



# ACE3028A

## Low-Power Reset Circuits with Capacitor-Adjustable Reset Timeout Delay

### Description

The ACE3028A Series is a high-precision voltage detector developed using CMOS process. The detection voltage is fixed internally with an accuracy of 2 %. A time delayed reset can be accomplished with the addition of an external capacitor. Two output forms, Nch open-drain and CMOS output, are available.

### Features

- Ultra-low current consumption : 1.0  $\mu$ A
- High-precision detection voltage : 2 %
- Operating voltage range : 0.7 V to 7.0 V
- Hysteresis characteristics : 5 % typ.
- Detection voltage : 1.5V to 6.0 V (0.1 V step)
- Output forms :
  - Nch open-drain output (Active Low)
  - CMOS output (Active Low)
- Lead-free products

### Application

- Power supply monitor for portable equipment such as notebook PCs, digital still cameras, PDAs and cellular phones
- Constant voltage power monitor for cameras, video equipment and communication equipment
- Power monitor and reset for CPUs and microcomputers

### Absolute Maximum Rating

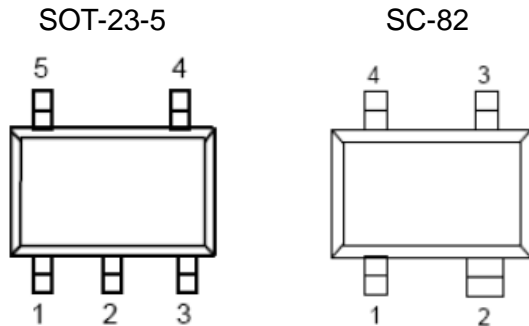
Parameter	Symbol	Absolute Maximum Ratings	Unit	
Power supply voltage	$V_{DD}$	$V_{SS}-0.3 \sim V_{SS}+8$	V	
Output voltage	$V_{OUT}$	$V_{SS}-0.3 \sim V_{SS}+8$	V	
Power dissipation	SOT-23-5	PD	400	mW
	SC-82	PD	250	mW
Operating ambient temperature	$T_{opr}$	-40 ~+85	°C	
Storage temperature	$T_{stg}$	-40 ~+125	°C	



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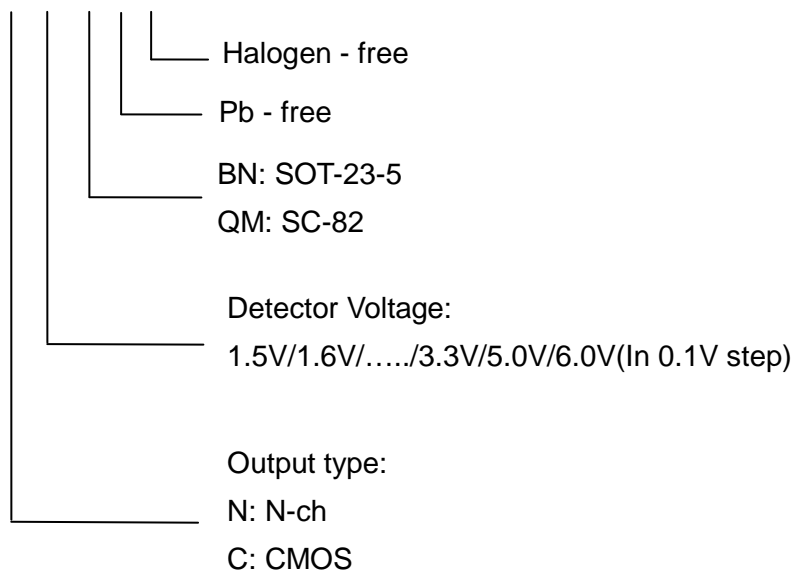
### Packaging Type



SOT-23-5	SC-82	Description	Function
1	4	OUT	Reset Signal Output Pin
2	1	V <sub>DD</sub>	Power Input
3	2	GND	Ground
4		NC	No connection
5	3	C <sub>D</sub>	Capacitor Connect Pin with Delay

