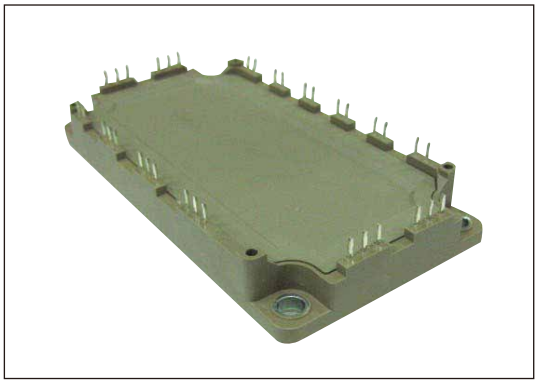
6MBI180VB-120-50

IGBT Modules

IGBT MODULE (V series)
1200V / 180A / 6 in one package

Features

Compact Package
P.C.Board Mount
Low V_{CE} (sat)



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)**

Items		Symbols	Conditions		Maximum ratings	Units
Inverter	Collector-Emitter voltage	V_{CES}			1200	V
	Gate-Emitter voltage	V_{GES}			±20	V
	Collector current	Ic	Continuous	Tc=100°C	150	A
		Ic pulse	1ms	Tc=80°C	400	
		-Ic			150	
		-Ic pulse	1ms		400	
	Collector power dissipation	Pc	1 device		835	W
Junction temperature		Tj			175	°C
Operating junciton temperature (under switching conditions)		Tjop			150	
Case temperature		Tc			125	
Storage temperature		Tstg			-40 ~ +125	
Isolation voltage	Between terminal and copper base (*1) Between thermistor and others (*2)	V_{iso}	AC : 1min.		2500	VAC
Screw torque	Mounting (*3)	-	M5		3.5	N m

Note *1: All terminals should be connected together during the test.
Note *2: Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.
Note *3: Recommendable value : 2.5-3.5 Nm (M5)

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

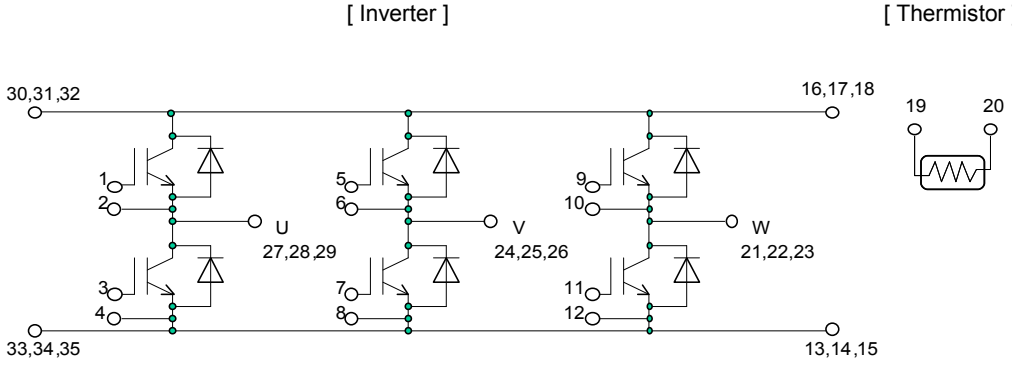
	Items	Symbols	Conditions		Characteristics min.	typ.	max.	Units
Inverter	Zero gate voltage collector current	I_{CES}	V_{GE} = 0V, V_{CE} = 1200V		-	-	1.0	mA
	Gate-Emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V		-	-	200	nA
	Gate-Emitter threshold voltage	$V_{GE\ (th)}$	V_{CE} = 20V, I_C = 200mA		6.0	6.5	7.0	V
	Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (terminal)	V_{GE} = 15V, I_C = 200A	Tj=25°C	-	2.85	3.30	V
				Tj=125°C	-	3.20	-	
				Tj=150°C	-	3.25	-	
		$V_{CE\ (sat)}$ (chip)	V_{GE} = 15V, I_C = 200A	Tj=25°C	-	1.85	2.30	
				Tj=125°C	-	2.20	-	
				Tj=150°C	-	2.25	-	
	Internal gate resistance	R_g (int)	-		-	3.8	-	Ω
	Input capacitance	Cies	V_{CE} = 10V, V_{GE} = 0V, f = 1MHz		-	16.5	-	nF
	Turn-on time	ton	V_{CC} = 600V, I_C = 200A, V_{GE} = +15 / -15V, R_G = 1.2Ω		-	0.39	1.20	μs
		tr			-	0.09	0.60	
		tr (i)			-	0.03	-	
	Turn-off time	toff			-	0.53	1.00	
		tf			-	0.06	0.30	
	Forward on voltage	V_F (terminal)	I_F = 200A	Tj=25°C	-	2.70	3.15	V
				Tj=125°C	-	2.85	-	
				Tj=150°C	-	2.80	-	
		V_F (chip)	I_F = 200A	Tj=25°C	-	1.70	2.15	
				Tj=125°C	-	1.85	-	
				Tj=150°C	-	1.80	-	
	Reverse recovery time	trr	I_F = 200A		-	-	0.35	μs
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

● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	typ.	max.	Units
Thermal resistance (1device)	Rth(j-c)	Inverter IGBT	-	-	0.18	°C/W
		Inverter FWD	-	-	0.29	
Contact thermal resistance (1device) (*4)	Rth(c-f)	with Thermal Compound	-	0.05	-	

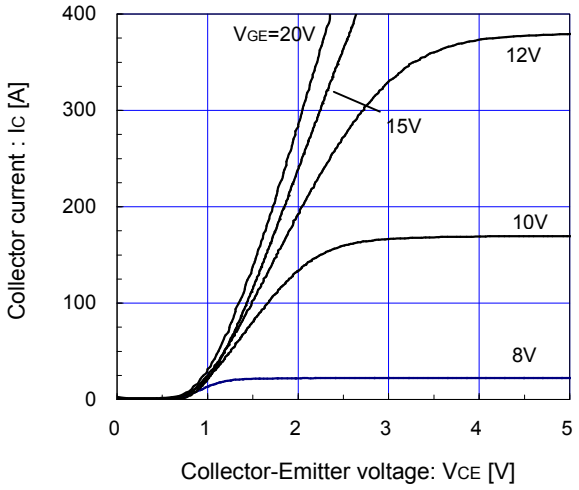
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Equivalent Circuit Schematic

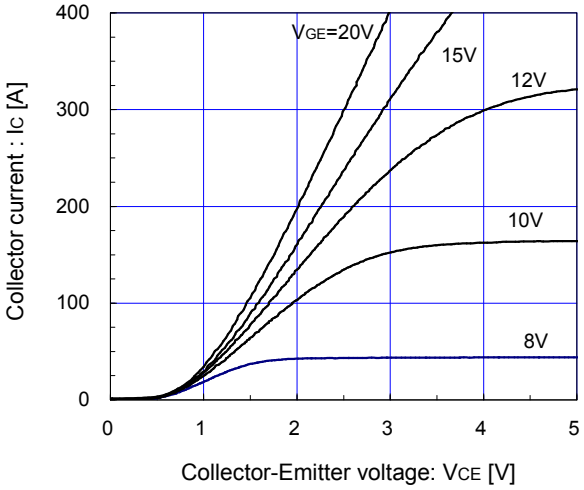


■ Characteristics (Representative)

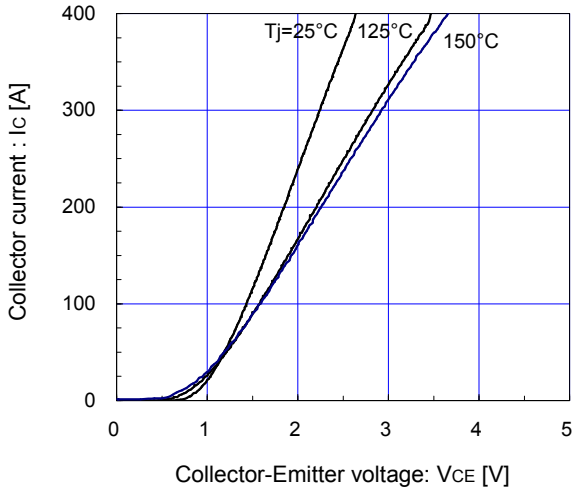
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip



