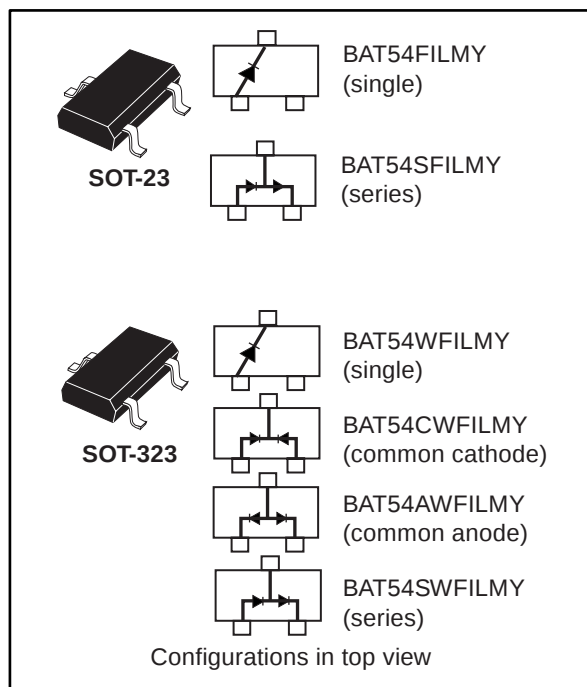


Automotive small signal Schottky diodes

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	μ A
		$T_j = 100$ °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	

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

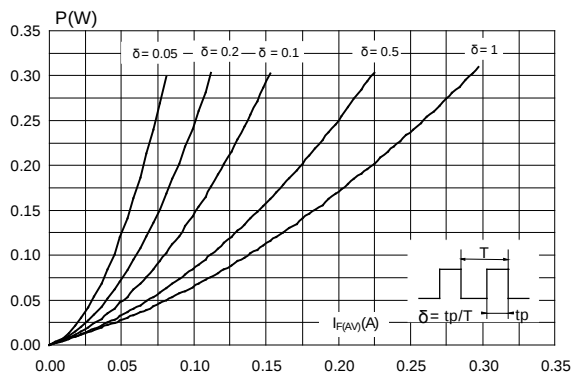


Figure 2: Average forward current versus ambient temperature ($\delta = 1$)

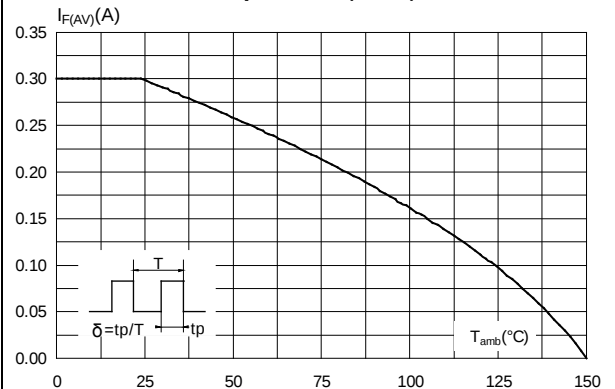


Figure 3: Reverse leakage current versus reverse applied voltage (typical values)

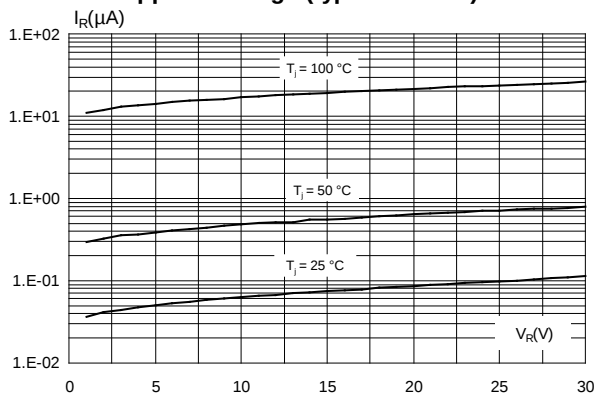


Figure 4: Reverse leakage current versus junction temperature

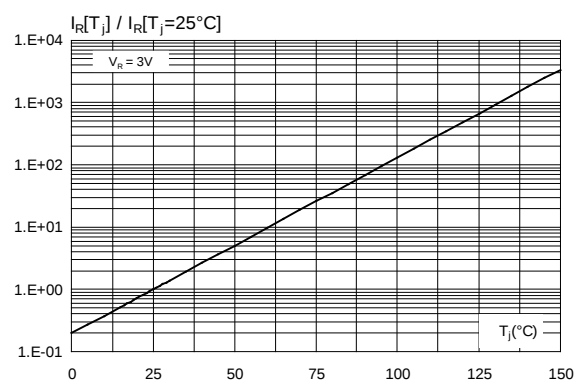


Figure 5: Junction capacitance versus reverse applied voltage (typical values)

