# SD103AWS / BWS / CWS

## List

List........................................................ 1

Package outline........................................................ 2

Features........................................................ 2

Mechanical data........................................................ 2

Maximum ratings ........................................................ 2

Rating and characteristic curves........................................................ 3

Pinning information........................................................ 4

Marking........................................................ 4

Suggested solder pad layout........................................................ 4

Packing information........................................................ 5

Reel packing........................................................ 6

Suggested thermal profiles for soldering processes........................................................ 6

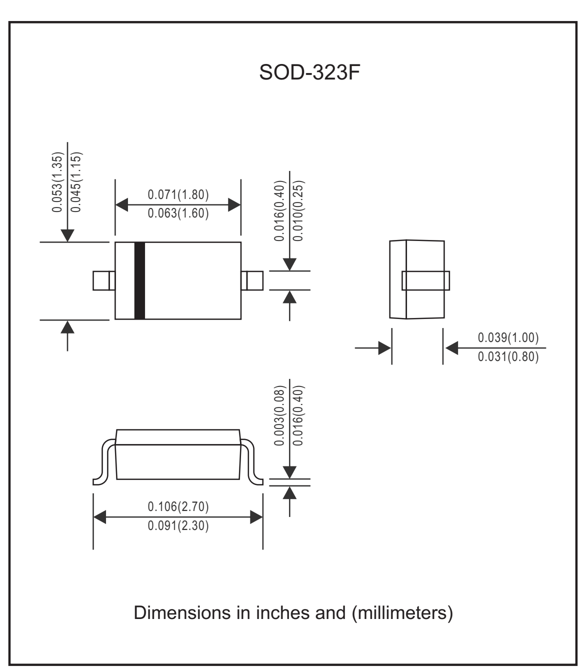
High reliability test capabilities........................................................ 7

Formosa MS

# SD103AWS / BWS / CWS

## 350mA Surface Mount Small Signal Schottky Diode - 20V-40V

## Package outline




## Features

- Low current rectification and high speed switching.
- Extremely small surface mount type.
- Low forward voltage drop.
- Silicon epitaxial planar chip, metal silicon junction.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.SD103AWS-H.

## Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-323F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.005 gram

## Maximum ratings (AT $T_A$=25°C unless otherwise noted)

| PARAMETER | CONDITIONS | Symbol | SD103AWS | SD103BWS | SD103CWS | UNIT |
|---|---|---|---|---|---|---|
| Peak repetitive reverse voltage<br>Working peak reverse voltage<br>DC blocking voltage | | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 40 | 30 | 20 | V |
| RMS reverse voltaget | | $V_{R(RMS)}$ | 28 | 21 | 14 | V |
| Average rectified output current | | $I_{F(AV)}$ | 350 | | | mA |
| Non-repetitive peak forward surge current | @ t < 1.0s | $I_{FSM}$ | 1.5 | | | A |
| Total device dissipation | | $P_D$ | 200 | | | mW |
| Thermal resistance | Junction to ambient | $R_{\theta JA}$ | 625 | | | °C/W |
| Operating temperature | | $T_J$ | -55 ~ +125 | | | °C |
| Storage temperature | | $T_{STG}$ | -65 ~ +125 | | | °C |

## Electrical Characteristics (AT $T_A$=25°C unless otherwise noted)

| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Reverse breakdown voltage | $I_R$=100uA,SD103AWS<br>$I_R$=100uA,SD103BWS<br>$I_R$=100uA,SD103CWS | $V_{(BR)R}$ | 40<br>30<br>20 | | | V |
| Forward voltage | $I_F$ = 20mA<br>$I_F$ = 200mA | $V_F$ | | | 0.37<br>0.60 | V |
| Reverse current | $V_R$ = 30 V, SD103AWS<br>$V_R$ = 20 V, SD103BWS<br>$V_R$ = 10 V, SD103CWS | $I_R$ | | | 5.0 | uA |
| Typical Junction capacitance | $V_R$ = 0 V, f = 1.0MHz | $C_J$ | | 50 | | pF |
| Reverse recover time | $I_F = I_R$ = 200mA, $I_{rr}$ = 0.1 X $I_R$, $R_L$ = 100 OHM | $t_{rr}$ | | 10 | | ns |

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|---|---|---|---|---|
| DS-22163T | 2009/08/10 | 2011/04/20 | B | 7 |

