

6MBI450U-170



IGBT Module U-Series 1700V / 450A 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}		1700	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		450	
	-I _C pulse		900	
Collector Power Dissipation	P _C	1 device	2080	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 T_J=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} =1700V	—	—	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 =450mA	4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	V _{CE(sat)} V _{GE} =15V, I _C =450A	T _J =25°C	—	2.50	V
			T _J =125°C	—	2.85	
			T _J =25°C	—	2.05	
			T _J =125°C	—	2.40	
	Input capacitance	C _{ies} V _{CE} =10V, V _{GE} =0V, f=1MHz	—	45	—	nF
	Turn-on time	V _{CC} =900V I _C =450A V _{GE} =±15V	—	0.58	1.20	μs
			—	0.32	0.60	
			—	0.10	—	
	Turn-off time	R _G =1.1 Ω	—	0.80	1.50	μs
			—	0.15	0.30	
	Forward on voltage	V _F V _{GE} =0V (terminal) I _F =450A (chip)	T _J =25°C	—	2.25	V
			T _J =125°C	—	2.45	
			T _J =25°C	—	1.80	
			T _J =125°C	—	2.00	
	Reverse recovery time	t _{rr} I _F =450A	—	0.3	0.6	μs
	Lead resistance, terminal-chip*5	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

*5:Biggest internal terminal resistance among arm.

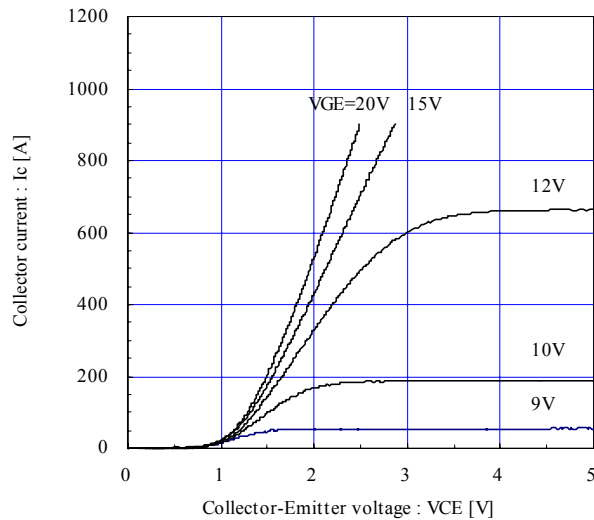
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Unit
			Min.	Typ.	Max.	
Thermal resistance	R _{th(j-c)}	IGBT	—	—	0.06	°C/W
	R _{th(j-c)}	FWD	—	—	0.10	°C/W
Contact Thermal resistance	R _{th(c-f)} *6	With thermal compound	—	0.0167	—	°C/W

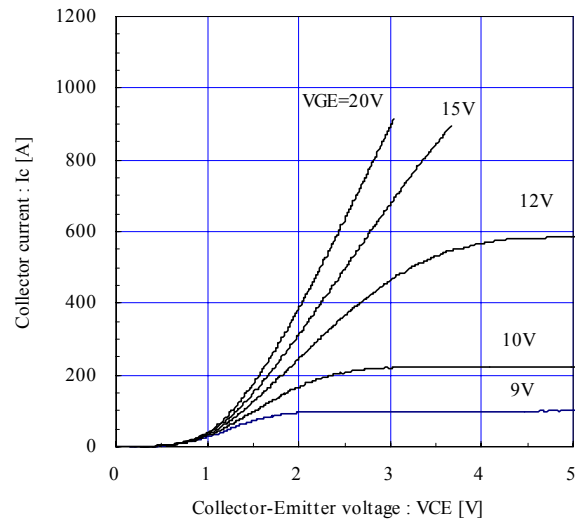
*6 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

