



ACE3018A

Ultra-Small High-Precision Voltage Detector

Description

The ACE3018A Series is a series of high-precision voltage detectors developed using CMOS process. The detection voltage is fixed internally, with an accuracy of 2.0%. Two output forms, NMOS open-drain and CMOS output, are available.

Features

- Ultra-low current consumption: 0.9 μ A@3.5V(Typ.)
- High-precision detection voltage: $\pm 2.0\%$
- Operating voltage range: 0.95 V ~ 7.0V
- Hysteresis characteristics: $-V_{DET} \times 5\%$ (Typ.)
- Detection voltage: 1.5V ~ 6.0V(10mV step)
- Output forms:
 - NMOS open-drain output (Active Low)
 - CMOS output (Active Low)

Application

- Memory battery back-up circuits
- Power-on reset circuits
- Power failure detection
- Power monitor for portable equipment such as notebook computers, digital cameras, PDA, and cellular phones.
- Constant voltage power monitors for cameras, video equipment and communication devices.
- Power monitor for microcomputers and reset for CPUs.

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Unit
Power supply voltage		V_{DD}	$V_{SS} - 0.3 \sim V_{SS} + 8$	V
Output voltage		V_{OUT}	$V_{SS} - 0.3 \sim V_{SS} + 8$	V
Power dissipation	SOT-23-3	PD	400	mW
	SOT-23-5		400	
	SOT-89-3		600	
	TO-92		500	
	SOT-343 (SC-82)		250	
Operating ambient temperature		T_{opr}	-40 ~85	°C
Storage temperature		T_{stg}	-40 ~125	°C
Soldering Temperature & Time		T_{solder}	260°C, 10s	°C
ESD rating	Human Body Model -(HBM)		4	KV
	Machine Model- (MM)		200	V

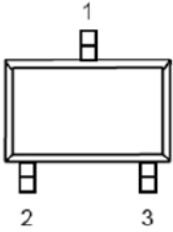


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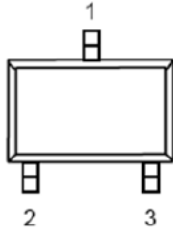
Ultra-Small High-Precision Voltage Detector

Packaging Type

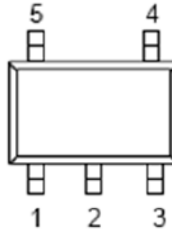
SOT-23-3



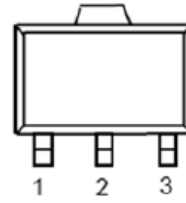
TOST-23-3



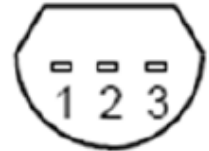
SOT-23-5



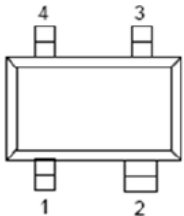
SOT-89-3



TO-92



SOT-343 (SC-82)

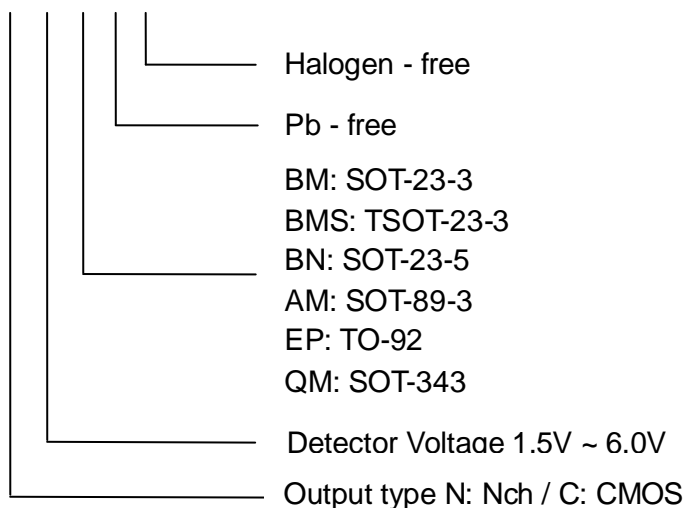


PIN Configuration

SOT-23-3		TSOT-23-3	SOT-23-5	SOT-89-3	TO-92		SOT-343	Description	Function
A	B			A	B				
1	1	1	2	2	2	1	2	V _{DD}	Voltage input pin
2	3	2	1	1	1	3	1	V _{OUT}	Voltage detection output pin
3	2	3	3	3	3	2	4	V _{SS}	Ground
			4				3	NC	No connection
			5					NC	No connection