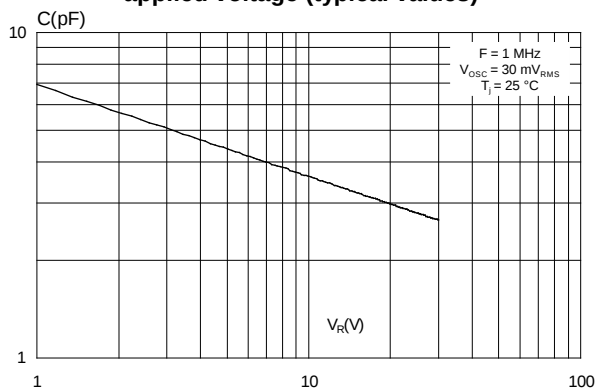


Figure 6: Forward voltage drop versus forward current (typical values)

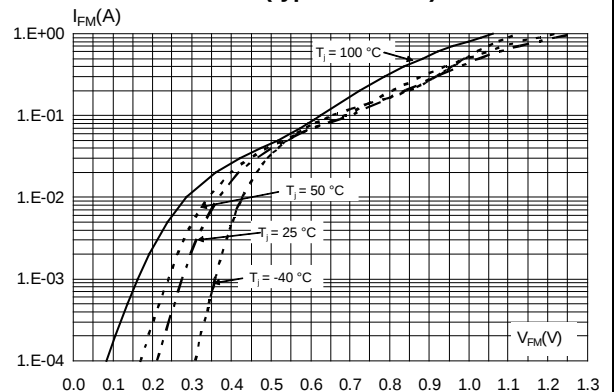
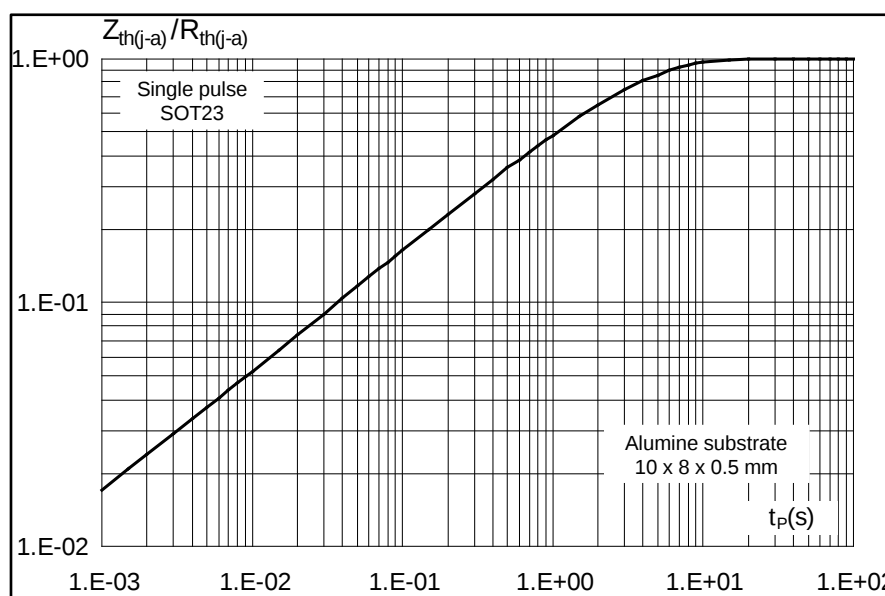


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-23)



