

600V / 30A

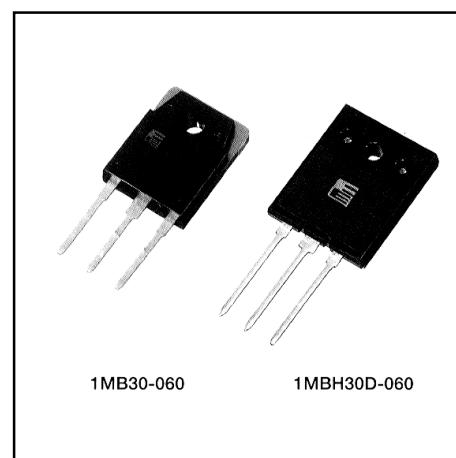
## Molded Package

## ■ 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)

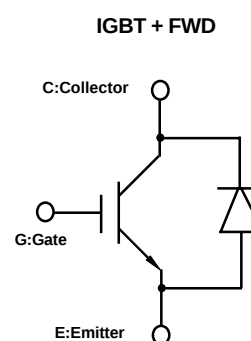
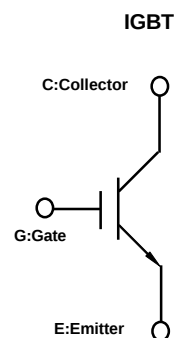
## 1MB30-060 / IGBT

| Item                         |     |         | Symbol    | Rating      | Unit |
|------------------------------|-----|---------|-----------|-------------|------|
| Collector-Emitter voltage    |     |         | $V_{CES}$ | 600         | V    |
| Gate-Emitter voltage         |     |         | $V_{GES}$ | ±20         | V    |
| Collector<br>current         | DC  | Tc=25°C | Ic25      | 48          | A    |
|                              |     | Tc=80°C | Ic80      | 30          | A    |
|                              | 1ms | Tc=25°C | Icp       | 192         | A    |
| Max. power dissipation(IGBT) |     |         | Pc        | 180         | W    |
| Operating temperature        |     |         | Tj        | +150        | °C   |
| Storage temperature          |     |         | Tstg      | -40 to +150 | °C   |
| Screw torque                 |     |         | -         | 50          | N-cm |

## 1MBH30D-060 / IGBT+FWD

| Item                          |     |                       | Symbol            | Rating      | Unit |
|-------------------------------|-----|-----------------------|-------------------|-------------|------|
| Collector-Emitter voltage     |     |                       | V <sub>CES</sub>  | 600         | V    |
| Gate-Emitter voltage          |     |                       | V <sub>GES</sub>  | ±20         | V    |
| Collector<br>current          | DC  | T <sub>C</sub> =25°C  | I <sub>C25</sub>  | 58          | A    |
|                               |     | T <sub>C</sub> =100°C | I <sub>C100</sub> | 30          | A    |
|                               | 1ms | T <sub>C</sub> =25°C  | I <sub>CP</sub>   | 232         | A    |
| Max. power dissipation (IGBT) |     |                       | P <sub>C</sub>    | 220         | W    |
| Max. power dissipation (FWD)  |     |                       | P <sub>C</sub>    | 120         | W    |
| Operating temperature         |     |                       | T <sub>J</sub>    | +150        | °C   |
| Storage temperature           |     |                       | T <sub>stg</sub>  | -40 to +150 | °C   |
| Screw torque                  |     |                       | -                 | 70          | N-cm |

## ■ Equivalent Circuit Schematic



● Electrical characteristics (at T<sub>j</sub>=25°C unless otherwise specified)

1MB30-060 / IGBT

| Item                                 | Symbol               | Characteristics |      |      | Conditions                                 | Unit |
|--------------------------------------|----------------------|-----------------|------|------|--------------------------------------------|------|
|                                      |                      | Min.            | Typ. | Max. |                                            |      |
| Zero gate voltage collector current  | I <sub>CES</sub>     | —               | —    | 1.0  | V <sub>GE</sub> =0V, V <sub>CE</sub> =600V | mA   |
| Gate-Emitter leakage current         | I <sub>GES</sub>     | —               | —    | 20   | V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V | μA   |
| Gate-Emitter threshold voltage       | V <sub>GE(th)</sub>  | 5.5             | —    | 8.5  | V <sub>CE</sub> =20V, I <sub>C</sub> =30mA | V    |
| Collector-Emitter saturation voltage | V <sub>CE(sat)</sub> | —               | —    | 3.0  | V <sub>GE</sub> =15V, I <sub>C</sub> =30A  | V    |
| Input capacitance                    | C <sub>ies</sub>     | —               | 1900 | —    | V <sub>GE</sub> =0V                        | pF   |
| Output capacitance                   | C <sub>oes</sub>     | —               | 400  | —    | V <sub>CE</sub> =10V                       |      |
| Reverse transfer capacitance         | C <sub>res</sub>     | —               | 100  | —    | f=1MHz                                     |      |
| Turn-on time                         | t <sub>on</sub>      | —               | —    | 1.2  | V <sub>CC</sub> =300V I <sub>C</sub> =30A  | μs   |
|                                      | t <sub>r</sub>       | —               | —    | 0.6  | V <sub>GE</sub> =±15V                      |      |
| Turn-off time                        | t <sub>off</sub>     | —               | —    | 1.0  | R <sub>G</sub> =82 ohm                     |      |
|                                      | t <sub>f</sub>       | —               | —    | 0.35 | (Half Bridge)                              |      |

