**MITSUBISHI HVIGBT MODULES**

# CM800DZ-34H

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

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

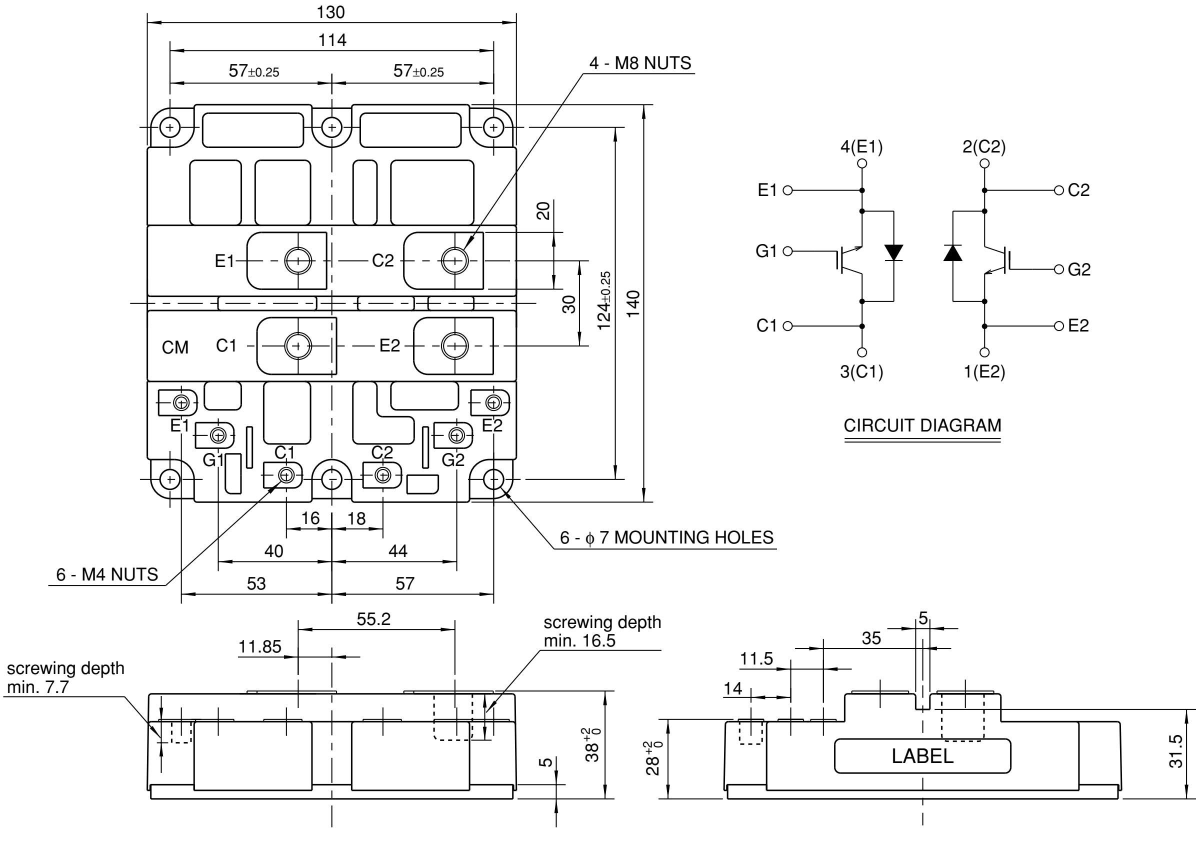
**CM800DZ-34H**

- ● $I_C$ .................................................................800A
- ● $V_{CES}$ .....................................................1700V
- ● Insulated Type
- ● 2-element in a Pack
- ● AlSiC Baseplate

