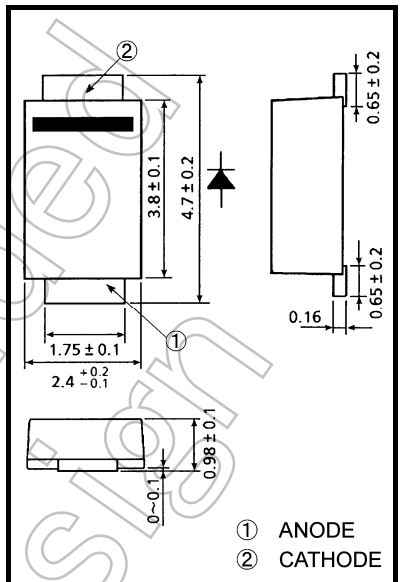
TOSHIBA High Efficiency Rectifier Silicon Epitaxial Type

CMH02

Switching Mode Power Supply Applications

Unit: mm

- Repetitive peak reverse voltage: V_{RRM} = 400 V
- Average forward current: $I_{F\ (AV)}$ = 3.0 A
- Low forward voltage: V_{FM}=1.3 V (Max.)
- Very fast reverse recovery time: trr =50ns (Max.)
- Suitable for compact assembly due to small surface-mount package "M−FLAT™" (Toshiba package name)



JEDEC	—
JEITA	—
TOSHIBA	3-4E1A

Weight: 0.023 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	400	V
Average forward current	$I_{F\ (AV)}$	3.0 (Note 1)	A
Peak one cycle surge forward current (non-repetitive)	I_{FSM}	40 (50 Hz)	A
Junction temperature	T_j	−40~150	°C
Storage temperature range	T_{stg}	−40~150	°C

Note 1: Tℓ=87°C Device mounted on a ceramic board
board size: 50 mm × 50 mm
soldering land: 2 mm ×2 mm
board thickness:0.64t

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)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM\ (1)}$	I_{FM} = 0.1 A (pulse test)	—	0.73	—	V
	$V_{FM\ (2)}$	I_{FM} = 1.0 A (pulse test)	—	0.93	—	
	$V_{FM\ (3)}$	I_{FM} = 3.0 A (pulse test)	—	1.1	1.3	
Peak repetitive reverse current	I_{RRM}	V_{RRM} = 400 V (pulse test)	—	—	10	μA
Reverse recovery time	t_{rr}	I_F = 1 A, di/dt = −30 A/μs	—	—	50	ns
Forward recovery time	t_{fr}	I_F = 1.0 A	—	—	100	ns
Thermal resistance (junction to ambient)	$R_{th\ (j\text{-}a)}$	Device mounted on a ceramic board (board size: 50 mm × 50 mm) (soldering land: 2 mm × 2 mm) (board thickness: 0.64 t)	—	—	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 t)	—	—	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 t)	—	—	210	
Thermal resistance (junction to lead)	$R_{th\ (j\text{-}\ell)}$	—	—	—	16	°C/W

Start of commercial production
2002-12

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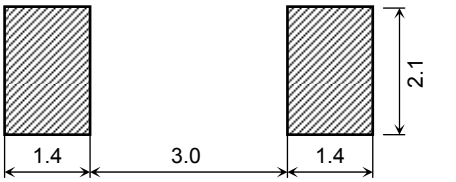
Marking

Abbreviation code	Part No.
H2	CMH02

Standard Soldering Pad

Unit: mm



Handling Precaution

The absolute maximum ratings denote the absolute maximum ratings, which are rated values and must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend when you design a circuit with a device.

VRRM: We recommend that the worst case voltage, including surge voltage, be no greater than 80% of the absolute maximum rating of VRRM for a DC circuit and be no greater than 50% of that of VRRM for an AC circuit. VRRM has a temperature coefficient of 0.1%/℃. Take this temperature coefficient into account designing a device at low temperature.

IF(AV): We recommend that the worst case current be no greater than 80% of the absolute maximum rating of IF(AV). Carry out adequate heat design. If you can't design a circuit with excellent heat radiation, set the margin by using an allowable Tamax-IF (AV) curve.

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

We recommend that a device be used at a Tj of below 120℃ under the worst load and heat radiation conditions.

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

Please refer to the Rectifiers databook for further information.

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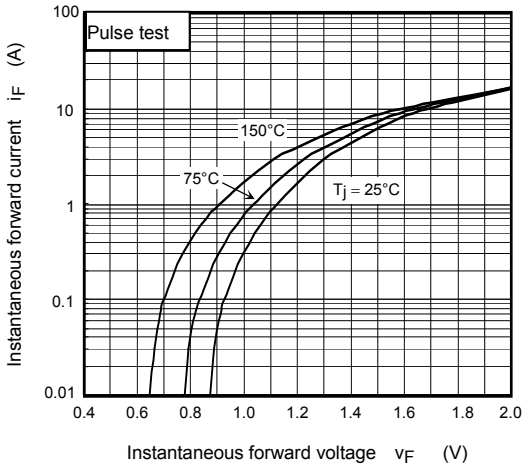
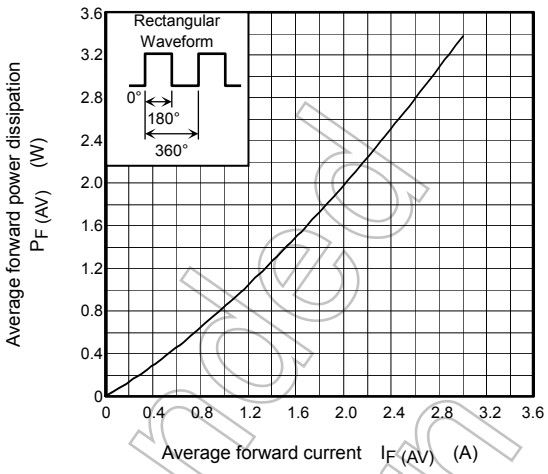
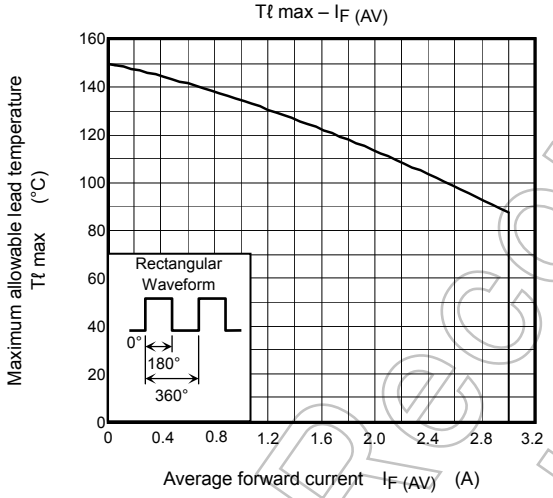
$i_F - v_F$



