GS432

Adjustable Precision Shunt Regulators

Product Description

The GS432 is a 3 terminal adjustable voltage reference with specified thermal stability over applicable commercial temperature ranges.

Output voltage may be set to any value between V_{REF} (1.24V) and 16V with two external resistors (see Figure 2). When used with a photo-coupler, the GS432 is an ideal voltage reference in isolated feedback circuits for 1.24V to 16V switching-mode power supplies.

This device has a typical output impedance of 0.05Ω. Active output circuitry provides a very sharp turn-on characteristic, making the GS432 excellent replacements for zener diodes in many applications, including on-board regulation and adjustable power supplies.

Features

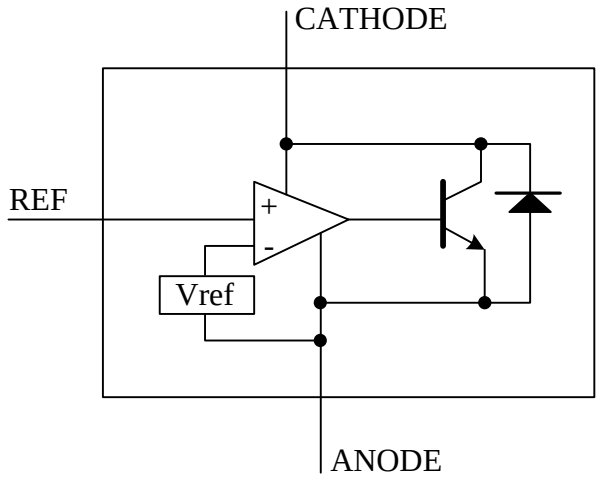
- Precise Reference Voltage to 1.240V
- Guaranteed 1% Reference Voltage Tolerance
- Sink Current Capability, 80μA to 100mA
- Quick Turn-on
- Adjustable Output Voltage, $V_O = V_{REF}$ to 16V
- 0.2Ω Typical Output Impedance
- TO-92 and SOT-23 and SOT-89 Package

Applications

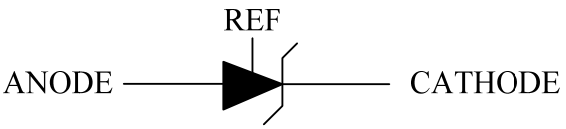
- Linear Regulators
- Adjustable Power Supplies
- Switching Power Supplies

Block Diagram & Symbol

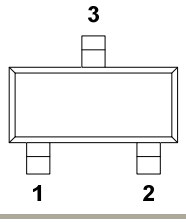
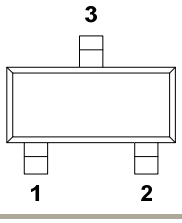
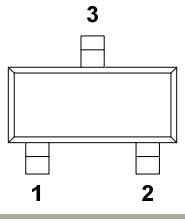
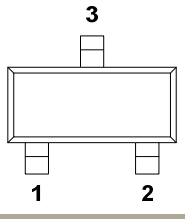
Block Diagram

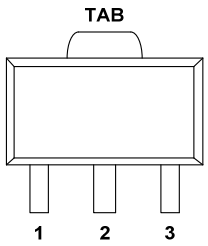
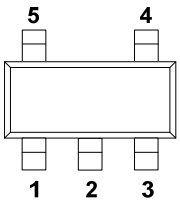
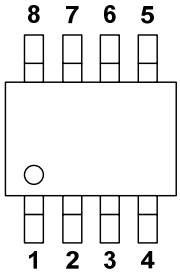


Symbol

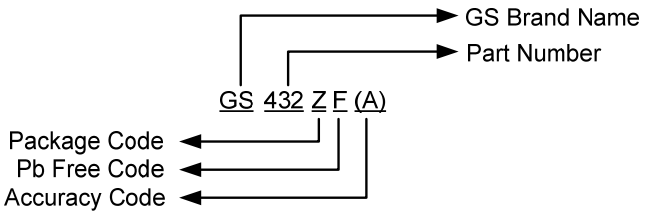


Packages & Pin Assignments

GS432JW (SOT-23)		GS432JZ (SOT-23)		GS432Z (SOT-23-3L)		GS432W (SOT-23-3L)	
							
1	REF	1	CATHODE	1	REF	1	CATHODE
2	CATHODE	2	REF	2	CATHODE	2	REF
3	ANODE	3	ANODE	3	ANODE	3	ANODE

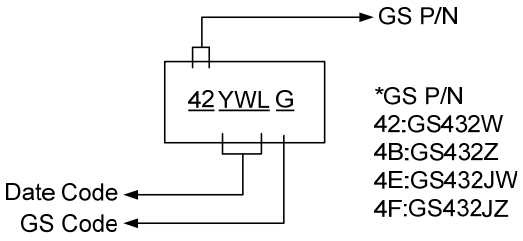
GS432Y (SOT-89)		GS432L (TO-23-5L)		GS432S (SOP-8)			
							
