

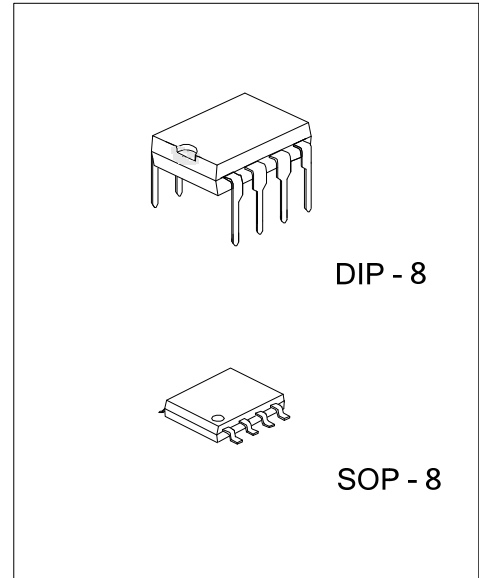
**3422****LINEAR INTEGRATED CIRCUIT****HIGH PERFORMANCE DUAL
BIPOLAR OPERATIONAL
AMPLIFIER****■ DESCRIPTION**

The UTC **3422** is a dual high performances operational amplifier featuring speed of 25MHz and single supply operation from 3V ~ 36V.

The UTC **3422** is therefore an enhanced replacement of standard dual operational amplifiers.

■ FEATURES

- * Single Supply Operation: 3V ~ 36V
- * Dual Supply Operation: $\pm 1.5V \sim \pm 18V$
- * High Gain Bandwidth Product: 25MHz
- * High Slew Rate: $15V/\mu s$
- * Low Voltage Noise: $14nV/\sqrt{Hz}$
- * No Phase Inversion
- * ESD Tolerance: 2KV
- * Latch-Up Immunity

**■ ORDERING INFORMATION**

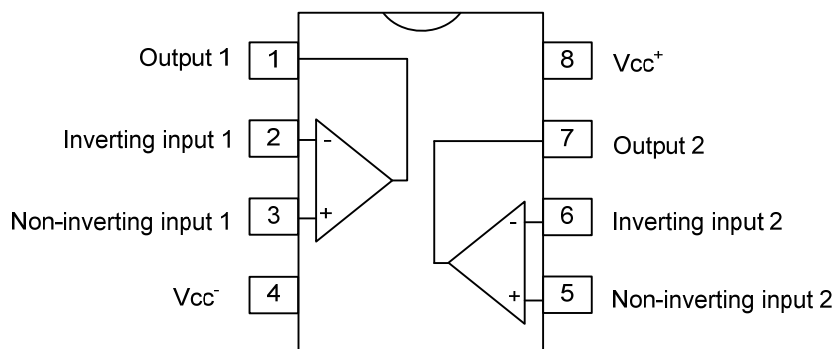
Ordering Number		Package	Packing
Lead Free	Halogen Free		
3422L-D08-T	3422G-D08-T	DIP-8	Tube
-	3422G-S08-R	SOP-8	Tape Reel

