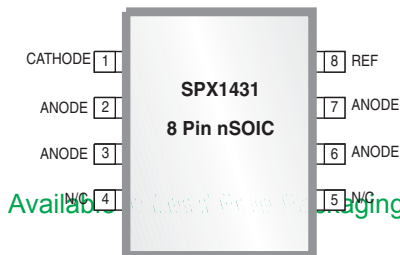


Precision Adjustable Shunt Regulator

FEATURES

- Trimmed Bandgap Reference to 0.4%
- Wide Operating Current 1mA to 150mA
- Extended Temperature Range: -55°C to 125°C
- Low Temperature Coefficient 30 ppm/°C
- Offered in TO-92, SOIC, SOT-89, SOT-23-5
- Improved Replacement in Performance for LT1431
- Low Cost Solution



Available in Lead Free Packaging
 Now Available in Lead Free Packaging

APPLICATIONS

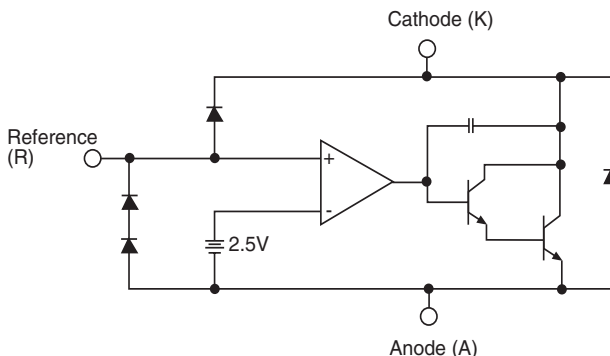
- Battery Operating Equipment
- Adjustable Supplies
- Switching Power Supplies
- Error Amplifiers
- Single Supply Amplifier
- Monitors / VCRs / TVs
- Personal Computers

DESCRIPTION

The SPX1431 is a 3-terminal adjustable shunt voltage regulator providing a highly accurate bandgap reference. The SPX1431 acts as an open-loop error amplifier with a 2.5V temperature compensation reference. The SPX1431's thermal stability, wide operating current (150mA) and temperature range (-55°C to 125°C) makes it suitable for a variety of applications that require a low cost, high performance solution. SPX1431 tolerance of 0.4% is proven to be sufficient to overcome all of the other errors in the system to virtually eliminate the need for trimming in the power supply manufacturer's assembly lines and contributes a significant cost savings.

The output voltage may be adjusted to any value between V_{REF} and 36 volts with two external resistors. The SPX1431 is available in TO-92, SOIC-8, SOT-89, and SOT-23-5 packages.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Cathode-Anode Reverse Breakdown V_{KA}	37V
Anode-Cathode Forward Current, (<10ms) I_{AK}	1A
Operating Cathode Current I_K	150mA
Reference Input Current I_{REF}	10mA
Continuous Power Dissipation at 25°C P_D	
TO-92	775mW
SOT-23	200 mW
SOIC-8	750mW
SOT-89	1000mW

Junction Temperature T_J	150 °C
Storage Temperature T_{STG}	-65 to 150 °C

NOTE: Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

RECOMMENDED CONDITIONS

PARAMETER	SYMBOL	RATING	UNIT
Cathode Voltage	V_{KA}	V_{REF} to 36	V
Cathode Current	I_K	10	mA

TYPICAL THERMAL RESISTANCES

PACKAGE	θ_{JA}	θ_{JC}	TYPICAL DERATING
TO-92	160°C/W	80°C/W	6.3 mW/°C
SOT-23	575°C/W	150°C/W	1.7 mW/°C
SOIC-8	175°C/W	45°C/W	5.7 mW/°C
SOT-89	110°C/W	8°C/W	9.1mW/°C

Typical deratings of the thermal resistances are given for ambient temperature >25°C.

ELECTRICAL CHARACTERISTICS

Electrical characteristics at 25°C $I_K=10\text{mA}$ $V_K=V_{REF}$, unless otherwise specified.

PARAMETER	SYMBOL	FIGURE	CONDITIONS	MIN	TYP	MAX	UNITS
SPX1431							
Reference Voltage	V_{REF}	2	$T_J = 0^\circ\text{C to } 105^\circ\text{C}$	2.490	2.500	2.510	V
		2		2.465		2.535	V
ΔV_{REF} with Temp.*	TC	2			0.07	0.20	mV/°C
Ratio of Change in V_{REF} to Cathode Voltage	$\frac{\Delta V_{REF}}{\Delta V_K}$	3	$V_K = 3\text{V to } 36\text{V}$	-2.0	-1.1		mV/V
Reference Input Current	I_{REF}	3			0.7	1.9	μA
I_{REF} Temp Deviation	ΔI_{REF}	3	$T_J = 0^\circ\text{C to } 105^\circ\text{C}$		0.4	1.2	μA
Min I_K for Regulation	$I_{K(MIN)}$	2			0.4	1	mA
Off State Leakage	$I_{K(OFF)}$	4	$V_{REF} = 0\text{V},$ $V_{KA} = 36\text{V}$		0.04	250	nA
Dynamic Output Impedance	Z_{KA}	2	$f_z \leq 1\text{kHz}$ $I_K = 1\text{ to } 150\text{mA}$		0.15	0.5	Ω

Operating Range (T_J) = -55°C to 125°C.

