TL082

GENERAL PURPOSE JFET INPUT OPERATIONAL AMPLIFIERS

Features

- Low Power Consumption
- Wide Common-Mode and Differential Voltage Ranges
- Low Input Bias and Offset Currents
- Output Short-Circuit Protection
- Low Total Harmonic Distortion…0.003% Typ
- High Input Impedance…JFET-Input Stage
- Latch-Up-Free Operation
- High Slew Rate…13V/μs Typ
- Common-Mode Input Voltage Range Includes V_{CC}+
- SOP-8L: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

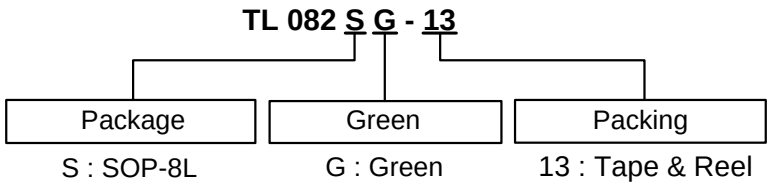
General Description

The JFET-input operational amplifier family is designed to offer a wider selection than any previously developed operational amplifier family. Each of these JFET-input operational amplifiers incorporates well-matched, high-voltage JFET and bipolar transistors in a monolithic integrated circuit. The devices feature high slew rates, low input bias and offset currents, and low offset-voltage temperature coefficient.

Applications

- Active filters
- Audio pre-amps
- Sample and holds
- Peak detectors

Ordering Information

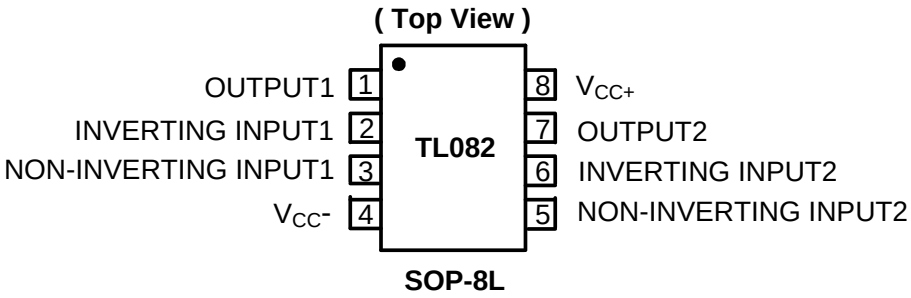


Device	Package Code	Packaging (Note 2)	13" Tape and Reel	
			Quantity	Part Number Suffix
TL082SG-13	S	SOP-8L	2500/Tape & Reel	-13

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html
2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

Pin Assignments

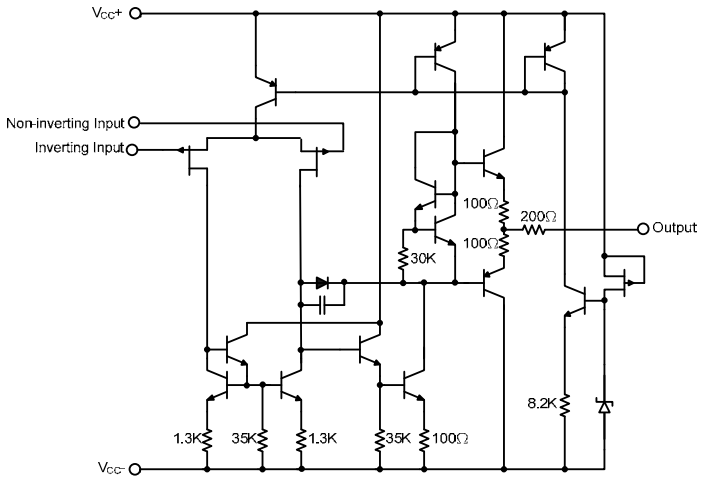
(1) Dual channel SOP-8L



Pin Descriptions

Pin Name	Pin No.	Description
OUTPUT1	1	Channel 1 Output
INVERTING INPUT1	2	Channel 1 Inverting Input
NON-INVERTING INPUT1	3	Channel 1 Non-inverting Input
V_{CC}-	4	Supply Voltage
NON-INVERTING INPUT2	5	Channel 2 Non-inverting Input
INVERTING INPUT2	6	Channel 2 Inverting Input
OUTPUT2	7	Channel 2 Ouput
V_{CC}+	8	Supply Voltage

