

PRELIMINARY

## CAT508

### -5V Precision Reference

#### FEATURES

- -5.000V Output  $\pm 0.3\%$
- Output Adjustment Range of  $> \pm 3\%$
- Excellent Temperature Stability  $< 3$  ppm/ $^{\circ}\text{C}$
- Output Sinks and Sources  $> 10$  mA

#### APPLICATIONS

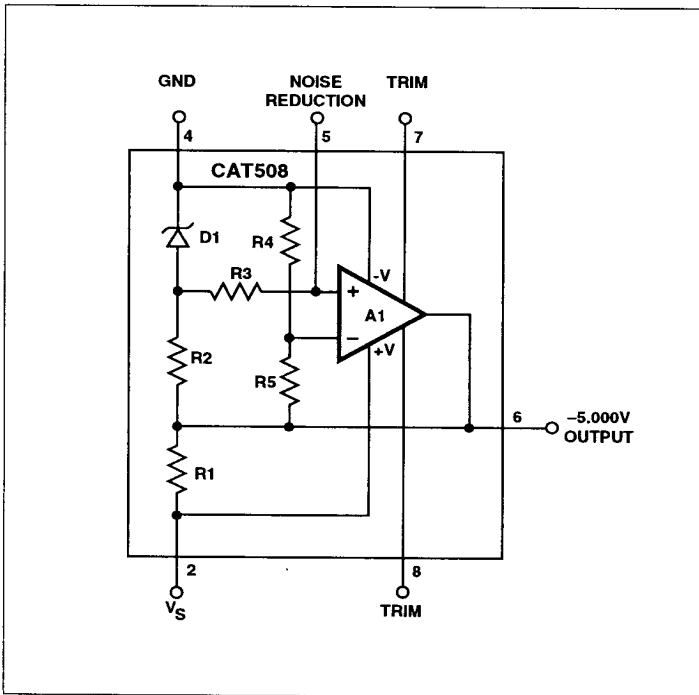
- A/D and D/A Converters
- V/F Converters
- Bridge Excitation
- General Purpose System Reference

#### DESCRIPTION

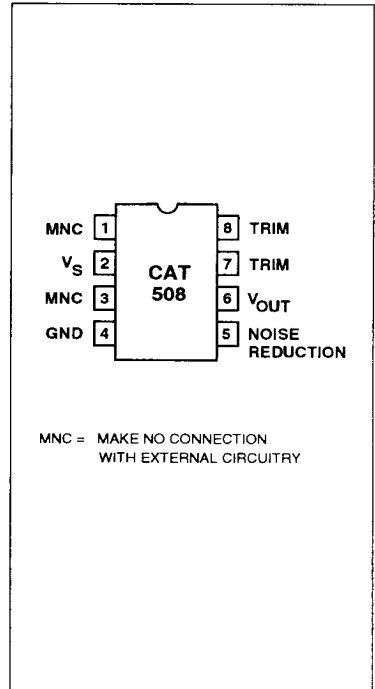
The CAT508 is a precision -5V reference based upon a buried zener diode which eliminates the noise and stability problems associated with surface devices. The output is pretrimmed using Optimum's on-chip EEPROM driven trim circuitry to  $\pm 0.3\%$  accuracy with a temperature drift of less than 3 ppm/ $^{\circ}\text{C}$ . Even greater accuracy may be had through the use of the trim pins provided on the CAT508. Trim allows for an output adjustment of  $\pm 6\%$  without exacting the usual penalty in temperature stability. For noise sensitive applications the CAT508 offers a Noise Reduction pin which further reduces the noise generated by the buried zener. These features combined with the CAT508's ability to source and sink more than 10 mA of current make it an excellent choice as a system reference in a broad range of applications.

The CAT508 is offered in both plastic and ceramic DIPs for operation over the Commercial 0 to  $+70^{\circ}\text{C}$  and the Industrial  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  temperature ranges.

#### FUNCTIONAL DIAGRAM



#### PIN CONFIGURATION



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
$V_S$ to GND .....	+0.5V to -18V
Inputs	
Trim .....	+0.5V to $V_S$ -0.5V
Noise Reduction .....	+0.5V to $V_S$ -0.5V
Output	
$V_{OUT}$ .....	+0.5V to $V_S$ -0.5V
$I_{OUT}$ .....	25mA
Output Short Circuit Duration .....	Indefinite
Operating Ambient Temperature	
Industrial ('I' Suffix) .....	-40°C to +85°C
Commercial ('C' Suffix) .....	0°C to +70°C
Storage Temperature .....	-65°C to +150°C
Lead Soldering (10 sec max) .....	+300°C

## ORDERING INFORMATION

Device	Package	Temp	Output
CAT508_P	8 pin Plastic DIP	C	-5.000V
CAT508_PI	8 pin Plastic DIP	I	-5.000V
CAT508_DI	8 pin CerDIP	I	-5.000V

Temperature: C = 0°C to +70°C  
I = -40°C to +85°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. Absolute Maximum Ratings are limited values applied individually while other parameters are within specified operating conditions, and functional operation at any of these conditions is NOT implied. Device performance and reliability may be impaired by exposure to absolute rating conditions for extended periods of time.

## RELIABILITY CHARACTERISTICS

Symbol	Parameter	Min	Max	Units	Test Method
$V_{ZAP}^{(1)}$	ESD Susceptibility	2000		Volts	MIL-STD-883, Test Method 3015
$I_{LTH}^{(1)(2)}$	Latch-Up	100		mA	JEDEC Standard 17

NOTES: 1. This parameter is tested initially and after a design or process change that affects the parameter.  
2. Latch-up protection is provided for stresses up to 100mA on address and data pins from -1V to  $V_S$  + 1V.

DC ELECTRICAL CHARACTERISTICS:  $V_S = -15V$ ;  $T_A = 25^\circ C$ 

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{OUT}$	Output Voltage	$I_{LOAD} = 0$ "A" Suffix "B" Suffix	-4.985 -4.975	-5.000	-5.015 -5.025	V
$\Delta V_O$	Output Voltage Adjustment Range	$R_{TRIM} = 10k\Omega$	$\pm 3$	$\pm 6$	—	%
$TCV_O$	Output Voltage Temp Coefficient	"A" Suffix "B" Suffix	— —	—	$\pm 3$ $\pm 10$	ppm/°C ppm/°C
	Change in $V_O$ Temp Coefficient with Output Adjustment	$R_{TRIM} = 10k$	—	—	$\pm 0.5$	ppm/°C
$I_O$	Output Current	$I_{SOURCE}$ $I_{SINK}$	10 10	15	—	mA mA
$I_{SC}$	Output Short Circuit Current		—	—	20	mA
$R_O$	Output Resistance		—	—	0.05	$\Omega$
	Line Regulation	$V_S = 13$ to 16.5 V	—	—	0.005	%/V
	Load Regulation	$I_{LOAD} = 0$ - 10 mA	—	0.0005	0.001	%/mA

## Power Supply

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_S$	Supply Voltage Range		-13	-15	-16.5	V
$I_S$	Supply Current	$I_L = 0$	—	4	6	mA

AC ELECTRICAL CHARACTERISTICS:  $V_S = -15V$ ;  $T_A = 25^\circ C$ 

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$e_n$	Noise	0.1 to 10 Hz, $C_{NR} = 0$ $C_{NR} = 0\mu F$	— —	50 15	— —	$\mu V_{p-p}$ $\mu V_{p-p}$
$t_{ON}$	Turn-On Settling Time		—	5	—	$\mu S$