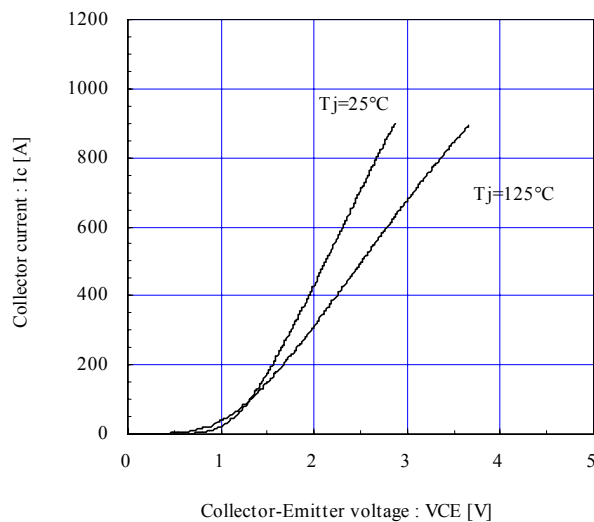
Collector current vs. Collector-Emitter voltage (typ.)

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

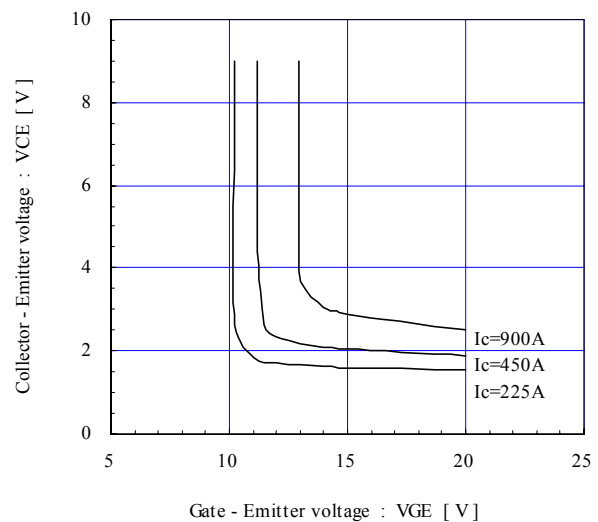
Collector current vs. Collector-Emitter voltage (typ.)

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

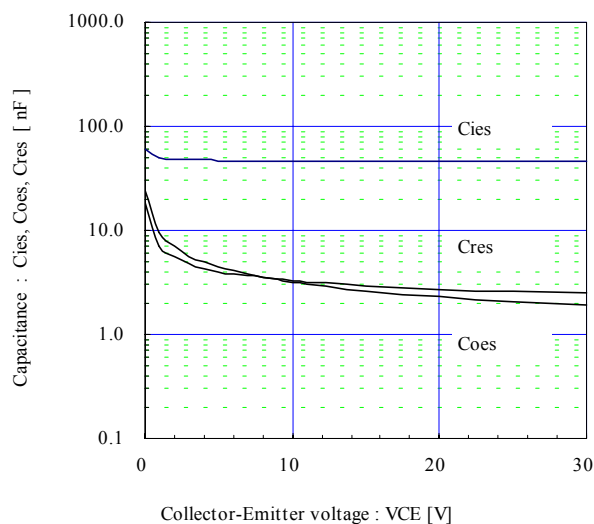
Collector current vs. Collector-Emitter voltage (typ.)

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

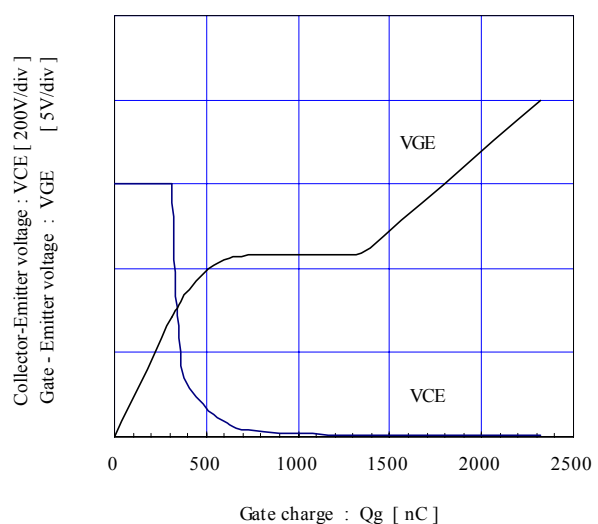
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

