

2MBI450VH-120-50

IGBT Modules

IGBT MODULE (V series) 1200V / 450A / 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
Collector-Emitter voltage	V _{CES}		1200	V
Gate-Emitter voltage	V _{GES}		±20	V
Collector current	I _C	Continuous	T _C =100°C T _C =25°C	A
	I _C pulse	1ms	900	
	-I _C		450	
	-I _C pulse	1ms	900	
	P _C	1 device	2400	
Collector power dissipation	P _C	1 device	2400	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) Mounting (*2) Terminals (*3)	AC : 1min.	2500 6.0 5.0	VAC N m

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)

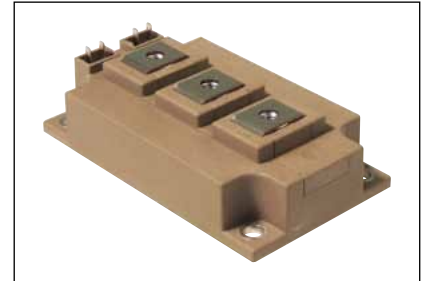
● Electrical characteristics (at T_J= 25°C unless otherwise specified)

Items	Symbols	Conditions		Characteristics			Units
				min.	typ.	max.	
Zero gate voltage collector current	I _{CEs}	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 = 450mA		6.0	6.5	7.0	V
Collector-Emitter saturation voltage	V _{CE(sat)} (terminal)	V _{GE} = 15V I _C = 450A	T _J =25°C	-	2.10	2.45	V
			T _J =125°C	-	2.45	-	
			T _J =150°C	-	2.50	-	
	V _{CE(sat)} (chip)		T _J =25°C	-	1.80	2.15	
			T _J =125°C	-	2.15	-	
			T _J =150°C	-	2.20	-	
Internal gate resistance	R _{g(int)}	-		-	1.9	-	Ω
Input capacitance	C _{ies}	V _{CE} = 10V, V _{GE} = 0V, f = 1MHz		-	36.4	-	nF
Turn-on time	t _{on}	V _{CC} = 600V L _S = 30nH		-	0.60	-	μsec
	t _r	I _C = 450A		-	0.20	-	
	t _{r(i)}	V _{GE} = ±15V		-	0.05	-	
Turn-off time	t _{off}	R _G = 1Ω		-	0.80	-	μsec
	t _f	T _J = 150°C		-	0.08	-	
Forward on voltage	V _F (terminal)	V _{GE} = 0V I _F = 450A	T _J =25°C	-	1.95	2.40	V
			T _J =125°C	-	2.15	-	
			T _J =150°C	-	2.10	-	
	V _F (chip)		T _J =25°C	-	1.70	2.15	
			T _J =125°C	-	1.90	-	
			T _J =150°C	-	1.85	-	
Reverse recovery time	t _{rr}	I _F = 450A		-	0.15	-	μsec

● Thermal resistance characteristics

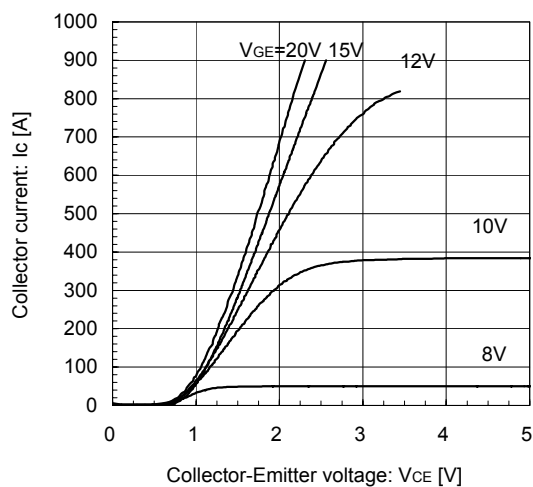
Items	Symbols	Conditions	Characteristics			Units
			min.	typ.	max.	
Thermal resistance (1device)	R _{th(j-c)}	Inverter IGBT Inverter FWD	-	-	0.062 0.110	°C/W
Contact thermal resistance (1device) (*4)	R _{th(c-f)}	with Thermal Compound	-	0.0125	-	

