



3404

LINEAR INTEGRATED CIRCUIT

SINGLE-SUPPLY DUAL OPERATIONAL AMPLIFIER

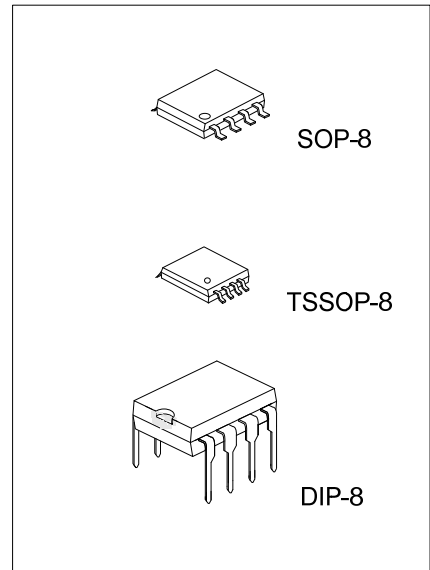
DESCRIPTION

The UTC **3404** is high performance single supply dual operational amplifier.

The UTC **3404** is improved version of the UTC M2904 on slew rate & cross-over distortion.

FEATURES

- *Single supply
- *Operating voltage: +4v~+36v
- *Low operating current: 2.0ma (typ.)
- *Slew rate: 1.2v/μs (typ.)



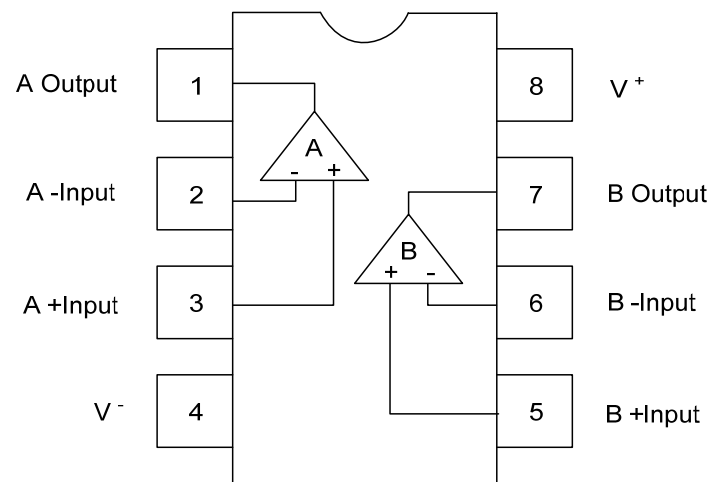
*Pb-free plating product number: 3404L

ORDERING INFORMATION

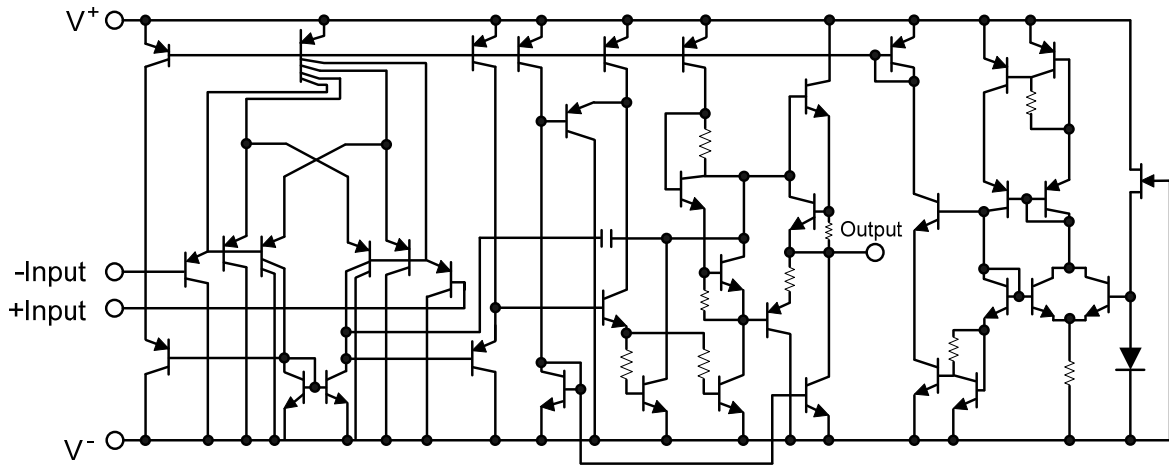
Ordering Number		Package	Packing
Normal	Lead Free Plating		
3404-D08-T	3404L-D08-T	DIP-8	Tube
3404-P08-R	3404L-P08-R	TSSOP-8	Tape Reel
3404-P08-T	3404L-P08-T	TSSOP-8	Tube
3404-S08-R	3404L-S08-R	SOP-8	Tape Reel
3404-S08-T	3404L-S08-T	SOP-8	Tube

