BAT30

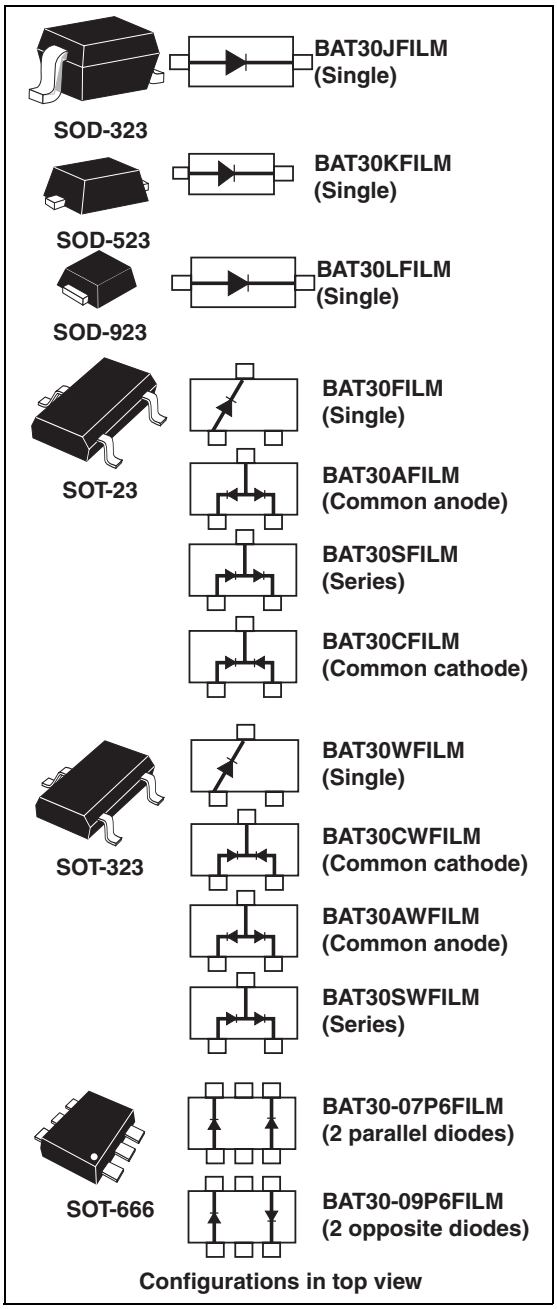
Small signal Schottky diodes

Features

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- Extremely fast switching
- Surface mount device
- Low capacitance diode

Description

The BAT30 series uses 30 V Schottky barrier diodes encapsulated in a wide range of packages such as SOD-323, SOD-523, SOD-923, SOT-23, SOT-323, or SOT-666. This device is specially suited for switching mode applications needing low forward voltage drop diodes.



Configurations in top view

Table 1. Device summary

Symbol	Value
I_F	300 mA
V_{RRM}	30 V
C(typ)	14 pF
T_j (max)	150 °C

1 Characteristics

Table 2. Absolute ratings (limiting values at T_j = 25° C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		30	V
I_F	Continuous forward current		300	mA
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal	1	A
T_{stg}	Storage temperature range		-65 to +150	°C
T_j	Maximum operating junction temperature(1)		150	°C
T_L	Maximum soldering temperature		260	°C

1. Pulse test: t_p = 5 ms, δ < 2 %

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-a)}$	Junction to ambient(1)	SOT-23	500	°C/W
		SOT-323, SOD-323,	550	
		SOD-523, SOT-666	600	
		SOD-923	900	

1. On epoxy printed circuit board with recommended pad layout

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	V_R = 5 V	-	-	0.5	µA
			V_R = 10 V	-	-	1	
			V_R = 25 V	-	0.65	3	
			V_R = 30 V	-	-	5	
		T_j = 70 °C	V_R = 10 V	-	7	20	
		T_j = 85 °C		-	18	50	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 0.1 mA	-	-	240	mV
			I_F = 1 mA	-	-	300	
			I_F = 10 mA	-	-	375	
			I_F = 30 mA	-	-	430	
			I_F = 100 mA	-	-	500	
			I_F = 200 mA	-	-	580	
			I_F = 300 mA	-	530	-	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
C	Diode capacitance	V_R = 0 V, F = 1 MHz	-	22	-	pF
		V_R = 1 V, F = 1 MHz	-	14	-	
		V_R = 10 V, F = 1 MHz	-	6	-	

