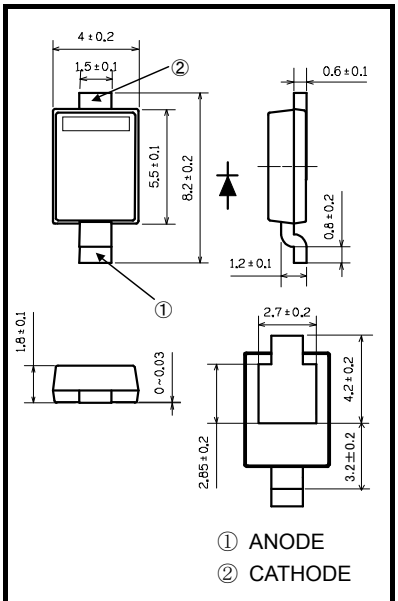
TOSHIBA High Efficiency Rectifier Silicon Epitaxial Type

CLH07

○ Switching Mode Power Supply Applications

- Forward voltage: V_{FM} = 1.8 V (Max.)
- Average forward current: $I_{F\ (AV)}$ = 5.0 A
- Repetitive peak reverse voltage: V_{RRM} = 400 V
- Surface-mount package
  "L−FLAT" (Toshiba package name)

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	3-4F1A

Weight: 0.15 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	400	V
Average forward current	$I_{F(AV)}$	5.0	A
Peak one cycle surge forward current (non-repetitive)	I_{FSM}	50 (50 Hz)	A
Junction temperature	T_j	−40~150	°C
Storage temperature range	T_{stg}	−40~150	°C

Note 1: T_ℓ = 92°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).

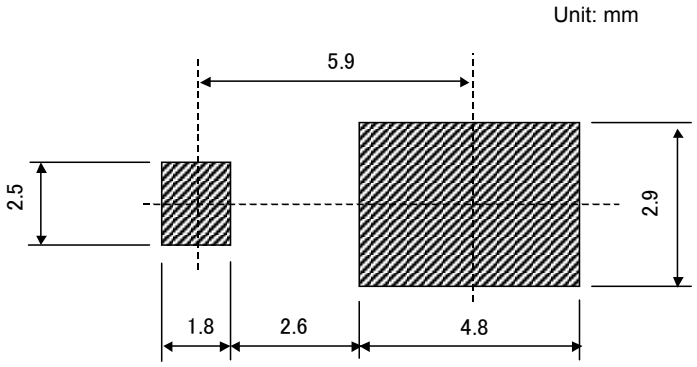
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM\ (1)}$	I_{FM} = 1.0 A (pulse test)	―	0.98	―	V
	$V_{FM\ (2)}$	I_{FM} = 3.0 A (pulse test)	―	1.23	―	
	$V_{FM\ (3)}$	I_{FM} = 5.0 A (pulse test)	―	1.40	1.80	
Repetitive peak reverse current	I_{RRM}	V_{RRM} = 400 V (pulse test)	―	―	10	μA
Reverse recovery time	t_{rr}	I_F = 2A, di/dt = −50 A/μs	―	―	35	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 glass-epoxy board (board size: 50 mm x 50 mm) (board thickness: 1.6 t) (soldering land) Cathode: 5.7 mm x 6.2 mm, Anode :4.5 mm x 3.4 mm	―	―	100	°C/W
Thermal resistance (junction to ambient)	$R_{th\ (j\text{-}\ell)}$	―	―	―	5	°C/W

Marking

Abbreviation Code	Part No.
H07	CLH07

Standard Soldering Pad



Handling Precautions

1) The absolute maximum rating denotes 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 designing a circuit incorporating this device:

   V_{RRM}: Use this rating with reference to (1) above. The V_{RRM} has a temperature coefficient of 0.1%/° C. Take this temperature coefficient into account when designing a device at low temperature.

   $I_{F\ (AV)}$: We recommend that the worst case current be no greater than 80% of the absolute maximum rating of $I_{F(AV)}$ and that Tj be below 120° C .When using this device, take the margin into consideration by using an allowable Ta (max)-$I_{F\ (AV)}$ curve.

