

BAS516

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BAS516

250mA Surface Mount Small Signal Switching Diode 75V

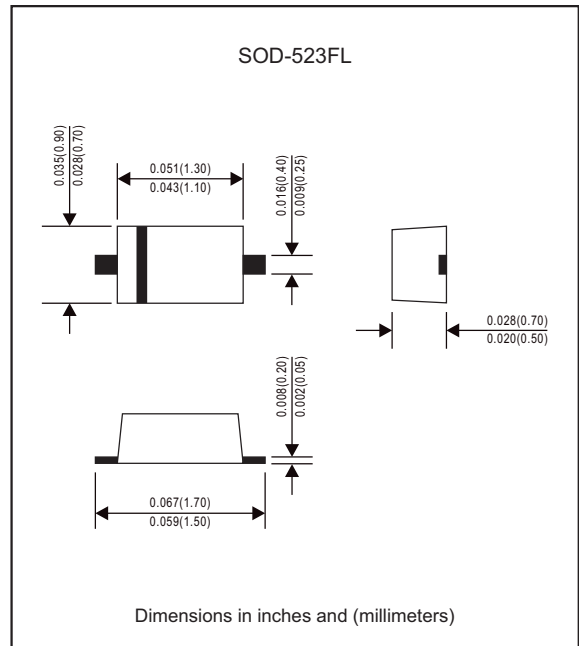
Features

- Ultra small plastic SMD package
- High switching speed: max. 4ns
- Continuous reverse voltage: max. 75V
- Repetitive peak reverse voltage: max. 85V
- Repetitive peak forward current: max. 500mA
- High-speed switching in e.g. surface mounted circuits
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. BAS516-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	Max.	Unit
Repetitive peak reverse voltage	V_{RRM}	85	V
Continuous reverse voltage	V_R	75	V
Continuous forward current $T_s=90^{\circ}\text{C}$; Note 1; see Fig.1	I_F	250	mA
Repetitive peak forward current	I_{FRM}	500	mA
Non-repetitive peak forward current square wave; $T_J=25^{\circ}\text{C}$ prior to surge; see Fig.3 $t=1\mu\text{s}$ $t=1\text{ms}$ $t=1\text{s}$	I_{FSM}	4 1 0.5	A
Total power dissipation $T_s=90^{\circ}\text{C}$; Note 1	P_D	500	mW
Maximum junction temperature	T_J	+150	$^{\circ}\text{C}$
Storage temperature range	T_{STG}	-65 to +150	$^{\circ}\text{C}$

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

Parameter	Conditions	Symbol	MIN.	TYP.	MAX.	Unit
Forward voltage	$I_F=1\text{mA}$ $I_F=10\text{mA}$ $I_F=50\text{mA}$ $I_F=150\text{mA}$	V_F			0.715 0.855 1.0 1.25	V
Reverse current	$V_R=25\text{V}$ $V_R=75\text{V}$ $V_R=25\text{V}, T_J=150^{\circ}\text{C}$ $V_R=75\text{V}, T_J=150^{\circ}\text{C}$	I_R			0.03 1.0 30 50	μA
Diode capacitance	$V_R=0, f=1\text{MHz}$ see; Fig.5	C_D			1.0	pF
Reverse recovery time	when switched from $I_F=10\text{mA}$ to $I_R=10\text{mA}$; $R_L=100\Omega$; measured at $I_R=1\text{mA}$; see Fig.6	t_{rr}			4.0	ns
Forward recovery voltage	when switched from $I_F=10\text{mA}$; $t_r=20\text{ns}$; see Fig.7	V_{FR}			1.75	V

Thermal characteristics

Parameter	Symbol	Value	Unit
Typical thermal resistance from junction to soldering point (Note 1)	$R_{\theta JS}$	120	K/W

Note 1: Soldering point of the cathode tab.

Rating and characteristic curves (BAS516)

FIG.1-Max. permissible continuous forward current as a function of soldering point temperature