## APPLICATION

Traction drives, High Reliability Converters / Inverters, DC choppers

**OUTLINE DRAWING & CIRCUIT DIAGRAM** Dimensions in mm



Jul. 2005

## MAXIMUM RATINGS

| Symbol | Item | Conditions | Ratings | Unit |
|---|---|---|---|---|
| $V_{CES}$ | Collector-emitter voltage | $V_{GE}$ = 0V, $T_j$ = 25°C | 1700 | V |
| $V_{GES}$ | Gate-emitter voltage | $V_{CE}$ = 0V, $T_j$ = 25°C | ±20 | V |
| $I_C$ | Collector current | $T_C$ = 80°C | 800 | A |
| $I_{CM}$ |  | Pulse (Note 1) | 1600 | A |
| $I_E$ (Note 2) | Emitter current |  | 800 | A |
| $I_{EM}$ (Note 2) |  | Pulse (Note 1) | 1600 | A |
| $P_C$ (Note 3) | Maximum power dissipation | $T_C$ = 25°C, IGBT part | 6200 | W |
| $T_j$ | Junction temperature |  | –40 ~ +150 | °C |
| $T_{op}$ | Operating temperature |  | –40 ~ +125 | °C |
| $T_{stg}$ | Storage temperature |  | –40 ~ +125 | °C |
| $V_{iso}$ | Isolation voltage | RMS, sinusoidal, f = 60Hz, t = 1min. | 4000 | V |
| $t_{psc}$ | Maximum short circuit pulse width | $V_{CC}$ = 1150V, $V_{CES}$ ≤ 1700V, $V_{GE}$ = 15V<br>$T_j$ = 125°C | 10 | µs |

## ELECTRICAL CHARACTERISTICS

| Symbol | Item | Conditions | Limits |  |  | Unit |
|---|---|---|---|---|---|---|
|  |  |  | Min | Typ | Max |  |
| $I_{CES}$ | Collector cut-off current | $V_{CE}$ = $V_{CES}$, $V_{GE}$ = 0V, $T_j$ = 25°C | — | — | 12 | mA |
| $V_{GE(th)}$ | Gate-emitter threshold voltage | $I_C$ = 80mA, $V_{CE}$ = 10V, $T_j$ = 25°C | 4.5 | 5.5 | 6.5 | V |
| $I_{GES}$ | Gate leakage current | $V_{GE}$ = $V_{GES}$, $V_{CE}$ = 0V, $T_j$ = 25°C | — | — | 0.5 | µA |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $I_C$ = 800A, $V_{GE}$ = 15V, $T_j$ = 25°C (Note 4) | — | 2.60 | 3.30 | V |
|  |  | $I_C$ = 800A, $V_{GE}$ = 15V, $T_j$ = 125°C (Note 4) | — | 3.10 | — |  |
| $C_{ies}$ | Input capacitance | $V_{CE}$ = 10V, f = 100kHz<br>$V_{GE}$ = 0V, $T_j$ = 25°C | — | 72 | — | nF |
| $C_{oes}$ | Output capacitance |  | — | 9.0 | — | nF |
| $C_{res}$ | Reverse transfer capacitance |  | — | 3.6 | — | nF |
| $Q_g$ | Total gate charge | $V_{CC}$ = 850V, $I_C$ = 800A, $V_{GE}$ = 15V, $T_j$ = 25°C | — | 6.6 | — | µC |
| $V_{EC}$ (Note 2) | Emitter-collector voltage | $I_E$ = 800A, $V_{GE}$ = 0V, $T_j$ = 25°C (Note 4) | — | 2.30 | 3.00 | V |
|  |  | $I_E$ = 800A, $V_{GE}$ = 0V, $T_j$ = 125°C (Note 4) | — | 2.00 | — |  |
| $t_{d(on)}$ | Turn-on delay time | $V_{CC}$ = 850V, $I_C$ = 800A, $V_{GE}$ = ±15V<br>$R_{G(on)}$ = 3.3Ω, $T_j$ = 125°C, $L_s$ = 150nH<br>Inductive load | — | — | 1.60 | µs |
| $t_r$ | Turn-on rise time |  | — | — | 1.30 | µs |
| $E_{on}$ | Turn-on switching energy |  | — | 350 | — | mJ/pulse |
| $t_{d(off)}$ | Turn-off delay time | $V_{CC}$ = 850V, $I_C$ = 800A, $V_{GE}$ = ±15V<br>$R_{G(off)}$ = 3.3Ω, $T_j$ = 125°C, $L_s$ = 150nH<br>Inductive load | — | — | 2.70 | µs |
| $t_f$ | Turn-off fall time |  | — | — | 0.50 | µs |
| $E_{off}$ | Turn-off switching energy |  | — | 260 | — | mJ/pulse |
| $t_{rr}$ (Note 2) | Reverse recovery time | $V_{CC}$ = 850V, $I_C$ = 800A, $V_{GE}$ = ±15V<br>$R_{G(on)}$ = 3.3Ω, $T_j$ = 125°C, $L_s$ = 150nH<br>Inductive load | — | — | 2.70 | µs |
| $Q_{rr}$ (Note 2) | Reverse recovery charge |  | — | 300 | — | µC |
| $E_{rec}$ (Note 2) | Reverse recovery energy |  | — | 120 | — | mJ/pulse |

