

# SPECIFICATION

Device Name : IGBT Module

Type Name : 6MBI75S-140-01

Spec. No. : MS5F 4849

Date : Jun. - 02 - 2000

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Fuji Electric Co., Ltd.  
Matsumoto Factory

|         |                | DATE         | NAME        | APPROVED | Fuji Electric Co., Ltd. |           |       |
|---------|----------------|--------------|-------------|----------|-------------------------|-----------|-------|
| DRAWN   | Jun. - 2 - '00 | T. Kobayashi | T. Miyazaki |          | DWG. NO.                | MS5F 4849 | 1 / 8 |
| CHECKED | June - 2 - '00 | S. Miyata    |             |          |                         |           |       |



# Revised Records

| Date        | Classi-<br>fication | Ind. | Content | Applied<br>date | Drawn | Checked  | Approved |
|-------------|---------------------|------|---------|-----------------|-------|----------|----------|
| Jun.- 2-'60 | enactment           | —    | —       | Issued<br>date  | —     | S. Myhka | T. Myhka |
|             |                     |      |         |                 |       |          |          |
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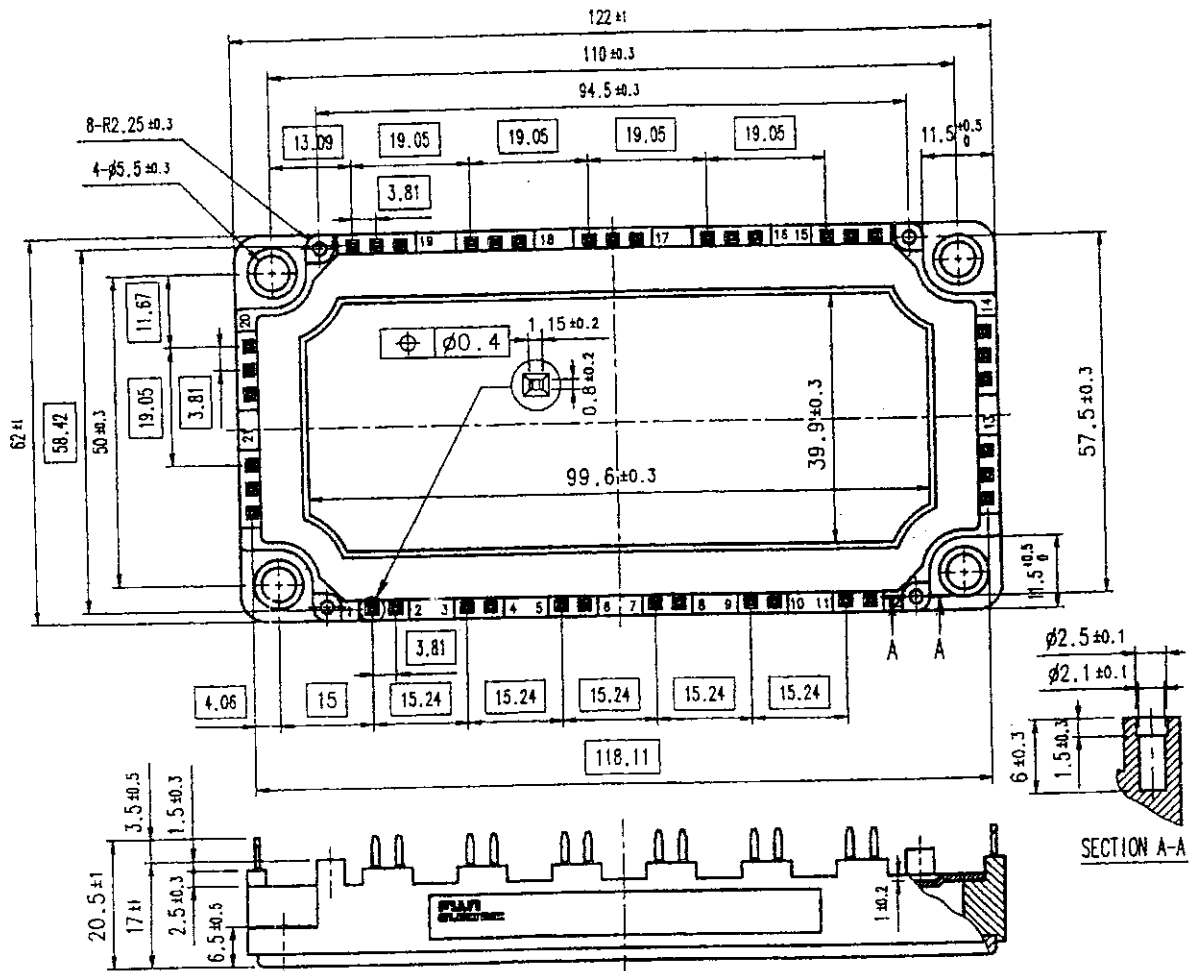
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6MBI75S-140-01

