6MBI150U-170

IGBT Module U-Series 1700V / 150A 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 voltaga		V_{GES}			±20	V
Collector current		I_C	Continuous	Tc=25°C	225	A
				Tc=80°C	150	
		I_{cp}	1ms	Tc=25°C	450	
				Tc=80°C	300	
		$-I_C$			150	
		$-I_C$ pulse			300	
Collector Power Dissipation		P_C	1 device		735	W
Junction temperature		T_j			+150	℃
Storage temperature		T_{stg}			-40 to +125	
Isolation voltage	between terminal and copper base *1	V_{iso}	AC:1min.		3400	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 Min.	Typ.	Max.	Unit
Inverter	Zero gate voltage collector current	I_{CES}	V_{GE}=0V, V_{CE}=1700V		–	–	2.0	mA
	Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=±20V		–	–	400	nA
	Gate-Emitter threshold voltage	$V_{GE(th)}$	V_{CE}=20V, I_C=150mA		4.5	6.5	8.5	V
	Collector-Emitter saturation voltage	$V_{CE(sat)}$ (terminal)	V_{GE}=15V, I_C=150A	Tj=25°C	–	2.20	2.70	V
				Tj=125°C	–	2.55	–	
		$V_{CE(sat)}$ (chip)		Tj=25°C	–	2.05	2.55	
				Tj=125°C	–	2.40	–	
	Input capacitance	C_{ies}	V_{CE}=10V, V_{GE}=0V, f=1MHz		–	15	–	nF
	Turn-on time	t_{on}	V_{CC}=900V		–	0.58	1.20	µs
		t_r	I_C=150A		–	0.32	0.60	
		$t_{r(i)}$	V_{GE}=±15V		–	0.10	–	
	Turn-off time	t_{off}	R_G=4.7 Ω		–	0.80	1.50	
		t_f			–	0.15	0.30	
	Forward on voltage	V_F (terminal)	V_{GE}=0V	Tj=25°C	–	1.95	2.70	V
			I_F=150A	Tj=125°C	–	2.15	–	
		V_F (chip)		Tj=25°C	–	1.80	2.55	
				Tj=125°C	–	2.00	–	
	Reverse recovery time	t_{rr}	I_F=150A		–	0.3	0.60	µs
	Lead resistance, terminal-chip*	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.

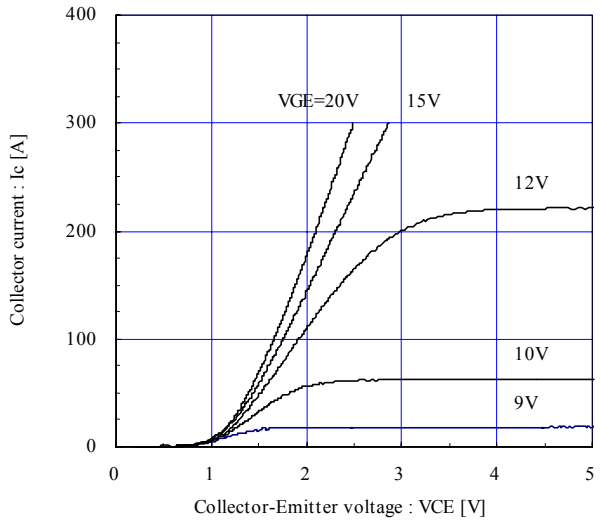
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics Min.	Typ.	Max.	Unit
Thermal resistance	Rth(j-c)	IGBT	–	–	0.17	°C/W
	Rth(j-c)	FWD	–	–	0.28	°C/W
Contact Thermal resistance	Rth(c-f)*5	With thermal compound	–	0.025	–	°C/W

