

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 @ $T_C=25^{\circ}\text{C}$	519	A
	@ $T_C=60^{\circ}\text{C}$	400	A
I_{CM}	Pulsed Collector Current $t_p=1\text{ms}$	800	A
P_D	Maximum Power Dissipation @ $T_{vj}=150^{\circ}\text{C}$	2450	W

Diode

Symbol	Description	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	400	A
I_{FM}	Diode Maximum Forward Current $t_p=1\text{ms}$	800	A

Module

Symbol	Description	Value	Unit
T_{vjmax}	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{vioP}	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	$I_C=400\text{A}, V_{GE}=15\text{V}, T_{vj}=25^{\circ}\text{C}$		2.90	3.35	V
		$I_C=400\text{A}, V_{GE}=15\text{V}, T_{vj}=125^{\circ}\text{C}$		3.60		
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$I_C=16.0\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	4.5	5.5	6.5	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			0.6		Ω
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, f=1\text{MHz}, V_{GE}=0\text{V}$		26.0		nF
C_{res}	Reverse Transfer Capacitance			1.70		nF
Q_G	Gate Charge	$V_{GE}=-15\dots+15\text{V}$		4.2		μC
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600\text{V}, I_C=400\text{A}, R_G=2.2\Omega, L_S=30\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=25^{\circ}\text{C}$		252		ns
t_r	Rise Time			63		ns
$t_{d(off)}$	Turn-Off Delay Time			427		ns
t_f	Fall Time			44		ns
E_{on}	Turn-On Switching Loss			24.7		mJ
E_{off}	Turn-Off Switching Loss			16.5		mJ
$t_{d(on)}$	Turn-On Delay Time	$V_{CC}=600\text{V}, I_C=400\text{A}, R_G=2.2\Omega, L_S=30\text{nH}, V_{GE}=\pm 15\text{V}, T_{vj}=125^{\circ}\text{C}$		258		ns
t_r	Rise Time			65		ns
$t_{d(off)}$	Turn-Off Delay Time			465		ns
t_f	Fall Time			57		ns
E_{on}	Turn-On Switching Loss			35.2		mJ
E_{off}	Turn-Off Switching Loss			22.6		mJ
I_{SC}	SC Data	$t_P \leq 10\mu\text{s}, V_{GE}=15\text{V}, T_{vj}=125^{\circ}\text{C}, V_{CC}=800\text{V}, V_{CEM} \leq 1200\text{V}$		1600		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	$I_F=400\text{A}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$		1.85	2.30	V
		$I_F=400\text{A}, V_{GE}=0\text{V}, T_{vj}=125^{\circ}\text{C}$		1.90		
Q_r	Recovered Charge	$V_R=600\text{V}, I_F=400\text{A},$ $-di/dt=6540\text{A}/\mu\text{s}, L_S=30\text{nH},$ $V_{GE}=-15\text{V}, T_{vj}=25^{\circ}\text{C}$		38.9		μC
I_{RM}	Peak Reverse Recovery Current			401		A
E_{rec}	Reverse Recovery Energy			13.8		mJ
Q_r	Recovered Charge	$V_R=600\text{V}, I_F=400\text{A},$ $-di/dt=6300\text{A}/\mu\text{s}, L_S=30\text{nH},$ $V_{GE}=-15\text{V}, T_{vj}=125^{\circ}\text{C}$		68.0		μC
I_{RM}	Peak Reverse Recovery Current			444		A
E_{rec}	Reverse Recovery Energy			26.2		mJ

Module Characteristics $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Min.	Typ.	Max.	Unit
L_{CE}	Stray Inductance			30	nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal to Chip		0.35		m Ω
R_{thJC}	Junction-to-Case (per IGBT)			0.051	K/W
	Junction-to-Case (per Diode)			0.114	
R_{thCH}	Case-to-Heatsink (per IGBT)		0.029		K/W
	Case-to-Heatsink (per Diode)		0.065		
	Case-to-Heatsink (per Module)		0.010		
M	Terminal Connection Torque, Screw M5	2.5		5.0	N.m
	Mounting Torque, Screw M6	3.0		5.0	
G	Weight of Module		300		g