Ordering information

ACE3018A X XX XX + H

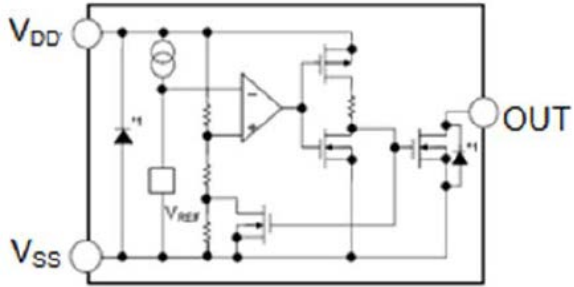




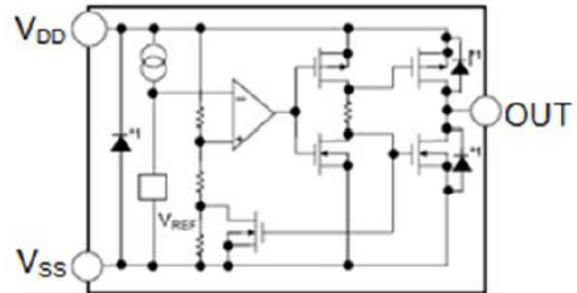
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Block diagram



NMOS open-drain



CMOS output



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Electrical Characteristics:

($T_A=25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
Detection voltage*1	$-V_{\text{DET}}$		$-V_{\text{DET(S)}} \times 0.98$	$-V_{\text{DET(S)}}$	$-V_{\text{DET(S)}} \times 1.02$	V
Hysteresis width	V_{HYS}		$0.02 \times -V_{\text{DET(S)}}$	$0.05 \times -V_{\text{DET(S)}}$	$0.08 \times -V_{\text{DET(S)}}$	V
Current consumption	I_{SS}	$V_{\text{DD}} = -V_{\text{DET}} + 0.5\text{V}$	ACE3018A C/N 20~26	1.0	2.0	uA
			ACE3018A C/N 26~39	1.2	2.5	uA
			ACE3018A C/N 39~60	1.5	3.0	uA
Operating voltage	V_{DD}		0.95		7	V
Output current	I_{OUT}	NMOS : $V_{\text{OUT}} = 0.5\text{V}$ $V_{\text{DD}} = -V_{\text{DET}} - 0.5\text{V}$	ACE3018A C/N 20~26	3.0	13.0	mA
			ACE3018A C/N 26~39	3.0	15.0	mA
			ACE3018A C/N 39~60	3.0	18.0	mA
		PMOS : $V_{\text{DD}} - V_{\text{OUT}} = 0.5\text{V}$ $V_{\text{DD}} = -V_{\text{DET}} + 0.5\text{V}$	ACE3018A C/N 20~26	1.5	4.0	mA
			ACE3018A C/N 26~39	1.5	6.0	mA
			ACE3018A C/N 39~60	1.5	8.0	mA
Leakage current	I_{LEAK}	Only for NMOS open-drain output products, $V_{\text{DD}} = 8.0\text{V}$, $V_{\text{OUT}} = 8.0\text{V}$			1.0	uA
temperature coefficient		$T_a = -40^\circ\text{C} \sim +85^\circ\text{C}$		± 120	± 360	ppm $^\circ\text{C}$
Delay time	T_{PLH}			200		uS

*1. $-V_{\text{DET}}$: Actual detection voltage value, $-V_{\text{DET(S)}}$: Specified detection voltage value



Function Description

1. When a voltage higher than the release voltage ($+V_{DET}$) is applied to the voltage input pin (V_{DD}), the voltage will gradually fall. When a voltage higher than the detect voltage ($-V_{DET}$) is applied to V_{DD} , output (V_{OUT}) will be equal to the input at V_{DD} .

