

SPECIFICATION

Device Name : IGBT Module

Type Name : 7MBR10SA120D-01

Spec. No. : MS6M 0545

Date : Jun. - 02 - 2000

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

Fuji Electric Co., Ltd.
Matsumoto Factory

| | DATE | NAME | APPROVED | Fuji Electric Co., Ltd. | | |
|---------|----------------|---------------------|---------------------|-------------------------|-----------|--------|
| DRAWN | Jun. - 2 - '00 | <i>T. Kobayashi</i> | | DWG. NO. | MS6M 0545 | 1 / 10 |
| CHECKED | June - 2 - 00 | <i>S. Matsumoto</i> | <i>T. Kobayashi</i> | | | |

Revised Records

| Date | Classi- fication | Ind. | Content | Applied date | Drawn | Checked | Approved |
|----------|---------------------|------|---------|-----------------|-------|------------|-------------|
| Jan-2-60 | enactment | — | ————— | Issued date | — | S. Nishida | T. Miyazaki |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

Fuji Electric Co., Ltd.

DWG NO

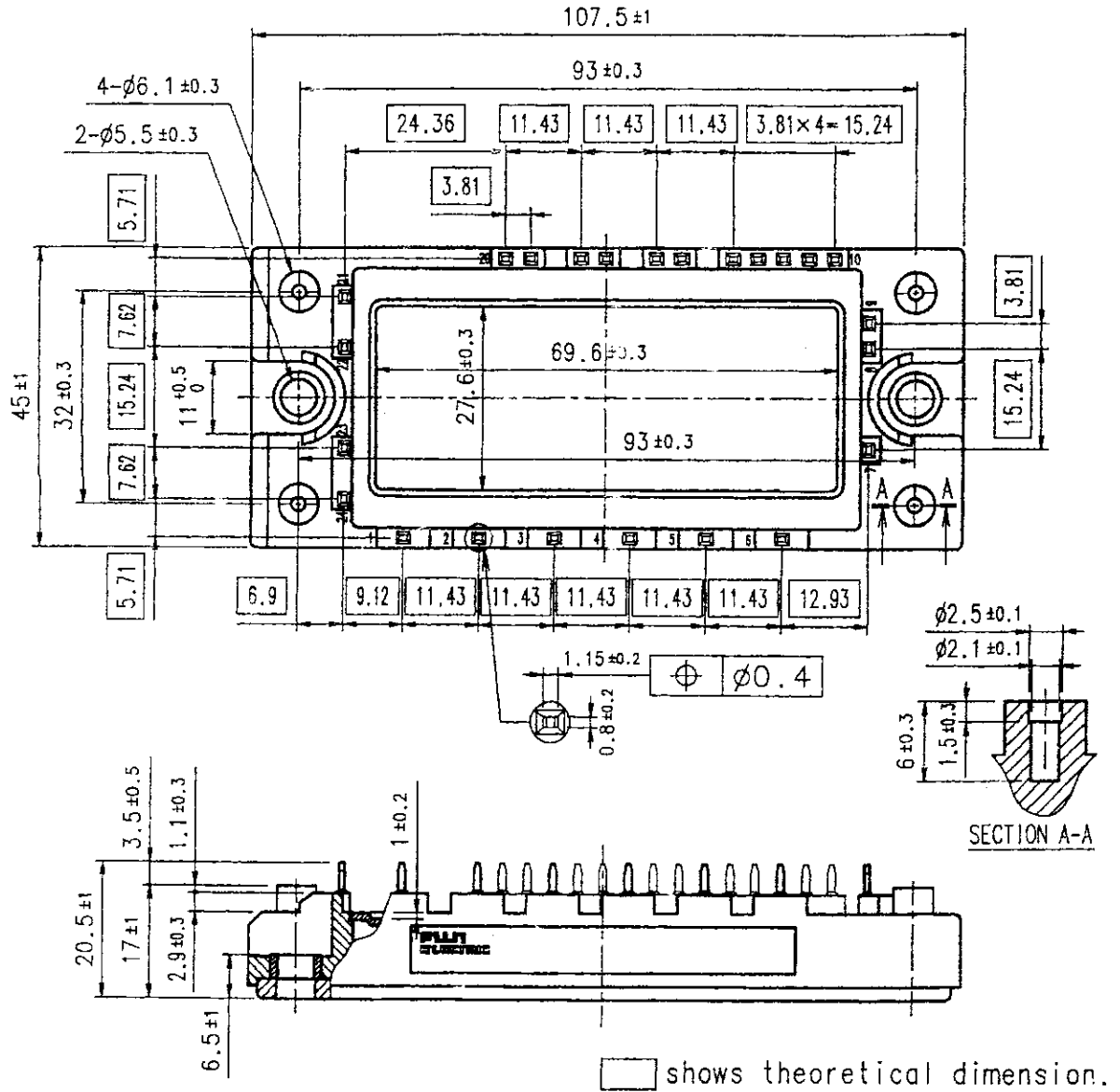
MS6M 0545

2 / 10

| | |
|--|--|
| | |
| | |
| | |
| | |

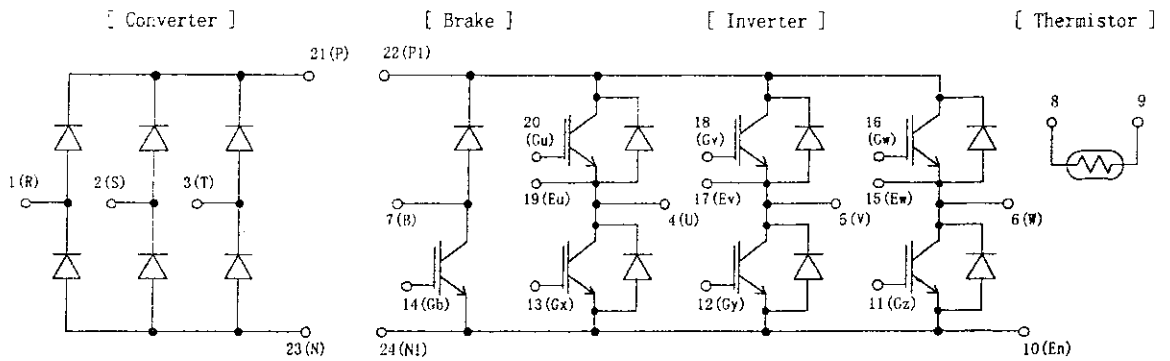
7MBR10SA120D-01

1. Outline Drawing (Unit : mm)



This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

2. Equivalent circuit



Fuji Electric Co., Ltd.

DWG. NO.

MS6M 0545

3 / 10

3. Absolute Maximum Ratings (at Tc= 25C unless otherwise specified)

| Items | | Symbols | Conditions | Maximum Ratings | Units | |
|--|--|------------------|------------------------|-----------------|------------------|---|
| Inverter | Collector-Emitter voltage | VCES | | 1200 | V | |