Block Diagram



Absolute Maximum Ratings (Note 8)

Symbol	Parameter	Rating	Unit
V_{CC}+	Supply Voltage + (Note 3)	+18	V
V_{CC}-	Supply Voltage - (Note 3)	-18	V
V_I	Input voltage (Notes 3 and 5)	±15	V
V_{ID}	Differential input Voltage, V_{ID} (Note 4)	±30	V
	Duration of output short circuit (Note 6)	Unlimited	
P_D	Power Dissipation (Note 7)	860	mW
T_J	Operating Junction Temperature Range	150	°C
T_{ST}	Storage Temperature Range	-65 to +150	°C

Notes: 3. ALL voltage values, except differential voltages, are with respect to the midpoint between V_{CC}+ and V_{CC}-.
4. Differential voltage are at the non-inverting input terminal with respect to the inverting input terminal.
5. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15V, whichever is less.
6. The output may be shorted to ground or either supply. Temperature and/or supply voltage must be limited to ensure that the dissipation rating is not exceeded.
7. Maximum power dissipation is a function of $T_J(max)$, θ_{JA}, and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D=(T_J(max)-T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150℃ can affect reliability

Recommended Operating Conditions (Note 8)

Symbol	Description	Rating	Unit
V_{CC}±	Supply Voltage	±15	V
T_A	Operating Ambient Temperature Range	-40 to +85	°C

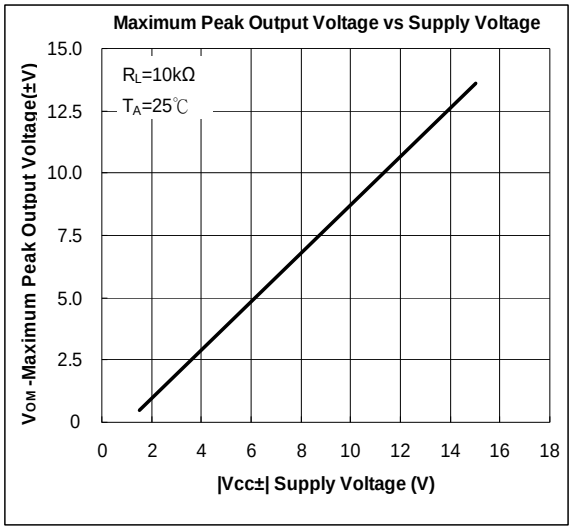
Notes: 8. Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Recommended Operating Conditions indicate conditions for which the device is intended to be functional, but specific performance is not guaranteed. For guaranteed specifications and the test conditions, see the Electrical Characteristics.

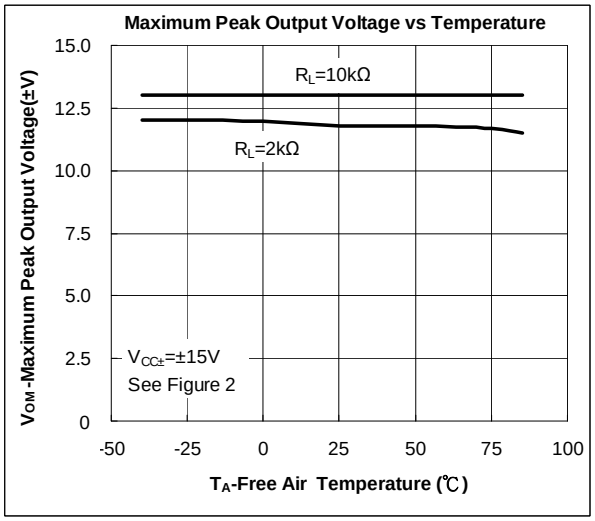
Electrical Characteristics ($V_{CC\pm}$ = ±15V, T_A = 25°C; unless otherwise noted)

