

2MBI300VH-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 300A / 2 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)

Items		Symbols	Conditions	Maximum ratings	Units	
Inverter	Collector-Emitter voltage	V _{CE}		1200	V	
	Gate-Emitter voltage	V _{GE}		±20	V	
	Collector current	I _c	Continuous	T _c =100°C	300	A
				T _c =25°C	360	
		I _c pulse	1ms		600	
		-I _c			300	
		-I _c pulse	1ms		600	
Collector power dissipation	P _c	1 device		1600	W	
Junction temperature		T _j		175	°C	
Operating junction temperature (under switching conditions)		T _{jop}		150		
Case temperature		T _c		125		
Storage temperature		T _{stg}		-40 ~ +125		
Isolation voltage	between terminal and copper base (*1)	V _{iso}	AC : 1min.	2500	VAC	
Screw torque	Mounting (*2)	-		6.0	N m	
	Terminals (*3)	-		5.0		

Note *1: All terminals should be connected together during the test.

Note *2: Recommendable Value : 3.0-6.0 Nm (M5 or M6)

Note *3: Recommendable Value : 2.5-5.0 Nm (M6)

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

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Zero gate voltage collector current	I _{CE}	V _{GE} = 0V, V _{CE} = 1200V	-	-	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 = 300mA	6.0	6.5	7.0	V
Inverter	Collector-Emitter saturation voltage	V _{GE} = 15V I _C = 300A	T _j =25°C	1.95	2.40	V
			T _j =125°C	2.25	-	
			T _j =150°C	2.30	-	
			T _j =25°C	1.75	2.10	
Inverter	Internal gate resistance	-	T _j =25°C	2.10	-	Ω
			T _j =125°C	2.05	-	
			T _j =150°C	2.10	-	
			T _j =150°C	2.10	-	
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz	-	24.1	-	nF
Turn-on time	ton	V _{CC} = 600V L _S = 30nH	-	0.60	-	μsec
	tr	I _C = 300A	-	0.20	-	
	tr (i)	V _{GE} = ±15V	-	0.05	-	
	toff	R _G = 1.8Ω	-	0.80	-	
Turn-off time	tf	T _j = 150°C	-	0.08	-	μsec
	Forward on voltage	V _{GE} = 0V I _F = 300A	T _j =25°C	1.90	2.35	
			T _j =125°C	2.05	-	
			T _j =150°C	2.00	-	
			T _j =25°C	1.70	2.15	
Reverse recovery time	trr	I _F = 300A	T _j =125°C	1.85	-	μsec
			T _j =150°C	1.80	-	
			T _j =150°C	1.80	-	
			T _j =150°C	1.80	-	

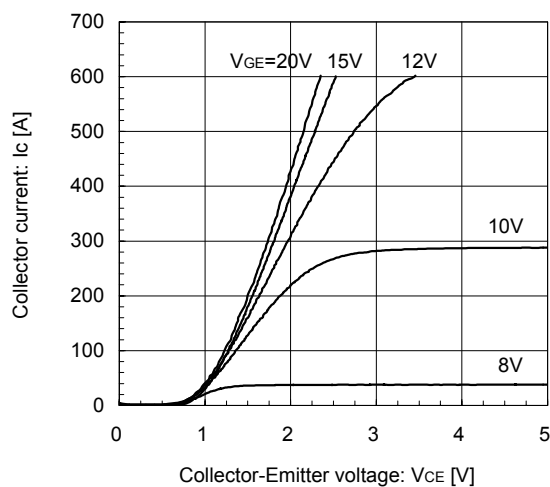
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	IGBT	-	-	0.093	°C/W
		FWD	-	-	0.150	
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0125	-	

