

# SPECIFICATION

Device Name : IGBT Module

Type Name : 6MBI100S-140-01

Spec. No. : MS5F 4850

Date : Jun. - 02 - 2000

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Matsumoto Factory

|         |                | DATE | NAME               | APPROVED         | Fuji Electric Co., Ltd. |           |     |
|---------|----------------|------|--------------------|------------------|-------------------------|-----------|-----|
| DRAWN   | Jun. - 2 - '00 |      | <i>T. Kojima</i>   |                  | DWG. NO.                | MS5F 4850 | 1/8 |
| CHECKED | June - 2 - 00  |      | <i>S. H. H. H.</i> | <i>T. Kojima</i> |                         |           |     |

## Revised Records

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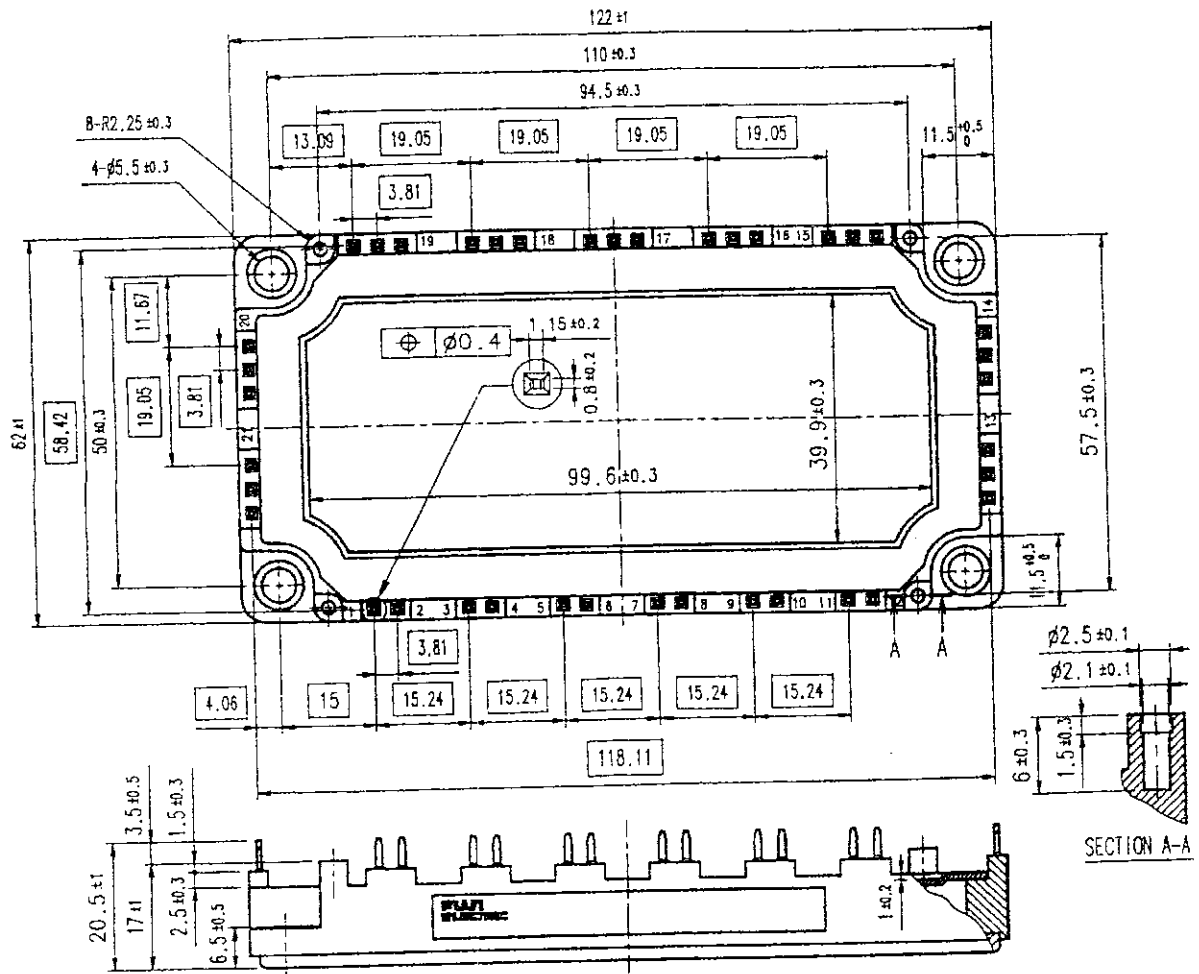
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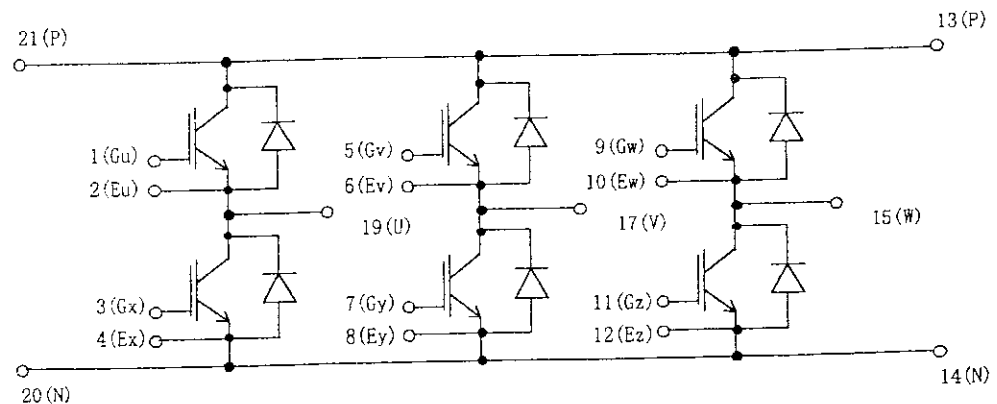
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## 1. Outline Drawing ( Unit : mm )