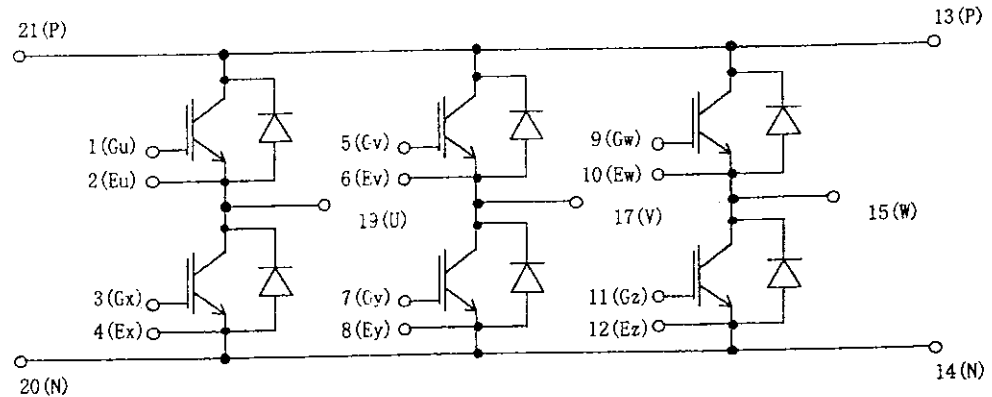
1. Outline Drawing ( Unit : mm )



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□ shows theoretical dimension.

2. Equivalent circuit



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

| Items                                | Symbols              | Conditions | Maximum Ratings     |     | Units |
|--------------------------------------|----------------------|------------|---------------------|-----|-------|
|                                      |                      |            |                     |     |       |
| Collector-Emitter voltage            | V <sub>CES</sub>     |            | 1400                |     | V     |
| Gate-Emitter voltage                 | V <sub>GES</sub>     |            | +20                 |     | V     |
| Collector current                    | I <sub>c</sub>       | Continuous | T <sub>c</sub> =25C | 100 | A     |
|                                      |                      |            | T <sub>c</sub> =75C | 75  |       |
|                                      | I <sub>c</sub> pulse | 1ms        | T <sub>c</sub> =25C | 200 |       |
|                                      |                      |            | T <sub>c</sub> =75C | 150 |       |
|                                      | -I <sub>c</sub>      |            |                     | 75  |       |
| -I <sub>c</sub> pulse                | 1ms                  |            | 150                 |     |       |
| Collector Power Dissipation          | P <sub>c</sub>       | 1 device   | 520                 |     | W     |
| Junction temperature                 | T <sub>j</sub>       |            | 150                 |     | C     |
| Storage temperature                  | T <sub>stg</sub>     |            | -40~+125            |     | C     |
| Isolation voltage <sup>(*)</sup>     | V <sub>iso</sub>     | AC : 1min. | 2500                |     | V     |
| Mounting Screw Torque <sup>(*)</sup> |                      |            | 3.5                 |     | Nm    |

