

SPECIFICATION

Device Name : IGBT Module

Type Name : 1MB1600PX-120-03

Spec. No. : MS5F4504

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Fuji Electric Co., Ltd.
Matsumoto Factory

| | DATE | NAME | APPROVED | Fuji Electric Co., Ltd. | | |
|---------|-----------------|------------|----------|--------------------------------|----------|-----|
| DRAWN | Jan. - 21 - '99 | J. Hayaume | | DWG. NO. | MS5F4504 | 1/8 |
| CHECKED | Jan. - 22 - '99 | J. Isono | J. Isono | | | |

Revised Records

| Date | Classification | Ind. | Content | Applied date | Drawn | Checked | Approved |
|-------------|----------------|------|--|--------------|-------------|--------------|----------|
| Jan.-21-'99 | enactment | — | — | Issued date | — | Y. Isono | Y. Isono |
| Feb.-01-'99 | Revision | a | Definition of solder void under DBCs is changed. (5/8 page.) | Feb.-01-'99 | J. Nagamine | S. Kobayashi | S.K |
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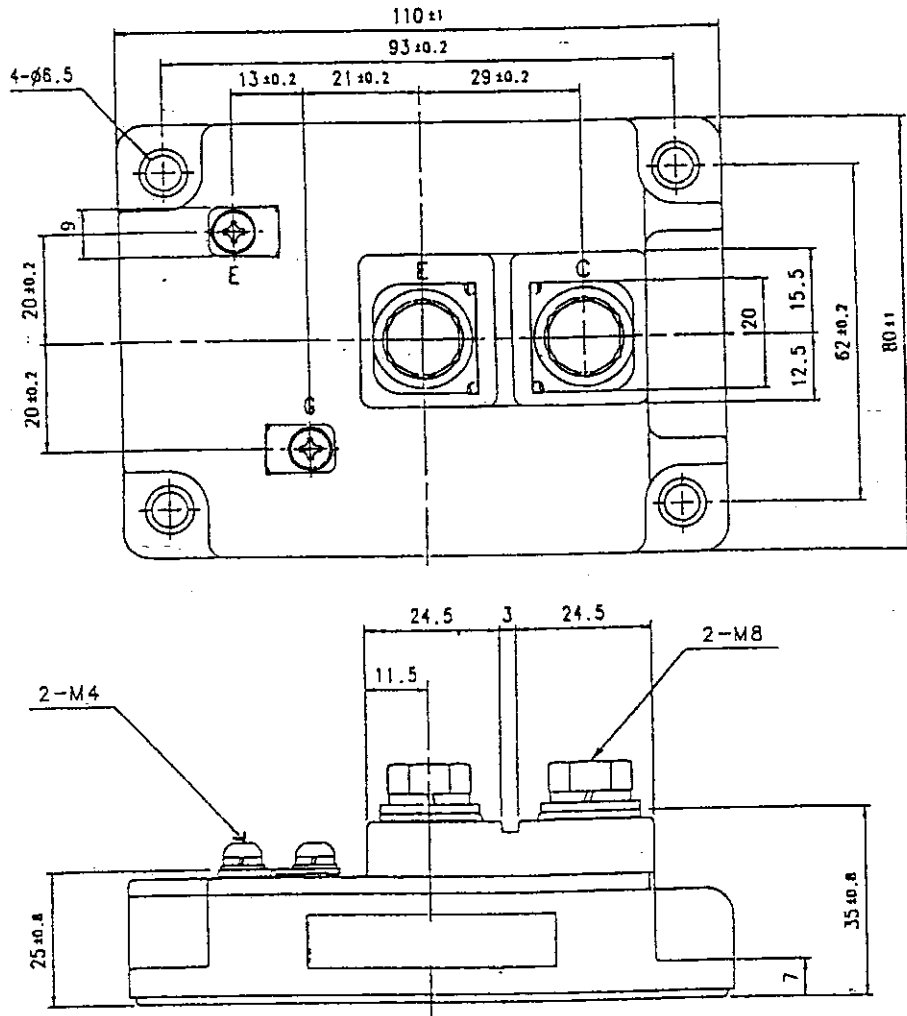
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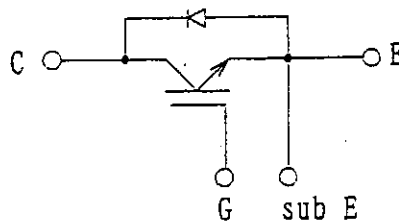
1MBI600PX-120-03

