



Key Parameters

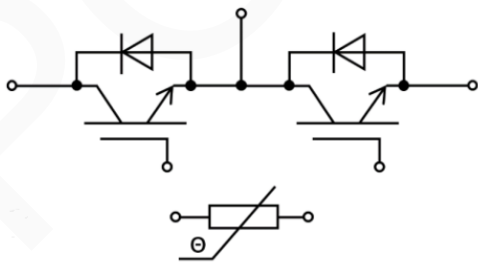
V_{CE}	= 1200V
I_C	= 600A

Features

- 1200V Trench Gate & Field Stop Structure
- Low switching loss
- Positive Temperature Coefficient
- High Reliability
- High Short Circuit Capability

Applications

- Solar Inverter
- Uninterrupted Power Supply
- Servo Drives
- Motor Drives



Equivalent Circuit Schematic

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Absolute Maximum Ratings						
Symbol	Characteristic	Value			Unit	
V _{CES}	Collector-Emitter Voltage	1200			V	
I _{CDC}	Continuous DC Collector Current (T _c =115°C, T _j =175°C)	600			A	
I _{CRM}	Peak Collector Current (tp=1ms)	1200			A	
V _{GES}	Gate-Emitter Voltage	±20			V	
P _{tot}	Total Power Dissipation (T _c =25°C, T _j =175°C)	3950			W	
IGBT Characteristics						
Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =600A, V _{GE} =15V, T _{Vj} =25°C		1.75	2.15	V
		I _C =600A, V _{GE} =15V, T _{Vj} =125°C		2.20		
		I _C =600A, V _{GE} =15V, T _{Vj} =150°C		2.25		V
V _{GE(th)}	Gate-emitter Threshold Voltage	V _{GE} =V _{CE} , I _C =23mA, T _{Vj} =25°C	5.20	5.80	6.40	V
I _{CES}	Collector-Emitter leakage Current	V _{CE} =1200V, V _{GE} =0V, T _{Vj} =25°C			1.0	mA
I _{GES}	Gate-Emitter leakage Current	V _{CE} =0V, V _{GE} =±20V, T _{Vj} =25°C	-100		100	nA
R _{gint}	Internal Gate Resistance			1.2		Ω
Q _G	Gate Charge	V _{GE} =±15V, T _{Vj} =25°C		9.7		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=1MHz, T _{Vj} =25°C		128		nF
C _{res}	Reverse Transfer Capacitance			1.47		nF
t _{d(on)}	Turn-on Delay Time	I _C =600A V _{CE} = 600 V V _{GE} = ±15V R _{Gon} = 1.5Ω R _{Goff} = 1.5Ω Inductive Load	T _{Vj} =25°C	435		ns
			T _{Vj} =125°C	450		
			T _{Vj} =150°C	450		
t _r	Rise Time		T _{Vj} =25°C	115		ns
			T _{Vj} =125°C	160		
			T _{Vj} =150°C	170		
t _{d(off)}	Turn-off Delay Time		T _{Vj} =25°C	625		ns
			T _{Vj} =125°C	680		
			T _{Vj} =150°C	700		
t _f	Fall Time		T _{Vj} =25°C	90		ns
			T _{Vj} =125°C	200		
			T _{Vj} =150°C	235		
E _{on}	Energy Dissipation During Turn-on Time		T _{Vj} =25°C	55		mJ
			T _{Vj} =125°C	100		
			T _{Vj} =150°C	110		
E _{off}	Energy Dissipation During Turn-off Time		T _{Vj} =25°C	35		mJ
			T _{Vj} =125°C	50		
			T _{Vj} =150°C	60		
I _{SC}	SC Data	t _{sc} ≤10μs, V _{GE} =15V, T _{Vj} =150°C, V _{cc} ≤800V		2650		A

