



SPX1004

Precision Voltage Reference

FEATURES

- Initial Voltage Tolerance 1004-1.2, $\pm 4\text{mV}$
- Low Dynamic Impedance $0.6\ \Omega$ Max.
- Low Operating Current 1004-1.2, $10\ \mu\text{A}$
- Wide Operating Current Range $10\ \mu\text{A}$ to $20\ \text{mA}$
- Direct Replacement for LT1004 & LM1004

APPLICATIONS

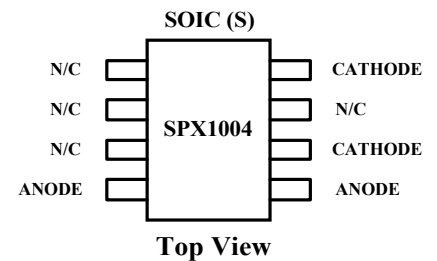
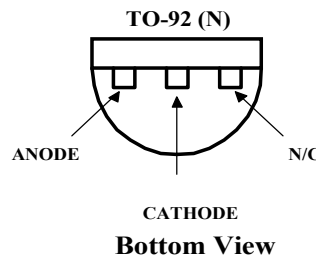
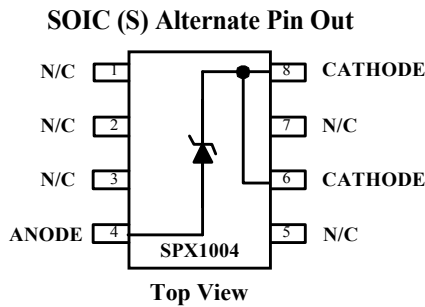
- A/D and D/A Reference
- Reference for 5V Systems
- Digital Voltmeter
- Power Supply Monitor

PRODUCT DESCRIPTION

The SPX1004 is a 2-terminal band-gap precision voltage reference which provides a stable fixed output voltage of 1.2.

The SPX1004 can be used as a pin-to-pin replacement of the LT1004 and LM1004. The SPX1004 is available in packages SOIC-8, TO-92 and Die at the operating temperature range of 0°C to 70°C .

PIN CONNECTIONS



ABSOLUTE MAXIMUM RATINGS

Forward Current.....	30 mA
Reverse Current.....	30 mA
Maximum Junction Temp.....	150°C
Storage Temperature Range.....	-65°C to 150°C
Lead Temperature Range (10 Sec.).....	+300°C

TYPICAL THERMAL RESISTANCES

Package	θ_{JA}	θ_{JC}	Typical Derating
TO-92	160 °C/W	80 °C/W	6.3 mW/°C
8L SOIC	175 °C/W	45 °C/W	5.7 mW/°C

ELECTRICAL CHARACTERISTICS Electrical Characteristics are guaranteed over full junction temperature range (0°C to 70°C). Ambient temperature must be derated based on power dissipation and package thermal characteristics.

Parameter	Test Conditions	SPX1004-1.2V			Units
		Min.	Typ.	Max.	
Reverse Breakdown Voltage	$I_Z = 100 \mu A, T_J = 25^\circ C$	1.231	1.235	1.239	V
	$0^\circ C \leq T_A \leq 70^\circ C$	1.225	1.235	1.245	V
Average Temperature Coefficient	$I_{min} \leq I_Z \leq 20 \text{ mA}$		20		ppm/°C
Minimum Operating Current			4	10	μA
Reverse Breakdown Voltage Change With Current	$I_{min} \leq I_Z \leq 1 \text{ mA}$		0.5	1	mV
	Over Temperature		0.5	1.5	mV
	$1 \text{ mA} \leq I_Z \leq 20 \text{ mA}$		6.5	10	mV
	Over Temperature		6.5	20	mV
Reverse Dynamic Impedance	$I_Z = 100 \text{ mA}, f = 25 \text{ Hz}$		0.2	0.6	Ω
	Over Temperature		1	1.5	Ω
Wide Band Noise	$I_Z = 100 \mu A$				
	$10 \text{ Hz} \leq f \leq 10 \text{ KHz}$		60		μV
Long Term Stability	$I_Z = 100 \mu A$				
	$T_A = 25^\circ C \pm 0.1^\circ C$		20		ppm/kH

