



Key Parameters

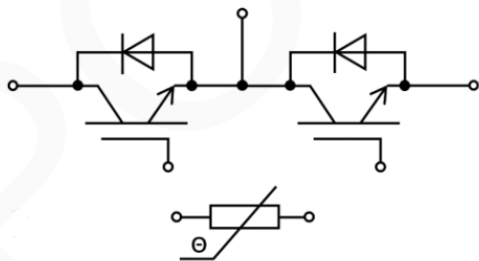
V_{CE}	= 1700V
I_C	= 600A

Features

- 1700V Trench Gate & Field Stop Structure
- Low switching loss
- Positive Temperature Coefficient
- High Reliability
- High Short Circuit Capability

Applications

- Wind turbines



Equivalent Circuit Schematic

Prepared by : ABA	Date of Publication : 09.2026
Approved by :	Revision : 0

Absolute Maximum Ratings						
Symbol	Characteristic	Value			Unit	
V _{CES}	Collector-Emitter Voltage	1700			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)	3900			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		1.80		V
		I _C =600A, V _{GE} =15V, T _{vj} =125°C		2.10		
		I _C =600A, V _{GE} =15V, T _{vj} =150°C		2.30		V
V _{GE(th)}	Gate-emitter Threshold Voltage	V _{GE} =V _{CE} , I _C =24mA, T _{vj} =25°C		6.30		V
I _{CES}	Collector-Emitter leakage Current	V _{CE} =1700V, 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	ηA
R _{gint}	Internal Gate Resistance			1.5		Ω
Q _G	Gate Charge	V _{GE} =±15V, T _{vj} =25°C		6.4		μC
C _{ies}	Input Capacitance	V _{CE} =25V, V _{GE} =0V, f=1MHz, T _{vj} =25°C		83		ηF
C _{res}	Reverse Transfer Capacitance			0.82		ηF
t _{d(on)}	Turn-on Delay Time	I _C =600A V _{CE} = 900 V V _{GE} = ±15V R _{Gon} = 1.0Ω R _{Goff} = 1.0Ω di/dt _{on} =4000A/μs (T _{vj} =150° C), dv/dt _{off} =3600V/μs (T _{vj} =150° C), Ls=35nH Inductive Load	T _{vj} =25°C	350		ηs
			T _{vj} =125°C	370		
			T _{vj} =150°C	375		
t _r	Rise Time		T _{vj} =25°C	110		ηs
			T _{vj} =125°C	115		
			T _{vj} =150°C	120		
t _{d(off)}	Turn-off Delay Time		T _{vj} =25°C	670		ηs
			T _{vj} =125°C	795		
			T _{vj} =150°C	830		
t _f	Fall Time		T _{vj} =25°C	485		ηs
			T _{vj} =125°C	660		
			T _{vj} =150°C	685		
E _{on}	Energy Dissipation During Turn-on Time		T _{vj} =25°C	215		mJ
			T _{vj} =125°C	270		
			T _{vj} =150°C	285		
E _{off}	Energy Dissipation During Turn-off Time		T _{vj} =25°C	150		mJ
			T _{vj} =125°C	195		
			T _{vj} =150°C	205		
I _{sc}	SC Data	t _{sc} ≤10μs, V _{GE} =15V, T _{vj} =150°C, V _{cc} ≤1000V		2500		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	tp=1ms			1200		A
V _F	Forward Voltage	I _F =600A,T _{vj} =25°C			1.70		V
		I _F =600A,T _{vj} =125°C			1.80		V
		I _F =600A,T _{vj} =150°C			1.85		V
I _{rr}	Peak Reverse Recovery Current	I _F =600A V _R =900V -di _F /dt =4000A/μs, (T _{vj} =150°C), Inductive Load	T _{vj} =25°C		370		A
			T _{vj} =125°C		410		
			T _{vj} =150°C		415		
Q _{rr}	Recovered Charge		T _{vj} =25°C		165		μC
			T _{vj} =125°C		265		
			T _{vj} =150°C		290		
E _{rec}	Reverse Recovery Energy		T _{vj} =25°C		90		mJ
			T _{vj} =125°C		160		
			T _{vj} =150°C		175		

