DATA SHEET

LinearDimensions SEMICONDUCTOR

LND431LV

Low-voltage Adjustable Precision Shunt Regulators

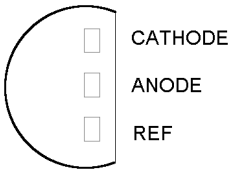
GENERAL DESCRIPTION

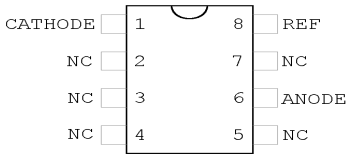
The LND431LV are three-terminal low-voltage adjustable shunt regulators with specified thermal stability. The output voltage may be set to any value between V_{ref} (approximately 1.24V) and 6V with two external resistors. These devices have typical output impedance of 0.2Ω..

FEATURES

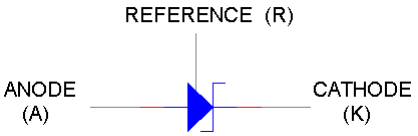
- Equivalent Full-Range Temperature Coefficient 30ppm/ºC
- Temperature Compensated for Operation Over Full Rated Operating Temperature Range
- Adjustable Output Voltage
- Sink Current Capability 1mA to 100mA
- Low (0.2 Ω Typ) Dynamic Output Impedance
- Low Output Noise

PIN CONFIGURATION





SYMBOL



ABSOLUTE MAXIMUM RATINGS

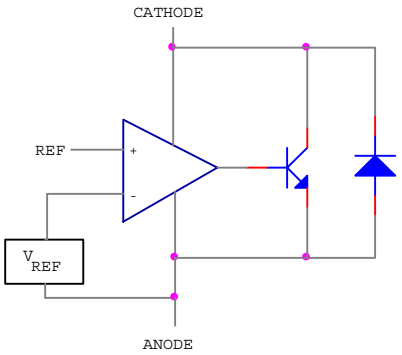
PARAMETER	VALUE	UNITS
Cathode voltage (see note 1)	7	V
Continuous cathode current range	-20 to 20	mA
Reference input current range	-.050 to 3.0	
Operating free-air temperature rage	0 to 70	ºC
Lead temperature 1.6mm from case for 10 seconds	260	

Note1: Voltage values are with respect to the anode terminal unless otherwise noted

RECOMMENDED OPERATING CONDITIONS

PARAMETER	VALUE	MAX	UNITS
Cathode voltage, V_{KA}	V_{ref}	6	V
Cathode current, I_k (for regulation)	.1	15	mA

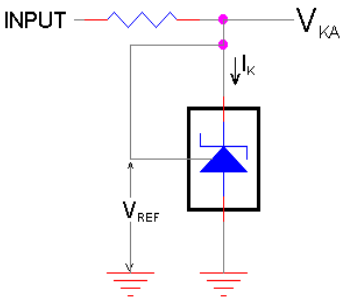
FUNCTIONAL BLOCK DIAGRAM



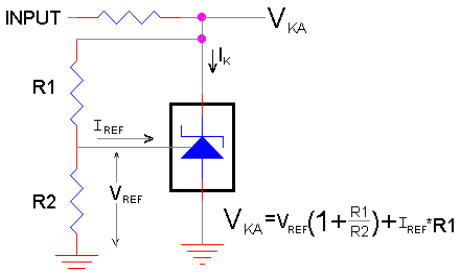
ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CIRCUIT	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Reference input voltage	V_{ref}	1	V_{KA} = V_{ref}, I_k =10mA	1222	1240	1258	mV
Deviation of reference input voltage over full temperature range	$V_{ref(dev)}$	1	V_{KA} = V_{ref}, I_K =10mA, T_A = Full range		4	12	
Ratio of change in reference input voltage to the change in cathode voltage	$\Delta V_{ref}/\Delta V_{KA}$	2	I_K=10 mA ΔV_{KA}=6V to V_{ref}		-1.4	-2.7	mV/V
Reference input current	I_{ref}	2	I_K=10mA, R1=10KΩ, R2=∞ T_A =full range		0.15	0.5	μA
Deviation of reference input current over full temperature range	$I_{ref(dev)}$	2	I_K=10mA, R1=10KΩ, R2=∞ T_A =full range		0.05	0.3	
Minimum cathode current for regulation	I_{min}	1	V_{KA} = V_{ref}		55	80	μA
Off- state cathode current	I_{off}	3	V_{KA} = 6 V, V_{ref}= 0		0.001	1	μA
Dynamic impedance	$\|Z_{KA}\|$	1	V_{KA} =V_{ref}, I_K=1mA to 100mA, f≤ 1KHz		0.2	0.4	Ω

