

6MBI450U-120



IGBT Module U-Series 1200V / 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}		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		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 Tj=25°C unless otherwise specified)

Item		Symbols	Conditions		Characteristics			Unit
					Min.	Typ.	Max.	
Inverter	Zero gate voltage collector current	ICES	VGE=0V, VCE=1200V		—	—	3.0	mA
	Gate-Emitter leakage current	IGES	VCE=0V, VGE=±20V		—	—	600	nA
	Gate-Emitter threshold voltage	VGE(th)	VCE=20V, IC=450mA		4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	VCE(sat) (terminal)	VGE=15V, IC=450A	TJ=25°C	—	2.20	2.55	V
				TJ=125°C	—	2.45	—	
		VCE(sat) (chip)		TJ=25°C	—	1.75	2.10	
				TJ=125°C	—	2.00	—	
	Input capacitance	Cies	VCE=10V, VGE=0V, f=1MHz		—	50	—	nF
	Turn-on time	ton	VCC=600V IC=450A VGE=±15V		—	0.36	1.20	μs
		tr			—	0.21	0.60	
		tr(i)			—	0.03	—	
	Turn-off time	toff	RG=1.1 Ω		—	0.37	1.00	
tf		—			0.07	0.30		
Forward on voltage	VF (terminal)	VGE=0V	TJ=25°C	—	2.05	2.35	V	
		IF=450A	TJ=125°C	—	2.15	—		
	VF (chip)		TJ=25°C	—	1.60	1.90		
			TJ=125°C	—	1.70	—		
Reverse recovery time	trr	IF=450A		—	—	0.35	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	Ω	

*5:Biggest internal terminal resistance among arm.

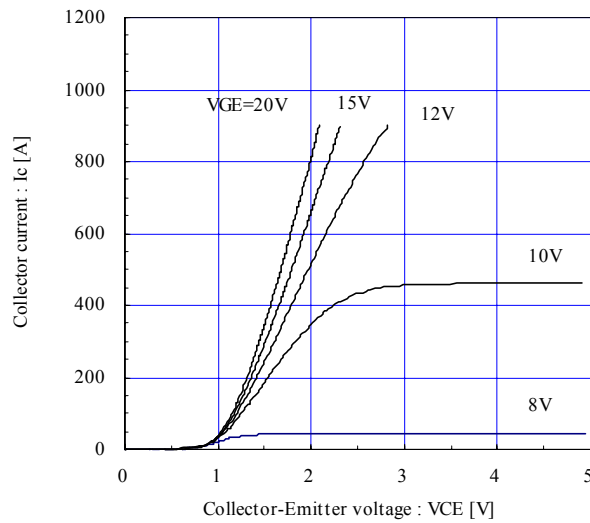
● Thermal resistance characteristics

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

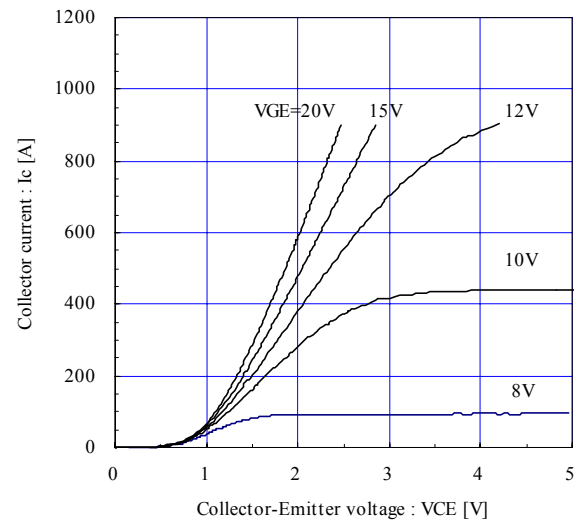
*6 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

