

BAT54 / BAT54A / BAT54C / BAT54S

List

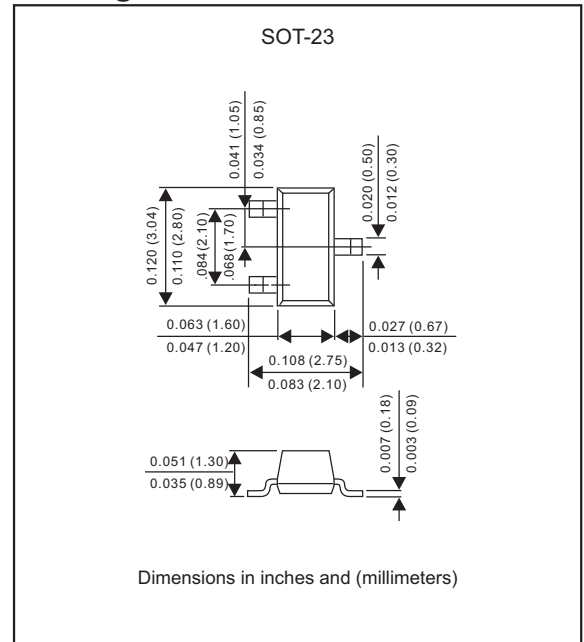
List.....	1
Package outline.....	2
Features.....	2
Mechanical data.....	2
Maximum ratings and Electrical characteristics	2
Rating and characteristic curves.....	3
Pinning information.....	4
Marking.....	4
Suggested solder pad layout.....	4
Packing information.....	5
Reel packing.....	6
Suggested thermal profiles for soldering processes.....	6
High reliability test capabilities.....	7

BAT54 / BAT54A / BAT54C / BAT54S**200mA Surface Mount Small Signal
Schottky Diodes 30V****Features**

- Low current rectification and high speed switching
- Small surface mount type
- Up to 200mA current capability
- Low forward voltage drop
- Silicon epitaxial planar chip, metal silicon junction
- High speed ($t_{rr} < 5 \text{ ns}$)
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. BAT54-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per
MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline**Maximum ratings** (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Repetitive peak reverse voltage		V_{RRM}			30	V
Reverse voltage		V_R			30	V
Total device dissipation	FR-5 Board, (Note 1) $T_A=25^\circ\text{C}$ Derate above 25°C	P_D			200 2.0	mW mW/ $^\circ\text{C}$
Repetitive peak forward current		I_{FRM}			300	mA
Non-repetitive peak forward current	$t_p < 1\text{s}$	I_{FSM}			600	mA
Forward current		I_F			200	mA
Thermal resistance	Junction to ambient Junction to case	$R_{\theta JA}$ $R_{\theta JC}$		500 350		$^\circ\text{C}/\text{W}$ $^\circ\text{C}/\text{W}$
Operating junction temperature range		T_J	-55		+125	$^\circ\text{C}$
Storage temperature range		T_{STG}	-55		+125	$^\circ\text{C}$

Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Forward voltage	$I_F=0.1\text{mA}$	V_F		0.220	0.240	V
	$I_F=1\text{mA}$			0.290	0.320	V
	$I_F=10\text{mA}$			0.350	0.400	V
	$I_F=30\text{mA}$			0.410	0.500	V
	$I_F=100\text{mA}$			0.520	1.000	V
Reverse leakage current	$V_R=25\text{V}$	I_R		0.5	2.0	μA
Diode capacitance	$V_R=1.0\text{V}$, $f=1.0\text{MHz}$	C_T			10.0	pF
Reverse recovery time	$I_F=I_R=10\text{mA}$, $I_{R(REC)}=1.0\text{mA}$	t_{rr}			5.0	ns

Note 1: FR-5 = 1.0 x 0.75 x 0.062 in

Rating and characteristic curves for each diode (BAT54 / A / C / S)