Note 1. Pulse width and repetition rate should be such that junction temperature ($T_j$) does not exceed $T_{opmax}$ rating (125°C).
2. The symbols represent characteristics of the anti-parallel, emitter to collector free-wheel diode (FWDi).
3. Junction temperature ($T_j$) should not exceed $T_{jmax}$ rating (150°C).
4. Pulse width and repetition rate should be such as to cause negligible temperature rise.

## THERMAL CHARACTERISTICS

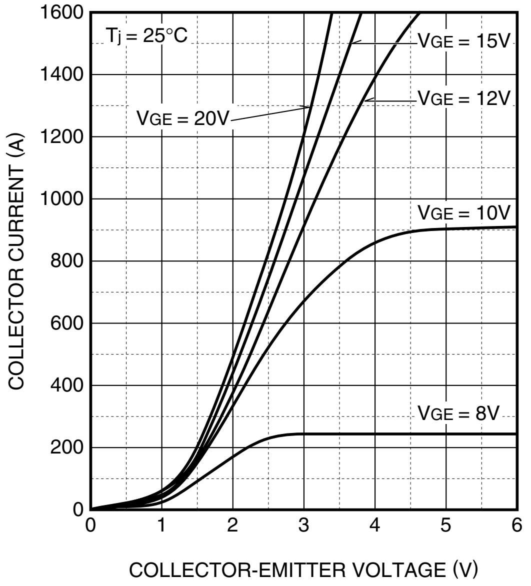
| Symbol | Item | Conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| $R_{th(j-c)Q}$ | Thermal resistance | Junction to Case, IGBT part, 1/2 module | — | — | 20.0 | K/kW |
| $R_{th(j-c)R}$ | | Junction to Case, FWDi part, 1/2 module | — | — | 34.0 | K/kW |
| $R_{th(c-f)}$ | Contact thermal resistance | Case to Fin, $\lambda_{grease}$ = 1W/m·K, 1/2 module | — | 16.0 | — | K/kW |

## MECHANICAL CHARACTERISTICS

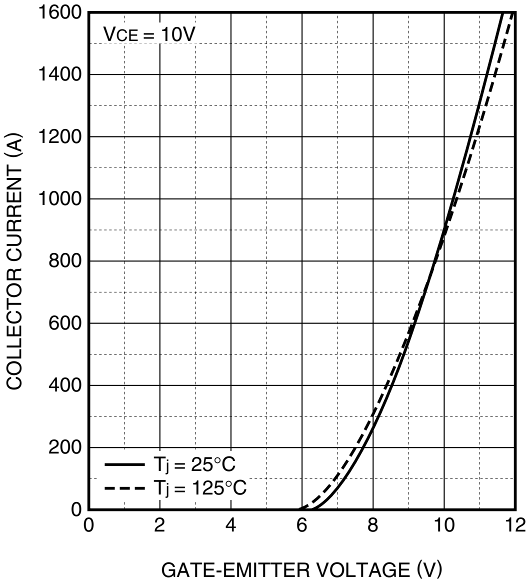
| Symbol | Item | Conditions | Limits | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| M | Mounting torque | M8 : Main terminals screw | 7.0 | — | 13.0 | N·m |
| | | M6 : Mounting screw | 3.0 | — | 6.0 | |
| | | M4 : Auxiliary terminals screw | 1.0 | — | 2.0 | |
| — | Mass | | — | 1.0 | — | kg |
| CTI | Comparative tracking index | | 250 | — | — | — |
| $d_a$ | Clearance distance in air | | 10.0 | — | — | mm |
| $d_s$ | Creepage distance along surface | | 15.0 | — | — | mm |
| $L_{C-E(int)}$ | Internal inductance | IGBT part | — | 18 | — | nH |
| $R_{C-E(int)}$ | Internal lead resistance | $T_C$ = 25°C | — | 0.16 | — | mΩ |

