

### FEATURES

- Low Temperature Coefficient
- Wide Operating Current Range: 50 $\mu$ A to 5mA
- Low Output Impedance: 0.6 $\Omega$  Typ.
- Superior Replacement for Other 1.2V References
- No Frequency Compensation Required
- Low Cost

### APPLICATIONS

- Battery Powered Systems
- Instrumentation
- A/D, D/A Converters
- Monitors/ VCR/ TV
- Current sources

### GENERAL DESCRIPTION

The AMS5010 is a two-terminal band-gap voltage reference diode, which provides a fixed 1.22V output voltage. This device features a low output impedance and low temperature coefficient, operating over a 50 $\mu$ A to 5mA current range. The AMS5010 is ideal for usage in battery power instrument application as well as a reference for CMOS A/D converters.

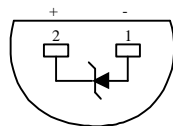
The AMS5010NT, MT, LN, HN, GH grades are specified operational over a temperature range of 0°C to 70°C while AMS5010LT, KT, JT grades are rated over the full -55°C to +125°C temperature range. The AMS5010 is available in TO-92 and TO-52 (metal can) packages.

### ORDERING INFORMATION:

MAX. TEMPCO	PACKAGE TYPE		OPERATING TEMPERATURE RANGE
	TO-92	TO-52	
5ppm/°C	-	AMS5010NT	0°C to 70°C
10ppm/°C	-	AMS5010MT	0°C to 70°C
25ppm/°C	AMS5010LN	-	0°C to 70°C
50ppm/°C	AMS5010HN	-	0°C to 70°C
100ppm/°C	AMS5010GN	-	0°C to 70°C
25ppm/°C	-	AMS5010LT	-55°C to +125°C
50ppm/°C	-	AMS5010KT	-55°C to +125°C
100ppm/°C	-	AMS5010JT	-55°C to +125°C

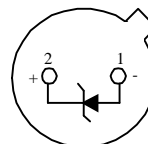
### PIN CONNECTIONS

**TO-92**  
Plastic Package (N)



**Bottom View**

**TO-52**  
Metal Can Package (T)



**Bottom View**

## ABSOLUTE MAXIMUM RATINGS

Reverse Current	10mA	Storage Temperature TO-92 package	-65°C to +150°C
Forward Current	10mA	Storage Temperature TO-52 package	-65°C to +200°C
Operating Temperature Range		Lead Temperature (Soldering 10 sec.)	260°C
NT, MT, LN, HN, GN	0°C to 70°C	Maximum Power Dissipation (at 25°C)	
LT, KT, JT	-55°C to +125°C	TO-52	750mW
		TO-92	600mW

## ELECTRICAL CHARACTERISTICS

Electrical Characteristics at  $I_R = 500 \mu A$ , and  $T_A = +25^\circ C$  unless otherwise specified.

Parameter	Conditions	AMS5010			Units
		Min	Typ	Max	
Reference Voltage	$I_R = 100 \mu A$	1.20	1.220	1.25	V
Reference Current (Note 3)		50	100	5000	$\mu A$
Reverse Current	To rated specs.	50		100	$\mu A$
Dynamic Output Impedance	$I_R = 100 \mu A$		.6		$\Omega$
	$I_R = 500 \mu A$		.6	2	$\Omega$
RMS Noise Voltage (Note 4)	$I_R = 500 \mu A$ , $10Hz \leq f \leq 10kHz$		5		$\mu V$
Temperature Coefficient (Note 5)	$50\mu A \leq I_R \leq 5mA$ $T_{MIN} \leq T_A \leq T_{MAX}$				
AMS5010G – J			30	100	ppm/°C
AMS5010H – K			25	50	ppm/°C
AMS5010L			10	25	ppm/°C
AMS5010M			5	10	ppm/°C
AMS501N			3	5	ppm/°C

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed.

**Note 2:** For elevated temperature operation,  $T_j$  max is  $\leq +150^\circ C$

Thermal Resistance	TO-92	TO-52
$\theta_{JA}$ (junction to ambient)	170°C/W (0.125" leads)	140°C/W

**Note 3:** Optimum performance is obtained at currents below 500 $\mu A$ . For current operation below 200 $\mu A$ , stray shunt capacitances should be limited to 20pF or increased to 1 $\mu F$ . If strays can not be avoided, a shunt capacitor of at least 1000pF is recommended.

**Note 4:** Guaranteed but not 100% production tested. These limits are not used to calculate average outgoing quality levels.

**Note 5:** The average temperature coefficient is defined as the maximum deviation of reference voltage at all measured temperatures between the operating  $T_{MAX}$  and  $T_{MIN}$ , divided by  $T_{MAX} - T_{MIN}$ .