



TL072

LINEAR INTEGRATED CIRCUIT

LOW NOISE DUAL J-FET OPERATIONAL AMPLIFIER

DESCRIPTION

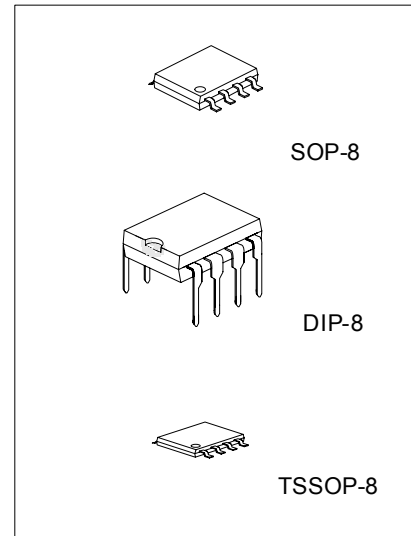
The UTC **TL072** is a high speed J-FET input quad operational amplifier. It incorporates well matched, high voltage J-FET and bipolar transistors in a monolithic integrated circuit. The device features high slew rates, low input bias and offset current, and low offset voltage temperature coefficient.

FEATURES

- *Low power consumption
- *Wide common-mode (up to V_{CC+}) and differential voltage range
- *Low input bias and offset current
- *Low noise $e_n = 15nV / \sqrt{Hz}$ (typ)
- *Output short-circuit protection
- *High input impedance J-FET input stage
- *Low harmonic distortion:0.01%(typ)
- *Internal frequency compensation
- *Latch up free operation
- *High slewrate:16V/ μs (typ)

ORDERING INFORMATION

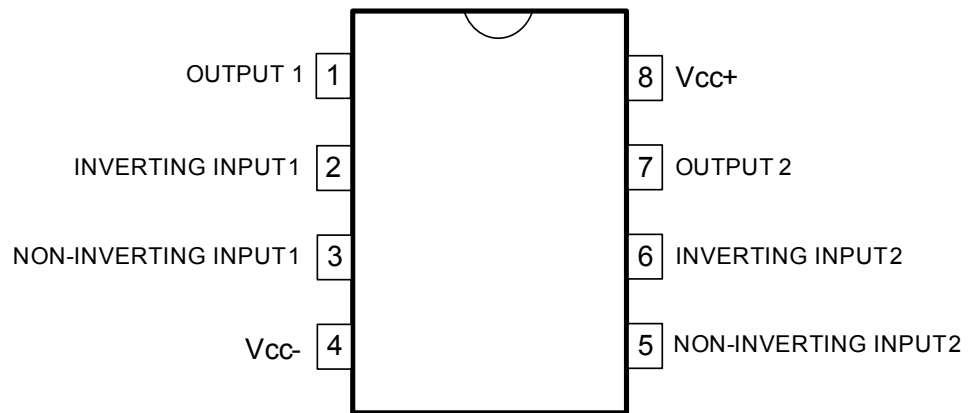
Ordering Number		Package	Packing
Normal	Lead Free Plating		
TL072-D08-T	TL072L-D08-T	DIP-8	Tube
TL072-P08-R	TL072L-P08-R	TSSOP-8	Tape Reel
TL072-P08-T	TL072L-P08-T	TSSOP-8	Tube
TL072-S08-R	TL072L-S08-R	SOP-8	Tape Reel
TL072-S08-T	TL072L-S08-T	SOP-8	Tube



