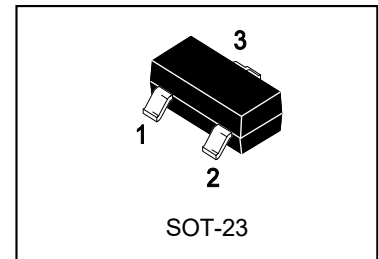


# Programmable Precision Reference

## S-LR432XXTLT1G

### DESCRIPTION

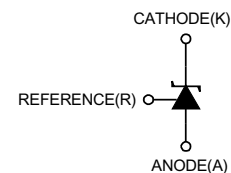
The S-LR432ATLT1G is an automotive three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between VREF (approximately 1.24V) and 20V with two external resistors. It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.



1: Ref; 2: Cathode; 3: Anode

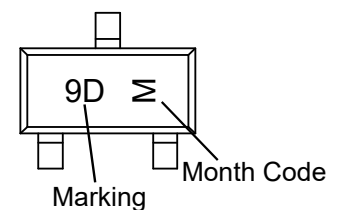
### FEATURES

- Precise Reference Voltage to 1.24V/1.25V
- Guaranteed 0.5%/1.0% Reference Voltage Tolerance
- Sink Current Capability, 80µA to 100mA
- Quick Turn-on
- Adjustable Output Voltage,  $V_o = V_{REF}$  to 20V
- 0.2Ω Typical Output Impedance
- ESD HBM 4500V
- We declare that the material of product is RoHS compliant and Halogen Free.
- S- prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q100 qualified and PPAP capable.

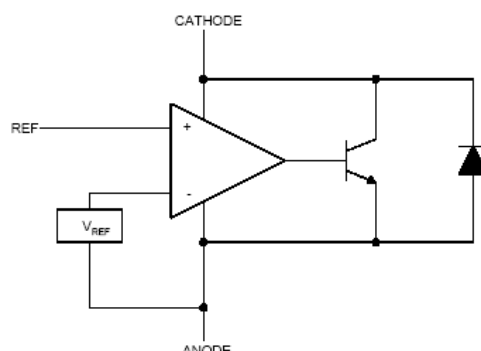


### ORDERING INFORMATION

Device	Marking	RanK	Vref(V)	Shipping
S-LR432ATLT1G	9D	1.0%	1.24	3000 /Tape&Reel
S-LR432BTLT1G	9E	0.5%	1.24	3000 /Tape&Reel
S-LR432APTLT1G	9F	1.0%	1.25	3000 /Tape&Reel
S-LR432BPTLT1G	9G	0.5%	1.25	3000 /Tape&Reel



### BLOCK DIAGRAM



**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
$T_{opr}$	Operating Ambient Temperature	-40 to 125	°C
$T_j$	Operating Junction Temperature Range	-40 to 150	°C
$T_{stg}$	Storage Temperature Range	-65 to 150	°C

**ELECTRICAL CHARACTERISTICS** (TA= 25°C unless otherwise noted.)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	
$V_{REF}$	Reference Voltage	S-LR432ATLT1G	$V_{KA}=V_{REF}, I_K=10mA$ (Fig. 1) $T_A=25^\circ C$	1.228	1.240	1.252	V
		S-LR432BTLT1G		1.234	1.240	1.246	
	Reference Voltage	S-LR432APTLT1G	$V_{KA}=V_{REF}, I_K=10mA$ (Fig. 1) $T_A=25^\circ C$	1.238	1.250	1.262	
		S-LR432BPTLT1G		1.244	1.250	1.256	
$V_{DEV}$	$V_{REF}$ Temp Deviation	$T_A=full\ range$ $V_{KA}=V_{REF}, I_K=10mA$ (Fig. 1)		10	25	mV	
$\Delta V_{REF}/\Delta V_{KA}$	Ratio of Change in $V_{REF}$ to Change in Cathode Volt	$I_K=10mA, V_{KA}=18V$ to $V_{REF}$ (Fig. 2)		-1	-2.7	mV / V	
$I_{REF}$	Reference Input Current	$I_K=10mA, R_1=10k\Omega$ $R_2=\infty$ (Fig.2)		0.25	0.5	$\mu A$	
$I_{REF(DEV)}$	$I_{REF}$ Temp Deviation	$T_K=full\ range, R_1=10k\Omega,$ $R_2=\infty, I_K=10mA$ (Fig. 2)		0.05	0.3	$\mu A$	
$I_{k(off)}$	Off-state cathode current	$V_{REF}=0\ V, (Fig.3)$ $V_k=18V$		0.04	0.5	$\mu A$	
$Z_{ka}$	Dynamic Output Impedance	$V_{ka}=V_{ref}, I_k=1mA$ to $100mA$ $F \leq 1kHz$ (Fig. 1)		0.2	0.4	$\Omega$	
$I_{K(MIN)}$	Minimum Operating Current	$V_{KA}=V_{REF}$ (Fig. 1)		60	80	$\mu A$	

