

Schottky Barrier Diode

CRS20I40A

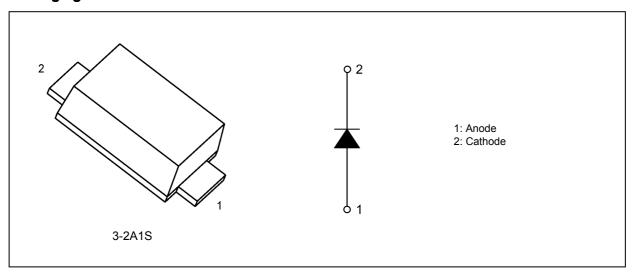
1. Applications

- · Secondary Rectification in Switching Regulators
- · Reverse-Current Protection in Mobile Devices

2. Features

- (1) Peak forward voltage: V_{FM} = 0.6 V (max) @ I_{FM} = 2 A
- (2) Average forward current: $I_{F(AV)} = 2 A$
- (3) Repetitive peak reverse voltage: $V_{RRM} = 40 \text{ V}$
- (4) Small, thin package suitable for high-density board assembly Toshiba Nickname: S-FLATTM

3. Packaging and Internal Circuit



4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25$ °C)

Characteristics	Symbol	Note	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}		40	V
Average forward current	I _{F(AV)}	(Note 1)	2	Α
Non-repetitive peak forward surge current	I _{FSM}	(Note 2)	20	
Junction temperature	Tj		150	°C
Storage temperature	T _{stg}		-55 to 150	

Note: 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).

Note 1: T_{ℓ} = 106 °C, square wave (α = 180°), V_R = 20 V

Note 2: f = 50 Hz, half-sine wave

Start of commercial production



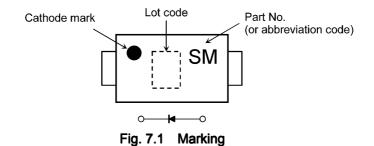
5. Thermal Characteristics

Characteristics	Symbol	Note	Test Condition	Max	Unit
Thermal resistance (junction-to-ambient)	$R_{th(j-a)}$		Device mounted on a ceramic board (board size: 50 mm × 50 mm) (soldering land size: 2 mm × 2 mm) (board thickness: 0.64 mm)		°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)	140	
Thermal resistance (junction-to-lead)	R _{th(j-ℓ)}		Junction to cathode lead	20	°C/W

6. Electrical Characteristics (Unless otherwise specified, $T_a = 25$ °C)

Characteristics	Symbol	Note	Test Condition	Min	Тур.	Max	Unit
Peak forward voltage	V _{FM(1)}		I _{FM} = 0.1 A (pulse measurement)	_	0.28	_	V
	V _{FM(2)}		I _{FM} = 1.0 A (pulse measurement)	_	0.42	_	
	V _{FM(3)}		I _{FM} = 2.0 A (pulse measurement)	_	0.53	0.60	
Repetitive peak reverse current	I _{RRM(1)}		V _{RRM} = 5 V (pulse measurement)	_	4	_	μΑ
	I _{RRM(2)}		V _{RRM} = 40 V (pulse measurement)	_	9	60	
Junction capacitance	Cj		V _R = 10 V, f = 1 MHz	_	35	_	pF

7. Marking



Marking Code	Part Number		
SM	CRS20I40A		



8. Usage Considerations

- (1) Schottky barrier diodes (SBDs) have reverse current greater than other types of diodes. This makes SBDs more vulnerable to damage due to thermal runaway under high-temperature and high-voltage conditions. Thus, both forward and reverse power losses of SBDs should be considered for thermal and safety design.
- (2) The absolute maximum ratings are rated values that must not be exceeded during operation, even for an instant. The following are the recommended general derating methods for designing a circuit board using this device.
 - V_{RRM} :Use this rating with reference to (1) above. V_{RRM} has a temperature coefficient of 0.1 %/°C at low temperatures. 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 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 $T_{a(max)}\mbox{-} I_{F(AV)}$ 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.
- (3) 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 land pattern dimensions (provided for reference only).
- (4) For other design considerations, see the Rectifiers databook or the Toshiba Semiconductor website.