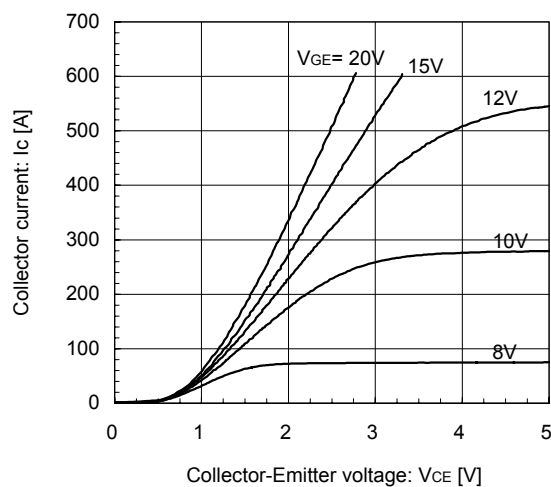
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

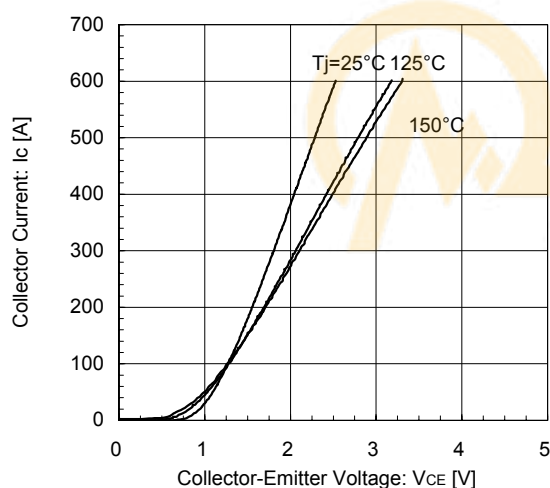
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 25°C / chip



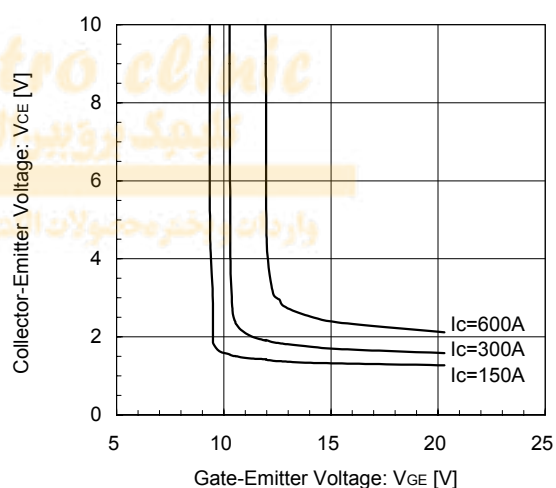
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 150°C / chip



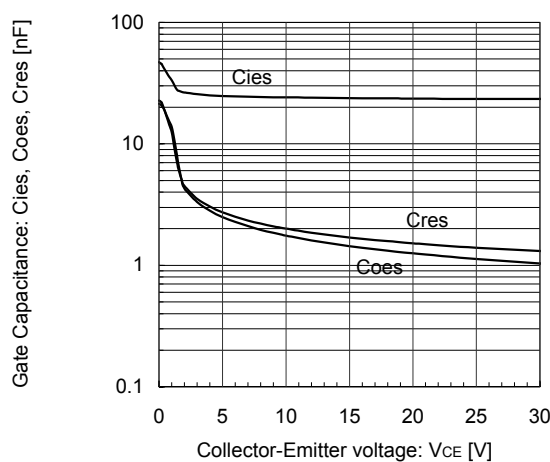
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE} = 15V / chip



