

**PRELIMINARY**  
 Notice: This is not a final specification.  
 Some parametric limits are subject to change.

**MITSUBISHI HVIGBT MODULES**  
**CM800DZ-34H**

3rd-Version HVIGBT (High Voltage Insulated Gate Bipolar Transistor) Modules

**HIGH POWER SWITCHING USE**  
**INSULATED TYPE**

**CM800DZ-34H**



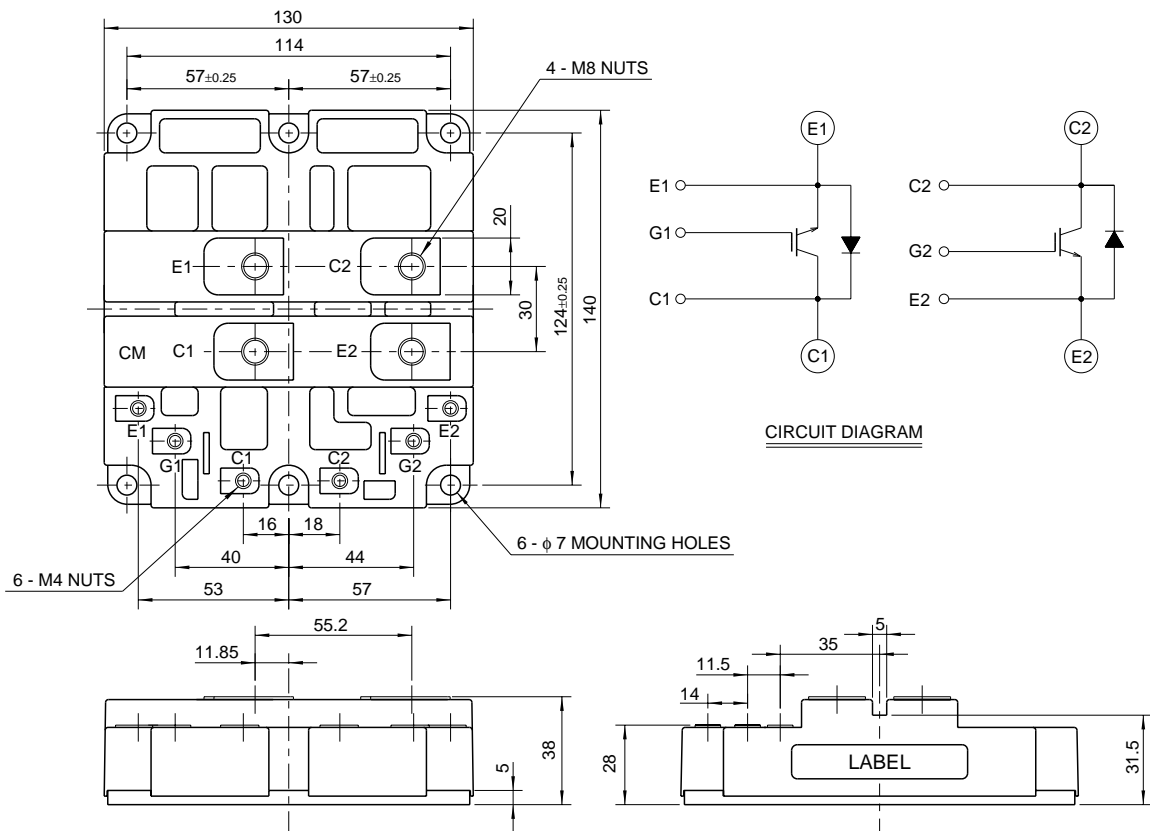
- IC ..... 800A
- VCES ..... 1700V
- Insulated Type
- 2-elements in a pack

**APPLICATION**

Inverters, Converters, DC choppers, Induction heating, DC to DC converters.

**OUTLINE DRAWING & CIRCUIT DIAGRAM**

Dimensions in mm



HVIGBT MODULES (High Voltage Insulated Gate Bipolar Transistor Modules)