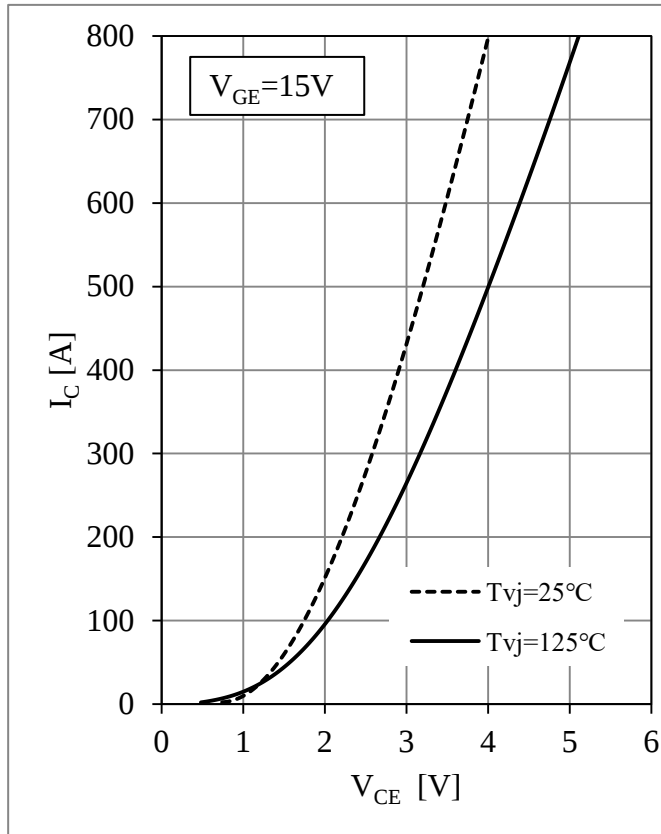


Fig 1. IGBT Output Characteristics

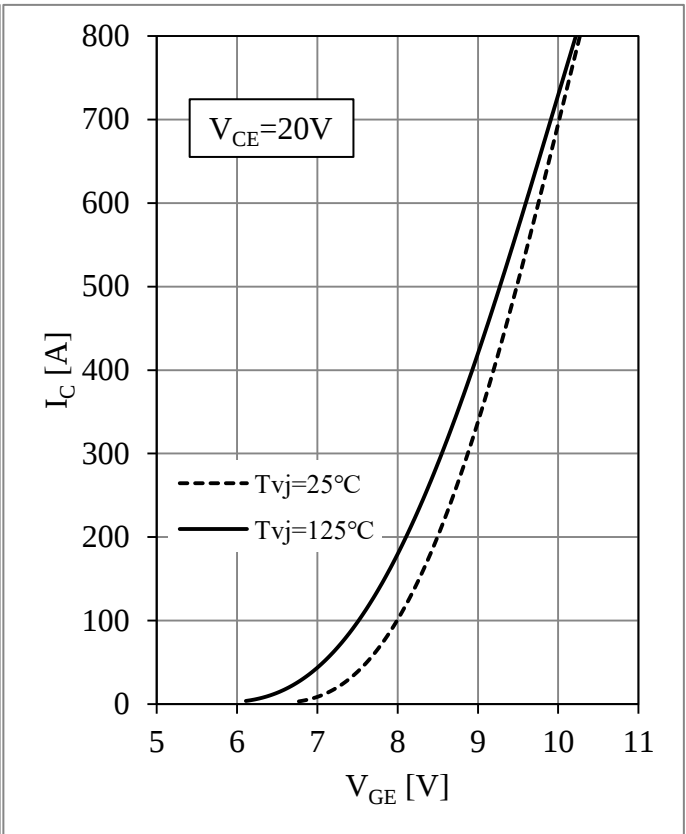
