

# NE5520 LVDT Signal Conditioner

## Product Specification

### Linear Products

#### DESCRIPTION

The NE5520 is a signal conditioning circuit for use with Linear Variable Differential Transformers (LVDT). The chip includes a low distortion amplitude stable sine wave oscillator with programmable frequency to drive the primary of the LVDT; a synchronous demodulator to convert the LVDT output amplitude and phase to position information; and an output amp to provide gain and filtering.

#### FEATURES

- Oscillator frequency: 1kHz to 20kHz
- Low distortion
- Capable of ratiometric operation
- Single supply operation 5V to 20V or dual supply  $\pm 2.5V$  to  $\pm 10V$

- Low power consumption

#### APPLICATIONS

- LVDT signal conditioning
- RVDT signal conditioning

#### ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
14-Pin Plastic DIP	0 to +70°C	NE5520N
16-Pin SOL Package	0 to +70°C	NE5520D
16-Pin Ceramic DIP	0 to +70°C	NE5520F

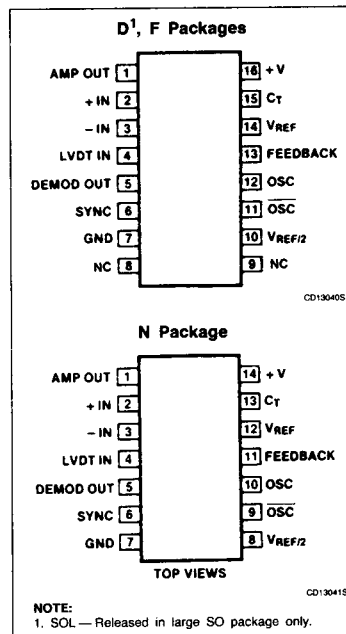
#### ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
$V_S$	Supply voltage	+20	V
	Split supply voltage	$\pm 10$	V
$T_A$	Operating temperature range	0 to +70	°C
$T_{STG}$	Storage temperature range	-65 to +165	°C
$P_D$	Power Dissipation <sup>1</sup>	840	mW

#### NOTES:

1. Supplied only in large SO (Small Outline) package. See package diagram.
2. Pin numbers are for N package.

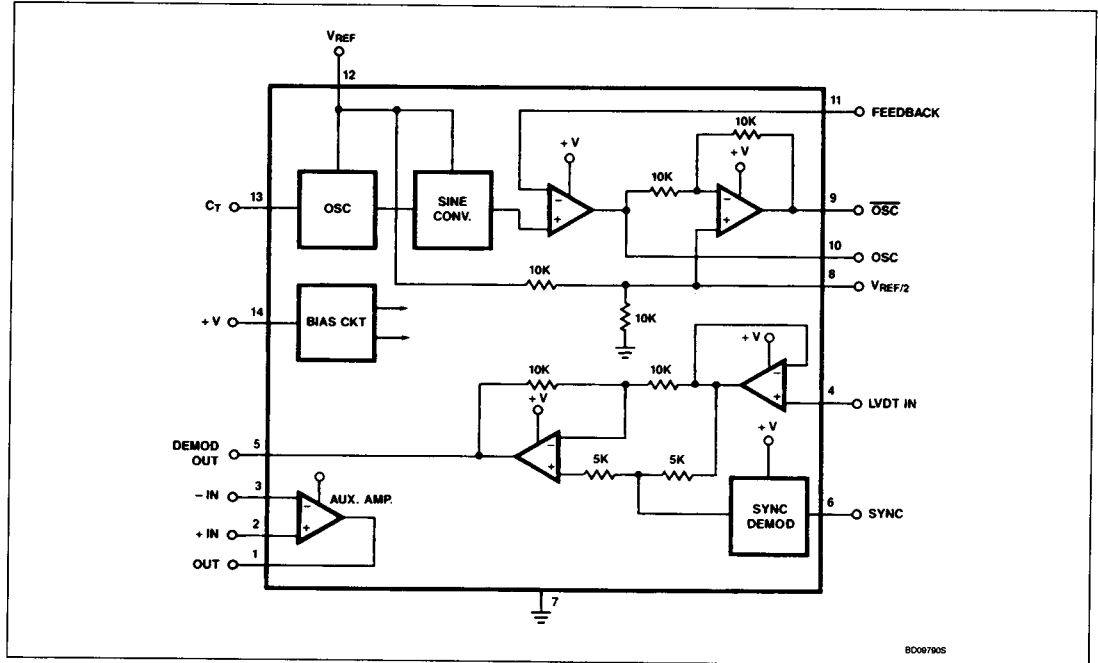
#### PIN CONFIGURATIONS



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### BLOCK DIAGRAM



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**DC ELECTRICAL CHARACTERISTICS**  $T_A = 25^\circ\text{C}$ ,  $V_R = V_+ = 10\text{V}$ , unless otherwise specified.