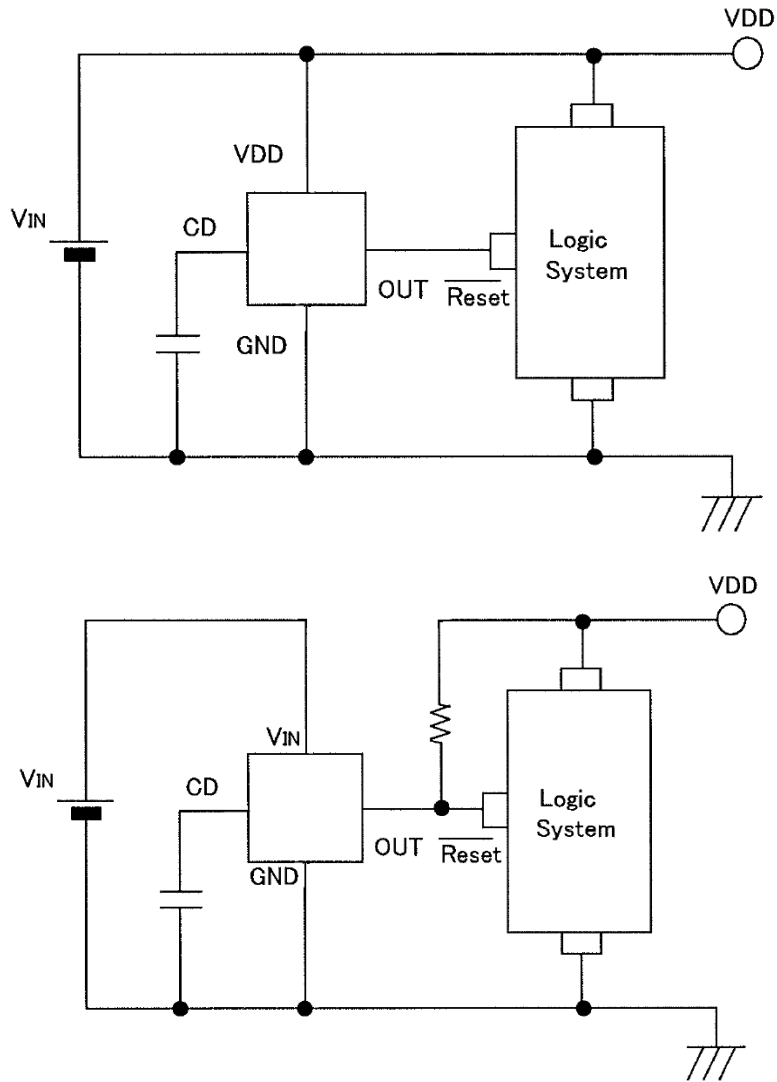
### Ordering information

ACE3028AX XX XX + H

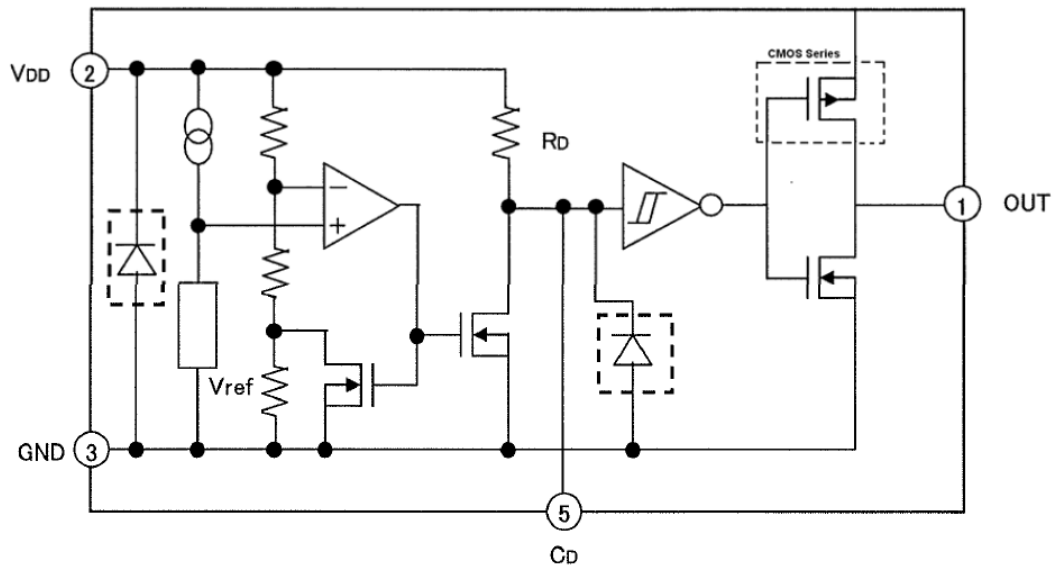




### Typical Application Circuit



### Block Diagram





### Electrical Characteristics

(Ta=25°C unless otherwise specified)