1	REF	1	NC	1	CATHODE	5	NC
2	ANODE	2	NC	2	ANODE	6	ANODE
3	CATHODE	3	CATHODE	3	ANODE	7	ANODE
		4	REF	4	NC	8	REF
		5	ANODE	1	CATHODE	5	NC

Ordering Information

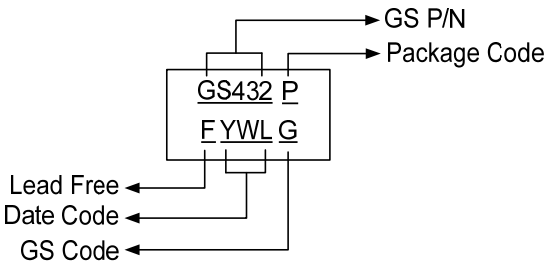


Device	Package
GS432JWF	SOT-23
GS432JZF	SOT-23
GS432WF	SOT-23-3L
GS432ZF	SOT-23-3L
GS432LF	SOT-23-5L
GS432SF	SOP-8
GS432YF	SOT-89

Marking Information



SOT-23



SOP-8 & SOT-89

Absolute Maximum Ratings

Symbol	Parameter	Rating		Unit
V_{KA}	Cathode Voltage	20		V
I_K	Continuous Cathode Current Range	100		mA
I_{REF}	Reference Current Range	3		mA
θ_{JA}	Thermal Resistance Junction To Ambient	SOT-23 SOT-23-5L SOP-8 SOT-89	833 833 192 250	°C/W
P_D	Power Dissipation	SOT-23 SOT-23-5L SOP-8 SOT-89	0.15 0.15 0.625 0.5	W
T_{OPR}	Ambient Temperature Range	-40 to 85		°C
T_J	Junction Temperature Range	0 to 125		°C
T_{STG}	Storage Temperature Range	-65 to 150		°C
T_{LEAD}	Lead Temperature Range, (Soldering, 10sec)	260		°C

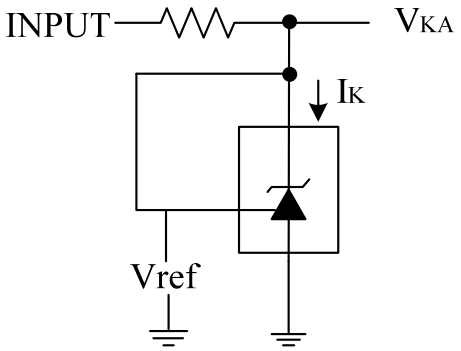
Electrical Characteristics

T_A =25ºC (unless otherwise noted)

Symbol	Parameter	Test Conditions	GS432(A)			GS432(B)			Unit
			Min	Typ	Max	Min	Typ	Max	
V_{REF}	Reference Voltage	V_{KA} = V_{REF}, I_K =10mA (Fig.1)	1.234	1.240	1.246	1.228	1.240	1.252	V
V_{DEV}	V_{REF} Temp Deviation	T_A = Full Range (**Note 1**) V_{KA} = V_{REF}, I_K =10mA (Fig.1)		10	25		10	25	mV
$\frac{\triangle V_{REF}}{\triangle V_{KA}}$	Voltage Ration (Open loop gain)	I_K =10mA, V_{KA} = 14.5V to V_{REF} (Fig.2)	-2.7	-1		-2.7	-1		mV/V
I_{REF}	Reference Input Current	I_K =10mA R_1 =10KΩ, R_2=∞ (Fig.2)		0.15	0.5		0.15	0.5	μA
$I_{REF(DEV)}$	I_{REF} Temp Deviation	T_A = Full Range (**Note 1**) R_1 =10KΩ, R_2=∞, I_K =10mA (Fig.2)		0.1	0.4		0.1	0.4	μA
I_K (min)	Min.Cathode Current	V_{KA} = V_{REF} (Fig.1)		20	80		20	80	μA
I_K (off)	Off-state Cathode Current	V_{KA} =14.5V, V_{REF} =0V (Fig.3)		0.135	0.15		0.135	0.15	μA
$\lvert Z_{KA} \rvert$	Dynamic Output Impedance	V_{KA}=V_{REF}, I_K=1mA to 100mA, f≤1kHz (Fig.1)		0.05	0.15		0.05	0.15	Ω