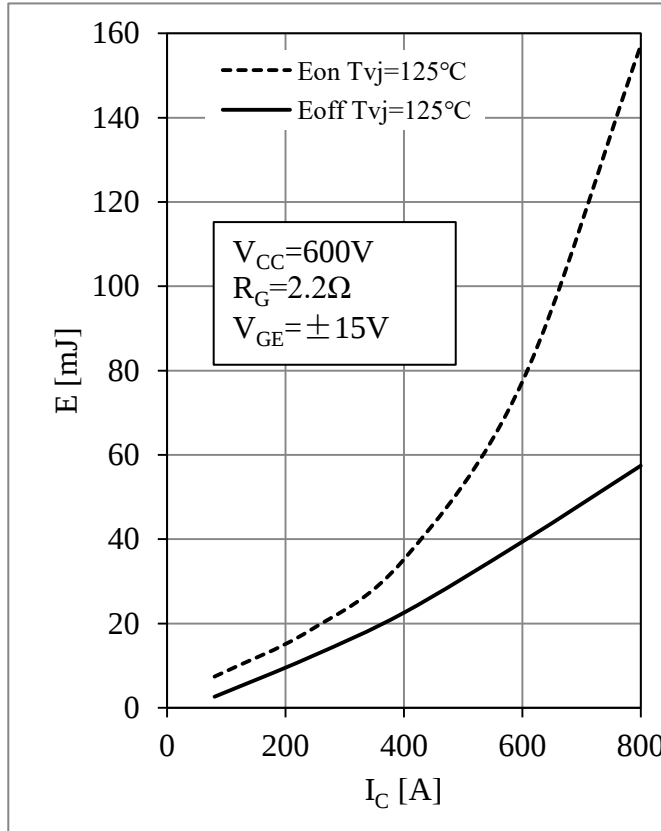
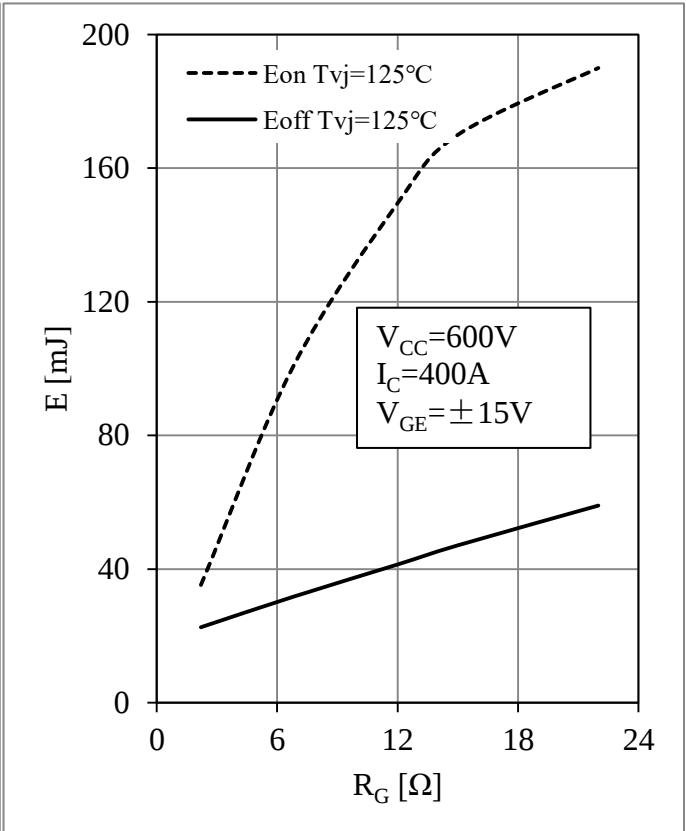


