

# 7MBR75XRE120-50

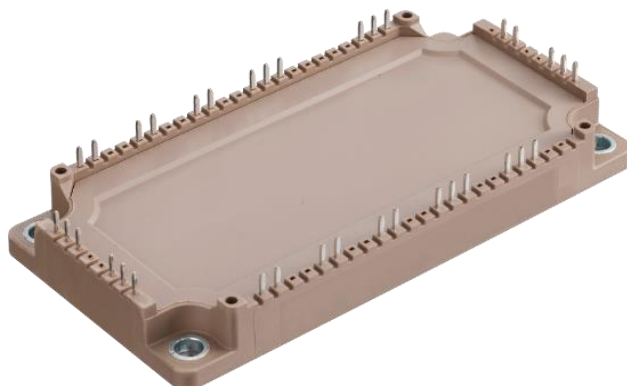
IGBT Modules

**Power Module(X series)**  
1200V / 75A / PIM

## Features

LOW  $V_{CE(sat)}$   
Compact Package  
P.C.Board Mount Module  
Converter Diode Bridge Dynamic Brake Circuit  
RoHS compliant Product

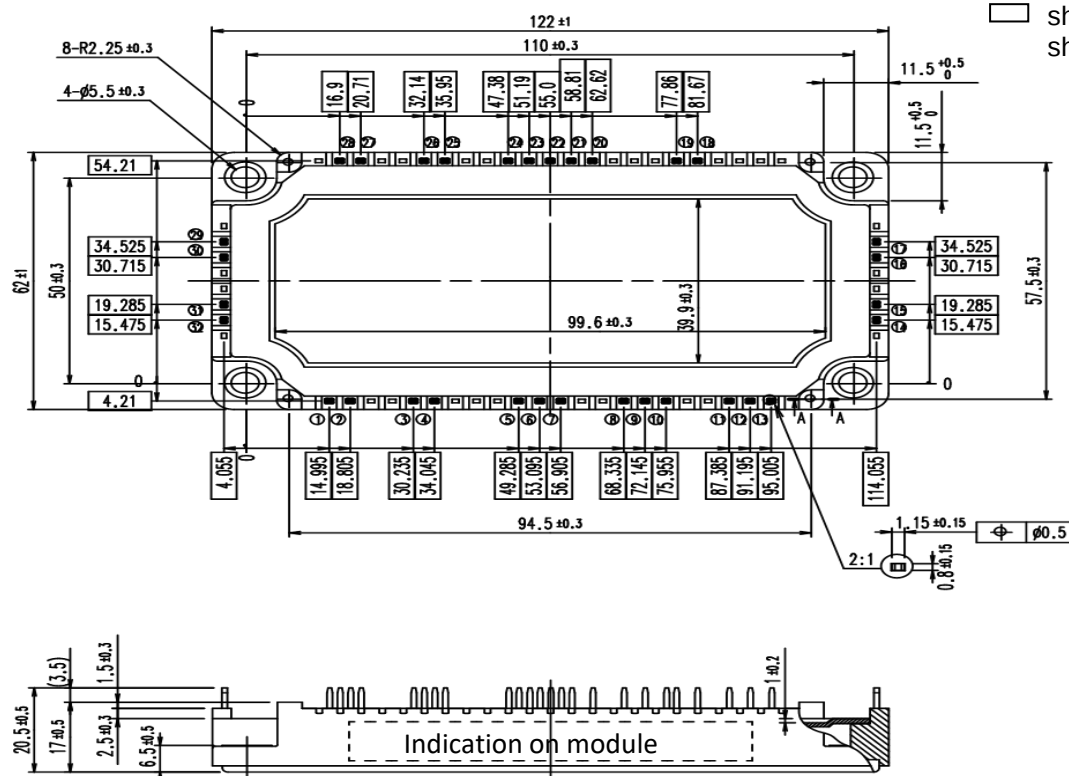
## Typical appearance



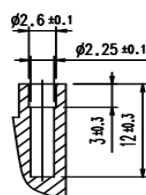
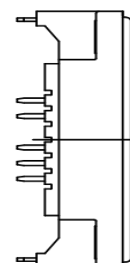
## Applications

Inverter for Motor Drive  
AC and DC Servo Drive Amplifier  
Uninterruptible Power Supply

## Outline drawing ( Unit : mm )



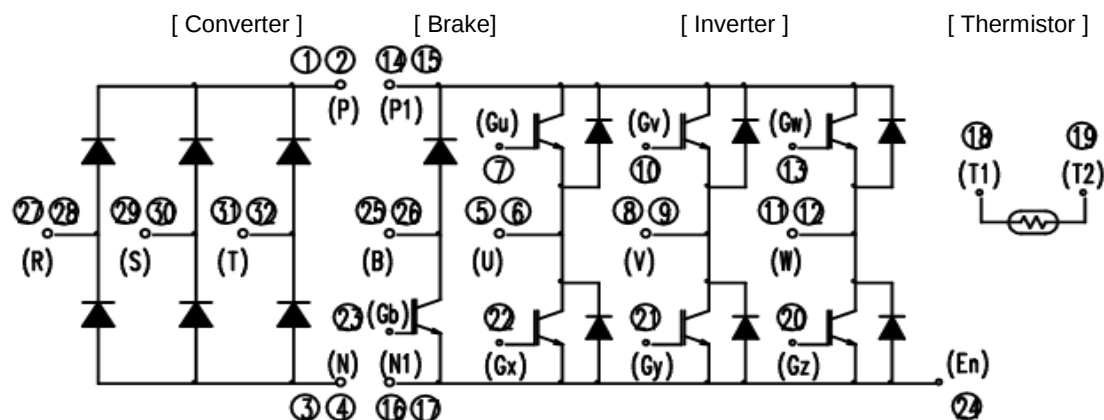
□ shows theoretical dimension.  
□ shows reference dimension.



Section A-A

Weight: 310 g (typ.)

## Equivalent circuit



# 7MBR75XRE120-50

**IGBT Modules**

□ **Maximum ratings** ( at  $T_c = 25^\circ\text{C}$  unless otherwise specified )