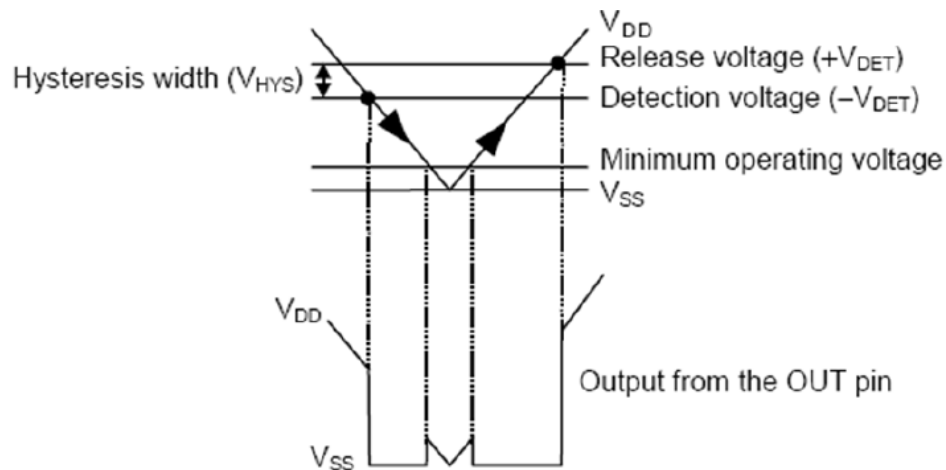
Note that high impedance exists at V_{OUT} with the N-channel open drain configuration. If the pin is pulled up, V_{OUT} will be equal to the pull up voltage.

2. When V_{DD} falls below $-V_{DET}$, V_{OUT} will be equal to the ground voltage (V_{SS}) level (detect state). Note that this also applies to N-channel open drain configurations.
3. When V_{DD} falls to a level below that of the minimum operating voltage (V_{MIN}) output will become unstable.

Because the output pin is generally pulled up with N-channel open drain configurations, output will be equal to pull up voltage.

4. When V_{DD} rises above the V_{SS} level (excepting levels lower than minimum operating voltage), V_{OUT} will be equal to V_{SS} until V_{DD} reaches the $+V_{DET}$ level.
5. Although V_{DD} will rise to a level higher than $+V_{DET}$, V_{OUT} maintains ground voltage level via the delay circuit.
6. Following transient delay time, V_{DD} will be output at V_{OUT} .

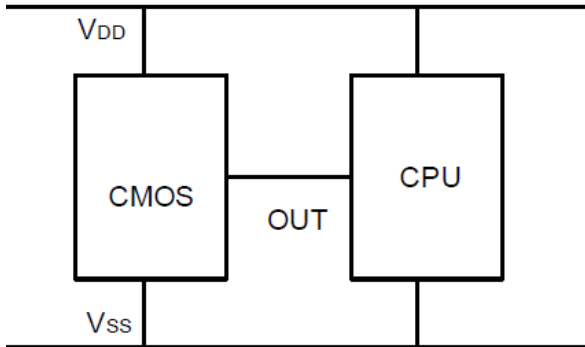
Note that high impedance exists with the N-channel open drain configuration and that voltage will be dependent on pull up.



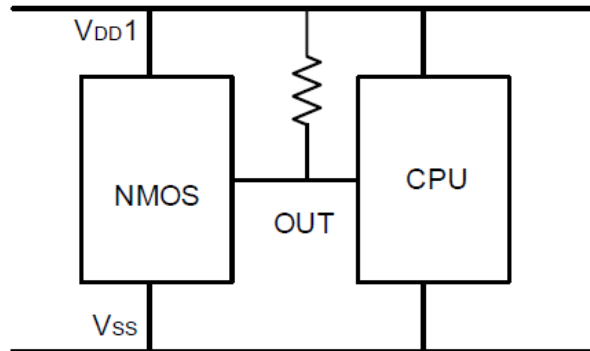
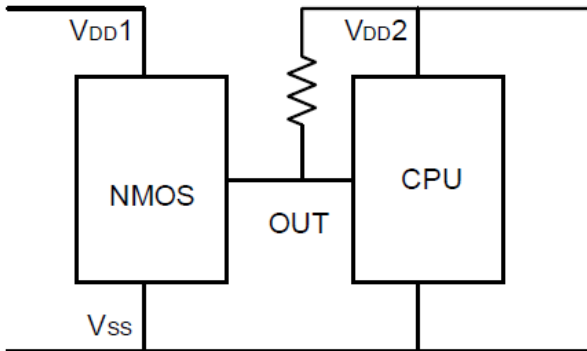


