

BAT54W-Q1 / BAT54AW-Q1 /BAT54CW-Q1 BAT54SW-Q1

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BAT54W-Q1 / BAT54AW-Q1 /BAT54CW-Q1 BAT54SW-Q1

200mA Surface Mount Small Signal Schottky Diodes 30V

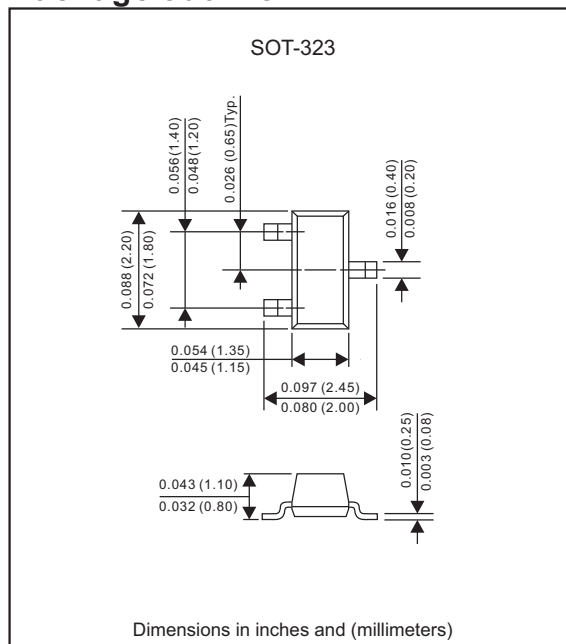
Features

- Low current rectification and high speed switching
- Tiny surface mount type
- Up to 200mA current capability
- Low forward voltage drop
- Silicon epitaxial planar chip, metal silicon junction.
- High speed
- Lead-free parts meet RoHS requirements
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen-free part, ex. BAT54W-Q1-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-323
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



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

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
DC reverse voltage		V_R			30	V
Repetitive peak forward current		I_{FRM}			300	mA
Non-repetitive peak forward current	$t_p < 1s$	I_{FSM}			600	mA
Power dissipation	$T_A = 25^\circ\text{C}$	P_D			200	mW
Forward current(DC)		I_F			200	mA
Thermal resistance	Junction to ambient	$R_{\theta JA}$			500	$^\circ\text{C}/\text{W}$
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
Reverse breakdown voltage	$I_R = 10\mu\text{A}$	$V_{(BR)R}$	30			V
Forward voltage	$I_F = 0.1\text{mA}$	V_F		0.220	0.240	V
	$I_F = 1\text{mA}$	V_F		0.290	0.320	V
	$I_F = 10\text{mA}$	V_F		0.350	0.400	V
	$I_F = 30\text{mA}$	V_F		0.410	0.500	V
	$I_F = 100\text{mA}$	V_F		0.520	1.000	V
Reverse leakage current	$V_R = 25\text{V}$	I_R		0.5	2.0	μA
Total capacitance	$V_R = 1\text{V}$, $f = 1\text{MHz}$	C_T		7.6	10.0	pF
Reverse recovery time	$I_F = I_R = 10\text{mA}$, $I_{R(Rec)} = 1.0\text{mA}$	t_{rr}			5	ns

Rating and characteristic curves for each diode (BAT54W-Q1 / BAT54AW-Q1 / BAT54CW-Q1 / BAT54SW-Q1)