### TEST CIRCUITS

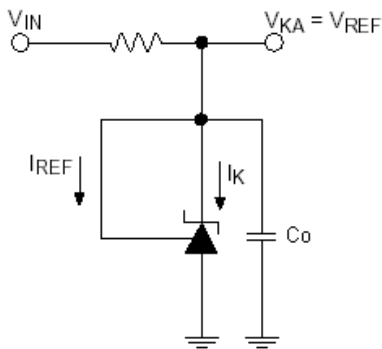


Fig.1 Test Circuit for  $V_{KA}=V_{REF}$ ,  $V_o=V_{KA}=V_{REF}$ ,  $C_o=0.1\mu F$

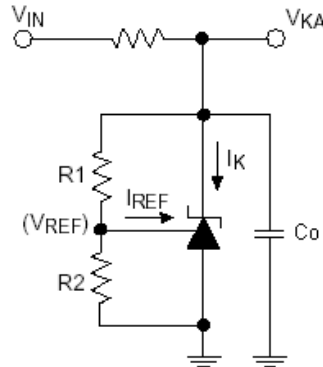


Fig.2 Test Circuit for  $V_{KA}>V_{REF}$ ,  $V_o=V_{KA}=V_{REF}\cdot(1+R_1/R_2)+I_{REF}\cdot R_1$ ,  $C_o=0.1\mu F$