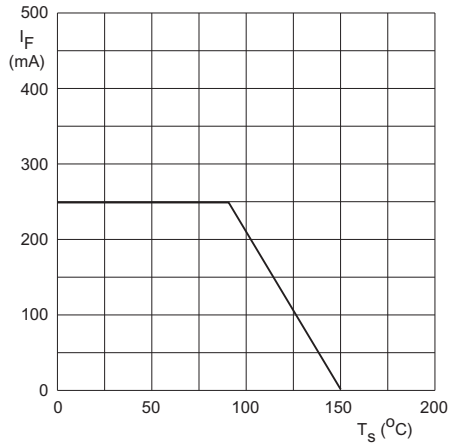


FIG.2 - Forward current as forward voltage

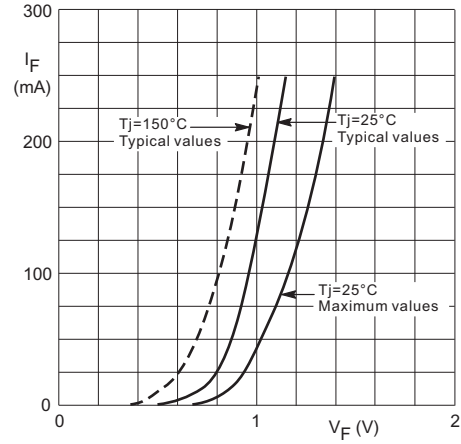


FIG.3-Reverse current as junction temperature

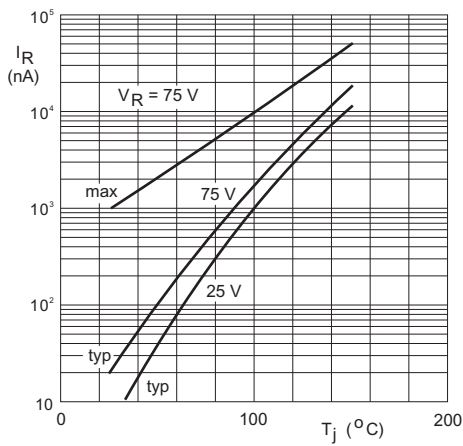


FIG.4-Capacitance between terminals characteristics

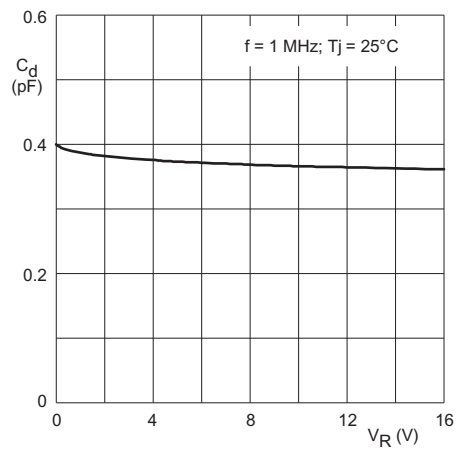
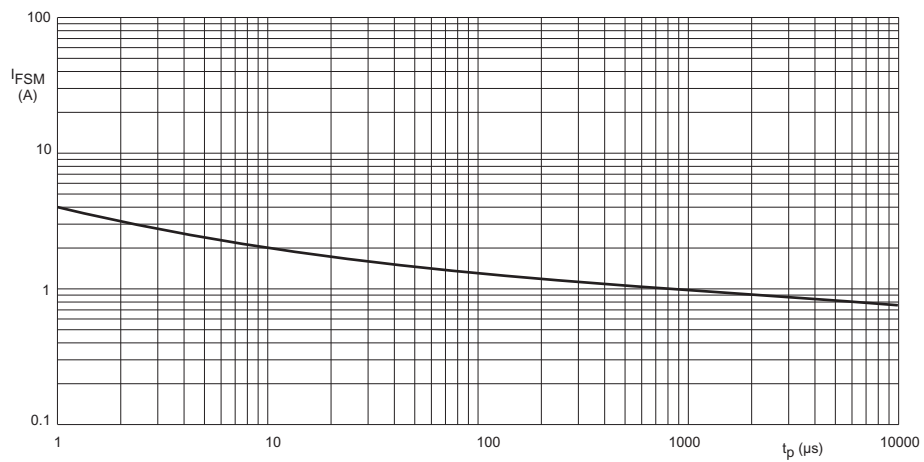
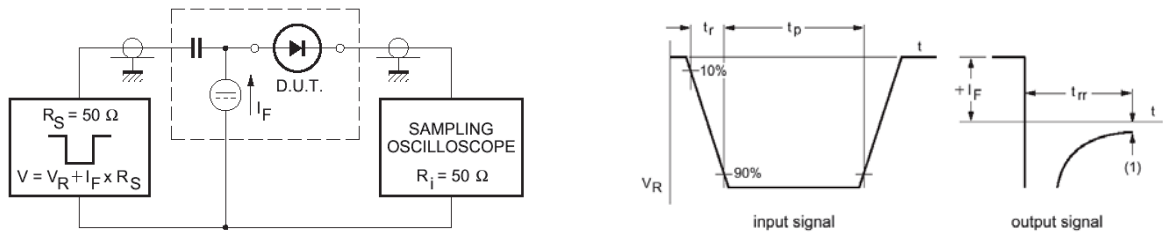


FIG.5-Max. permissible non-repetitive peak forward current as a function of pulse duration



Rating and characteristic curves (BAS516)

FIG.6 Reverse recovery voltage test circuit and waveforms.

