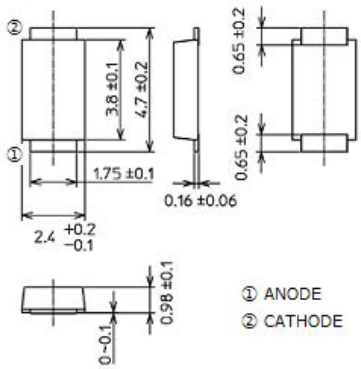
TOSHIBA Fast Recovery Diode Silicon Diffused Type

RS1M

Switching Mode Power Supply Applications
DC/DC Converter Applications

- Repetitive peak reverse voltage : V_{RRM} = 1000 V
- Average forward current : $I_{F\ (AV)}$ = 1 A
- Peak forward voltage : V_{FM} = 2 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}	1000	V
Average forward current	$I_{F\ (AV)}$	1 (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: Tℓ = 108°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).

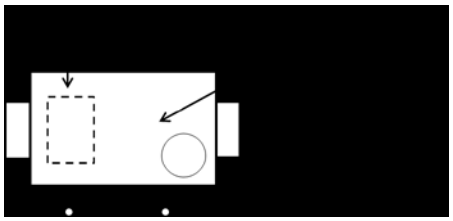
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V_{FM}	I_{FM} = 1 A (pulse test)	―	―	2	V
Repetitive peak reverse current	I_{RRM}	V_{RRM} = 1000V (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	―	270	―	ns
Thermal resistance	$R_{th\ (j-a)}$	Device mounted on a ceramic board board size: 50 mm × 50 mm soldering land: 2 mm × 2 mm board thickness: 0.64mm	―	―	60	°C/W
		Device mounted on a glass-epoxy board board size: 50 mm × 50 mm soldering land: 6 mm × 6 mm board thickness: 1.6mm	―	―	135	
		Device mounted on a glass-epoxy board board size: 50 mm × 50 mm soldering land: 2.1 mm × 1.4 mm board thickness: 1.6mm	―	―	210	
Thermal resistance (junction to lead)	$R_{th\ (j-ℓ)}$	―	―	―	16	°C/W

Start of commercial production
2006-07

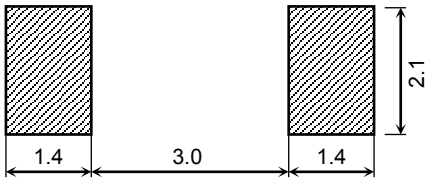
Marking

Abbreviation Code	Part No.
RS1M	RS1M



Land pattern dimensions for reference only

Unit: mm



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.

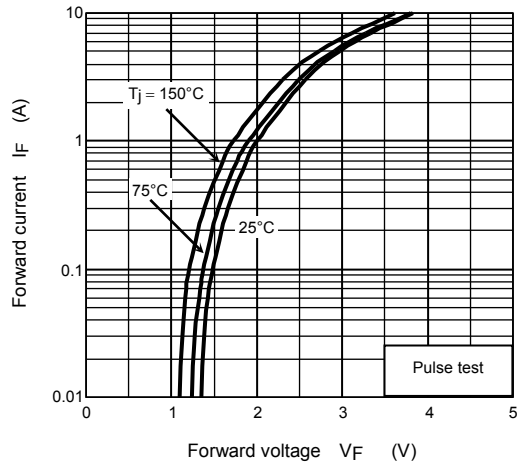
   I_{FSM}: This rating specifies peak non-repetitive forward surge current. This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

   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.

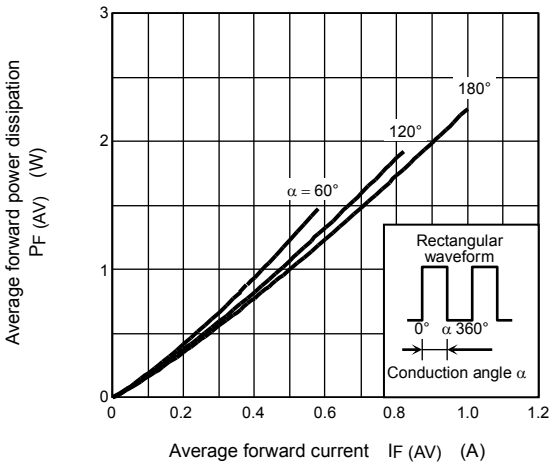
2) Thermal resistance (junction-to-ambient) varies with the mounting conditions of a device on a circuit board. An appropriate thermal resistance value should be used, considering the heat sink, circuit board design and soldering land size.

