# 6MBI75UA-120

e-Front runners

## IGBT Module U-Series 1200V / 75A 6 in one-package

### ■ Features

· High speed switching
· Voltage drive
· Low inductance module structure

### ■ Applications

· Inverter for Motor drive
· AC and DC Servo drive amplifier
· Uninterruptible power supply
· Industrial machines, such as Welding machines

### ■ Maximum ratings and characteristics

● **Absolute maximum ratings (at Tc=25°C unless otherwise specified)**

| Item | | Symbol | Conditions | | Rating | Unit |
|---|---|---|---|---|---|---|
| Collector-Emitter voltage | | $V_{CES}$ | | | 1200 | V |
| Gate-Emitter voltaga | | $V_{GES}$ | | | ±20 | V |
| Collector current | | $I_C$ | Continuous | Tc=25°C | 100 | A |
| | | | | Tc=80°C | 75 | |
| | | $I_{CP}$ | 1ms | Tc=25°C | 200 | |
| | | | | Tc=80°C | 150 | |
| | | $-I_C$ | | | 75 | |
| | | $-I_C$ pulse | | | 150 | |
| Collector Power Dissipation | | $P_C$ | 1 device | | 390 | W |
| Junction temperature | | $T_j$ | | | +150 | °C |
| Storage temperature | | $T_{stg}$ | | | -40 to +125 | |
| Isolation voltage | between terminal and copper base *1 | $V_{iso}$ | AC:1min. | | 2500 | VAC |
| | between thermistor and others *2 | | | | | |
| Screw Torque | Mounting *3 | - | | | 3.5 | N·m |

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

*2 : Two thermistor terminals should be connected together, each other terminals should be connected together and shorted to base plate when isolation test will be done.

*3 :Recommendable value : 2.5 to 3.5 N·m(M5)

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

| | Item | Symbols | Conditions | | Characteristics Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| Inverter | Zero gate voltage collector current | $I_{CES}$ | $V_{GE}$=0V, $V_{CE}$=1200V | | – | – | 1.0 | mA |
| | Gate-Emitter leakage current | $I_{GES}$ | $V_{CE}$=0V, $V_{GE}$=±20V | | – | – | 200 | nA |
| | Gate-Emitter threshold voltage | $V_{GE(th)}$ | $V_{CE}$=20V, $I_C$=75mA | | 4.5 | 6.5 | 8.5 | V |
| | Collector-Emitter saturation voltage | $V_{CE(sat)}$ (terminal) | $V_{GE}$=15V, $I_C$=75A | Tj=25°C | – | 2.05 | 2.40 | V |
| | | | | Tj=125°C | – | 2.30 | – | |
| | | $V_{CE(sat)}$ (chip) | | Tj=25°C | – | 1.75 | 2.10 | |
| | | | | Tj=125°C | – | 2.00 | – | |
| | Input capacitance | $C_{ies}$ | $V_{CE}$=10V, $V_{GE}$=0V, f=1MHz | | – | 8 | – | nF |
| | Turn-on time | $t_{on}$ | $V_{CC}$=600V | | – | 0.25 | 1.20 | µs |
| | | $t_r$ | $I_C$=75A | | – | 0.12 | 0.60 | |
| | | $t_{r(i)}$ | $V_{GE}$=±15V | | – | 0.03 | – | |
| | Turn-off time | $t_{off}$ | $R_G$=9.1 Ω | | – | 0.36 | 1.00 | |
| | | $t_f$ | | | – | 0.07 | 0.30 | |
| | Forward on voltage | $V_F$ (terminal) | $V_{GE}$=0V | Tj=25°C | – | 2.10 | 2.50 | V |
| | | | $I_F$=75A | Tj=125°C | – | 2.30 | – | |
| | | $V_F$ (chip) | | Tj=25°C | – | 1.80 | 2.20 | |
| | | | | Tj=125°C | – | 2.00 | – | |
| | Reverse recovery time | $t_{rr}$ | $I_F$=75A | | – | – | 0.35 | µs |
| | Lead resistance, terminal-chip*4 | R lead | | | – | 4.1 | – | mΩ |
| Thermistor | Resistance | R | T=25°C | | – | 5000 | – | Ω |
| | | | T=100°C | | 465 | 495 | 520 | |
| | B value | B | T=25/50°C | | 3305 | 3375 | 3450 | K |

*4:Biggest internal terminal resistance among arm.

