

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.

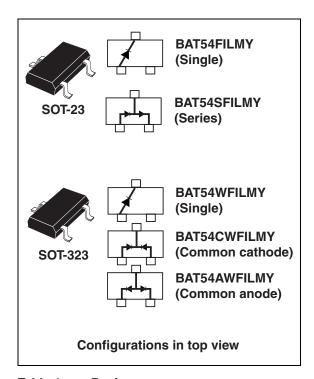


Table 1. Device summary

Symbol	Value
I _F	300 mA
V _{RRM}	40 V
C (typ)	7 pF
T _j (max)	150 °C

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Characteristics BAT54-Y

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	1	Α
T _{stg}	Storage temperature range	-65 to +150	°C
Tj	Operating junction temperature range	-40 to +150	°C
TL	Maximum soldering temperature	260	°C

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
R _{th(j-a)} Junction to ambient ⁽¹⁾	Junction to ambient ⁽¹⁾	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.	Тур.	Max.	Unit	
Reverse leakage current	Reverse leakage	T _j = 25 °C	V _B = 30 V	V - 20 V			1	μA
	T _j = 100 °C	v _R = 30 v			100	μA		
V _F ⁽²⁾ Forward voltage drop		$I_F = 0.1 \text{ mA}$			240			
		T _j = 25 °C	I _F = 1 mA			320		
	Forward voltage drop		I _F = 10 mA			400	mV	
			I _F = 30 mA			500		
			I _F = 100 mA			900		

^{1.} Pulse test: t_p = 5 ms, δ < 2 %

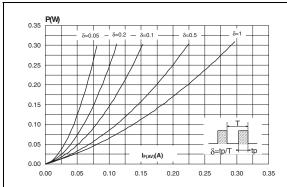
Table 5. Dynamic characteristics

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

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

BAT54-Y Characteristics

Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature ($\delta = 1$)



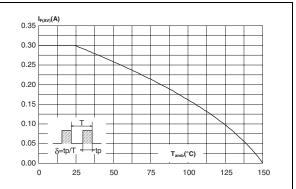
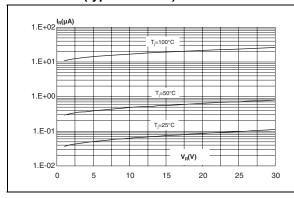


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

Figure 4. Reverse leakage current versus junction temperature



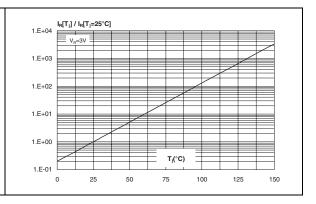
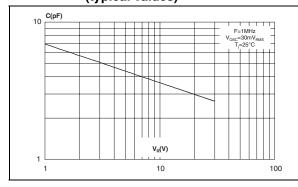
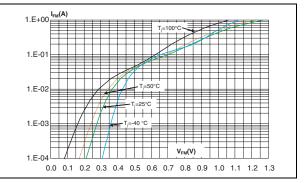


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

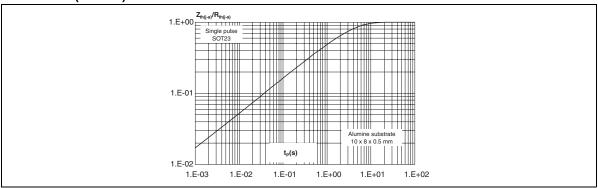
Figure 6. Forward voltage drop versus forward current (typical values)





Characteristics BAT54-Y

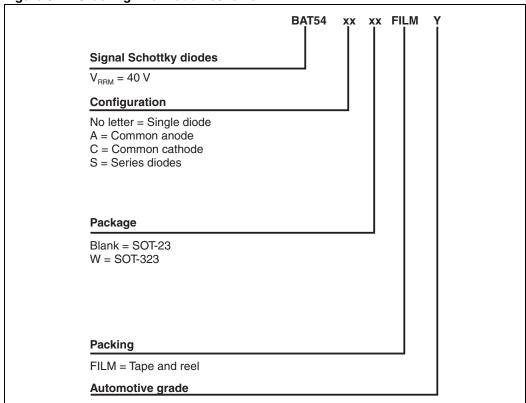
Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SOT-23)



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2 Ordering information scheme

Figure 8. Ordering information scheme



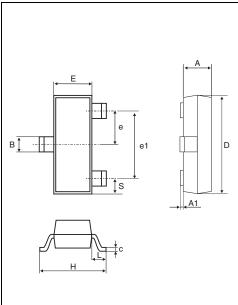
Package information BAT54-Y

3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

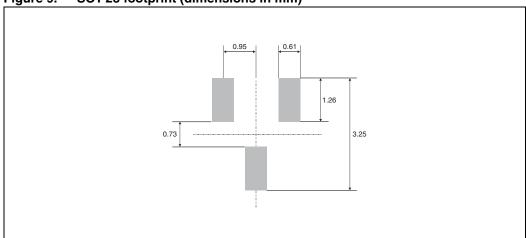
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK[®] is an ST trademark.

Table 6. SOT-23 dimensions



	Dimensions				
Ref.	ef. Millimeters		Inches		
	Min.	Max.	Min.	Max.	
Α	0.89	1.4	0.035	0.055	
A1	0	0.1	0	0.004	
В	0.3	0.51	0.012	0.02	
С	0.085	0.18	0.003	0.007	
D	2.75	3.04	0.108	0.12	
е	0.85	1.05	0.033	0.041	
e1	1.7	2.1	0.067	0.083	
Е	1.2	1.6	0.047	0.063	
Н	2.1	2.75	0.083	0.108	
L	0.6 typ.		0.024	4 typ.	
S	0.35	0.65	0.014	0.026	

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



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BAT54-Y Package information

Table 7. SOT-323 dimensions

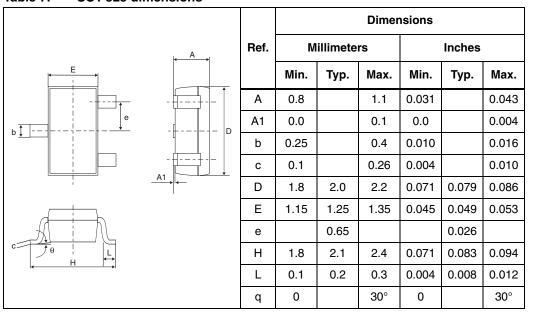
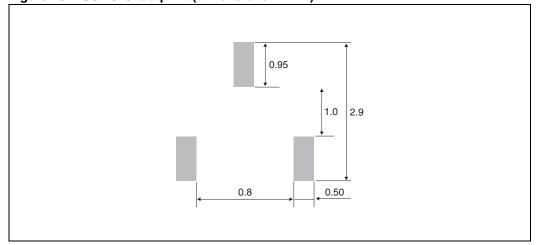


Figure 10. SOT-323 footprint (dimensions in mm)



Ordering information BAT54-Y

4 Ordering information

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	10 mg		
BAT54WFILMY	73Y	SOT-323 Single	6 mg		
BAT54CWFILMY	77Y	SOT-323 Common cathode	6 mg	3000	Tape and reel
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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