

## 1200V / 8A

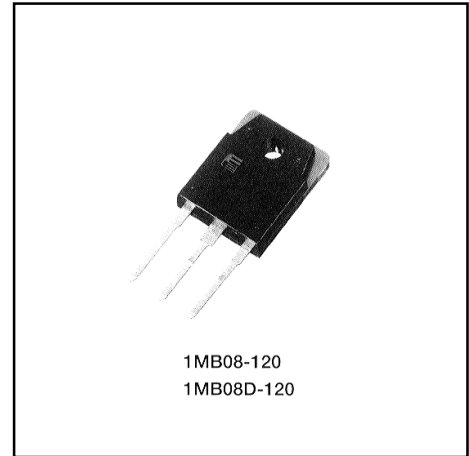
## Molded Package

### ■ Features

- Small molded package
- Low power loss
- Soft switching with low switching surge and noise
- High reliability, high ruggedness (RBSOA, SCSOA etc.)
- Comprehensive line-up

### ■ Applications

- Inverter for Motor drive
- AC and DC Servo drive amplifier
- Uninterruptible power supply



### ■ Maximum ratings and characteristics

- Absolute maximum ratings (at  $T_c=25^\circ\text{C}$  unless otherwise specified)

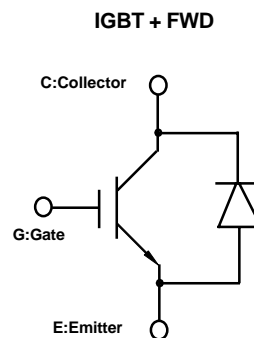
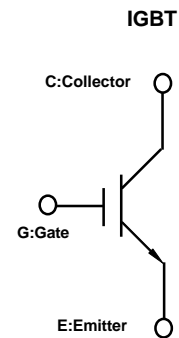
#### 1MB08-120 / IGBT

| Item                         | Symbol    | Rating                  | Unit             |    |   |
|------------------------------|-----------|-------------------------|------------------|----|---|
| Collector-Emitter voltage    | $V_{CES}$ | 1200                    | V                |    |   |
| Gate-Emitter voltage         | $V_{GES}$ | $\pm 20$                | V                |    |   |
| Collector current            | DC        | $T_c=25^\circ\text{C}$  | $I_{C25}$        | 13 | A |
|                              |           | $T_c=100^\circ\text{C}$ | $I_{C100}$       | 8  | A |
|                              | 1ms       | $T_c=25^\circ\text{C}$  | $I_{cp}$         | 39 | A |
| Max. power dissipation(IGBT) | $P_c$     | 115                     | W                |    |   |
| Operating temperature        | $T_j$     | +150                    | $^\circ\text{C}$ |    |   |
| Storage temperature          | $T_{stg}$ | -40 to +150             | $^\circ\text{C}$ |    |   |
| Screw torque                 | -         | 50                      | N-cm             |    |   |

#### 1MB08D-120 / IGBT+FWD

| Item                          | Symbol    | Rating                  | Unit             |    |   |
|-------------------------------|-----------|-------------------------|------------------|----|---|
| Collector-Emitter voltage     | $V_{CES}$ | 1200                    | V                |    |   |
| Gate-Emitter voltage          | $V_{GES}$ | $\pm 20$                | V                |    |   |
| Collector current             | DC        | $T_c=25^\circ\text{C}$  | $I_{C25}$        | 13 | A |
|                               |           | $T_c=100^\circ\text{C}$ | $I_{C100}$       | 8  | A |
|                               | 1ms       | $T_c=25^\circ\text{C}$  | $I_{cp}$         | 39 | A |
| Max. power dissipation (IGBT) | $P_c$     | 115                     | W                |    |   |
| Max. power dissipation (FWD)  | $P_c$     | 70                      | W                |    |   |
| Operating temperature         | $T_j$     | +150                    | $^\circ\text{C}$ |    |   |
| Storage temperature           | $T_{stg}$ | -40 to +150             | $^\circ\text{C}$ |    |   |
| Screw torque                  | -         | 50                      | N-cm             |    |   |

