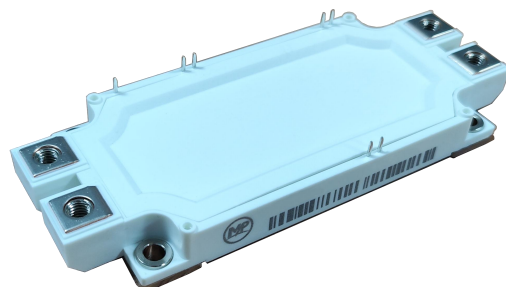


Electrical Features

- Trench/Fieldstop IGBT
- Low $V_{CE(sat)}$
- $V_{CE(sat)}$ with positive temperature coefficient
- 10 μ s short circuit capability
- Fast&soft reverse recovery anti-parallel FWD
- Low inductance case



Typical Applications

- Motor Drives
- High Power Converters
- UPS System
- Servo Drives
- Wind Turbines

IGBT, Inverter

Maximum Rated Values							
Symbol	Item	Conditions	Rating			Unit	
IGBT							
V_{CES}	Collector-emitter voltage	$T_{vj}=25^{\circ}\text{C}$	1200			V	
V_{GES}	Gate-emitter voltage	-	± 20			V	
I_C	Collector current,DC	$T_C=100^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	600			A	
I_{CRM}	Repetitive peak collector current	$t_p=1\text{ms}$	1200			A	
tsc	Short circuit withstand time	$V_{GE}=15\text{V}, V_{CC}=600\text{V}, T_{vj}\leq 150^{\circ}\text{C}$	10			μs	
P_{tot}	Total power dissipation	$T_C=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	4838			W	
Characteristics Values							
Symbol	Item	Conditions	Values			Unit	
IGBT			Min.	Typ.	Max.		
I_{CES}	Collector-emitter cut-off current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	3	mA	
I_{GES}	Gate leakage current	$V_{CE}=0\text{V}, V_{GE}=20\text{V}, T_{vj}=25^{\circ}\text{C}$	-	-	400	nA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=23\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	5.0	5.7	7.0	V	
V_{CEsat}	Collector-emitter saturation voltage	$I_C=600\text{A}$ $V_{GE}=15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	-	2.2		2.4
			$T_{vj}=125^{\circ}\text{C}$	-	2.7		-
			$T_{vj}=150^{\circ}\text{C}$	-	2.9	-	
C_{ies}	Input capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}$ $f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}$	-	49.77	-	nF	
C_{oes}	Output capacitance		-	2.28	-		
C_{res}	Reverse transfer capacitance		-	2.22	-		
Q_G	Gate charge	$V_{GE}=\pm 15\text{V}$	-	7.5	-	nC	
R_g	Internal gate resistance	$T_{vj}=25^{\circ}\text{C}$	-	0.28	-	Ω	

