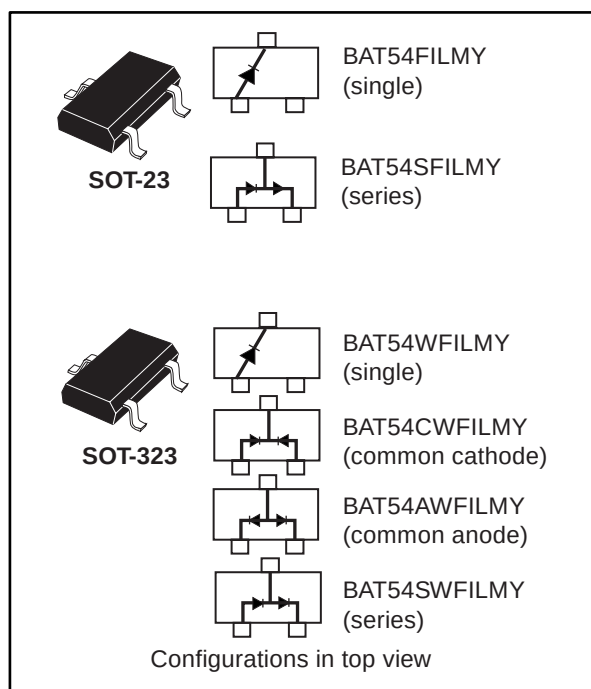


Automotive small signal Schottky diodes

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
I_F	300 mA
V_{RRM}	40 V
C (typ.)	7 pF
$T_J(\text{max.})$	150 °C

Features

- AEC-Q101 qualified
- 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



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	$t_p = 10$ ms sinusoidal	A
T_{stg}	Storage temperature range	-65 to +150	°C
T_j	Operating junction temperature range ⁽¹⁾	-40 to +150	°C
T_L	Maximum soldering temperature	260	°C

Notes:

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

Table 3: Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient ⁽¹⁾	SOT-23	500
		SOT-323	550

Notes:

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

Notes:

⁽¹⁾Pulse test: $t_p = 5$ ms, $\delta < 2$ %

⁽²⁾Pulse test: $t_p = 380$ μ s, $\delta < 2$ %

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

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

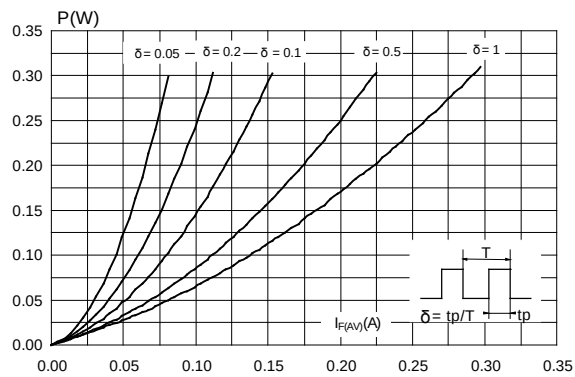


Figure 2: Average forward current versus ambient temperature ($\delta = 1$)

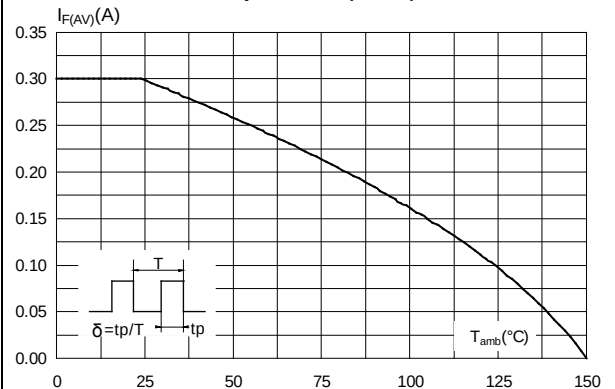


Figure 3: Reverse leakage current versus reverse applied voltage (typical values)