Figure 1. Power dissipation versus average forward current

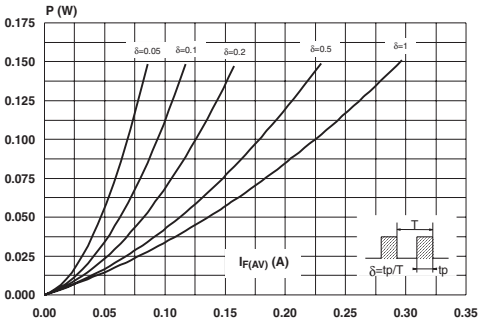


Figure 2. Average forward current versus ambient temperature (δ = 1)

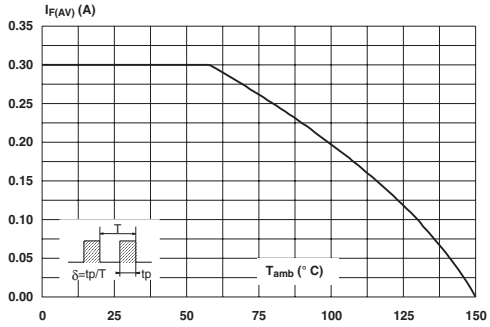


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration

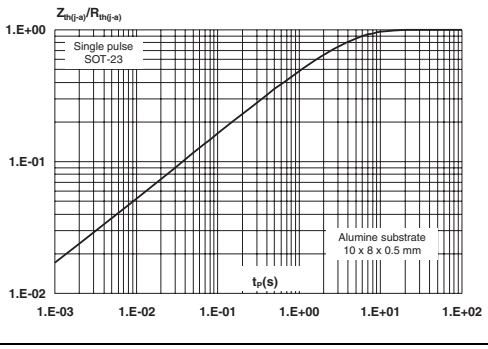


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

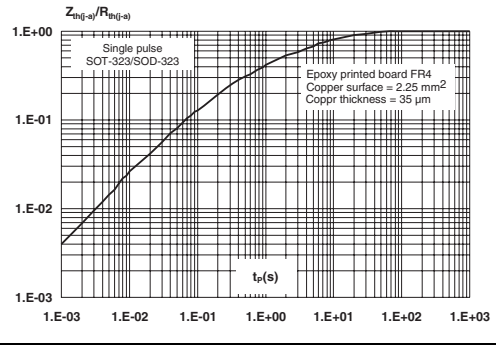


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration

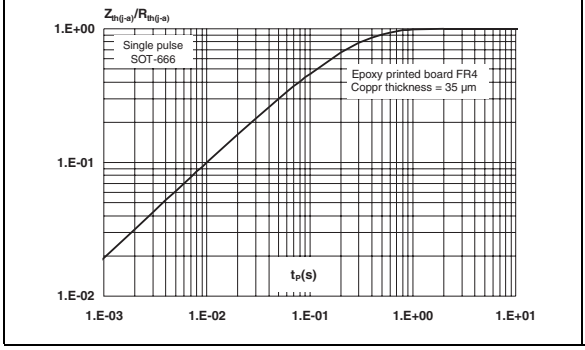


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

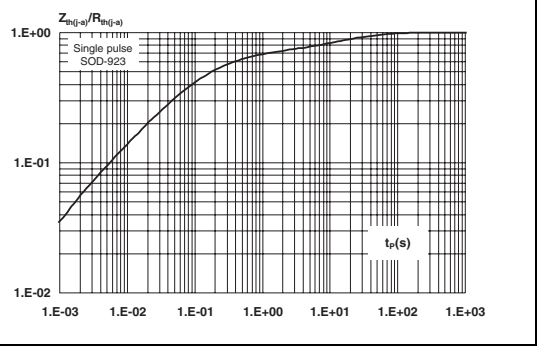


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration

