

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°C		1200		V	
V _{GES}	Gate-emitter voltage	-		±20		V	
I _C	Collector current,DC	T _C =100°C,T _{vj} =175°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} ≤150°C		10		μs	
P _{tot}	Total power dissipation	T _C =25°C,T _{vj} =175°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°C		-	-	10	μA
I _{GES}	Gate leakage current	V _{CE} =0V,V _{GE} =20V,T _{vj} =25°C		-	-	50	nA
V _{GE(th)}	Gate-emitter threshold voltage	I _C =17.1mA,V _{CE} =V _{GE} ,T _{vj} =25°C		5.0	5.7	7.0	V
V _{CESat}	Collector-emitter saturation voltage	I _C =450A V _{GE} =15V	T _{vj} =25°C	-	2.18	-	
			T _{vj} =125°C	-	2.61	-	
			T _{vj} =150°C	-	2.68	-	
C _{ies}	Input capacitance	V _{CE} =25V,V _{GE} =0V f=1MHz,T _{vj} =25°C		-	31.8	-	nF
C _{oes}	Output capacitance			-	2.1	-	
C _{res}	Reverse transfer capacitance			-	1.08	-	
Q _G	Gate charge	V _{GE} =± 15V		-	2814	-	nC
R _g	Internal gate resistance	T _{vj} =25°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)		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}	Thermalresistance,case to heatsink	per IGBT/ λgrease=1 W/(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	$T_{vj}=25^{\circ}C$	1200	V
I_F	Forward current, DC	$T_C=100^{\circ}C, T_{vj}=150^{\circ}C$	450	A
I_{FRM}	Repetitive peak forward current	$t_p=1ms$	900	A
I^2t	I^2t -value	$V_R=0V, t_p=10ms, T_{vj}=150^{\circ}C$	28500	A^2s

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	V _R =600V I _F =450A V _{GE} =-15V	T _{vj} =25°C	-	183	-	A
			T _{vj} =125°C	-	259	-	
			T _{vj} =150°C	-	284	-	
t _{rr}	Reverse recovery time		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	-	26.1	-	
R _{thJC}	Thermal resistance, junction to case	per diode		-	-	0.1	K/W
R _{thCH}	Thermal resistance, case to heatsink	per diode/ $\lambda_{grease}=1W/(m \cdot K)$		-	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	-	

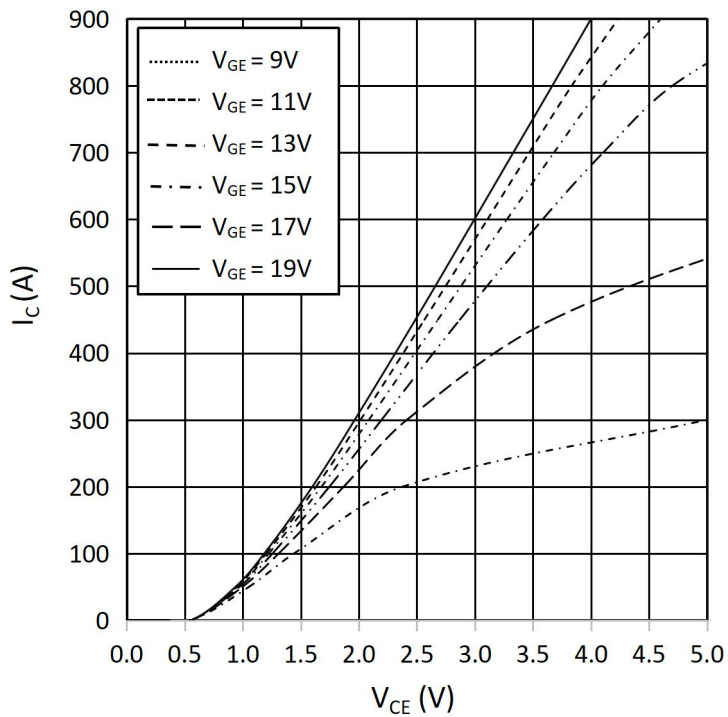
Module

Symbol	Item	Conditions	Rating			Unit
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)