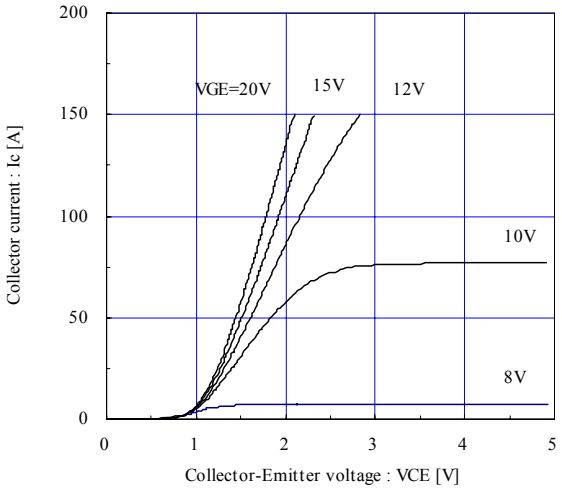
● **Thermal resistance characteristics**

| Items | Symbols | Conditions | Characteristics Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Thermal resistance | Rth(j-c) | IGBT | – | – | 0.32 | °C/W |
| | Rth(j-c) | FWD | – | – | 0.73 | °C/W |
| Contact Thermal resistance | Rth(c-f)*5 | With thermal compound | – | 0.05 | – | °C/W |

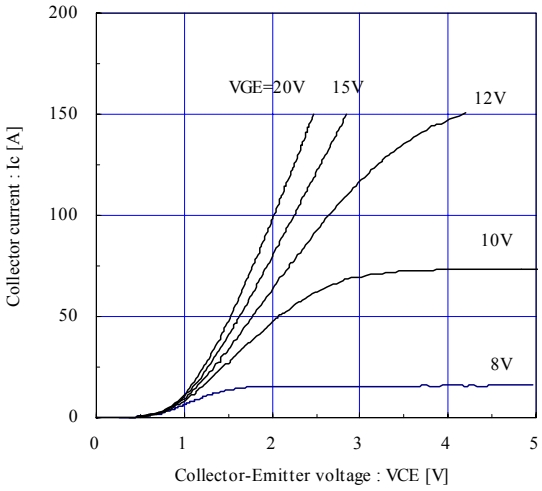
*5 : This is the value which is defined mounting on the additional cooling fin with thermal compound

## ■ Characteristics (Representative)

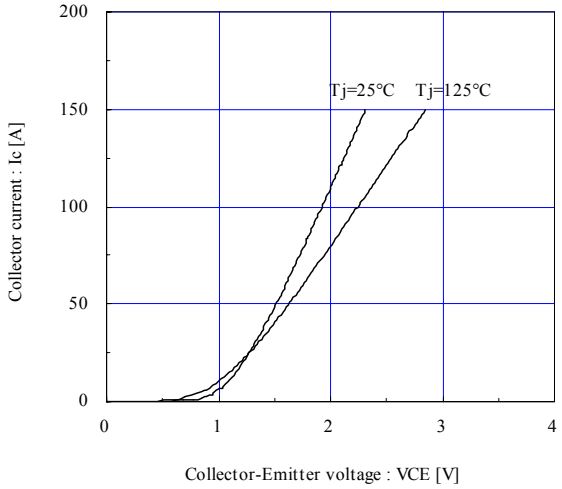
Collector current vs. Collector-Emitter voltage (typ.)
Tj= 25°C / chip



