STARPOWER

SEMICONDUCTOR **IGBT**

GD200CLK120C2S

1200V/200A chopper in one-package

General Description

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

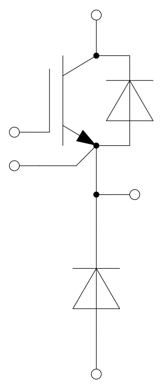
Features

- NPT IGBT technology
- Low switching loss
- 10μs short circuit capability
- $V_{CE(sat)}$ with positive temperature coefficient
- Fast & soft reverse recovery anti-parallel FW*D*
- Isolated copper baseplate using DBC technology

Typical Applications

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

Equivalent Circuit Schematic



Absolute Maximum Ratings T_C=25°C unless otherwise noted

IGBT

Symbol	Description	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Collector Current @ T_C=25°C @ T_C=80°C	340 200	A
I_{CM}	Pulsed Collector Current t_p=1ms	400	A
P_D	Maximum Power Dissipation @ T_j=150°C	1359	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Diode Maximum Forward Current t_p=1ms	400	A

Module

Symbol	Description	Value	Unit
T_{jmax}	Maximum Junction Temperature	150	°C
T_{jop}	Operating Junction Temperature	-40 to +125	°C
T_{STG}	Storage Temperature Range	-40 to +125	°C
V_{ISO}	Isolation Voltage RMS,f=50Hz,t=1min	2500	V

IGBT Characteristics T_C=25^{o}C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C=100A,V_{GE}=15V, T_j=25^{o}C		2.15	2.60	V
		I_C=100A,V_{GE}=15V, T_j=125^{o}C		2.65		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C=2.0mA,V_{CE}=V_{GE}, T_j=25^{o}C	4.8	5.7	6.3	V
I_{CES}	Collector Cut-Off Current	V_{CE}=V_{CES},V_{GE}=0V, T_j=25^{o}C			5.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=V_{GES},V_{CE}=0V, T_j=25^{o}C			400	nA
C_{ies}	Input Capacitance	V_{CE}=30V,f=1MHz, V_{GE}=0V		/		nF
C_{res}	Reverse Transfer Capacitance			/		nF
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=200A, R_G=5.1Ω,V_{GE}=±15V, T_j=25^{o}C		373		ns
t_r	Rise Time			104		ns
$t_{d(off)}$	Turn-Off Delay Time			459		ns
t_f	Fall Time			168		ns
E_{on}	Turn-On Switching Loss			12.9		mJ
E_{off}	Turn-Off Switching Loss			17.1		mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC}=600V,I_C=200A, R_G=5.1Ω,V_{GE}=±15V, T_j=125^{o}C		373		ns
t_r	Rise Time			105		ns
$t_{d(off)}$	Turn-Off Delay Time			475		ns
t_f	Fall Time			197		ns
E_{on}	Turn-On Switching Loss			17.4		mJ
E_{off}	Turn-Off Switching Loss			23.7		mJ
I_{SC}	SC Data	t_P≤10μs,V_{GE}=15V, T_j=125^{o}C,V_{CC}=900V, V_{CEM}≤1200V		1500		A

Diode Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=100A,V_{GE}=0V,T_j=25°C		1.65	2.05	V
		I_F=100A,V_{GE}=0V,T_j=125°C		1.65		
Q_r	Recovered Charge	V_R=600V,I_F=200A, R_G=5.1Ω,V_{GE}=-15V T_j=25°C		17.7		μC
I_{RM}	Peak Reverse Recovery Current			145		A
E_{rec}	Reverse Recovery Energy			8.06		mJ
Q_r	Recovered Charge	V_R=600V,I_F=200A, R_G=5.1Ω,V_{GE}=-15V T_j=125°C		34.0		μC
I_{RM}	Peak Reverse Recovery Current			190		A
E_{rec}	Reverse Recovery Energy			16.7		mJ

Module Characteristics T_C=25°C unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance			20	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		0.35		mΩ
R_{thJC}	Junction-to-Case (per IGBT) Junction-to-Case (per Diode)			0.092 0.219	K/W
R_{thCH}	Case-to-Heatsink (per IGBT) Case-to-Heatsink (per Diode) Case-to-Heatsink (per Module)		0.018 0.044 0.010		K/W
M	Terminal Connection Torque, Screw M6 Mounting Torque, Screw M6	2.5 3.0		5.0 5.0	N.m
G	Weight of Module		300		g