Diode Characteristics

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_F	Diode DC Forward Current			600		A
I_{FRM}	Diode Peak Forward Current	$t_p=1ms$		1200		A
V_F	Forward Voltage	$I_F=600A, T_{vj}=25^{\circ}C$		1.75		V
		$I_F=600A, T_{vj}=125^{\circ}C$		1.90		V
		$I_F=600A, T_{vj}=150^{\circ}C$		1.90		V
I_{rr}	Peak Reverse Recovery Current	$T_{vj}=25^{\circ}C$		460		A
		$T_{vj}=125^{\circ}C$		450		
		$T_{vj}=150^{\circ}C$		445		
Q_{rr}	Recovered Charge	$I_F=600A$ $V_R=600V$ $-di_F/dt = 2700A/\mu s,$ $(T_{vj}=150^{\circ}C)$		50		μC
		$T_{vj}=25^{\circ}C$		95		
		$T_{vj}=125^{\circ}C$		105		
E_{rec}	Reverse Recovery Energy	$T_{vj}=25^{\circ}C$		12		mJ
		$T_{vj}=125^{\circ}C$		25		
		$T_{vj}=150^{\circ}C$		30		

Module Characteristics

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{isol}	Isolation voltage	$t=1min, f=50Hz$	3400			V
T_{jmax}	Maximum Junction Temperature				175	$^{\circ}C$
$T_{vj op}$	Operating Junction Temperature		-40		150	$^{\circ}C$
T_{stg}	Storage Temperature		-40		125	$^{\circ}C$
$R_{CC'+EE'}$	Module lead resistance terminal to chip			1.1		m Ω
L_{SCE}	Stray Inductance, Module			20		nH
$R_{\theta jc}$	Junction-to Case	per IGBT-inverter		0.038		$^{\circ}C/W$
		per Diode-inverter		0.063		$^{\circ}C/W$
$R_{\theta cs}$	Case to Sink	per IGBT-inverter		0.029		$^{\circ}C/W$
		per Diode-inverter		0.048		$^{\circ}C/W$
M_t	Module Electrodes Torque	Recommended(M6)	3.0		6.0	N·m
M_s	Module-to-Sink Torque	Recommended(M5)	3.0		6.0	N·m
G	Weight of Module			345		g

NTC thermistors Characteristics

Symbol	Characteristic	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance			5.0		k Ω
P_{25}	Power Dissipation				10.0	mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$		3375		K

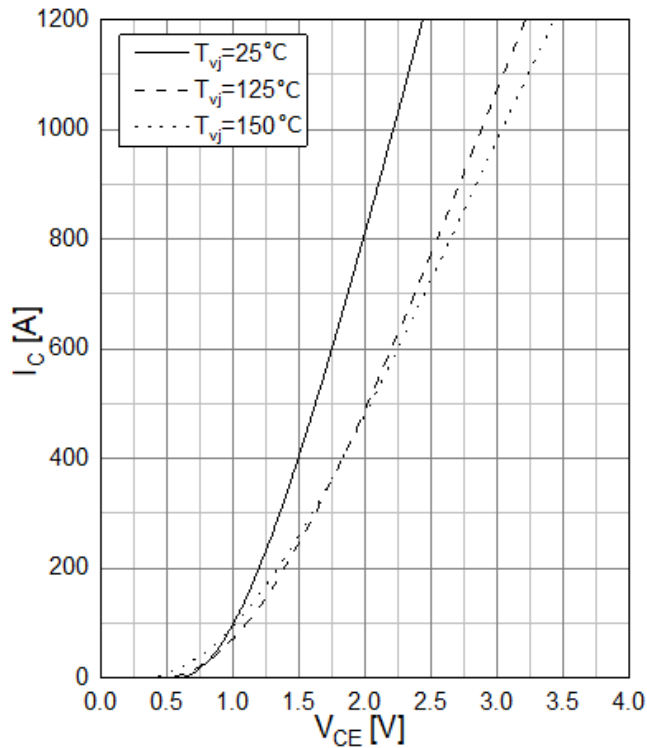
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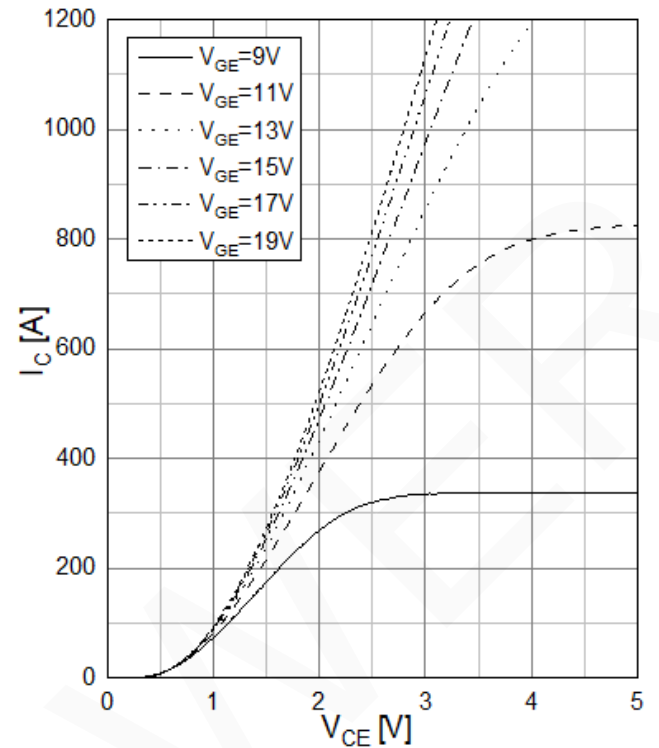
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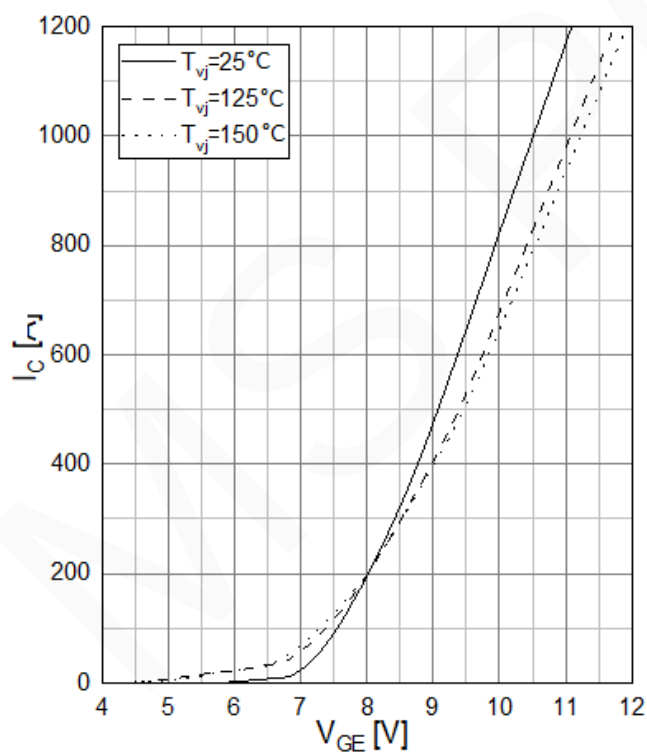
Output characteristic IGBT
 $I_C = f(V_{CE}), V_{GE} = 15V$