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

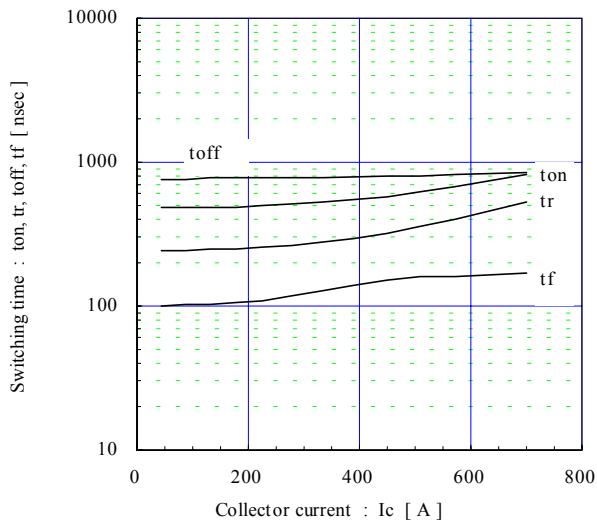
Capacitance vs. Collector-Emitter voltage (typ.)

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

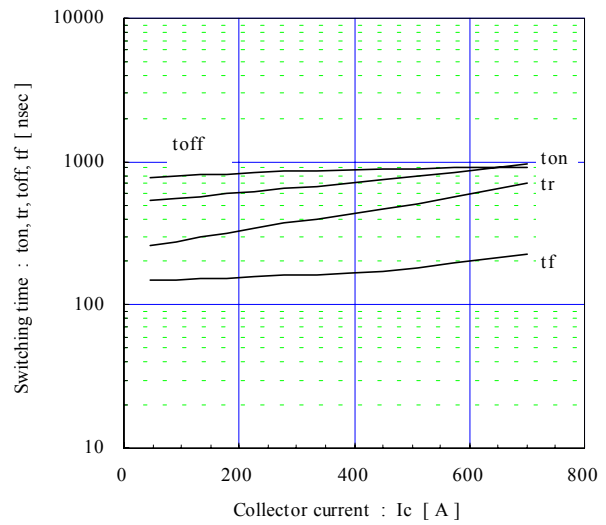
Dynamic Gate charge (typ.)

 $V_{cc} = 900\text{V}$, $I_c = 450\text{A}$, $T_j = 25^\circ\text{C}$ 

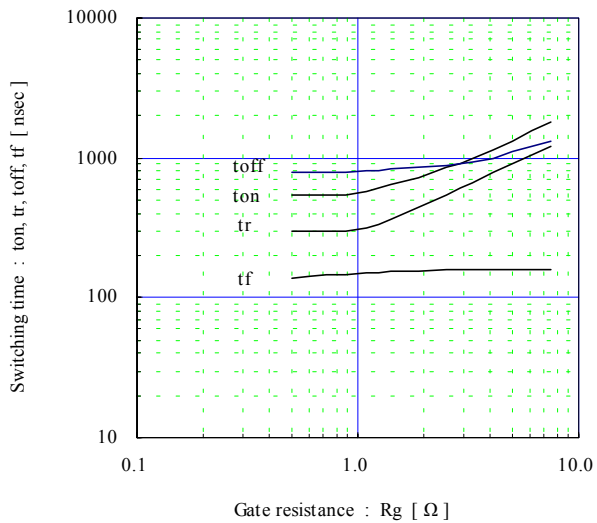
Switching time vs. Collector current (typ.)

