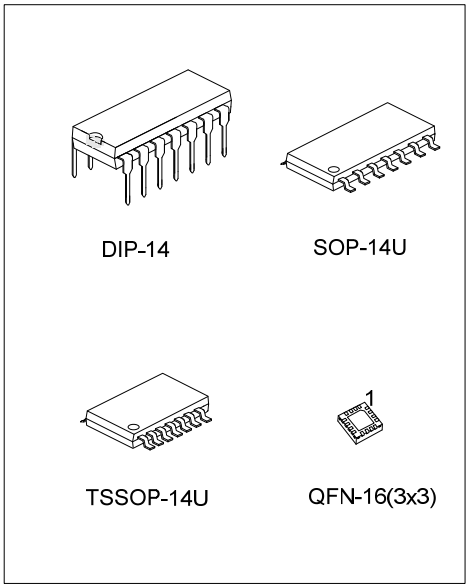
LM324B

LINEAR INTEGRATED CIRCUIT

QUAD OPERATIONAL AMPLIFIERS



■ DESCRIPTION

The UTC **LM324B** consists of four independent, high gain internally frequency compensated operational amplifiers which are designed specifically to operated from a single power supply over a wide voltage range. Operation from split power supplies is also possible. Application areas include transducer amplifier, DC gain blocks and all the conventional OP amp circuits which now can be easily implemented in single power supply system.

■ FEATURES

*Internally frequency compensated for unity gain
*Large DC voltage gain :100dB
*Wide operating supply range (V_{CC}=3V~36V)
*Input common-mode voltage includes ground
*Large output voltage swing: From 0V to V_{CC}-1.5V
*Power drain suitable for battery operation
*High ESD (2kV, HBM)

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen-Free		
LM324BL-D14-T	LM324BG-D14-T	DIP-14	Tube
LM324BL-UEA-R	LM324BG-UEA-R	SOP-14U	Tape Reel
LM324BL-UEB-R	LM324BG-UEB-R	TSSOP-14U	Tape Reel
LM324BL-Q16-3030-R	LM324BG-Q16-3030-R	QFN-16(3×3)	Tape Reel

LM324BG-D14-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) DIP: DIP-14, UEA: SOP-14U, UEB: TSSOP-14U
Q16-3030: QFN-16(3×3)
(3) G: Halogen Free and Lead Free, L: Lead Free

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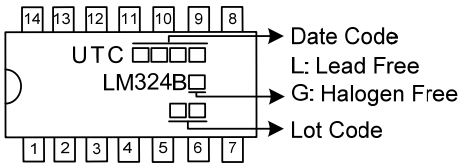
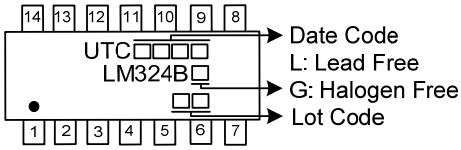
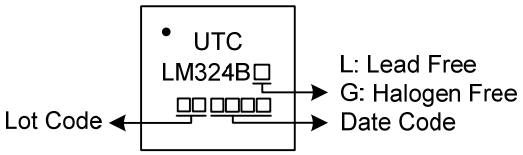
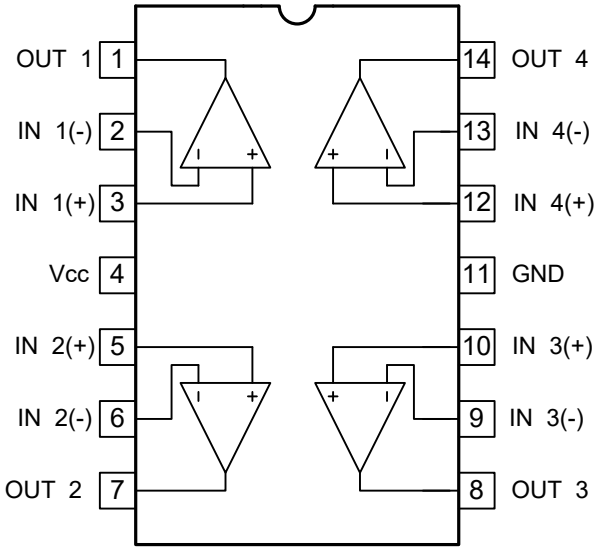
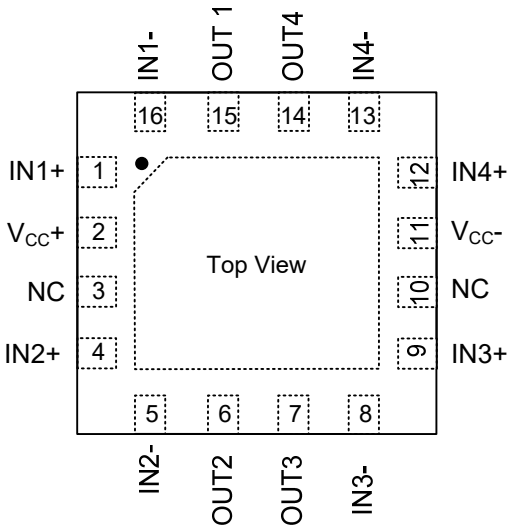
■ MARKING