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

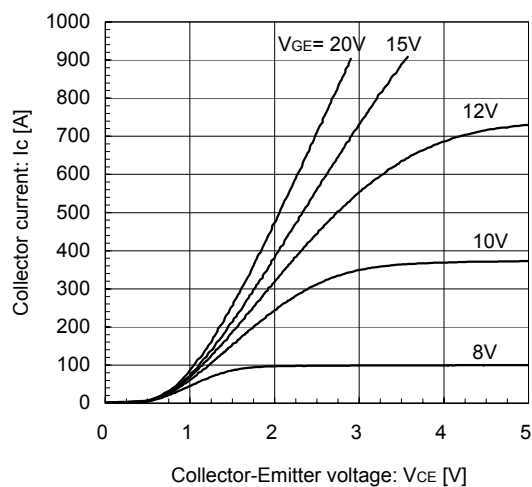


■ Characteristics (Representative)

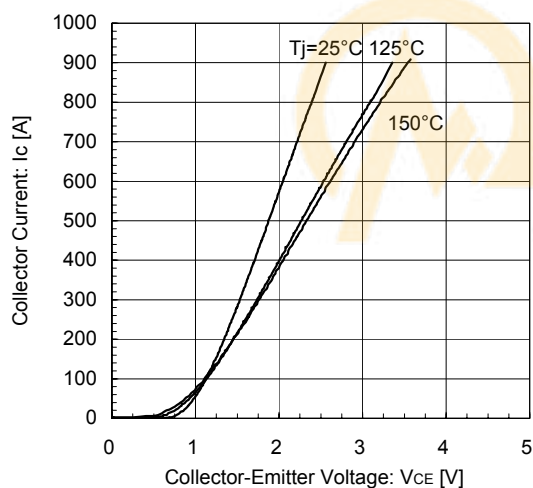
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 25°C / chip



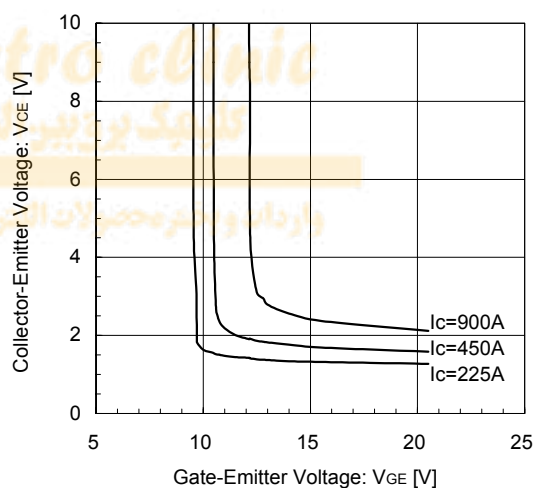
Collector current vs. Collector-Emitter voltage (typ.)
T_j = 150°C / chip



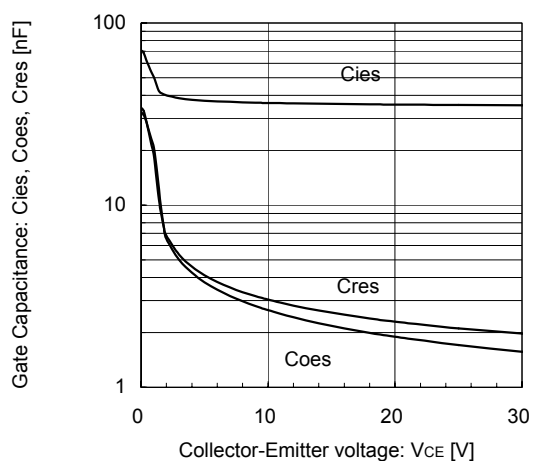
Collector current vs. Collector-Emitter voltage (typ.)
V_{GE} = 15V / chip