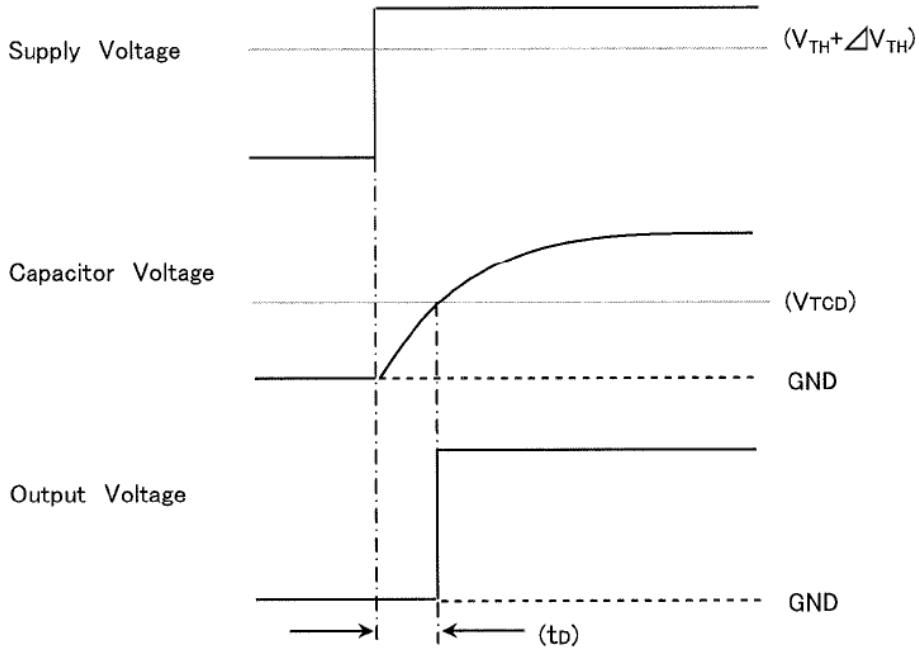
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	
Detection voltage*1	$V_{TH}$		$V_{TH(S)} \times 0.98$	$V_{TH(S)}$	$V_{TH(S)} \times 1.02$	V	
Hysteresis width	$\Delta V_{TH}$		$0.02 \times V_{TH(S)}$	$0.05 \times V_{TH(S)}$	$0.08 \times V_{TH(S)}$	V	
Current consumption	$I_{SS}$	$V_{DD} = V_{TH(S)} + 0.5V$		1.0	2.0	uA	
Operating voltage	$V_{DD}$		0.7		7	V	
Output current  ...CMOS:	$I_{OUT}$	NCH: $V_{OUT} = 0.5V$ $V_{DD} = V_{TH(S)} - 0.5V$	2.0V~2.6V	3.0	13.0	20	mA
			2.6V~3.9V	3.0	15.0	20	mA
			3.9V~6.0V	3.0	18.0	20	mA
		CMOS: $V_{DD} - V_{OUT} = 0.5V$ $V_{DD} = V_{TH(S)} + 0.5V$	2.0V~2.6V	1.5	4.0	10	mA
			2.6V~3.9V	1.5	6.0	10	mA
			3.9V~6.0V	1.5	8.0	10	mA
Leakage current	$I_{LEAK}$			0.1	1	uA	
temperature coefficient		$I_{SW} = 200mA$		$\pm 100$		ppm/ °C	
CD PIN resistance	$R_D$	$I_{SW} = 200mA$	6	9	12	MΩ	
CD Delay Pin Threshold Voltage	$V_{TCD}$		$0.30 \times V_{DD}$	$0.5 \times V_{DD}$	$0.60 \times V_{DD}$	V	
CD Delay Time	T	$V_{IN} = 5.5V, V_{SW} = 0$ or $5.5V, EN = GND$	0.35 RC	0.69 RC	0.92 RC	S	
L transfer delay time	$t_{PHL}$		2	15	100	uS	
H transfer delay time	$t_{PLH}$		2	15	100	uS	

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

\*2. The parameter is guaranteed by design.