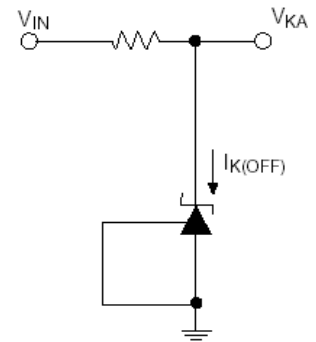


Fig.3 Test Circuit for  $I_{K(OFF)}$

### PERFORMANCE CHARACTERISTIC CURVES

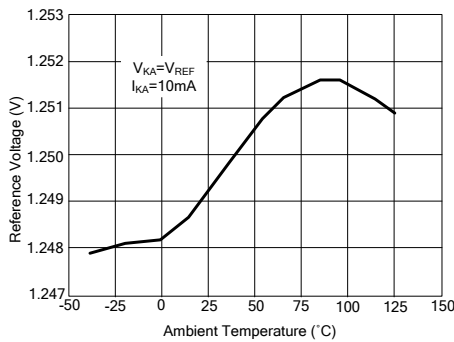


Figure 6. Reference Voltage VS. Ambient Temperature

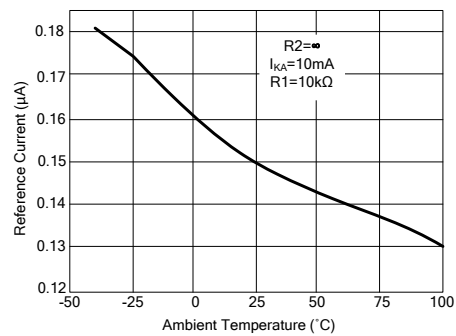


Figure 7. Reference Current VS. Ambient Temperature

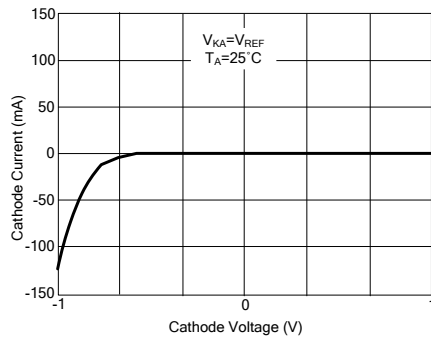


Figure 8. Cathode Current VS. Cathode Voltage

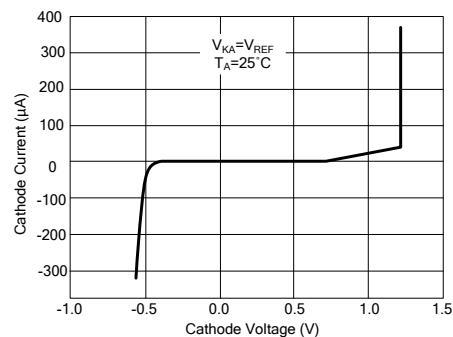


Figure 9. Current VS. cathode Voltage

PERFORMANCE CHARACTERISTIC CURVES (continued)

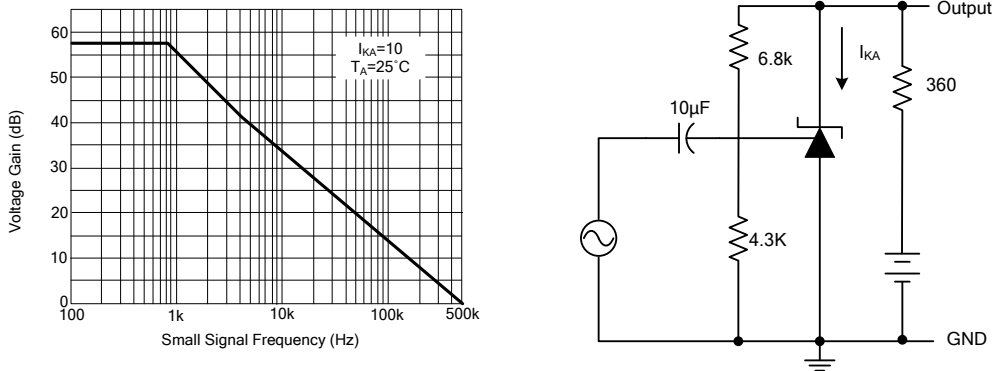


Figure 10. Small Signal Voltage Gain Vs. Frequency

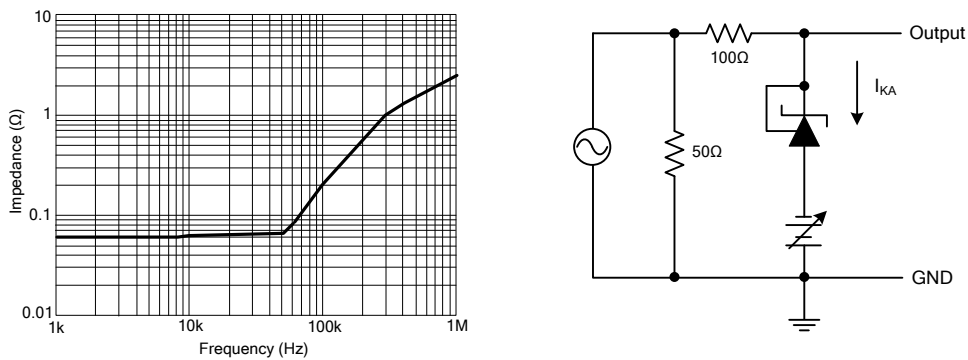


Figure 11. Dynamic Impedance Vs. Frequency

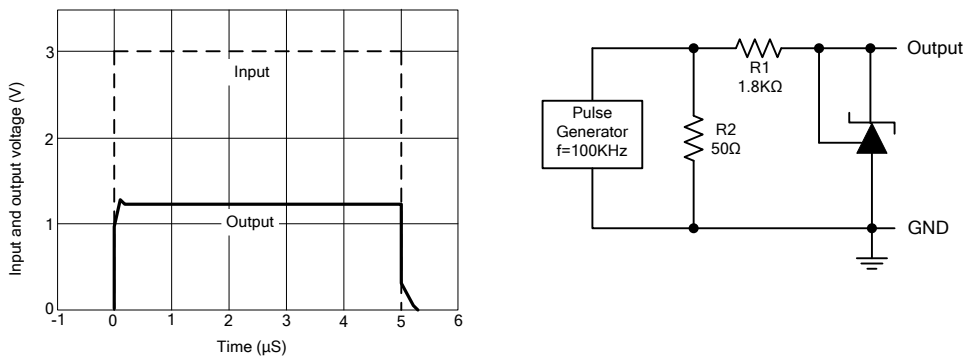


Figure 12. Pulse Response of Input and Output Voltage

PERFORMANCE CHARACTERISTIC CURVES (continued)

