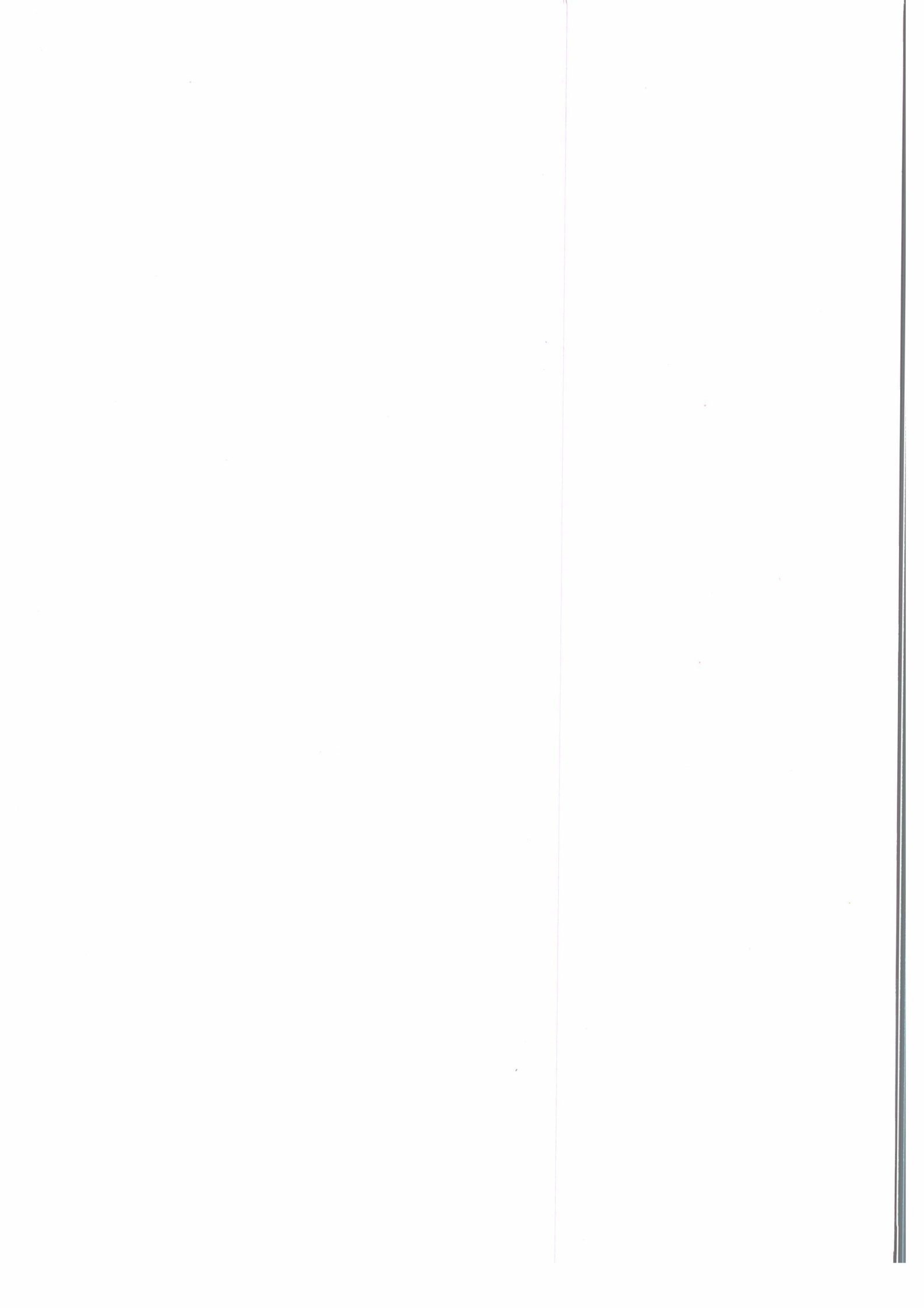




**LAMPIRAN**



## LAMPIRAN

### LM2900/LM3900, LM3301, LM3401 Quad Amplifiers

#### General Description

The LM2900 series consists of four independent, dual input, internally compensated amplifiers which were designed specifically to operate off of a single power supply voltage and to provide a large output voltage swing. These amplifiers make use of a current mirror to achieve the non-inverting input function. Application areas include: ac amplifiers, RC active filters, low frequency triangle, squarewave and pulse waveform generation circuits, tachometers and low speed, high voltage digital logic gates.

