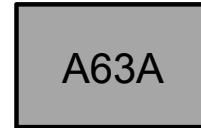


Features

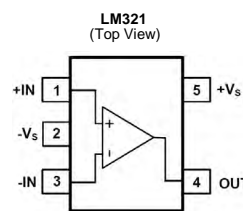
Gain-Bandwidth product: 1MHz
(VCC = 5V, TA = 25°C. Typical values unless specified).
Low supply current: 430µA
Low input bias current: 45nA
Wide supply voltage range
Operates on 24V or 12V Supplies
Stable with high capacitive loads
Small Packaging: LM321 Available in SOT-23-5L.

Applications

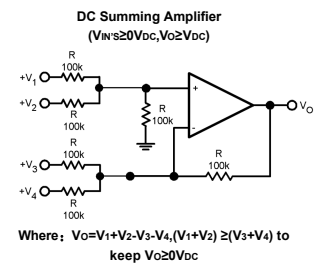
Chargers
Power supplies
Industrial: controls, instruments
Desktops
Communications infrastructure



PIN CONFIGURATIONS



APPLICATION Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Supply Voltage, V+ to V-	24V or 12V
Input Voltage	- 0.3V to Vcc
Input Current (VIN < -0.3V)	50mA
Output Short Circuit to GND (V ≤ 15V, Ta = 25°C)	Continuous
Storage Temperature Range	-65°C to +150°C
Junction Temperature	150°C
Operating Temperature Range	0°C to +70°C
Lead Temperature Range (Soldering 10 sec)	260°C

NOTE:

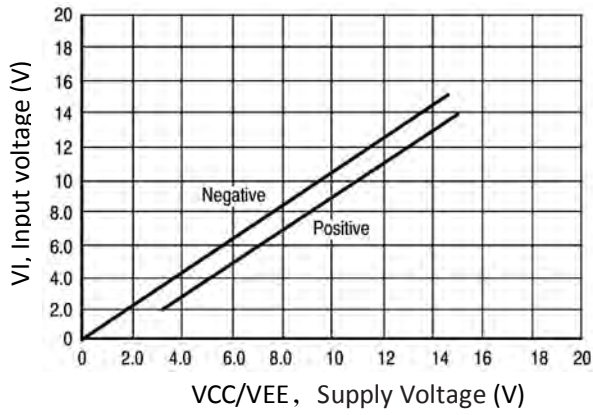
Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics (T_J=25°C unless otherwise specified)

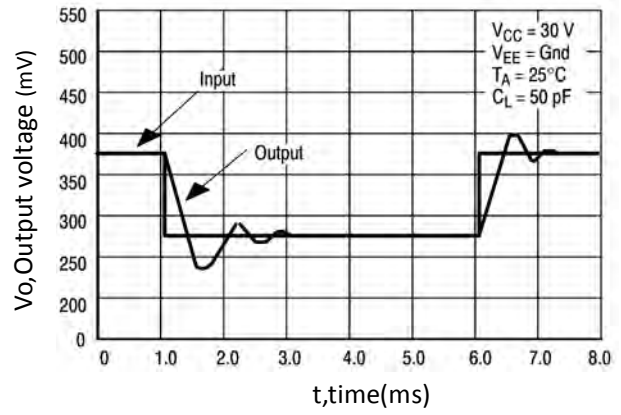
(Unless otherwise specified, all limits guaranteed for at Tamb=25°C, Vcc=5V)

Parameter	Conditions		value			Units
			Min	Typ	Max	
Input Offset Voltage				±2	±5	mV
Input Bias Current	IIN(+) or IIN(-), VCM=0V			±45	±250	nA
Input Offset Current	IIN(+) - IIN(-), VCM=0V			±3	±50	nA
Input Common-Mode Voltage Range	Ta=25°C, V ⁺ =24V		0		Vcc -1.5	V
Supply Current	Iout=0	Vcc =24V		1	2	mA
		Vcc =5V		0.5	1.2	mA
Large Signal Voltage Gain	Vcc =15V, Ta=25°C, RL≥2kΩ (Vo=1~11V)		25	100		V/mV
Common Mode Rejection Ratio	DC, Ta=25°C, VCM=0~Vcc-1.5V		65	90		dB
Power Supply Rejection Ratio	DC, Ta=25°C, Vcc =5~24V		65	100		dB
Output Current Sourcing	VIN(+)=1V, VIN(-)=0V, Vcc=15V, Vo=2V		20	40		mA
Output Current Sinking	VIN(-)=1V, VIN(+)=0V, Vcc=15V, Vo=2V		10	15		mA
	VIN(-)=1V, VIN(+)=0V, Vcc=15V, Vo=200mV ¹²			50		μA
Output Short Circuit to Ground	Vcc=15V			40	60	mA
Slew Rate	V ⁺ = 15V, RL = 2kΩ, VIN = 0.5 to 5V CL = 100pF			0.4		V/μs
Output voltage swing	VOH	Vcc=24V	RL=2kΩ	22		V
		Vcc=24V	RL=10kΩ	22		V
	VOL	Vcc=5V, RL=10kΩ			5	20