### ■ Equivalent Circuit Schematic



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

1MB08-120 / IGBT

| Item                                 | Symbol   | Characteristics |      |      | Conditions        | Unit          |
|--------------------------------------|----------|-----------------|------|------|-------------------|---------------|
|                                      |          | Min.            | Typ. | Max. |                   |               |
| Zero gate voltage collector current  | ICES     | –               | –    | 1.0  | VGE=0V, VCE=1200V | mA            |
| Gate-Emitter leakage current         | IGES     | –               | –    | 20   | VCE=0V, VGE=±20V  | µA            |
| Gate-Emitter threshold voltage       | VGE(th)  | 5.5             | –    | 8.5  | VCE=20V, Ic=8mA   | V             |
| Collector-Emitter saturation voltage | VCE(sat) | –               | –    | 3.5  | VGE=15V, Ic=8A    | V             |
| Input capacitance                    | Cies     | –               | 1000 | –    | VGE=0V            | pF            |
| Output capacitance                   | Coes     | –               | 160  | –    | VCE=10V           |               |
| Reverse transfer capacitance         | Cres     | –               | 60   | –    | f=1MHz            |               |
| Turn-on time                         | ton      | –               | –    | 1.2  | VCC=600V Ic=8A    | µs            |
|                                      | tr       | –               | –    | 0.6  | VGE=±15V          |               |
| Turn-off time                        | toff     | –               | –    | 1.5  | RG=200 ohm        | (Half Bridge) |
|                                      | tf       | –               | –    | 0.5  |                   |               |

1MB08D-120 / IGBT+FWD

| Item                                 | Symbol   | Characteristics |      |      | Conditions                     | Unit          |
|--------------------------------------|----------|-----------------|------|------|--------------------------------|---------------|
|                                      |          | Min.            | Typ. | Max. |                                |               |
| Zero gate voltage collector current  | ICES     | –               | –    | 1.0  | VGE=0V, VCE=1200V              | mA            |
| Gate-Emitter leakage current         | IGES     | –               | –    | 20   | VCE=0V, VGE=±20V               | µA            |
| Gate-Emitter threshold voltage       | VGE(th)  | 5.5             | –    | 8.5  | VCE=20V, Ic=8mA                | V             |
| Collector-Emitter saturation voltage | VCE(sat) | –               | –    | 3.5  | VGE=15V, Ic=8A                 | V             |
| Input capacitance                    | Cies     | –               | 1000 | –    | VGE=0V                         | pF            |
| Output capacitance                   | Coes     | –               | 160  | –    | VCE=10V                        |               |
| Reverse transfer capacitance         | Cres     | –               | 60   | –    | f=1MHz                         |               |
| Turn-on time                         | ton      | –               | –    | 1.2  | VCC=600V, Ic=8A                | µs            |
|                                      | tr       | –               | –    | 0.6  | VGE=±15V                       |               |
| Turn-off time                        | toff     | –               | –    | 1.5  | RG=200 ohm                     | (Half Bridge) |
|                                      | tf       | –               | –    | 0.5  |                                |               |
| FWD forward on voltage               | VF       | –               | –    | 3.0  | IF=8A, VGE=0V                  | V             |
| Reverse recovery time                | trr      | –               | –    | 0.35 | IF=8A, VGE=-10V, di/dt=100A/µs | µs            |

● Thermal resistance characteristics

1MB08-120 / IGBT

| Item               | Symbol   | Characteristics |      |      | Conditions | Unit |
|--------------------|----------|-----------------|------|------|------------|------|
|                    |          | Min.            | Typ. | Max. |            |      |
| Thermal resistance | Rth(j-c) | –               | –    | 1.08 | IGBT       | °C/W |

