

HG741 Operational Amplifier

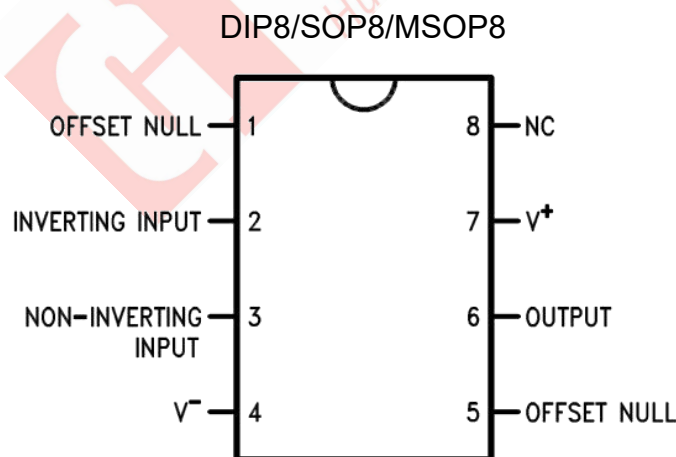
General Description

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.

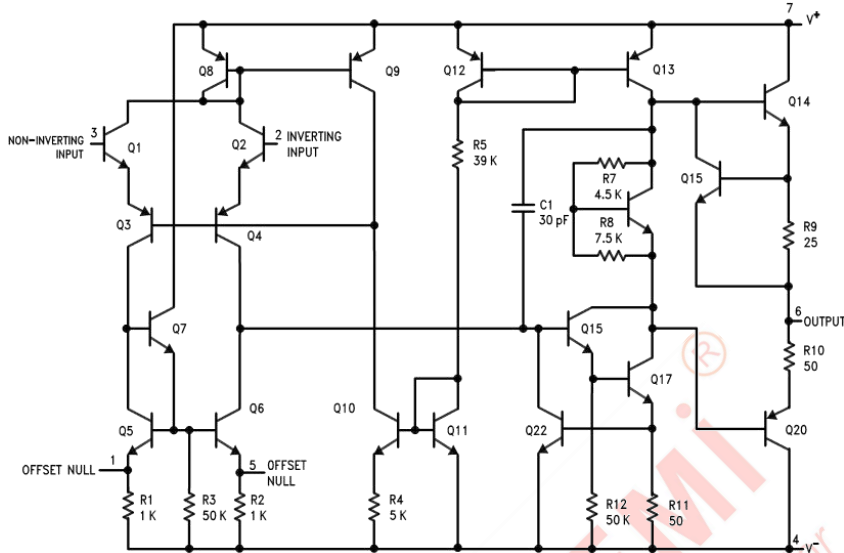
Ordering Information

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

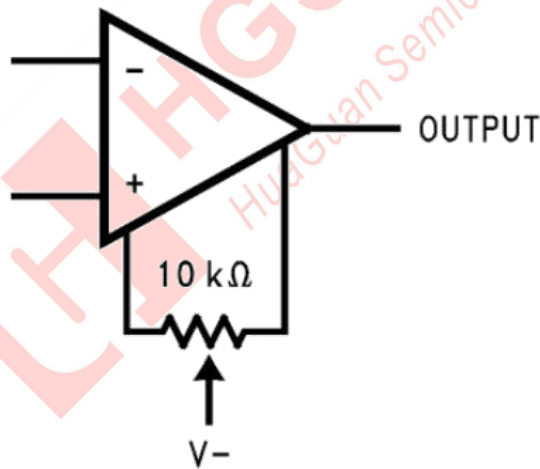
Connection Diagram



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
	$T_{\text{MIN}} \leq T_A \leq T_{\text{MAX}}$ $R_L \geq 2\text{K}\Omega$ $V_S = \pm 20\text{V}, V_O = \pm 15\text{V}$ $V_S = \pm 15\text{V}, V_O = \pm 10\text{V}$ $V_S = \pm 5\text{V}, V_O = \pm 2\text{V}$	32				15			V/mW V/mW V/mW
Output Voltage Swing	$V_S = \pm 20\text{V}$ $R_L \geq 10\text{K}\Omega$ $R_L \geq 2\text{K}\Omega$	± 16							V V
	$V_S = \pm 15\text{V}$ $R_L \geq 10\text{K}\Omega$ $R_L \geq 2\text{K}\Omega$					± 12	± 14		V V
Output Short Circuit Current	$T_A = 25^{\circ}\text{C}$ $T_{\text{MIN}} \leq T_A \leq T_{\text{MAX}}$	10	25	35			25		mA mA
		10		40					
Common-Mode Rejection Ratio	$T_{\text{MIN}} \leq T_A \leq T_{\text{MAX}}$ $R_S \leq 10\text{K}\Omega, V_{\text{CM}} = \pm 12\text{V}$ $R_S \leq 50\Omega, V_{\text{CM}} = \pm 12\text{V}$			0.5			70	90	dB dB