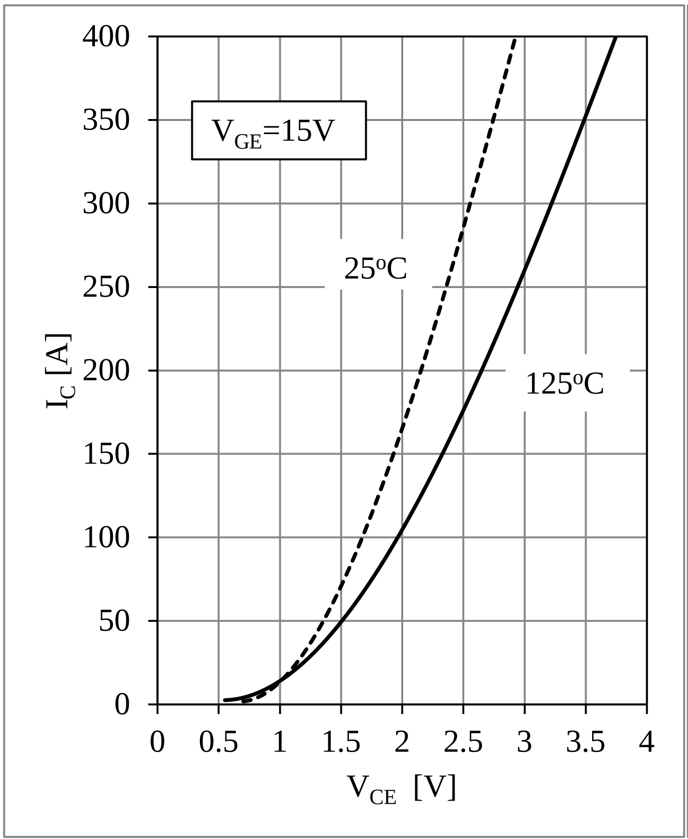


Fig 1. IGBT Output Characteristics

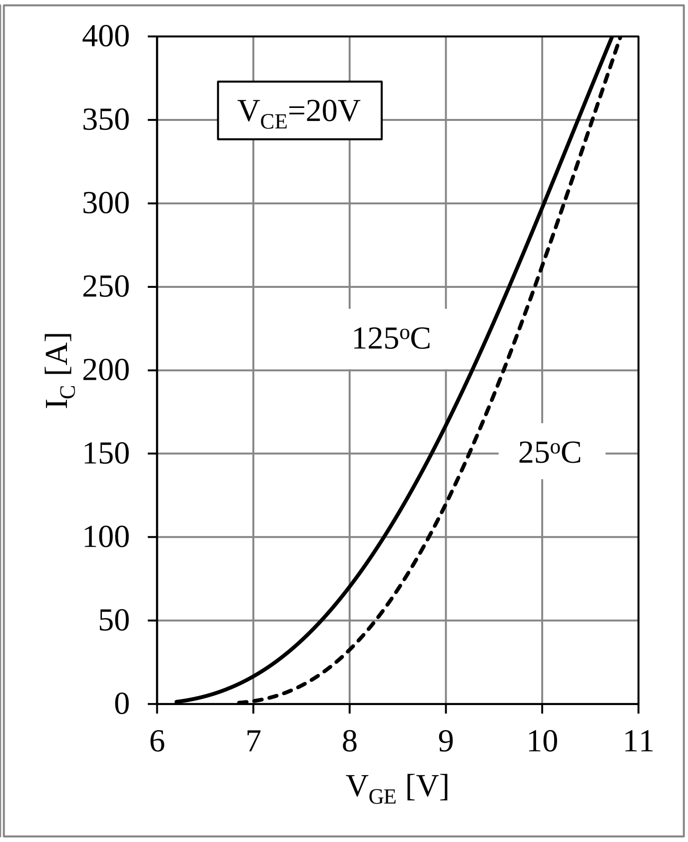


Fig 2. IGBT Transfer Characteristics