   I_{FSM}: This rating specifies the non-repetitive peak current. This applies to abnormal operation only, When using a device, design a circuit board and a soldering land size to match the appropriate thermal resistance value.

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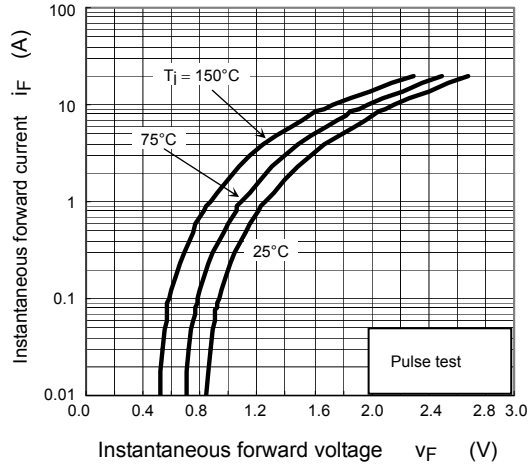
   T_j: Derate this rating when using the device to ensure high reliability. We recommend that the device be used at a Tj of below 120° C.

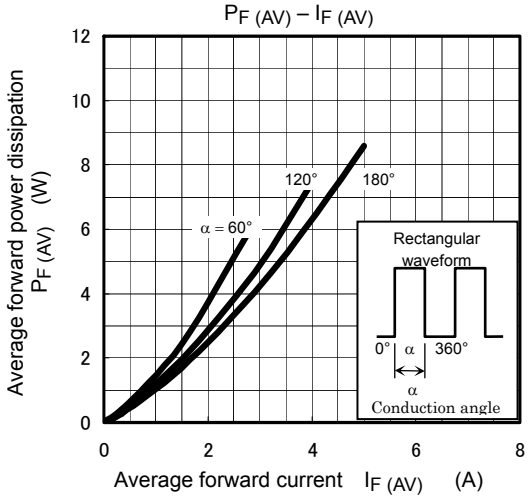
2) The thermal resistance between junction and ambient varies depending on the mounting condition of the See. When using the device, design the circuit board and the soldering land size to match the appropriate thermal resistance value.

3) See the Rectifiers databook for further information.

