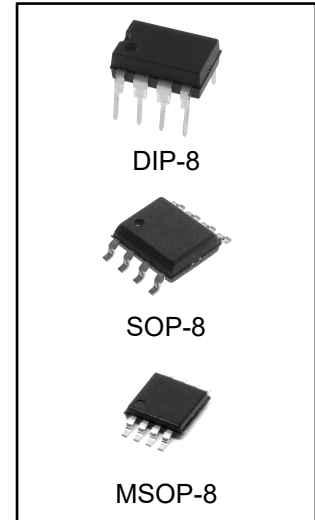


## LM741 Operational Amplifier

### General Description

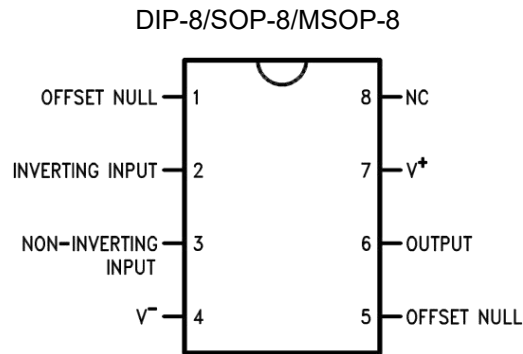
The LM741 series are general purpose operational amplifiers which feature improved performance over industry standards like the LM709. They are a direct, plug-in replacement for the 709C, LM201, MC1439 and 748 in most applications. The amplifiers offer many features which make their application nearly foolproof: overload protection on the input and output, no latch-up when the common mode range is exceeded, as well as freedom from oscillations.



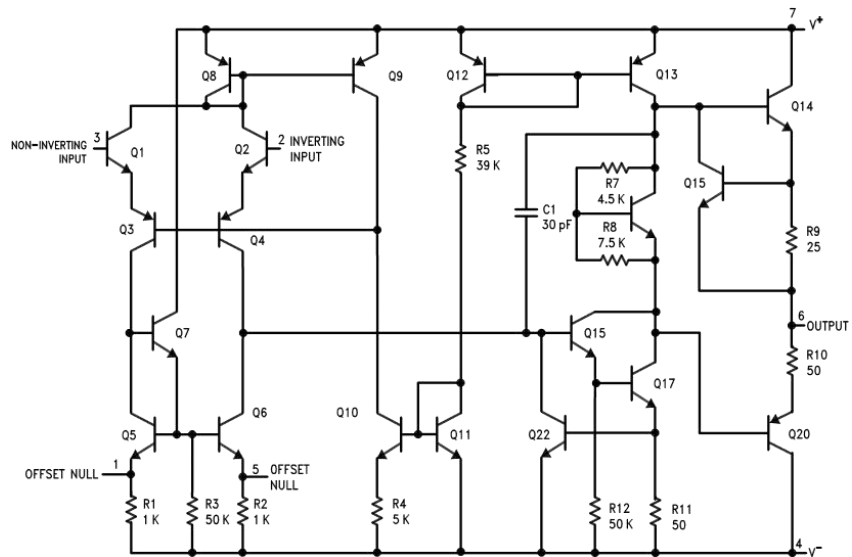
### Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM741N	DIP-8	LM741	TUBE	2000pcs/Box
LM741AN	DIP-8	LM741A	TUBE	2000pcs/Box
LM741M/TR	SOP-8	LM741	REEL	2500pcs/Reel
LM741AM/TR	SOP-8	LM741A	REEL	2500pcs/Reel
LM741MM/TR	MSOP-8	LM741	REEL	3000pcs/Reel
LM741AMM/TR	MSOP-8	LM741A	REEL	3000pcs/Reel

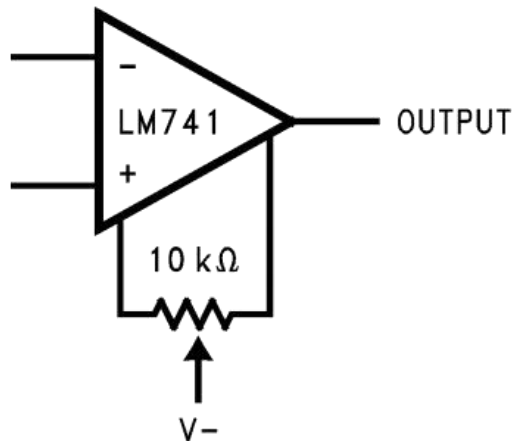
## Connection Diagram



## Schematic Diagram



## Offset Nulling Circuit



**Absolute Maximum Ratings** <sup>(1)</sup>

CONDITION	LIMITS
Supply Voltage	± 18V
Power Dissipation <sup>(Note2)</sup>	500mW
Differential Input Voltage	± 30V
Input Voltage <sup>(Note3)</sup>	± 15V
Output Short Circuit Duration	Continuous
Operating Temperature Range	0°C to +70°C
Junction Temperature	150°C
Soldering Information (10 seconds)	245°C
Storage Temperature Range	-65°C to +150°C
ESD Tolerance	400V

