

## High Efficiency Snubber Diode

### Features and Benefits

- High Peak Reverse Voltage,  $V_{RM}$ : 800 V
- Low Forward Voltage,  $V_F$ : 0.92 V (max) at  $I_F = 1.2$  A
- Peak Forward Surge Current,  $I_{FSM}$ : 110 A
- Average Forward Current,  $I_{F(AV)}$ : 1.2 A
- Flammability rating UL94V-0 (Equivalent)
- Pins Pb (lead) free

### Package: Axial



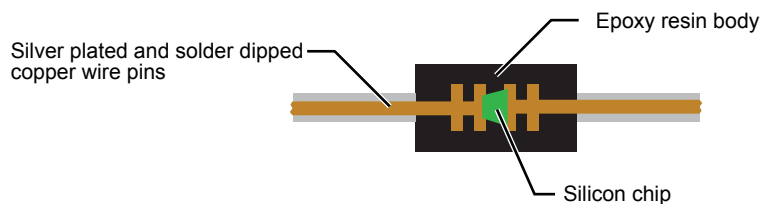
### Description

The SARS01 is an 800 V silicon diode designed especially for use in high-efficiency snubber circuits. This diode can sustain a high voltage with low loss, with low-noise rectification.

### Applications

- White goods appliances
- Audio-visual equipment
- Light fixtures
- Communication equipment
- Factory automation

### Product Structure



**Selection Guide**

Part Number	Packing*
SARS01V	5000 pieces per reel, 52 mm pitch axial taping
SARS01V1	2000 pieces per box, 52 mm pitch axial taping
SARS01V0	2000 pieces per box, 26 mm pitch axial taping
SARS01W	4000 pieces per box, radial taping

\*See the Packing Options page for details on the packing orientation.

**Absolute Maximum Ratings**

Characteristic	Symbol	Conditions	Rating	Unit
Peak Reverse Surge Voltage	$V_{RSM}$		800	V
Peak Reverse Voltage	$V_{RM}$		800	V
Average Forward Current	$I_{F(AV)}$	Refer to figure 1	1.2	A
Peak Forward Surge Current	$I_{FSM}$	10 ms, half sine wave, one shot	110	A
Junction Temperature	$T_j$		-40 to 150	°C
Storage Temperature	$T_{stg}$		-40 to 150	°C

Electrical Characteristics valid at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Characteristic	Symbol	Test Conditions	Value	Unit
Forward Voltage	$V_F$	$I_F = 1.2\text{ A}$	0.92 (max)	V
Reverse Current	$I_R$	$V_R = V_{RM}$	10 (max)	$\mu\text{A}$
Reverse Current (High Temperature)	$I_{R(H)}$	$V_R = V_{RM}, T_j = 100^\circ\text{C}$	50 (max)	$\mu\text{A}$
Reverse Recovery Time	$t_{rr}$	$I_F = I_{RP} = 10\text{ mA}$ , 90% recovery point; refer to figure 2	2 to 18	$\mu\text{s}$
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	Between junction and pin	20 (max)	$^\circ\text{C/W}$

**Voltage Derating versus Ambient Temperature**

Power loss by reverse voltage not included

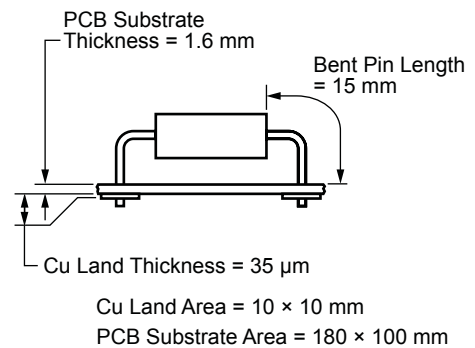
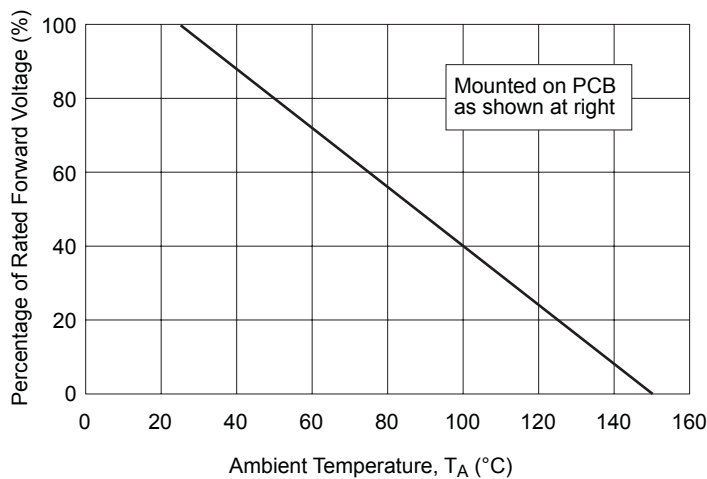


