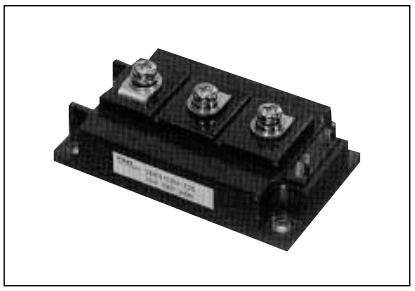
2MBI300UC-120

IGBT Modules

IGBT MODULE (U 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
Collector-Emitter voltage	V_{CES}			1200	V
Gate-Emitter voltage	V_{GES}			±20	V
Collector current	Ic	Continuous	Tc=25°C	400	A
			Tc=80°C	300	
	Ic pulse	1ms	Tc=25°C	800	
			Tc=80°C	600	
	-Ic			300	
	-Ic pulse			600	
Collector power dissipation	Pc	1 device		1470	W
Junction temperature	Tj			150	°C
Storage temperature	Tstg			-40 to +125	°C
Isolation voltage — Between terminal and copper base (*1)	V_{iso}	AC : 1min.		2500	VAC
Screw torque	Mounting (*2)			3.5	N·m
	Terminals (*2)			4.5	

Note *1: All terminals should be connected together when isolation test will be done.
Note *2: Recommendable value : Mounting : 2.5-3.5 N·m (M5 or M6), Terminals : 3.5-4.5 N·m (M6)

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

Items	Symbols	Conditions		Characteristics min.	Characteristics typ.	Characteristics max.	Units
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 = 300mA		4.5	6.5	8.5	V
Collector-Emitter saturation voltage	$V_{CE\ (sat)}$ (teminal)	V_{GE} = 15V, I_C = 300A	Tj=25°C	-	1.90	2.25	V
			Tj=125°C	-	2.15	-	
	$V_{CE\ (sat)}$ (chip)		Tj=25°C	-	1.75	2.10	
			Tj=125°C	-	2.00	-	
Input capacitance	Cies	V_{GE} = 0V, V_{CE} = 10V, f = 1MHz		-	34	-	nF
Turn-on time	ton	V_{CC} = 600V, I_C = 300A, V_{GE} = ±15V, R_G = 1.1Ω		-	0.36	1.20	μs
	tr			-	0.21	0.60	
	tr (i)			-	0.03	-	
Turn-off time	toff			-	0.37	1.00	
	tf			-	0.07	0.30	
Forward on voltage	V_F (teminal)	V_{GE} = 0V, I_F = 300A	Tj=25°C	-	1.75	2.05	V
			Tj=125°C	-	1.85	-	
	V_F (chip)		Tj=25°C	-	1.60	1.90	
			Tj=125°C	-	1.70	-	
Reverse recovery time	trr	I_F = 300A		-	-	0.35	μs
Lead resistance, terminal-chip (*3)	R lead			-	0.53	-	mΩ

Note *3: Biggest internal terminal resistance among arm.

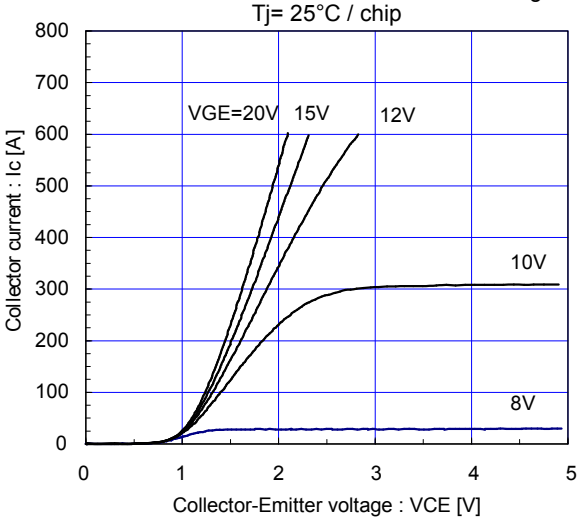
● Thermal resistance characteristics

Items	Symbols	Conditions	Characteristics min.	Characteristics typ.	Characteristics max.	Units
Thermal resistance (1device)	Rth(j-c)	IGBT	-	-	0.085	°C/W
		FWD	-	-	0.14	
Contact thermal resistance	Rth(c-f)	with Thermal Compound (*4)	-	0.025	-	

