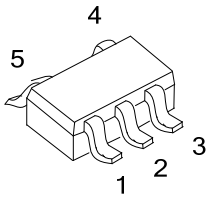
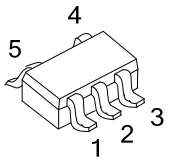
LV321

LINEAR INTEGRATED CIRCUIT

SINGLE GENERAL PURPOSE, LOW VOLTAGE, RAIL-TO-RAIL OUTPUT OPERATIONAL AMPLIFIER



SOT-25



SOT-353

■ DESCRIPTION

The UTC **LV321** is a single op amp with low supply current. It brings good performance in low voltage, low power operating systems. The UTC **LV321** has a guaranteed 0.8V/μs slew rate and a 1MHz unity-gain bandwidth, in low supply current. It provides heavy rail-to-rail (R-to-R) output swing loads and the input common-mode voltage range including ground. Besides, it is also capable for comfortably driving large capacitive loads.

The UTC **LV321** has bipolar input and CMOS output for improved noise performance and higher output current drive. It's the most cost effective solution for the applications where low voltage operation, space saving and low price are required.

■ FEATURES

* 2.7V and 5V Performance Guaranteed
* No Crossover Distortion
* 130μA Low Supply Current
* Rail-to-Rail Output Swing @10kΩ Load: V^+ -25mV
  V^- +15mV
* V_{CM} From -0.2V to V^+ -0.8V

■ ORDERING INFORMATION

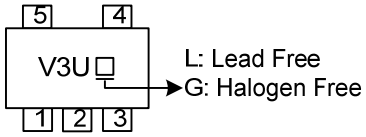
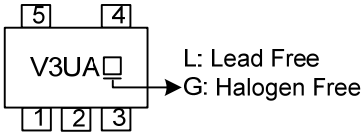
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV321L-AF5-R	LV321G-AF5-R	SOT-25	Tape Reel
LV321L-AF5-A-R	LV321G-AF5-A-R	SOT-25	Tape Reel
LV321L-AL5-R	LV321G-AL5-R	SOT-353	Tape Reel

LV321G-AF5-A-R

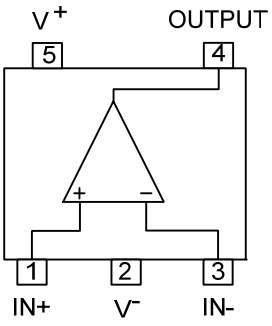
(1)Packing Type
(2)Packing Type
(3)Package Type
(4)Green Package

(1) R: Tape Reel
(2) refer to Pin Assignment
(3) AF5: SOT-25, AL5: SOT-353
(4)G: Halogen Free and Lead Free, L: Lead Free

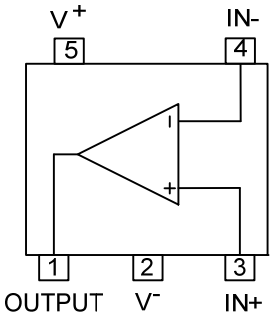
■ MARKING

LV321	LV321-A
	

■ PIN CONFIGURATION



LV321



LV321-A

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{SS}	2.7 ~ 5.5	V
Supply Voltage (V^+- V^-)		V_{SS}	5.5	V
Differential Input Voltage		$V_{I(DIFF)}$	±Supply Voltage	
Output Short Circuit	V^+	$I_{O(SC)}$	(Note 2)	
	V^-		(Note 3)	
Infrared (15 sec)			215	°C
Junction Temperature		T_J	+150	°C
Operation Temperature		T_{OPR}	-40 ~ +85	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Notes: 1. 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.
2. Shorting output to V+ will adversely affect reliability.
3. Shorting output to V- will adversely affect reliability

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-25	θ_{JA}	265	°C/W
	SOT-353		478	°C/W