Figure 1. Derating Characteristic and Mounting Conditions

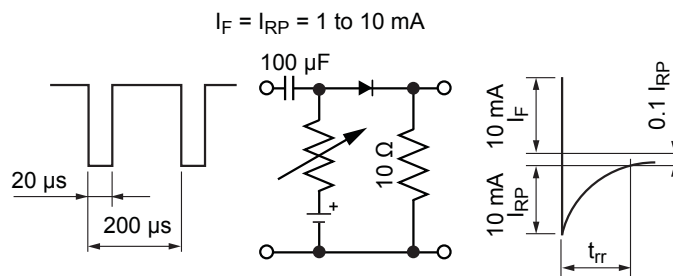
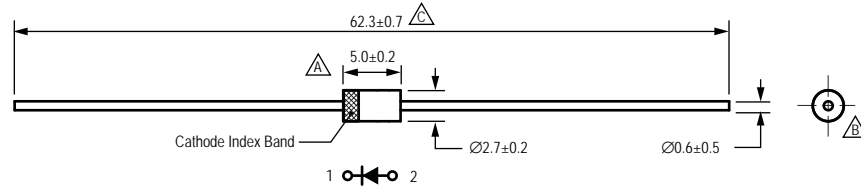


Figure 2. Definition of Peak Reverse Current,  $I_{RP}$

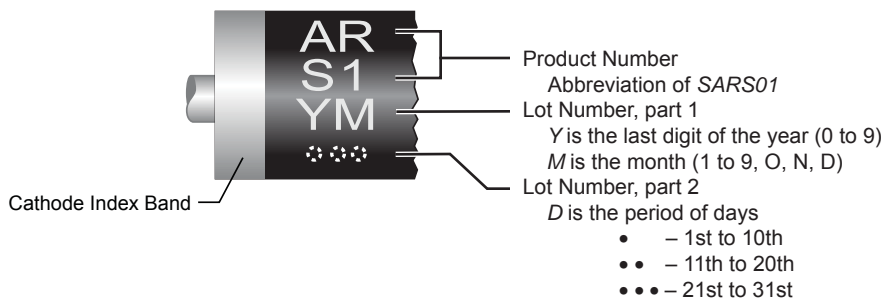
Package Outline



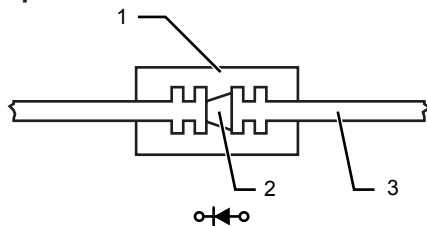
Dimensions in mm

- $\triangle A$  Offset body centerline to pin centerline 0.5 mm maximum
- $\triangle B$  Concentricity body and pin 0.3 mm maximum
- $\triangle C$  Pin dimension does not include trim burr; burr 2 mm maximum

Package Marking



Material Composition and Internal Structure



1. Body: Plastic, epoxy resin
2. Chip: Si
3. Pins: Cu wire  
Ag plating  
Solder dipped

Weight: Approximately 0.2 g

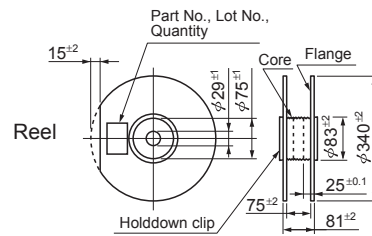
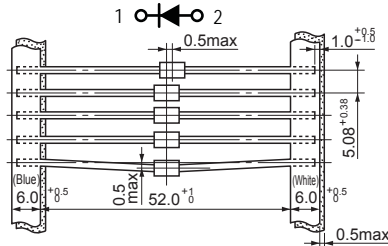


Pin treatment Pb-free. Device composition compliant with the RoHS directive.