Mar. 2001

**MAXIMUM RATINGS (T<sub>j</sub> = 25°C)**

| Symbol                   | Item                          | Conditions   | Ratings      | Unit |
|--------------------------|-------------------------------|--|--------------|------|
| V <sub>CE</sub> S        | Collector-emitter voltage     | V <sub>GE</sub> = 0V                                       | 1700         | V    |
| V <sub>GE</sub> S        | Gate-emitter voltage          | V <sub>CE</sub> = 0V                                       | ±20          | V    |
| I <sub>C</sub>           | Collector current             | T <sub>C</sub> = 25°C                                      | 800          | A    |
| I <sub>CM</sub>          |                               | Pulse (Note 1)   | 1600         | A    |
| I <sub>E</sub> (Note 2)  | Emitter current               | T <sub>C</sub> = 25°C                                      | 800          | A    |
| I <sub>EM</sub> (Note 2) |                               | Pulse (Note 1)   | 1600         | A    |
| P <sub>C</sub> (Note 3)  | Maximum collector dissipation | T <sub>C</sub> = 25°C, IGBT part                           | 5000         | W    |
| T <sub>j</sub>           | Junction temperature          | —  | -40 ~ +150   | °C   |
| T <sub>stg</sub>         | Storage temperature           | —  | -40 ~ +125   | °C   |
| V <sub>iso</sub>         | Isolation voltage             | Charged part to base plate, rms, sinusoidal, AC 60Hz 1min. | 4000         | V    |
| —                        | Mounting torque               | Main terminals screw M8                                    | 6.67 ~ 13.00 | N·m  |
|                          |                               | Mounting screw M6  | 2.84 ~ 6.00  | N·m  |
|                          |                               | Auxiliary terminals screw M4                               | 0.88 ~ 2.00  | N·m  |
| —                        | Mass                          | Typical value  | 1.0          | kg   |

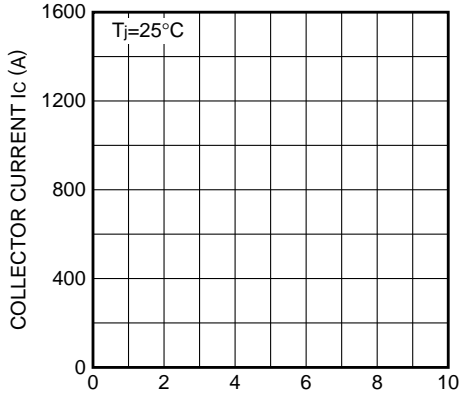
**ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C)**

| Symbol                   | Item                                 | Conditions   | Limits |       |       | Unit |
|--------------------------|--------------------------------------|--|--------|-------|-------|------|
|                          |                                      |  | Min    | Typ   | Max   |      |
| I <sub>CE</sub> S        | Collector cutoff current             | V <sub>CE</sub> = V <sub>CE</sub> S, V <sub>GE</sub> = 0V            | —      | —     | 12    | mA   |
| V <sub>GE(th)</sub>      | Gate-emitter threshold voltage       | I <sub>C</sub> = 80mA, V <sub>CE</sub> = 10V                         | 4.5    | 5.5   | 6.5   | V    |
| I <sub>GE</sub> S        | Gate-leakage current                 | V <sub>GE</sub> = V <sub>GE</sub> S, V <sub>CE</sub> = 0V            | —      | —     | 0.5   | μA   |
| V <sub>CE(sat)</sub>     | Collector-emitter saturation voltage | T <sub>j</sub> = 25°C  | —      | 2.80  | 3.64  | V    |
|                          |                                      | T <sub>j</sub> = 125°C   | —      | 3.20  | —     |      |
| C <sub>ies</sub>         | Input capacitance                    | V <sub>CE</sub> = 10V<br>V <sub>GE</sub> = 0V                        | —      | 72    | —     | nF   |
| C <sub>oes</sub>         | Output capacitance                   |  | —      | 9.0   | —     | nF   |
| C <sub>res</sub>         | Reverse transfer capacitance         |  | —      | 3.6   | —     | nF   |
| Q <sub>G</sub>           | Total gate charge                    | V <sub>CC</sub> = 850V, I <sub>C</sub> = 800A, V <sub>GE</sub> = 15V | —      | 6.6   | —     | μC   |
| t <sub>d(on)</sub>       | Turn-on delay time                   | V <sub>CC</sub> = 850V, I <sub>C</sub> = 800A                        | —      | —     | 1.60  | μs   |
| t <sub>r</sub>           | Turn-on rise time                    | V <sub>GE1</sub> = V <sub>GE2</sub> = 15V                            | —      | —     | 2.00  | μs   |
| t <sub>d(off)</sub>      | Turn-off delay time                  | R <sub>G</sub> = 3.3Ω  | —      | —     | 2.70  | μs   |
| t <sub>f</sub>           | Turn-off fall time                   | Resistive load switching operation                                   | —      | —     | 0.80  | μs   |
| V <sub>EC</sub> (Note 2) | Emitter-collector voltage            | I <sub>E</sub> = 800A, V <sub>GE</sub> = 0V                          | —      | 2.60  | 3.38  | V    |
| t <sub>rr</sub> (Note 2) | Reverse recovery time                | I <sub>E</sub> = 800A  | —      | —     | 2.70  | μs   |
| Q <sub>rr</sub> (Note 2) | Reverse recovery charge              | die / dt = -1600A / μs   | —      | 150   | —     | μC   |
| R <sub>th(j-c)Q</sub>    | Thermal resistance                   | Junction to case, IGBT part (Per 1/2 module)                         | —      | —     | 0.025 | K/W  |
| R <sub>th(j-c)R</sub>    |                                      | Junction to case, FWDi part (Per 1/2 module)                         | —      | —     | 0.043 | K/W  |
| R <sub>th(c-f)</sub>     | Contact thermal resistance           | Case to fin, conductive grease applied (Per 1/2 module)              | —      | 0.020 | —     | K/W  |