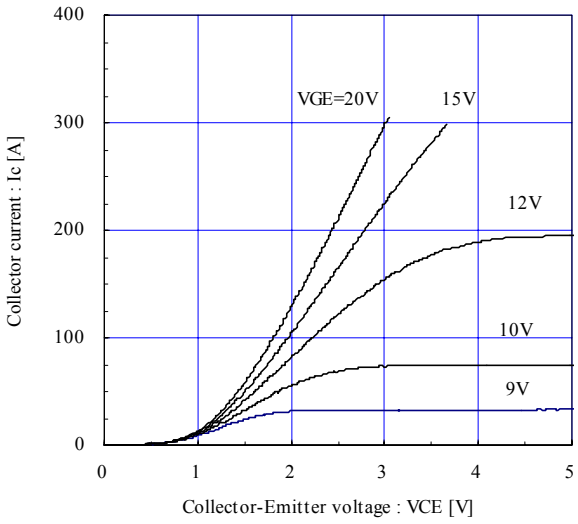
*5 : This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

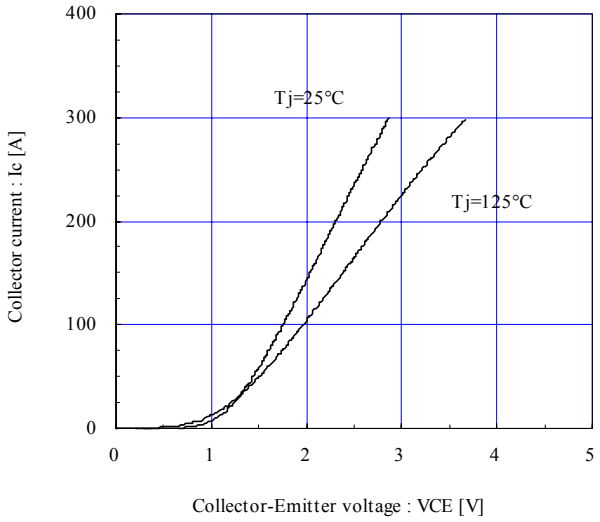
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip



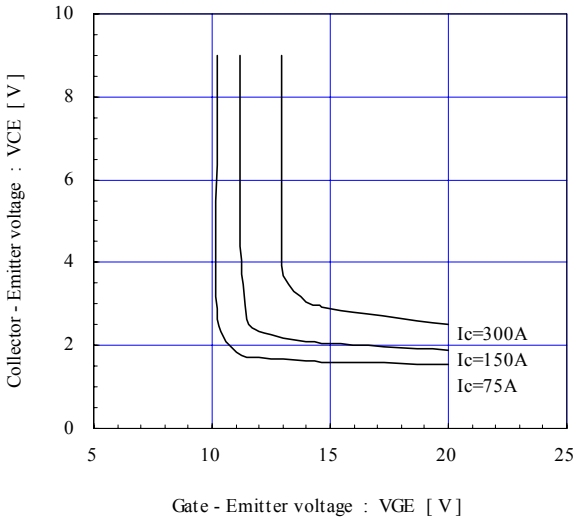
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C / chip



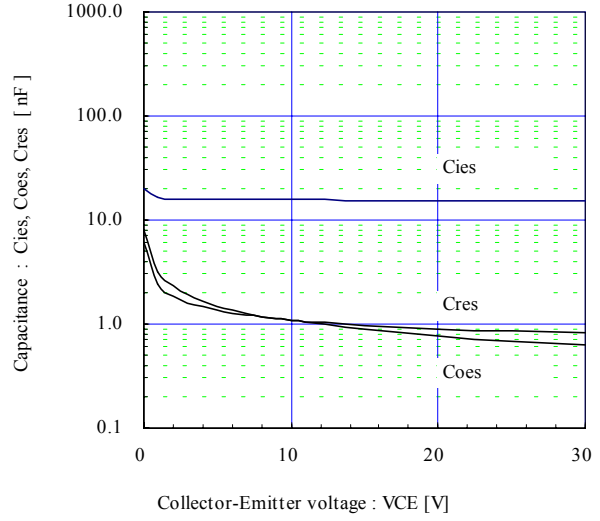
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



