MPFS75R12CBF

1200V 75A IGBT Module

Features

- Trench/Fieldstop IGBT
- Low V_{CESAT}
- Al2O3 Substrate with Low Thermal Resistance
- Standard Housing
- Copper Base Plate
- Solder Contact Technology
- Integrated NTC temperature sensor

Typical Applications

- Motor Drives
- Servo Drives
- Auxiliary Inverters

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		75		A
I_{CRM}	Repetitive peak collector current	t_p=1ms		150		A
P_{tot}	Total power dissipation	T_C=25°C,T_{vj}=175°C		630		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		-	- 1	mA
I_{GES}	Gate leakage current	V_{CE}=0V,V_{GE}=20V,T_{vj}=25°C		-	- 100	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	I_C=2.4mA,V_{CE}=V_{GE},T_{vj}=25°C		5.2	5.95 6.6	V
V_{CEsat}	Collector-emitter saturation voltage	I_C=75A V_{GE}=15V	T_{vj}=25°C	-	1.83 -	V
			T_{vj}=125°C	-	2.18 -	
			T_{vj}=150°C	-	2.25 -	
C_{ies}	Input capacitance	V_{CE}=25V,V_{GE}=0V f=1MHz,T_{vj}=25°C		-	5.3 -	nF
C_{oes}	Output capacitance			-	0.35 -	
C_{res}	Reverse transfer capacitance			-	0.18 -	
Q_G	Gate charge	V_{CC}=600V,I_C=40A V_{GE}=-15...+15V,T_{vj}=25°C		-	0.477 -	µC
R_g	Internal gate resistance	T_{vj}=25°C		-	2.4 -	Ω

$t_{d(on)}$	Turn-on delay time	V_{CC}=600V I_C=75A V_{GE}=±15V $R_{G(on)}$=20Ω $R_{G(off)}$=20Ω di/dt=2389A/μs (T_{vj}=125℃) du/dt=6656V/μs (T_{vj}=125℃)	T_{vj}=25℃	-	103.2	-	ns
			T_{vj}=125℃	-	102.4	-	
			T_{vj}=150℃	-	98.4	-	
t_r	Rise time		T_{vj}=25℃	-	60.8	-	
			T_{vj}=125℃	-	68.0	-	
			T_{vj}=150℃	-	68.5	-	
$t_{d(off)}$	Turn-off delay time		T_{vj}=25℃	-	363.4	-	
			T_{vj}=125℃	-	386.1	-	
			T_{vj}=150℃	-	422.1	-	
t_f	Fall time		T_{vj}=25℃	-	248.2	-	
			T_{vj}=125℃	-	337.8	-	
			T_{vj}=150℃	-	339.6	-	
E_{on}	Turn-on energy (per pulse)		T_{vj}=25℃	-	13.7	-	mJ
			T_{vj}=125℃	-	18.5	-	
			T_{vj}=150℃	-	19.9	-	
E_{off}	Turn-off energy (per pulse)		T_{vj}=25℃	-	4.8	-	
			T_{vj}=125℃	-	6.5	-	
			T_{vj}=150℃	-	7.1	-	
SC data	Short-circuit current	V_{CC}=600V,V_{GE}≤15V,T_{vj}=125℃ V_{CES}≤1200V,t_P≤10μs		-	386	-	A
R_{thJC}	Thermal resistance,junction to case	Per IGBT		-	0.238	-	K/W
R_{thCH}	Thermalresistance,case to heatsink	Per IGBT λgrease=1W/(m·K)		-	0.076	-	K/W
Tvjop	Temperature under switching conditions			-40		150	℃

Diode，Inverter

Maximum Rated Values

Symbol	Item	Conditions	Rating	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25℃	1200	V
I_F	Forward current,DC		75	A
I_{FRM}	Repetitive peak forward current	t_p=1ms	150	A
I^2t	I^2t-value	V_R=0V,t_p=10ms,T_{vj}=125℃	960	A^2s

