HK431

HK431特殊声明：

1：航顺芯片　铁脚封装　精度0.5-0.7%　　A档（中低端消费类产品建议使用）

2：航顺芯片　铁脚封装　精度0.7-1.2%　B档（不建议使用）

3：航顺大芯片　　铁脚封装　精度0.5%（中低端产品建议使用）

4：航顺大芯片　　铜脚封装　精度0.5%（中高端产品建议使用，抗静电 抗干扰强　精度高）

HK431

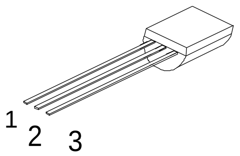
PROGRAMMABLE PRECISION REFERENCE

DESCRIPTION

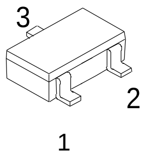
The HK431 is three- terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output Voltage may be set to any value between Vref(approximately 2.5V) and 36 V with two external resistors.These devices have provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

FEATURE

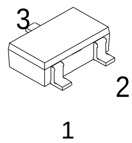
*Programmable output Voltage to 36V
*Low dynamic output impedance 0.2Ω
*Sink current capability of 0.5 to 100mA
*Equivalent full-range temperature coefficient of 50ppm/°C typical
*Temperature compensated for operation over full rated operating temperature range
*Low output noise voltage
*Fast turn on response



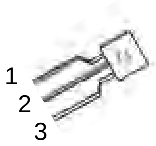
1:Ref; 2: Anode; 3:Cathode TO-92



1:Ref; 2:Cathode; 3:Anode SOT-23-3L



1:Ref; 2:Cathode; 3:Anode SOT-23



1:Ref; 2: Anode; 3:Cathode TO-92

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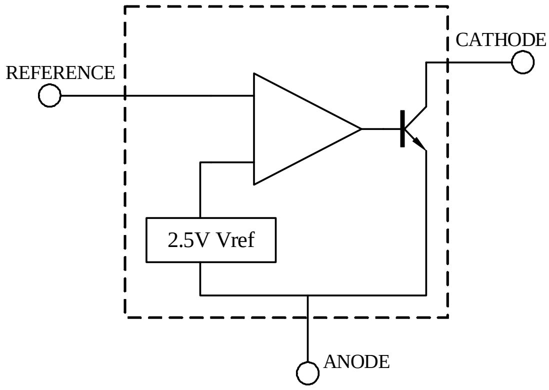
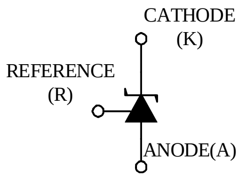
BLOCK DIAGRAM





ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified))

CHARACTERISTICS	SYMBOL	VALUE		UNITS
Cathode Voltage	V_{KA}	37		V
Cathode Current Range(Continuous)	I_{KA}	-100~+150		mA
Reference Input Current Range	Iref	-0.05~+10		mA
Power Dissipation	P_D	TO-92	770	mW
		SOT-23-3	370	
Operating temperature	Topr	-40~+85		°C
Storage temperature Temperature	Tstg	-65~+150		°C

RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}		36	V
Cathode Current	I_{KA}	0.5		100	mA

ELECTRICAL CHARACTERISTICS(Ta=25°C,unless otherwise specified)

Characteristic		Symbol	Test conditions		MIN	TYP	MAX	UNIT
Reference Input Voltage 1	0.5%	Vref	$V_{KA}=V_{REF}$,I_{KA}=10mA		2.488	2.50	2.512	V
	1%				2.475	2.50	2.525	
	2%				2.450	2.50	2.550	
Reference Input Voltage 2*	0.5%	Vref	$V_{KA}=V_{REF}$,I_{KA}=10mA		2.483	2.495	2.507	V
	1%				2.470	2.495	2.520	
	2%				2.445	2.495	2.545	
Deviation of reference Input Voltage Over temperature		ΔVref	$V_{KA}=V_{REF}$,I_{KA}=10mA $T_{MIN}\leq T_A\leq T_{MAX}$			4.5	25	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage		$\Delta V_{ref}/\Delta V_{KA}$	I_{KA}=10mA	ΔV_{KA}=10V~V_{REF}		-1.0	-2.7	mV/V
				ΔV_{KA}=36V~10V		-0.5	-2.0	
Reference Input Current		Iref	I_{KA}=10mA,R1=10kΩ,R2=∞			1	2	μA
Deviation of Reference Input Current Over Ful l Temperature Range		ΔIref/ΔT	I_{KA}=10mA,R1=10kΩ,R2=∞,T_A= full Temperature			0.2	0.4	μA
Minimum cathode current for regulation		I_{KA}(min)	$V_{KA}=V_{REF}$			0.3	0.5	mA
Off-state cathode Current		I_{KA}(OFF)	V_{KA}=36V,V_{REF}=0			0.05	0.5	μA
Dynamic Impedance		Z_{KA}	$V_{KA}=V_{REF}$,I_{KA}=1 to 100mA f≤1.0kHz			0.15	0.5	Ω