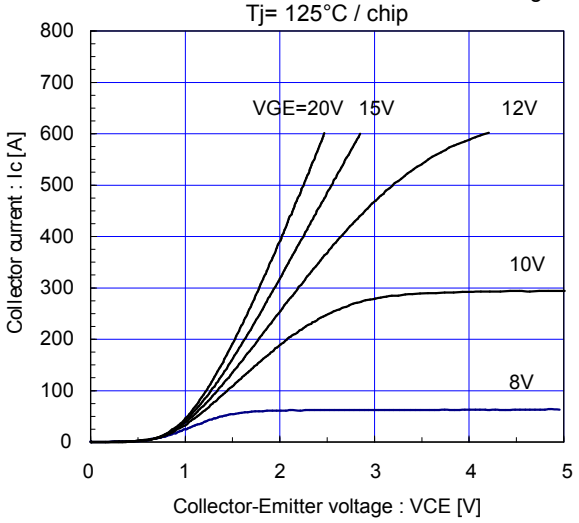
Note *4: This is the value which is defined mounting on the additional cooling fin with thermal compound.

■ Characteristics (Representative)

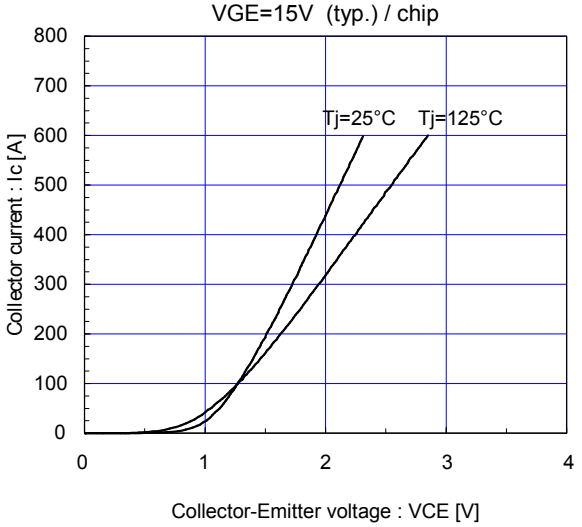
Collector current vs. Collector-Emitter voltage
Tj= 25°C / chip



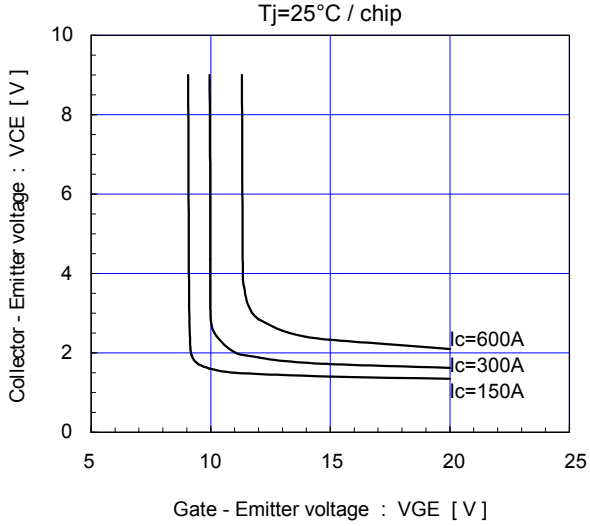
Collector current vs. Collector-Emitter voltage
Tj= 125°C / chip



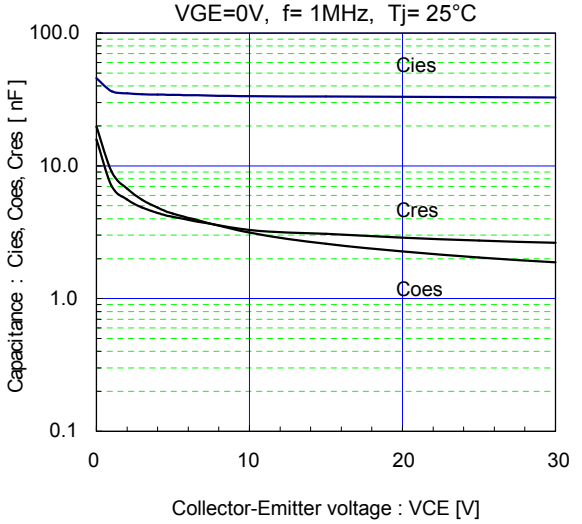
Collector current vs. Collector-Emitter voltage
VGE=15V (typ.) / chip



