



MP5010

Very Low Tempco
1.2 Volt Reference

FEATURES

- Tested and Guaranteed as low as 5 ppm/°C Max Tempco
- Wide Operating Range: 50 μ A - 5 mA
- Low Output Impedance: 0.6 Ω Typical

BENEFITS

- Lower Sensitivity to Capacitive Loading
- No Frequency Compensation Required
- Accurate Stable Reference over Temp

APPLICATIONS

- Building Block for Custom References
- Low Current Voltage Reference for Hand Held Multimeters
- Voltage Reference for Video Flash Converters
- Voltage Reference for D/A and A/D Converters
- Precision Analog Control Circuits

GENERAL DESCRIPTION

The MP5010 is a 2 terminal, band-gap voltage reference which provides a fixed 1.2V nominal output voltage. The design and process enables us to provide guaranteed tempcos as low as 5 ppm/°C max. We provide this with a wide input current

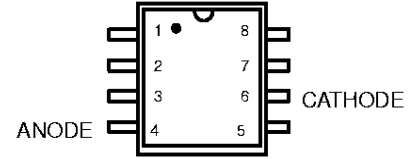
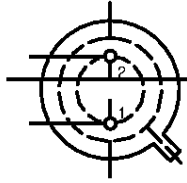
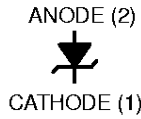
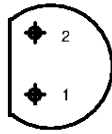
range of 50 μ A to 5mA, lower sensitivity to load capacitances, and a low output impedance of 0.6 Ω (typ).

Specified for operation over the commercial (0 to +70°C), industrial (-40 to +85°C), and military (-55 to +125°C) temperature ranges, the MP5010 is available in Plastic TO-92, Metal Can TO-52, and Surface Mount (SOIC) packages.

ORDERING INFORMATION

Part No.	Max Tempco	Temperature Range	Package Type
MP5010GN	100	-40 to +85°C	Plastic TO-92
MP5010HN	50	-40 to +85°C	Plastic TO-92
MP5010LN	25	-40 to +85°C	Plastic TO-92
MP5010MN	10	0 to 70°C	Plastic TO-92
MP5010JT	100	-55 to +125°C	TO-52
MP5010KT	50	-55 to +125°C	TO-52
MP5010LT	25	-55 to +125°C	TO-52
MP5010MT	10	-40 to +85°C	TO-52
MP5010NT	5	-40 to +85°C	TO-52
MP5010JR	100	-40 to +85°C	SO-8
MP5010MR	10	-40 to +85°C	SO-8

PIN CONFIGURATIONS



TO-92 PLASTIC

TO-52 (Metal Can)

8 Lead SOIC (0.150'')

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	25°C			Tmin to Tmax		Units	Test Conditions/Comments
		Min	Typ	Max	Min	Max		
Reference Current	I_R	50		5000			μA	
Reference Voltage	V_{REF}	1.200	1.220	1.250			V	$I_R = 500\mu A$
Output Impedance ¹	Z_{OUT}		.6	2			Ω	$I_R = 500\mu A$
RMS Noise Voltage ¹			5				μV	$10Hz \leq f \leq 10 kHz$ $I_R = 500\mu A$
BREAKDOWN VOLTAGE								
TEMPERATURE COEFFICIENT								
G-S			30	100			ppm/°C	$I_R = 500\mu A$
H-K			25	50				$T_{min} \leq T_A \leq T_{max}$
L			10	25				
M			5	10				
N			3	5				
Reverse Current		50		5000			μA	To rated specs

ABSOLUTE MAXIMUM RATINGS^{1, 2, 3}

Maximum Temperature

Storage (JT, KT, LT, MT, NT)	-65 to +200°C
Storage (GN, HN, LN, JR, GR, RR, LR)	-65 to +125°C
Operating Range (JT, KT, LT)	-55 to +125°C
Operating Range (GN, HN, LN, NT, MT, JR, RR, LR)	-40 to +85°C
Operating Range (MN, GR)	0 to 70°C

Lead Temperature (soldering, 10 sec) +260°C

Maximum Power Dissipation (all packages) (2)

Power Dissipation (25°C) 13mW

Maximum Current

Forward Current 10mA

Reverse Current 10mA

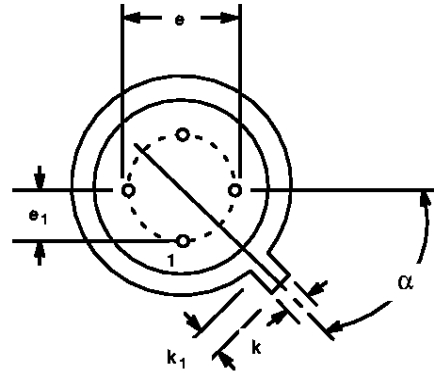
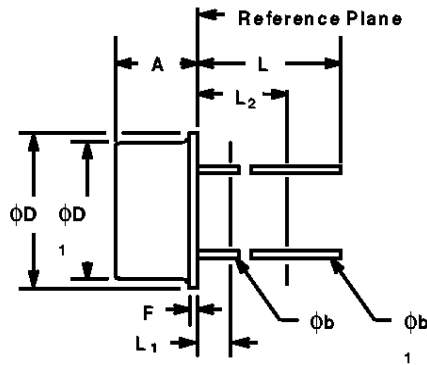
NOTES:

¹ Guaranteed, not tested.