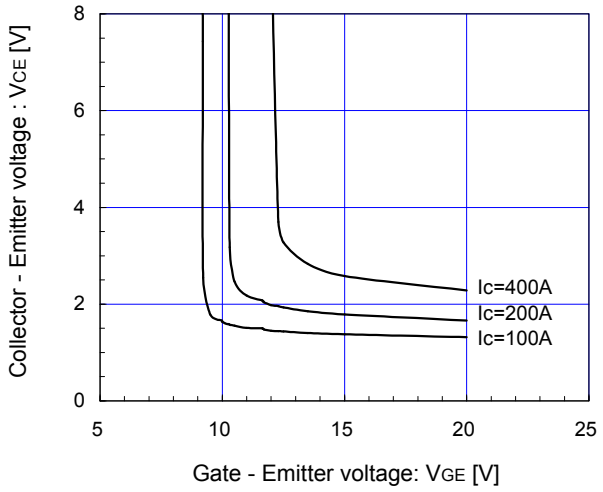
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 150°C / chip



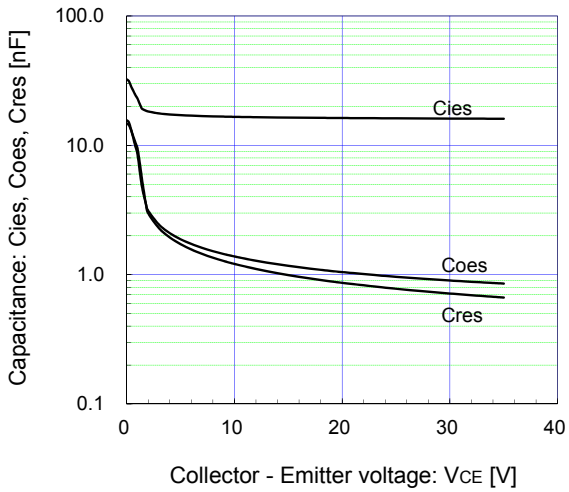
[Inverter]
Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



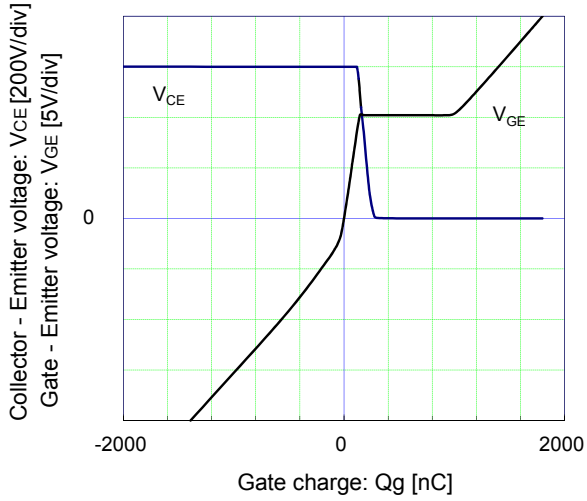
[Inverter]
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj= 25°C / chip



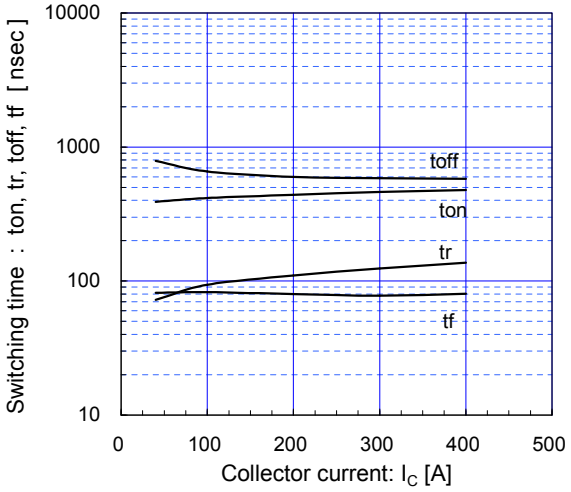
[Inverter]
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