## PERFORMANCE CURVES

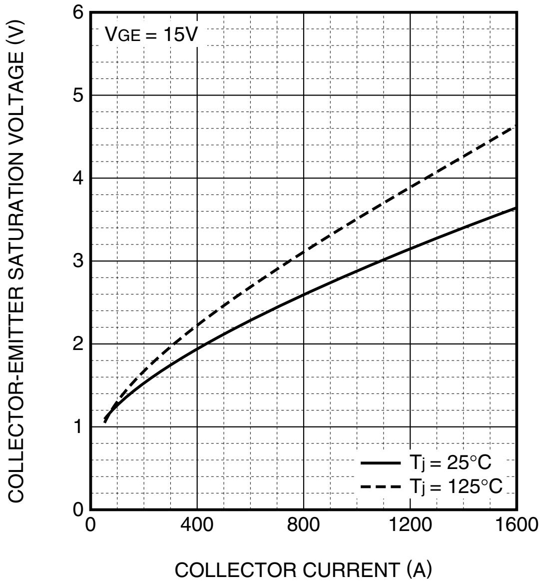
**OUTPUT CHARACTERISTICS
(TYPICAL)**



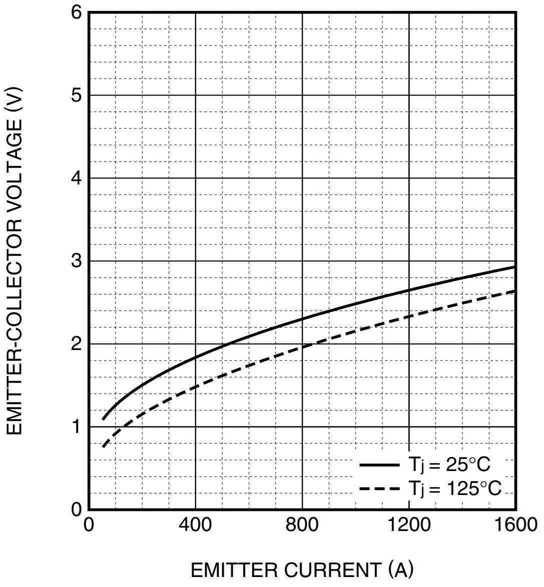
**TRANSFER CHARACTERISTICS
(TYPICAL)**



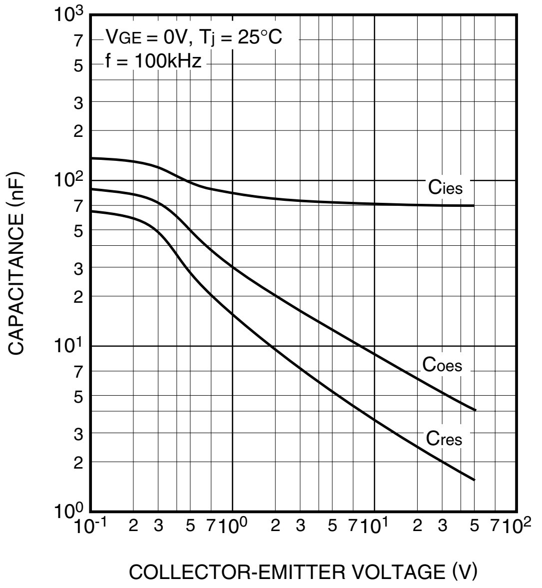
**COLLECTOR-EMITTER SATURATION
VOLTAGE CHARACTERISTICS
(TYPICAL)**



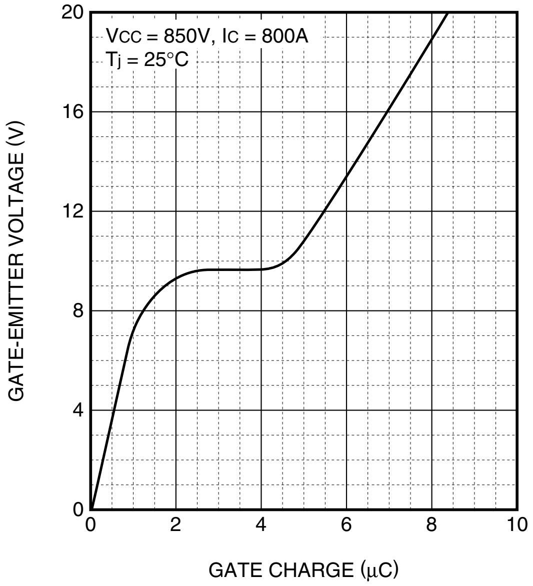
**FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



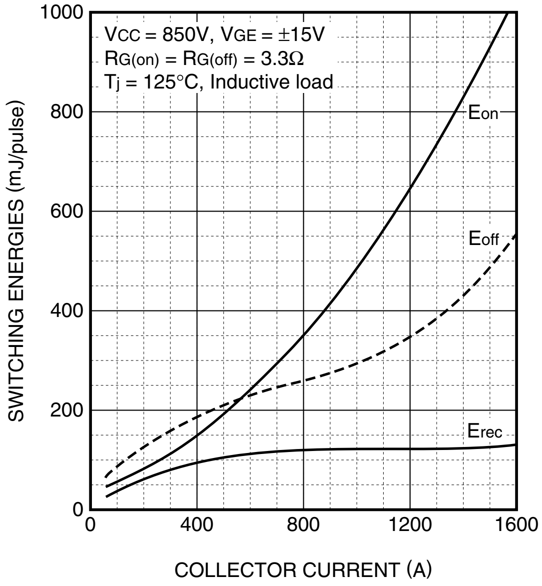
**CAPACITANCE CHARACTERISTICS**
**(TYPICAL)**



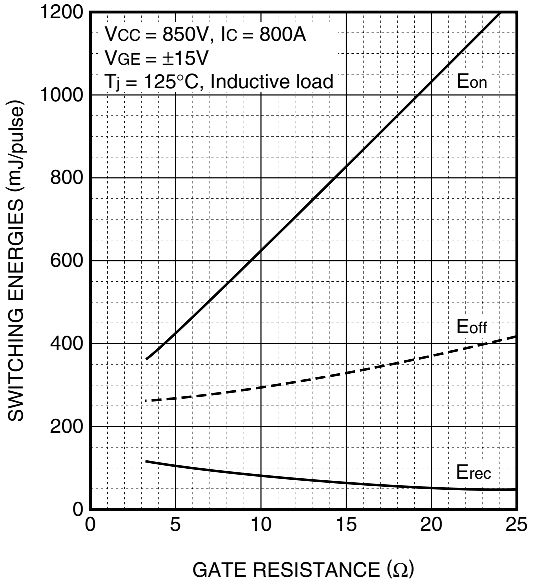
**GATE CHARGE CHARACTERISTICS**
**(TYPICAL)**



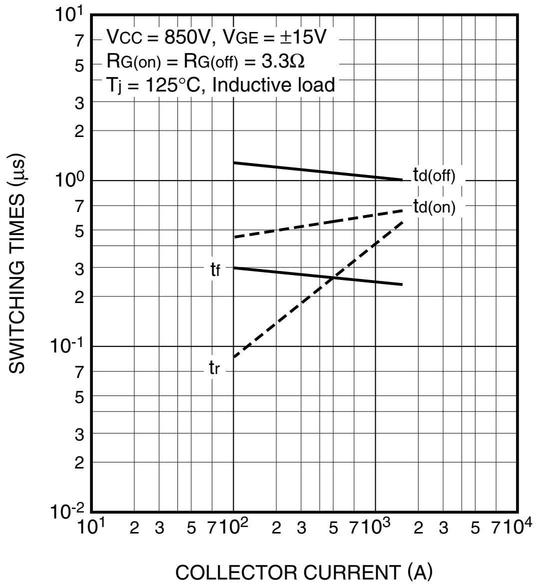
**HALF-BRIDGE**
**SWITCHING ENERGY CHARACTERISTICS**
**(TYPICAL)**