| Items                                                               |                                                         | Symbols    | Conditions                              |                              | Maximum ratings | Units            |
|---------------------------------------------------------------------|---------------------------------------------------------|------------|-----------------------------------------|------------------------------|-----------------|------------------|
| Inverter                                                            | Collector-emitter voltage,gate-emitter short-circuited  | $V_{CES}$  |                                         |                              | 1200            | V                |
|                                                                     | Gate -emitter voltage,collector-emitter short-circuited | $V_{GES}$  |                                         |                              | ±20             | V                |
|                                                                     | Collector current                                       | $I_C$      | Continuous                              | $T_c=100^{\circ}\text{C}$    | 75              | A                |
|                                                                     | Repetitive peak collector current                       | $I_{CRM}$  | 1ms                                     |                              | 150             |                  |
|                                                                     | Forward current                                         | $I_F$      | Continuous                              |                              | 75              |                  |
|                                                                     | Repetitive peak forward current                         | $I_{FRM}$  | 1ms                                     |                              | 150             |                  |
|                                                                     | Total power dissipation                                 | $P_{tot}$  | 1 device                                |                              | 480             | W                |
| Brake IGBT                                                          | Collector-emitter voltage,gate-emitter short-circuited  | $V_{CES}$  |                                         |                              | 1200            | V                |
|                                                                     | Gate -emitter voltage,collector-emitter short-circuited | $V_{GES}$  |                                         |                              | ±20             | V                |
|                                                                     | Collector current                                       | $I_C$      | Continuous                              | $T_c=100^{\circ}\text{C}$    | 50              | A                |
|                                                                     | Repetitive peak collector current                       | $I_{CRM}$  | 1ms                                     |                              | 100             |                  |
|                                                                     | Total power dissipation                                 | $P_{tot}$  | 1 device                                |                              | 250             | W                |
| Brake FWD                                                           | Forward current                                         | $I_F$      | Continuous                              |                              | 25              | A                |
|                                                                     |                                                         | $I_{FRM}$  | 1ms                                     |                              | 50              |                  |
|                                                                     | Repetitive peak reverse voltage                         | $V_{RRM}$  |                                         |                              | 1200            | V                |
| Converter                                                           | Repetitive peak reverse voltage                         | $V_{RRM}$  |                                         |                              | 1600            | V                |
|                                                                     | Average output current                                  | $I_O$      | Three-phase full wave rectified current | $T_c=80^{\circ}\text{C}$     | 75              | A                |
|                                                                     | Surge(non-Repetitive) forward current (*1)              | $I_{FSM}$  | $t=10\text{ms}$ , Half sine wave form   | $T_{vj}=25^{\circ}\text{C}$  | 945             | A                |
|                                                                     |                                                         |            |                                         | $T_{vj}=150^{\circ}\text{C}$ | 775             |                  |
|                                                                     | $I^2t$ (Non-Repetitive) (*1)                            | $I^2t$     |                                         | $T_{vj}=25^{\circ}\text{C}$  | 4485            | A <sup>2</sup> s |
|                                                                     |                                                         |            |                                         | $T_{vj}=150^{\circ}\text{C}$ | 3000            |                  |
| Virtual junction temperature                                        |                                                         | $T_{vj}$   | Inverter, Brake                         |                              | 175             | °C               |
|                                                                     |                                                         |            | Converter                               |                              | 150             |                  |
| Operating virtual junction temperature (under switching conditions) |                                                         | $T_{vjop}$ | Inverter, Brake                         |                              | 175             |                  |
|                                                                     |                                                         |            | Converter                               |                              | 150             |                  |
| Case temperature                                                    |                                                         | $T_c$      |                                         |                              | 125             |                  |
| Storage temperature                                                 |                                                         | $T_{stg}$  |                                         |                              | -40 ~ 125       |                  |
| Isolation voltage                                                   | between terminals and copper base (*2)                  | $V_{iso}$  | A.C. : 1min.                            |                              | 2500            | Vrms             |
|                                                                     | between thermistor and others (*3)                      |            |                                         |                              |                 |                  |
| Screw torque (*4)                                                   | Mounting torque of screws to heat sink                  | -          | M5                                      |                              | 6.0             | N·m              |

(\*1)  $T_{vj}$  : Temperature at test start.

(\*2) All terminals should be connected together during the test.

(\*3) Two thermistor terminals should be connected together, other terminals should be connected together and shorted to base plate during the test.

(\*4) Recommendable value : Mounting 2.5 ~ 6.0 N·m (M5)

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**IGBT Modules**

□ **Electrical characteristics ( at  $T_{vj} = 25^{\circ}\text{C}$  unless otherwise specified)**

| Items                               |                                                                | Symbols                                                                                                                                                                      | Conditions                                                                                               |                                     | Characteristics |      |               | Units         |
|-------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------|------|---------------|---------------|
|                                     |                                                                |                                                                                                                                                                              |                                                                                                          |                                     | min.            | typ. | max.          |               |
| Inverter                            | Collector-emitter cut-off current,gate-emitter short-circuited | $I_{\text{CES}}$                                                                                                                                                             | $V_{\text{GE}} = 0\text{V}$<br>$V_{\text{CE}} = 1200\text{V}$                                            |                                     | -               | -    | 50            | $\mu\text{A}$ |
|                                     | Gate leakage current,collector-emitter short-circuited         | $I_{\text{GES}}$                                                                                                                                                             | $V_{\text{CE}} = 0\text{V}$ $V_{\text{GE}} = +20/-20\text{V}$                                            |                                     | -               | -    | 100           | nA            |
|                                     | Gate-Emitter threshold voltage                                 | $V_{\text{GE(th)}}$                                                                                                                                                          | $V_{\text{CE}} = 20\text{V}$<br>$I_{\text{C}} = 75\text{mA}$                                             |                                     | 6.0             | 6.5  | 7.0           | V             |
|                                     | Collector-Emitter saturation voltage                           | $V_{\text{CE(sat)}}$ (terminal)                                                                                                                                              | $V_{\text{GE}} = 15\text{V}$<br>$I_{\text{C}} = 75\text{A}$                                              | $T_{\text{vj}}=25^{\circ}\text{C}$  | -               | 1.80 | 2.25          | V             |
|                                     |                                                                | $V_{\text{CE(sat)}}$ (chip)                                                                                                                                                  |                                                                                                          | $T_{\text{vj}}=25^{\circ}\text{C}$  | -               | 1.50 | 1.95          |               |
|                                     |                                                                |                                                                                                                                                                              |                                                                                                          | $T_{\text{vj}}=125^{\circ}\text{C}$ | -               | 1.85 | -             |               |
|                                     |                                                                |                                                                                                                                                                              |                                                                                                          | $T_{\text{vj}}=150^{\circ}\text{C}$ | -               | 1.95 | -             |               |
|                                     |                                                                |                                                                                                                                                                              |                                                                                                          | $T_{\text{vj}}=175^{\circ}\text{C}$ | -               | 2.00 | -             |               |
|                                     | Internal Gate resistance                                       | $r_{\text{g}}$                                                                                                                                                               | -                                                                                                        |                                     | -               | 7.50 | -             | $\Omega$      |
|                                     | Capacitance                                                    | $C_{\text{ies}}$                                                                                                                                                             | $V_{\text{CE}} = 10\text{V}, V_{\text{GE}} = 0\text{V}, f = 1\text{MHz}$                                 |                                     | -               | 8.0  | -             | nF            |
|                                     |                                                                | $C_{\text{oes}}$                                                                                                                                                             |                                                                                                          |                                     | -               | 0.27 | -             |               |
|                                     |                                                                | $C_{\text{res}}$                                                                                                                                                             |                                                                                                          |                                     | -               | 0.07 | -             |               |
|                                     | Gate charge                                                    | $Q_{\text{G}}$                                                                                                                                                               | $V_{\text{CC}} = 600\text{V}$ $V_{\text{GE}}=-15 \rightarrow +15\text{V}$<br>$I_{\text{C}} = 75\text{A}$ |                                     | -               | 510  | -             | nC            |
|                                     | Forward voltage                                                | $V_{\text{F}}$ (terminal)                                                                                                                                                    | $I_{\text{F}} = 75\text{A}$                                                                              | $T_{\text{vj}}=25^{\circ}\text{C}$  | -               | 2.10 | 2.55          | V             |
|                                     |                                                                | $V_{\text{F}}$ (chip)                                                                                                                                                        |                                                                                                          | $T_{\text{vj}}=25^{\circ}\text{C}$  | -               | 1.80 | 2.25          |               |
|                                     |                                                                |                                                                                                                                                                              |                                                                                                          | $T_{\text{vj}}=125^{\circ}\text{C}$ | -               | 1.85 | -             |               |
| $T_{\text{vj}}=150^{\circ}\text{C}$ |                                                                |                                                                                                                                                                              |                                                                                                          | -                                   | 1.80            | -    |               |               |
| $T_{\text{vj}}=175^{\circ}\text{C}$ |                                                                |                                                                                                                                                                              |                                                                                                          | -                                   | 1.75            | -    |               |               |
| Switching time (*1)                 | $t_{\text{d(on)}}$                                             | $V_{\text{CC}} = 600\text{V}$<br>$I_{\text{C}},I_{\text{F}} = 75\text{A}$ $L_{\text{S}} = 30\text{nH}$<br>$V_{\text{GE}} = +15/-15\text{ V}$<br>$R_{\text{G}} = 5.1\ \Omega$ | $T_{\text{vj}}=25^{\circ}\text{C}$                                                                       | -                                   | 0.18            | -    | $\mu\text{s}$ |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=125^{\circ}\text{C}$                                                                      | -                                   | 0.21            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=150^{\circ}\text{C}$                                                                      | -                                   | 0.21            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=175^{\circ}\text{C}$                                                                      | -                                   | 0.22            | -    |               |               |
|                                     | $t_{\text{r}}$                                                 | $V_{\text{CC}} = 600\text{V}$<br>$I_{\text{C}},I_{\text{F}} = 75\text{A}$ $L_{\text{S}} = 30\text{nH}$<br>$V_{\text{GE}} = +15/-15\text{ V}$<br>$R_{\text{G}} = 5.1\ \Omega$ | $T_{\text{vj}}=25^{\circ}\text{C}$                                                                       | -                                   | 0.04            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=125^{\circ}\text{C}$                                                                      | -                                   | 0.05            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=150^{\circ}\text{C}$                                                                      | -                                   | 0.05            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=175^{\circ}\text{C}$                                                                      | -                                   | 0.05            | -    |               |               |
|                                     | $t_{\text{d(off)}}$                                            | $V_{\text{CC}} = 600\text{V}$<br>$I_{\text{C}},I_{\text{F}} = 75\text{A}$ $L_{\text{S}} = 30\text{nH}$<br>$V_{\text{GE}} = +15/-15\text{ V}$<br>$R_{\text{G}} = 5.1\ \Omega$ | $T_{\text{vj}}=25^{\circ}\text{C}$                                                                       | -                                   | 0.25            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=125^{\circ}\text{C}$                                                                      | -                                   | 0.28            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=150^{\circ}\text{C}$                                                                      | -                                   | 0.29            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=175^{\circ}\text{C}$                                                                      | -                                   | 0.29            | -    |               |               |
|                                     | $t_{\text{f}}$                                                 | $V_{\text{CC}} = 600\text{V}$<br>$I_{\text{C}},I_{\text{F}} = 75\text{A}$ $L_{\text{S}} = 30\text{nH}$<br>$V_{\text{GE}} = +15/-15\text{ V}$<br>$R_{\text{G}} = 5.1\ \Omega$ | $T_{\text{vj}}=25^{\circ}\text{C}$                                                                       | -                                   | 0.12            | -    |               |               |
| $T_{\text{vj}}=125^{\circ}\text{C}$ |                                                                |                                                                                                                                                                              | -                                                                                                        | 0.18                                | -               |      |               |               |
| $T_{\text{vj}}=150^{\circ}\text{C}$ |                                                                |                                                                                                                                                                              | -                                                                                                        | 0.20                                | -               |      |               |               |
| $T_{\text{vj}}=175^{\circ}\text{C}$ |                                                                |                                                                                                                                                                              | -                                                                                                        | 0.21                                | -               |      |               |               |
| Reverse recovery time               | $t_{\text{rr}}$                                                | $V_{\text{CC}} = 600\text{V}$<br>$I_{\text{C}},I_{\text{F}} = 75\text{A}$ $L_{\text{S}} = 30\text{nH}$<br>$V_{\text{GE}} = +15/-15\text{ V}$<br>$R_{\text{G}} = 5.1\ \Omega$ | $T_{\text{vj}}=25^{\circ}\text{C}$                                                                       | -                                   | 0.10            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=125^{\circ}\text{C}$                                                                      | -                                   | 0.17            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=150^{\circ}\text{C}$                                                                      | -                                   | 0.21            | -    |               |               |
|                                     |                                                                |                                                                                                                                                                              | $T_{\text{vj}}=175^{\circ}\text{C}$                                                                      | -                                   | 0.24            | -    |               |               |