1MBH30D-060 / IGBT+FWD

| Item                                 | Symbol               | Characteristics |      |      | Conditions                                                | Unit |
|--------------------------------------|----------------------|-----------------|------|------|-----------------------------------------------------------|------|
|                                      |                      | Min.            | Typ. | Max. |                                                           |      |
| Zero gate voltage collector current  | I <sub>CES</sub>     | —               | —    | 1.0  | V <sub>GE</sub> =0V, V <sub>CE</sub> =600V                | mA   |
| Gate-Emitter leakage current         | I <sub>GES</sub>     | —               | —    | 20   | V <sub>CE</sub> =0V, V <sub>GE</sub> =±20V                | μA   |
| Gate-Emitter threshold voltage       | V <sub>GE(th)</sub>  | 5.5             | —    | 8.5  | V <sub>CE</sub> =20V, I <sub>C</sub> =30mA                | V    |
| Collector-Emitter saturation voltage | V <sub>CE(sat)</sub> | —               | —    | 3.0  | V <sub>GE</sub> =15V, I <sub>C</sub> =30A                 | V    |
| Input capacitance                    | C <sub>ies</sub>     | —               | 1900 | —    | V <sub>GE</sub> =0V                                       | pF   |
| Output capacitance                   | C <sub>oes</sub>     | —               | 400  | —    | V <sub>CE</sub> =10V                                      |      |
| Reverse transfer capacitance         | C <sub>res</sub>     | —               | 100  | —    | f=1MHz                                                    |      |
| Turn-on time                         | t <sub>on</sub>      | —               | —    | 1.2  | V <sub>CC</sub> =300V, I <sub>C</sub> =30A                | μs   |
|                                      | t <sub>r</sub>       | —               | —    | 0.6  | V <sub>GE</sub> =±15V                                     |      |
| Turn-off time                        | t <sub>off</sub>     | —               | —    | 1.0  | R <sub>G</sub> =82 ohm                                    |      |
|                                      | t <sub>f</sub>       | —               | —    | 0.35 | (Half Bridge)                                             |      |
| FWD forward on voltage               | V <sub>F</sub>       | —               | —    | 3.0  | I <sub>F</sub> =30A, V <sub>GE</sub> =0V                  | V    |
| Reverse recovery time                | t <sub>rr</sub>      | —               | —    | 0.3  | I <sub>F</sub> =30A, V <sub>GE</sub> =-10V, di/dt=100A/μs | μs   |

● Thermal resistance characteristics

1MB30-060 / IGBT

| Item               | Symbol               | Characteristics |      |      | Conditions | Unit |
|--------------------|----------------------|-----------------|------|------|------------|------|
|                    |                      | Min.            | Typ. | Max. |            |      |
| Thermal resistance | R <sub>th(j-c)</sub> | —               | —    | 0.69 | IGBT       | °C/W |

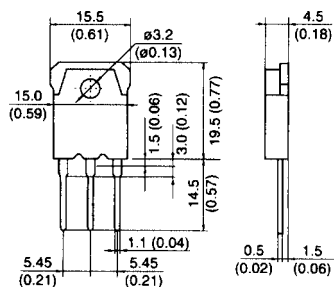
1MBH30D-060 / IGBT+FWD

| Item               | Symbol               | Characteristics |      |      | Conditions | Unit |
|--------------------|----------------------|-----------------|------|------|------------|------|
|                    |                      | Min.            | Typ. | Max. |            |      |
| Thermal resistance | R <sub>th(j-c)</sub> | —               | —    | 0.56 | IGBT       | °C/W |
|                    | R <sub>th(j-c)</sub> | —               | —    | 1.04 | FWD        | °C/W |

■ Outline drawings, mm

1MB30-060

TO-3P



1MBH30D-060

TO-3PL