Packing Options

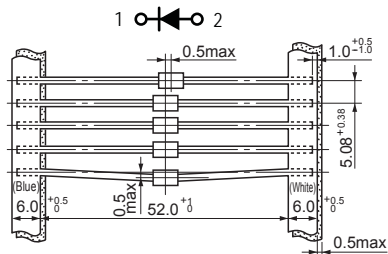
V orientation

Axial taping  
5,000 pieces  
per reel



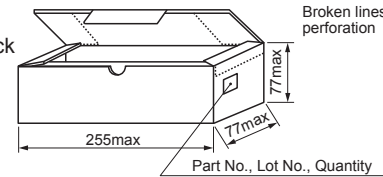
V1 orientation

Axial taping  
2,000 pieces  
per box



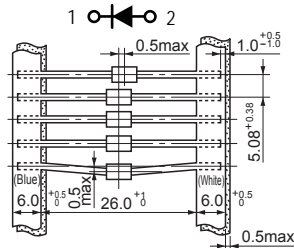
Ammunition  
(Ammo) pack

Broken lines:  
perforation



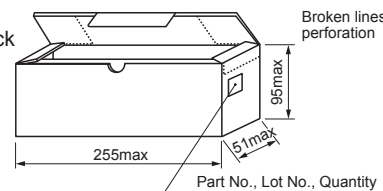
V0 orientation

Axial taping  
2,000 pieces  
per box



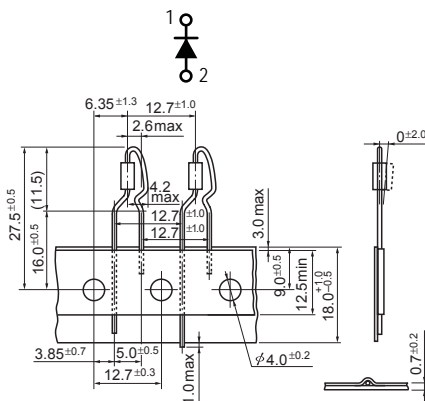
Ammunition  
(Ammo) pack

Broken lines:  
perforation



W orientation

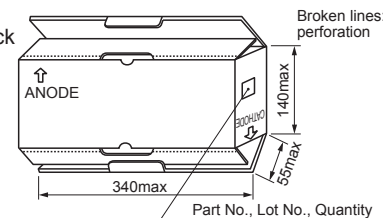
Radial taping  
4,000 pieces  
per box



Dimensions in mm

Ammunition  
(Ammo) pack

Broken lines:  
perforation



## Reliability Tests

Characteristic	Test Conditions	Acceptance Criterion	Rating	Unit
Thermal Fatigue Test	$\Delta T_j = 100^\circ\text{C}$	1	5000	cycle
High Temperature Reverse Bias Test	$T_A = 150^\circ\text{C}$ , $V_R = V_{RM}$ (AC, half-sine wave)	1	1000	hour
Humidity Reverse Bias Test	$T_A = 85^\circ\text{C}$ , RH = 85%, $V_R = V_{RM} \times 0.8$ (DC)	1	500	hour
High Temperature Storage Test	$T_A = 150^\circ\text{C}$	1	1000	hour
Moisture Resistance Test	$T_A = 85^\circ\text{C}$ , RH = 85%	1	1000	hour
Thermal Shock Test	Ice water (5 minutes), then boiling water (5 minutes)	1	100	cycle
Temperature Cycle Test	$-40^\circ\text{C}$ (30 minutes), then room temperature (5 minutes), then $150^\circ\text{C}$ (30 minutes)	1	100	cycle
Pressure Cooker Test	$2.03 \times 10^5$ Pa, 100% RH, unsaturated equipment	1	48	hour
Resistance to Soldering Heat Test	$260 \pm 5^\circ\text{C}$ , solder dip to 1.5 mm from body	1	10	second
	$380 \pm 5^\circ\text{C}$ , using soldering iron	1	3.5	second
Solderability Test	$245 \pm 5^\circ\text{C}$ , $5 \pm 0.5$ seconds, using rosin flux	2	95	%
Pin Bend Test	Apply EIAJ ED-4701/400	3	2	cycle
Pin Pull Test		3	10	second
Pin Twist Test		3	2	cycle
Drop Test		3	10	cycle

NOTE: Acceptance criteria as follows:

- 1 – Product meets all the values specified in the Electrical Characteristics table, after being exposed to normal temperature more than 2 hours and less than 24 hours.
- 2 – Product meets rating of the reliability test.
- 3 – No structural failures during reliability test, and product meets  $V_F$  and  $I_R$  specifications in the Electrical Characteristics table after completion of the reliability test.

## Design Notes

Use resistors in series, and adjust so the diode saturates at junction temperature,  $T_j \leq 150^\circ\text{C}$ .

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