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

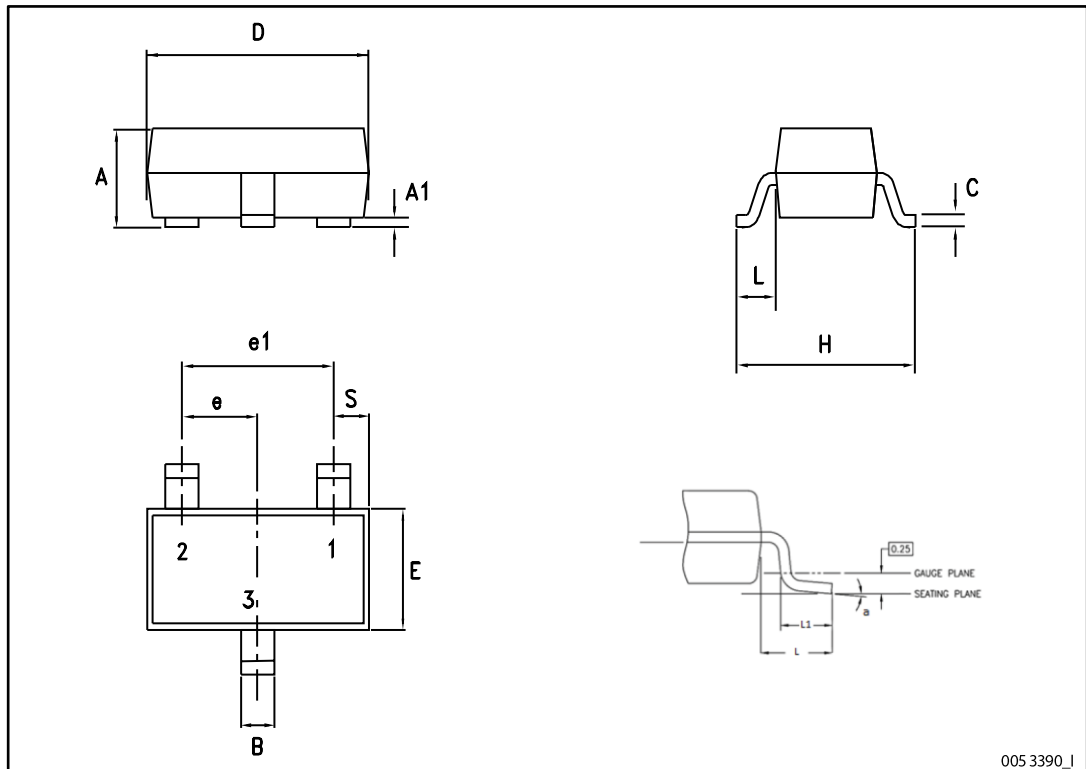
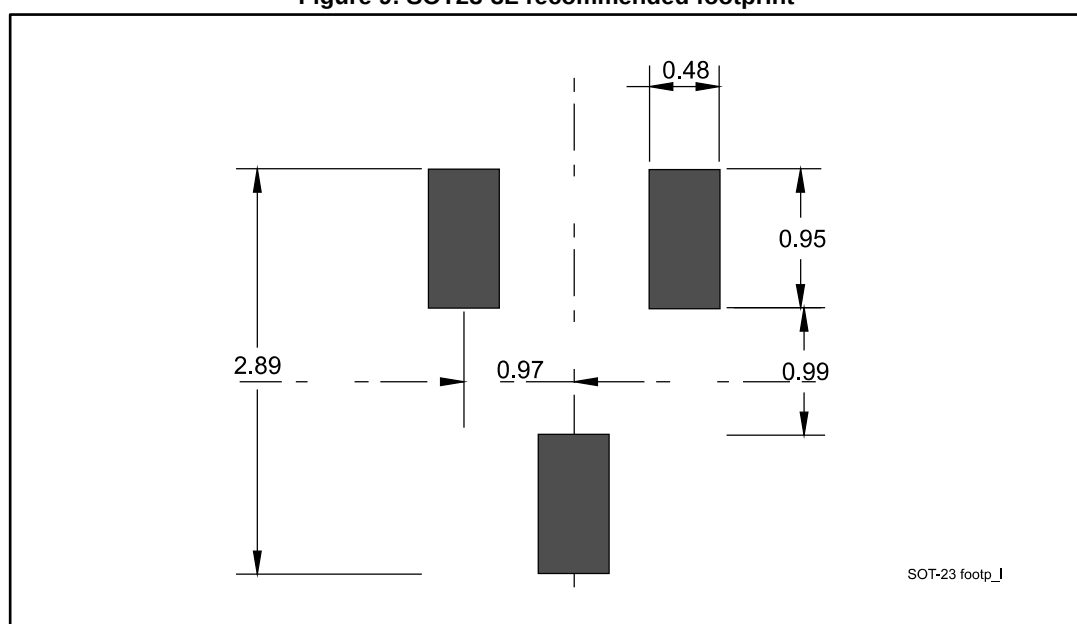