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		0.072		$^{\circ}C/W$
$R_{\theta cs}$	Case to Sink	per IGBT-inverter		0.033		$^{\circ}C/W$
		per Diode-inverter		0.037		$^{\circ}C/W$
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
$B_{25/80}$	B-value	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$		3414		K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298.15K))]$		3436		K

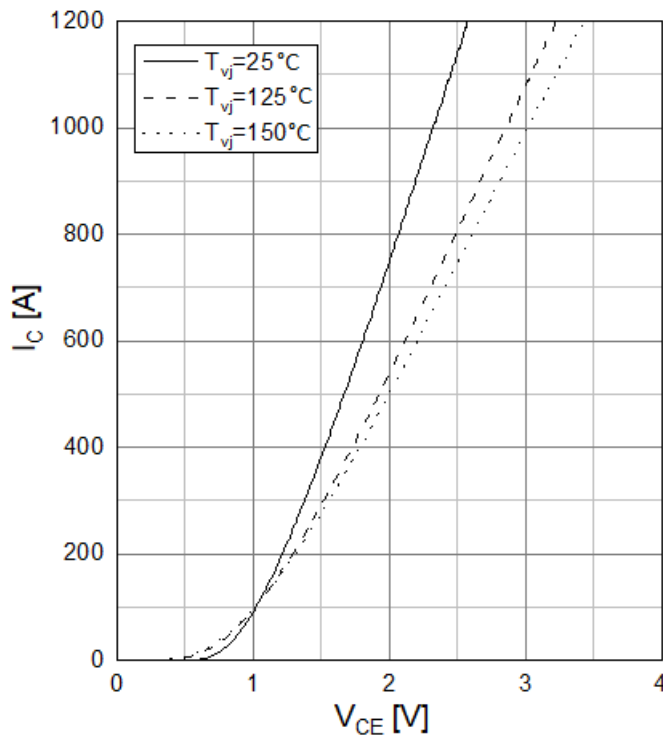
Prepared by : ABA

Date of Publication : 09.2026

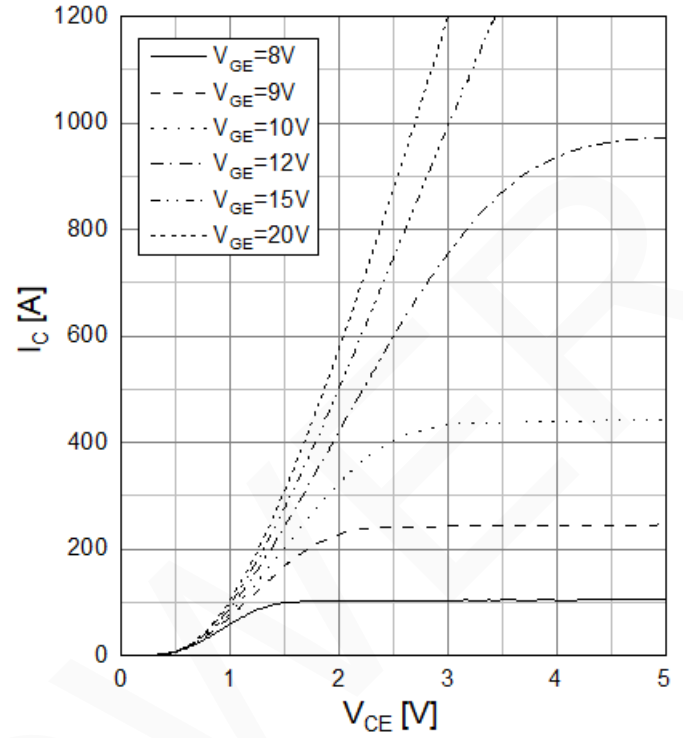
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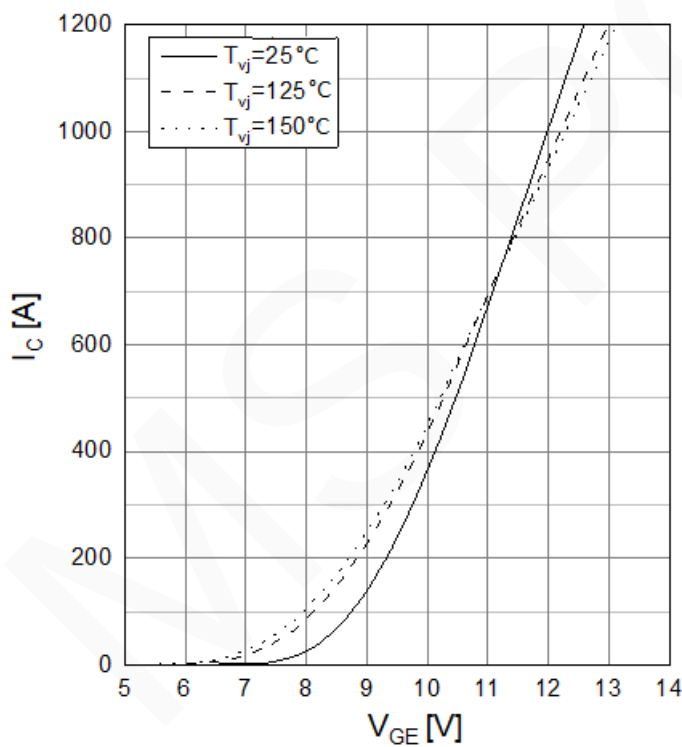
Output Characteristic IGBT
 $I_C = f(V_{CE}), V_{GE} = 15V$