(\*1) Turn on time ( $t_{on}$ ) =  $t_{d(on)} + t_r$ , Turn off time ( $t_{off}$ ) =  $t_{d(off)} + t_f$

# 7MBR75XRE120-50

**IGBT Modules**

| Items                                |                               | Symbols                     | Conditions                             |                       | Characteristics |      |      | Units    |
|--------------------------------------|-------------------------------|-----------------------------|----------------------------------------|-----------------------|-----------------|------|------|----------|
|                                      |                               |                             |                                        |                       | min.            | typ. | max. |          |
| Inverter                             | Switching loss<br>(per pulse) | $E_{on}$                    | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 5.41 | -    | mJ       |
|                                      |                               |                             | $I_C, I_F = 75A \quad L_s = 30nH$      | $T_{vj}=125^{\circ}C$ | -               | 7.80 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 8.48 | -    |          |
|                                      |                               |                             | $R_G = 5.1 \Omega$                     | $T_{vj}=175^{\circ}C$ | -               | 9.27 | -    |          |
|                                      |                               | $E_{off}$                   | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 5.53 | -    |          |
|                                      |                               |                             | $I_C, I_F = 75A \quad L_s = 30nH$      | $T_{vj}=125^{\circ}C$ | -               | 6.64 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 7.23 | -    |          |
|                                      |                               |                             | $R_G = 5.1 \Omega$                     | $T_{vj}=175^{\circ}C$ | -               | 7.48 | -    |          |
|                                      |                               | $E_{rr}$                    | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 2.20 | -    |          |
|                                      |                               |                             | $I_C, I_F = 75A \quad L_s = 30nH$      | $T_{vj}=125^{\circ}C$ | -               | 3.88 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 4.75 | -    |          |
|                                      |                               |                             | $R_G = 5.1 \Omega$                     | $T_{vj}=175^{\circ}C$ | -               | 5.33 | -    |          |
| Zero Gate voltage collector current  |                               | $I_{CES}$                   | $V_{GE} = 0V$<br>$V_{CE} = 1200V$      |                       | -               | -    | 50   | $\mu A$  |
| Gate-Emitter leakage current         |                               | $I_{GES}$                   | $V_{CE} = 0V, \quad V_{GE} = +20/-20V$ |                       | -               | -    | 100  | nA       |
| Collector-Emitter saturation voltage |                               | $V_{CE(sat)}$<br>(terminal) | $V_{GE} = 15V$<br>$I_C = 50A$          | $T_{vj}=25^{\circ}C$  | -               | 1.70 | 2.15 | V        |
|                                      |                               | $V_{CE(sat)}$<br>(chip)     |                                        | $T_{vj}=25^{\circ}C$  | -               | 1.50 | 1.95 |          |
|                                      |                               |                             |                                        | $T_{vj}=125^{\circ}C$ | -               | 1.85 | -    |          |
|                                      |                               |                             |                                        | $T_{vj}=150^{\circ}C$ | -               | 1.95 | -    |          |
|                                      |                               |                             |                                        | $T_{vj}=175^{\circ}C$ | -               | 2.00 | -    |          |
| Internal Gate resistance             |                               | $r_g$                       | -                                      |                       | -               | 0.0  | -    | $\Omega$ |
| Brake                                | Switching time (*1)           | $t_{d(on)}$                 | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 0.09 | -    | $\mu s$  |
|                                      |                               |                             | $I_C = 50A \quad L_s = 30nH$           | $T_{vj}=125^{\circ}C$ | -               | 0.09 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 0.09 | -    |          |
|                                      |                               |                             | $R_G = 18 \Omega$                      | $T_{vj}=175^{\circ}C$ | -               | 0.10 | -    |          |
|                                      |                               | $t_r$                       | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 0.04 | -    |          |
|                                      |                               |                             | $I_C = 50A \quad L_s = 30nH$           | $T_{vj}=125^{\circ}C$ | -               | 0.04 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 0.04 | -    |          |
|                                      |                               |                             | $R_G = 18 \Omega$                      | $T_{vj}=175^{\circ}C$ | -               | 0.04 | -    |          |
|                                      |                               | $t_{d(off)}$                | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 0.24 | -    |          |
|                                      |                               |                             | $I_C = 50A \quad L_s = 30nH$           | $T_{vj}=125^{\circ}C$ | -               | 0.27 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 0.27 | -    |          |
|                                      |                               |                             | $R_G = 18 \Omega$                      | $T_{vj}=175^{\circ}C$ | -               | 0.28 | -    |          |
|                                      |                               | $t_f$                       | $V_{CC} = 600V$                        | $T_{vj}=25^{\circ}C$  | -               | 0.11 | -    |          |
|                                      |                               |                             | $I_C = 50A \quad L_s = 30nH$           | $T_{vj}=125^{\circ}C$ | -               | 0.17 | -    |          |
|                                      |                               |                             | $V_{GE} = +15/-15 V$                   | $T_{vj}=150^{\circ}C$ | -               | 0.20 | -    |          |
|                                      |                               |                             | $R_G = 18 \Omega$                      | $T_{vj}=175^{\circ}C$ | -               | 0.21 | -    |          |
| Reverse current                      |                               | $I_{RRM}$                   | $V_R = 1200V$                          |                       | -               | -    | 50   | $\mu A$  |
| Forward voltage                      |                               | $V_F$ (terminal)            | $I_F = 25A$                            | $T_{vj}=25^{\circ}C$  | -               | 2.00 | 2.45 | V        |
|                                      |                               | $V_F$<br>(chip)             | $I_F = 25A$                            | $T_{vj}=25^{\circ}C$  | -               | 1.80 | 2.25 |          |
|                                      |                               |                             | $T_{vj}=125^{\circ}C$                  | -                     | 1.85            | -    |      |          |
|                                      |                               |                             | $T_{vj}=150^{\circ}C$                  | -                     | 1.80            | -    |      |          |
|                                      |                               |                             | $T_{vj}=175^{\circ}C$                  | -                     | 1.75            | -    |      |          |
| Reverse current                      |                               | $I_{RRM}$                   | $V_R = 1600V$                          |                       | -               | -    | 50   | $\mu A$  |
| Forward voltage                      |                               | $V_{FM}$                    | $I_F = 75A$                            | terminal              | -               | 1.30 | 1.75 | V        |
|                                      |                               |                             | chip                                   | -                     | 1.00            | 1.45 |      |          |
| Thermistor                           | Resistance                    | $R$                         | $T = 25^{\circ}C$                      |                       | -               | 5000 | -    | $\Omega$ |
|                                      |                               |                             | $T = 100^{\circ}C$                     |                       | 465             | 495  | 520  |          |
|                                      | B value                       |                             | $B$                                    | $T = 25/ 50^{\circ}C$ |                 | 3305 | 3375 | 3450     |

