

TOSHIBA Fast Recovery Diode Silicon Diffused Type

# CMF04

Switching Mode Power Supply Applications  
DC/DC Converter Applications

Repetitive peak reverse voltage:  $V_{RRM} = 800\text{ V}$

- Average forward current:  $I_F (AV) = 0.5\text{ A}$
- 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 surface-mount package, M-FLAT™

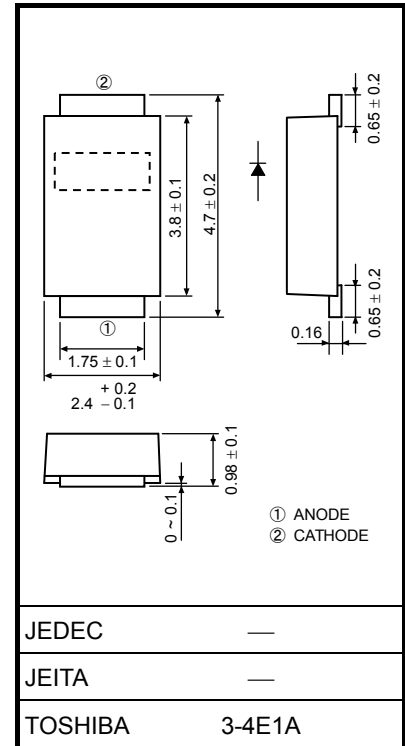
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Rating	Unit
Repetitive peak reverse voltage	$V_{RRM}$	800	V
Average forward current	$I_F (AV)$	0.5 (Note 1)	A
Peak one-cycle surge forward current (non-repetitive)	$I_{FSM}$	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).

Unit: mm



Weight: 0.023 g (typ.)

Start of commercial production  
2007-04

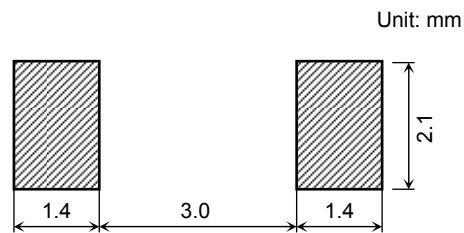
**Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V <sub>FM</sub>	I <sub>FM</sub> = 0.5 A (pulse test)	—	—	2.5	V
Repetitive peak reverse current	I <sub>RRM</sub>	V <sub>RRM</sub> = 800 V (pulse test)	—	—	50	μA
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1 A, di/dt = -30 A/μs	—	—	100	ns
Forward recovery time	t <sub>fr</sub>	I <sub>F</sub> = 1 A	—	550	—	ns
Thermal resistance	R <sub>th(j-a)</sub>	Device mounted on a ceramic board (board size: 50 mm × 50 mm) (soldering land: 2 mm × 2 mm) (board thickness: 0.64 mm)	—	—	60	°C/W
		Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (soldering land: 6 mm × 6 mm) (board thickness: 1.6 mm)	—	—	135	
		Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (soldering land: 2.1 mm × 1.4 mm) (board thickness: 1.6 mm)	—	—	210	
Thermal resistance (junction to lead)	R <sub>th(j-l)</sub>	—	—	—	16	°C/W

**Marking**

Abbreviation Code	Part No.
F4	CMF04

**Standard Soldering Pad**



**Handling Precautions**

The absolute maximum ratings of a semiconductor device are a set of ratings that must not be exceeded, even for a moment. Do not exceed any of these ratings.

The following are the general derating methods we recommend for designing a circuit using this device.

V<sub>RRM</sub>: We recommend that the worst-case voltage, including surge voltage, be no greater than 80% of the absolute maximum rating of V<sub>RRM</sub> for a DC circuit; and no greater than 50% of that of V<sub>RRM</sub> for an AC circuit.

V<sub>RRM</sub> has a temperature coefficient (0.1%/°C). Be sure to take this temperature coefficient into account when designing a device for use at low temperature.