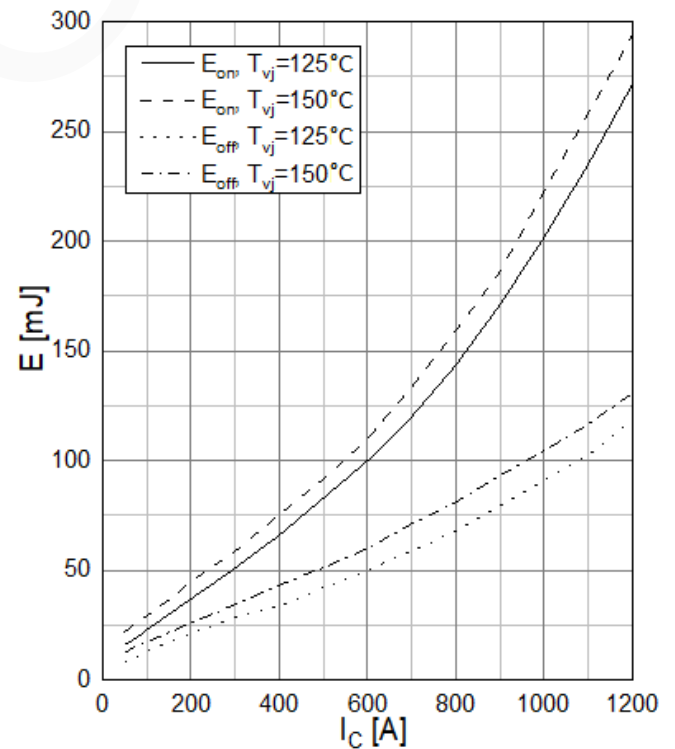
Output characteristic IGBT
 $I_C = f(V_{CE}), T_{vj} = 150^\circ C$



