

BAT54X

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BAT54X

200mA Surface Mount Small Signal Schottky Diodes 30V

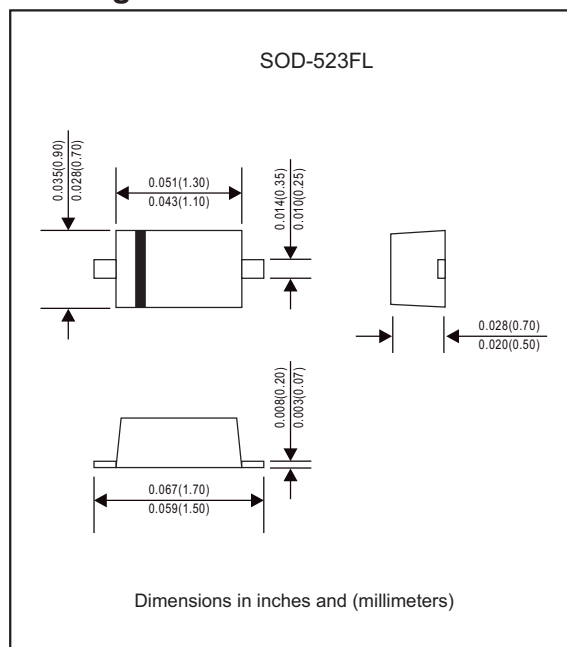
Features

- Extremely fast switching speed
- Up to 200mA current capability
- Low forward voltage drop V_F (typ.) 0.35V @ $I_F=10\text{mA}$
- Lead-free parts meet RoHS requirements
- Suffix "-H" Halogen-free part, ex. BAT54X-H

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-523FL
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.002 gram

Package outline



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

Parameter	Symbol	Limits	Unit
Reverse voltage	V_R	30	V
Forward current (DC)	I_F	200	mA
Repetitive peak forward current	I_{FRM}	300	mA
Non-repetitive peak forward current ($t < 1.0\text{s}$)	I_{FSM}	600	mA

Thermal characteristics

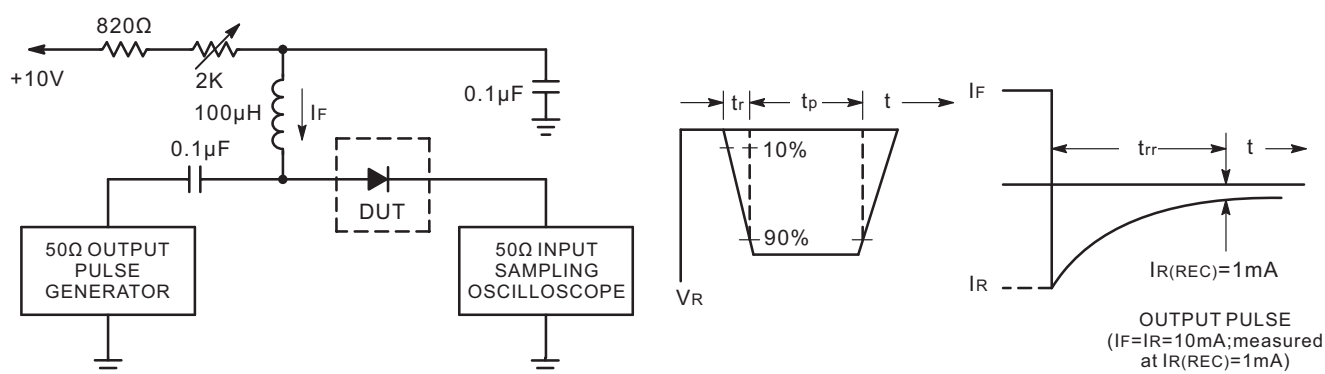
Parameter	Symbol	Limits	Unit
Total device dissipation, FR-5 board, (Note 1) $T_A = 25^\circ\text{C}$	P_D	200	mW
Derate above 25°C		1.57	mW/ $^\circ\text{C}$
Thermal resistance junction to ambient	$R_{\theta JA}$	635	$^\circ\text{C/W}$
Operating junction temperature range	T_J	-40 to +125	$^\circ\text{C}$
Storage temperature range	T_{STG}	-40 to +125	$^\circ\text{C}$