Typical Application Circuits

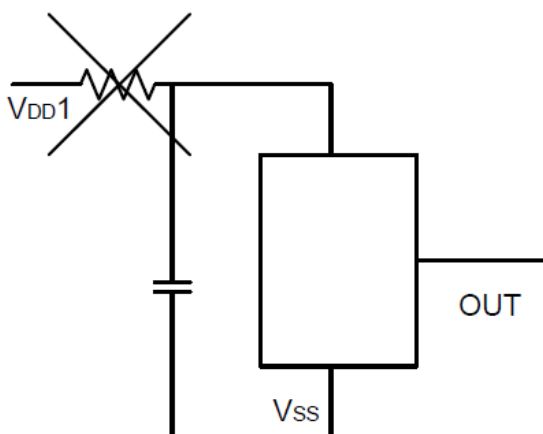
1 - CMOS output



2 - NMOS open-drain



3 - Forbidden Circuits



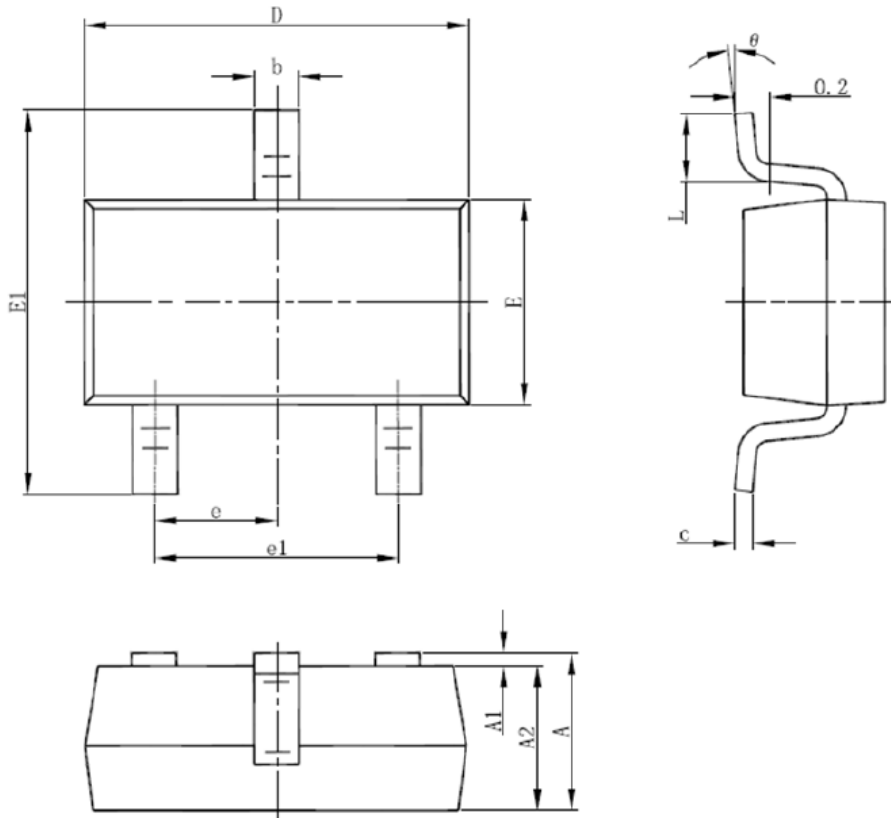


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Packing Information

SOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

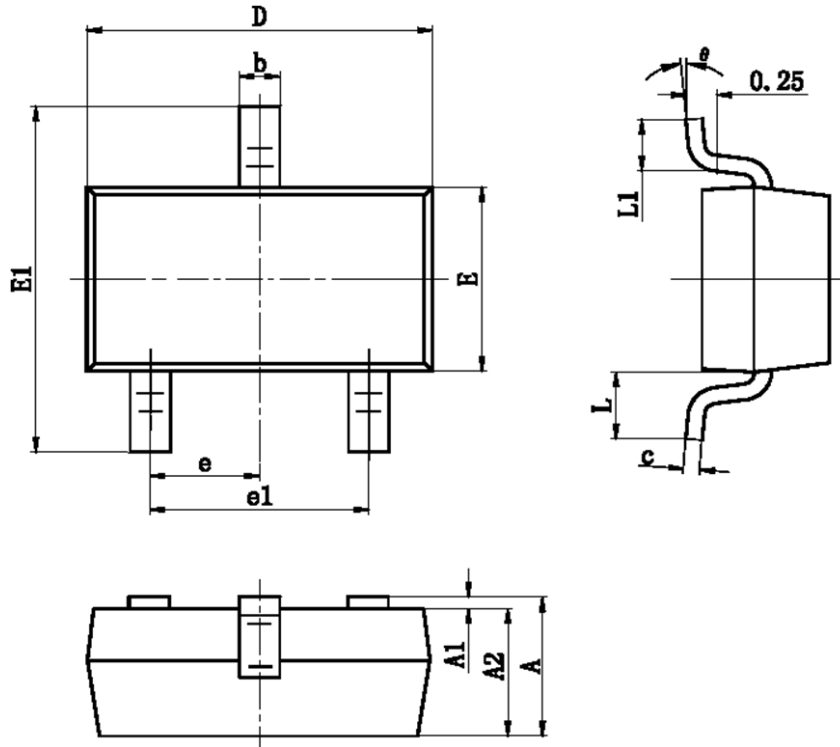


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Ultra-Small High-Precision Voltage Detector