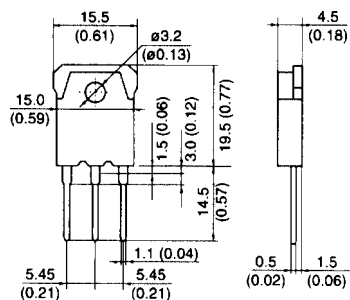
1MB08D-120 / IGBT+FWD

| Item               | Symbol   | Characteristics |      |      | Conditions | Unit |
|--------------------|----------|-----------------|------|------|------------|------|
|                    |          | Min.            | Typ. | Max. |            |      |
| Thermal resistance | Rth(j-c) | –               | –    | 1.08 | IGBT       | °C/W |
|                    | Rth(j-c) | –               | –    | 1.78 | FWD        | °C/W |

■ Outline drawings, mm

1MB08-120, 1MB08D-120

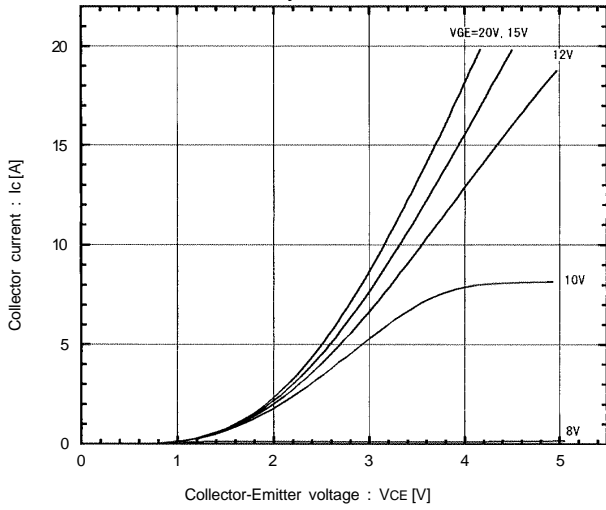
TO-3P



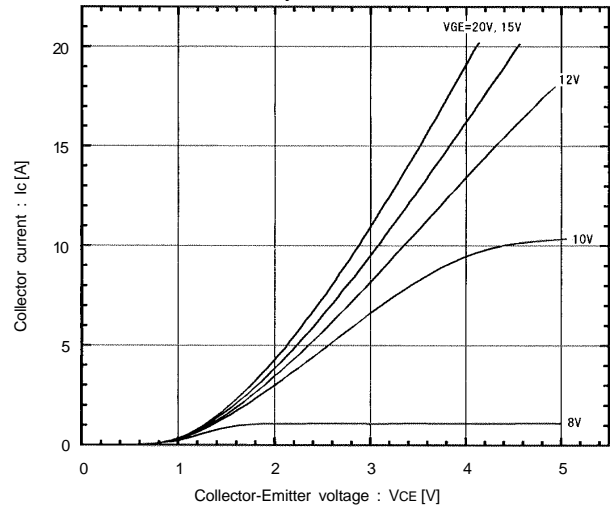
Characteristics

1MB08-120,1MB08D-120

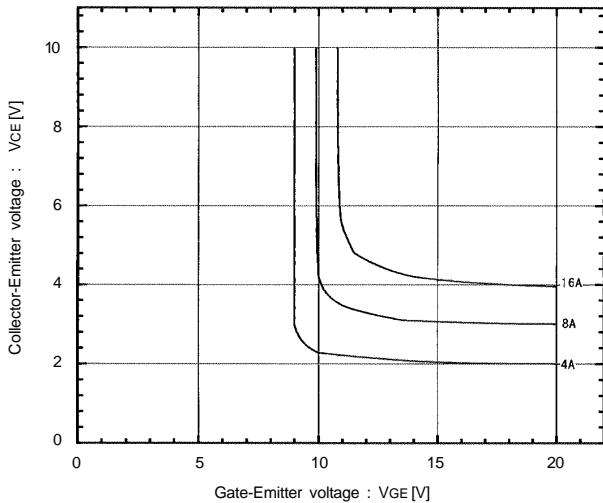
Collector current vs. Collector-Emitter voltage  
T<sub>j</sub>=25°C