1. Outline Drawing

Unit : mm



2. Equivalent circuit



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

| Items | | Symbols | Ratings | Units | |
|----------------------------|------------|------------------|-----------------------|-------|---|
| Collector-Emitter voltage | | V _{CE} | 1200 | V | |
| Gate-Emitter voltage | | V _{GE} | ±20 | V | |
| Collector current | Continuous | Tc=25°C | I _c | 800 | A |
| | | Tc=80°C | | 600 | |
| | 1ms | Tc=25°C | I _c pulse | 1600 | |
| | | Tc=80°C | | 1200 | |
| | | | -I _c | 600 | |
| | 1ms | | -I _c pulse | 1200 | |
| Max. power dissipation | | P _C | 4100 | W | |
| Operating temperature | | T _j | +150 | °C | |
| Storage temperature | | T _{stg} | -40~+125 | °C | |
| Isolation voltage (rms) #4 | | V _{is} | AC 2500 (1min.) | V | |
| Screw torque | | Mounting #1 | 4.5 | N·m | |
| | | Terminals #2 | 11.0 | | |
| | | Terminals #3 | 1.7 | | |

Note : #1 Recommendable value : 4.0±0.5 N·m (M6) #4: All terminals should be connected together when isolation test will be done.
 Note : #2 Recommendable value : 10.0±1.0 N·m (M8)
 Note : #3 Recommendable value : 1.50±0.2 N·m (M4)

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

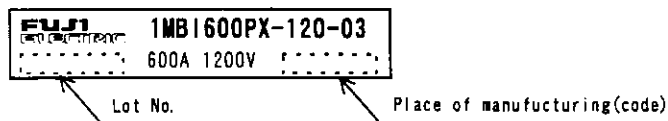
| Items | Symbols | Characteristics | | | Conditions | Units |
|--------------------------------------|----------------------|-----------------|------|------|---|-------|
| | | min. | typ. | max. | | |
| Zero gate voltage Collector current | I _{CE} | — | — | 0.5 | V _{GE} =0V, V _{CE} =1200V | mA |
| Gate-Emitter leakage current | I _{GES} | — | — | ±0.5 | V _{CE} =0V, V _{GE} =±20V | μA |
| Gate-Emitter threshold voltage | V _{GE(th)} | 6.0 | 8.0 | 9.0 | V _{CE} =20V, I _c =600mA | V |
| Collector-Emitter saturation voltage | V _{CE(sat)} | — | 2.85 | 3.2 | V _{GE} =15V, I _c =600A | V |
| Input capacitance | C _{ies} | — | 60 | — | V _{GE} =0V | nF |
| Output capacitance | C _{oes} | — | 9 | — | V _{CE} =10V | |
| Reverse transfer capacitance | C _{res} | — | 4 | — | f=1MHz | |
| Turn-on time | t _{on} | — | 750 | 1200 | V _{cc} =600V | ns |
| | t _r | — | 200 | 600 | I _c =600A | |
| Turn-off time | t _{off} | — | 650 | 1000 | V _{GE} =±15V | ns |
| | t _f | — | 100 | 300 | R _G =2.0Ω | |
| Diode forward on voltage | V _F | — | — | 3.4 | I _F =600A, V _{GE} =0V | V |
| Reverse recovery time | t _{rr} | — | — | 350 | I _F =600A | ns |

5. Thermal resistance characteristics

| Items | Symbols | Characteristics | | | Conditions | Units |
|--------------------|----------------------|-----------------|--------|------|-------------------------|-------|
| | | min. | typ. | max. | | |
| Thermal resistance | R _{th(j-c)} | — | — | 0.03 | IGBT | °C/W |
| | R _{th(j-c)} | — | — | 0.06 | Diode | |
| | ※ | — | 0.0063 | — | the base to cooling fin | |
| | R _{th(c-f)} | — | — | — | — | |

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

6. Indication module (モジュール表示)



7. Applicable category (適用範囲)

This specification is applied to IGBT module named 1MBI600PX-120-03.
 本納入仕様書は、IGBTモジュール 1MBI600PX-120-03 に適用する。

8. Storage and transportation notes (保管, 運搬上の注意事項)

- This IGBT module should be stored at a standard temperature of 5 to 35°C and humidity of 45% to 75%.
 常温保存が望ましい。
- Store modules in a place with few temperature changes in order to avoid condensation on the module surface.
 急激な温度変化の無きこと。(モジュール表面が結露しないこと)
- Avoid exposure to corrosive gases and dust.
 腐蝕性ガスの発生場所、塵埃の多い場所は避けること。
- Avoid excessive external force on the module.
 製品に荷重がかからないように十分注意すること。
- Store modules with unprocessed terminals.
 モジュールの端子は未加工の状態で保管すること。
- Do not drop or otherwise shock the modules when transporting.
 製品の運搬時に衝撃を与えたり、落下させたりしないこと。

