

6MBI300U-120



IGBT Module U-Series 1200V / 300A 6 in one-package

■ Features

- High speed switching
- Voltage drive
- Low inductance module structure

■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply
- Industrial machines, such as Welding machines

■ Maximum ratings and characteristics

● Absolute maximum ratings (at Tc=25°C unless otherwise specified)

Item	Symbol	Conditions	Rating	Unit
Collector-Emitter voltage	V _{CES}		1200	V
Gate-Emitter voltage	V _{GES}		±20	V
Collector current	I _c	Continuous	T _c =25°C	A
			T _c =80°C	
	I _{cp}	1ms	T _c =25°C	
			T _c =80°C	
	-I _c		300	
	-I _c pulse		600	
Collector Power Dissipation	P _c	1 device	1385	W
Junction temperature	T _j		+150	°C
Storage temperature	T _{stg}		-40 to +125	
Isolation voltage	between terminal and copper base *1	V _{iso}	AC:1min.	VAC
	between thermistor and others *2			
Screw Torque	Mounting *3	-	3.5	N·m
	Terminals *4		4.5	

*1 : All terminals should be connected together when isolation test will be done.

*2 : Two thermistor terminals should be connected together, each other terminals should be connected together and shorted to base plate when isolation test will be done.

*3 :Recommendable value : 2.5 to 3.5 N·m(M5) *4 :Recommendable value : 3.5 to 4.5 N·m(M6)

● Electrical characteristics (at Tj=25°C unless otherwise specified)

Item	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	I _{CES} V _{GE} =0V, V _{CE} =1200V	—	—	3.0	mA
	Gate-Emitter leakage current	I _{GES} V _{CE} =0V, V _{GE} =±20V	—	—	600	nA
	Gate-Emitter threshold voltage	V _{GE(th)} V _{CE} =20V, I _c =300mA	4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)} V _{GE} =15V, I _c =300A	T _j =25°C	2.05	2.40	V
			T _j =125°C	2.30	—	
			T _j =25°C	1.75	2.10	
			T _j =125°C	2.00	—	
	Input capacitance	C _{ies} V _{CE} =10V, V _{GE} =0V, f=1MHz	—	34	—	nF
	Turn-on time	V _{CC} =600V I _c =300A V _{GE} =±15V	—	0.36	1.20	μs
			—	0.21	0.60	
			—	0.03	—	
	Turn-off time	R _G =2 Ω	—	0.37	1.00	μs
			—	0.07	0.30	
	Forward on voltage	V _F V _{GE} =0V (terminal) I _F =300A	T _j =25°C	1.90	2.20	V
			T _j =125°C	2.00	—	
			T _j =25°C	1.60	1.90	
			T _j =125°C	1.70	—	
	Reverse recovery time	t _{rr} I _F =300A	—	—	0.35	μs
	Lead resistance, terminal-chip*4	R lead	—	1.0	—	mΩ
Thermistor	Resistance	R T=25°C	—	5000	—	Ω
		T=100°C	465	495	520	
	B value	B T=25/50°C	3305	3375	3450	K

*4:Biggest internal terminal resistance among arm.

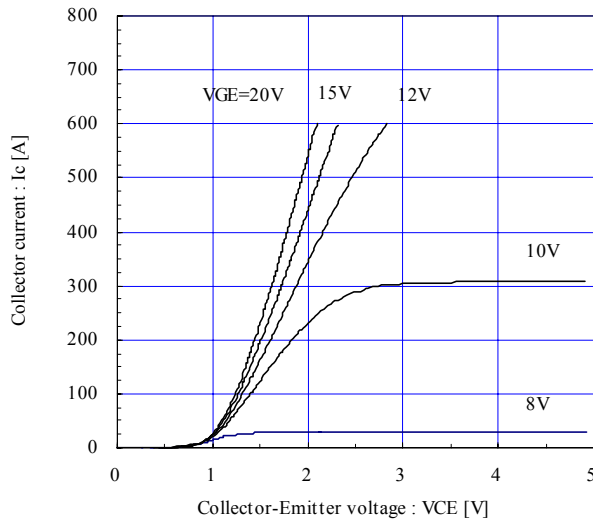
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	—	—	0.09	°C/W
	R _{th(j-c)}	FWD	—	—	0.15	°C/W
Contact Thermal resistance	R _{th(c-f)} *5	With thermal compound	—	0.0167	—	°C/W