PARAMETER MEASUREMENT INFORMATION

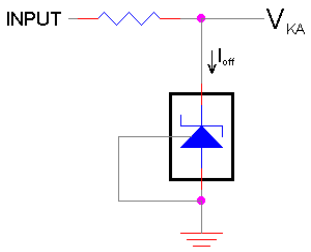


Test Circuit 1. For V_{KA} =V_{REF}



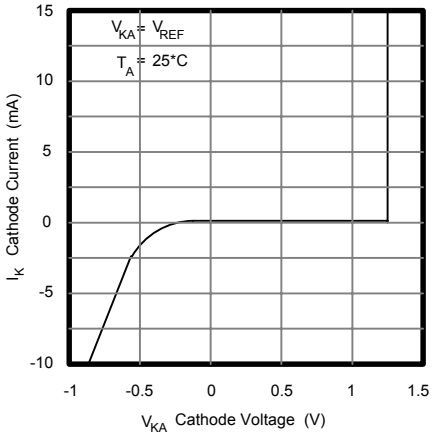
Test Circuit 2. For V_{KA} > V_{REF}

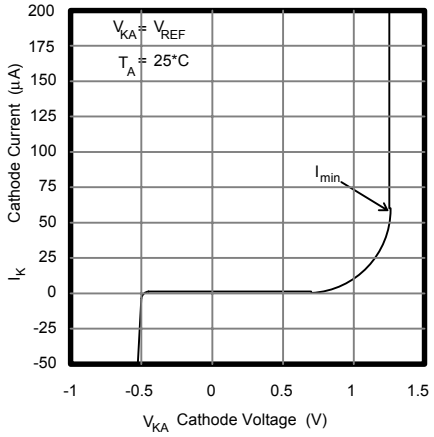
PARAMETER MEASUREMENT INFORMATION



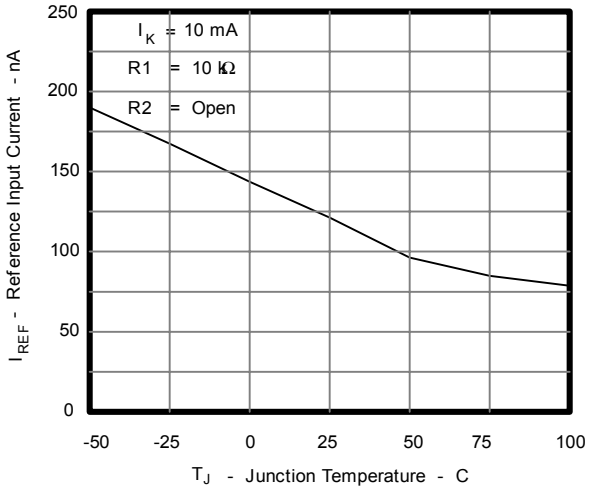
Test Circuit 3. For I_{OFF}

TYPICAL CHARACTERISTICS

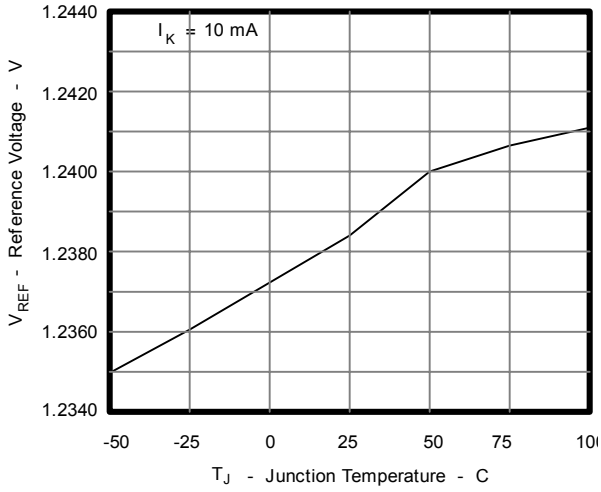




Cathode Current v/s Cathode Voltage

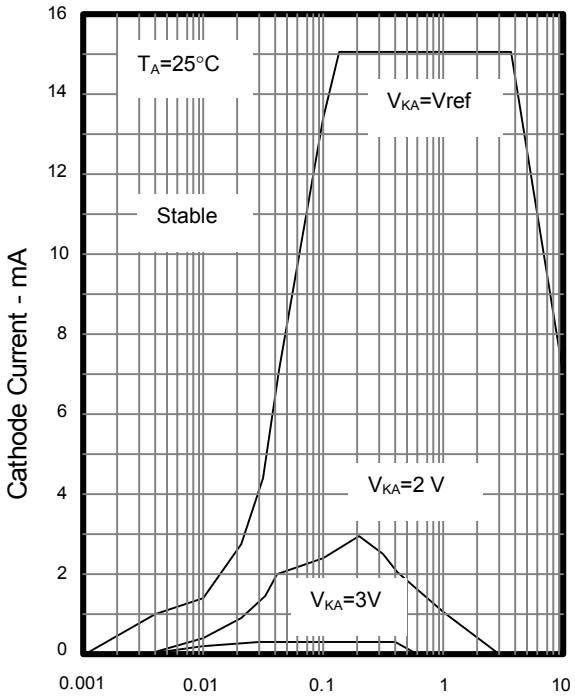


Ref Voltage v/s Junction Temperature

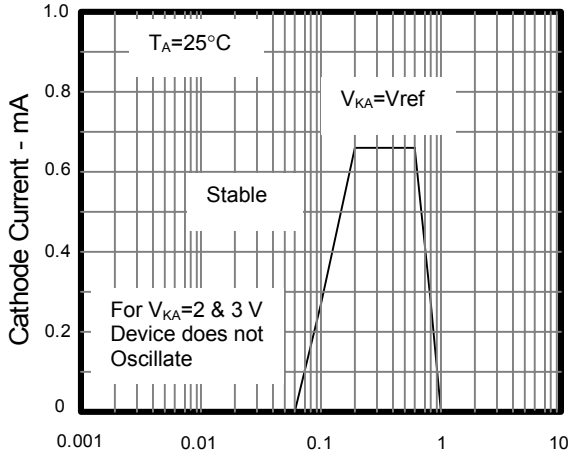


Ref Input Current v/s Junction Temperature

Stability Boundary Condition

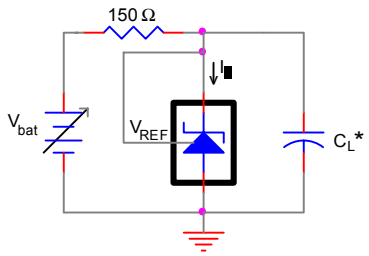


C_L- Load Capacitance - μ F
Ceramic Capacitors

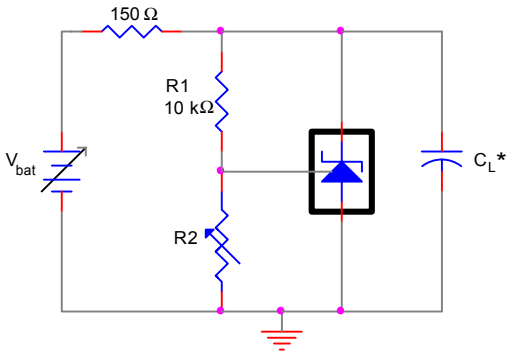