$$I_C = f(V_{CE})$$

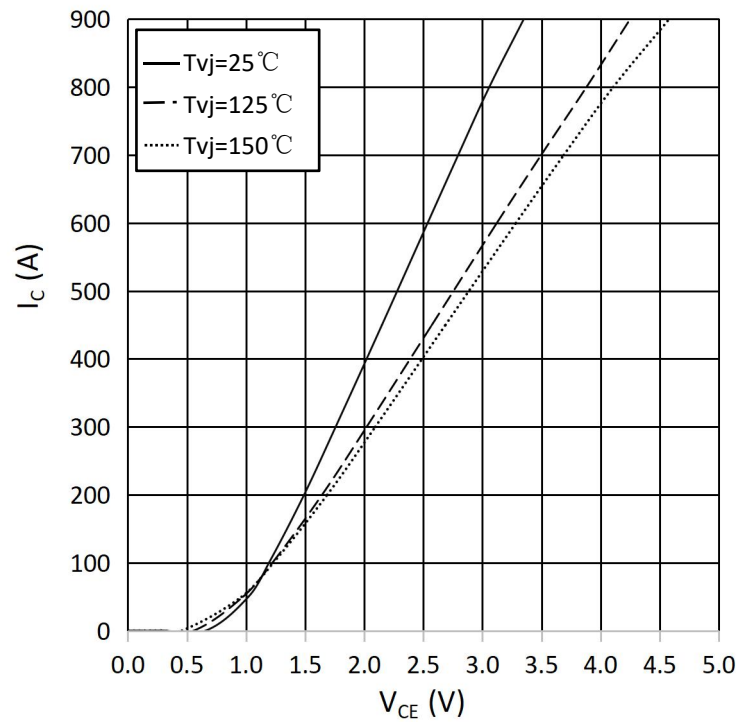
$$T_{vj} = 150^{\circ}\text{C}$$



output characteristic IGBT, Inverter (typical)

$$I_C = f(V_{CE})$$

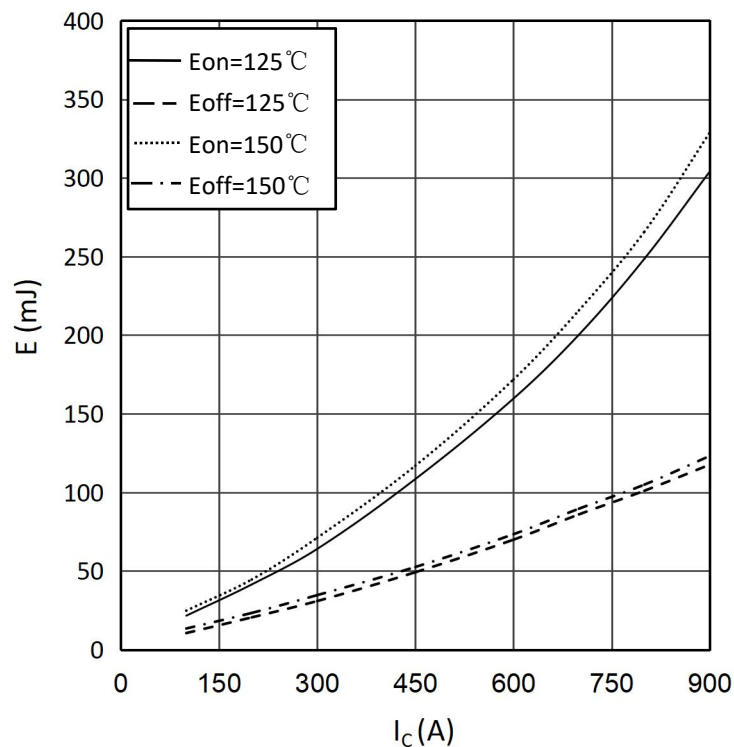
$$V_{GE} = 15\text{ V}$$



switching losses IGBT, Inverter (typical)