(\*1) 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 T<sub>j</sub>= 25C unless otherwise specified)

| Items                                | Symbols              | Conditions                                    | Characteristics        |      |      | Units |
|--------------------------------------|----------------------|---|------------------------|------|------|-------|
|                                      |                      |   | min.                   | typ. | Max. |       |
| Zero gate voltage Collector current  | I <sub>CES</sub>     | V <sub>GE</sub> 0 V, V <sub>CE</sub> 1400 V   |                        |      | 1.0  | mA    |
| Gate-Emitter leakage current         | I <sub>GES</sub>     | V <sub>CE</sub> 0 V, V <sub>GE</sub> +20 V    |                        |      | 200  | nA    |
| Gate-Emitter threshold voltage       | V <sub>GE(th)</sub>  | V <sub>CE</sub> 20 V, I <sub>c</sub> = 75 mA  | 5.5                    | 7.2  | 8.5  | V     |
| Collector-Emitter saturation voltage | V <sub>CE(sat)</sub> | V <sub>GE</sub> 15 V, T <sub>j</sub> = 25 C   |                        | 2.4  | 2.7  | V     |
|                                      |                      | I <sub>c</sub> = 75 A, T <sub>j</sub> = 125 C |                        | 3.0  |      |       |
| Input capacitance                    | C <sub>ies</sub>     | V <sub>GE</sub> 0 V                           |                        | 9000 |      | pF    |
| Output capacitance                   | C <sub>oes</sub>     | V <sub>CE</sub> 10 V                          |                        | 1875 |      |       |
| Reverse transfer capacitance         | C <sub>res</sub>     | f = 1 MHz                                     |                        | 1650 |      |       |
| Turn-on time                         | t <sub>on</sub>      | V <sub>cc</sub> = 800 V                       |                        | 0.35 | 1.2  | us    |
|                                      | t <sub>r</sub>       | I <sub>c</sub> = 75 A                         |                        | 0.25 | 0.6  |       |
|                                      | t <sub>r(0)</sub>    | V <sub>GE</sub> +15 V                         |                        | 0.1  |      |       |
| Turn-off time                        | t <sub>off</sub>     | R <sub>G</sub> = 16 ohm                       |                        | 0.45 | 1.0  | us    |
|                                      | t <sub>f</sub>       |   |                        | 0.08 | 0.3  |       |
| Forward on voltage                   | V <sub>F</sub>       | I <sub>F</sub> = 75 A                         | T <sub>j</sub> = 25 C  | 2.6  | 3.4  | V     |
|                                      |                      |   | T <sub>j</sub> = 125 C | 2.2  |      |       |
| Reverse recovery time                | t <sub>rr</sub>      | I <sub>F</sub> = 75 A                         |                        |      | 0.35 | us    |

5. Thermal resistance characteristics

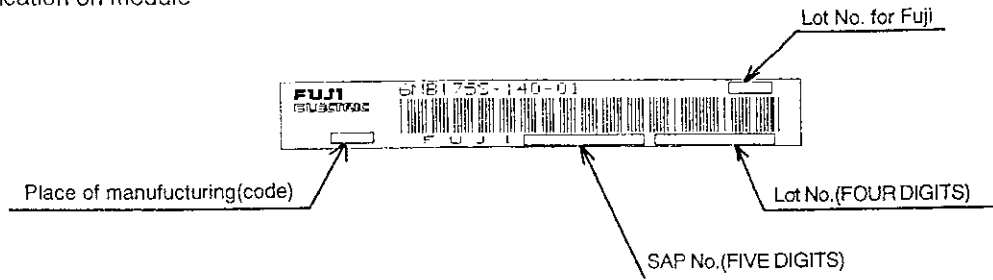
| Items                         | Symbols              | Conditions                           | Characteristics |      |      | Units |
|-------------------------------|----------------------|--------------------------------------|-----------------|------|------|-------|
|                               |                      |                                      | min.            | typ. | Max. |       |
| Thermal resistance (1 device) | R <sub>th(j-c)</sub> | IGBT                                 |                 |      | 0.24 | C/W   |
|                               |                      | FWD                                  |                 |      | 0.50 |       |
| Contact Thermal resistance    | R <sub>th(c-f)</sub> | with Thermal Compound <sup>(*)</sup> |                 | 0.05 |      |       |

