

## HG741 Operational Amplifier

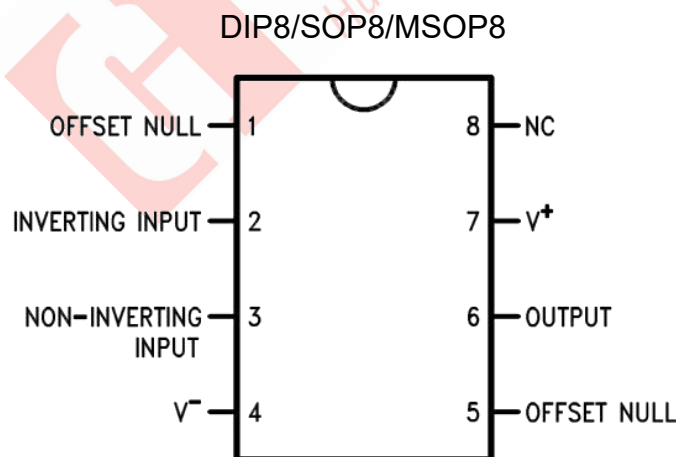
### General Description

The HG741 series are general purpose operational amplifiers which feature improved performance over industry standards like the HG709. They are direct, plug-in replacements 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.

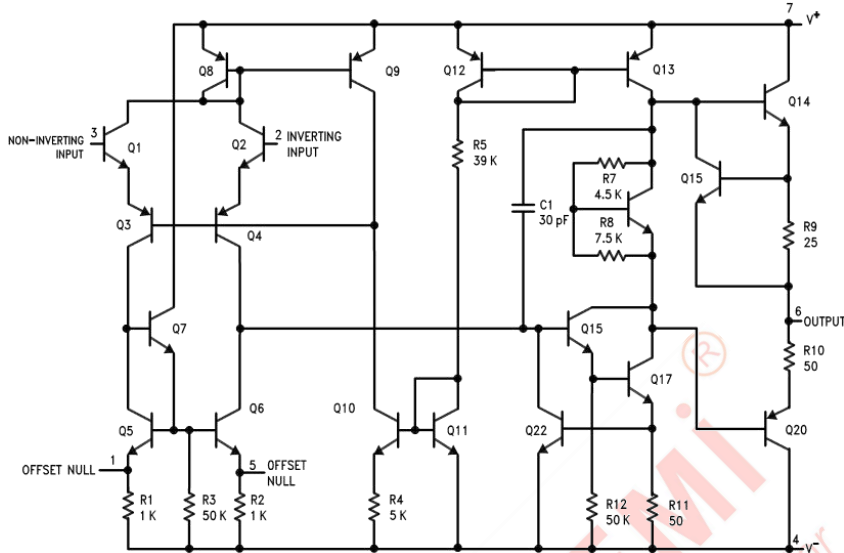
### Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
HG741CN	DIP8	HG741	TUBE	2000pcs/Box
HG741ACN	DIP8	HG741A	TUBE	2000pcs/Box
HG741CM/TR	SOP8	HG741	REEL	2500pcs/Reel
HG741ACM/TR	SOP8	HG741A	REEL	2500pcs/Reel
HG741CMM/TR	MSOP8	HG741	REEL	3000pcs/Reel
HG741ACMM/TR	MSOP8	HG741A	REEL	3000pcs/Reel

