

## 3 CHANNEL DIFFERENTIAL AMPLIFIER-COMPARATOR

(For 2 data channels and ungated index channel)

# ET9560

### FEATURES

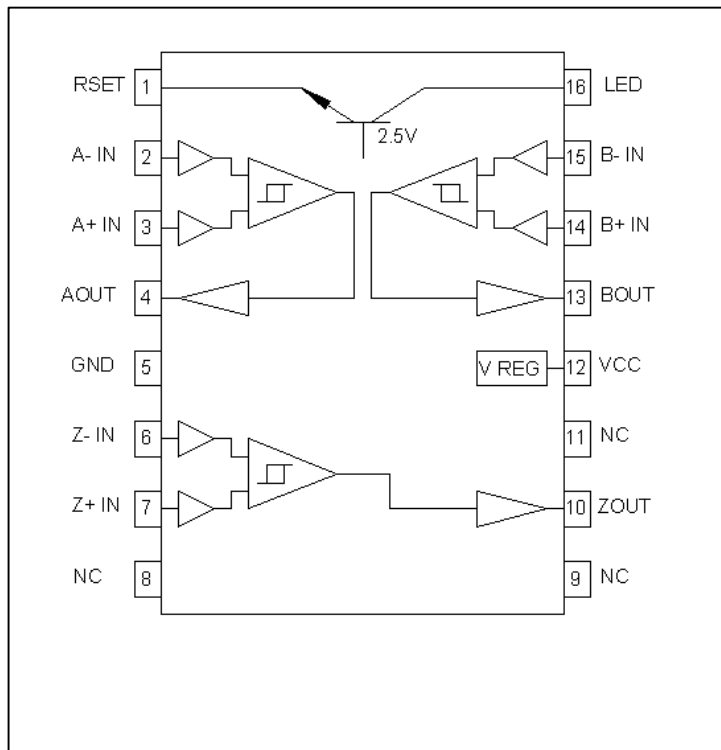
- Supply Voltage Range 4.5V to 30V
- Operation to 1MHz
- Designed for photodiode inputs
- Ungated Index channel
- Current sink for LED drive (see application note

#### APP-D2)

- Outputs short circuit protected
- 25mA peak drive current

### APPLICATIONS

- High Speed Optical Encoders
- Industrial Controls



### DESCRIPTION

These devices are specifically designed as receiver circuits for the photodiode signals available in optical encoders. Connect the anode of the photodiodes to the input pins, with the cathode(s) connected to V<sub>CC</sub> for reverse-bias operation. The input amplifiers have a dynamic range of nearly 1000:1, and allow contrast ratios of encoded signal to common mode signal of as low as 2:1. Differential inputs enhance noise rejection and performance over temperature. Gating of the Z channel provides synchronization of the reference pulse to the data channel phasing.

### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Units	Ref.
Operating Temperature Range	T <sub>A</sub>	-40	125	°C	Note 1
Supply Voltage Range	V <sub>CC</sub>	4.5	30	V	

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## ELECTRICAL CHARACTERISTICS

Unless otherwise specified, typical values given at  $V_{CC}=12V$ ,  $T_A = 25^{\circ}C$ , with LED and RSET open.

Parameters	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Supply Current	$I_{CC1}$	4.5	7.2	11.5	mA	$V_{CC} = 4.5 V$
	$I_{CC2}$	5.0	8.0	12.5		$V_{CC} = 30.0V$
Input Common Mode Voltage	$V_{CM}$		1.35		V	
Average Photocurrent Input	$I_{IA}$	0.066	0.3	40	$\mu A$	Each input
Peak Photocurrent Input	$I_{IP}$	0.13	0.5	60	$\mu A$	Each input
Dark Cell Level	$I_{ID}$	0.02	0.1	20	$\mu A$	Each input
Photocurrent Contrast Ratio	$I_{IR}$	2:1	5:1			Peak:Dark Cell
Comparator Threshold			1.25: 1			Ratio of Differential Inputs
Output High Level Voltage	$V_{OH}$	2.5 28.0	3.0 28.5		V	$I_{OH} = -4mA, V_{CC} = 4.5V$ $I_{OH} = -4mA, V_{CC} = 30V$
Output Low Level Voltage	$V_{OL}$		199	400	mV	$V_{CC} = 4.5V-30V$ $I_{OL} = 8mA$
Output Short-Circuit Current Driving High (All Outputs)	$I_{OS}$	15	25	50	mA	$V_{CC} = 5V, V_{OUT} = 0V$
Output Short-Circuit Current Driving Low (All Outputs)	$I_{OS}$	30	70	120	mA	$V_{CC} = 5V, V_{OUT} = 5V$
RSET Voltage	$V_{RSET}$	1.3	1.7	2.1	V	$R = 180 \text{ ohms}$

## AC SWITCHING CHARACTERISTICS

Values given at  $V_{CC} = 5V$ ,  $T_A = 25^{\circ}C$ ,  $C_L = 15pF$  on all outputs.

Parameters	Symbol	Min.	Typ.	Max	Units	Test Conditions
Pre-Amplifier Bandwidth	$BW_{PA}$		900		KHz	Photocurrent = $1\mu A$ Minimum
Propagation delay from Comparator Input to Output	$T_{PD}$		850		ns	
Output Rise Time	$T_R$		100		ns	
Output Fall Time	$T_F$		20		ns	

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## NOTES:

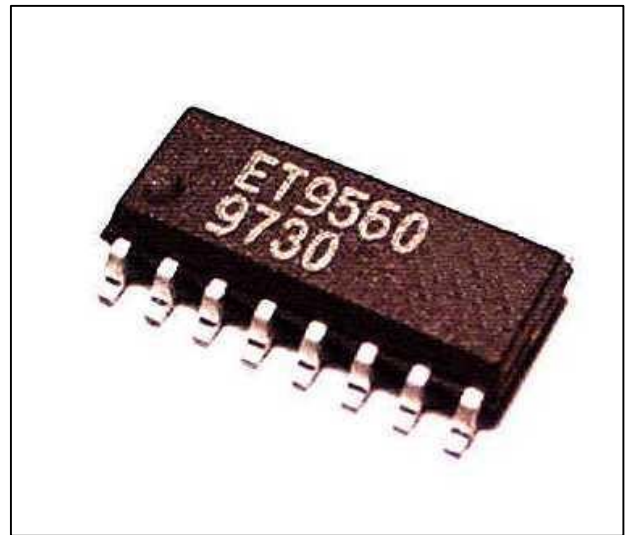
1. This is not a test parameter, but for information only.

## PACKAGE

Chip Only  
16 Lead SOIC

## SUFFIX

-C  
-SOP



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