| | Gate-Emitter voltage | VGES | | +20 | V | |
| | Collector current | Ic | Continuous | Tc=25C | 15 | A |
| | | | | Tc=80C | 10 | |
| | | Icp | 1ms | Tc=25C | 30 | A |
| | | | | Tc=80C | 20 | |
| -Ic | | | 10 | A | | |
| Collector Power Dissipation | Pc | 1 device | 75 | W | | |
| Brake | Collector-Emitter voltage | VCES | | 1200 | V | |
| | Gate-Emitter voltage | VGES | | +20 | V | |
| | Collector current | Ic | Continuous | Tc=25C | 15 | A |
| | | | | Tc=80C | 10 | |
| | | Icp | 1ms | Tc=25C | 30 | A |
| | | | | Tc=80C | 20 | |
| Collector Power Dissipation | Pc | 1 device | 75 | W | | |
| Repetitive peak reverse Voltage(Diode) | VRRM | | 1200 | V | | |
| Converter | Repetitive peak reverse Voltage | VRRM | | 1600 | V | |
| | Average Output Current | Io | 50Hz/60Hz sine wave | 25 | A | |
| | Surge Current (Non-Repetitive) | IFSM | Tj=150C,10ms | 260 | A | |
| | I ² t (Non-Repetitive) | I ² t | half sine wave | 338 | A ² s | |
| Junction temperature | Tj | | 150 | C | | |
| Storage temperature | Tstg | | -40~ +125 | C | | |
| Isolation voltage | between terminal and copper base ^{(*)1} | Viso | AC : 1min. | 2500 | V | |
| | between thermistor and others ^{(*)2} | | | 2500 | V | |
| Mounting Screw Torque ^{(*)3} | | | | 3.5 | Nm | |

(*)1 All terminals should be connected together when isolation test will be done.

(*)2 Terminal 8 and 9 should be connected together. Terminal 1 to 7 and 10 to 24 should be connected together and shorted to copper base.

(*)3 Recommendable Value : 2.5~3.5 Nm (M5)

