

Linear Integrated Systems

LS-5010

FEATURES:

- Replaces . . . MP5010, AD589
 . . . LT1004, LM113
 . . . LTC8069
- Initial accuracy $\pm 4\text{mV}$
- Ultra Low Tempco: $5\text{ppm}/^\circ\text{C}$ max
- Wide Operating Range: $50\mu\text{A} - 10\text{mA}$
- Low Output Impedance: 0.6Ω typical
- Radiation Resistant to 1 mega Rad
- Low noise
- Long-term stability

APPLICATIONS:

- Test and measurement systems
- Current Loop Instrumentation
- Current Source Generation
- ADC and DAC Reference

DESCRIPTION:

The LS-5010 is a two terminal, band-gap voltage reference which provides a fixed operating voltage of 1.23 volts. The LS-5010 has the lowest operating temperature coefficient in the industry and is available with only $5\text{ppm}/^\circ\text{C}$ max.

Optimization of key parameters in the design and processing allows the LS-5010 to remain stable out to 1 mega rad of gamma radiation making it ideal for space and military data acquisition applications.

ABSOLUTE MAXIMUM RATINGS

Maximum Temperature:

Storage Temperature, JT-KT-LT-MT-NT	-65°C to $+200^\circ\text{C}$
Storage Temperature, GN-HN-LN	-65°C to $+150^\circ\text{C}$
Operating Range, JT-KT-LT	-55°C to $+125^\circ\text{C}$
Operating Range, GN-HN-LN-MT-NT	0° to $+70^\circ\text{C}$
Lead Temperature (soldering, 10 sec.)	$+260^\circ\text{C}$

Maximum Power Dissipation:

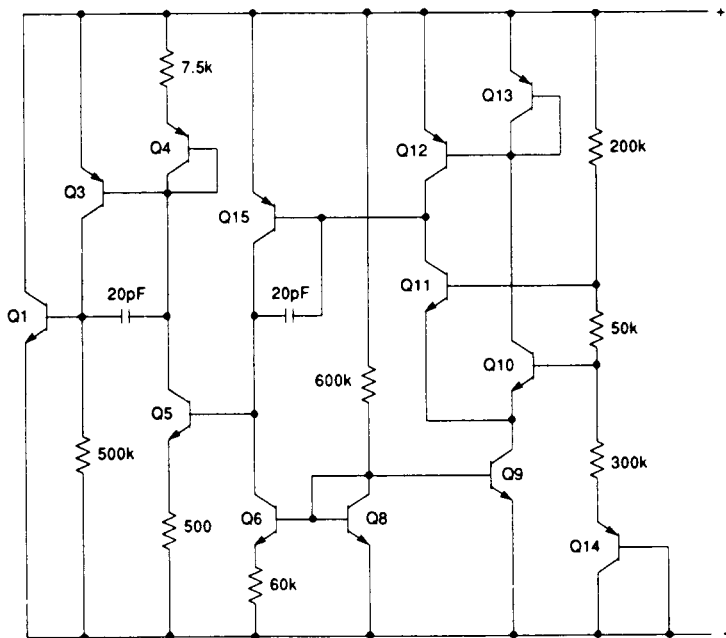
Power Dissipation (free air), JT-KT-LT-MT-NT	750mW
Power Dissipation (free air), GN-HN-LN	600mW
Linear Derating Factor, JT-KT-LT-MT-NT	$4.3\text{mW}/^\circ\text{C}$
Linear Derating Factor, GN-HN-LN	$5\text{mW}/^\circ\text{C}$

Maximum Current:

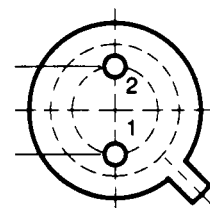
Forward Current	10mA
Reverse Current	10mA

Packaging TO -92 and TO -52

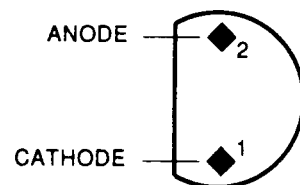
SCHEMATIC DIAGRAM



PIN CONNECTIONS (bottom view)



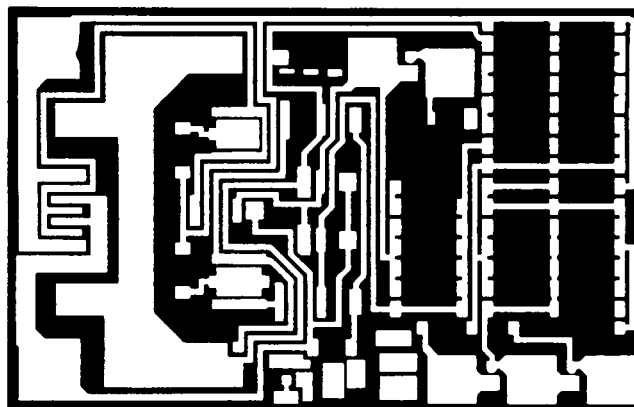
TO-52
(T-Suffix)



TO-92
(N-Suffix)
Plastic

DICE CHARACTERISTICS

Die Size 0.038×0.057 Inch, 2166 sq. mils
(0.965×1.44mm, 1.39 sq. mm)



ELECTRICAL CHARACTERISTICS

CHARACTERISTICS	MIN	TYP	MAX	UNITS	CONDITIONS
Reference Current	50	100	5000	μA	
Reference Voltage	1.20	1.237	1.25	V	$I_R = 100\mu\text{A}$
Output Impedance		.6		Ω	$I_R = 100\mu\text{A}$
		.6	2	Ω	$I_R = 500\mu\text{A}$
RMS Noise Voltage		5		μV	$10\text{Hz} \leq f \leq 10\text{k Hz}$ $I_R = 500\mu\text{A}$
Breakdown Voltage					
Temperature coefficient					
LS-5010 G-J		30	100	ppm/ $^{\circ}\text{C}$	
LS-5010 H-K		25	50	ppm/ $^{\circ}\text{C}$	$50\mu\text{A} \leq I_R \leq 5\text{mA}$
LS-5010 L	10	25		ppm/ $^{\circ}\text{C}$	$T_{\text{min}} \leq T_A \leq T_{\text{max}}$
LS-5010 M	5	10		ppm/ $^{\circ}\text{C}$	
LS-5010 N		3	5	ppm/ $^{\circ}\text{C}$	
Reverse Current	50		1000	μA	To Rated Specs

NOTES:

Optimum performance is obtained at currents below 500 μA .

Stray shunt capacitances should be minimized.

If strays cannot be avoided, a shunt capacitor of a least 1000 pF is recommended.

ORDER INFORMATION

MAX. TEMPCO ppm/ $^{\circ}\text{C}$	TEMP. RANGE	ORDER PART
100	COM	LS-5010GN
50	COM	LS-5010HN
25	COM	LS-5010LN
10	COM	LS-5010MT
5	COM	LS-5010NT
100	MIL	LS-5010JT
50	MIL	LS-5010KT
25	MIL	LS-5010LT