

**LV358S****LINEAR INTEGRATED CIRCUIT****GENERAL PURPOSE, LOW VOLTAGE, RAIL-TO-RAIL OUTPUT OPERATIONAL AMPLIFIERS****DESCRIPTION**

The UTC **LV358S** 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 2MHz unity-gain frequency. The UTC **LV358S** has a guaranteed 1 V/ μ s 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.

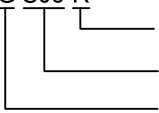
The UTC **LV358S** has bipolar input and CMOS output for improved noise performance and higher output current drive. It's the most cost effective solution for the applications where low voltage operation, space saving and low price are required.

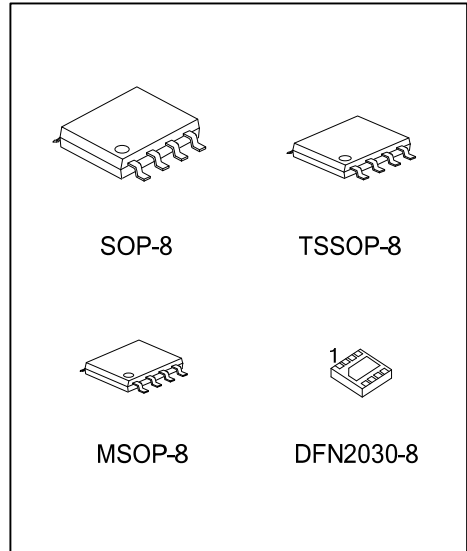
FEATURES

- * Supply Voltage: 2.7~5.5V
- * Supply current: 95 μ A / Amplifier (Typ.)
- * Input Offset Voltage: 3mV (Max.)
- * Rail-to-Rail outputs
- * Slew Rate 1.0V/ μ s(Typ.)

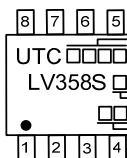
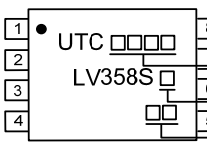
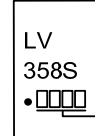
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV358SL-S08-R	LV358SG-S08-R	SOP-8	Tape Reel
LV358SL-SM1-R	LV358SG-SM1-R	MSOP-8	Tape Reel
LV358SL-P08-R	LV358SG-P08-R	TSSOP-8	Tape Reel
LV358SL-K08-2030-R	LV358SG-K08-2030-R	DFN2030-8	Tape Reel

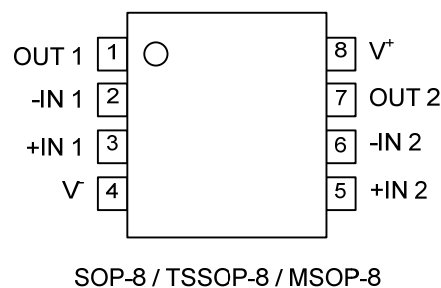
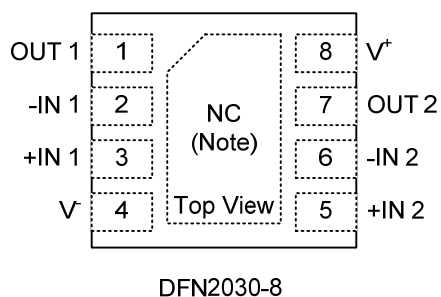
LV358SG-S08-R  (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) S08: SOP-8, P08: TSSOP-8, SM1: MSOP-8 K08-2030: DFN2030-8 (3) G: Halogen Free and Lead Free, L: Lead Free
--	--