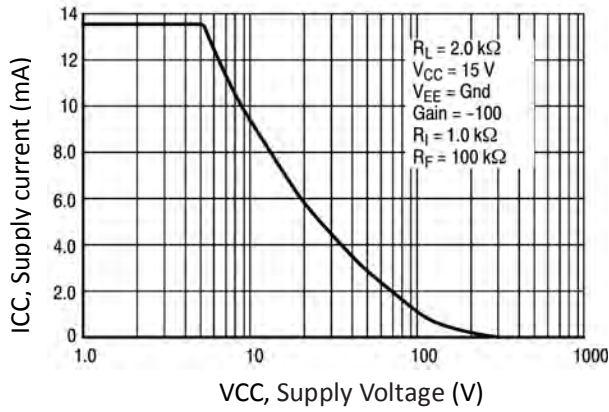
RATING AND CHARACTERISTIC CURVES



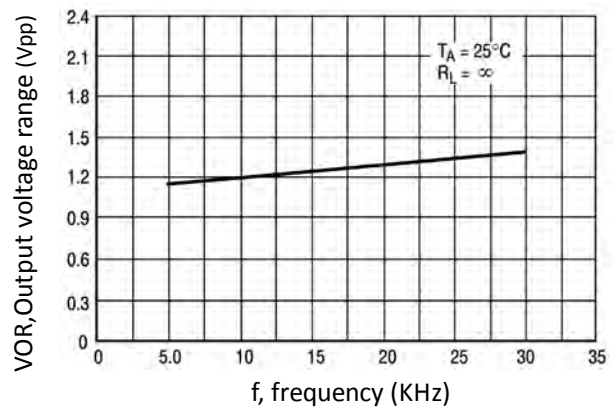
Input voltage range



Small signal voltage follower impulse response
(same direction)

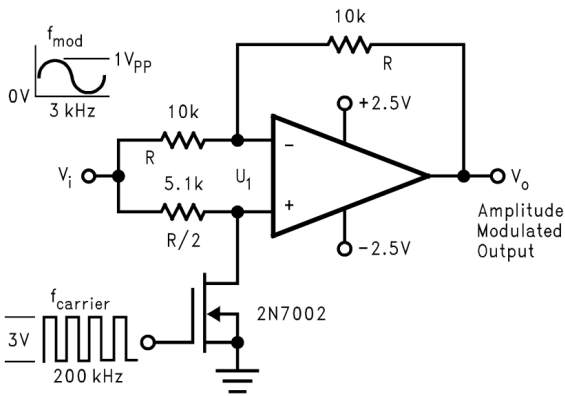


Supply current (static power consumption)

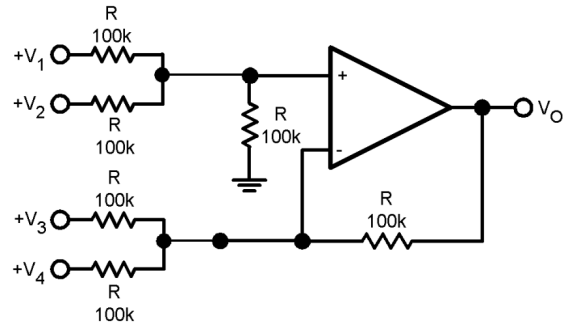


Large signal frequency response

Application Circuit

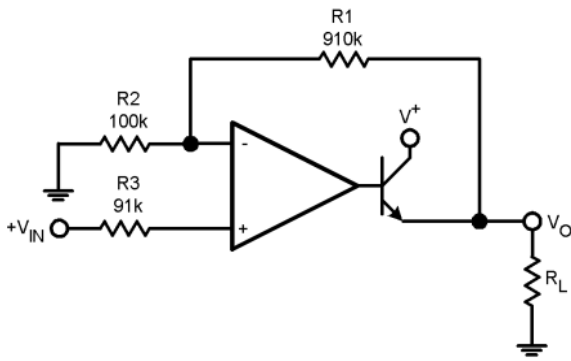


Amplitude Modulator Circuit



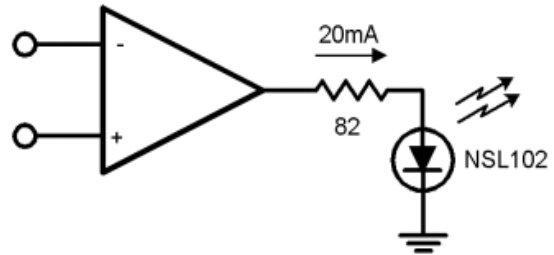
Where: $V_O = V_1 + V_2 - V_3 - V_4$, $(V_1 + V_2) \geq (V_3 + V_4)$ to keep $V_O \geq 0V_{DC}$

DC Summing Amplifier
($V_{IN's} \geq 0V_{DC}$, $V_O \geq V_{DC}$)

