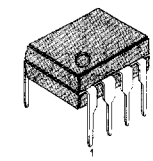
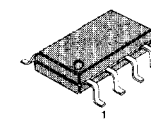
SINGLE OPERATIONAL AMPLIFIERS

The LM741 is a general purpose operational amplifier the high gain & wide range of operating voltage provide superior performance in integrator, summing amplifier and general feedback amplifier.

8 DIP



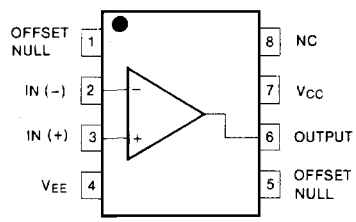
8 SOP



FEATURES

- **Short circuit protection**
- **Excellent temperature stability**
- **Internal frequency compensation**
- **High input voltage range: ±13V (TYP)**
- **Null of offset**

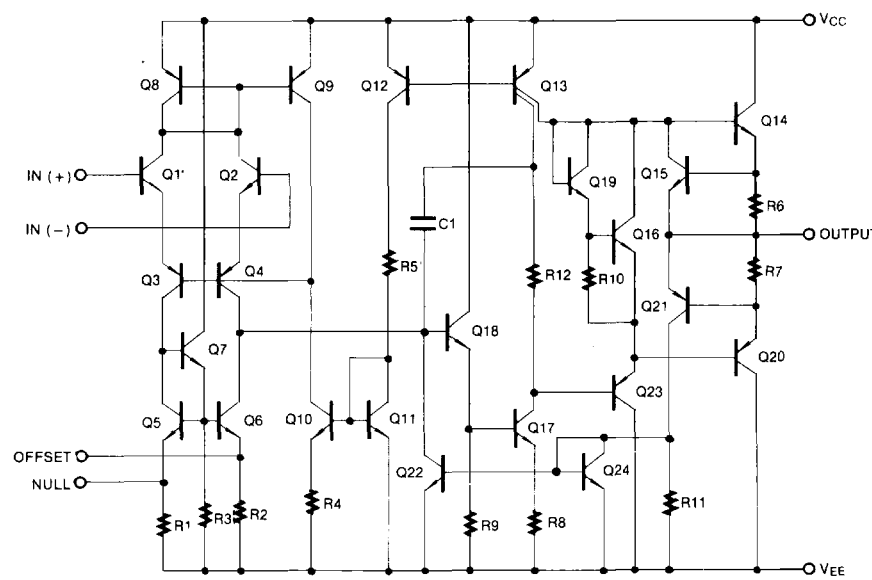
BLOCK DIAGRAM



ORDERING INFORMATION

Device	Package	Operating Temperature
LM741CN	8 DIP	0 ~ +70°C
LM741CD	8 SOP	

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Characteristic	Symbol	Value	Unit
Power Supply Voltage	V_S	±18	V
Differential Input Voltage	V_{ID}	±30	V
Input Voltage	V_I	±15	V
Output Short Circuit Duration		Indefinite	
Power Dissipation	P_D	500	mW
Operating Temperature Range	T_{opr}	0 ~ +70	°C
Storage Temperature Range	T_{stg}	−65 ~ +150	°C

