



BAT20J

HIGH EFFICIENCY SWITCHING AND ULTRA LOW LEAKAGE CURRENT SCHOTTKY DIODE

MAIN PRODUCT CHARACTERISTICS

| | |
|-----------------------|------------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 23 V |
| I_R 25°C(max) @ 15V | 12 μ A |
| T_j (max) | 150 °C |

FEATURES AND BENEFITS

- Low conduction losses
- Very low reverse current
- Negligible switching losses
- Low capacitance diode
- Low forward and reverse recovery times
- Extremely fast switching
- Surface mount device

DESCRIPTION

The BAT20J is using 23V schottky barrier diode encapsulated on a SOD-323 package. This is specially suited for switching mode in mobile phone and PDA power management applications or LED driver circuits (step up converters).

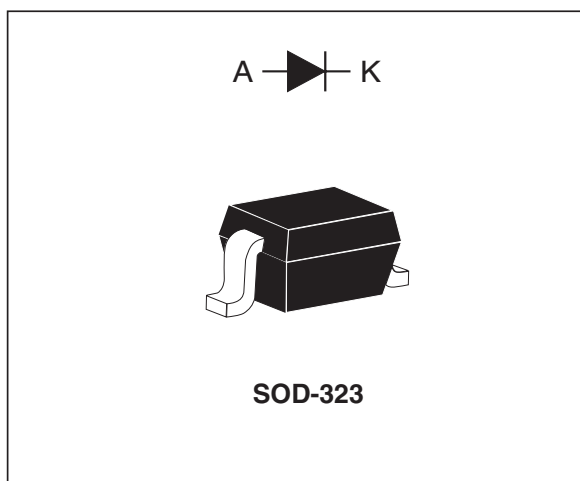
ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | Value | Unit |
|--------------|---|--------------|------|
| V_{RRM} | Repetitive peak reverse voltage | 23 | V |
| $I_{F(RMS)}$ | Repetitive peak forward current | 2 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.38$ | 1 | A |
| I_{FSM} | Surge non repetitive forward current ($t_p=10ms$ sinusoidal) | 5 | A |
| T_{stg} | Maximum storage temperature range | - 65 to +150 | °C |
| T_j | Maximum operating junction temperature * | 150 | °C |
| TL | Maximum temperature for soldering during * | 260 | °C |

* : $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

Order code

| Part Number | Marking |
|-------------|---------|
| BAT20JFILM | 20 |



BAT20J

THERMAL RESISTANCE

| Symbol | Parameter | Value | Unit |
|---------------|-------------------------|-------|------|
| $R_{th(j-a)}$ | Junction to Ambient (*) | 600 | °C/W |

(*) Mounted on epoxy board without copper heat sink.

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameters | Tests conditions | | Min. | Typ. | Max. | Unit |
|------------|---|--------------------------|---|------|----------------------|----------------------|---------------|
| I_R^* | Reverse leakage current (see note 1) | $T_j = 25^\circ\text{C}$ | $V_R = 5\text{ V}$ $V_R = 8\text{ V}$ $V_R = 15\text{ V}$ | | 0.65 0.88 3.00 | 2 3 12 | μA |
| I_R^* | Reverse leakage current | $T_j = 85^\circ\text{C}$ | $V_R = 5\text{ V}$ $V_R = 8\text{ V}$ $V_R = 15\text{ V}$ | | 55 70 120 | 120 150 250 | |
| V_F^{**} | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 10\text{ mA}$ $I_F = 100\text{ mA}$ $I_F = 1\text{ A}$ | | 0.28 0.35 0.54 | 0.31 0.40 0.62 | V |

* Pulse test $t_p = 380\ \mu\text{s}$, $\delta < 2\%$

** Pulse test $t_p = 5\text{ ms}$, $\delta < 2\%$

Note 1: I_R at 23 V and $T_j = 25^\circ\text{C}$ is equal to 60 μA typ.