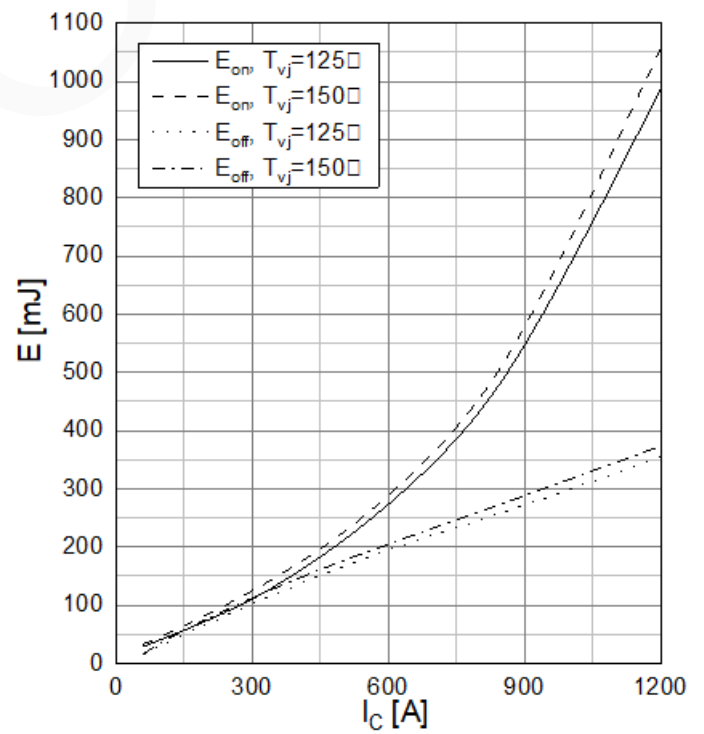
Output Characteristic IGBT
 $I_C = f(V_{CE}), T_{vj} = 150^\circ C$



