

Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ 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 @ $T_C=25^{\circ}\text{C}$	413	A
	@ $T_C=70^{\circ}\text{C}$	300	
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	600	A
P_D	Maximum Power Dissipation @ $T_{vj}=150^{\circ}\text{C}$	2118	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	300	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	600	A

Module

Symbol	Description	Value	Unit
T_{vjmax}	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{vjop}	Operating Junction Temperature	-40 to +125	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	2500	V

IGBT Characteristics $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	$I_C=300\text{A}, V_{GE}=15\text{V}, T_{vj}=25^\circ\text{C}$		3.00	3.45	V	
		$I_C=300\text{A}, V_{GE}=15\text{V}, T_{vj}=125^\circ\text{C}$		3.80			
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=3.0\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^\circ\text{C}$	4.4	5.1	6.0	V	
I_{CES}	Collector Cut-Off Current	$V_{CE}=V_{CES}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$			5.0	mA	
I_{GES}	Gate-Emitter Leakage Current	$V_{GE}=V_{GES}, V_{CE}=0\text{V}, T_{vj}=25^\circ\text{C}$			400	nA	
R_{Gint}	Internal Gate Resistance			0.83		Ω	
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, f=1\text{MHz}, V_{GE}=0\text{V}$		20.0		nF	
C_{res}	Reverse Transfer Capacitance				1.40		nF
Q_G	Gate Charge	$V_{GE}=-15\dots+15\text{V}$		3.20		μC	
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600\text{V}, I_C=300\text{A}, R_G=3.0\Omega, L_s=42\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=25^\circ\text{C}$		58		ns	
t_r	Rise Time				85		ns
$t_{d(off)}$	Turn-Off Delay Time				380		ns
t_f	Fall Time				38		ns
E_{on}	Turn-On Switching Loss				34.6		mJ
E_{off}	Turn-Off Switching Loss				7.25		mJ
$t_{d(on)}$	Turn-On Delay Time		$V_{CC}=600\text{V}, I_C=300\text{A}, R_G=3.0\Omega, L_s=42\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=125^\circ\text{C}$		52		ns
t_r	Rise Time					84	
$t_{d(off)}$	Turn-Off Delay Time				411		ns
t_f	Fall Time				48		ns
E_{on}	Turn-On Switching Loss				42.7		mJ
E_{off}	Turn-Off Switching Loss				8.94		mJ
I_{SC}	SC Data	$t_p \leq 10\mu\text{s}, V_{GE}=15\text{V}, T_{vj}=125^\circ\text{C}, V_{CC}=800\text{V}, V_{CEM} \leq 1200\text{V}$		2000		A	

Diode Characteristics $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=300\text{A}, V_{GE}=0\text{V}, T_{vj}=25^\circ\text{C}$		1.70	2.25	V
		$I_F=300\text{A}, V_{GE}=0\text{V}, T_{vj}=125^\circ\text{C}$		1.70		
Q_r	Recovered Charge	$V_R=600\text{V}, I_F=300\text{A},$ $-di/dt=3010\text{A}/\mu\text{s}, V_{GE}=-15\text{V},$ $L_S=42\text{nH}, T_{vj}=25^\circ\text{C}$		25.8		μC
I_{RM}	Peak Reverse Recovery Current			197		A
E_{rec}	Reverse Recovery Energy			6.85		mJ
Q_r	Recovered Charge			46.4		μC
I_{RM}	Peak Reverse Recovery Current	$V_R=600\text{V}, I_F=300\text{A},$ $-di/dt=3140\text{A}/\mu\text{s}, V_{GE}=-15\text{V},$ $L_S=42\text{nH}, T_{vj}=125^\circ\text{C}$		251		A
E_{rec}	Reverse Recovery Energy			13.5		mJ

Module Characteristics $T_c=25^\circ\text{C}$ 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		m Ω
R_{thJC}	Junction-to-Case (per IGBT)			0.059	K/W
	Junction-to-Case (per Diode)			0.115	
R_{thCH}	Case-to-Heatsink (per IGBT)		0.030		K/W
	Case-to-Heatsink (per Diode)		0.059		
	Case-to-Heatsink (per Module)		0.010		
M	Terminal Connection Torque, Screw M6	2.5		5.0	N.m
	Mounting Torque, Screw M6	3.0		5.0	
G	Weight of Module		300		g