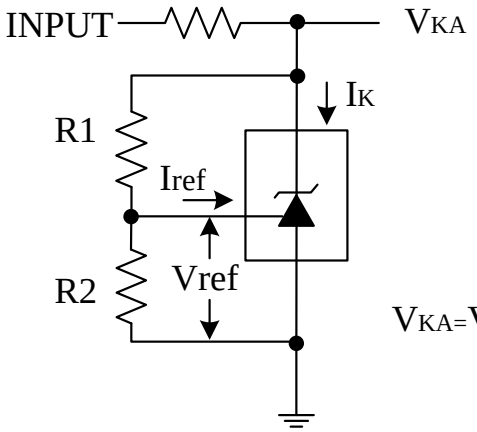
Note 1: Full temperature range is -40ºC to 105ºC

Test Circuits



$V_{KA} = V_{REF}$, $V_O = V_{KA} = V_{REF}$

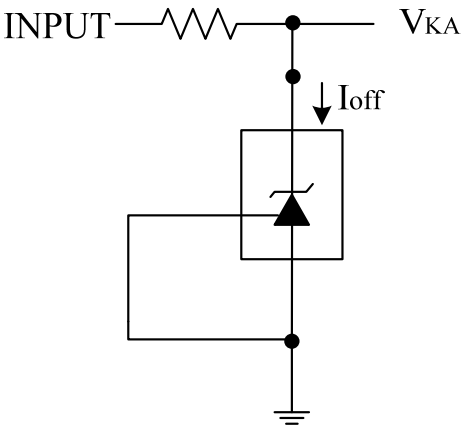
Figure 1.



$V_{KA} < V_{REF}$, $V_O = V_{KA}$

$$V_{KA} = Vref(1+\frac{R1}{R2}) + Iref \cdot R1$$

Figure 2.

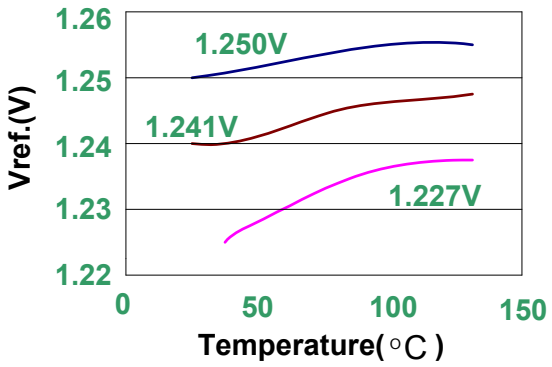


$I_{K(OFF)}$

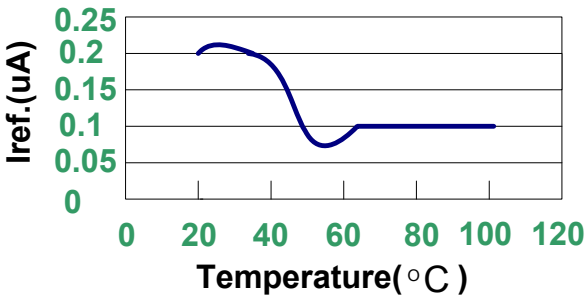
Figure 3.