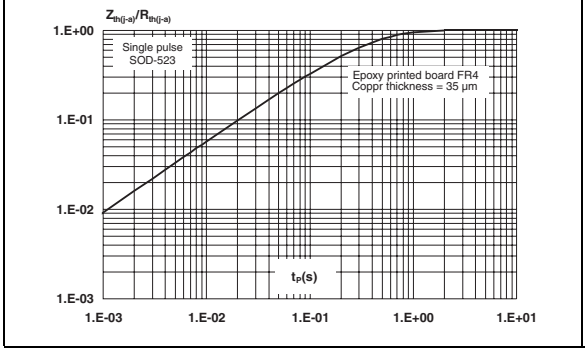


Figure 8. Thermal resistance junction to ambient versus copper surface under each lead (SOD-923)

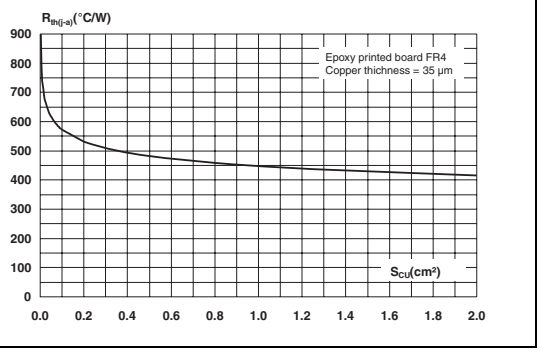


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SOD-323)

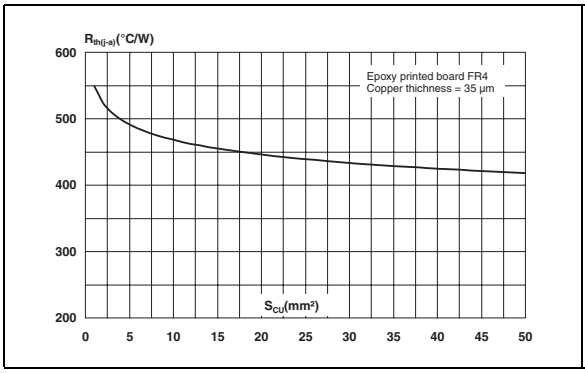


Figure 10. Leakage current versus reverse applied voltage (typical values)

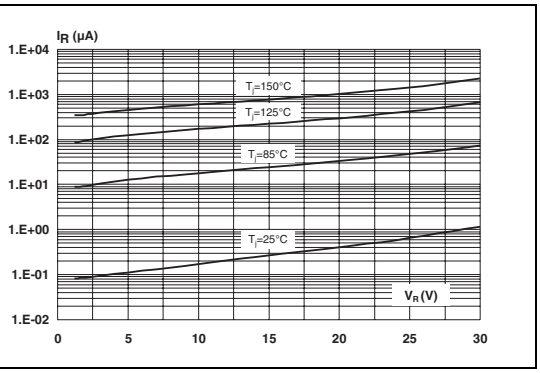


Figure 11. Relative variation of reverse leakage current versus junction temperature (typical values)

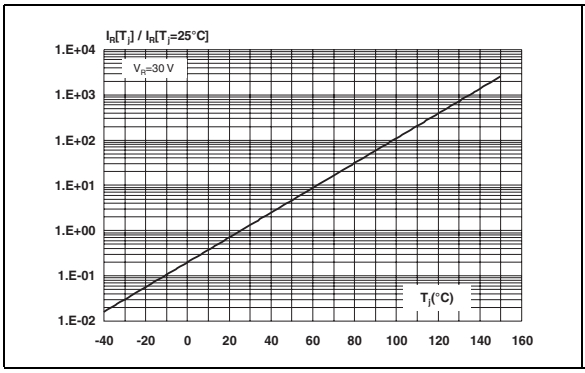


Figure 12. Junction capacitance versus reverse applied voltage (typical values)

