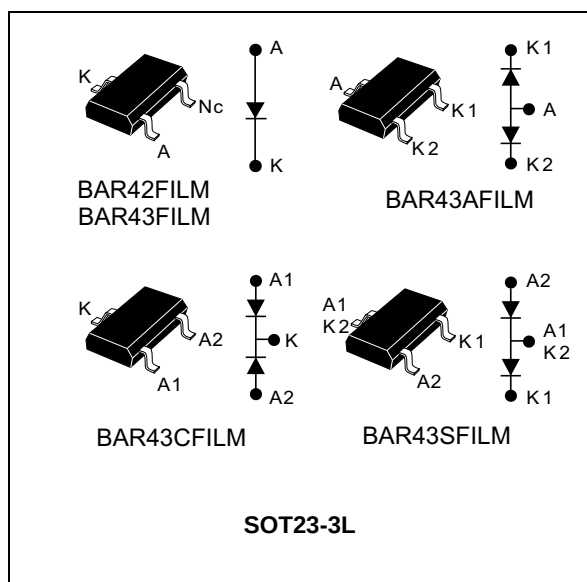




## Description

General purpose metal to silicon diodes featuring very low turn-on voltage and fast switching.

Table 1. Device summary

| Symbol      | Value           |
|-------------|-----------------|
| $I_{F(AV)}$ | 0.1 A           |
| $V_{RRM}$   | 30 V            |
| $T_j$       | 150 °C          |
| $V_F$ (max) | 0.33 and 0.40 V |

## Features

- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount device

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

| Symbol      | Parameter                                             |                          | Value         | Unit |
|-------------|-------------------------------------------------------|--------------------------|---------------|------|
| $V_{DRM}$   | Repetitive peak off-state voltage                     |                          | 30            | V    |
| $I_{F(AV)}$ | Continuous forward current                            |                          | 0.1           | A    |
| $I_{FSM}$   | Surge non repetitive forward current                  | $t_p = 10$ ms sinusoidal | 0.75          | A    |
| $P_{tot}$   | Power dissipation <sup>(1)</sup>                      | $T_{amb} = 25$ °C        | 250           | mW   |
| $T_{stg}$   | Maximum Storage temperature range                     |                          | - 65 to + 150 | °C   |
| $T_j$       | Maximum operating junction temperature <sup>(2)</sup> |                          | 150           | °C   |
| $T_L$       | Maximum temperature for soldering during 10 s         |                          | 260           | °C   |

1. For double diodes,  $P_{tot}$  is the total dissipation of both diodes
2.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink.

**Table 3. Thermal parameter**

| Symbol        | Parameter                          | Value | Unit |
|---------------|------------------------------------|-------|------|
| $R_{th(j-a)}$ | Junction to ambient <sup>(1)</sup> | 500   | °C/W |

1. Mounted on epoxy board with recommended pad layout.

**Table 4. Static electrical characteristics**

| Symbol               | Parameter               | Test conditions |                     | Min.           | Typ. | Max. | Unit    |
|----------------------|-------------------------|-----------------|---------------------|----------------|------|------|---------|
| $V_{BR}$             | Breakdown voltage       | $T_j = 25$ °C   | $I_R = 100$ $\mu$ A | 30             |      |      | V       |
| $I_R$ <sup>(1)</sup> | Reverse leakage current | $T_j = 25$ °C   | $V_R = V_{RRM}$     |                |      | 500  | nA      |
|                      |                         | $T_j = 100$ °C  |                     |                |      | 100  | $\mu$ A |
| $V_F$ <sup>(2)</sup> | Forward voltage drop    | $T_j = 25$ °C   | BAR42               | $I_F = 10$ mA  |      | 0.35 | V       |
|                      |                         |                 | BAR42               | $I_F = 50$ mA  |      | 0.50 |         |
|                      |                         |                 |                     | $I_F = 2$ mA   | 0.26 | 0.33 |         |
|                      |                         |                 | ALL                 | $I_F = 100$ mA |      | 1    |         |

1. Pulse test:  $t_p = 5$  ms,  $\delta < 2$  %
2. Pulse test:  $t_p = 380$   $\mu$ s,  $\delta < 2$  %

Table 5. Dynamic characteristics (T<sub>j</sub> = 25 °C)

| Symbol | Test conditions       |                                                                                                                       | Min. | Typ. | Max. | Unit |
|--------|-----------------------|-----------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| C      | Junction capacitance  | T <sub>j</sub> = 25 °C V <sub>R</sub> = 1 V F = 1 MHz                                                                 |      | 7    |      | pF   |
| C      | Reverse recovery time | I <sub>F</sub> = 10 mA I <sub>R</sub> = 10 mA<br>T <sub>j</sub> = 25 °C I <sub>rr</sub> = 1 mA R <sub>L</sub> = 100 Ω |      |      | 5    | pF   |
| η      | Detection efficiency  | C <sub>L</sub> = 300 pF F = 45 MHz<br>T <sub>j</sub> = 25 °C V <sub>i</sub> = 2 V R <sub>L</sub> = 50 Ω               | 80   |      |      | ps   |

