

BAS316

250mA Surface Mount Switching Diode- 100V

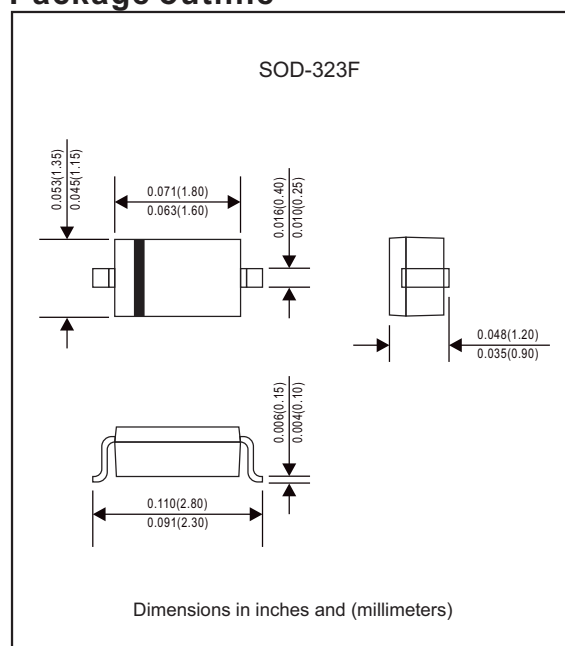
Features

- Ultra small plastic SMD package
- High switching speed: max. 4ns
- Continuous reverse voltage: max.75V
- Repetitive peak reverse voltage: max.100V
- Repetitive peak forward current: max.500mA
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free parts, ex. BAS316-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-323F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.005 gram

Package outline



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

PARAMETER	CONDITIONS	SYMBOL	MAX.	UNIT
Repetitive peak reverse voltage		V_{RRM}	100	V
Continuous reverse voltage		V_R	75	V
RMS reverse voltage		$V_{R(RMS)}$	53	V
Continuous forward current		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}	5 1 0.5	A A A
Total power dissipation		P_D	200	mW

Thermal characteristics

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Thermal resistance junction to ambient air	$R_{\theta JA}$	-	625	$^{\circ}\text{C/W}$
Storage temperature range	T_{STG}	-55	+150	$^{\circ}\text{C}$
Operating junction temperature range	T_J	-55	+150	$^{\circ}\text{C}$

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

PARAMETER	CONDITIONS	SYMBOL	MAX.	UNIT
Forward voltage	see Fig.2 $I_F = 1\text{mA}$	V_F	715	mV
	$I_F = 10\text{mA}$		855	mV
	$I_F = 50\text{mA}$		1	V
	$I_F = 150\text{mA}$		1.25	V
Reverse current	see Fig.4 $V_R = 25\text{V}$	I_R	30	nA
	$V_R = 75\text{V}$		1	μA
	$V_R = 25\text{V}; T_J = 150^\circ\text{C}$		30	μA
	$V_R = 75\text{V}; T_J = 150^\circ\text{C};$		50	μA
Diode capacitance	$f = 1\text{MHz}; V_R = 0$; see Fig.5	C_D	2	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	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

Rating and characteristic curves(BAS316)