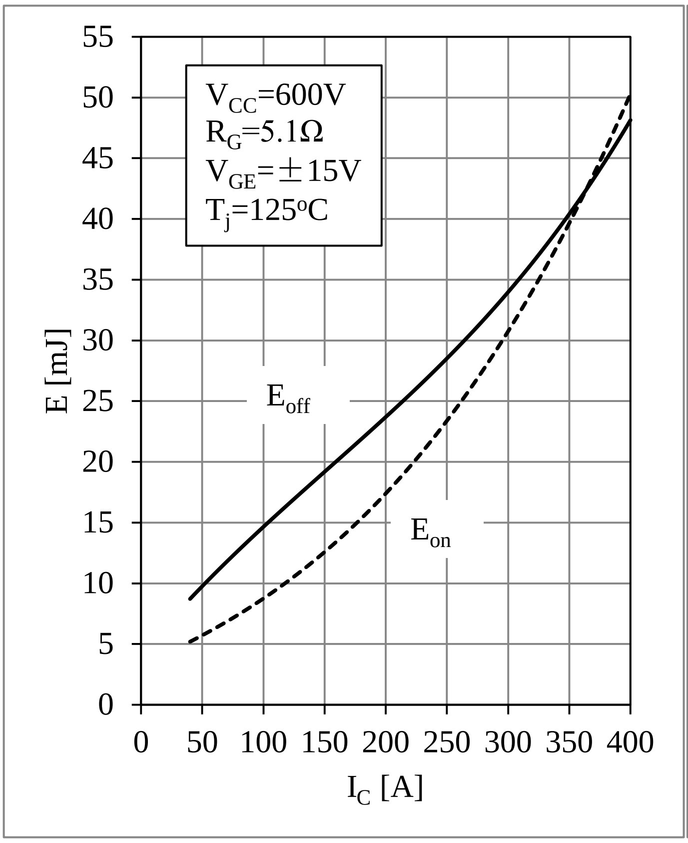


Fig 3. IGBT Switching Loss vs. I_C

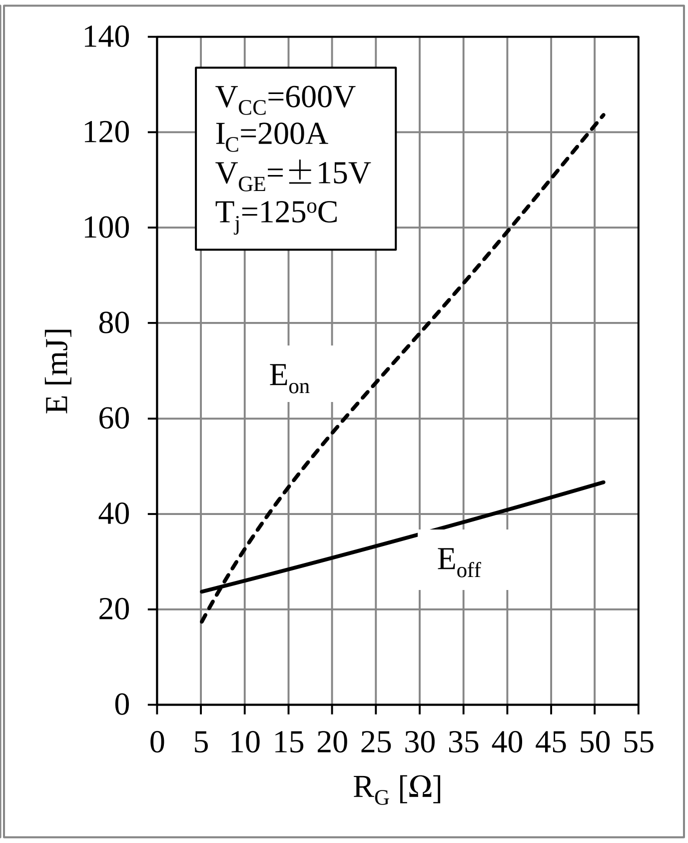


Fig 4. IGBT Switching Loss vs. R_G

