# LM741 Operational Amplifier

General Description

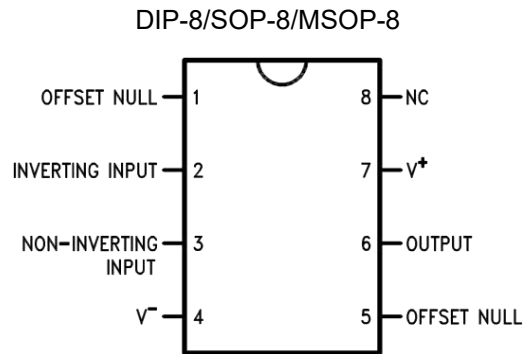The LM741 series are general purpose operational amplifies which feature improved performance over industry standards like the LM709.They are e direct, plug-in replacements for the 709C, LM201, MC1439 and 748 in most applications. The amplifiers offer many features which make their applica tion nearly foolproof: overload protection on the input and output, no latch-up when the common mode range is ex ceeded, as well as freedom from oscillations.
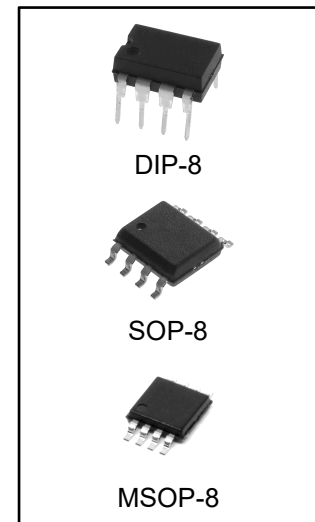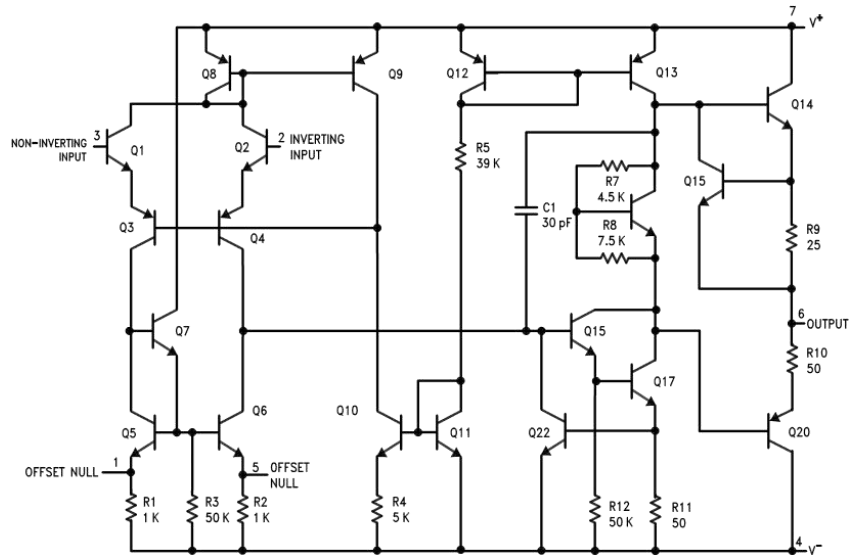
DIP-8

SOP-8

MSOP-8

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

DIP-8/SOP-8/MSOP-8

Pin		Pin
OFFSET NULL	1	8 — NC
INVERTING INPUT	2	7 — V⁺
NON—INVERTING INPUT	3	6 — OUTPUT
V⁻	4	5 — OFFSET NULL

Schematic Diagram

Offset Nulling Circuit
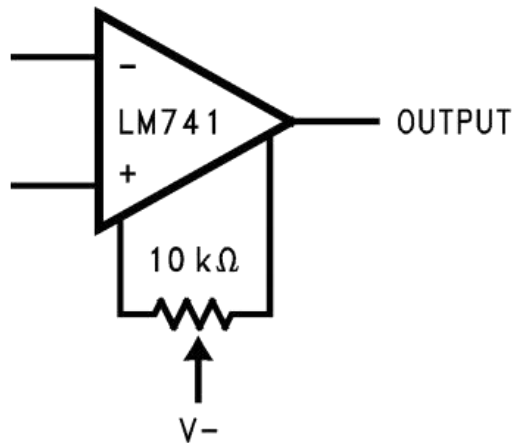
Absolute Maximum Ratings [1]