TEST CIRCUITS

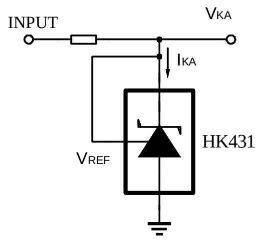


Fig 7 Test Circuit For VKA=VREF

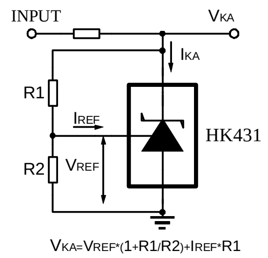


Fig 8 Test Circuit for VKA≥VREF

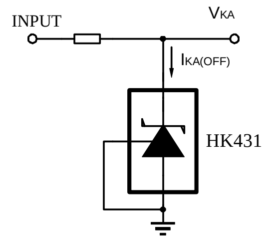
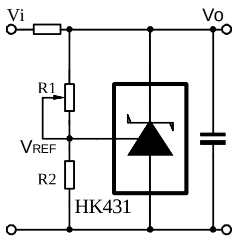


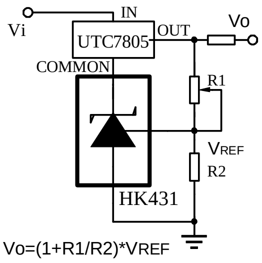
Fig 9 Test Circuit For IKA(OFF)

TYPICAL APPLICATION



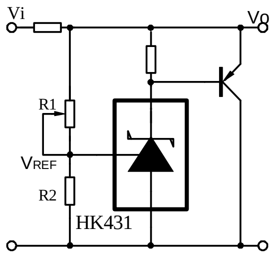
Vo=(1+R1/R2)*VREF

Fig 10 Shutdown Regulator



Vo=(1+R1/R2)*VREF

Fig 11 Output Control of a Three -Terminal Fixed Regulator



Vo=(1+R1/R2)*VREF

Fig 12 Higher-current Shunt Regulator

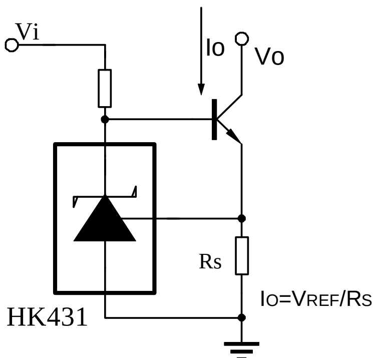
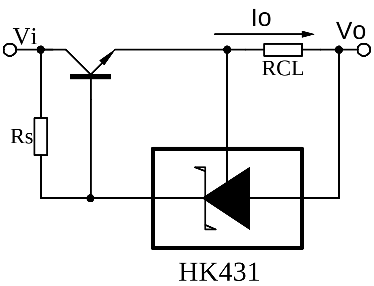


Fig 13 Constant-current Sink



RS=VREF/RCL

Fig 14 Current Limiting or Current Source

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TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1 Cathode Current
Vs Cathode Voltage