9. Specification of solder void. (半田ボイドの仕様)

- Under chips. (チップ下) : $\leq 5\%$ (5%以下)
- Under DBCs of chip area. (チップ直下の範囲のDBC下) : $\leq 10\%$ (10%以下)
- Under DBCs ~~except chip area.~~ (チップ直下以外の範囲のDBC下) : $\leq 10\%$ (10%以下)

10. Specification of Soldering.

- Vacuum soldering.

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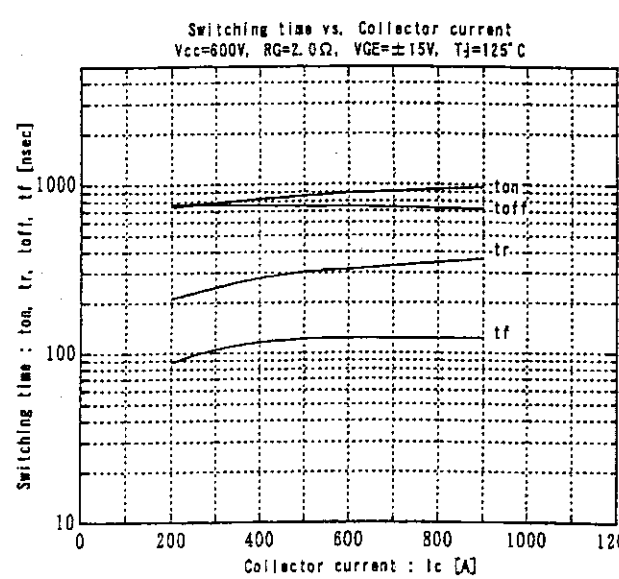
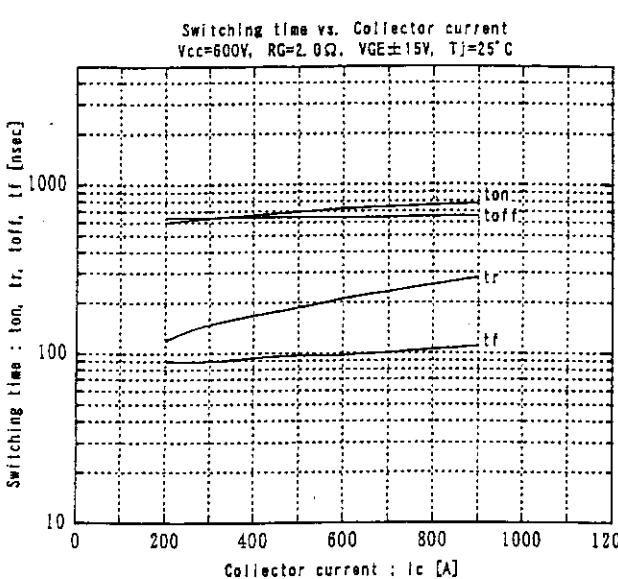
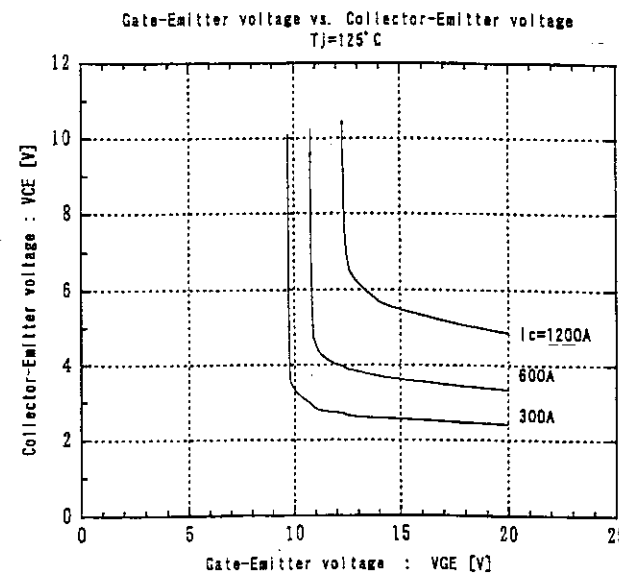
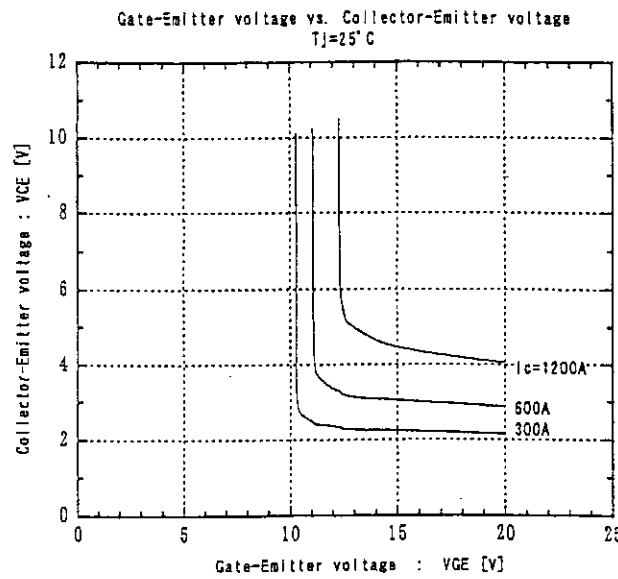
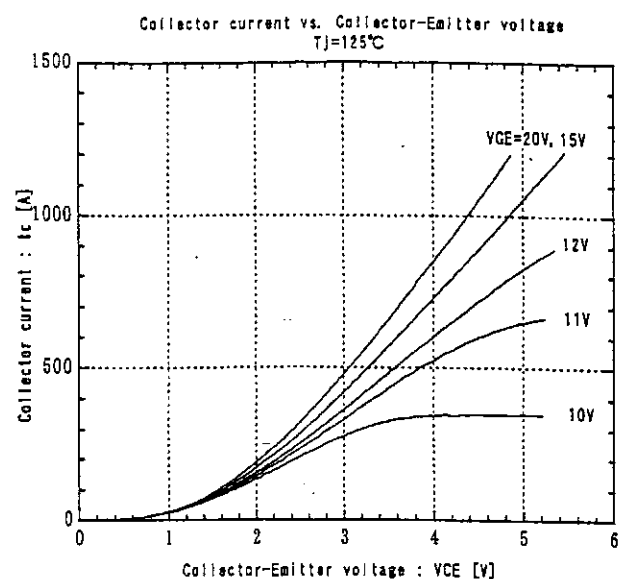
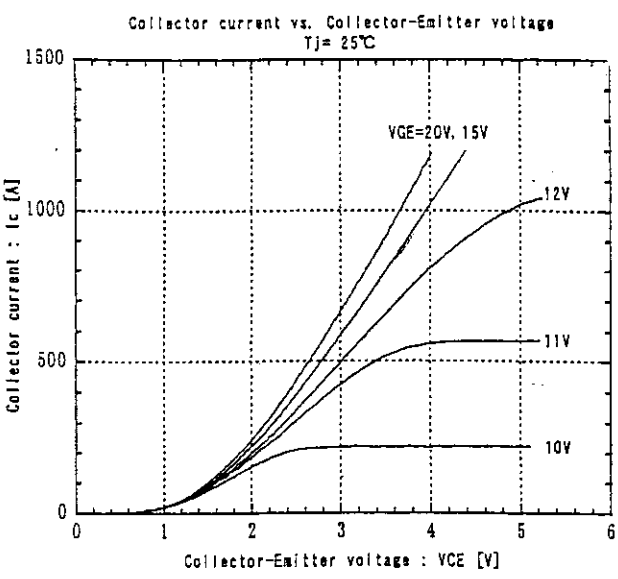
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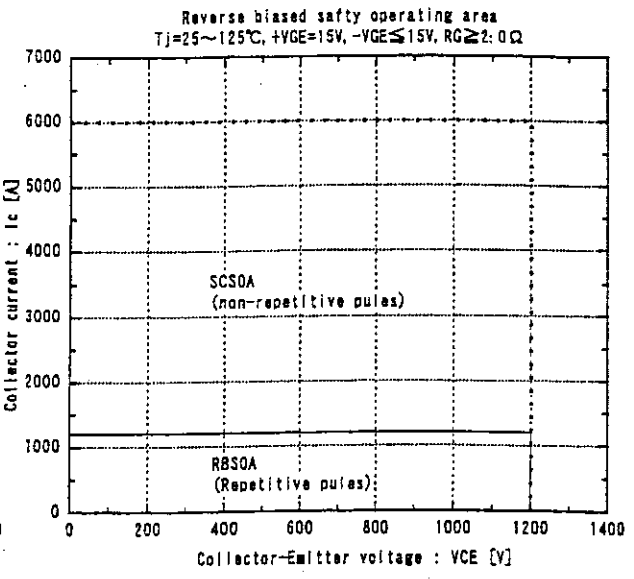