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

4. Electrical characteristics (at T_j= 25C unless otherwise specified)

| Items | Symbols | Conditions | Characteristics | | | Units | | |
|-----------------------|--------------------------------------|-------------|----------------------------------|------|------|-------|-----|----|
| | | | min. | typ. | Max. | | | |
| Inverter | Zero gate voltage Collector current | ICES | VGE 0 V, VCE 1200 V | | | 1.0 | mA | |
| | Gate-Emitter leakage current | IGES | VCE 0 V, VGE +-20 V | | | 200 | nA | |
| | Gate-Emitter threshold voltage | VGE(th) | VCE 20 V, I _c = 10 mA | 5.5 | 7.2 | 8.5 | V | |
| | Collector-Emitter saturation voltage | VCE(sat) | VGE 15 V, I _c = 10 A | chip | 2.1 | | | V |
| | | | terminal | | 2.15 | 2.6 | | |
| | Input capacitance | Cies | VGE 0 V, VCE 10 V f = 1 MHz | | 1200 | | | pF |
| | Turn-on time | ton | Vcc= 600 V | | 0.35 | 1.2 | | us |
| | | | I _c = 10 A | | 0.25 | 0.6 | | |
| | | | VGE +-15 V | | 0.1 | | | |
| | Turn-off time | toff | RG = 120 ohm | | 0.45 | 1.0 | | us |
| | | | | 0.08 | 0.3 | | | |
| Forward on voltage | VF | IF = 10 A | chip | 2.3 | | | V | |
| | | terminal | | 2.35 | 3.2 | | | |
| Reverse recovery time | trr | IF = 10 A | | | | 350 | ns | |
| Brake | Zero gate voltage Collector current | ICES | VGE 0 V, VCE 1200 V | | | 1.0 | mA | |
| | Gate-Emitter leakage current | IGES | VCE 0 V, VGE +-20 V | | | 200 | nA | |
| | Collector-Emitter saturation voltage | VCE(sat) | VGE 15 V, I _c = 10 A | chip | 2.1 | | | V |
| | | | terminal | | 2.2 | 2.6 | | |
| | Turn-on time | ton | Vcc= 600 V | | 0.35 | 1.2 | | us |
| | | | I _c = 10 A | | 0.25 | 0.6 | | |
| | | | VGE +-15 V | | 0.45 | 1.0 | | |
| | Turn-off time | toff | RG = 120 ohm | | 0.08 | 0.3 | | us |
| | | | | | | | | |
| | Reverse current | IRRM | VR = 1200 V | | | | 1.0 | mA |
| Converter | VFM | IF = 10 A | chip | 0.9 | | | V | |
| | | terminal | | 1.0 | 1.5 | | | |
| Reverse current | IRRM | VR = 1600 V | | | | 1.0 | mA | |
| Thermistor | Resistance | R | T = 25C | | 5000 | | ohm | |
| | | | T = 100C | 465 | 495 | 520 | | |
| | B value | B | T = 25/50C | 3305 | 3375 | 3450 | K | |

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

5. Thermal resistance characteristics

| Items | Symbols | Conditions | Characteristics | | | Units |
|----------------------------------|----------|---------------------------|-----------------|------|------|-------|
| | | | min. | typ. | Max. | |
| Thermal resistance (1 device) | Rth(j-c) | Inverter IGBT | | | 1.67 | C/W |
| | | Inverter FWD | | | 2.78 | |
| | | Brake IGBT | | | 1.67 | |
| | | Converter Diode | | | 1.30 | |
| Contact Thermal resistance | Rth(c-f) | with Thermal Compound (*) | | 0.05 | | C/W |

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

Fuji Electric Co., Ltd.

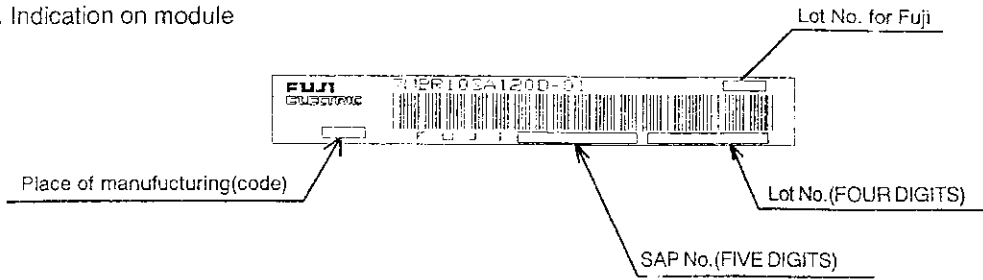
DWG. NO.

MS6M 0545

5 / 10

H04-004-03

6. Indication on module



7. Applicable category

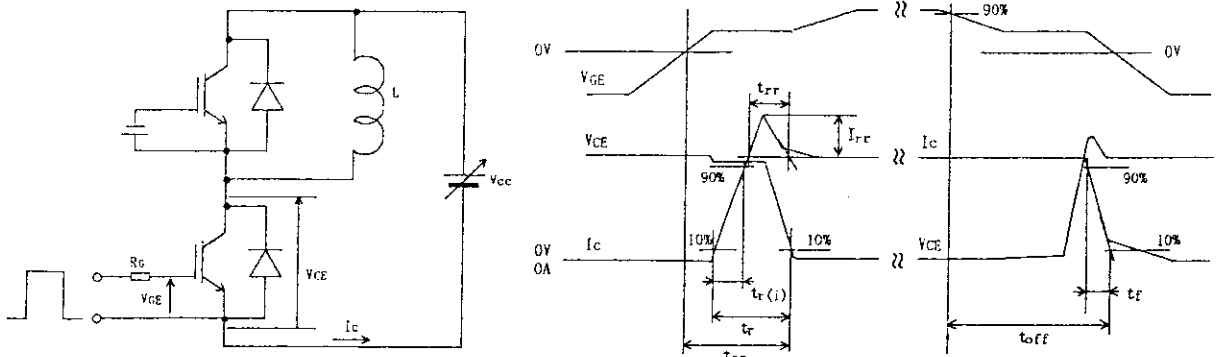
This specification is applied to Power Integrated Module named 7MBR10SA120D-01 .