Typical Performance Characteristics

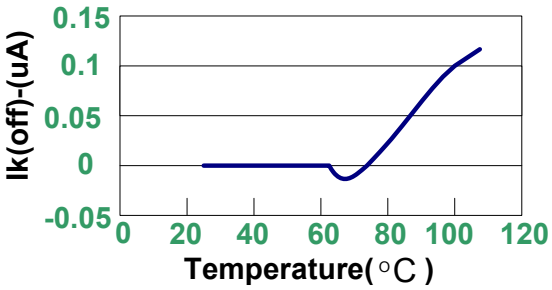
Vref.vs Free-Air Temperature



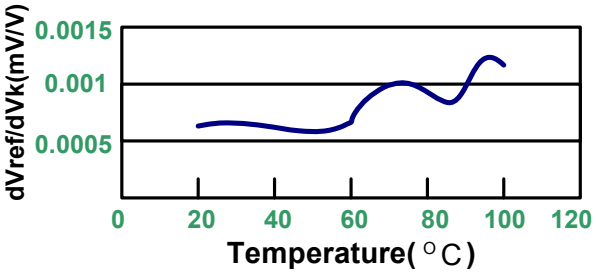
Iref. vs Free-Air Temperature



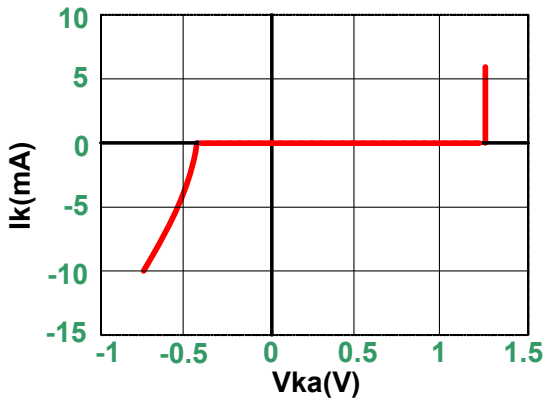
Ik(off)vs. Free-Air temperature



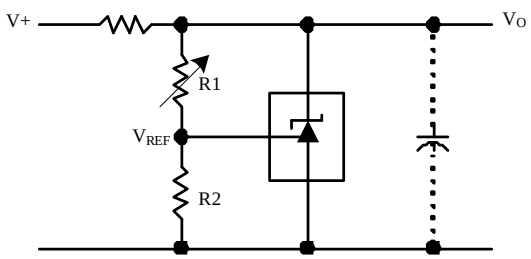
Raito of Delta Vref to Delta Vk vs Temperature



Cathode Current vs Cathode Voltage



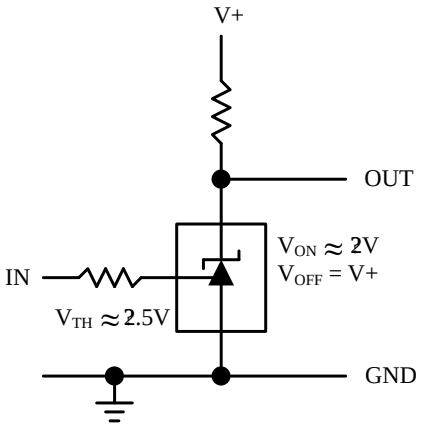
Typical Applications



$V_O = (1+R1/R2)V_{REF}$

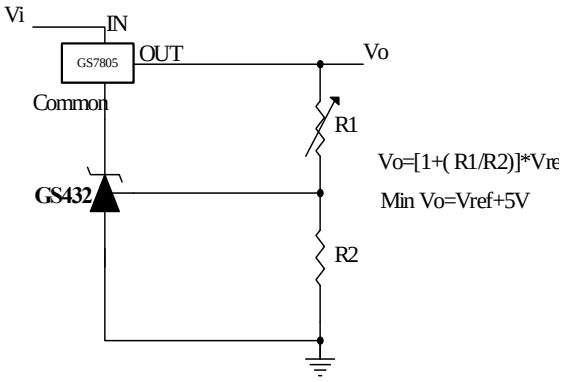
Shunt Regulator

Figure 4.



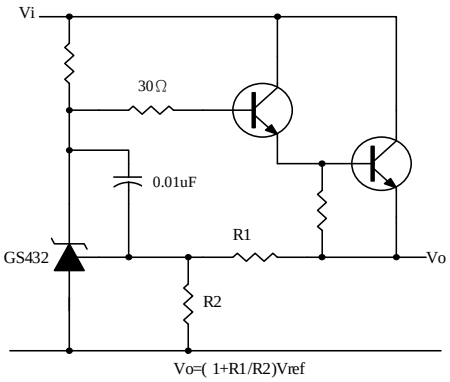
Single Supply Comparator with Temperature Compensated Threshold

Figure 5.



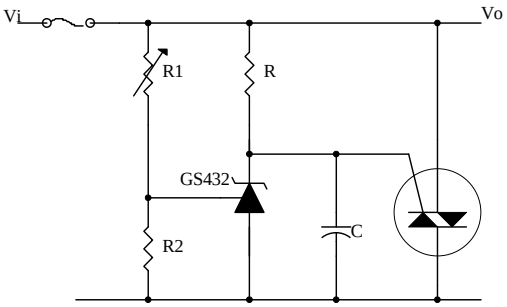
Output Control of a 3-Terminal Fixed Regulator

Figure 6.



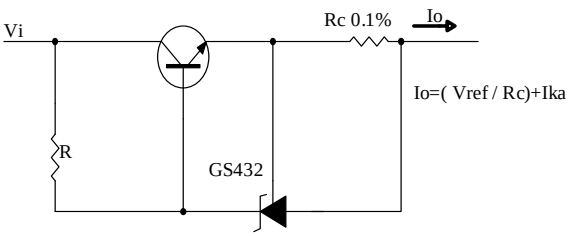
Series Regulator

Figure 7.