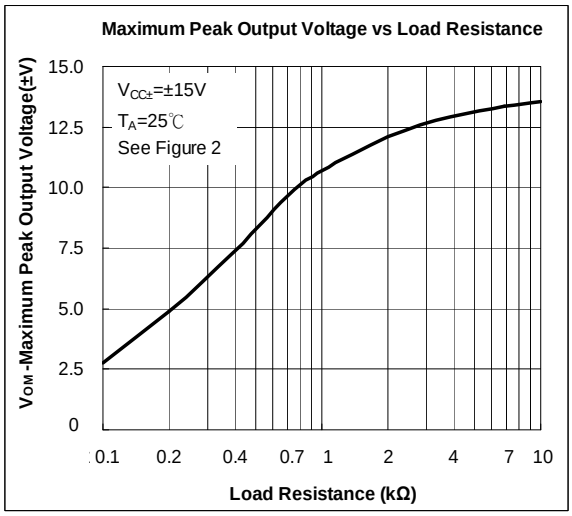
Symbol	Parameter	Test Conditions		Min	Typ.	Max	Unit
V_{IO}	Input Offset Voltage	V_O=0, R_S=50Ω	T_A=25°C		3	6	mV
			T_A= full range			9	
$^{\alpha}V_{IO}$	Temperature Coefficient of Input Offset Voltage	V_O=0, R_S=50Ω, T_A= full range			18		μV/°C
I_{IO}	Input Offset Current	V_O=0	T_A=25°C		5	100	pA
			T_A= full range			10	nA
I_{IB}	Input Bias Current	V_O=0	T_A=25°C		30	200	pA
			T_A= full range			20	nA
V_{ICR}	Common Mode Input Voltage Range			±11	-12~+15		V
V_{OM}	Maximum Peak Output Voltage Swing	R_L=10kΩ, T_A=25°C		±12	±13.5		V
		R_L≧10kΩ,	T_A= full range	±12			
		R_L≧2kΩ		±10	±12		
A_{VD}	Large Signal Differential Voltage Amplification	V_O=±10V, R_L≧2kΩ	T_A=25°C	50	200		V/mV
			T_A= full range	25			
B_1	Unity Gain Bandwidth				3		MHz
r_i	Input Resistance	T_A=25°C			10^{12}		Ω
CMRR	Common Mode Rejection Ratio	V_{IC}=V_{ICRmin}, V_O=0 R_S=50Ω, T_A=25°C		75	86		dB
k_{SVR}	Supply Voltage Rejection Ratio ($\Delta V_{CC}\pm/\Delta V_{IO}$)	V_{CC}=±9 to ±15V V_O=0 R_S=50Ω, T_A=25°C		80	86		dB
I_{CC}	Supply Current (each amplifier)	V_O=0, T_A=25°C No load			1.4	2.8	mA
V_{O1}/V_{O2}	Crosstalk Attenuation	A_{VD}=100, T_A=25°C			120		dB
SR	Slew Rate at Unity Gain	V_I=10V, C_L=100pF, R_L=2kΩ (See Figure 1)	T_A=25°C	8	13		V/μs
			T_A= full range	5			
tr	Rise Time	V_I=20mV, R_L=2kΩ, C_L=100pF (See Figure 1)			0.05		μs
	Overshoot Factor				20		%
Vn	Equivalent Input Noise Voltage	R_S=20Ω	f=1kHz		18		$nV/\sqrt{HZ}$
			f=10 Hz to 10kHz		4		μV
In	Equivalent Input Noise Current	R_S=20Ω, f=1kHz			0.01		$pA/\sqrt{HZ}$
THD	Total Harmonic Distortion	V_{Irms}=6V, A_{VD}=1, R_L≧2kΩ, R_S≦1kΩ, f=1kHz			0.003		%
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOP-8L (Note 9)			145		°C/W
θ_{JC}	Thermal Resistance Junction-to-Case	SOP-8L (Note 9)			35		°C/W

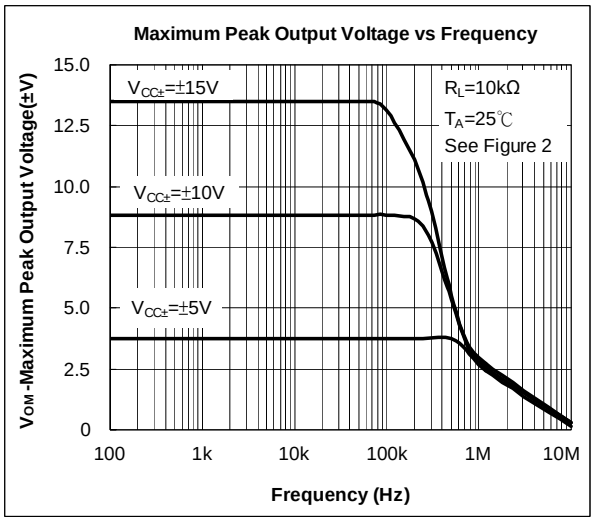
Notes: 9. Test condition for SOP-8L: Devices mounted on FR-4 substrate PC board, with minimum recommended pad layout.