*** See appropriate test circuit (Figure 2)**

CALCULATING AVERAGE TEMPERATURE COEFFICIENT (TC)

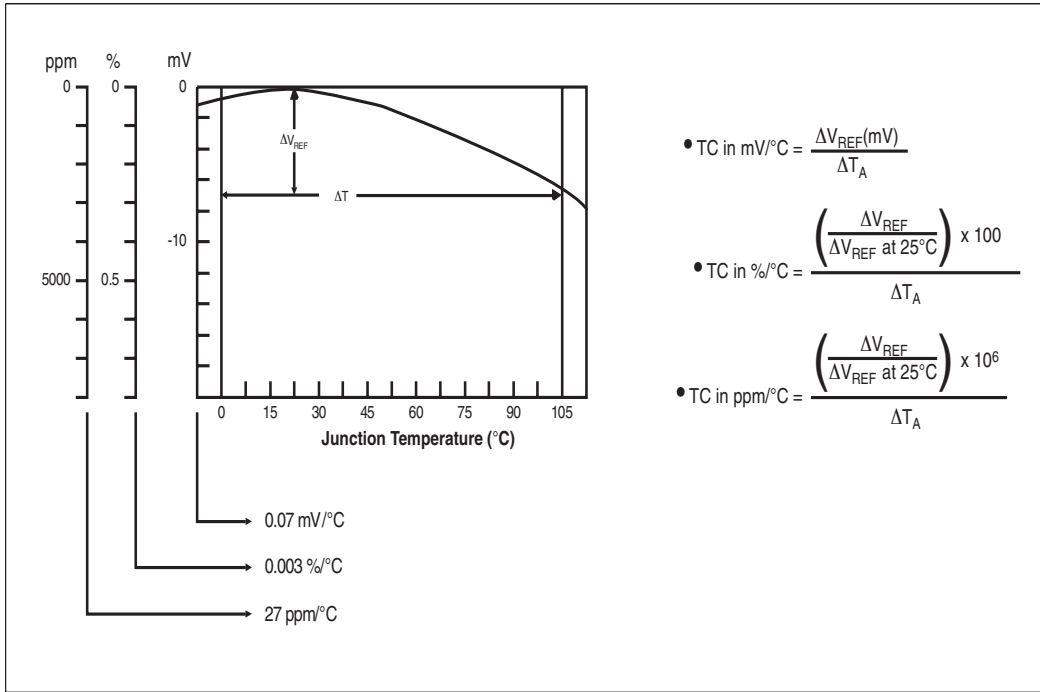


Figure 1. V_{REF} VS Temperature.

