

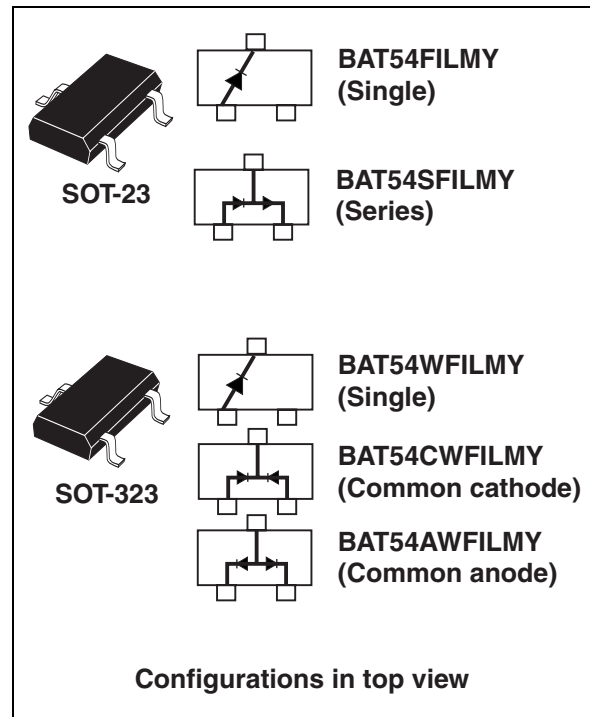
## Automotive small signal Schottky diodes

### Features

- Low conduction and reverse losses
- Negligible switching losses
- Low forward and reverse recovery times
- Extremely fast switching
- Surface mount device
- Low capacitance diode
- ECOPACK<sup>®</sup>2 compliant component
- AEC-Q101 qualified

### Description

The BAT54 series uses 40 V Schottky barrier diodes packaged in SOT-23, SOT-323. These devices are suitable for automotive application.



**Table 1. Device summary**

Symbol	Value
$I_F$	300 mA
$V_{RRM}$	40 V
C (typ)	7 pF
$T_j$ (max)	150 °C

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at  $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Parameter	Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage	40	V	
$I_F$	Continuous forward current	300	mA	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	1	A
$T_{stg}$	Storage temperature range	-65 to +150	°C	
$T_j$	Operating junction temperature range	-40 to +150	°C	
$T_L$	Maximum soldering temperature	260	°C	

**Table 3. Thermal parameters**

Symbol	Parameter	Value	Unit	
$R_{th(j-a)}$	Junction to ambient <sup>(1)</sup>	SOT-23	500	°C/W
		SOT-323	550	°C/W

1. Epoxy printed circuit board with recommended pad layout

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = 30\text{ V}$		1	$\mu\text{A}$
		$T_j = 100\text{ °C}$				
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 0.1\text{ mA}$		240	mV
			$I_F = 1\text{ mA}$		320	
			$I_F = 10\text{ mA}$		400	
			$I_F = 30\text{ mA}$		500	
			$I_F = 100\text{ mA}$		900	

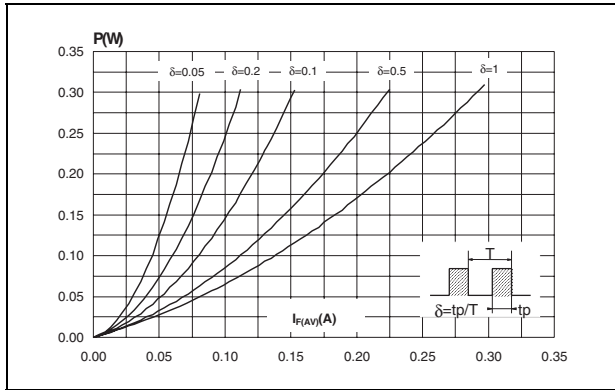
1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

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

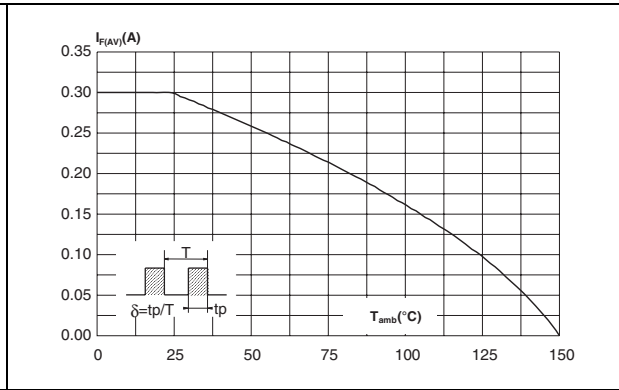
**Table 5. Dynamic characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C	Diode capacitance	$V_R = 1\text{ V}$ , $F = 1\text{ MHz}$		7	10	pF
$t_{rr}$	Reverse recovery time	$I_F = 10\text{ mA}$ , $I_R = 10\text{ mA}$ , $T_j = 25\text{ °C}$ $I_{rr} = 1\text{ mA}$ , $R_L = 100\text{ }\Omega$			5	ns