■ 2.7V ELECTRICAL CHARACTERISTICS

All limits guaranteed for T_J =25°C, V^+=2.7V, V^-=0V, V_{CM}=1.0V, V_{OUT} =V^+/2 and R_L>1MΩ, unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
DC CHARACTERISTICS						
Input Offset Voltage	V_{OS}			1.7	7	mV
Input Common Mode Voltage Range	V_{CM}	For CMRR≥50dB	0	-0.2		V
			1.7	1.9		V
Output Swing	V_{OUT}	R_L=10kΩ to 1.35V	V^+-100	V^+-25		mV
				15	100	mV
Input Offset Voltage Average Drift	TCVos			5		μV/°C
Input Bias Current	$I_{I(BIAS)}$			11	250	nA
Input Offset Current	$I_{I(OFF)}$			5	50	nA
Common Mode Rejection Ratio	CMRR	0V≤V_{CM}≤1.7V	50	63		dB
Power Supply Rejection Ratio	PSRR	2.7V≤V^+ ≤5V, V_{OUT} =1V	50	60		dB
Supply Current	I_{SS}			80	170	μA
AC CHARACTERISTICS						
Gain Bandwidth Product	GBWP	C_L=200pF		1		MHz
Phase Margin	Φ_m			60		Deg
Gain Margin	G_m			10		dB
Input Referred Voltage Noise	eN	F=1kHz		46		$\frac{nV}{\sqrt{Hz}}$
Input Referred Current Noise	i_n	F=1kHz		0.17		$\frac{pA}{\sqrt{Hz}}$

■ 5V ELECTRICAL CHARACTERISTICS

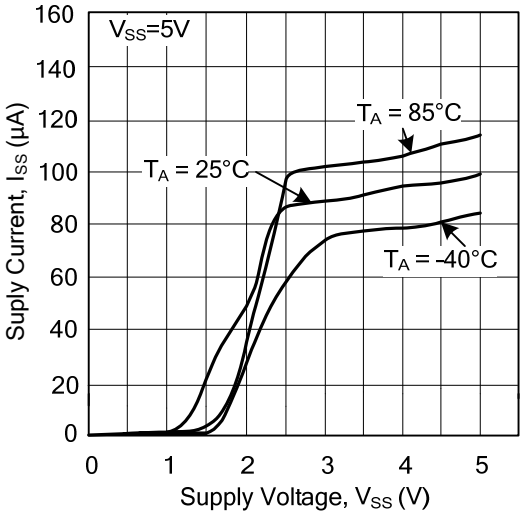
All limits guaranteed for T_J =25°C, V^+=5V, V^-=0V, V_{CM}=2.0V, V_{OUT}=V^+/2 and R_L>1MΩ, unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
DC CHARACTERISTICS							
Input Offset Voltage	V_{OS}				1.7	7	mV
Input Common-Mode Voltage Range	V_{CM}	For CMRR≥50dB			-0.2	0	V
				4.0	4.2		V
Output Swing	V_{OUT}	R_L=2kΩ to2.5V	V_{OH}	V^+-120	V^+-25		mV
			V_{OL}		20	120	mV
		R_L=10kΩ to 2.5V	V_{OH}	V^+-100	V^+-20		mV
			V_{OL}		15	100	mV
Input Offset Voltage Average Drift	TCVos				5		μV/°C
Input Bias Current	$I_{I(BIAS)}$				15	250	nA
Input Offset Current	$I_{I(OFF)}$				5	50	nA
Common Mode Rejection Ratio	CMRR	0V≤V_{CM}≤4V		50	65		dB
Power Supply Rejection Ratio	PSRR	2.7V≤V^+≤5V V_{OUT}=1V, V_{CM}=1V		50	60		dB
Large Signal Voltage Gain(Note 1)	G_V	R_L=2kΩ		15	100		V/mV
Output Short Circuit Current	I_{OUT}	Sourcing, V_{OUT} =0V		5	60		mA
		Sinking, V_{OUT} =5V		10	160		mA
Supply Current	I_{SS}				130	250	μA
AC CHARACTERISTICS							
Slew Rate	SR	(Note 2)			0.8		V/μs
Gain Bandwidth Product	GBWP	C_L=200pF			1		MHz
Phase Margin	Φ_m				60		Deg
Gain Margin	G_m				10		dB
Input Referred Voltage Noise	eN	f=1kHz			39		$\frac{nV}{\sqrt{Hz}}$
Input Referred Current Noise	i_n	f=1kHz			0.21		$\frac{pA}{\sqrt{Hz}}$

