BAT54-Y

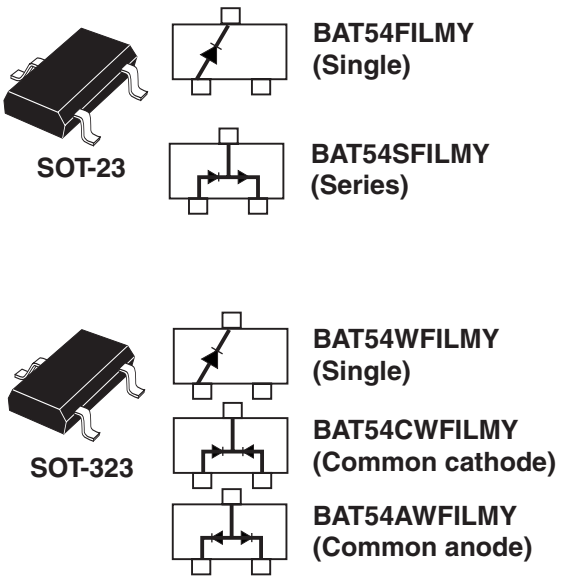
Automotive small signal Schottky diodes

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®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.



Configurations in top view

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 °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 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(1)	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 °C	V_R = 30 V			1	µA
		T_j = 100 °C				100	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 0.1 mA			240	mV
			I_F = 1 mA			320	
			I_F = 10 mA			400	
			I_F = 30 mA			500	
			I_F = 100 mA			900	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

Table 5. Dynamic characteristics

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

Figure 1. Average forward power dissipation versus average forward current

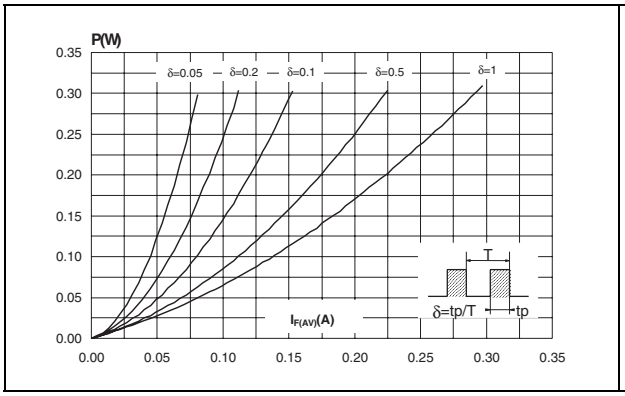


Figure 2. Average forward current versus ambient temperature (δ = 1)