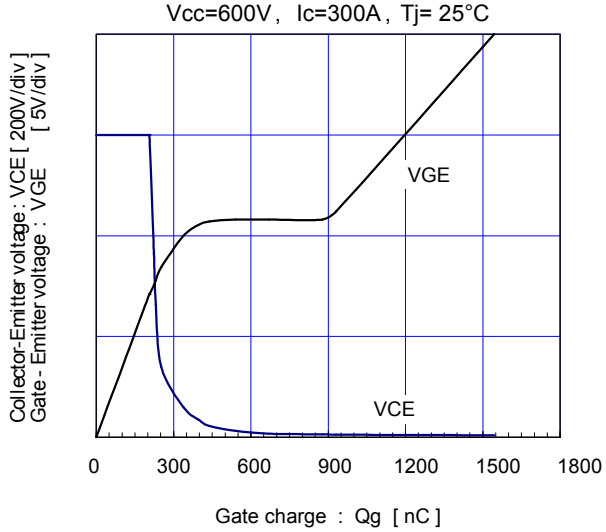
Collector-Emitter voltage vs. Gate-Emitter voltage
Tj=25°C / chip



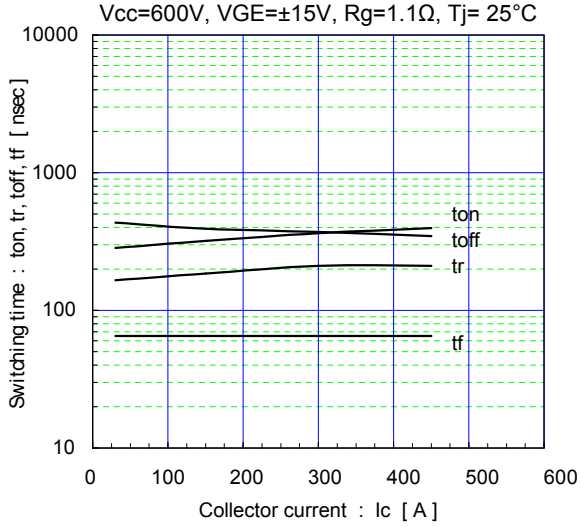
Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C



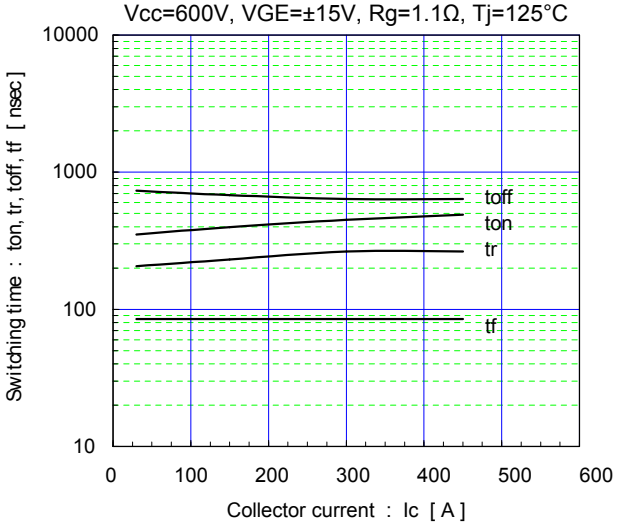
Dynamic Gate charge (typ.)
Vcc=600V, Ic=300A, Tj= 25°C



