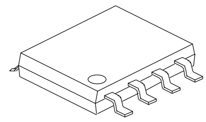
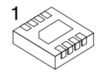
GENERAL PURPOSE, LOW VOLTAGE, RAIL-TO-RAIL OUTPUT OPERATIONAL AMPLIFIERS



SOP-8



DFN2020-8

■ DESCRIPTION

The UTC **L6132** is a dual op amp with low supply current and low voltage (2.7-5.5V). It brings nice performance to low voltage and low power systems. With a 1MHz unity-gain frequency. The UTC **L6132** has a guaranteed 1 V/μs slew rate and 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 **L6132** 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

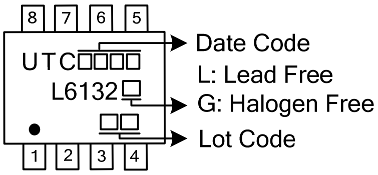
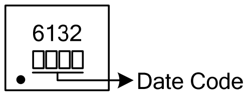
* 2.7V and 5V Performance Guaranteed
* No Crossover Distortion
* 210μA Low Supply Current
* Rail-to-Rail Output Swing
  @10kΩ Load V^{+} -10mV
  V^{-} +65mV
* V_{CM} From -0.2V to V^{+} -0.8V

■ ORDERING INFORMATION

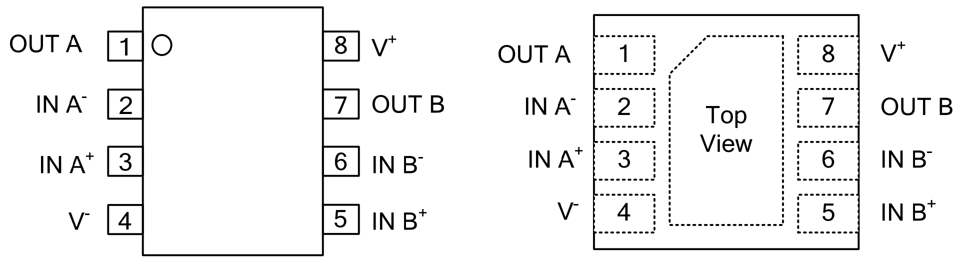
Ordering Number		Package	Packing
Lead Free	Halogen Free		
L6132L-S08-R	L6132G-S08-R	SOP-8	Tape Reel
L6132L-K08-2020-R	L6132G-K08-2020-R	DFN2020-8	Tape Reel

L6132G-S08-R	
(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) S08: SOP-8, K08-2020: DFN-8(2×2)
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOP-8	DFN2020-8
	

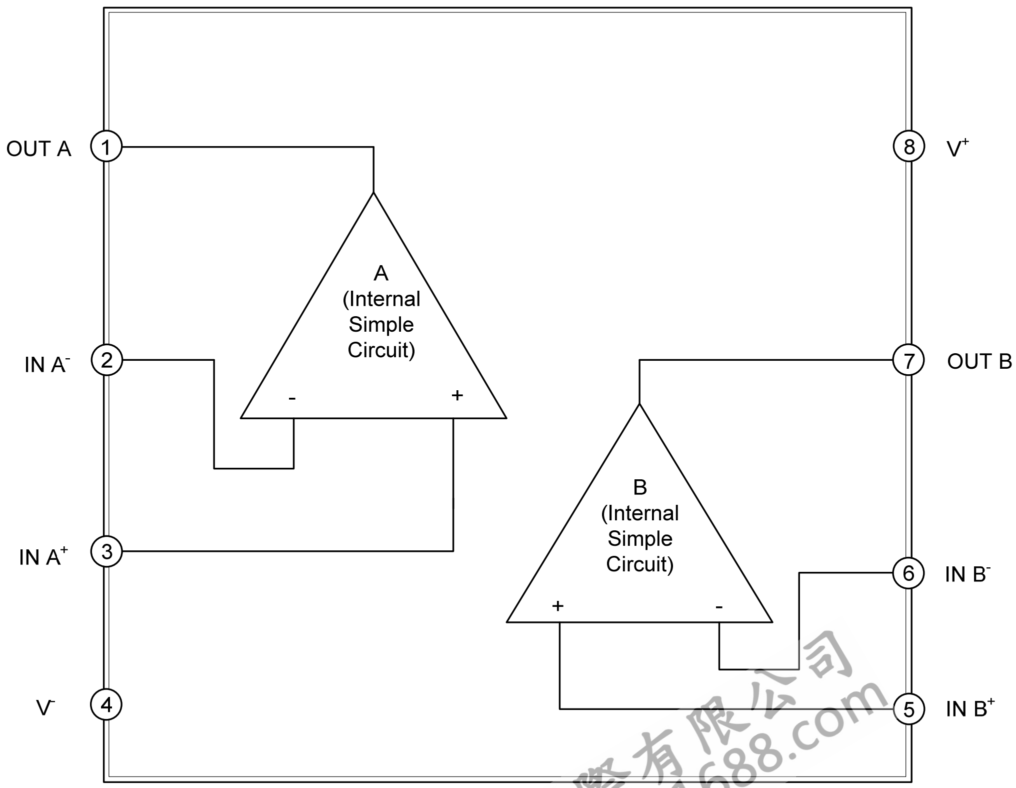
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUTA	Output for Channel 1
2	IN A^-	Negative Input for Channel 1
3	IN A^+	Positive Input for Channel 1
4	V^-	Supply Output Voltage
5	IN B^+	Positive Input for Channel 2
6	IN B^-	Negative Input for Channel 2
7	OUT B	Output for Channel 2
8	V^+	Supply Input Voltage