TEST CIRCUITS

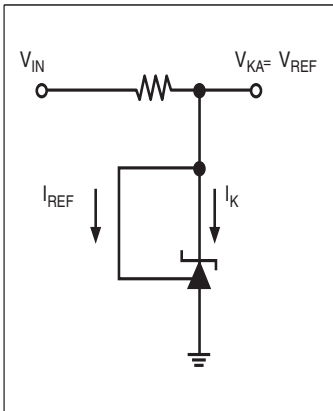


Figure 2. Test Circuit for V_{KA} = V_{REF}

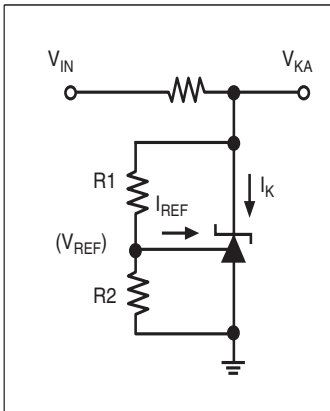


Figure 3. Test Circuit for V_{KA} > V_{REF}

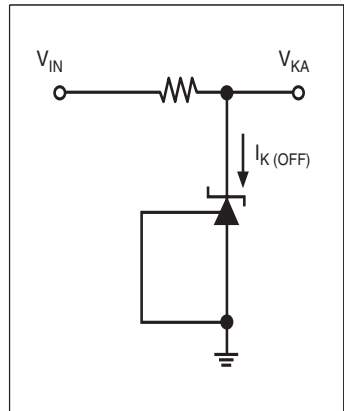


Figure 4. Test Circuit for I_{K(OFF)}

TYPICAL PERFORMANCE CHARACTERISTICS

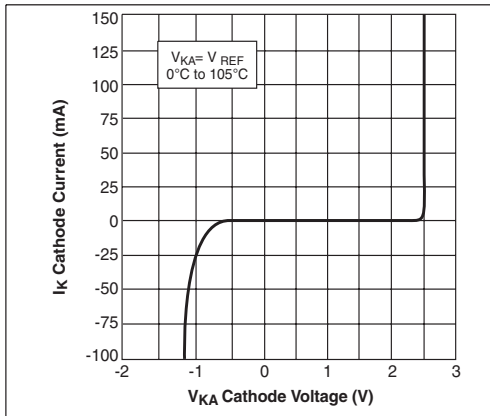


Figure 5. High Current Operating Characteristics

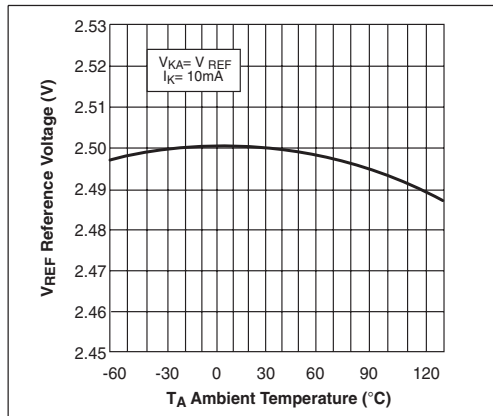


Figure 6. Reference Voltage VS Ambient Temperature

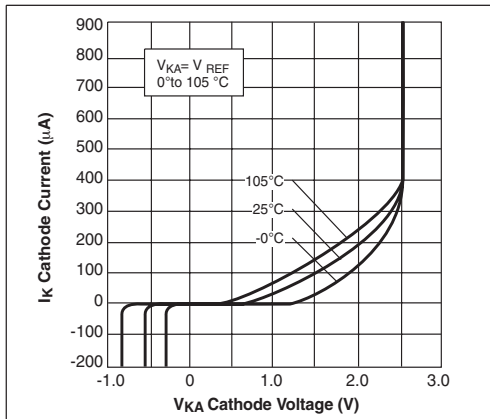


Figure 7. Low Current Operating Characteristics