Crowbar Circuit

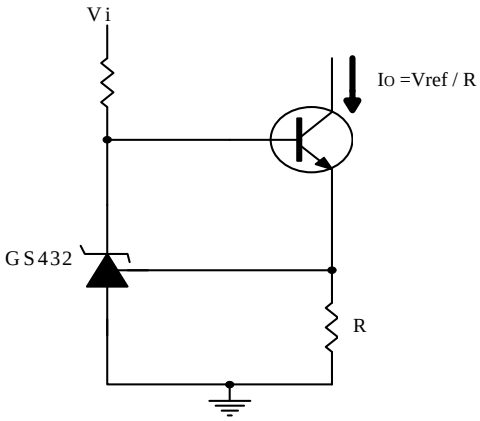
Figure 8.



Precision Current Limiter

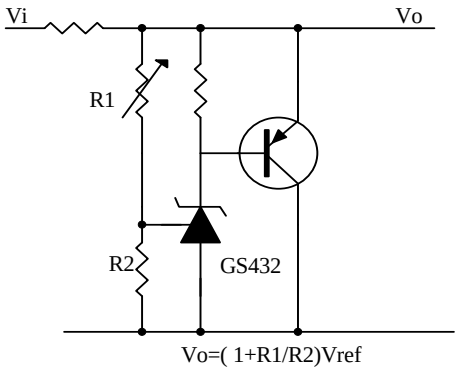
Figure 9.

Typical Applications (Continued)



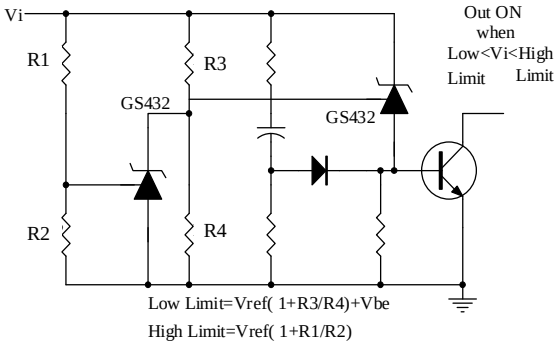
Precision Constant-Current Sink

Figure 10.



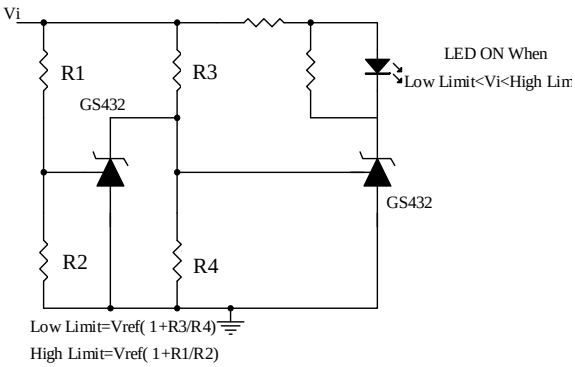
High Current Shunt Regulator

Figure 11.



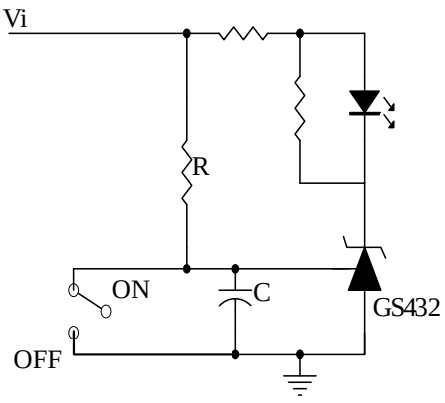
Over Voltage/Under Voltage Protection Circuit

Figure 12.



Voltage Monitor

Figure 13.



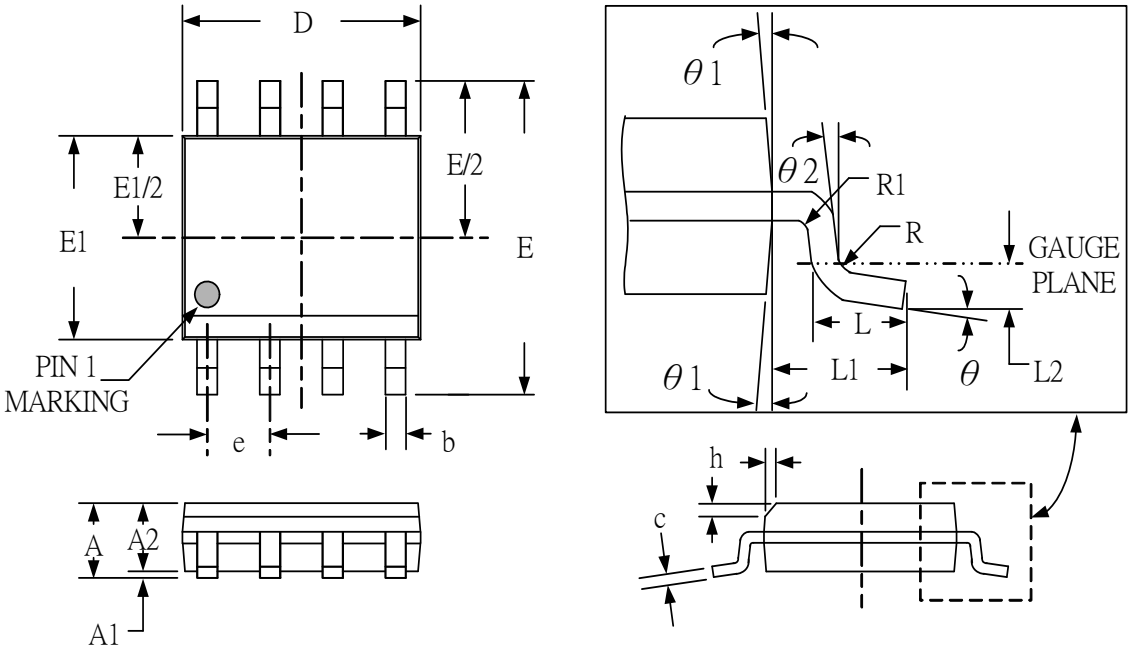
Delay=R*CI*In[Vi/(Vi-Vref)]

