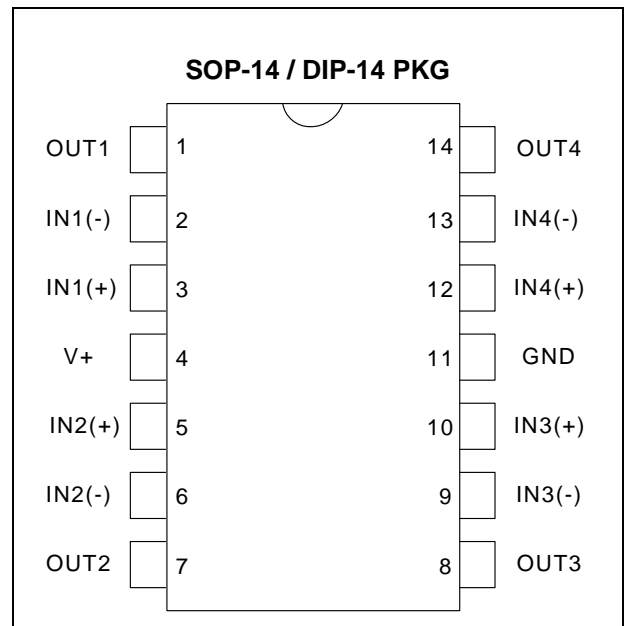


FEATURES

- Wide range of supply voltages
- Low supply current drain independent of supply voltage
- Low input biasing current
- Low input offset voltage and offset current
- Input common-mode voltage range includes ground
- Differential input voltage range equal to the power supply voltage
- DC voltage gain 100V/mV Typ
- Internally frequency compensation



ORDERING INFORMATION

Device	Package
LM324GD	SOP 14
LM324N	DIP 14

DESCRIPTION

The LM324 consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits.

ABSOLUTE MAXIMUM RATING

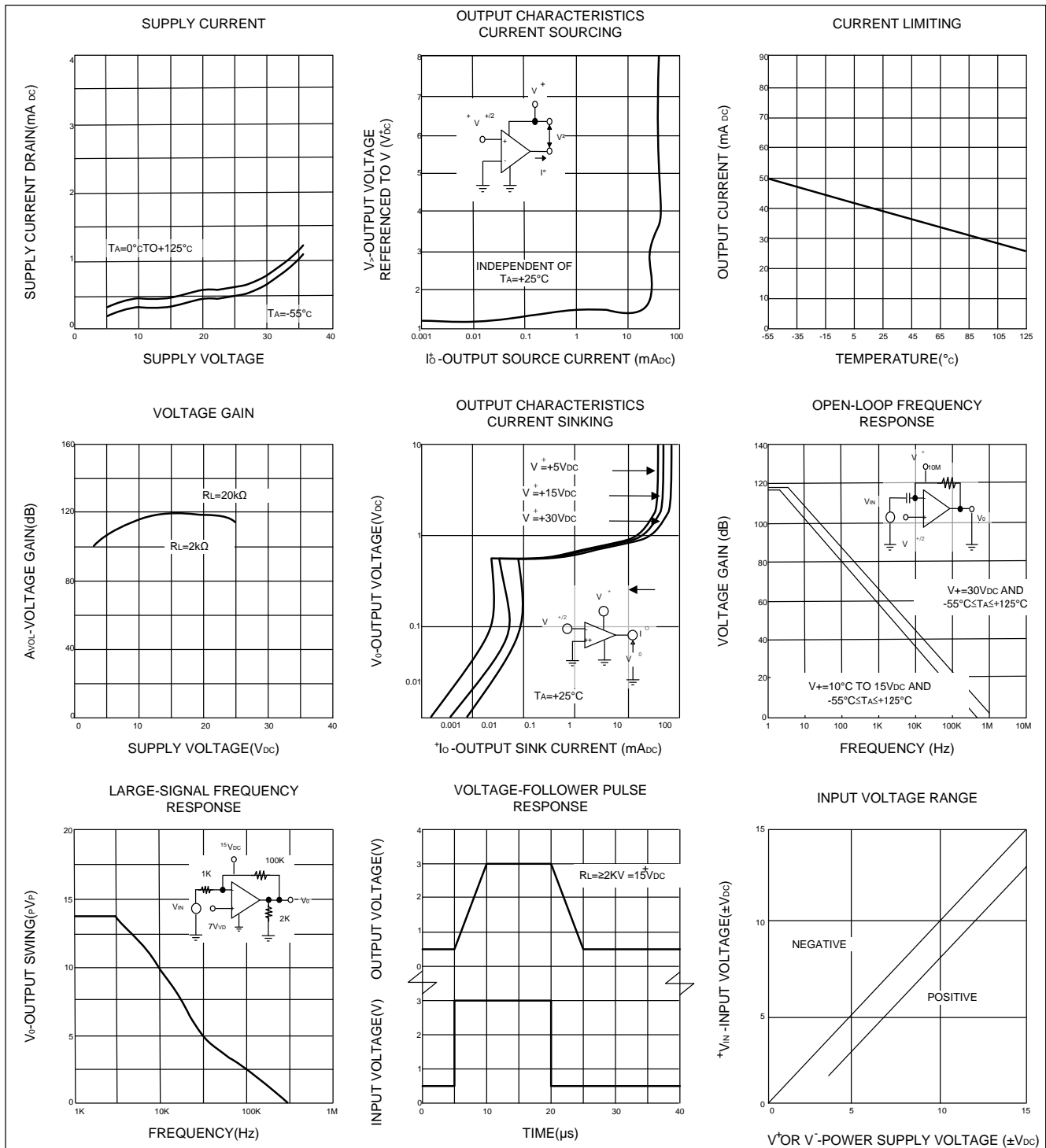
CHARACTERISTIC	SYMBOL	Value	UNIT
Supply Voltage	V_{CC}	40	V
Input Voltage	V_{IN}	-0.3 to +40	V
Operating Temperature Range	T_{OPR}	-40 to +85	°C