3422L-D08-T (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel, T: Tube (2) D08: DIP-8, S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free
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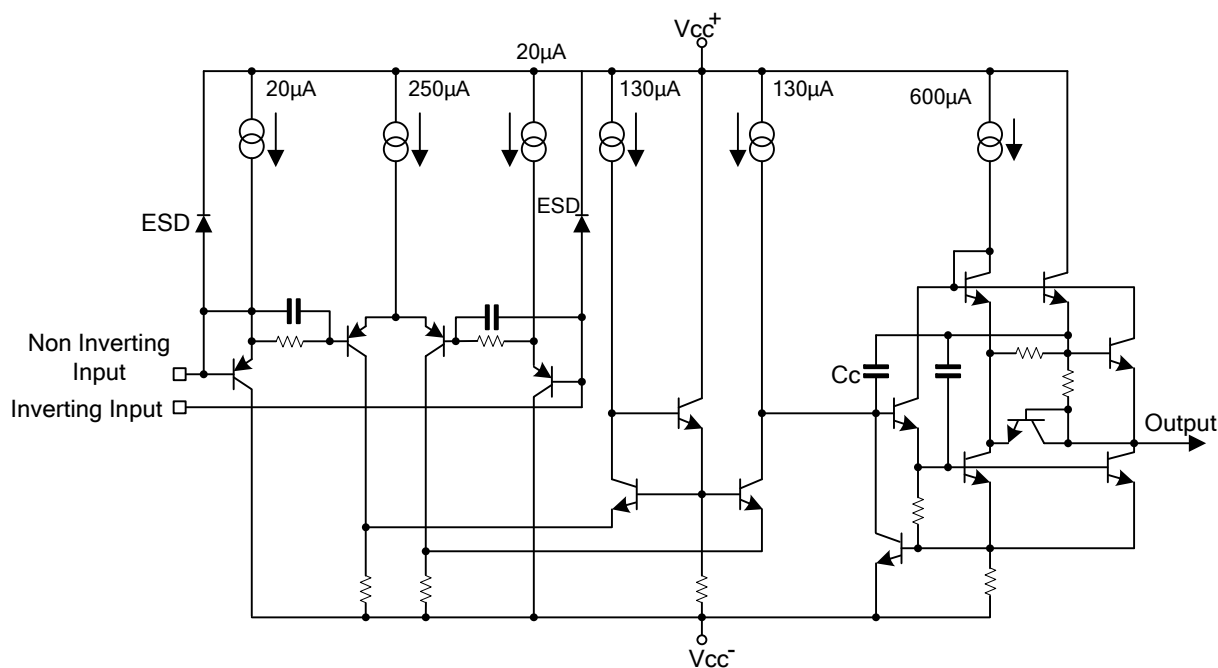
■ MARKING

DIP-8	SOP-8
8 7 6 5 UTC □ □ □ □ 3422 □ 1 2 3 4 → Date Code → L: Lead Free → G: Halogen Free → Lot Code	8 7 6 5 UTC □ □ □ □ 3422G 1 2 3 4 → Date Code → Lot Code

■ PIN CONFIGURATION



■ BLOCK DIAGRAM (1/2 Shown)



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	$\pm 18 \sim 36$	V
Differential Input Voltage (Note 1)	V_{ID}	± 36	V
Input Voltage (Note 1)	V_{IN}	± 18	V
Output Short-Circuit Duration (Note 2)		Infinite	
Maximum Power Dissipation (Note 2)	P_{TOT}	500	mW
Operating Temperature	T_{OPR}	$-40 \sim +125$	$^{\circ}\text{C}$
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-65 \sim +150$	$^{\circ}\text{C}$

Notes: 1. Either or both input voltages must not exceed the magnitude of V_{CC}^{+} or V_{CC}^{-}