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

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### 6. Indication on module



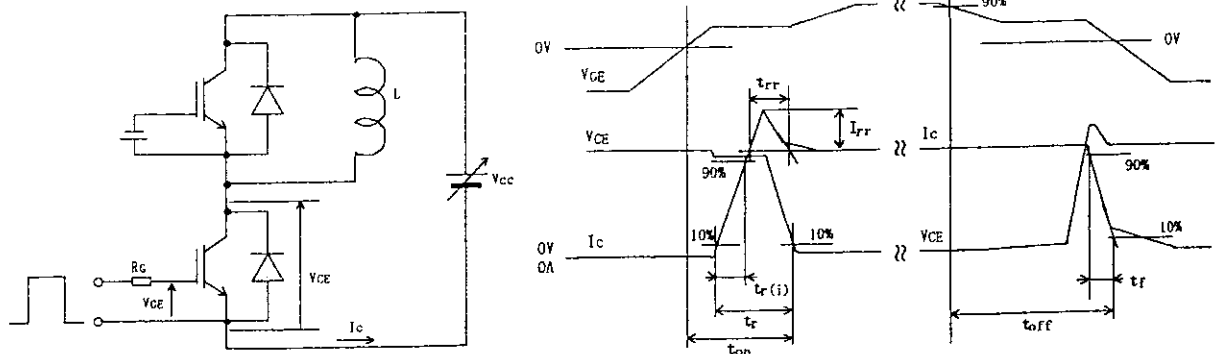
### 7. Applicable category

This specification is applied to IGBT Module named 6MBI75S-140-01.

### 8. Storage and transportation notes

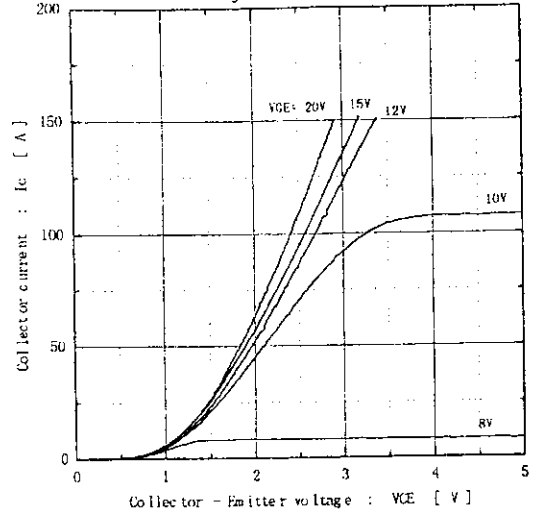
- The module should be stored at a standard temperature of 5 to 35°C and humidity of 45 to 75% .
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
- Avoid exposure to corrosive gases and dust.
- Avoid excessive external force on the module.
- 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

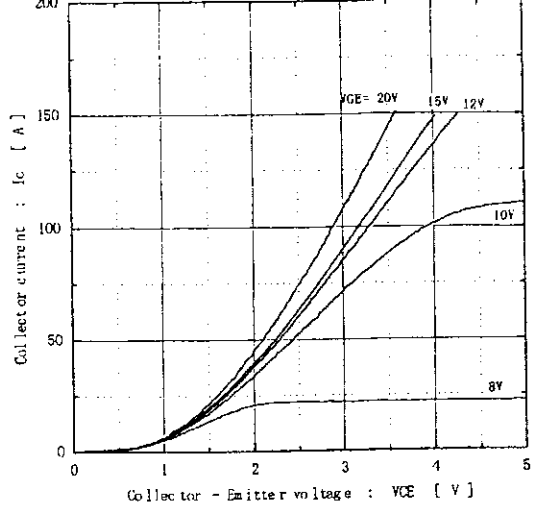


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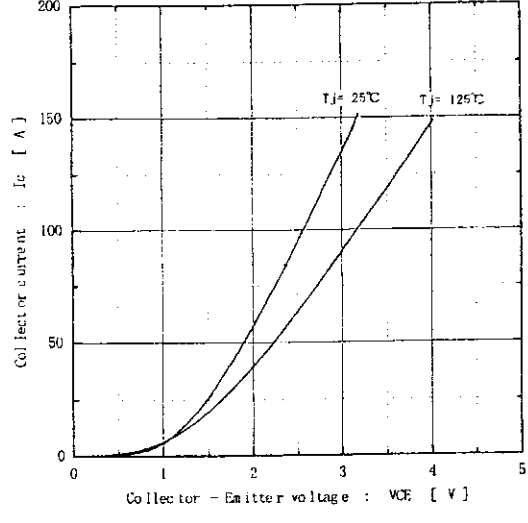
Collector current vs. Collector-Emitter voltage  
 $T_j = 25^\circ\text{C}$  (typ.)