PACKAGE	MARKING
DIP-14	
SOP-14U TSSOP-14U	
QFN-16(3×3)	

■ PIN DESCRIPTION

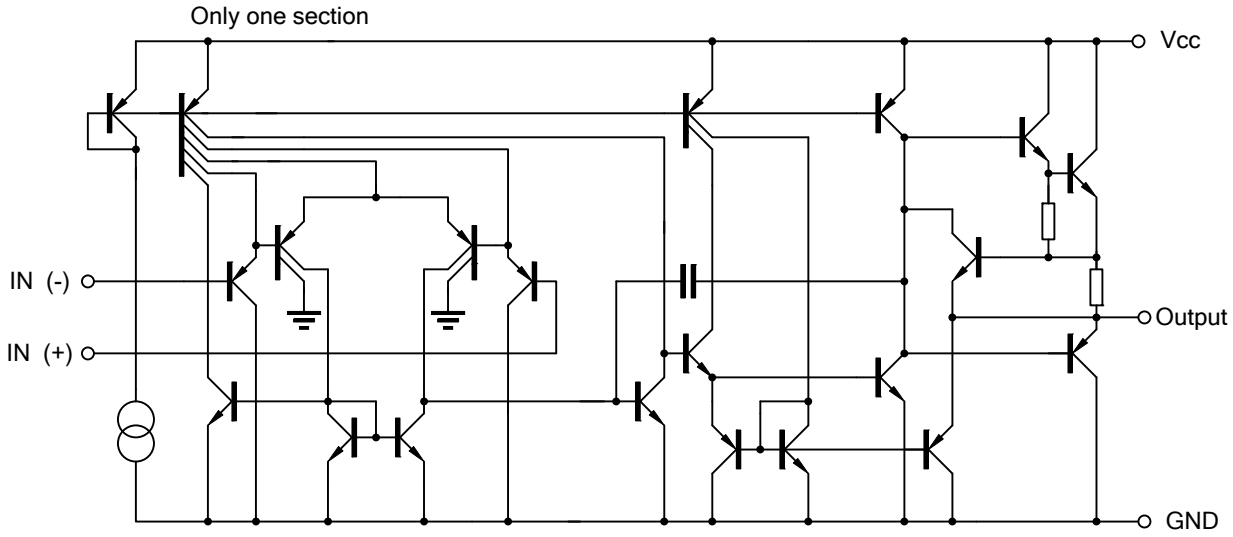


DIP-14/SOP-14U/TSSOP-14U



QFN-16(3×3)

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	±20 or 40	V
Differential Input Voltage		$V_{I(DIFF)}$	±40	V
Input Voltage		V_{IN}	-0.3 ~ +40	V
Power Dissipation	DIP-14	P_D	800	mW
	SOP-14U		580	mW
	TSSOP-14U		460	mW
	QFN-16(3×3)		1300	mW
Electrostatic Discharge	Human-Body Model (HBM) Per JESD22-A114/115	$V_{(ESD)}$	2000	V
Operating Temperature		T_{OPR}	-40 ~ +85	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

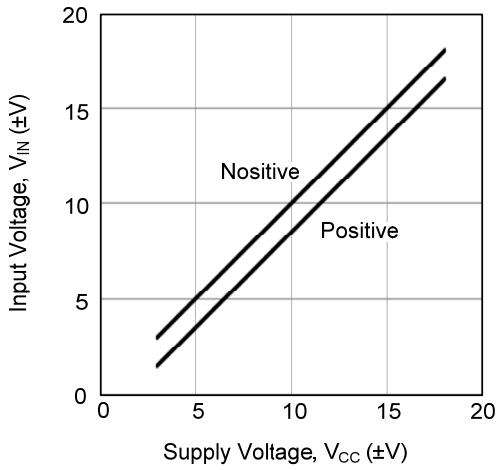
■ ELECTRICAL CHARACTERISTICS

(V_{CC}=5.0V, All voltage referenced to GND unless otherwise specified.)