DYNAMIC ELECTRICAL CHARACTERISTICS

| Symbol | Parameters | Tests conditions | | Min. | Typ. | Max. | Unit |
|--------|-------------------|--------------------|--------------------|------|------|------|------|
| C_d | Diode capacitance | $V_R = 5\text{ V}$ | $F = 1\text{ MHz}$ | | 20 | 30 | pF |

To evaluate the maximum conduction losses, use the following equations :

$$P = 0.32 \times I_{F(AV)} + 0.23 \times I_{F(RMS)}^2$$

Fig. 1: Peak forward current versus ambient temperature ($\delta = 0.11$).

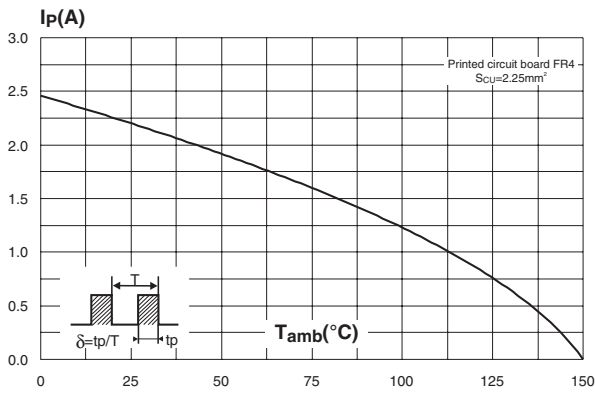


Fig. 2: Average forward current versus ambient temperature ($\delta = 0.5$).

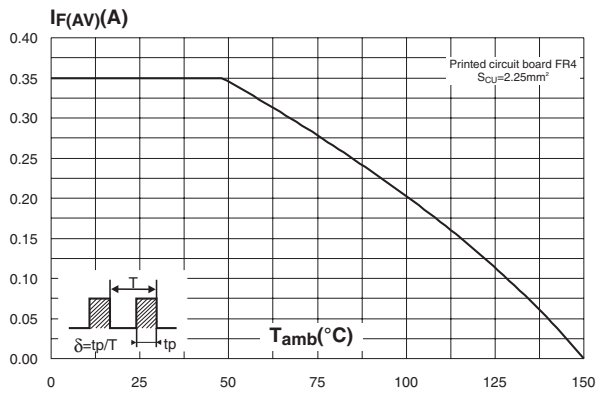


Fig. 3: Relative variation of thermal impedance junction to ambient versus pulse duration .

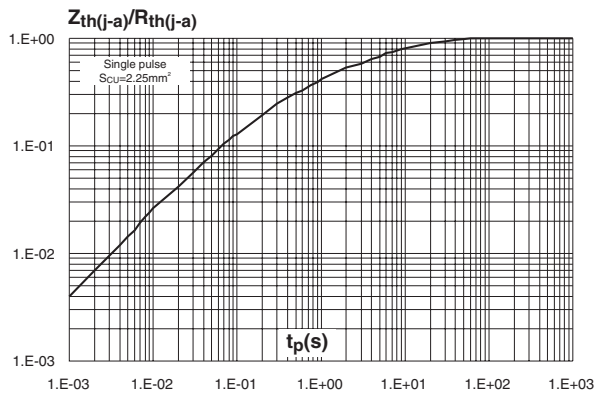


Fig. 4: Reverse leakage current versus reverse voltage applied (typical values).

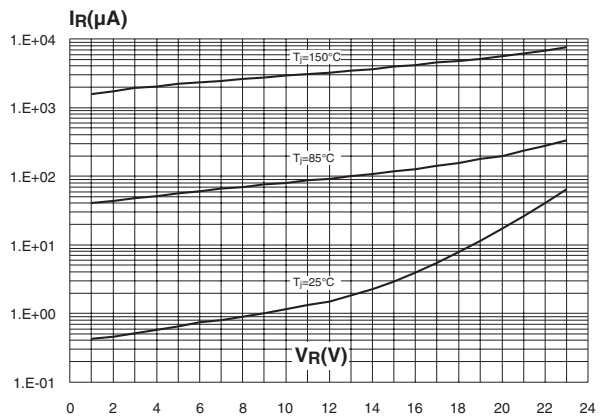


Fig. 5: Relative variation of reverse leakage current versus junction temperature (typical values).