Transfer characteristic IGBT
 $I_C = f(V_{GE}), V_{CE} = 20V$



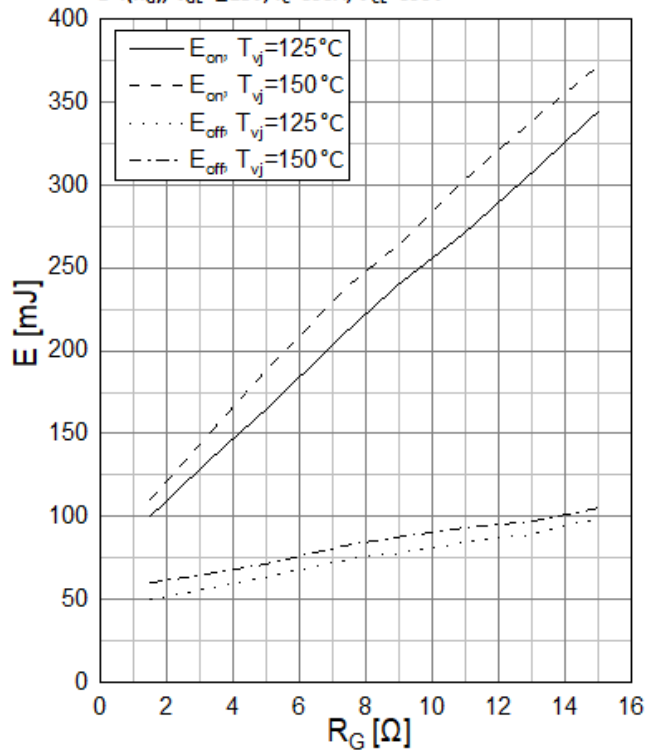
Switching losses IGBT
 $E = f(I_C), V_{GE} = \pm 15V, R_{Gon} = R_{Goff} = 1.5\Omega, V_{CE} = 600V$



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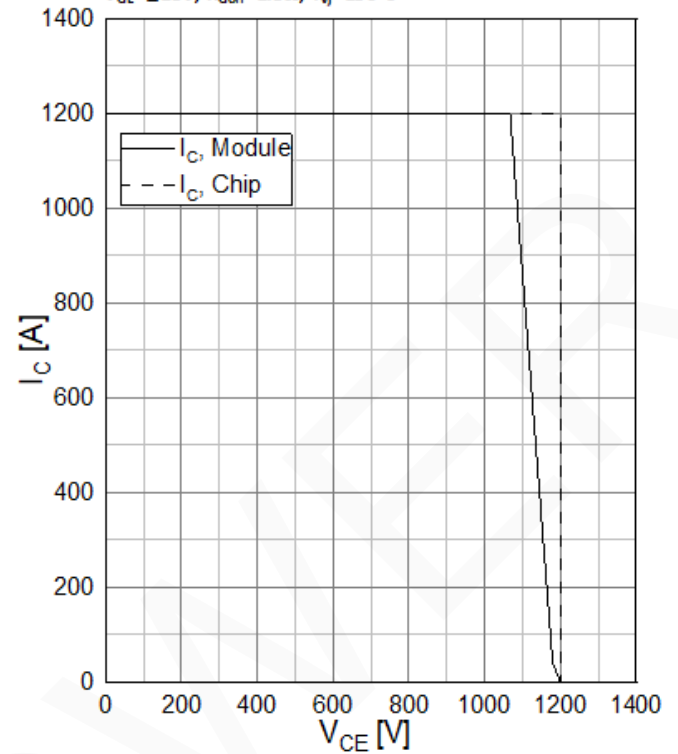
Switching losses IGBT

