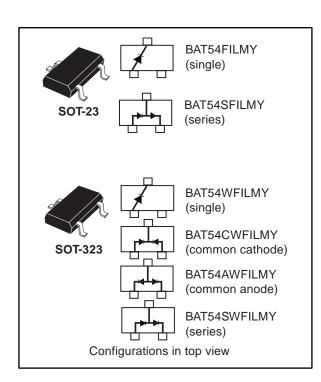


Automotive small signal Schottky diodes

Datasheet - production data



Description

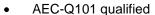
The BAT54 series use the 40 V Schottky barrier diodes packaged in SOT-23 and SOT-323.

These devices are suitable for automotive applications.

Table 1: Device summary

Symbol	Value
l _F	300 mA
V_{RRM}	40 V
C (typ.)	7 pF
T _i (max.)	150 °C

Features





- Low conduction and reverse losses
- Negligible switching losses
- Low forward and reverse recovery times
- Extremely fast switching
- Surface mount device
- Low capacitance diode
- PPAP capable
- ECOPACK®2 compliant component

Characteristics BAT54-Y

1 Characteristics

Table 2: Absolute ratings (limiting values at 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	1	Α
T _{stg}	Storage temperature range	-65 to +150	°C
Tj	Operating junction temperature range ⁽¹⁾	-40 to +150	°C
T∟	Maximum soldering temperature	260	°C

Notes:

Table 3: Thermal parameters

Symbol	Parameter	Value	Unit	
	lunction to ambient(1)	SOT-23	500	0000
Kth(j-a)	R _{th(j-a)} Junction to ambient ⁽¹⁾	SOT-323	550	°C/W

Notes:

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I_ (1)	I _R ⁽¹⁾ Reverse leakage current	T _j = 25 °C	V _R = 30 V	-	-	1	
IR ^(*)		T _j = 100 °C		-	-	100	μA
		T _j = 25 °C	I _F = 0.1 mA	-	-	240	
			I _F = 1 mA	-	-	320	
V _F ⁽²⁾	V _F ⁽²⁾ Forward voltage drop		I _F = 10 mA	-	-	400	mV
			I _F = 30 mA	-	-	500	
			I _F = 100 mA	-	-	900	

Notes:

Table 5: Dynamic characteristics

Table of Dynamic Characteriones						
Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
С	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



 $^{^{(1)}(}dP_{tot}/dT_j) < (1/R_{th(j\text{-}a)}) \ condition \ to \ avoid \ thermal \ runaway \ for \ a \ diode \ on \ its \ own \ heatsink.$

⁽¹⁾Epoxy printed circuit board with recommended pad layout

 $^{^{(1)}\}text{Pulse}$ test: t_p = 5 ms, δ < 2 %

 $^{^{(2)}}$ Pulse test: t_p = 380 μ s, δ < 2%

BAT54-Y Characteristics

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

0.35 P(W)

0.30 \$\frac{P(W)}{\delta_0.05 - \delta_0.02 - \delta_0.01 - \delta_0.05 - \delta_0.

Figure 2: Average forward current versus ambient temperature ($\delta = 1$) 0.35 0.30 0.25 0.20 0.15 0.10 0.05 T_{amb}(°C) 0.00 0 25 50 75 100 125 150

0.30 0.25 0.20 0.15 0.10 0.05 0.00 0.00 0.05 0.10 0.15 0.20 0.25 0.30 0.35

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

1.E+02

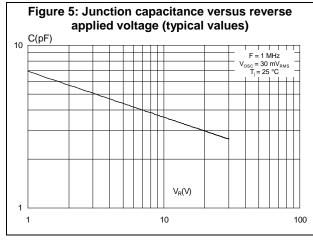
1.E+01

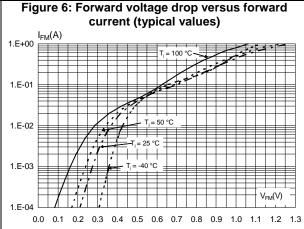
1.E+01

1.E-02

0 5 10 15 20 25 30

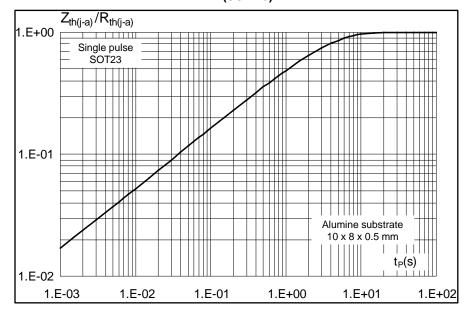
Figure 4: Reverse leakage current versus junction temperature $I_R[T_j] / I_R[T_j=25^{\circ}C]$ 1.E+04 $V_R = 3V$ 1.E+03 1.E+02 1.E+01 1.E+00 $T_j(^{\circ}C)$ 1.E-01 25 50 75 100 125 150





Characteristics BAT54-Y

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



47/

BAT54-Y Package information

2 Package information

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.