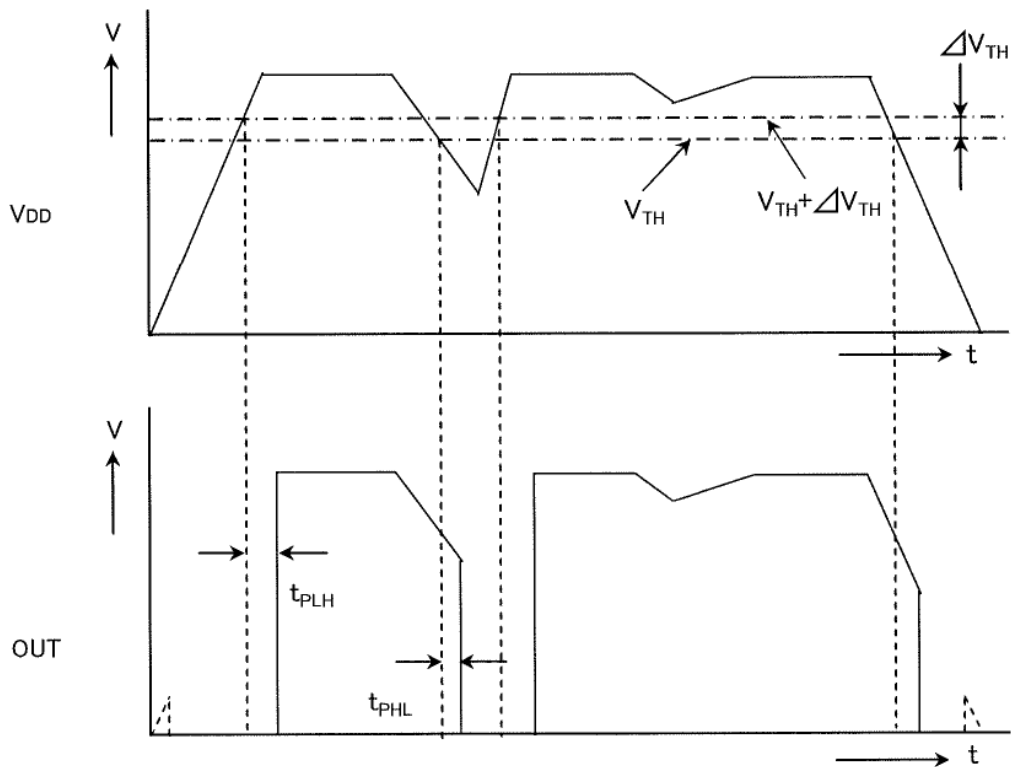


Timing Chart



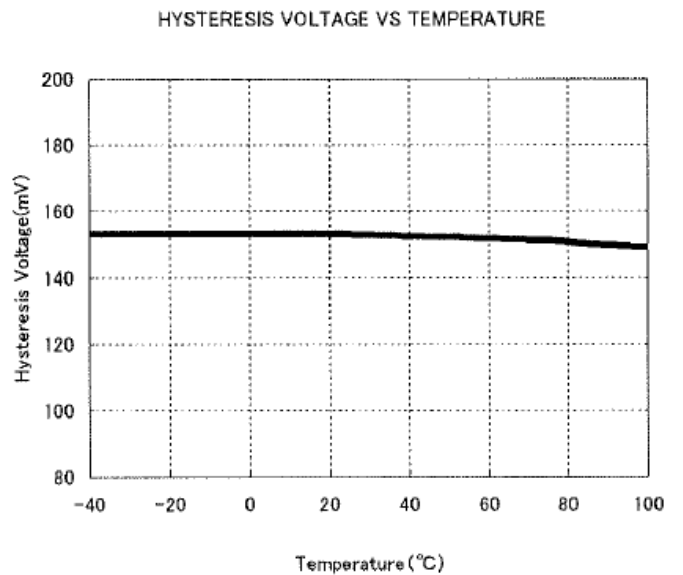
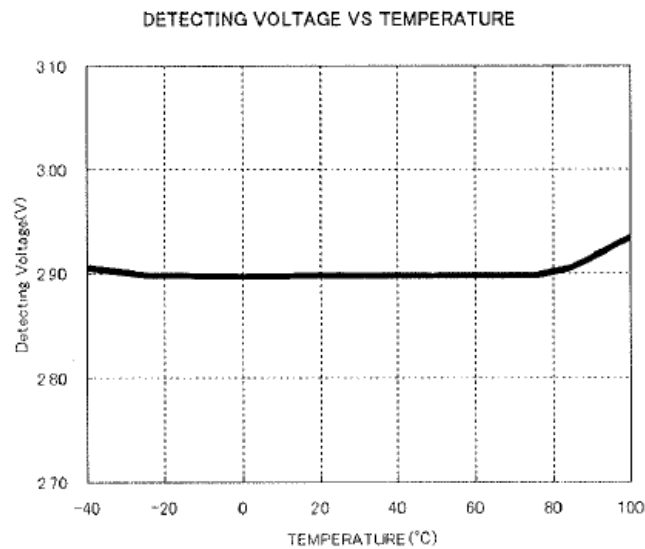
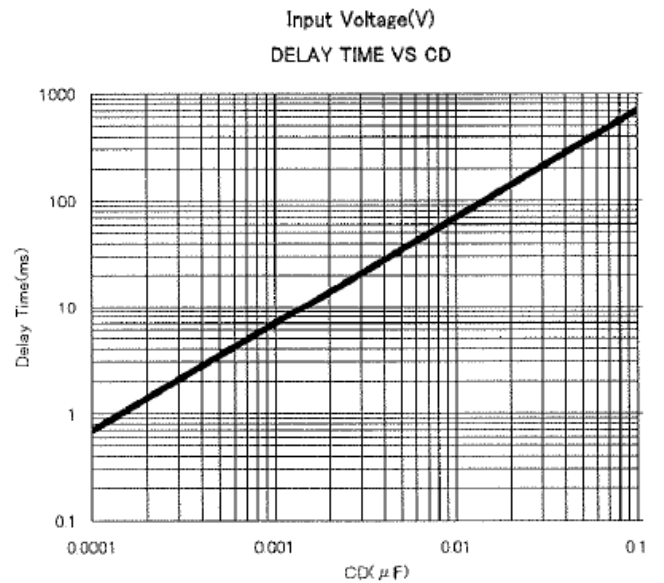