ELECTRICAL CHARACTERISTICS

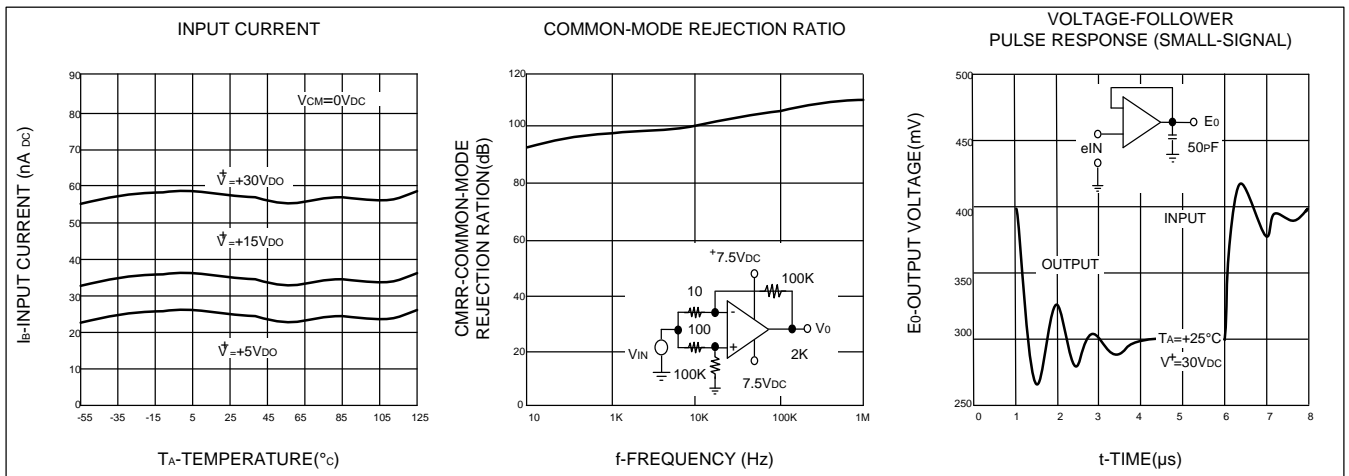
At specified free-air temperature, $V_{CC}=5V$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS*	MIN	TYP	MAX	UNIT	
V_{IO} Input offset voltage	$V_{CC}=5V$ to MAX, $V_{IC}=V_{ICR}$ min, $V_O=1.4V$	25°C	3	7	mV	
		Full range		9		
αV_{IO} Average temperature coefficient of input offset voltage		Full range	7		$\mu V/^\circ C$	
I_{IO} Input offset current	$V_O=1.4V$	25°C	2	50	nA	
		Full range		150		
αI_{IO} Average temperature coefficient of input offset current		Full range	10		$\mu A/^\circ C$	
I_{IB} Input bias current	$V_O=1.4V$	25°C	-20	-250	nA	
		Full range		-500		
V_{ICR} Common-mode input voltage range	$V_{CC}=5V$ to MAX	25°C	0	$V_{CC}-1.5$	V	
		Full range	0	$V_{CC}-2.0$		
V_{OH} High-level output voltage	$R_L=2k\Omega$	25°C	$V_{CC}-1.5$		V	
	$V_{CC}=MAX, R_L=2k\Omega$	Full range	26			
	$V_{CC}=MAX, R_L=10k\Omega$	Full range	27	28		
V_{OL} Low-level output voltage	$R_L \geq 10k\Omega$	Full range	5	20	mV	
A_{VD} Large-signal differential voltage amplification	$V_{CC}=15V$ $V_O=1V$ to 11V $R_L \geq 2k\Omega$	25°C	25	100	V/mV	
		Full range	15			
CMRR Common-mode rejection ratio	$V_{CC} = 5 V$ to MAX, $V_{IC} = V_{ICR}$ min	25°C	65	80	dB	
k_{SVR} Supply voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$)	$V_{CC} = 5 V$ to MAX	25°C	65	100	dB	
V_{O1}/V_{O2} Crosstalk attenuation	$f=1$ kHz to 20 kHz	25°C		120	dB	
I_O Output current	$V_{CC}=15V,$ $V_{ID}=1V, V_O=0V$	25°C	-20	-30	mA	
		Full range	-10			
	$V_{CC}=15V,$ $V_{ID}=-1V, V_O=15V$	25°C	10	20		
		Full range	5			
	$V_{ID} = -1 V, V_O = 200mV$	25°C	12	30	μA	
I_{OS} Short-circuit output current	V_{CC} at 5 V, GND at -5V, $V_O=0$	25°C		± 40	± 60	mA
I_{CC} Supply current (two amplifiers)	$V_O=2.5V$, No load	Full range		1.5	2.4	mA
	$V_{CC} = MAX,$ $V_O = 0.5V_{CC}$, No load	Full range		1.1	3	