FIG.1-TYPICAL FORWARD CHARACTERISTICS

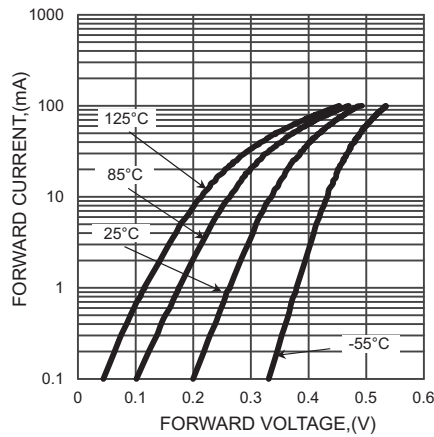


FIG.2 - TYPICAL LEAKAGE CURRENT CHARACTERISTICS

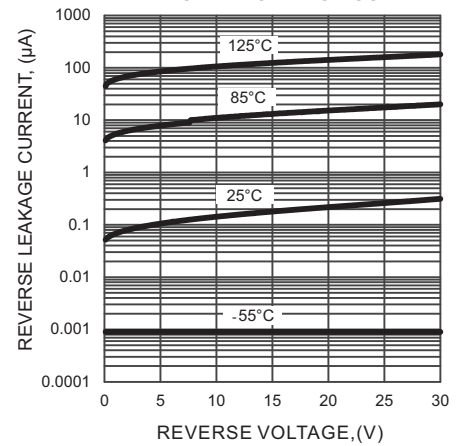
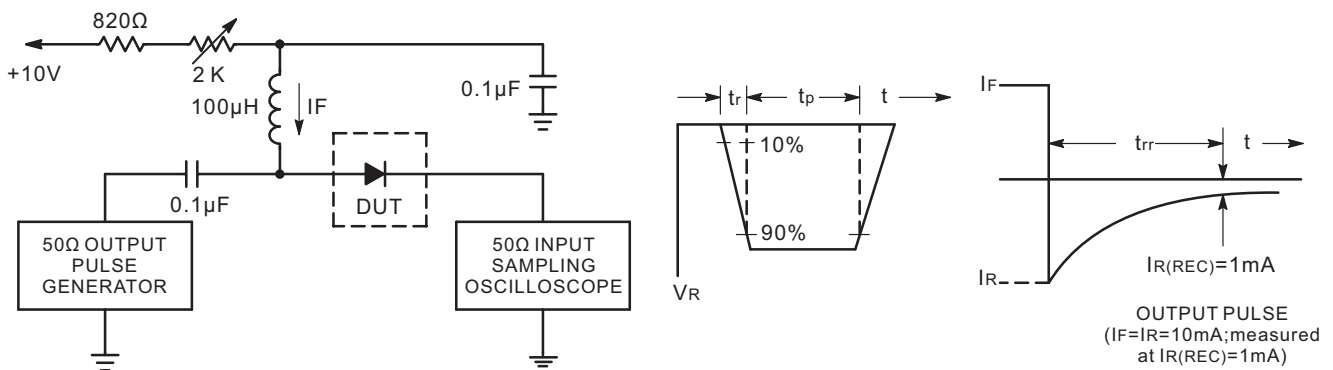
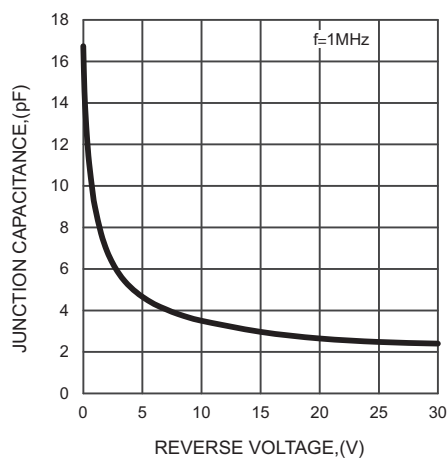


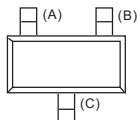
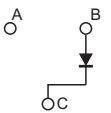
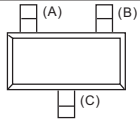
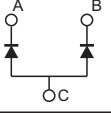
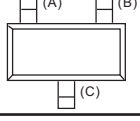
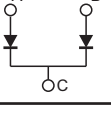
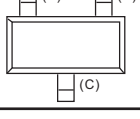
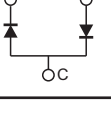
FIG.3-TYPICAL JUNCTION CAPACITANCE