8. Storage and transportation notes

- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
- Avoid exposure to corrosive gases and dust.
- Avoid excessive external force on the module.
- Store modules with unprocessed terminals.
- Do not drop or otherwise shock the modules when transporting.
- Please connect adequate fuse or protector of circuit between three-phase line and this product to prevent the equipment from causing secondary destruction.

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

9. Definitions of switching time



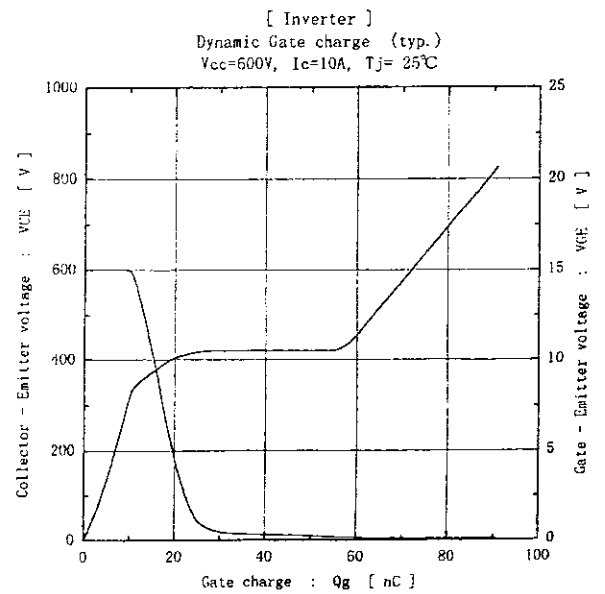
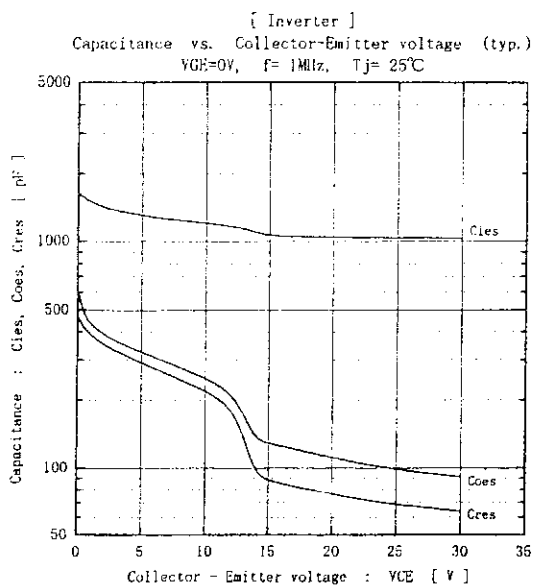
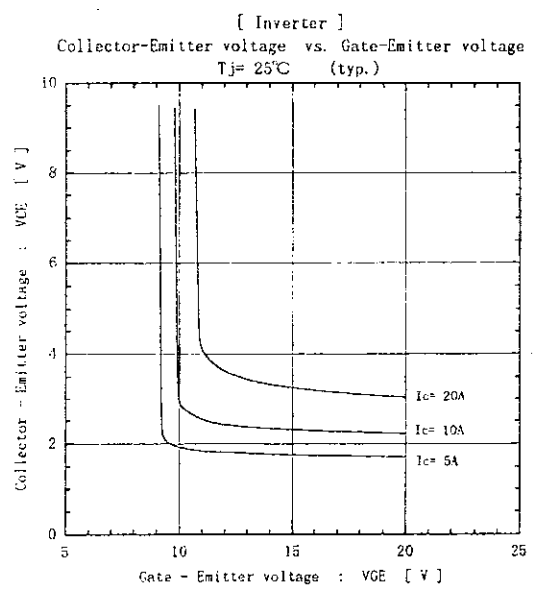
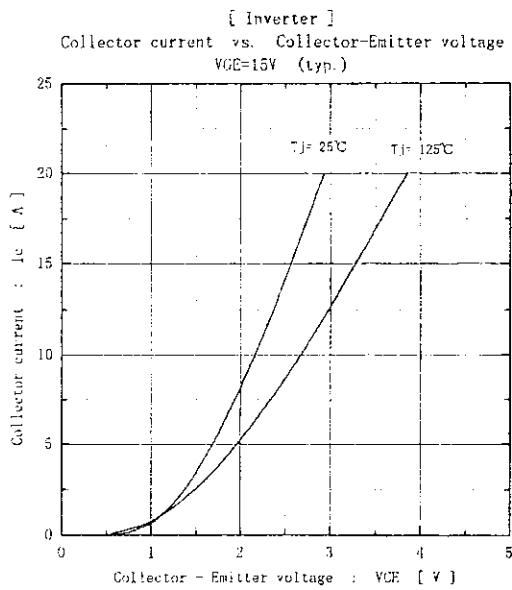
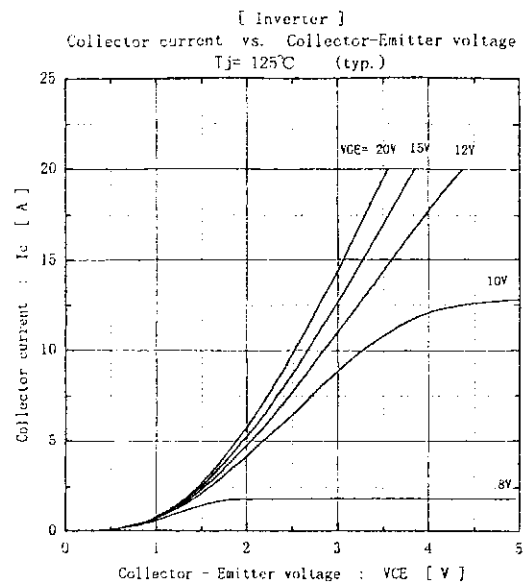
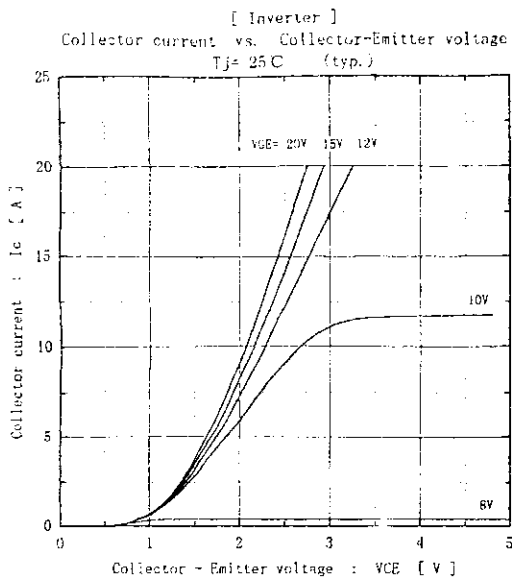
Fuji Electric Co.,Ltd.

DWG NO

MS6M 0545

6 / 10

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.



Fuji Electric Co., Ltd.

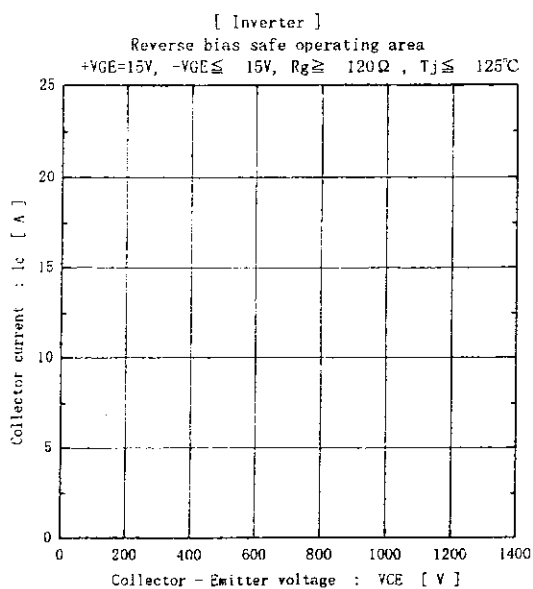
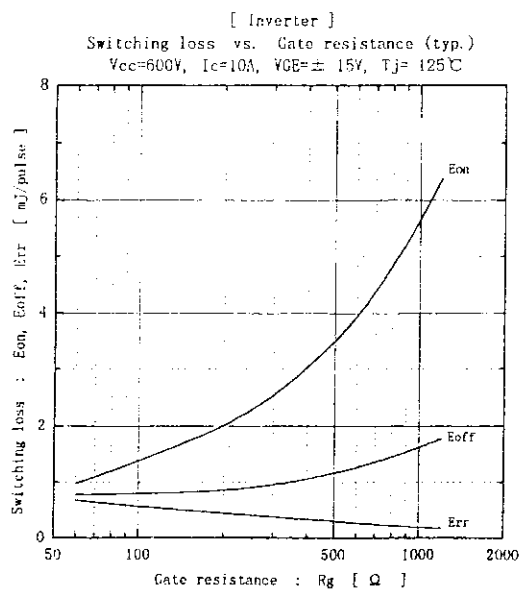
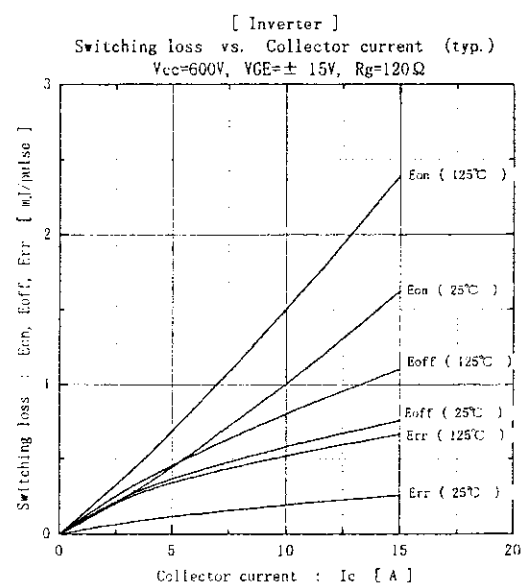
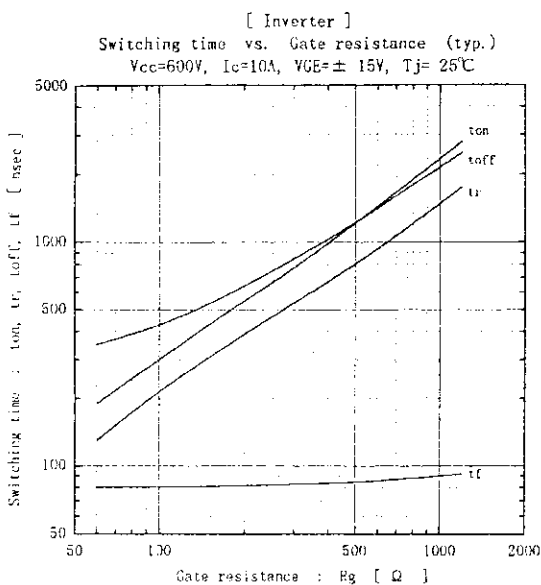
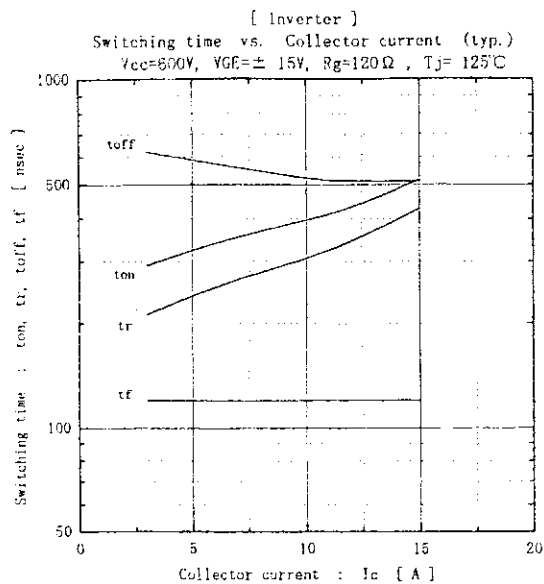
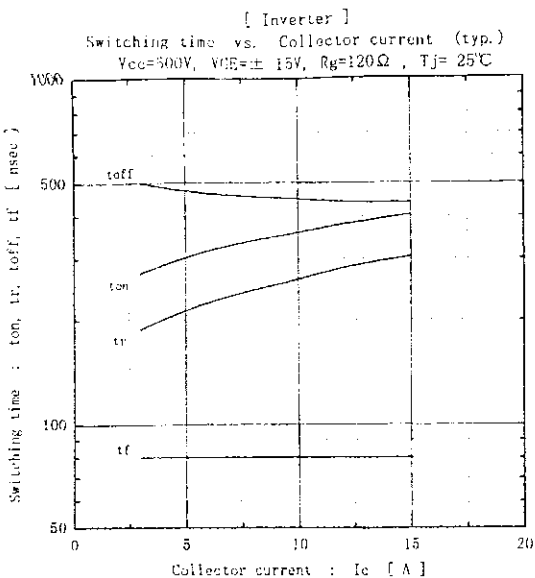
DWG NO.