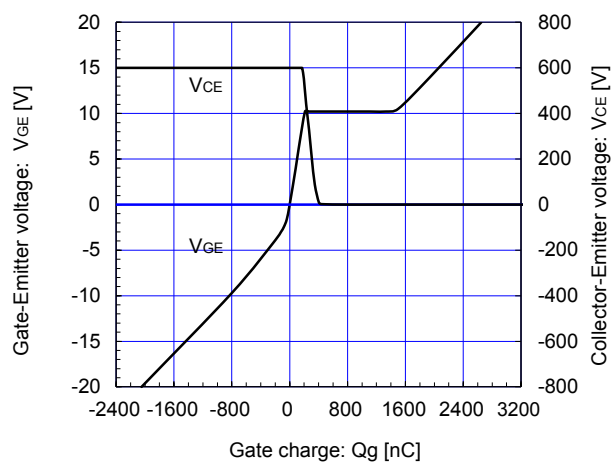
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j = 25°C / chip



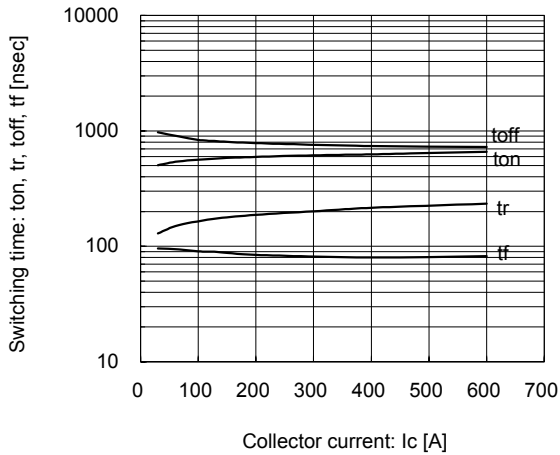
Gate Capacitance vs. Collector-Emitter Voltage (typ.)
V_{GE} = 0V, f = 1MHz, T_j = 25°C



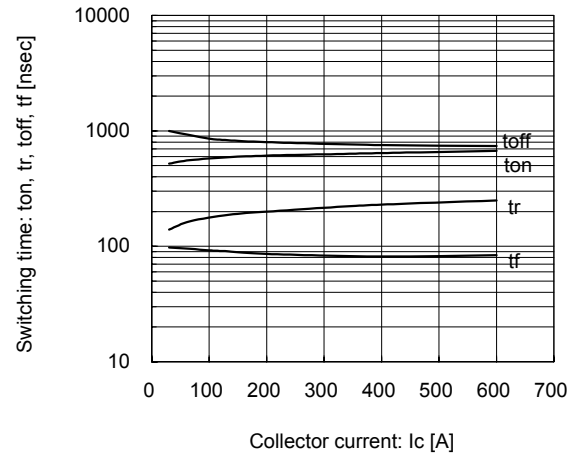
Dynamic Gate Charge (typ.)
V_{CC} = 600V, I_C = 300A, T_j = 25°C



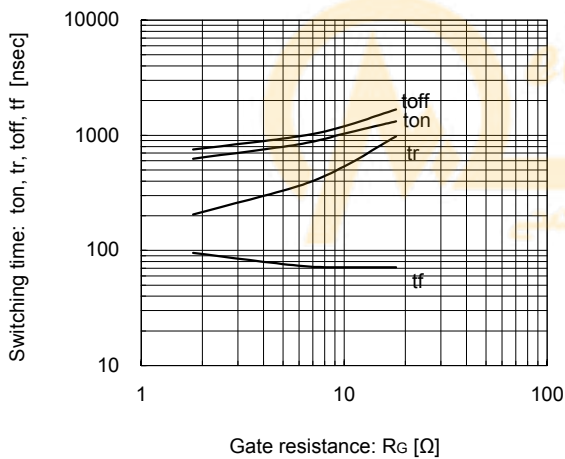
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=125^\circ C$