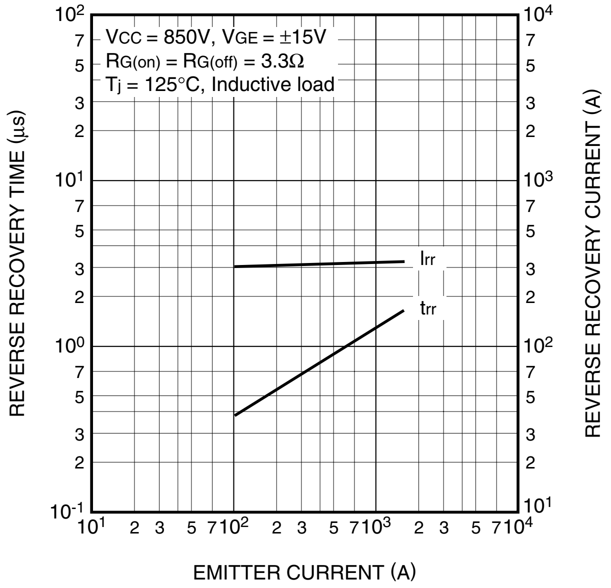
**HALF-BRIDGE**
**SWITCHING ENERGY CHARACTERISTICS**
**(TYPICAL)**



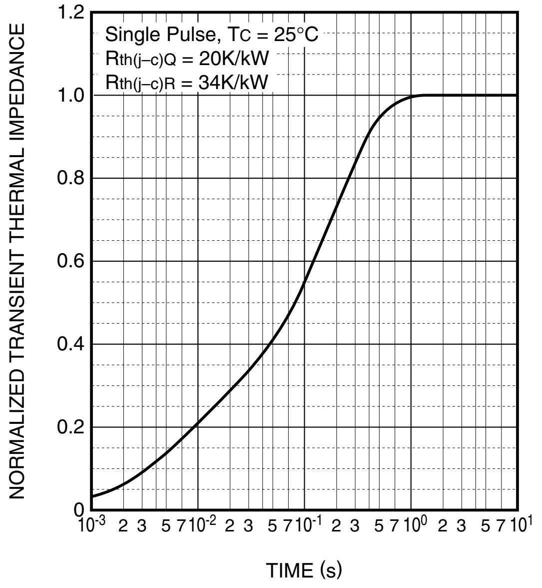
### HALF-BRIDGE SWITCHING TIME CHARACTERISTICS (TYPICAL)



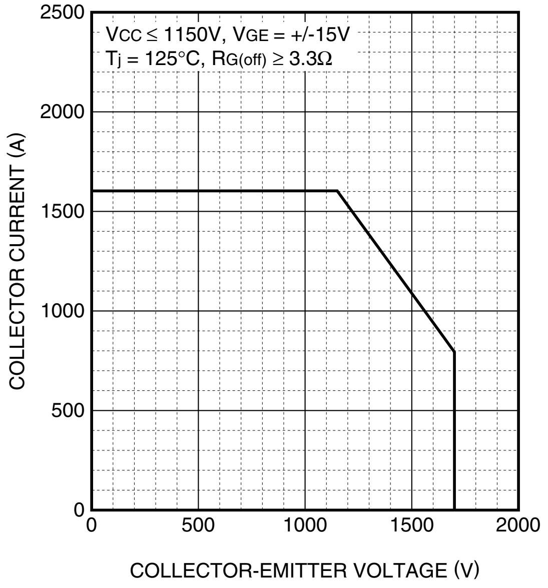
### FREE-WHEEL DIODE REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



### TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS



### REVERSE BIAS SAFE OPERATING AREA (RBSOA)



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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

## Как с нами связаться

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