



# UA741

## GENERAL PURPOSE SINGLE OPERATIONAL AMPLIFIER

- LARGE INPUT VOLTAGE RANGE
- NO LATCH-UP
- HIGH GAIN
- SHORT-CIRCUIT PROTECTION
- NO FREQUENCY COMPENSATION REQUIRED
- SAME PIN CONFIGURATION AS THE UA709

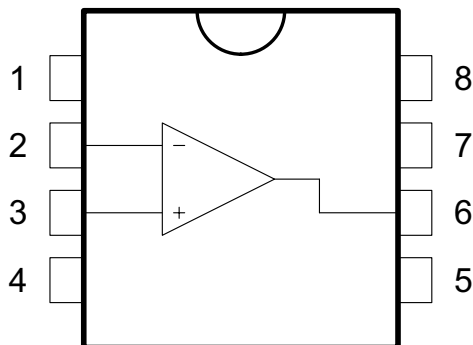
### DESCRIPTION

The UA741 is a high performance monolithic operational amplifier constructed on a single silicon chip. It is intended for a wide range of analog applications.

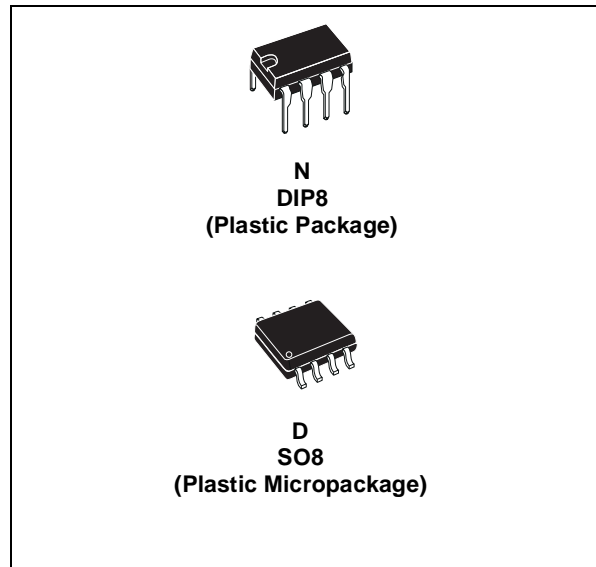
- Summing amplifier
- Voltage follower
- Integrator
- Active filter
- Function generator

The high gain and wide range of operating voltages provide superior performances in integrator, summing amplifier and general feedback applications. The internal compensation network (6dB/octave) insures stability in closed loop circuits.

### PIN CONNECTIONS (top view)



- 1 - Offset null 1
- 2 - Inverting input
- 3 - Non-inverting input
- 4 -  $V_{CC}^-$
- 5 - Offset null 2
- 6 - Output
- 7 -  $V_{CC}^+$
- 8 - N.C.