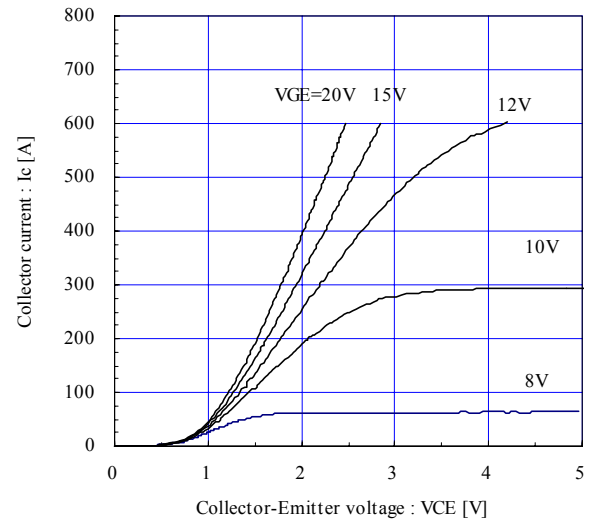
*5 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

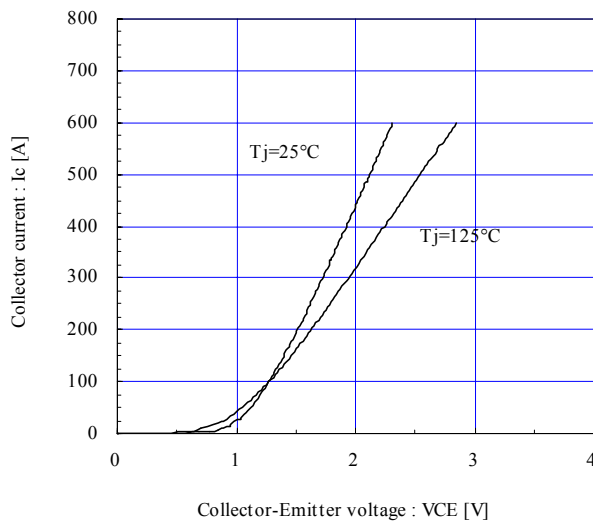
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

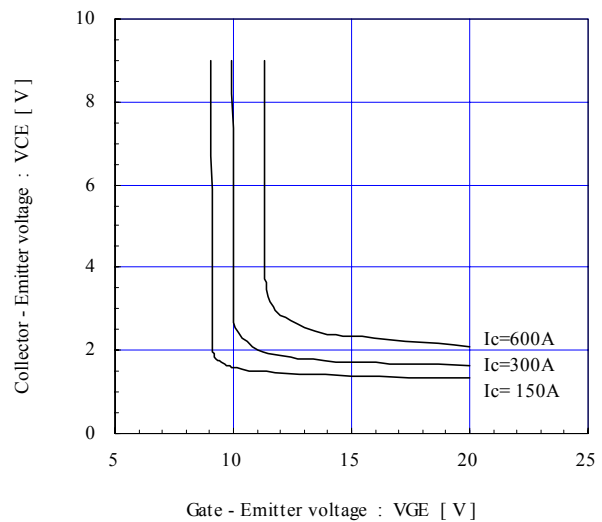
Collector current vs. Collector-Emitter voltage (typ.)

 $T_j = 125^\circ\text{C}$ / chip

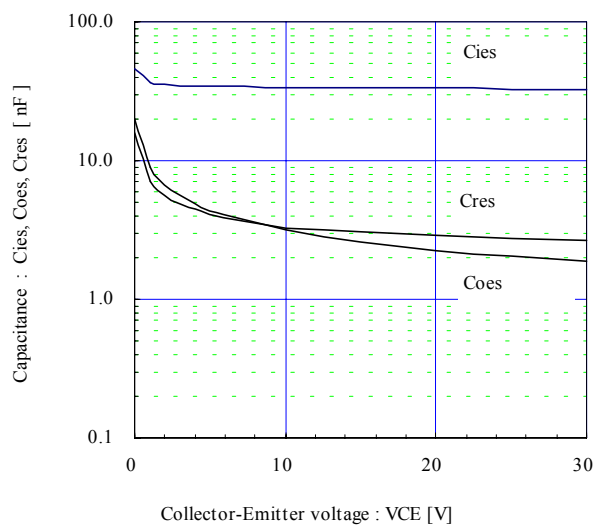
Collector current vs. Collector-Emitter voltage (typ.)