(\*1) Turn on time ( $t_{on}$ ) =  $t_{d(on)} + t_r$ , Turn off time ( $t_{off}$ ) =  $t_{d(off)} + t_f$ 
**FM6M01871**

# 7MBR75XRE120-50

**IGBT Modules**
**NOTICE:**

The external gate resistance ( $R_G$ ) shown above is one of our recommended value for the purpose of minimum switching loss. However the optimum  $R_G$  depends on circuit configuration and/or environment. We recommend that the  $R_G$  has to be carefully chosen based on consideration if IGBT module matches design criteria, for example, switching loss, EMC/EMI, spike voltage, surge current and no unexpected oscillation and so on.

**□ Thermal resistance characteristics**

| Items                                          | Symbols       | Conditions                    | Characteristics |      |      | Units |
|------------------------------------------------|---------------|-------------------------------|-----------------|------|------|-------|
|                                                |               |                               | min.            | typ. | max. |       |
| Thermal resistance junction to case (1device)  | $R_{th(j-c)}$ | Inverter IGBT                 | -               | -    | 0.31 | K/W   |
|                                                |               | Inverter FWD                  | -               | -    | 0.39 |       |
|                                                |               | Brake IGBT                    | -               | -    | 0.59 |       |
|                                                |               | Brake FWD                     | -               | -    | 1.00 |       |
|                                                |               | Converter Diode               | -               | -    | 0.47 |       |
| Contact thermal resistance (1 IGBT+1 FWD) (*1) | $R_{th(c-s)}$ | with 1 W/(m·K) thermal grease | -               | 0.05 | -    |       |

(\*1) This is the value which is defined mounting on the additional heat sink 1 with(m.k) thermal grease.

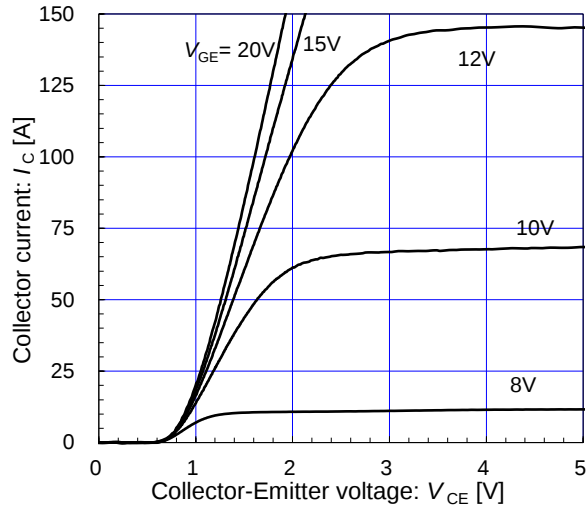
# 7MBR75XRE120-50

IGBT Modules

[ Inverter ]

Collector current vs. Collector-Emittor voltage (typ.)

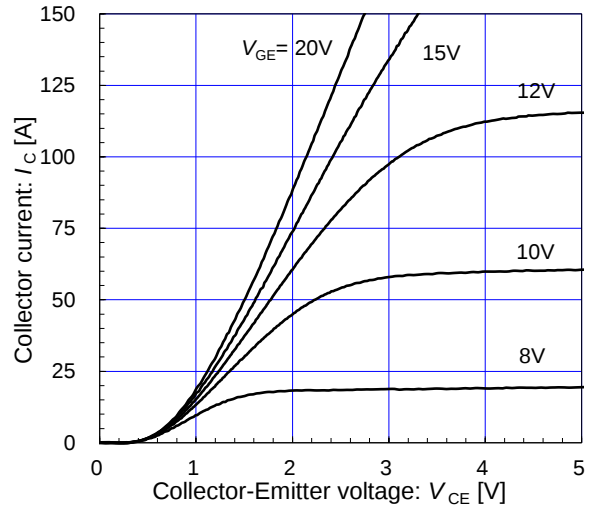
$T_{vj} = 25^{\circ}\text{C}$  / chip



[ Inverter ]

Collector current vs. Collector-Emittor voltage (typ.)

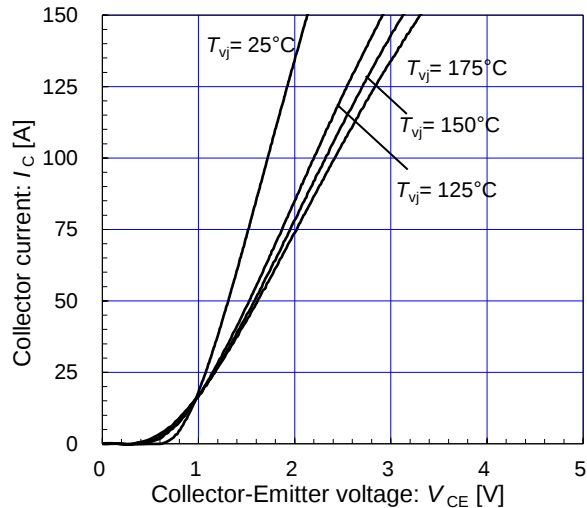
$T_{vj} = 175^{\circ}\text{C}$  / chip



[ Inverter ]

Collector current vs. Collector-Emittor voltage (typ.)