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Note1)

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 INFORMATION (Note)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-8	θ_{JA}	250	°C/W
	DFN2020-8		155	°C/W
Junction to Case	SOP-8	θ_{JC}	140	°C/W
	DFN2020-8		20	°C/W

Note: θ_{JA} is measured in the natural convection at T_A=25°C on a low effective thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

■ ELECTRICAL CHARACTERISTICS (FOR 2.7V)

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	6	mV
Input Common Mode Voltage Range	V_{CM}	For CMRR≥50dB	0	-0.2		V
				1.9	1.7	V
Output Swing	V_{OUT}	R_L=10kΩ to 1.35V	V^+-100	V^+-10		mV
				60	180	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}	Both amplifiers		140	340	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		$\frac{pA}{\sqrt{Hz}}$

■ ELECTRICAL CHARACTERISTICS (FOR 5V)

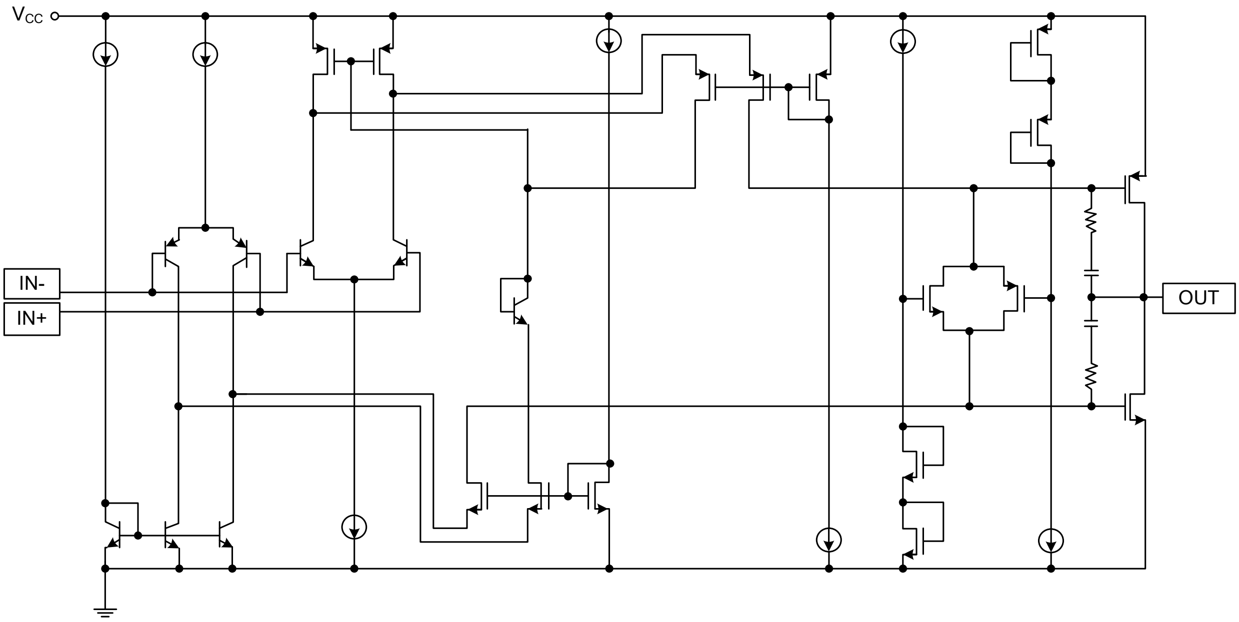
All limits guaranteed for T_J=25°C, V^+=5V, V^-=0V, V_{CM}=2.0V, V_{OUT}=V^+/2 and R_L>1MΩ, unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
DC CHARACTERISTICS							
Input Offset Voltage	V_{OS}				1.7	6	mV
Input Common-Mode Voltage Range	V_{CM}	For CMRR≥50dB		0	-0.2		V
					4.2	4	V
Output Swing	V_{OUT}	R_L=2KΩ to 2.5V	V_{OH}	V^+-300	V^+-40		mV
			V_{OL}		120	300	mV
		R_L=10KΩ to 2.5V	V_{OH}	V^+-100	V^+-10		mV
			V_{OL}		65	180	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		10	230		mA
		Sinking, V_{OUT} =5V		30	160		mA
Supply Current	I_{SS}	Both Amplifiers			210	440	μA
AC CHARACTERISTICS							
Slew Rate	SR	(Note 2)			1		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		$\frac{pA}{\sqrt{Hz}}$