Figure 1. Forward voltage drop versus forward current (typical values, low level)

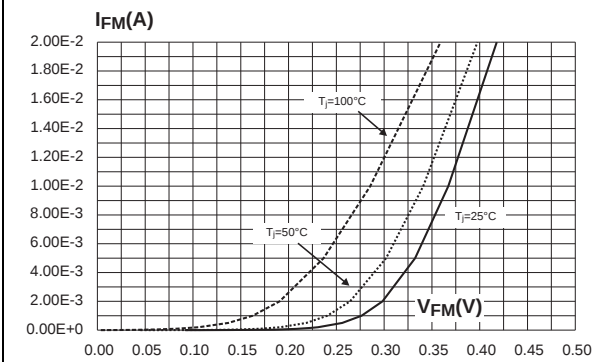


Figure 2. Forward voltage drop versus forward current (typical values, high level)

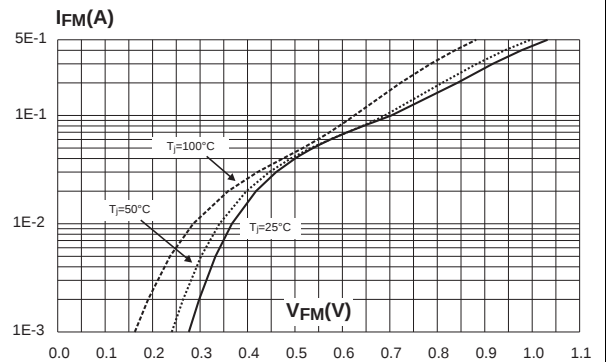


Figure 3. Reverse leakage current versus reverse voltage applied (typical values)