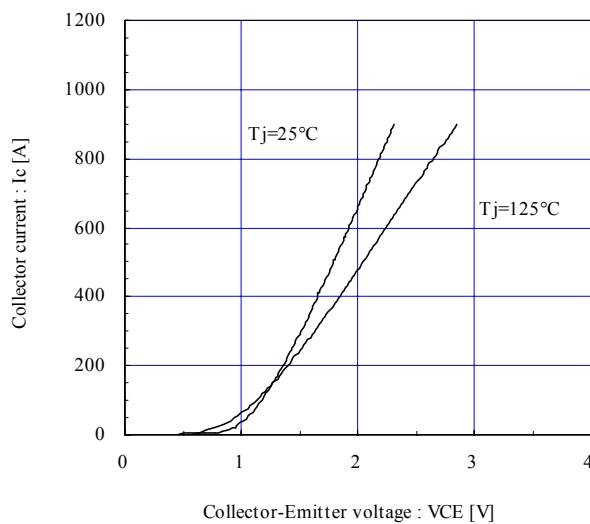
Collector current vs. Collector-Emitter voltage (typ.)

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

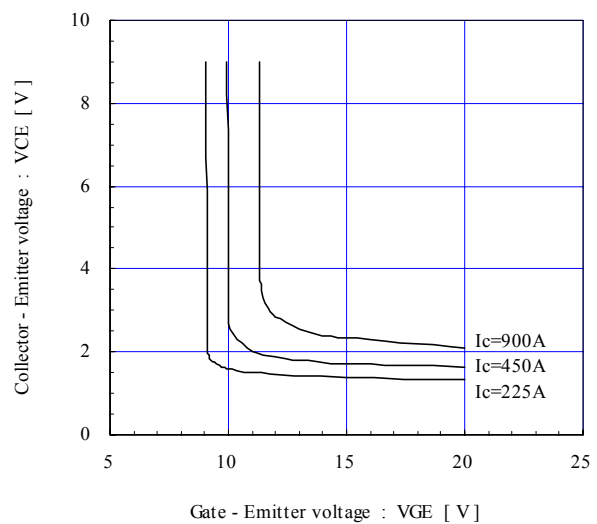
Collector current vs. Collector-Emitter voltage (typ.)

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

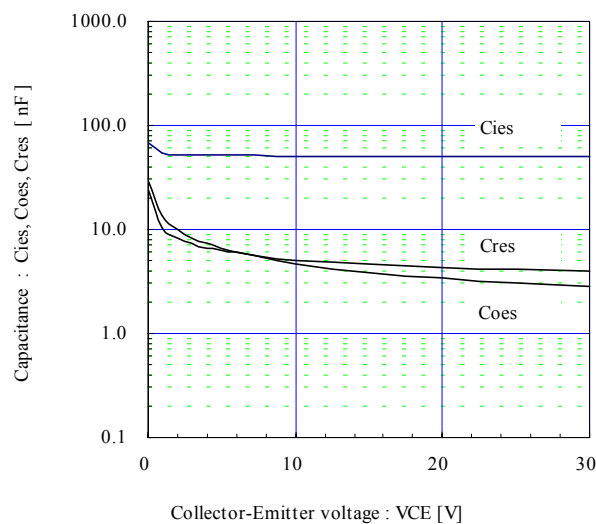
Collector current vs. Collector-Emitter voltage (typ.)

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

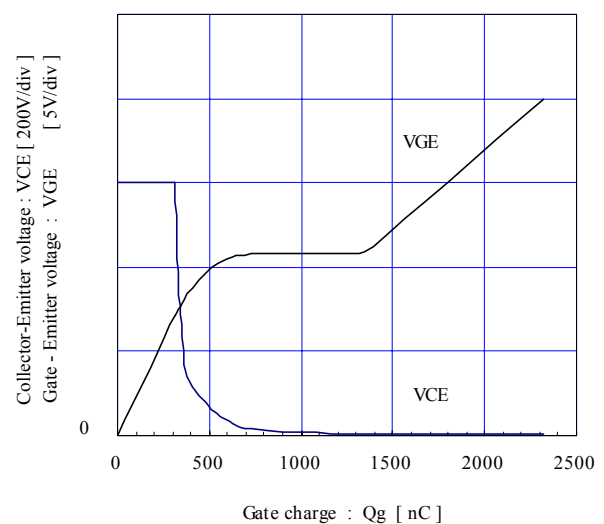
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)