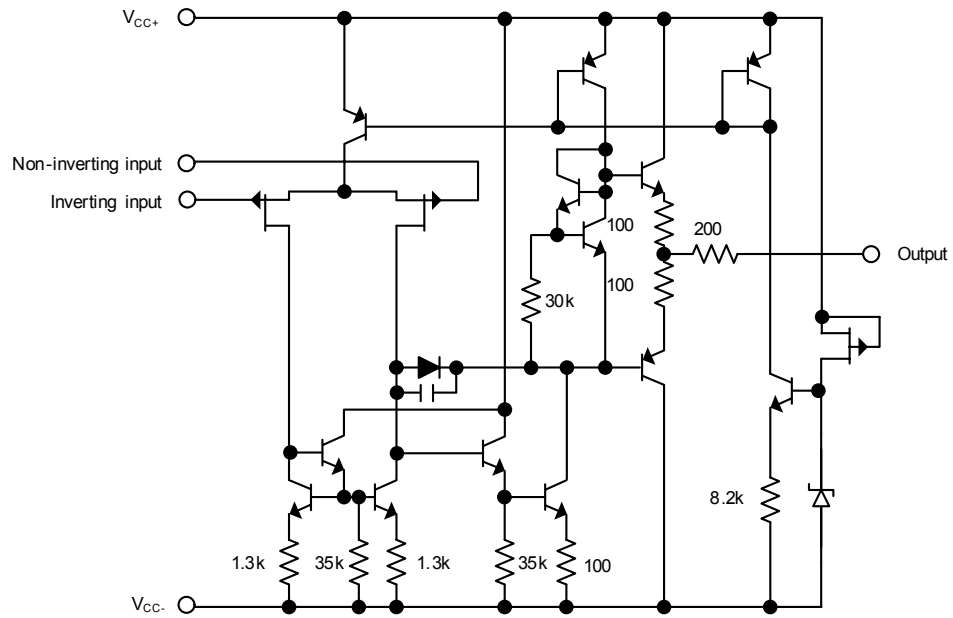
*Pb-free plating product number: TL072L

<p>TL072L-D08-T</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



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage (note 1)	V _{CC}	±18	V
Input Voltage (note 2)	V _{IN}	±15	V
Differential Input Voltage (note 3)	V _{I(DIFF)}	±30	V
Power Dissipation	P _D	680	mW
Output Short-Circuit Duration (Note 4)		Infinite	
Operating Temperature	T _{OPR}	0 ~ +70	°C
Storage Temperature	T _{STG}	-65 ~ +150	°C

- Notes: 1. All voltage values, except differential voltage, are with respect to the zero reference level (ground) of the supply voltages where the zero reference level is the midpoint between V_{CC-} and V_{CC+}.
2. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
3. Differential voltages are at the non-inverting input terminal with respect to the inverting input terminal.
4. The output may be shorted to ground or to either supply. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.
5. 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

($V_{CC}=\pm 15V$, $T_a=25^\circ C$, $T_{MIN}=0^\circ C$, $T_{MAX}=70^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT	
Input Offset Voltage	$V_{I(OFF)}$	$R_S=50\Omega$	$T_a=25^\circ C$		3	10	mV	
			T_{MIN} T_a T_{MAX}				13	mV
Temperature Coefficient of Input Offset Voltage	$\Delta V_{I(OFF)}$	$R_S=50\Omega$			10		$\mu V/^\circ C$	
Input Offset Current*	$I_{I(OFF)}$		$T_a=25^\circ C$		5	100	pA	
			T_{MIN} T_a T_{MAX}				10	nA
Input Bias Current*	$I_{I(BIAS)}$		$T_a=25^\circ C$		20	200	pA	
			T_{MIN} T_a T_{MAX}				20	nA
Input Common Mode Voltage	$V_{I(CM)}$			± 11	$-12 \sim +15$		V	
Output Voltage Swing	$V_{O(SW)}$	$R_L=2k\Omega$	$T_a=25^\circ C$	10	12		V	
		$R_L=10k\Omega$		12	13.5		V	
		$R_L=2k\Omega$	T_{MIN} T_a T_{MAX}	10				V
		$R_L=10k\Omega$		12				V
Large Signal Voltage Gain	A _{vd}	$R_L=10k\Omega$, $V_{OUT}=\pm 10V$	$T_a=25^\circ C$	25	200		V/mV	
			T_{MIN} T_a T_{MAX}	15			V/mV	
Gain Bandwidth Product	GB _W	$T_a=25^\circ C$, $R_L=10k\Omega$, $C_L=100pF$		2.5	4		MHz	
Input Resistance	R_{IN}				10^{12}		Ω	
Common Mode Rejection Ratio	CMR	$R_S=50\Omega$	$T_a=25^\circ C$	70	86		dB	
			T_{MIN} T_a T_{MAX}	70			dB	
Supply Voltage Rejection Ratio	SVR	$R_S=50\Omega$	$T_a=25^\circ C$	70	86		dB	
			T_{MIN} T_a T_{MAX}	70			dB	
Supply Current	I_{CC}	No load	$T_a=25^\circ C$		1.4	2.5	mA	
			T_{MIN} T_a T_{MAX}				2.5	mA
Channel Separation	V ₀₁ /V ₀₂	G _v =100			120		dB	
Output Short-circuit Current	I _{os}		$T_a=25^\circ C$	10	40	60	mA	
			T_{MIN} T_a T_{MAX}	10			60	mA
Slew Rate	SR	$V_{IN}=10V$, $R_L=2k\Omega$, $C_L=100pF$, unity gain		8	16		V/ μs	
Rise Time	t _r	$V_{IN}=20mV$, $R_L=2k\Omega$, $C_L=100pF$, unity gain			0.1		μs	
Overshoot Factor	K _{ov}	$V_{IN}=20mV$, $R_L=2k\Omega$, $C_L=100pF$, unity gain			10		%	
Total Harmonic Distortion	THD	G _v =20dB, f=1kHz, $R_L=2k\Omega$, $C_L=100pF$, $V_{OUT}=2V_{pp}$			0.01		%	
Phase Margin	ϕ_m				45		Degrees	
Equivalent Input Noise Voltage	e _N	$R_S=100\Omega$, f=1KHz			15		$\frac{nV}{\sqrt{Hz}}$	