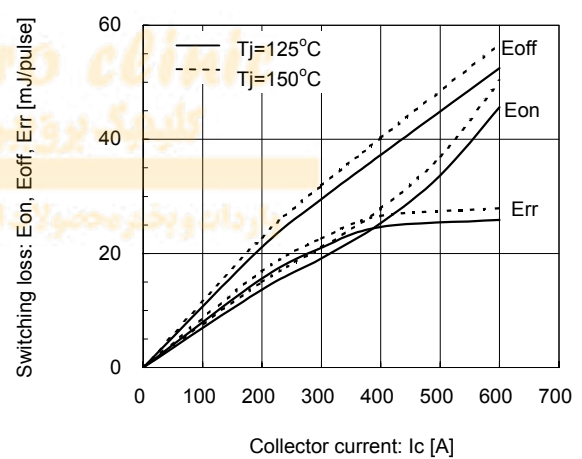
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=150^\circ C$



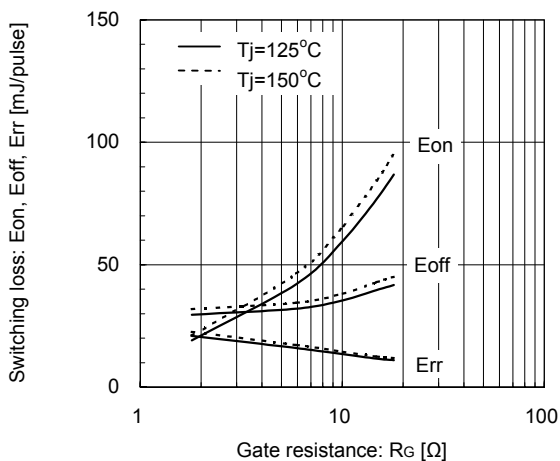
Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



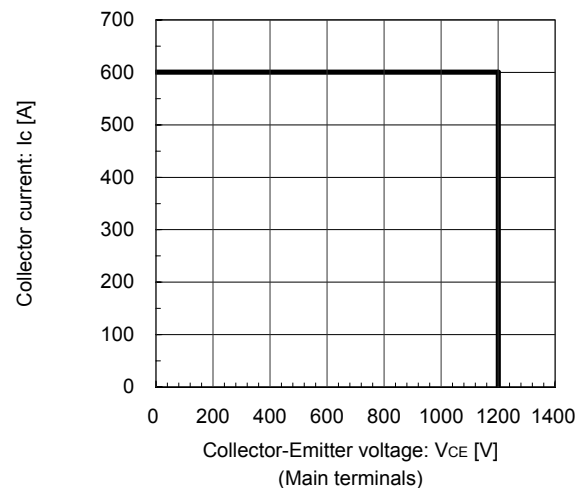
Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1.8\Omega$, $T_J=125^\circ C$, $150^\circ C$



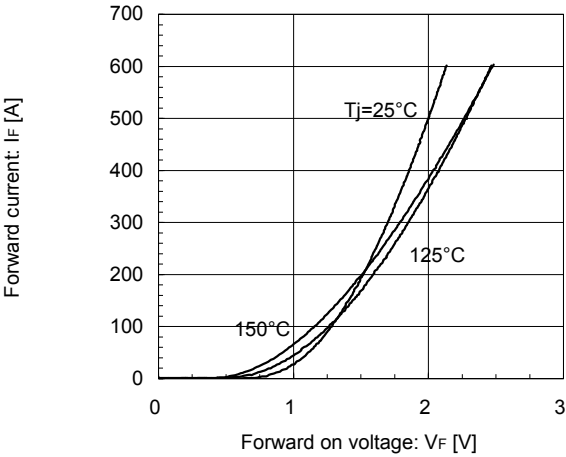
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=300A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$



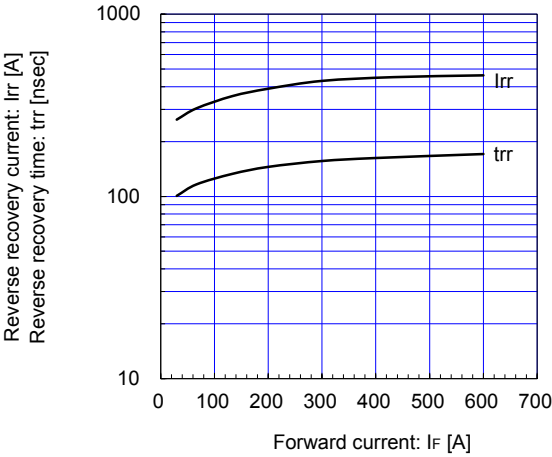
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=1.8\Omega$, $T_J=150^\circ C$