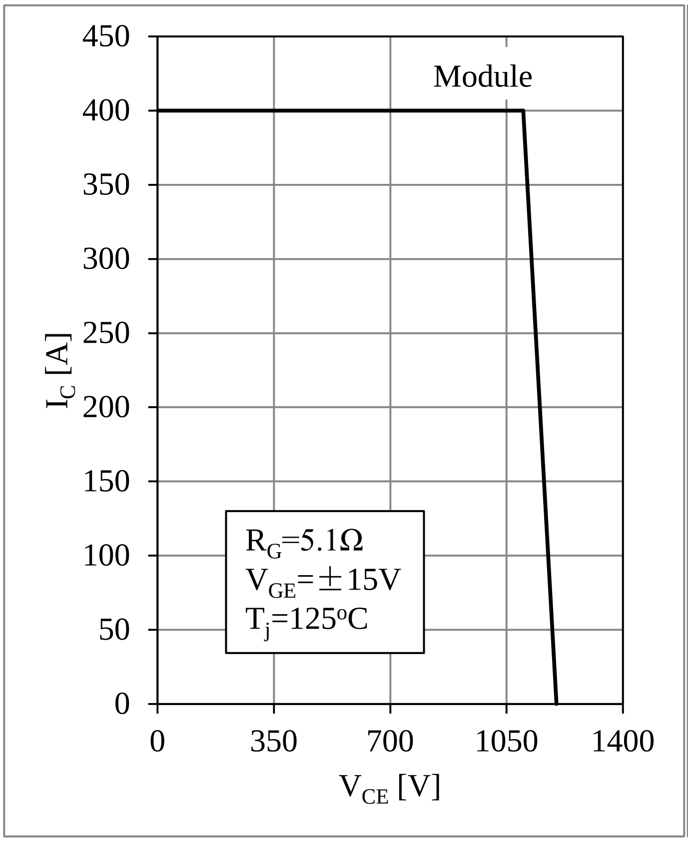


Fig 5. RBSOA

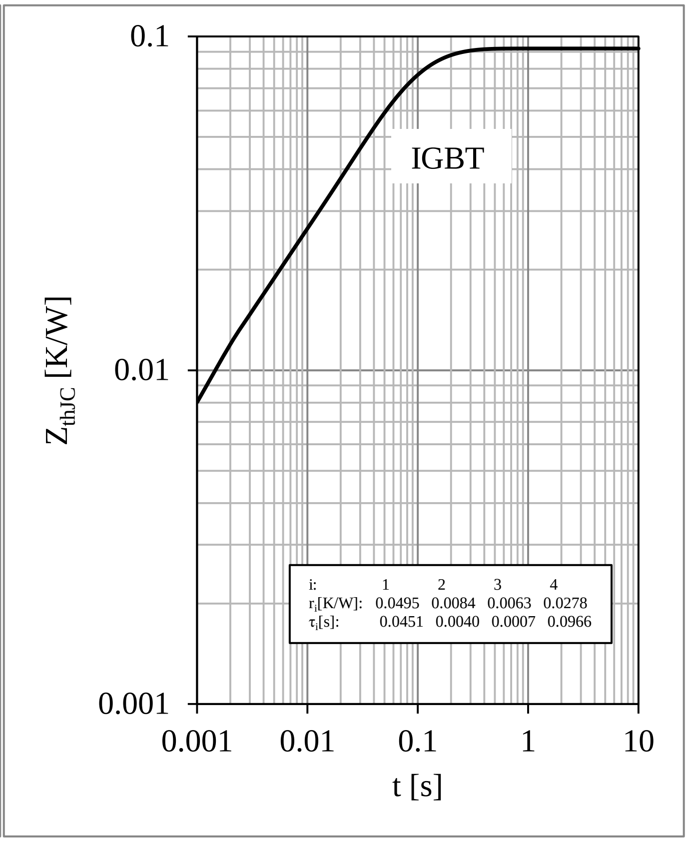


Fig 6. IGBT Transient Thermal Impedance