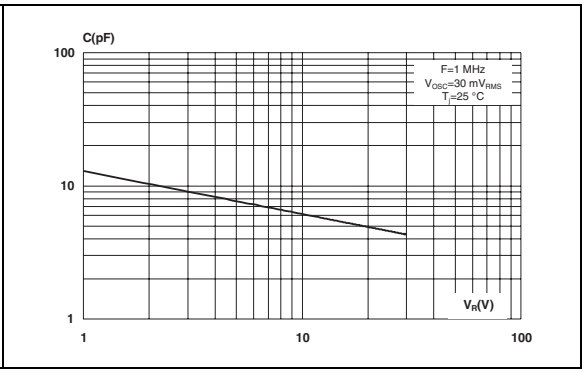


Figure 13. Forward voltage drop versus forward current (typical values)

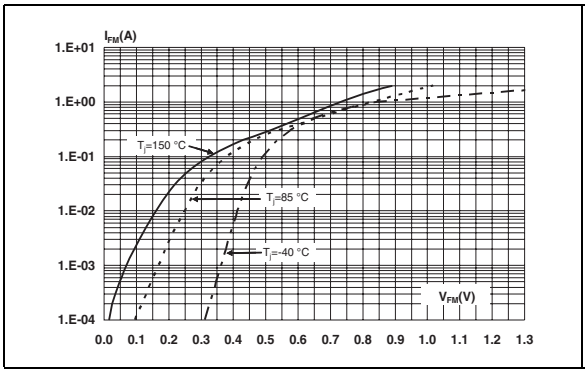
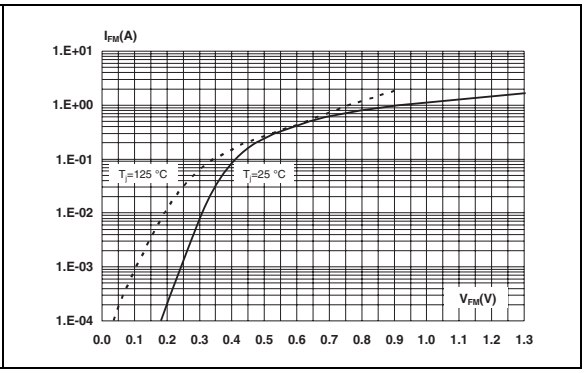
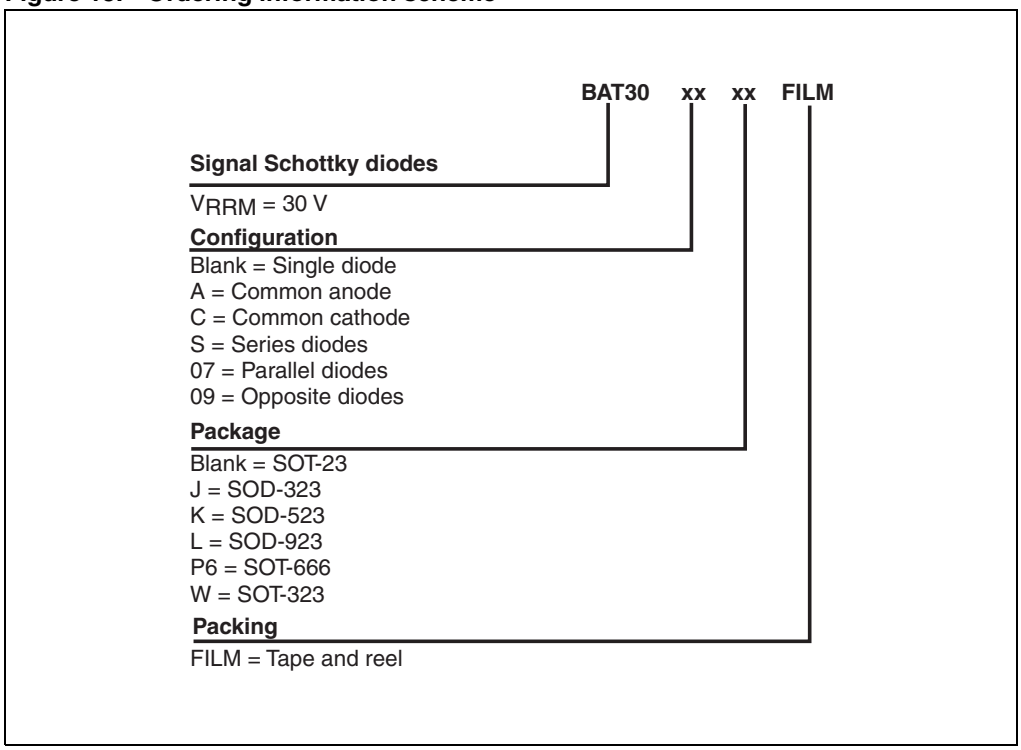