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

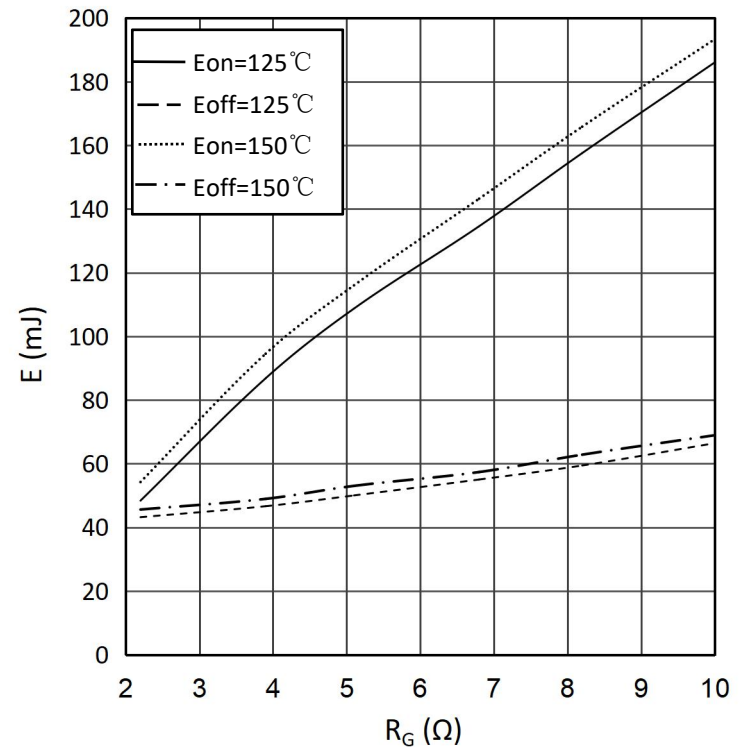
$$V_{GE} = \pm 15\text{ V}, R_{Gon} = 5.1\Omega, R_{Goff} = 5.1\Omega, V_{CE} = 600\text{ V}$$



switching losses IGBT, Inverter (typical)

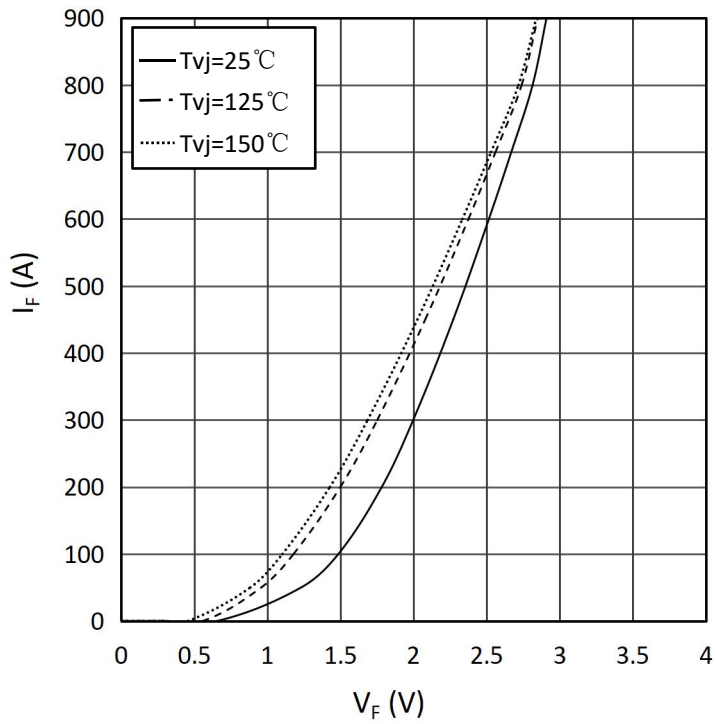
$$E_{on} = f(R_G), E_{off} = f(R_G)$$

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



forward characteristic of Diode, Inverter (typical)

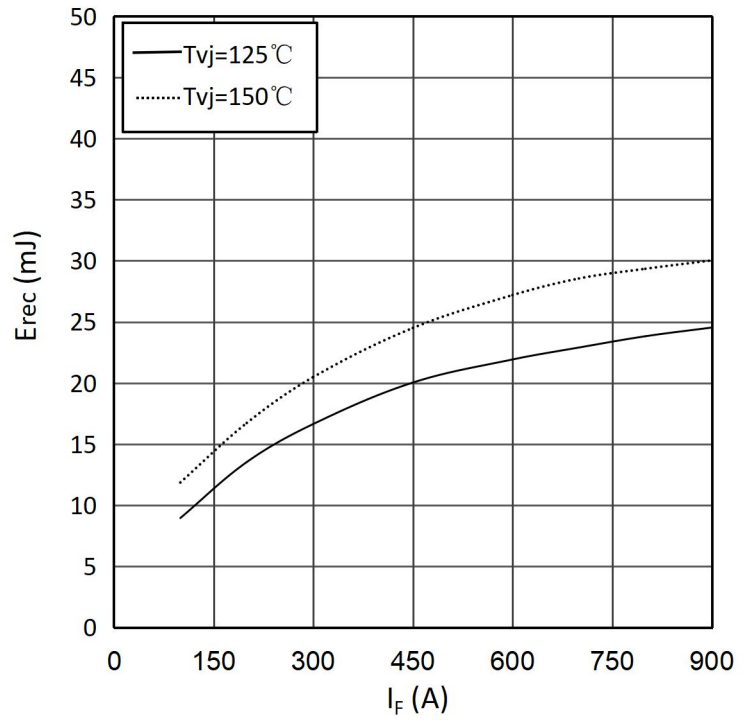
$$I_F = f(V_F)$$



switching losses Diode, Inverter (typical)