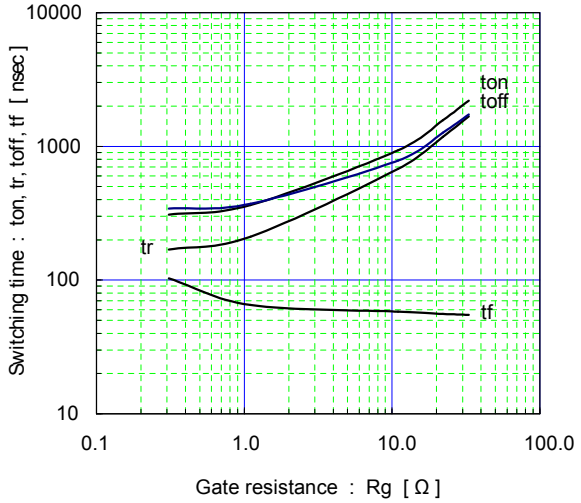
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.1Ω, Tj= 25°C



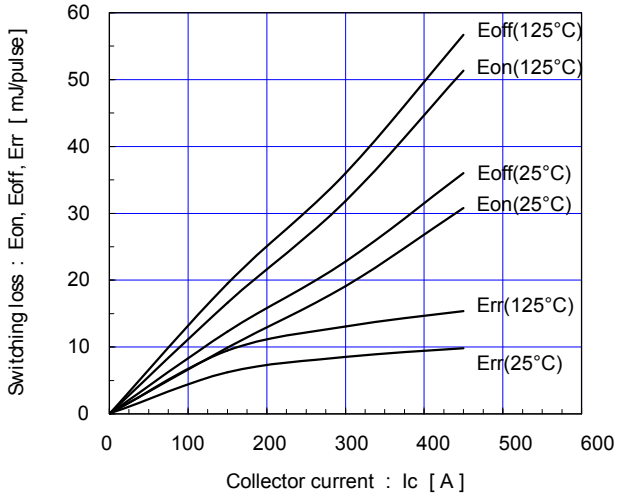
Switching time vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.1Ω, Tj=125°C



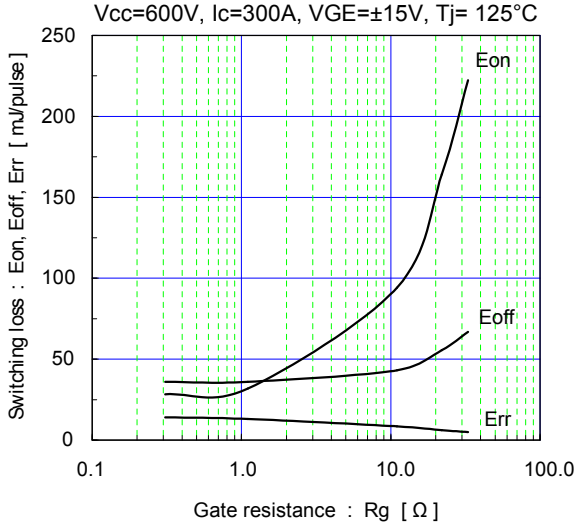
Switching time vs. Gate resistance (typ.)
Vcc=600V, Ic=300A, VGE=±15V, Tj= 25°C



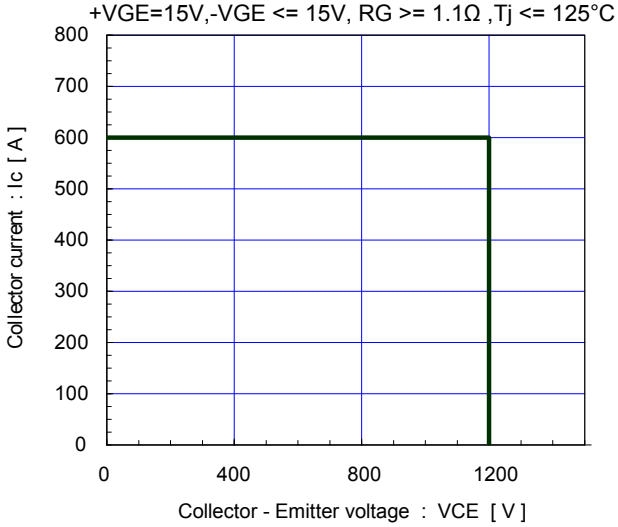
Switching loss vs. Collector current (typ.)
Vcc=600V, VGE=±15V, Rg=1.1Ω