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

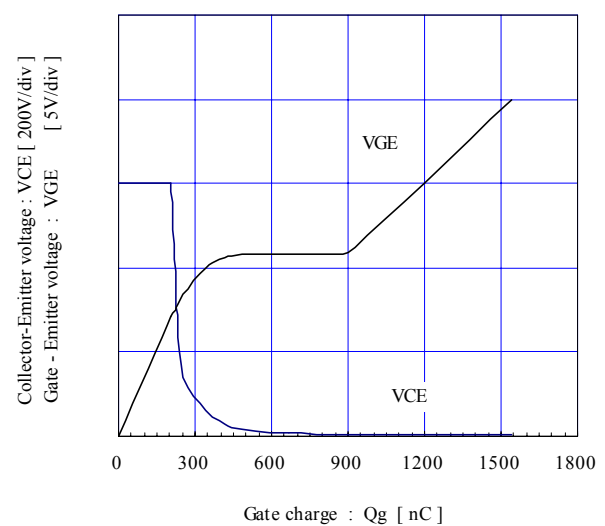
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

 $T_j = 25^\circ\text{C}$ / chip

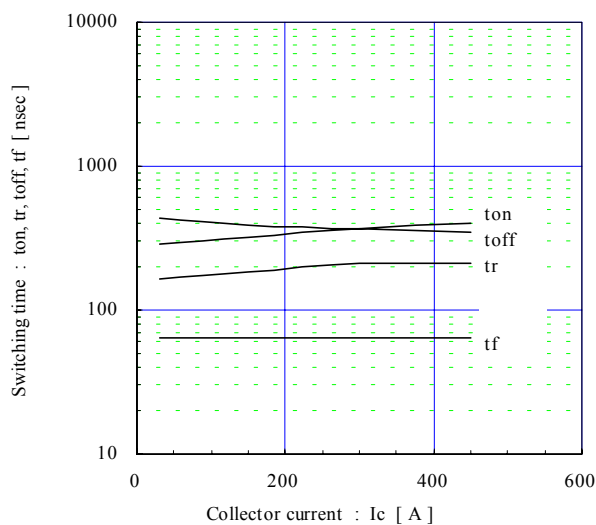
Capacitance vs. Collector-Emitter voltage (typ.)

 $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$, $T_j = 25^\circ\text{C}$ 

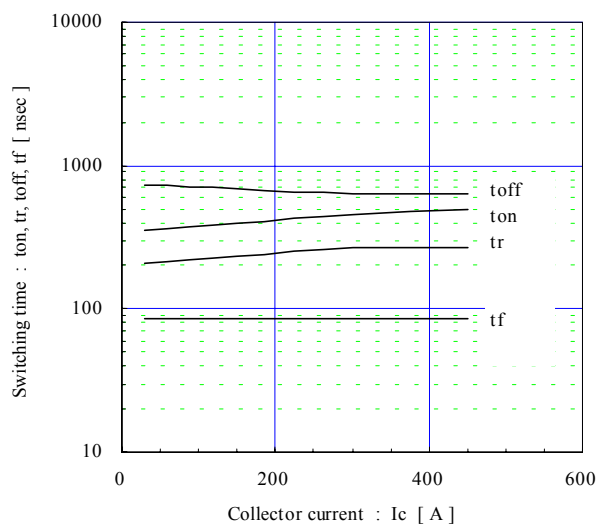
Dynamic Gate charge (typ.)