 $V_{cc}=900V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$, $T_j=25^\circ C$ 

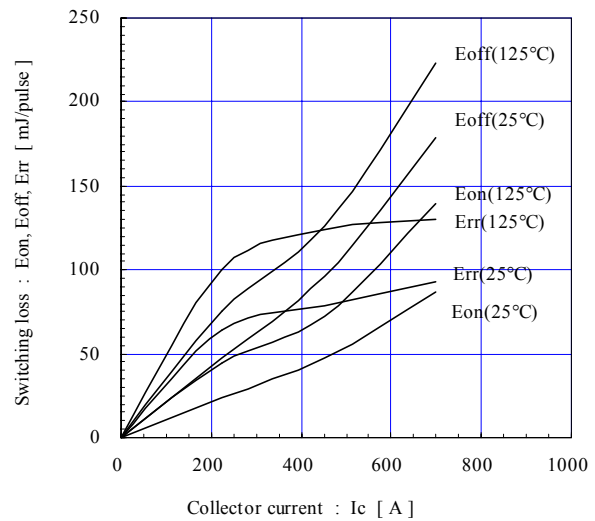
Switching time vs. Collector current (typ.)

 $V_{cc}=900V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$, $T_j=125^\circ C$ 

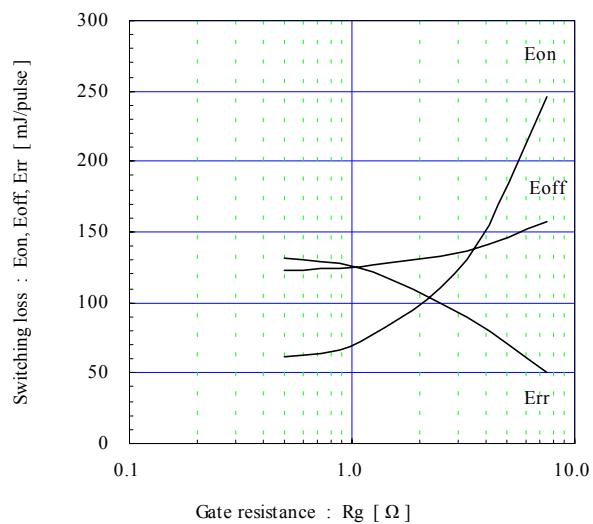
Switching time vs. Gate resistance (typ.)

 $V_{cc}=900V$, $I_c=450A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$ 

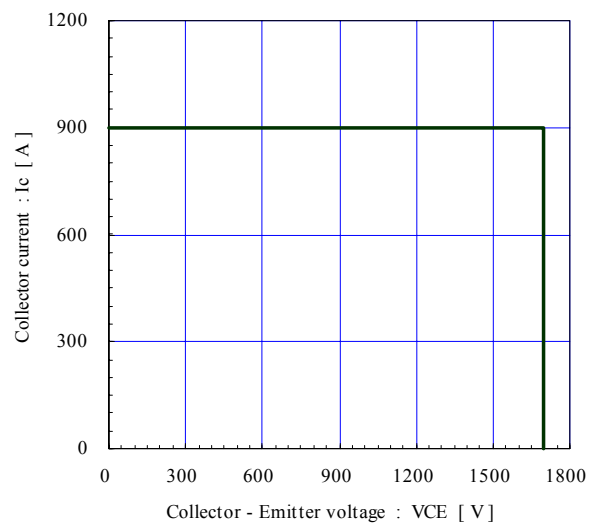
Switching loss vs. Collector current (typ.)