Typical Performance Curves

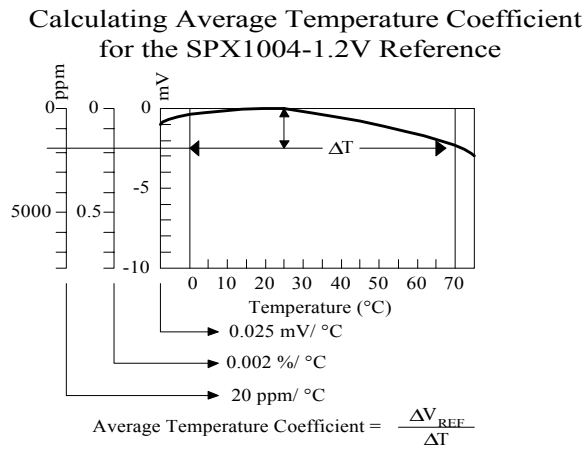


Figure 1

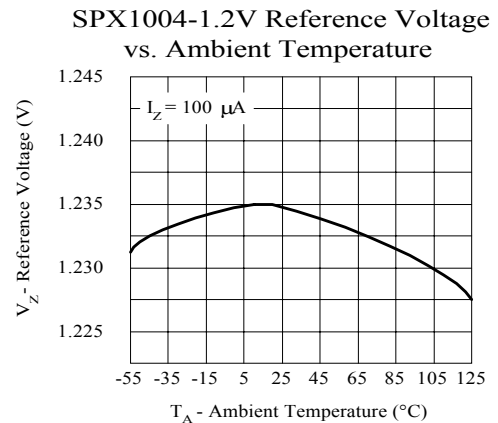
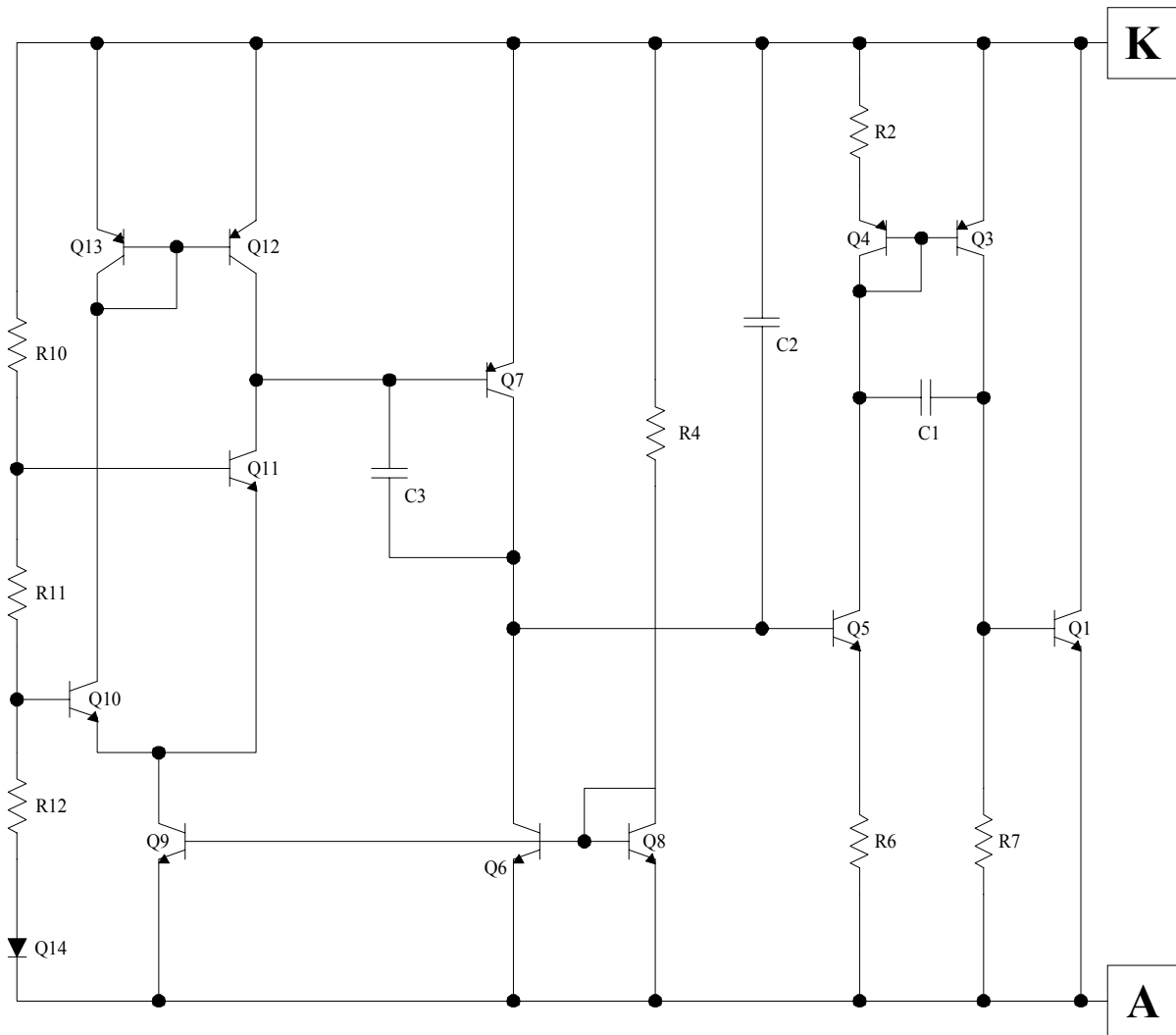