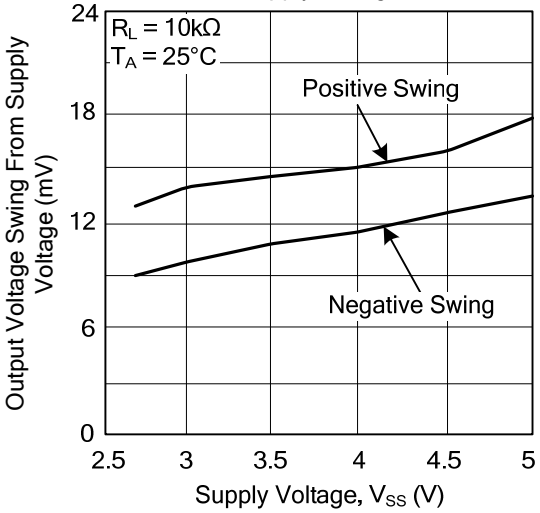
Notes: 1. R_L is connected to V^-. The output voltage is 0.5V≤V_{OUT}≤4.5V.
2. Connected as voltage follower with 3V step input.
3. All numbers are typical, and apply for packages soldered directly note a PC board is still air.

■ TYPICAL CHARACTERISTICS

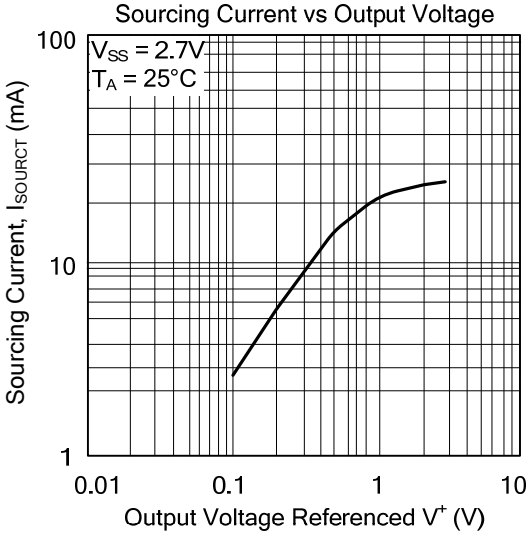
Supply Current vs Supply Voltage



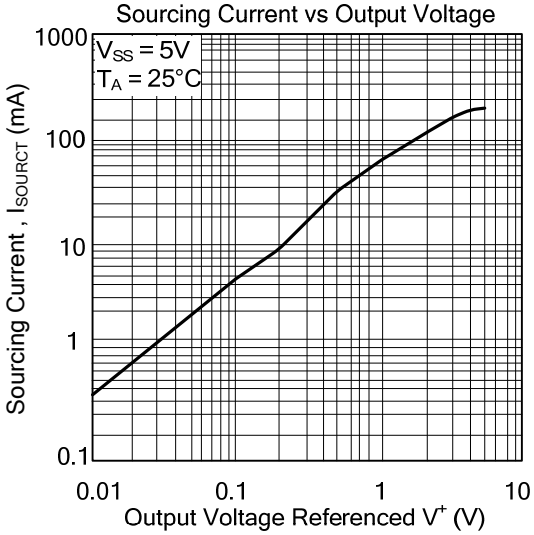
Output Voltage Swing vs Supply Voltage



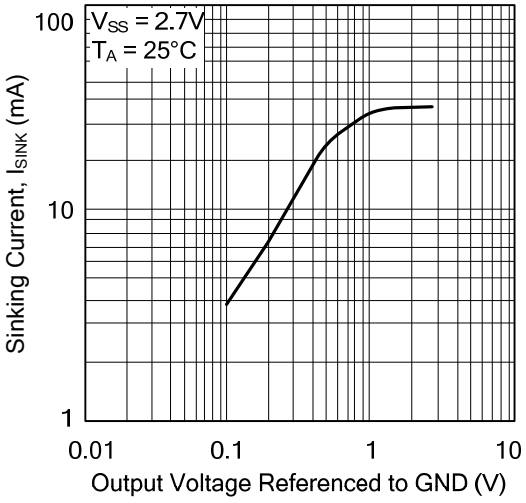
Sourcing Current vs Output Voltage



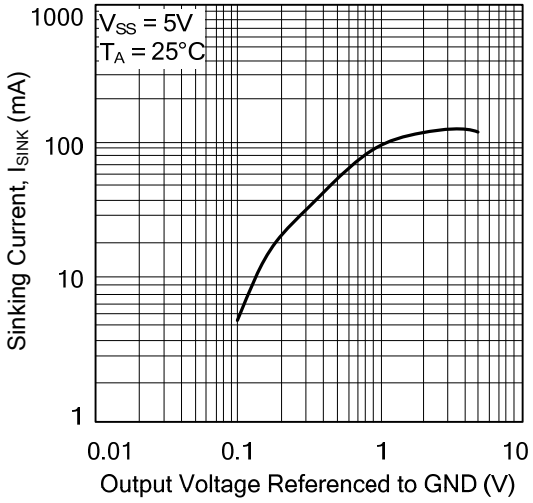
Sourcing Current vs Output Voltage