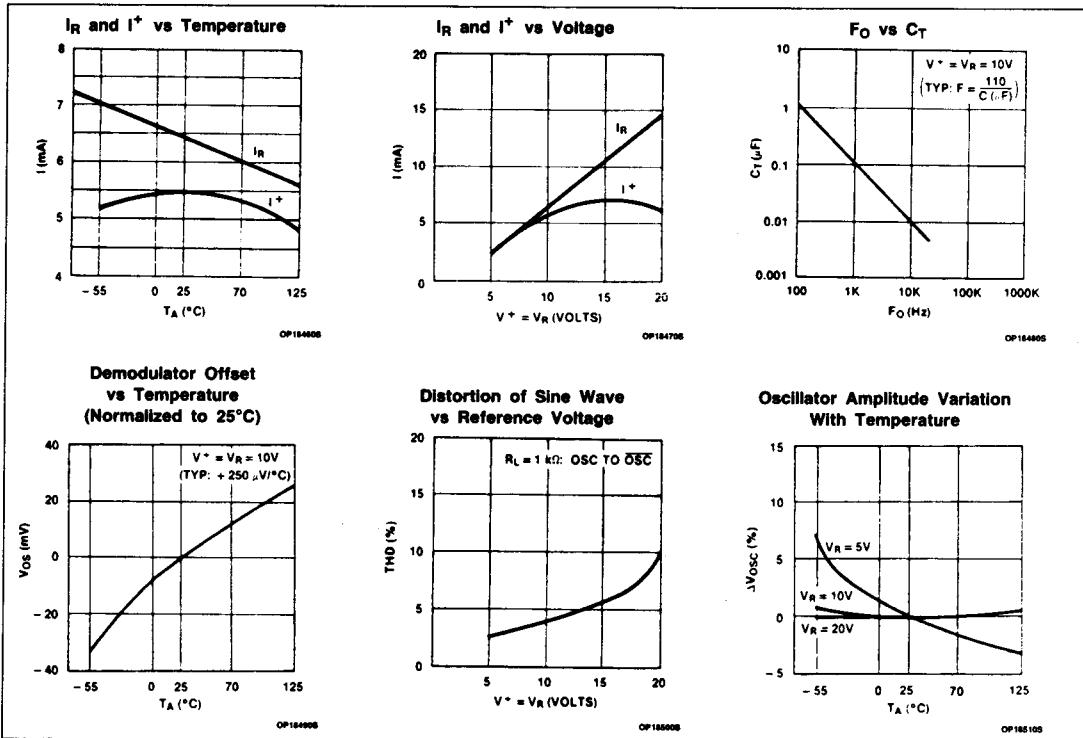
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
$I_{CC}$	Supply current	Over temperature		7.0	10	mA
$I_{REF}$	Reference current	Over temperature		5.5	10	mA
$V_{REF}$	Reference voltage range	Over temperature	5		$V_+$	V
$P_D$	Power dissipation			120	220	mW
<b>Oscillator section</b>						
	Oscillator output			$\frac{V_R}{8.7}$		$V_{RMS}$
	Sine wave distortion			4		%
	Initial amplitude error				$\pm 3$	%
	Tempco of amplitude				0.05	%/ $^\circ\text{C}$
	Voltage coefficient of amplitude error				2.5	%/V
	Initial accuracy of oscillator frequency				20	%
	Tempco of frequency error			0.05		%/ $^\circ\text{C}$
	Voltage coefficient of frequency			2.5		%/V( $V_R$ )
	Oscillator output load current	Over temperature	8	15		$\text{mA}_{RMS}$ $\text{mA}_{RMS}$
<b>Demodulator section</b>						
$E_r$	Linearity error	Over temperature		0.05	0.1	%
	Maximum demodulator input	Over temperature range	$\frac{V_R}{2} - 0.5$		$\frac{V_R}{2} + 0.5$	V
	Demodulator offset voltage	Over temperature range			65	mV
	Demodulator input current	Over temperature	-1000	-300		nA
	$V_{R/2}$ accuracy	Over temperature	-3	$\pm 0.5$	+3	%
<b>Auxiliary output amplifier</b>						
$V_{OS}$	Input offset voltage	Over temperature	-10		10	mV
$I_{BIAS}$	Input bias current	Over temperature range	-500	-300		nA
$I_{OS}$	Input offset current		-100		100	nA
$A_V$	Gain	$R_L = 10\text{k}\Omega$ over temperature		100		V/mV
SR	Slew rate			1.5		V/ $\mu\text{s}$
GBW	Gain bandwidth	$A_V = 1$		1		MHz
$V_{OUT}$	Output voltage swing	$R_L = 10\text{k}\Omega$ over temperature	1.5		$V_+ - 1.5$	V
$I_{SC}$	Output short-circuit current			50		mA

**NOTE:**Rating applies to ambient temperatures up to  $70^\circ\text{C}$ . Above  $70^\circ\text{C}$  derate linearly at  $7.6\text{mW}/^\circ\text{C}$  for the plastic package and  $7.3\text{mW}/^\circ\text{C}$  for the cerdip package.

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## TYPICAL PERFORMANCE CHARACTERISTICS



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# LVDT Signal Conditioner

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## TYPICAL SINGLE SUPPLY LVDT CIRCUIT