$E = f(R_G), V_{GE} = \pm 15V, I_C = 600A, V_{CE} = 600V$



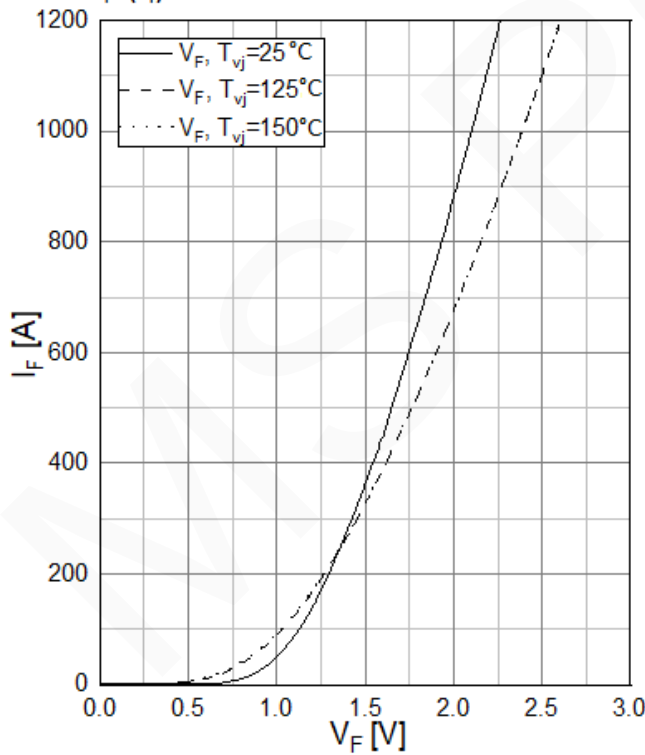
Reverse bias safe operating area IGBT

$V_{GE} = \pm 15V, R_{Goff} = 1.5\Omega, T_{vj} = 150^\circ C$



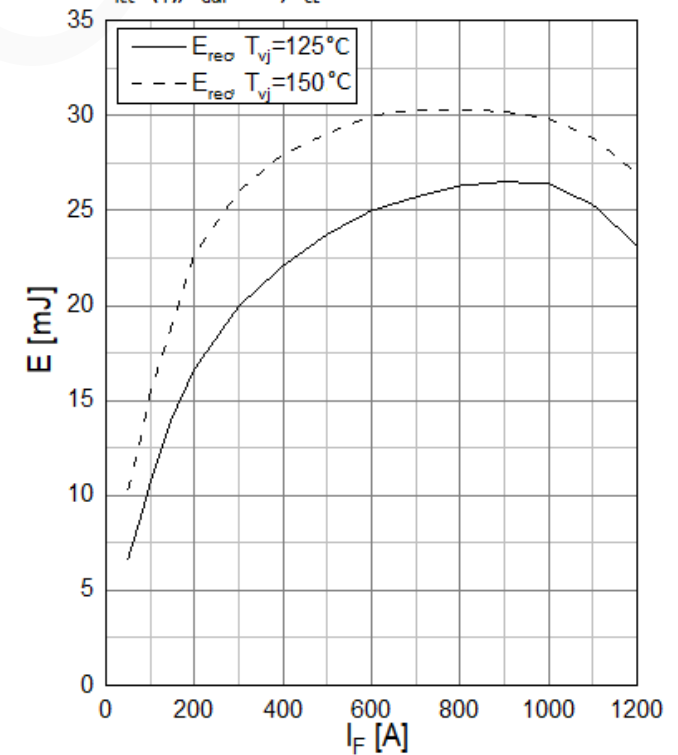
Forward characteristic Diode

$I_F = f(V_F)$