Delay Time

Figure 14.

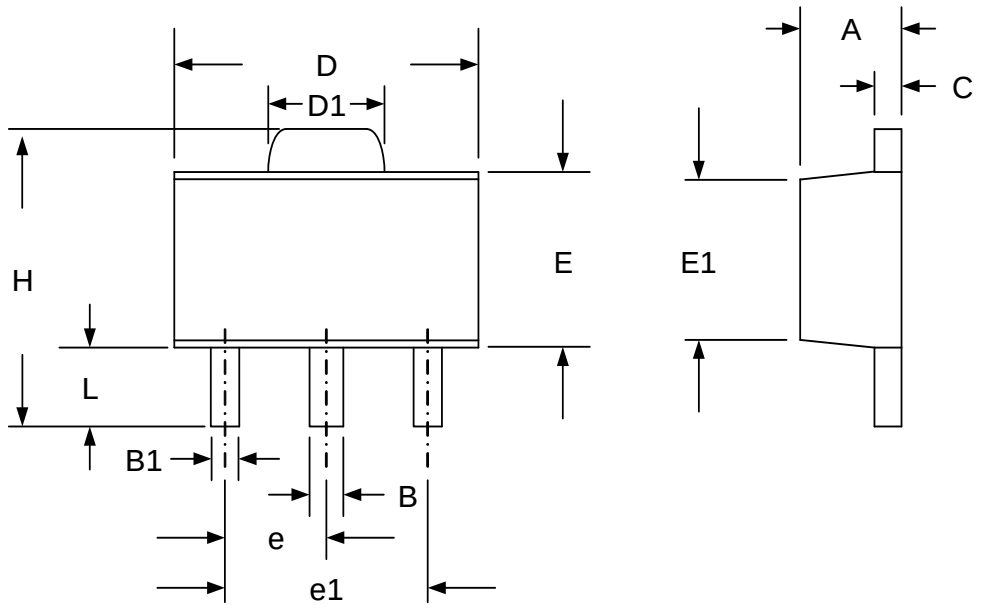
Package Dimension

SO-8 PLASTIC PACKAGE



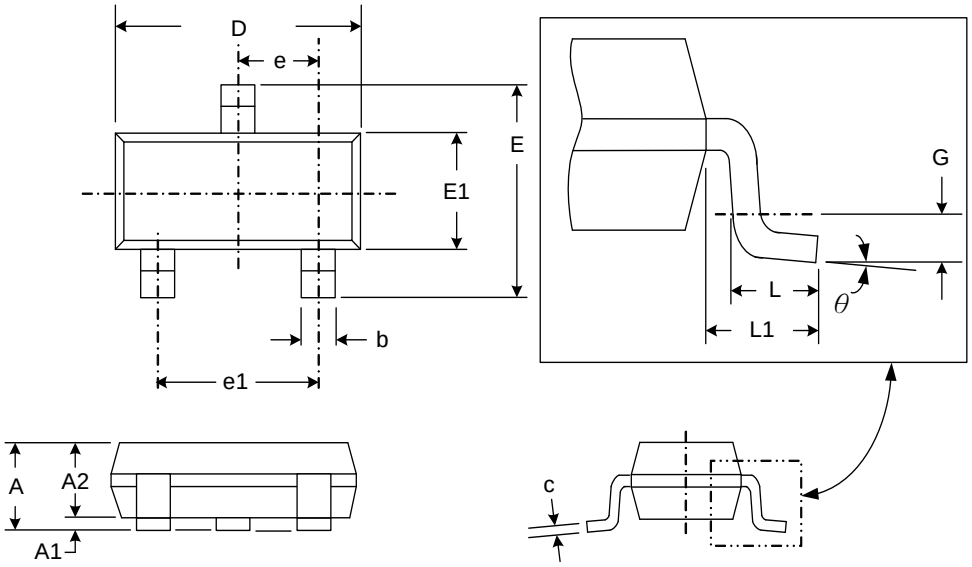
Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	.053	.069
A1	0.10	0.25	.004	.010
A2	1.25	1.65	.049	.065
b	0.31	0.51	.012	.020
c	0.17	0.25	.007	.010
D	4.90 (TYP)		.193 (TYP)	
E	6.00 (TYP)		.236 (TYP)	
E1	3.90 (TYP)		.154 (TYP)	
e	1.27 (TYP)		.050 (TYP)	
L	0.40	1.27	.016	.050
L1	1.04 (TYP)		.041 (TYP)	
L2	0.25 (TYP)		.010 (TYP)	
R	0.07	-	.003	-
R1	0.07	-	.003	-
h	0.25	0.50	.010	.020
θ	0°	8°	0°	8°
θ1	5°	15°	5°	15°
θ2	0°	-	0°	-