MARKING

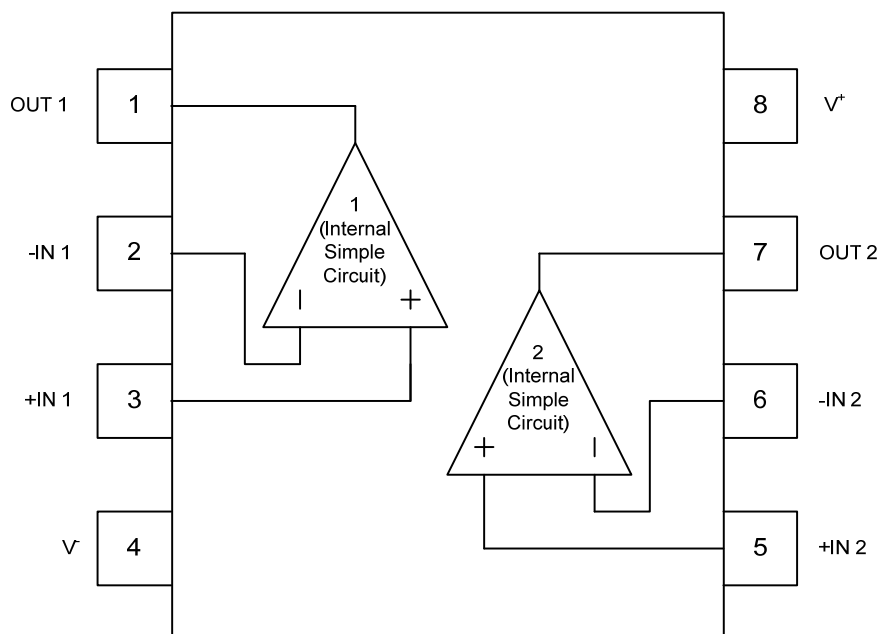
PACKAGE	MARKING
SOP-8 / MSOP-8	 UTC □ □ □ □ LV358S □ • □ □ □ □ → Date Code L: Lead Free G: Halogen Free → Lot Code
TSSOP-8	 UTC □ □ □ □ LV358S □ • □ □ □ □ → Date Code L: Lead Free G: Halogen Free → Lot Code
DFN2030-8	 LV 358S • □ □ □ □ → Date Code

PIN CONFIGURATION

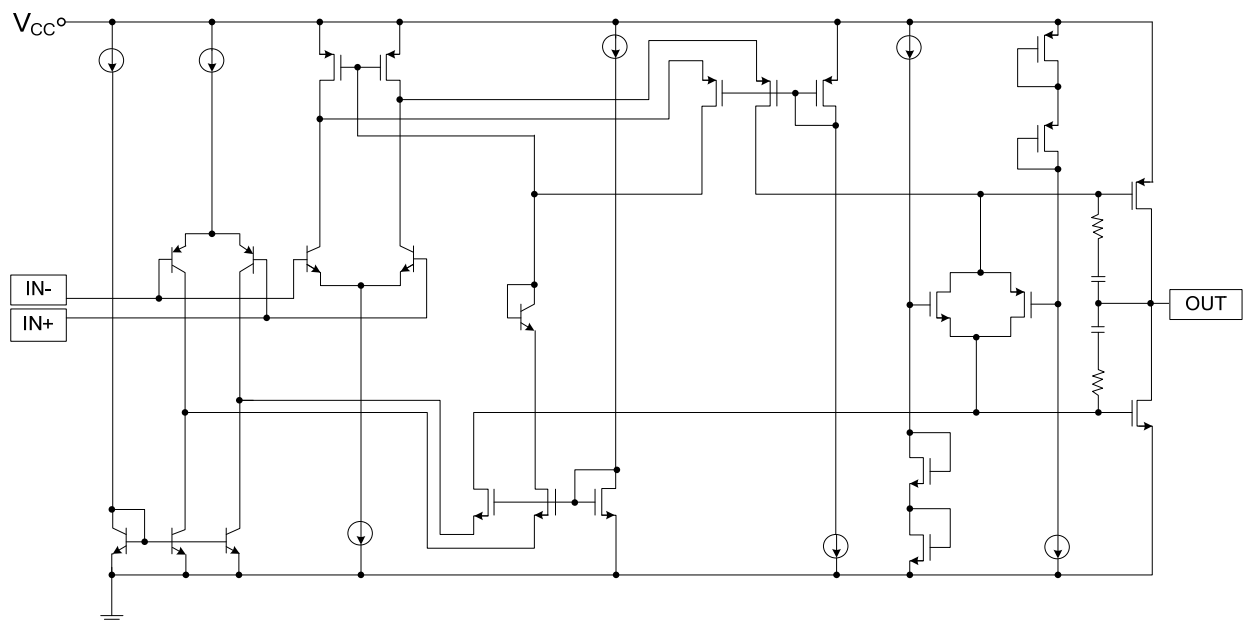


Note: No connect.