ELECTRICAL CHARACTERISTICS

(V_{CC} = 15V, V_{EE} = −15V, Ta = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 10K\Omega$			2.0	6.0	mV
		$R_S \leq 50\Omega$					
Input Offset Voltage Adjustment Range	V_{IOR}	$V_S = \pm 20V$			±15		mV
Input Offset Current	I_{IO}				20	200	nA
Input Bias Current	I_{IB}				80	500	nA
Input Resistance	R_i	$V_S = \pm 20V$		0.3	2.0		MΩ
Input Voltage Range	V_{ICR}			±12	±13		V
Large Signal Voltage Gain	A_V	$R_L \geq 2K\Omega$	$V_S = \pm 20V$, $V_O = \pm 15V$				V/mV
			$V_S = \pm 15V$, $V_O = \pm 10V$	20	200		
Output Short Circuit Current	I_{OS}				25		mA
Output Voltage Swing	V_{OUT}	$V_S = \pm 20V$	$R_L \geq 10K\Omega$				V
			$R_L \geq 2KQ$				
		$V_S = \pm 15V$	$R_L \geq 10K\Omega$	±12	±14		
			$R_L \geq 2K\Omega$	±10	±13		
Common Mode Rejection Ratio	CMRR	$R_S \leq 10K\Omega$, $V_{CM} = \pm 12V$		70	90		dB
		$R_S \leq 50K\Omega$, $V_{CM} = \pm 12V$					
Power Supply Rejection Ratio	PSRR	$V_S = \pm 20V$ to $V_S = \pm 5V$ $R_S \leq 50\Omega$					dB
		$V_S = \pm 15V$ to $V_S = \pm 5V$ $R_S \leq 10K\Omega$		77	96		

ELECTRICAL CHARACTERISTICS (Continued)

Characteristic		Symbol	Test Conditions	Min	Typ	Max	Unit
Transient Response	Rise Time	t_r	Unity Gain		0.3		μS
	Overshoot	OS			10		%
Bandwidth		BW					MHz
Slew Rate		SR	Unity Gain		0.5		V/μS
Supply Current		I_S	$R_L = \infty\Omega$		1.5	2.8	mA
Power Consumption		P_C	$V_S = \pm 20V$				mW
			$V_S = \pm 15V$		50	85	

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ELECTRICAL CHARACTERISTICS

($0°C \leq Ta \leq +70°C$ for the LM741C $V_{CC} = \pm 15V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	$R_S \leq 50K\Omega$					mV
		$R_S \leq 10\Omega$				7.5	
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$						μV/°C
Input Offset Current	I_{IO}					300	nA
Input Offset Current Drift	$\Delta I_{IO}/\Delta T$						nA/°C
Input Bias Current	I_{IB}					0.8	μA
Input Resistance	R_I	$V_S = \pm 20V$					MΩ
Input Voltage Range	V_{ICR}			±12	±13		V
Output Voltage Swing	V_{OUT}	$V_S = \pm 20V$	$R_L \geq 10K\Omega$				V
			$R_L \geq 2K\Omega$				
		$V_S = \pm 15V$	$R_L \geq 10K\Omega$	±12	±14		
			$R_L \geq 2K\Omega$	±10	±13		
Output Short Circuit Current	I_{OS}			10		40	mA
Common Mode Rejection Ratio	CMRR	$R_S \leq 10K\Omega$, $V_{CM} = \pm 12V$		70	90		dB
		$R_S \leq 50K\Omega$, $V_{CM} = \pm 12V$					
Power Supply Rejection Ratio	PSRR	$V_S = \pm 20V$ to $\pm 5V$	$R_S \leq 50\Omega$				dB
			$R_S \leq 10K\Omega$	77	96		
Large Signal Voltage Gain	A_V	$R_L \geq 2K\Omega$	$V_S = \pm 20V$, $V_O = \pm 15V$				V/mV
			$V_S = \pm 15V$, $V_O = \pm 10V$	15			
			$V_S = \pm 15V$, $V_O = 2V$				

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 7 OUTPUT RESISTANCE vs FREQUENCY