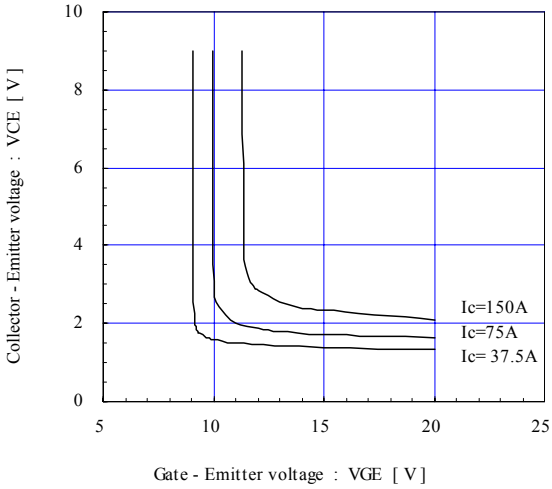

Collector current vs. Collector-Emitter voltage (typ.)
Tj= 125°C/ chip



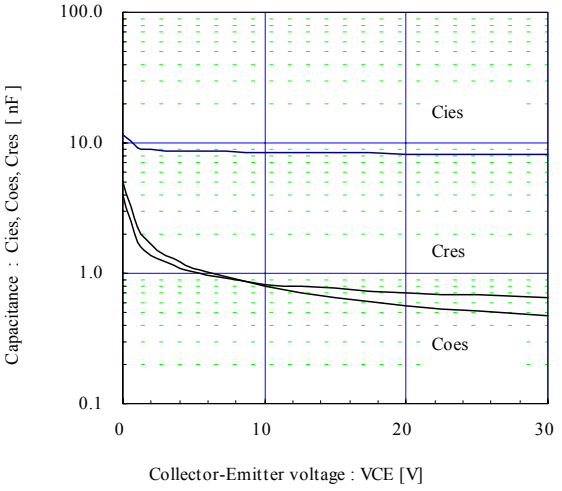

Collector current vs. Collector-Emitter voltage (typ.)
VGE=15V / chip



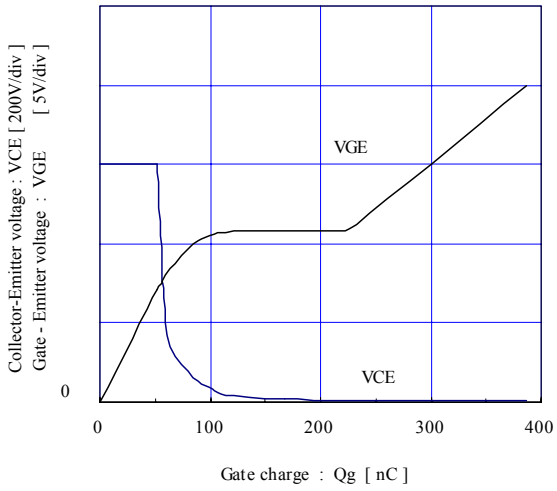

Collector-Emitter voltage vs. Gate-Emitter voltage (typ.)
Tj=25°C / chip




Capacitance vs. Collector-Emitter voltage (typ.)
VGE=0V, f= 1MHz, Tj= 25°C

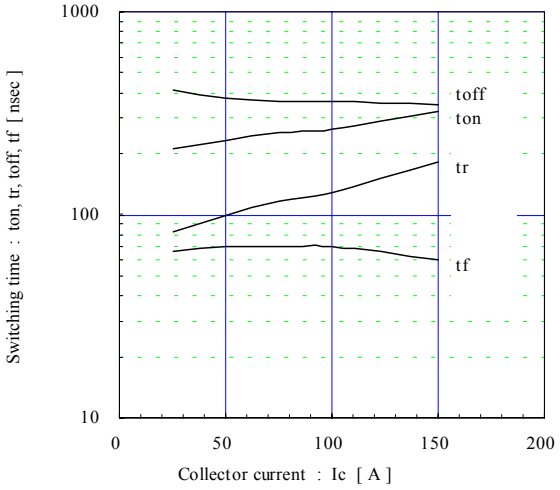



Dynamic Gate charge (typ.)
Vcc=600V, Ic=75A, Tj= 25°C



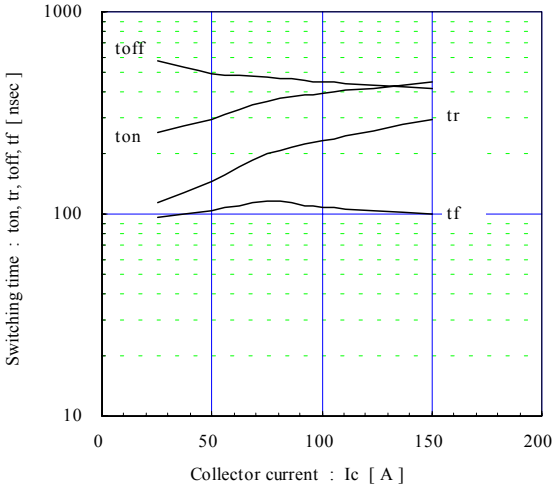
Switching time vs. Collector current (typ.)