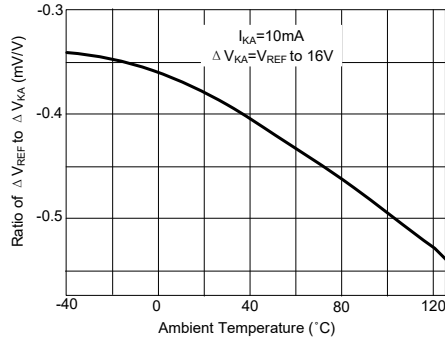


Figure 13. Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage Vs. Ambient Temperature

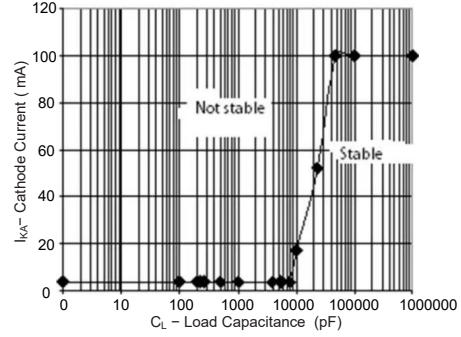


Figure 14. Cathode Current Vs Load Capacitance

TYPICAL APPLICATION CIRCUIT

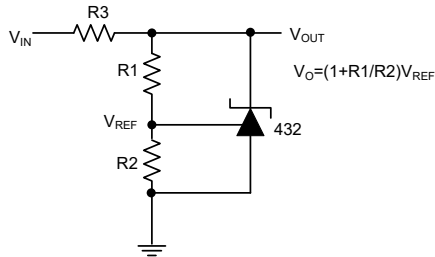


Figure 15. Shunt Regulator

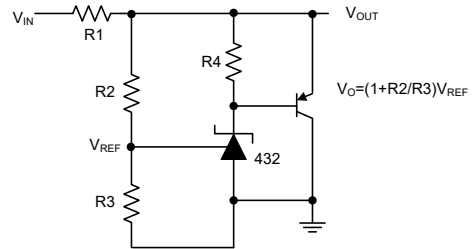


Figure 16. High Current Shunt Regulator

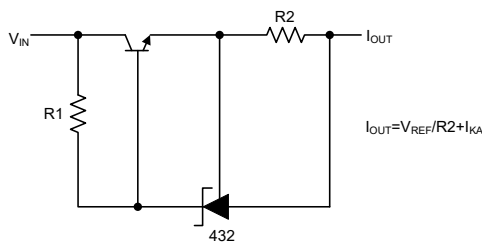


Figure 17. Current Source or Current Limit

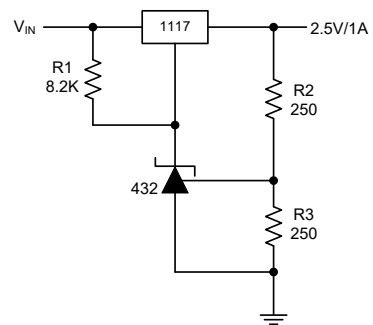


Figure 18. Precision 2.5V/1A Regulator

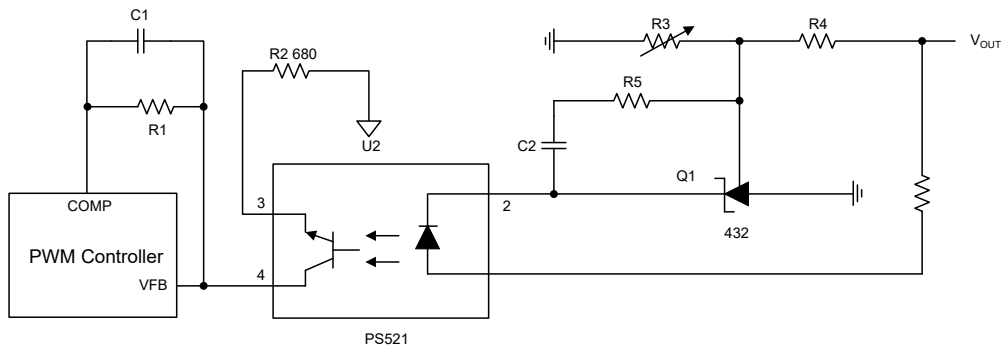
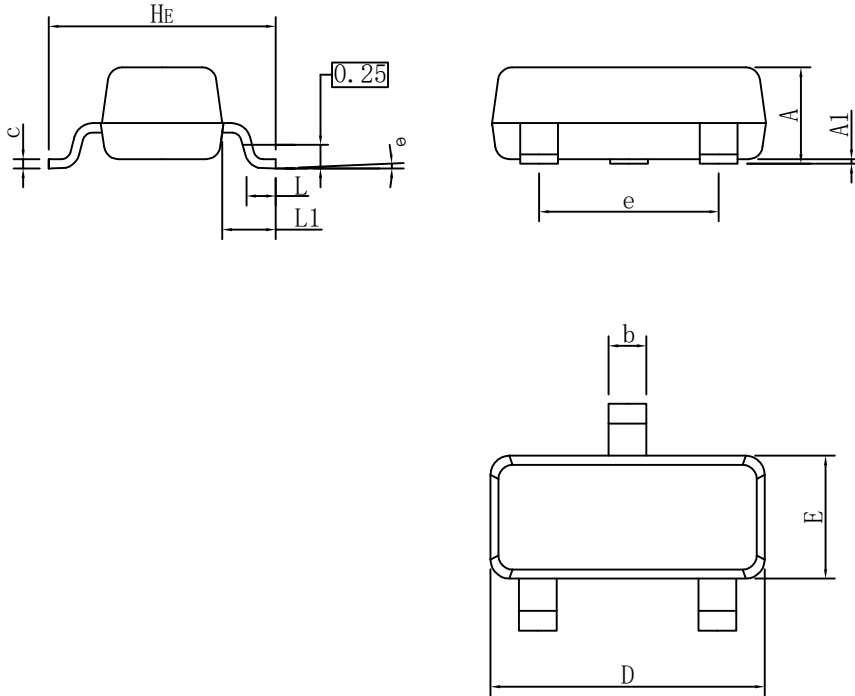


Figure 19. PWM Converter with Reference

**PACKAGE OUTLINE DIMENSIONS**

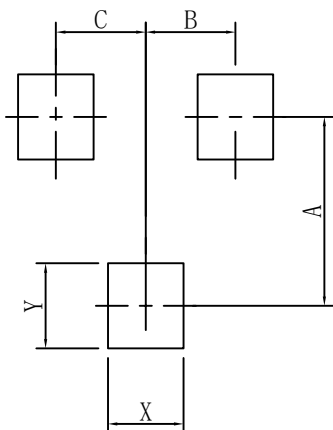


SOT23E			
DIM	MIN	NOR	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.30	0.40	0.50
c	0.10	0.17	0.20
D	2.80	2.90	3.00
E	1.20	1.30	1.40
e	1.80	1.90	2.00
L	0.20	0.40	0.60
L1	0.60REF		
He	2.20	2.40	2.60
θ	0°	-	10°
All Dimensions in mm			

**GENERAL NOTES**

1. Top package surface finish Ra0.4±0.2um
2. Bottom package surface finish Ra0.7±0.2um
3. Side package surface finish Ra0.4±0.2um

**RECOMMENDED PAD LAYOUT**



SOT23E	
DIM	(mm)
X	0.80
Y	0.90
A	2.00
B	0.95
C	0.95

**REVISION HISTORY**

Version	Description	Update by	Update Date
1.0	LRC ORIGINAL RELEASE.	陈帅	2022-11-30
1.1	增加S-LR432BTLT1G规格参数	陈帅	2023-01-05
1.2	增加S-LR432APLT1G和S-LR432BPTLT1G规格参数	陈帅	2023-03-27
1.3	变更 Cathode Current Vs Load Capacitance曲线	陈帅	2023-08-18



**DISCLAIMER**

- Curve guarantee in the specification. The curve of test items with electric parameter is used as quality guarantee. The curve of test items without electric parameter is used as reference only.
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