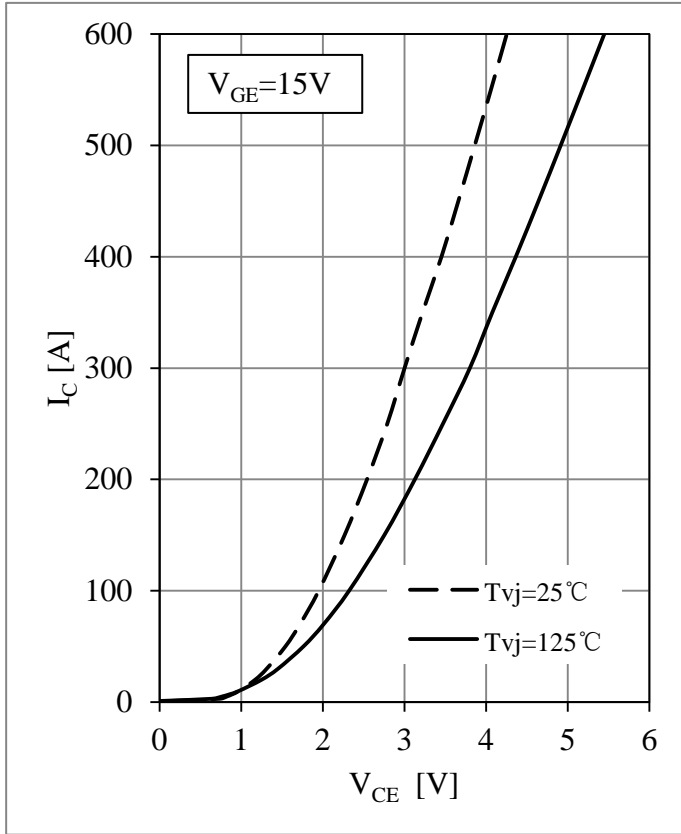


Fig 1. IGBT Output Characteristics

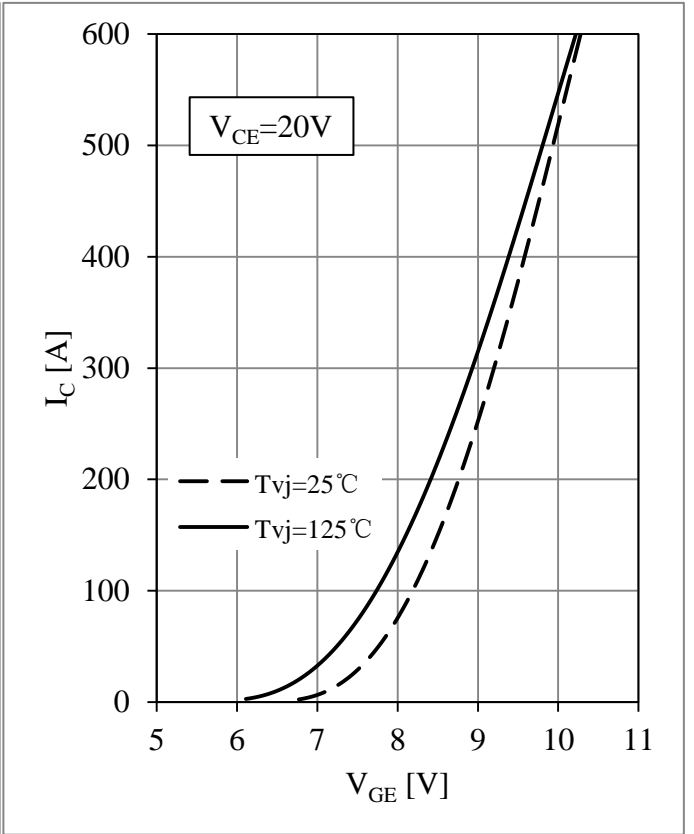


Fig 2. IGBT Transfer Characteristics