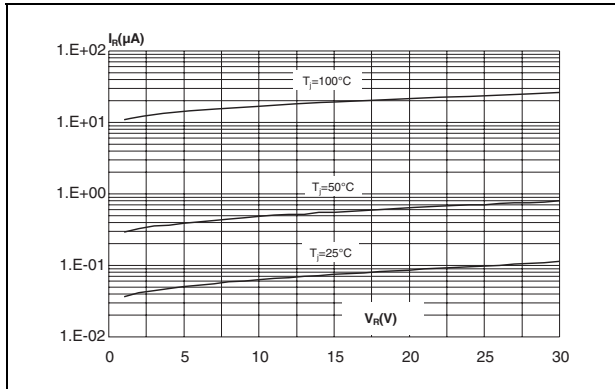
**Figure 1. Average forward power dissipation versus average forward current**



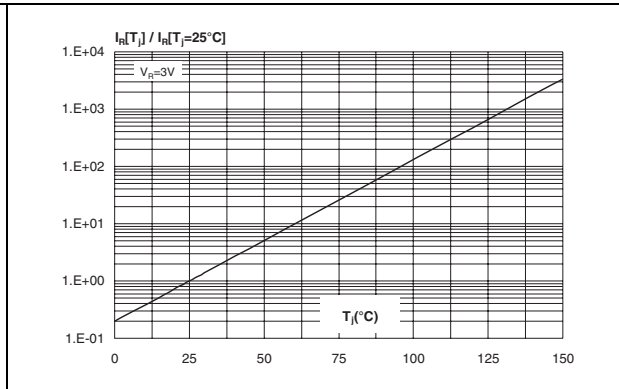
**Figure 2. Average forward current versus ambient temperature (delta = 1)**



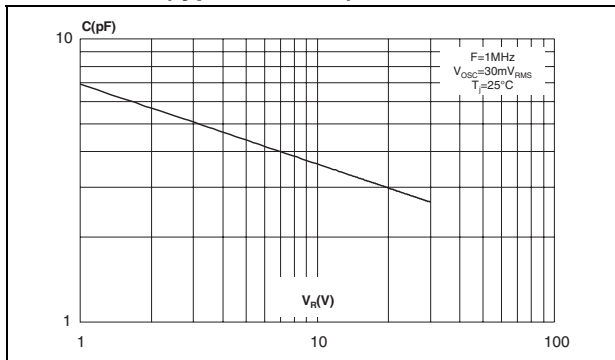
**Figure 3. Reverse leakage current versus reverse applied voltage (typical values)**