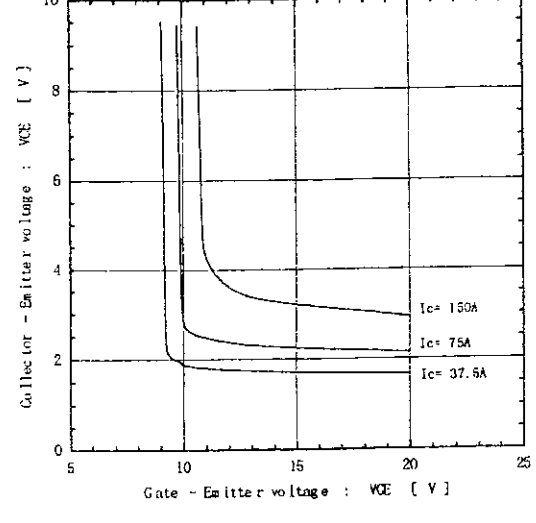
Collector current vs. Collector-Emitter voltage  
 $T_j = 125^\circ\text{C}$  (typ.)



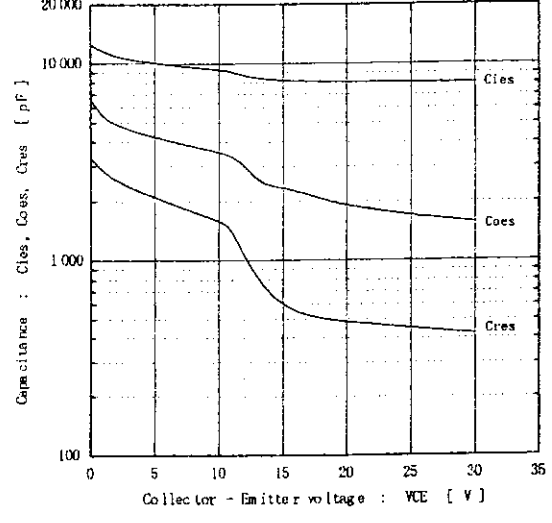
Collector current vs. Collector-Emitter voltage  
 $V_{GE} = 1.5\text{V}$  (typ.)



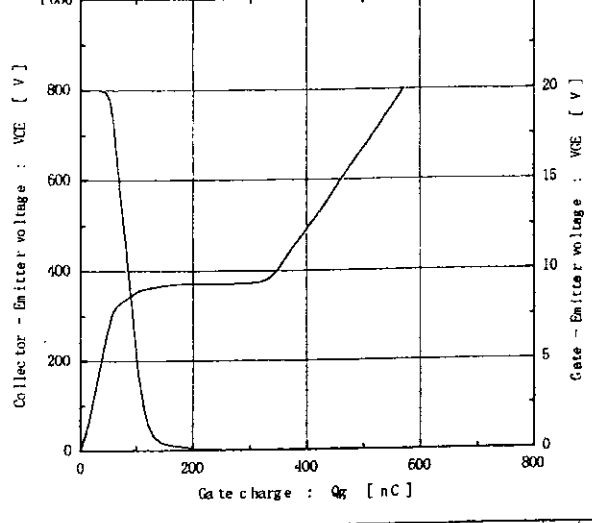
Collector-Emitter voltage vs. Gate-Emitter voltage  
 $T_j = 25^\circ\text{C}$  (typ.)