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

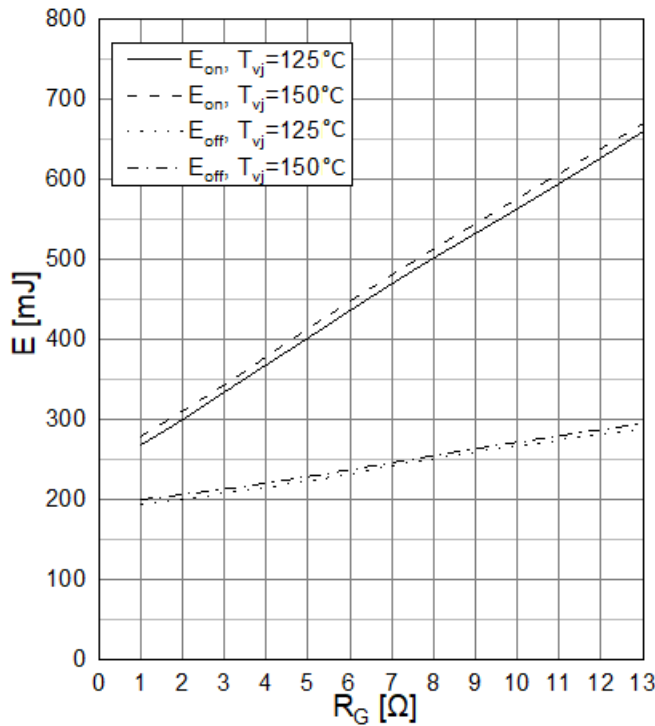


Switching Losses IGBT
 $E = f(I_C), V_{GE} = \pm 15V, R_{Gon} = R_{Goff} = 1\Omega, V_{CE} = 900V$

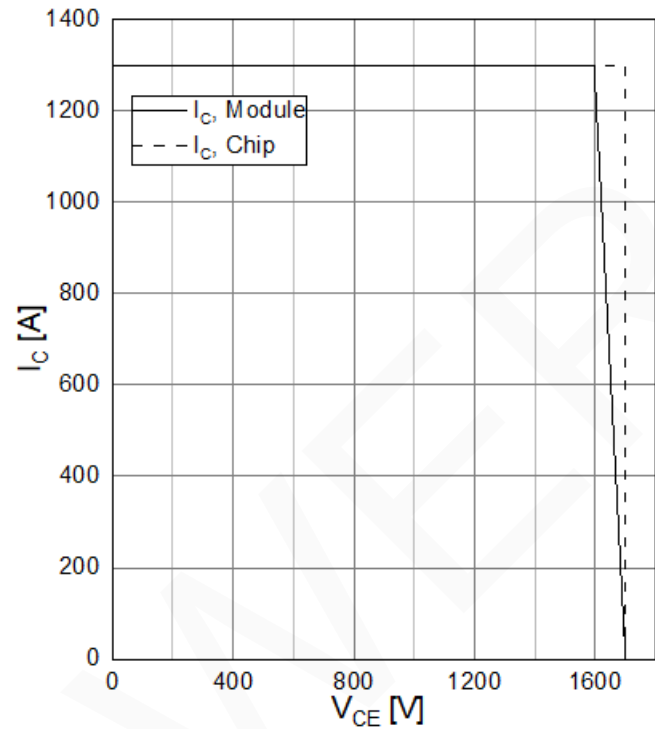


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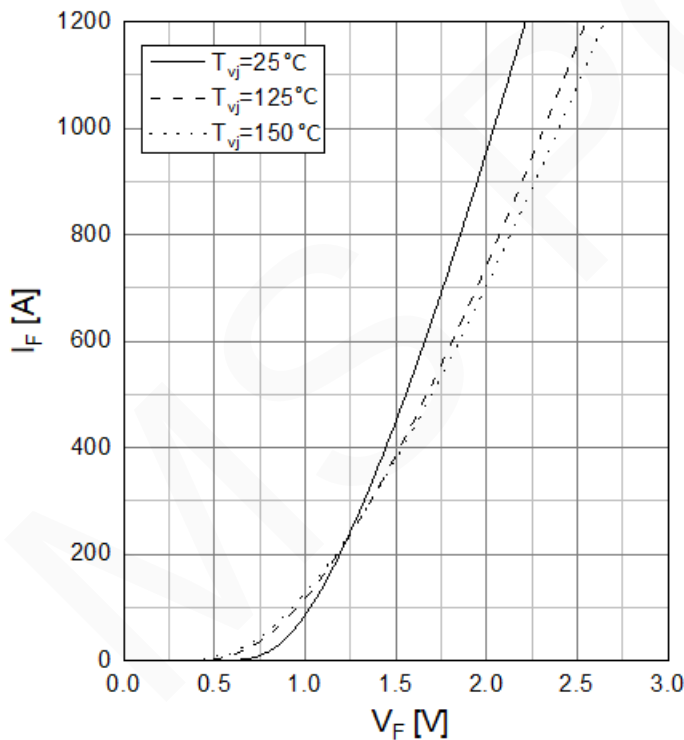
Switching Losses IGBT
 $E = f(R_G), V_{GE} = \pm 15V, I_C = 600A, V_{CE} = 900V$