BLOCK DIAGRAM



■ INTERNAL SIMPLE CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS (Note1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	6.0	V
Differential Input Voltage		$\pm$ Supply Voltage	
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-65~+150	°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.

■ RECOMMENDED OPWRAING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	2.7 ~ 5.5	V
Operating Free-Air Temperature	T_{OPR}	-40 ~ +85	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance (Note)	SOP-8	170	°C/W
	MSOP-8	215	°C/W
	TSSOP-8	220	°C/W
	DFN2030-8	70	°C/W

Note: All numbers are typical, and apply for packages soldered directly note a PC board is still air.

■ 2.7V ELECTRICAL CHARACTERISTICS

($V^+ = 2.7V$, $V^- = 0V$, $V_{CM} = 1.0V$ and $R_L > 1M\Omega$, $T_A = 25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
DC CHARACTERISTICS						
Supply Current/Amplifier	I _Q			80	140	μA
Input Offset Voltage	V _{OS}			±1	±3	mV
Input Offset Voltage Average Drift	ΔV _{OS} /ΔT			±5		μV/°C
Input Bias Current	I _B			±15		nA
Input Offset Current	I _{OS}			±5		nA
Common-mode Voltage Range	V _{CM}	For CMRR ≥ 50dB	-0.1	-0.3		V
				1.9	1.7	V
Common-Mode Rejection Ratio	CMRR	-0.1V ≤ V _{CM} ≤ 1.7V	64	88		dB
Output Swing	V _O	R _L =10kΩ to 1.35V	V ⁺ -100	V ⁺ -10		mV
				45	75	mV
AC CHARACTERISTICS						
Gain Bandwidth Product	GBW	C _L =200pF		1.9		MHz
Phase Margin	ΦM			55		Deg
Gain Margin	G _m			10		dB
Input Referred Voltage Noise	e _n	F=1KHz		46		$\frac{nV}{\sqrt{Hz}}$
Input Referred Current Noise	i _n	F=1KHz		0.17		$\frac{pA}{\sqrt{Hz}}$