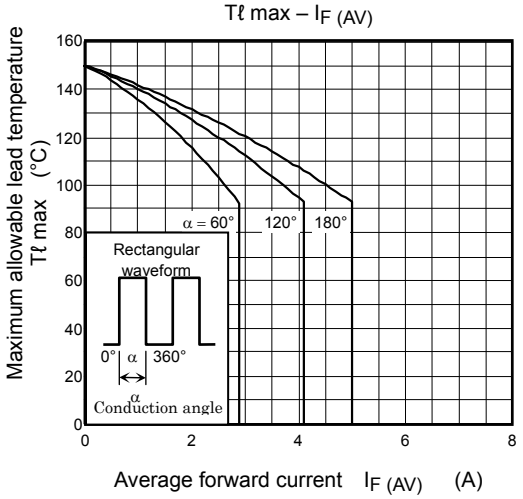
$i_F - v_F$



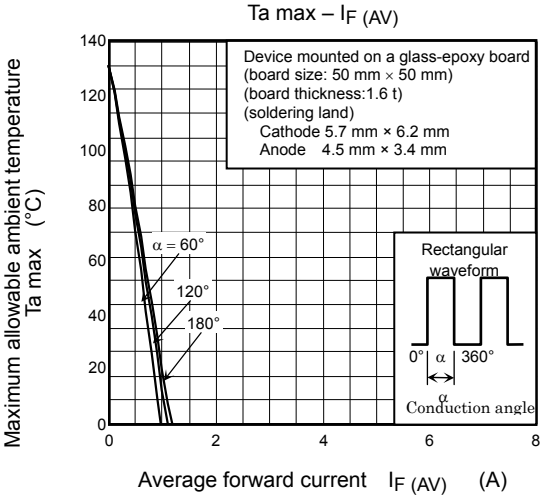
$P_{F\,(AV)} - I_{F\,(AV)}$



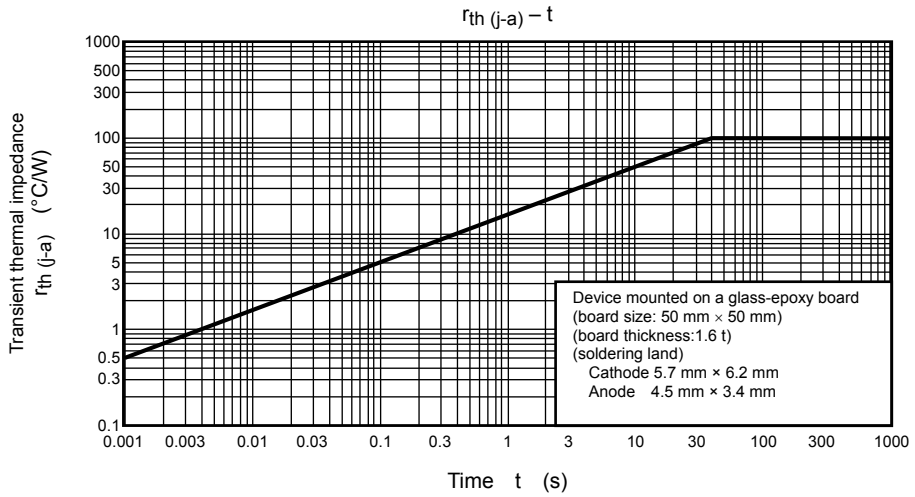
T_ℓ max – $I_{F\,(AV)}$

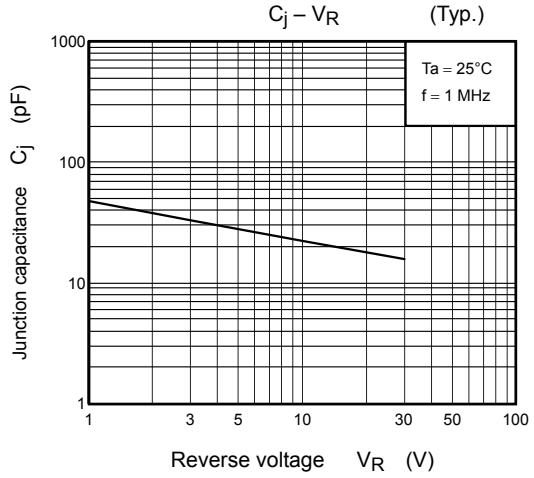


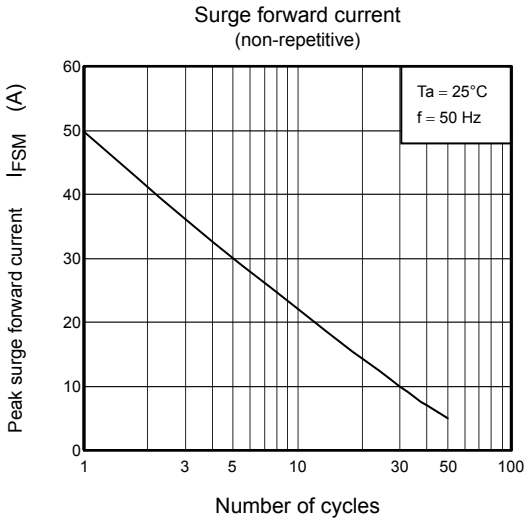
Ta max – $I_{F\,(AV)}$



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




$C_j - V_R$ (Typ.)
Ta = 25°C
f = 1 MHz
Junction capacitance C_j (pF)
1000
100
10
1
1
3
5
10
30
50
100
Reverse voltage V_R (V)


Surge forward current
(non-repetitive)
Ta = 25°C
f = 50 Hz
Peak surge forward current I_{FSM} (A)
60
50
40
30
20
10
0
1
3
5
10
30
50
100
Number of cycles

RESTRICTIONS ON PRODUCT USE

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