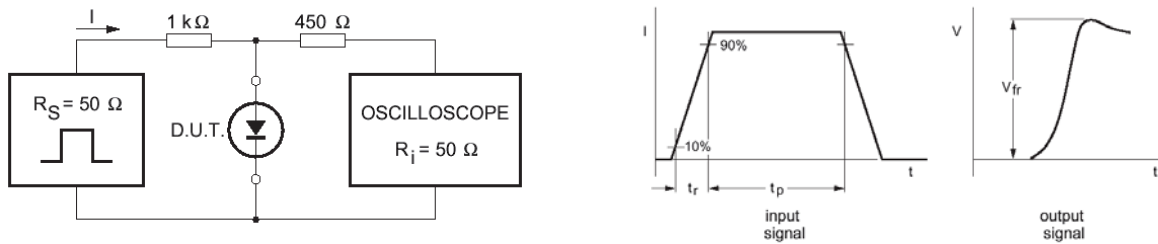


(1) $I_R = 1 \text{ mA}$.

Input signal: reverse pulse rise time $t_r = 0.6 \text{ ns}$; reverse voltage pulse duration $t_p = 100 \text{ ns}$; duty factor $\delta = 0.05$;

Oscilloscope: rise time $t_r = 0.35 \text{ ns}$.

FIG.7 Forward recovery voltage test circuit and waveforms.



Input signal: forward pulse rise time $t_r = 20 \text{ ns}$; forward current pulse duration $t_p \geq 100 \text{ ns}$; duty factor $\delta \leq 0.005$.

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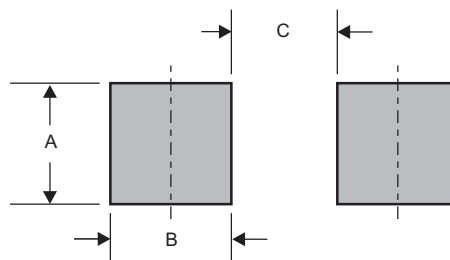
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
BAS516	6,A