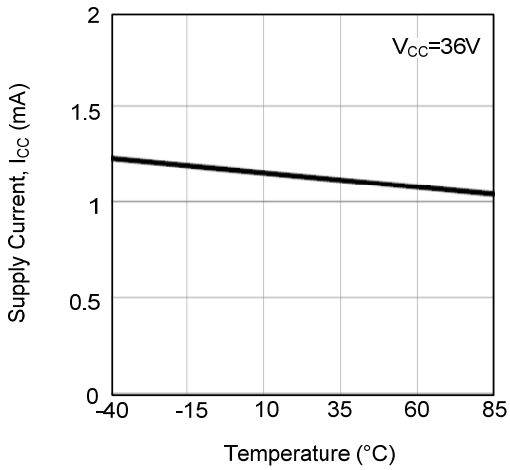
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Supply Current	I_{CC}	R_L=∞, V_{CC}=36V		1.0	3.0	mA
		V_{CC}=5V		0.7	1.2	mA
Power Supply Rejection Ratio	PSRR		65	100		dB
Input Offset Voltage	$V_{I(OFF)}$	V_{CM}=0V toV_{CC}-1.5V $V_{O(P)}$=1.4V, R_S=0Ω		0.5	3.0	mV
Input Offset Current	$I_{I(OFF)}$			1.5	10	nA
Input Bias Current	$I_{I(BIAS)}$				50	nA
Input Common Mode Voltage	$V_{I(CM)}$	V_{CC}=36V	0		V_{CC}-1.5	V
Common Mode Rejection Ratio	CMRR		65	90		dB
Large Signal Voltage Gain	G_V	V_{CC}=15V, R_L≧10KΩ $V_{O(P)}$=1V ~ 11V	50	100		V/mV
Output Voltage Swing	V_{OH}	I_O=50uA	V_{CC}-1.6	V_{CC}-1.4		V
		I_O=1mA	V_{CC}-1.7	V_{CC}-1.5		V
		I_O=5mA	V_{CC}-1.8	V_{CC}-1.6		V
	V_{OL}	I_O=50uA			150	mV
		I_O=1mA		0.75	1	V
Output Current	I_{SOURCE}	V_I(+)=1V, V_I(-)=0V V_{CC}=15V, V_O=GND	-20	-45		mA
	I_{SINK}	V_I(+)=0V, V_I(-)=1V V_{CC}=15V, V_O= V_{CC}	10	25		mA
Slew Rate	SR			1.1		V/μs
Gain-Bandwidth Product	GBW			1.7		MHz