$t_{d(on)}$	Turn-on delay time	$V_{CC}=600V,$ $I_C=600A,$ $V_{GE}=\pm 15V,$ $R_{G(on)}=5.1\ \Omega,$ $R_{G(off)}=5.1\ \Omega,$ $L_{load}=200\mu H$	$T_{vj}=25^\circ C$	-	272	-	ns
			$T_{vj}=125^\circ C$	-	253	-	
			$T_{vj}=150^\circ C$	-	249	-	
t_r	Rise time		$T_{vj}=25^\circ C$	-	264	-	
			$T_{vj}=125^\circ C$	-	262	-	
			$T_{vj}=150^\circ C$	-	259	-	
$t_{d(off)}$	Turn-off delay time		$T_{vj}=25^\circ C$	-	1019	-	
			$T_{vj}=125^\circ C$	-	1096	-	
			$T_{vj}=150^\circ C$	-	1112	-	
t_f	Fall time		$T_{vj}=25^\circ C$	-	144	-	
			$T_{vj}=125^\circ C$	-	195	-	
			$T_{vj}=150^\circ C$	-	225	-	
E_{on}	Turn-on energy (per pulse)	$T_{vj}=25^\circ C$	-	148.5	-	mJ	
		$T_{vj}=125^\circ C$	-	159.4	-		
		$T_{vj}=150^\circ C$	-	166.9	-		
E_{off}	Turn-off energy (per pulse)	$T_{vj}=25^\circ C$	-	83.9	-		
		$T_{vj}=125^\circ C$	-	95.6	-		
		$T_{vj}=150^\circ C$	-	99.3	-		
R_{thJC}	Thermal resistance, junction to case	per IGBT	-	-	0.031	K/W	
R_{thCH}	Thermal resistance, case to heatsink	per IGBT/ $\lambda_{grease}=1W/(m \cdot K)$	-	0.035	-	K/W	
T_{vjop}	Temperature under switching conditions		-40		150	$^\circ C$	
Diode, Inverter							
Maximum Rated Values							
Symbol	Item	Conditions			Rating	Unit	
V_{RRM}	Repetitive peak reverse voltage	$T_{vj}=25^\circ C$			1200	V	
I_F	Forward current, DC	$T_C=100^\circ C, T_{vj}=150^\circ C$			600	A	
I_{FRM}	Repetitive peak forward current	$t_p=1ms$			1200	A	
Characteristic Values							
V_F	Continuous forward voltage	$I_F=600A$ $V_{GE}=0V$	$T_{vj}=25^\circ C$	-	2.28	-	V
			$T_{vj}=125^\circ C$	-	2.51	-	
			$T_{vj}=150^\circ C$	-	2.53	-	
I_{RM}	Peak reverse recovery current		$T_{vj}=25^\circ C$	-	159.5	-	A
			$T_{vj}=125^\circ C$	-	228.4	-	
			$T_{vj}=150^\circ C$	-	249.4	-	
t_{rr}	Reverse recovery time		$T_{vj}=25^\circ C$	-	516.1	-	ns
			$T_{vj}=125^\circ C$	-	475.9	-	
			$T_{vj}=150^\circ C$	-	474.5	-	
Q_r	Recovered charge	$T_{vj}=25^\circ C$	-	35.1	-	μC	
		$T_{vj}=125^\circ C$	-	55.8	-		
		$T_{vj}=150^\circ C$	-	66.5	-		
E_{rec}	Reverse recovery energy	$T_{vj}=25^\circ C$	-	9.9	-	mJ	
		$T_{vj}=125^\circ C$	-	18.9	-		
		$T_{vj}=150^\circ C$	-	21.9	-		

R_{thJC}	Thermal resistance, junction to case	per diode	-	-	0.071	K/W
R_{thCH}	Thermal resistance, case to heatsink	per diode/ $\lambda_{grease}=1W/(m \cdot K)$	-	0.0395	-	K/W
T_{vjop}	Temperature under switching conditions		-40		150	°C