 $V_{cc} = 600\text{V}$, $I_c = 300\text{A}$, $T_j = 25^\circ\text{C}$ 

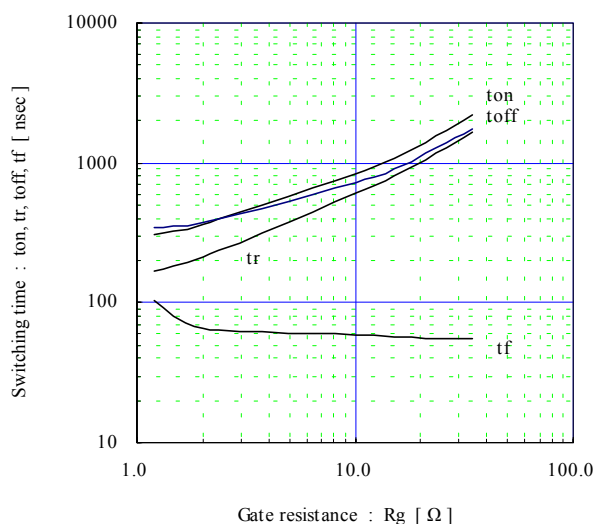
Switching time vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2\Omega$, $T_j=25^\circ C$ 

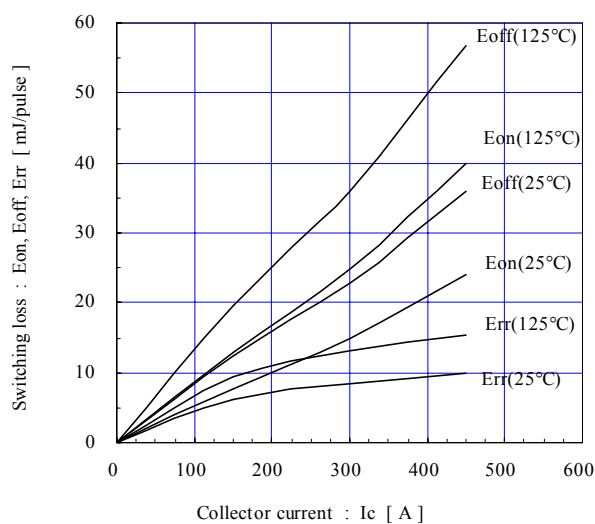
Switching time vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2\Omega$, $T_j=125^\circ C$ 

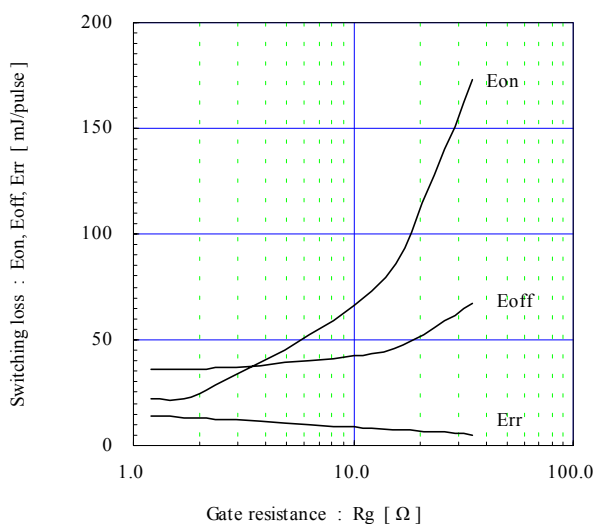
Switching time vs. Gate resistance (typ.)

 $V_{cc}=600V$, $I_c=300A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$ 

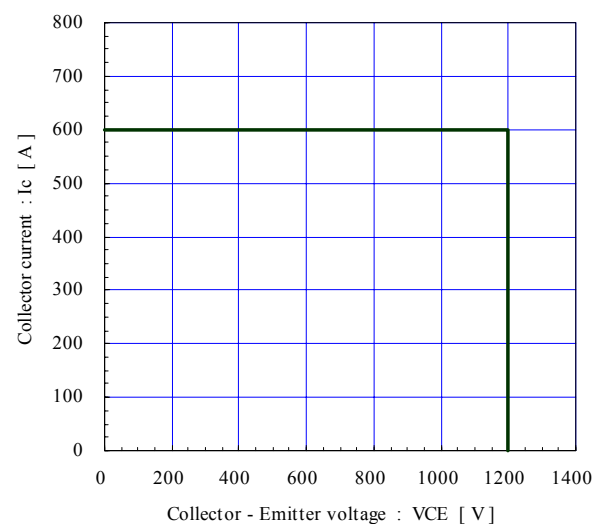
Switching loss vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=2\Omega$ 

