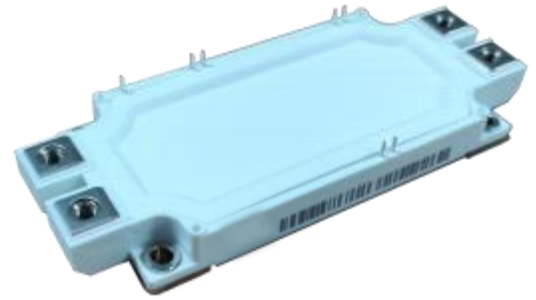


Electrical Features

- 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
- UPS System
- Servo Drives
- Wind Turbines

IGBT , Inverter

Maximum Rated Values							
Symbol	Item	Conditions	Rating	Unit			
IGBT							
V_{CES}	Collector-emitter voltage	$T_{vj}=25^{\circ}C$	1200	V			
V_{GES}	Gate-emitter voltage	-	± 20	V			
I_C	Collector current, DC	$T_C=100^{\circ}C, T_{vj}=175^{\circ}C$	450	A			
I_{CRM}	Repetitive peak collector current	$t_p=1ms$	900	A			
t_{SC}	Short circuit withstand time	$V_{GE}=15V, V_{CC}=600V, T_{vj}\leq 150^{\circ}C$	10	μs			
P_{tot}	Total power dissipation	$T_C=25^{\circ}C, T_{vj}=175^{\circ}C$	2586	W			
Characteristics Values							
Symbol	Item	Conditions	Values			Unit	
IGBT			Min.	Typ.	Max.		
I_{CES}	Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	10	μA	
I_{GES}	Gate leakage current	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	50	nA	
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=17.1mA, V_{CE}=V_{GE}, T_{vj}=25^{\circ}C$	5.0	5.7	7.0	V	
V_{CEsat}	Collector-emitter saturation voltage	$I_C=450A$ $V_{GE}=15V$	$T_{vj}=25^{\circ}C$	-	2.13		-
			$T_{vj}=125^{\circ}C$	-	2.60		-
			$T_{vj}=150^{\circ}C$	-	2.68	-	
C_{ies}	Input capacitance	$V_{CE}=25V, V_{GE}=0V$ $f=1MHz, T_{vj}=25^{\circ}C$	-	31.8	-	nF	
C_{oes}	Output capacitance		-	2.1	-		
C_{res}	Reverse transfer capacitance		-	1.08	-		
Q_G	Gate charge	$V_{GE}=\pm 15V$	-	2814	-	nC	
R_g	Internal gate resistance	$T_{vj}=25^{\circ}C$	-	0.4	-	Ω	

t _{d(on)}	Turn-on delay time	V _{CC} =600V I _C =450A V _{GE} =±15V R _{G(on)} =5.1 Ω R _{G(off)} =5.1 Ω L _{load} =50uH	T _{vj} =25°C	-	126	-	ns
			T _{vj} =125°C	-	148	-	
			T _{vj} =150°C	-	152	-	
t _r	Rise time		T _{vj} =25°C	-	142	-	
			T _{vj} =125°C	-	168	-	
			T _{vj} =150°C	-	176	-	
t _{d(off)}	Turn-off delay time		T _{vj} =25°C	-	715	-	
			T _{vj} =125°C	-	783	-	
			T _{vj} =150°C	-	840	-	
t _f	Fall time		T _{vj} =25°C	-	121	-	
			T _{vj} =125°C	-	128	-	
			T _{vj} =150°C	-	136	-	
E _{on}	Turn-on energy (per pulse)	V _{CC} =600V , I _C =450A V _{GE} =±15V , R _{G(on)} =5.1Ω di/dt=3800A/μs(T _{vj} =150°C)	T _{vj} =25°C	-	84.2	-	mJ
			T _{vj} =125°C	-	108.8	-	
			T _{vj} =150°C	-	116.8	-	
E _{off}	Turn-off energy (per pulse)		T _{vj} =25°C	-	47.7	-	
			T _{vj} =125°C	-	49.2	-	
			T _{vj} =150°C	-	52.5	-	
SC data	Short-circuit current	V _{CC} =600V, V _{GE} ≤15V, T _{vj} =25°C V _{CES} ≤1200V, t _p ≤10μs	-	2388	-	A	
R _{thJC}	Thermal resistance, junction to case	per IGBT	-	-	0.058	K/W	
R _{thCH}	Thermal resistance, case to heatsink	per IGBT/ λgrease=1W/(m·K)	-	0.03	-	K/W	
T _{vjop}	Temperature under switching conditions		-40		150	°C	
Diode , Inverter							
Maximum Rated Values							
Symbol	Item	Conditions		Rating		Unit	
V _{RRM}	Repetitive peak reverse voltage	T _{vj} =25°C		1200		V	
I _F	Forward current, DC	T _C =100°C, T _{vj} =150°C		450		A	
I _{FRM}	Repetitive peak forward current	t _p =1ms		900		A	
I ² t	I ² t-value	V _R =0V, t _p =10ms, T _{vj} =150°C		28500		A ² s	
Characteristic Values							
V _F	Continuous forward voltage	I _F =450A V _{GE} =0V	T _{vj} =25°C	-	2.19	-	V
			T _{vj} =125°C	-	2.08	-	
			T _{vj} =150°C	-	2.02	-	
I _{RM}	Peak reverse recovery current		T _{vj} =25°C	-	183	-	A
			T _{vj} =125°C	-	259	-	
			T _{vj} =150°C	-	284	-	
t _{rr}	Reverse recovery time	I _F =450A V _{GE} =-15V -di _F /dt=3500A/μs (T _{vj} =150°C)	T _{vj} =25°C	-	175	-	ns
			T _{vj} =125°C	-	421	-	
			T _{vj} =150°C	-	590	-	
Q _r	Recovered charge		T _{vj} =25°C	-	26.2	-	μC
			T _{vj} =125°C	-	60.8	-	
			T _{vj} =150°C	-	76.9	-	