*The Input bias currents are junction leakage currents, which approximately double for every 10°C increase in the junction temperature.

■ PARAMETER MEASUREMENT INFORMATION

Figure 1. Voltage Follower

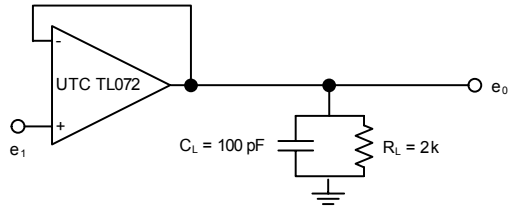
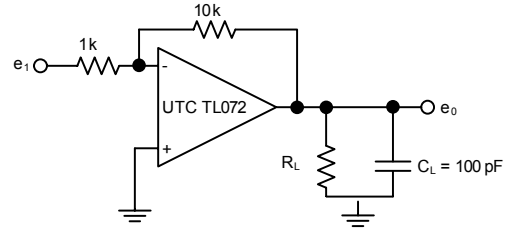
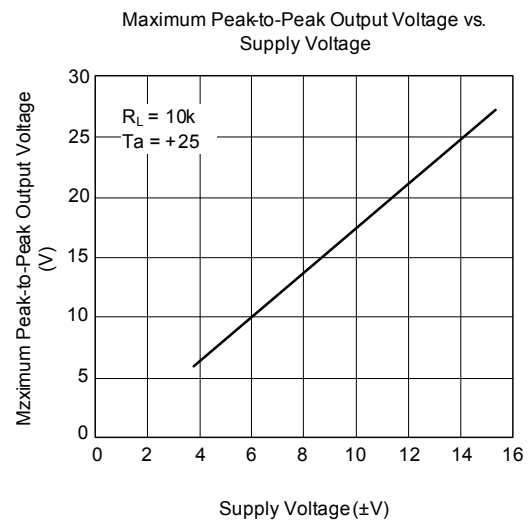
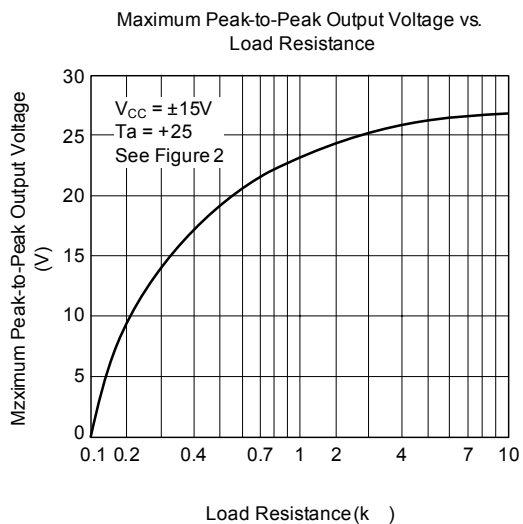
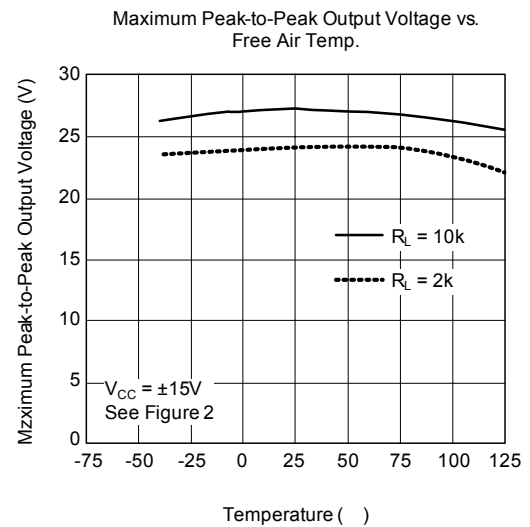
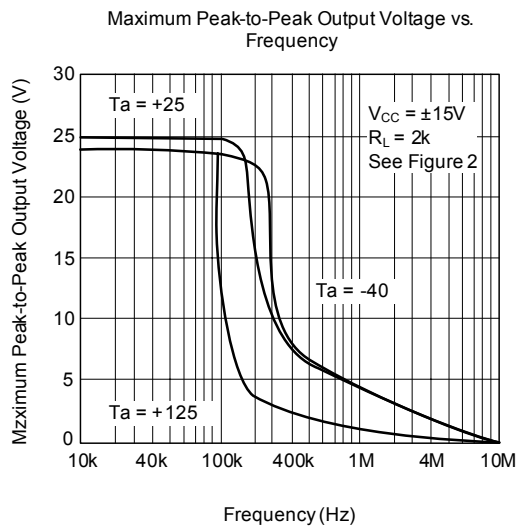
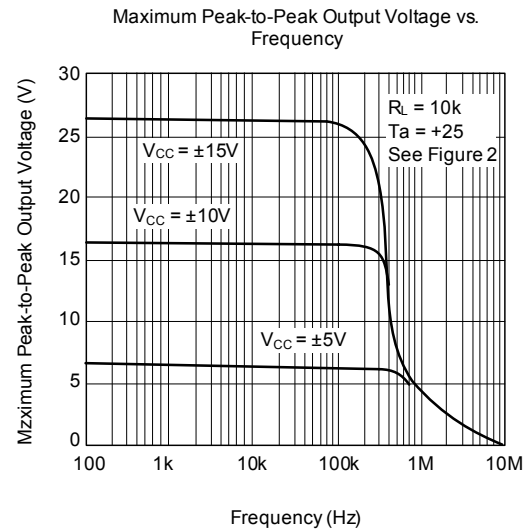
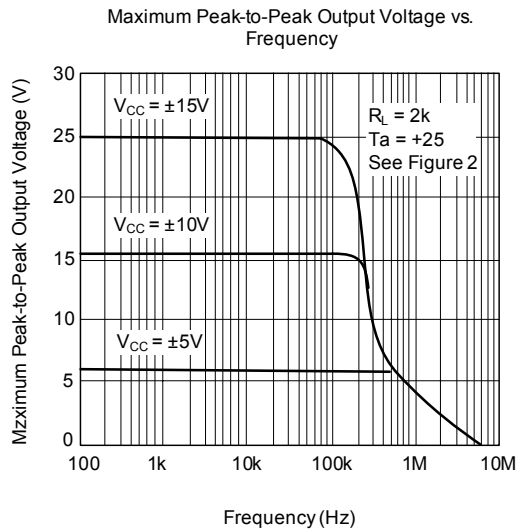