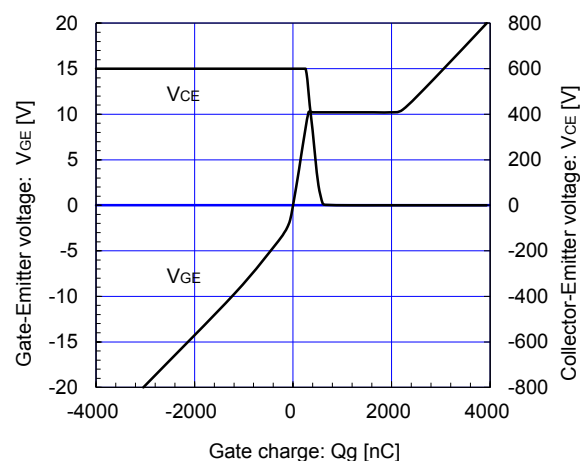
Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
T_j = 25°C / chip



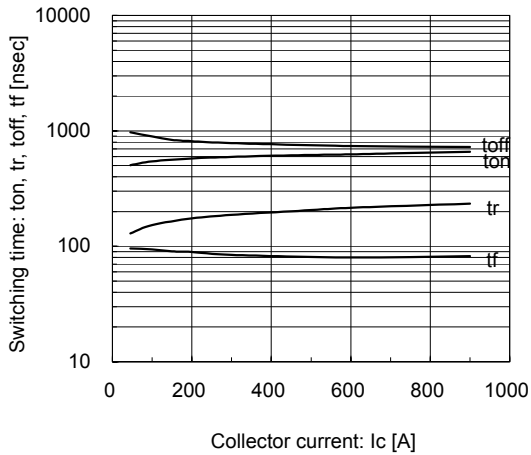
Gate Capacitance vs. Collector-Emitter Voltage (typ.)
V_{GE} = 0V, f = 1MHz, T_j = 25°C



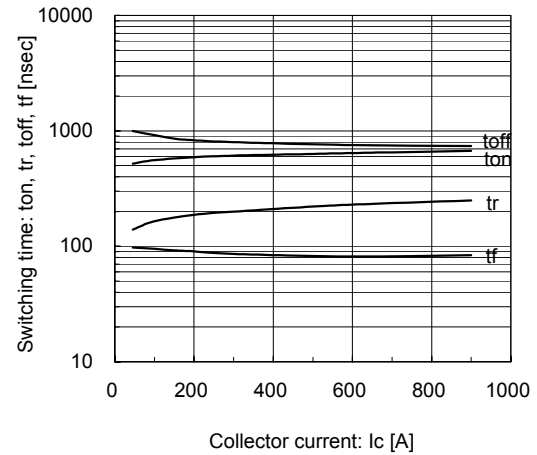
Dynamic Gate Charge (typ.)
V_{CC} = 600V, I_C = 450A, T_j = 25°C



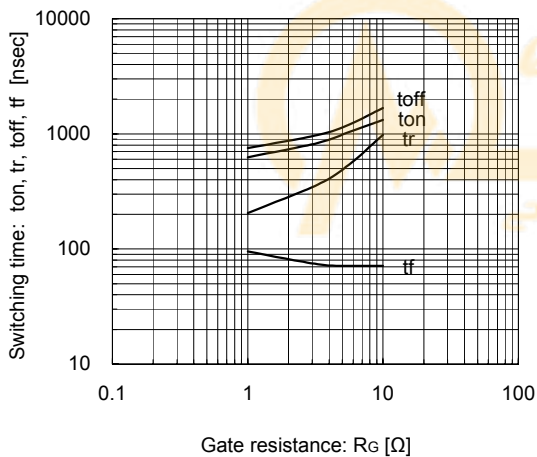
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1\Omega$, $T_J=125^\circ C$



