



# THE DATASHEET OF BAT20JFILM





## 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).

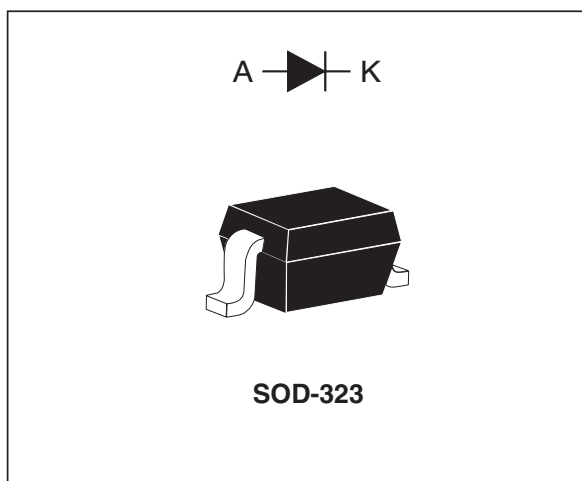
#### ABSOLUTE RATINGS (limiting values)

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.

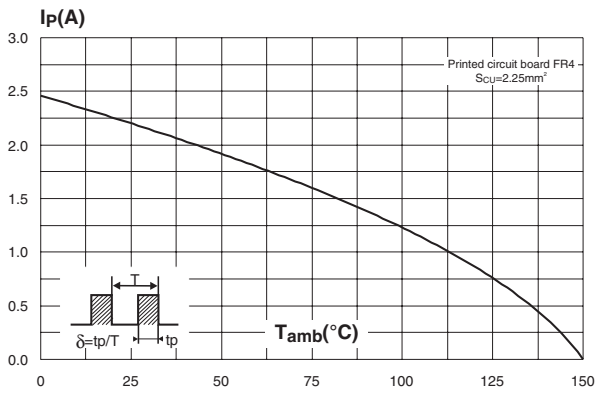
### DYNAMIC ELECTRICAL CHARACTERISTICS

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

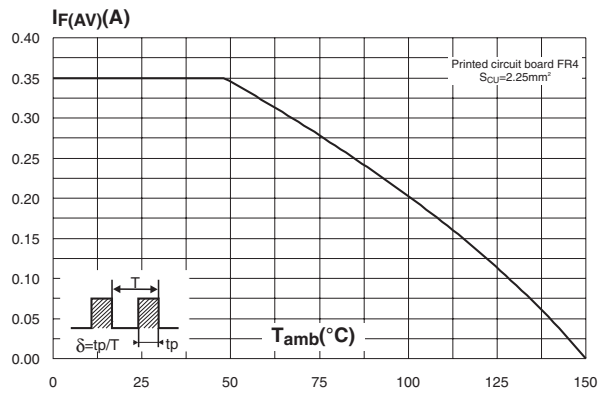
To evaluate the maximum conduction losses, use the following equations :

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

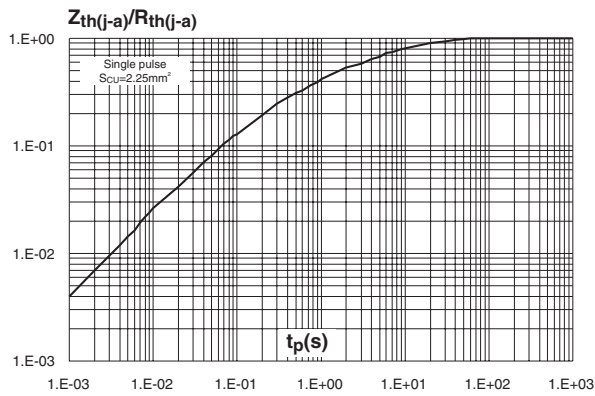
**Fig. 1:** Peak forward current versus ambient temperature ( $\delta = 0.11$ ).



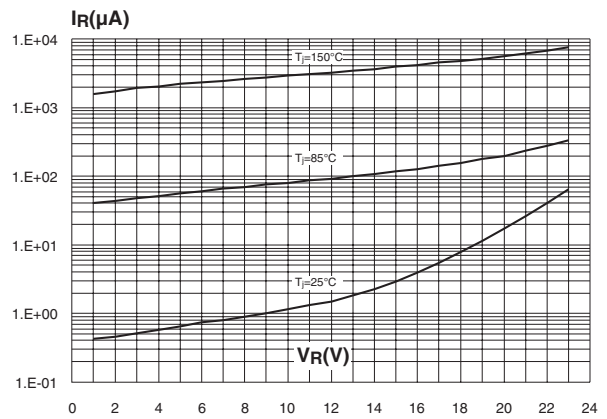
**Fig. 2:** Average forward current versus ambient temperature ( $\delta = 0.5$ ).



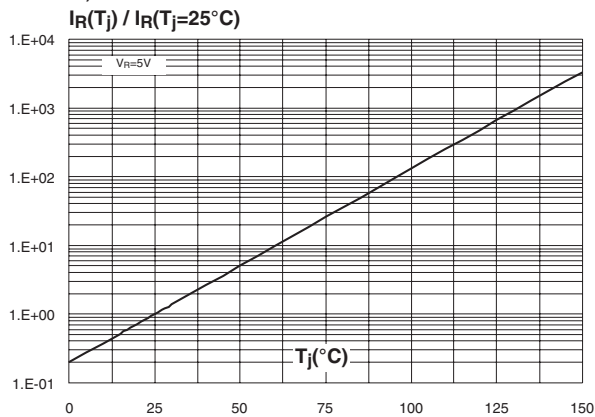
**Fig. 3:** Relative variation of thermal impedance junction to ambient versus pulse duration.