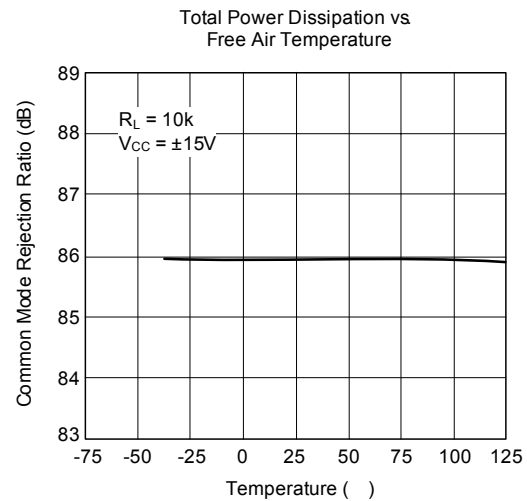
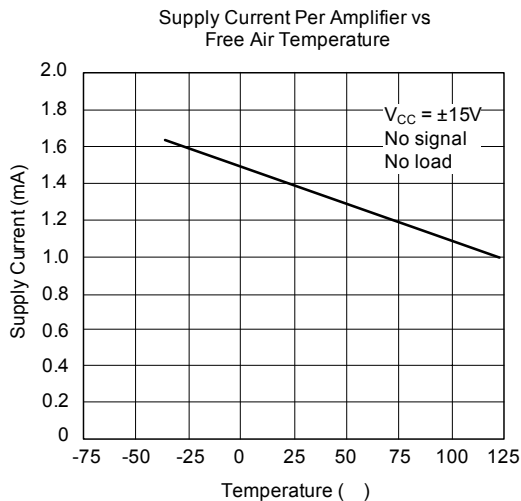
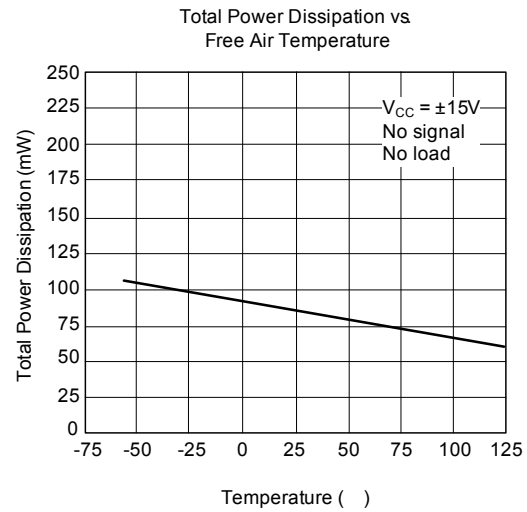
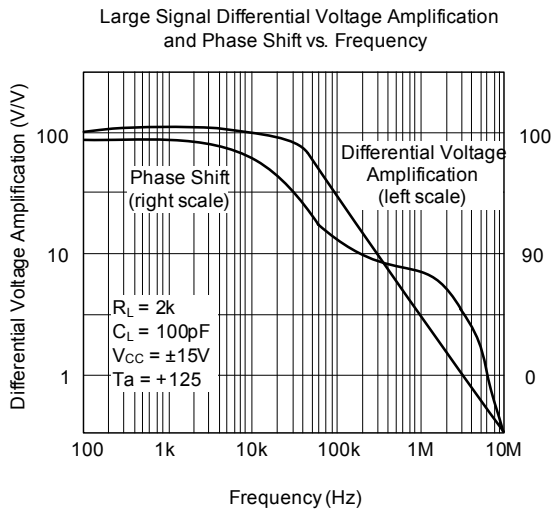
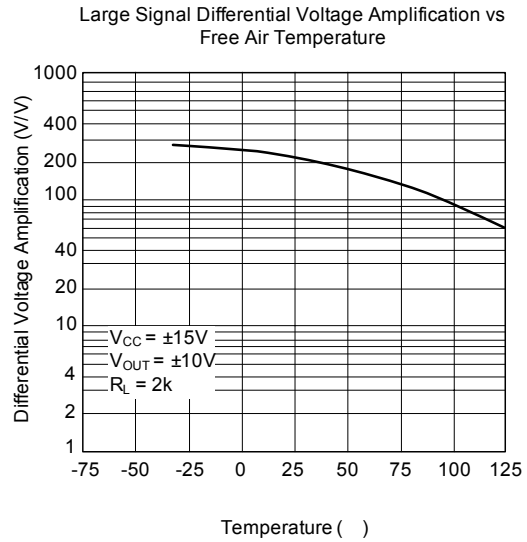
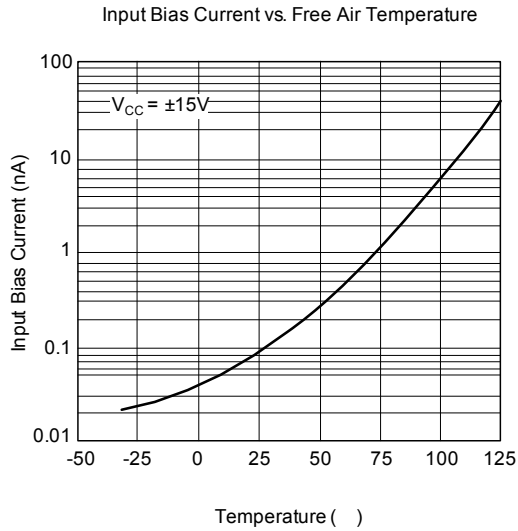
Figure 2. Gain-of-10 Inverting Amplifier