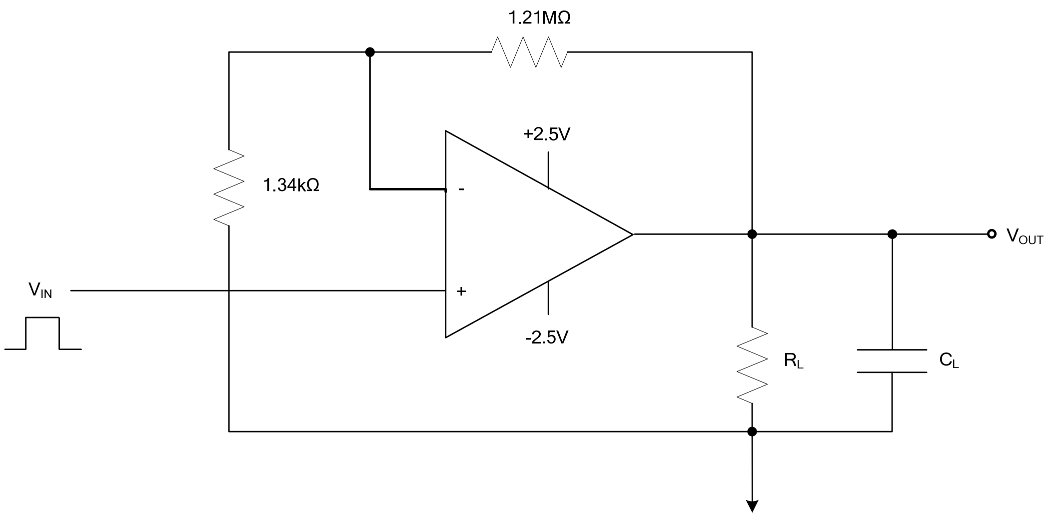
Notes: 1. R_L is connected to V^-. The output voltage is 0.5V≤V_{OUT}≤4.5V.

2. Connected as voltage follower with 3V step input. Number specified is these lower of the positive and negative slew rates