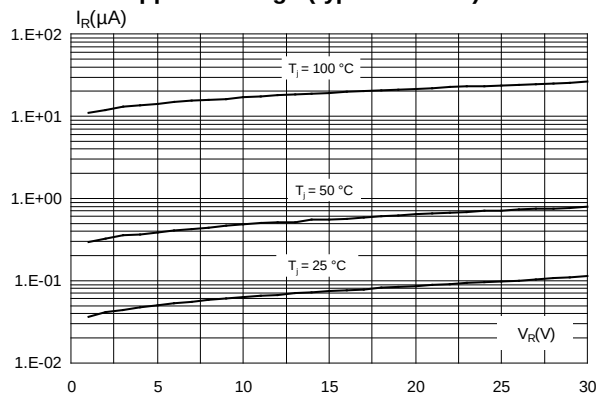


Figure 4: Reverse leakage current versus junction temperature

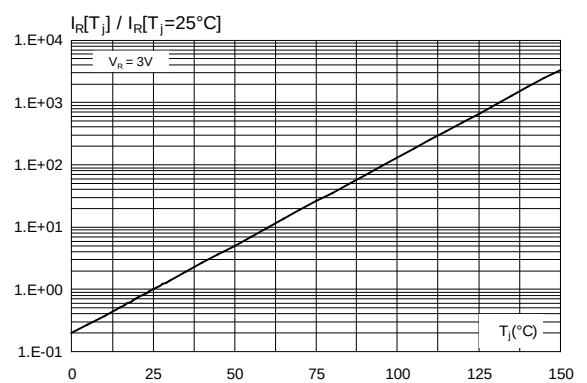


Figure 5: Junction capacitance versus reverse applied voltage (typical values)

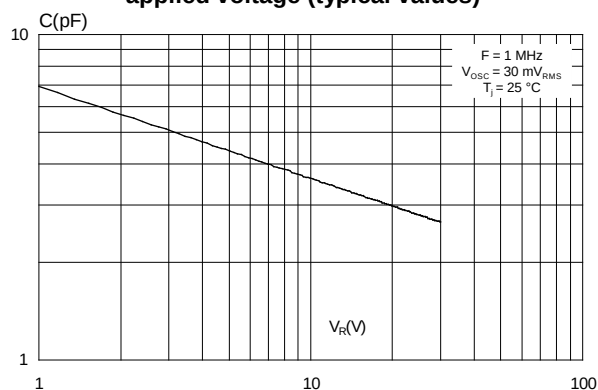


Figure 6: Forward voltage drop versus forward current (typical values)

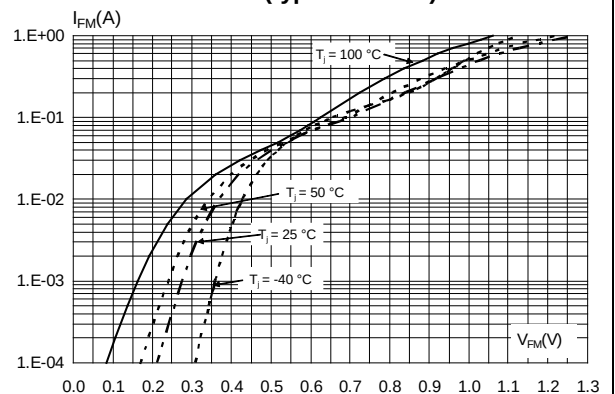
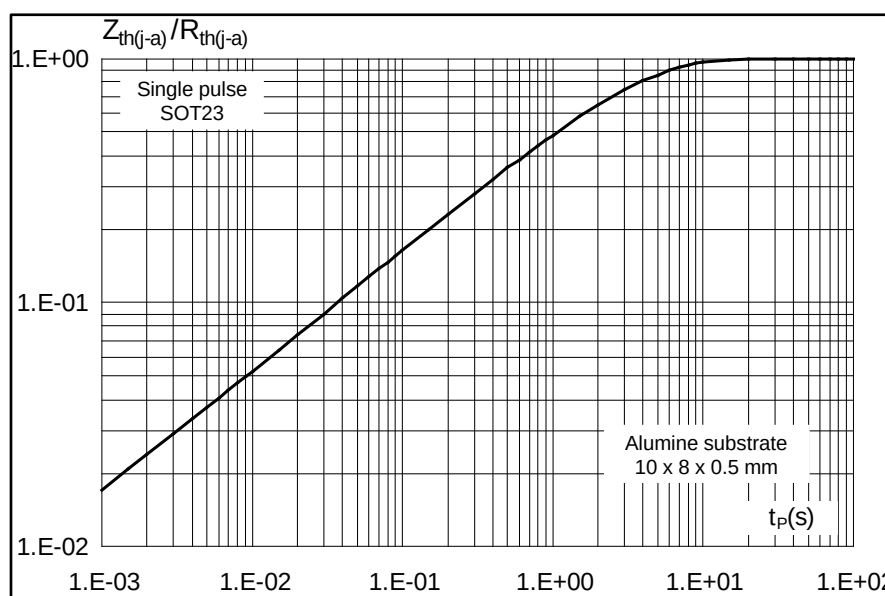


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-23)