		80	95						
Supply Voltage Rejection Ratio	$T_{\text{MIN}} \leq T_A \leq T_{\text{MAX}}$ $V_S = \pm 20\text{V to } \pm 5\text{V}$ $R_S \leq 50\Omega$ $R_S \leq 10\text{K}\Omega$	86	96						dB dB
						77	96		
Transient Response Rise Time Overshoot	$T_A = 25^{\circ}\text{C}, \text{Unity Gain}$								μs
			0.25	0.8			0.3		
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/ μs
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
			80	150			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)
θ_{JA} (Junction to Ambient)	100°C/W	195°C/W
θ_{JC} (Junction to Case)	N/A	N/A

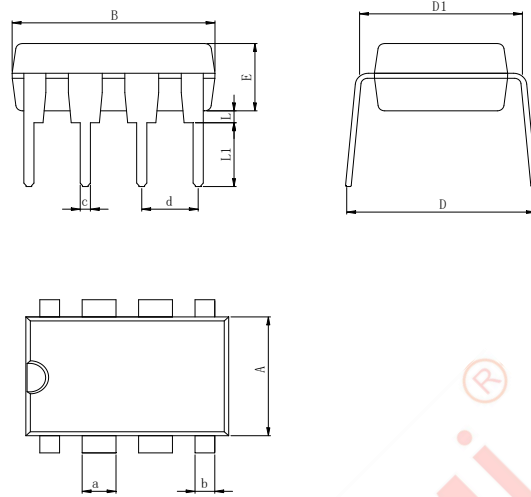
Note 3: For supply voltages less than $\pm 15\text{V}$, the absolute maximum input voltage is equal to the supply voltage.

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

Note 5: Human body model, 1.5 k Ω in series with 100 pF.

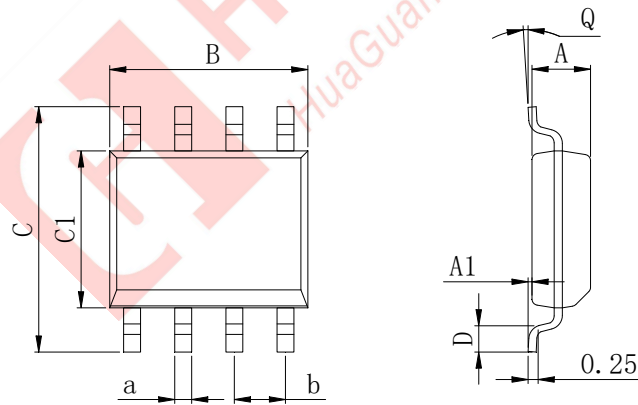
Physical Dimensions

DIP-8L



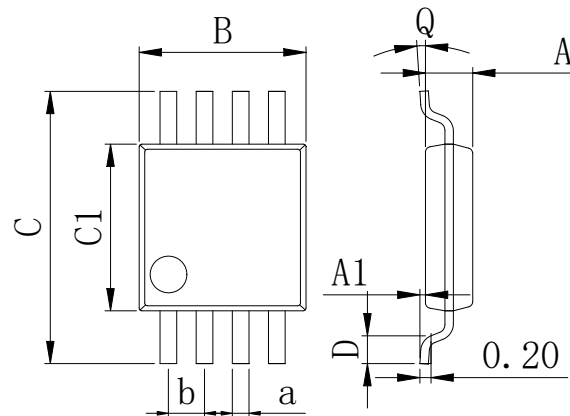
Dimensions In Millimeters(DIP8L)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

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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