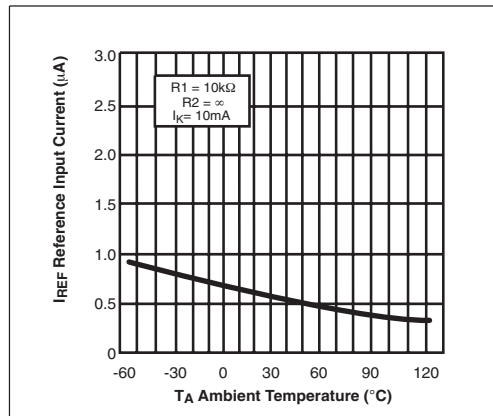


Figure 8. Reference Input Current VS Ambient Temperature

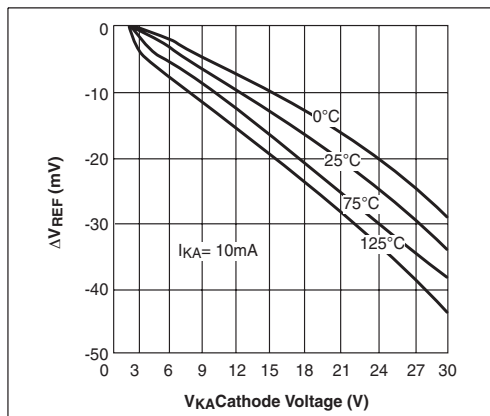


Figure 9. Reference Voltage Line Regulation VS Cathode Voltage and $T_{AMBIENT}$

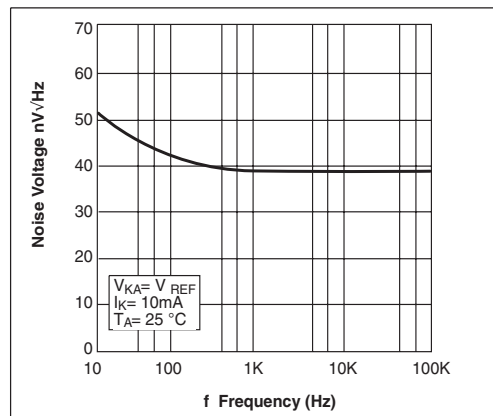


Figure 10. Noise Voltage VS Frequency

TYPICAL PERFORMANCE CHARACTERISTICS

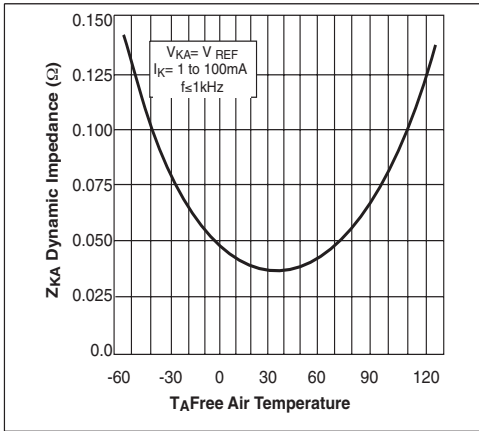


Figure 11. Low Frequency Dynamic Output Impedance VS $T_{AMBIENT}$

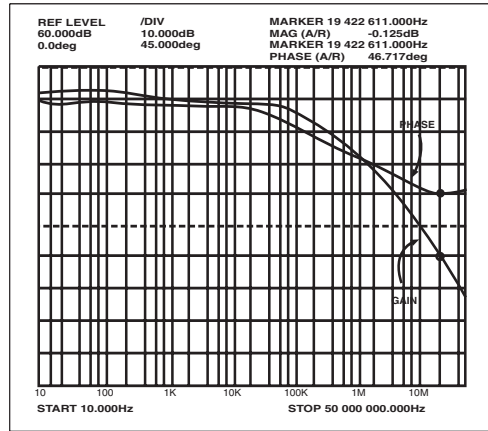


Figure 12. Small Signal Gain and Phase VS Frequency; $I_K = 10mA, T_A = 25^\circ C$