■ 5V ELECTRICAL CHARACTERISTICS

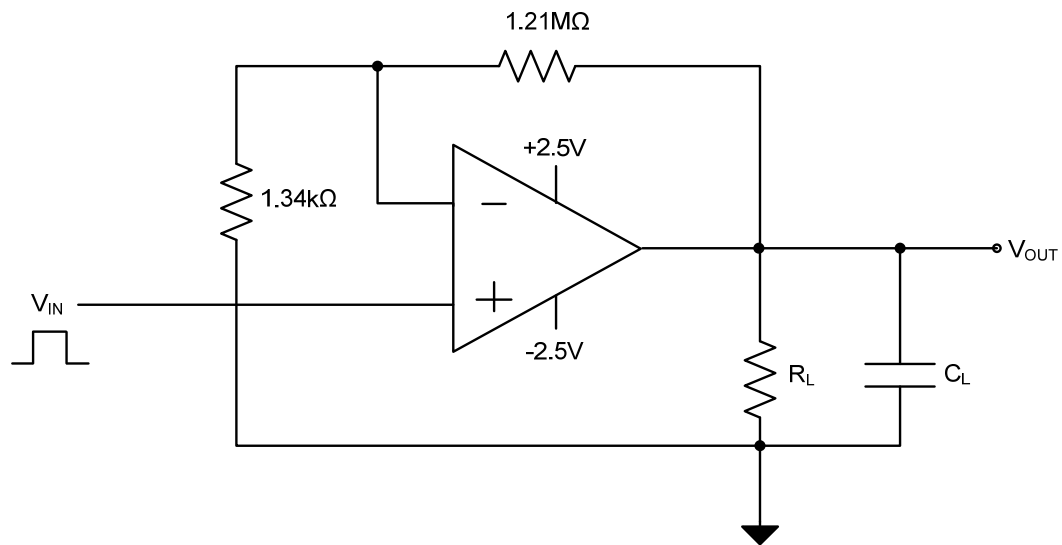
($V^+ = 5.0V$, $V^- = 0V$, $V_{CM} = 1.0V$ and $R_L > 1M\Omega$, $T_A = 25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
DC CHARACTERISTICS							
Supply Current/Amplifier	I _Q				95	150	μA
Power Supply Rejection Ratio	PSRR	2.7V ≤ V ⁺ ≤ 5V V _{OUT} =1V, V _{CM} =1V		64	90		dB
Input Offset Voltage	V _{OS}				±1	±3	mV
Input Offset Voltage Average Drift	ΔV _{OS} /ΔT				±5		μV/°C
Input Bias Current	I _B				±15		nA
Input Offset Current	I _{OS}				±5		nA
Input Common-Mode Voltage Range	V _{CM}	For CMRR ≥ 50dB		-0.1	-0.3		V
					4.2	4	V
Common-Mode Rejection Ratio	CMRR	-0.1V ≤ V _{CM} ≤ 4V		65	90		dB
Large Signal Voltage Gain(Note 1)	A _V	R _L =2KΩ		80	100		dB
Output Swing	V _O	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}		45	75	mV
Output Short Circuit Current	I _{SC}	Sourcing, V _{OUT} = 0V			120		mA
		Sinking, V _{OUT} = 5V			100		mA
AC CHARACTERISTICS							
Slew Rate	SR	(Note 2)			1		V/μs
Gain Bandwidth Product	GBW	C _L =200pF			2		MHz
Phase Margin	Φ _M				57		Deg
Gain Margin	G _m				10		dB
Input Referred Voltage Noise	e _n	f=1KHz			40		$\frac{nV}{\sqrt{Hz}}$
Input Referred Current Noise	i _n	f=1KHz			0.21		$\frac{pA}{\sqrt{Hz}}$