■ TYPICAL CHARACTERISTICS

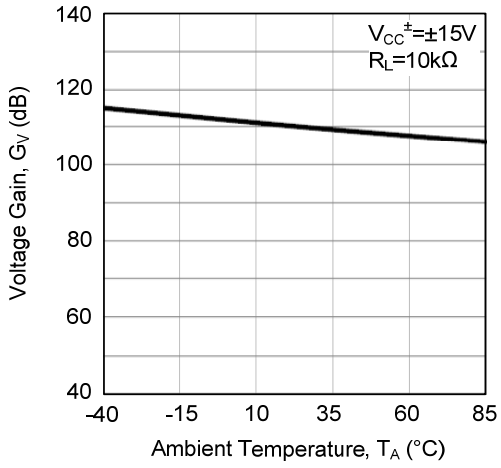
Input Voltage Range



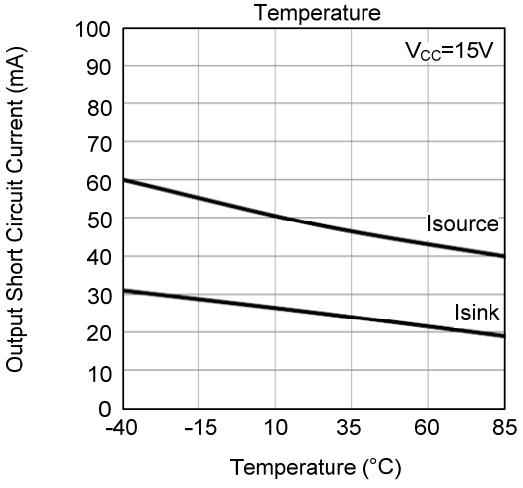
Supply Current vs. Temperature



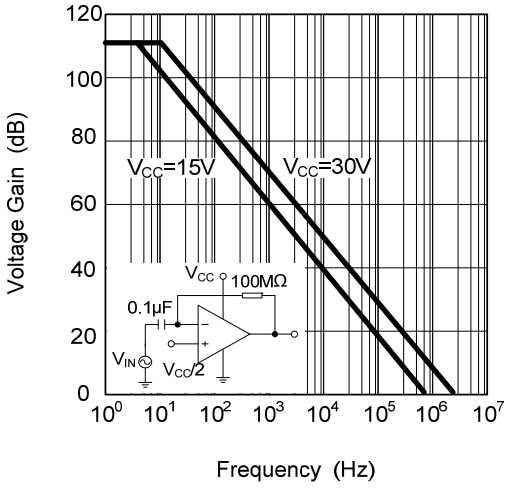
Voltage Gain vs. Temperature



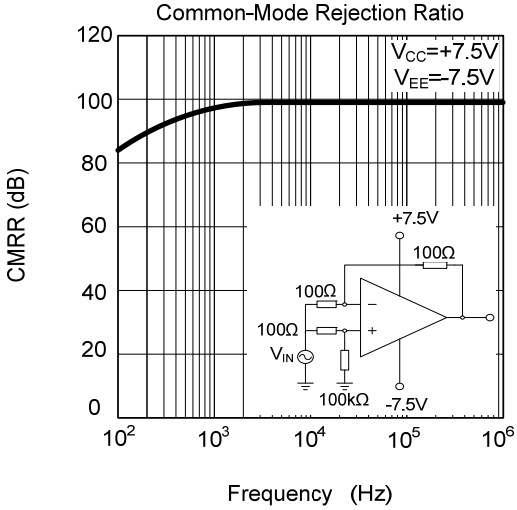
Output Short Circuit Current vs. Temperature



Open Loop Frequency response

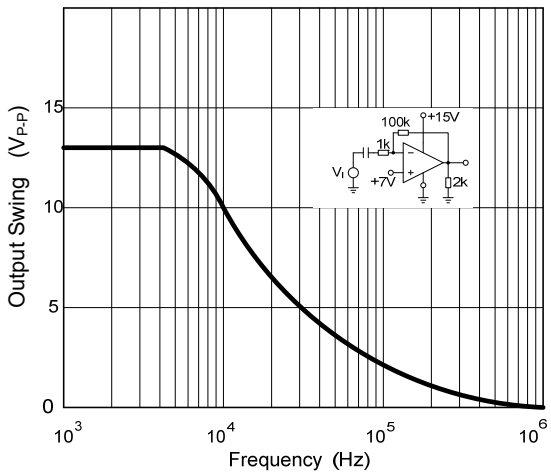


Common-Mode Rejection Ratio

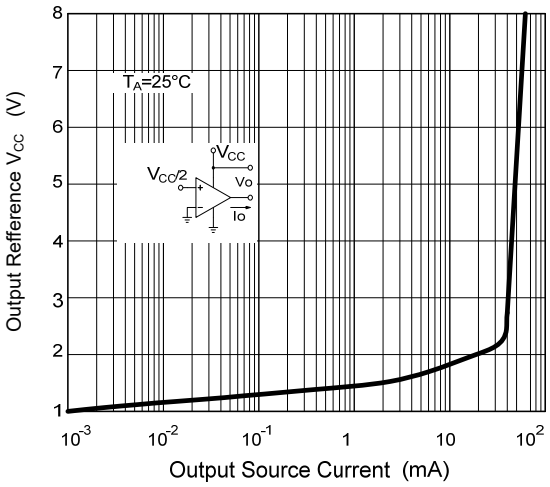


■ TYPICAL CHARACTERISTICS (Cont.)

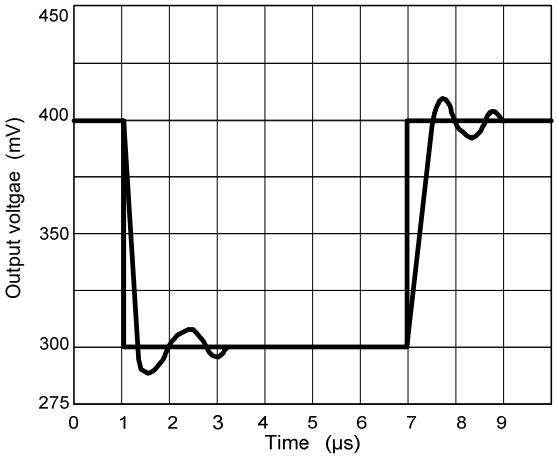
Large Signal Frequency Response



Output Characteristics Current Sourcing



Voltage Follower pulse response (small signal)



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