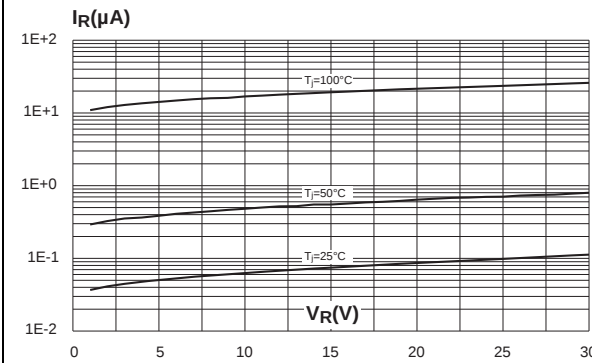


Figure 4. Reverse leakage current versus junction temperature

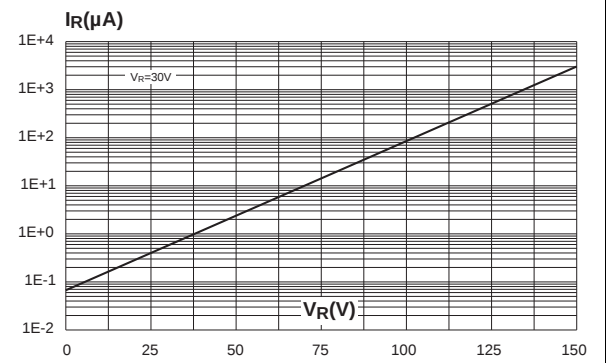


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

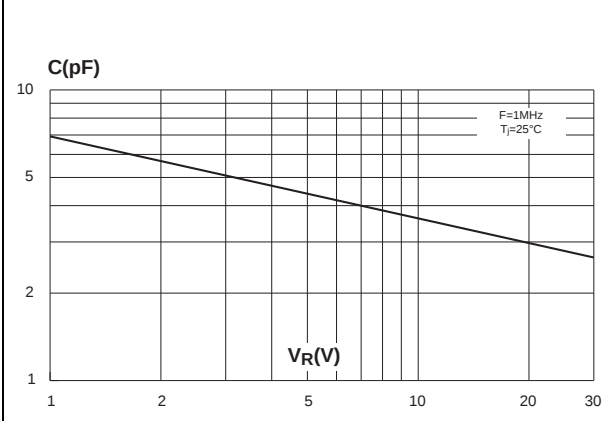


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

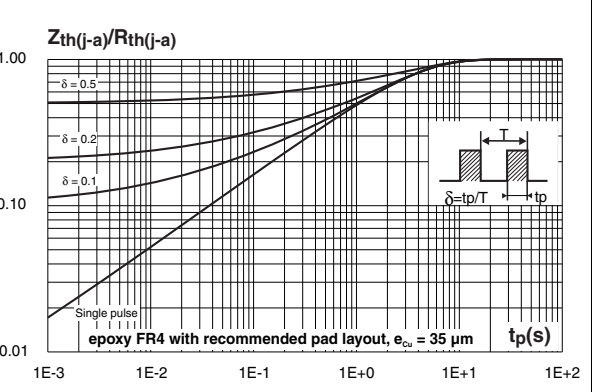
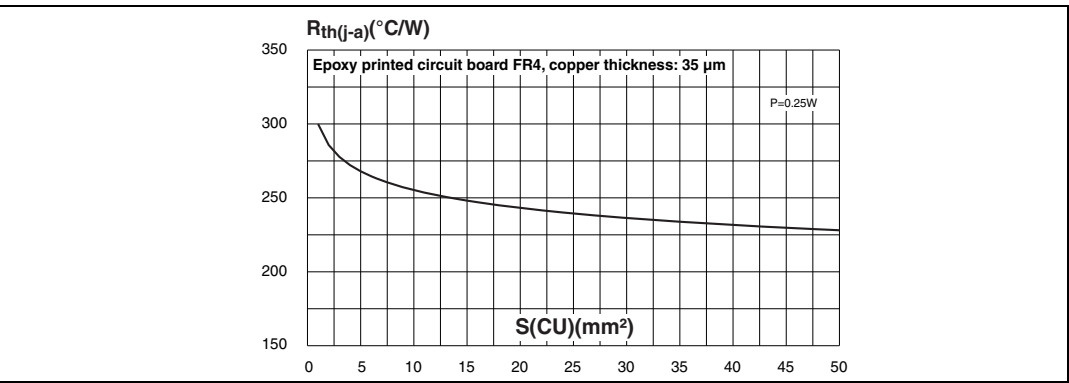


Figure 7. Thermal resistance junction to ambient versus copper surface under each lead



# 2 Package information

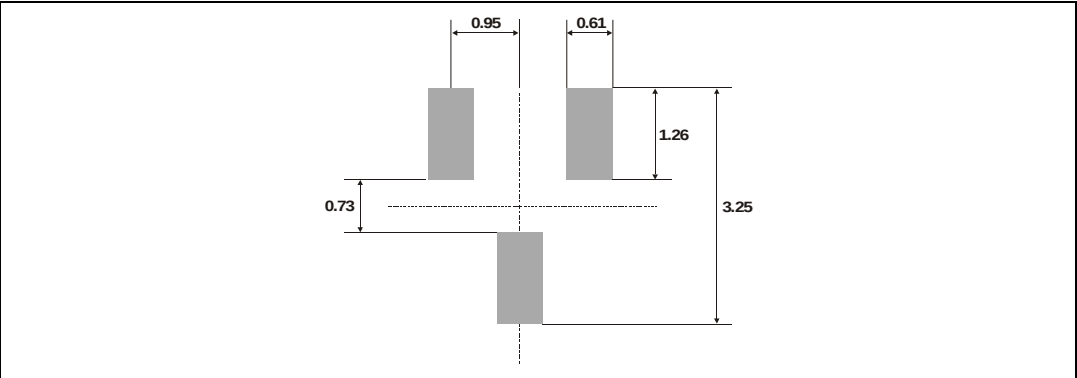
- Epoxy meets UL94, V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

Table 6. SOT23-3L dimensions

| Ref. | Dimensions  |      |            |       |
|------|-------------|------|------------|-------|
|      | Millimeters |      | Inches     |       |
|      | Min.        | Max. | Min.       | Max.  |
| A    | 0.89        | 1.4  | 0.035      | 0.055 |
| A1   | 0           | 0.1  | 0          | 0.004 |
| B    | 0.3         | 0.51 | 0.012      | 0.02  |
| c    | 0.085       | 0.18 | 0.003      | 0.007 |
| D    | 2.75        | 3.04 | 0.108      | 0.12  |
| e    | 0.85        | 1.05 | 0.033      | 0.041 |
| e1   | 1.7         | 2.1  | 0.067      | 0.083 |
| E    | 1.2         | 1.6  | 0.047      | 0.063 |
| H    | 2.1         | 2.75 | 0.083      | 0.108 |
| L    | 0.6 typ.    |      | 0.024 typ. |       |
| S    | 0.35        | 0.65 | 0.014      | 0.026 |

Figure 8. Footprint (dimensions in mm)



### 3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package  | Weight | Base Qty | Delivery mode |
|------------|---------|----------|--------|----------|---------------|
| BAR42FILM  | D94     | SOT23-3L | 0.01 g | 3000     | Tape and reel |
| BAR43FILM  | D95     |          |        |          |               |
| BAR43AFILM | DB1     |          |        |          |               |
| BAR43CFILM | DB2     |          |        |          |               |
| BAR43SFILM | DA5     |          |        |          |               |

### 4 Revision history

Table 8. Document revision history

| Date        | Revision | Changes                           |
|-------------|----------|-----------------------------------|
| Aug-2001    | 2B       | Last release.                     |
| 16-Apr-2005 | 3        | Layout update. No content change. |
| 23-Apr-2014 | 4        | Updated ECOPACK statement.        |
| 18-Jul-2017 | 5        | Updated figure in cover page.     |

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