

# High Efficiency Snubber Diode

## Features and Benefits

- High Peak Reverse Voltage,  $V_{RM}$ : 800 V
- Low Forward Voltage,  $V_F$ : 1.05 V (max.) at  $I_F = 1.0$  A
- Peak Forward Surge Current,  $I_{FSM}$ : 30 A
- Average Forward Current,  $I_{F(AV)}$ : 1.0 A
- Flammability rating UL94V-0 (Equivalent)
- Pins Pb (lead) free

## Package: Surface Mount



Not to scale

## Description

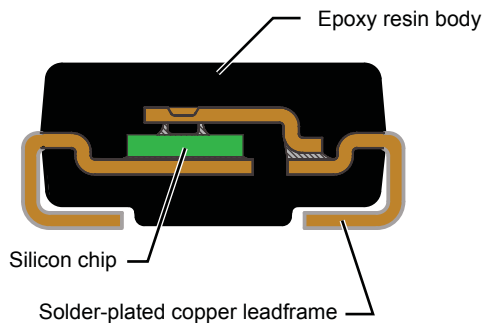
The SARS05 is an 800 V silicon diode designed especially for use in high-efficiency snubber circuits. This diode can sustain a high voltage with low loss, with low-noise rectification.

To suppress surge voltage, conduct the surge voltage and noise into a capacitor via a series resistor,  $R_S$ . Then allow the capacitor to discharge the energy into power supply line with the regenerative circuit operation, shown below in the typical application circuit schematic.

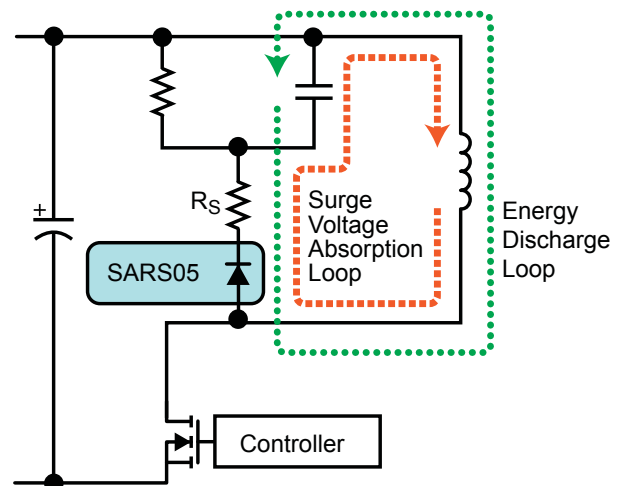
## Applications

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

## Product Structure



## Typical Application



**Selection Guide**

| Part Number | Packing*   |
|-------------|--|
| SARS05VL    | 1800 pieces per reel, embossed taping; cathode left  |
| SARS05VR    | 1800 pieces per reel, embossed taping; cathode right |

\*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               | 1.0        | A                 |
| Peak Forward Surge Current | $I_{FSM}$   | 10 ms, half sine wave, one shot | 30         | A                 |
| $I^2t$ Limiting Value      | $I^2t$      | 1 ms < t < 10 ms                | 4.5        | A <sup>2</sup> ·s |
| Junction Temperature       | $T_j$       |                                 | -40 to 150 | °C                |
| Storage Temperature        | $T_{stg}$   |                                 | -40 to 150 | °C                |

**Design Notes**

Use a series resistor ( $R_S$  in the typical application circuit schematic), and choose a value for the resistor such that the SARS05 diode saturates at junction temperature,  $T_j \leq 150^\circ\text{C}$ .