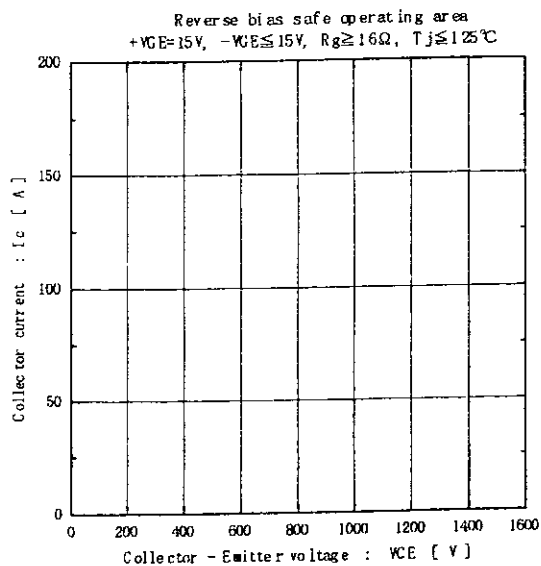
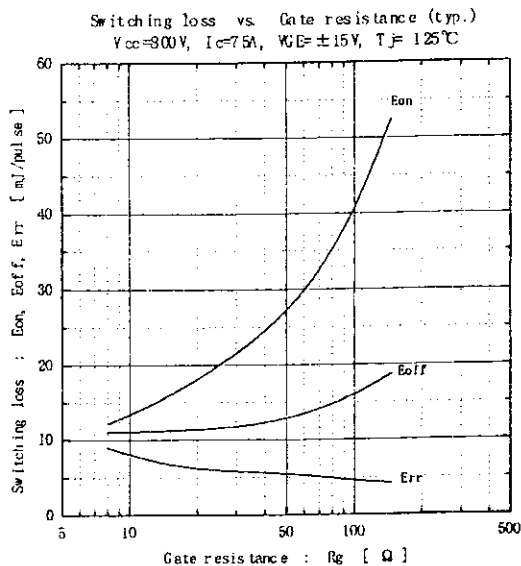
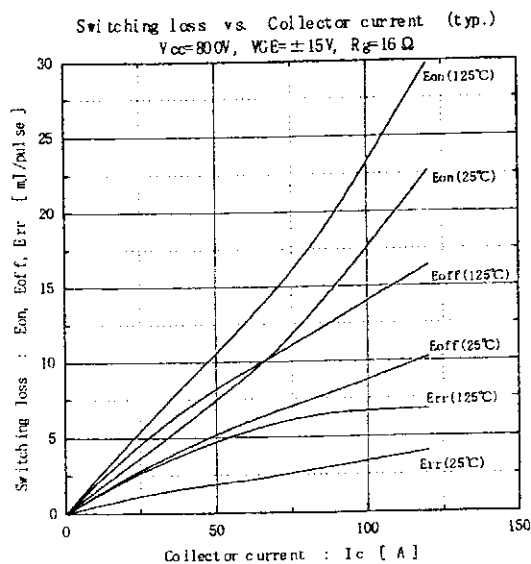
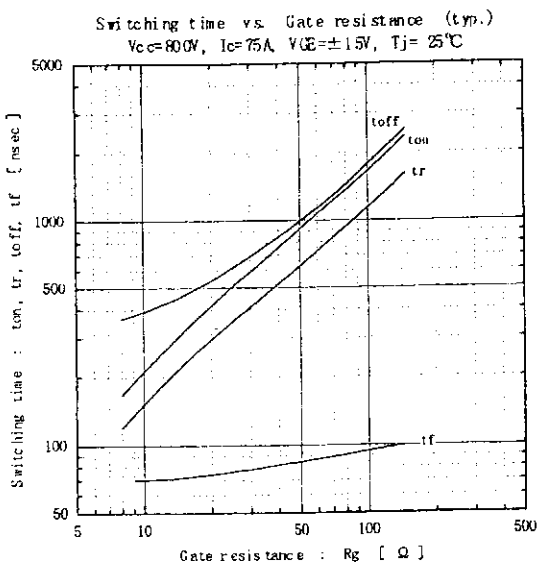
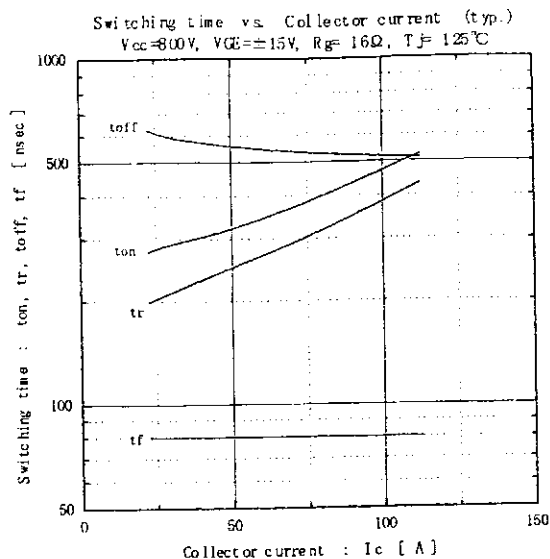
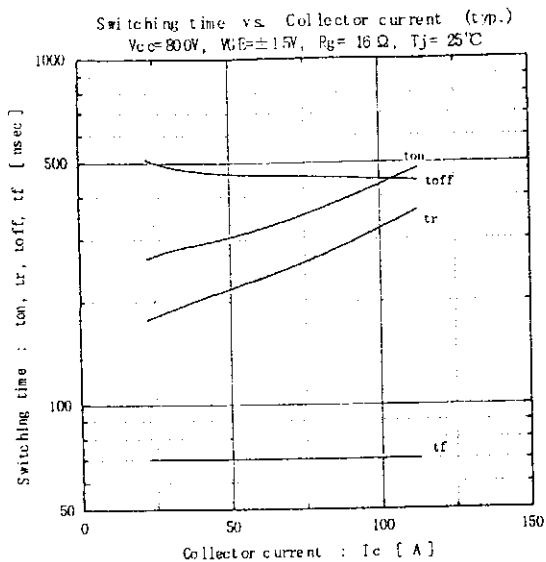
Capacitance vs. Collector-Emitter voltage (typ.)  
 $V_{GE} = 0\text{V}$ ,  $f = 1\text{MHz}$ ,  $T_j = 25^\circ\text{C}$