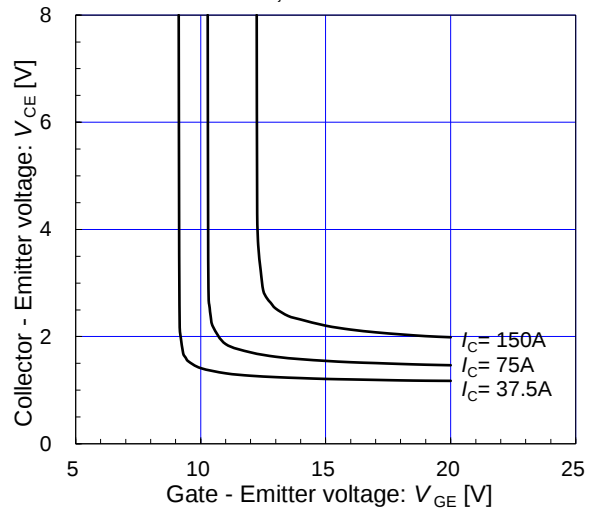
$V_{GE} = 15\text{V}$  / chip



[ Inverter ]

Collector-Emittor voltage vs. Gate-Emittor voltage (typ.)

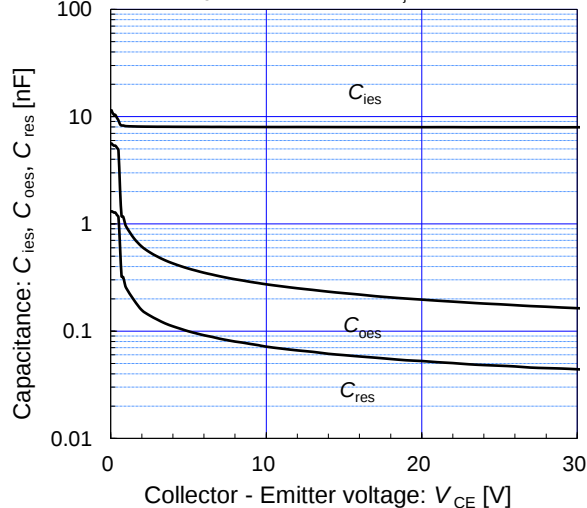
$T_{vj} = 25^{\circ}\text{C}$  / chip



[ Inverter ]

Capacitance vs. Collector-Emittor voltage (typ.)

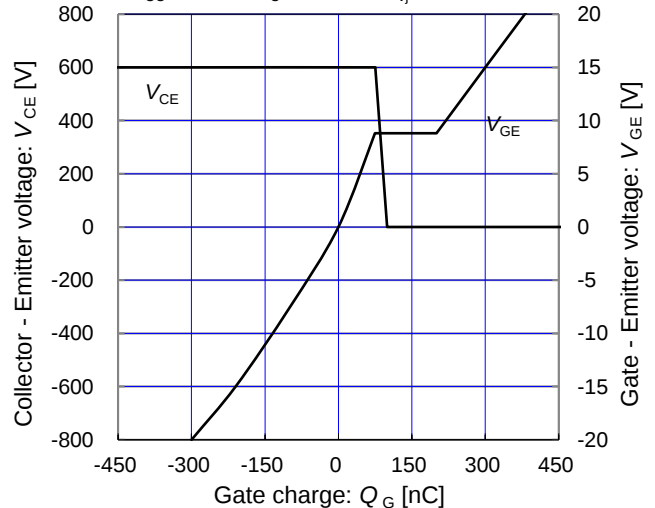
$V_{GE} = 0\text{V}$ ,  $f = 1\text{MHz}$ ,  $T_{vj} = 25^{\circ}\text{C}$



[ Inverter ]

Dynamic Gate charge (typ.)

$V_{CC} = 600\text{V}$ ,  $I_c = 75\text{A}$ ,  $T_{vj} = 25^{\circ}\text{C}$



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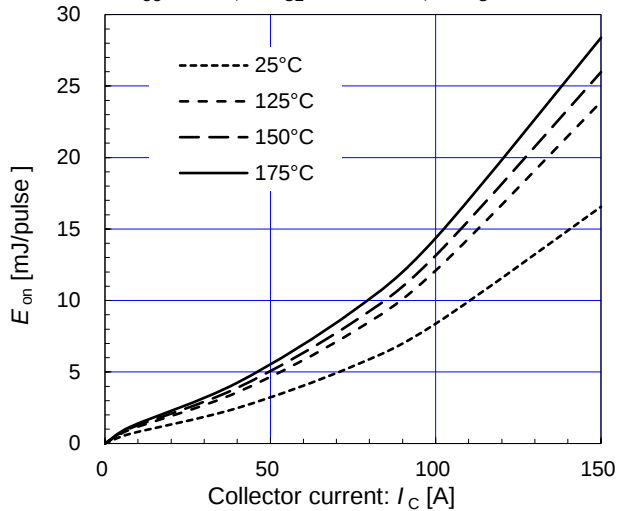
# 7MBR75XRE120-50

IGBT Modules

[ Inverter ]

$E_{on}$  vs. Collector current (typ.)

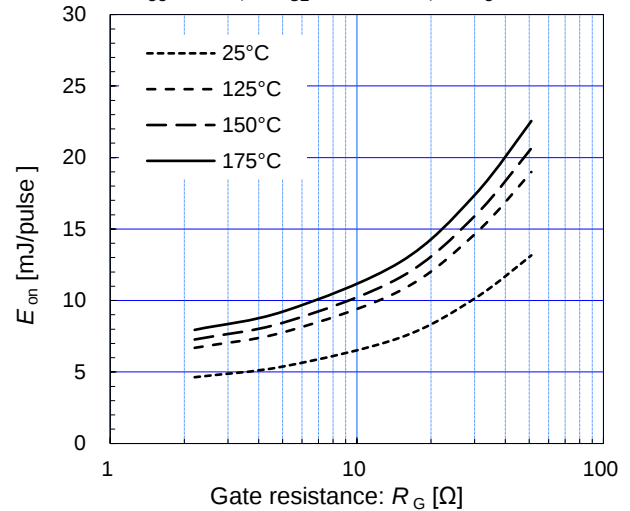
$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $R_G=5.1\Omega$



[ Inverter ]

$E_{on}$  vs. Gate resistance (typ.)

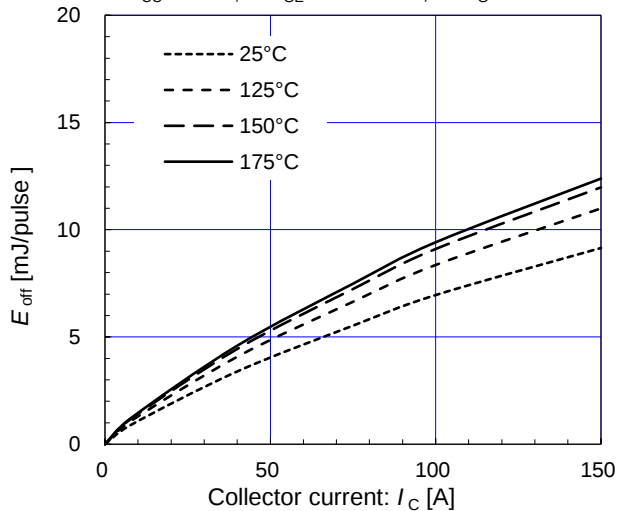
$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $I_C=75A$



[ Inverter ]

$E_{off}$  vs. Collector current (typ.)

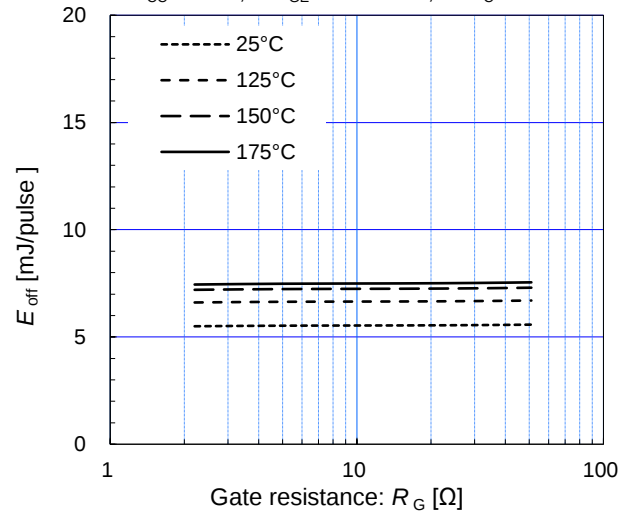
$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $R_G=5.1\Omega$



[ Inverter ]

$E_{off}$  vs. Gate resistance (typ.)