FIG.1- Typical forward voltage

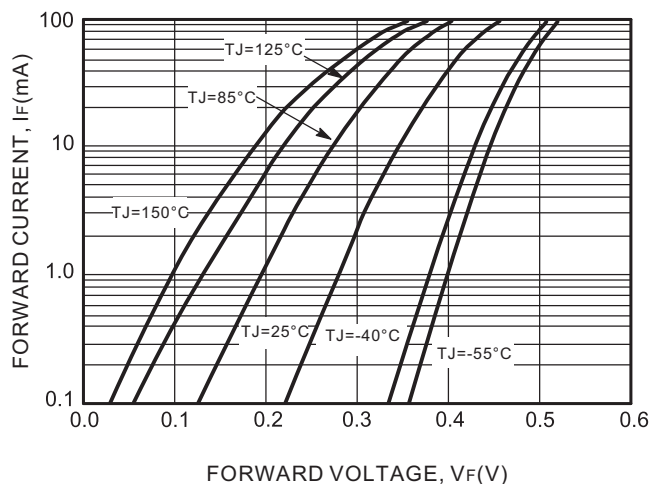


FIG.2 - Typical leakage current

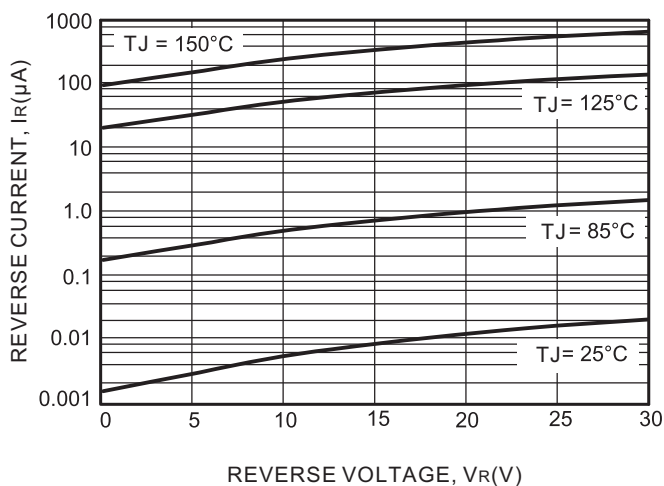
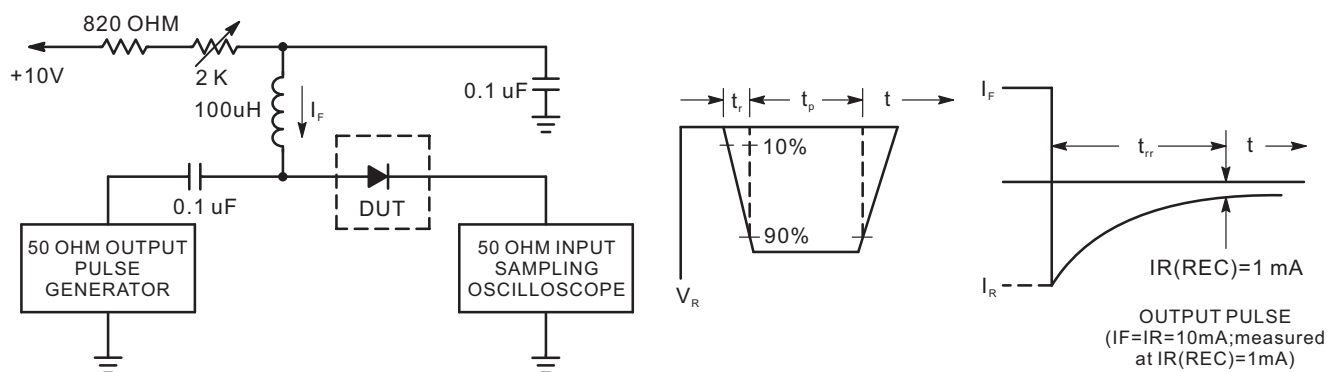
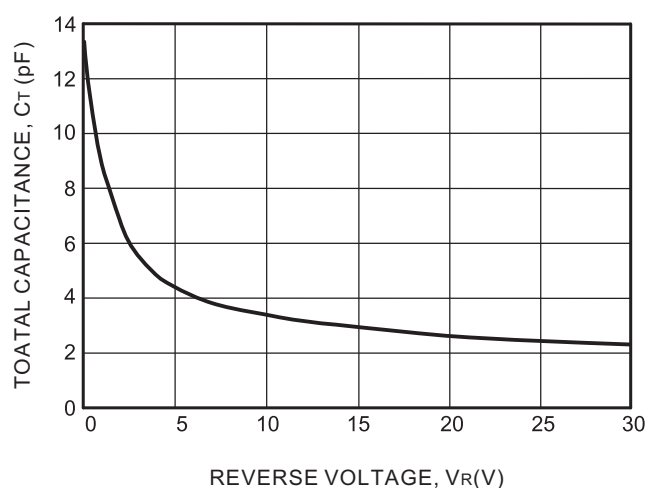


FIG.3 - Total capacitance

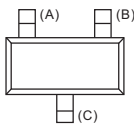
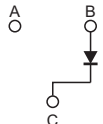
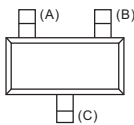
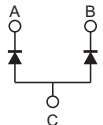
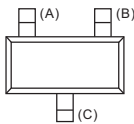
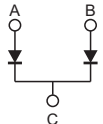
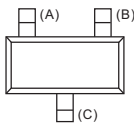
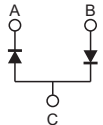


- Notes : 1. A 2.0Kohm variable resistor adjusted for a forward Current (I_F) of 10mA.
2. Input pulse is adjusted so $I_R(\text{peak})$ is equal to 10 mA.
3. $t_p \gg t_{rr}$.