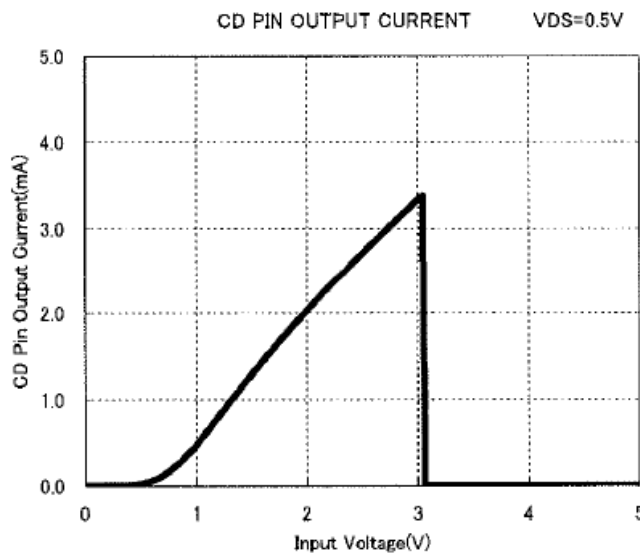
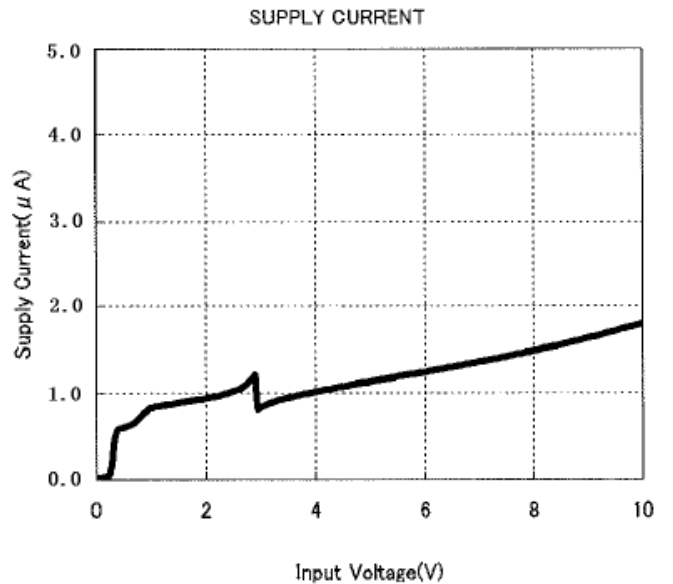
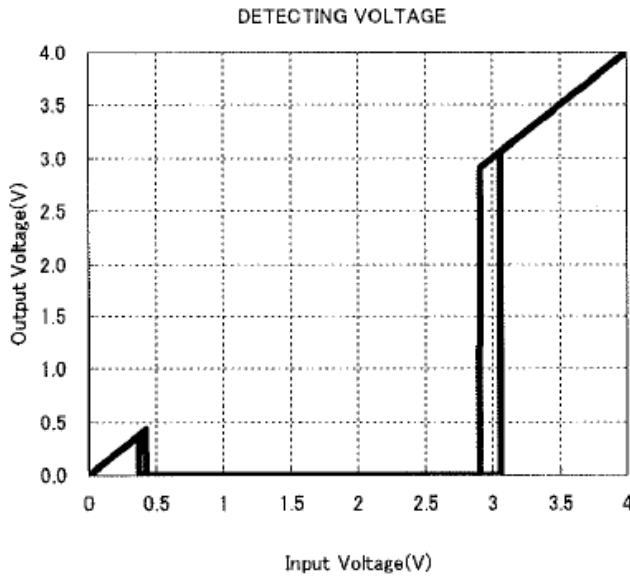
$(t_D)$  Delay Time  $t_D \cong 0.69 \times R_D \times C_D (F)$  (s)