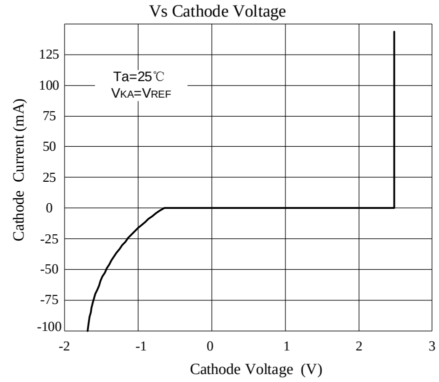


Fig 2 Cathode Current
Vs Cahode Voltage

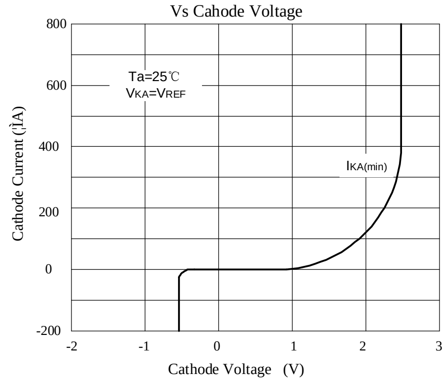


Fig 3 Change in Reference Input Voltage Vs
Cathode voltage

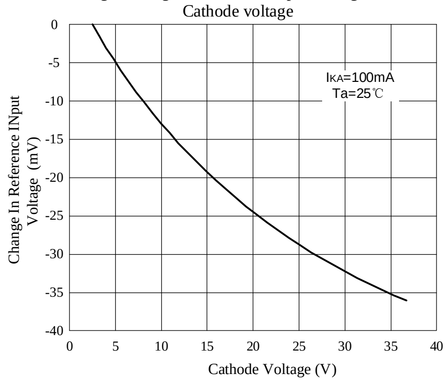


Fig 4 Pulse Response

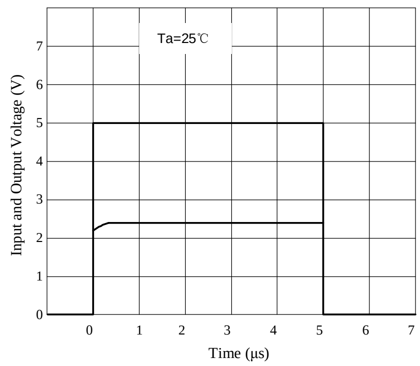


Fig 5 Dynamic Impedance Vs
Frequency

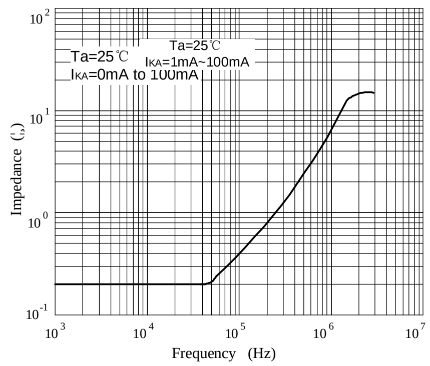


Fig 6 Small Signal Voltage
Amplification Vs Frequency

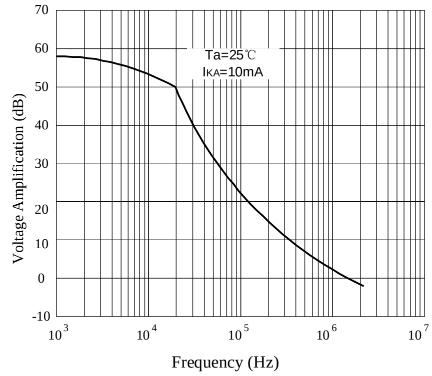
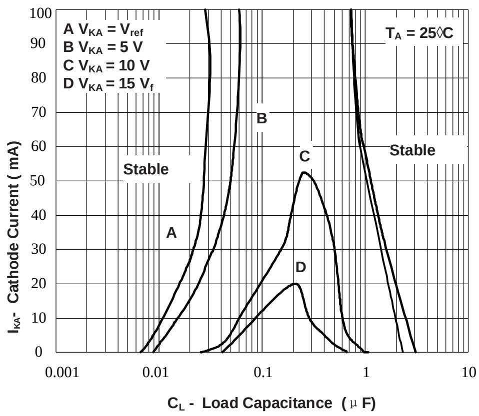