Typical Performance Characteristics

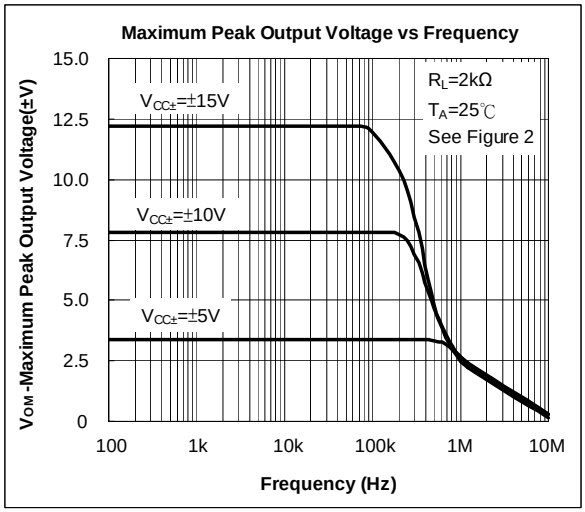


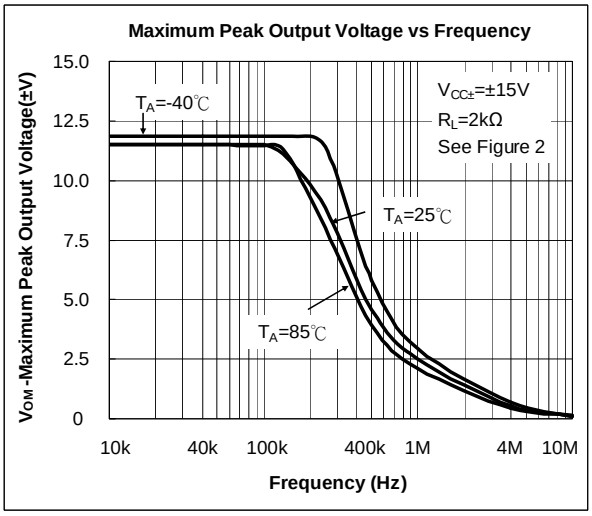


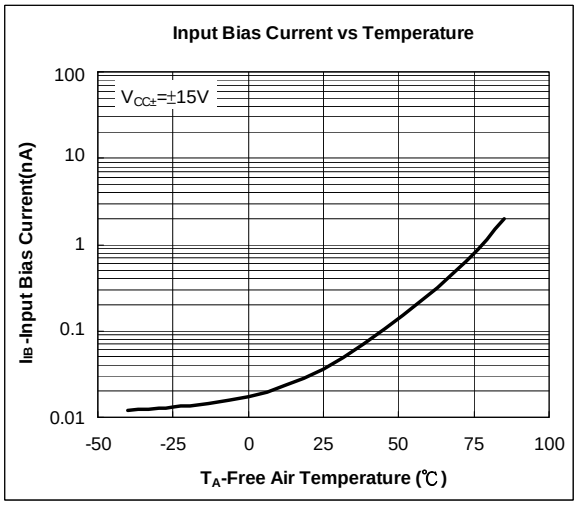


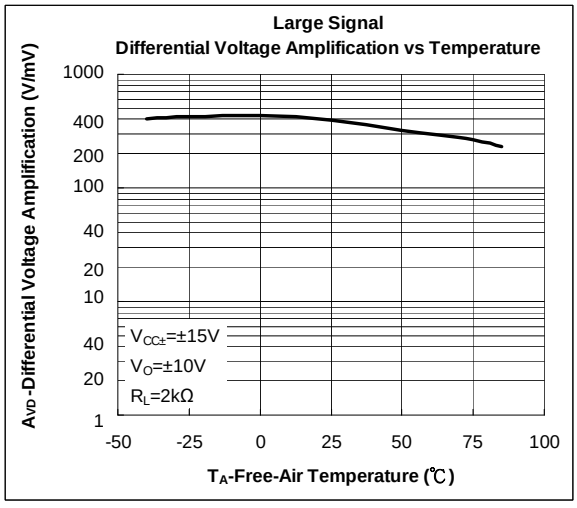


Typical Performance Characteristics (Continued)