Figure 2

SIMPLIFIED SCHEMATIC



TYPICAL PERFORMANCE CURVES

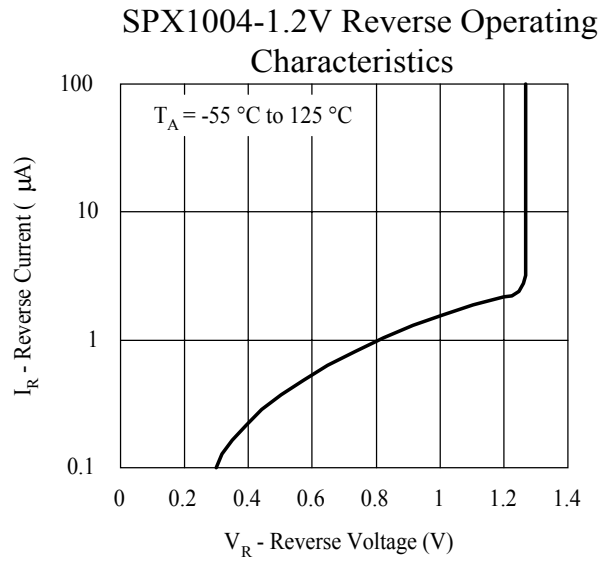


Figure 3

TYPICAL PERFORMANCE CURVES

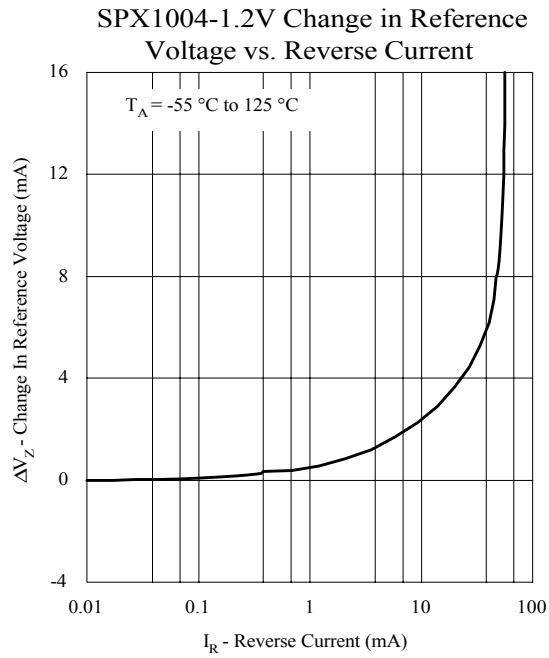


Figure 4

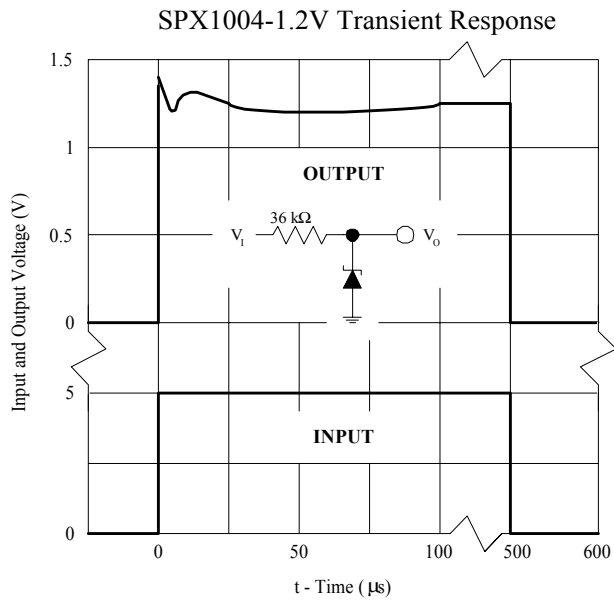


Figure 5

TYPICAL PERFORMANCE CURVES

SPX1004-1.2V Reverse Dynamic Impedance

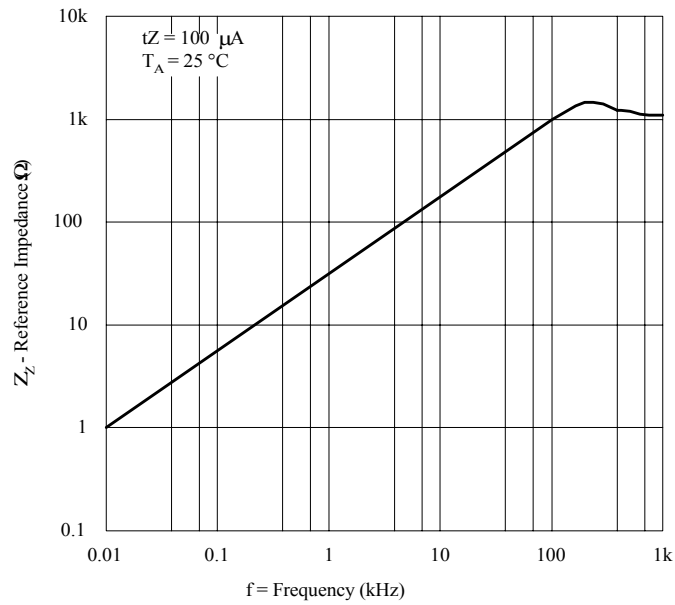