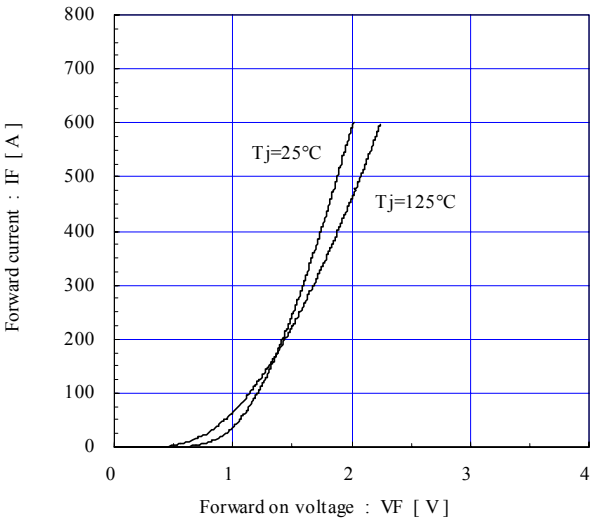
Switching loss vs. Gate resistance (typ.)

 $V_{cc}=600V$, $I_c=300A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$ 

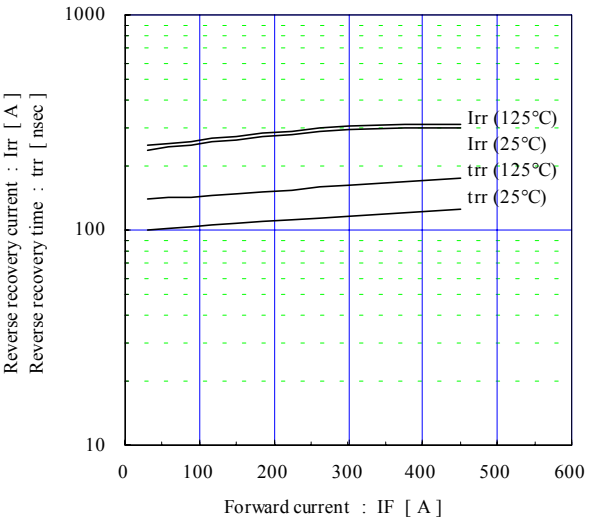
Reverse bias safe operating area (max.)

 $+V_{GE}=15V$, $-V_{GE} \leq 15V$, $R_g \geq 2\Omega$, $T_j \leq 125^\circ C$ Stray inductance $\leq 100nH$ 

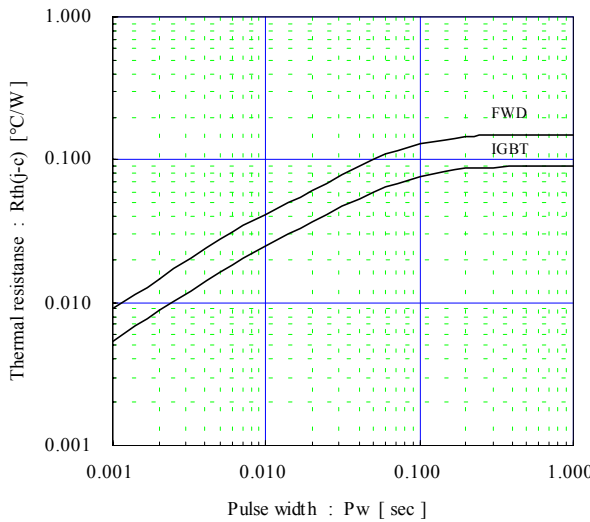
Forward current vs. Forward on voltage (typ.)
chip