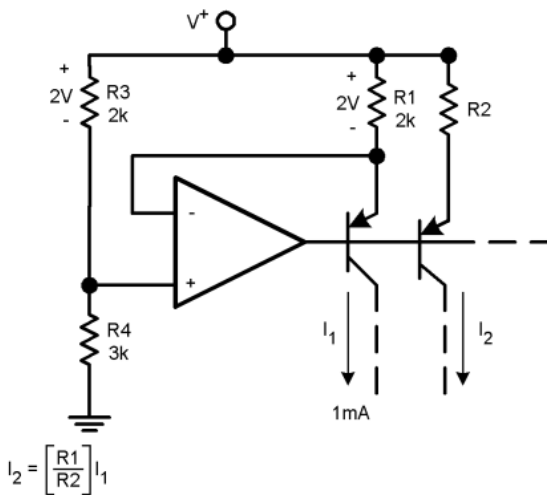


$V_O = 0V_{DC}$ for $V_{IN} = 0V_{DC}$, $A_v = 10$

Power Amplifier

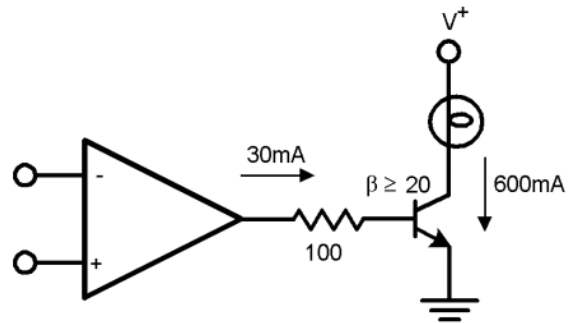


LED Driver



$$I_2 = \left[\frac{R_1}{R_2} \right] I_1$$

Fixed Current Sources



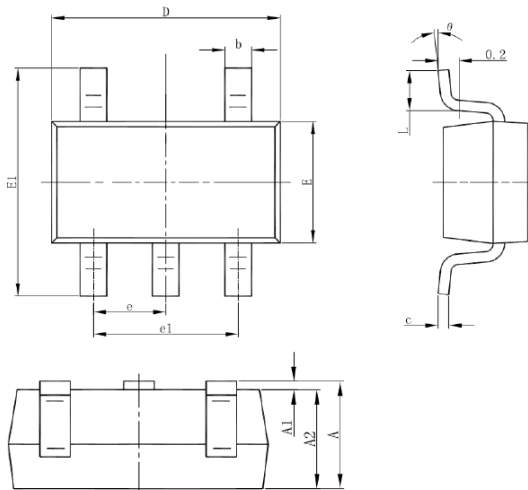
Lamp Driver

Soldering parameters

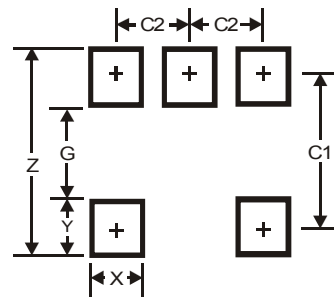
Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout



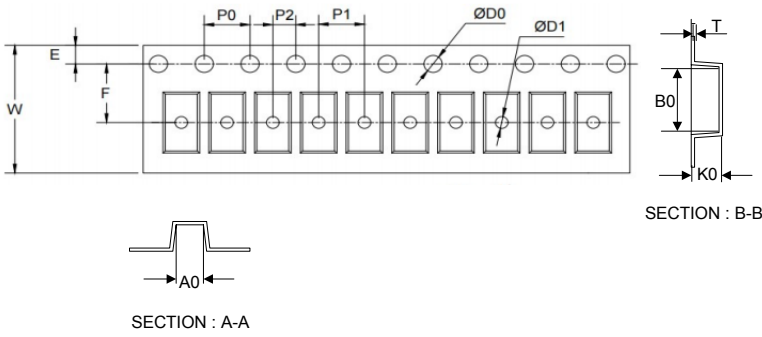
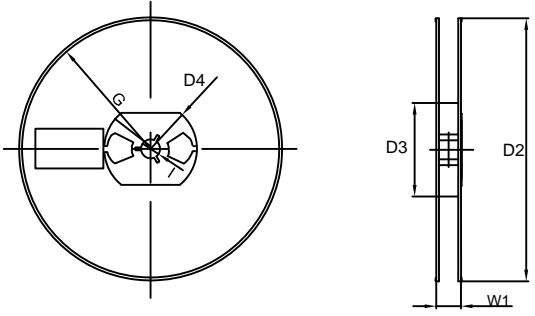
SOT-23-5L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°

Dimensions	Value (in mm)
Z	3.50
G	1.30
X	0.60
Y	1.10
C1	2.40
C2	0.95

Tape & reel specification

Tape	Symbol	Dimension (mm)	
	P0	4.00±0.20	
	P1	4.00±0.20	
	P2	2.00±0.20	
	D0	1.55±0.20	
	D1	1.20±0.20	
	E	1.55±0.20	
	F	3.60±0.20	
	W	8.00±0.20	
	A0	3.80±0.20	
	B0	3.50±0.20	
	K0	1.55±0.20	
	T	0.25±0.15	
	<p>7" Reel</p> 	D2	178.0±5.0
		D3	55Min.
D4		R24.0±3.0	
G		R82.0±3.0	
I		13.0±2.0	
W1		11.0±3.0	
Quantity: 3000PCS			