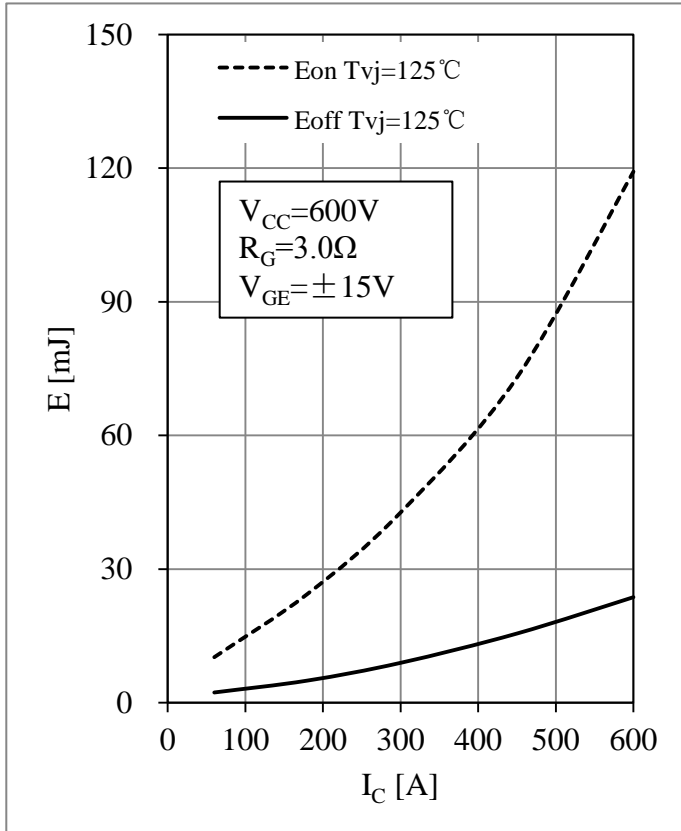


Fig 3. IGBT Switching Loss vs. I_C

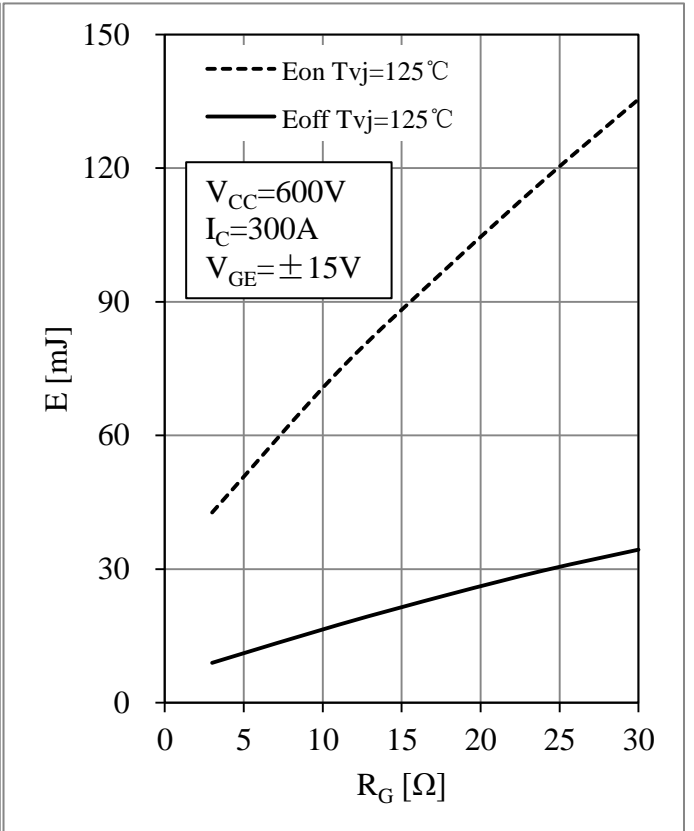


Fig 4. IGBT Switching Loss vs. R_G