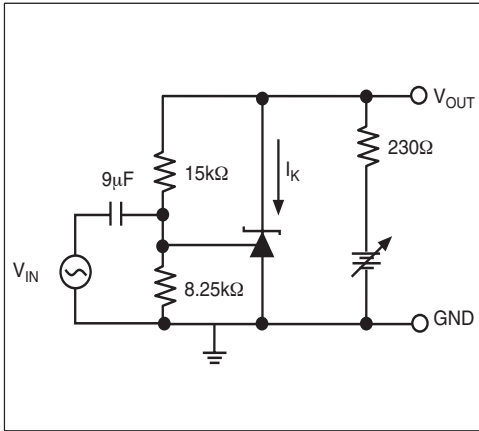


Figure 13. Test Circuit for Gain and Phase Frequency Response

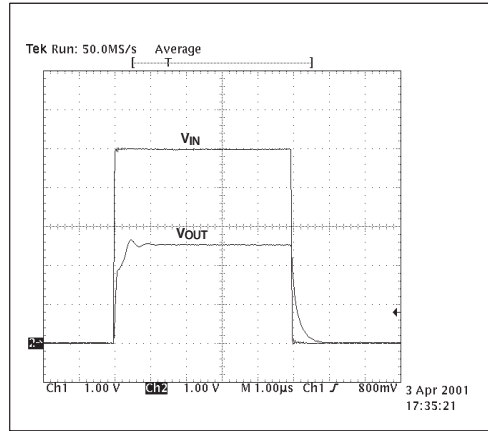


Figure 14. Frequency = 100kHz, $I_K = 10mA, T_A = 25^\circ C$

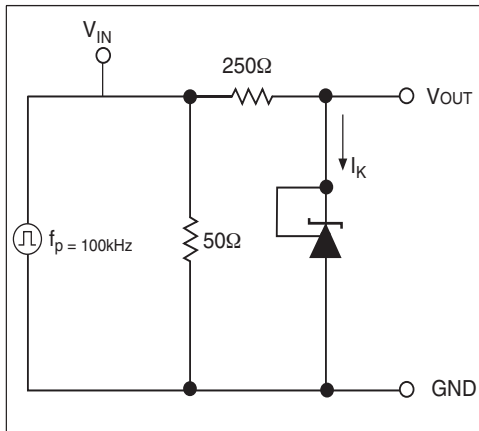


Figure 15. Test Circuit for Pulse Response

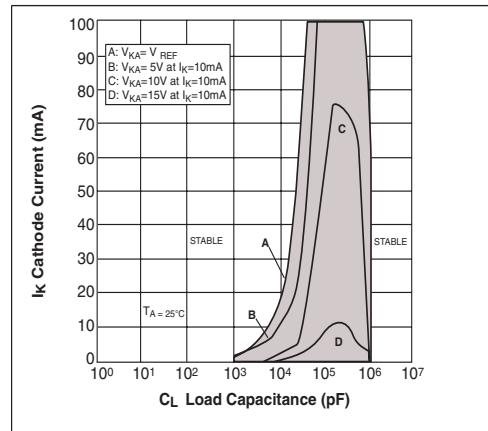


Figure 16. Stability Boundary Conditions

TYPICAL PERFORMANCE CHARACTERISTICS

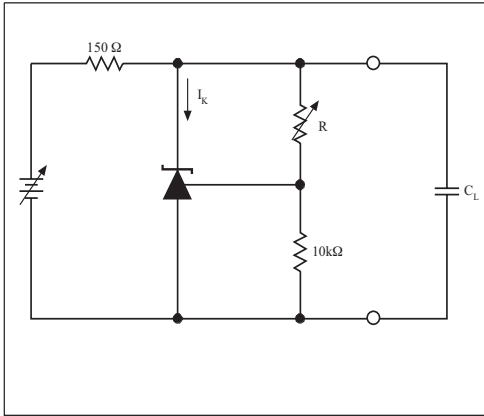


Figure 17. Test Circuit for Stability

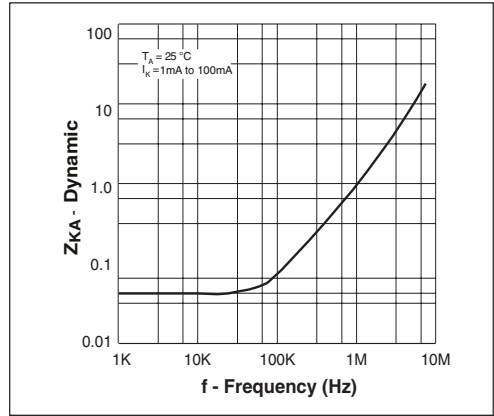


Figure 18. Dynamic Output Impedance $T_A = 25^\circ\text{C}$, $I_k = 1$ to 100mA

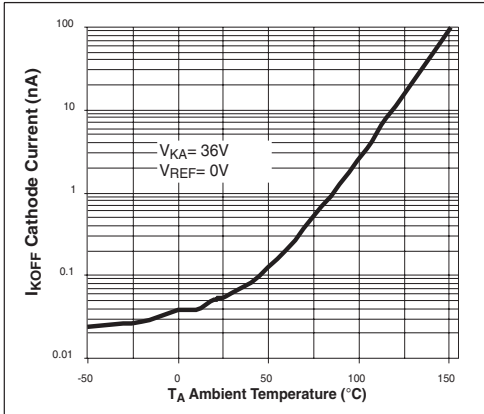


Figure 19. Off State Leakage

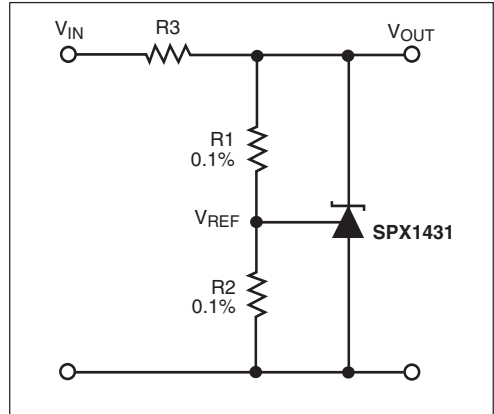


Figure 20. Shunt Regulator $V_{OUT} = (1 + R1/R2)V_{REF}$

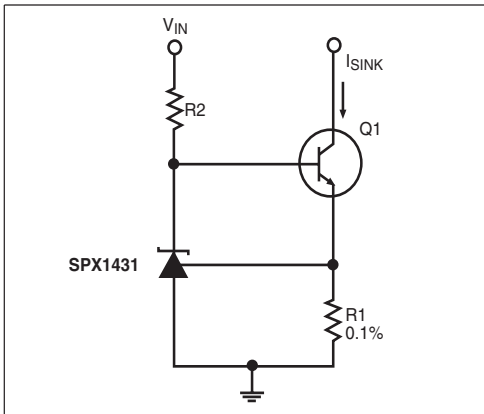


Figure 21. Constant Current, Sink, $I_{SINK} = V_{REF}/R1$

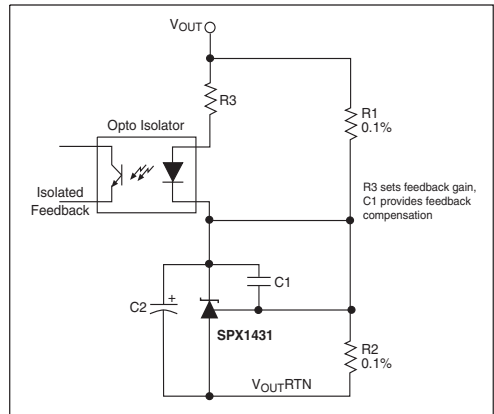


Figure 22. Reference Amplifier for Isolated Feedback in Off-Line DC-DC Converters