<p>3404L-D08-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) D08: DIP-8, P08: TSSOP-8, S08: SOP-8 (3) L: Lead Free Plating, Blank: Pb/Sn</p>
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■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT (1/2 SHOWN)



■ ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$)

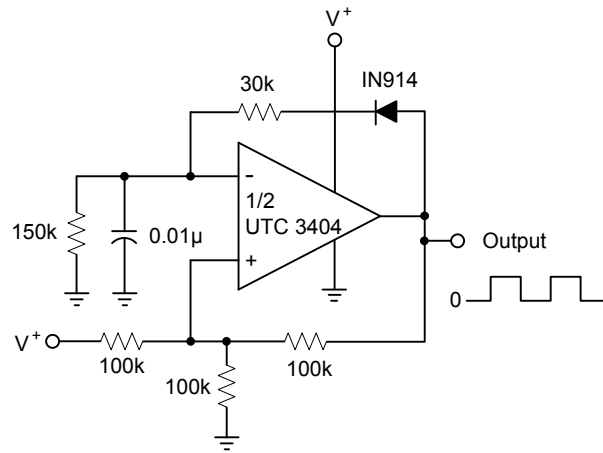
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+(V^+/V^-)$	36V (or ± 18)	V
Differential Input Voltage	$V_{I(DIFF)}$	36	V
Input Voltage	V_{IN}	-0.3 ~ 36	V
Power Dissipation	DIP-8	500	mW
	SOP-8	300	
	TSSOP8	250	
Operating Temperature Range	T_{OPR}	-40 ~ +85	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-40 ~ +125	$^\circ\text{C}$

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.

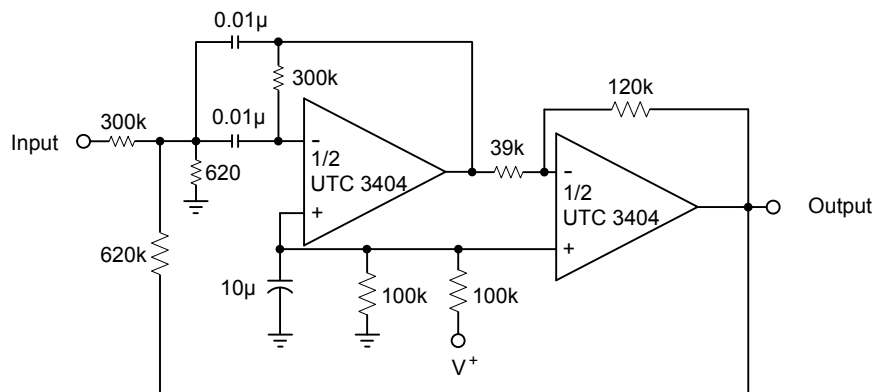
■ ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V^+/V^- = \pm 15\text{V}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_{I(OFF)}$	$R_s=0\Omega$		2	5	mV
Input Offset Current	$I_{I(OFF)}$			5	50	nA
Input Bias Current	$I_{I(BIAS)}$			70	200	nA
Large Signal Voltage Gain	G_V	$R_L > 2\text{K}\Omega$	88	100		dB
Maximum Output Voltage Swing	V_{OM}	$R_L=2\text{K}\Omega$	± 13	± 14		V
Input Common Mode Voltage Range	$V_{I(CM)}$		-15 ~ +13			V
Common Mode Rejection Ratio	CMR	DC	70	90		dB
Supply Voltage Rejection Ratio	SVR		80	94		dB
Operating Current	I_{CC}	$R_L=\infty$		2.0	3.5	mA
Output Source Current	I_{SOURCE}	$V_{IN+}=1\text{V}, V_{IN-}=0\text{V}$	20	30		mA
Output Sink Current	$I_{O(SINK)}$	$V_{IN+}=0\text{V}, V_{IN-}=1\text{V}$	10	20		mA
Slew Rate	SR			1.2		V/ μs
Unity Gain Bandwidth	f_T			1.2		MHz