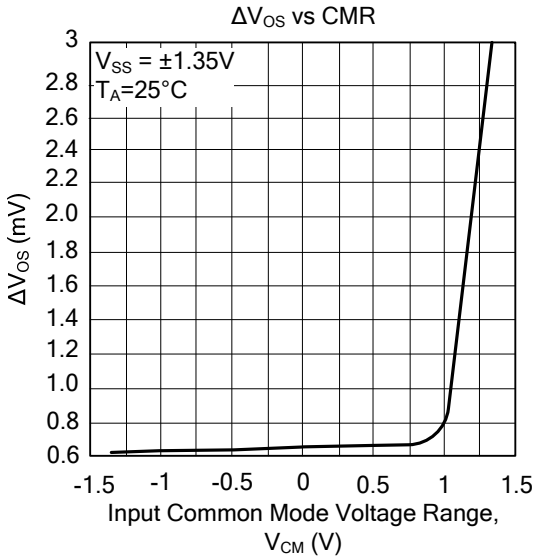
Sinking Current vs Output Voltage

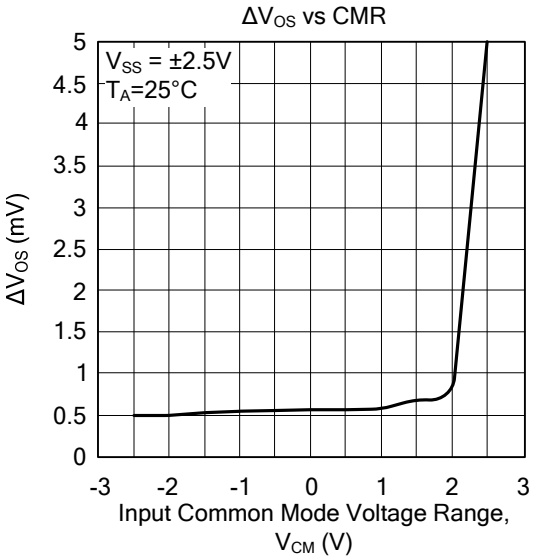


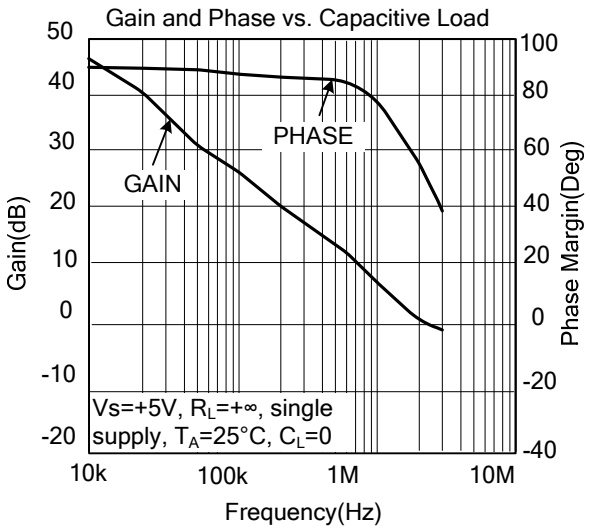
Sinking Current vs Output Voltage

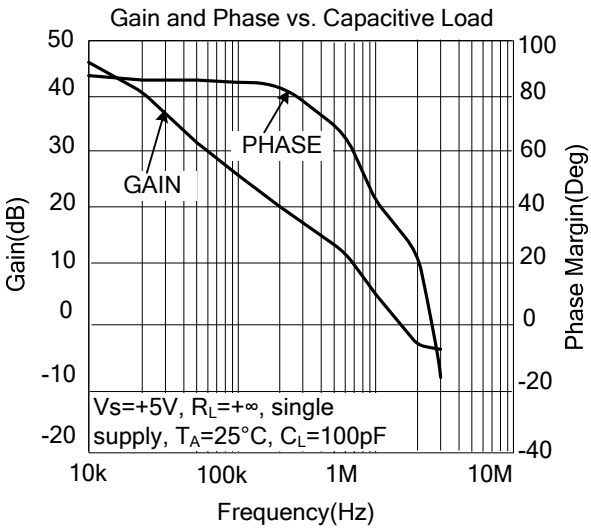


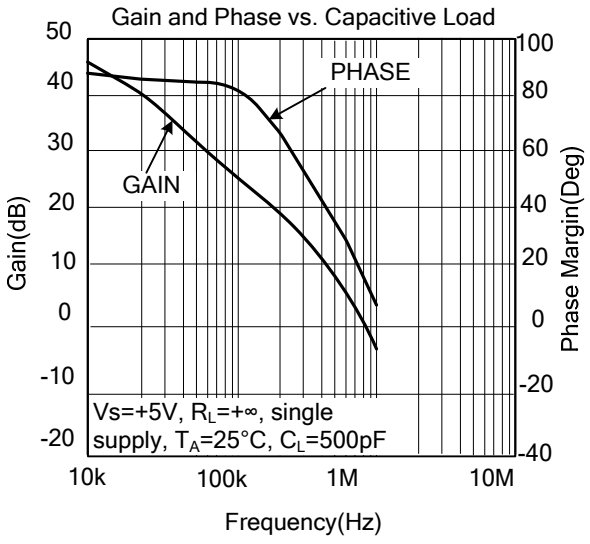
■ TYPICAL CHARACTERISTICS (Cont.)