MS6M 0545

7/10

H04-004-03

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.



Fuji Electric Co., Ltd.

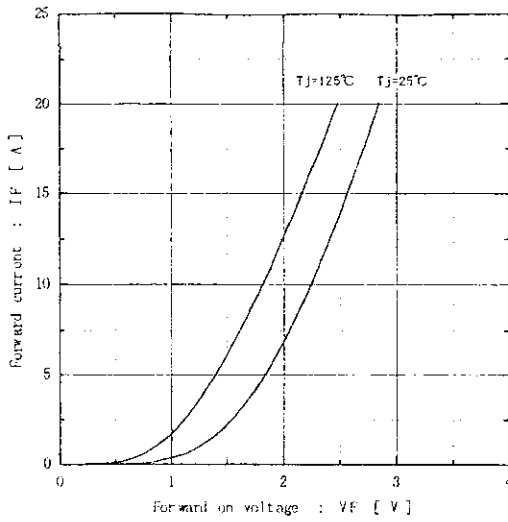
DWG. NO.

MS6M 0545

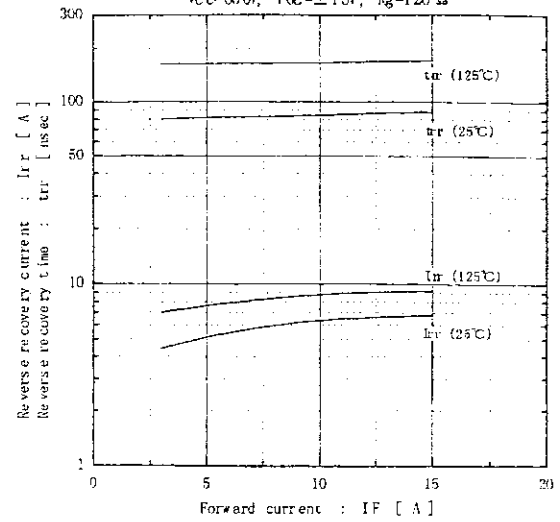
8 / 10

This material and the information herein is the property of Fuji Electric Co., Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co., Ltd.