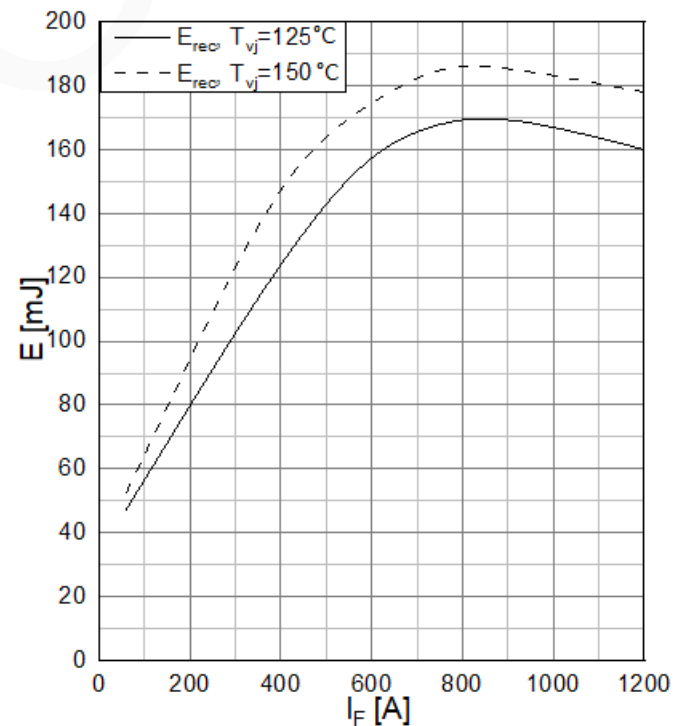
Reverse Bias Safe Operating Area IGBT
 $V_{GE} = \pm 15V, R_{Goff} = 1\Omega, T_{vj} = 150^\circ C$