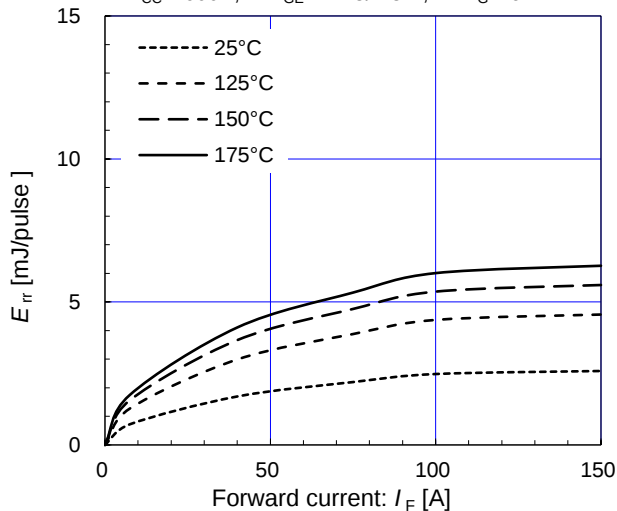
$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $I_C=75A$



[ Inverter ]

$E_{rr}$  vs. Forward current (typ.)

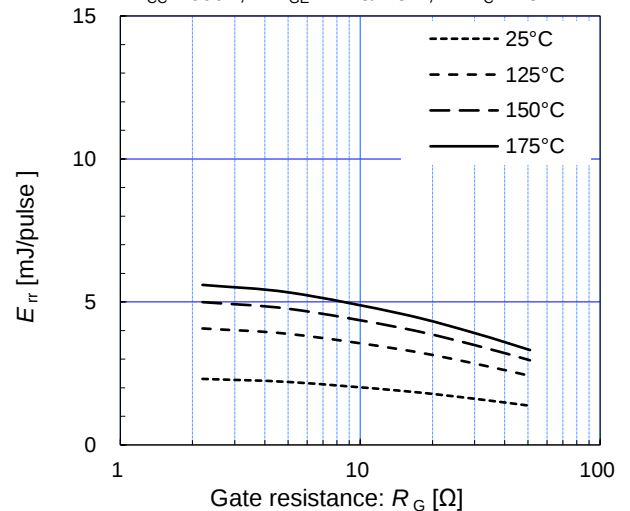
$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $R_G=5.1\Omega$



[ Inverter ]

$E_{rr}$  vs. Gate resistance (typ.)

$V_{CC}=600V$ ,  $V_{GE}=+15/-15V$ ,  $I_C=75A$



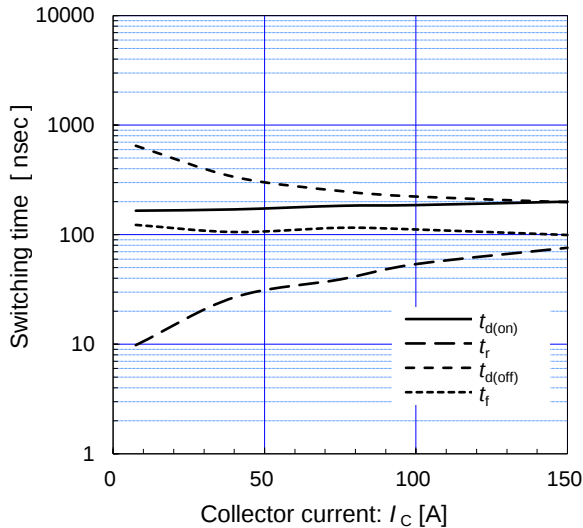
# 7MBR75XRE120-50

IGBT Modules

[ Inverter ]

Switching time vs. Collector current (typ.)

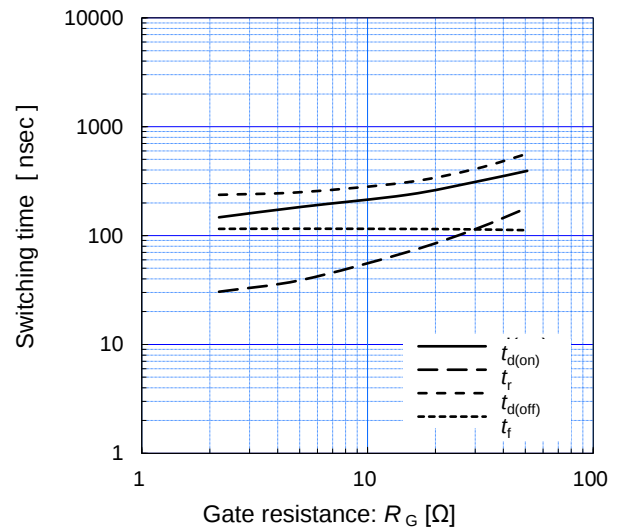
$V_{CC} = 600V$ ,  $R_G = 5.1\Omega$   $V_{GE} = +15/-15V$ ,  $T_{vj} = 25^\circ C$



[ Inverter ]

Switching time vs. Gate resistance (typ.)

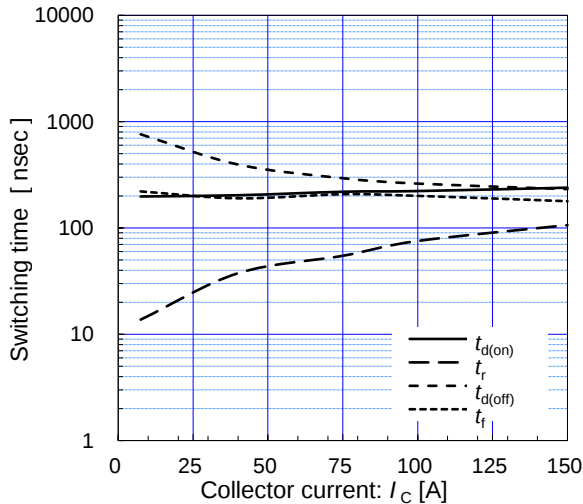
$V_{CC} = 600V$ ,  $I_C = 75A$ ,  $V_{GE} = +15/-15V$ ,  $T_{vj} = 25^\circ C$



[ Inverter ]

Switching time vs. Collector current (typ.)

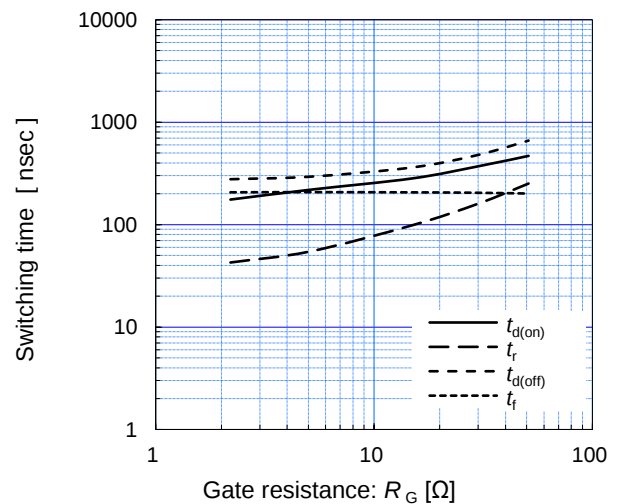
$V_{CC} = 600V$ ,  $R_G = 5.1\Omega$   $V_{GE} = +15/-15V$ ,  $T_{vj} = 175^\circ C$



[ Inverter ]

Switching time vs. Gate resistance (typ.)