2. Power dissipation must be considered to ensure maximum junction temperature (T_J) is not exceeded

■ OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	3 ~ 36	V

■ ELECTRICAL CHARACTERISTICS ($V_{CC}^{+}=15\text{V}$, $V_{CC}^{-}=-15\text{V}$, $T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS			MIN	TYP	MAX	UNIT
Input Offset Voltage	V _{IO}	V _{IC} =0V, V _O =0V	V _{CC} ⁺ =+15V, V _{CC} ⁻ =-15V				2.5	mV
			T _{MIN} ≤T _A ≤T _{MAX}				3.5	
			V _{CC} ⁺ =+5V, V _{CC} ⁻ =0V				2.5	
Input Offset Voltage Drift	△V _{IO}	V _{IC} =0V, V _O =0V				2		μV/°C
Input Offset Current	I _{IO}	V _{IC} =0V, V _O =0V				3	65	nA
Input Bias Current	I _{IB}	V _{IC} =0V, V _O =0V				100	650	nA
Common Mode Input Voltage	V _{ICM}					V _{CC} ⁻ to V _{CC} ⁺ -1.8		V
Large Signal Voltage Gain	A _{VD}	R _L =2kΩ, V _O =0V ~ +10V T _{MIN} ≤T _A ≤T _{MAX}			32 20	100		V/mV
Output Voltage Swing	±V _{OPP}	V _{ID} =±1V	V _{CC} ⁺ =+15V, V _{CC} ⁻ =-15V, R _L =2kΩ	V _{OH}	13.4	13.9		V
				V _{OL}		-13.9	-13.5	
			R _L =10kΩ	V _{OH}	13.4	14		
				V _{OL}		-14.7	-14.1	
			V _{CC} ⁺ =+5V, V _{CC} ⁻ =0V, R _L =2kΩ	V _{OH}	3.7			
				V _{OL}		0.15	0.2	
Output Short Circuit Current	I _O	V _{ID} =±1V, V _O =0V,	Source	25	37		mA	
			Sink	25	37			
Common Mode Rejection Ratio	CMR	V _{ic} =-15V ~ +13.2V			80	100		dB
Supply Voltage Rejection Ratio	SVR	V _{CC} ⁺ /V _{CC} ⁻ =+15V/-15V ~ +5V/-5V			90	105		dB
Supply Current	I _{CC}	V _O =0V,no load, each amplifier	V _{CC} ⁺ =+15V, V _{CC} ⁻ =-15V				2.75	mA
			T _{MIN} ≤T _A ≤T _{MAX}			2.15	3	
			V _{CC} ⁺ =+5V,V _{CC} ⁻ =0V				2.75	
Slew Rate	SR	V _I =-10V~10V,C _L =100pF,R _L =2kΩ, A _V =+1			8	15		V/μs
Gain Bandwidth Product	GBP	f=100kHz, R _L =2kΩ, C _L =100pF			17	25		MHz
Unity Gain Bandwidth	B	Open loop				5		MHz
Phase Margin	m	R _L =2kΩ				50		Degrees
		R _L =2kΩ, C _L =100pF				40		
Equivalent Input Noise Voltage	e _N	R _S =100Ω, f=1kHz				14		$\frac{nV}{\sqrt{Hz}}$
Channel Separation	V _{O1} /V _{O2}	f=20Hz ~ 20kHz				120		dB
Total Harmonic Distortion	THD	V _{CC} =±15V, f=1kHz, A _{VCL} =20dB, R _L =600Ω, V _O =3Vrms				0.003		%

■ APPLICATIONS INFORMATION

UTC 3422 IN COMPARATOR APPLICATION

The UTC **3422** is a dual bipolar operational amplifier offering a single supply operation from 3V ~ 36V with very good performances: medium speed (25MHz), unity gain stability and low noise.

Most of operational amplifiers are not suited for comparator use because of low transition speed, output signal incompatible with standard logics level and mainly, phase inversion. The phase inversion occurs when a strong differential signal is applied to the device inputs. The output level is then inverted and shows a wrong logic state. The UTC **3422** does not present this problematic behaviour.

Figure 1 shows basic comparator application. Figure 2 shows the curves of the device response in standard comparator configuration without external components.

Transition speed : Typical transition speed under a single 5V supply voltage is about 2 μ s from 50mV overdrive. $V_{OH(MIN)}$ is 3.7V and $V_{OL(MAX)}$ is 0.2V (2k Ω load) making it compatible with standard logic families.

Figure 3 shows output signal transition for a 50mV input signal overdrive respectively of 3 μ s.

Figure 4 shows output signal transition for a 250mV input signal overdrive respectively of 1 μ s.