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

| Characteristic                       | Symbol          | Test Conditions  | Value         | Unit               |
|--------------------------------------|-----------------|--|---------------|--------------------|
| Forward Voltage                      | $V_F$           | $I_F = 1.0\text{ A}$   | 1.05 (max)    | V                  |
| Reverse Current                      | $I_R$           | $V_R = V_{RM}$   | 5 (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                | $t_{rr}$        | $I_F = I_{RP} = 100\text{ mA}$ , 95% recovery point, $T_j = 25^\circ\text{C}$ , see figure 2 | 2 to 19 (max) | $\mu\text{s}$      |
| Thermal Resistance, Junction to Lead | $R_{\theta JL}$ | Between junction and pin   | 20 (max)      | $^\circ\text{C/W}$ |

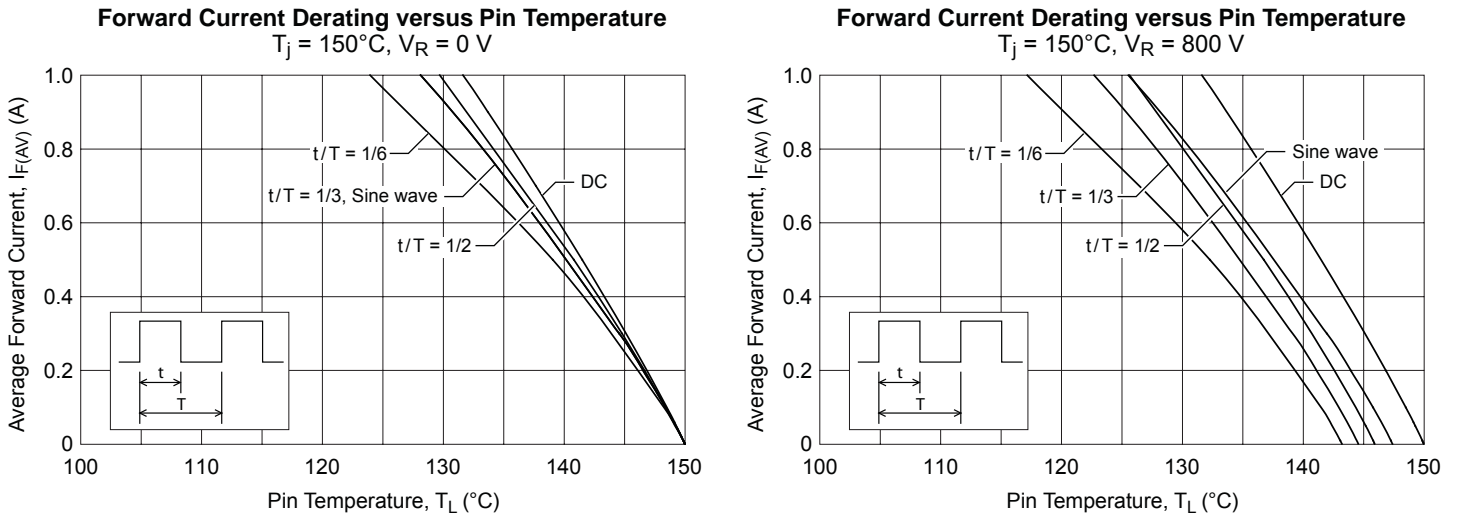


Figure 1. Derating Characteristics and Mounting Conditions

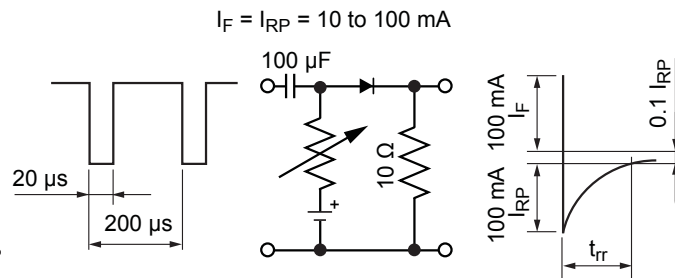
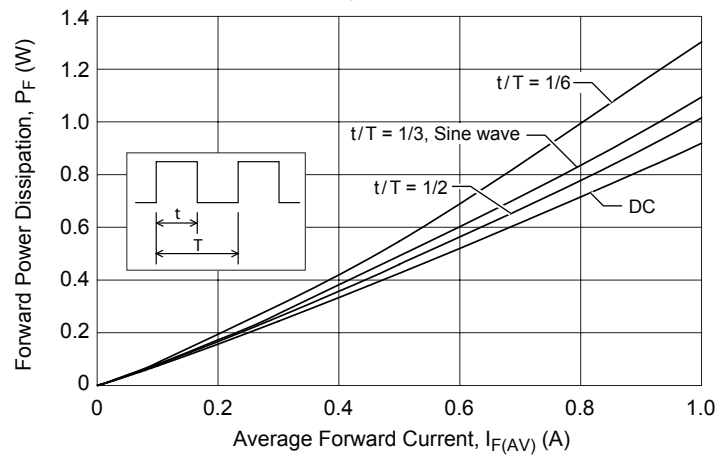