■ INTERNAL SIMPLE CIRCUIT

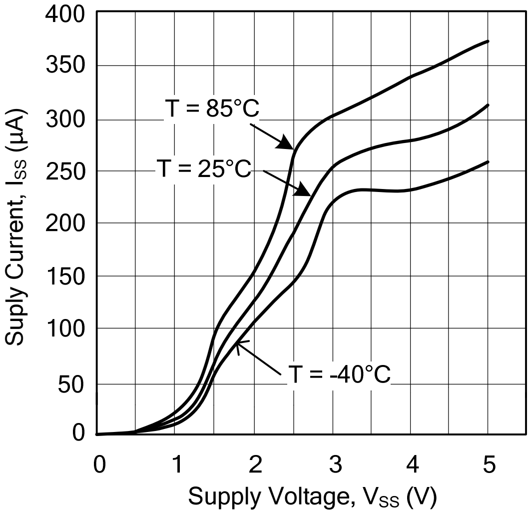


■ TEST CIRCUIT FOR STABILITY VS CAPACITIVE LOAD

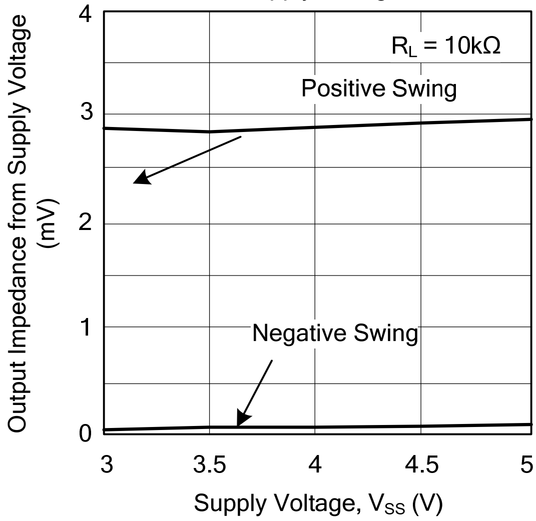


■ TYPICAL CHARACTERISTICS

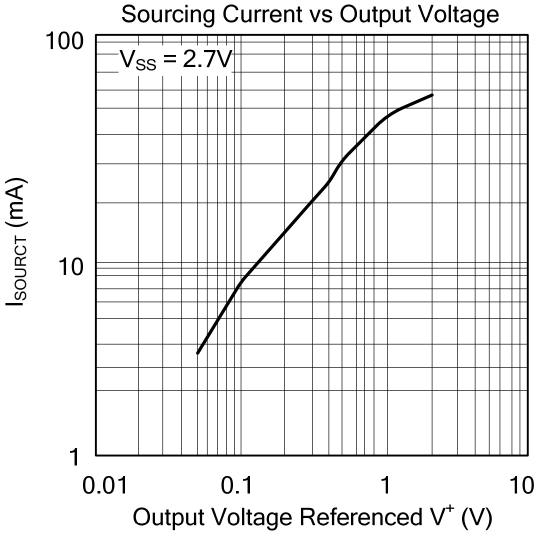
Supply Current vs Supply Voltage



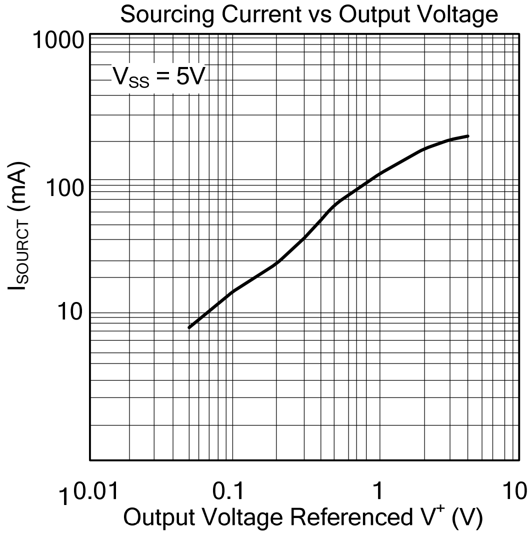
Output Voltage Swing vs Supply Voltage



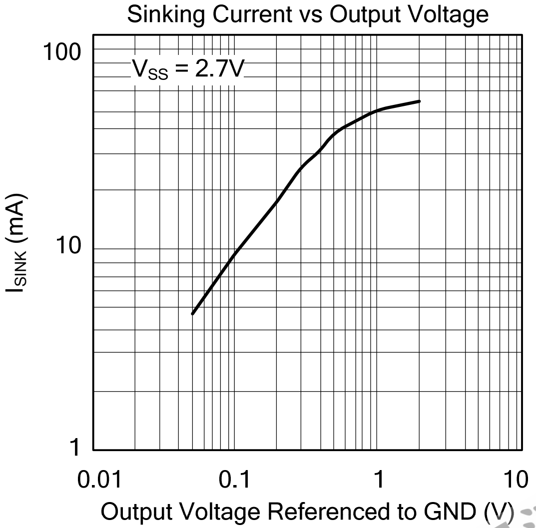
Sourcing Current vs Output Voltage