$$E_{rec} = f(I_F)$$

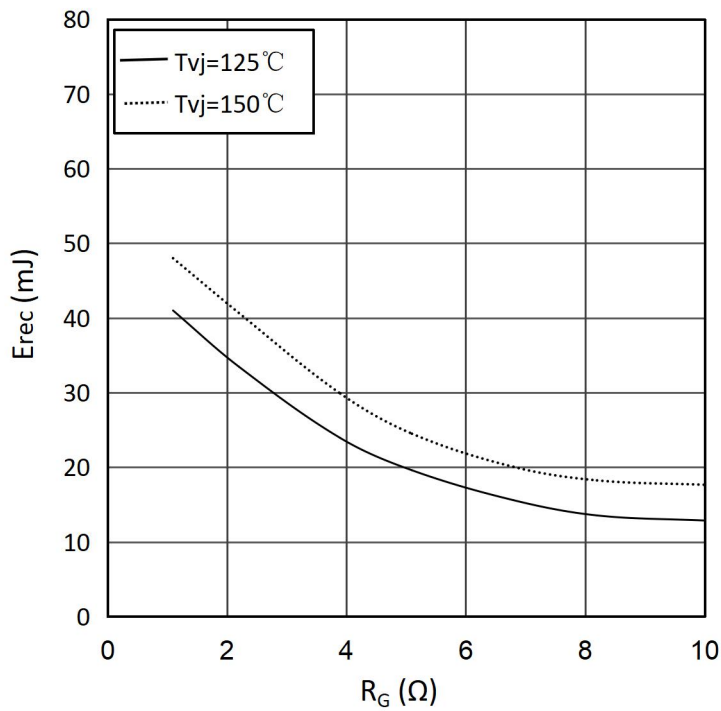
$$R_{Gon}=5.1\Omega, V_{CE}=600V$$



switching losses Diode, Inverter (typical)

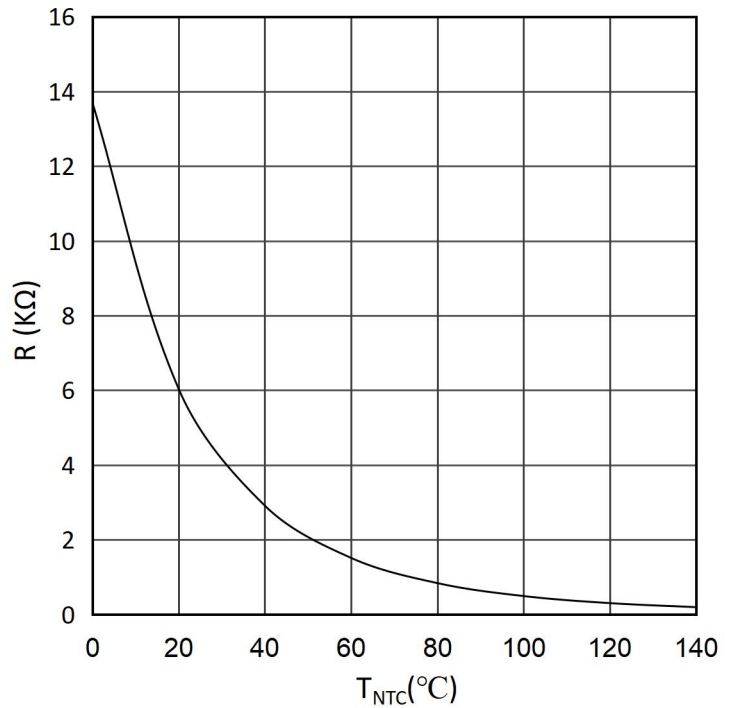
$$E_{rec} = f(R_G)$$

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

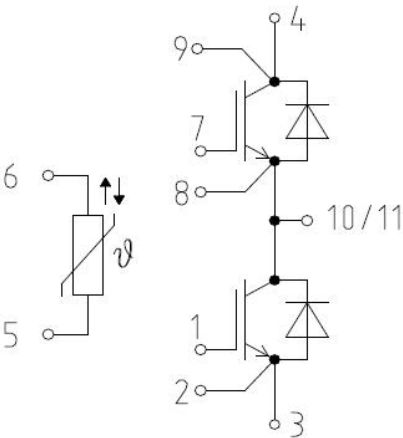


NTC-Thermistor-temperature characteristic(typical)