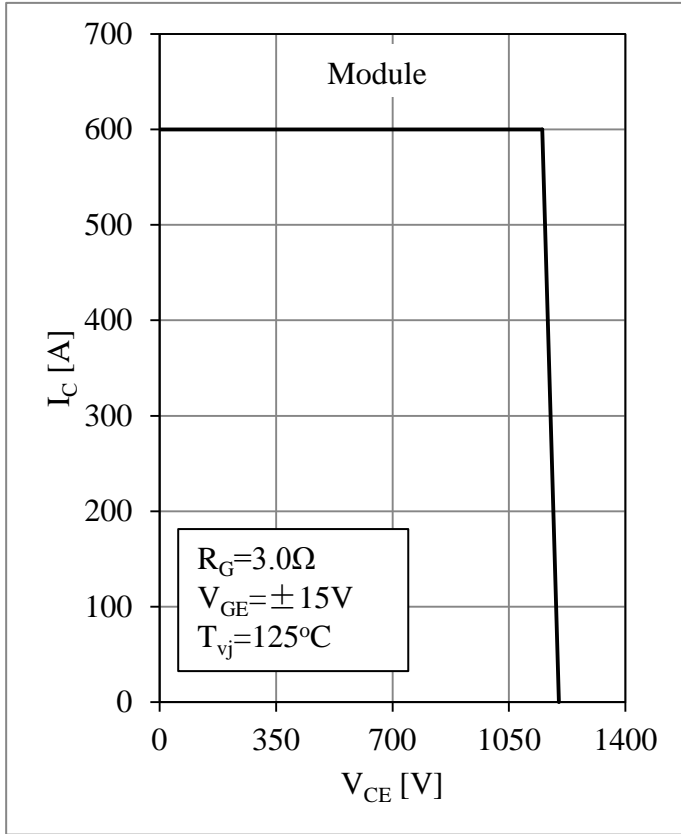


Fig 5. RBSOA

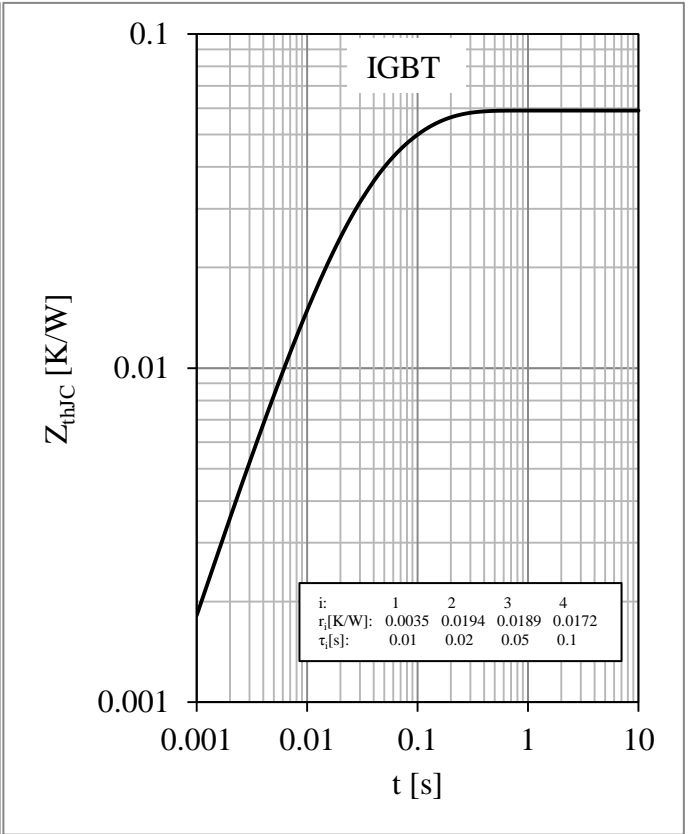


Fig 6. IGBT Transient Thermal Impedance