Packing Information

TSOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

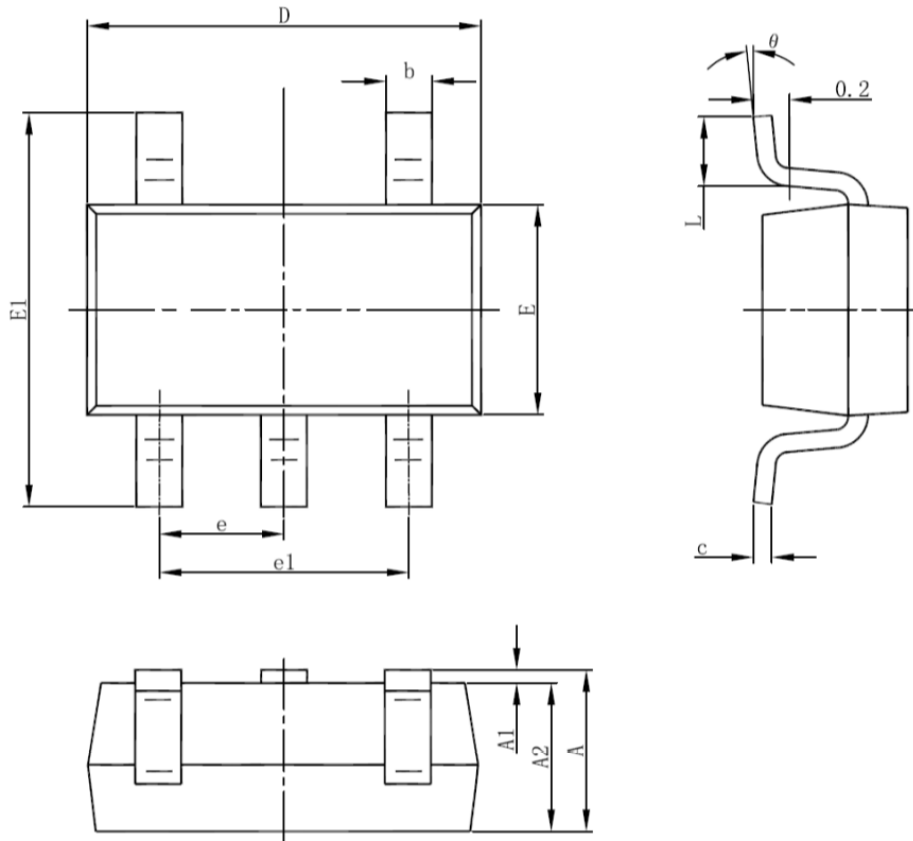


ACE3018A

Ultra-Small High-Precision Voltage Detector

Packing Information

SOT-23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°

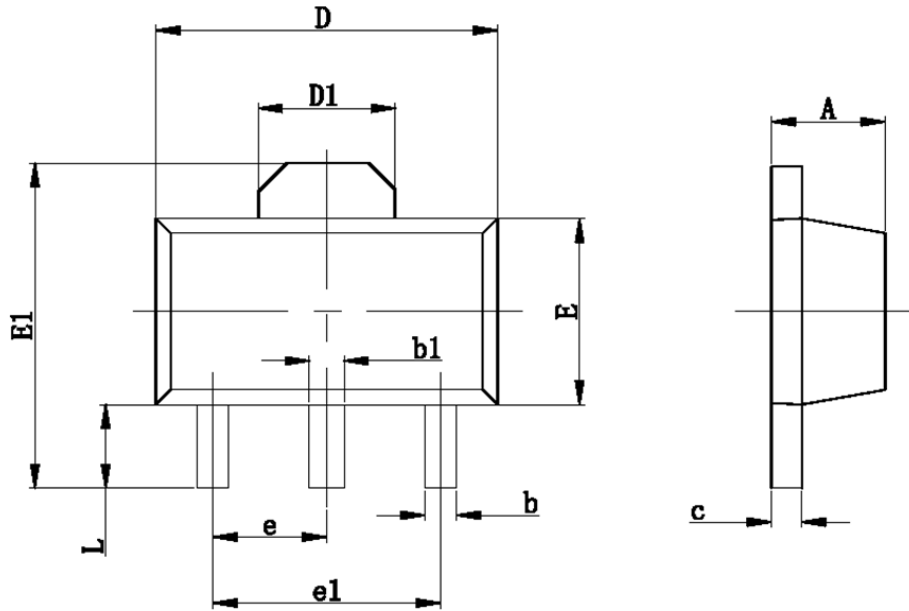


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Ultra-Small High-Precision Voltage Detector

Packing Information

SOT-89-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060TYP	
e1	3.000 TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

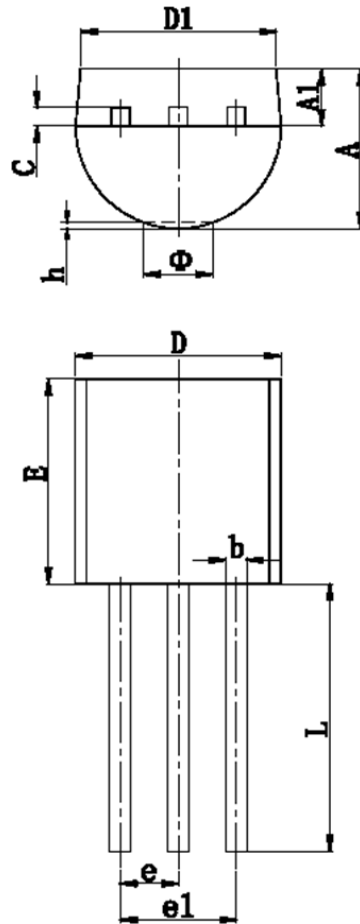


ACE3018A

Ultra-Small High-Precision Voltage Detector

Packing Information

TO-92