Fig 2. IGBT Transfer Characteristics

Fig 3. IGBT Switching Loss vs. I_C Fig 4. IGBT Switching Loss vs. R_G

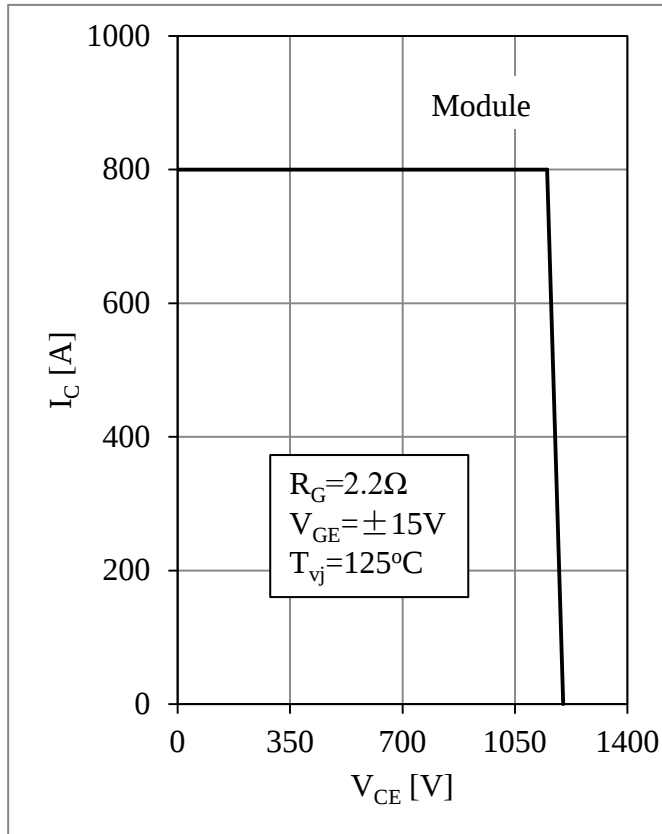


Fig 5. RBSOA

