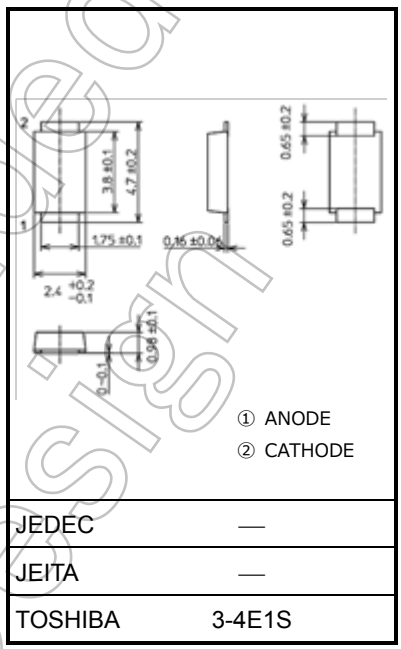
TOSHIBA Fast Recovery Diode Silicon Diffused Type

CMF03

○ High-Speed Rectification (Fast recovery)
○ Radio-Frequency Rectification in Switching Regulators
○ DC-DC Converters

- Repetitive peak reverse voltage : V_{RRM} = 900 V
- Average forward current : $I_{F\ (AV)}$ = 0.5 A
- Peak forward voltage : V_{FM} = 2.5 V (max)
- Very fast reverse-recovery time : t_{rr} = 100 ns (max)
- Suitable for high-density board assembly due to the use of a small Toshiba Nickname: M−FLAT™

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	3-4E1S

Weight: 0.023 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	900	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 125	°C
Storage temperature range	T_{stg}	−40 to 150	°C

Note 1: T_ℓ = 102°C Rectangular waveform (α = 180°)

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).

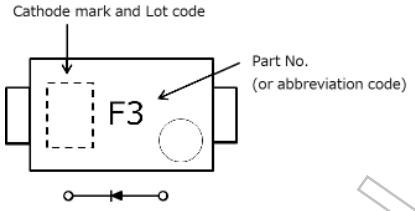
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V_{FM}	I_{FM} = 0.5 A (pulse test)	―	―	2.5	V
Repetitive peak reverse current	I_{RRM}	V_{RRM} = 900 V (pulse test)	―	―	50	μA
Reverse recovery time	t_{rr}	I_F = 1 A, di/dt = -30 A/μs	―	―	100	ns
Forward recovery time	t_{fr}	I_F = 1 A	―	550	―	ns
Thermal resistance	$R_{th(j-a)}$	Device mounted on a ceramic board board size 50 mm × 50 mm soldering land size 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 size 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 size 2.1 mm × 1.4 mm board thickness 1.6 mm	―	―	210	
Thermal resistance (junction to lead)	$R_{th(j-\ell)}$	―	―	―	16	°C/W

Start of commercial production
2006-12

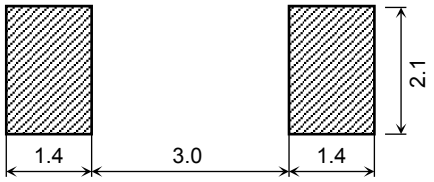
Marking

Abbreviation Code	Part No.
F3	CMF03



Land pattern dimensions for reference only

Unit: mm



Usage Considerations

1) The absolute maximum ratings are rated values that must not be exceeded for a moment to have you use an element safely. Please refer to each following absolute maximum ratings on the occasion of use and design.

   V_{RRM}: In DC circuit, the voltage peaks of applied voltage must be rated less than 80 % absolute maximum ratings.
   In AC circuit, the voltage peaks of applied voltage must be rated less than 50 % absolute maximum ratings.
   And, V_{RRM} has a temperature coefficient of 0.1 %/℃.
   Please take this coefficient into account when designing a circuit board that will be operated in a low-temperature environment.

   $I_{F(AV)}$: We recommend that the current be in less than 80 % of rating and the junction temperature (T_j) be in less than 80 % of absolute maximum rating under the worst condition.
   This rating is based on the premise that the device is radiating heat enough.
   Therefore, when enough heat radiation is not expected, please consider the margin to the permission curve of $T_{a(max)}$ - $I_{F(AV)}$ for using the device.

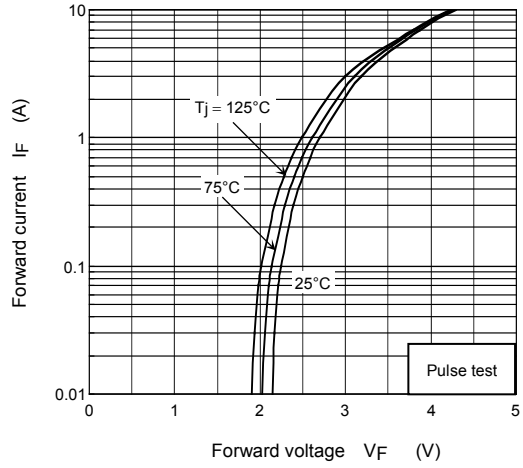
   I_{FSM} : This rating specifies a non-repetitive limit value.
   This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

   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 80 %.