## Rating and characteristic curves (SD103AWS / BWS / CWS)

Fig. 1 POWER DERATING CURVE

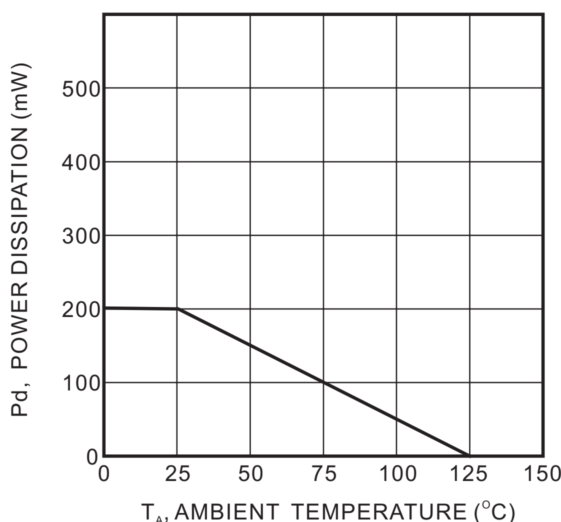



Fig. 2 TYPICAL FORWARD CHARACTERISTIC

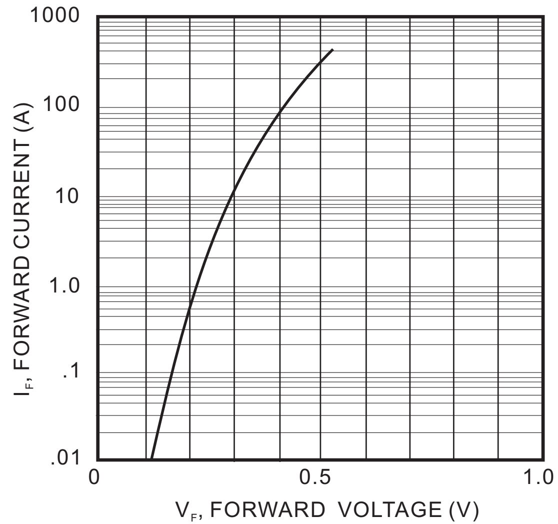
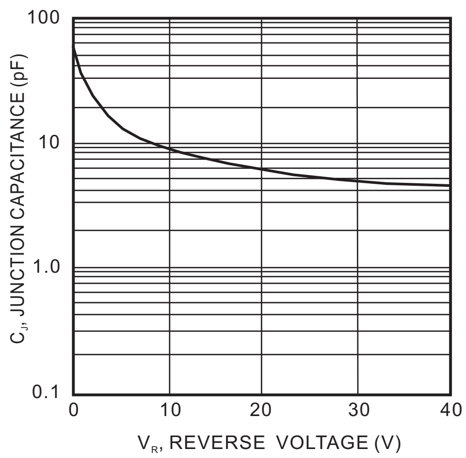



Fig. 3 TYPICAL JUNCTION CAPACITANCE VS REVERSE VOLTAGE



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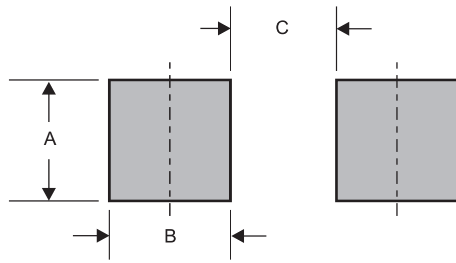
## Pinning information

| Pin | Simplified outline | Symbol |
|---|---|---|
| Pin1 cathode<br>Pin2 anode | 1 2 | 1 2 |

## Marking

| Type number | Marking code |
|---|---|
| SD103AWS | S4 |
| SD103BWS | S4, S5 |
| SD103CWS | S4, S6 |

## Suggested solder pad layout




Dimensions in inches and (millimeters)