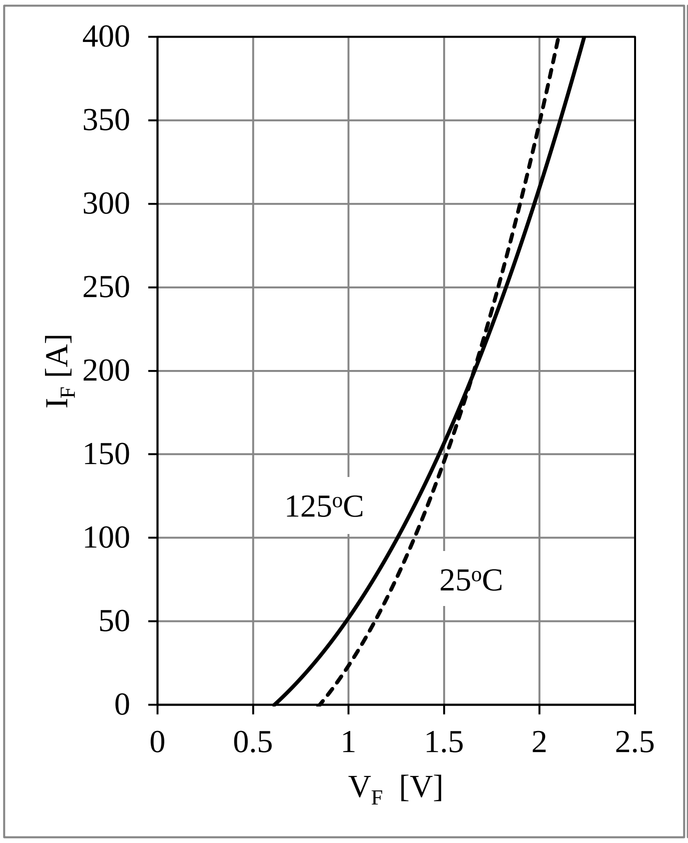


Fig 7. Diode Forward Characteristics

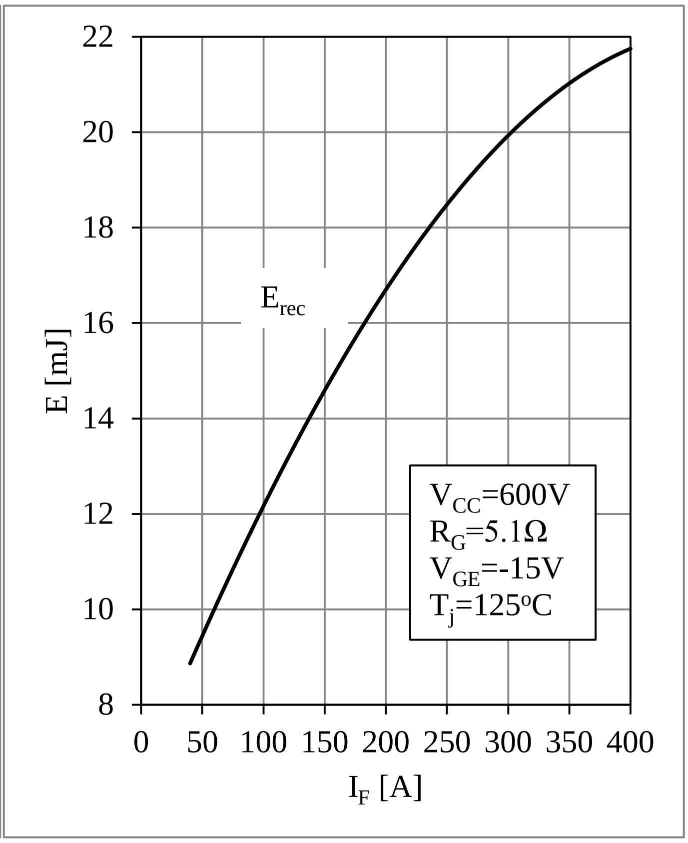


Fig 8. Diode Switching Loss vs. I_F

