

## HG741 Operational Amplifier

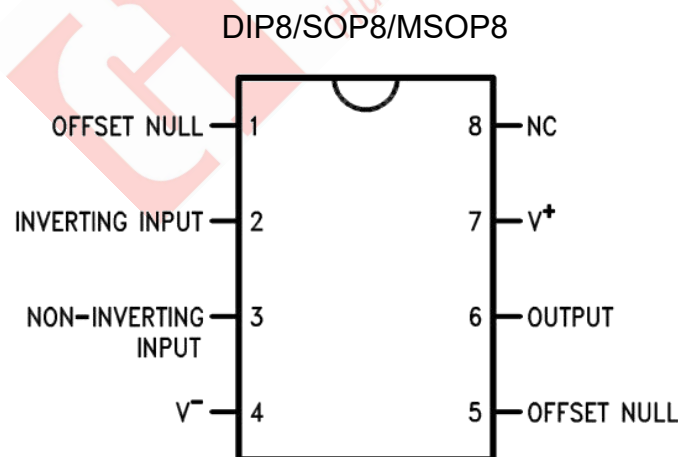
### General Description

The HG741 series are general purpose operational amplifiers which feature improved performance over industry standards like the HG709. They are a direct, plug-in replacement for the 709C, HG201, 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.

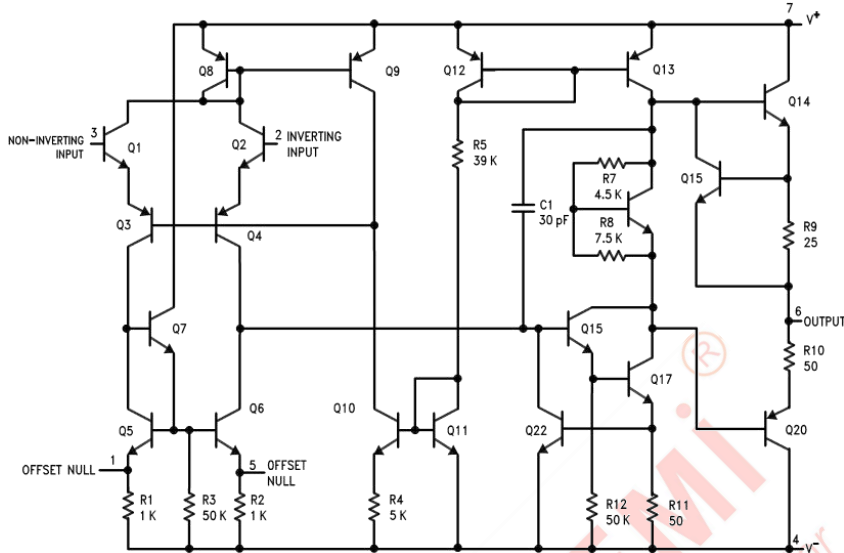
### Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
HG741N	DIP8	HG741	TUBE	2000pcs/Box
HG741AN	DIP8	HG741A	TUBE	2000pcs/Box
HG741M/TR	SOP8	HG741	REEL	2500pcs/Reel
HG741AM/TR	SOP8	HG741A	REEL	2500pcs/Reel
HG741MM/TR	MSOP8	HG741	REEL	3000pcs/Reel
HG741AMM/TR	MSOP8	HG741A	REEL	3000pcs/Reel

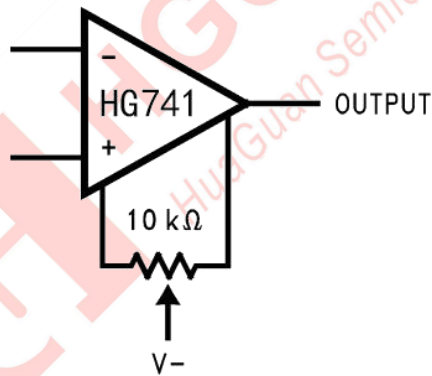
### Connection Diagram



**Schematic Diagram**



**Offset Nulling Circuit**



**Absolute Maximum Ratings**

CONDITION		LIMITS	Units
Supply Voltage		±22	V
Power Dissipation(Note2)		500	mW
Differential Input Voltage		±30	V
Input Voltage(Note3)		±15	V
Output Short Circuit Duration		Continuous	
Operating Temperature Range	HG741A	-40 ~ +85	°C
	HG741	0 ~ +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 ~ +150	°C
ESD Tolerance(Note7)		400	V