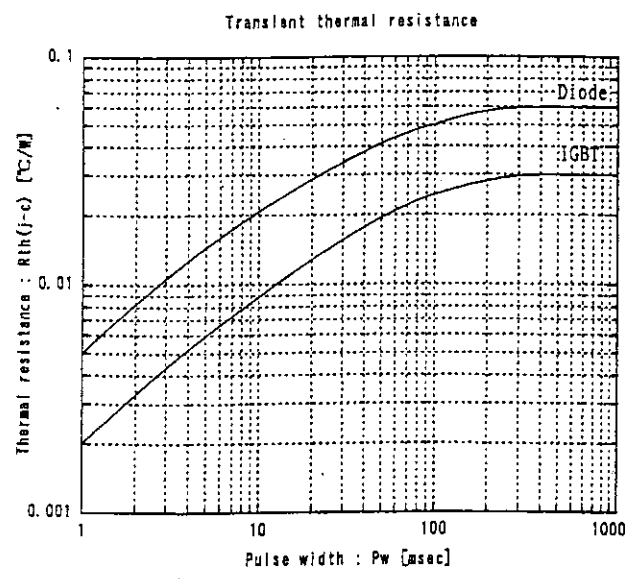
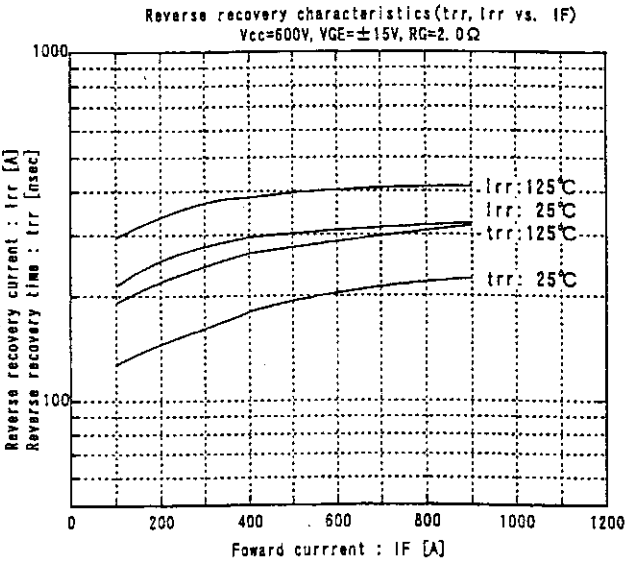
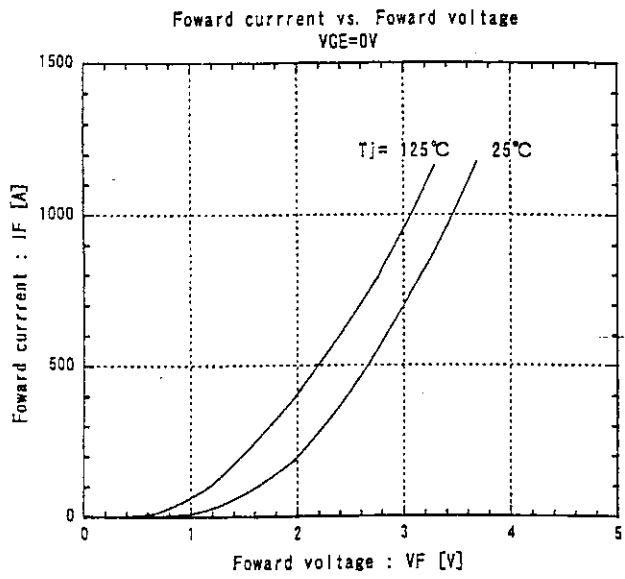
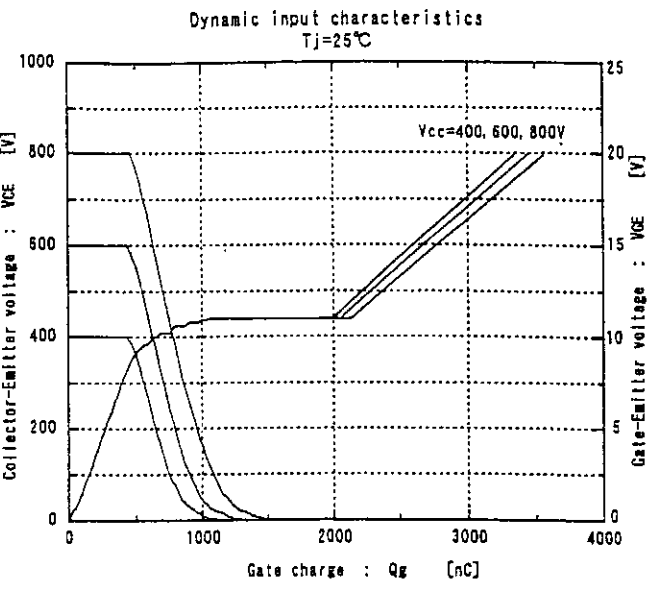
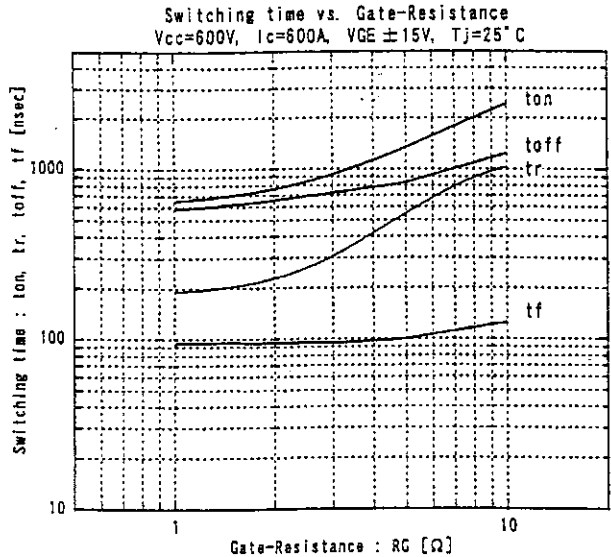
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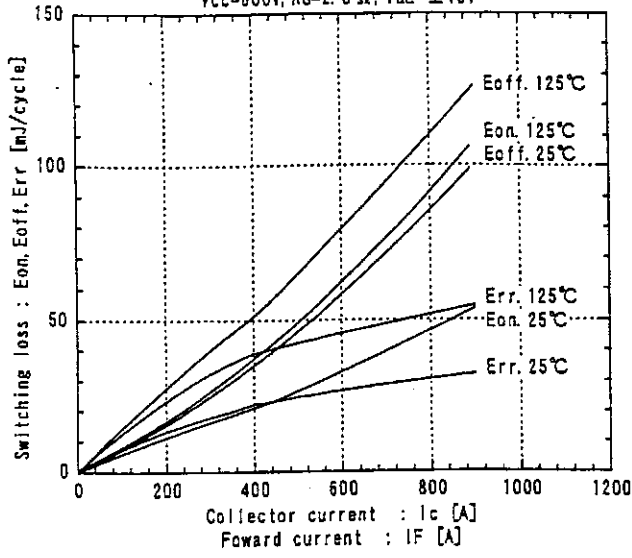