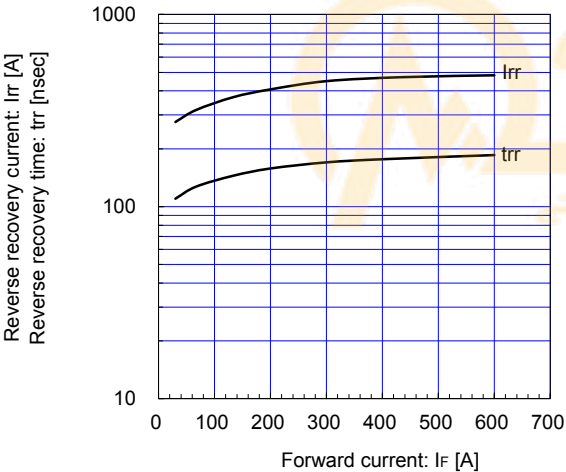
Forward Current vs. Forward Voltage (typ.)
chip



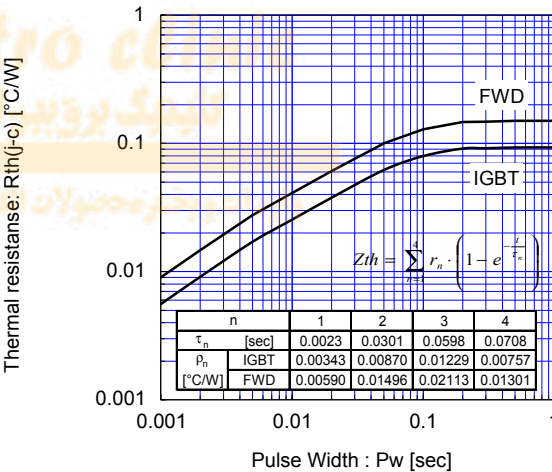
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1.8\Omega$, $T_j=125^{\circ}\text{C}$



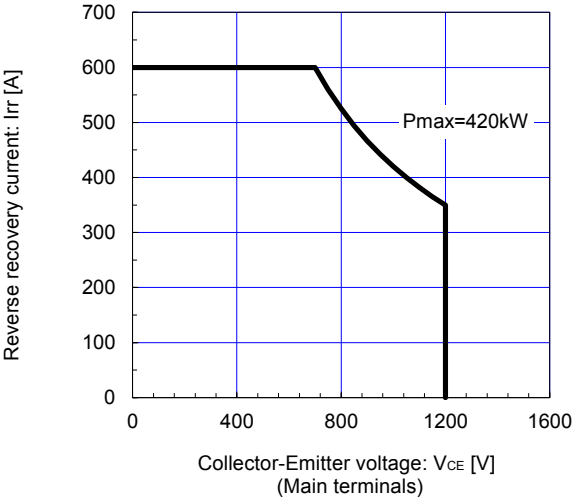
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1.8\Omega$, $T_j=150^{\circ}\text{C}$