- Epoxy meets UL94, V0
- Lead-free packages

2.1 SOT23 package information

Figure 8: SOT23-3L package outline

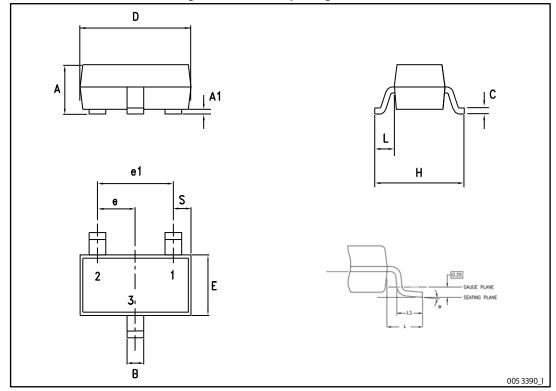
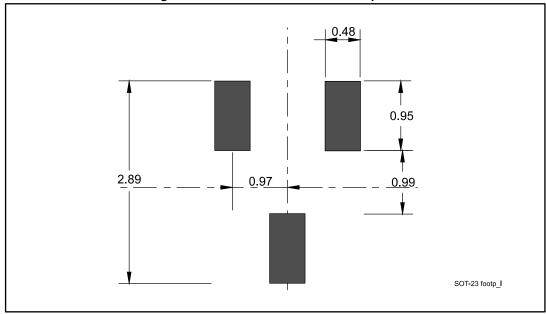


Table 6: SOT23-3L mechanical data

Dim.	mm				
	Min.	Тур.	Max.		
А	0.89		1.40		
A1	0		0.10		
В	0.30		0.51		
С	0.085		0.18		
D	2.75		3.04		
е	0.85		1.05		
e1	1.70		2.10		
Е	1.20		1.75		
Н	2.10		3.00		
L		0.60			
S	0.35		0.65		
L1	0.25		0.55		
а	0°		8°		

Figure 9: SOT23-3L recommended footprint



3

Dimensions are in mm.

Downloaded from Arrow.com.

BAT54-Y Package information

2.2 SOT323-3L package information

Figure 10: SOT323-3L package outline

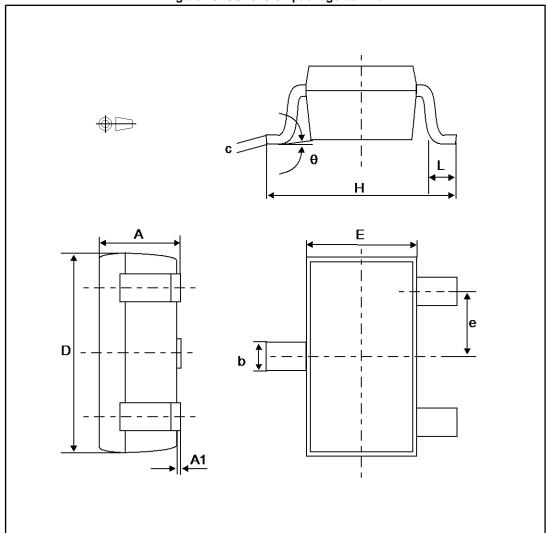
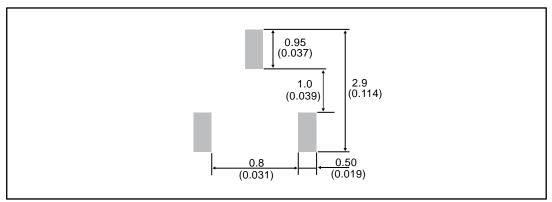


Table 7: SOT323-3L package mechanical data

	Dimensions						
Ref.		Millimeters		Inches			
	Min.	Тур.	Max.	Min.	Тур.	Max.	
А	0.8		1.1	0.031		0.043	
A1	0.0		0.1	0.000		0.003	
b	0.25		0.4	0.0098		0.0157	
С	0.1		0.26	0.003		0.0102	
D	1.8	2.0	2.2	0.070	0.078	0.086	
Е	1.15	1.25	1.35	0.0452	0.0492	0.0531	
е	0.60	0.65	0.70	0.024	0.026	0.028	
Н	1.8	2.1	2.4	0.070	0.082	0.094	
L	0.1	0.2	0.30	0.004	0.008	0.012	
θ	0		30°	0		30°	

Figure 11: SOT323-3L recommended footprint in mm (dimensions in inches)



BAT54-Y Ordering information

3 Ordering information

Figure 12: Ordering information scheme

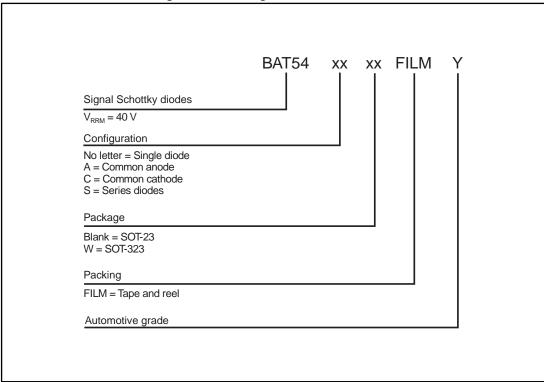


Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
BAT54FILMY	86Y	SOT-23 single	10 mg		
BAT54SFILMY	88Y	SOT-23 serial	SOT-23 serial		
BAT54WFILMY	73Y	SOT-323 single		2000	Tana and roal
BAT54CWFILMY	77Y	SOT-323 common cathode	6 m a	3000	Tape and reel
BAT54AWFILMY	74Y	SOT-323 common anode 6 mg			
BAT54SWFILMY	78Y	SOT-323 serial			



Revision history BAT54-Y

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
04-Nov-2011	1	Initial release.
06-Jul-2017	2	Added BAT54SWFILMY.
		Minor text changes to improve readability.
05-Oct-2017	3	Updated Table 4: "Static electrical characteristics".

IMPORTANT NOTICE - PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2017 STMicroelectronics - All rights reserved