Characteristic Values

				Min.	Typ.	Max.	
V_F	Continuous forward voltage	I_F=75A V_{GE}=0V	T_{vj}=25℃	-	1.86	-	V
			T_{vj}=125℃	-	1.74	-	
			T_{vj}=150℃	-	1.69	-	
I_{RM}	Peak reverse recovery current	V_R=600V I_F=75A V_{GE}=-15V -di$_F$/dt=2113A/μs (T_{vj}=125℃)	T_{vj}=25℃	-	52.8	-	A
			T_{vj}=125℃	-	63.7	-	
			T_{vj}=150℃	-	69.0	-	
t_{rr}	Reverse recovery time		T_{vj}=25℃	-	76.6	-	ns
			T_{vj}=125℃	-	218.7	-	
			T_{vj}=150℃	-	344.6	-	
Q_r	Recovered charge		T_{vj}=25℃	-	2.26	-	μC
			T_{vj}=125℃	-	12.6	-	
			T_{vj}=150℃	-	15.3	-	

E_{rec}	Reverse recovery energy		T_{vj}=25℃	-	0.27	-	mJ
			T_{vj}=125℃	-	4.0	-	
			T_{vj}=150℃	-	4.87	-	
R_{thJC}	Thermal resistance,junction to case	Per diode		-	0.426	-	K/W
R_{thCH}	Thermal resistance,case to heatsink	Per diode,λ_{grease} =1 W/(mK)			0.073		K/W
Tvjop	Temperature under switching conditions			-40		150	℃

NTC Thermistor Characteristics

Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
R_{25}	Rated resistance	T_C=25℃	-	5	-	kΩ
ΔR/R	Deviation of resistance	T_C=100℃,R_{100}=493Ω	-5	-	5	%
P_{25}	Power dissipation	T_C=25℃	-	-	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	-	

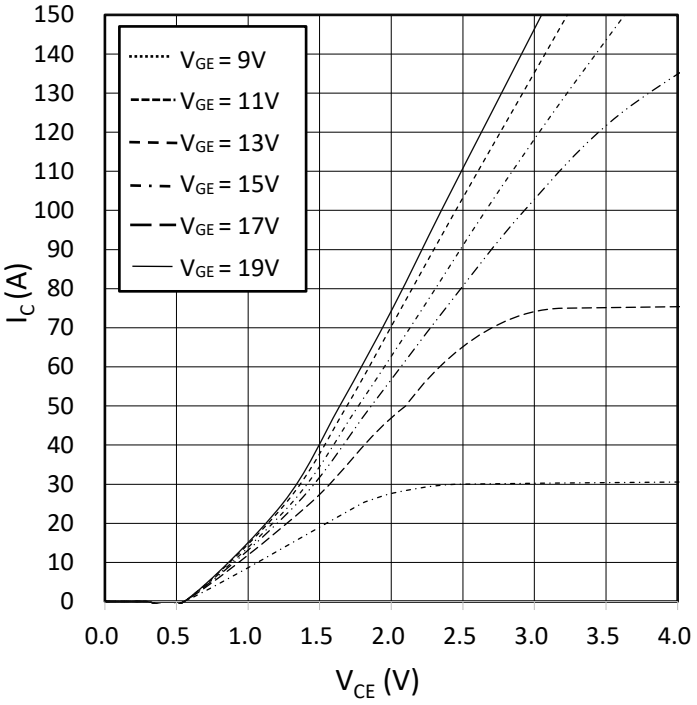
Module

Symbol	Item	Conditions	Rating			Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate，RMS,f=50Hz,t=1min	2500			V
$T_{vj\ max}$	Maximum junction temperature	-	175			℃
$T_{vj\ op}$	Operating junction temperature	Continuous operationg(under switching)	-40~150			℃
T_{stg}	Storage temperature	-	-40~125			℃
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
Ms	Mounting torque	Mounting to heat sink,M5 screw	3	-	6	Nm
ds	Creepage distance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	10	-	
da	Clearance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	7.5	-	
m	Weight	-	-	175	-	g