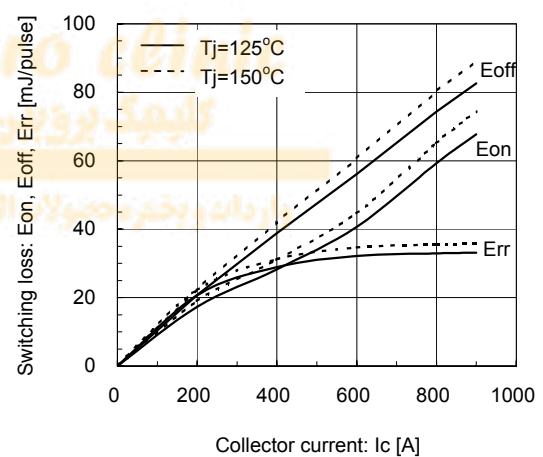
Switching time vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1\Omega$, $T_J=150^\circ C$



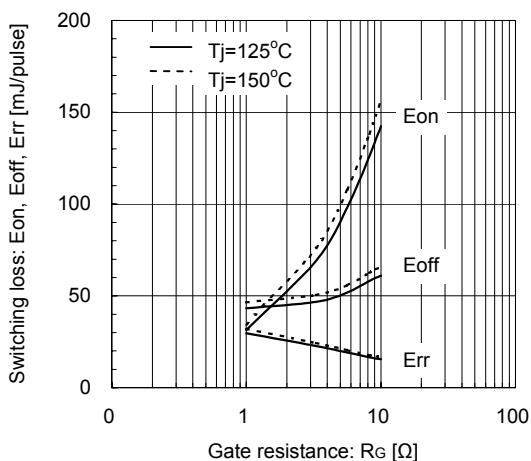
Switching time vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=450A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$



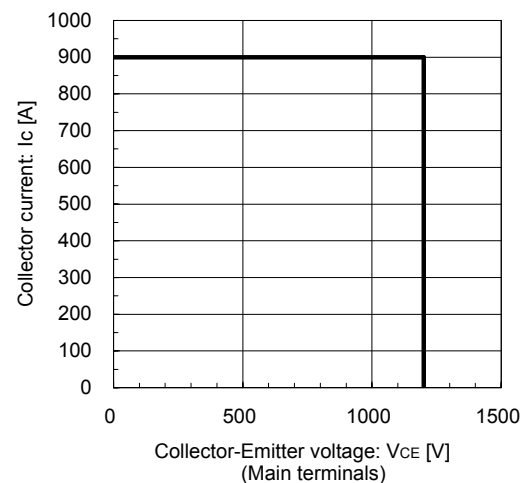
Switching loss vs. Collector current (typ.)
 $V_{CC}=600V$, $V_{GE}=\pm 15V$, $R_G=1\Omega$, $T_J=125^\circ C$, $150^\circ C$



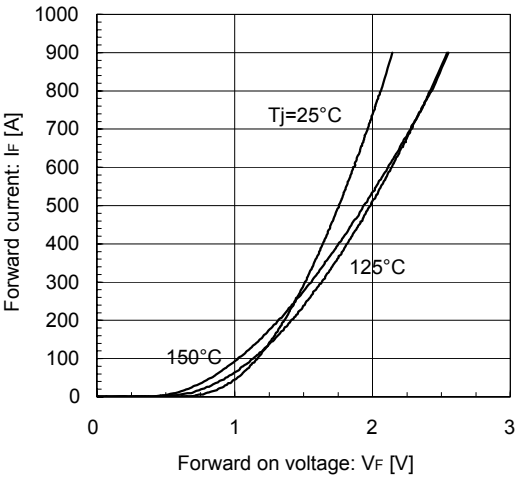
Switching loss vs. Gate resistance (typ.)
 $V_{CC}=600V$, $I_C=450A$, $V_{GE}=\pm 15V$, $T_J=125^\circ C$, $150^\circ C$