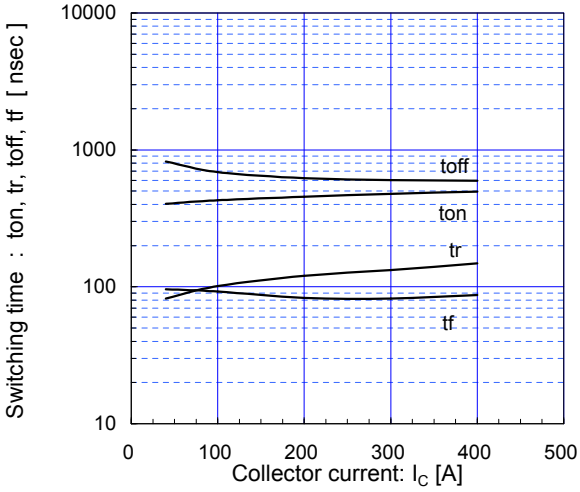
[Inverter]
Dynamic gate charge (typ.)
Vcc=600V, Ic=200A, Tj= 25°C



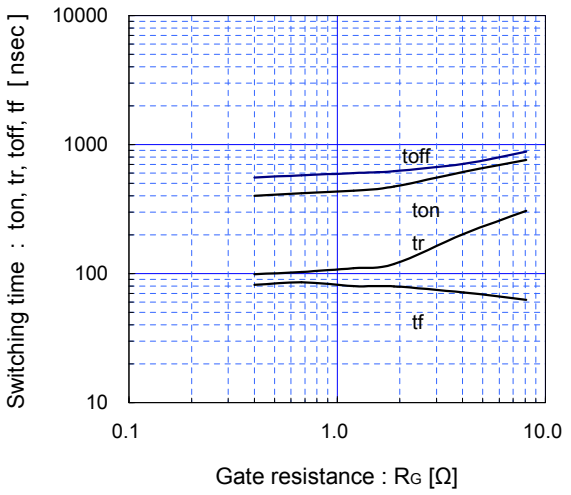
[Inverter]
Switching time vs. Collector current (typ.)
Vcc=600V, V_{GE}=±15V, R_G=1.2Ω, Tj= 125°C



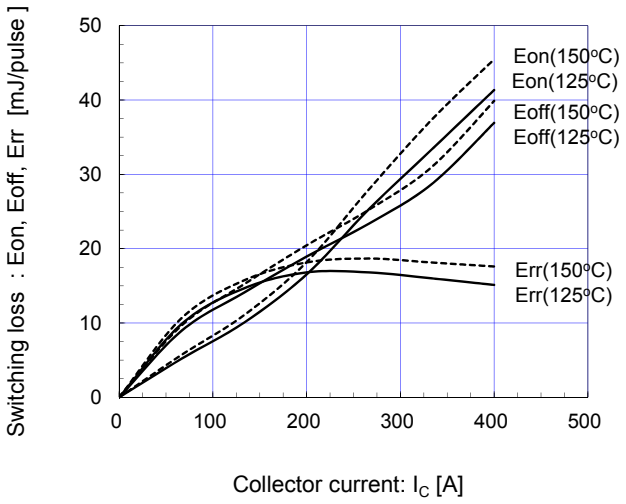
[Inverter]
Switching time vs. Collector current (typ.)
Vcc=600V, V_{GE}=±15V, R_G=1.2Ω, Tj= 150°C



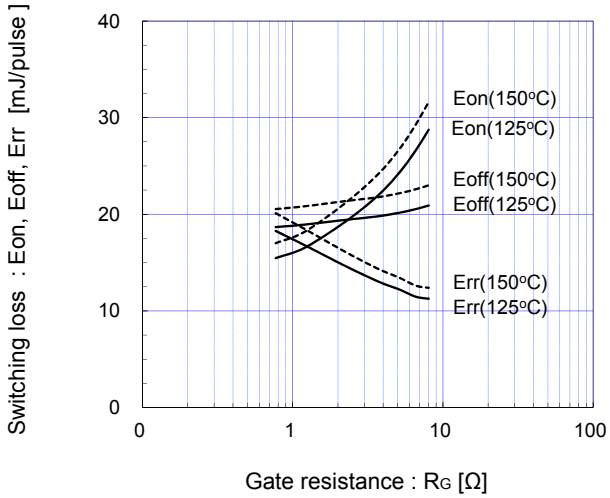
[Inverter]
Switching time vs. gate resistance (typ.)
Vcc=600V, Ic=200A, V_{GE}=±15V, Tj= 125°C