#### Features

- Wide single supply voltage range or dual supplies  $4 V_{DC}$  to  $36 V_{DC}$   
 $\pm 2 V_{DC}$  to  $\pm 18 V_{DC}$
- Supply current drain independent of supply voltage
- Low input biasing current 30 nA
- High open-loop gain 70 dB
- Wide bandwidth 2.5 MHz (Unity Gain)
- Large output voltage swing  $(V^+ - 1) V_{p-p}$
- Internally frequency compensated for unity gain
- Output short-circuit protection

#### URAIAN UMUM :

Seri LM 3900 terdiri dari empat penguat yang mandiri masing-masing dengan dwi input dan terkompensasi internal, dirancang untuk bekerja menggunakan tegangan catu tunggal dan menghasilkan ayunan tegangan output besar. Penguat ini memanfaatkan cermin arus untuk memperoleh fungsi input non-inverting. Bidang penerapan meliputi penguat AC, filter aktif RC, gelombang segitiga frekuensi rendah, rangkaian pembangkit gelombang persegi dan pulsa, tachometer dan gelombang logik tegangan tinggi digital.

#### CIRI-CIRI

- Rentang tegangan catu tunggal . . . . . dan dwi catu yang lebar . . . . .
- Penyedotan arus tidak bergantung tegangan catu
- Arus tumpu rendah . . . . .
- Penguatan gelung terbuka tinggi . . . . .
- Lebar jalur lapang . . . . .
- Ayunan tegangan output besar . . . . .
- Terkompensasi frekuensi secara internal untuk penguatan satu . . . . .
- Perlindeungan hubung singkat . . . . .

## Absolute Maximum Ratings

## DATA MAKSIMUM ABSOLUT

	LM2900/LM3900	LM3301	LM3401
Supply Voltage	32 VDC	28 VDC	18 VDC
Power Dissipation ( $T_A = 25^\circ\text{C}$ ) (Note 1)	$\pm 18$ VDC	$\pm 14$ VDC	$\pm 9$ VDC
Cavity DIP	800 mW		
Flat Pack	800 mW		
Molded DIP	570 mW	570 mW	570 mW
Input Currents, $I_{IN}^+$ or $I_{IN}^-$	20 mA <sub>DC</sub>	20 mA <sub>DC</sub>	20 mA <sub>DC</sub>
Output Short-Circuit Duration - One Amplifier $T_A = 25^\circ\text{C}$ (See Application Hints)	Continuous	Continuous	Continuous
Operating Temperature Range			
LM2900	-40°C to +85°C	-40°C to +85°C	0°C to +75°C
LM3900	0°C to +70°C		
Storage Temperature Range	-65°C to +150°C	-65°C to +150°C	-65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	300°C	300°C	300°C

### Electrical Characteristics (Note 6)

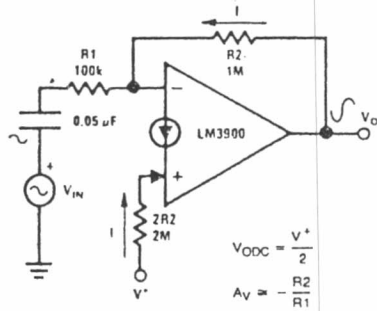
CIRI ELEKTRIS :

PARAMETER	Parameter
Open Loop Voltage Gain	<i>Gelung terbuka</i> <i>Penguatan tegangan</i>
Voltage Gain	<i>Penguatan tegangan</i>
Input Resistance	<i>Tahanan Innut</i>
Output Resistance	<i>Tahanan Output</i>
Unity Gain Bandwidth	<i>Lebar jalur penguatan satu</i>
Input Bias Current	<i>Arus tumpu input</i>
Slew Rate	<i>Slew Rate</i>
Supply Current	<i>Arus Catu</i>
Output Voltage Swing	<i>Ayunan tegangan output</i>
V <sub>OUT</sub> High	<i>V<sub>out</sub> tinggi</i>
V <sub>OUT</sub> Low	<i>V<sub>out</sub> rendah</i>
V <sub>OUT</sub> High	<i>V<sub>out</sub> tinggi</i>
Output Current Capability	<i>Kemampuan arus output</i>
Source	<i>Source</i>
Sink	<i>Sink</i>
I <sub>SINK</sub>	<i>I sink</i>