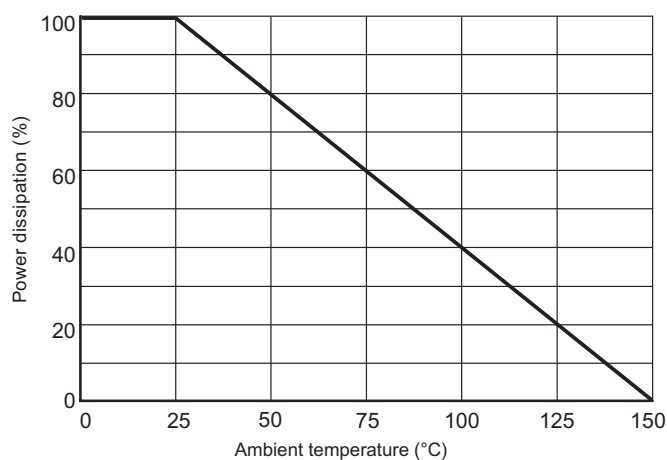


Fig.1 Steady State Power Derating

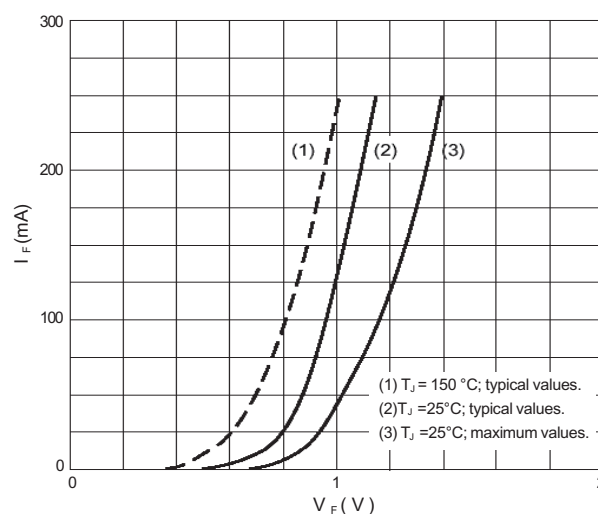


Fig.2 Forward current as a function of forward voltage.

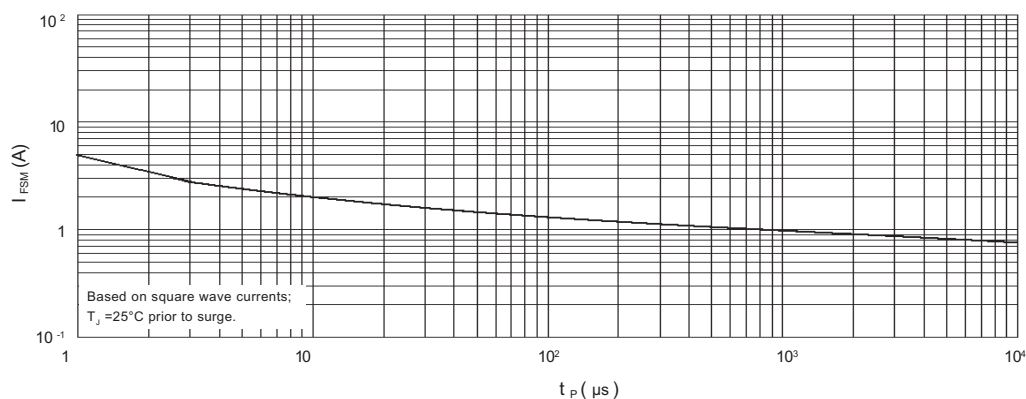


Fig.3 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

Rating and characteristic curves(BAS316)

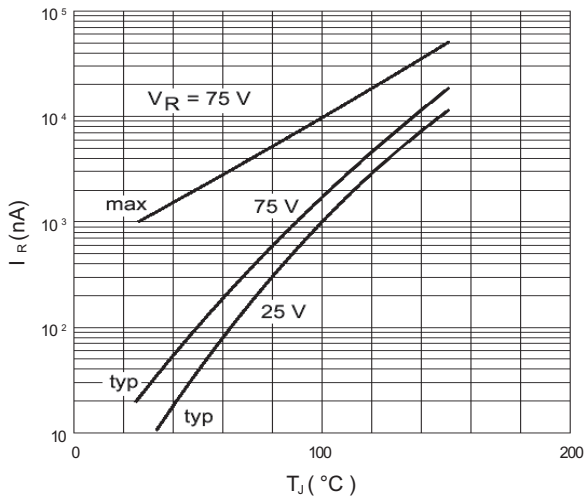


Fig.4 Reverse current as a function of junction temperature.

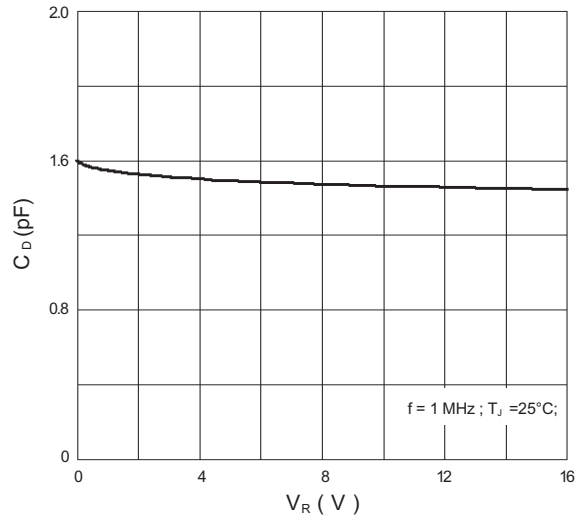
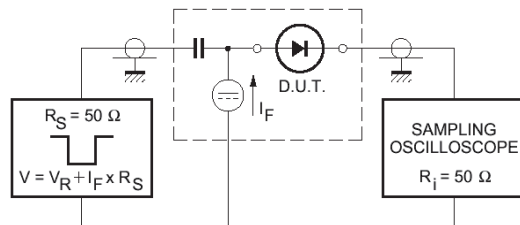


Fig.5 Diode capacitance as a function of reverse voltage; typical values.