output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

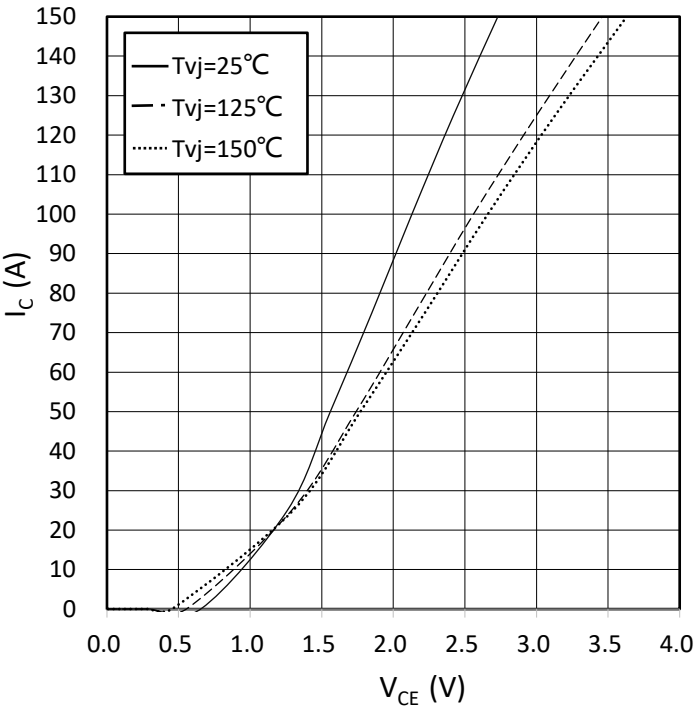
$T_{vj} = 150℃$



output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$

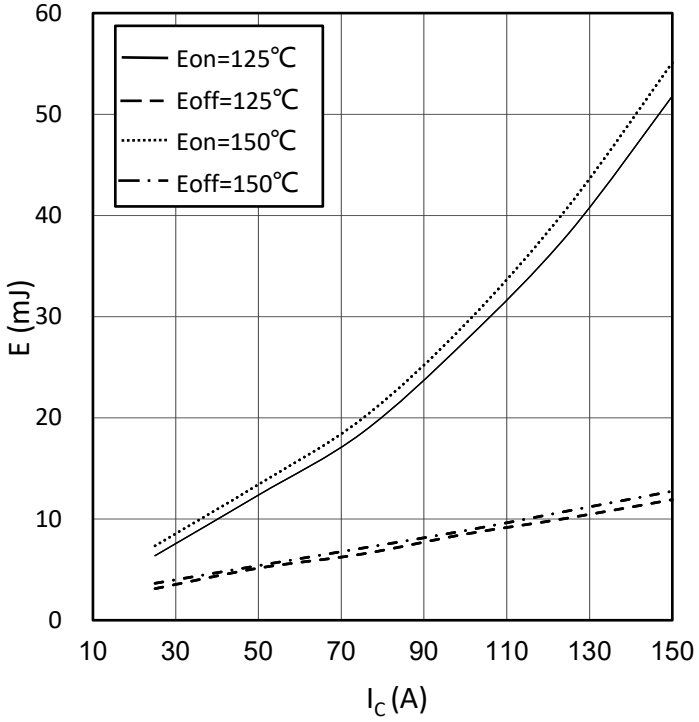
$V_{GE} = 15\ V$



switching losses IGBT,Inverter(typical)

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

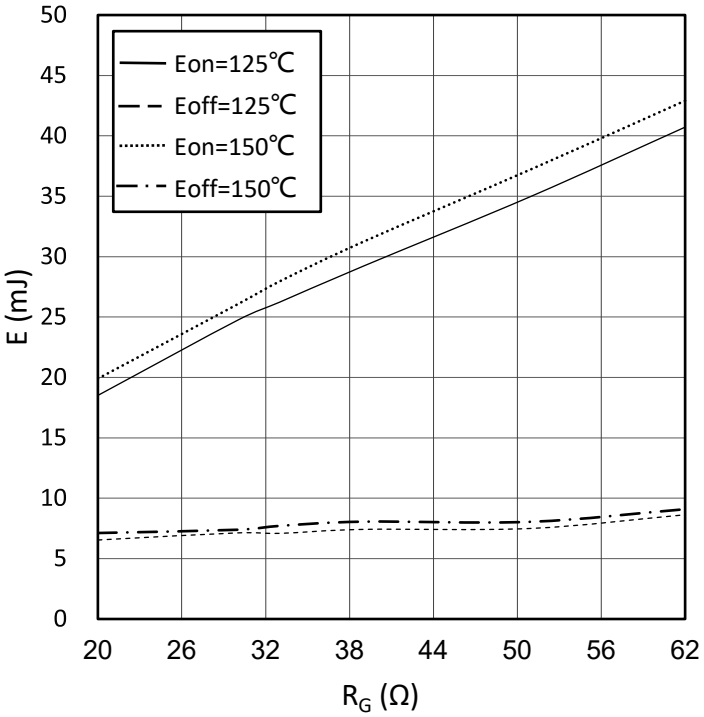
$V_{GE} = \pm 15V$, $R_{Gon} = 20\Omega$, $R_{Goff} = 20\Omega$, $V_{CE} = 600V$



switching losses IGBT,Inverter(typical)