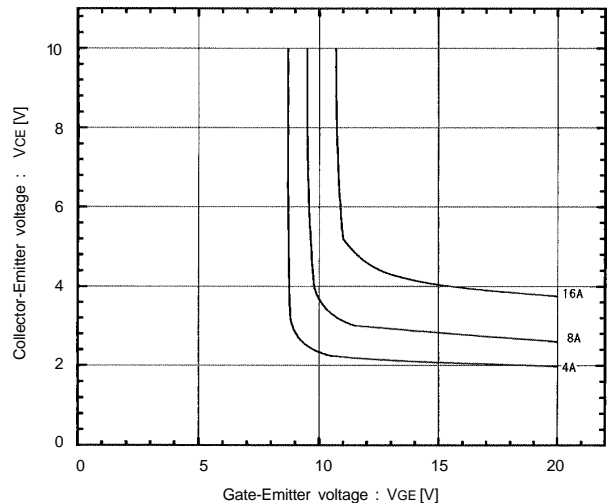
Collector current vs. Collector-Emitter voltage  
T<sub>j</sub>=125°C



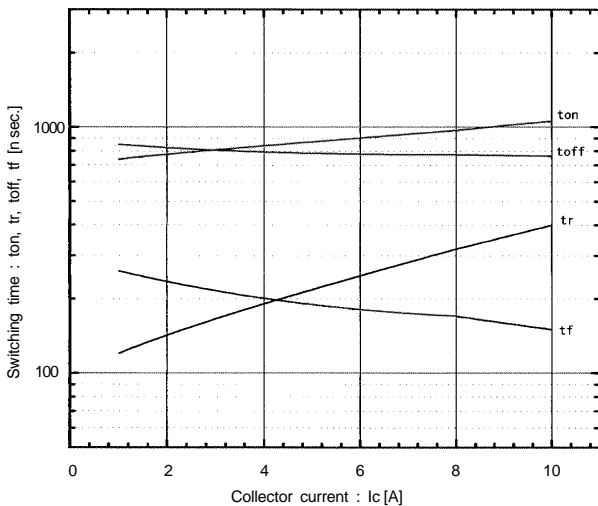
Collector-Emitter vs. Gate-Emitter voltage  
T<sub>j</sub>=25°C



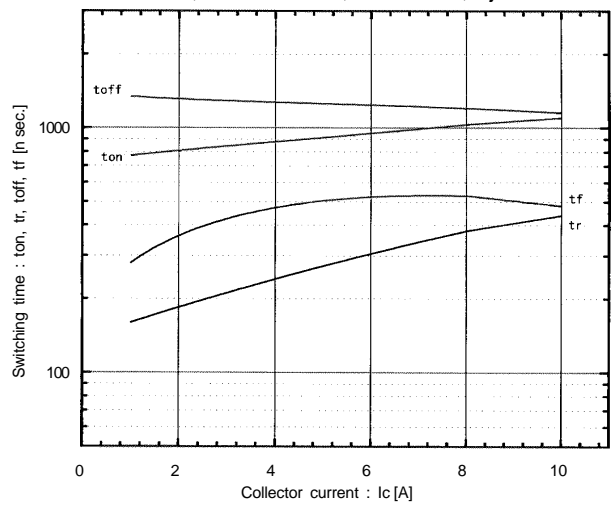
Collector-Emitter vs. Gate-Emitter voltage  
T<sub>j</sub>=125°C



Switching time vs. Collector current  
V<sub>CC</sub>=600V, R<sub>G</sub>=200 ohm, V<sub>GE</sub>=±15V, T<sub>j</sub>=25°C