Note1: "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

Note 2: For operation at elevated temperatures, these devices must be derated based on thermal resistance, and T<sub>j</sub> max. (listed under "Absolute Maximum Ratings"). T<sub>j</sub> = T<sub>A</sub> + (θ<sub>jA</sub> PD).

Note 3: For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Thermal Resistance	DIP(N)	SOP-8(M)
θ <sub>jA</sub> (Junction to Ambient)	100°C/W	195°C/W
θ <sub>jC</sub> (Junction to Case)	N/A	N/A

**Electrical Characteristics**

Parameter	Conditions	LM741A			LM741			Units	
		Min	Typ	Max	Min	Typ	Max		
Input Offset Voltage	$T_A=25^{\circ}\text{C}$ $R_S \leq 10\text{K}\Omega$ $R_S \leq 50\Omega$		0.8	3.0		1.0	5.0	mW mW	
	$T_{AMIN} \leq T_A \leq T_{AMAX}$ $R_S \leq 50\Omega$ $R_S \leq 10\text{K}\Omega$			4.0			6.0	mW mW	
	Average Input Offset Voltage Drift			15				$\mu\text{V}/^{\circ}\text{C}$	
Input Offset Voltage Adjustment Range	$T_A=25^{\circ}\text{C}, V_S=\pm 18\text{V}$	$\pm 10$				$\pm 15$		mW	
Input Offset Current	$T_A=25^{\circ}\text{C}$ $T_{AMIN} \leq T_A \leq T_{AMAX}$		3.0	30 70		20 85	200 500	nA nA	
	Average Input Offset Current Drift			0.5				$\text{nA}/^{\circ}\text{C}$	
Input Bias Current	$T_A=25^{\circ}\text{C}$ $T_{AMIN} \leq T_A \leq T_{AMAX}$		30	80 0.21		80	500 1.5	nA $\mu\text{A}$	
	Input Resistance	$T_A=25^{\circ}\text{C}, V_S=\pm 18\text{V}$	1.0	6.0		0.3	2.0		$\text{M}\Omega$
$T_{AMIN} \leq T_A \leq T_{AMAX}, V_S=\pm 18\text{V}$		0.5						$\text{M}\Omega$	
Input Voltage Range	$T_A=25^{\circ}\text{C}$							V	
	$T_{AMIN} \leq T_A \leq T_{AMAX}$				$\pm 12$	$\pm 13$		V	
Large Signal Voltage Gain	$T_A=25^{\circ}\text{C}, R_L \geq 2\text{K}\Omega$ $V_S=\pm 18\text{V}, V_O=\pm 15\text{V}$ $V_S=\pm 15\text{V}, V_O=\pm 10\text{V}$	50				50	200	V/mW V/mW	
	$T_{AMIN} \leq T_A \leq T_{AMAX}$ $R_L \geq 2\text{K}\Omega$ $V_S=\pm 18\text{V}, V_O=\pm 15\text{V}$ $V_S=\pm 15\text{V}, V_O=\pm 10\text{V}$	32				25		V/mW V/mW	
	$V_S=\pm 5\text{V}, V_O=\pm 2\text{V}$	10						V/mW	
	Output Voltage Swing	$V_S=\pm 18\text{V}$ $R_L \geq 10\text{K}\Omega$ $R_L \geq 2\text{K}\Omega$	$\pm 16$ $\pm 15$						V V
$V_S=\pm 15\text{V}$ $R_L \geq 10\text{K}\Omega$ $R_L \geq 2\text{K}\Omega$					$\pm 12$ $\pm 10$	$\pm 14$ $\pm 13$		V V	
Output Short Circuit Current		$T_A=25^{\circ}\text{C}$	10	25	35		25		mA
		$T_{AMIN} \leq T_A \leq T_{AMAX}$	10		40				mA