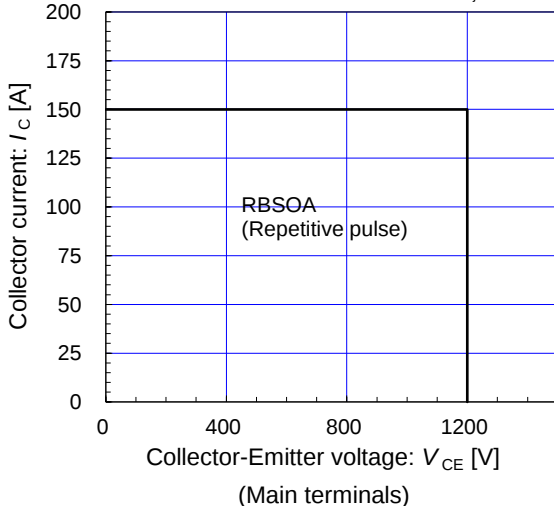
$V_{CC} = 600V$ ,  $I_C = 75A$ ,  $V_{GE} = +15/-15V$ ,  $T_{vj} = 175^\circ C$



[ Inverter ]

Reverse bias safe operating area (max.)

$V_{GE} = +15/-15V$ ,  $R_G \geq 5.1\Omega$   $T_{vj} = 175^\circ C$

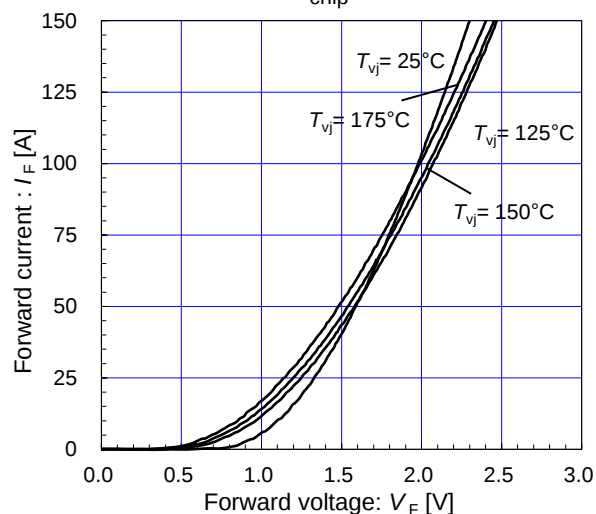


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IGBT Modules

[ Inverter ]

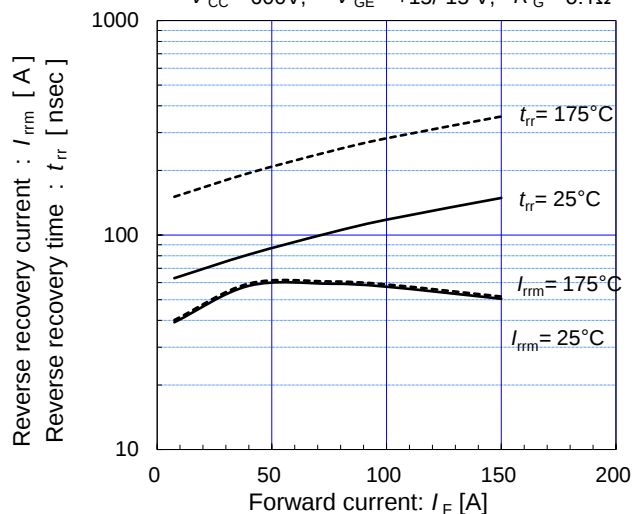
Forward current vs. Forward voltage (typ.)  
chip



[ Inverter ]

Reverse recovery characteristics (typ.)

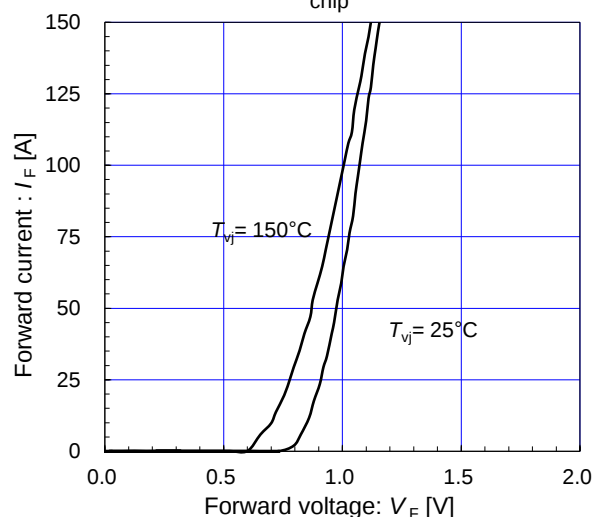
$V_{CC} = 600V$ ,  $V_{GE} = +15/-15V$ ,  $R_G = 5.1\Omega$



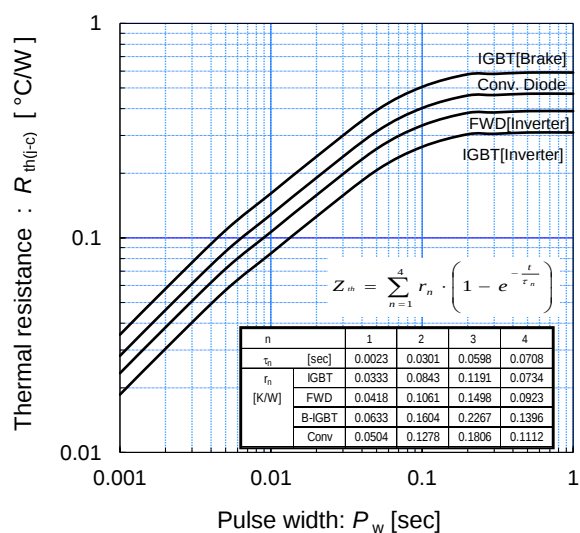
[ Converter ]

Forward current vs. Forward voltage (typ.)

chip

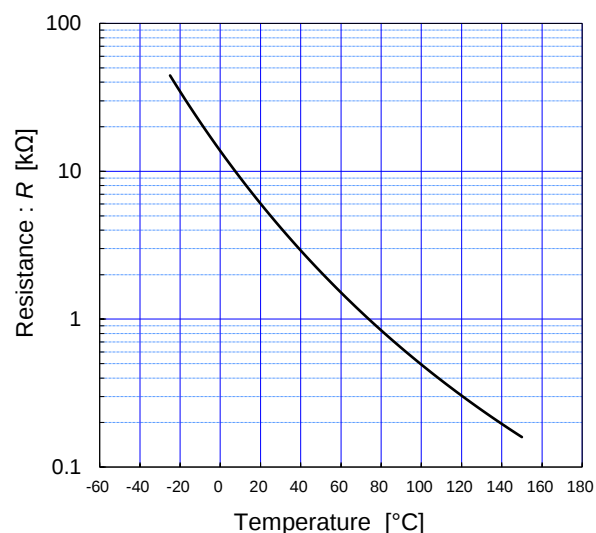


Transient thermal resistance (max.)



[ Thermistor ]

Temperature characteristic (typ.)



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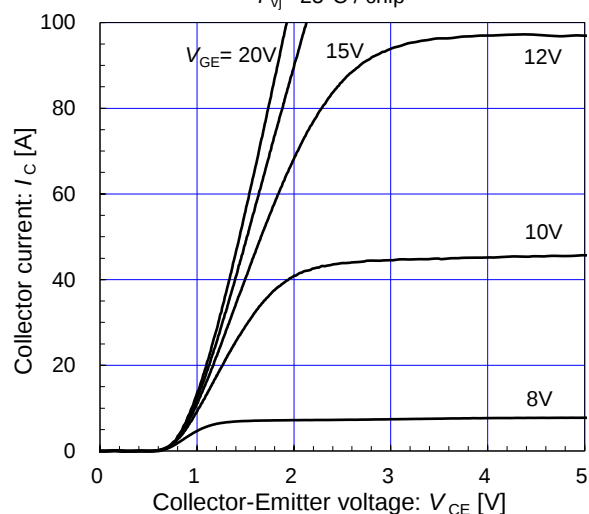
# 7MBR75XRE120-50

IGBT Modules

[ Brake ]

Collector current vs. Collector-Emmitter voltage (typ.)