Recovery Time Equivalent Test Circuit

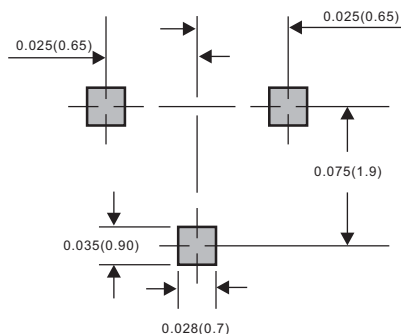
BAT54W-Q1 / BAT54AW-Q1 /BAT54CW-Q1 BAT54SW-Q1

Pinning information

Type number	Marking code	Simplified outline	Symbol
BAT54W-Q1	L4		
BAT54AW-Q1	L42		
BAT54CW-Q1	L43		
BAT54SW-Q1	L44		

Suggested solder pad layout

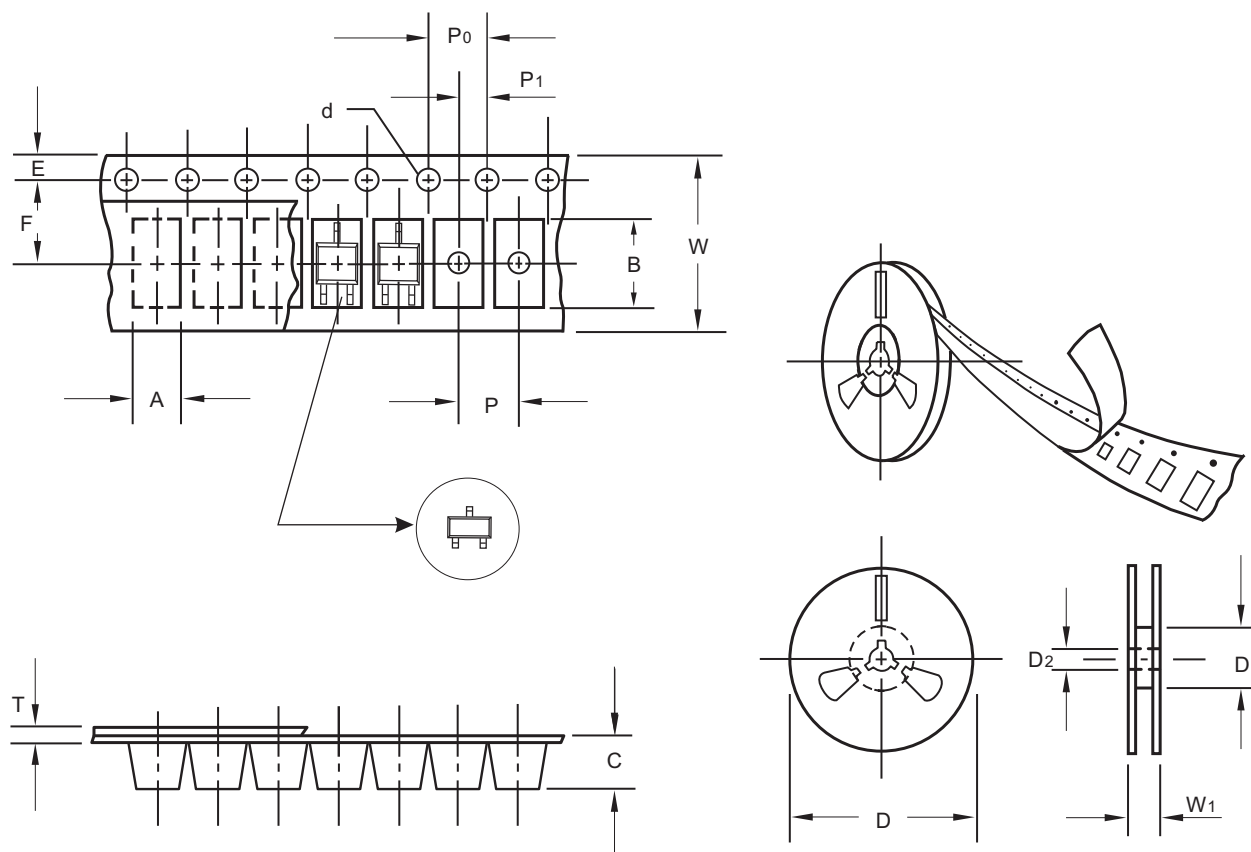
SOT-323



Dimensions in inches and (millimeters)