Note 1: FR-5 minimum pad

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

Parameter	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		0.22	0.24	V
$I_F=1\text{mA}$			0.29	0.32	
$I_F=10\text{mA}$			0.35	0.40	
$I_F=30\text{mA}$			0.41	0.50	
$I_F=100\text{mA}$			0.52	1.00	
Reverse leakage current, $V_R=25\text{V}$	I_R		0.5	2.0	μA
Reverse recovery time, $I_F=I_R=10\text{mA}$, $I_{R(REC)}=1.0\text{mA}$, Figure 1	t_{rr}			5.0	ns
Total capacitance, $V_R=1.0\text{V}$, $f=1.0\text{MHz}$	C_T			10	pF

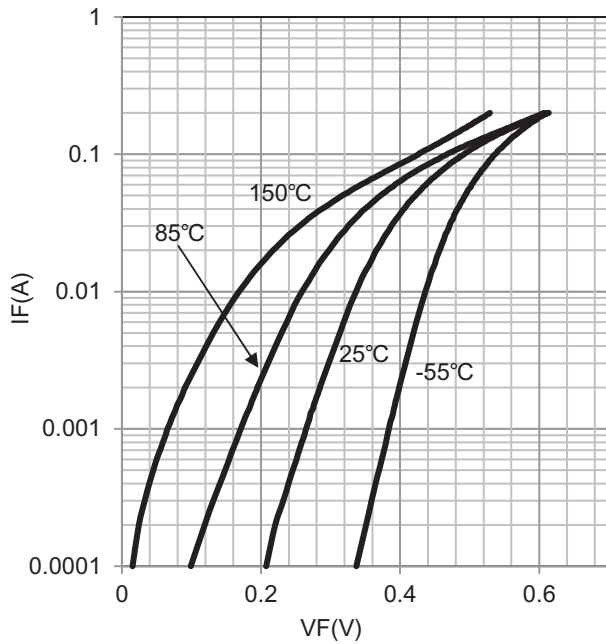


Notes 1: A 2.0KΩ variable resistor adjusted for a forward current (I_F) of 10mA.
 2: Input pulse is adjusted so $I_R(\text{peak})$ is equal to 10mA.
 3: $t_p \gg t_{rr}$.

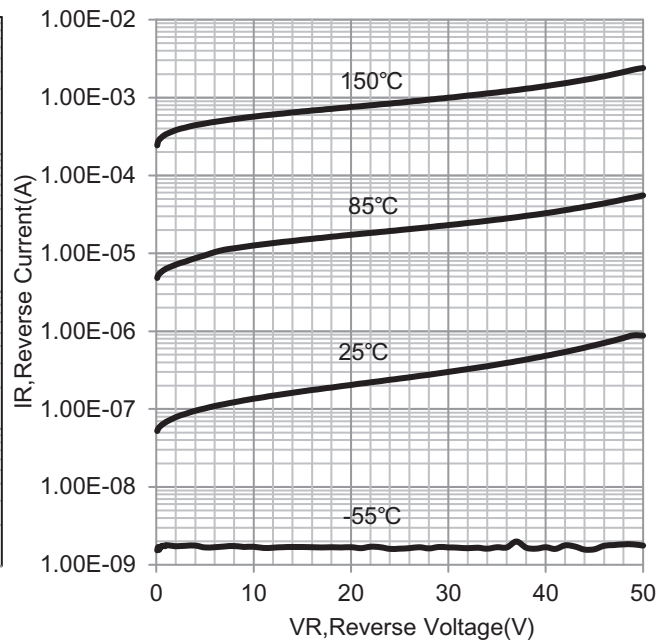
FIG.1-Recovery Time Equivalent Test Circuit

RATING AND CHARACTERISTIC CURVES (BAT54X)