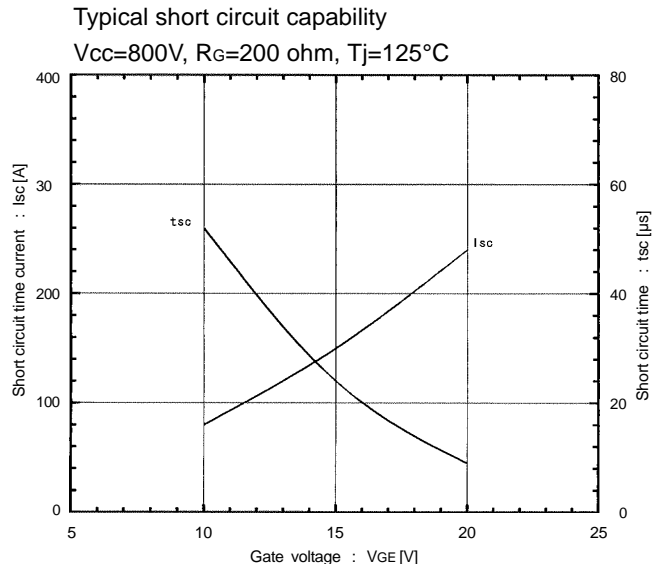
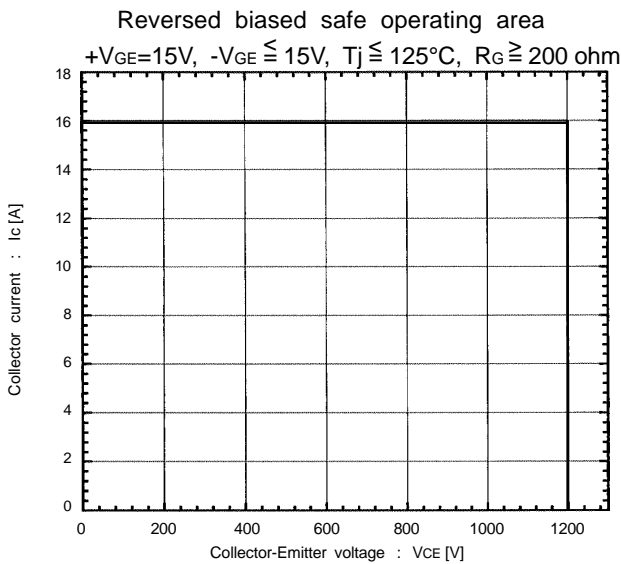
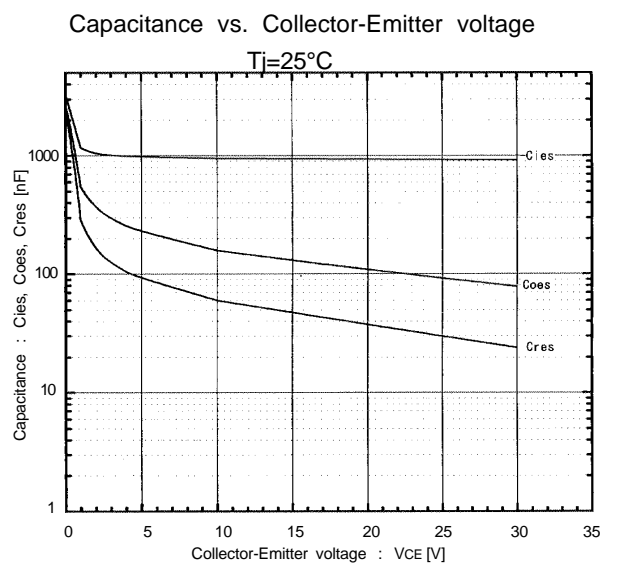