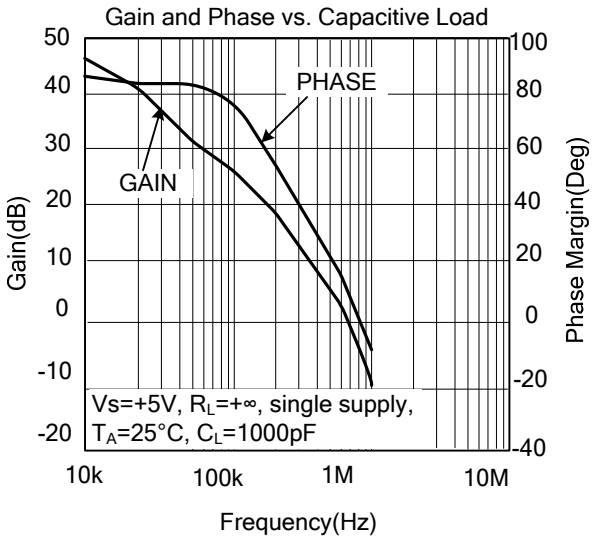






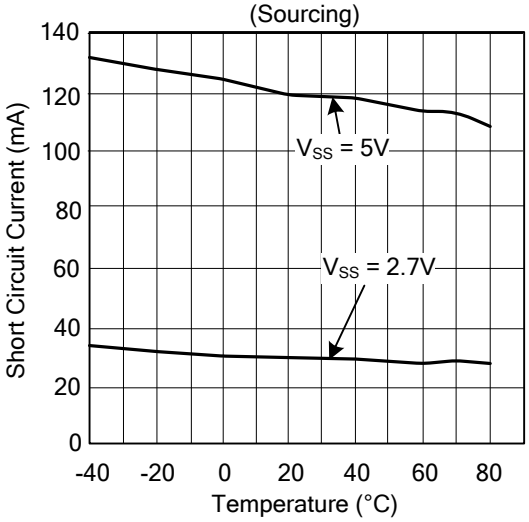




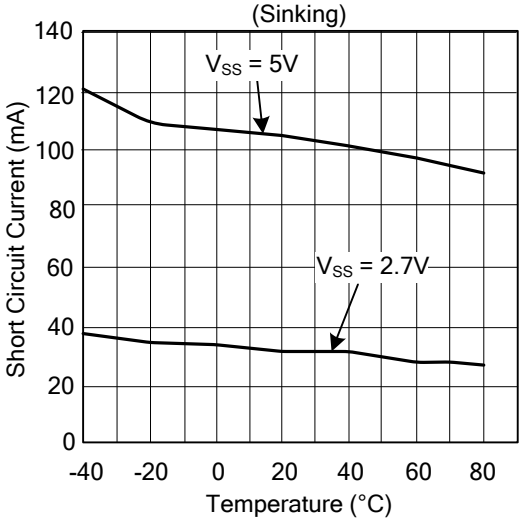


■ TYPICAL CHARACTERISTICS (Cont.)

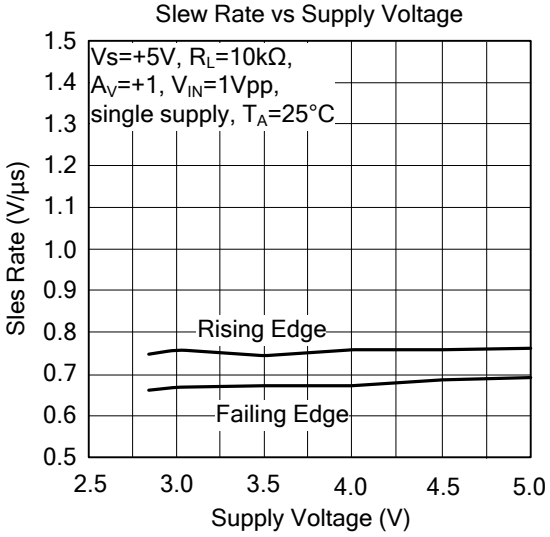
Short Circuit Current vs Temperature (Sourcing)



Short Circuit Current vs Temperature (Sinking)

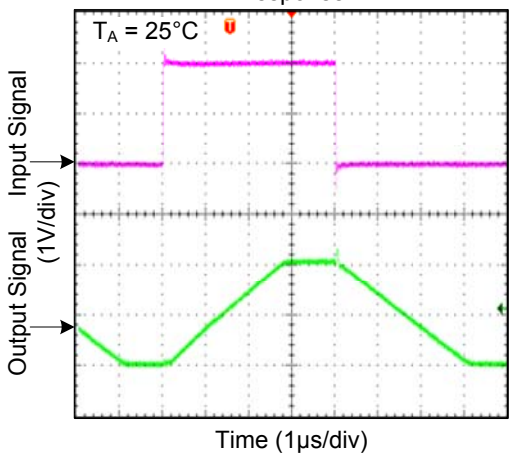


Slew Rate vs Supply Voltage

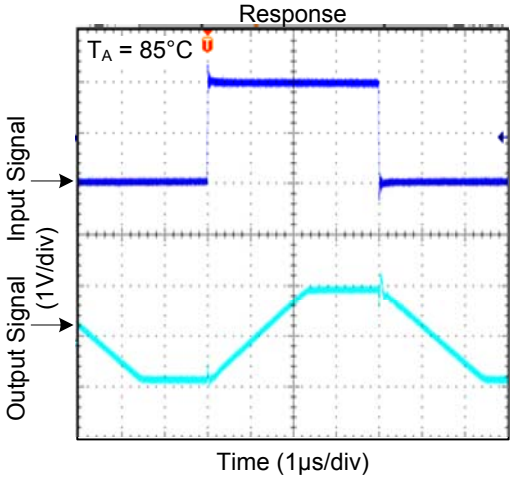


■ TYPICAL CHARACTERISTICS (Cont.)