TYPICAL PERFORMANCE CHARACTERISTICS

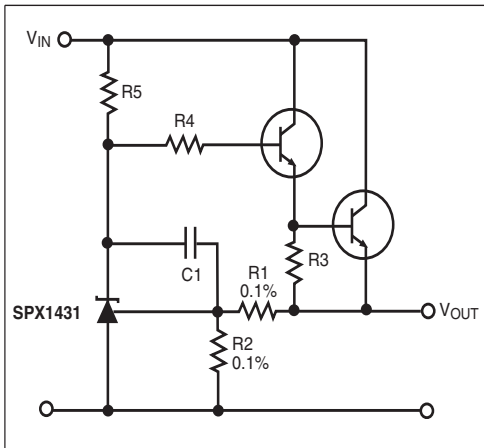


Figure 23. Precision High Current Series Regulator

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

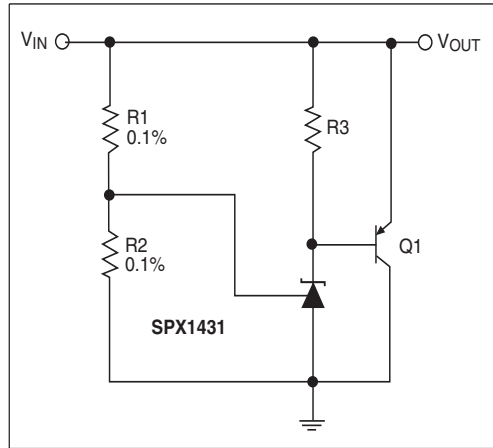


Figure 24. High Current Shunt Regulator

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

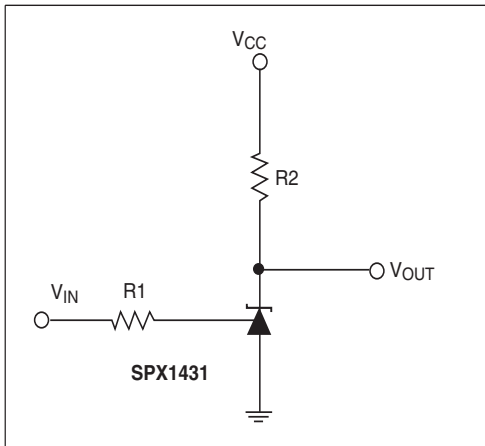
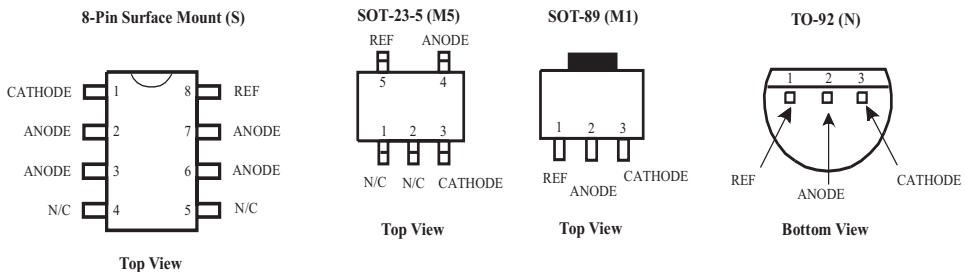


Figure 25. Single Supply Comparator with Temperature Compensated Threshold. V_{IN} threshold = 2.5V

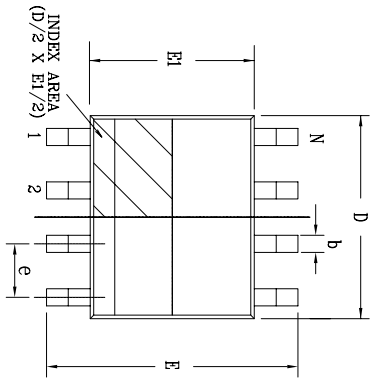
* Resistor values are chosen such that the effect to I_{REF} is negligible .

PACKAGE PINOUTS

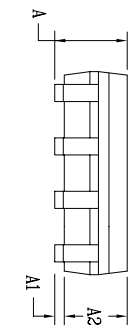


REVISION HISTORY			
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A	DRAWING ORIGINATION	08/16/05	JL
B	DRAWING FORMAT MODIFICATION	07/19/06	JL

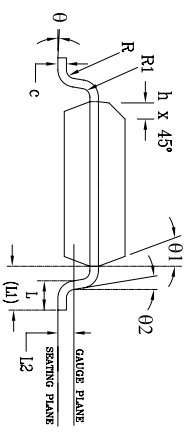
8 Pin SOICN		JEDEC MS-012		Variation AA		
SYMBOLS	DIMENSIONS IN MM (Control Unit)			DIMENSIONS IN INCH (Reference Unit)		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.35	—	1.75	0.053	—	0.069
A1	0.10	—	0.25	0.004	—	0.010
A2	1.25	—	1.65	0.049	—	0.065
b	0.31	—	0.51	0.012	—	0.020
c	0.17	—	0.25	0.007	—	0.010
E	6.00 BSC			0.236 BSC		
E1	3.90 BSC			0.154 BSC		
e	1.27 BSC			0.050 BSC		
h	0.25	—	0.50	0.010	—	0.020
L	0.40	—	1.27	0.016	—	0.050
L1	1.04 REF			0.041 REF		
L2	0.25 BSC			0.010 BSC		
R	0.07	—	—	0.003	—	—
R1	0.07	—	—	0.003	—	—
θ	0°	—	8°	0°	—	8°
θ1	5°	—	15°	5°	—	15°
θ2	0°	—	—	0°	—	—
D	4.90 BSC			0.193 BSC		
N	8			8		




Top View



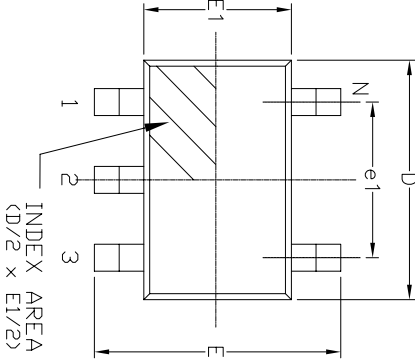
Side View



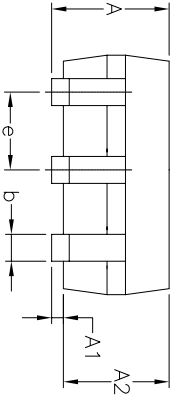
Front View

		SIPLEX CORPORATION	
Packaging Approval:		Drawing No:	
By: JL	Date: 07/19/06	Revision: B	Sheet: 1 OF 1