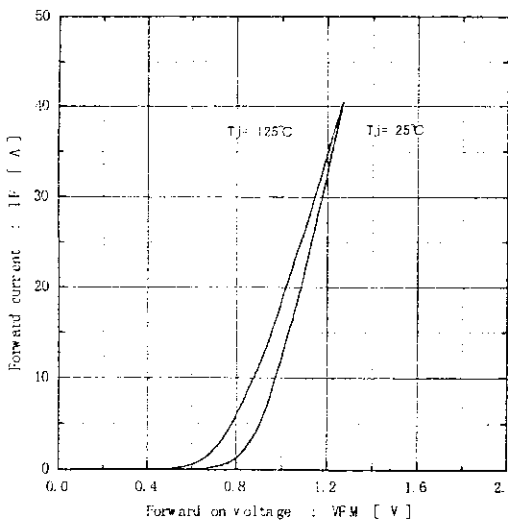
[Inverter]
Forward current vs. Forward on voltage (typ.)



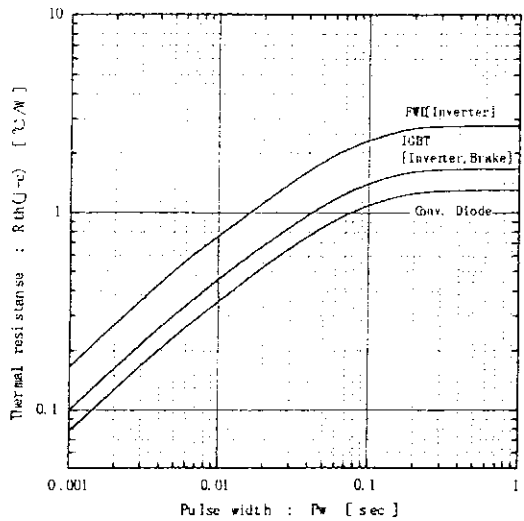
[Inverter]
Reverse recovery characteristics (typ.)
V_{CE}=60V, V_{CE}=±15V, R_g=120Ω



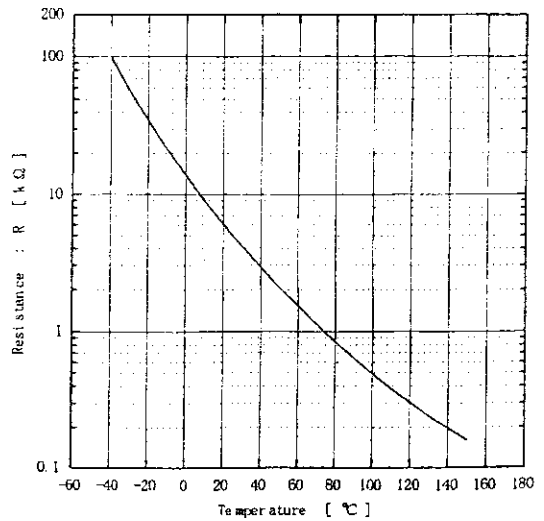
[Converter]
Forward current vs. Forward on voltage (typ.)



Transient thermal resistance



[Thermistor]
Temperature characteristic (typ.)



Fuji Electric Co., Ltd.