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.400	4.700	0.173	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

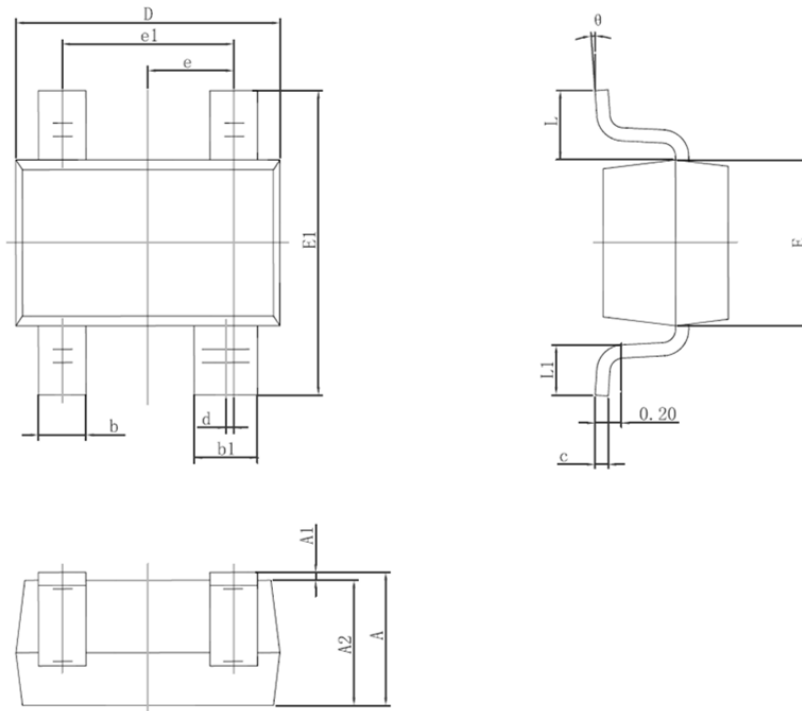


ACE3018A

Ultra-Small High-Precision Voltage Detector

Packing Information

SOT-343 (SC-82)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.250	0.400	0.010	0.016
b1	0.350	0.500	0.014	0.020
c	0.080	0.150	0.003	0.006
d	0.050 TYP.		0.002 TYP.	
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP.		0.026 TYP.	
e1	1.200	1.400	0.047	0.055
L	0.525 REF.		0.021 REF.	
L1	0.260	0.460	0.010	0.018
theta	0°	8°	0°	8°



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Ultra-Small High-Precision Voltage Detector

Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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