

# CMF04

## Radio-Frequency Rectification in Switching Regulators DC-DC Converters

Unit: mm

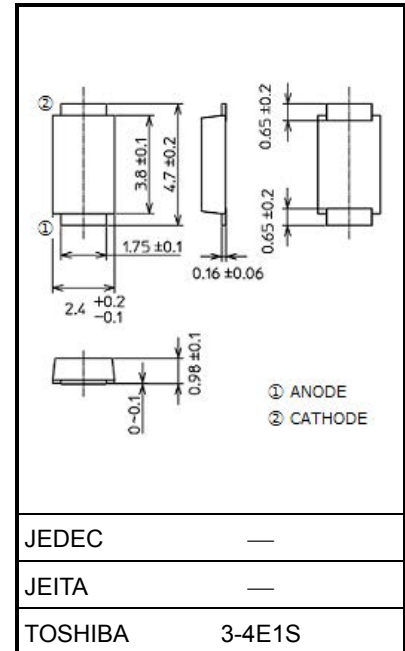
- Repetitive peak reverse voltage :  $V_{RRM} = 800\text{ V}$
- Average forward current :  $I_F (AV) = 0.5\text{ A}$
- Peak forward voltage :  $V_{FM} = 2.5\text{ V (max)}$
- Very fast reverse-recovery time :  $t_{rr} = 100\text{ ns (max)}$
- Suitable for high-density board assembly due to the use of a small Toshiba Nickname: M-FLAT™

### Absolute Maximum Ratings (Ta = 25°C)

| Characteristic                            | Symbol     | Rating       | Unit |
|---|------------|--------------|------|
| Repetitive peak reverse voltage           | $V_{RRM}$  | 800          | V    |
| Average forward current                   | $I_F (AV)$ | 0.5 (Note 1) | A    |
| Non-repetitive peak forward surge current | $I_{FSM}$  | 10 (50 Hz)   | A    |
| Junction temperature                      | $T_j$      | -40 to 150   | °C   |
| Storage temperature range                 | $T_{stg}$  | -40 to 150   | °C   |

Note 1:  $T_l = 127^\circ\text{C}$   
Rectangular waveform ( $\alpha = 180^\circ$ )

Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



Weight: 0.023 g (typ.)

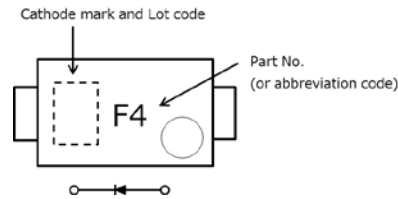
### Electrical Characteristics (Ta = 25°C)

| Characteristic                           | Symbol        | Test Condition   | Min | Typ. | Max | Unit |
|--|---------------|--|-----|------|-----|------|
| Peak forward voltage                     | $V_{FM}$      | $I_{FM} = 0.5\text{ A (pulse test)}$   | —   | —    | 2.5 | V    |
| Repetitive peak reverse current          | $I_{RRM}$     | $V_{RRM} = 800\text{ V (pulse test)}$  | —   | —    | 50  | μA   |
| Reverse recovery time                    | $t_{rr}$      | $I_F = 1\text{ A, di/dt} = -30\text{ A/}\mu\text{s}$   | —   | —    | 100 | ns   |
| Forward recovery time                    | $t_{fr}$      | $I_F = 1\text{ A}$   | —   | 550  | —   | ns   |
| Thermal resistance (junction to ambient) | $R_{th(j-a)}$ | Device mounted on a ceramic board<br>board size 50 mm × 50 mm<br>soldering land size 2 mm × 2 mm<br>board thickness 0.64 mm        | —   | —    | 60  | °C/W |
|  |               | Device mounted on a glass-epoxy board<br>board size 50 mm × 50 mm<br>soldering land size 6 mm × 6 mm<br>board thickness 1.6 mm     | —   | —    | 135 |      |
|  |               | Device mounted on a glass-epoxy board<br>board size 50 mm × 50 mm<br>soldering land size 2.1 mm × 1.4 mm<br>board thickness 1.6 mm | —   | —    | 210 |      |
| Thermal resistance (junction to lead)    | $R_{th(j-l)}$ | —  | —   | —    | 16  | °C/W |

