CM100DY-24NF

- IC: 100A
- VCES: 1200V
- Insulated Type
- 2-elements in a pack

APPLICATION
General purpose inverters & Servo controls, etc

OUTLINE DRAWING & CIRCUIT DIAGRAM
Dimensions in mm
### MAXIMUM RATINGS (Tj = 25 °C, unless otherwise specified)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Ratings</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCES</td>
<td>Collector-emitter voltage</td>
<td>G-E Short</td>
<td>1200</td>
<td>V</td>
</tr>
<tr>
<td>VGES</td>
<td>Gate-emitter voltage</td>
<td>C-E Short</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>IC</td>
<td>Collector current</td>
<td>DC, TC' = 113°C^3</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>IE</td>
<td>Emitter current</td>
<td>Pulse (Note 2)</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>IC(ES)</td>
<td>Collector current saturation voltage</td>
<td>IC = 100A, VGE = 15V</td>
<td>2.5 ~ 3.5</td>
<td>V</td>
</tr>
<tr>
<td>Cies</td>
<td>Output capacitance</td>
<td>VCE = 10V</td>
<td>3.5 ~ 4.5</td>
<td>V</td>
</tr>
<tr>
<td>Cies</td>
<td>Collector-emitter voltage</td>
<td>VCE = 10V</td>
<td>—</td>
<td>V</td>
</tr>
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</tr>
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<td>IE</td>
<td>Emitter current</td>
<td>Pulse (Note 2)</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>IPc</td>
<td>Maximum collector dissipation</td>
<td>TC = 25 °C</td>
<td>650</td>
<td>W</td>
</tr>
<tr>
<td>Tj</td>
<td>Junction temperature</td>
<td>TC = 25 °C</td>
<td>—40 ~ +150</td>
<td>°C</td>
</tr>
<tr>
<td>Tstg</td>
<td>Storage temperature</td>
<td>TC = 25 °C</td>
<td>—40 ~ 125</td>
<td>°C</td>
</tr>
<tr>
<td>V iso</td>
<td>Isolation voltage</td>
<td>Terminals to base plate, f = 60Hz, AC 1 minute</td>
<td>2500</td>
<td>Vrms</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test conditions</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICES</td>
<td>Collector cutoff current</td>
<td>VCE = VCES, VGE = 0V</td>
<td>—</td>
<td>mA</td>
</tr>
<tr>
<td>VGE(th)</td>
<td>Gate-emitter threshold voltage</td>
<td>IC = 10mA, VCE = 10V</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>IGES</td>
<td>Gate leakage current</td>
<td>±VGE = VGES, VCE = 0V</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>VCE(sat)</td>
<td>Collector-emitter saturation voltage</td>
<td>IC = 100A, VGE = 15V</td>
<td>2.5 ~ 3.5</td>
<td>V</td>
</tr>
<tr>
<td>Cies</td>
<td>Output capacitance</td>
<td>VCE = 10V</td>
<td>—</td>
<td>23</td>
</tr>
<tr>
<td>Cies</td>
<td>Collector-emitter voltage</td>
<td>VCE = 10V</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Cies</td>
<td>Reverse transfer capacitance</td>
<td>VGE = 0V</td>
<td>—</td>
<td>0.45</td>
</tr>
<tr>
<td>Qg</td>
<td>Total gate charge</td>
<td>VCC = 600V, IC = 100A, VGE = 15V</td>
<td>—</td>
<td>675</td>
</tr>
<tr>
<td>td(on)</td>
<td>Turn-on delay time</td>
<td>—</td>
<td>120</td>
<td>ns</td>
</tr>
<tr>
<td>tr</td>
<td>Turn-on rise time</td>
<td>VCC = 600V, IC = 100A</td>
<td>—</td>
<td>80</td>
</tr>
<tr>
<td>td(off)</td>
<td>Turn-off delay time</td>
<td>VGE = ±15V</td>
<td>—</td>
<td>450</td>
</tr>
<tr>
<td>tr</td>
<td>Turn-off fall time</td>
<td>RG = 3.1Ω, Inductive load</td>
<td>—</td>
<td>350</td>
</tr>
<tr>
<td>trr (Note 1)</td>
<td>Reverse recovery time</td>
<td>IE = 100A</td>
<td>—</td>
<td>150</td>
</tr>
<tr>
<td>Qrr (Note 1)</td>
<td>Reverse recovery charge</td>
<td>—</td>
<td>5.0</td>
<td>µC</td>
</tr>
<tr>
<td>VEC(Note 1)</td>
<td>Emitter-collector voltage</td>
<td>IE = 100A, VGE = 0V</td>
<td>—</td>
<td>3.2</td>
</tr>
<tr>
<td>Rth(J)</td>
<td>Thermal resistance</td>
<td>IGBT part (1/2 module)</td>
<td>—</td>
<td>0.19</td>
</tr>
<tr>
<td>Rth(F)</td>
<td>Thermal resistance</td>
<td>FWDI part (1/2 module)</td>
<td>—</td>
<td>0.35</td>
</tr>
<tr>
<td>Rth(f)</td>
<td>Contact thermal resistance</td>
<td>Case to heat sink, Thermal compound Applied^2 (1/2 module)</td>
<td>—</td>
<td>0.07</td>
</tr>
<tr>
<td>Rth(R)</td>
<td>Thermal resistance</td>
<td>Case temperature measured point is just under the chips</td>
<td>—</td>
<td>0.13^3</td>
</tr>
<tr>
<td>RG</td>
<td>External gate resistance</td>
<td>—</td>
<td>3.1</td>
<td>Ω</td>
</tr>
</tbody>
</table>

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*1 : Case temperature (Tc) measured point is shown in page OUTLINE DRAWING.

*2 : Typical value is measured by using thermally conductive grease of λ = 0.8[W/(m • K)].

*3 : Case temperature (Tc) measured point is just under the chips.

Note 1. IC, VCC, tr & Qg represent characteristics of the anti-parallel, emitter-collector free-wheel diode (FWDi).

2. Pulse width and repetition rate should be such that the device junction temperature (Tj) does not exceed Tmax rating.

3. Junction temperature (Tj) should not increase beyond 150 °C.
REVERSE RECOVERY CHARACTERISTICS
OF FREE-WHEEL DIODE
(TYPICAL)

EMITTER CURRENT \( I_E \) (A)

REVERSE RECOVERY TIME \( t_{rr} \) (ns)

Conditions:
\( V_CC = 600V \)
\( V_GE = \pm 15V \)
\( R_S = 3.1\Omega \)
\( T_J = 25^\circ C \)
Inductive load

GATE CHARGE CHARACTERISTICS
(TYPICAL)

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

GATE CHARGE \( Q_G \) (nC)

\( I_C = 100A \)
\( V_CC = 600V \)
\( V_CC = 400V \)

TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(IGBT part & FWDi part)

NORMALIZED TRANSIENT THERMAL IMPEDANCE \( Z_{th} \) (j–c)

TIME (s)

IGBT part:
Per unit base = \( R_{th(j–c)} = 0.19K/W \)
FWDi part:
Per unit base = \( R_{th(j–c)} = 0.35K/W \)