□ shows theoretical dimension.

## 2. Equivalent circuit



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

| Items                                | Symbols   | Conditions |        | Maximum Ratings | Units |
|--------------------------------------|-----------|------------|--------|-----------------|-------|
| Collector-Emitter voltage            | VCES      |            |        | 1400            | V     |
| Gate-Emitter voltage                 | VGES      |            |        | +20             | V     |
| Collector current                    | Ic        | Continuous | Tc=25C | 150             | A     |
|                                      |           |            | Tc=75C | 100             |       |
|                                      | Ic pulse  | 1ms        | Tc=25C | 300             |       |
|                                      |           |            | Tc=75C | 200             |       |
|                                      | -Ic       |            |        | 100             |       |
|                                      | -Ic pulse | 1ms        | 200    |                 |       |
| Collector Power Dissipation          | Pc        | 1 device   |        | 700             | W     |
| Junction temperature                 | Tj        |            |        | 150             | C     |
| Storage temperature                  | Tstg      |            |        | -40~ +125       | C     |
| Isolation voltage <sup>(*)</sup>     | Viso      | AC : 1min. |        | 2500            | V     |
| Mounting Screw Torque <sup>(*)</sup> |           |            |        | 3.5             | Nm    |

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

(\*)2 Recommendable Value : 2.5~3.5 Nm (M5)