SOT-89 PLASTIC PACKAGE



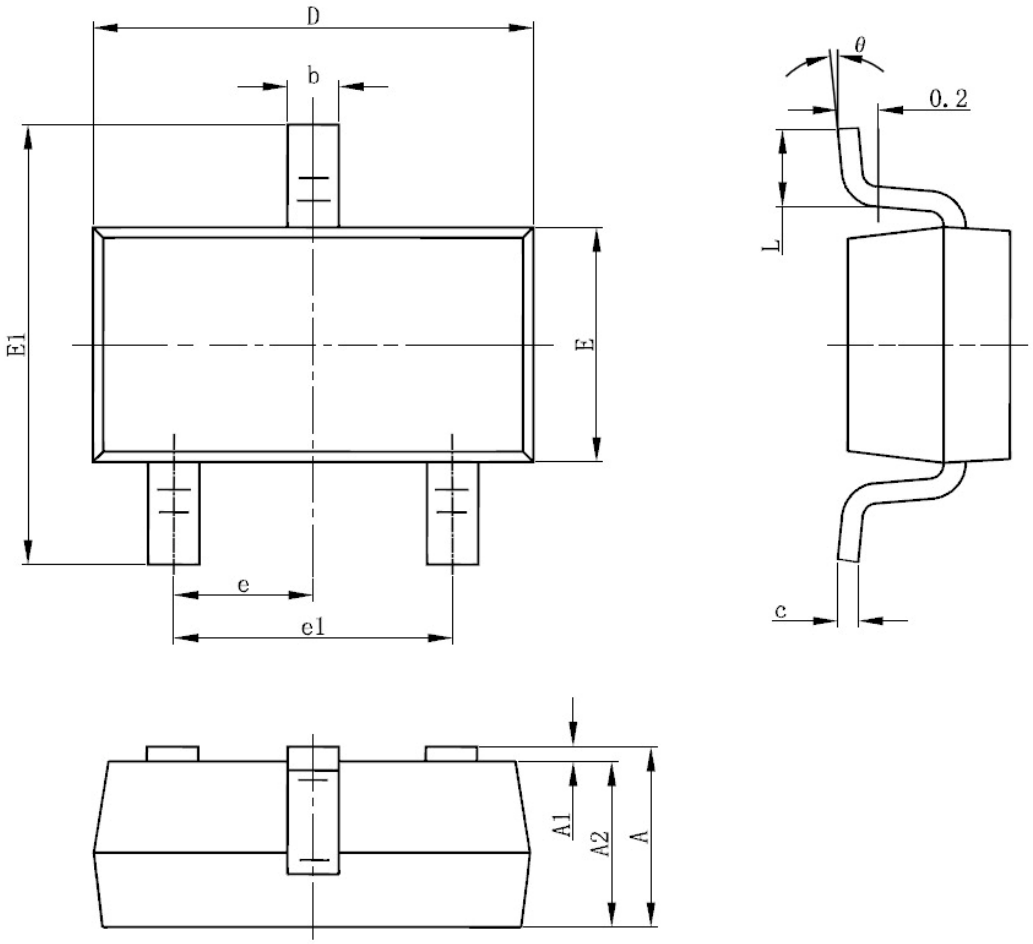
Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.40	1.60	.055	.063
B	0.44	0.56	.017	.022
B1	0.36	0.48	.014	.019
C	0.35	0.44	.014	.017
D	4.40	4.60	.173	.181
D1	1.62	1.83	.064	.072
E	2.29	2.60	.090	.102
E1	2.13	2.29	.084	.090
e	1.50 (TYP)		.059 (TYP)	
e1	3.00 (TYP)		.118 (TYP)	
H	3.94	4.25	.155	.167
L	0.89	1.20	.035	.047