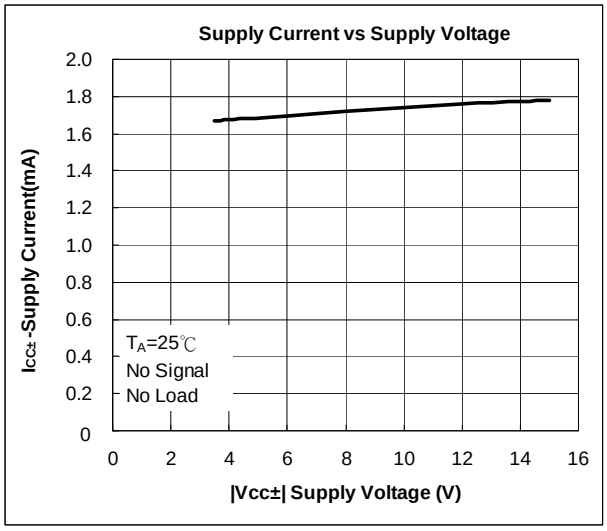


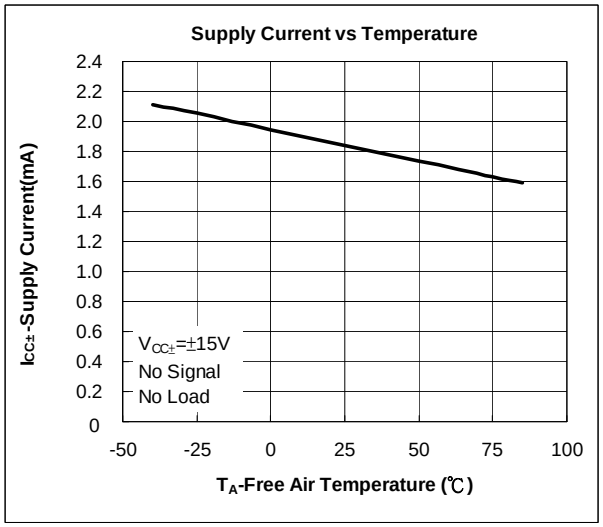


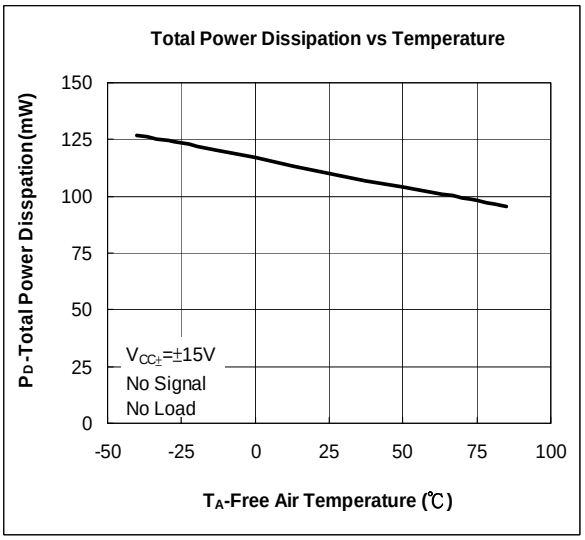


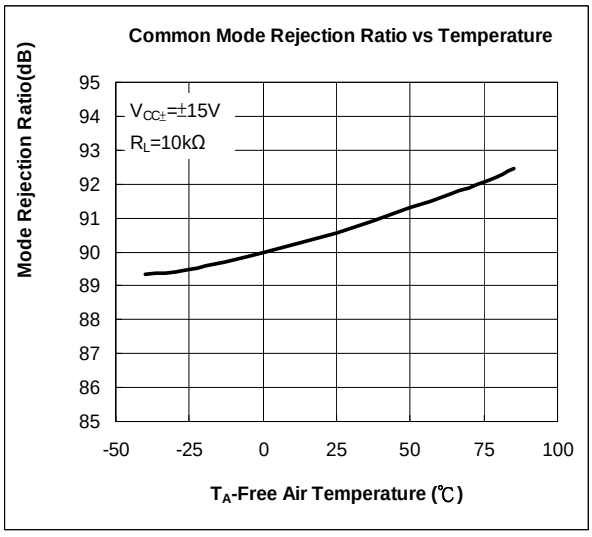


Typical Performance Characteristics (Continued)