Forward Characteristic Diode
 $I_F = f(V_F)$



Switching Losses Diode
 $E_{rec} = f(I_F), R_{Gon} = 1\Omega, V_{CE} = 900V$



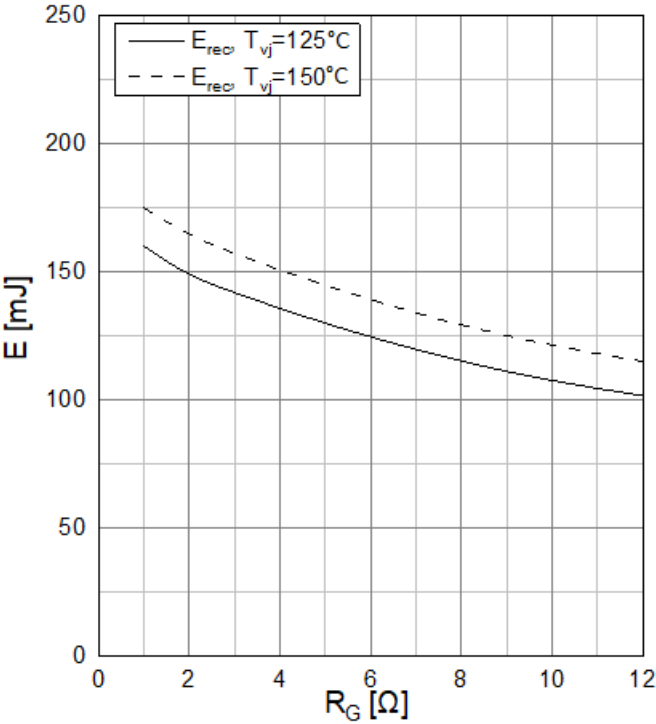
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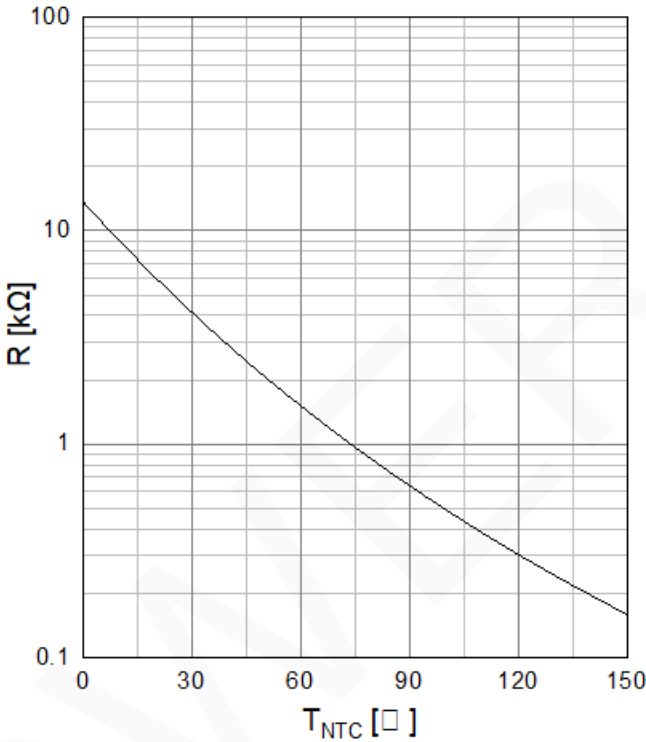
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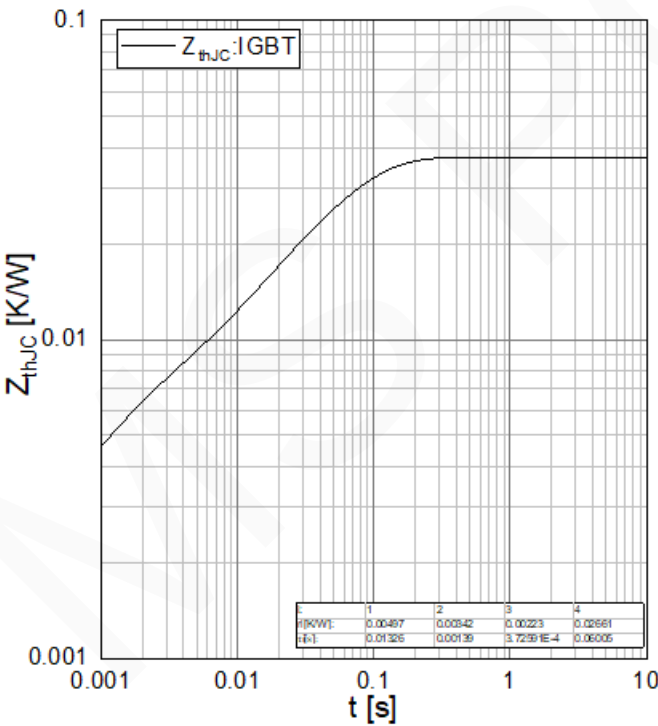
Switching Losses Diode
 $E_{rec}=f(R_G), I_F=600A, V_{CE}=900V$