| PACKAGE | A | B | C |
|---|---|---|---|
| SOD-323F | 0.059 (1.50) | 0.039 (1.00) | 0.051 (1.30) |

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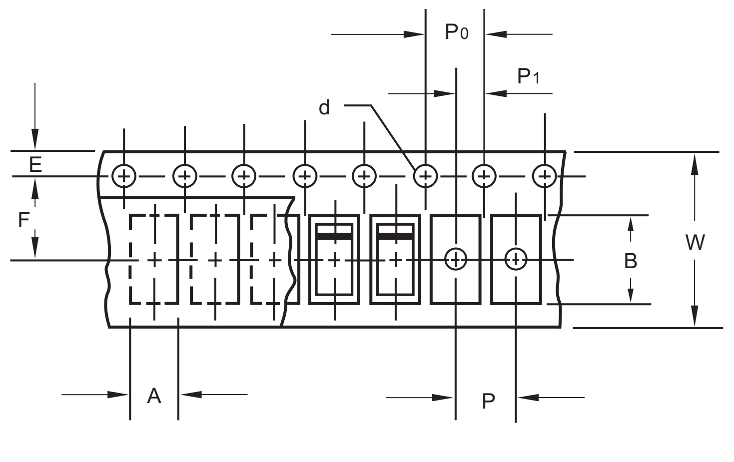
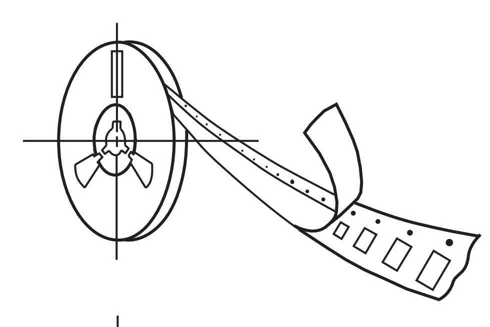
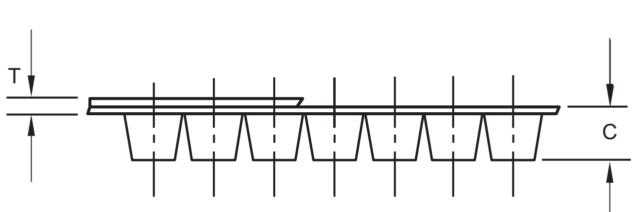
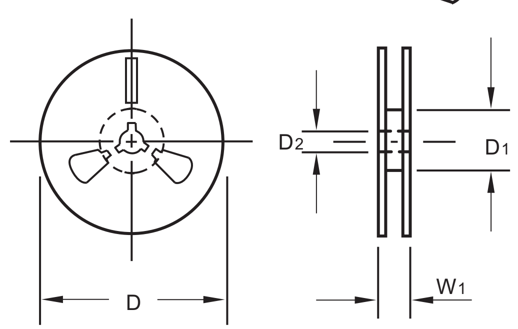
## Packing information






unit:mm

| Item | Symbol | Tolerance | SOD-323F |
|---|---|---|---|
| Carrier width | A | 0.1 | 1.46 |
| Carrier length | B | 0.1 | 2.95 |
| Carrier depth | C | 0.1 | 1.25 |
| Sprocket hole | d | 0.1 | 1.50 |
| 13" Reel outside diameter | D | 2.0 | - |
| 13" Reel inner diameter | $D_1$ | min | - |
| 7" Reel outside diameter | D | 2.0 | 178.00 |
| 7" Reel inner diameter | $D_1$ | min | 62.00 |
| Feed hole diameter | $D_2$ | 0.5 | 13.00 |
| Sprocket hole position | E | 0.1 | 1.75 |
| Punch hole position | F | 0.1 | 3.50 |
| Punch hole pitch | P | 0.1 | 4.00 |
| Sprocket hole pitch | $P_0$ | 0.1 | 4.00 |
| Embossment center | $P_1$ | 0.1 | 2.00 |
| Overall tape thickness | T | 0.1 | 0.23 |
| Tape width | W | 0.3 | 8.00 |
| Reel width | $W_1$ | 1.0 | 11.40 |