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

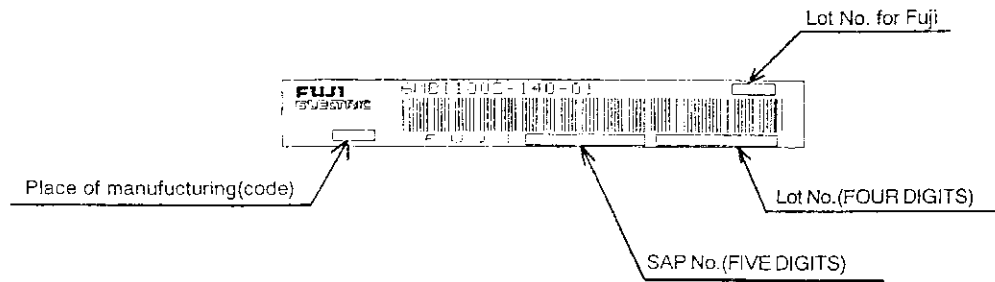
| Items                                | Symbols         | Conditions             | Characteristics |       |      | Units |
|--------------------------------------|-----------------|------------------------|-----------------|-------|------|-------|
|                                      |                 |                        | min.            | typ.  | Max. |       |
| Zero gate voltage Collector current  | ICES            | VGE 0 V, VCE 1400 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, Ic = 100 mA  | 5.5             | 7.2   | 8.5  | V     |
| Collector-Emitter saturation voltage | VCE(sat)        | VGE 15 V, Tj = 25 C    |                 | 2.4   | 2.7  | V     |
|                                      |                 | Ic = 100 A, Tj = 125 C |                 | 3.0   |      |       |
| Input capacitance                    | Cies            | VGE 0 V                |                 | 12000 |      | pF    |
| Output capacitance                   | Coes            | VCE 10 V               |                 | 2500  |      |       |
| Reverse transfer capacitance         | Cres            | f = 1 MHz              |                 | 2200  |      |       |
| Turn-on time                         | ton             | Vcc = 800 V            |                 | 0.35  | 1.2  | us    |
|                                      | tr              | Ic = 100 A             |                 | 0.25  | 0.6  |       |
|                                      | tr <sub>0</sub> | VGE +15 V              |                 | 0.1   |      |       |
| Turn-off time                        | toff            | RG = 12 ohm            |                 | 0.45  | 1.0  |       |
|                                      | tf              |                        |                 | 0.08  | 0.3  |       |
| Forward on voltage                   | VF              | IF = 100 A, Tj = 25 C  |                 | 2.6   | 3.4  | V     |
|                                      |                 | Tj = 125 C             |                 | 2.2   |      |       |
| Reverse recovery time                | trr             | IF = 100 A             |                 |       | 0.35 | us    |

### 5. Thermal resistance characteristics

| Items                            | Symbols  | Conditions                           | Characteristics |      |      | Units |
|----------------------------------|----------|--------------------------------------|-----------------|------|------|-------|
|                                  |          |                                      | min.            | typ. | Max. |       |
| Thermal resistance<br>(1 device) | Rth(j-c) | IGBT                                 |                 |      | 0.18 | C/W   |
|                                  |          | FWD                                  |                 |      | 0.36 |       |
| Contact Thermal resistance       | Rth(c-f) | with Thermal Compound <sup>(*)</sup> |                 | 0.05 |      |       |

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

## 6. Indication on module



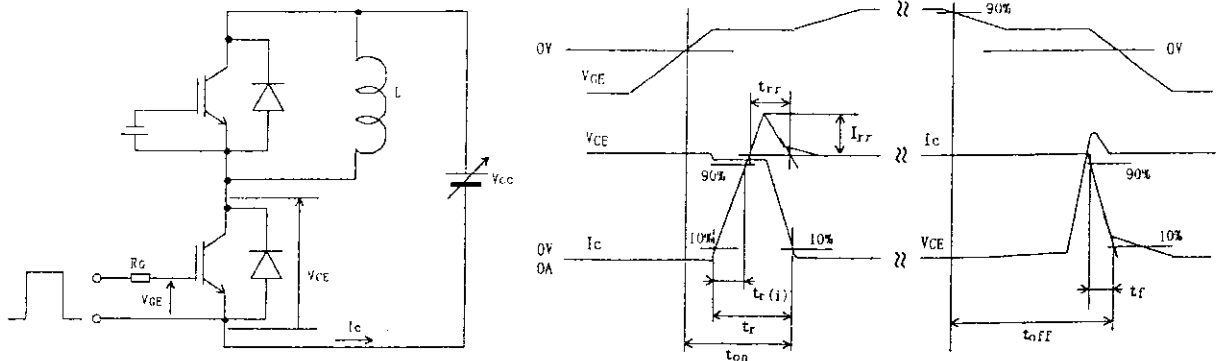
## 7. Applicable category

This specification is applied to IGBT Module named 6MBI100S-140-01.