E _{rec}	Reverse recovery energy		T _{vj} =25°C	-	8.36	-	mJ
			T _{vj} =125°C	-	20.2	-	
			T _{vj} =150°C	-	29.3	-	
R _{thJC}	Thermal resistance, junction to case	per diode	-	-	0.1	K/W	
R _{thCH}	Thermal resistance, case to heatsink	per diode/ λ _{grease} =1W/(m·K)	-	0.045	-	K/W	
T _{vjop}	Temperature under switching conditions		-40		150	°C	

NTC Thermistor Characteristics

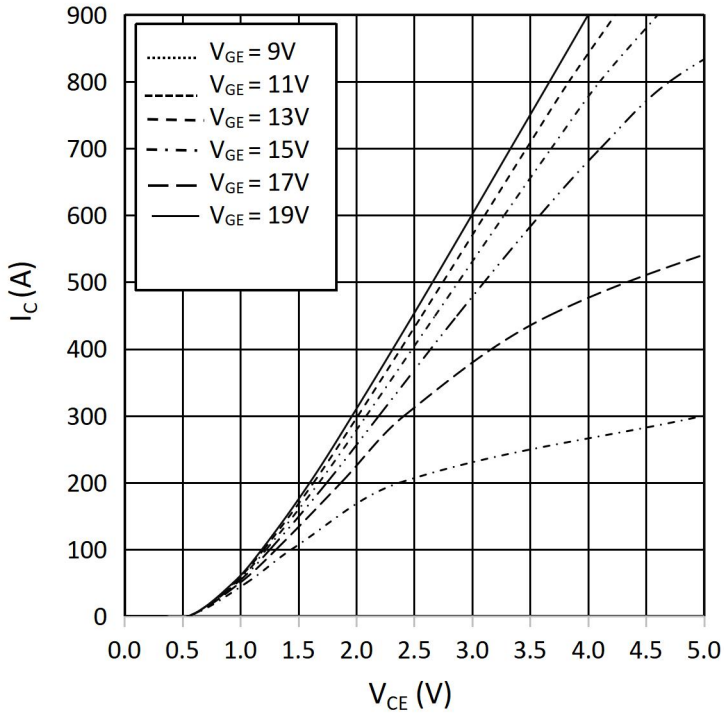
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
R ₂₅	Rated resistance	T _C =25°C	-	5	-	kΩ
ΔR/R	Deviation of resistance	T _C =100°C, R ₁₀₀ =493Ω	-5	-	5	%
P ₂₅	Power dissipation	T _C =25°C	-	-	20	mW
B _{25/50}	B-constant	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$	-	3375	-	K
B _{25/80}	B-constant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

