

# Schottky Barrier Diodes

## BAT54AL

These Schottky barrier diodes are designed for high speed switching applications, circuit protection, and voltage clamping. Extremely low forward voltage reduces conduction loss. Miniature surface mount package is excellent for hand held and portable applications where space is limited.

### Features

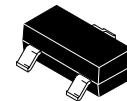
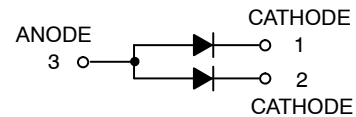
- Extremely Fast Switching Speed
- Low Forward Voltage – 0.35 V (Typ) @  $I_F = 10$  mAdc
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### MAXIMUM RATINGS ( $T_J = 125^\circ\text{C}$ unless otherwise noted)

| Rating                                                                                     | Symbol    | Value       | Unit                       |
|--------------------------------------------------------------------------------------------|-----------|-------------|----------------------------|
| Reverse Voltage                                                                            | $V_R$     | 30          | V                          |
| Forward Power Dissipation<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_F$     | 225<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Forward Current (DC)                                                                       | $I_F$     | 200 Max     | mA                         |
| Non-Repetitive Peak Forward Current<br>$t_p < 10$ msec                                     | $I_{FSM}$ | 600         | mA                         |
| Repetitive Peak Forward Current<br>Pulse Wave = 1 sec,<br>Duty Cycle = 66%                 | $I_{FRM}$ | 300         | mA                         |
| Junction Temperature                                                                       | $T_J$     | -55 to 150  | $^\circ\text{C}$           |
| Storage Temperature Range                                                                  | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$           |

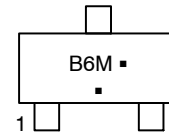
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## 30 VOLT SCHOTTKY BARRIER DETECTOR AND SWITCHING DIODES



SOT-23 (TO-236)  
CASE 318  
STYLE 12

### MARKING DIAGRAM



B6 = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

### ORDERING INFORMATION

| Device      | Package             | Shipping <sup>†</sup> |
|-------------|---------------------|-----------------------|
| BAT54ALT1G  | SOT-23<br>(Pb-Free) | 3,000/Tape & Reel     |
| SBAT54ALT1G | SOT-23<br>(Pb-Free) | 3,000/Tape & Reel     |
| SBAT54ALT3G | SOT-23<br>(Pb-Free) | 10,000/Tape & Reel    |

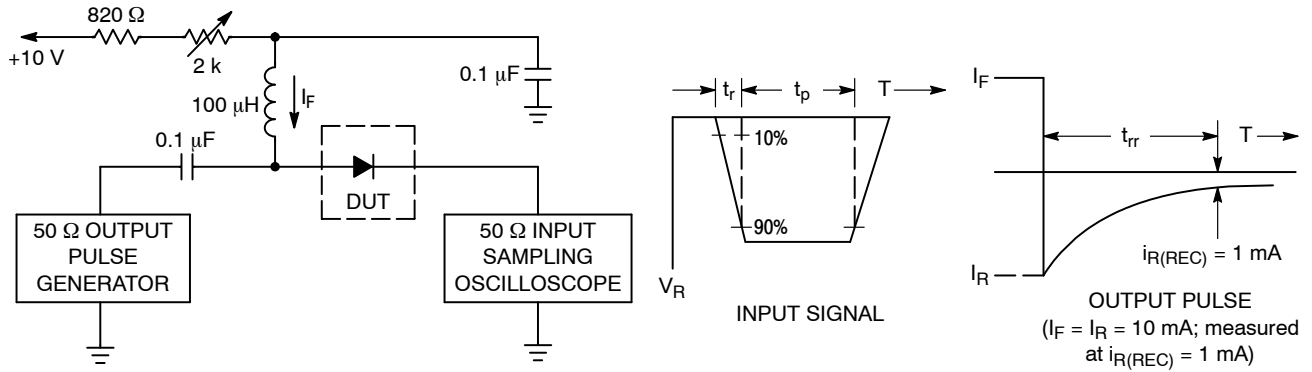
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](http://www.onsemi.com/BRD8011/D).