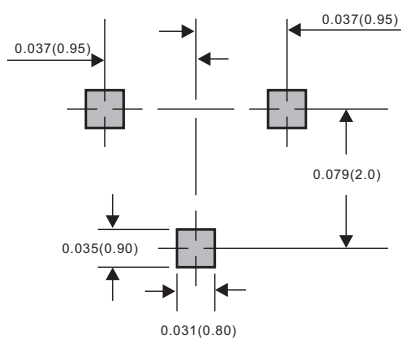


Notes 1: A 2.0K Ω variable resistor adjusted for a forward Current (I_F) of 10mA.
 2: Input pulse is adjusted so $I_R(\text{peak})$ is equal to 10 mA.
 3: $t_p \gg t_{rr}$.

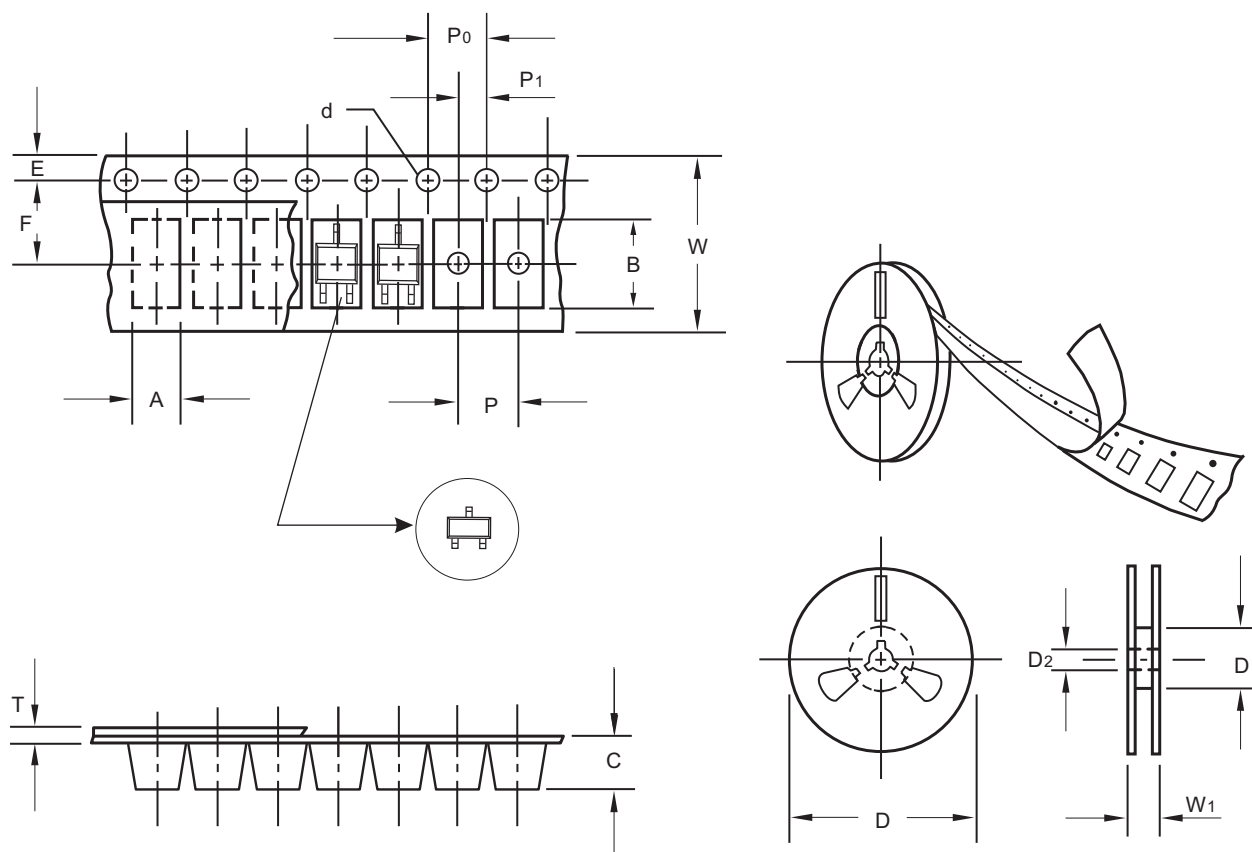
Recovery Time Equivalent Test Circuit

BAT54 / BAT54A / BAT54C / BAT54S**Pinning information**

Type number	Marking code	Simplified outline	Symbol
BAT54	JV3, LV3, L4, KL1		
BAT54A	B6, L42, KL2		
BAT54C	5C, KL3, L43		
BAT54S	LD3, L44, KL4		