Dynamic Gate charge (typ.)  
 $V_{CC} = 80\text{V}$ ,  $I_c = 75\text{A}$ ,  $T_j = 25^\circ\text{C}$

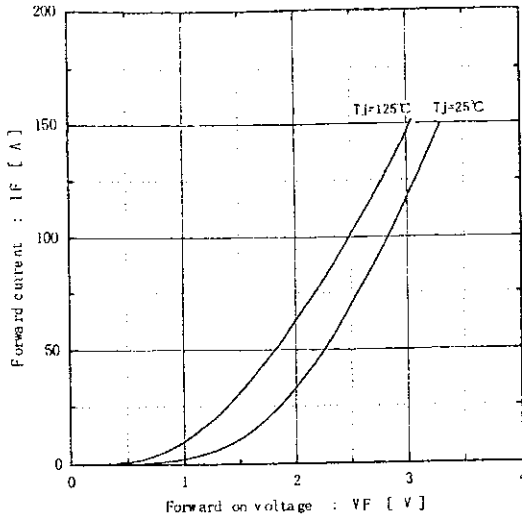


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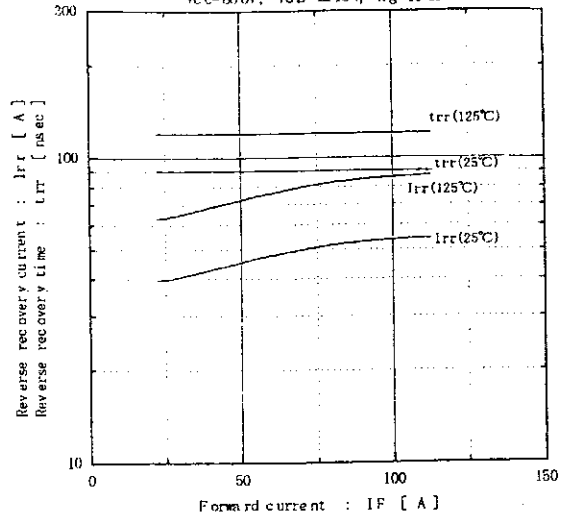
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Forward current vs. Forward on voltage (typ.)



Reverse recovery characteristics (typ.)

Vc=800V, VGE=±15V, Rg=16Ω



Transient thermal resistance