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

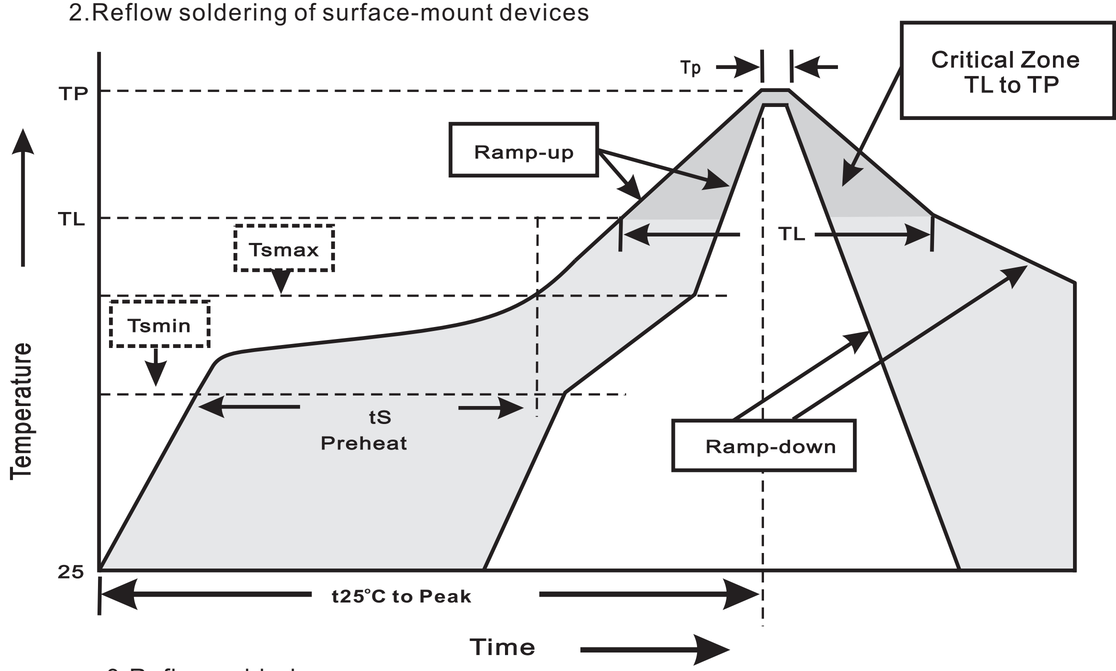
# SD103AWS / BWS / CWS

## Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---|---|---|---|---|---|---|---|---|---|
| SOD-323F | 7" | 3,000 | 4.0 | 30,000 | 183*183*123 | 178 | 382*262*387 | 240,000 | 8.0 |

## Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2.Reflow soldering of surface-mount devices




3.Reflow soldering

| Profile Feature | Soldering Condition |
|---|---|
| Average ramp-up rate(TL to TP) | <3°C/sec |
| Preheat<br>-Temperature Min(Tsmin)<br>-Temperature Max(Tsmax)<br>-Time(min to max)(ts) | <br>150°C<br>200°C<br>60~120sec |
| Tsmax to TL<br>-Ramp-upRate | <br><3°C/sec |
| Time maintained above:<br>-Temperature(TL)<br>-Time(tL) | <br>217°C<br>60~260sec |
| Peak Temperature(TP) | 255°C-0/+5°C |
| Time within 5°C of actual Peak Temperature(tP) | 10~30sec |
| Ramp-down Rate | <6°C/sec |
| Time 25°C to Peak Temperature | <6minutes |

# SD103AWS / BWS / CWS

## High reliability test capabilities

| Item Test | Conditions | Reference |
|---|---|---|
| 1. Solder Resistance | at 260±5°C for 10±2sec.<br>immerse body into solder 1/16"±1/32" | MIL-STD-750D<br>METHOD-2031 |
| 2. Solderability | at 245±5°C for 5 sec. | MIL-STD-202F<br>METHOD-208 |
| 3. High Temperature Reverse Bias | $V_R$=80% rate at $T_J$=125°C for 168 hrs. | MIL-STD-750D<br>METHOD-1038 |
| 4. Forward Operation Life | Rated average rectifier current at $T_A$=25°C for 500hrs. | MIL-STD-750D<br>METHOD-1027 |
| 5. Intermittent Operation Life | $T_A$ = 25°C, $I_F$ = $I_O$<br>On state: power on for 5 min.<br>off state: power off for 5 min.<br>on and off for 500 cycles. | MIL-STD-750D<br>METHOD-1036 |
| 6. Pressure Cooker | 15$P_{SIG}$ at $T_A$=121°C for 4 hrs. | JESD22-A102 |
| 7. Temperature Cycling | -55°C to +125°C dwelled for 30 min.<br>and transferred for 5min. total 10 cycles. | MIL-STD-750D<br>METHOD-1051 |
| 8. Thermal Shock | 0°C for 5 min. rise to 100°C for 5 min. total 10 cycles. | MIL-STD-750D<br>METHOD-1056 |
| 9. Forward Surge | Non-repetitive peak forward surge current @ t < 1.0s | MIL-STD-750D<br>METHOD-4066-2 |
| 10. Humidity | at $T_A$=85°C, RH=85% for 1000hrs. | MIL-STD-750D<br>METHOD-1021 |
| 11. High Temperature Storage Life | at 175°C for 1000 hrs. | MIL-STD-750D<br>METHOD-1031 |