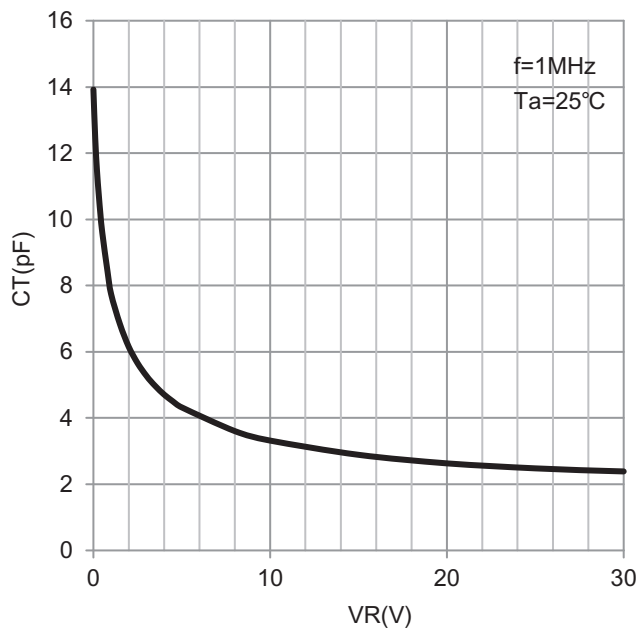
Typ IF vs. VF



Typ IR vs. VR



Typ CT vs. VR



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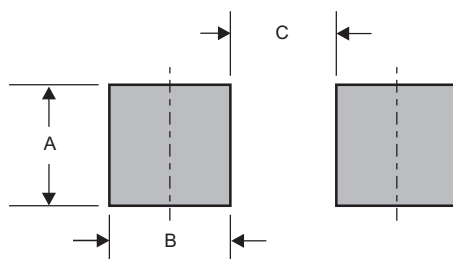
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
BAT54X	JV