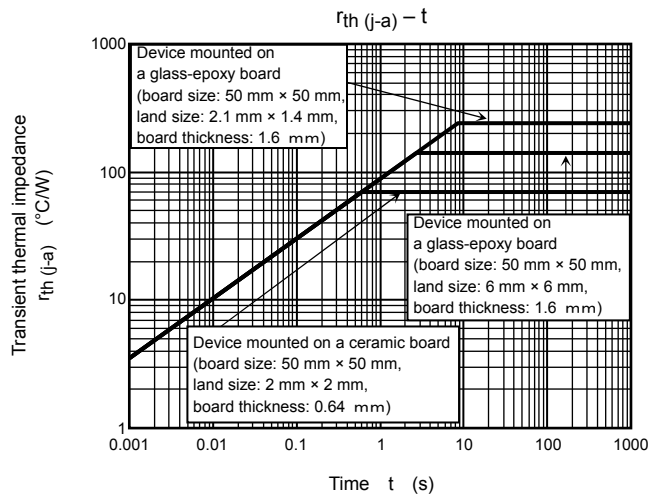
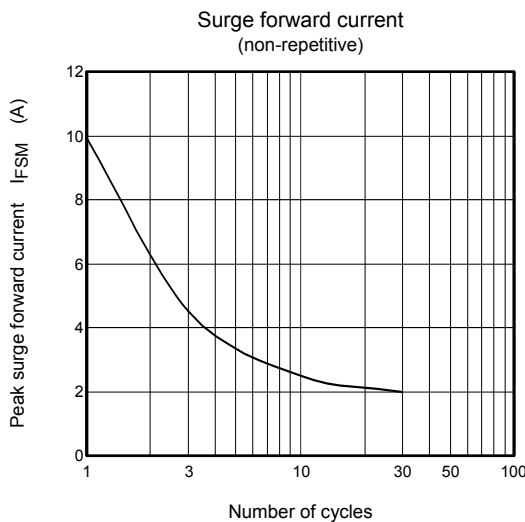
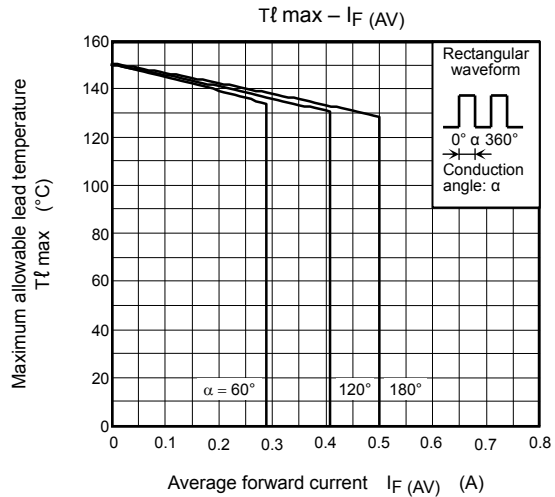
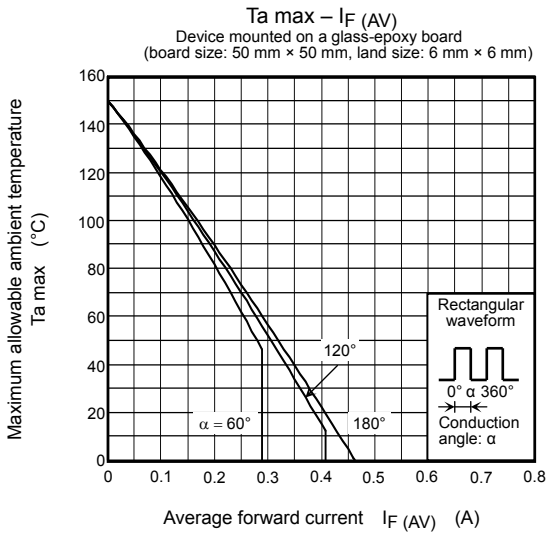
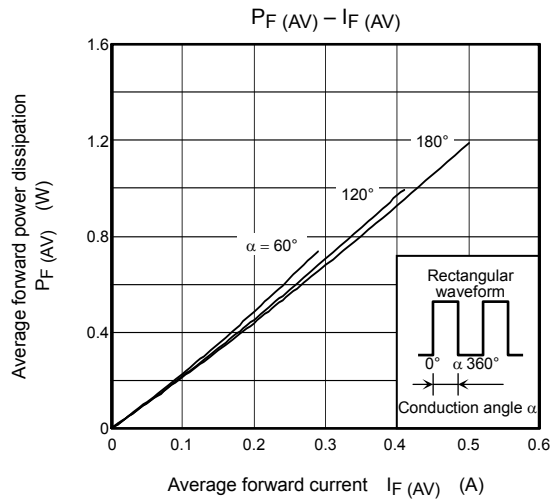
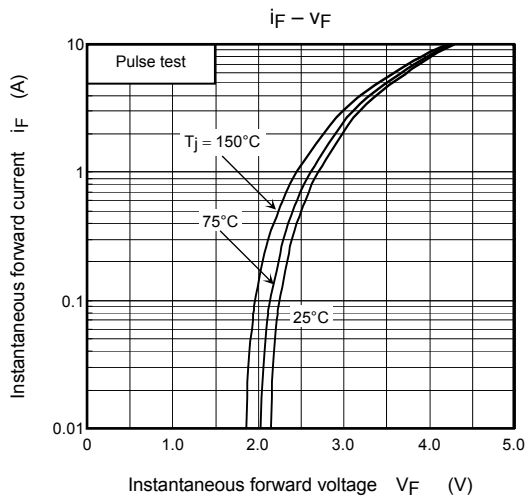
I<sub>F(AV)</sub>: We recommend that the worst-case current be no greater than 80% of the absolute maximum rating of I<sub>F(AV)</sub>. Carry out sufficient heat design. If it is not possible to design a circuit with excellent heat radiation, set a margin by using an allowable Tamax-I<sub>F(AV)</sub> curve.

This rating specifies the non-repetitive peak current in one cycle of a 50 Hz sine wave, condition angle 180°. Therefore the rating applies only to abnormal operation, which seldom occurs during the lifespan of a device.

For this device, we recommend T<sub>j</sub> of below 120°C under the worst load and heat radiation conditions.

Thermal resistance between junction and ambient fluctuates depending on the mounting condition of the device. When using the device, be sure to design the circuit board and soldering land size to match the appropriate thermal resistance value.

Refer to the Rectifier databook for further information.



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