Figure 14. Forward voltage drop versus forward current (typical values)



2 Ordering information scheme

Figure 15. Ordering information scheme

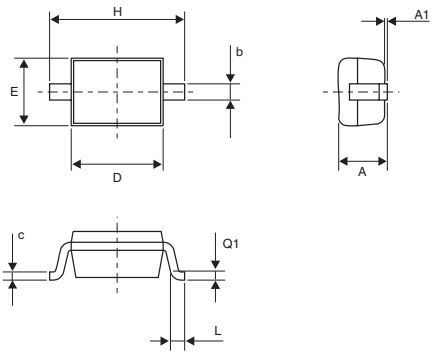


3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. SOD-323 dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	-	1.17	-	0.046
A1	0	0.1	0	0.004
b	0.25	0.44	0.01	0.017
c	0.1	0.25	0.004	0.01
D	1.52	1.8	0.06	0.071
E	1.11	1.45	0.044	0.057
H	2.3	2.7	0.09	0.106
L	0.1	0.46	0.004	0.02
Q1	0.1	0.41	0.004	0.016

Figure 16. SOD-323 footprint (dimensions in mm)

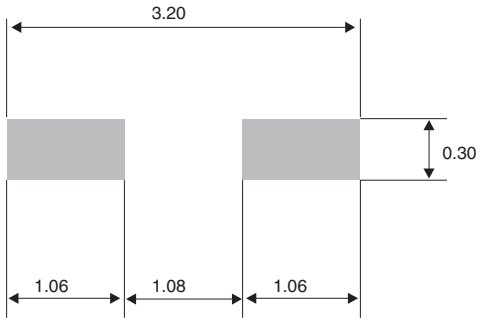
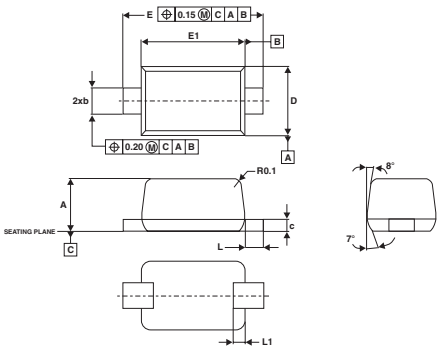


Table 7. SOD-523 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.50	0.60	0.70	0.020	0.024	0.028
E	1.50	1.60	1.70	0.059	0.063	0.067
E1	1.10	1.20	1.30	0.043	0.047	0.051
D	0.70	0.80	0.90	0.028	0.031	0.035
b	0.25	-	0.35	0.010	-	0.014
c	0.07	-	0.20	0.003	-	0.008
L	0.15	0.20	0.25	0.006	0.008	0.010
L1	0.05	-	0.20	0.002	-	0.008

Figure 17. SOD-523 footprint (dimensions in mm)

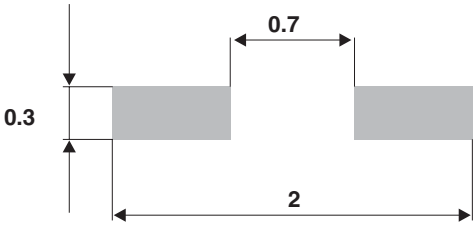
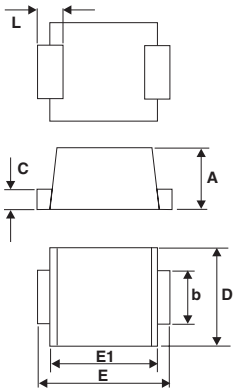