C_L- Load Capacitance - μ F
Tantalum Capacitors

* Stability boundary condition test shows that tantalum capacitors are recommended to minimize the conditions that may cause the device to oscillate.



TEST CIRCUIT FOR $V_{KA} = V_{REF}$



TEST CIRCUIT FOR $V_{KA} = 2\ V,\ 3\ V$

The Areas under the curves represent conditions that may cause the device to oscillate. For V_{KA} =2V and 3V curves, R2 and V_{bat} were adjusted to establish the initial V_{KA} and I_K conditions with C_L =0. Vbat and C_L then were adjusted to determine the ranges of stability.

TYPICAL APPLICATIONS

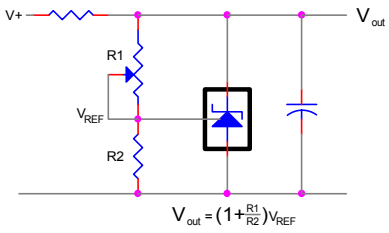


Figure 1. Shunt Regulator

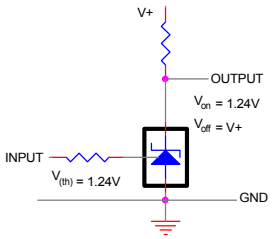


Figure 2. Single-supply comparator
With temperature compensated threshold