**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 TAMIN≤TA≤TAMAX		3.0	30 70		20	200 300	nA nA	
	Average Input Offset Current Drift			0.5				nA/°C	
Input Bias Current	TA=25°C TAMIN≤TA≤TAMAX		30	80 0.210		80	500 0.8	nA 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	TA=25°C, RL≥2KΩ Vs=±20V, Vo=±15V Vs=±15V, Vo=±10V	50			20	200		V/mW V/mW	
	TAMIN≤TA≤TAMAX RL≥2KΩ Vs=±20V, Vo=±15V Vs=±15V, Vo=±10V	32			15			V/mW V/mW	
	Vs=±5V, Vo=±2V	10						V/mW	
	Output Voltage Swing	Vs=±20V RL≥10KΩ RL≥2KΩ	±16 ±15						V V
Vs=±15V RL≥10KΩ RL≥2KΩ					±12 ±10	±14 ±13		V V	
Output Short Circuit Current		TA=25°C	10	25	35		25		mA
		TAMIN≤TA≤TAMAX	10		40				mA
Common-Mode Rejection Ratio	TAMIN≤TA≤TAMAX Rs≤10KΩ, VCM=±12V			0.5	70	90		dB	
	Rs≤50Ω, VCM=±12V	80	95					dB	
Supply Voltage Rejection Ratio	TAMIN≤TA≤TAMAX Vs=±20V to Vs=±5V Rs≤50Ω	86	96					dB	
	Rs≤10KΩ				77	96		dB	

Transient Response Rise Time Overshoot	TA=25°C,Unity Gain		0.25 6.0	0.8 20		0.3 5		μs
Bandwidth(Note5)	TA=25°C	0.43 7	1.5					MHz
Slew Rate	TA=25°C,Unity Gain	0.3	0.7			0.5		V/μs
Supply Current	TA=25°C					1.7	2.8	mA
Power Consumption	TA=25°C VS=±20V VS=±15V		80	150		50	85	mw mw

**Note 1:** "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 ±15V, the absolute maximum input voltage is equal to the supply voltage.

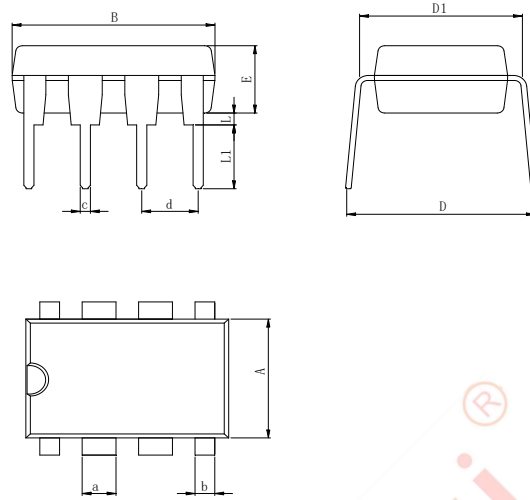
Note 4: Unless otherwise specified, these specifications apply for  $V_S = \pm 15V$ ,  $-40^\circ C \leq T_A \leq +85^\circ C$  (HG741A). For the HG741, these specifications are limited to  $0^\circ C \leq T_A \leq +70^\circ C$ .

Note 5: Calculated value from:  $BW$  (MHz) =  $0.35 / \text{Rise Time}(\mu s)$ .

Note 6: Human body model, 1.5 kΩ in series with 100 pF.

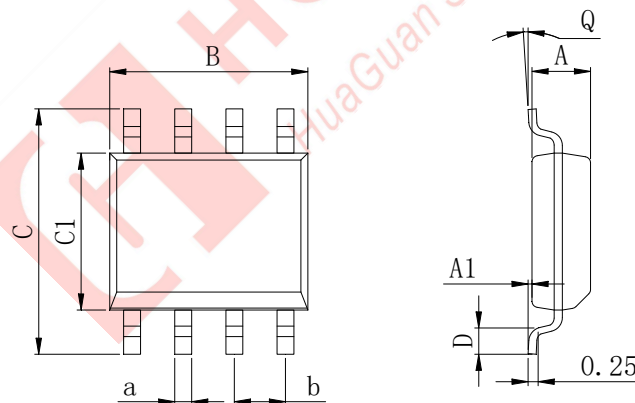
## Physical Dimensions

### DIP-8L



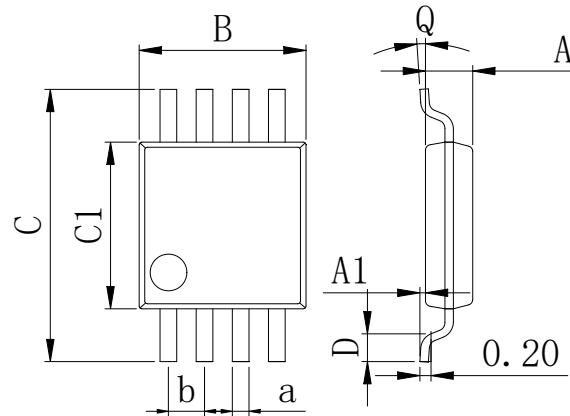
Dimensions In Millimeters(DIP8L)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

### SOP-8L 150mil



Dimensions In Millimeters(SOP8)									
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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