

**ALPHA
SEMICONDUCTOR**

Excellence in Analog Power Products

AS5010

**LOW TEMPCO VOLTAGE REFERENCE
1.23 VOLTS**

FEATURES

- Low drift 5ppm/ $^{\circ}$ C
- Low dynamic impedance 0.6 Ω Typ.
- Operating current 50 μ A to 5mA
- Low power 60 μ W @ I_{in}=50 μ A
- Two terminal "Zener" operation
- Low output tolerance \pm 0.125%
- Low noise 5 μ V p-p Typ.
- Direct Replacements for LM113, ICL8069, AD589, MP5010
- Low cost

APPLICATIONS

- A to D and D to A Converters
- Constant Current Source
- Digital Voltmeter
- Power Supply Monitor
- Precision Regulators

PRODUCT DESCRIPTION

The ALPHA Semiconductor AS5010 is a 2-terminal band-gap precision voltage reference, which provides a stable fixed output voltage of 1.23 volts. ALPHA Semiconductor's design, process, and precise on chip trimming enables us to achieve a low temperature coefficient as low as 5 ppm/ $^{\circ}$ C and \pm 1.25% reference tolerance. The AS5010 is an excellent choice for applications needing low input current between 50 μ A to 5mA, low drift over temperature, low noise, low power, and low cost.

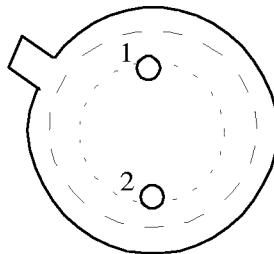
The AS5010 is available in many versions. The AS5010N, M, L, H, G grades are specified for 0 $^{\circ}$ C to +70 $^{\circ}$ C operation, in plastic packages (TO-92) and the AS5010, L, K, J grades are rated for -55 $^{\circ}$ C to +125 $^{\circ}$ C in metal can packages (TO-52). The AS5010 NT and MT grades are specified for 0 $^{\circ}$ C to +70 $^{\circ}$ C operation.

ORDERING INFORMATION

PART NUMBER	MAX TEMPCO ppm/ $^{\circ}$ C	PACKAGE TYPE	TEMP. RANGE
AS5010NT	5	TO-52	COM.
AS5010MT	10	TO-52	COM
AS5010LT	25	TO-52	MIL
AS5010KT	50	TO-52	MIL
AS5010JT	100	TO-52	MIL
AS5010NN	5	TO-92	COM
AS5010MN	10	TO-92	COM
AS5010LN	25	TO-92	COM
AS5010HN	50	TO-92	COM
AS5010GN	100	TO-92	COM

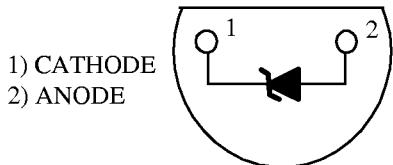
PIN CONNECTION

TO-52
Metal Can Package



Bottom View

TO-92
Plastic Package



Bottom View

ABSOLUTE MAXIMUM RATINGS

Forward Current.....	10 mA	Storage Temperature	-65 to +200°C TO-52 Pkg.
Reverse Current.....	10 mA		-65 to +150°C TO-92 Pkg.
Max Power Dissipation.....	750 mW TO-52 Pkg. 600 mW TO-92 Pkg.		Lead Temperature +260°C
Operating Temperature.....	MIL. TO-52 Pkg. COM. TO-92 Pkg.		

ELECTRICAL CHARACTERISTICS

Electrical Characteristics at Iin = 500µA, and Ta = +25°C unless otherwise noted.

Parameters	Conditions	AS5010NT/NN			AS5010MT/MN			AS5010LN			AS5010HN			Unites
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Output Voltage		1.225		1.245	1.225		1.245	1.220		1.250	1.220		1.250	V
Output Impedance			0.6	2		0.6	2		0.6	2		0.6	2	Ω
Noise Voltage	0.1Hz≤f≤10Hz		5			5			5			5		µV p-p
Tempco	Note 1		3	5			10			25			50	ppm/°C
Turn-On Settling	0.1% of V out		15			15			15			15		µSec
Operating Current	Note 2	0.05		5	0.05		5	0.05		5	0.05		5	mA
Operating Temp. Range		0		70	0		70	0		70	0		70	°C

Parameters	Conditions	AS5010GN			AS5010LT			AS5010KT			AS5010JT			Unites
		Min	Typ	Max										
Output Voltage		1.220		1.250	1.220		1.250	1.220		1.250	1.220		1.250	V
Output Impedance			0.6	2		0.6	2		0.6	2		0.6	2	Ω
Noise Voltage	0.1Hz≤f≤10Hz		5			5			5			5		µV p-p
Tempco	Note 1			100			25			50			100	ppm/°C
Turn-On Settling	0.1% of V out		15			15			15			15		µSec
Operating Current	Note 2	0.05		5	0.05		5	0.05		5	0.05		5	mA
Operating Temp. Range		0		70	-55		125	-55		125	-55		125	°C

Note 1: Three-point measurement guarantees the error band over the specified temperature range.

Note 2: Optimum performance is obtained at currents below 500µ A.