Fig 7 Cathode Current Vs Load Capacitance



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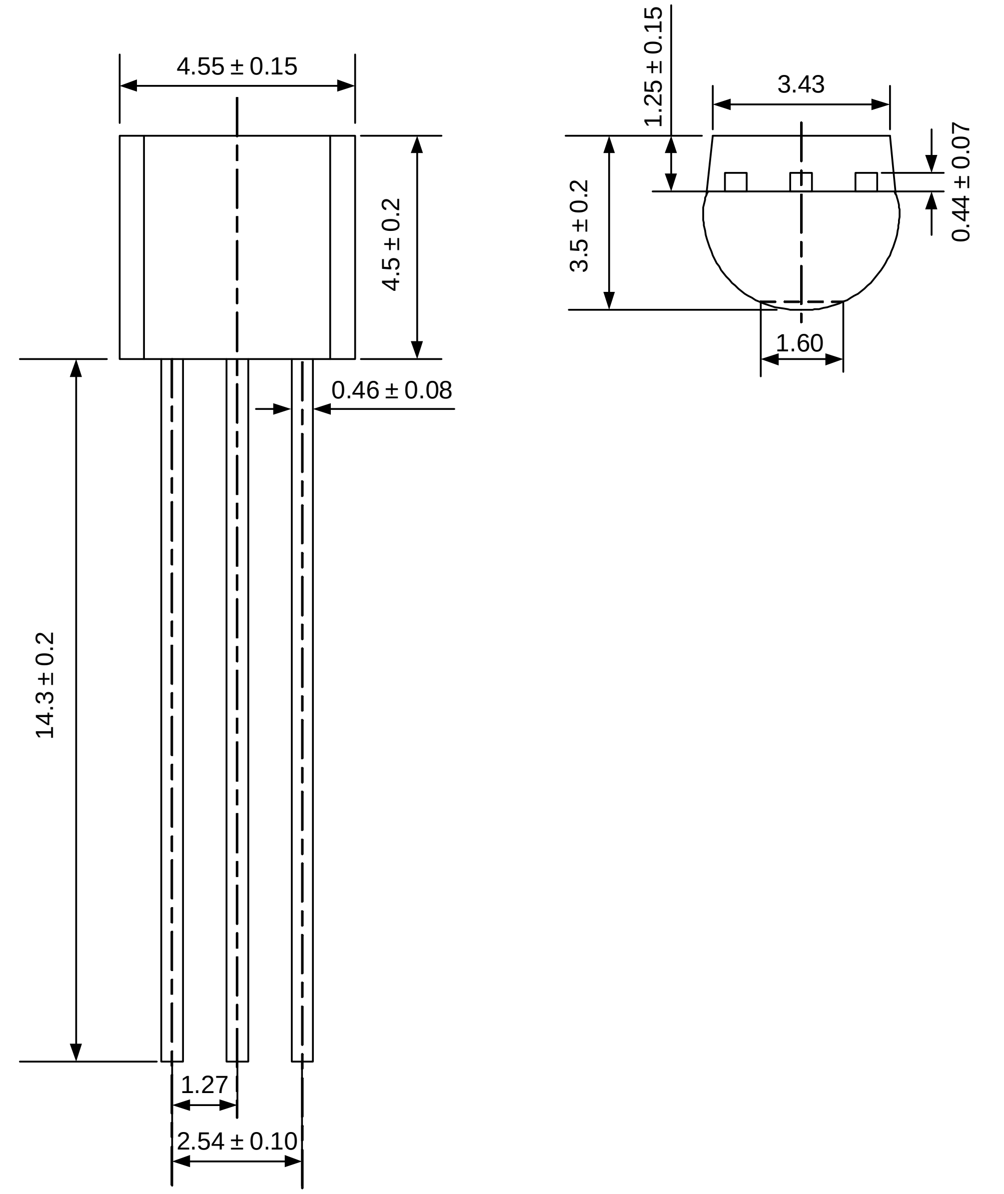
PACKAGE DIMENSIONS