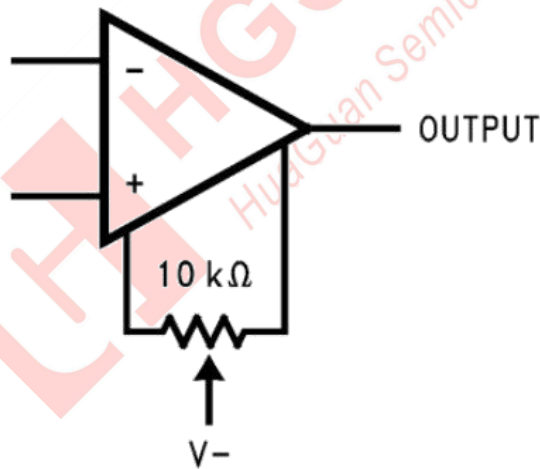
### Connection Diagram



**Schematic Diagram**



**Offset Nulling Circuit**



## Absolute Maximum Ratings

CONDITION		LIMITS
Supply Voltage		±22V
Power Dissipation(Note2)		500mW
Differential Input Voltage		±30V
Input Voltage(Note3)		±15V
Output Sort Circuit Duration		Continuous
Operating Temperature Range		0°C to +70°C
Junction Temperature	HG741A	150°C
	HG741	100°C
Soldering Information	N-Package(10 seconds)	260°C
	J-or H-Package(10 seconds)	300°C
M-Package	Vapor Phase(60 seconds)	215°C
	Infrared(15 seconds)	215°C
Storage Temperature Range		-65°C to +150°C
ESD Tolerance(Note7)		400V

## Electrical Characteristics

Parameter	Conditions	HG741A			HG741			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	TA=25°C Rs≤10KΩ Rs≤50Ω		0.8	3.0		2.0	6.0	mW mW
	TAMIN≤TA≤TAMAX Rs≤50Ω Rs≤10KΩ			4.0			7.5	mW mW
	Average Input Offset Voltage Drift			15				µV/°C
Input Offset Voltage Adjustment Range	TA=25°C, VS=±20V	±10				±15		mW
Input Offset Current	TA=25°C		3.0	30		20	200	nA
	TAMIN≤TA≤TAMAX			70			300	nA
Average Input Offset Current Drift				0.5				nA/°C
Input Bias Current	TA=25°C		30	80		80	500	nA
	TAMIN≤TA≤TAMAX			0.210			0.8	µA
Input Resistance	TA=25°C, VS=±20V	1.0	6.0		0.3	2.0		MΩ
	TAMIN≤TA≤TAMAX, VS=±20V	0.5						MΩ
Input Voltage Range	TA=25°C				±12	±13		V
	TAMIN≤TA≤TAMAX							V

Large Signal Voltage Gain	$T_A=25^{\circ}\text{C}, R_L \geq 2\text{K}\Omega$ $V_S = \pm 20\text{V}, V_O = \pm 15\text{V}$ $V_S = \pm 15\text{V}, V_O = \pm 10\text{V}$	50				20	200	V/mW V/mW	
	$T_{AMIN} \leq T_A \leq T_{AMAX}$ $R_L \geq 2\text{K}\Omega$ $V_S = \pm 20\text{V}, V_O = \pm 15\text{V}$ $V_S = \pm 15\text{V}, V_O = \pm 10\text{V}$ $V_S = \pm 5\text{V}, V_O = \pm 2\text{V}$	32				15		V/mW V/mW V/mW	
Output Voltage Swing	$V_S = \pm 20\text{V}$ $R_L \geq 10\text{K}\Omega$ $R_L \geq 2\text{K}\Omega$	$\pm 16$						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	$T_A = 25^{\circ}\text{C}$ $T_{AMIN} \leq T_A \leq T_{AMAX}$	10	25	35			25	mA mA	
Common-Mode Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$ $R_S \leq 10\text{K}\Omega, V_{CM} = \pm 12\text{V}$ $R_S \leq 50\Omega, V_{CM} = \pm 12\text{V}$			0.5			70	90	dB dB
Supply Voltage Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$ $V_S = \pm 20\text{V to } \pm 5\text{V}$ $R_S \leq 50\Omega$ $R_S \leq 10\text{K}\Omega$	86	96						dB dB
							77	96	
Transient Response Rise Time Overshoot	$T_A = 25^{\circ}\text{C}, \text{Unity Gain}$								$\mu\text{s}$
Bandwidth(Note5)	$T_A = 25^{\circ}\text{C}$	0.43							MHz
		7	1.5						
Slew Rate	$T_A = 25^{\circ}\text{C}, \text{Unity Gain}$	0.3	0.7				0.5		V/ $\mu\text{s}$
Supply Current	$T_A = 25^{\circ}\text{C}$						1.7	2.8	mA
Power Consumption	$T_A = 25^{\circ}\text{C}$ $V_S = \pm 20\text{V}$ $V_S = \pm 15\text{V}$								mw mw
							50	85	