Non-Inverting Large Signal Pulse Response



Non-Inverting Large Signal Pulse Response



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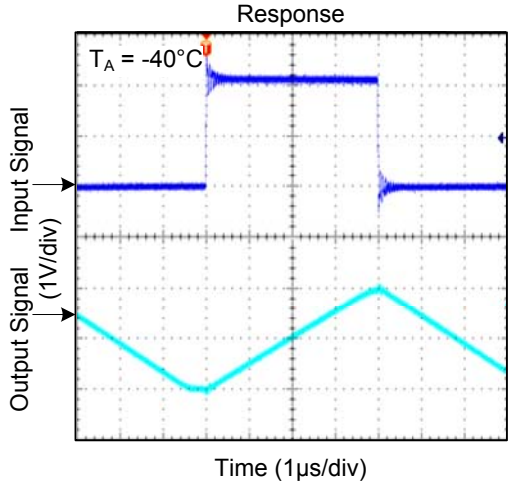

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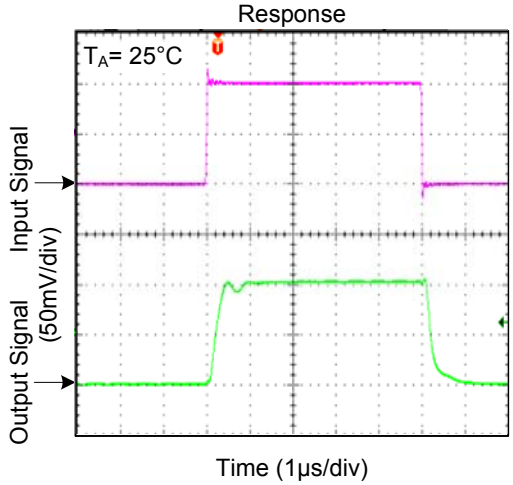

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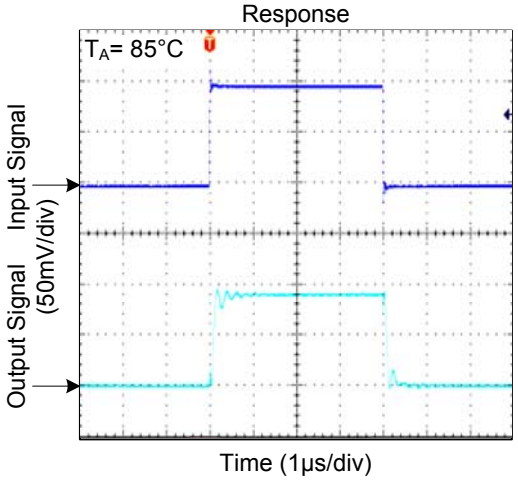
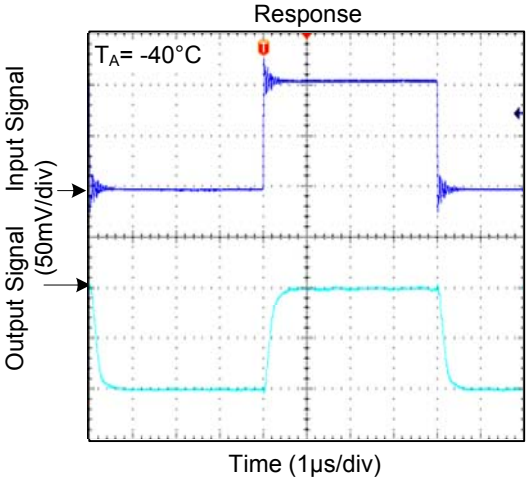
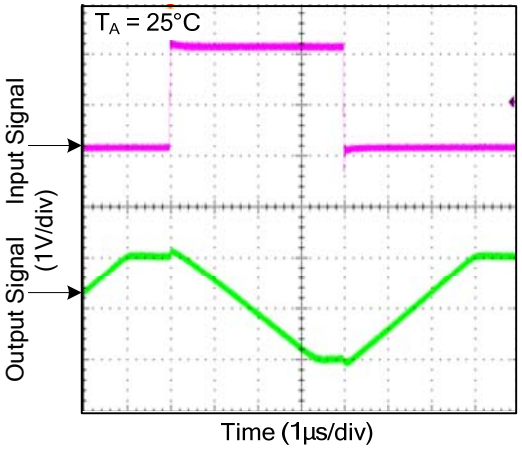