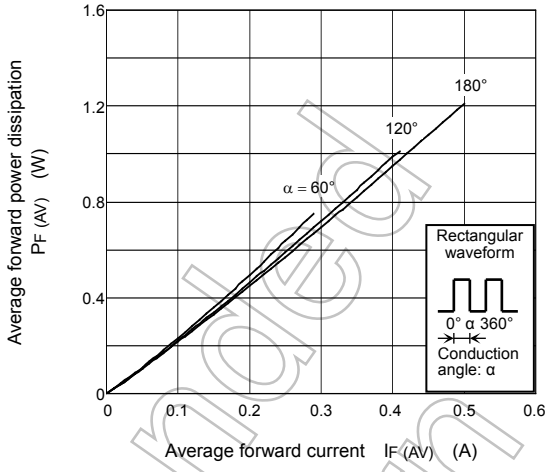
2) Thermal resistance (junction-to-ambient) varies with the mounting conditions of the device on the circuit board. An appropriate thermal resistance value that should be used, must be considering the circuit board design and soldering land size.

3) For other design considerations, see the Toshiba website.

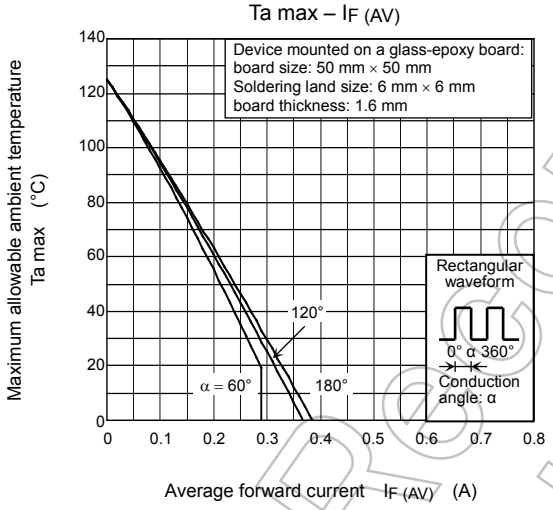
$I_F - V_F$



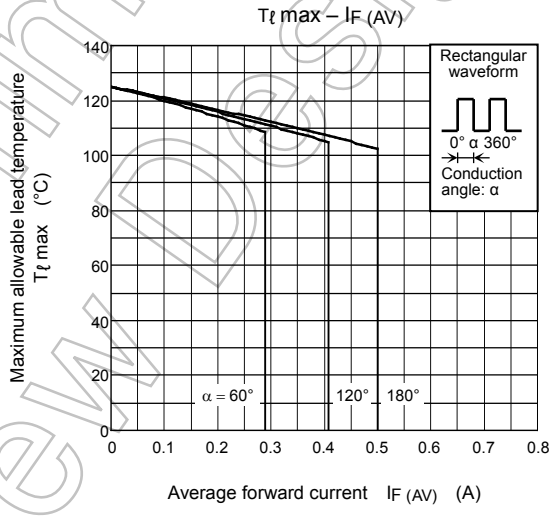
$P_{F\ (AV)} - I_{F\ (AV)}$



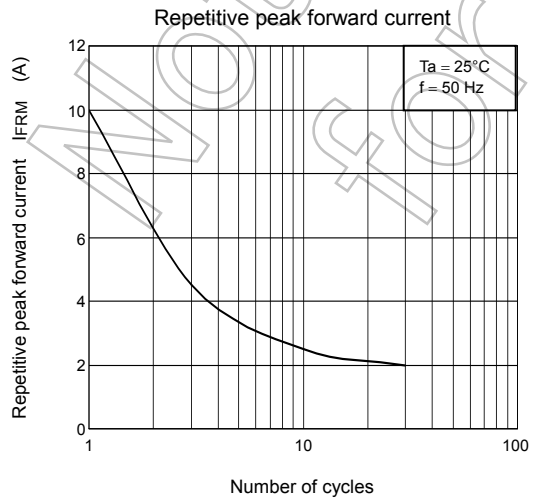
Ta max – $I_{F\ (AV)}$



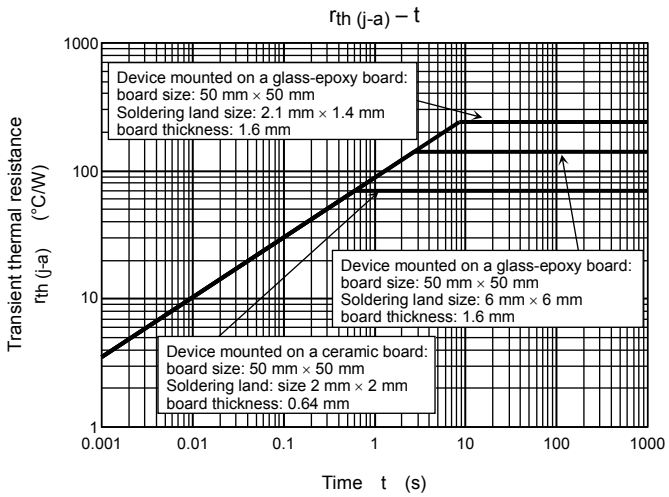
T_ℓ max – $I_{F\ (AV)}$



Repetitive peak forward current



$r_{th\ (j\text{-}a)} - t$



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