NTC Thermistor Characteristics

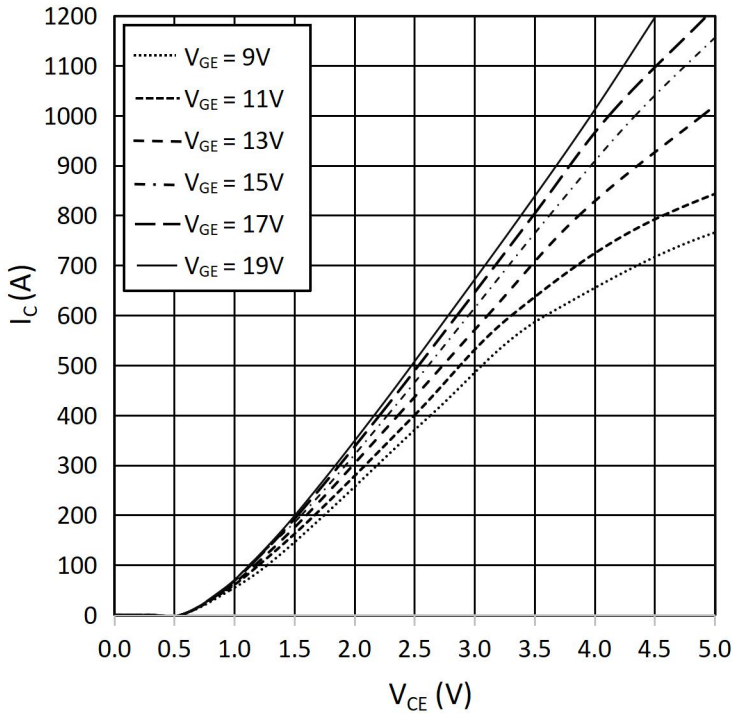
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
R_{25}	Rated resistance	$T_C=25^\circ C$	-	5	-	kΩ
$\Delta R/R$	Deviation of resistance	$T_C=100^\circ C, R_{100}=493\Omega$	-5	-	5	%
P_{25}	Power dissipation	$T_C=25^\circ C$	-	-	20	mW
$B_{25/50}$	B-constant	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$	-	3375	-	K
$B_{25/80}$	B-constant	$R_2=R_{25} \exp[B_{25/80}(1/T_2-1/(298.15K))]$	-	3411	-	
$B_{25/100}$	B-constant	$R_2=R_{25} \exp[B_{25/100}(1/T_2-1/(298.15K))]$	-	3433	-	

Module

Symbol	Item	Conditions	Rating			Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate, RMS, $f=50Hz, t=1min$	4000			V
-	Material of module baseplate	-	Cu			-
-	Internal isolation	Basic insulation(class 1, IEC 61140)	Al_2O_3			-
T_{stg}	Storage temperature	-	-40~125			°C
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M6	3.0	-	5.0	Nm
	Terminal connection torque	Screw M6	2.5	-	5.0	Nm
ds	Creepage distance	Terminal to terminal	-	13	-	mm
		Terminal to base plate	-	14.5	-	
da	Clearance	Terminal to terminal	-	10	-	mm
		Terminal to base plate	-	12.5	-	
m	Weight	-	-	340	-	g

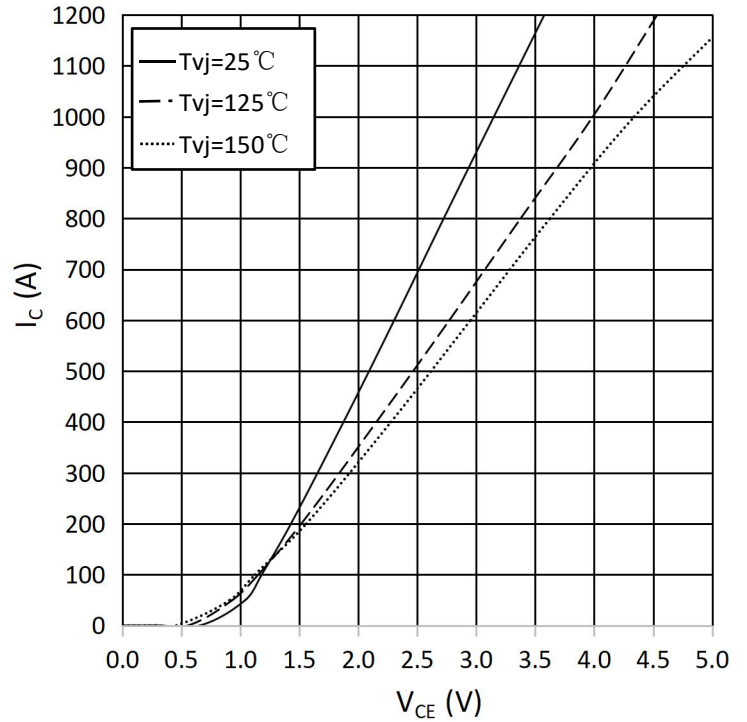
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