■ TYPICAL APPLICATIONS



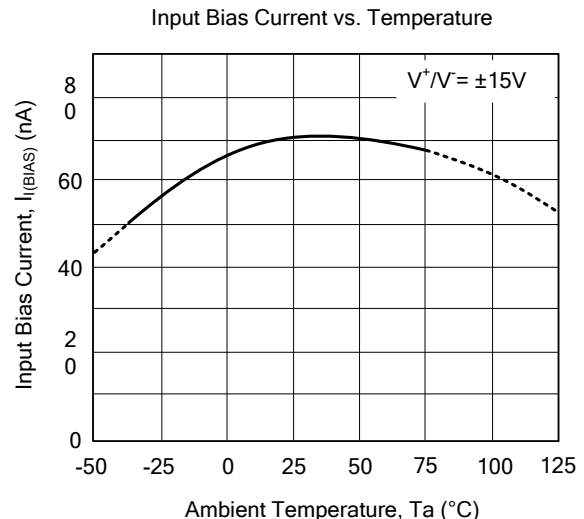
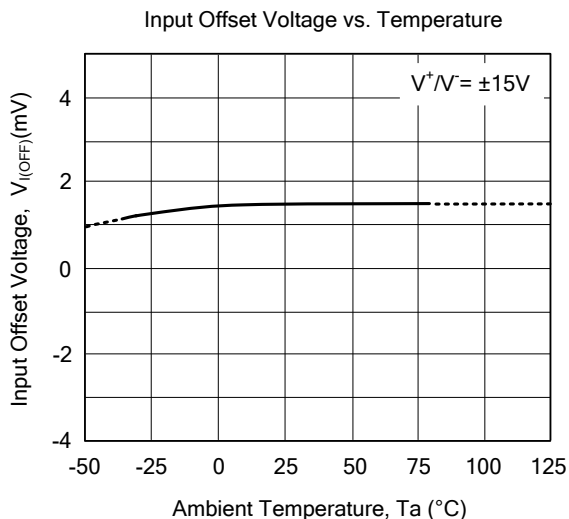
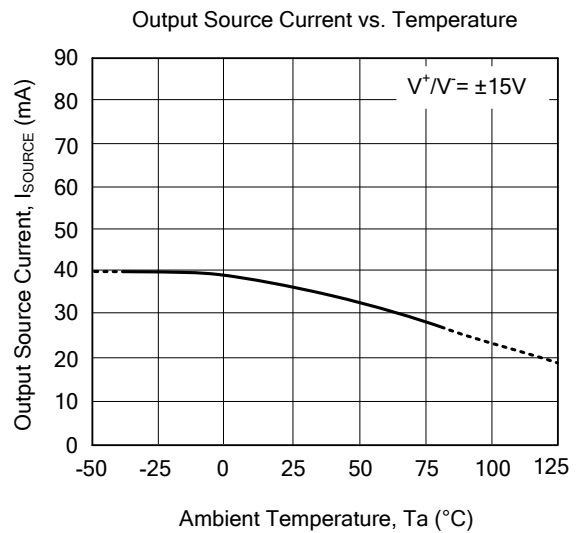
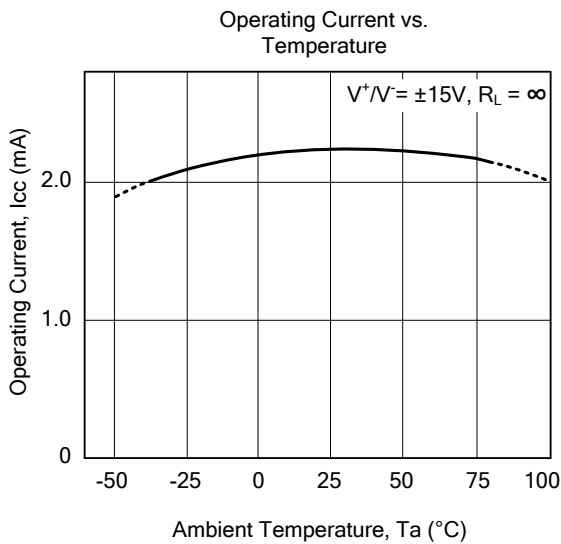
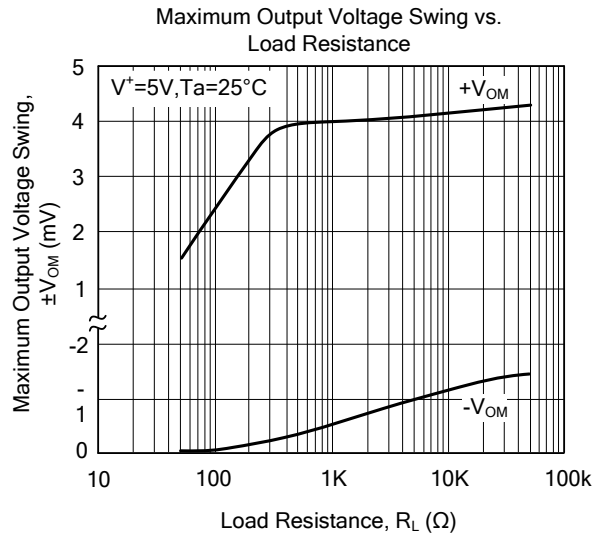
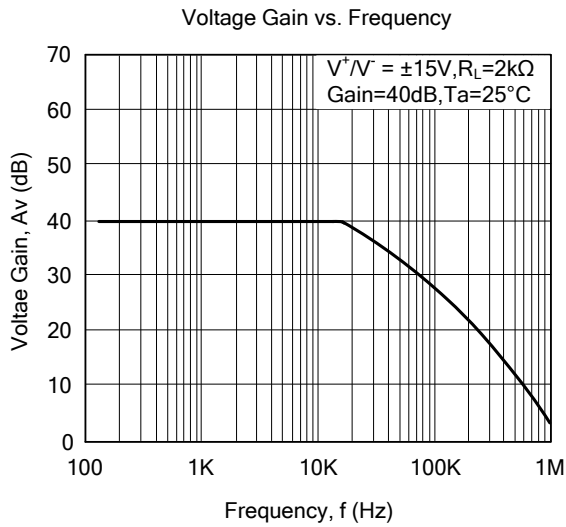
Square Wave Oscillator