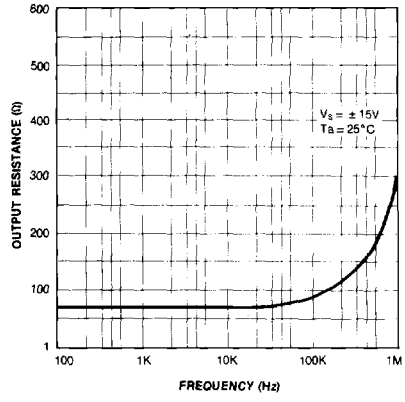

Fig. 8 INPUT RESISTANCE AND INPUT CAPACITANCE vs FREQUENCY

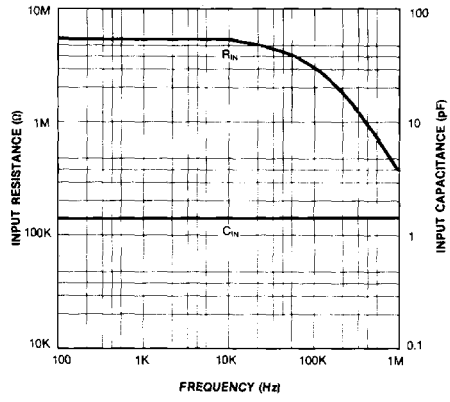

Fig. 9 INPUT BIAS CURRENT vs AMBIENT TEMPERATURE

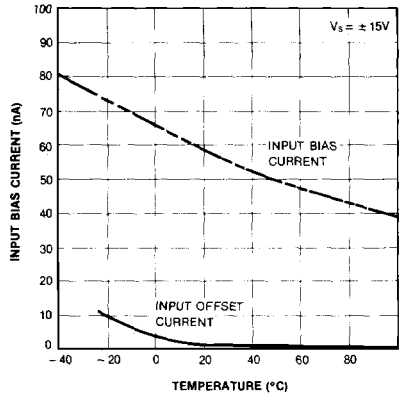

Fig. 10 POWER CONSUMPTION vs AMBIENT TEMPERATURE

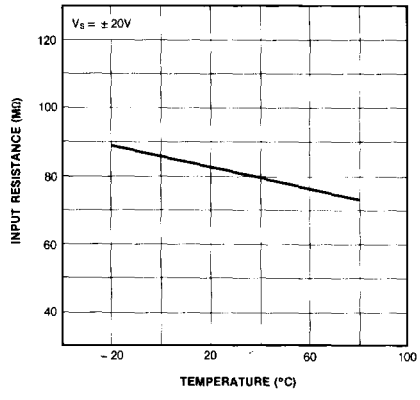

Fig. 11 INPUT OFFSET CURRENT vs AMBIENT TEMPERATURE

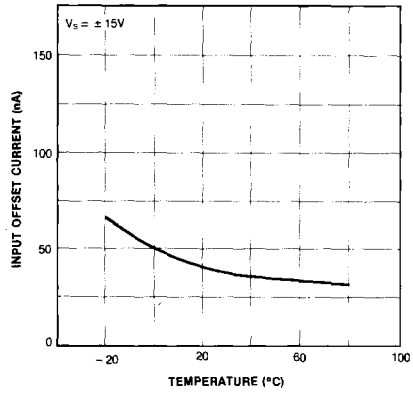

Fig. 12 INPUT RESISTANCE vs AMBIENT TEMPERATURE

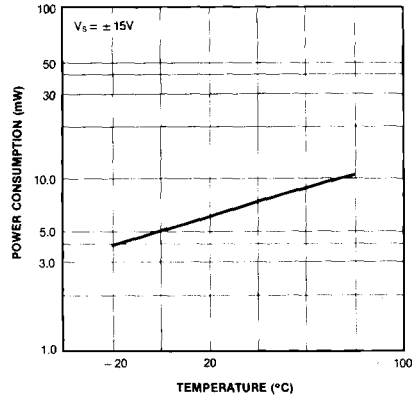

Fig. 13 NORMALIZED DC PARAMETERS vs AMBIENT TEMPERATURE

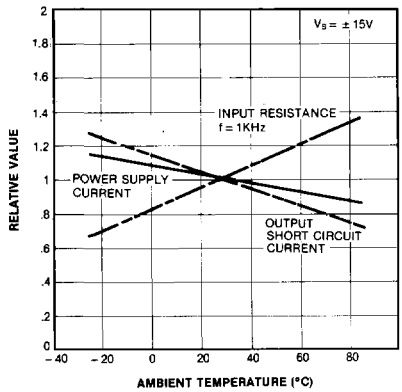

Fig. 14 FREQUENCY CHARACTERISTICS vs AMBIENT TEMPERATURE

