

# QM600HD-M

HIGH POWER SWITCHING USE  
NON-INSULATED TYPE

QM600HD-M



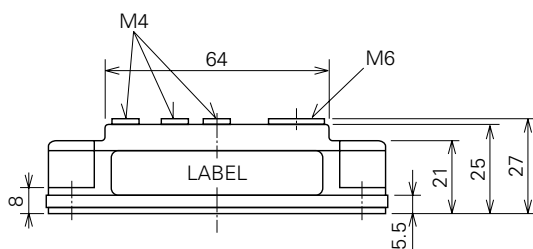
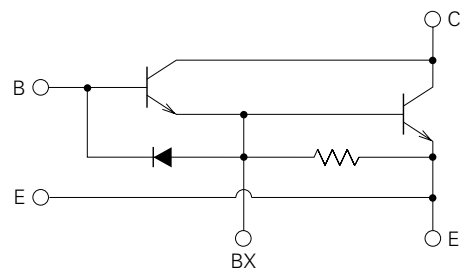
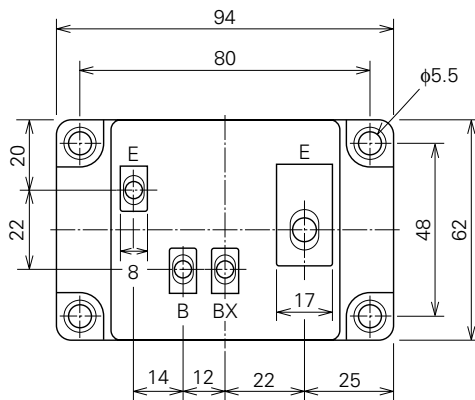
- **I<sub>C</sub>** Collector current ..... **600A**
- **V<sub>CEX</sub>** Collector-emitter voltage ..... **350V**
- **h<sub>FE</sub>** DC current gain ..... **500**
- **Non-Insulated Type**

## APPLICATION

Robotics, Forklifts, Welders

## OUTLINE DRAWING & CIRCUIT DIAGRAM

Dimensions in mm



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## ABSOLUTE MAXIMUM RATINGS (Tj=25°C, unless otherwise noted)

| Symbol     | Parameter                                               | Conditions                                  | Ratings   | Unit  |
|------------|---------------------------------------------------------|---------------------------------------------|-----------|-------|
| VCEX (SUS) | Collector-emitter voltage                               | IC=1A, VEB=2V                               | 350       | V     |
| VCEX       | Collector-emitter voltage                               | VEB=2V                                      | 350       | V     |
| VCBO       | Collector-base voltage                                  | Emitter open                                | 400       | V     |
| VEBO       | Emitter-base voltage                                    | Collector open                              | 10        | V     |
| IC         | Collector current                                       | DC                                          | 600       | A     |
| -IC        | Collector reverse current                               | DC (forward diode current)                  | —         | A     |
| PC         | Collector dissipation                                   | Tc=25°C                                     | 2080      | W     |
| IB         | Base current                                            | DC                                          | 15        | A     |
| -ICSM      | Surge collector reverse current (forward diode current) | Peak value of one cycle of 60Hz (half wave) | —         | A     |
| Tj         | Junction temperature                                    |                                             | -40~+150  | °C    |
| Tstg       | Storage temperature                                     |                                             | -40~+125  | °C    |
| Viso       | Isolation voltage                                       | Charged part to case, AC for 1 minute       | —         | V     |
| —          | Mounting torque                                         | Main terminal screw M6                      | 1.96~2.94 | N·m   |
|            |                                                         |                                             | 20~30     | kg·cm |
|            |                                                         | Mounting screw M5                           | 1.47~1.96 | N·m   |
|            |                                                         |                                             | 15~20     | kg·cm |
|            |                                                         | B(E) terminal screw M4                      | 0.98~1.47 | N·m   |
|            |                                                         |                                             | 10~15     | kg·cm |
| —          | Weight                                                  | BX terminal screw M4                        | 0.98~1.47 | N·m   |
|            |                                                         |                                             | 10~15     | kg·cm |
| —          | Weight                                                  | Typical value                               | 420       | g     |