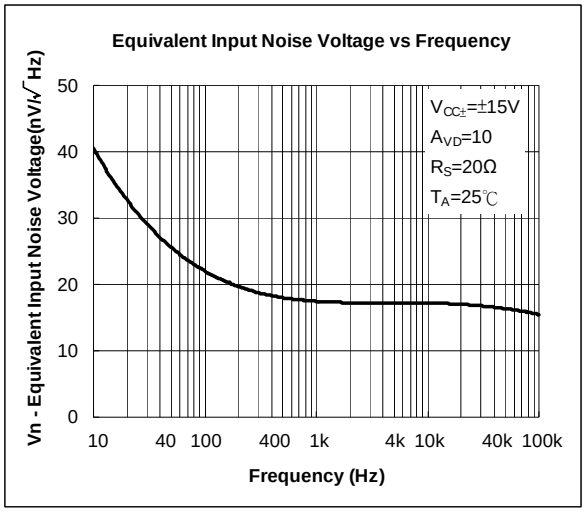


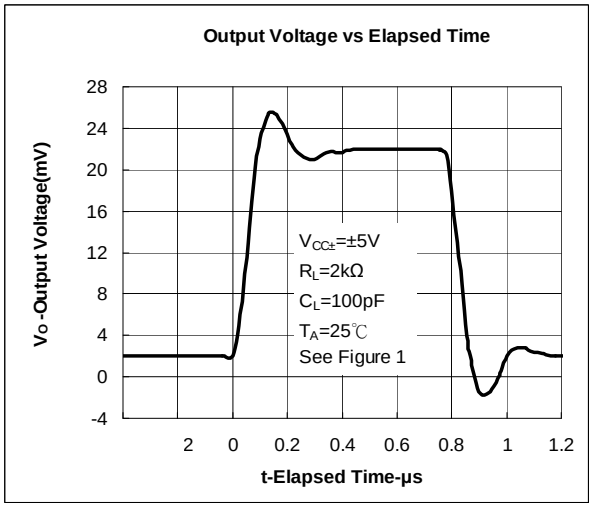


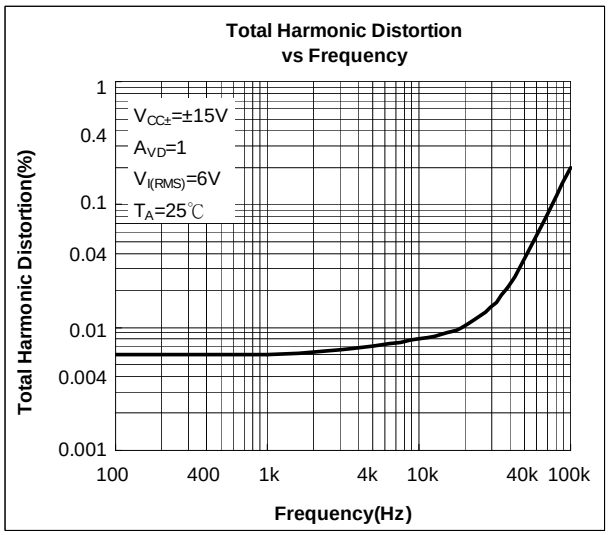


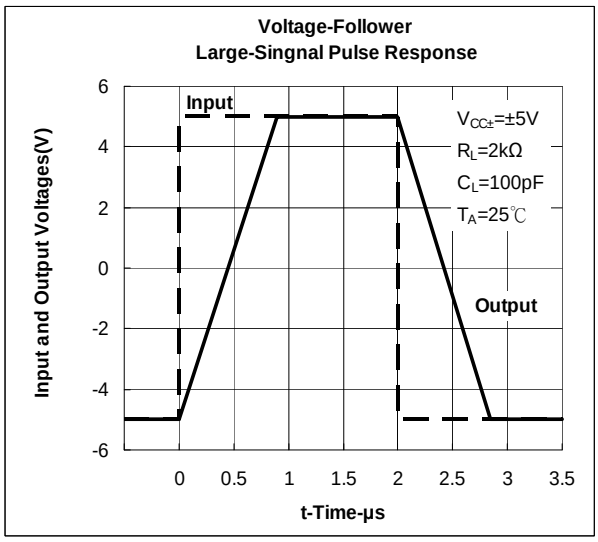


Typical Performance Characteristics (Continued)









Test Circuit

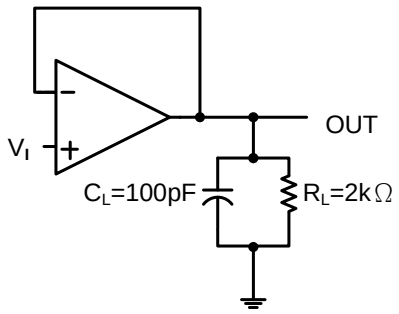


Figure 1. Unity-Gain Amplifier