Module

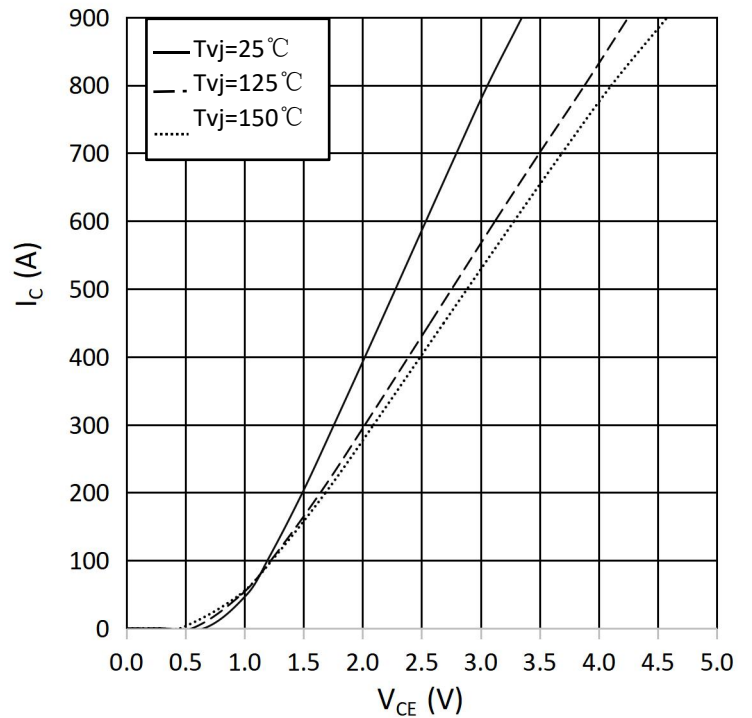
Symbol	Item	Conditions	Rating			Unit
			Min.	Typ.	Max.	
V _{ISOL}	Isolation voltage	Terminals to baseplate, RMS, f=50Hz, t=1min	2500			V
-	Material of module baseplate	-	Cu			-
-	Internal isolation	Basic insulation(class 1, IEC 61140)	Al ₂ O ₃			-
T _{stg}	Storage temperature	-	-40~125			°C
Symbol	Item	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)

$I_C = f(V_{CE})$

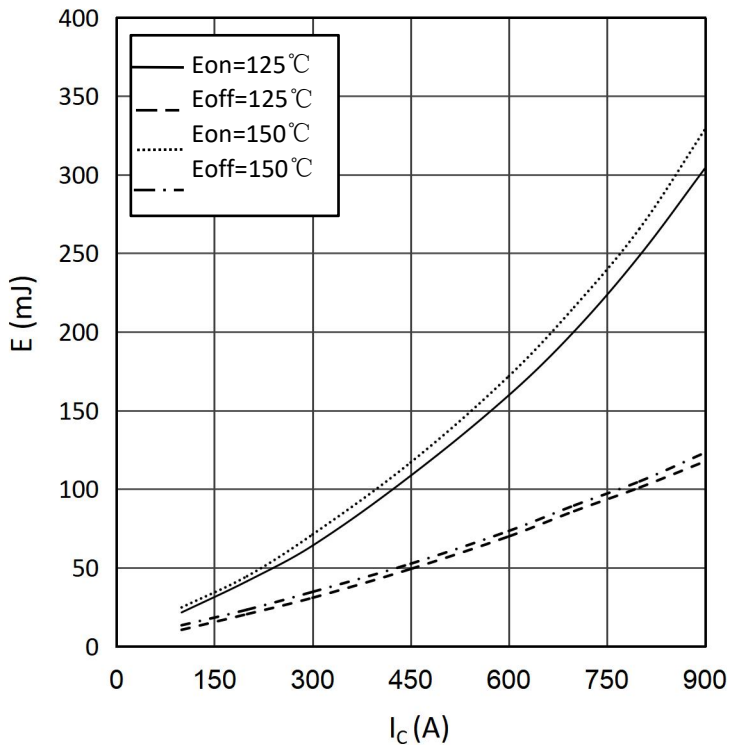

output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$


switching losses IGBT, Inverter (typical)