TO-92　　UNIT:mm



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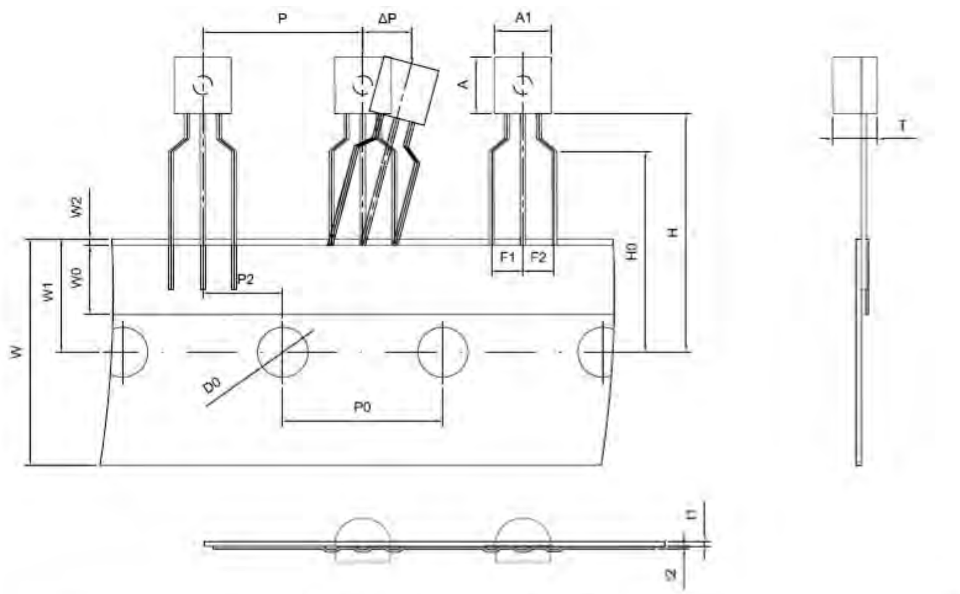
TO-92 TAPE&REEL　　UNIT:mm



Dimiensions are in millimeter								
A1	A	T	P	P0	P2	F1	F2	W
4,5±0,2	4,5±0,2	3,5±0,2	12,7±0,3	12,7±0,2	6,35±0,3	2,5±0,3	2,5±0,3	18,0+1,0/-0,5
W0	W1	W2	H	H0	D0	t1	t2	ΔP
6.0±0.5	9.0±0.5	1.0 MAX.	19.0±1.0	16.0±0.5	4.0±0.5	0.4±0.05	0.2±0.05	0 ± 1.0

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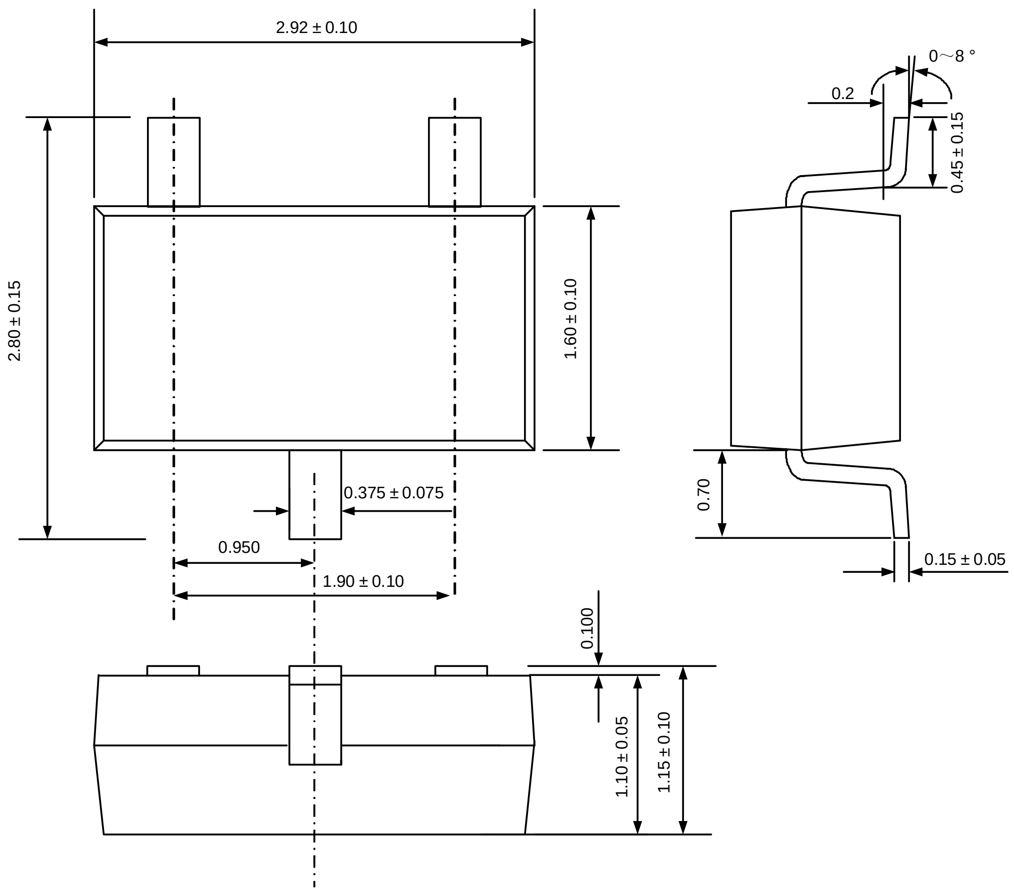
PACKAGE DIMENSIONS