## 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.

## 9. Definitions of switching time



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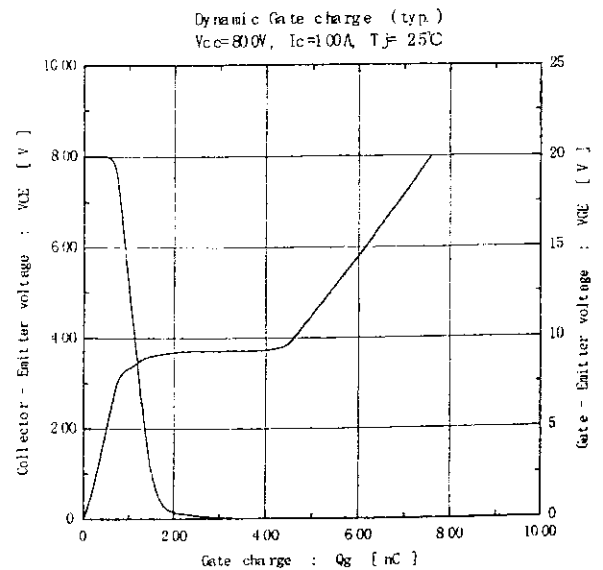
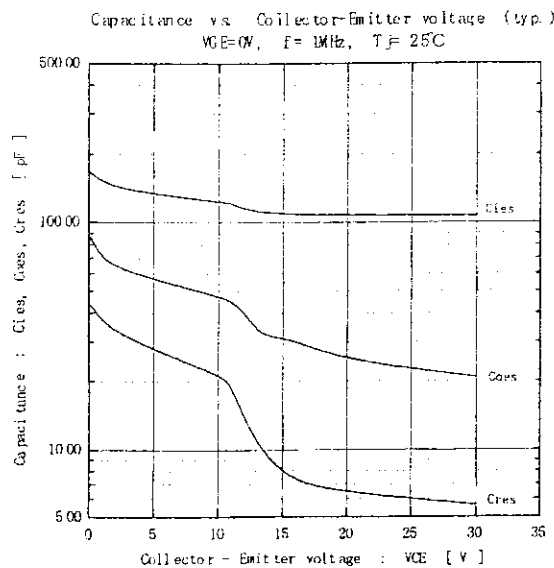
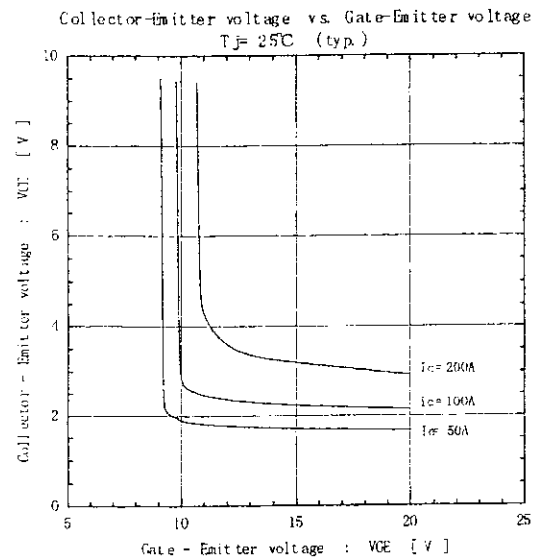
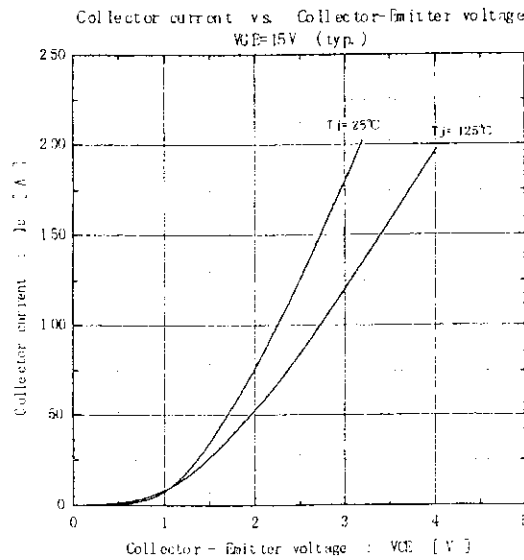
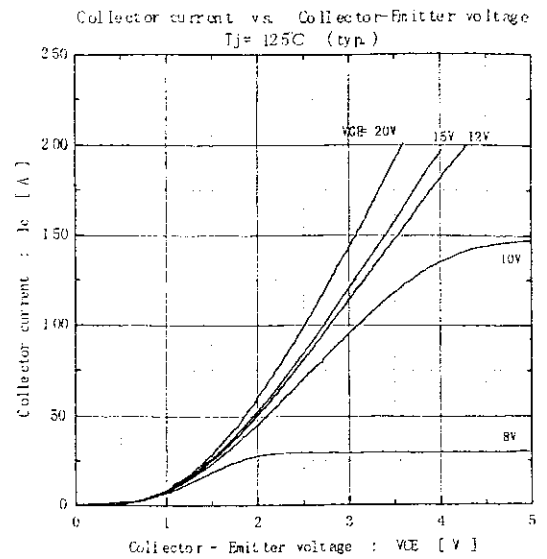
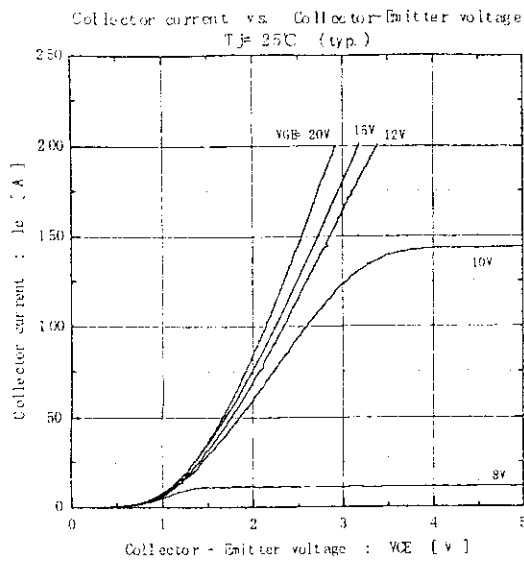