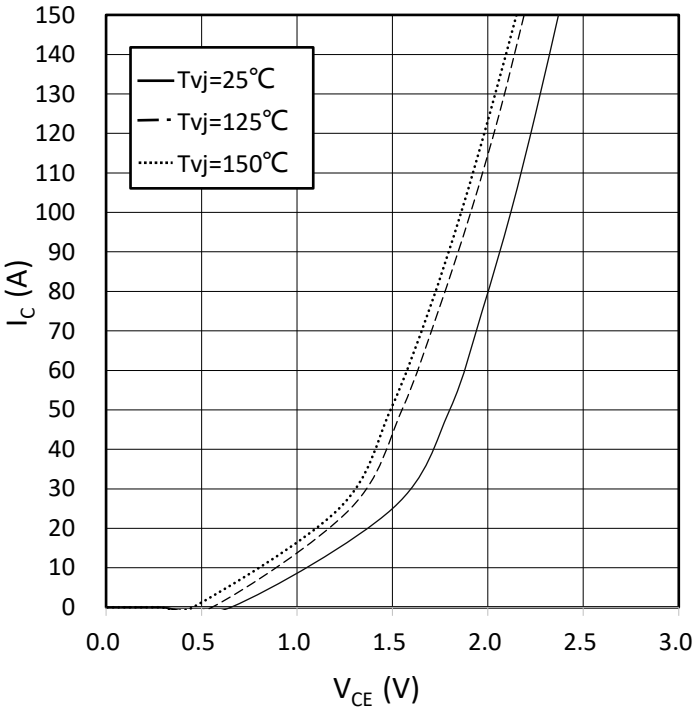
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

$V_{GE} = \pm 15V$, $I_C = 75A$, $V_{CE} = 600V$



forward characteristic of Diode, Inverter (typical)

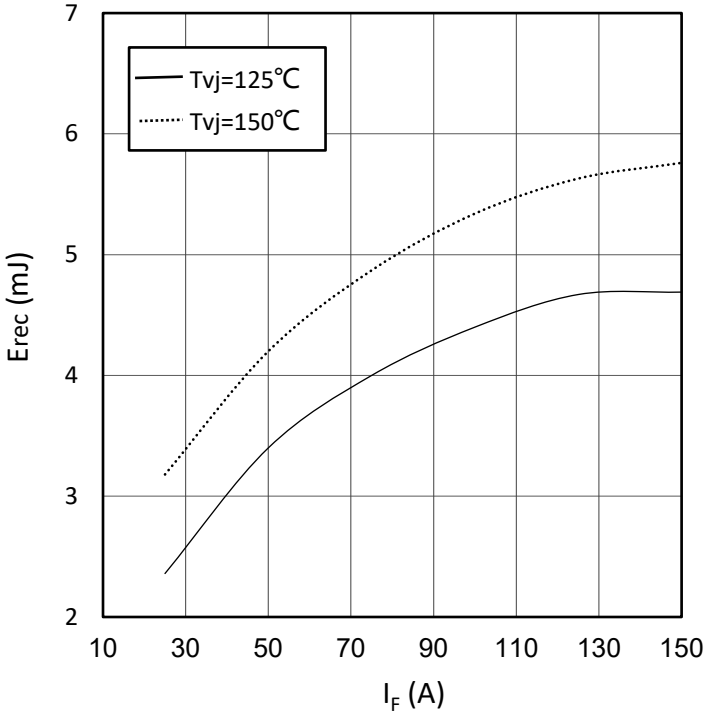
$I_F = f(V_F)$



switching losses Diode, Inverter (typical)