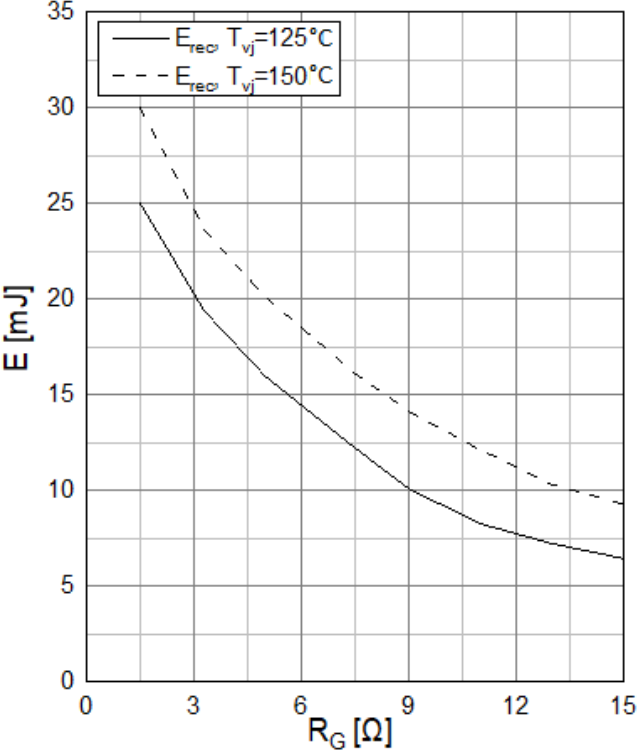
Switching losses Diode

$E_{rec} = f(I_F), R_{Gon} = 1.5\Omega, V_{CE} = 600V$

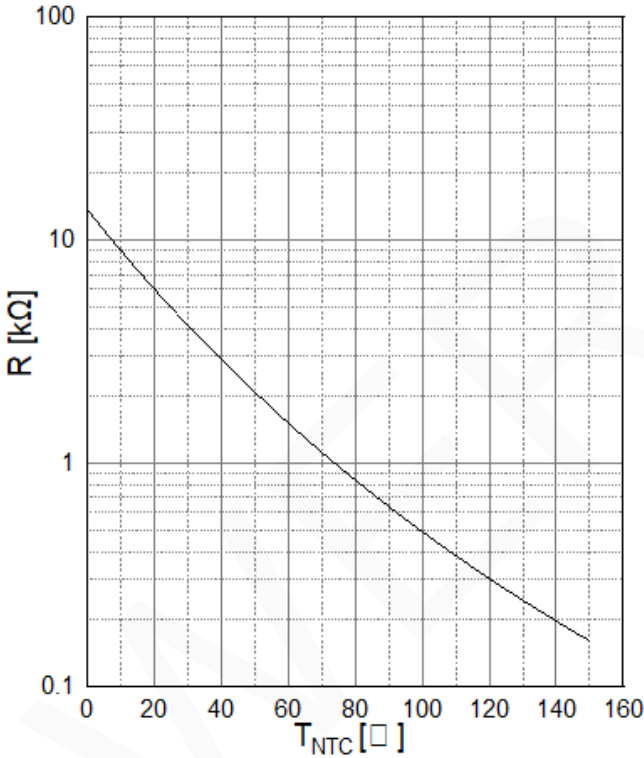


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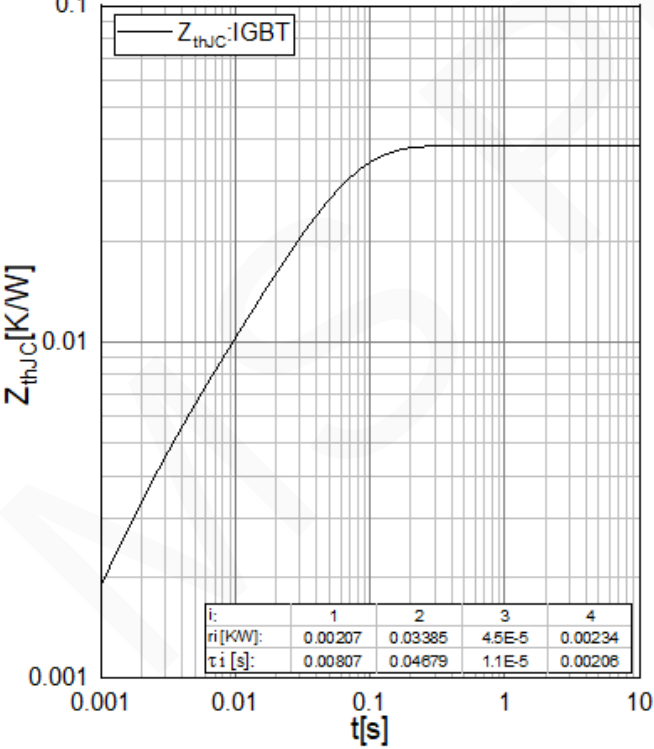
Switching losses Diode
 $E_{rec}=f(R_G), V_{CE}=600V$