BAT54W-Q1 / BAT54AW-Q1 /BAT54CW-Q1 BAT54SW-Q1

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.25
Carrier length	B	0.1	2.55
Carrier depth	C	0.1	1.19
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	54.40
Feed hole diameter	D ₂	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	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

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

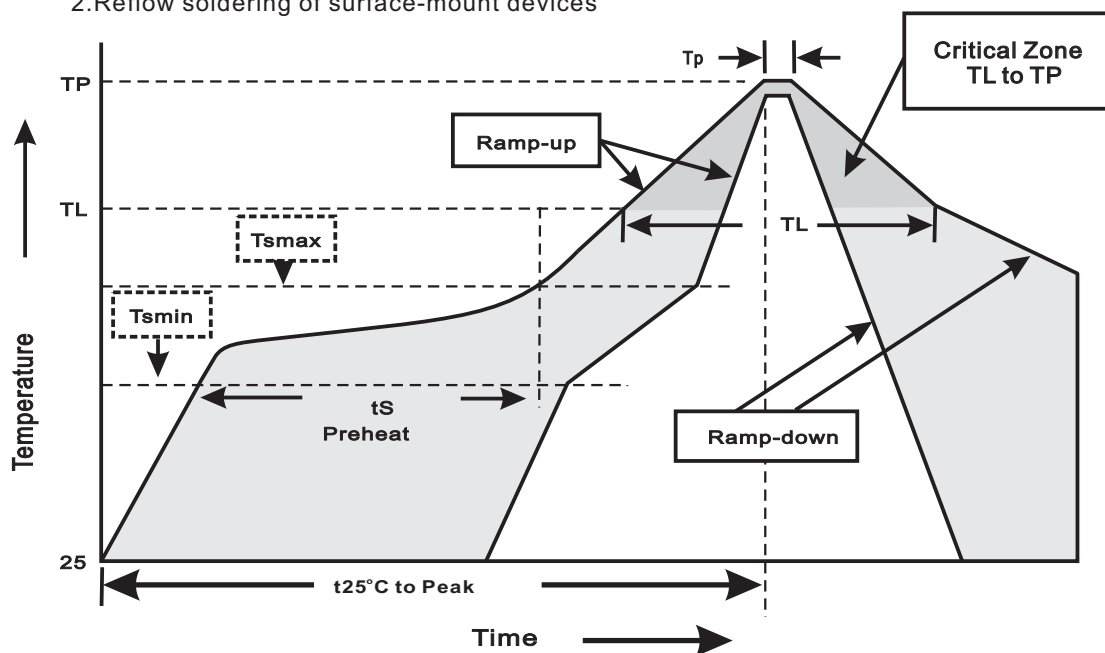
BAT54W-Q1 / BAT54AW-Q1 /BAT54CW-Q1 BAT54SW-Q1

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-323	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.5

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

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High reliability test capabilities

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. Operation Life	Ta=25°C, Rated Current (Io=Io max.) Test Duration: 1000hrs	MIL-STD-750E METHOD 1027.3
3. High Temperature Reverse Bias	80% Rated VR (TJ=TJ max.) Test Duration: 1000hrs	JESD22-A108
4. High Temperature Storage Life	Ta=150°C Test Duration: 1000hrs	JESD22 A-103
5. Temperature Cycle	-55°C(15min) to 150°C(15min) Test Cycles: 1000cycles	JESD22 A-104
6. Autoclave	P=2atm Ta=121°C RH=100% Test Duration: 96hrs	JESD22 A-102
7. Intermittent Operational Life	Ta=25°C, On/Io=Io max. 2min, Off/2min, Test Cycles: 15000cycles	MIL-STD-750E METHOD 1037
8. Solderability	245±5°C for 5sec	J-STD-002
9. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration: 1000hrs	MIL-STD-750E METHOD 1021.2
10. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
11. High Temperature High Humidity Reverse Bias	Ta=85°C, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration: 1000hrs	JESD22-A101