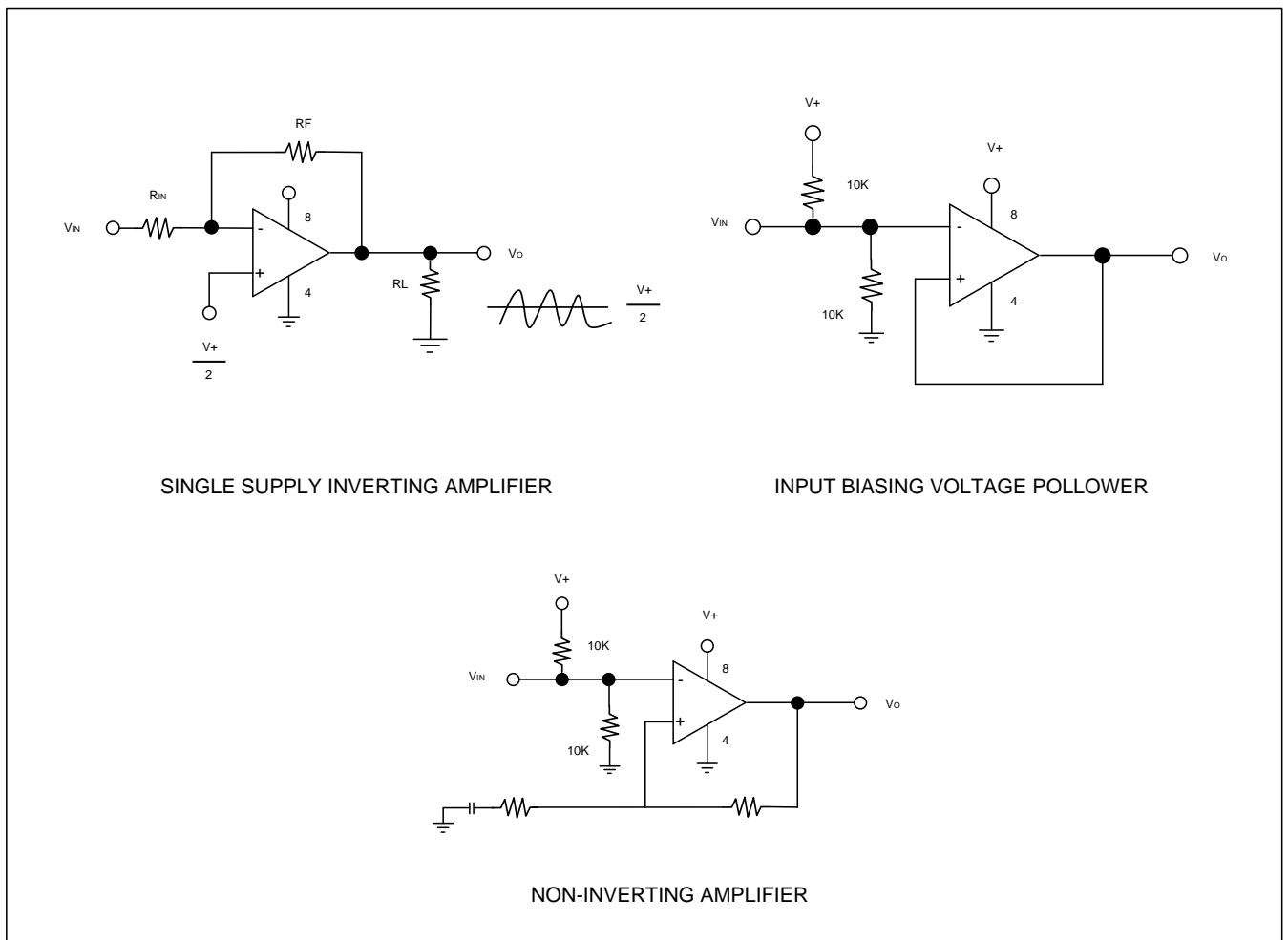
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



TYPICAL APPLICATIONS



REVISION NOTICE

The description in this datasheet can be revised without any notice to describe its electrical characteristics properly.