2 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

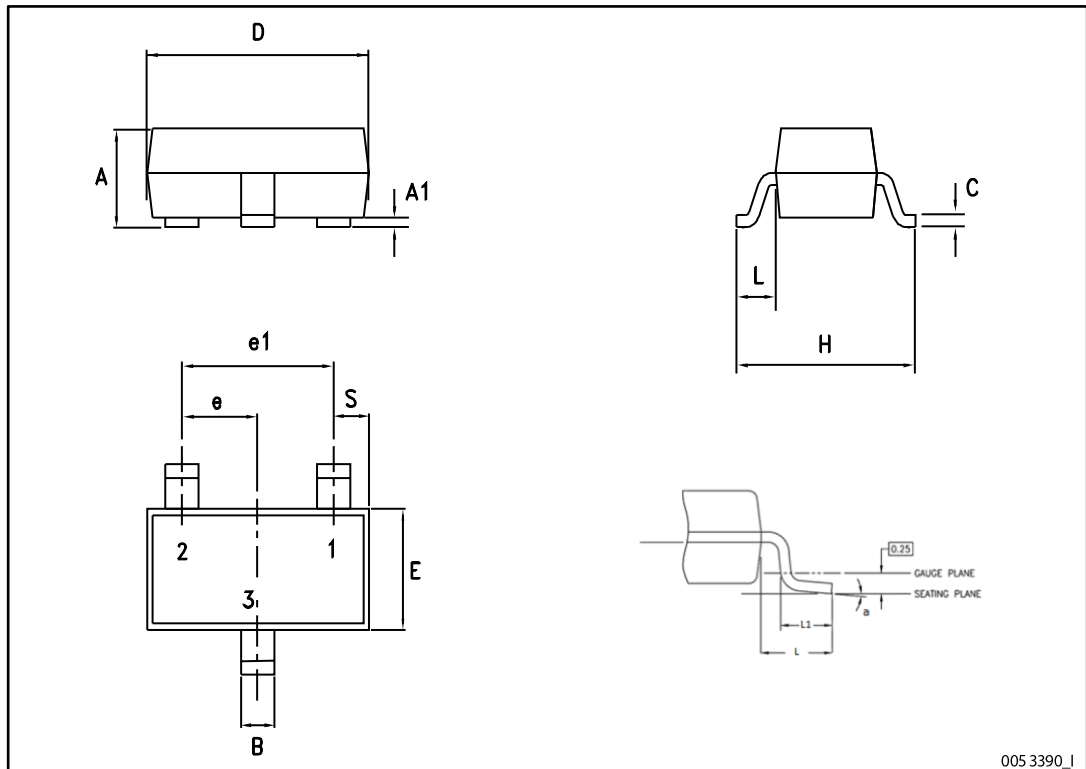
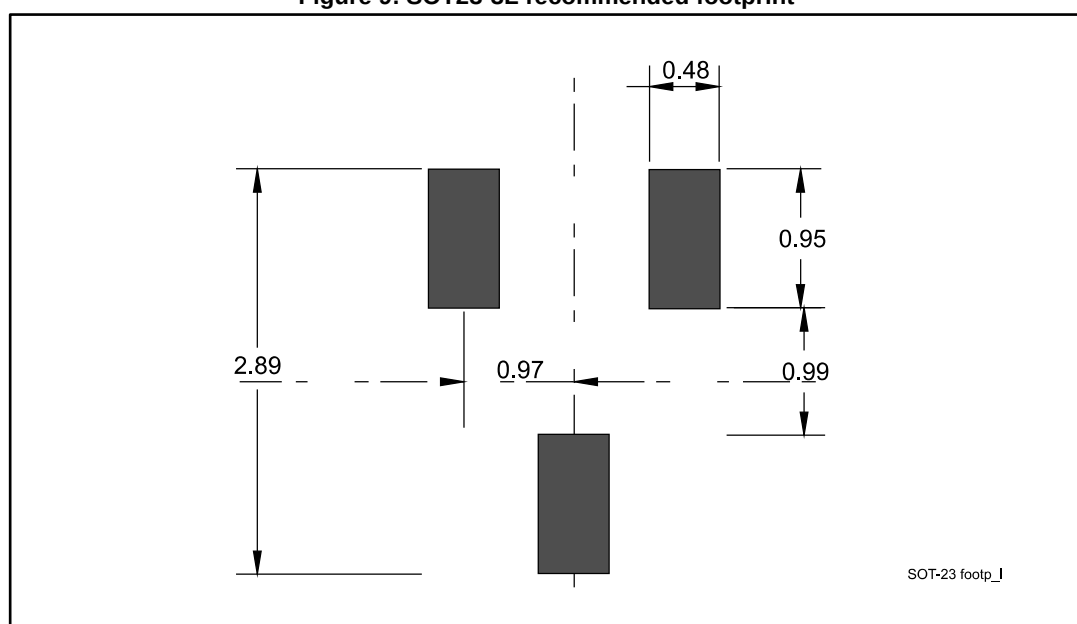