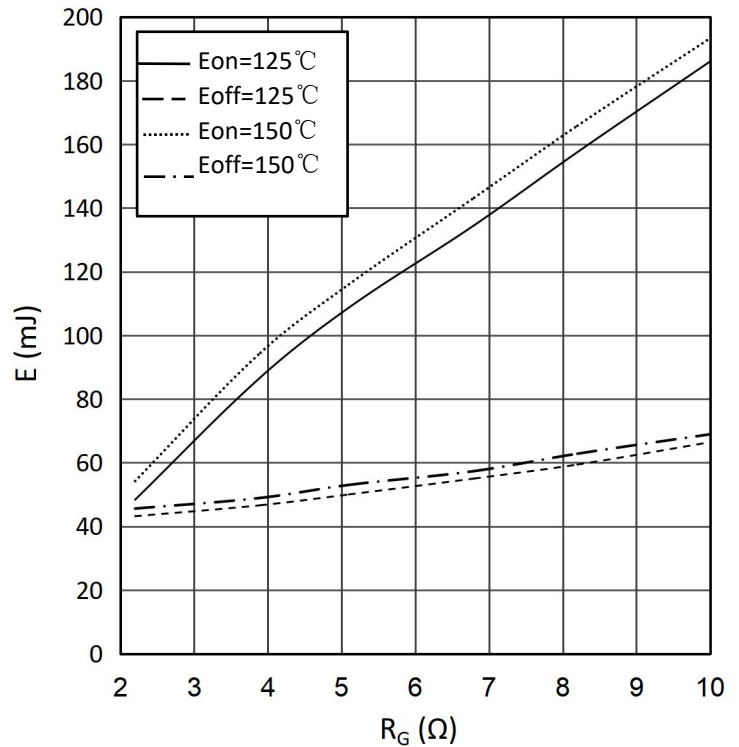
$E_{on} = f(I_C), E_{off} = f(I_C)$

$V_{GE} = \pm 15V, R_{Gon} = 5.1\Omega, R_{Goff} = 5.1\Omega, V_{CE} = 600V$


switching losses IGBT, Inverter (typical)

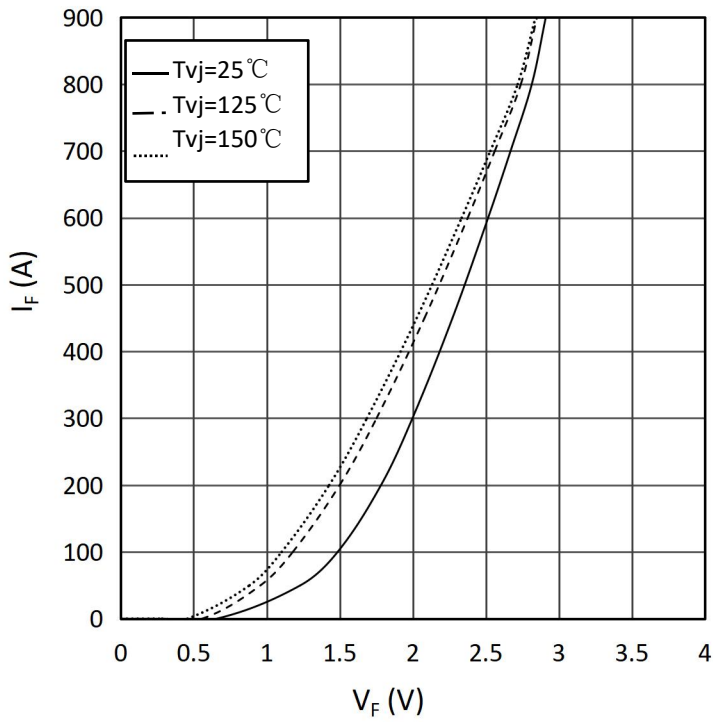
$E_{on} = f(R_G), E_{off} = f(R_G)$

$V_{GE} = \pm 15V, I_C = 450A, V_{CE} = 600V$



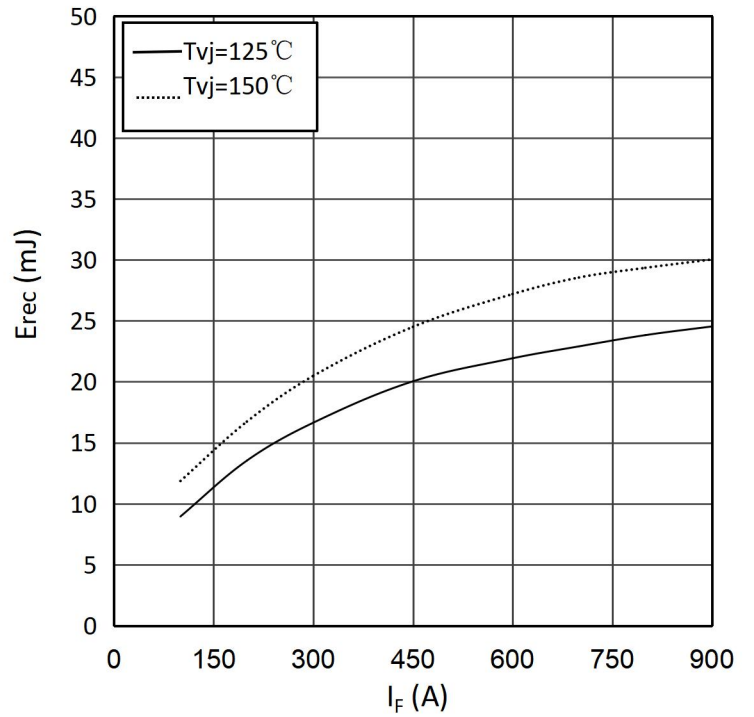
forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