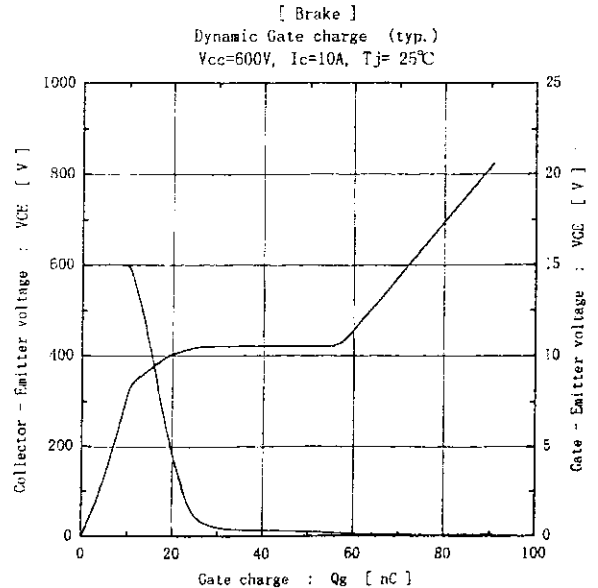
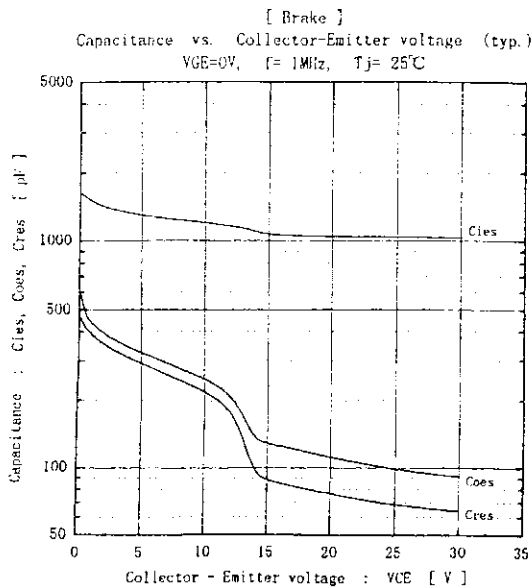
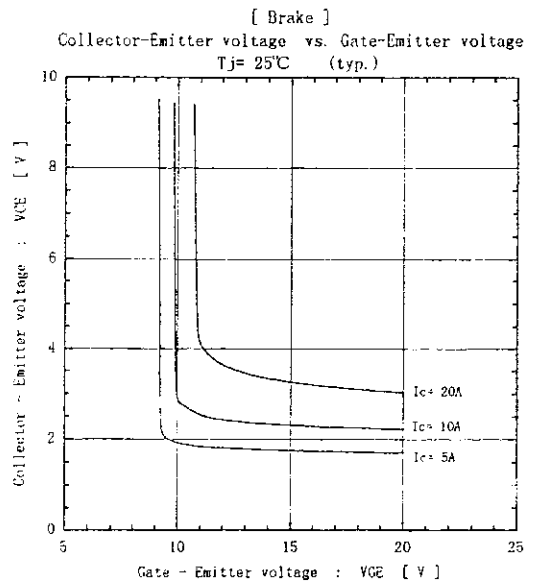
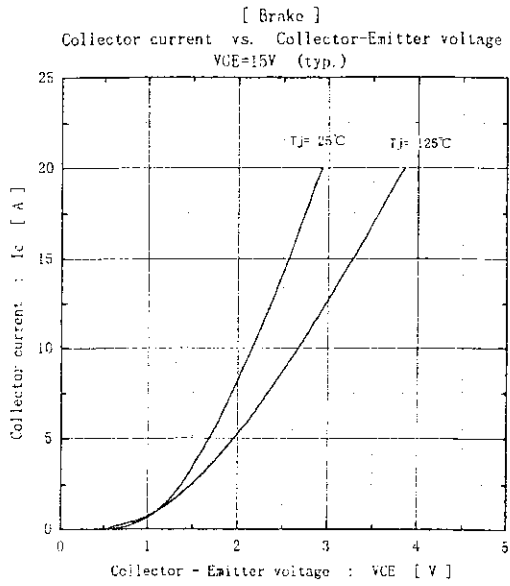
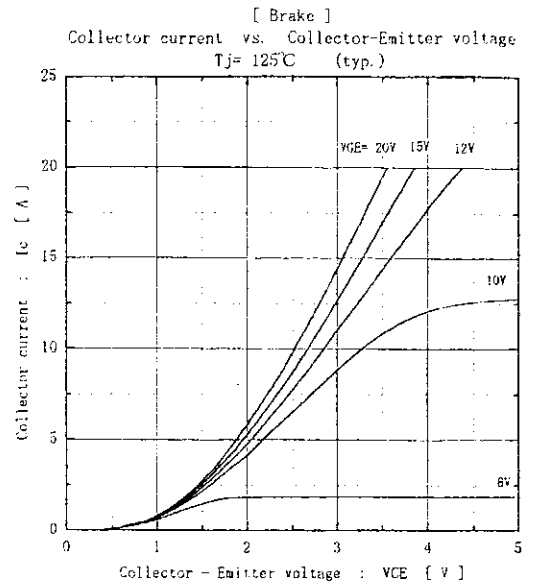
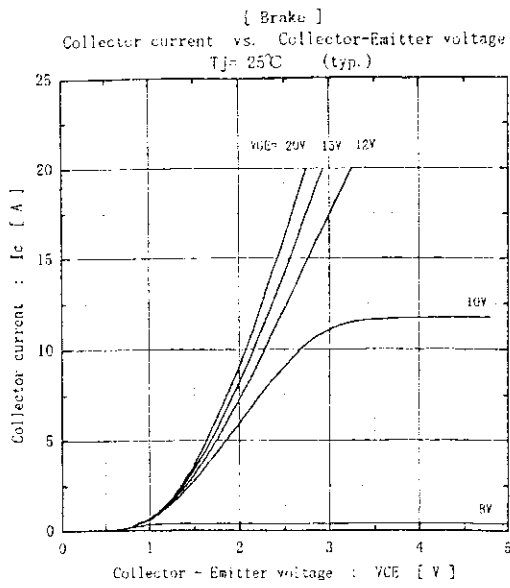
DWG. NO.

MS6M 0545

9 / 10

H04-004-03

This material and the information herein is the property of Fuji Electric Co. Ltd. They shall be neither reproduced, copied, lent, or disclosed in any way whatsoever for the use of any third party nor used for the manufacturing purposes without the express written consent of Fuji Electric Co. Ltd.



Fuji Electric Co., Ltd

DWG. NO.

MS6M 0545

10 / 10

H04-004-03