9. Land Pattern Dimensions (for reference only)

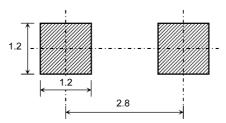


Fig. 9.1 Land Pattern Dimensions for Reference Only (Unit: mm)

10. Characteristics Curves (Note)

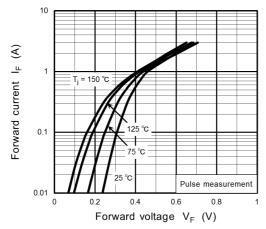


Fig. 10.1 I_F - V_F

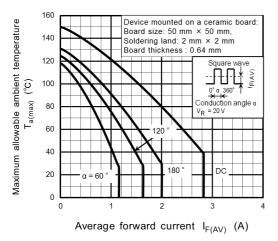


Fig. 10.3 $T_{a(max)}$ - $I_{F(AV)}$

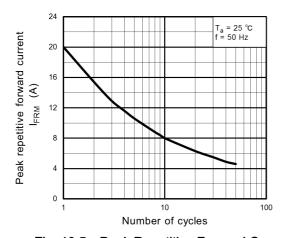


Fig. 10.5 Peak Repetitive Forward Current

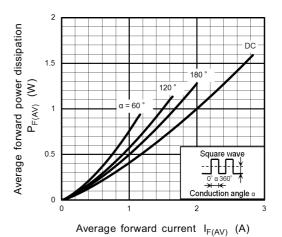


Fig. 10.2 P_{F(AV)} - I_{F(AV)}

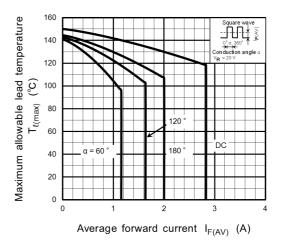


Fig. 10.4 $T_{\ell(max)}$ - $I_{F(AV)}$

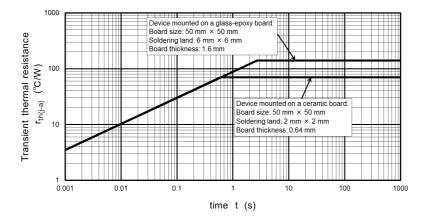
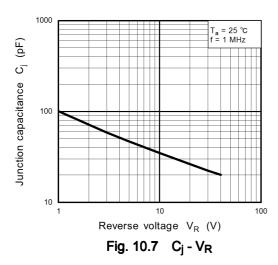


Fig. 10.6 r_{th(j-a)} - t



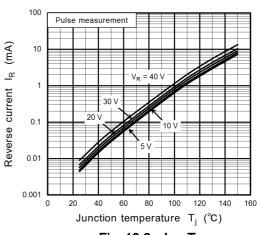


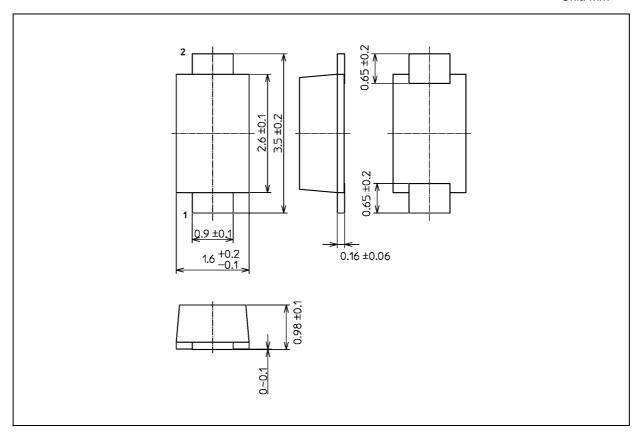
Fig. 10.8 I_R - T_j

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



Package Dimensions

Unit: mm



Weight: 0.013 g (typ.)

Package Name(s)
TOSHIBA: 3-2A1S
Nickname: S-FLAT



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