Table 8. SOD-923 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			0.40			0.016
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.08	0.145	0.21	0.003	0.006	0.008
D	0.55	0.60	0.65	0.022	0.024	0.026
E	0.95	1.00	1.05	0.037	0.039	0.041
E1	0.75	0.825	0.90	0.030	0.032	0.035
L	-	-	0.20	-	-	0.008

Figure 18. SOD-923 footprint (dimensions in mm)

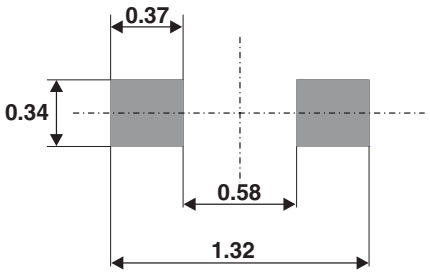
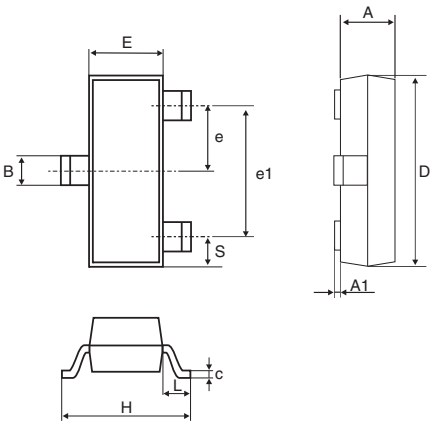


Table 9. SOT-23 dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.89	1.4	0.035	0.055
A1	0	0.1	0	0.004
B	0.3	0.51	0.012	0.02
c	0.085	0.18	0.003	0.007
D	2.75	3.04	0.108	0.12
e	0.85	1.05	0.033	0.041
e1	1.7	2.1	0.067	0.083
E	1.2	1.6	0.047	0.063
H	2.1	2.75	0.083	0.108
L	0.6 typ.		0.024 typ.	
S	0.35	0.65	0.014	0.026

Figure 19. SOT-23 footprint (dimensions in mm)

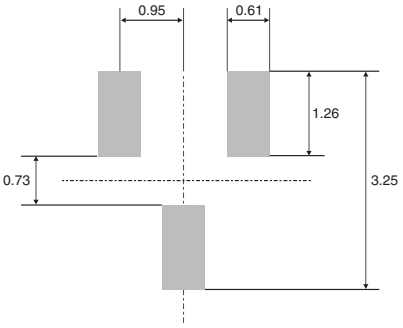
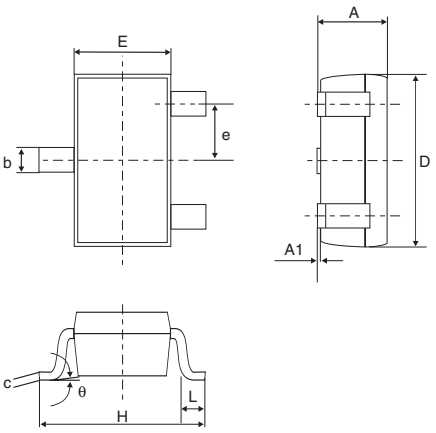


Table 10. SOT-323 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.8	-	1.1	0.031	-	0.043
A1	0.0	-	0.1	0.0	-	0.004
b	0.25	-	0.4	0.010	-	0.016
c	0.1	-	0.26	0.004	-	0.010
D	1.8	2.0	2.2	0.071	0.079	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	-	0.65	-	-	0.026	-
H	1.8	2.1	2.4	0.071	0.083	0.094
L	0.1	0.2	0.3	0.004	0.008	0.012
q	0	-	30°	0	-	30°