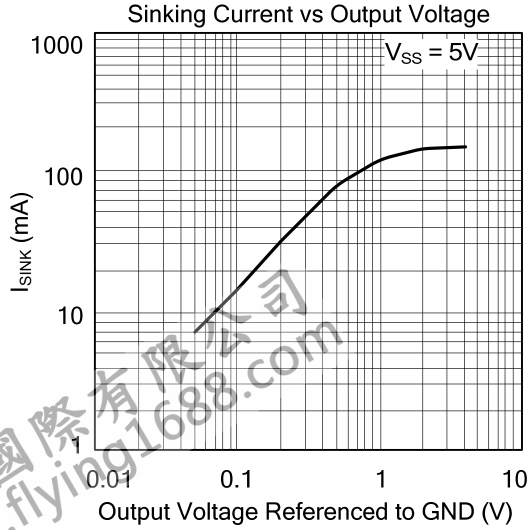
Sourcing Current vs Output Voltage



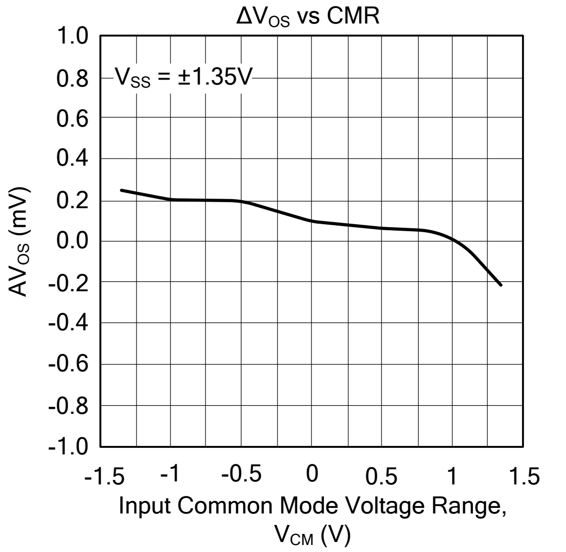
Sinking Current vs Output Voltage

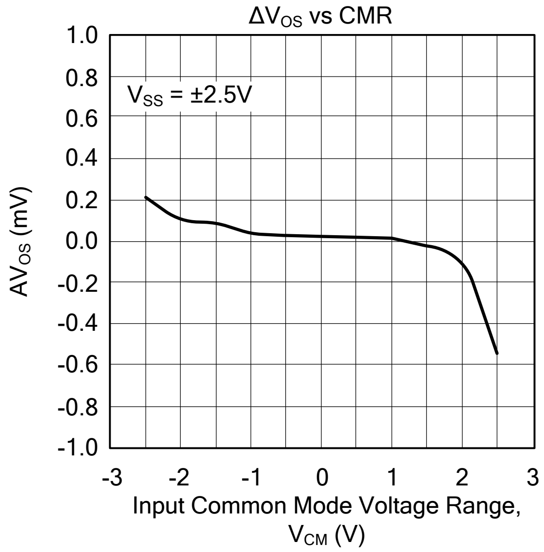


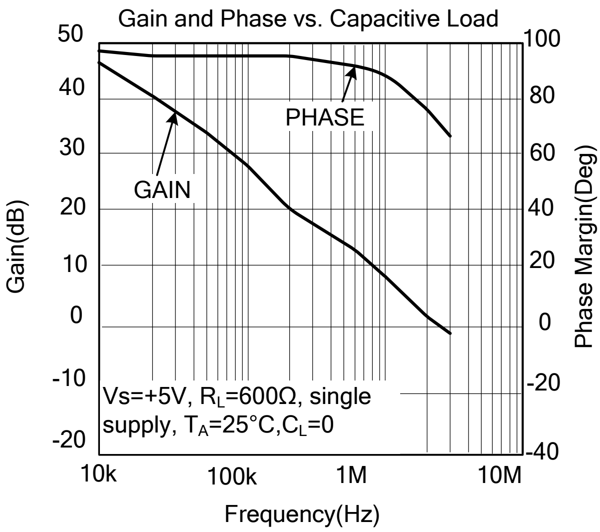
Sinking Current vs Output Voltage

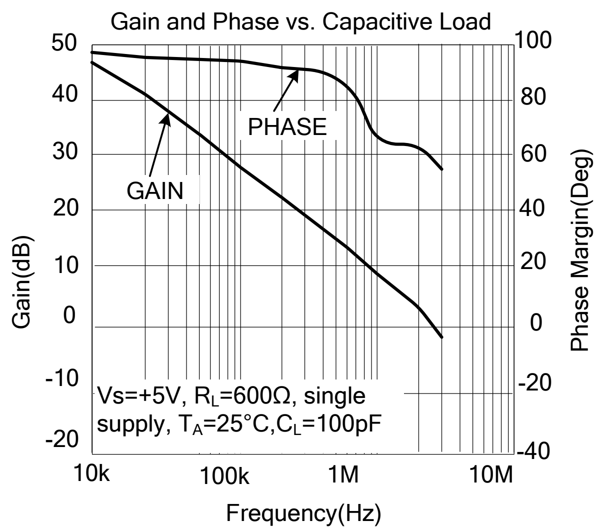


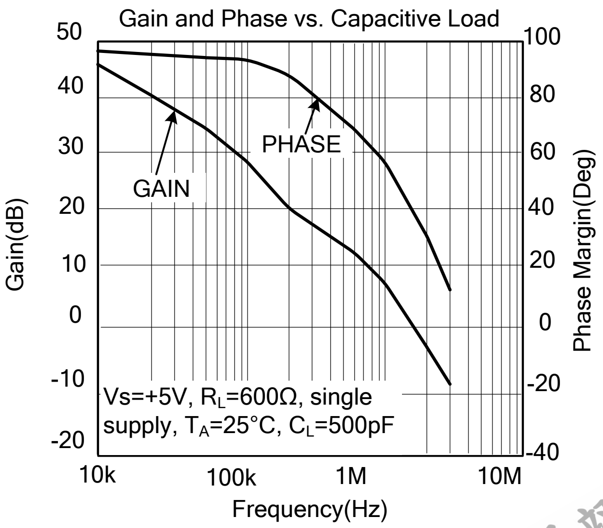
■ TYPICAL CHARACTERISTICS(Cont.)