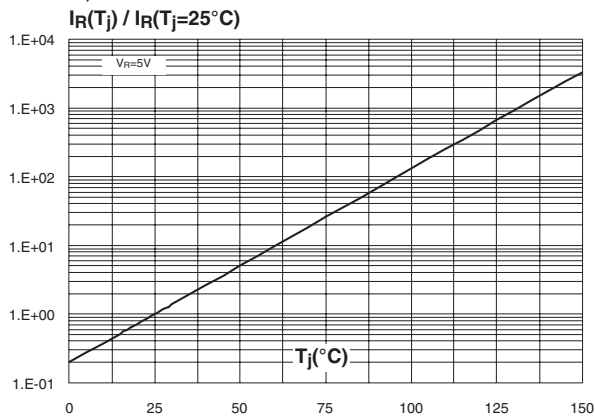


Fig. 6: Junction capacitance versus reverse voltage applied (typical values).

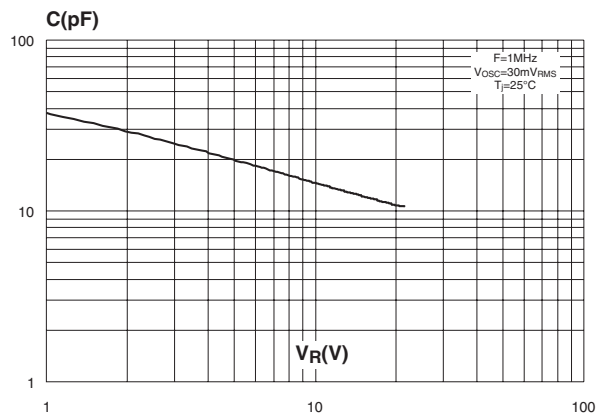


Fig. 7-1: Forward voltage drop versus forward current (typical values, high level).

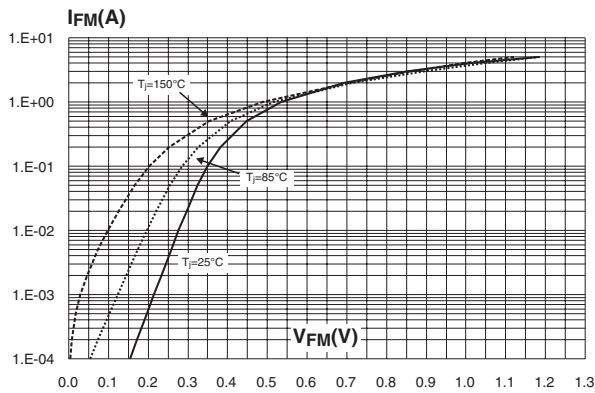


Fig. 7-2: Forward voltage drop versus forward current (low level).

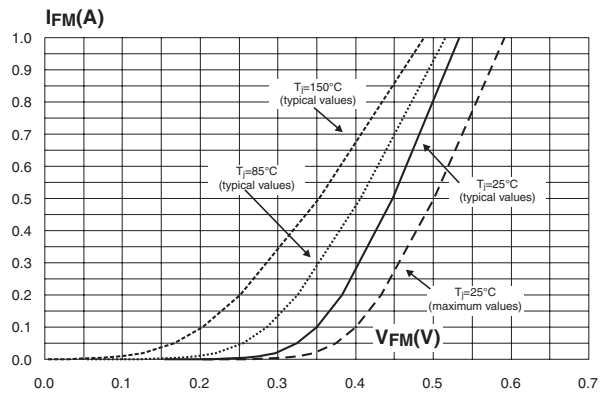


Fig. 8: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, $e_{Cu}=35\mu m$, typical values).

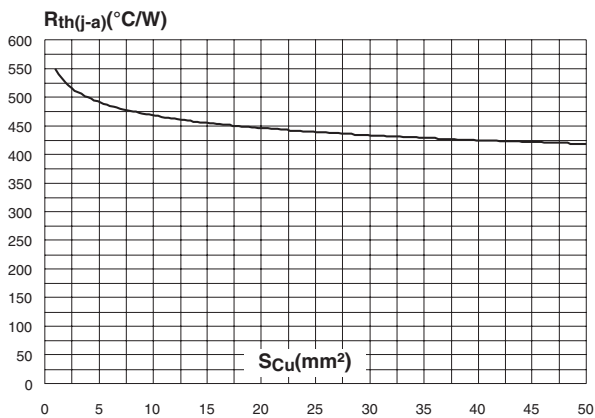
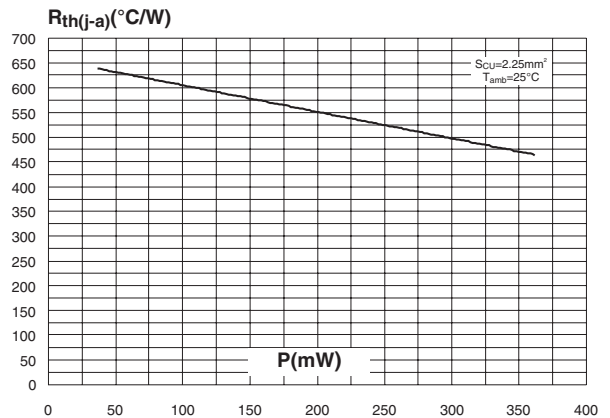
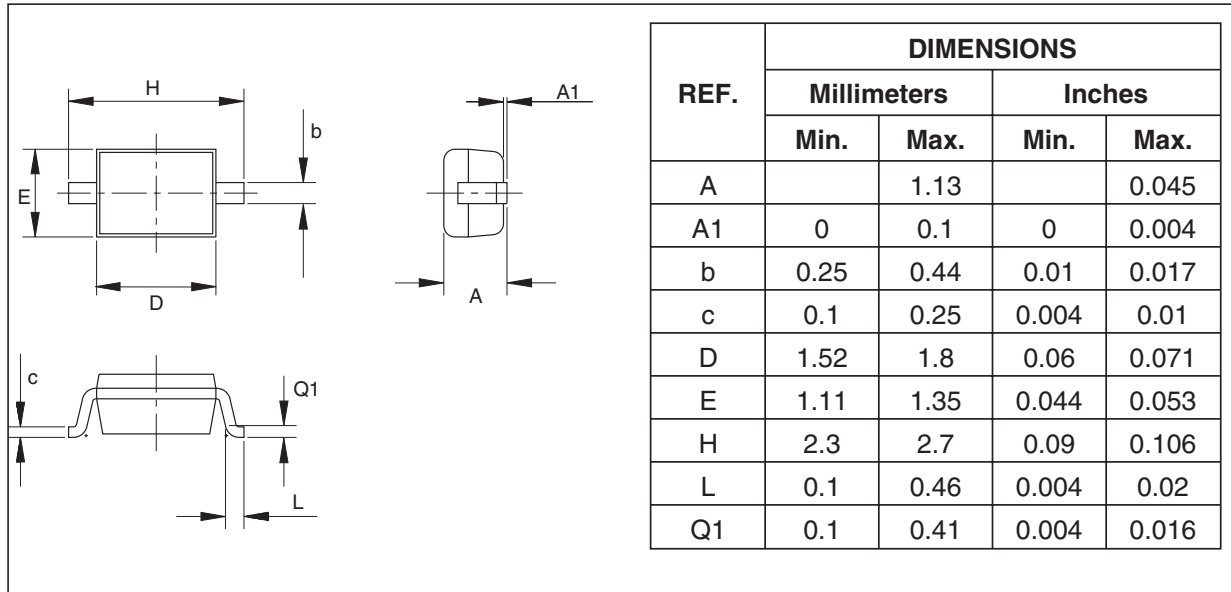


Fig. 9: Thermal resistance junction to ambient versus power dissipation (epoxy printed circuit board FR4, $e_{Cu}=35\mu m$, typical values).



PACKAGE MECHANICAL DATA
SOD-323



| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| BAT20JFILM | 20 | SOD-323 | 0.005g | 3000 | Tape & reel |

- Epoxy meets UL94,V0

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