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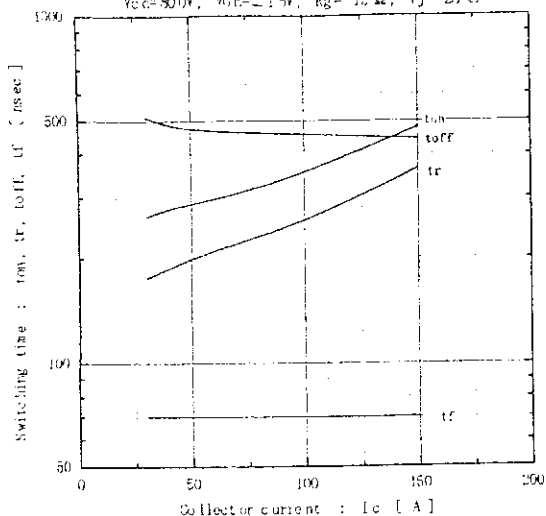
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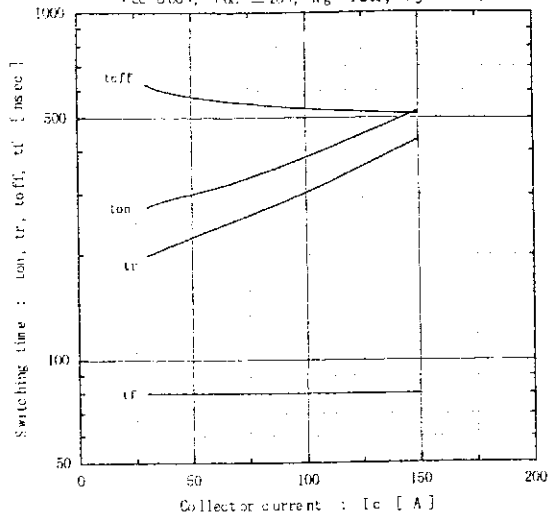
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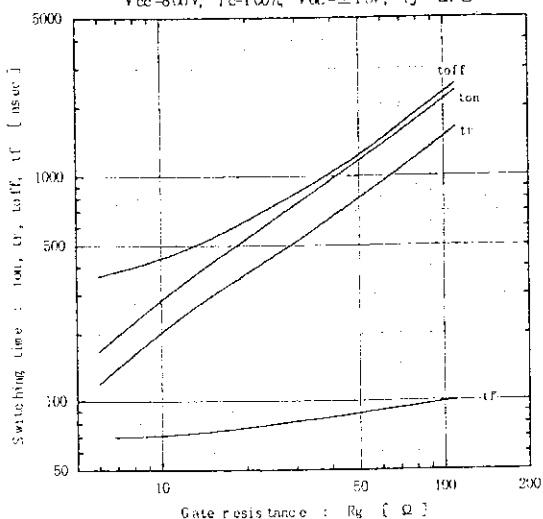
Switching time vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$ ,  $T_j=25^\circ C$