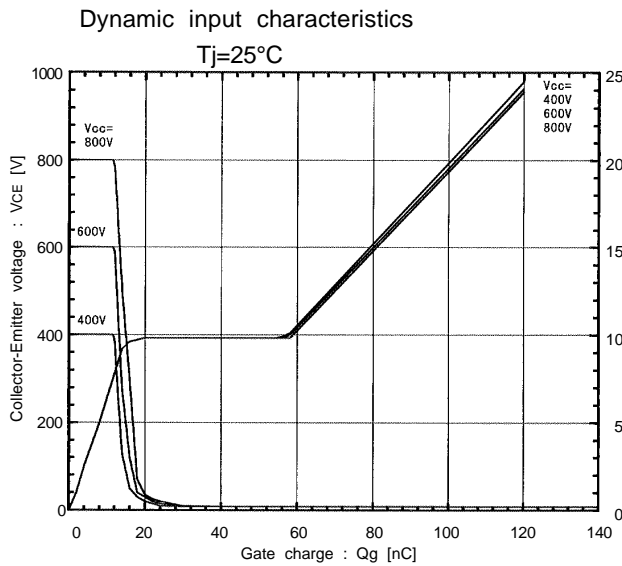
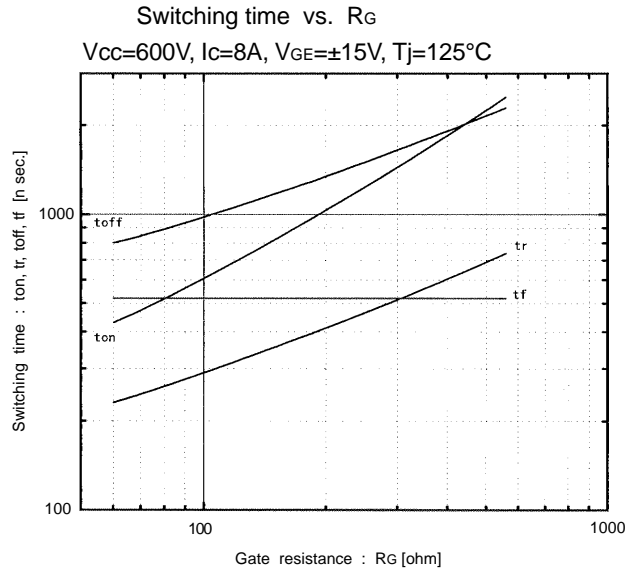
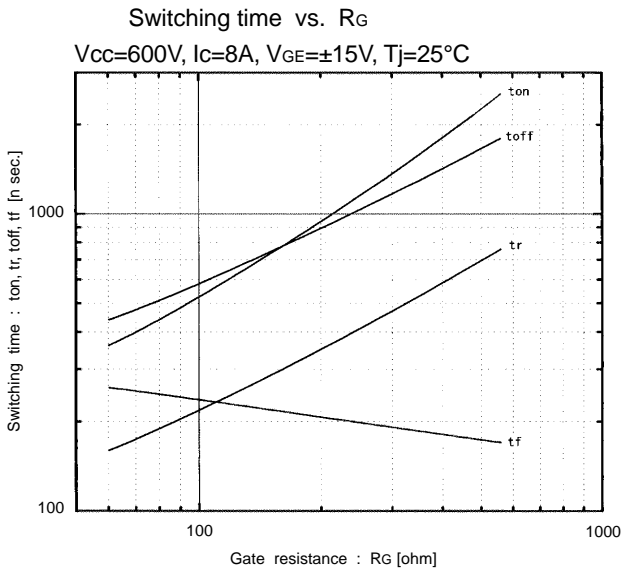