**Figure 4. Reverse leakage current versus junction temperature**



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



**Figure 6. Forward voltage drop versus forward current (typical values)**

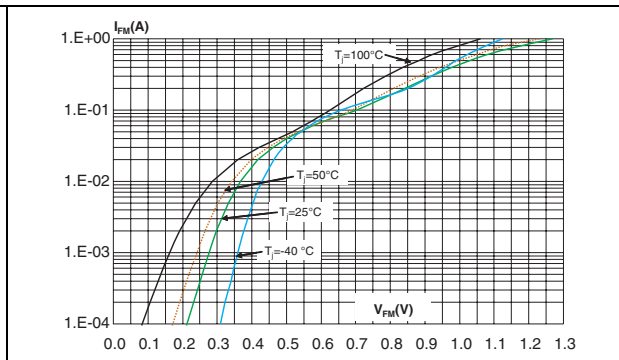
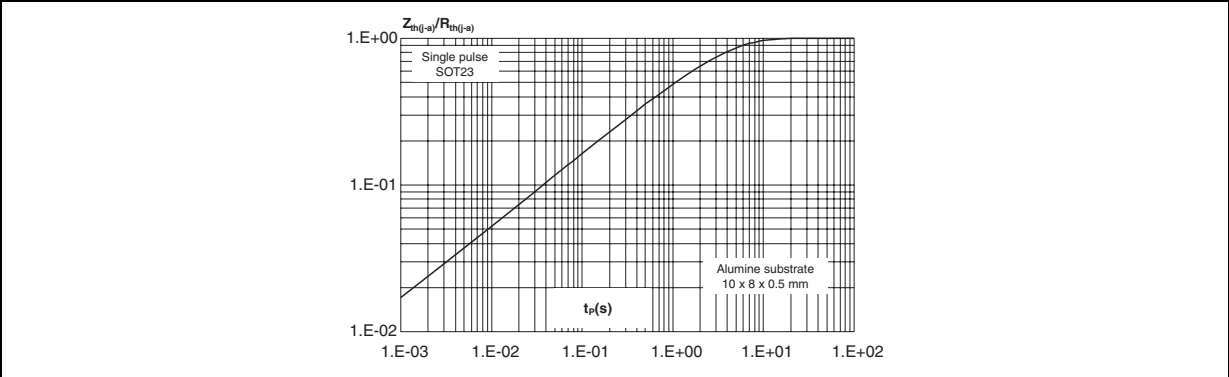
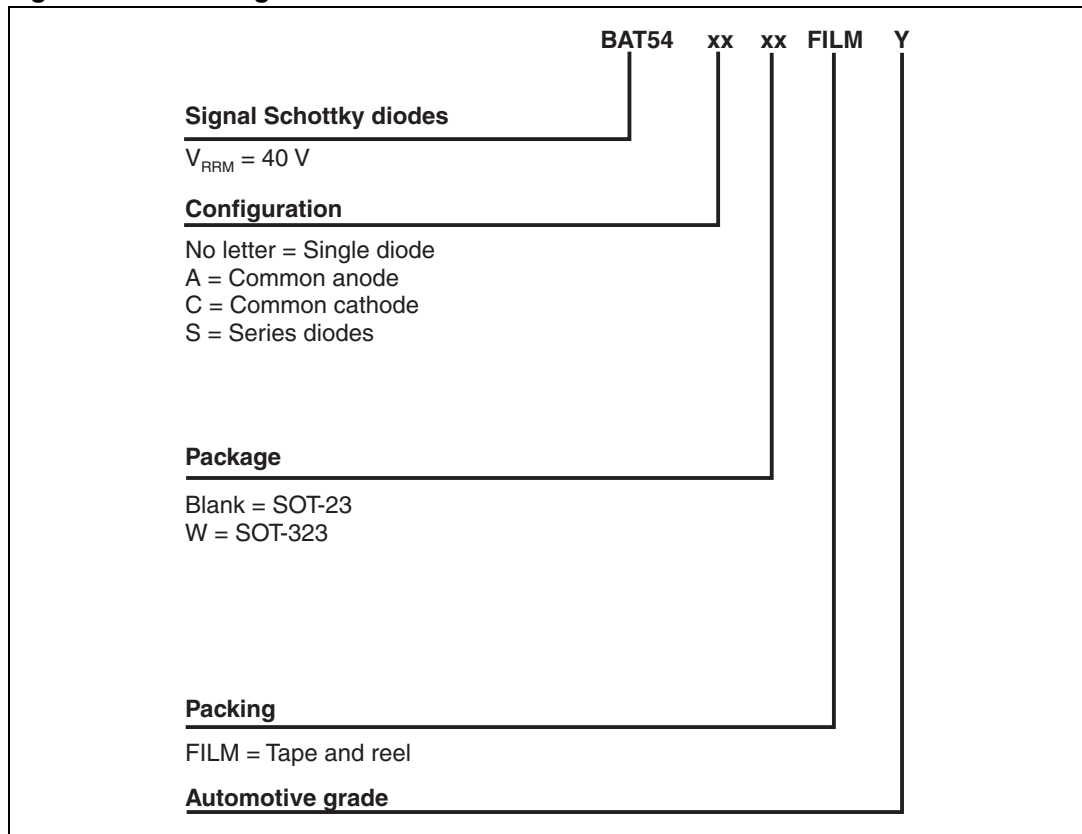


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-23)