Table 6: SOT23-3L mechanical data

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

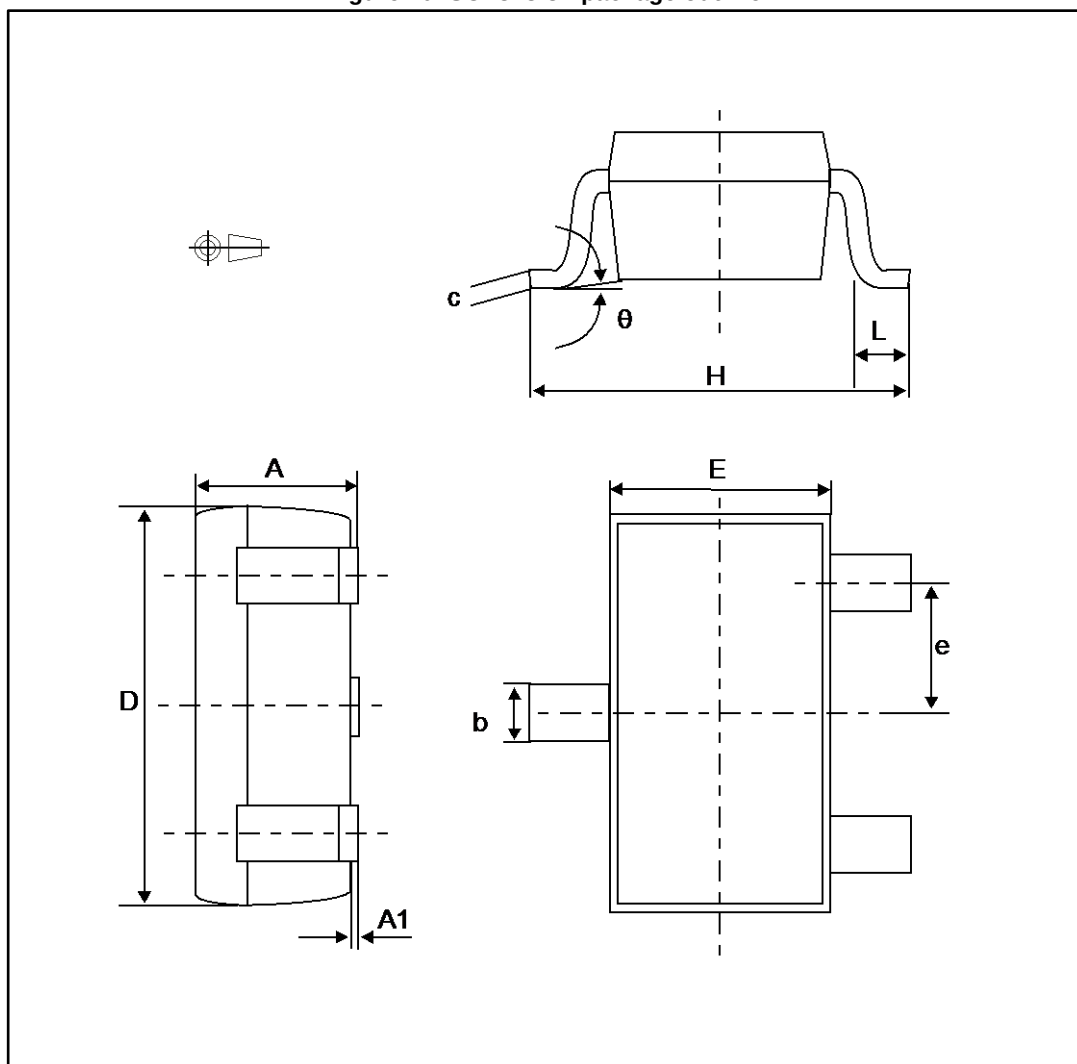
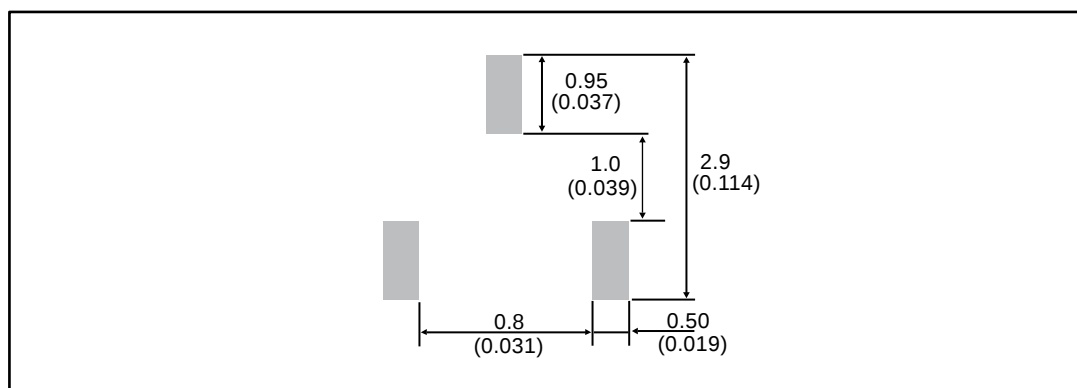