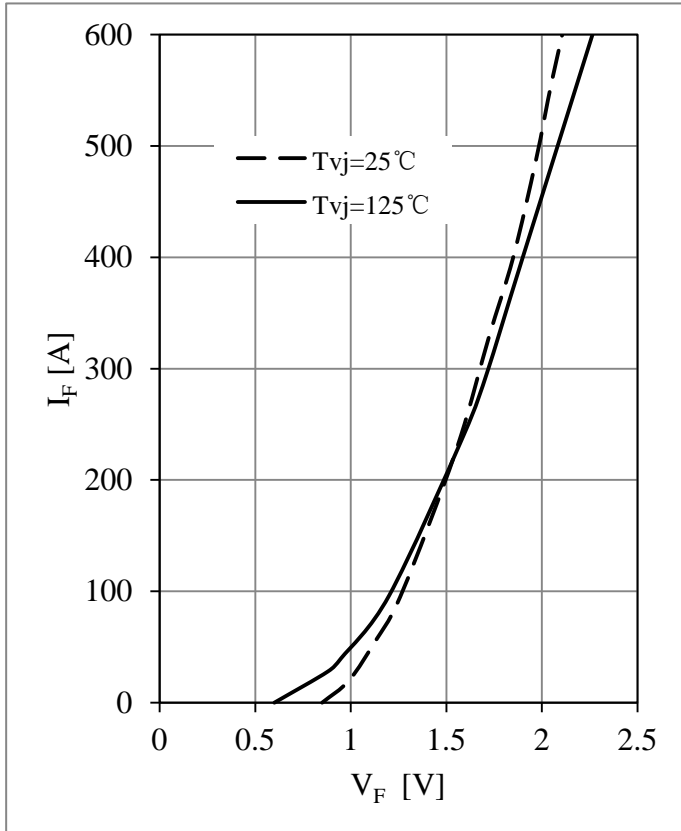


Fig 7. Diode Forward Characteristics

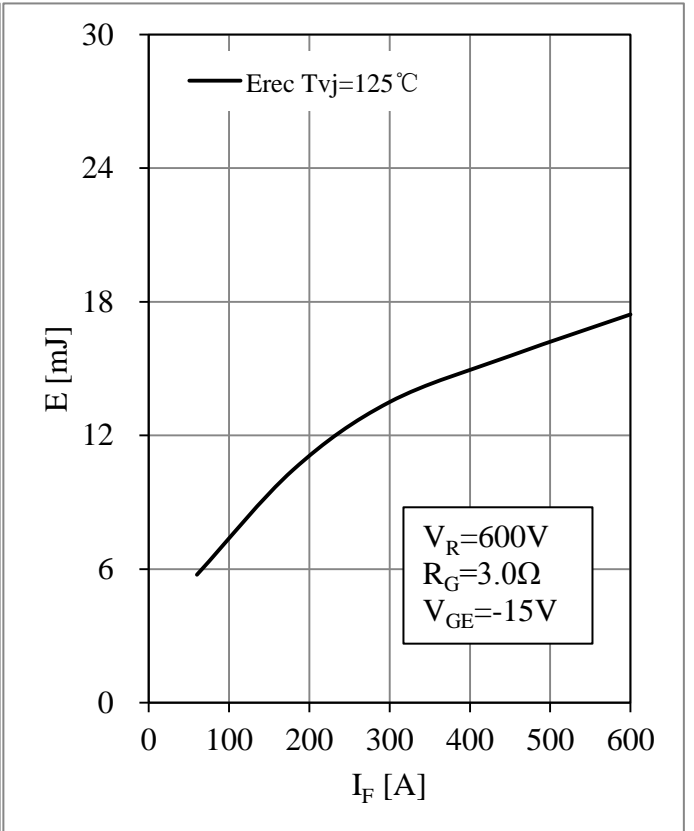


Fig 8. Diode Switching Loss vs. I_F