# BAT54AL

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) (EACH DIODE)

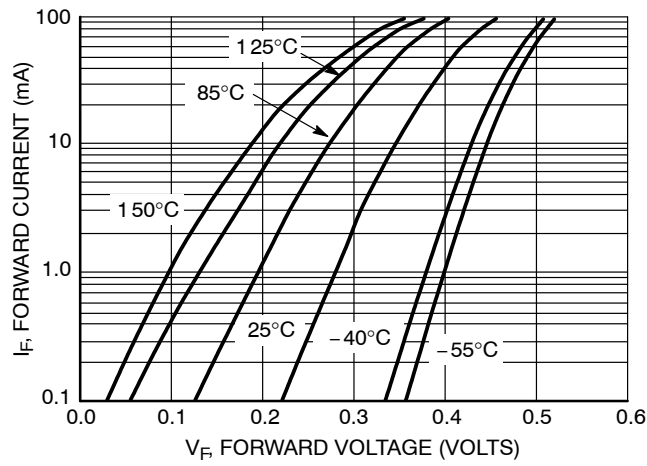
| Characteristic                                                                                                                                                 | Symbol      | Min                   | Typ                                  | Max                                  | Unit             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|--------------------------------------|--------------------------------------|------------------|
| Reverse Breakdown Voltage<br>( $I_R = 10\text{ }\mu\text{A}$ )                                                                                                 | $V_{(BR)R}$ | 30                    | –                                    | –                                    | V                |
| Total Capacitance<br>( $V_R = 1.0\text{ V}$ , $f = 1.0\text{ MHz}$ )                                                                                           | $C_T$       | –                     | 7.6                                  | 10                                   | pF               |
| Reverse Leakage<br>( $V_R = 25\text{ V}$ )                                                                                                                     | $I_R$       | –                     | 0.5                                  | 2.0                                  | $\mu\text{A}$ dc |
| Forward Voltage<br>( $I_F = 0.1\text{ mA}$ )<br>( $I_F = 1.0\text{ mA}$ )<br>( $I_F = 10\text{ mA}$ )<br>( $I_F = 30\text{ mA}$ )<br>( $I_F = 100\text{ mA}$ ) | $V_F$       | –<br>–<br>–<br>–<br>– | 0.22<br>0.29<br>0.35<br>0.41<br>0.52 | 0.24<br>0.32<br>0.40<br>0.50<br>0.80 | V                |
| Reverse Recovery Time<br>( $I_F = I_R = 10\text{ mAdc}$ , $I_{R(REC)} = 1.0\text{ mAdc}$ , Figure 1)                                                           | $t_{rr}$    | –                     | –                                    | 5.0                                  | ns               |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