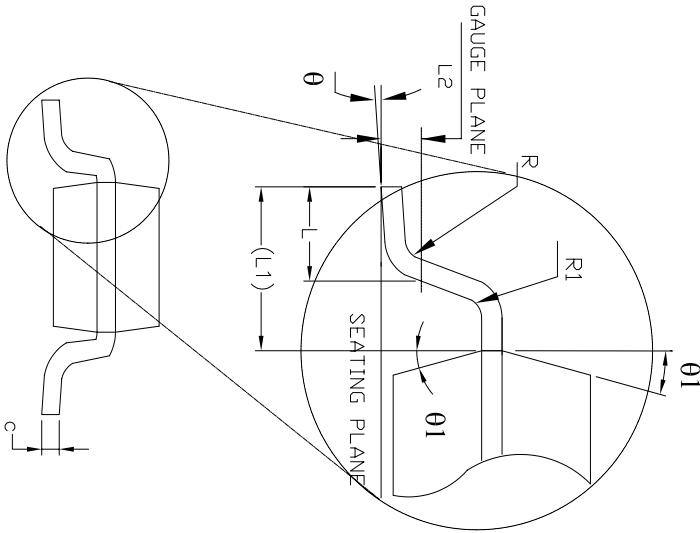
Top View



Side View




Front View

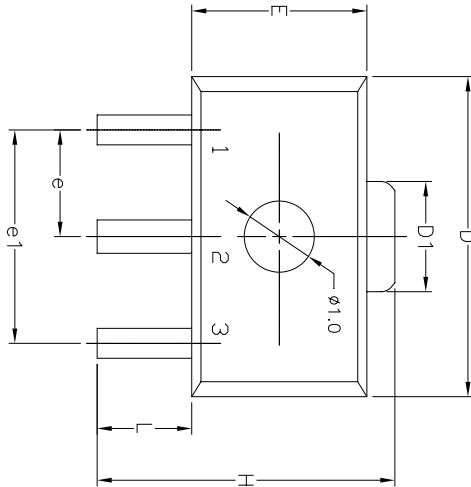


REVISION HISTORY			
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B	DRAWING FORMAT MODIFICATION	07/25/06	JL

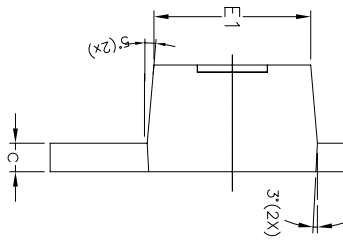
5 Pin SOT-23 JEDEC MO-178 Variation AA		DIMENSIONS IN MM		DIMENSIONS IN INCH	
SYMBOLS	MIN	NOM	MAX	MIN	MAX
A	—	1.45	—	—	0.057
A1	0.00	0.15	0.000	—	0.006
A2	0.90	1.15	1.30	0.036	0.045
b	0.30	—	0.50	0.012	—
c	0.08	—	0.22	0.003	—
D	—	2.90 BSC	—	—	0.115 BSC
E	—	2.80 BSC	—	—	0.111 BSC
E1	—	1.60 BSC	—	—	0.063 BSC
e	—	0.95 BSC	—	—	0.038 BSC
e1	—	1.90 BSC	—	—	0.075 BSC
L	0.30	0.45	0.60	0.012	0.018
L1	—	0.60 REF	—	—	0.024 REF
L2	—	0.25 BSC	—	—	0.010 BSC
R	0.10	—	—	0.004	—
R1	0.10	—	0.25	0.004	—
theta	0°	4°	8°	0°	4°
theta1	5°	10°	15°	5°	10°
N	—	5	—	—	5


SIPEX CORPORATION
 5 PIN SOT-23 PACKAGE OUTLINE
 Packaging Approval: _____ Drawing No: 5-PIN SOT-23
 By: JL Date: 07/25/06 Revision: B Sheet: 1 OF 1