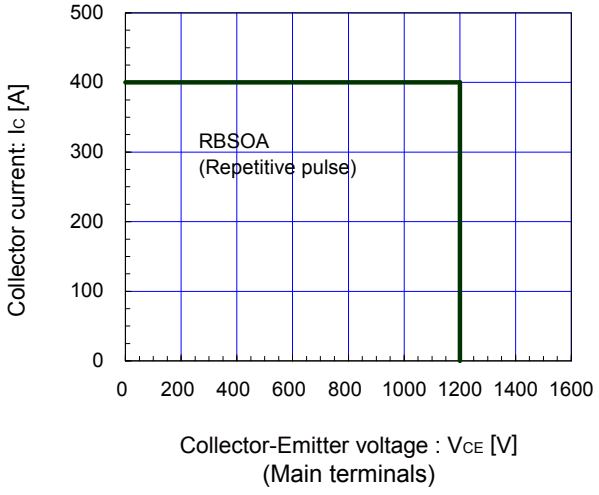
[Inverter]
Switching loss vs. Collector current (typ.)
Vcc=600V, V_{GE}=±15V, R_G=1.2Ω



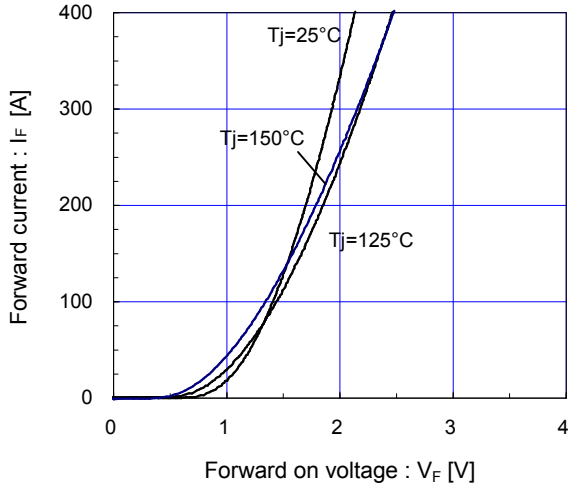
[Inverter]
Switching loss vs. gate resistance (typ.)
Vcc=600V, Ic=200A, V_{GE}=±15V



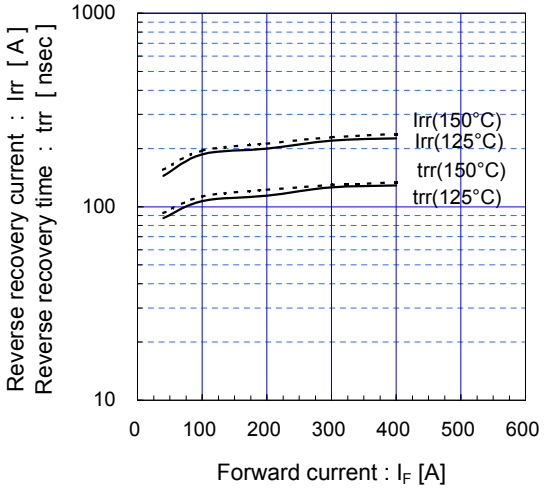
[Inverter]
Reverse bias safe operating area (max.)
+V_{GE}=15V,-V_{GE} <= 15V, R_G >= 1.2Ω ,Tj = 150°C



[Inverter]
Forward current vs. forward on voltage (typ.)
chip



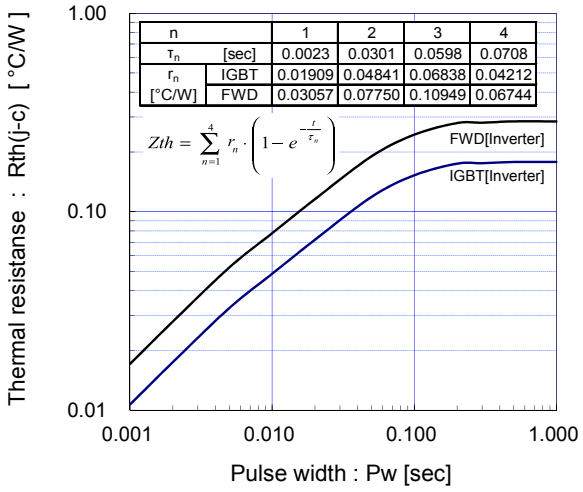
[Inverter]
Reverse recovery characteristics (typ.)
Vcc=600V, V_{GE}=±15V, R_G=1.2Ω