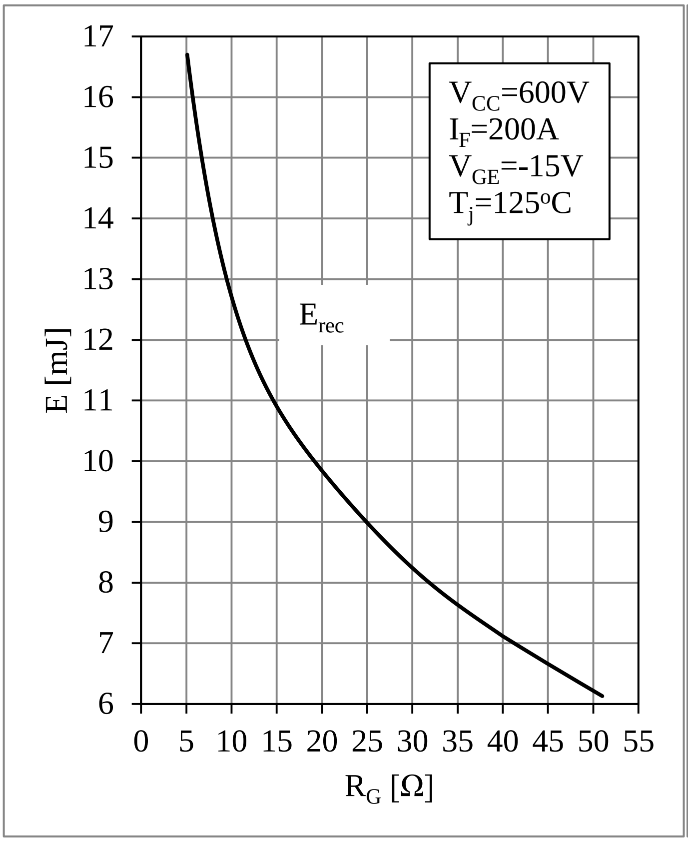


Fig 9. Diode Switching Loss vs. R_G

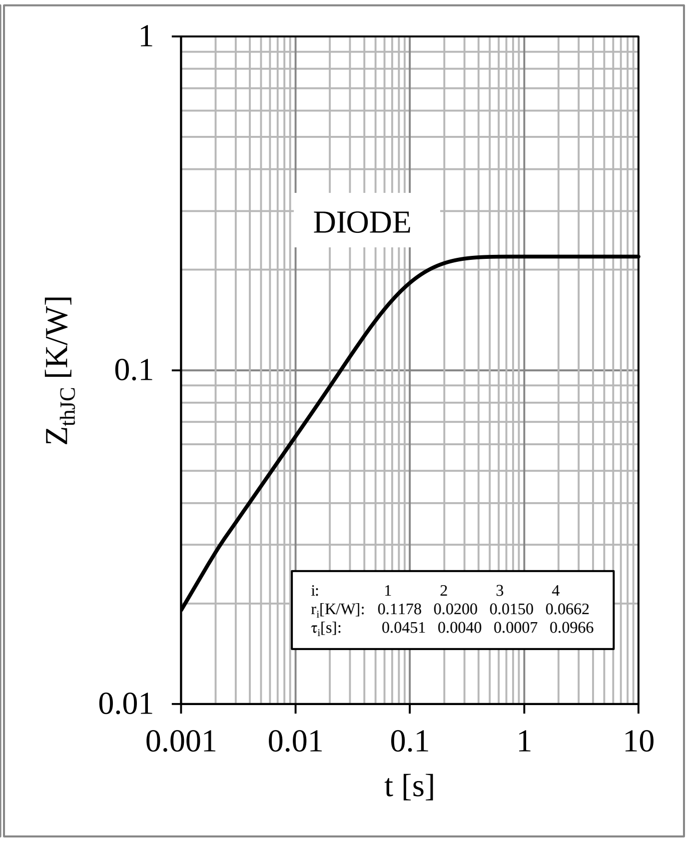
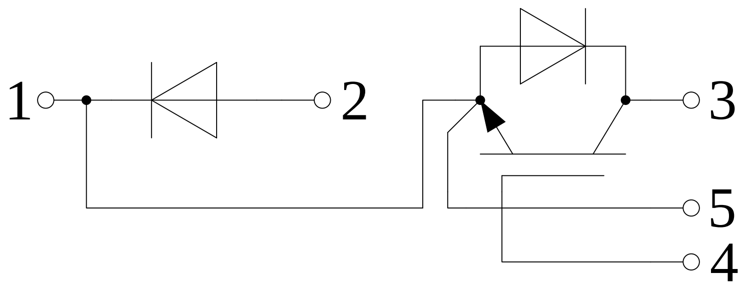