Non-Inverting Small Signal Pulse Response

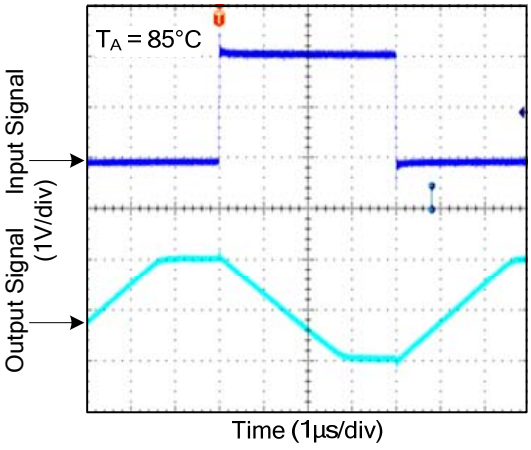


■ TYPICAL CHARACTERISTICS (Cont.)

Inverting Large Signal Pulse Response



Inverting Large Signal Pulse Response



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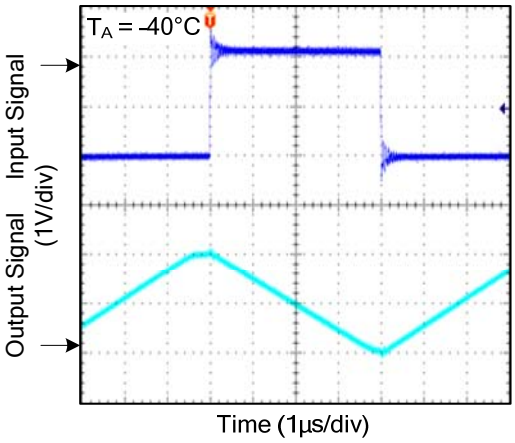

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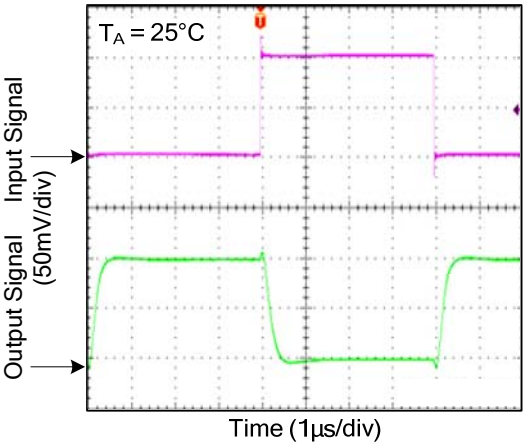

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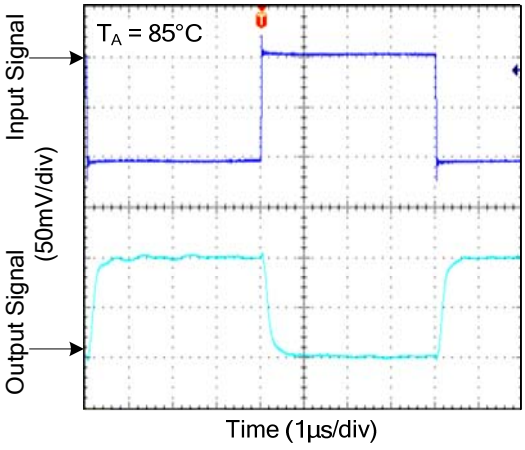

Inverting Small Signal Pulse Response