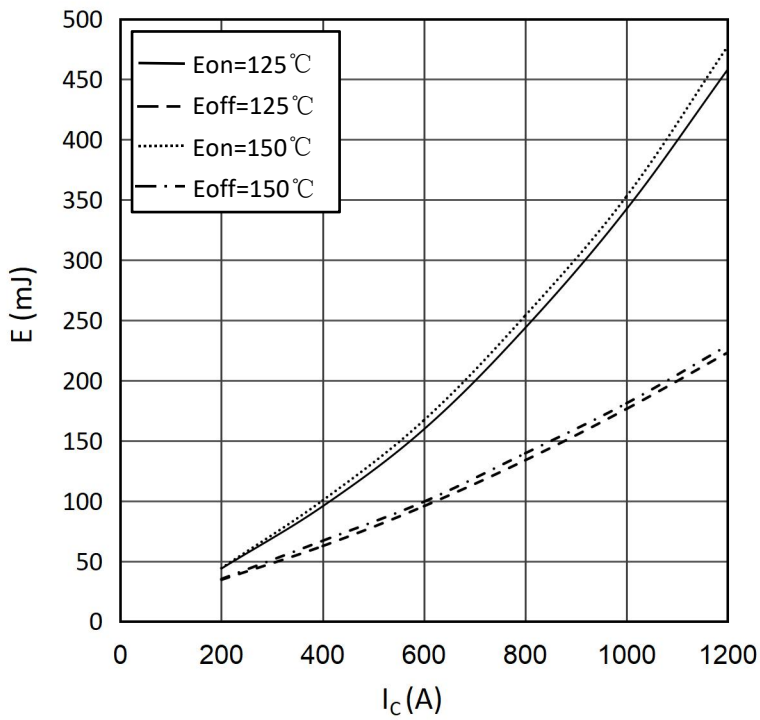
output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



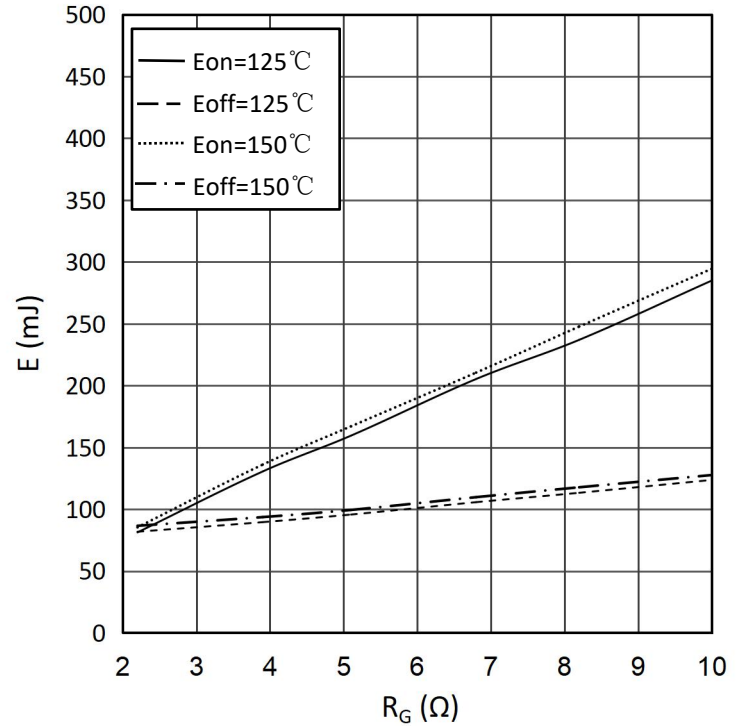
switching losses IGBT, Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{V}$, $R_{Gon} = 5.1\Omega$, $R_{Goff} = 5.1\Omega$, $V_{CE} = 600\text{V}$