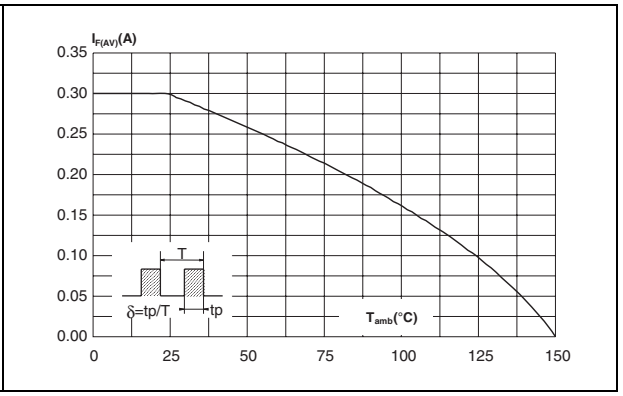


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

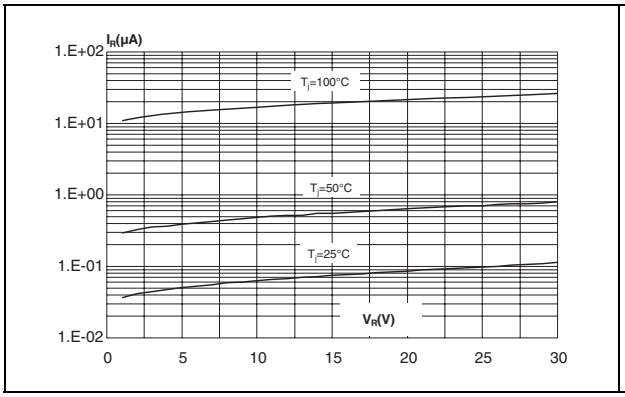


Figure 4. Reverse leakage current versus junction temperature

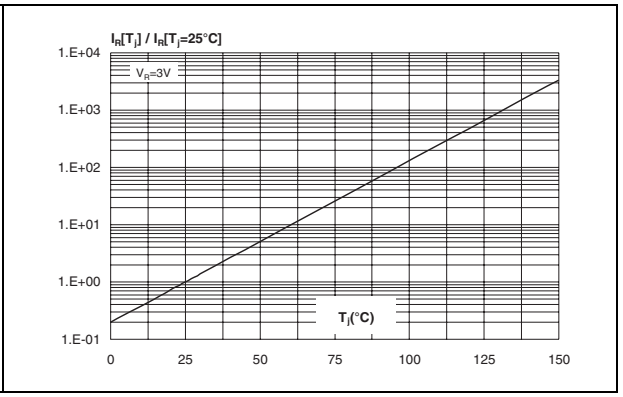


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

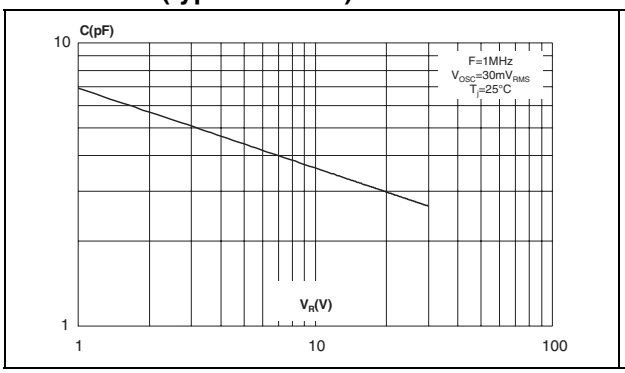


Figure 6. Forward voltage drop versus forward current (typical values)

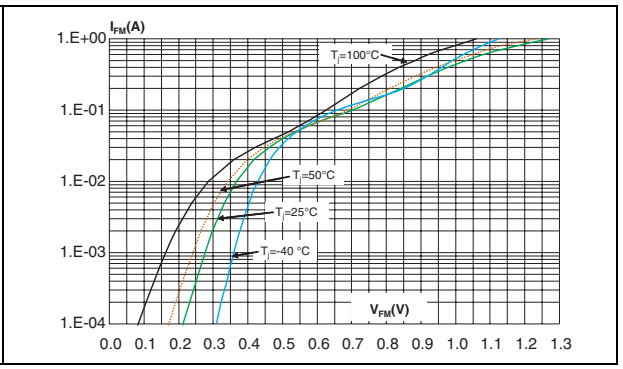
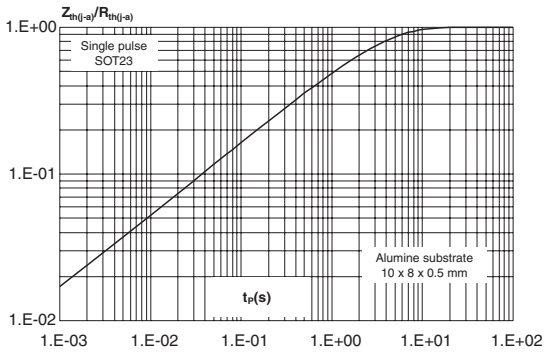
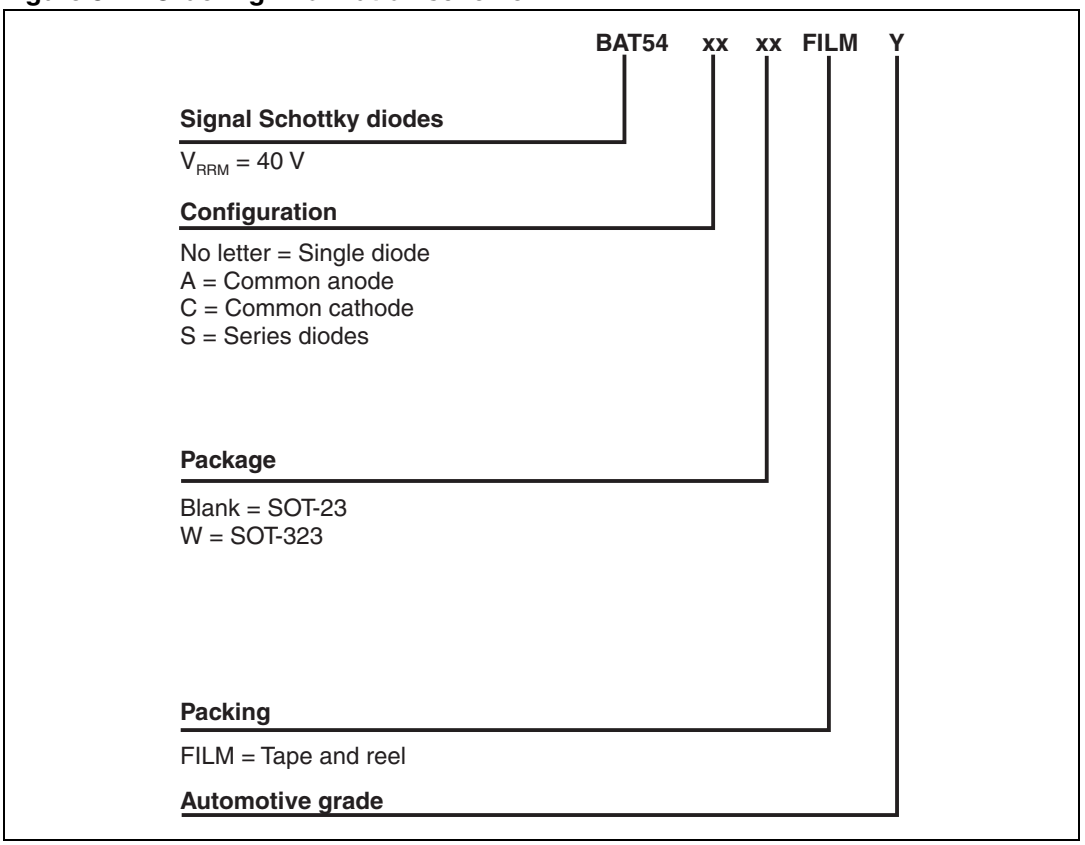