 $V_{cc}=900V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$ 

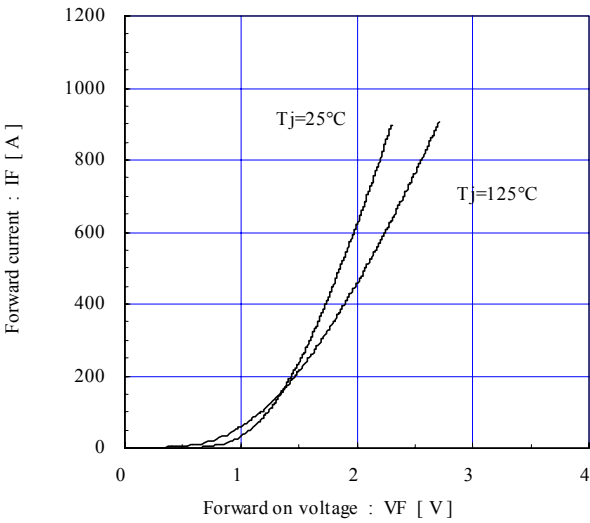
Switching loss vs. Gate resistance (typ.)

 $V_{cc}=900V$, $I_c=450A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$ 

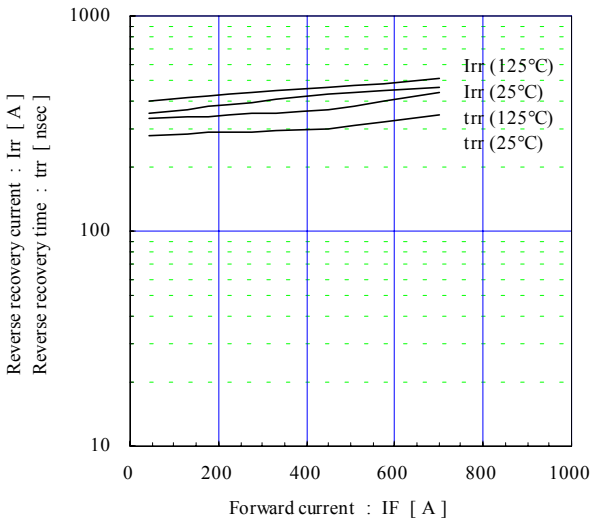
Reverse bias safe operating area (max.)

 $+V_{GE}=15V, -V_{GE} \leq 15V, R_g \geq 1.1\Omega, T_j \leq 125^\circ C$ Stray inductance $\leq 100nH$ 

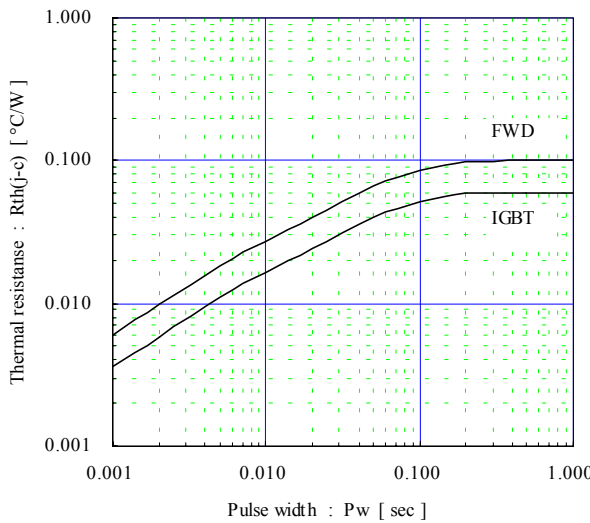
Forward current vs. Forward on voltage (typ.)
chip



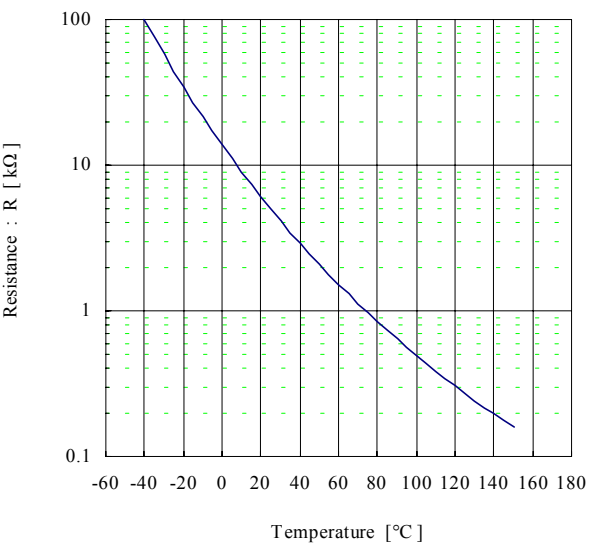
Reverse recovery characteristics (typ.)
Vcc=900V, VGE=±15V, Rg=1.1Ω



Transient thermal resistance (max.)