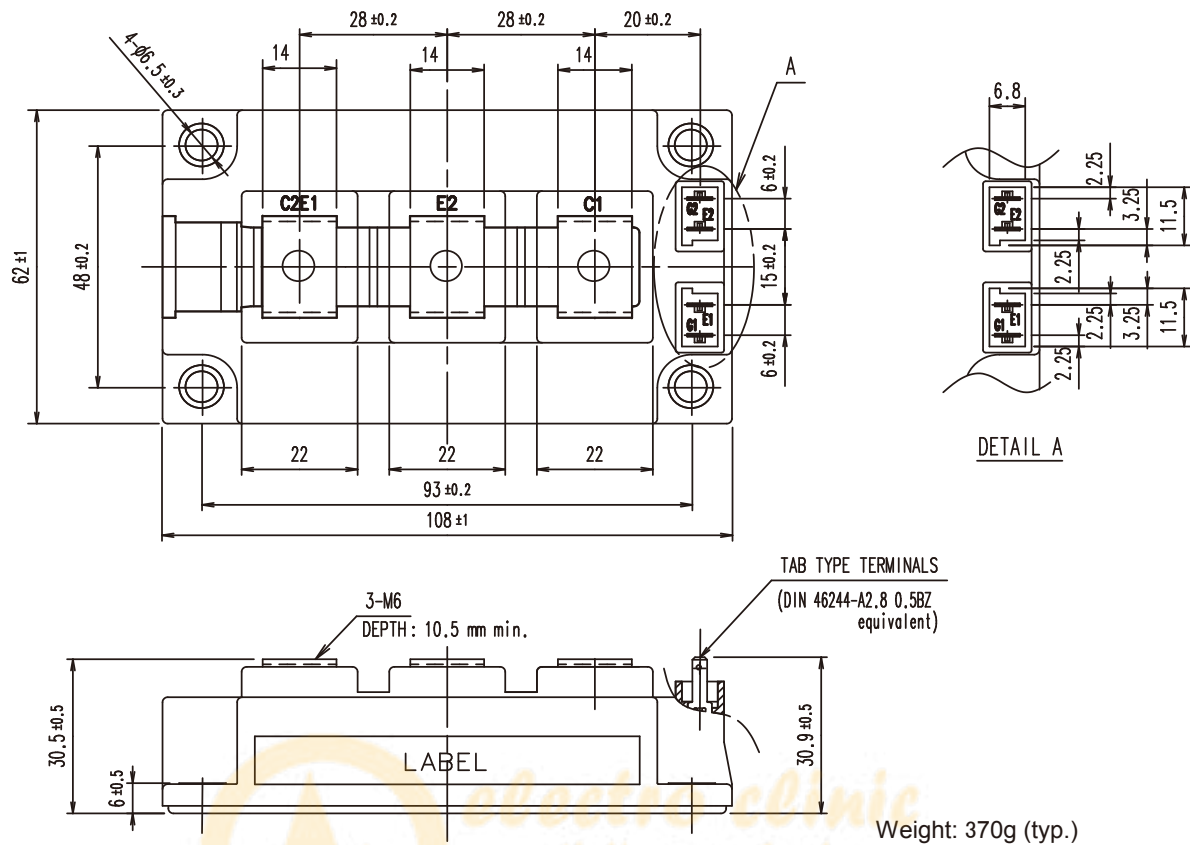
Transient Thermal Resistance (max.)



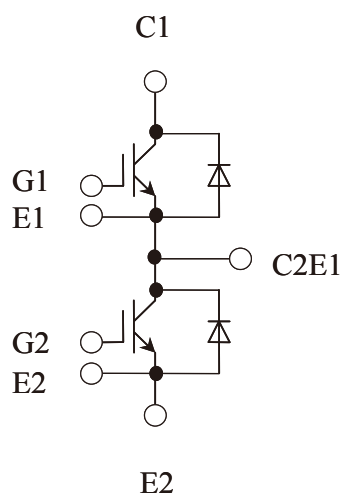
FWD safe operating area (max.)
 $T_j=150^{\circ}\text{C}$



■ Outline Drawings (Unit: mm)



■ Equivalent Circuit



WARNING

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• Machine tools	• Audiovisual equipment	• Electrical home appliances	• Personal equipment
			• Industrial robots etc.
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• Emergency equipment for responding to disasters and anti-burglary devices	• Safety devices
• Medical equipment	
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