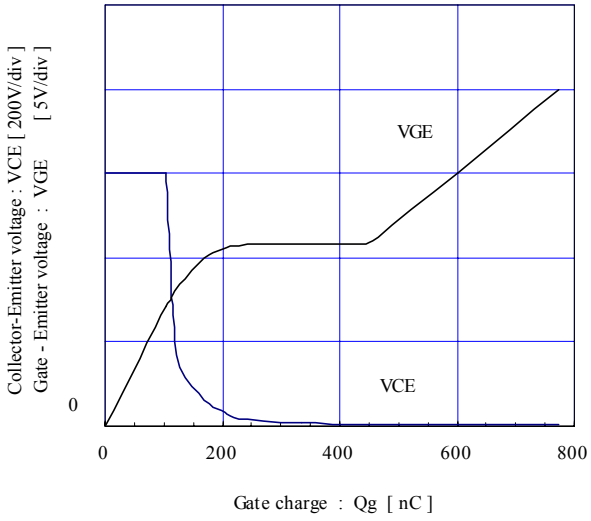
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip



Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C

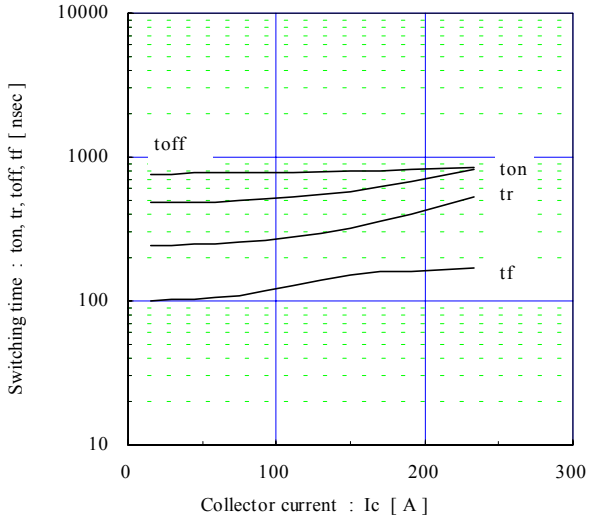


Dynamic Gate charge (typ.)
Vcc=900V, Ic=150A, Tj= 25°C



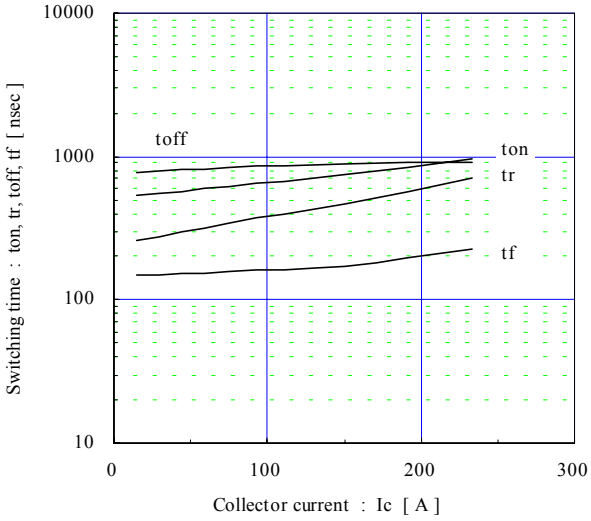
Switching time vs. Collector current (typ.)

Vcc=900V, VGE=±15V, Rg=4.7Ω, Tj= 25°C



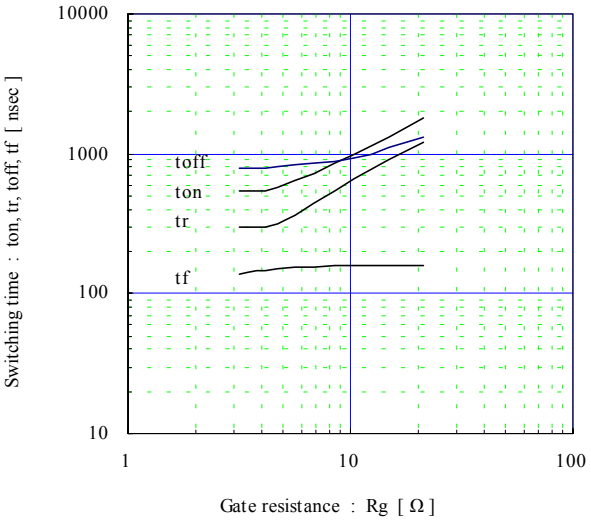
Switching time vs. Collector current (typ.)