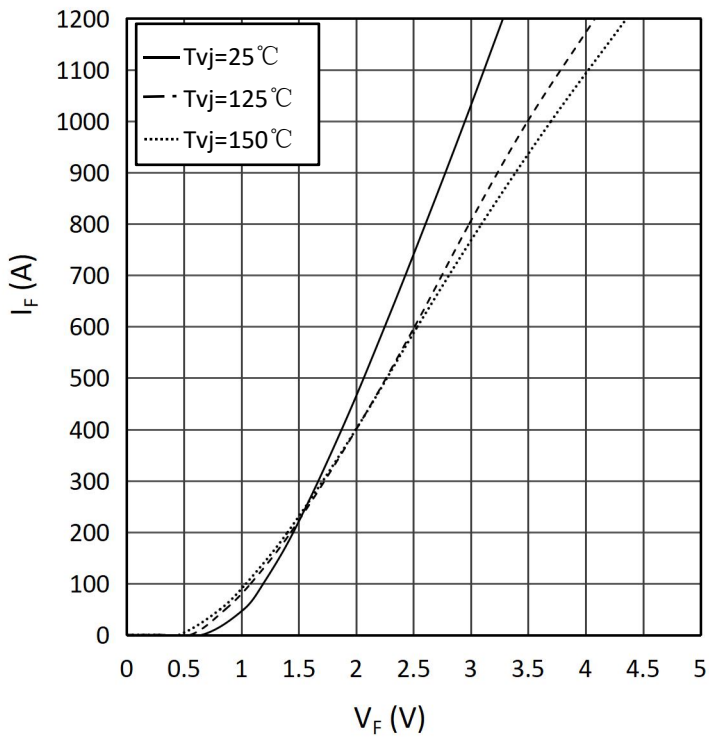
switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{V}$, $I_C = 600\text{A}$, $V_{CE} = 600\text{V}$



forward characteristic of Diode, Inverter (typical)

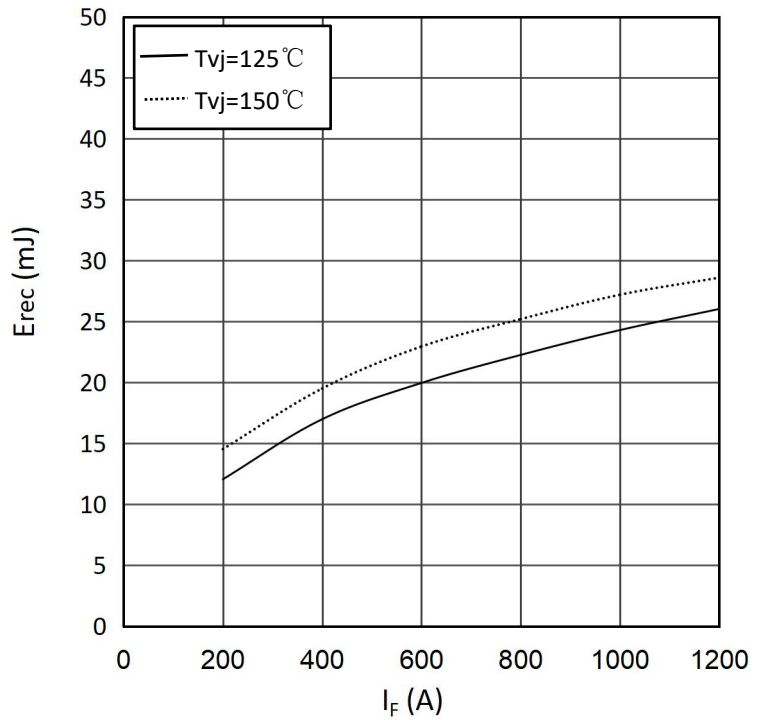
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