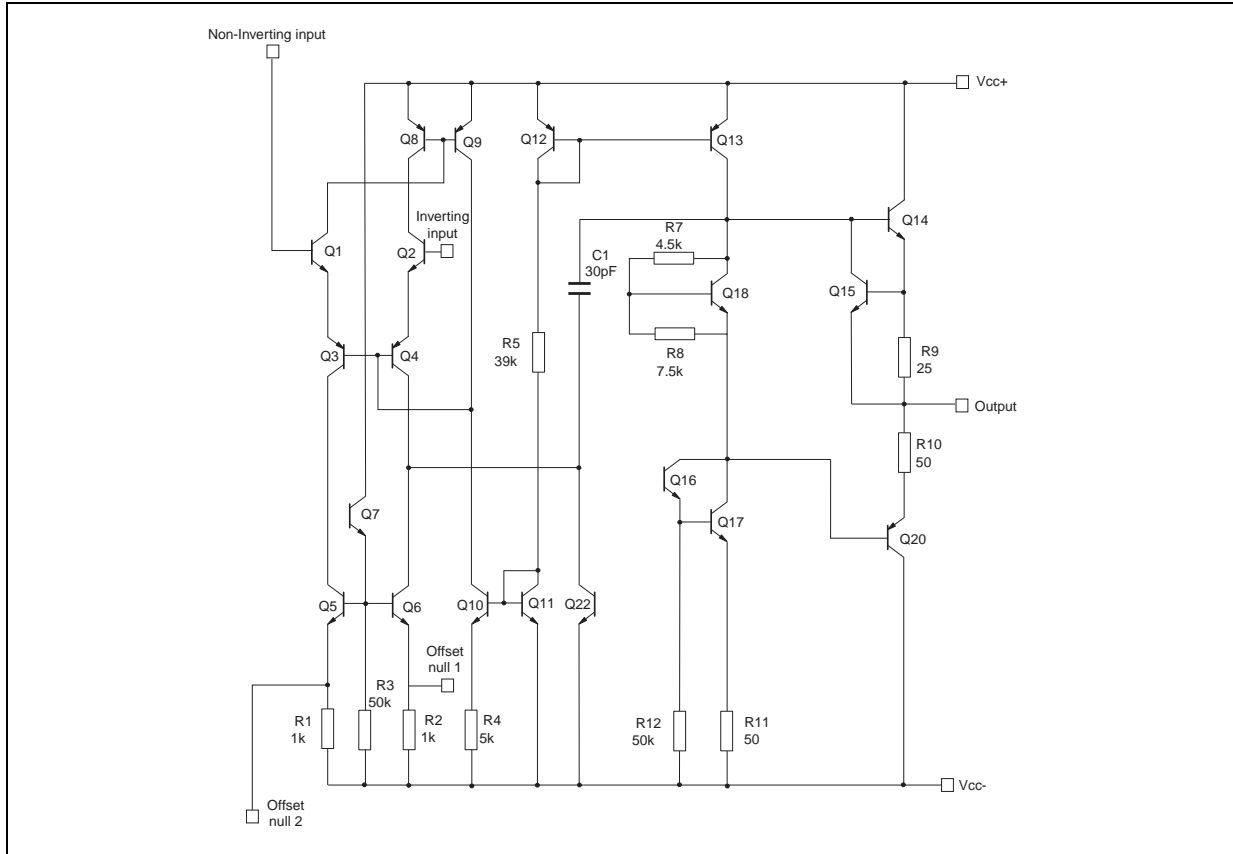
### ORDER CODE

Part Number	Temperature Range	Package	
		N	D
UA741C	0°C, +70°C	•	•
UA741I	-40°C, +105°C	•	•
UA741M	-55°C, +125°C	•	•

**Example : UA741CN**

**N** = Dual in Line Package (DIP)  
**D** = Small Outline Package (SO) - also available in Tape & Reel (DT)

**SCHEMATIC DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

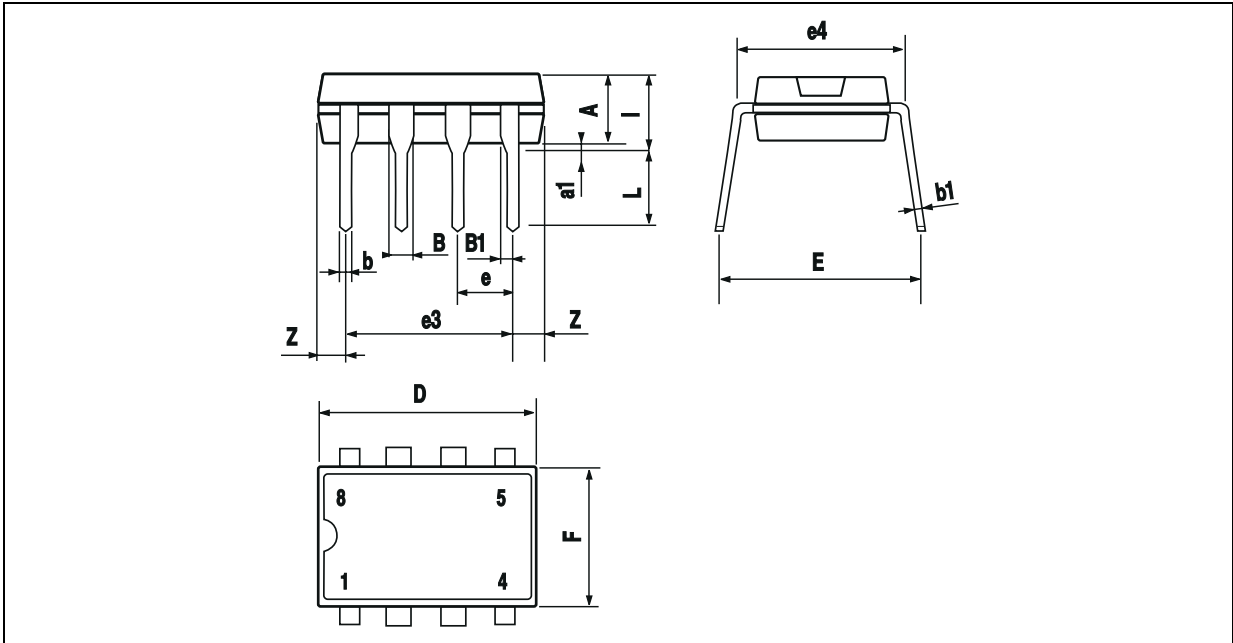
Symbol	Parameter	UA741M	UA741I	UA741C	Unit
$V_{CC}$	Supply voltage		$\pm 22$		V
$V_{id}$	Differential Input Voltage		$\pm 30$		V
$V_i$	Input Voltage		$\pm 15$		V
$P_{tot}$	Power Dissipation <sup>1)</sup>		500		mW
	Output Short-circuit Duration		Infinite		
$T_{oper}$	Operating Free-air Temperature Range	-55 to +125	-40 to +105	0 to +70	$^{\circ}C$
$T_{stg}$	Storage Temperature Range		-65 to +150		$^{\circ}C$