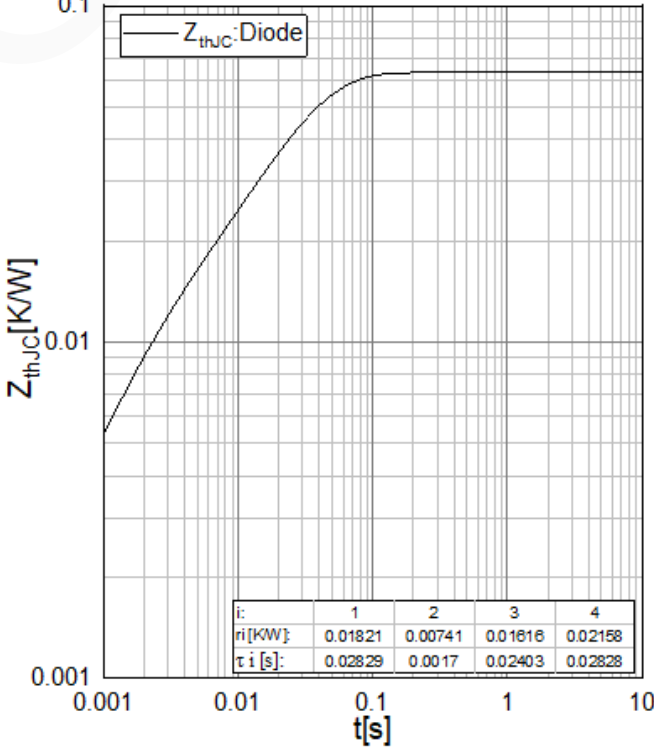
NTC temperature characteristic



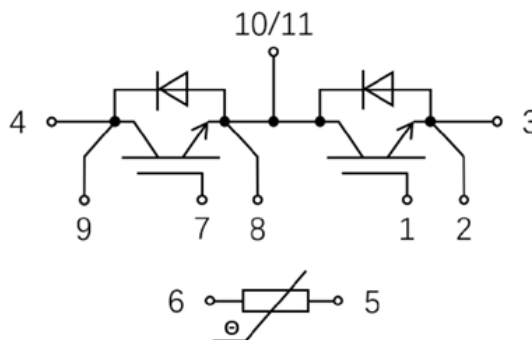
Transient Thermal Impedance IGBT
 $Z_{thJC}=f(t)$



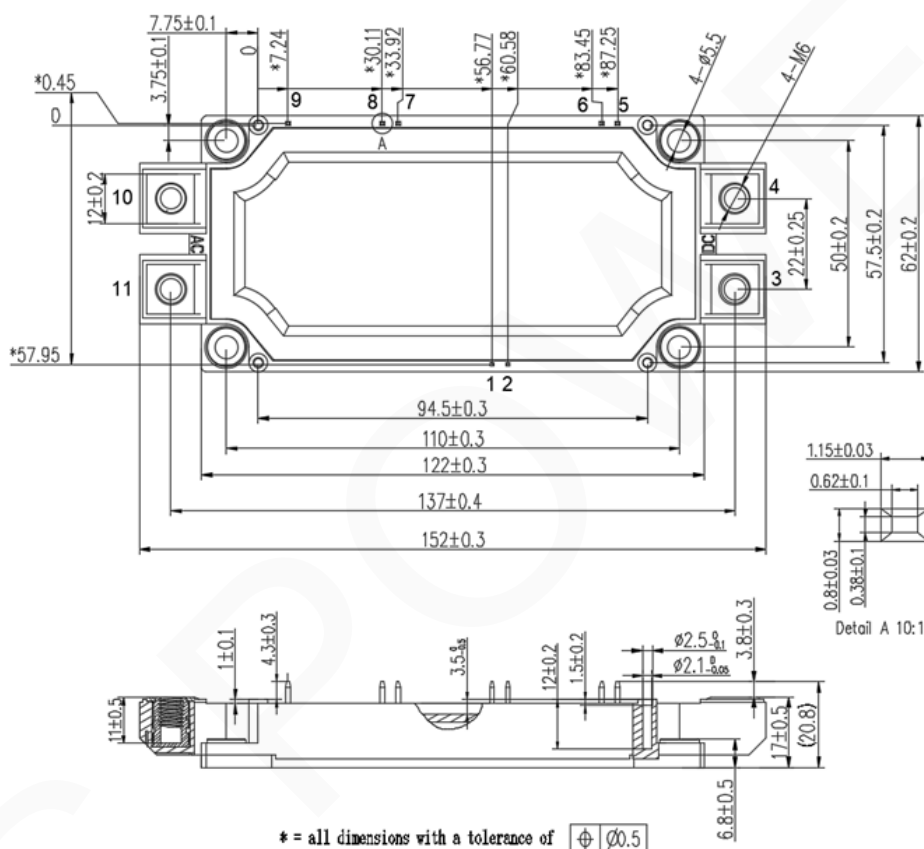
Transient Thermal Impedance Diode
 $Z_{thJC}=f(t)$



Circuit Diagram



Outline Drawing



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