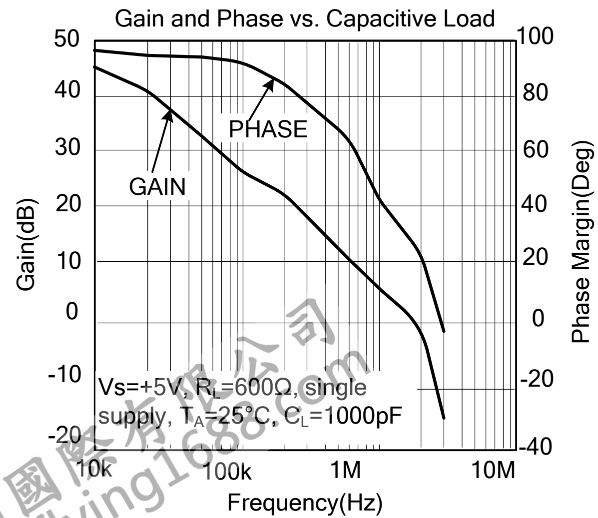




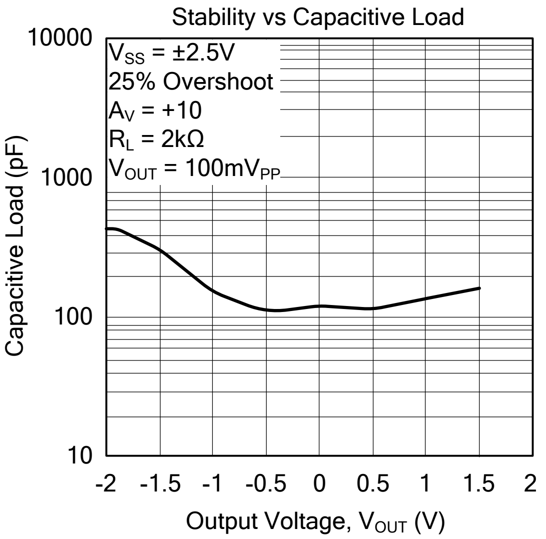


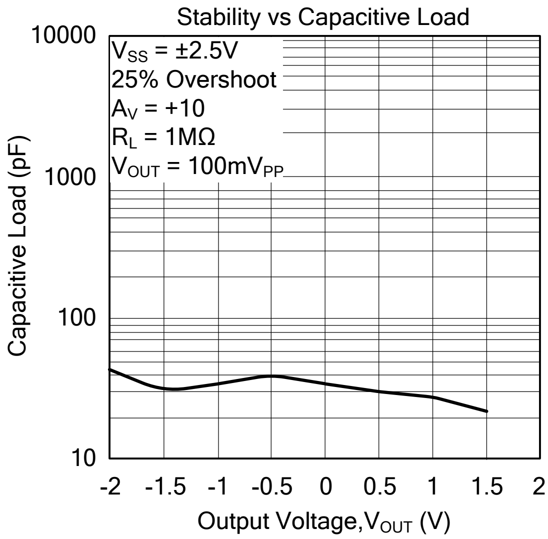


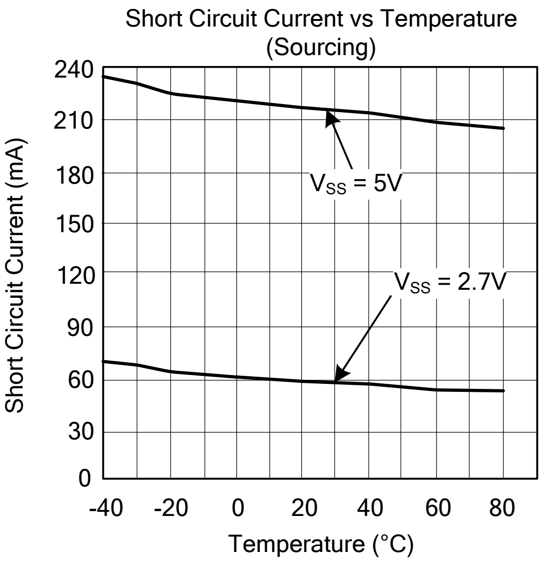


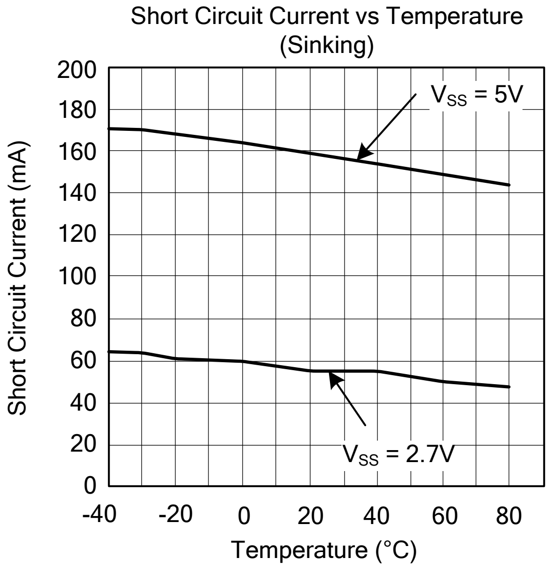


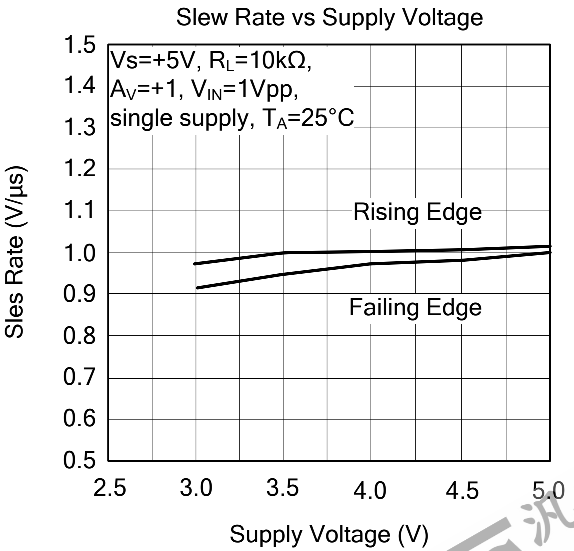
■ TYPICAL CHARACTERISTICS(Cont.)