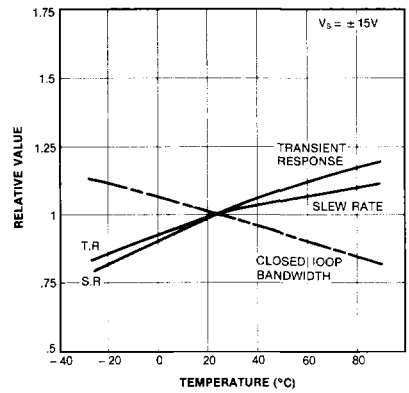

Fig. 15 FREQUENCY CHARACTERISTICS vs SUPPLY VOLTAGE

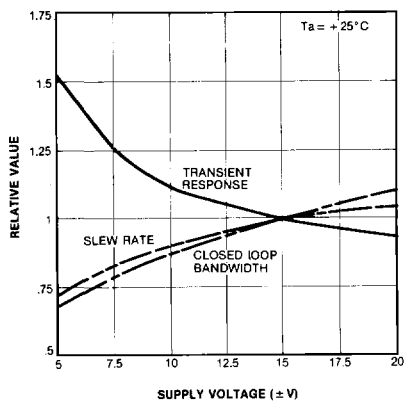

Fig. 16 OUTPUT SHORT CIRCUIT CURRENT vs AMBIENT TEMPERATURE

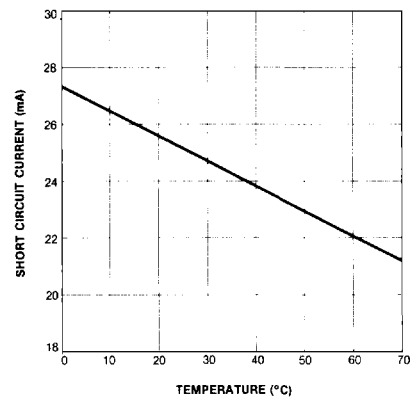

Fig. 17 TRANSIENT RESPONSE

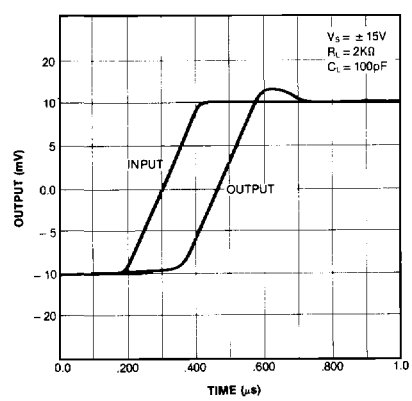

Fig. 18 COMMON-MODE REJECTION RATIO vs FREQUENCY

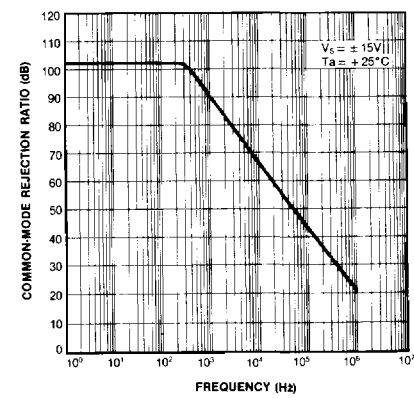

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Fig. 18 VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE

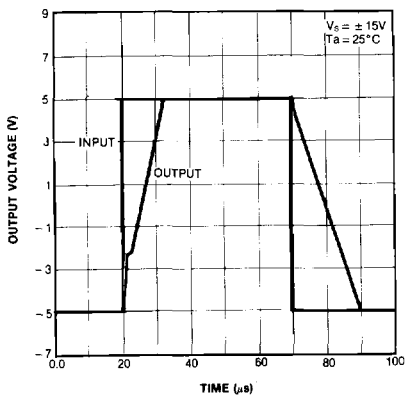

Fig. 19 OUTPUT SWING AND INPUT RANGE vs SUPPLY VOLTAGE