CONDITION	LIMITS
Supply Voltage	$\pm$18V
Power Dissipation[Note2]	500mW
Differential Input Voltage	$\pm$30V
Input Voltage[Note3]	$\pm$15V
Output Sort 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 Tj max. (listed under "Absolute Maximum Ratings"). Tj = TA +(θjA 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_{jA}(Junction to Ambient)	100˚C/W	195˚C/W
θ_{jC}(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˚C R_S≤10KΩ					1.0	5.0	mW
	R_S≤50Ω		0.8	3.0				mW
	T_{AMIN}≤T_A≤T_{AMAX} R_S≤50Ω			4.0				mW
	R_S≤10KΩ						6.0	mW
Average Input Offset Voltage Drift				15				µv/˚C
Input Offset Voltage Adjustment Range	T_A=25˚C,V_S=±18V	±10				±15		mW
Input Offset Current	T_A=25˚C		3.0	30		20	200	nA
	T_{AMIN}≤T_A≤T_{AMAX}			70		85	500	nA
Average Input Offset Current Drift				0.5				nA/˚C
Input Bias Current	T_A=25˚C		30	80		80	500	nA
	T_{AMIN}≤T_A≤T_{AMAX}			0.21			1.5	µA
Input Resistance	T_A=25˚C,V_S=±18V	1.0	6.0		0.3	2.0		MΩ
	T_{AMIN}≤T_A≤T_{AMAX}, V_S=±18V	0.5						MΩ
Input Voltage Range	T_A=25˚C							V
	T_{AMIN}≤T_A≤T_{AMAX}				±12	±13		V
Large Signal Voltage Gain	T_A=25˚C,R_L≥2KΩ V_S=±18V,V_O=±15V	50						V/mW
	V_S=±15V,V_O=±10V				50	200		V/mW
	T_{AMIN}≤T_A≤T_{AMAX} R_L≥2KΩ V_S=±18V,V_O=±15V	32						V/mW
	V_S=±15V,V_O=±10V				25			V/mW
	V_S=±5V,V_O=±2V	10						V/mW
Output Voltage Swing	V_S=±18V R_L≥10KΩ	±16						V
	R_L≥2KΩ	±15						V
	V_S=±15V R_L≥10KΩ				±12	±14		V
	R_L≥2KΩ				±10	±13		V
Output Short Circuit Current	T_A=25˚C	10	25	35		25		mA
	T_{AMIN}≤T_A≤T_{AMAX}	10		40				mA

Parameter	Conditions							Units
Common-Mode Rejection Ratio	T$_{AMIN}$≤TA≤T$_{AMAX}$			0.5				
	R$_S$≤10KΩ,V$_{CM}$=±12V				70	90		dB
	R$_S$≤50Ω,V$_{CM}$=±12V	80	95					dB
Supply Voltage Rejection Ratio	T$_{AMIN}$≤TA≤T$_{AMAX}$ Vs=±18VtoVS=±5V R$_S$≤50Ω	86	96					dB
	R$_S$≤10KΩ				77	96		dB
Transient Response Rise Time Overshoot	T$_A$=25˚C,Unity Gain		0.25	0.8		0.3		µs
			6.0	20		5		%
Bandwidth(Note5)	T$_A$=25˚C	0.437	1.5					MHz
Slew Rate	T$_A$=25˚C,Unity Gain	0.3	0.7			0.5		V/µs
Supply Current	T$_A$=25˚C					1.7	2.8	mA
Power Consumption	T$_A$=25˚C Vs=±18V		80	150				mw
	Vs=±15V					50	85	mw

Note 4: Calculated value from: BW (MHz) = 0.35/Rise Time(µs).
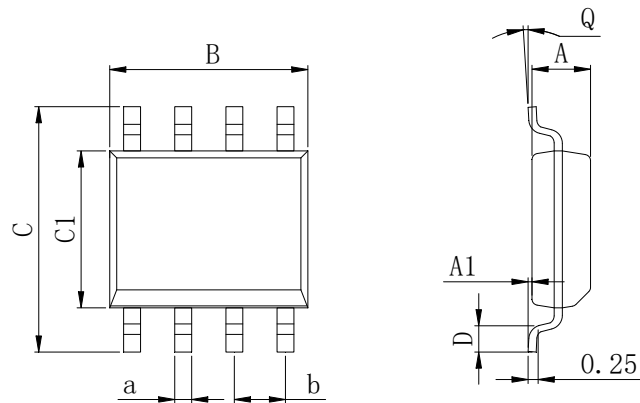Note 5: Human body model, 1.5 kΩ in series with 100 pF.

Physical Dimensions

DIP-8
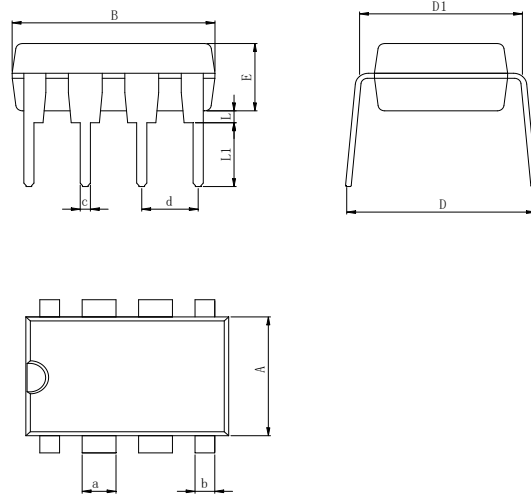
Dimensions In Millimeters(DIP-8)										
Symbol：	A	B	D	D1	E	L	L1	a	b	c	d
Min：	6.10	9.00	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max：	6.68	9.50	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

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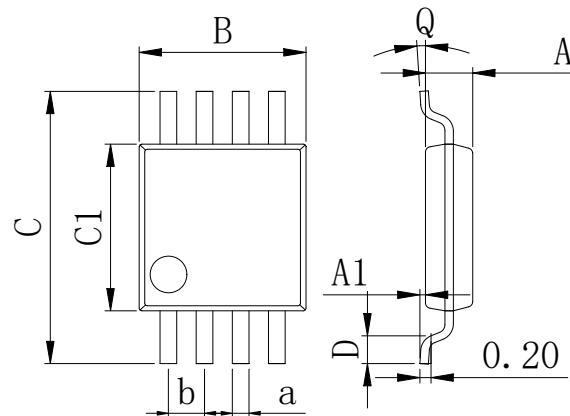
Dimensions In Millimeters(MSOP-8)								
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.80	0.05	2.90	4.75	2.90	0.35	0°	0.25	0.65 BSC
Max:	0.90	0.20	3.10	5.05	3.10	0.75	8°	0.35	

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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