- Note 1. Pulse width and repetition rate should be such that the device junction temp. (T<sub>j</sub>) does not exceed T<sub>jmax</sub> rating.  
 2. I<sub>E</sub>, V<sub>EC</sub>, t<sub>rr</sub>, Q<sub>rr</sub> & die/dt represent characteristics of the anti-parallel, emitter to collector free-wheel diode.  
 3. Junction temperature (T<sub>j</sub>) should not increase beyond 150°C.  
 4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

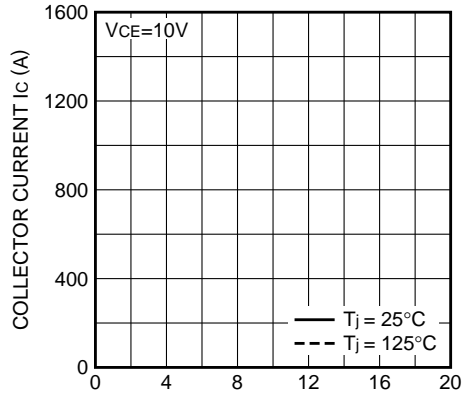
**PERFORMANCE CURVES**

**OUTPUT CHARACTERISTICS  
 (TYPICAL)**



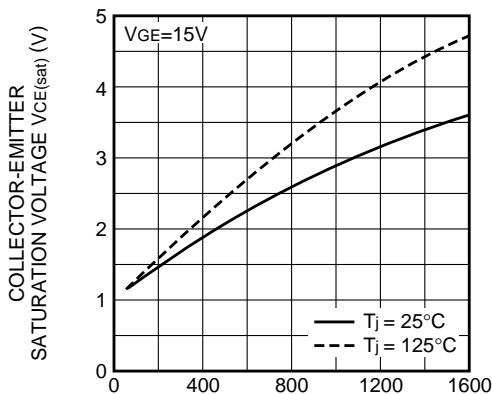
COLLECTOR-EMITTER SATURATION VOLTAGE  $V_{CE(sat)}$  (V)

**TRANSFER CHARACTERISTICS  
 (TYPICAL)**



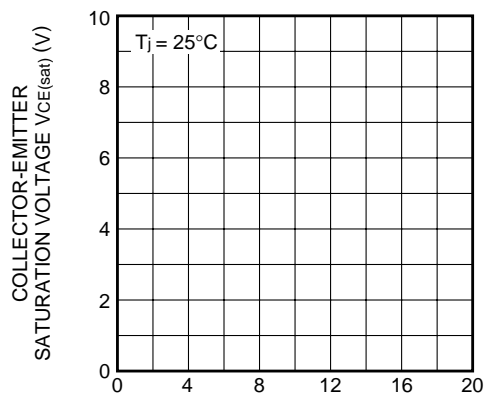
GATE-EMITTER VOLTAGE  $V_{GE}$  (V)

**COLLECTOR-EMITTER SATURATION  
 VOLTAGE CHARACTERISTICS  
 (TYPICAL)**



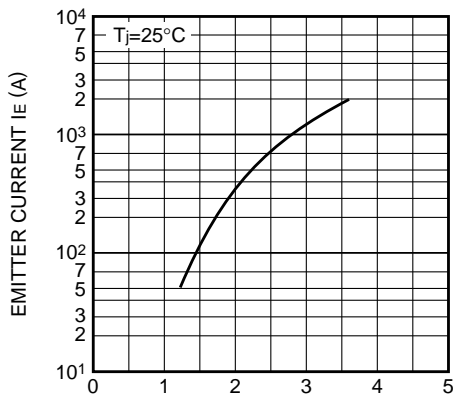
COLLECTOR CURRENT  $I_c$  (A)