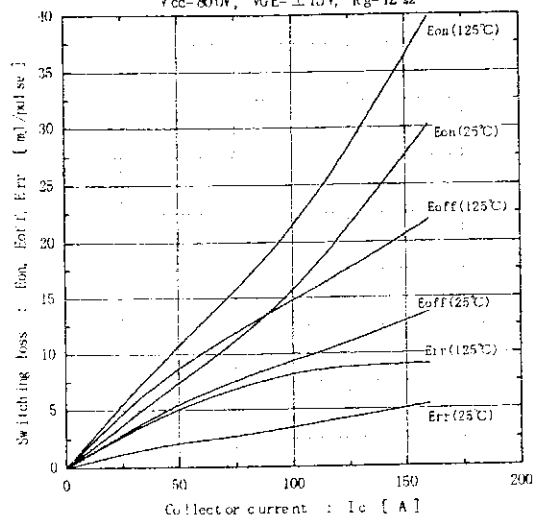
Switching time vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$ ,  $T_j=125^\circ C$



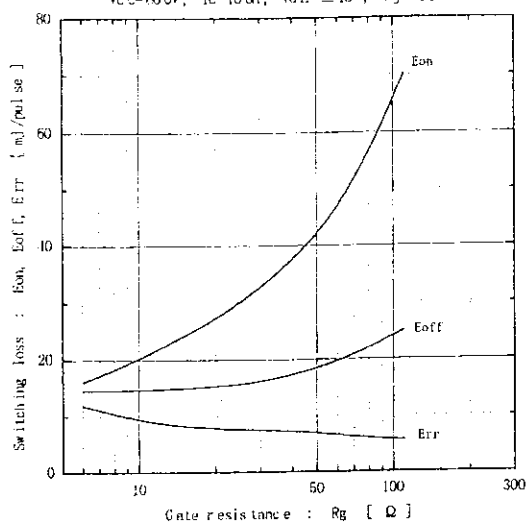
Switching time vs. Gate resistance (typ.)  
 $V_{CC}=800V$ ,  $I_c=100A$ ,  $V_{GE}=\pm 15V$ ,  $T_j=25^\circ C$