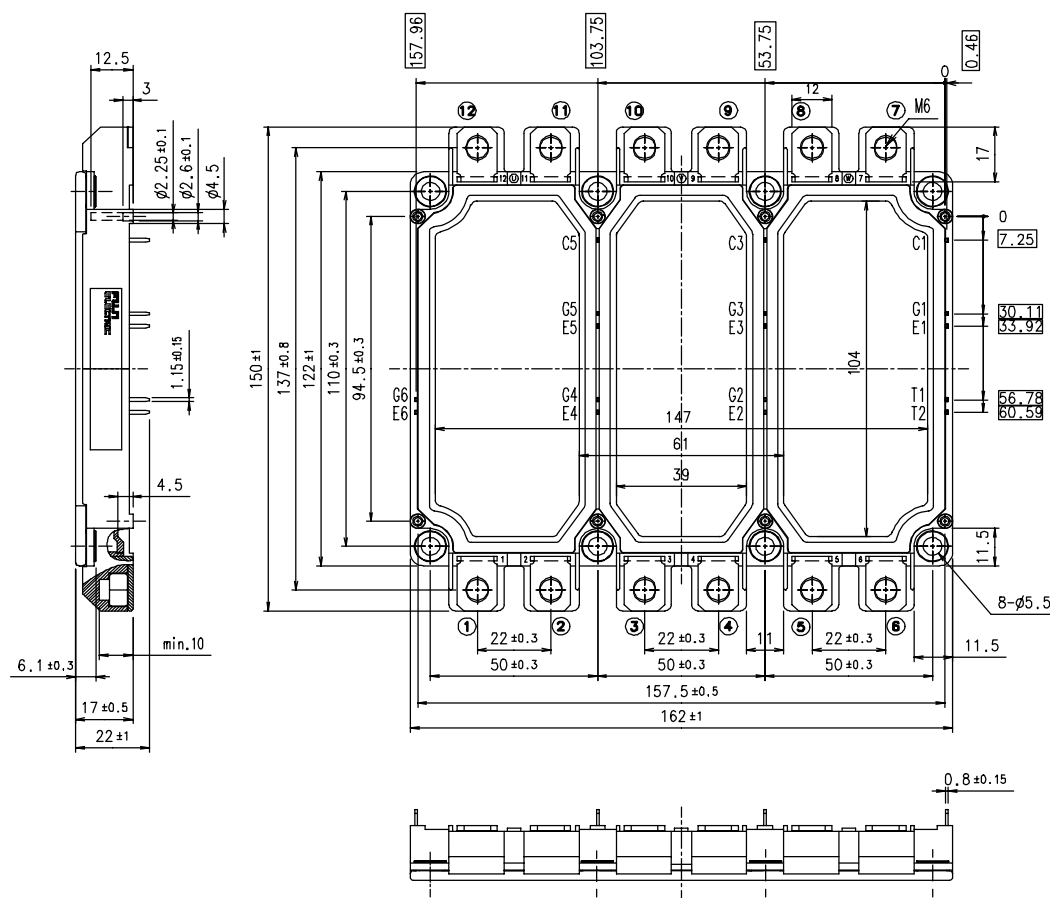


Temperature characteristic (typ.)



Outline Drawings, mm

M629



注) shows theoretical dimension and tolerance is ± 0.5 .

Equivalent Circuit Schematic