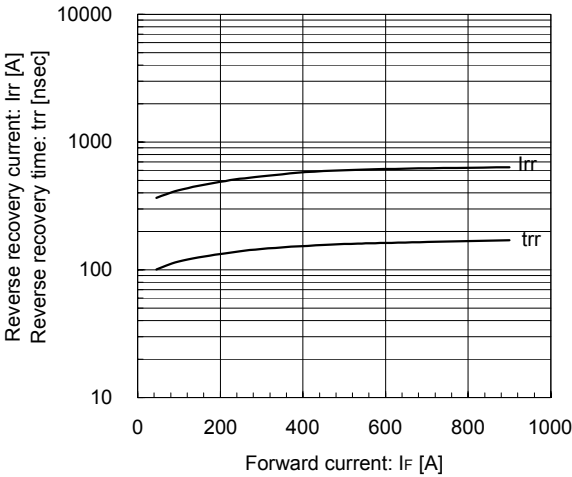
Reverse bias safe operating area (max.)
 $+V_{GE}=15V$, $-V_{GE}=15V$, $R_G=1\Omega$, $T_J=150^\circ C$



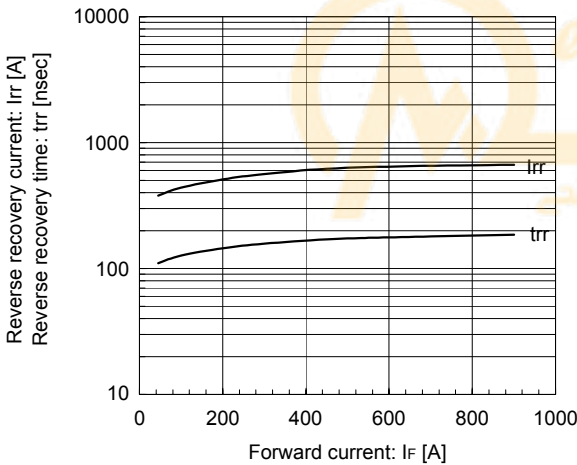
Forward Current vs. Forward Voltage (typ.)
chip



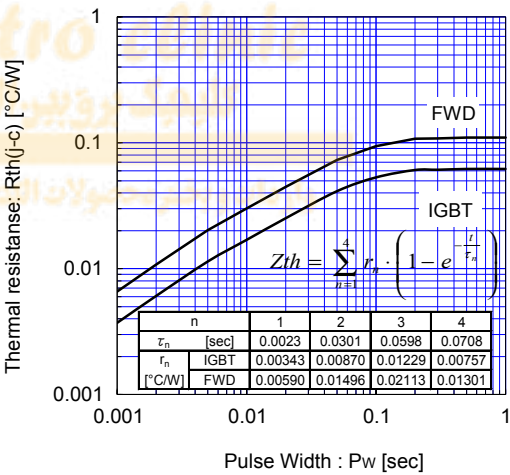
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1\Omega$, $T_J=125^\circ\text{C}$



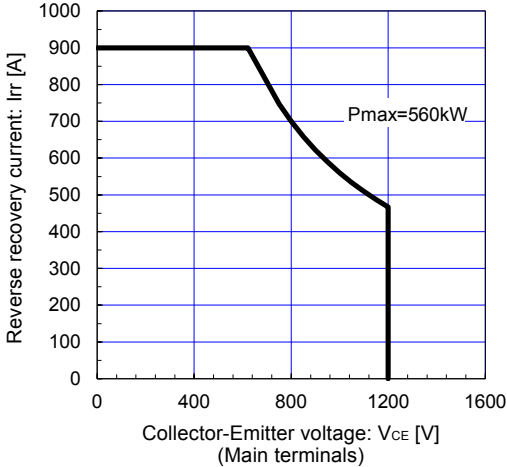
Reverse Recovery Characteristics (typ.)
 $V_{CC}=600\text{V}$, $V_{GE}=\pm 15\text{V}$, $R_G=1\Omega$, $T_J=150^\circ\text{C}$