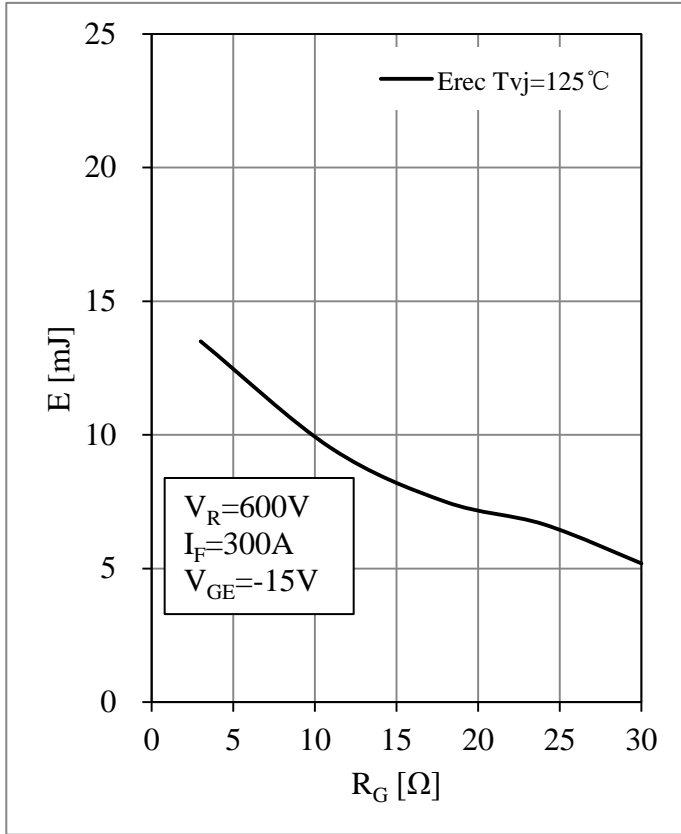


Fig 9. Diode Switching Loss vs. R_G

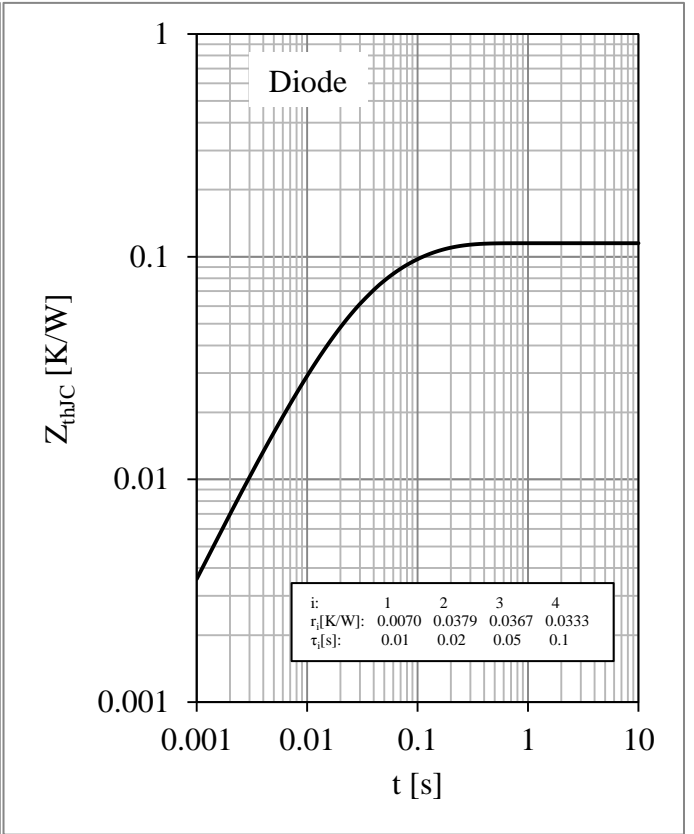
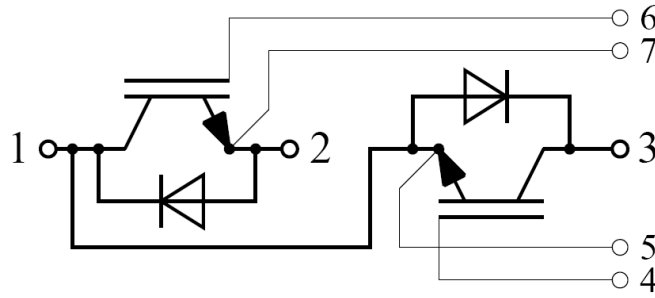