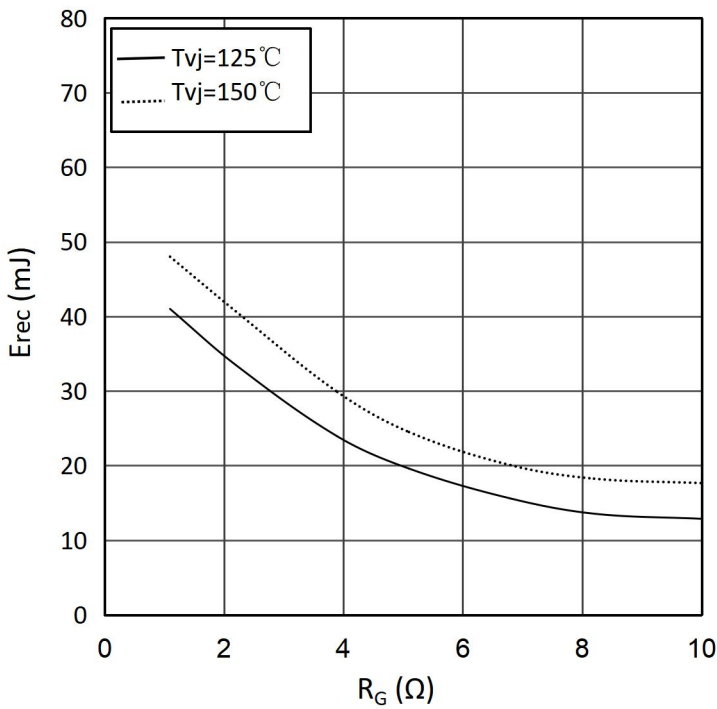
$E_{rec} = f(I_F)$



switching losses Diode, Inverter (typical)

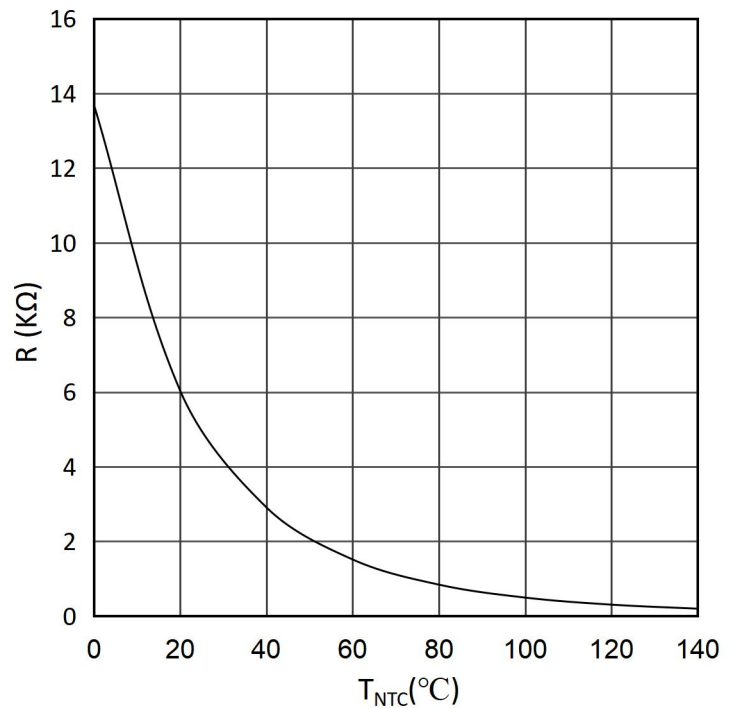
$E_{rec} = f(R_G)$

$I_F=450\text{A}, V_{CE}=600\text{V}$

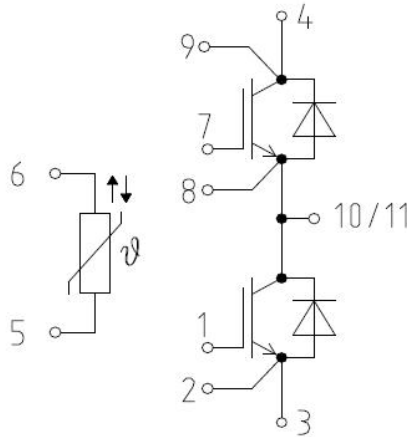


NTC-Thermistor-temperature characteristic(typical)

