

# LM741 Single Operational Amplifier

#### Features

- Short circuit protection
- Excellent temperature stability
- Internal frequency compensation
- High Input voltage range
- Null of offset

#### Description

The LM741 series are general purpose operational amplifiers. It is intended for a wide range of analog applications. The high gain and wide range of operating voltage provide superior performance in intergrator, summing amplifier, and general feedback applications.



#### **Internal Block Diagram**



### **Schematic Diagram**



# Absolute Maximum Ratings (TA = 25°C)

Parameter	Symbol	Value	Unit
Supply Voltage	Vcc	±18	V
Differential Input Voltage	VI(DIFF)	30	V
Input Voltage	VI	±15	V
Output Short Circuit Duration	-	Indefinite	-
Power Dissipation	PD	500	mW
Operating Temperature Range LM741C LM741I	Topr	0 ~ + 70 -40 ~ +85	°C
Storage Temperature Range	TSTG	-65 ~ + 150	°C

### **Electrical Characteristics**

(V<sub>CC</sub> = 15V, V<sub>EE</sub> = - 15V. T<sub>A</sub> = 25 °C, unless otherwise specified)

Deremeter		Symphol	Conditions		LM741C/LM741I			11	
Paramo	eter	Symbol	Conditions		Min.	Тур.	Max.	Unit	
Input Offset Voltage		VIO	Rs≤10KΩ		-	2.0	6.0	mV	
			Rs≤50Ω		-	-	-		
Input Offset Voltag	je	VIO(R)	Vcc = ±20V	$V_{CC} = \pm 20V$		±15	-	mV	
Input Offset Curre	, nt	lio		-	_	20	200	nA	
Input Bias Current			-		-	80	500	nA	
Input Resistance (	Note1)	RI	$V_{CC} = +20V$	-		2.0	-	MO	
Input Voltage Ran		Vi(d)			+12	+13	_	V	
Large Signal Voltage Gain		RL≥2KΩ	V <sub>CC</sub> =±20V, V <sub>O</sub> (P-P) =±15V	-	-	-			
	ige Gain	GV		VCC =±15V, VO(P-P) =±10V	20	200	-	V/mV	
Output Short Circu	uit Current	ISC	-		-	25	-	mA	
	VO(P-P)	$V_{CC} = \pm 20V$	RL≥10KΩ	-	-	-	V		
		V <sub>CC</sub> = ±15V	RL≥2KΩ	-	-	-			
Output Voltage Swing			RL≥10KΩ	±12	±14	-			
			RL≥2KΩ	±10	±13	-			
Common Mode Rejection Ratio		CMRR	Rs≤10KΩ, V <sub>CM</sub> = ±12V		70	90	-	dD	
			Rs≤50Ω, V <sub>CM</sub> = ±12V		-	-	-	aв	
Power Supply Rejection Ratio			VCC = ±15V t Rs≤50Ω	o VCC = ±15V	-	-	-	dP	
		PSKK	$V_{CC} = \pm 15V$ to $V_{CC} = \pm 15V$ Rs≤10K $\Omega$		77	96	-	uБ	
Transient	Rise Time	TR	Unity Gain		-	0.3	-	μs	
Response	Overshoot	OS			-	10	-	%	
Bandwidth		BW	-		-	-	-	MHz	
Slew Rate		SR	Unity Gain		-	0.5	-	V/µs	
Supply Current		ICC	RL=∞Ω		-	1.5	2.8	mA	
Power Consumption		PC	$V_{CC} = \pm 20V$		-	-	-	mW	
			$VCC = \pm 15V$		-	50	85		

Note:

1. Guaranteed by design.

#### **Electrical Characteristics**

( $0^{\circ}C \leq T_A \leq 70^{\circ}C$  V<sub>CC</sub> = ±15V, unless otherwise specified) The following specification apply over the range of  $0^{\circ}C \leq T_A \leq +70^{\circ}C$  for the LM741C; and the -40°C  $\leq T_A \leq +85^{\circ}C$ for the LM7411

Demonster	Cumula al	Conditions		LM741C/LM741I			11
Parameter	Symbol			Min.	Тур.	Max.	Unit
	) // a	Rs≤50Ω		-	-	-	mV
Input Offset Voltage	VIO	Rs≤10KΩ		-	-	7.5	
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$		-	-	-		μV/ °C
Input Offset Current	lio		-	-	-	300	nA
Input Offset Current Drift	ΔΙΙΟ/ΔΤ		-	-	-		nA/ °C
Input Bias Current	IBIAS		-	-	-	0.8	μΑ
Input Resistance (Note1)	RI	$V_{CC} = \pm 20V$		-	-	-	MΩ
Input Voltage Range	VI(R)	-		±12	±13	-	V
	Vo(p-p)	Vcc =±20V	Rs≥10KΩ	-	-	-	V
Output Voltage Swing			R <sub>S</sub> ≥2KΩ	-	-	-	
		Vcc =±15V	Rs≥10KΩ	±12	±14	-	
			R <sub>S</sub> ≥2KΩ	±10	±13	-	
Output Short Circuit Current	ISC	-		10	-	40	mA
Common Made Dejection Datia	CMRR	$R_S \le 10 K\Omega$ , $V_{CM} = \pm 12 V$		70	90	-	dB
		Rs≤50Ω, VCM = ±12V		-	-	-	
Power Supply Rejection Ratio	PSRR	$V_{CC} = \pm 20V$ to $\pm 5V$	Rs≤50Ω	-	-	-	dB
			Rs≤10KΩ	77	96	-	
Large Signal Voltage Gain	Gv	R <sub>S</sub> ≥2KΩ	V <sub>CC</sub> = ±20V, V <sub>O</sub> (P-P) = ±15V	-	-	-	V/mV
			$V_{CC} = \pm 15V,$ $V_{O(P,P)} = \pm 10V$	15	-	-	
			$V_{CC} = \pm 15V,$ $V_{O}(P-P) = \pm 2V$	-	-	-	

Note :

1. Guaranteed by design.

#### **Typical Performance Characteristics**



Figure 1. Output Resistance vs Frequency



Figure 3. Input Bias Current vs Ambient Temperature



Figure 5. Input Offset Current vs Ambient Temperature



Figure 2. Input Resistance and Input Capacitance vs Frequency



Figure 4. Power Consumption vs Ambient Temperature



Figure 6. Input Resistance vs Ambient Temperature

#### **Typical Performance Characteristics (continued)**



Figure 7. Normalized DC Parameters vs Ambient Temperature



Figure 9. Frequency Characteristics vs Supply Voltage



Figure 11. Transient Response



Figure 8. Frequency Characteristics vs Ambient Temperature



Figure 10. Output Short Circuit Current vs Ambient Temperature



Figure 12. Common-Mode Rejection Ratio vs Frequency

# **Typical Performance Characteristics (continued)**



Figure 13. Voltage Follower Large Signal Pulse Response



Figure 14. Output Swing and Input Range vs Supply Voltage

#### **Mechanical Dimensions**

#### Package



8-DIP

### Mechanical Dimensions (Continued)

#### Package



#### **Ordering Information**

Product Number	Package	Operating Temperature
LM741CN	8-DIP	0 + 70°C
LM741CM	8-SOP	0~+70 C
LM741IN	8-DIP	-40 ~ + 85°C

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