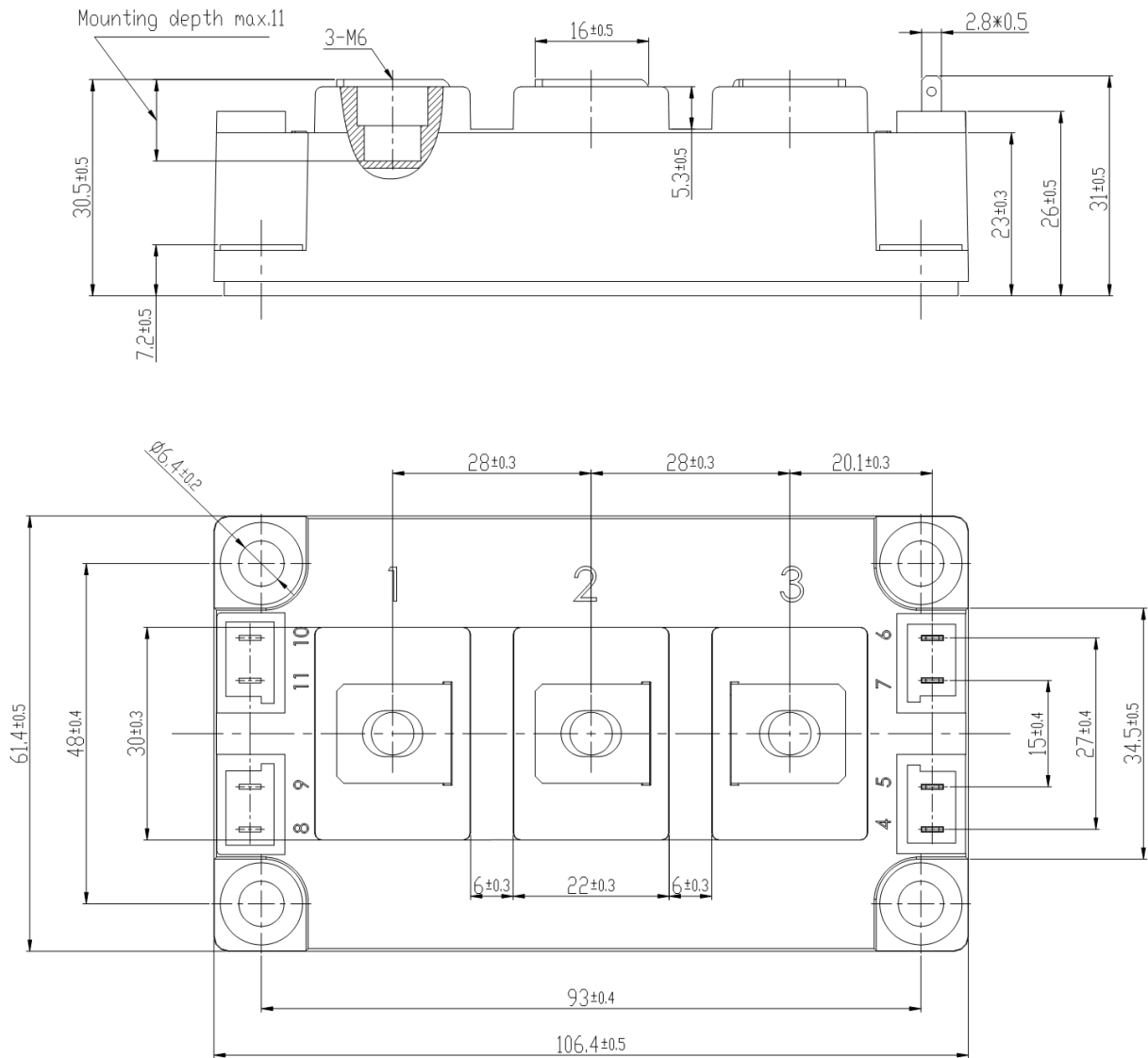
Fig 10. Diode Transient Thermal Impedance

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



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