$R_D$  :  $C_D$  Pin Resistance  
 $C_D$  : Capacitor





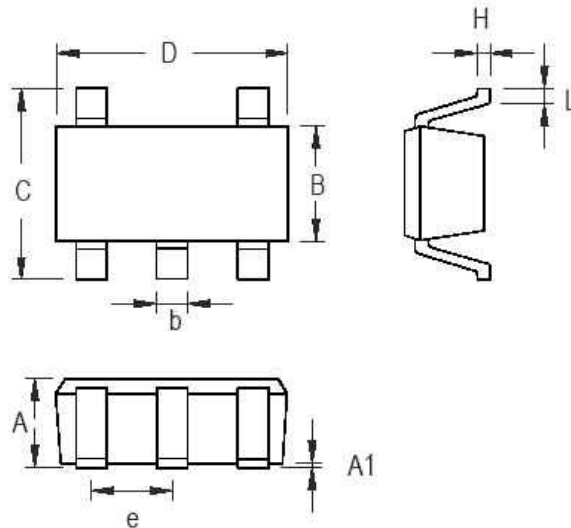
### Typical Characteristics





**Packing Information**

**SOT-23-5**

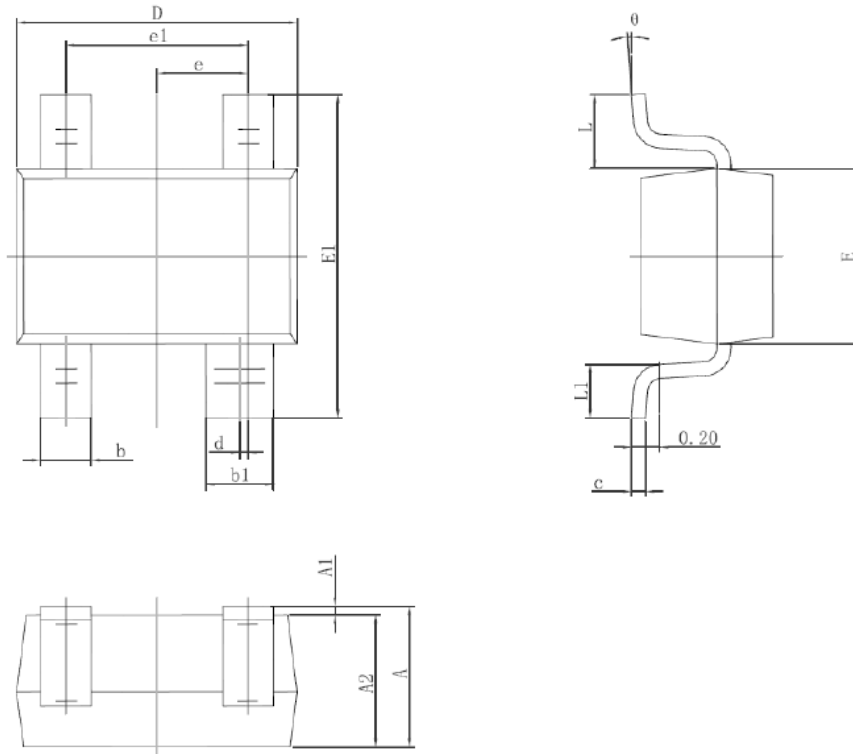


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024



Packing Information

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
θ	0°	8°	0°	8°





### Notes

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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.