Vcc=900V, VGE=±15V, Rg=4.7Ω, Tj=125°C



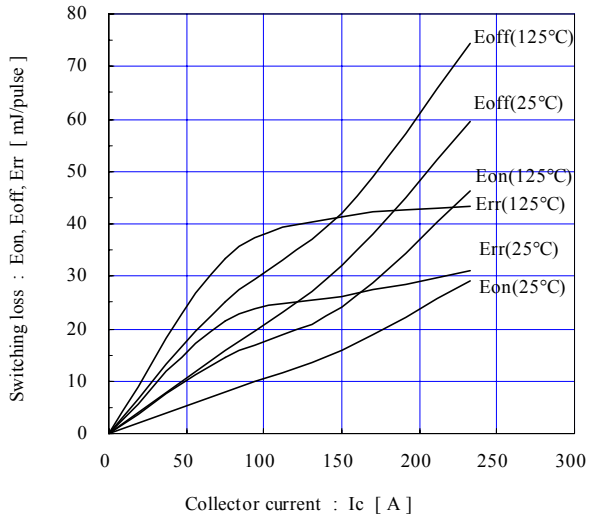
Switching time vs. Gate resistance (typ.)

Vcc=900V, Ic=150A, VGE=±15V, Tj= 25°C



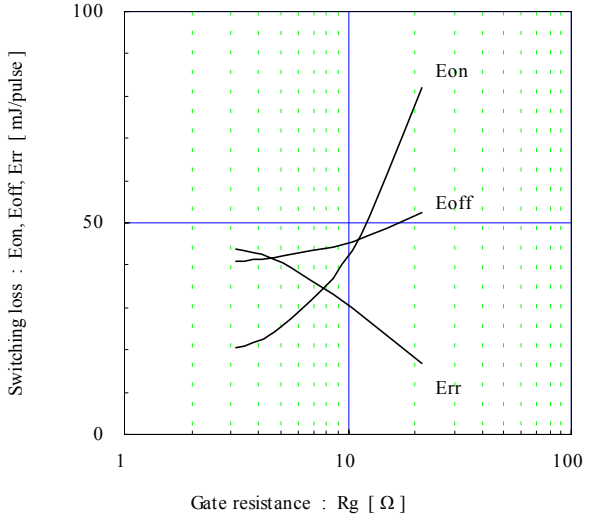
Switching loss vs. Collector current (typ.)

Vcc=900V, VGE=±15V, Rg=4.7Ω



Switching loss vs. Gate resistance (typ.)

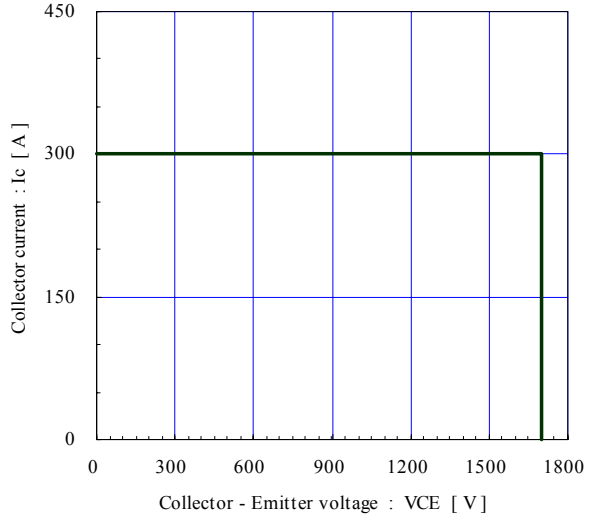
Vcc=900V, Ic=150A, VGE=±15V, Tj= 125°C



Reverse bias safe operating area (max.)