1. Power dissipation must be considered to ensure maximum junction temperature ( $T_j$ ) is not exceeded.

**ELECTRICAL CHARACTERISTICS** $V_{CC} = \pm 15V$ ,  $T_{amb} = +25^{\circ}C$  (unless otherwise specified)

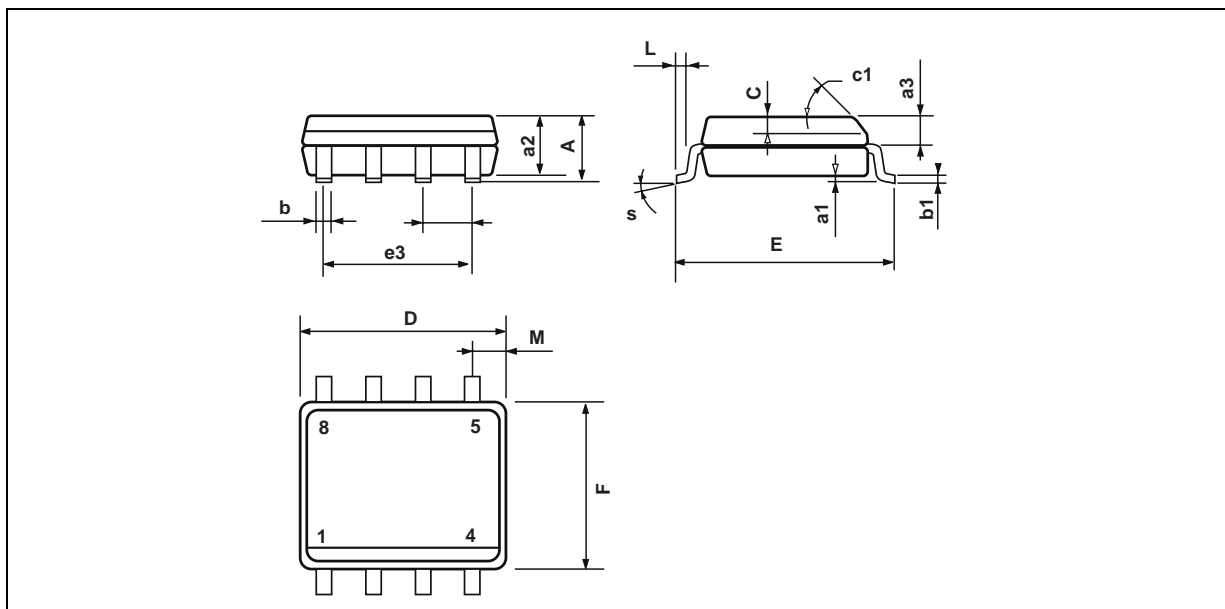
Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{io}$	Input Offset Voltage ( $R_s \leq 10k\Omega$ ) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$		1	5 6	mV
$I_{io}$	Input Offset Current $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$		2	30 70	nA
$I_{ib}$	Input Bias Current $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$		10	100 200	nA
$A_{vd}$	Large Signal Voltage Gain ( $V_o = \pm 10V$ , $R_L = 2k\Omega$ ) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$	50 25	200		V/mV
SVR	Supply Voltage Rejection Ratio ( $R_s \leq 10k\Omega$ ) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$	77 77	90		dB
$I_{CC}$	Supply Current, no load $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$		1.7	2.8 3.3	mA
$V_{icm}$	Input Common Mode Voltage Range $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$	$\pm 12$ $\pm 12$			V
CMR	Common Mode Rejection Ratio ( $R_s \leq 10k\Omega$ ) $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$	70 70	90		dB
$I_{OS}$	Output short Circuit Current	10	25	40	mA
$\pm V_{opp}$	Output Voltage Swing $T_{amb} = +25^{\circ}C$ $T_{min} \leq T_{amb} \leq T_{max}$				V
	$R_L = 10k\Omega$	12	14		
	$R_L = 2k\Omega$	10	13		
	$R_L = 10k\Omega$	12			
	$R_L = 2k\Omega$	10			
SR	Slew Rate $V_i = \pm 10V$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain	0.25	0.5		V/ $\mu s$
$t_r$	Rise Time $V_i = \pm 20mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain		0.3		$\mu s$
$K_{ov}$	Overshoot $V_i = 20mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , unity Gain		5		%
$R_i$	Input Resistance	0.3	2		M $\Omega$
GBP	Gain Bandwidth Product $V_i = 10mV$ , $R_L = 2k\Omega$ , $C_L = 100pF$ , $f = 100kHz$	0.7	1		MHz
THD	Total Harmonic Distortion $f = 1kHz$ , $A_v = 20dB$ , $R_L = 2k\Omega$ , $V_o = 2V_{pp}$ , $C_L = 100pF$ , $T_{amb} = +25^{\circ}C$		0.06		%
$e_n$	Equivalent Input Noise Voltage $f = 1kHz$ , $R_s = 100\Omega$		23		$\frac{nV}{\sqrt{Hz}}$
$\phi_m$	Phase Margin		50		Degrees

**PACKAGE MECHANICAL DATA**  
8 PINS - PLASTIC DIP



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

**PACKAGE MECHANICAL DATA**  
**8 PINS - PLASTIC MICROPACKAGE (SO)**



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

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