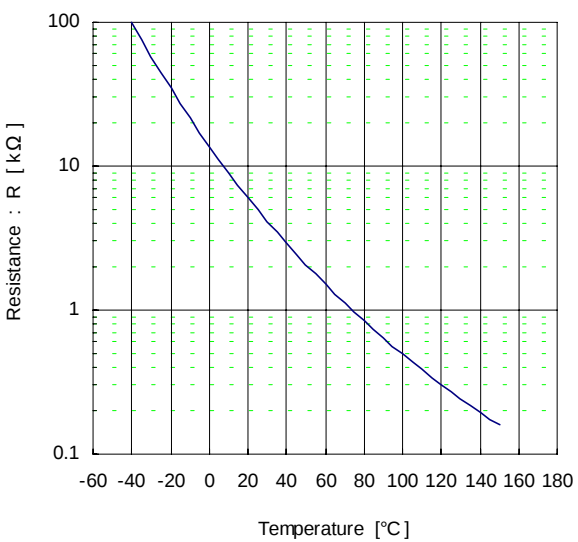
Reverse recovery characteristics (typ.)
 $V_{cc}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=2\Omega$



Transient thermal resistance (max.)

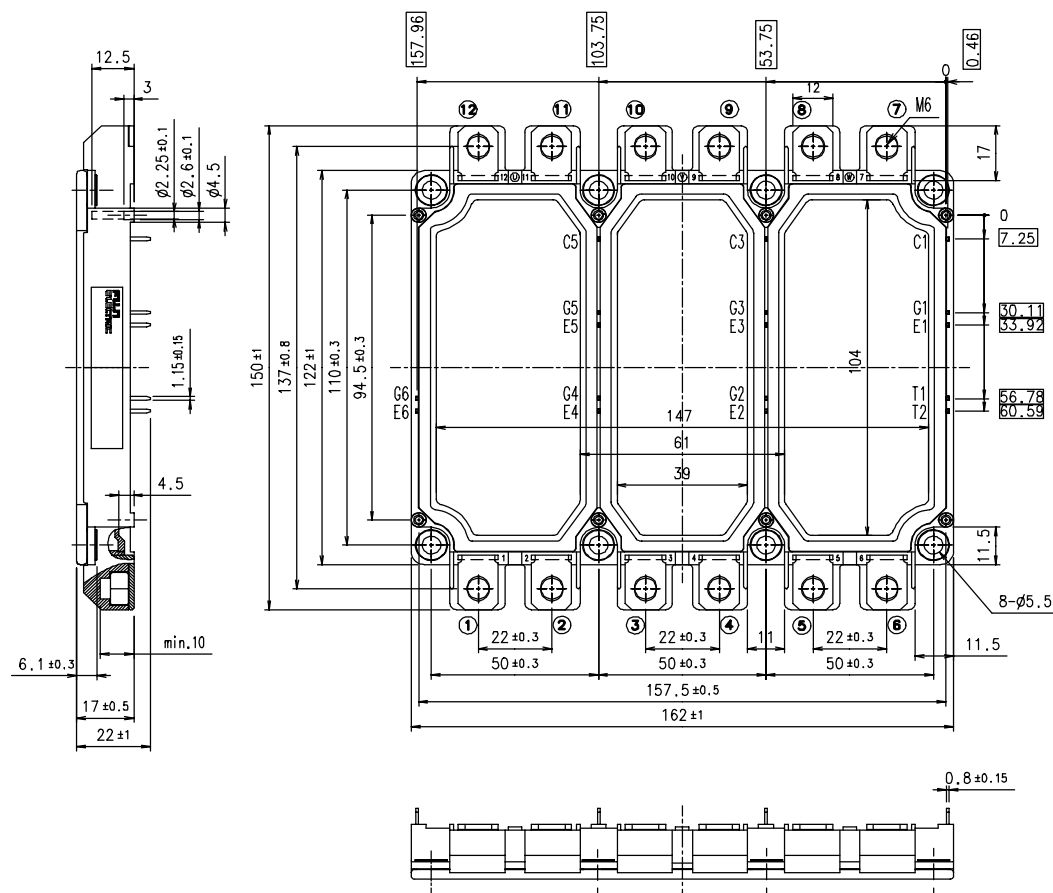


Temperature characteristic (typ.)



Outline Drawings, mm

M629



NOTE) shows theoretical dimension and tolerance is ± 0.5 mm.

Equivalent Circuit Schematic