Suggested solder pad layout

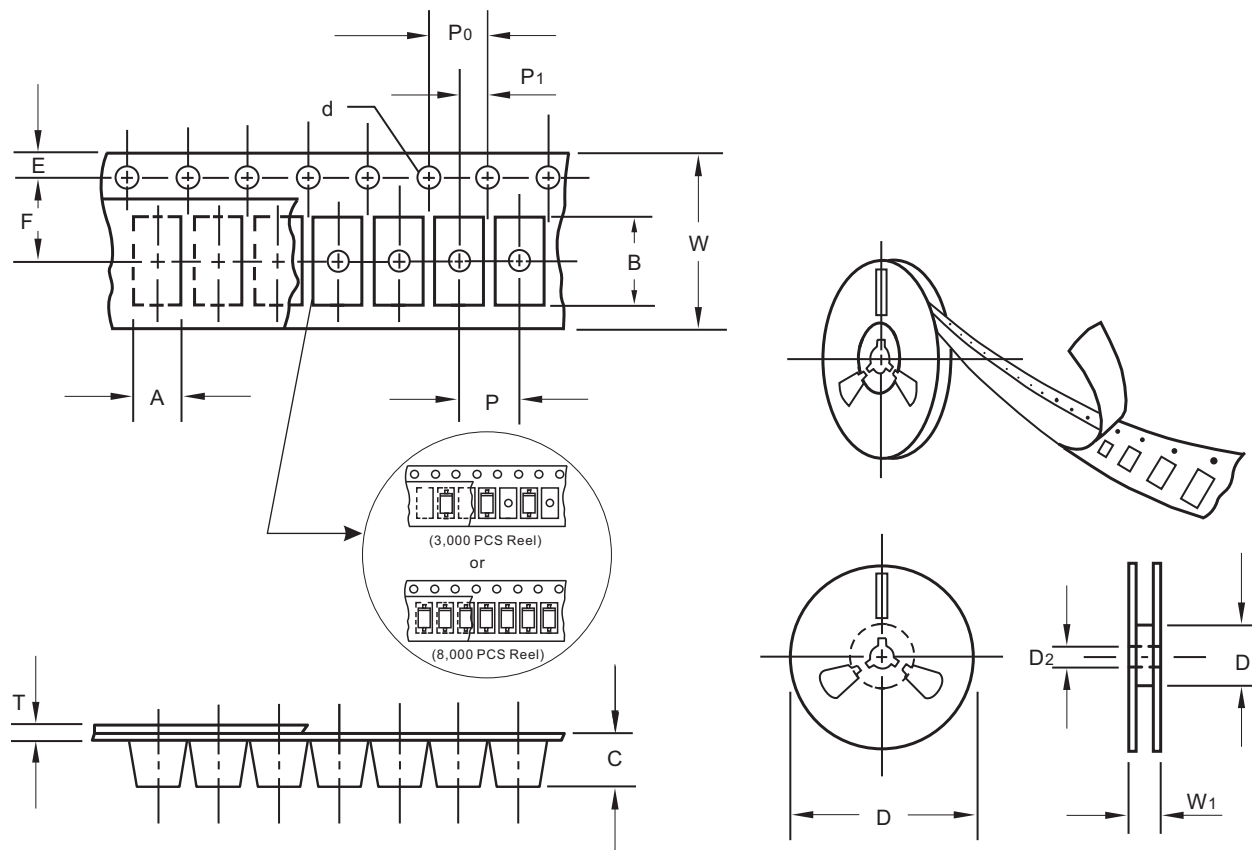


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-523FL	0.032 (0.80)	0.024 (0.60)	0.044 (1.10)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-523FL
Carrier width	A	0.1	0.90
Carrier length	B	0.1	1.94
Carrier depth	C	0.1	0.76
Sprocket hole	d	0.1	1.50
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	50.00
Feed hole diameter	D ₂	0.2	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
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	9.50

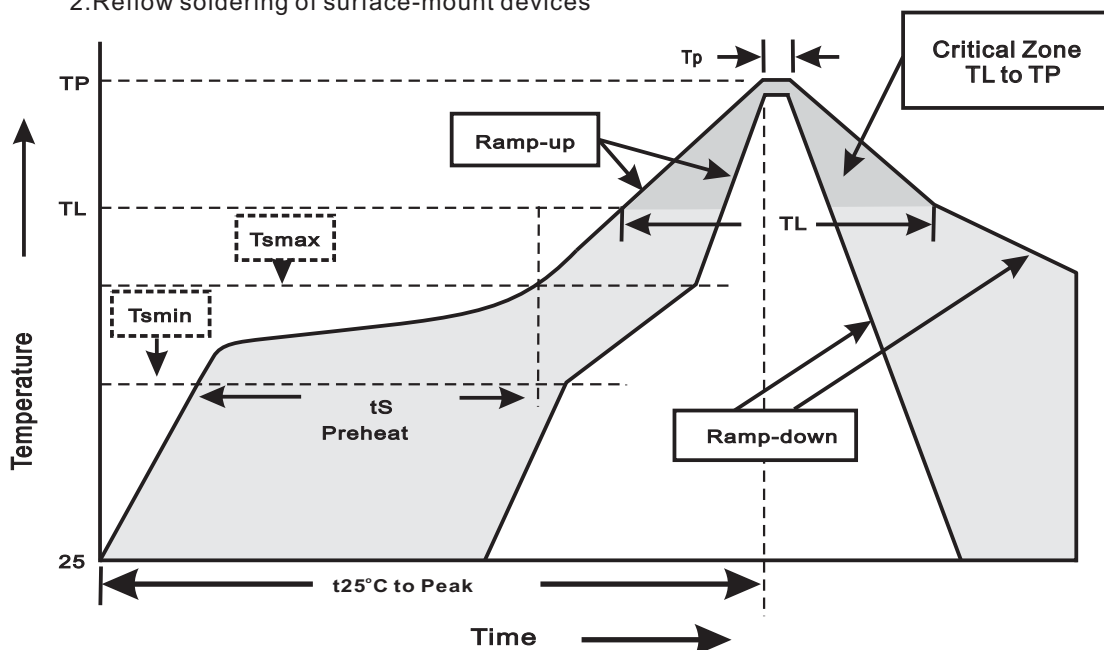
Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

BAT54X**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)
SOD-523FL	7"	3,000	2.0	30,000	183*123*183	178	382*257*387	240,000	8
		8,000	2.0	80,000	183*123*183	178	382*257*387	640,000	10

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 _{5min}) -Temperature Max(T _{5max}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{5max} 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. 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	Non-repetitive peak forward current at $t < 1.0\text{s}$	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