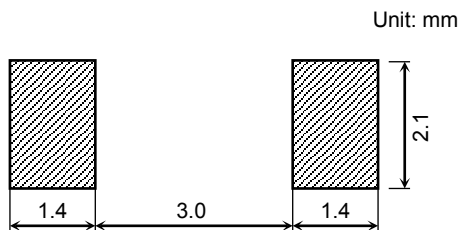
Start of commercial production  
2007-04

## Marking

|                   |          |
|-------------------|----------|
| Abbreviation Code | Part No. |
| F4                | CMF04    |

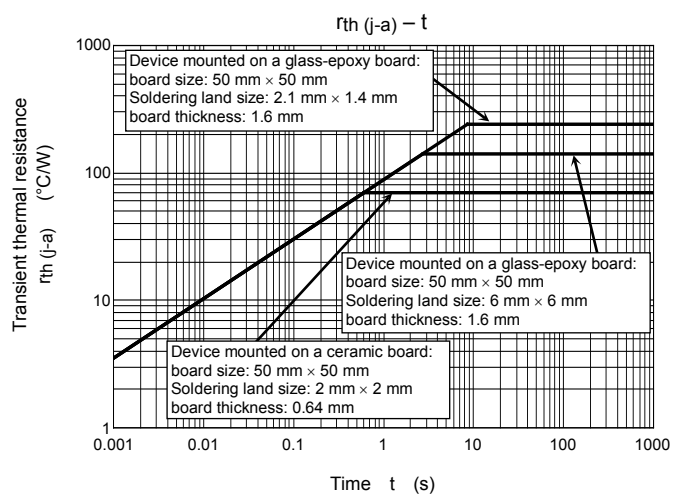
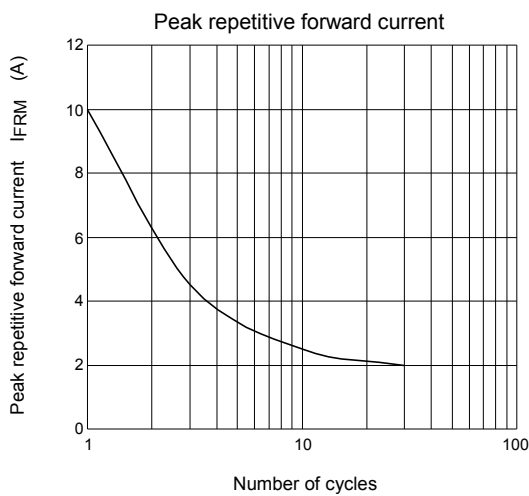
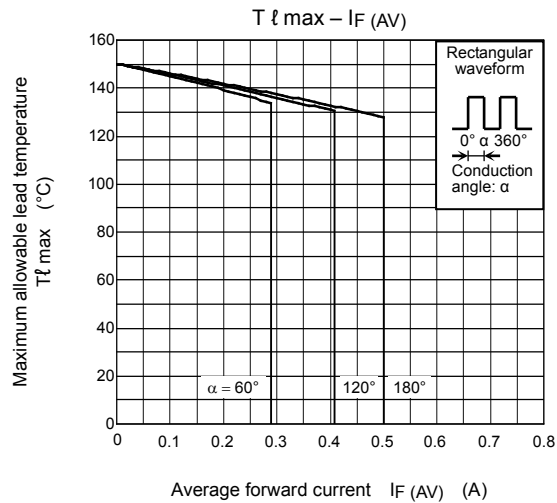
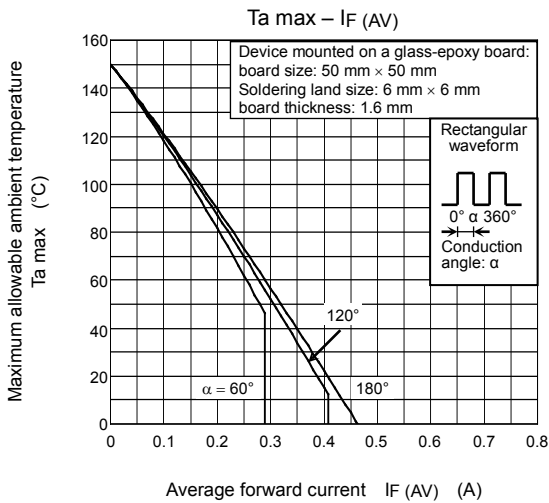
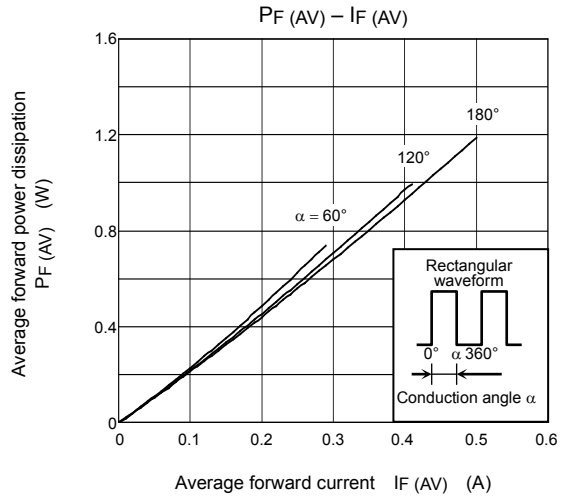
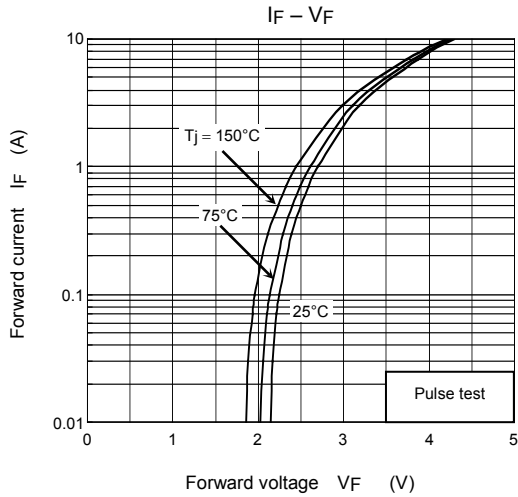