Switching time vs. Collector current  
V<sub>CC</sub>=600V, R<sub>G</sub>=200 ohm, V<sub>GE</sub>=±15V, T<sub>j</sub>=125°C



Characteristics

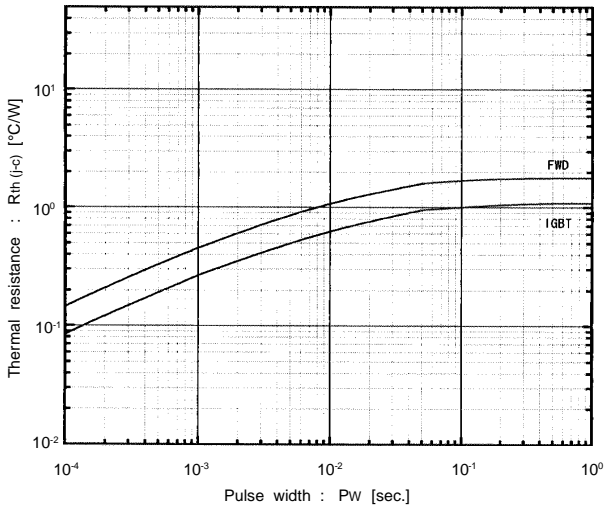
1MB08-120, 1MB08D-120



■ Characteristics

1MB08-120, 1MB08D-120

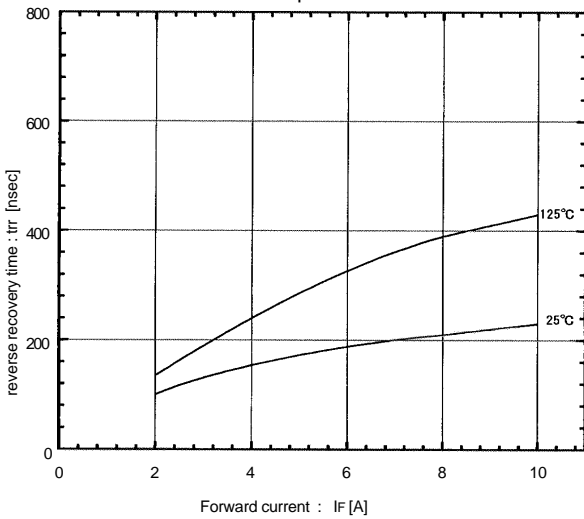
Transient thermal resistance



1MB08D-120

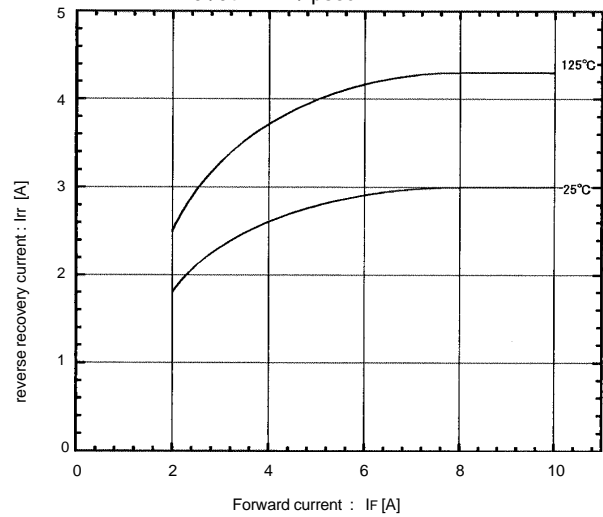
Reverse recovery time vs. Forward current

-di/dt=24A / μsec

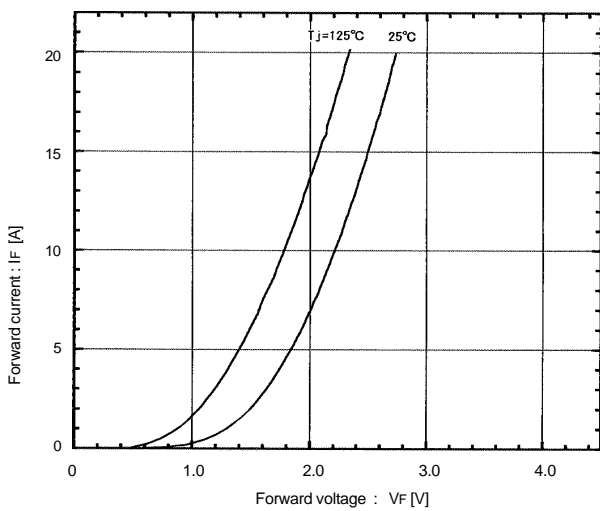


Reverse recovery current vs. Forward current

-di/dt=24A / μsec



Forward current vs. Forward voltage



Reverse recovery time characteristics vs. -di/dt

IF=8A, Tj=125°C