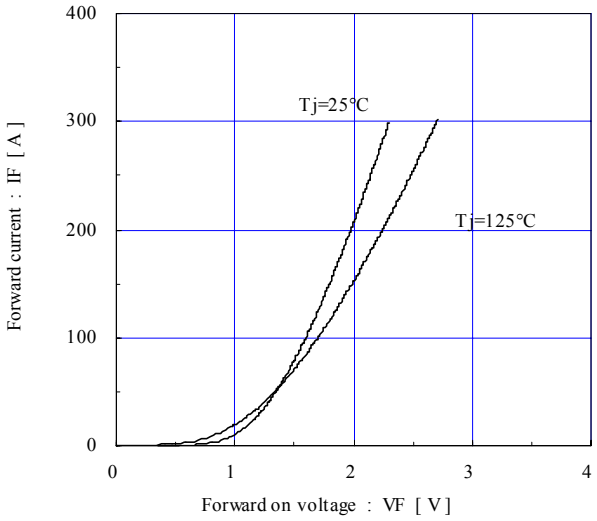
+VGE=15V,-VGE <= 15V, RG >= 4.7Ω ,Tj <= 125°C

Stray inductance <= 100nH



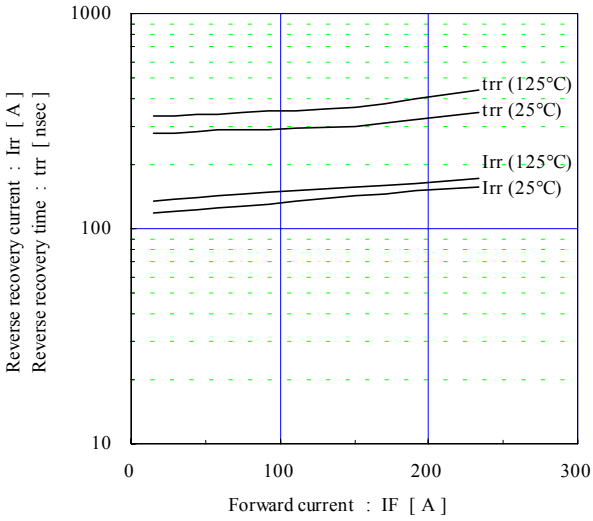
Forward current vs. Forward on voltage (typ.)

chip

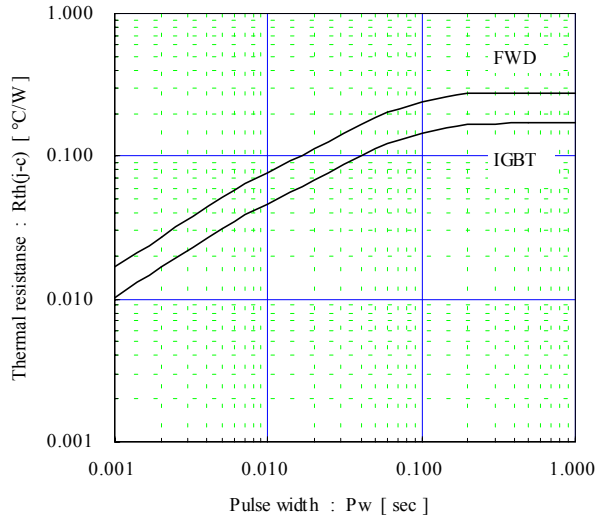


Reverse recovery characteristics (typ.)

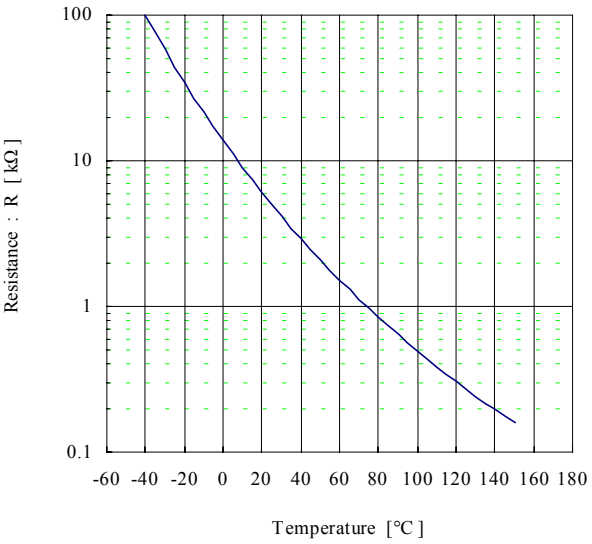
Vcc=900V, VGE=±15V, Rg=4.7Ω



Transient thermal resistance (max.)

