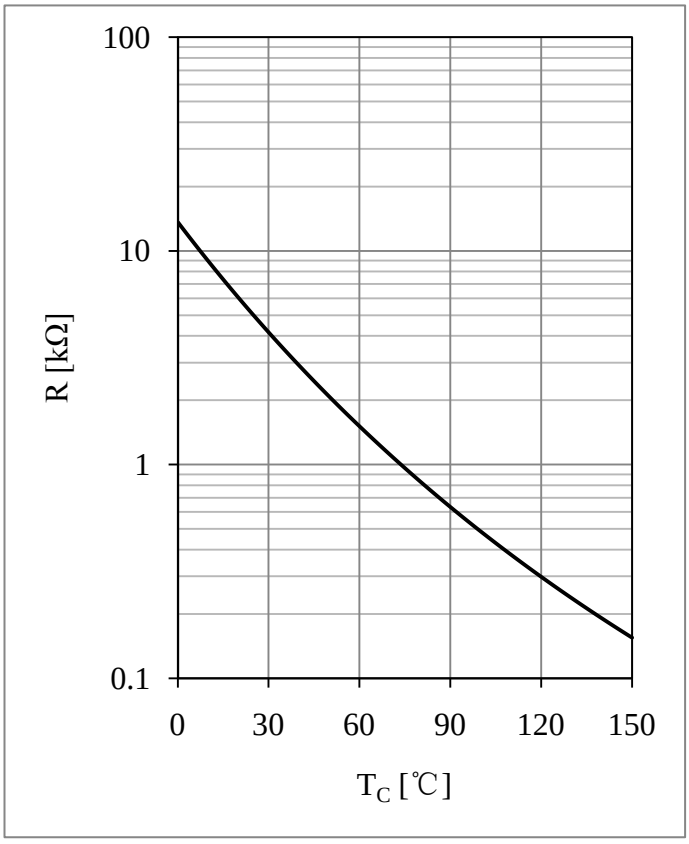
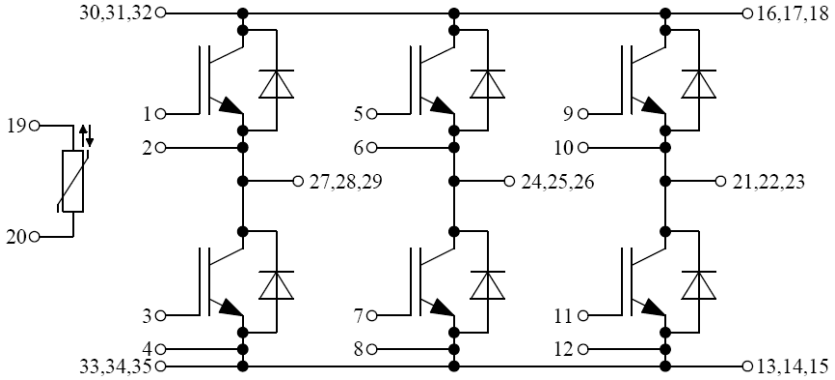


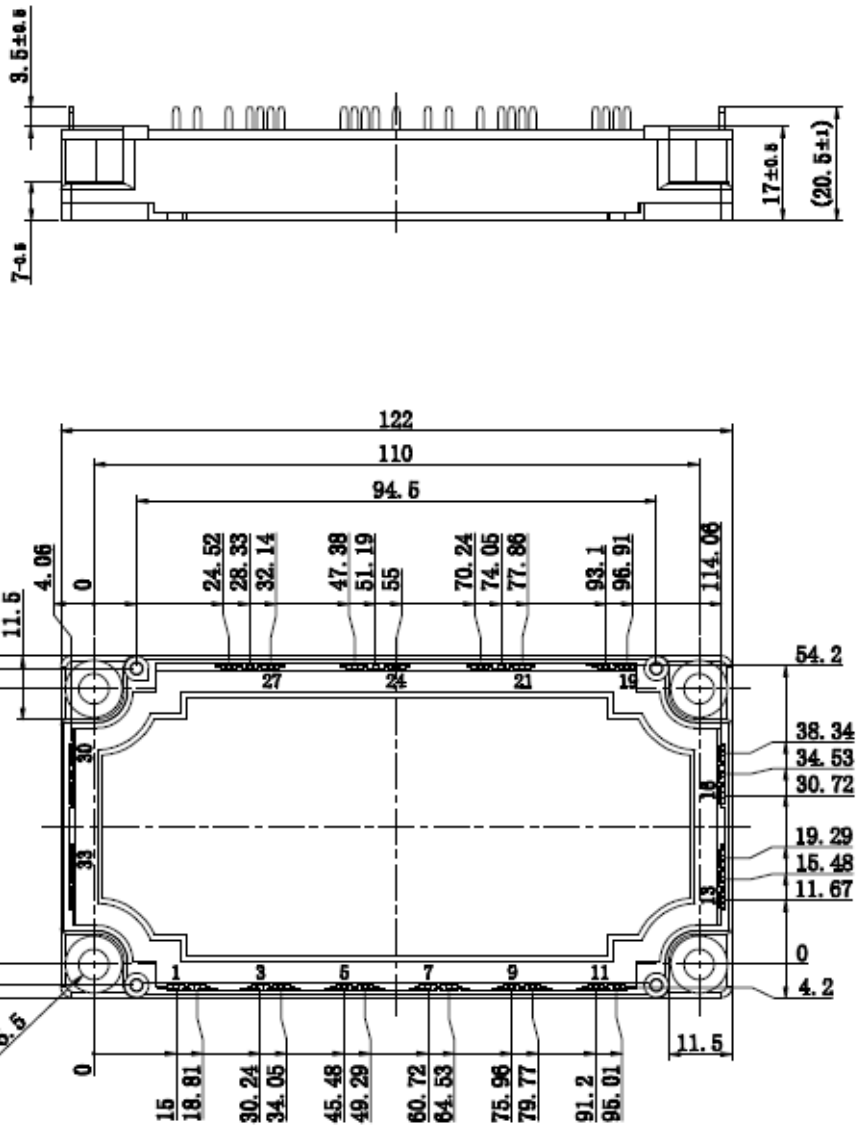
Fig 11. NTC-Temperature Characteristic

Equivalent Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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