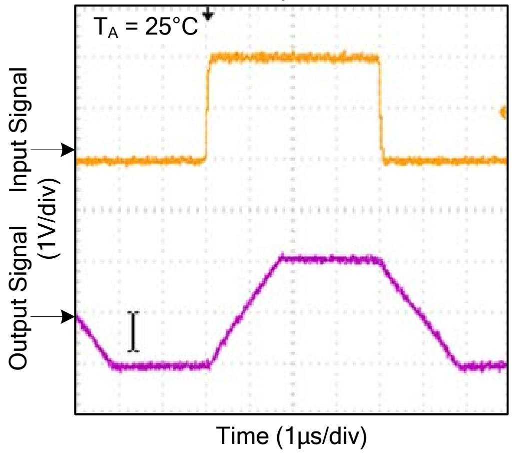




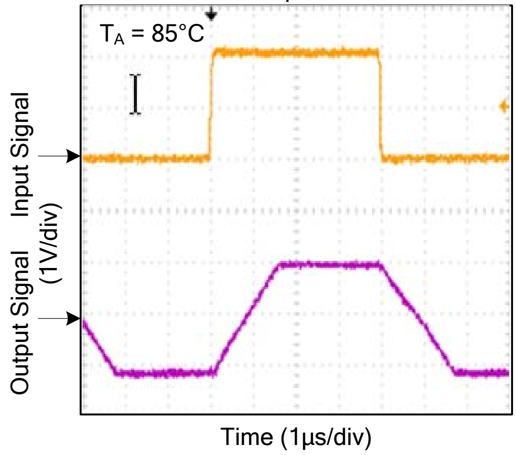


■ TYPICAL CHARACTERISTICS(Cont.)

Non-Inverting Large Signal Pulse Response



Non-Inverting Large Signal Pulse Response



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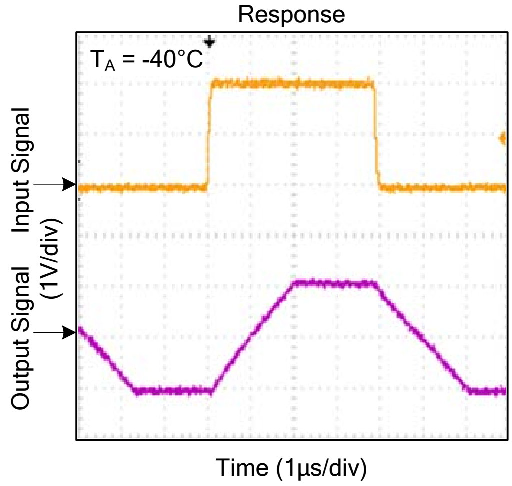

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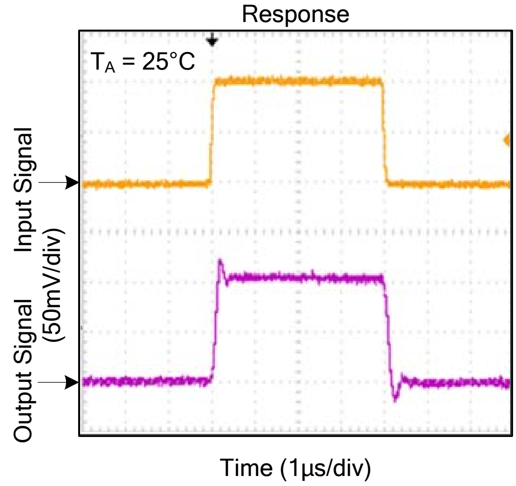