Suggested solder pad layout**SOT-23**

Dimensions in inches and (millimeters)

BAT54 / BAT54A / BAT54C / BAT54S**Packing information**

unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

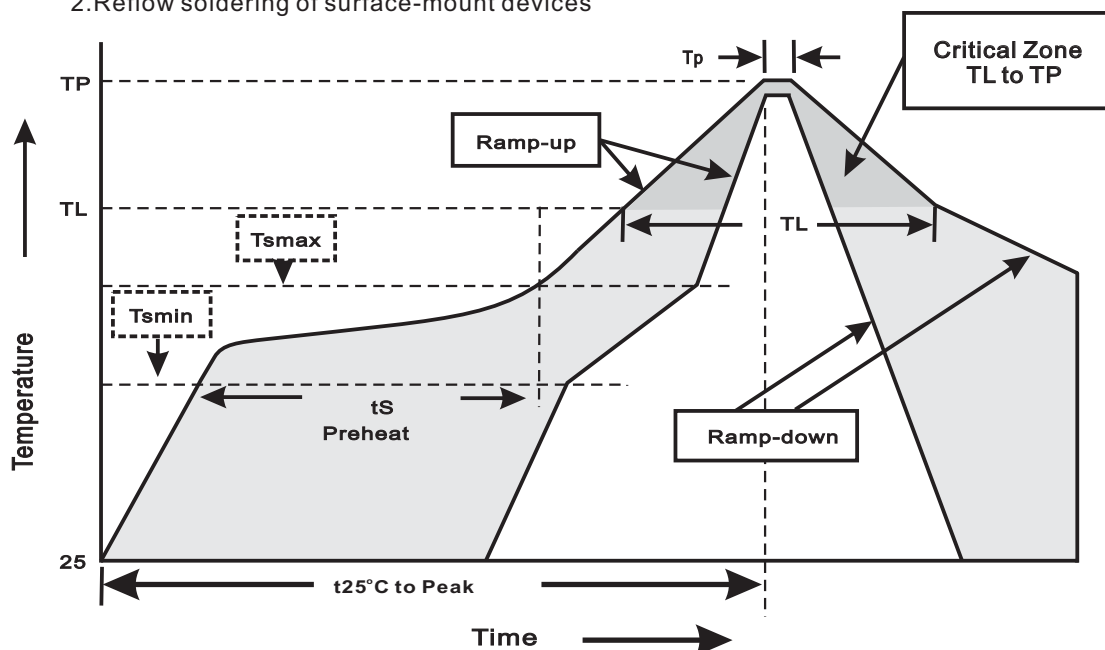
Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

BAT54 / BAT54A / BAT54C / BAT54S**Reel packing**

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices

**3.Reflow soldering**

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

BAT54 / BAT54A / BAT54C / BAT54S**High reliability test capabilities**

Item Test	Conditions	Reference
1. Solder Resistance	at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R = 80\%$ rate at $T_J = 125^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Forward Operation Life	Rated average rectifier current at $T_A = 25^{\circ}\text{C}$ for 500hrs.	MIL-STD-750D METHOD-1027
5. Intermittent Operation Life	$T_A = 25^{\circ}\text{C}$, $I_F = I_O$ On state: power on for 5 min. off state: power off for 5 min. on and off for 500 cycles.	MIL-STD-750D METHOD-1036
6. Pressure Cooker	$15P_{SIG}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Forward Surge	Forward surge current	MIL-STD-750D METHOD-4066-2
9. Humidity	at $T_A = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
10. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031