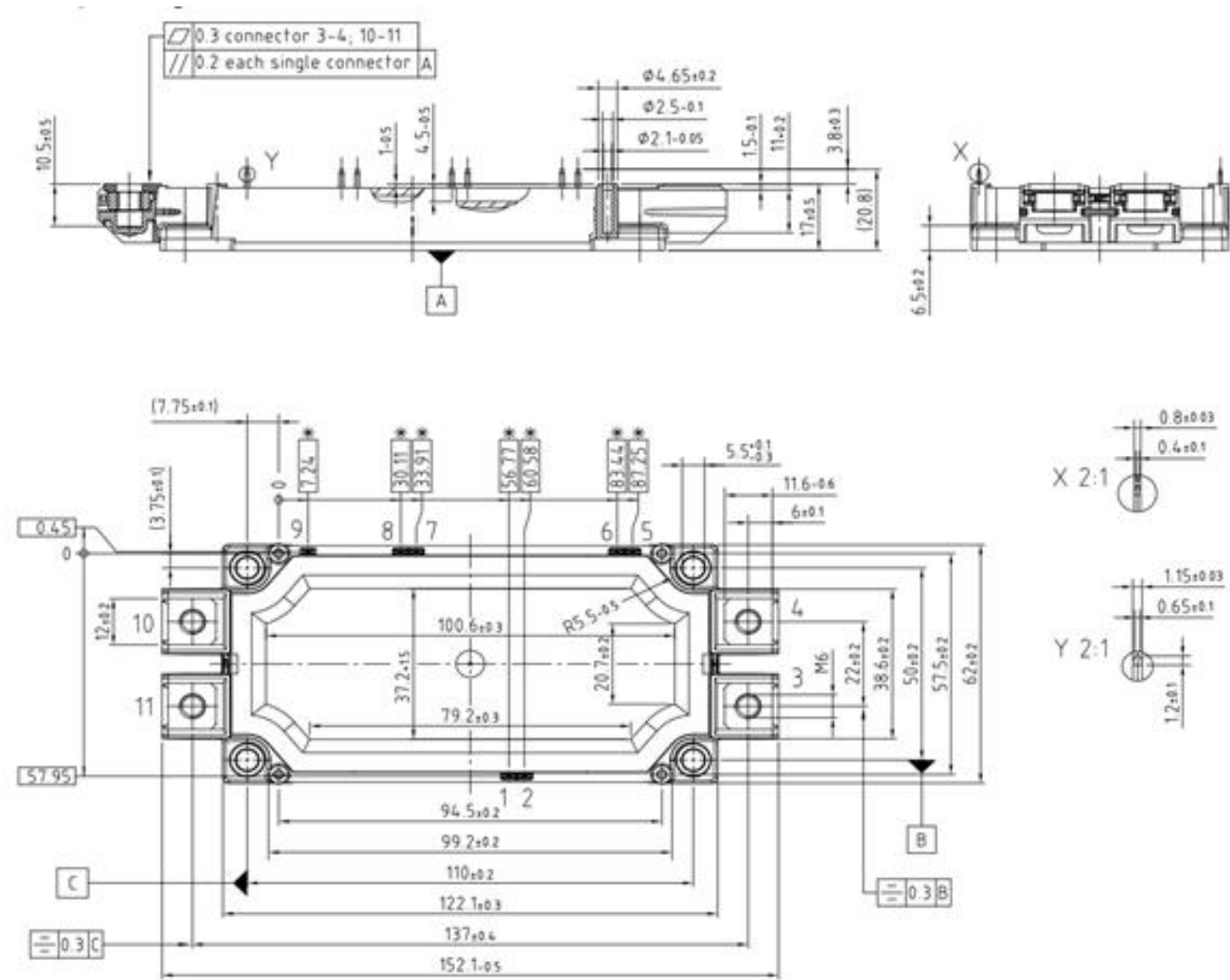
$$R=f(T)$$



Circuit diagram headline



Package outlines (Unit: mm)



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