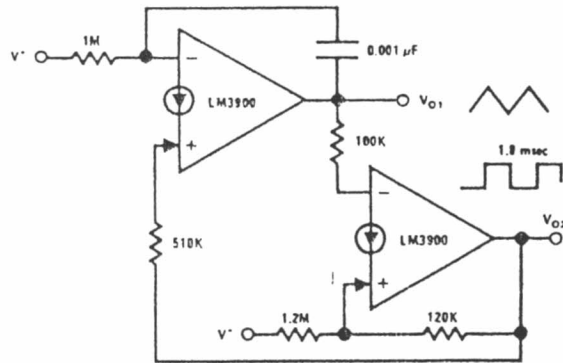
CONDITIONS	LM2900 LM3900			UNITS
	MIN	TYP	MAX	
T <sub>A</sub> = 25°C, f = 100 Hz T <sub>A</sub> = 25°C, Inverting Input	1.2	2.8		V/mV
		1		V/mV
		8		MΩ
				kΩ
T <sub>A</sub> = 25°C, Inverting Input		2.5		MHz
T <sub>A</sub> = 25°C, Inverting Input Inverting Input		30	200	nA
				nA
T <sub>A</sub> = 25°C, Positive Output Swing		0.5		V/μs
T <sub>A</sub> = 25°C, Negative Output Swing		20		V/μs
T <sub>A</sub> = 25°C, R <sub>L</sub> = ∞ On All Amplifiers		6.2	10	mADC
T <sub>A</sub> = 25°C, R <sub>L</sub> = 2k, V <sub>CC</sub> = 15.0 VDC I <sub>IN</sub> <sup>-</sup> = 0, I <sub>IN</sub> <sup>+</sup> = 0	13.5			VDC
I <sub>IN</sub> <sup>-</sup> = 10μA, I <sub>IN</sub> <sup>+</sup> = 0		0.09	0.2	VDC
I <sub>IN</sub> <sup>-</sup> = 0, I <sub>IN</sub> <sup>+</sup> = 0 R <sub>L</sub> = ∞, V <sub>CC</sub> = Absolute Maximum Ratings		29.5		VDC
T <sub>A</sub> = 25°C				
(Note 2)	6	18		mADC
V <sub>OL</sub> = 1V, I <sub>IN</sub> = 5μA	0.5	1.3		mADC
		5		mADC

Typical Applications ( $V^+ = 15\text{ V}_{DC}$ )

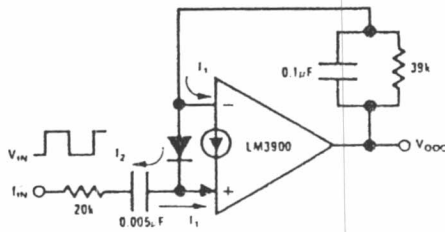
Inverting Amplifier



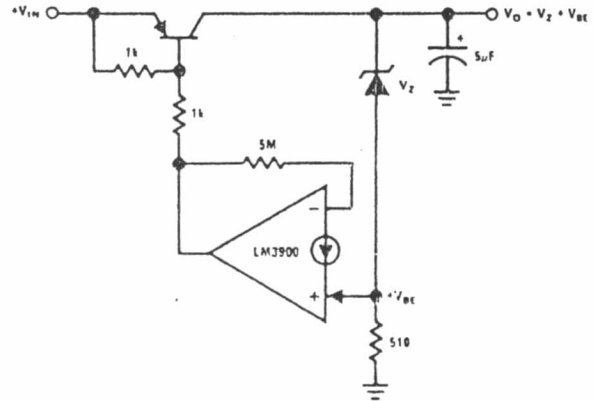
Triangle/Square Generator



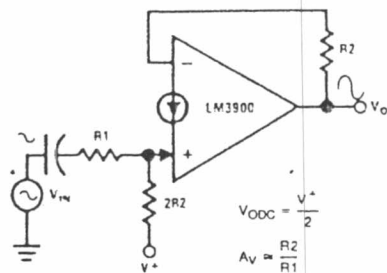
Frequency-Doubling Tachometer



Low  $V_{IN} - V_{OUT}$  Voltage Regulator



Non-Inverting Amplifier



Negative Supply Biasing