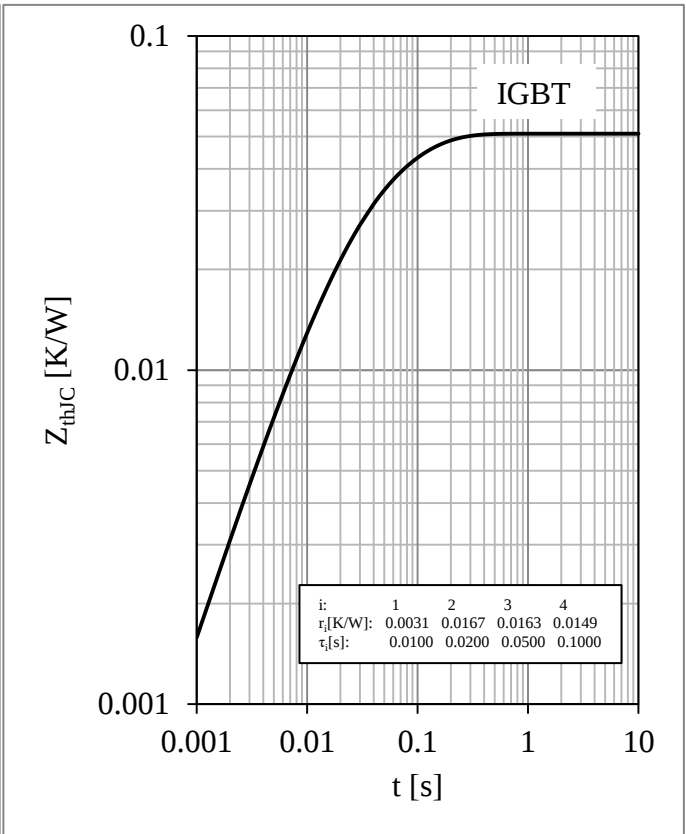


Fig 6. IGBT Transient Thermal Impedance

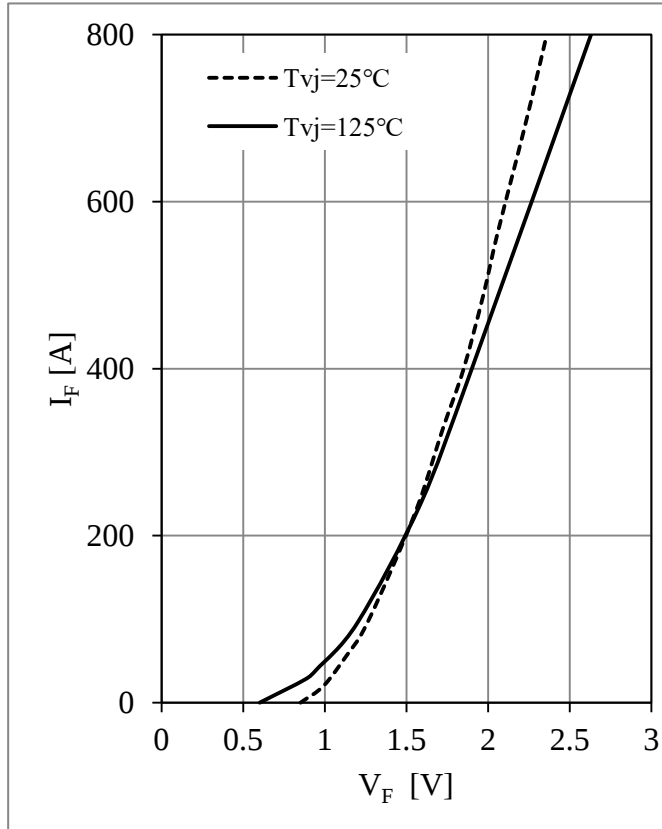
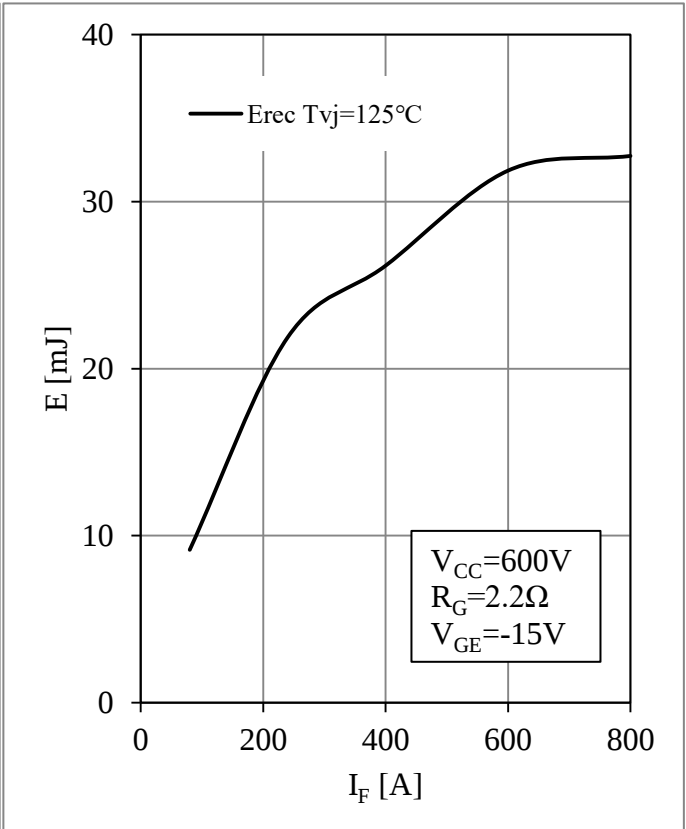