Table 6: SOT23-3L mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.89		1.40
A1	0		0.10
B	0.30		0.51
C	0.085		0.18
D	2.75		3.04
e	0.85		1.05
e1	1.70		2.10
E	1.20		1.75
H	2.10		3.00
L		0.60	
S	0.35		0.65
L1	0.25		0.55
a	0°		8°

Figure 9: SOT23-3L recommended footprint



Dimensions are in mm.

2.2 SOT323-3L package information

Figure 10: SOT323-3L package outline

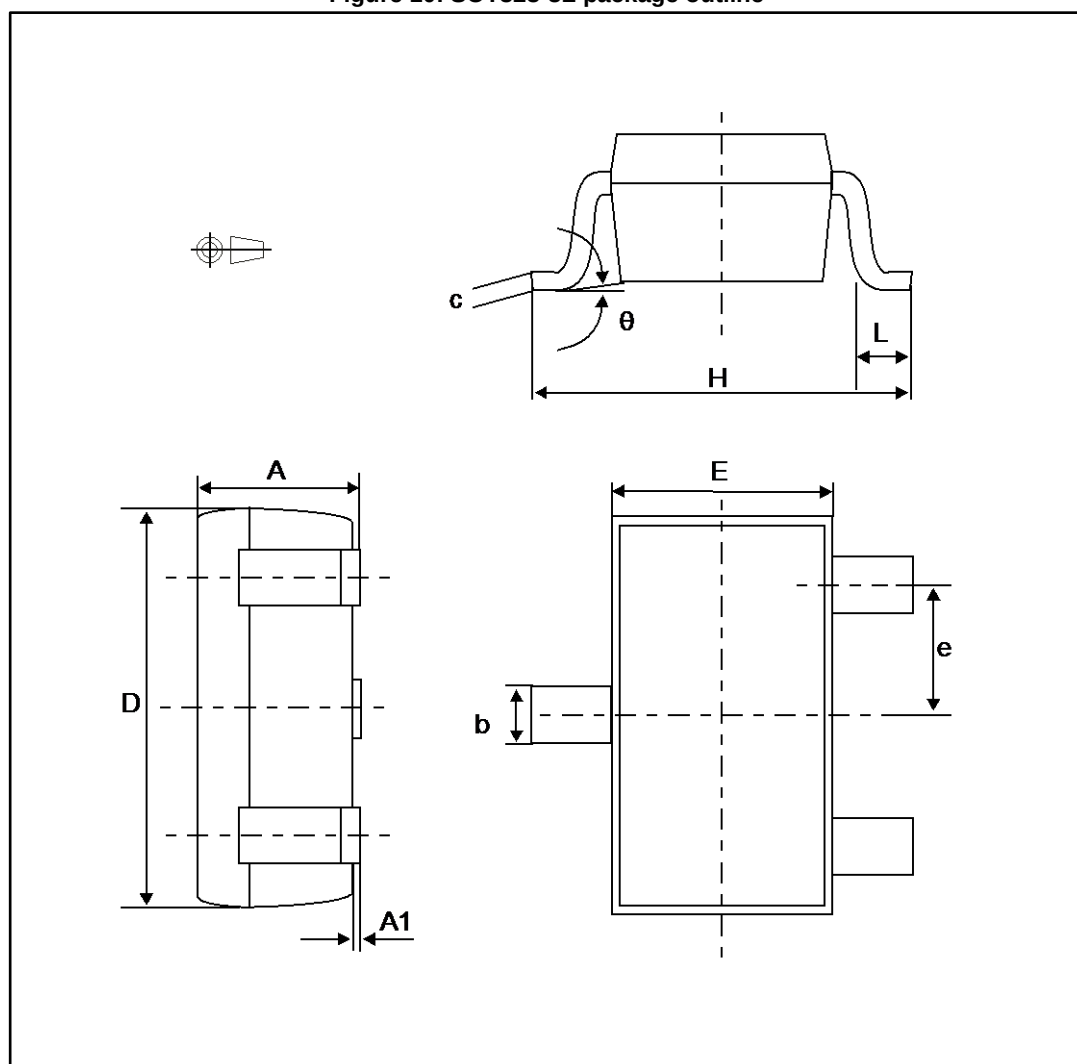
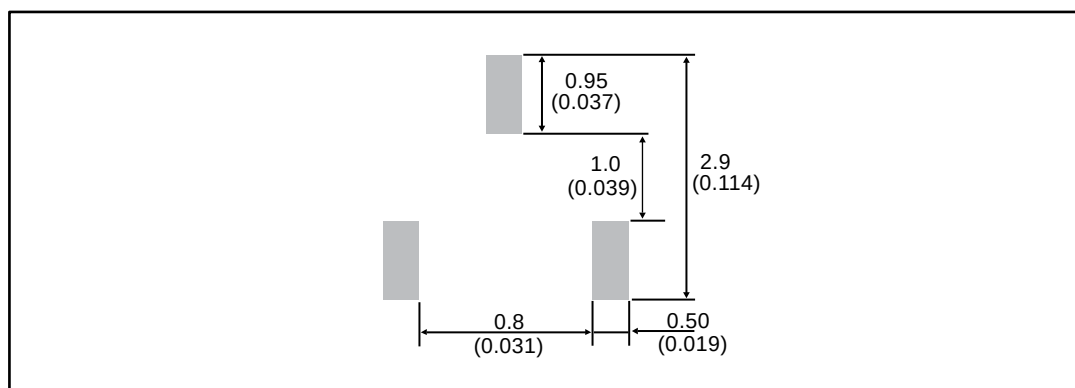