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-23)



2 Ordering information scheme

Figure 8. Ordering information scheme

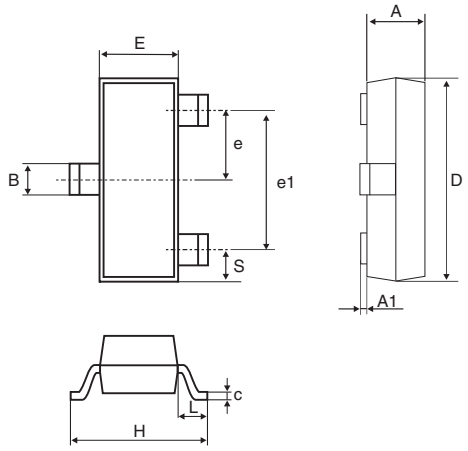


3 Package information

- 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. 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)

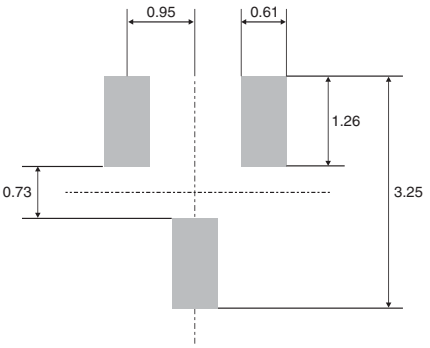
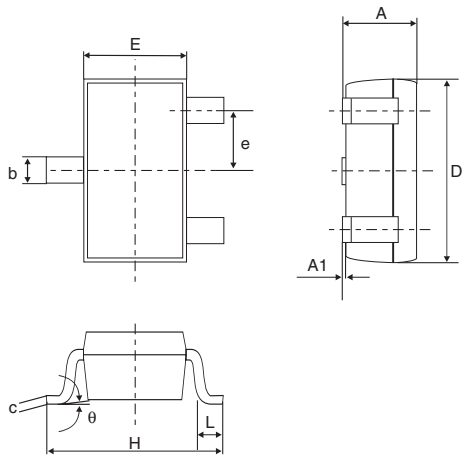
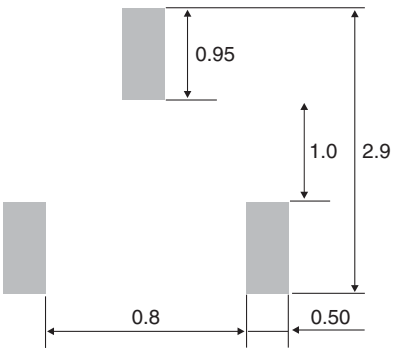


Table 7. SOT-323 dimensions



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.