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

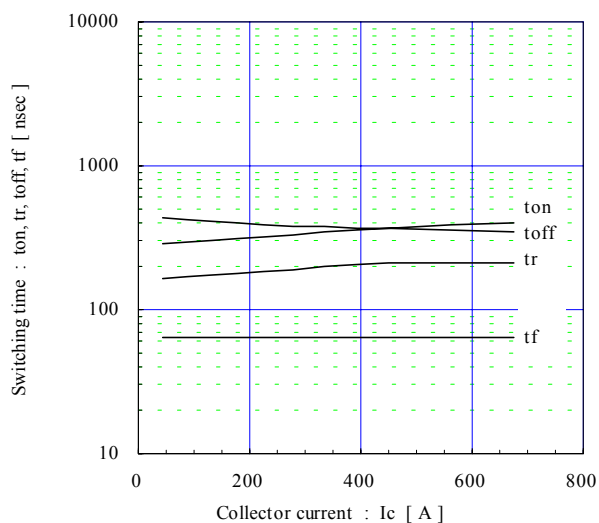
Capacitance vs. Collector-Emitter voltage (typ.)

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

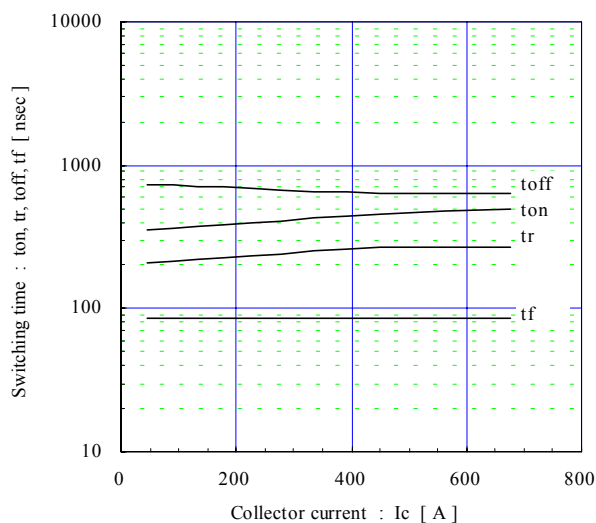
Dynamic Gate charge (typ.)

 $V_{ce} = 600\text{V}$, $I_c = 450\text{A}$, $T_j = 25^\circ\text{C}$ 

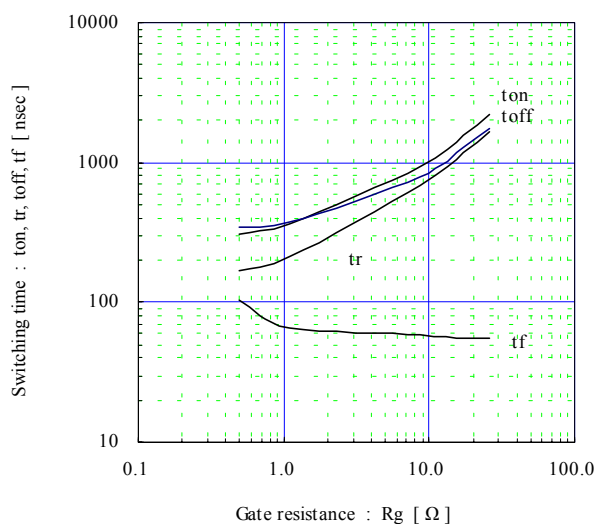
Switching time vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$, $T_j=25^\circ C$ 