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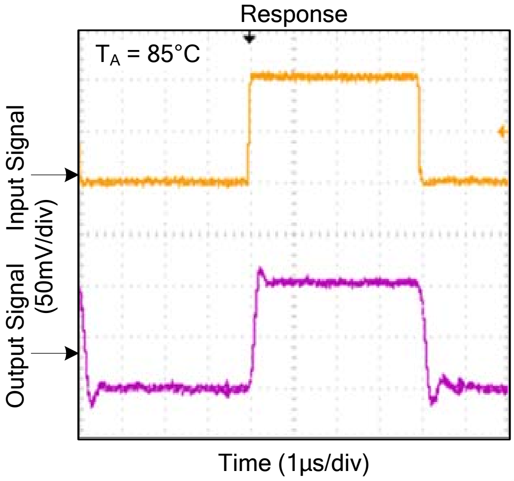
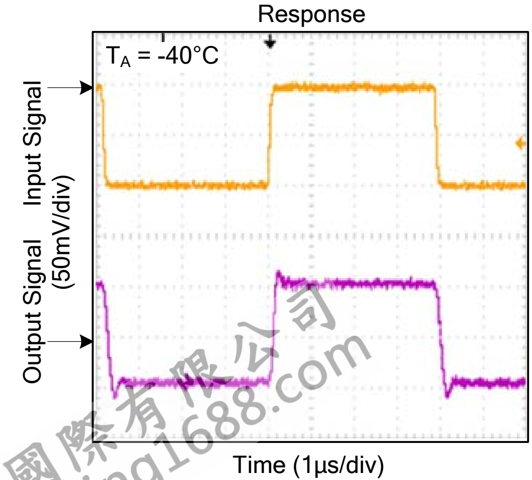
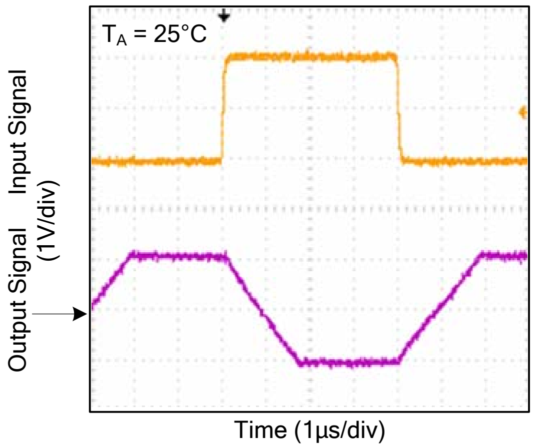


Non-Inverting Small Signal Pulse Response



■ TYPICAL CHARACTERISTICS(Cont.)

Inverting Large Signal Pulse Response



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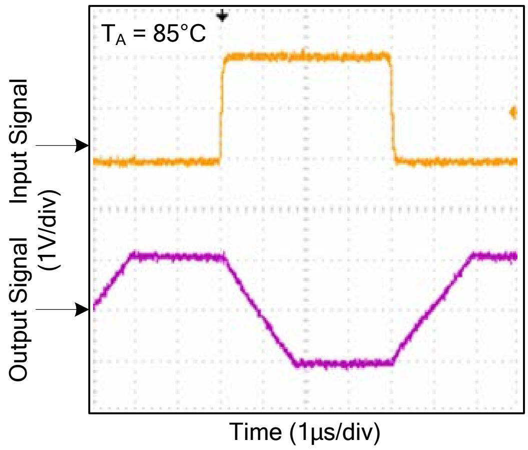

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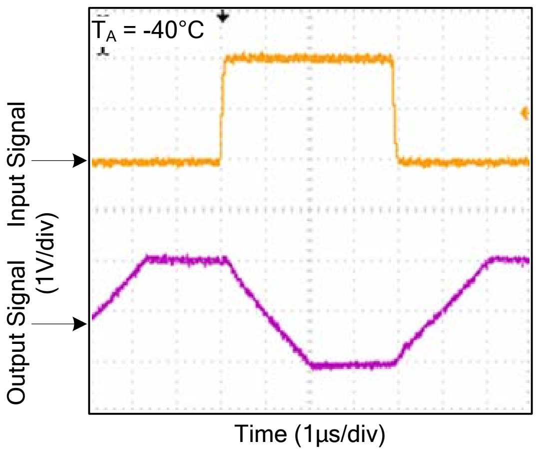

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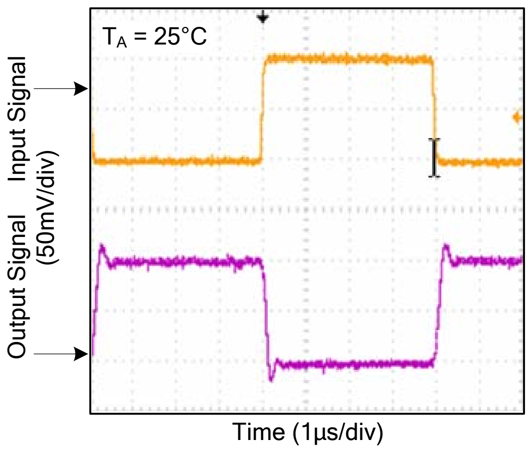
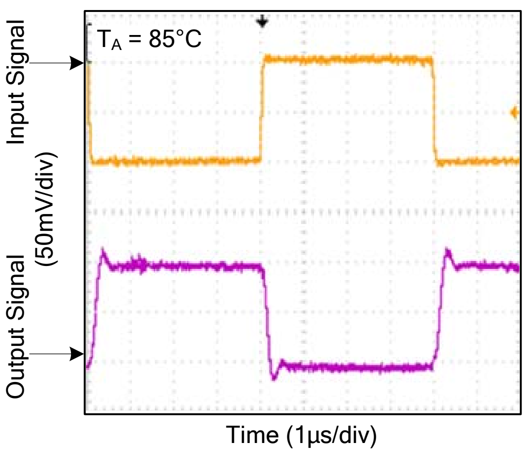


Inverting Small Signal Pulse Response



Inverting Small Signal Pulse Response