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

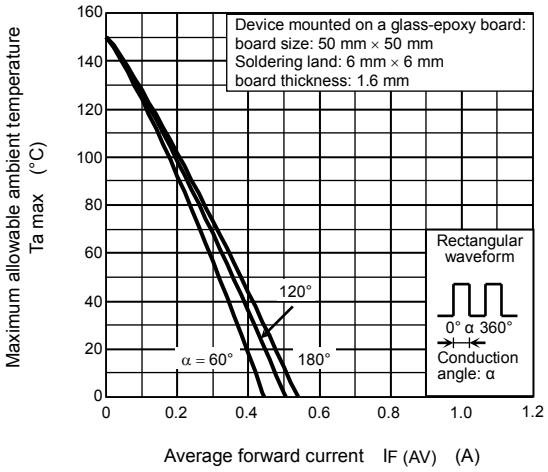
$I_F - V_F$



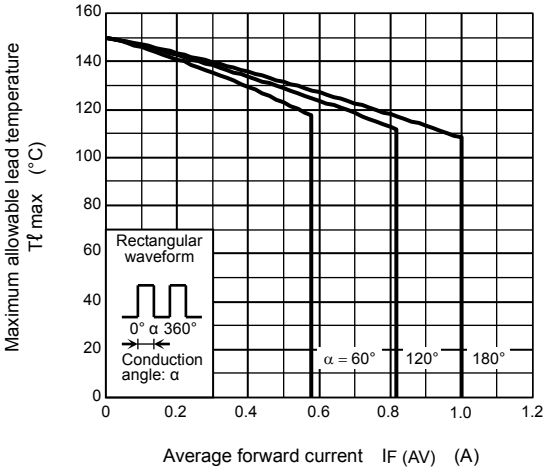
$P_{F\,(AV)} - I_{F\,(AV)}$



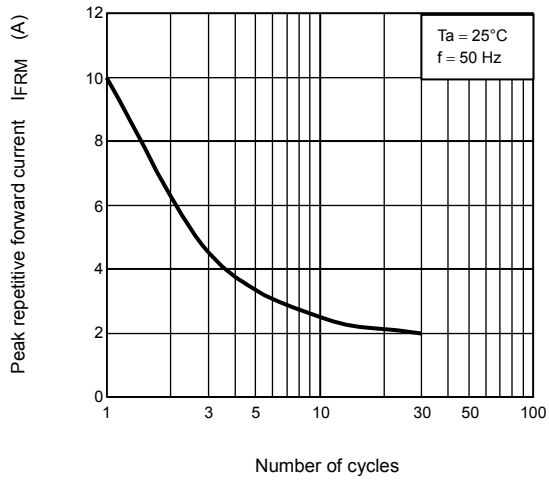
Ta max – $I_{F\,(AV)}$



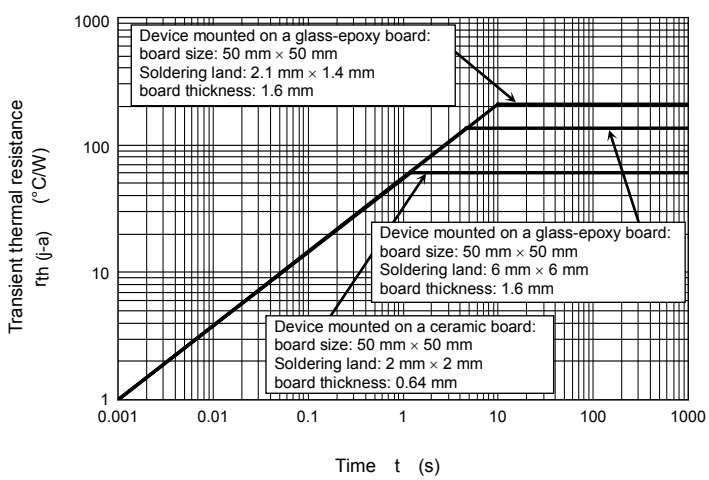
T ℓ max – $I_{F\,(AV)}$



Peak repetitive forward current



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



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