## Land pattern dimensions for reference only



## Handling Precaution

- 1) The absolute maximum ratings denote the absolute maximum ratings, which are rated values that must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend for when designing a circuit incorporating this device.
  - $V_{RRM}$ : We recommend that the worst case voltage, including surge voltage, be no greater than 80% of the absolute maximum rating of  $V_{RRM}$  for a DC circuit and no greater than 50% of that of  $V_{RRM}$  for an AC circuit.  $V_{RRM}$  has a temperature coefficient of 0.1%/°C. Take this temperature account coefficient into when designing a device for operation at low temperatures.
  - $I_{F(AV)}$ : We recommend that the worst-case current be no greater than 80% of the absolute maximum rating of  $I_{F(AV)}$  and that the worst-case junction temperature,  $T_j$ , be kept below 120°C. When using this device, allow margins, referring to the  $T_{a(max)} - I_{F(AV)}$  curve.
  - $I_{FSM}$ : This rating specifies peak non-repetitive forward surge current. This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.
  - $T_j$ : Derate device parameters in proportion to this rating in order to ensure high reliability. We recommend that the junction temperature ( $T_j$ ) of a device be kept below 120°C.
- 2) Thermal resistance (junction-to-ambient) varies with the mounting conditions of a device on a circuit board. An appropriate thermal resistance value should be used, considering the circuit board design and soldering land size.
- 3) For other design considerations, see the Toshiba website.



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