SOT-23-3L　UNIT:mm



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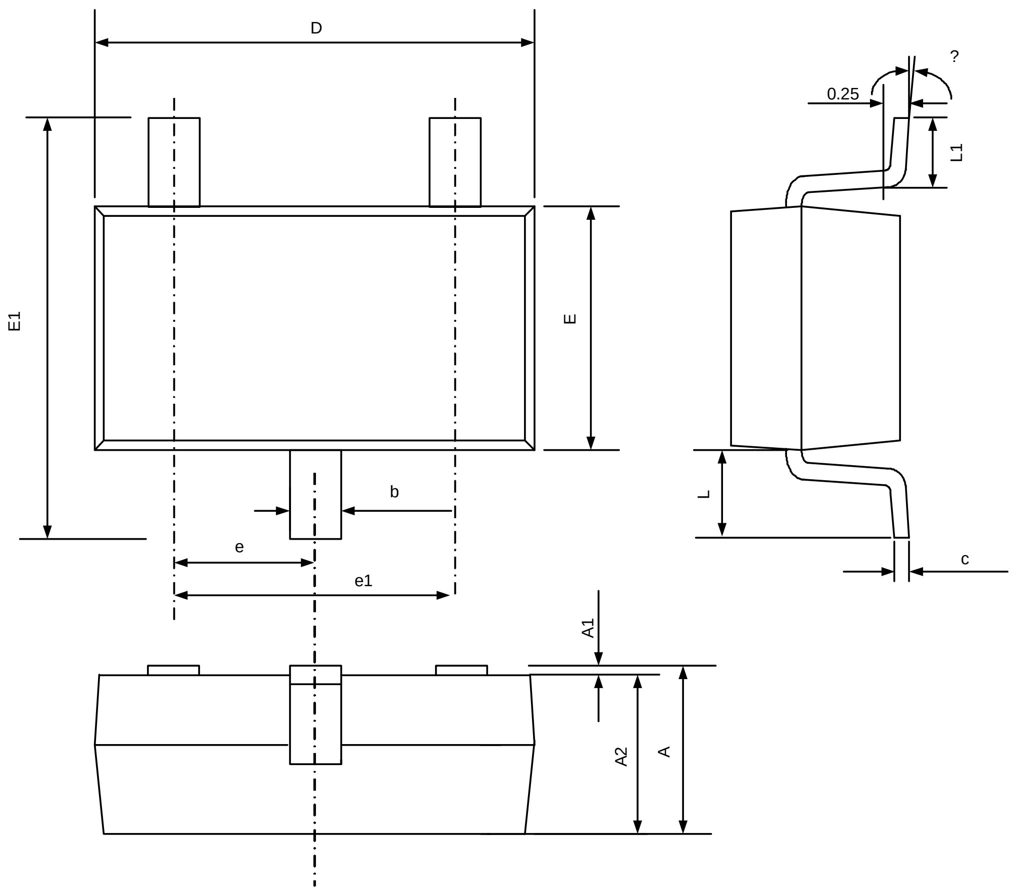
PACKAGE DIMENSIONS

SOT-23 UNIT:mm



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SOT-23　　UNIT:mm

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	2.2550	0.089	0.100
e	0.950TYP		0.037TYP	
E1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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Attach

Revision History

Data	REV	Description	Page
	1.0	Original	
2006.11.16	1.2	Revise “PACKAGE OUTLINE SOT-23-3”	5
2007.08.01	1.3	Revise Pin	1
2010.05.17	1.4	Increase encapsulation	6
2011.08.31	1.5	Increase TYPICAL PERFORMANCE CHARACTERISTICS Fig.7	5
2012.09.06	1.6	Increase PACKAGE	8