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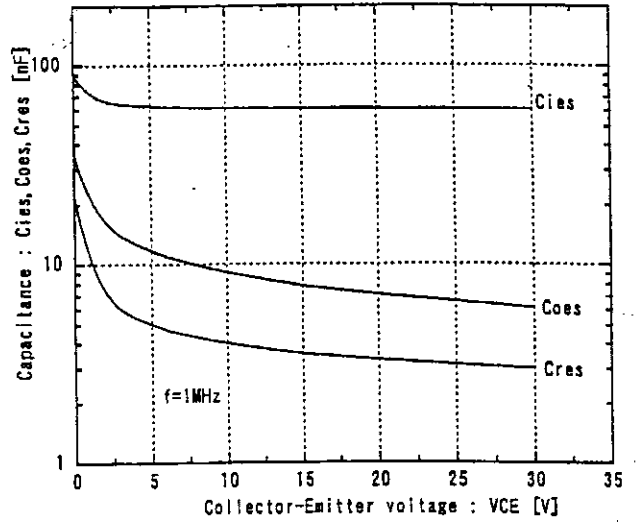
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Switching loss vs. Collector or Forward current
 $V_{CC}=600V$, $R_G=2.0\ \Omega$, $V_{GE}=\pm 15V$



Capacitance vs. Collector-Emitter voltage
 $T_J=25^\circ C$



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