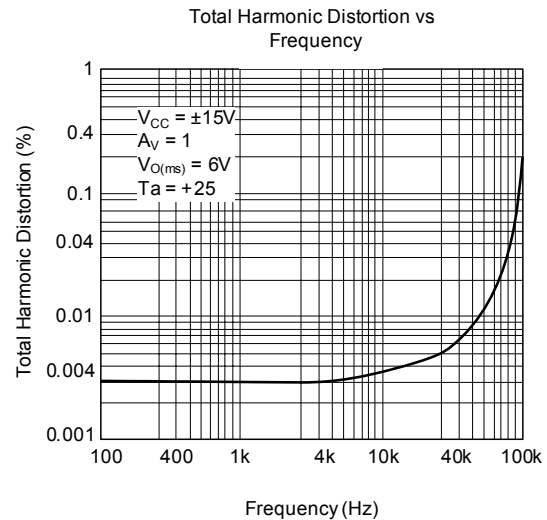
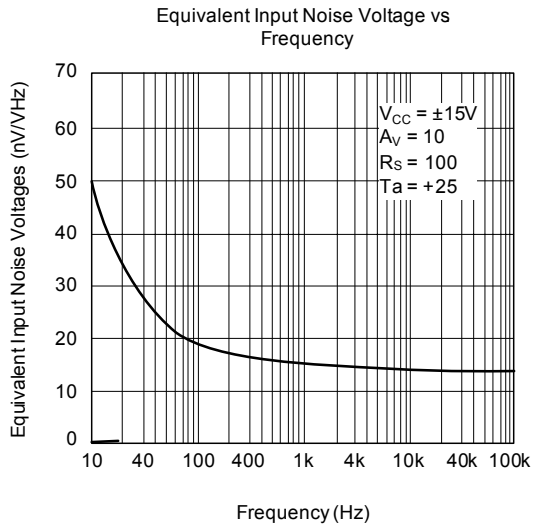
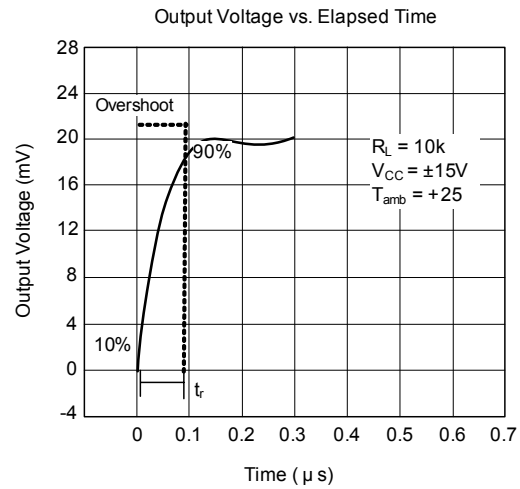
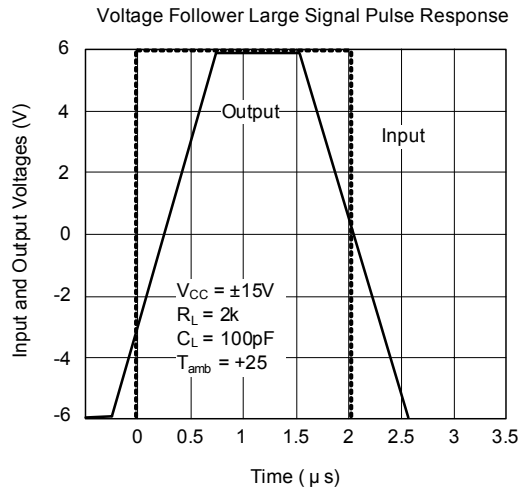
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS(Cont.)



■ TYPICAL CHARACTERISTICS(Cont.)



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