## 2 Ordering information scheme

Figure 8. Ordering information scheme



### 3 Package information

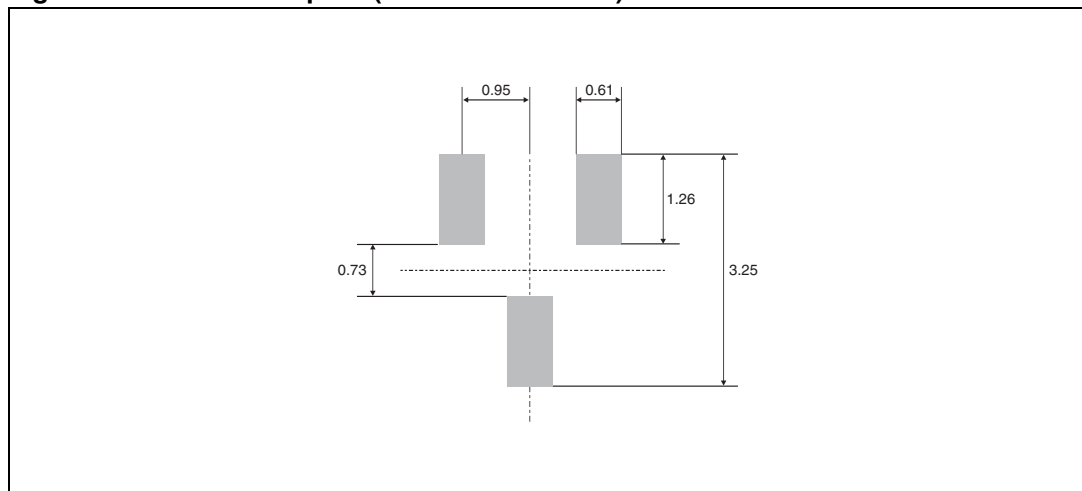
- Epoxy meets UL94, V0
- Lead-free packages

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. SOT-23 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

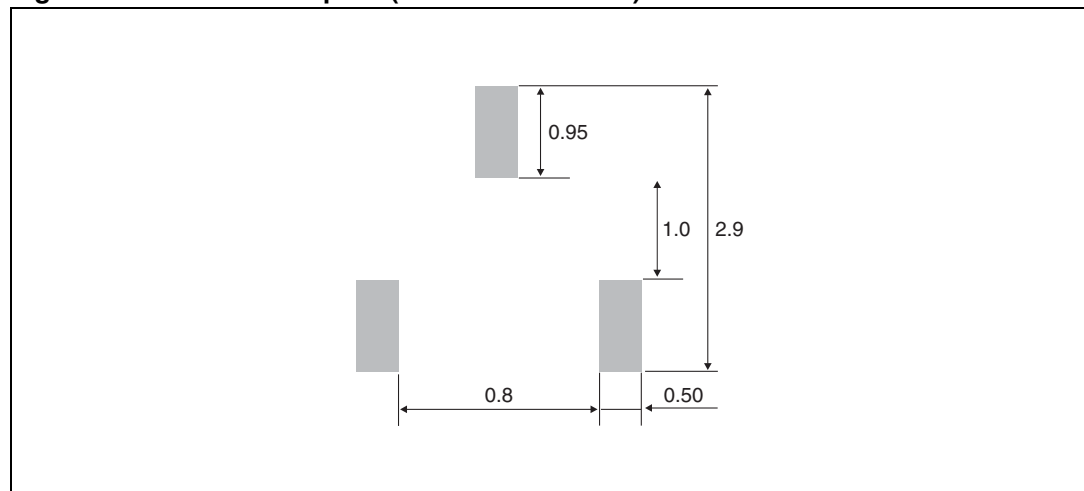
**Figure 9. SOT-23 footprint (dimensions in mm)**



**Table 7. SOT-323 dimensions**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.8		1.1	0.031		0.043
A1	0.0		0.1	0.0		0.004
b	0.25		0.4	0.010		0.016
c	0.1		0.26	0.004		0.010
D	1.8	2.0	2.2	0.071	0.079	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e		0.65			0.026	
H	1.8	2.1	2.4	0.071	0.083	0.094
L	0.1	0.2	0.3	0.004	0.008	0.012
q	0		30°	0		30°

**Figure 10. SOT-323 footprint (dimensions in mm)**



## 4 Ordering information

**Table 8. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAT54FILMY	86Y	SOT-23 Single	10 mg	3000	Tape and reel
BAT54SFILMY	88Y	SOT-23 Serial	10 mg		
BAT54WFILMY	73Y	SOT-323 Single	6 mg		
BAT54CWFILMY	77Y	SOT-323 Common cathode	6 mg		
BAT54AWFILMY	74Y	SOT-323 Common anode	6 mg		

## 5 Revision history

**Table 9. Document revision history**

Date	Revision	Changes
04-Nov-2011	1	Initial release.



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