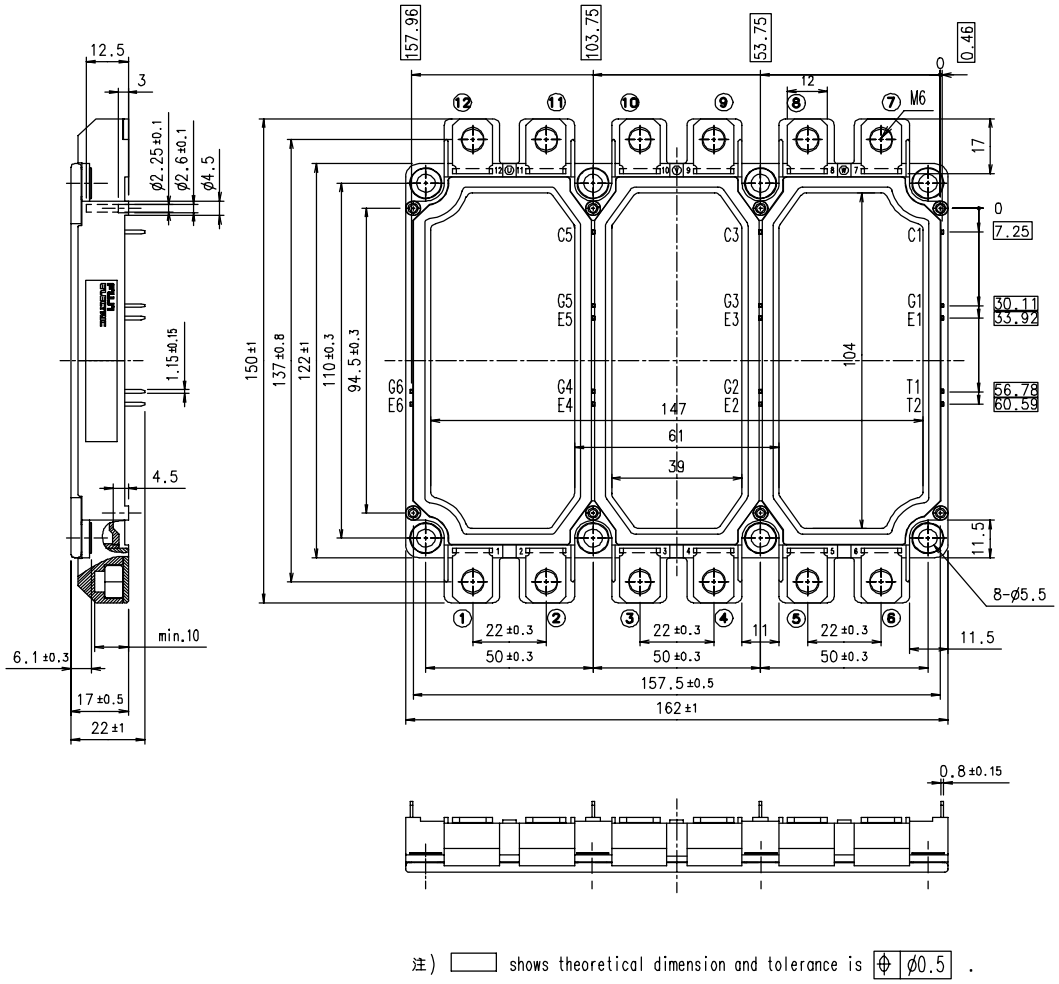


Temperature characteristic (typ.)



■ Outline Drawings, mm

M629



注) ☐ shows theoretical dimension and tolerance is Ⓣ ø0.5 .

■ Equivalent Circuit Schematic