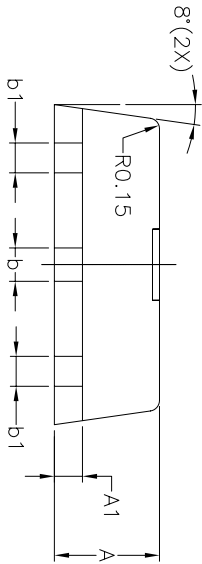
Top View



Front View




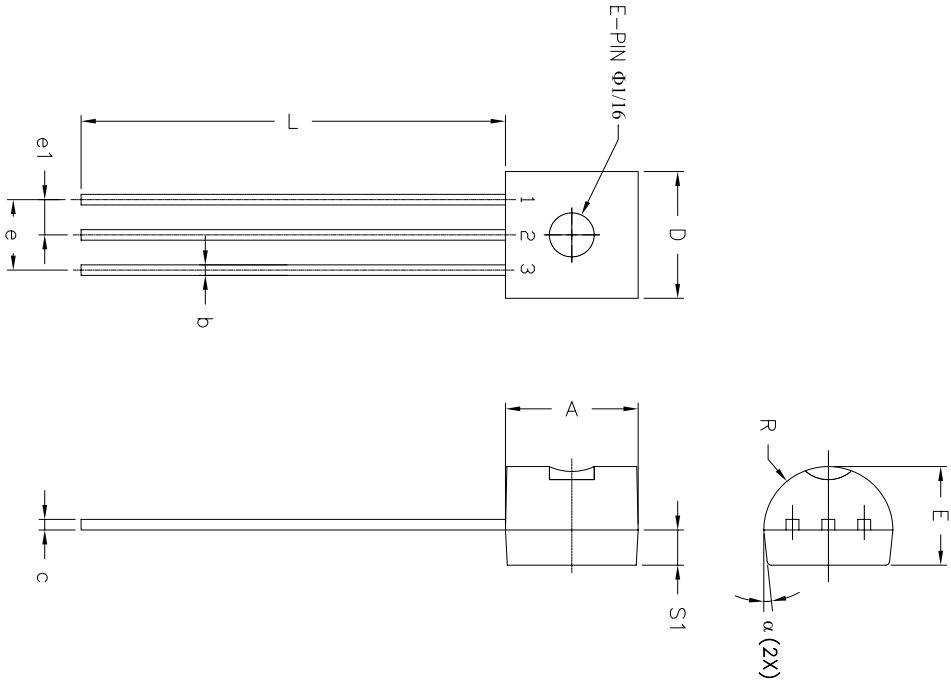
Side View



REVISION HISTORY			
REV.	DISCRIPTION	DATE	APP'D
A	DRAWING ORIGINATION	02/02/06	JL
B	DRAWING FORMAT MODIFICATION	09/11/06	JL

3 Pin SOT-89 JEDEC TO-243 Variation AA							
SYMBOLS	DIMENSIONS IN MM (Control Unit)			DIMENSIONS IN INCH (Reference Unit)			
	MIN	NOM	MAX	MIN	NOM	MAX	
A	1.40	1.50	1.60	0.055	0.059	0.063	
A1	0.30	0.40	0.50	0.011	0.015	0.019	
b	0.44	0.47	0.56	0.017	0.018	0.022	
b1	0.36	0.42	0.48	0.014	0.016	0.019	
c	0.35	0.40	0.44	0.014	0.015	0.017	
D	4.40	4.50	4.60	0.173	0.177	0.181	
D1	1.62	1.60	1.83	0.064	0.062	0.072	
E	2.29	2.50	2.60	0.090	0.098	0.102	
E1	2.13	—	2.29	0.084	—	0.090	
e	1.50 BSC			0.059 BSC			
e1	3.00 BSC			0.118 BSC			
H	3.94	—	4.25	0.155	—	0.167	
L	0.89	—	1.20	0.035	—	0.047	
N	3			3			

		SIPEX CORPORATION	
Packaging Approval:	Date:	Drawing No.:	Revision:
By: JL	09/11/06	3-PIN SOT-89	B
		Sheet:	1 OF 1



3 Pin TO-92 JEDEC TO-226-AA				
SYMBOLS	DIMENSIONS IN INCH (Control Unit)		DIMENSIONS IN MM (Reference Unit)	
	MIN	MAX	MIN	MAX
A	0.170	0.210	4.32	5.33
b	0.014	0.020	0.36	0.51
c	0.016	0.022	0.41	0.55
D	0.175	0.205	4.45	5.20
E	0.125	0.165	3.18	4.19
e	0.095	0.105	2.42	2.66
e1	0.045	0.055	1.15	1.39
L	0.500	0.610	12.70	15.49
R	0.045	0.095	2.16	2.41
S1	0.045	0.060	1.14	1.52
α	4°	6°	4°	6°
N	3		3	

REVISION HISTORY			
REV.	DESCRIPTION	DATE	APP'D
A	DRAWING ORIGINATOR	09/23/05	JL
B	DRAWING FORMAT MODIFICATION	09/15/06	JL

		SIPEX CORPORATION	
Packaging Approval:		3 PIN TO-92 PACKAGE OUTLINE	
Bpr: JL	Date: 08/15/06	Drawing No:	3-PIN TO-92
Revision: B		Sheet:	1 OF 1

Part Number	Package Code	RoHS	Status	Pack Quantity
SPX1431M1	SOT-89-3		Active	Bulk
SPX1431M1/TR	SOT-89-3		Active	2500 Tape & Reel
SPX1431M1-L	SOT-89-3	▪	Active	Bulk
SPX1431M1-L/TR	SOT-89-3	▪	Active	2500 Tape & Reel
SPX1431M5	SOT-23-5		EOL	Bulk
SPX1431M5/TR	SOT-23-5		EOL	2500 Tape & Reel
SPX1431M5-L	SOT-23-5	▪	EOL	Bulk
SPX1431M5-L/TR	SOT-23-5	▪	EOL	2500 Tape & Reel
SPX1431N	TO-92		EOL	Bulk
SPX1431N/TR	TO-92		OBS	2000 Tape & Reel
SPX1431N-L	TO-92	▪	EOL	Bulk
SPX1431N-L/TR	TO-92	▪	EOL	2000 Tape & Reel
SPX1431S	NSOIC8		EOL	Bulk
SPX1431S/TR	NSOIC8		EOL	2500 Tape & Reel
SPX1431S-L	NSOIC8	▪	EOL	Bulk
SPX1431S-L/TR	NSOIC8	▪	EOL	2500 Tape & Reel



Sipex Corporation

Headquarters and
Sales Office

233 South Hillview Drive
Milpitas, CA 95035
TEL: (408) 934-7500
FAX: (408) 935-7600

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru