



## 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 $\mu$ 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).

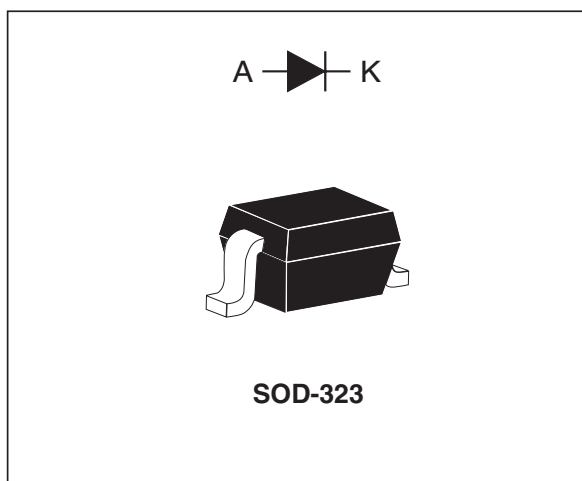
#### ABSOLUTE RATINGS (limiting values)

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 <b>note 1</b> )	$T_j = 25^\circ\text{C}$ $V_R = 5\text{ V}$ $V_R = 8\text{ V}$ $V_R = 15\text{ V}$		0.65 0.88 3.00	2 3 12	$\mu\text{A}$
$I_R^*$	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  $\mu\text{A}$  typ.

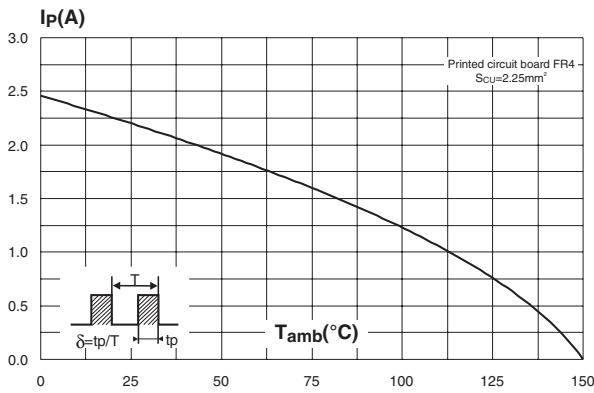
### DYNAMIC ELECTRICAL CHARACTERISTICS

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

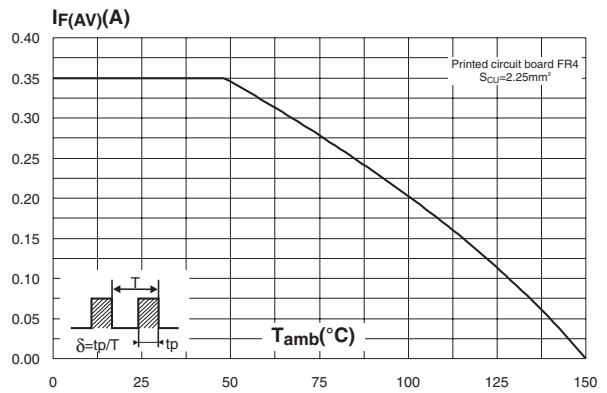
To evaluate the maximum conduction losses, use the following equations :

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

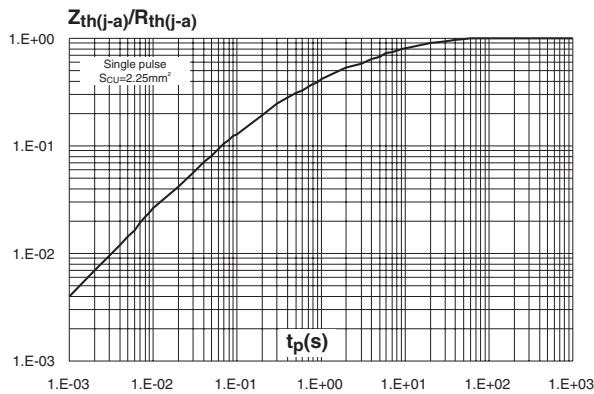
**Fig. 1:** Peak forward current versus ambient temperature ( $\delta = 0.11$ ).



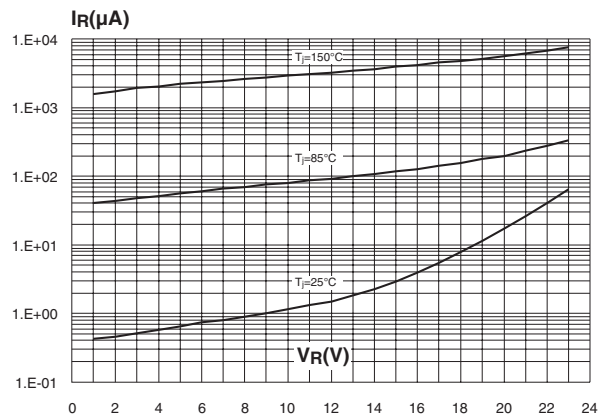
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ ).



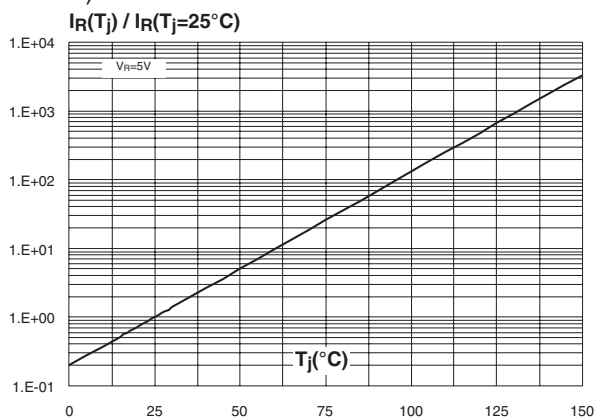
**Fig. 3:** Relative variation of thermal impedance junction to ambient versus pulse duration .



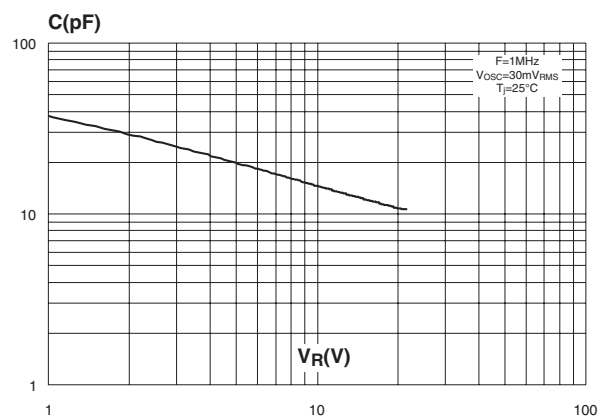
**Fig. 4:** Reverse leakage current versus reverse voltage applied (typical values).



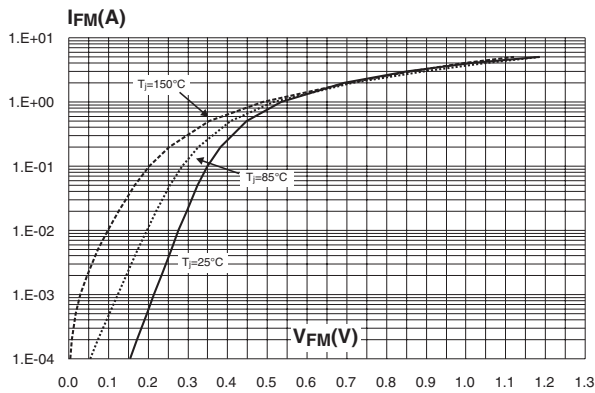
**Fig. 5:** Relative variation of reverse leakage current versus junction temperature (typical values).



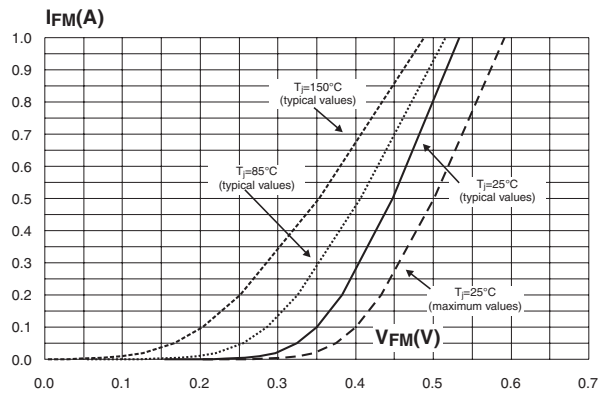
**Fig. 6:** Junction capacitance versus reverse voltage applied (typical values).



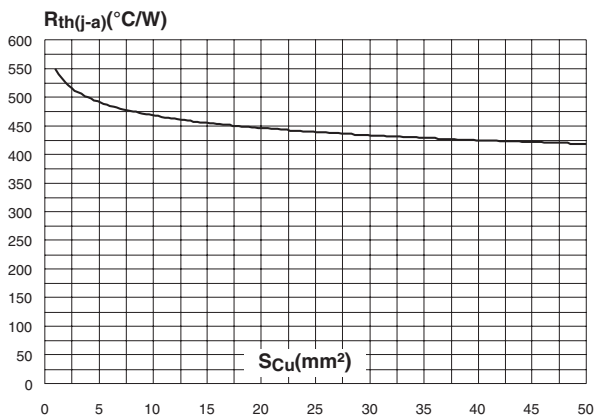
**Fig. 7-1:** Forward voltage drop versus forward current (typical values, high level).



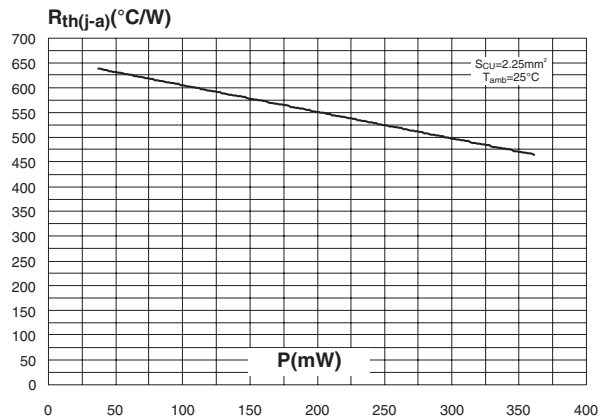
**Fig. 7-2:** Forward voltage drop versus forward current (low level).



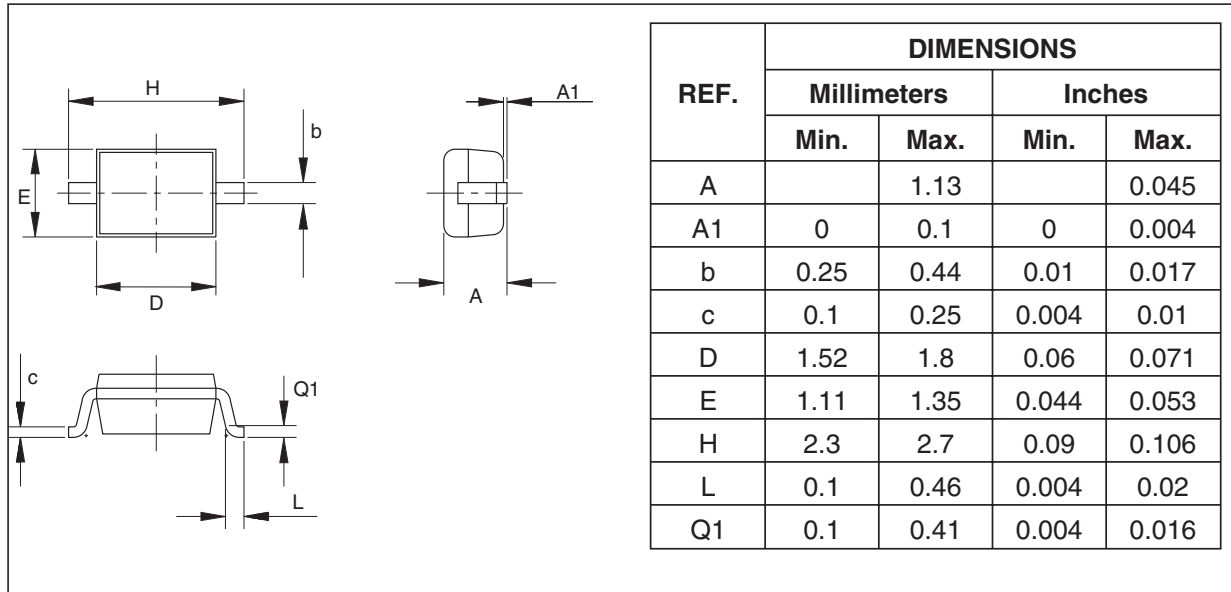
**Fig. 8:** Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4,  $\epsilon_{CU}=35\mu\text{m}$ , typical values).



**Fig. 9:** Thermal resistance junction to ambient versus power dissipation (epoxy printed circuit board FR4,  $\epsilon_{CU}=35\mu\text{m}$ , 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

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.

All other names are the property of their respective owners.

© 2004 STMicroelectronics - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany -  
Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain -  
Sweden - Switzerland - United Kingdom - United States

[www.st.com](http://www.st.com)