Suggested solder pad layout

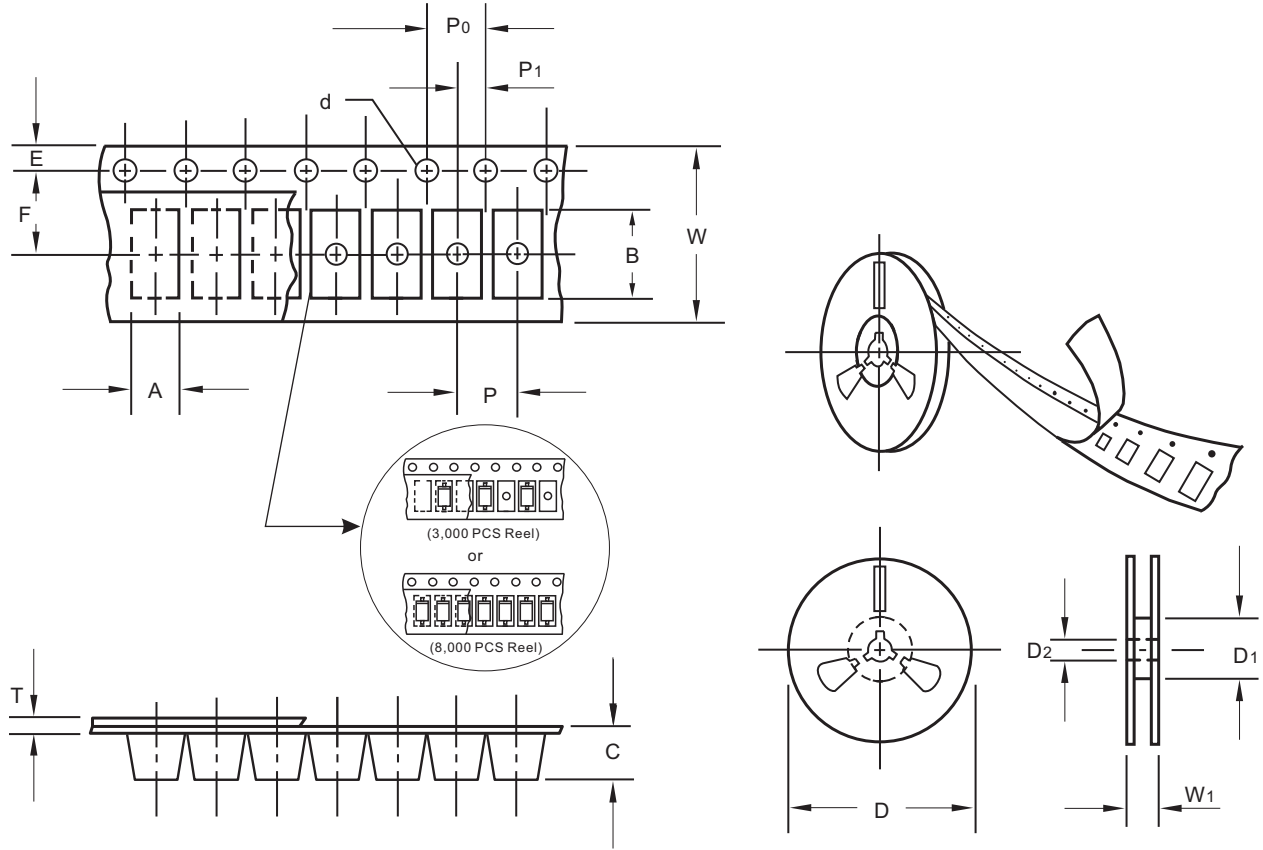


Dimensions in inches and (millimeters)

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	D1	min	50.00
Feed hole diameter	D2	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	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	9.50

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

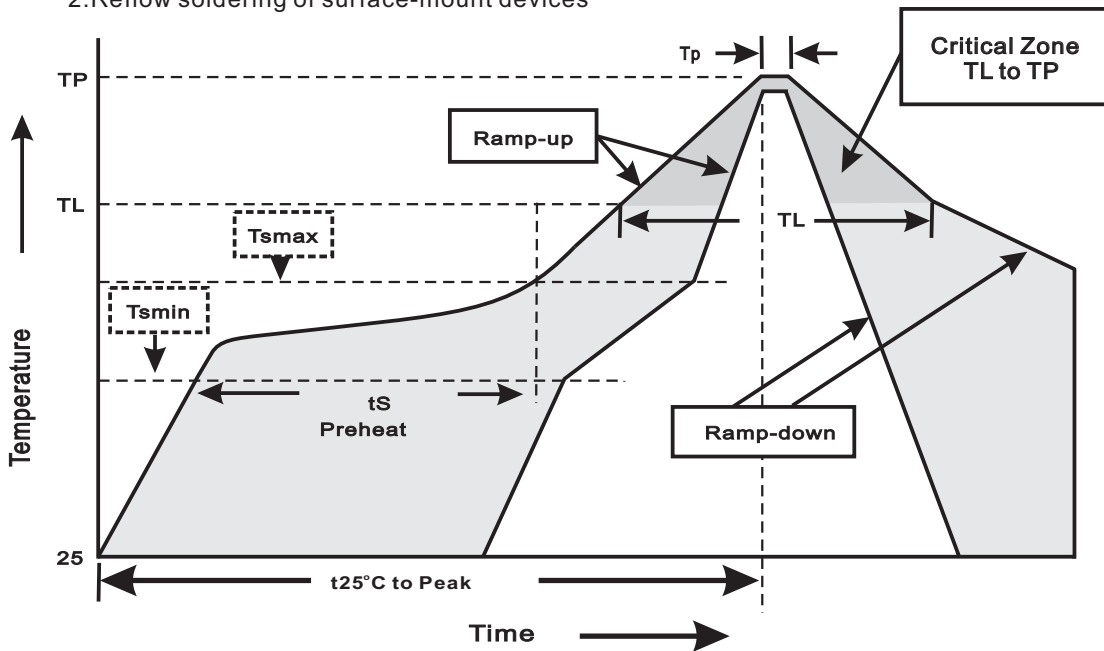
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Reel packing

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(TL to TP)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts)	150°C 200°C 60~120sec
Tsmax to TL -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(TL) -Time(tL)	217°C 60~260sec
Peak Temperature(TP)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(tP)	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±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_R=80\%$ rate at $T_J=150^\circ\text{C}$ 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°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Forward Surge	Peak 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