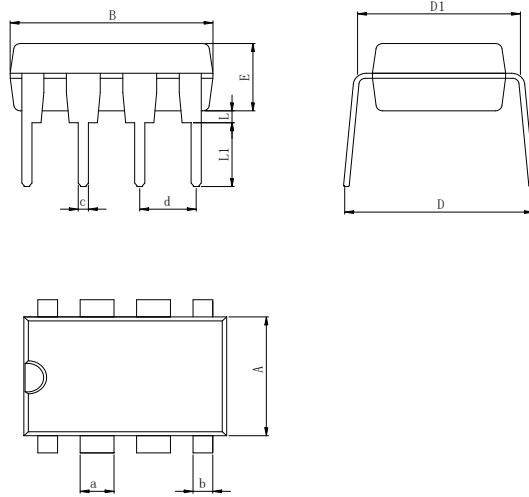
Common-Mode Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$			0.5				
	$R_S \leq 10K\Omega, V_{CM} = \pm 12V$				70	90		dB
	$R_S \leq 50\Omega, V_{CM} = \pm 12V$	80	95					dB
Supply Voltage Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$							
	$V_S = \pm 18V$ to $V_S = \pm 5V$							
	$R_S \leq 50\Omega$	86	96					dB
	$R_S \leq 10K\Omega$				77	96		dB
Transient Response Rise Time Overshoot	$T_A = 25^\circ C$ , Unity Gain		0.25	0.8			0.3	$\mu s$
			6.0	20			5	%
Bandwidth <sup>(Note5)</sup>	$T_A = 25^\circ C$	0.437	1.5					MHz
Slew Rate	$T_A = 25^\circ C$ , Unity Gain	0.3	0.7			0.5		V/ $\mu s$
Supply Current	$T_A = 25^\circ C$					1.7	2.8	mA
Power Consumption	$T_A = 25^\circ C$							
	$V_S = \pm 18V$		80	150				mw
	$V_S = \pm 15V$					50	85	mw

Note 4: Calculated value from:  $BW$  (MHz) =  $0.35 / \text{Rise Time}(\mu s)$ .

Note 5: Human body model, 1.5 k $\Omega$  in series with 100 pF.

## Physical Dimensions

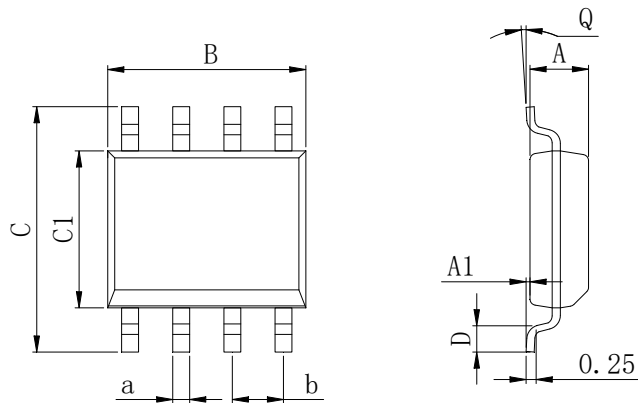
### DIP-8



**Dimensions In Millimeters(DIP-8)**

Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

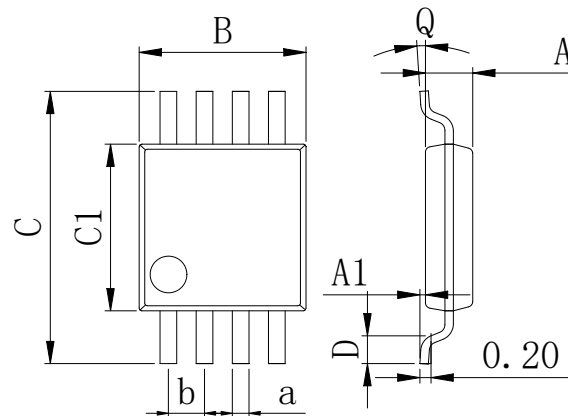
### SOP-8



**Dimensions In Millimeters(SOP-8)**

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	4.90	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	5.10	6.20	4.00	0.80	8°	0.45	

MSOP-8



Dimensions In Millimeters(MSOP-8)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.80	0.05	2.90	4.75	2.90	0.35	0°	0.25	0.65 BSC
Max:	0.90	0.20	3.10	5.05	3.10	0.75	8°	0.35	

## Revision History

DATE	REVISION	PAGE
2021-7-8	New	1-9
2023-9-1	Update encapsulation type、Update Lead Temperature、Updated DIP-8 dimension、 Add annotation for Maximum Ratings.	1、 3、 5
2023-10-16	Document Reformatting	1-9



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