$f_o=1\text{kHz}$

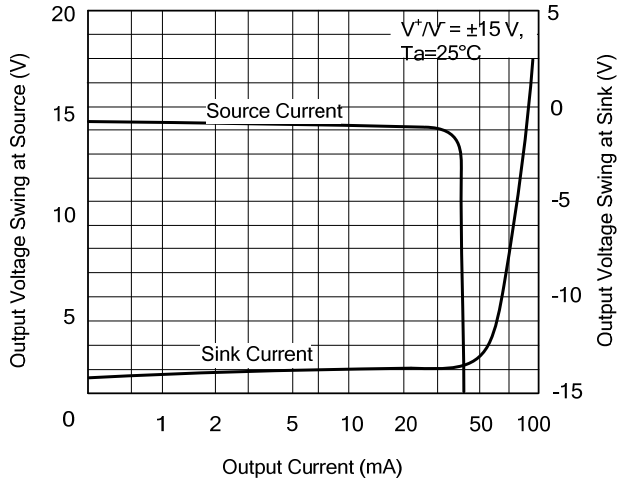
Bandpass Filter

■ TYPICAL CHARACTERISTICS

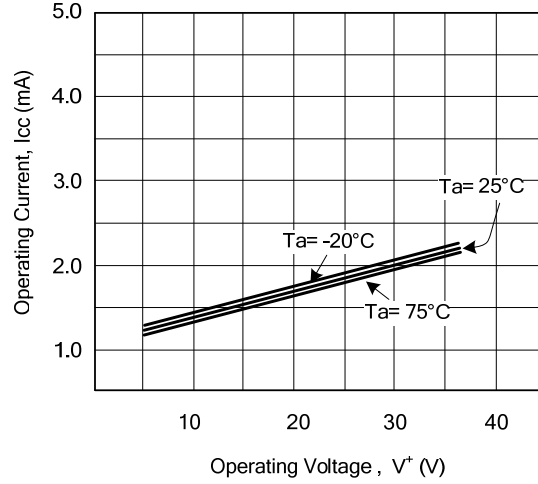


■ TYPICAL CHARACTERISTICS(Cont.)