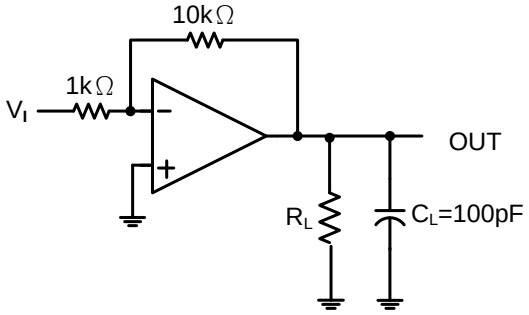
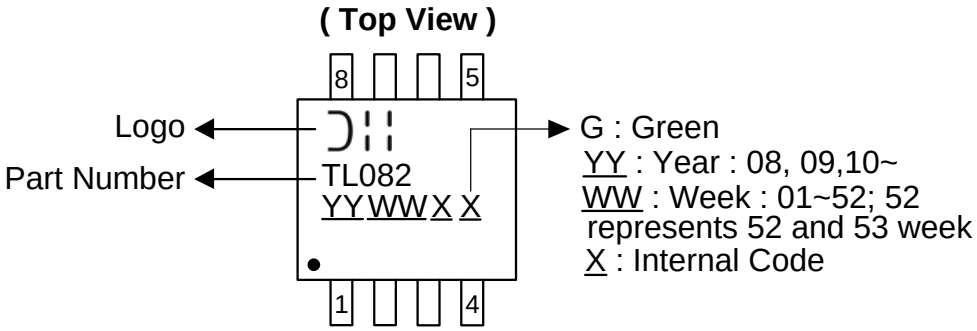


Figure 2. Gain-of-10 Inverting Amplifier

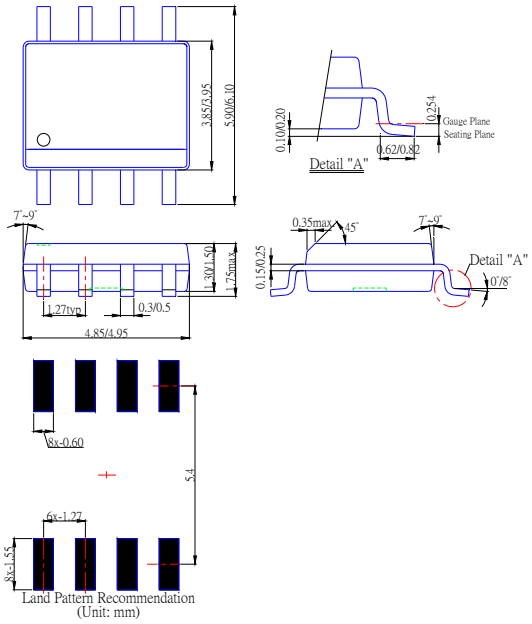
Marking Information

(1) SOP-8L



Package Information (All Dimensions in mm)

(1) Package type: SOP-8L



IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

www.diodes.com