Vcc=600V, VGE=±15V, Rg=9.1Ω, Tj= 25°C



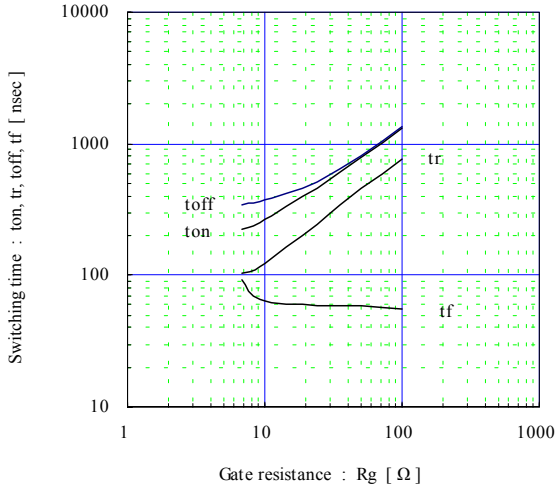

Switching time vs. Collector current (typ.)

Vcc=600V, VGE=±15V, Rg=9.1Ω, Tj=125°C



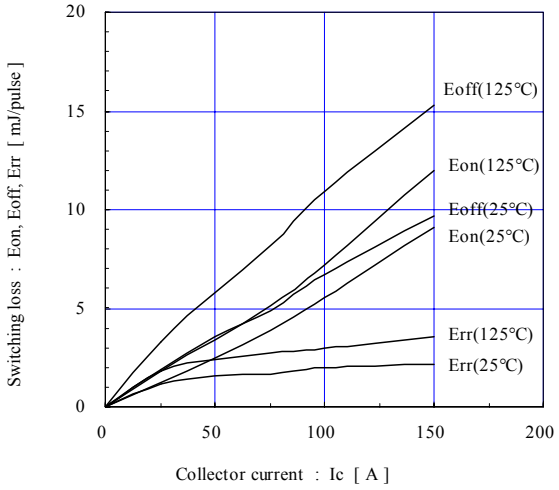

Switching time vs. Gate resistance (typ.)

Vcc=600V, Ic=75A, VGE=±15V, Tj= 25°C



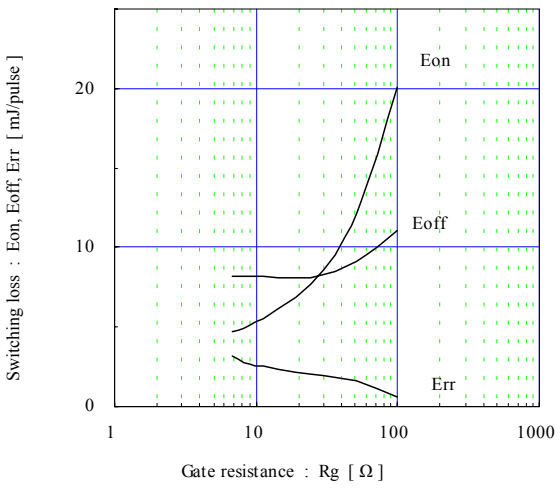

Switching loss vs. Collector current (typ.)

Vcc=600V, VGE=±15V, Rg=9.1Ω



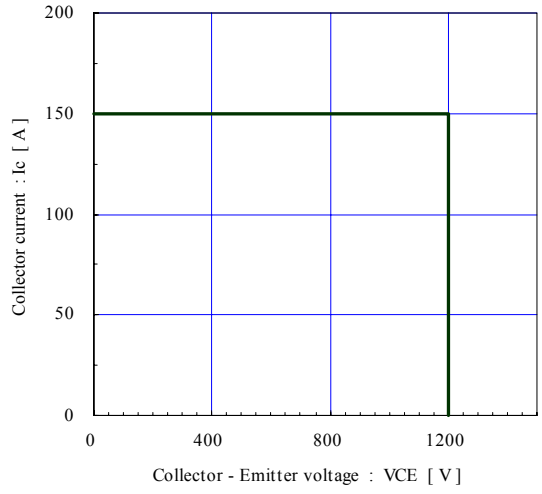

Switching loss vs. Gate resistance (typ.)