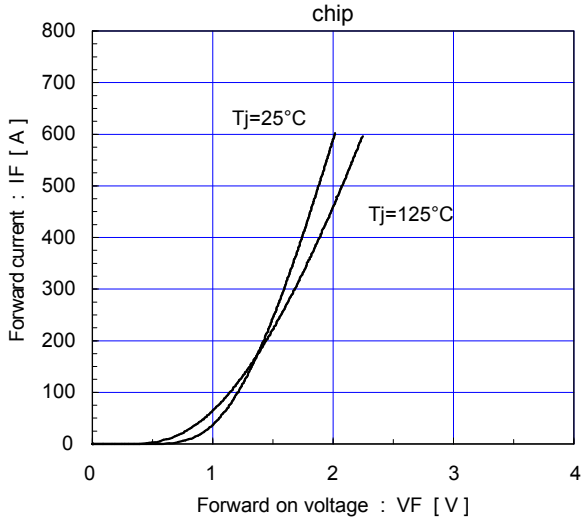
Switching loss vs. Gate resistance (typ.)
Vcc=600V, Ic=300A, VGE=±15V, Tj= 125°C



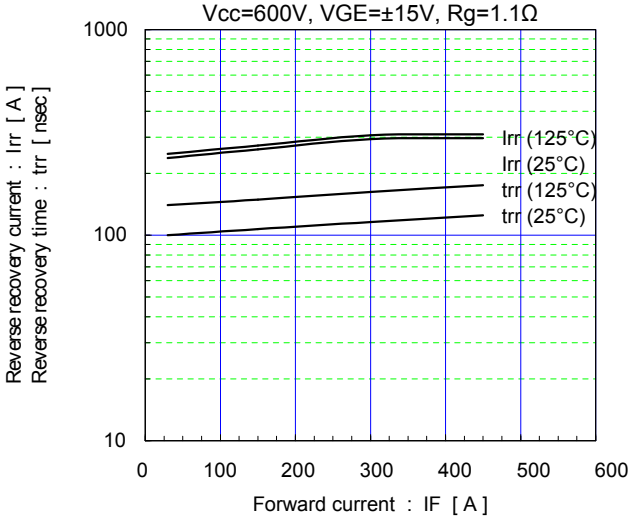
Reverse bias safe operating area
+VGE=15V,-VGE <= 15V, RG >= 1.1Ω ,Tj <= 125°C



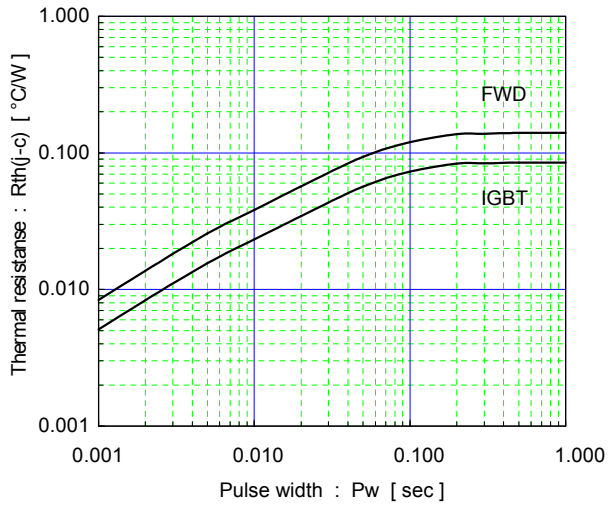
Forward current vs. Forward on voltage (typ.)
chip