Table 7: SOT323-3L package mechanical data

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

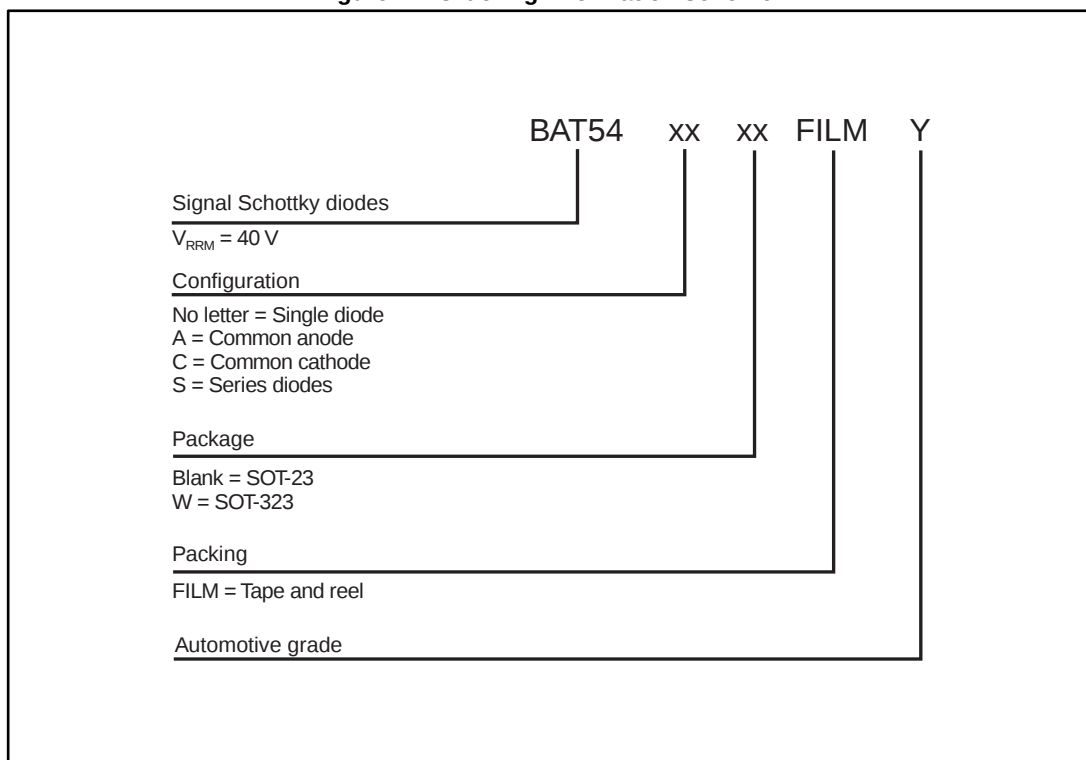


Table 8: Ordering information

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" .

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