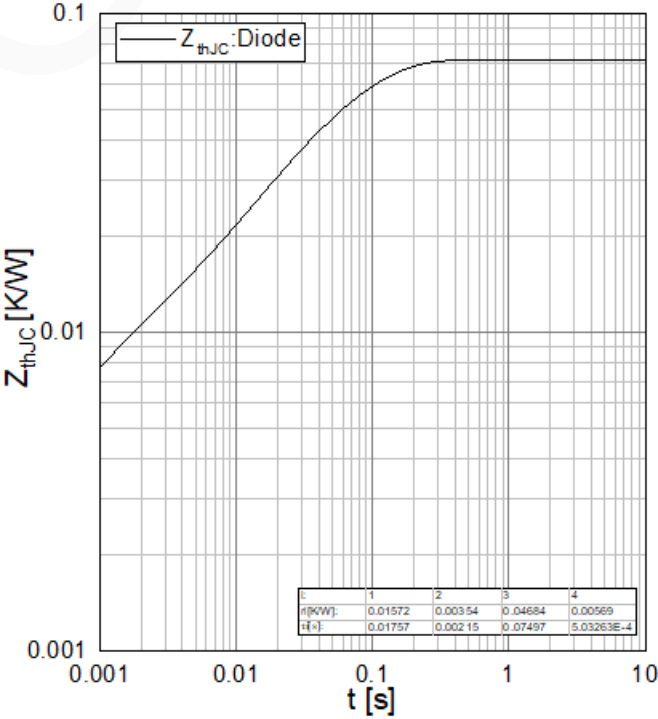
NTC Temperature Characteristic



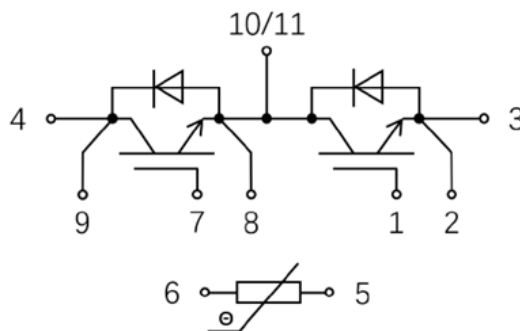
Transient Thermal Impedance IGBT
 $Z_{thJC}=f(t)$



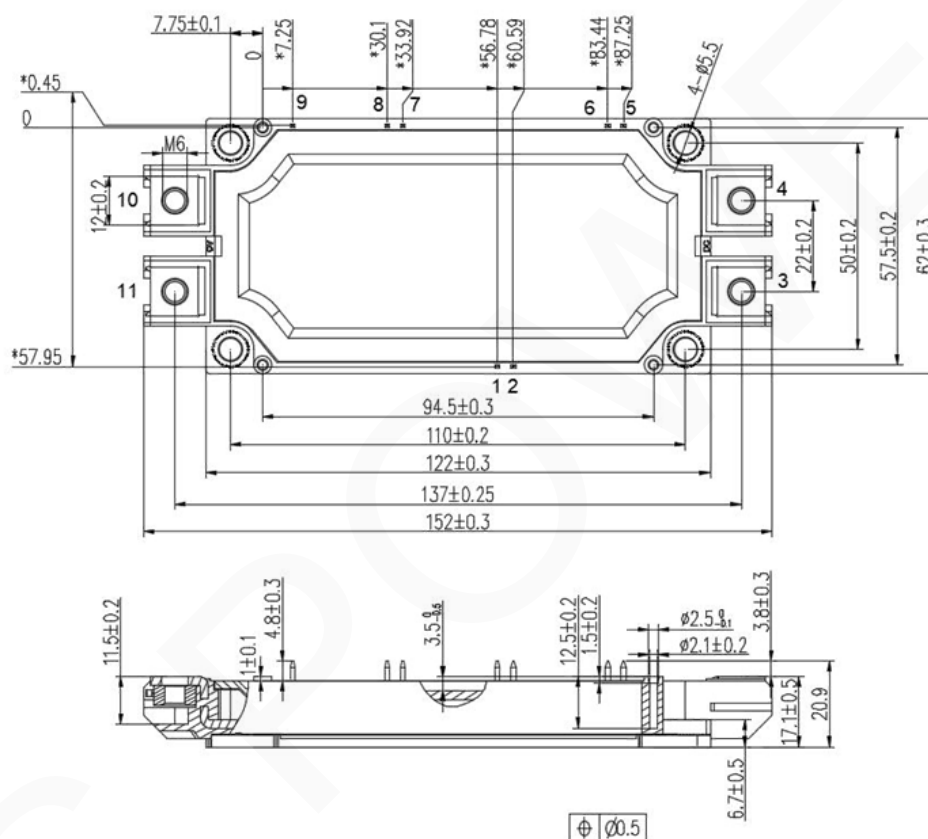
Transient Thermal Impedance Diode
 $Z_{thJC}=f(t)$



Circuit Diagram



Outline Drawing



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