Vcc=600V, Ic=75A, VGE=±15V, Tj= 125°C

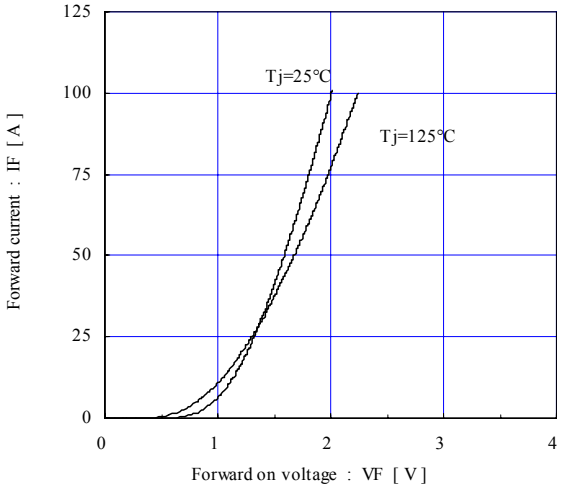



Reverse bias safe operating area (max.)

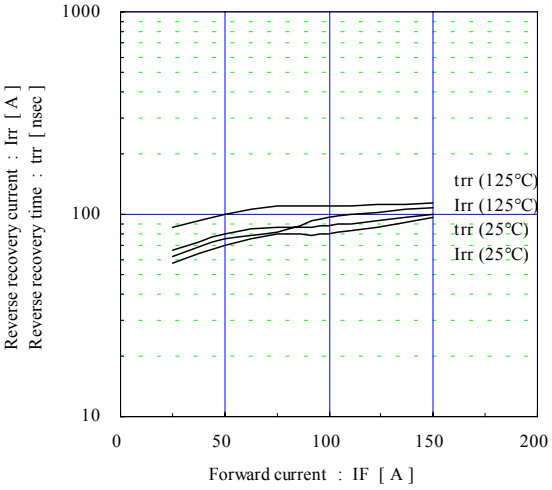
+VGE=15V,-VGE <= 15V, RG >= 9.1Ω ,Tj <= 125°C



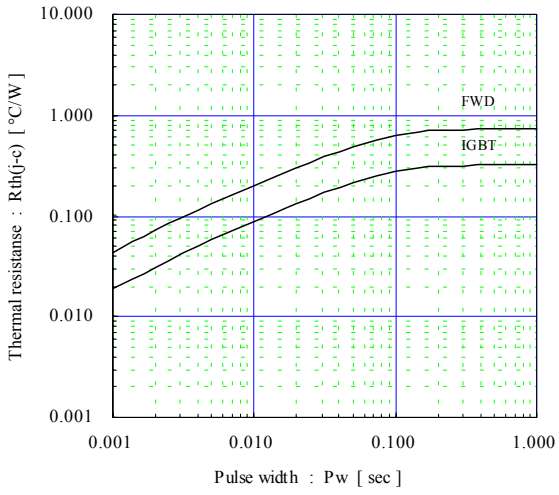
Forward current vs. Forward on voltage (typ.)
chip