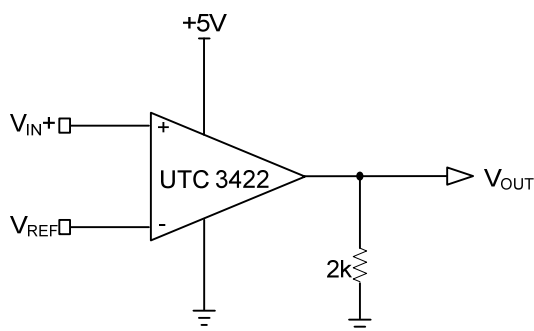


Figure.1 Basic Comparator Application

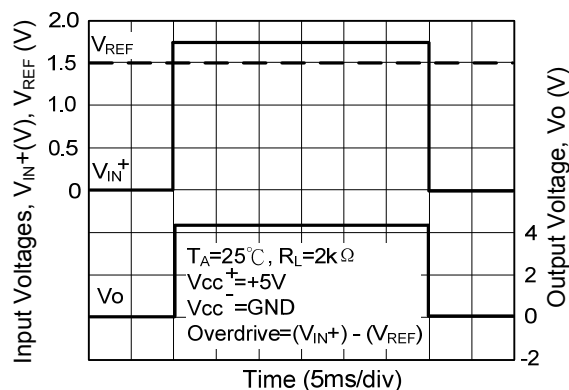


Figure.2 Operating Conditions

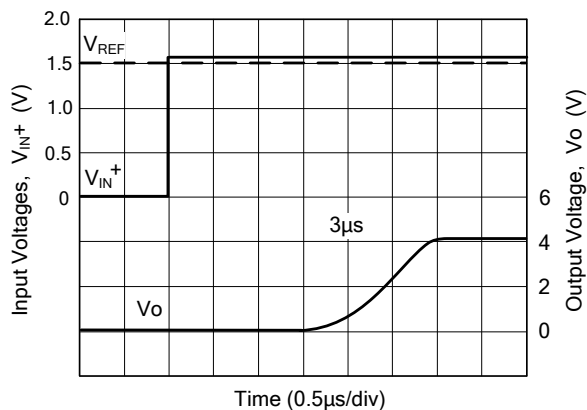


Figure.3 Transition Speed @ 50mV Overdrive

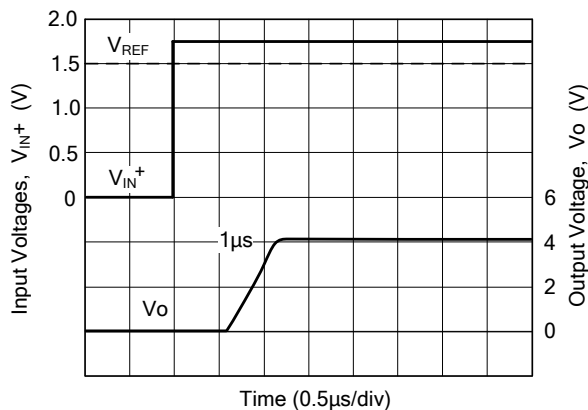


Figure.4 Transition Speed @ 250mV Overdrive

■ APPLICATIONS INFORMATION(Cont.)

PHASE INVERSION

The UTC **3422** keeps the right output level thanks to its specific input structures at high differential input voltage. The advantage is obvious on the following figures and can be also an advantage in linear use when saturation might occur.

Figure 5 shows the behaviour in follower stage with saturation output of UTC **3422**.

Figure 6 shows the saturation behaviour with 15MHz standard operational amplifier.

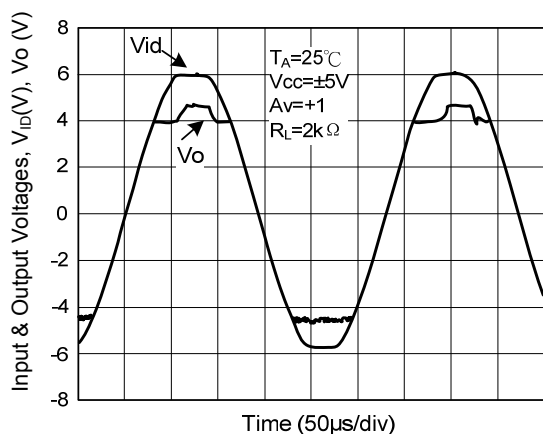


Figure.5 Behaviour With UTC3422

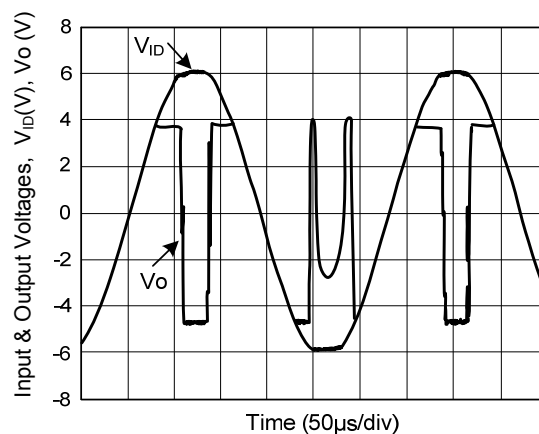


Figure.6 Saturation Behaviour With 15MHz Standard Operational Amplifier

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