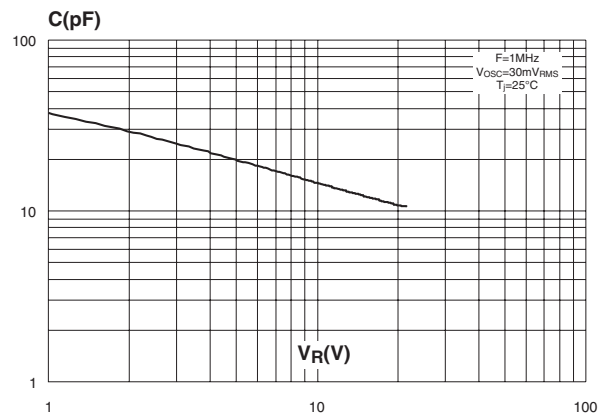
**Fig. 4:** Reverse leakage current versus reverse voltage applied (typical values).



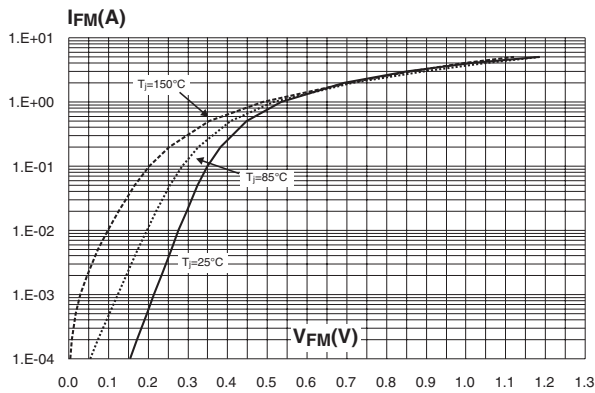
**Fig. 5:** Relative variation of reverse leakage current versus junction temperature (typical values).



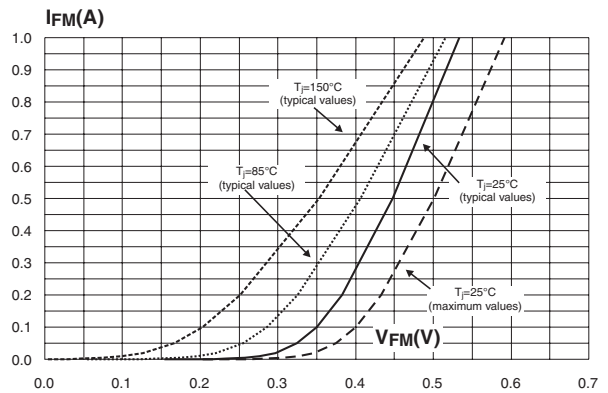
**Fig. 6:** Junction capacitance versus reverse voltage applied (typical values).



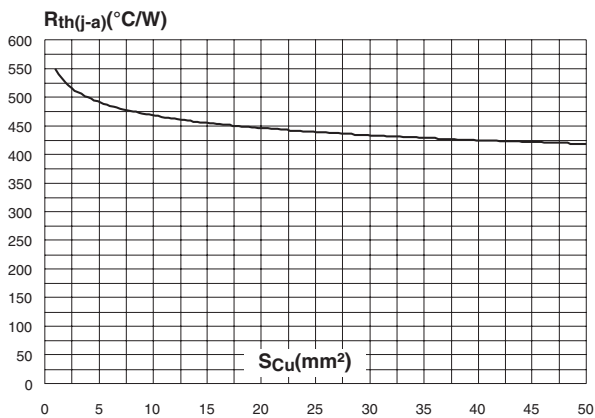
**Fig. 7-1:** Forward voltage drop versus forward current (typical values, high level).



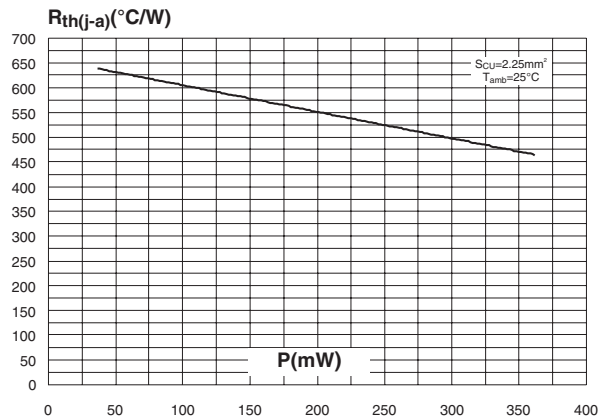
**Fig. 7-2:** Forward voltage drop versus forward current (low level).



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

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		1.13		0.045
A1	0	0.1	0	0.004
b	0.25	0.44	0.01	0.017
c	0.1	0.25	0.004	0.01
D	1.52	1.8	0.06	0.071
E	1.11	1.35	0.044	0.053
H	2.3	2.7	0.09	0.106
L	0.1	0.46	0.004	0.02
Q1	0.1	0.41	0.004	0.016

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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