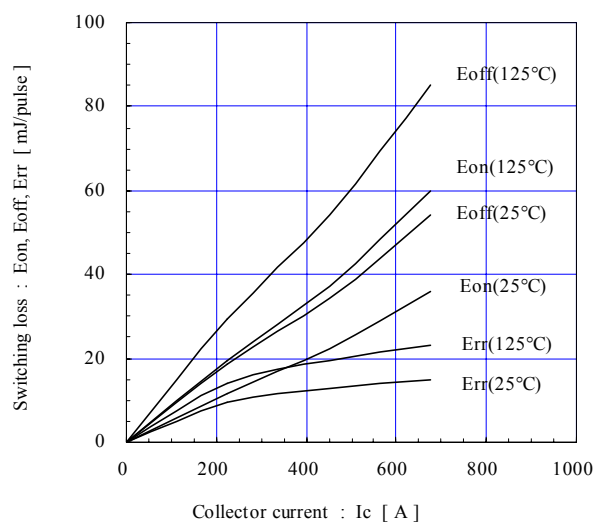
Switching time vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$, $T_j=125^\circ C$ 

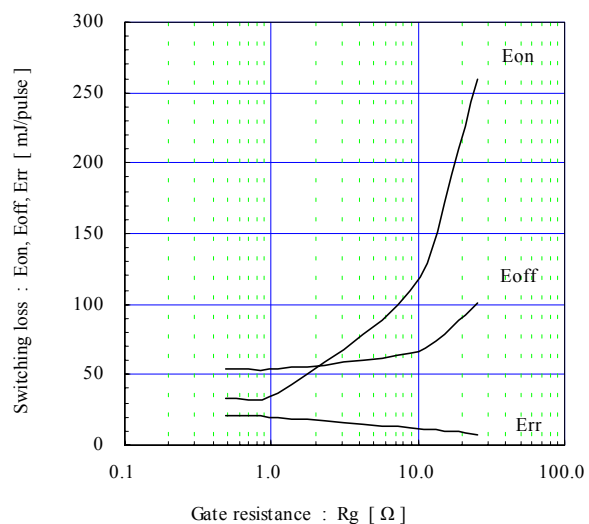
Switching time vs. Gate resistance (typ.)

 $V_{cc}=600V$, $I_c=450A$, $V_{GE}=\pm 15V$, $T_j=25^\circ C$ 

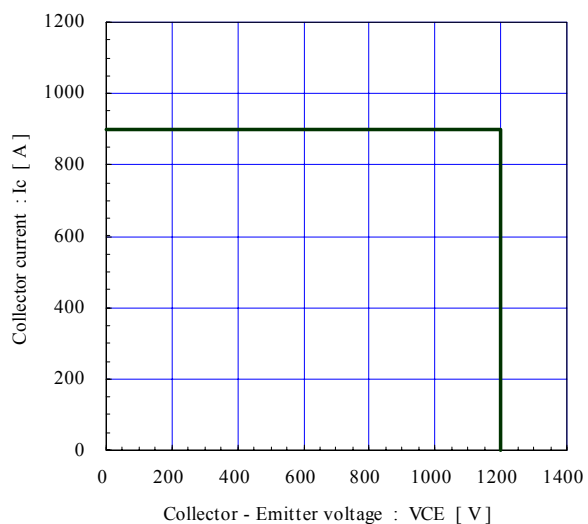
Switching loss vs. Collector current (typ.)

 $V_{cc}=600V$, $V_{GE}=\pm 15V$, $R_g=1.1\Omega$ 

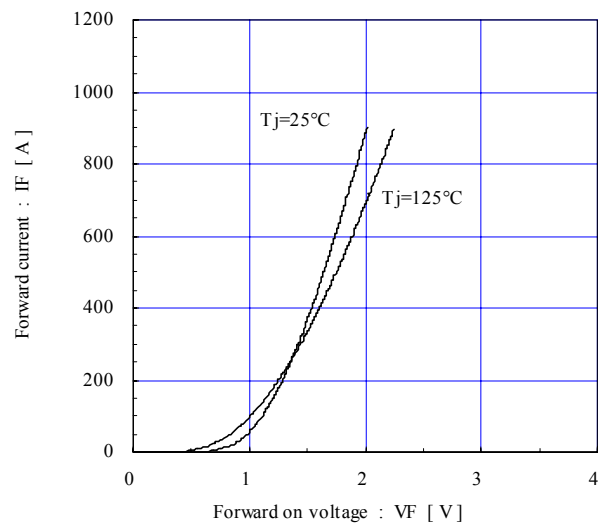
Switching loss vs. Gate resistance (typ.)