Fig 7. Diode Forward Characteristics

Fig 8. Diode Switching Loss vs. I_F

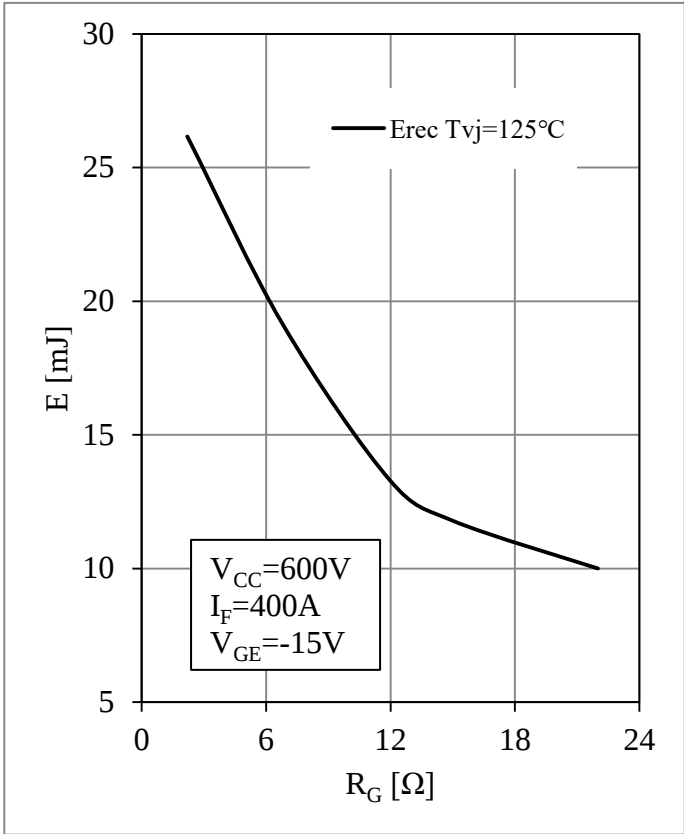


Fig 9. Diode Switching Loss vs. R_G

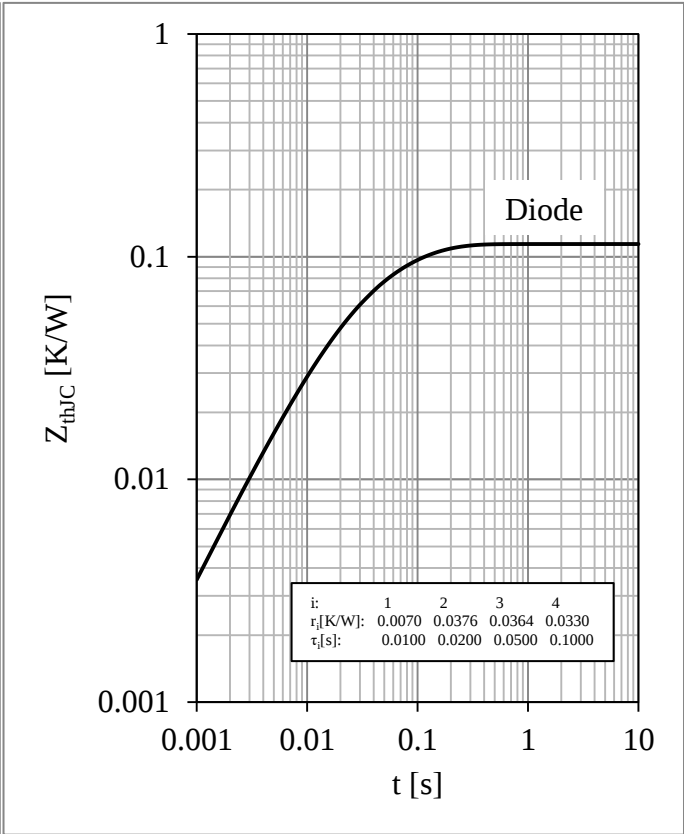
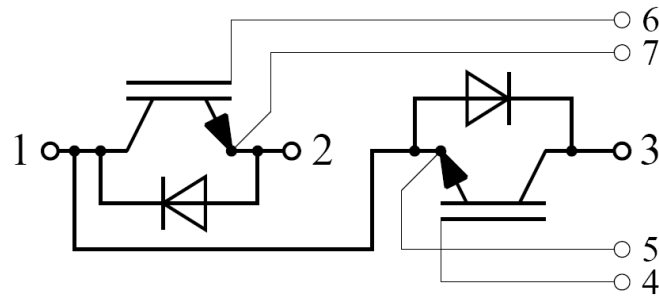