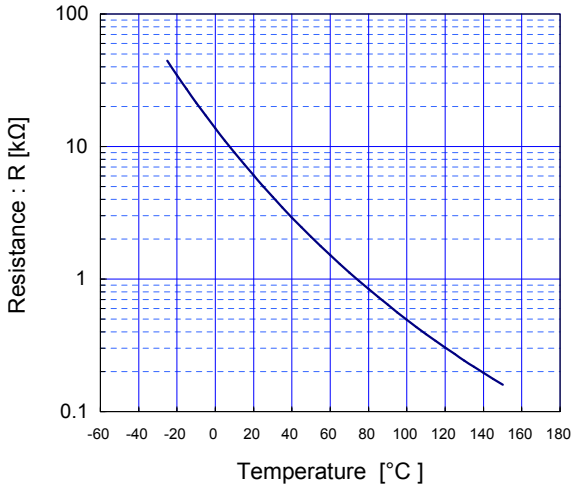
Transient thermal resistance (max.)

n		1	2	3	4
τ_n	[sec]	0.0023	0.0301	0.0598	0.0708
r_n	IGBT	0.01909	0.04841	0.06838	0.04212
[°C/W]	FWD	0.03057	0.07750	0.10949	0.06744

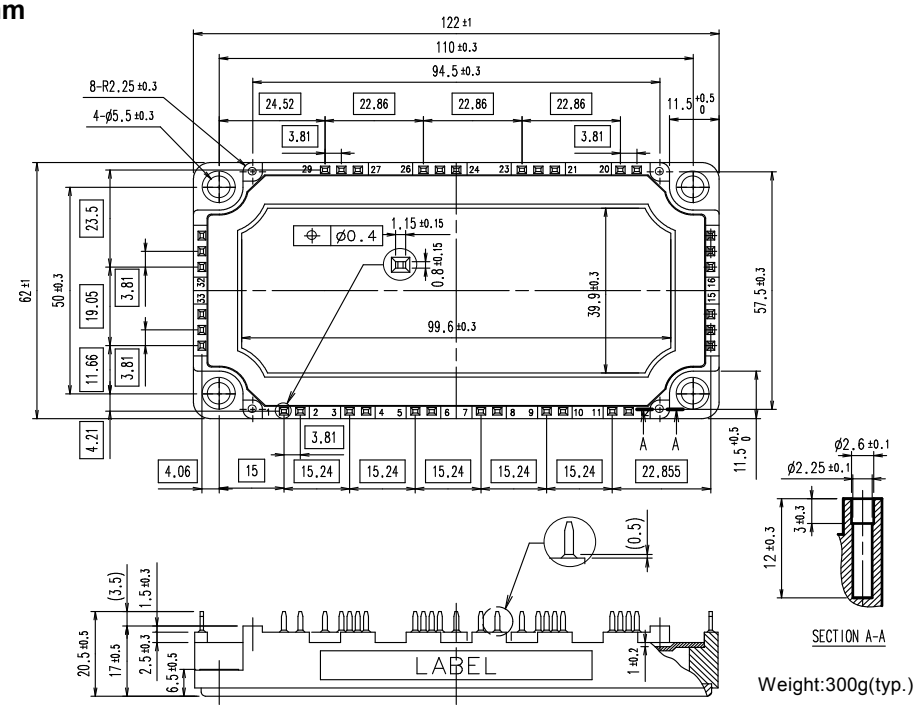
$$Zth = \sum_{n=1}^{4} r_n \cdot \left(1 - e^{-\frac{t}{\tau_n}}\right)$$



[Thermistor]
Temperature characteristic (typ.)



■ Outline Drawings, mm



Weight:300g(typ.)

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富士電機

Innovating Energy Technology

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