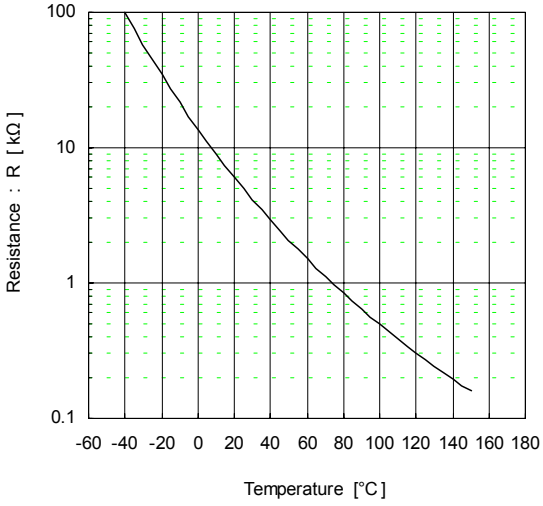

Reverse recovery characteristics (typ.)
Vcc=600V, VGE=±15V, Rg=9.1Ω



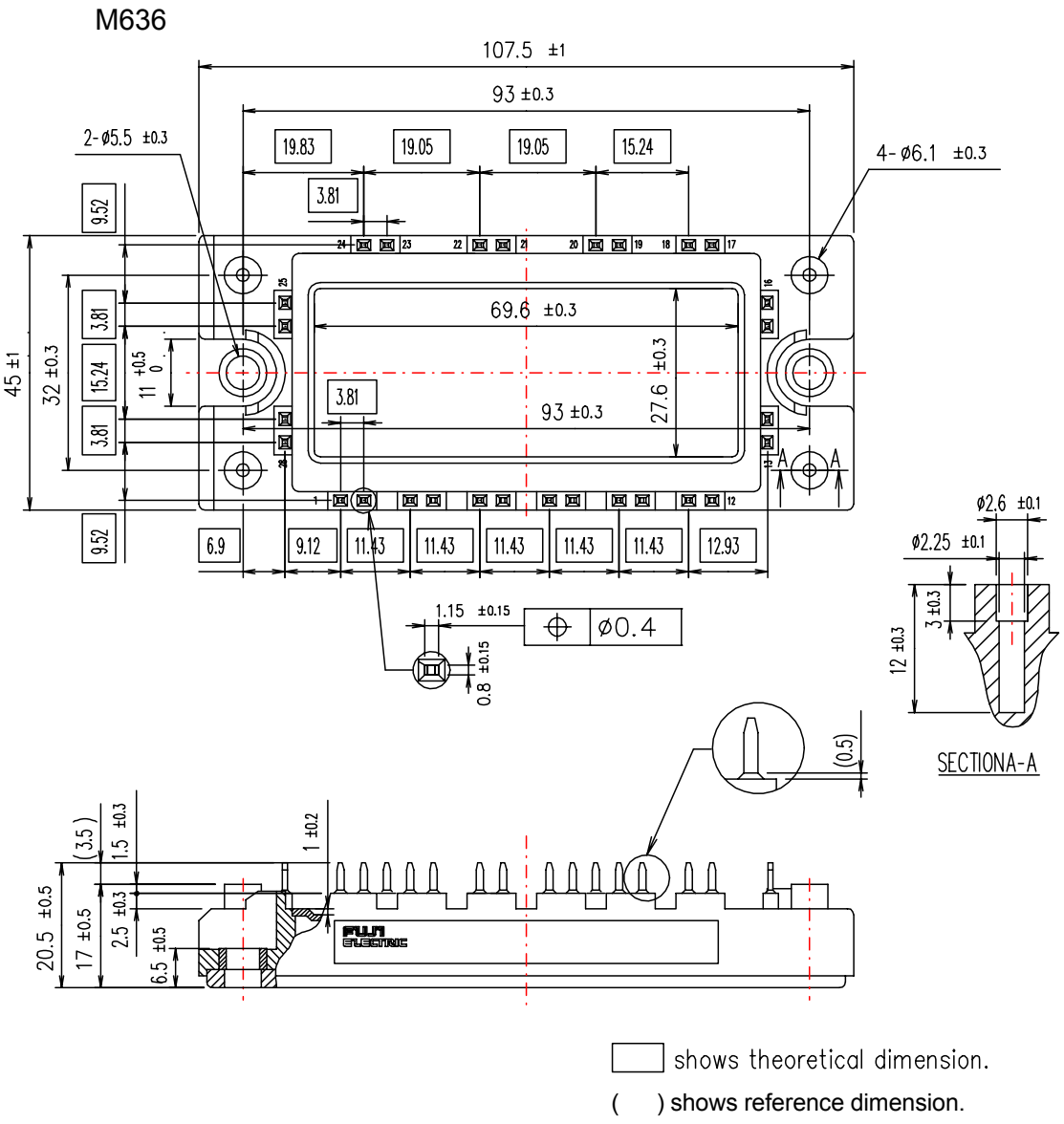

Transient thermal resistance (max.)




Temperature characteristic (typ.)



## ■ Outline Drawings, mm




## ■ Equivalent Circuit Schematic