 $V_{cc}=600V$, $I_c=450A$, $V_{GE}=\pm 15V$, $T_j=125^\circ C$ 

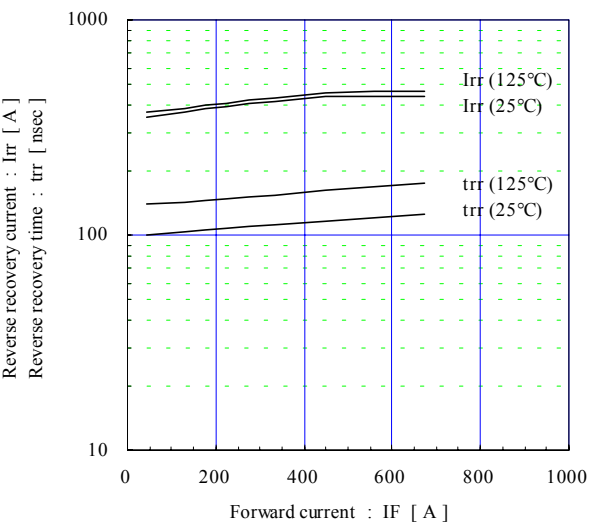
Reverse bias safe operating area (max.)

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

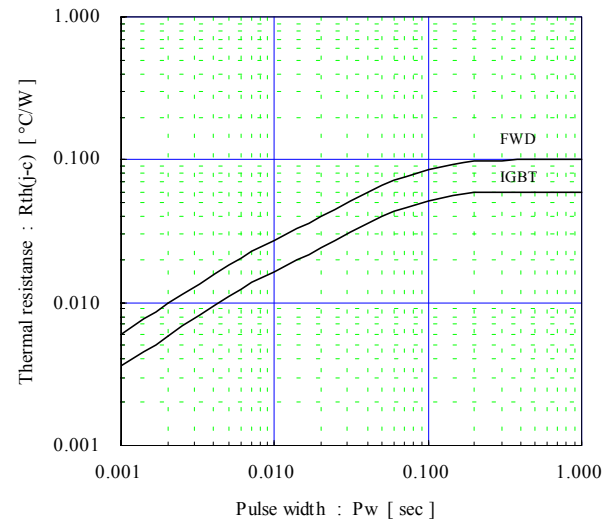
Forward current vs. Forward on voltage (typ.)
chip



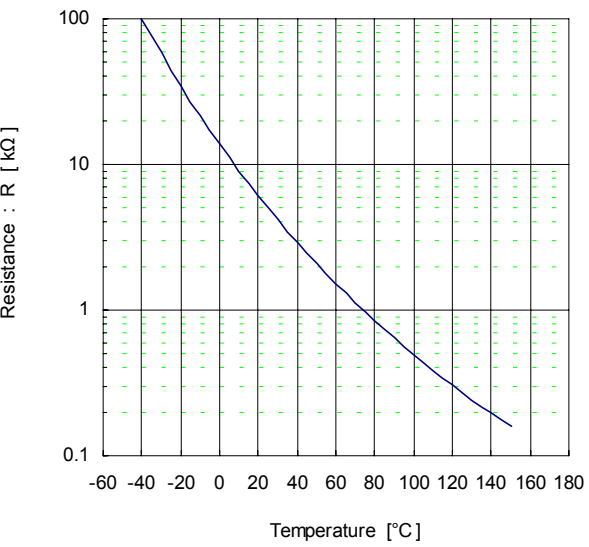
Reverse recovery characteristics (typ.)
 $V_{cc}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_g=1.1\Omega$



Transient thermal resistance (max.)