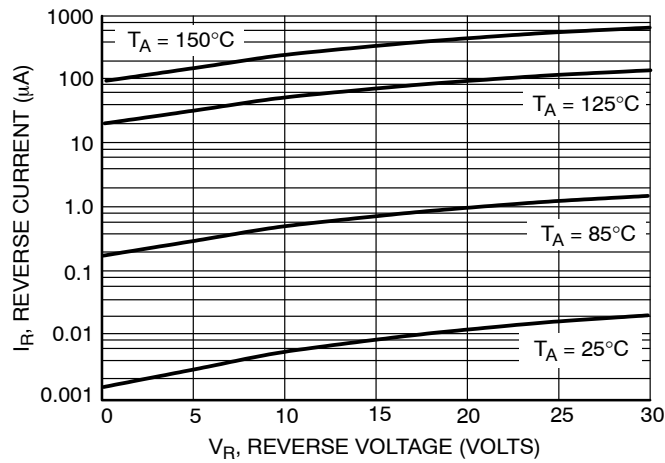


**Figure 1. Recovery Time Equivalent Test Circuit**

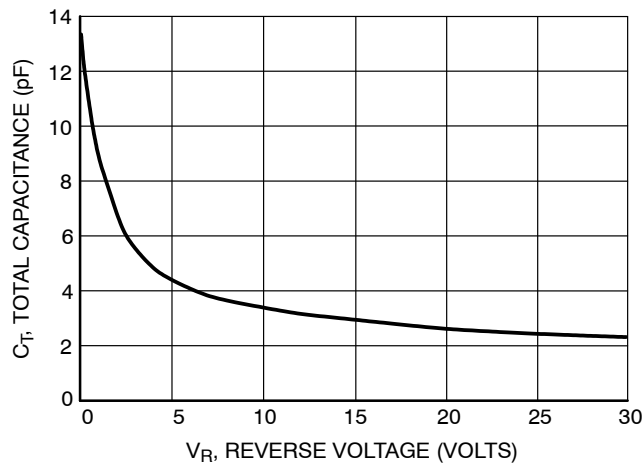
# BAT54AL



**Figure 2. Forward Voltage**

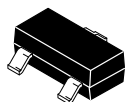


**Figure 3. Leakage Current**



**Figure 4. Total Capacitance**

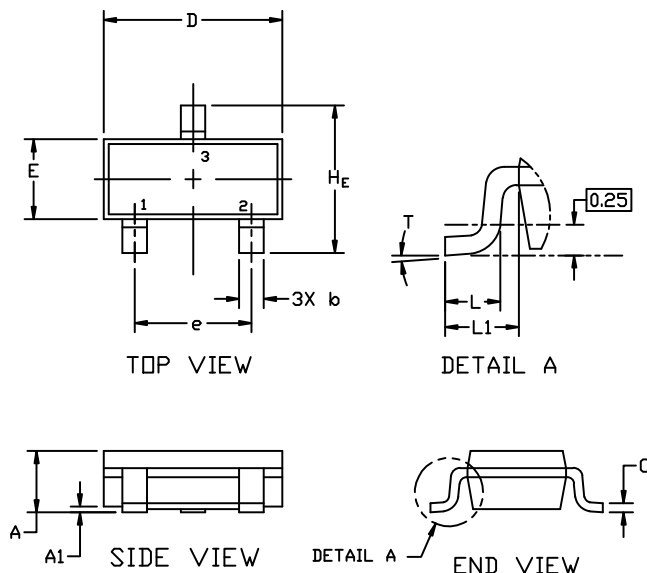
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 4:1

**SOT-23 (TO-236)**  
**CASE 318**  
**ISSUE AT**

DATE 01 MAR 2023

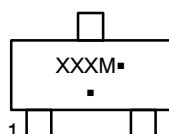


## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

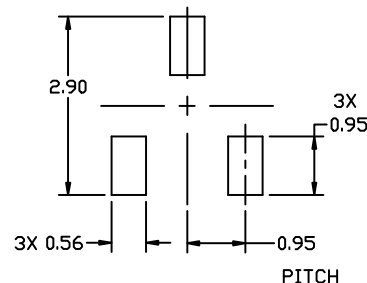
| DIM            | MILLIMETERS |      |      | INCHES |       |       |
|----------------|-------------|------|------|--------|-------|-------|
|                | MIN.        | NOM. | MAX. | MIN.   | NOM.  | MAX.  |
| A              | 0.89        | 1.00 | 1.11 | 0.035  | 0.039 | 0.044 |
| A1             | 0.01        | 0.06 | 0.10 | 0.000  | 0.002 | 0.004 |
| b              | 0.37        | 0.44 | 0.50 | 0.015  | 0.017 | 0.020 |
| c              | 0.08        | 0.14 | 0.20 | 0.003  | 0.006 | 0.008 |
| D              | 2.80        | 2.90 | 3.04 | 0.110  | 0.114 | 0.120 |
| E              | 1.20        | 1.30 | 1.40 | 0.047  | 0.051 | 0.055 |
| e              | 1.78        | 1.90 | 2.04 | 0.070  | 0.075 | 0.080 |
| L              | 0.30        | 0.43 | 0.55 | 0.012  | 0.017 | 0.022 |
| L1             | 0.35        | 0.54 | 0.69 | 0.014  | 0.021 | 0.027 |
| H <sub>E</sub> | 2.10        | 2.40 | 2.64 | 0.083  | 0.094 | 0.104 |
| T              | 0°          | ---  | 10°  | 0°     | ---   | 10°   |

## GENERIC MARKING DIAGRAM\*



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



## RECOMMENDED MOUNTING FOOTPRINT

\* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## STYLES ON PAGE 2

|                         |                        |                                                                                                                                                                                  |
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| <b>DESCRIPTION:</b>     | <b>SOT-23 (TO-236)</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                               |

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS



### SOT-23 (TO-236) CASE 318 ISSUE AT

DATE 01 MAR 2023

|                                                         |                                                       |                                                             |                                                             |                                                             |                                                             |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1 THRU 5:<br>CANCELLED                            | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE  |                                                             |                                                             |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE      | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE     | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE       | STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE      | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE | STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE          |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN       | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT   | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE           | STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION |
| STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE     |                                                             |                                                             |                                                             |                                                             |

|                  |                 |                                                                                                                                                                                     |
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