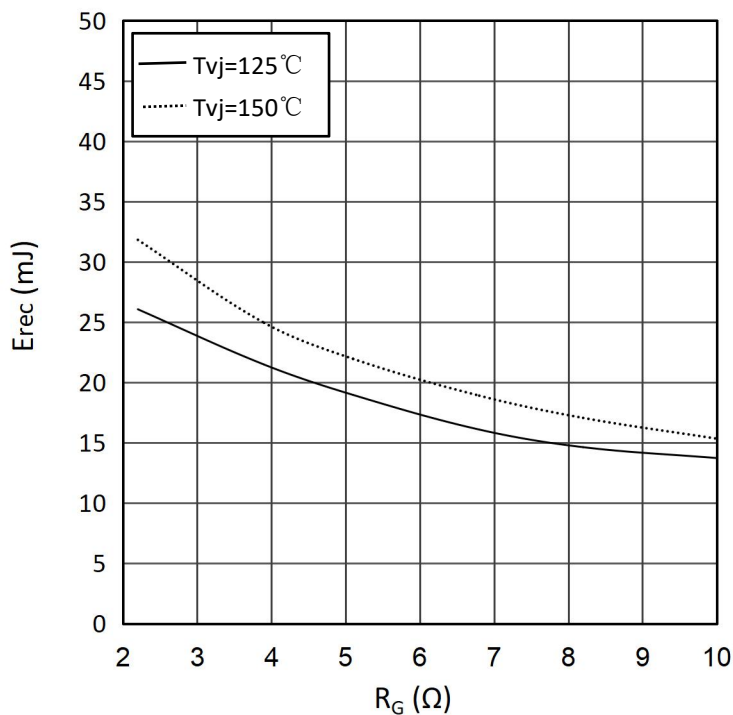
$R_{Gon}=5.1\Omega, V_{CE}=600V$



switching losses Diode, Inverter (typical)

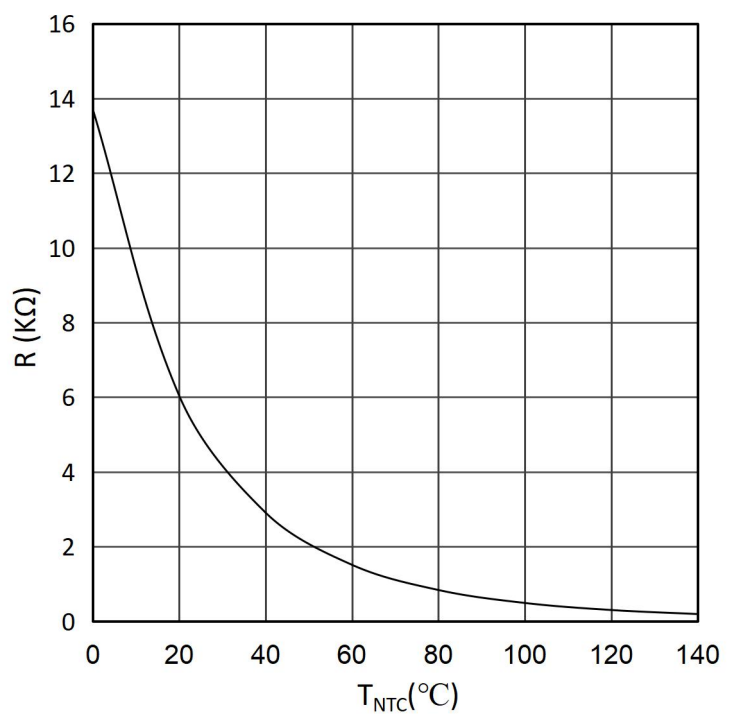
$E_{rec} = f(R_G)$

$I_F=600A, V_{CE}=600V$

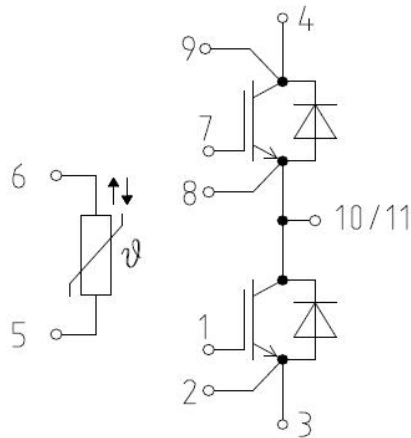


NTC-Thermistor-temperature characteristic(typical)