SOT-23 PLASTIC PACKAGE



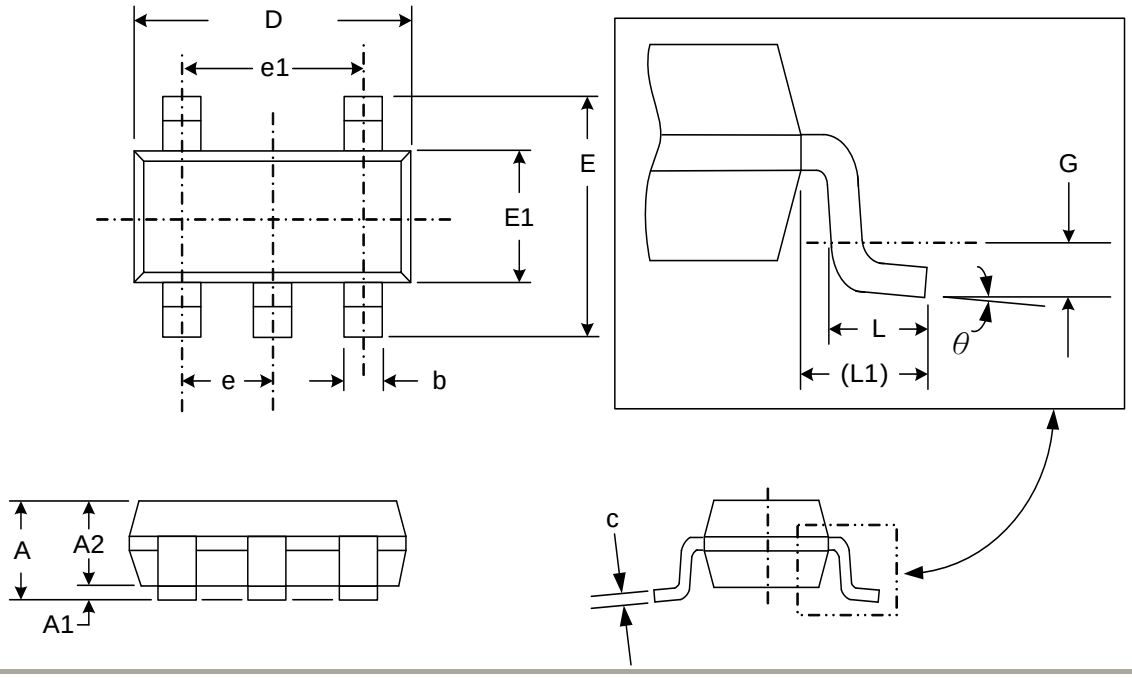
Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.17	.030	.046
A1	0.05	0.15	.002	.006
A2	0.70	1.02	.028	.040
b	0.30	0.50	.012	.020
c	0.08	0.20	.003	.008
D	2.80	3.04	.110	.120
E	2.10	2.64	.083	.104
E1	1.20	1.40	.047	.055
e	0.95 (TYP)		.037 (TYP)	
e1	1.90 (TYP)		.075 (TYP)	
L	0.40	0.60	.016	.024
L1	0.54 (TYP)		.021 (TYP)	
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

SOT-23-3L PLASTIC PACKAGE



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.05	1.25	0.041	0.049
A1	0	0.1	0	0.004
A2	1.05	1.15	0.041	0.045
b	0.3	0.5	0.012	0.020
c	0.1	0.2	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.5	1.7	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.950 (TYP)		0.037 (TYP)	
e1	1.8	2	0.071	0.079
L	0.3	0.6	0.012	0.024
Q	0°	8°	0°	8°

SOT-23-5L PLASTIC PACKAGE



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.95	1.45	.037	.057
A1	0.05	0.15	.002	.006
A2	0.90	1.30	.035	.051
b	0.30	0.50	.012	.020
c	0.08	0.20	.003	.008
D	2.80	3.00	.110	.118
E	2.60	3.00	.102	.118
E1	1.50	1.70	.059	.067
e	0.95 (TYP)		.037 (TYP)	
e1	1.90 (TYP)		.075 (TYP)	
L	0.35	0.55	.014	.022
L1	0.60 (TYP)		.024 (TYP)	
G	0.25 (TYP)		.010 (TYP)	
θ	0°	8°	0°	8°

Additional Information :

한국 대리점 : ㈜디웰전자 (Diwell Electronics Co., Ltd.)
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