**COLLECTOR-EMITTER SATURATION  
 VOLTAGE CHARACTERISTICS  
 (TYPICAL)**



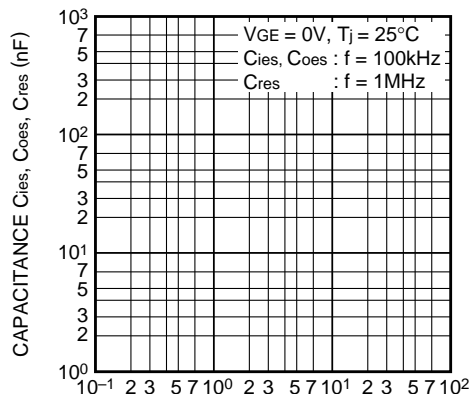
GATE-EMITTER VOLTAGE  $V_{GE}$  (V)

**FREE-WHEEL DIODE  
 FORWARD CHARACTERISTICS  
 (TYPICAL)**



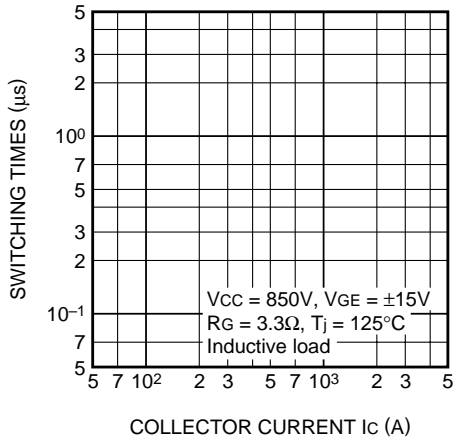
EMITTER-COLLECTOR VOLTAGE  $V_{EC}$  (V)

**CAPACITANCE VS.  $V_{CE}$   
 (TYPICAL)**

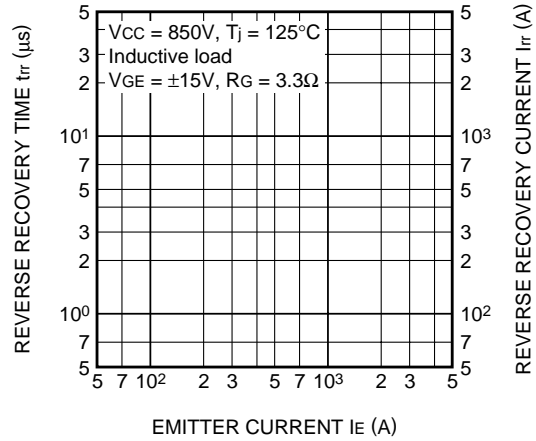


COLLECTOR-EMITTER VOLTAGE  $V_{CE}$  (V)

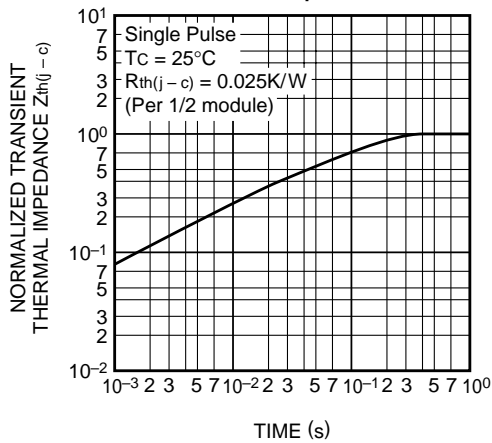
**HALF-BRIDGE  
 SWITCHING CHARACTERISTICS  
 (TYPICAL)**



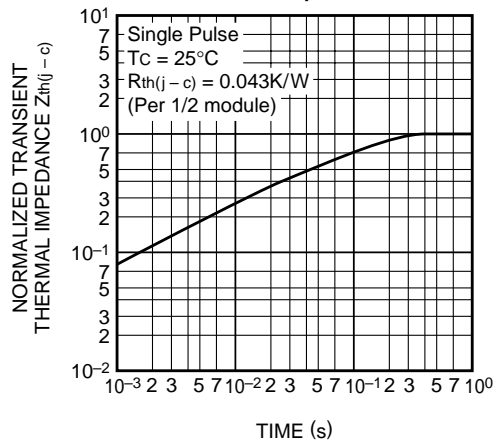
**REVERSE RECOVERY CHARACTERISTICS  
 OF FREE-WHEEL DIODE  
 (TYPICAL)**



**TRANSIENT THERMAL  
 IMPEDANCE CHARACTERISTICS  
 (IGBT part)**



**TRANSIENT THERMAL  
 IMPEDANCE CHARACTERISTICS  
 (FWDi part)**



**V<sub>GE</sub> - GATE CHARGE  
 (TYPICAL)**