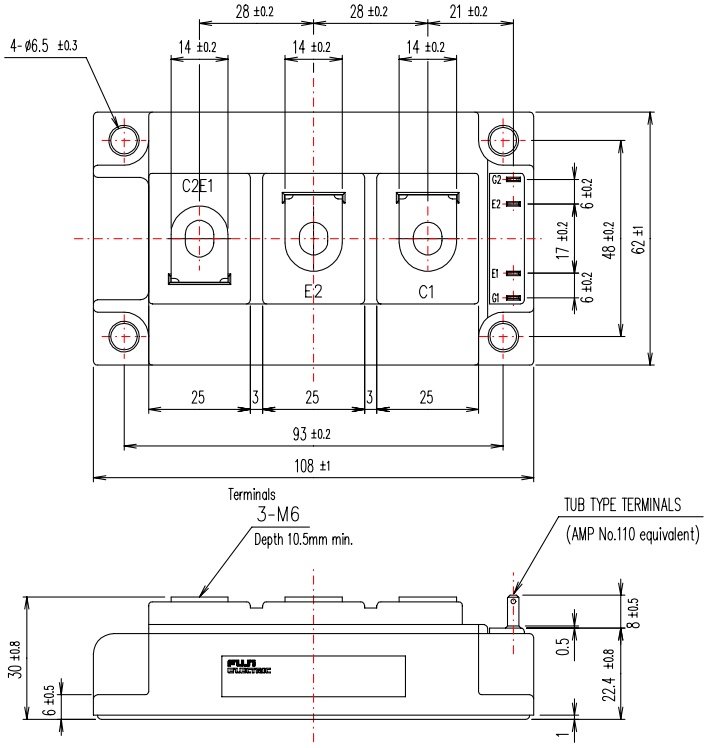
Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=1.1Ω



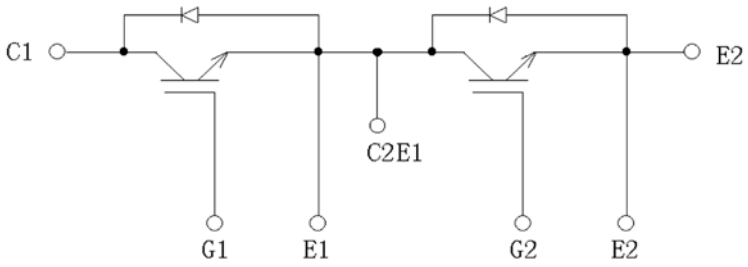
Transient thermal resistance



■ Outline Drawings, mm



■ Equivalent Circuit Schematic



WARNING

1. This Catalog contains the product specifications, characteristics, data, materials, and structures as of October 2008.
   The contents are subject to change without notice for specification changes or other reasons. When using a product listed in this Catalog, be sure to obtain the latest specifications.

2. All applications described in this Catalog exemplify the use of Fuji's products for your reference only. No right or license, either express or implied, under any patent, copyright, trade secret or other intellectual property right owned by Fuji Electric Device Technology Co., Ltd. is (or shall be deemed) granted. Fuji Electric Device Technology Co., Ltd. makes no representation or warranty, whether express or implied, relating to the infringement or alleged infringement of other's intellectual property rights which may arise from the use of the applications described herein.

3. Although Fuji Electric Device Technology Co., Ltd. is enhancing product quality and reliability, a small percentage of semiconductor products may become faulty. When using Fuji Electric semiconductor products in your equipment, you are requested to take adequate safety measures to prevent the equipment from causing a physical injury, fire, or other problem if any of the products become faulty. It is recommended to make your design fail-safe, flame retardant, and free of malfunction.

4. The products introduced in this Catalog are intended for use in the following electronic and electrical equipment which has normal reliability requirements.
   • Computers • OA equipment • Communications equipment (terminal devices) • Measurement equipment
   • Machine tools • Audiovisual equipment • Electrical home appliances • Personal equipment • Industrial robots etc.

5. If you need to use a product in this Catalog for equipment requiring higher reliability than normal, such as for the equipment listed below, it is imperative to contact Fuji Electric Device Technology Co., Ltd. to obtain prior approval. When using these products for such equipment, take adequate measures such as a backup system to prevent the equipment from malfunctioning even if a Fuji's product incorporated in the equipment becomes faulty.
   • Transportation equipment (mounted on cars and ships) • Trunk communications equipment
   • 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

6. Do not use products in this Catalog for the equipment requiring strict reliability such as the following and equivalents to strategic equipment (without limitation).
   • Space equipment • Aeronautic equipment • Nuclear control equipment
   • Submarine repeater equipment

8. If you have any question about any portion in this Catalog, ask Fuji Electric Device Technology Co., Ltd. or its sales agents before using the product.
   Neither Fuji Electric Device Technology Co., Ltd. nor its agents shall be liable for any injury caused by any use of the products not in accordance with instructions set forth herein.