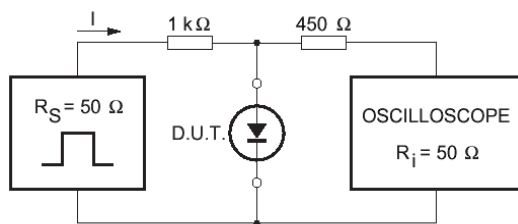


(1) $I_F = 1 \text{ mA}$.

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.6 Reverse 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 $\delta \leq 0.005$.

Fig.7 Forward recovery voltage test circuit and waveforms.

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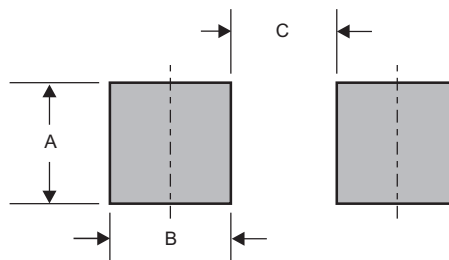
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
BAS316	Z9,A6

Suggested solder pad layout

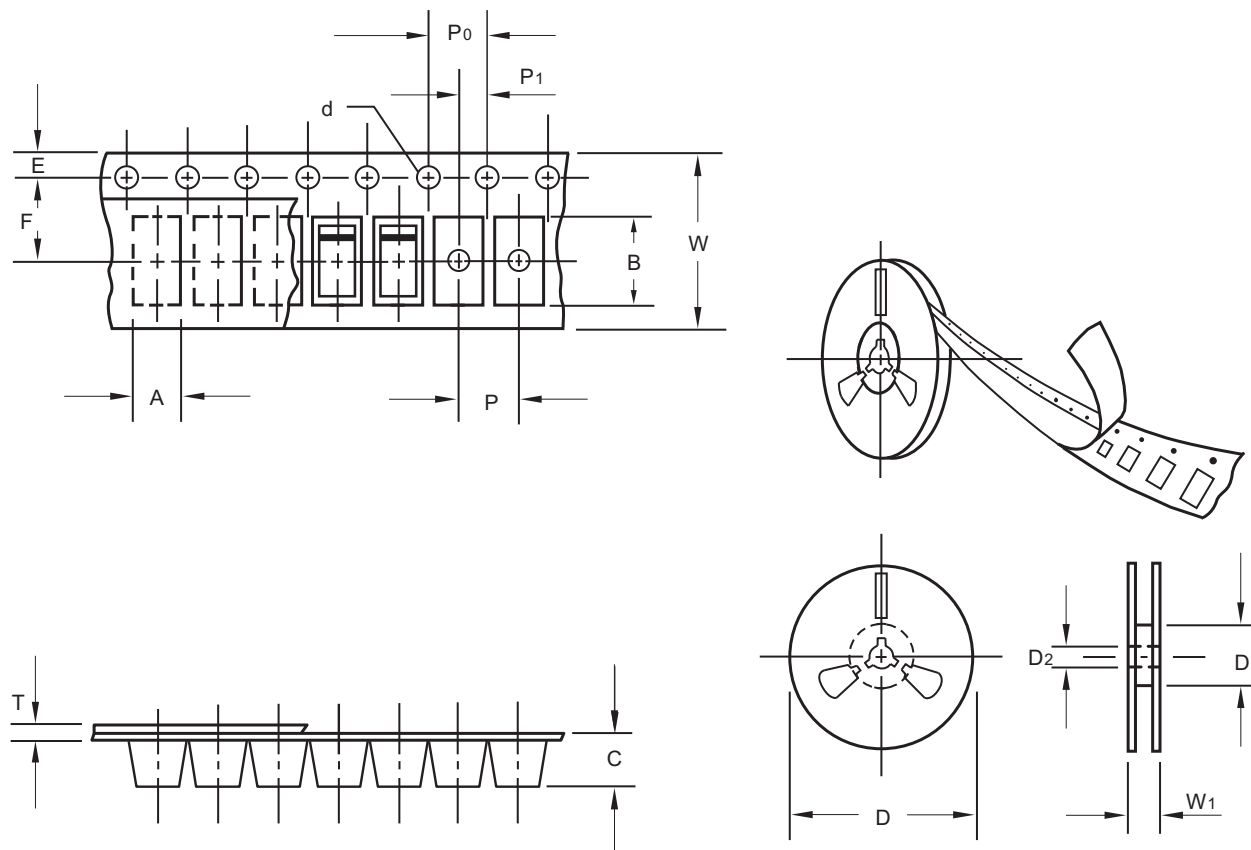


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.033 (0.83)	0.025 (0.63)	0.063 (1.60)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323F
Carrier width	A	0.1	1.48
Carrier length	B	0.1	3.30
Carrier depth	C	0.1	1.25
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	54.40
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	12.3

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

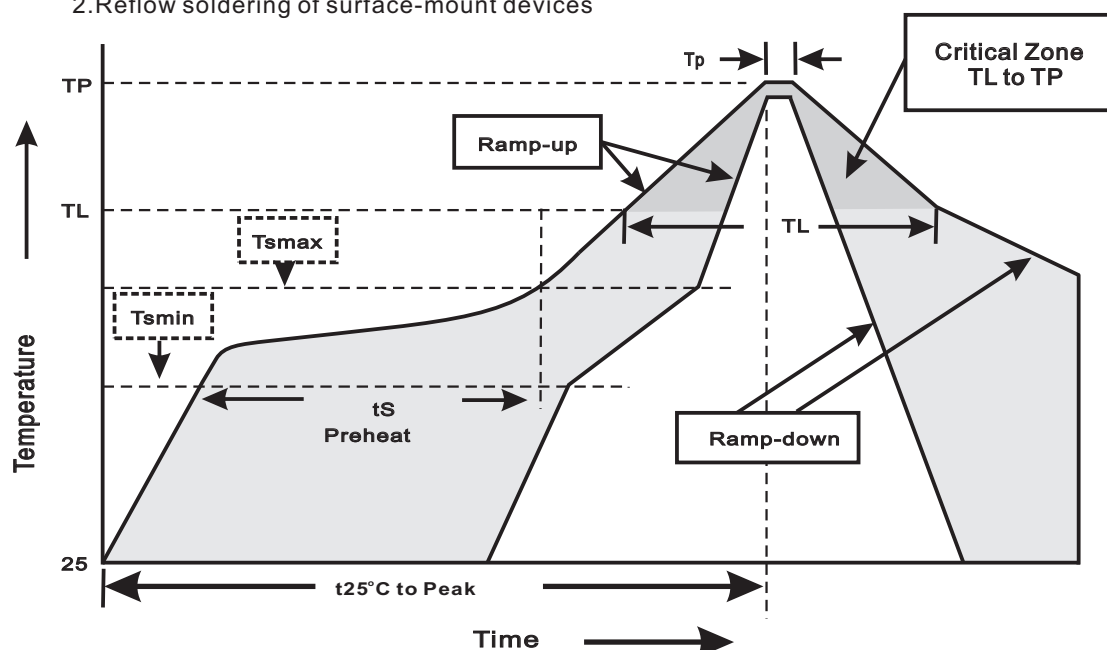
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Reel packing

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-323F	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	8.00

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)	$<3^{\circ}\text{C}/\text{sec}$
Preheat -Temperature Min(T_{smin}) -Temperature Max(T_{smax}) -Time(min to max)(t_s)	150°C 200°C $60\sim 120\text{sec}$
T_{smax} to T_L -Ramp-upRate	$<3^{\circ}\text{C}/\text{sec}$
Time maintained above: -Temperature(T_L) -Time(t_L)	217°C $60\sim 260\text{sec}$
Peak Temperature(T_P)	$255^{\circ}\text{C}-0/+5^{\circ}\text{C}$
Time within 5°C of actual Peak Temperature(t_P)	$10\sim 30\text{sec}$
Ramp-down Rate	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm5^{\circ}\text{C}$ for $10\pm2\text{sec}$.	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm5^{\circ}\text{C}$ 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 $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Forward Surge	Non-repetitive peak forward 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 150°C for 1000 hrs.	MIL-STD-750D METHOD-1031