

Precision Micropower Bandgap Shunt Reference



CLM4041

FEATURES

- Low Voltage Operation 1.225V
- Trimmed Bandgap Design 0.1%
- Wide Operating Current Range 60µA to 20mA
- Low Dynamic Impedance 0.25Ω
- Available in SOT-23, TO-92 and SO-8

APPLICATIONS

- Cellular Phones
- Portable Computers
- Instrumentation
- Automotive

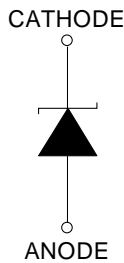
DESCRIPTION

The CLM4041 is a two terminal precision voltage reference with thermal stability guaranteed over temperature, a typical dynamic impedance of 0.25Ω and very sharp turn-on characteristics. The device has a fixed output of 1.225V for input currents between 60µA to 20mA and is an excellent choice for battery operated applications. Available in three tolerances, 0.5%, 1.0% and 2.0% and in three package outlines, SOT-23, SO-8 and TO-92.

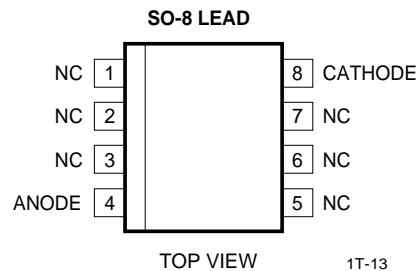
ORDERING INFORMATION

Part	Package	Tolerance	Temp. Range
CLM4041CS	SOT-23	0.5%	-40°C to +85°C
CLM4041DS	SOT-23	1.0%	-40°C to +85°C
CLM4041ES	SOT-23	2.0%	-40°C to +85°C
CLM4041CY	SO-8	0.5%	-40°C to +85°C
CLM4041DY	SO-8	1.0%	-40°C to +85°C
CLM4041EY	SO-8	2.0%	-40°C to +85°C
CLM4041CN	TO-92	0.5%	-40°C to +85°C
CLM4041DN	TO-92	1.0%	-40°C to +85°C
CLM4041EN	TO-92	2.0%	-40°C to +85°C

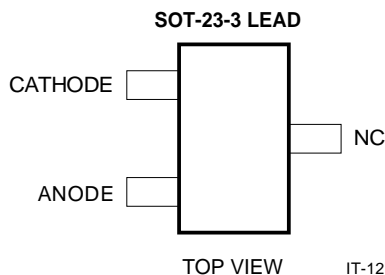
SYMBOL DIAGRAM AND PIN CONFIGURATIONS



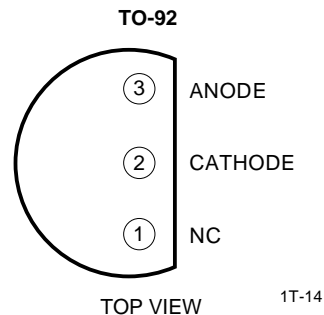
1T-15



1T-13



1T-12

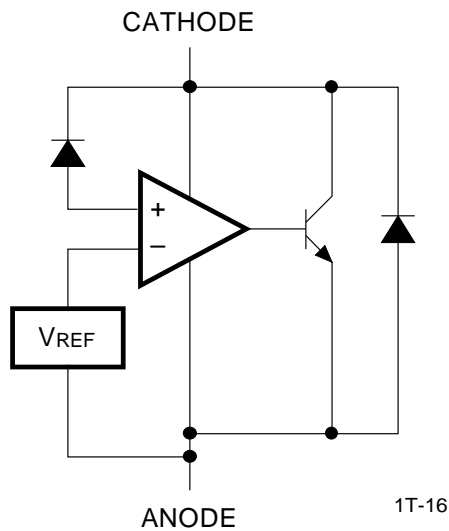


1T-14

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	MAXIMUM	UNITS
	Reverse Current	20	mA
T _A	Operating Temperature Range	-40 to +85	°C
T _J	Operating Junction Temperature Range	-40 to +150	
T _{STG}	Storage Temperature Range	-65 to +150	
T _{LEAD}	Lead Temperature (Soldering) 10 Seconds	260	
ESD	ESD Rating	2	kV

BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CLM4041C (0.5%)			CLM4041D (1.0%)			UNITS	CONDITIONS	
		MIN	TYP	MAX	MIN	TYP	MAX			
V _Z	Reverse Breakdown Voltage	1.219	1.225	1.231	1.213	1.225	1.237	V	I _Z = 100μA	T _A = 25°C
		1.211	1.225	1.239	1.201	1.225	1.249			T _A = -40 to +85°C
I _{Z(MIN)}	Minimum Breakdown Current		30	60		30	60	μA		
$\frac{\Delta V_Z}{\Delta T}$	Reverse Breakdown Voltage Temperature Coefficient			±100			±150	ppm/°C	I _Z = 10mA I _Z = 1mA I _Z = 100μA	T _A = -40 to +85°C
$\frac{\Delta V_Z}{\Delta T_Z}$	Ratio of Change in V _Z to Change in I _Z			1.5			2.0	mV	I _{Z(MIN)} ≤ I _Z ≤ 1mA	T _A = 25°C
				2.0			2.5			T _A = -40 to +85°C
				6.0			8.0		1mA ≤ I _Z ≤ 12mA	T _A = 25°C
				8.0			10.0			T _A = -40 to +85°C
Z _R	Reverse Dynamic Impedance		0.25	1.5		0.25	2.0	Ω	I _Z = 1mA, f = 120Hz, I _{AC} = 0.1 I _Z	
e _N	Wideband Noise (RMS)		20			20		μA	I _Z = 100μA 10Hz ≤ f ≤ 10kHz ΔV _Z	
ΔV _Z	Long Term Stability of Reverse Breakdown Voltage		120			120		ppm	t = 1000 Hours T = 25°C ± 0.1°C I _Z = 100μA	

ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CLM4041E (2.0%)			UNITS	CONDITIONS	
		MIN	TYP	MAX			
V _Z	Reverse Breakdown Voltage	1.200	1.225	1.250	V	I _Z = 100μA	T _A = 25°C
		1.189	1.225	1.261			T _A = -40 to +85°C
I _{Z(MIN)}	Minimum Breakdown Current		30	60	μA		
$\frac{\Delta V_Z}{\Delta T}$	Reverse Breakdown Voltage Temperature Coefficient			±150	ppm/°C	I _Z = 10mA I _Z = 1mA I _Z = 100μA	T _A = -40 to +85°C
$\frac{\Delta V_Z}{\Delta T_Z}$	Ratio of Change in V _Z to Change in I _Z			2.0	mV	I _{Z(MIN)} ≤ I _Z ≤ 1mA	T _A = 25°C
				2.5			T _A = -40 to +85°C
				8.0		1mA ≤ I _Z ≤ 12mA	T _A = 25°C
				10.0			T _A = -40 to +85°C
Z _R	Reverse Dynamic Impedance		0.25	2.0	Ω	I _Z = 1mA, f = 120Hz, I _{AC} = 0.1 I _Z	
e _N	Wideband Noise (RMS)		20		μA	I _Z = 100μA 10Hz ≤ f ≤ 10kHz ΔV _Z	
ΔV _Z	Long Term Stability of Reverse Breakdown Voltage		120		ppm	t = 1000 Hours T = 25°C ± 0.1°C I _Z = 100μA	