Figure 20. SOT-323 footprint (dimensions in mm)

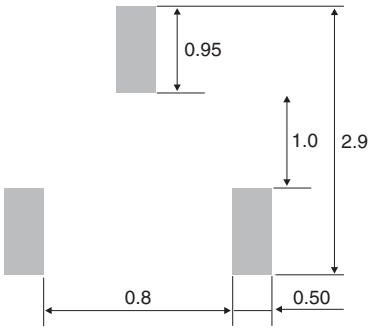
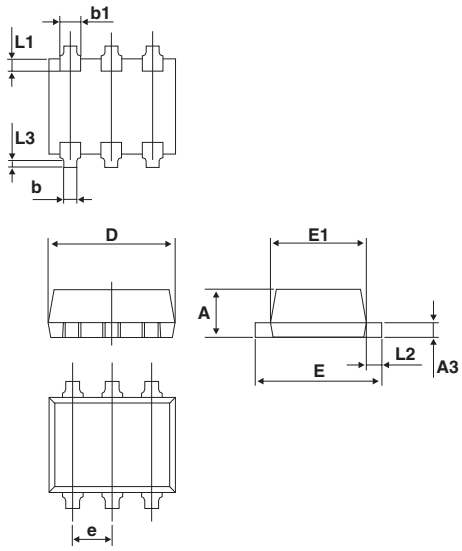
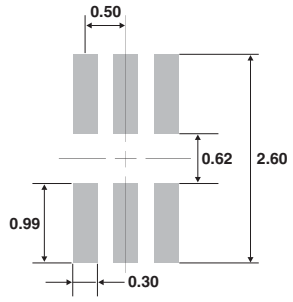


Table 11. SOT-666 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.45	-	0.60	0.018	-	0.024
A3	0.08	-	0.18	0.003	-	0.007
b	0.17	-	0.34	0.007	-	0.013
b1	0.19	0.27	0.34	0.007	0.011	0.013
D	1.50	-	1.70	0.059	-	0.067
E	1.50	-	1.70	0.059	-	0.067
E1	1.10	-	1.30	0.043	-	0.051
e	-	0.50	-	-	0.020	-
L1	-	0.19	-	-	0.007	-
L2	0.10		0.30	0.004		0.012
L3	-	0.10	-	-	0.004	-

Figure 21. SOT-666 footprint (dimensions in mm)



4 Ordering information

Table 12. Ordering information

Order code	Marking	Package	Weight	Base qty	Packing mode
BAT30-07P6FILM	P3	SOT-666 Parallel	2.9 mg	5000	Tape and reel
BAT30-09P6FILM	Q3	SOT-666 Opposite	2.9 mg	5000	Tape and reel
BAT30AFILM	A30	SOT-23 Common anode	10 mg	3000	Tape and reel
BAT30AWFILM	A30	SOT-323 Common anode	6 mg	3000	Tape and reel
BAT30CFILM	C30	SOT-23 Common cathode	10 mg	3000	Tape and reel
BAT30CWFILM	C30	SOT-323 Common cathode	6 mg	3000	Tape and reel
BAT30FILM	B30	SOT-23 Single	10 mg	3000	Tape and reel
BAT30JFILM	30	SOD-323 Single	5 mg	3000	Tape and reel
BAT30KFILM	30	SOD-523 Single	1.4 mg	3000	Tape and reel
BAT30LFILM	31	SOD-923 Single	0.56 mg	10000	Tape and reel
BAT30SFILM	S30	SOT-23 Serial	10 mg	3000	Tape and reel
BAT30SWFILM	S30	SOT-323 Serial	6 mg	3000	Tape and reel
BAT30WFILM	B30	SOT-323 Single	6 mg	3000	Tape and reel

5 Revision history

Table 13. Document revision history

Date	Revision	Changes
24-Jul-2006	1	First issue
08-Jul-2009	2	Added SOD-923 package. Table 12 sorted on alphabetic sequence of order code. Updated ECOPACK statement.
13-Oct-2009	3	Updated Table 7 quote “L1” from 0.10 to 0.05.

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