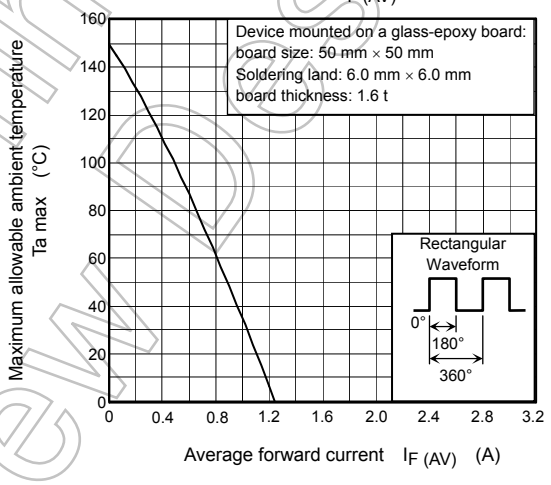
$P_{F\,(AV)} - I_{F\,(AV)}$



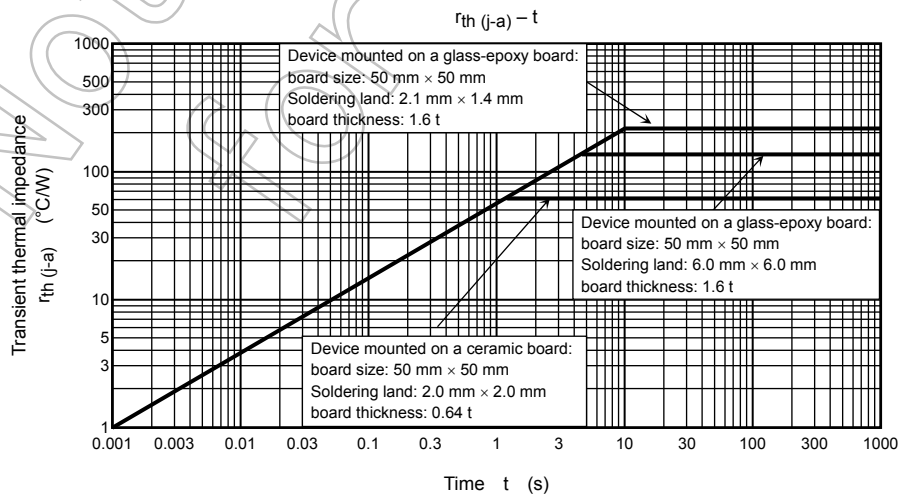
$T\ell\ \max - I_{F\,(AV)}$



$Ta\ \max - I_{F\,(AV)}$



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



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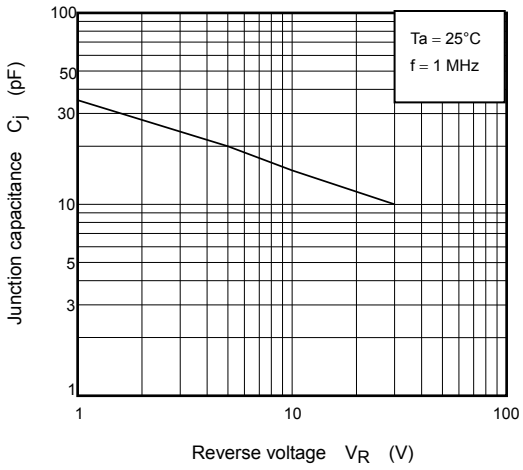
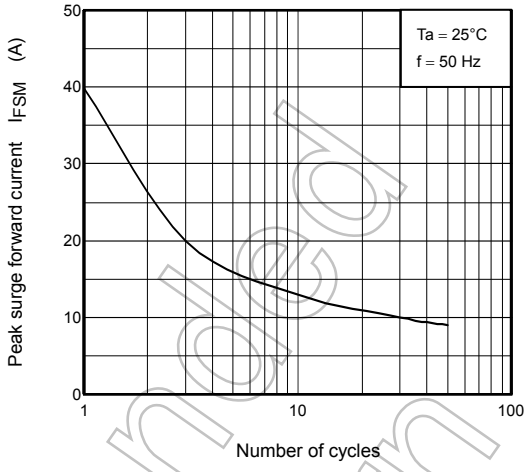
$C_j - V_R$ (Typ.)



Surge forward current
(non-repetitive)



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