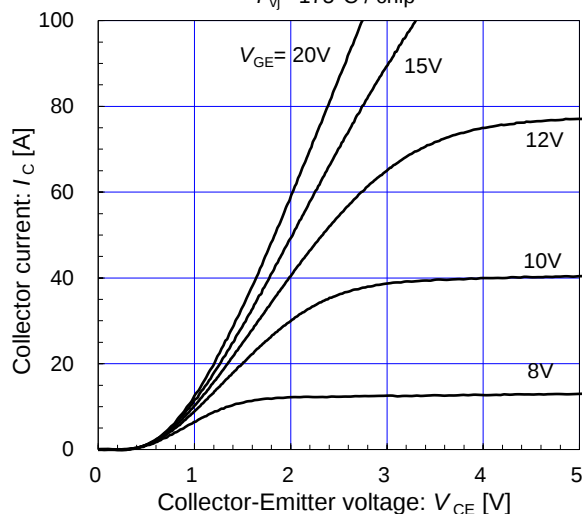
$T_{vj} = 25^{\circ}\text{C}$  / chip



[ Brake ]

Collector current vs. Collector-Emmitter voltage (typ.)

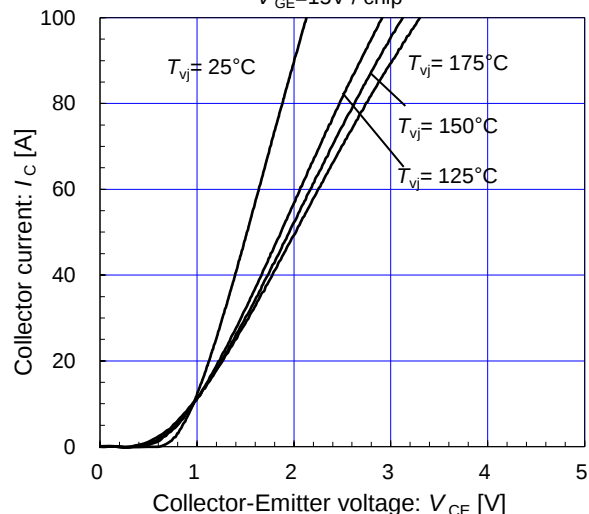
$T_{vj} = 175^{\circ}\text{C}$  / chip



[ Brake ]

Collector current vs. Collector-Emmitter voltage (typ.)

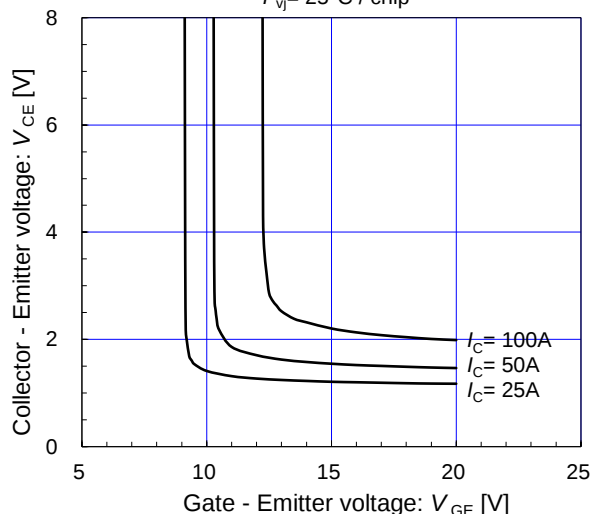
$V_{GE} = 15\text{V}$  / chip



[ Brake ]

Collector-Emmitter voltage vs. Gate-Emmitter voltage (typ.)

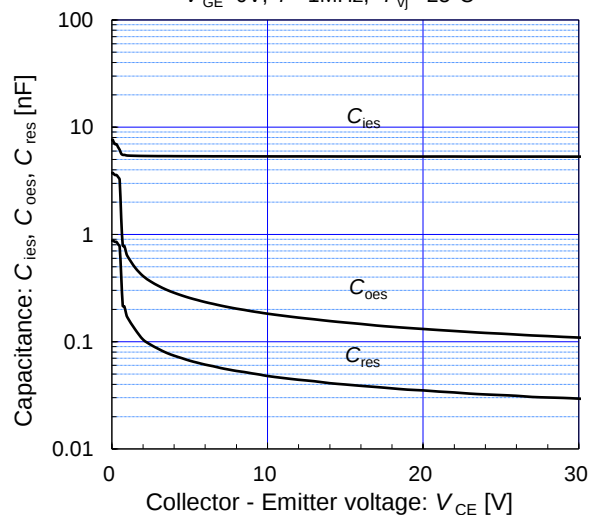
$T_{vj} = 25^{\circ}\text{C}$  / chip



[ Brake ]

Capacitance vs. Collector-Emmitter voltage (typ.)

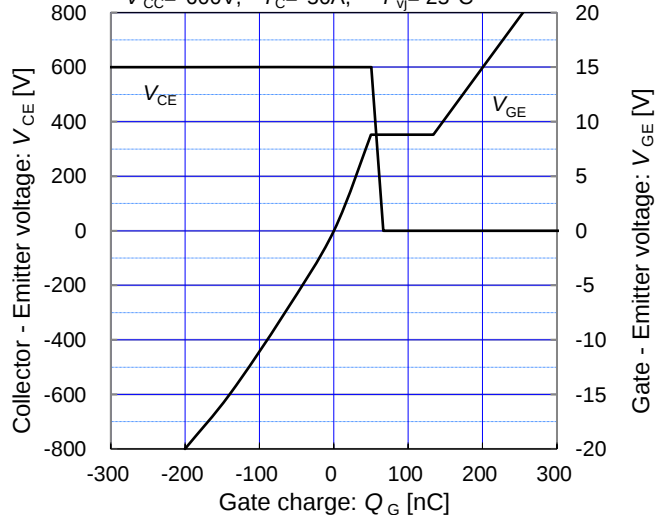
$V_{GE} = 0\text{V}$ ,  $f = 1\text{MHz}$ ,  $T_{vj} = 25^{\circ}\text{C}$



[ Brake ]

Dynamic Gate charge (typ.)

$V_{CC} = 600\text{V}$ ,  $I_c = 50\text{A}$ ,  $T_{vj} = 25^{\circ}\text{C}$



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## IGBT Modules

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| 3 アプリケーションマニュアル      | <a href="http://www.fujielectric.co.jp/products/semiconductor/model/igbt/application/">www.fujielectric.co.jp/products/semiconductor/model/igbt/application/</a> |
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| 3 Application Manuals                          | <a href="http://www.fujielectric.com/products/semiconductor/model/igbt/application/">www.fujielectric.com/products/semiconductor/model/igbt/application/</a> |
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| 5 Mounting Instructions                        | <a href="http://www.fujielectric.com/products/semiconductor/model/igbt/mounting/">www.fujielectric.com/products/semiconductor/model/igbt/mounting/</a>       |
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| 7 Fuji Electric Journal                        | <a href="http://www.fujielectric.com/products/semiconductor/journal/">www.fujielectric.com/products/semiconductor/journal/</a>                               |
| 8 Contact                                      | <a href="http://www.fujielectric.com/contact/">www.fujielectric.com/contact/</a>                                                                             |
| 9 Revised and discontinued product information | <a href="http://www.fujielectric.com/products/semiconductor/discontinued/">www.fujielectric.com/products/semiconductor/discontinued/</a>                     |

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