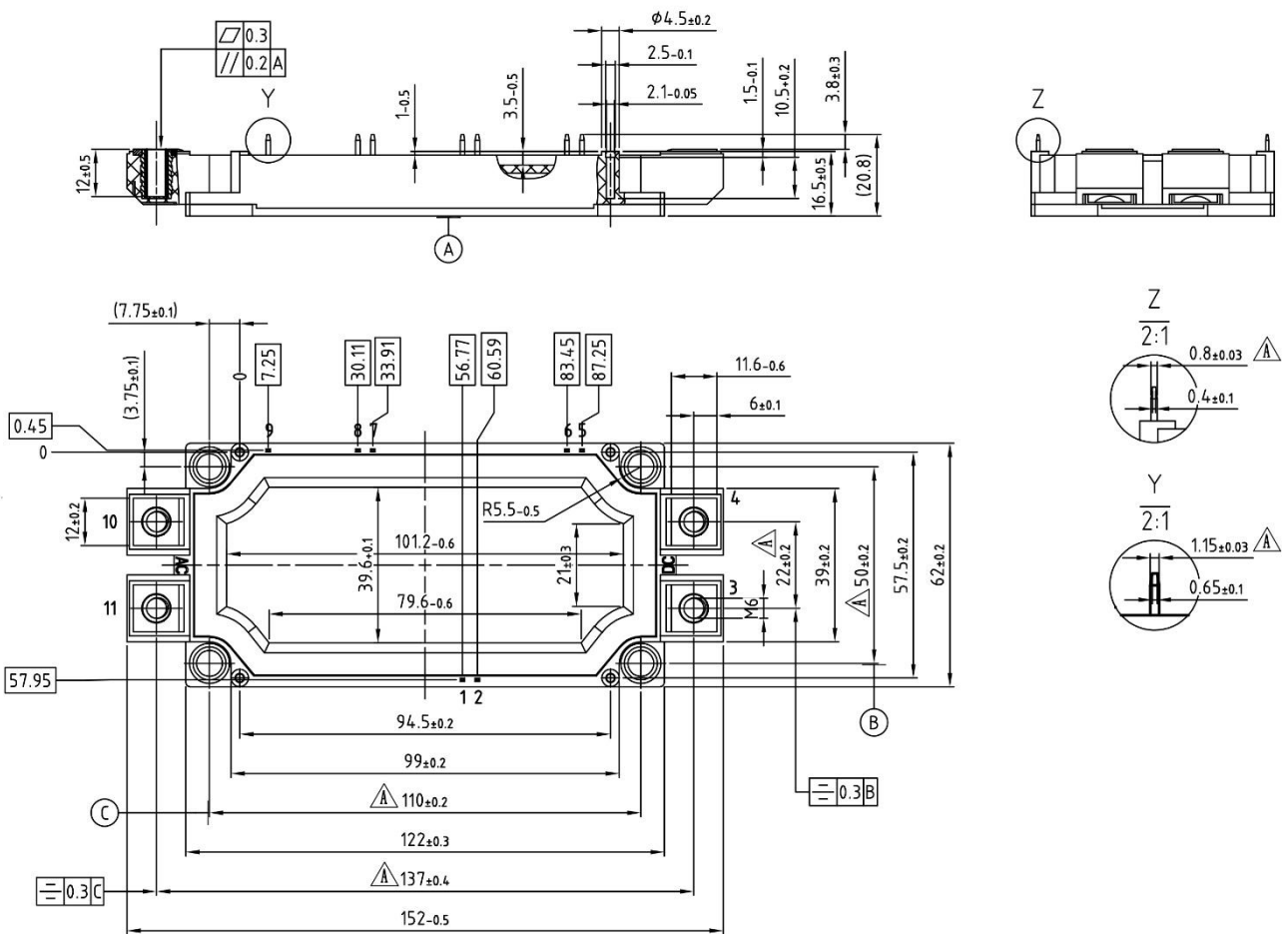
$R=f(T)$



Circuit diagram headline



Package outlines (Unit: mm)



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