$E_{rec} = f(I_F)$

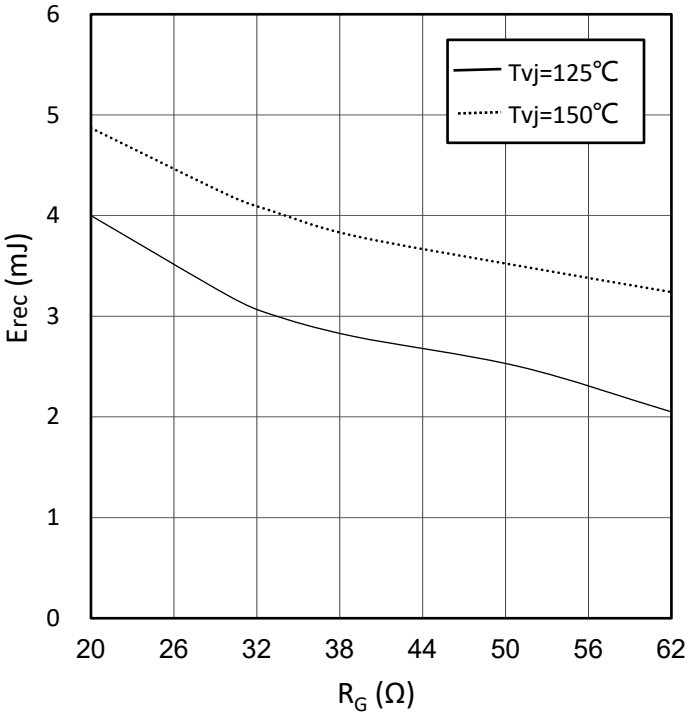
R_{Gon}=20Ω, V_{CE}=600V



switching losses Diode, Inverter (typical)

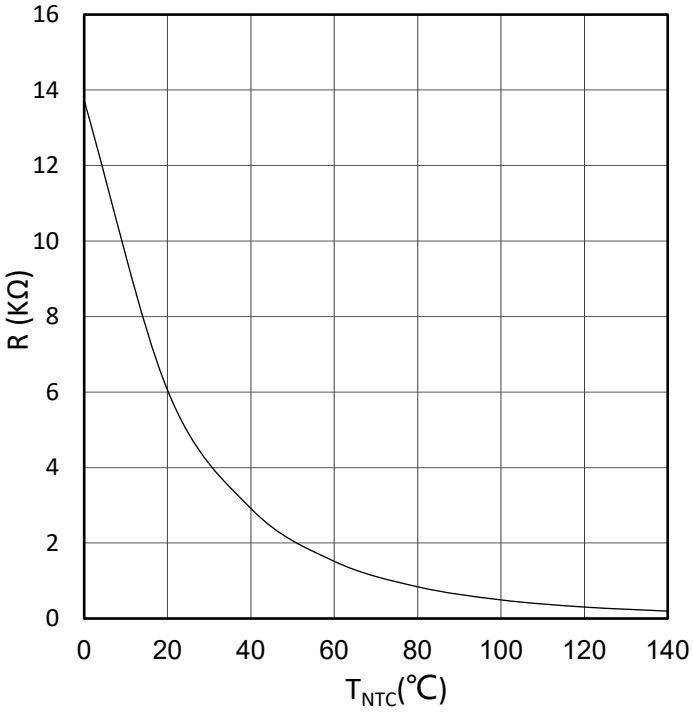
$E_{rec} = f(R_G)$

I_F=75A, V_{CE}=600V

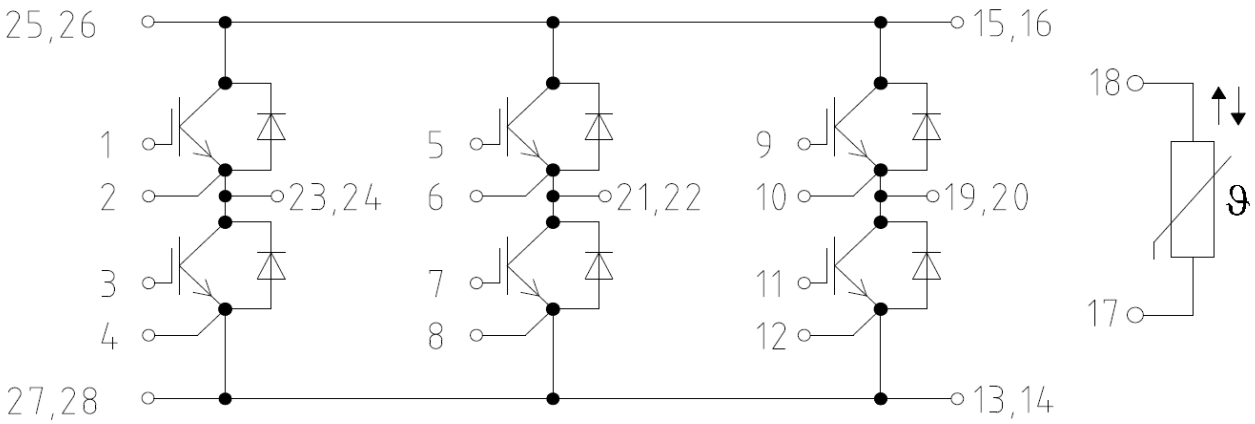


NTC-Thermistor-temperature characteristic(typical)