## ELECTRICAL CHARACTERISTICS (Tj=25°C, unless otherwise noted)

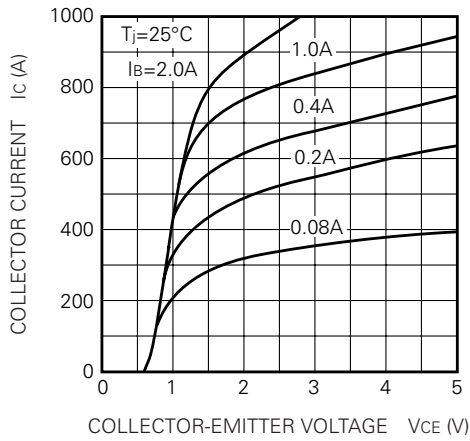
| Symbol      | Parameter                                | Test conditions                    | Limits |      |      | Unit |
|-------------|------------------------------------------|------------------------------------|--------|------|------|------|
|             |                                          |                                    | Min.   | Typ. | Max. |      |
| ICEX        | Collector cutoff current                 | VCE=350V, VEB=2V                   | —      | —    | 2.0  | mA   |
| ICBO        | Collector cutoff current                 | VCB=400V, Emitter open             | —      | —    | 2.0  | mA   |
| IEBO        | Emitter cutoff current                   | VEB=10V                            | —      | —    | 800  | mA   |
| VCE (sat)   | Collector-emitter saturation voltage     | IC=600A, IB=1.2A                   | —      | —    | 2.0  | V    |
| VBE (sat)   | Base-emitter saturation voltage          |                                    | —      | —    | 2.5  | V    |
| -VCEO       | Collector-emitter reverse voltage        | -IC=600A (diode forward voltage)   | —      | —    | —    | V    |
| hFE         | DC current gain                          | IC=600A, VCE=2V                    | 500    | —    | —    | —    |
| ton         | Switching time                           | VCC=200V, IC=600A, IB1=2A, -IB2=4A | —      | —    | 3.0  | μs   |
| ts          |                                          |                                    | —      | —    | 15   | μs   |
| tf          |                                          |                                    | —      | —    | 3.0  | μs   |
| Rth (j-c) Q | Thermal resistance (junction to case)    | Transistor part                    | —      | —    | 0.06 | °C/W |
| Rth (j-c) R |                                          | Diode part                         | —      | —    | —    | °C/W |
| Rth (c-f)   | Contact thermal resistance (case to fin) | Conductive grease applied          | —      | —    | 0.05 | °C/W |

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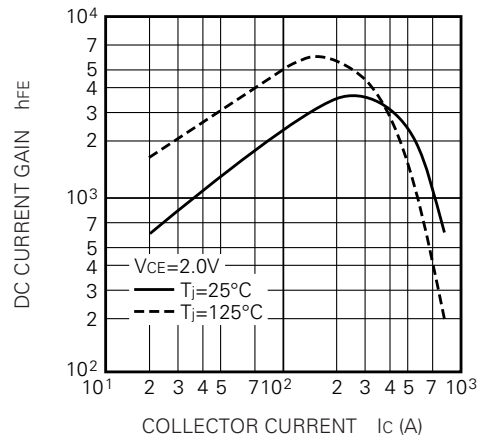
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## PERFORMANCE CURVES

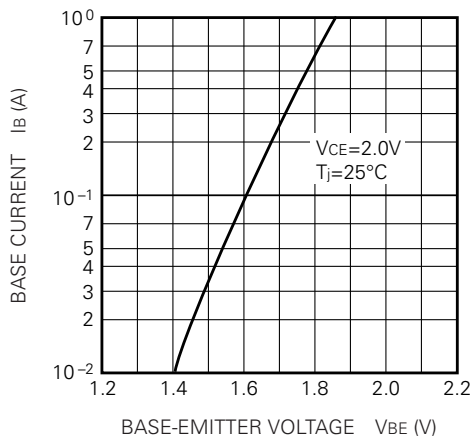
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



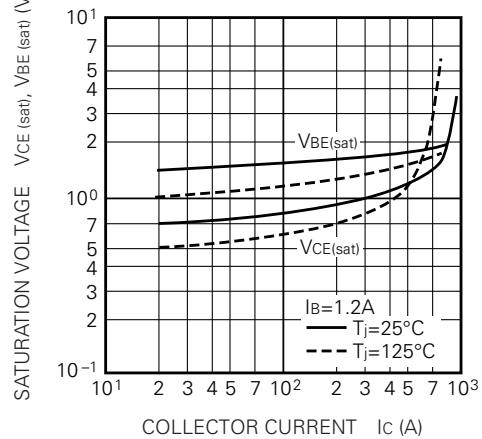
DC CURRENT GAIN VS. COLLECTOR CURRENT (TYPICAL)