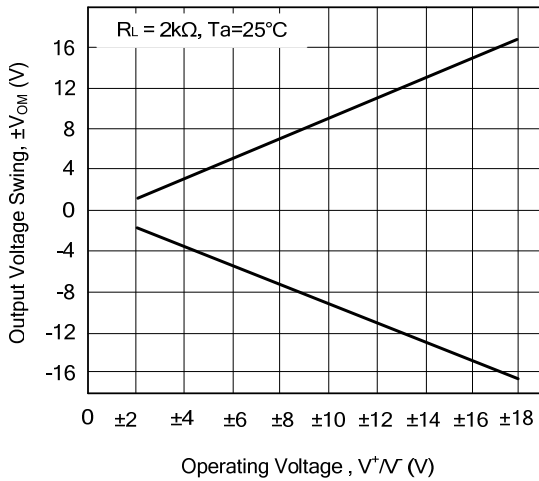
Output Source Current Output Sink Current vs. Output Voltage Swing



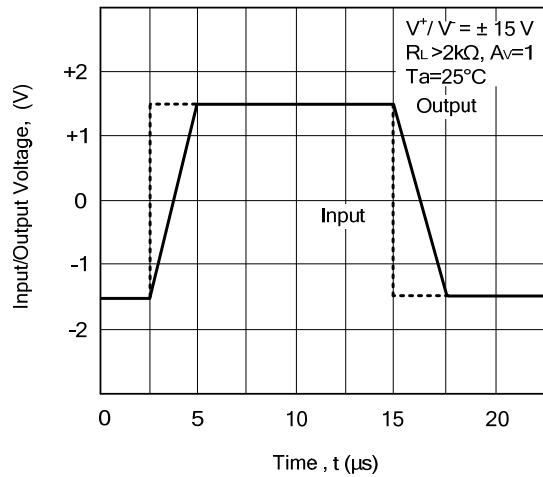
Operating Current vs. Operating Voltage



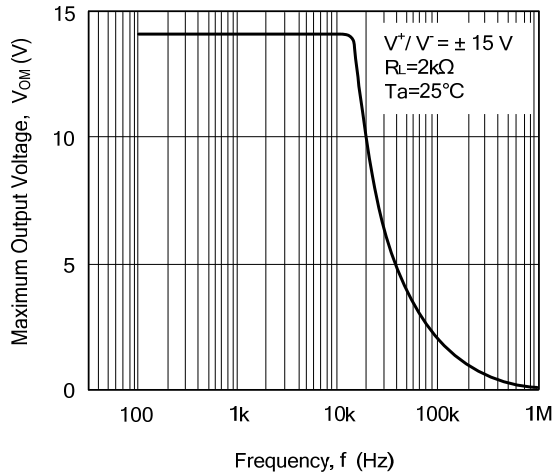
Output Voltage Swing vs. Operating Voltage



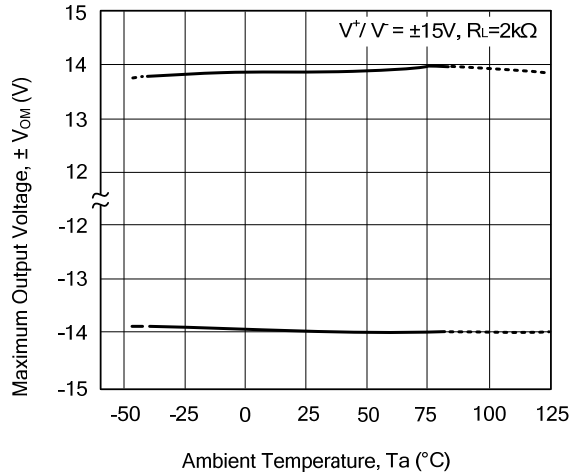
Pulse Response



Maximum Output Voltage vs. Frequency



Maximum Output Voltage vs. Temperature



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