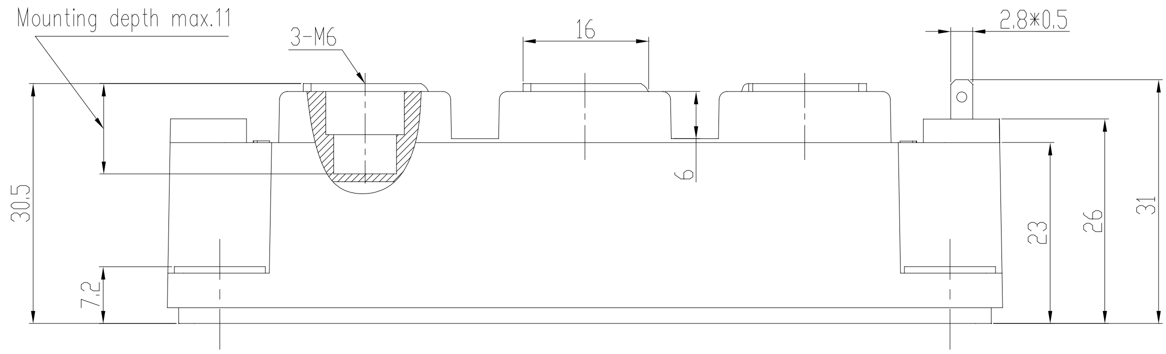
Fig 10. Diode Transient Thermal Impedance

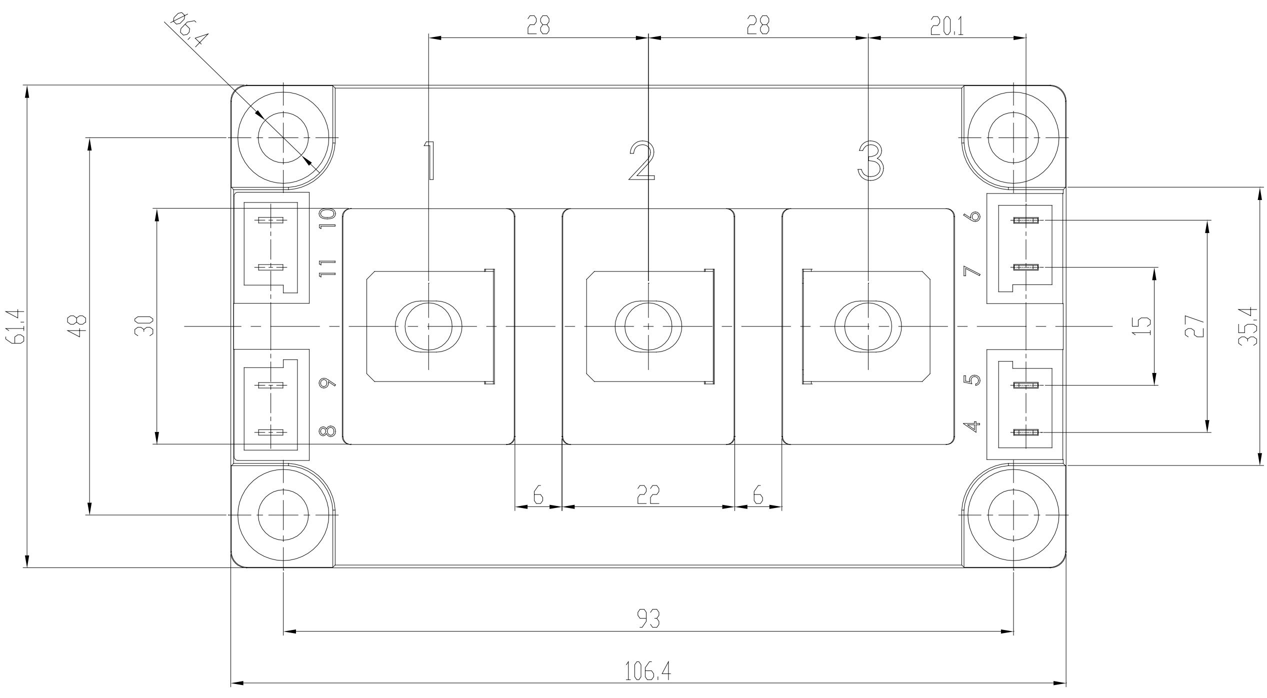
Circuit Schematic



Package Dimensions

Dimensions in Millimeters





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