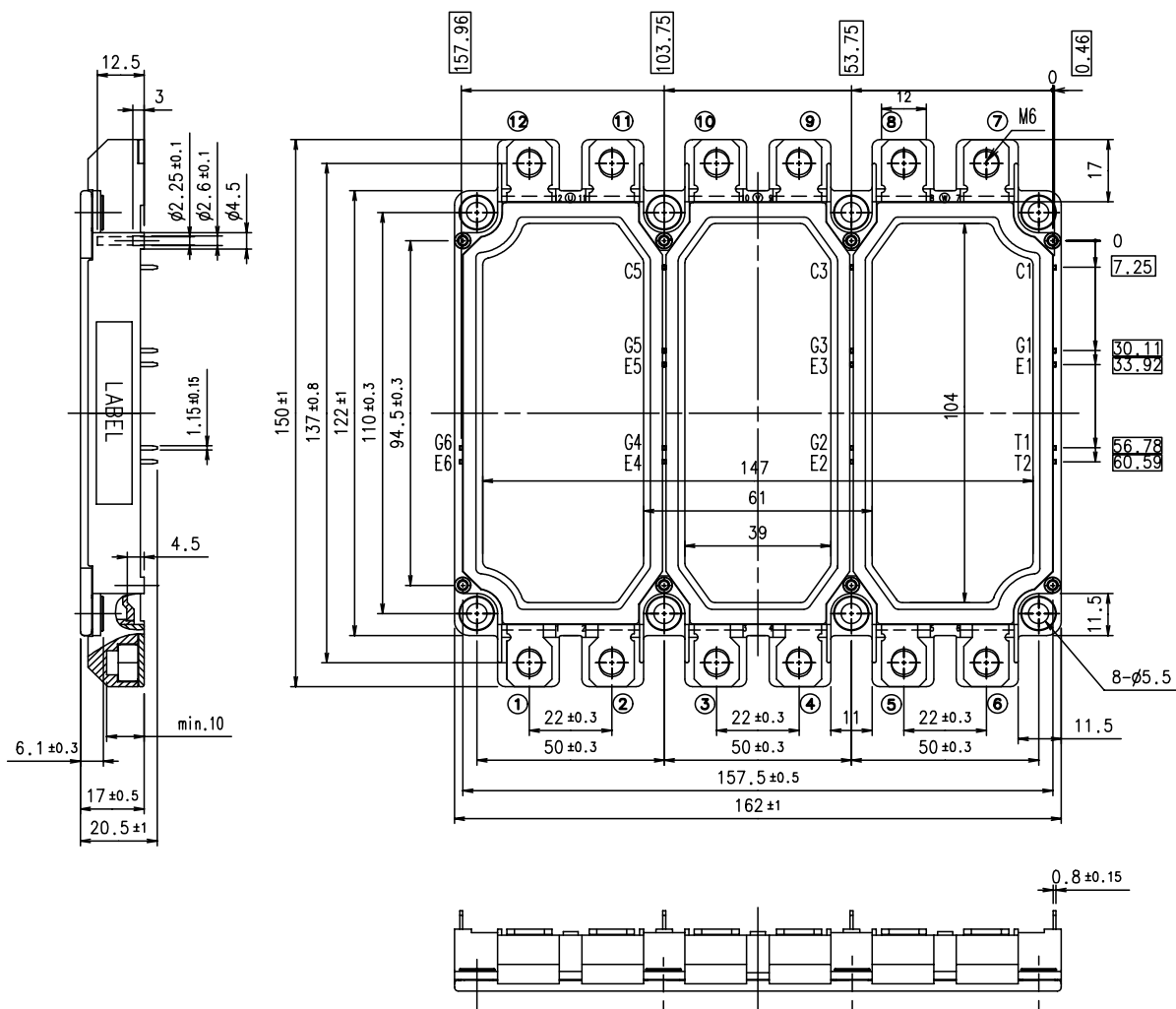


Temperature characteristic (typ.)



Outline Drawings, mm

M629



NOTE) shows theoretical dimension and tolerance is ± 0.5 .

Equivalent Circuit Schematic