**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  $T_j$  max. (listed under "Absolute Maximum Ratings").  $T_j = T_A + (\theta_{JA} P_D)$ .

Thermal Resistance	DIP(B)	SOP-8(M)
$\theta_{JA}$ (Junction to Ambient)	100°C/W	195°C/W
$\theta_{JC}$ (Junction to Case)	N/A	N/A

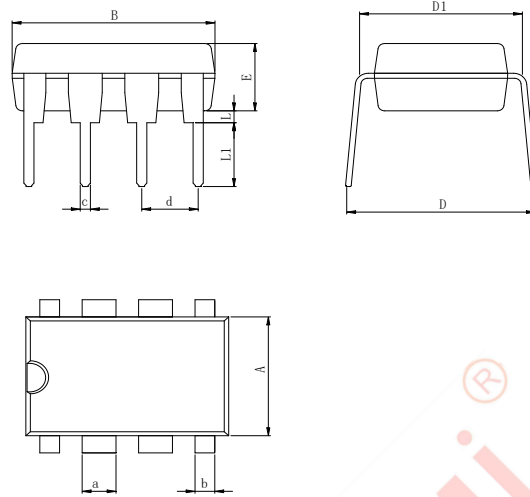
**Note 3:** For supply voltages less than  $\pm 15\text{V}$ , the absolute maximum input voltage is equal to the supply voltage.

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

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

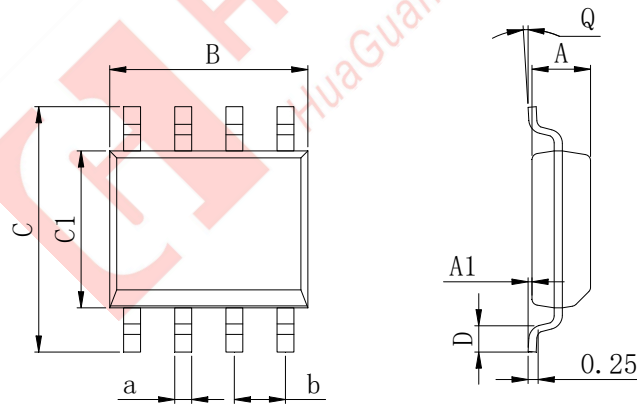
## Physical Dimensions

### DIP-8L



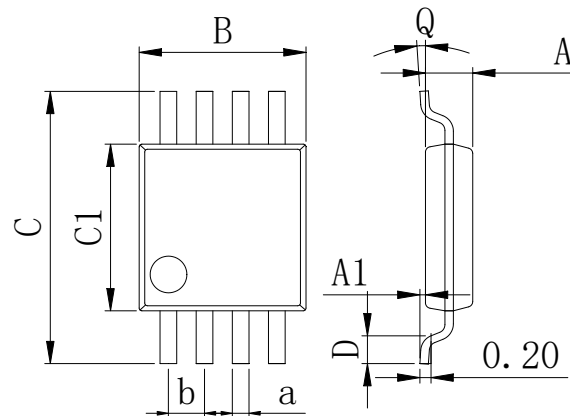
Dimensions In Millimeters(DIP8L)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

### SOP-8L 150mil



Dimensions In Millimeters(SOP8L)									
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	

MSOP8



Dimensions In Millimeters(MSOP8L)									
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	



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