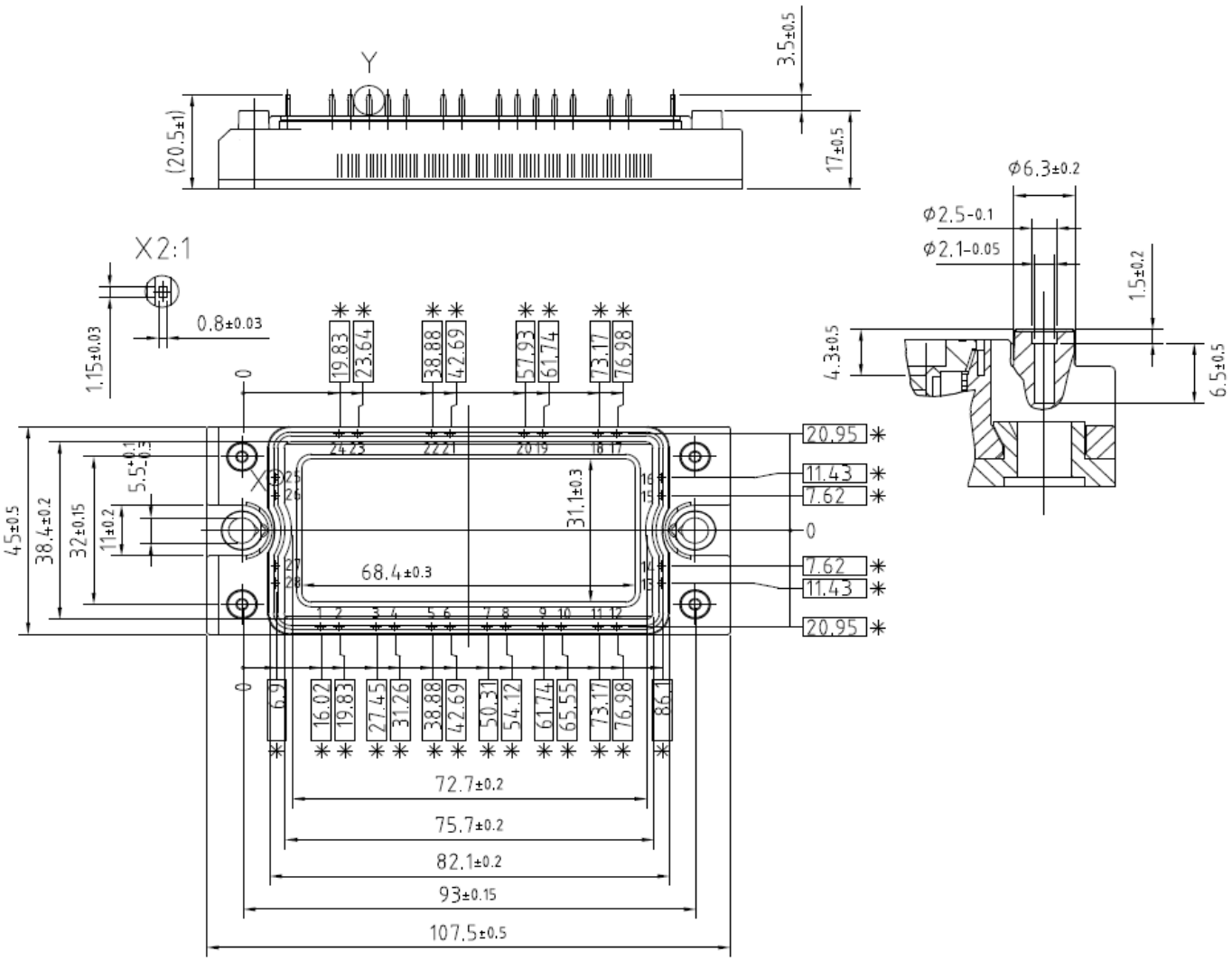
R=f (T)



Cricuit Diagram



Package Outlines



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