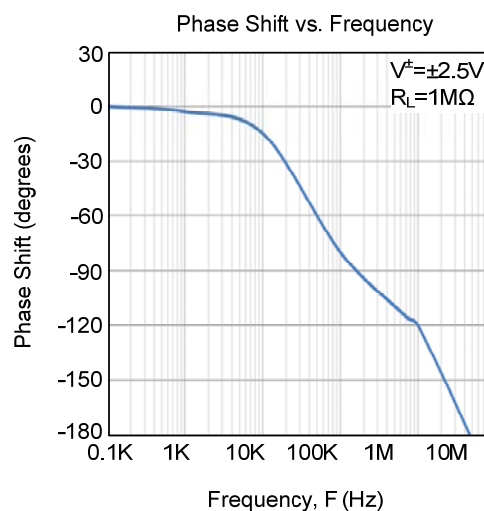
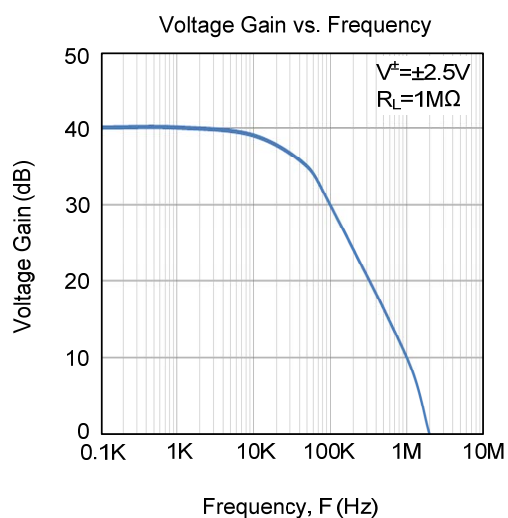
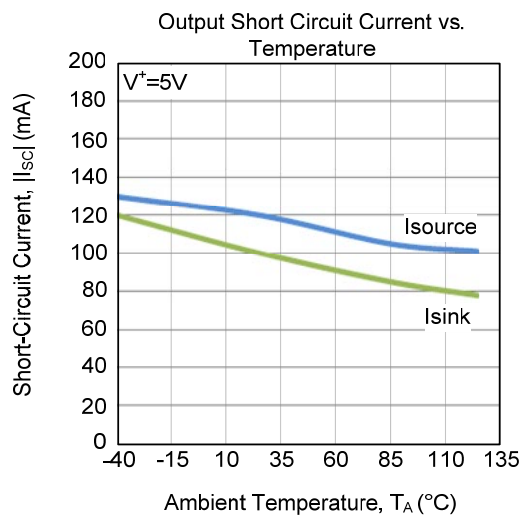
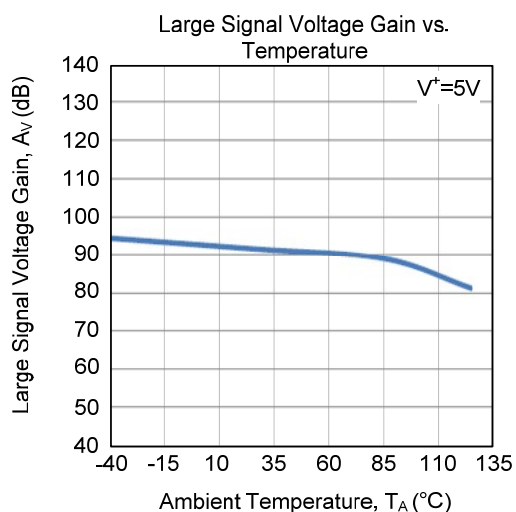
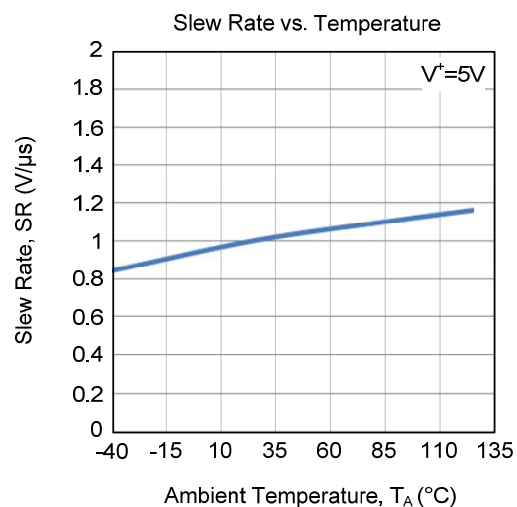
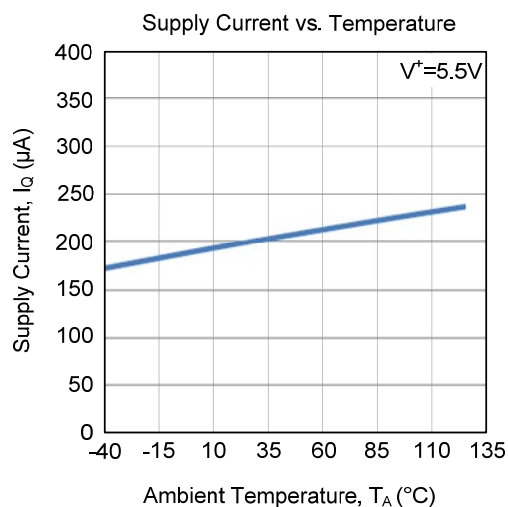
Notes: 1. R_L is connected to V^- . The output voltage is $0.5V \leq V_{OUT} \leq 4.5V$.

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

■ TEST CIRCUIT FOR STABILITY VS CAPACITIVE LOAD



■ TYPICAL CHARACTERISTICS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.