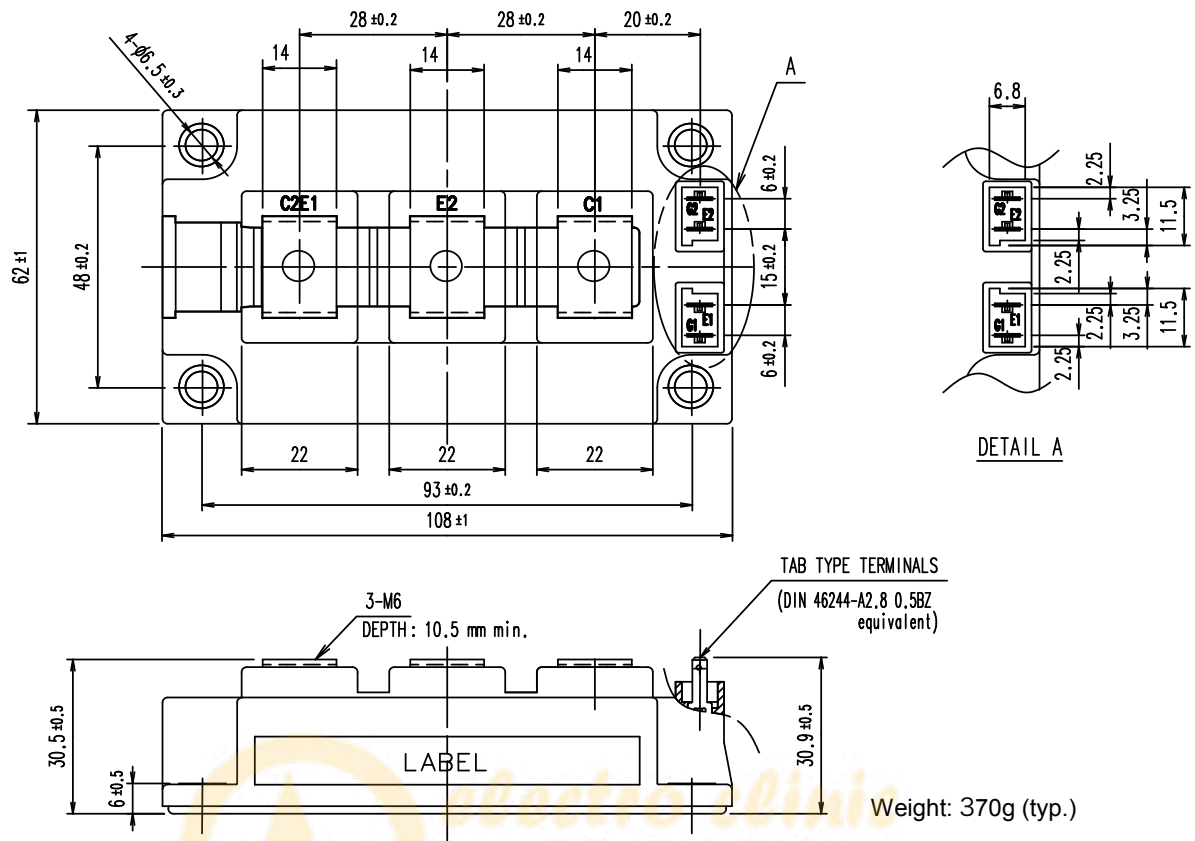
Transient Thermal Resistance (max.)



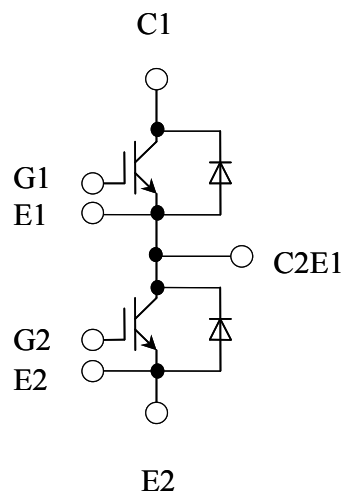
FWD safe operating area (max.)
 $T_J=150^\circ\text{C}$



■ 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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• Traffic-signal control equipment	• Gas leakage detectors with an auto-shut-off feature
• Emergency equipment for responding to disasters and anti-burglary devices	• Safety devices
• Medical equipment	
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• Submarine repeater equipment		
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