² Limited by max forward/reverse current.

³ Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation at or above this specification is not implied. Exposure to above maximum rating conditions for extended periods may affect device reliability.

2 LEAD TO-52 METAL CAN
TM2

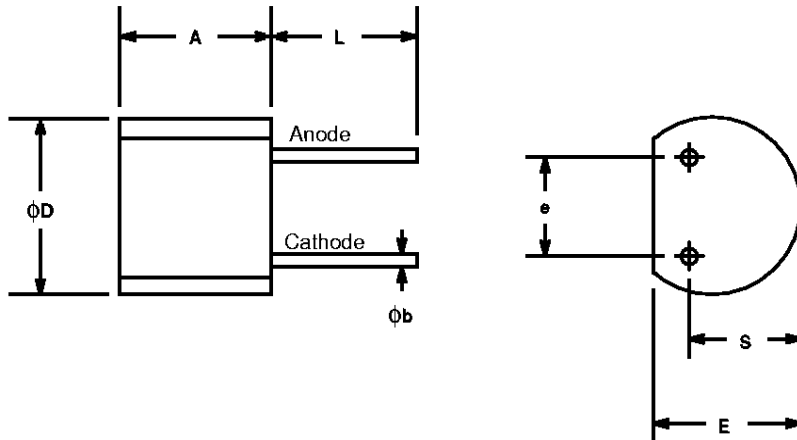


SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.115	0.150	2.92	3.81	—
ϕ_b	0.016	0.019	0.406	0.483	1, 5, 3
ϕ_{b1}	0.016	0.021	0.406	0.533	1, 5, 3
ϕ_D	0.209	0.230	5.31	5.84	—
ϕ_{D1}	0.178	0.195	4.52	4.95	—
e	0.100 BSC		2.54 BSC		3
e ₁	0.050 BSC		1.27 BSC		3
F	—	0.030	—	0.762	—
k	0.036	0.046	0.914	1.17	—
k ₁	0.028	0.048	0.711	1.22	2
L	0.500	0.750	12.70	19.05	1
L ₁	—	0.050	—	1.27	1
L ₂	0.250	—	6.35	—	1
α	45° BSC		45° BSC		3

NOTES

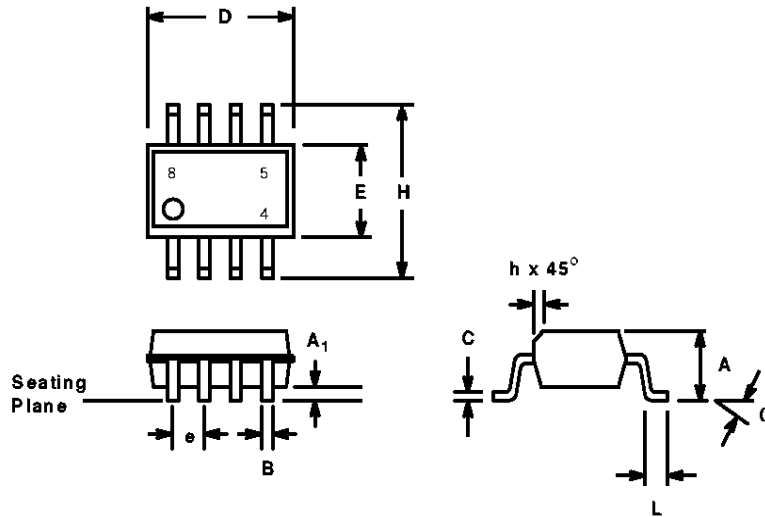
1. (All leads) ϕ_b applies between L₁ and L₂. ϕ_{b1} applies between L₂ and 0.500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L₁ and beyond 0.500 (12.70 mm) from the reference plane.
2. Measured from the maximum diameter of the product.
3. Leads having a maximum diameter 0.019 (0.48 mm) measured in gauging plane. 0.054 (1.37 mm) + 0.001 (0.03 mm) – 0.000 (0.00 mm) below the base plane of the product shall be within 0.007 inch (0.18 mm) of their true position relative to a maximum width tab.
4. The product may be measured by direct methods or by gauge.
5. All leads – Increase maximum limit by 0.003 (0.08 mm) when lead finish A or B is applied.

2 LEAD PLASTIC TO-92 TP2



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.170	0.210	4.32	5.33
ϕb	0.016	0.021	0.406	0.533
ϕD	0.175	0.205	4.44	5.21
E	0.125	0.165	3.18	4.19
e	0.095	0.105	2.41	2.67
L	0.500	—	12.7	—
S	0.080	0.105	2.03	2.67

8 LEAD SMALL OUTLINE
(150 MIL JEDEC SOIC)
S8



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.061	.068	1.55	1.73
A ₁	.004	.0098	0.102	0.249
B	.0138	.0192	0.351	0.488
C	.0075	.0098	0.191	0.249
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	0.050 BSC		1.27 BSC	
H	.230	.244	5.84	6.20
h	0.010	0.016	0.254	0.406
L	0.016	0.035	0.406	0.889
α	0°	8°	0°	8°

Notes

Notes

NOTICE

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