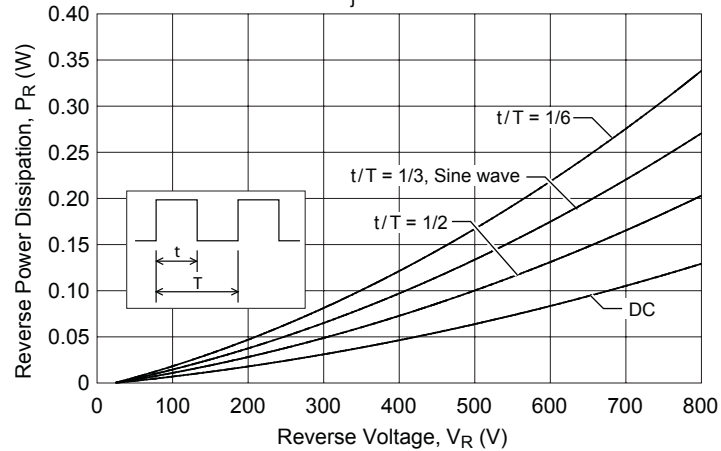
Figure 2. Definition of Peak Reverse Current,  $I_{RP}$

Characteristic Performance

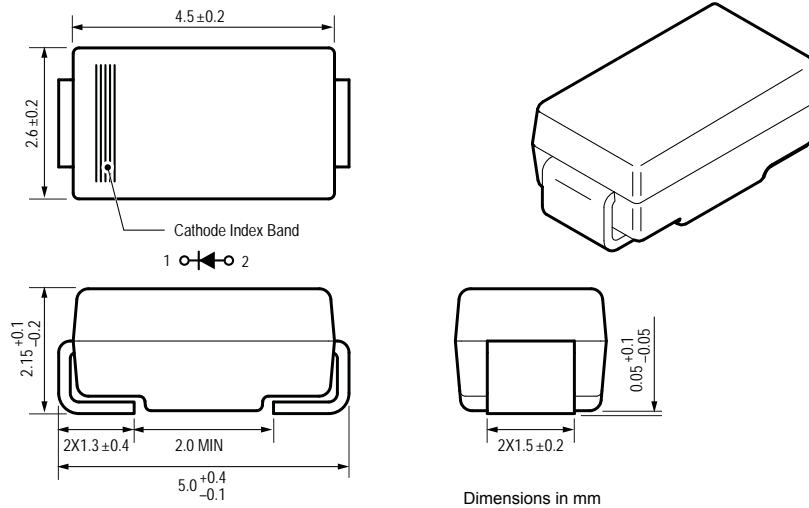
Forward Power Dissipation versus Average Forward Current  
 $T_j = 150^\circ\text{C}$



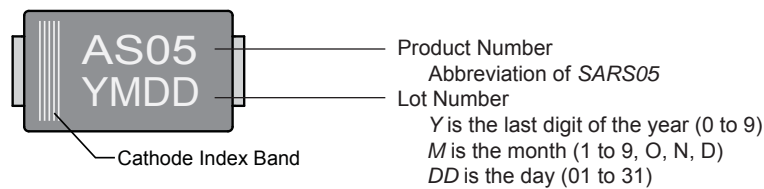
Reverse Power Dissipation versus Reverse Voltage  
 $T_j = 150^\circ\text{C}$