Table 7: SOT323-3L package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.8		1.1	0.031		0.043
A1	0.0		0.1	0.000		0.003
b	0.25		0.4	0.0098		0.0157
c	0.1		0.26	0.003		0.0102
D	1.8	2.0	2.2	0.070	0.078	0.086
E	1.15	1.25	1.35	0.0452	0.0492	0.0531
e	0.60	0.65	0.70	0.024	0.026	0.028
H	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)



3 Ordering information

Figure 12: Ordering information scheme

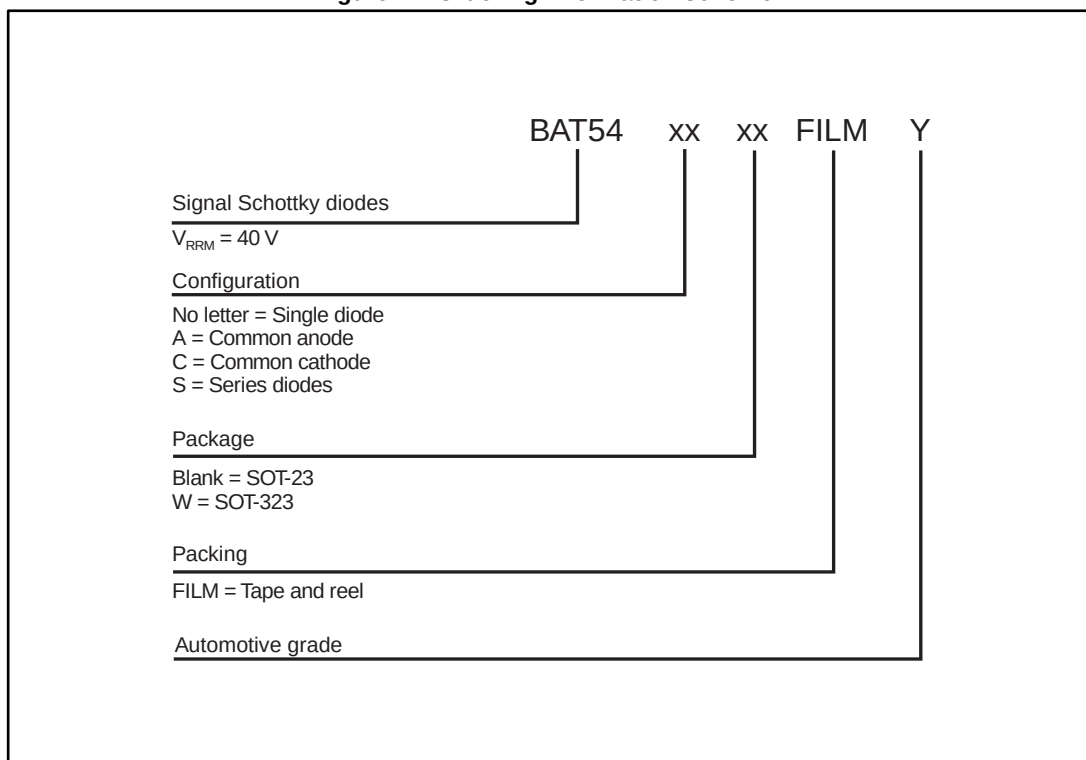


Table 8: Ordering information

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

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