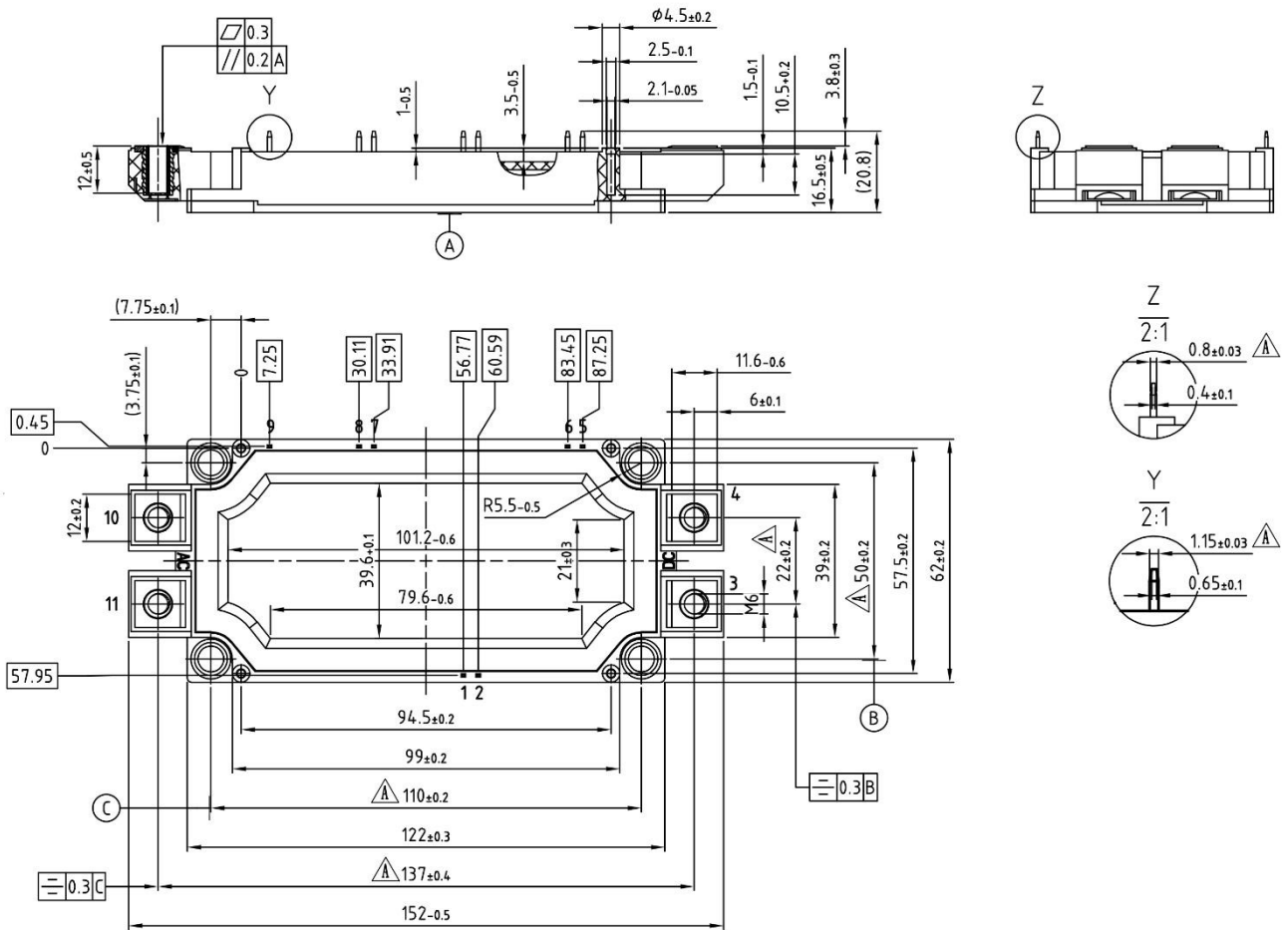
$R=f(T)$



Circuit diagram headline



Package outlines (Unit: mm)



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