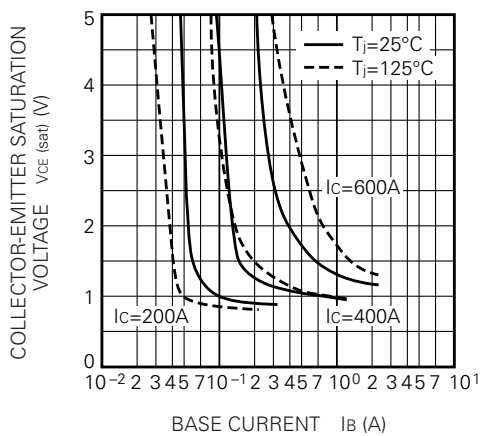
COMMON EMITTER INPUT CHARACTERISTIC (TYPICAL)



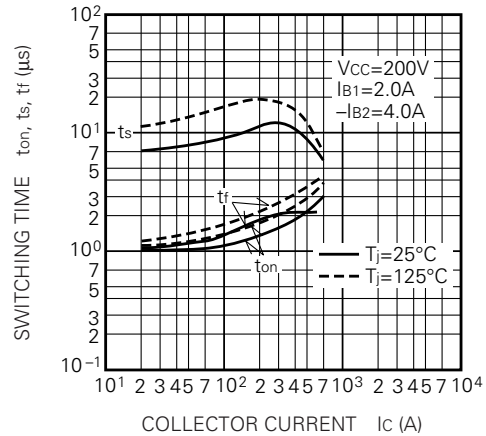
SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



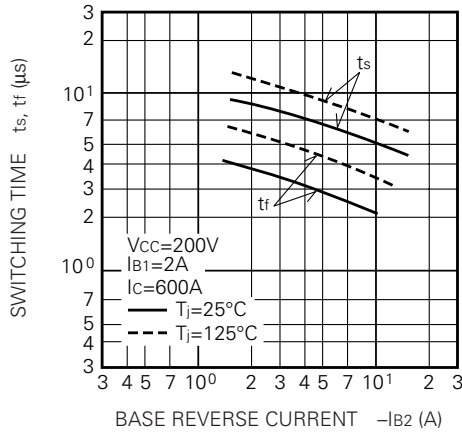
SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)



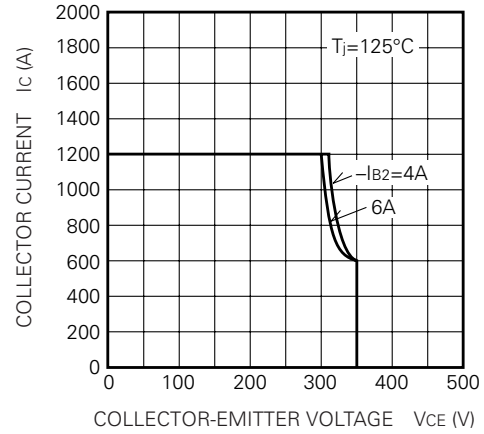
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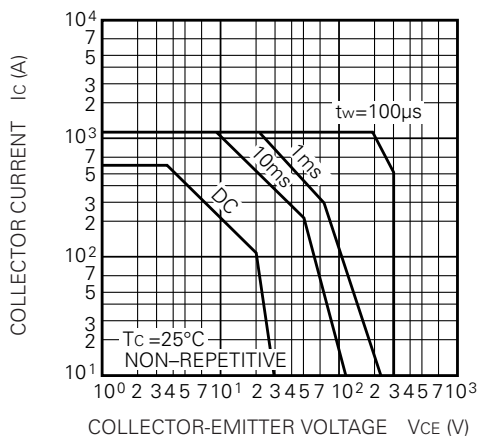
SWITCHING TIME VS. BASE  
CURRENT (TYPICAL)



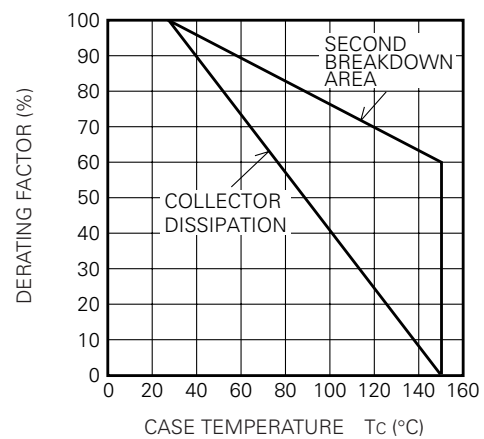
REVERSE BIAS SAFE OPERATING AREA



FORWARD BIAS SAFE OPERATING AREA



DERATING FACTOR OF F. B. S. O. A.



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTIC (TRANSISTOR)