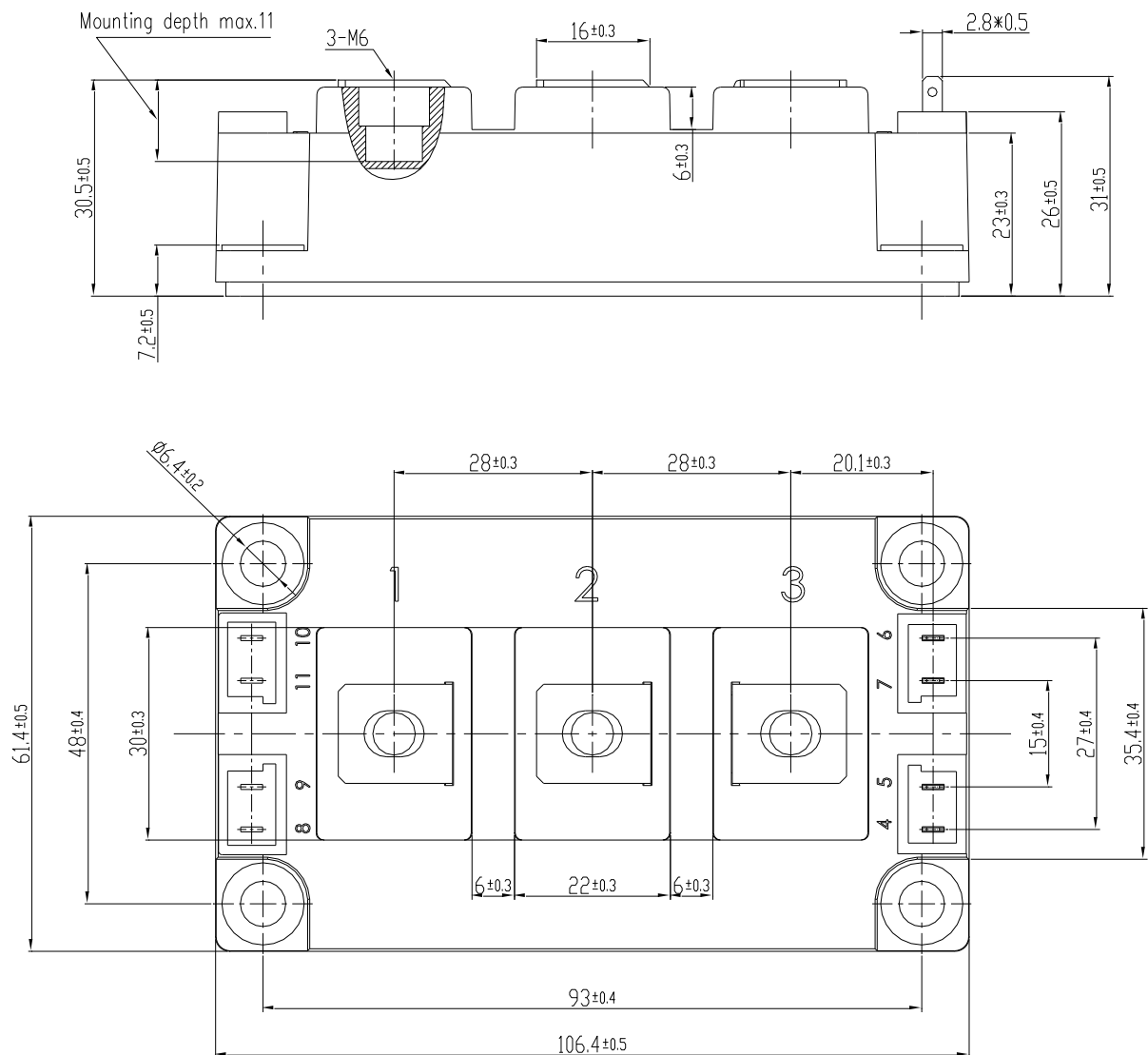
Fig 10. Diode Transient Thermal Impedance

Circuit Schematic



Package Dimensions

Dimensions in Millimeters



Terms and Conditions of Usage

The data contained in this product datasheet is exclusively intended for technically trained staff. you and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see www.powersemi.cc), For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify.

If and to the extent necessary, please forward equivalent notices to your customers.
Changes of this product data sheet are reserved.