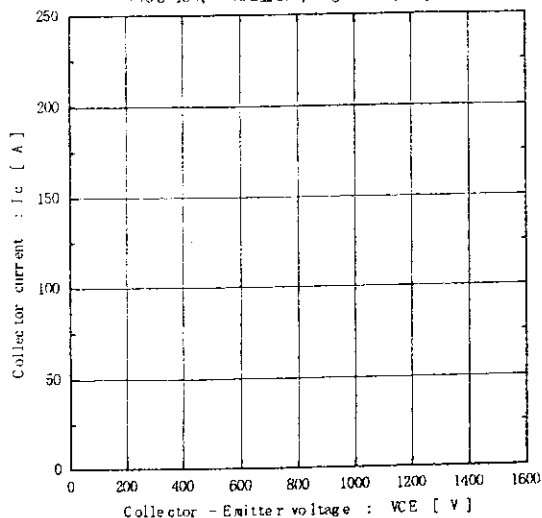
Switching loss vs. Collector current (typ.)  
 $V_{CC}=800V$ ,  $V_{GE}=\pm 15V$ ,  $R_g=12\Omega$



Switching loss vs. Gate resistance (typ.)  
 $V_{CC}=800V$ ,  $I_c=100A$ ,  $V_{GE}=\pm 15V$ ,  $T_j=125^\circ C$



Reverse bias safe operating area  
 $+V_{GE}=15V$ ,  $-V_{GE}\leq 15V$ ,  $R_g\geq 12\Omega$ ,  $T_j\leq 125^\circ C$



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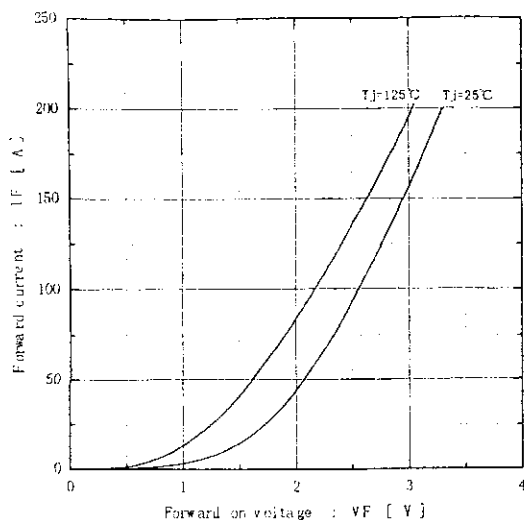
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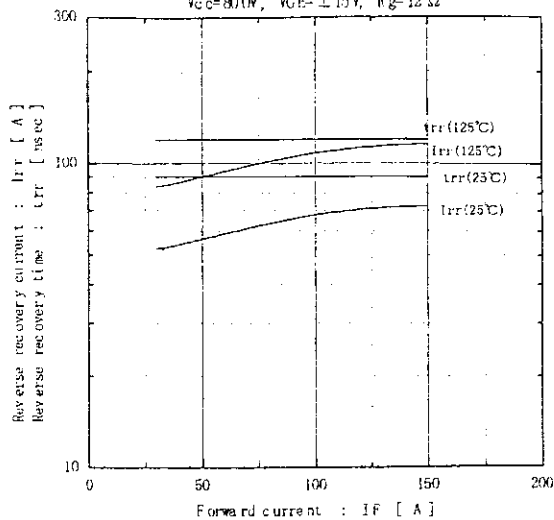
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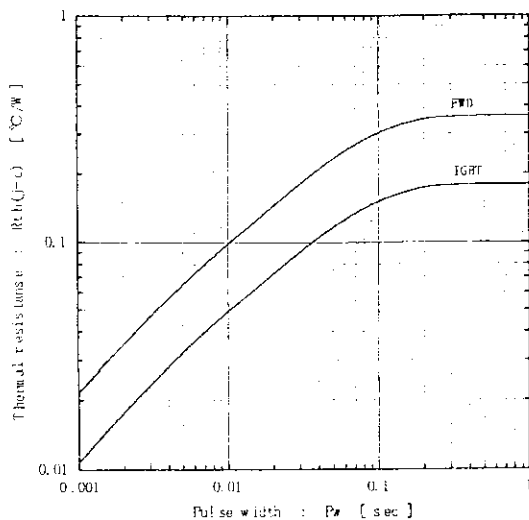
Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)  
 $V_{CC} = 80\text{V}$ ,  $V_{CE} = \pm 15\text{V}$ ,  $R_g = 12\ \Omega$



Transient thermal resistance



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