Figure 6

Forward Characteristics

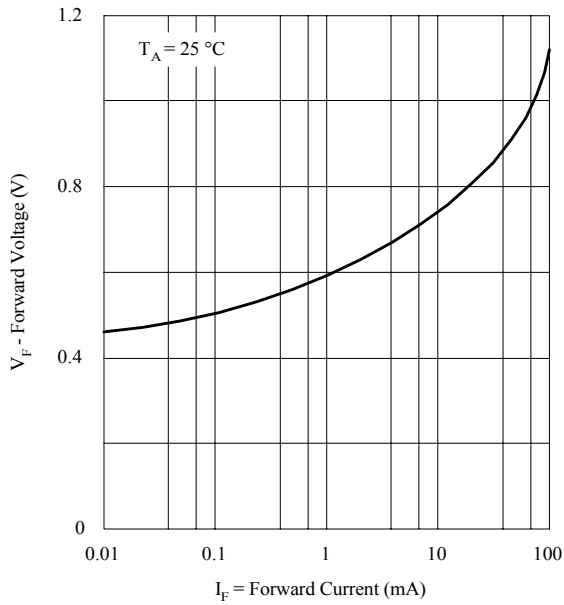


Figure 7

Low Frequency Reverse Dynamic Impedance

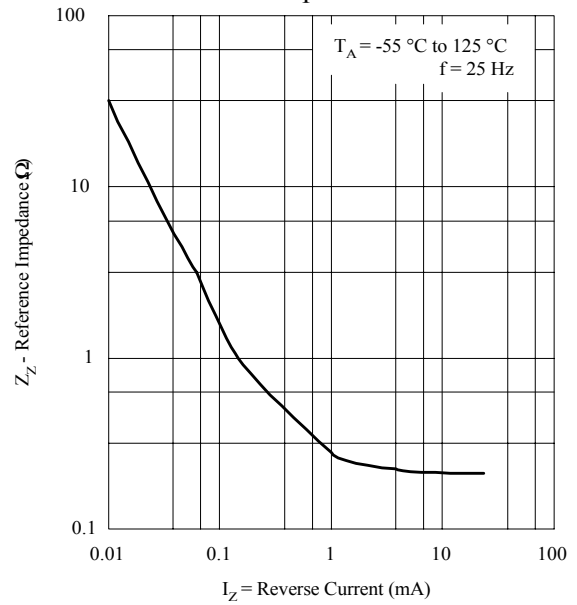


Figure 8

TYPICAL APPLICATIONS

1.235 Reference

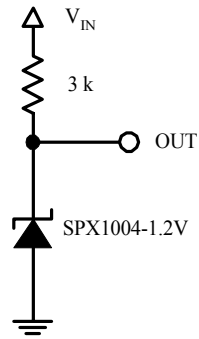


Figure 9

Lead Acid Low Battery Detector

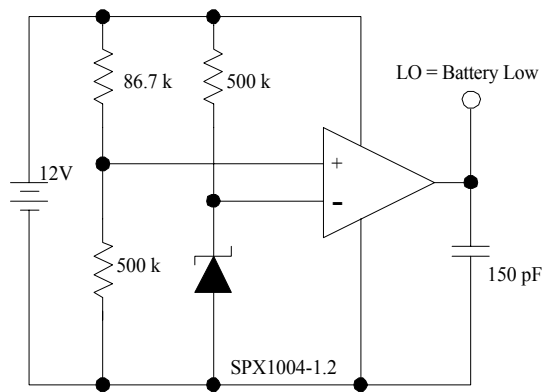


Figure 10

Micropower 10V Reference

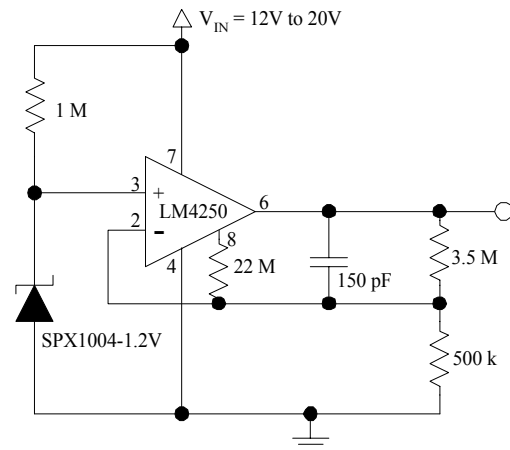


Figure 11

ORDERING INFORMATION

Ordering No.	Temperature Range	Output Voltage	Packages
SPX1004S	0°C to 70°C	1.2V	8 Lead SOIC
SPX1004N	0°C to 70°C	1.2V	3 Lead TO-92



SIGNAL PROCESSING EXCELLENCE

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