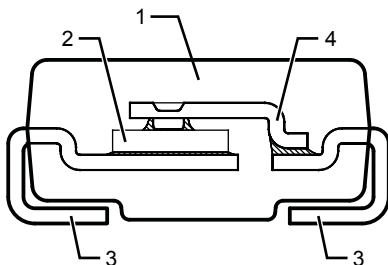
Package Outline



Package Marking



Material Composition and Internal Structure



- 1. Body: Plastic, epoxy resin
- 2. Chip: Si
- 3. Leadframe: Cu with solder plating
- 4. Interior Leadframe: Cu

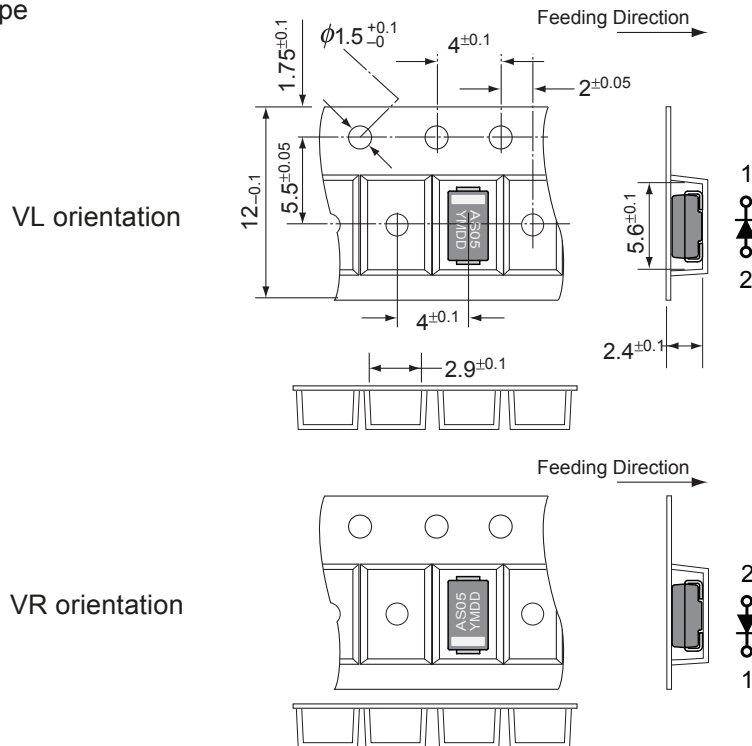
Weight: Approximately 0.072 g



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

Packing Options

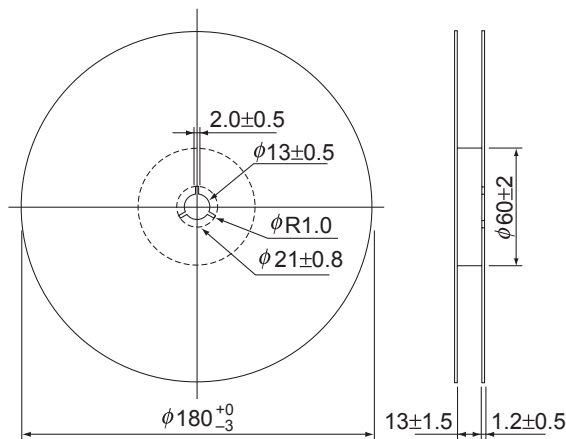
Embossed Tape



Dimensions in mm

Tape and reel dimensions the same for both orientations

Reel



1800 pieces per reel

- (1) Device is placed in the embossed pocket with the mounting electrode down.
- (2) 150 to 200 mm leader tape is attached to the tip of the tape.
- (3) 10 or more blank pockets are provided at both the beginning and the end of the tape.

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