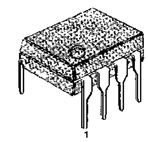
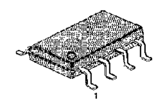
SINGLE OPERATIONAL AMPLIFIERS

The LM741 series are general purpose operational amplifiers which feature improved performance over industry standards like the LM709. It is intended for a wide range of analog applications.
The high gain and wide range of operating voltage provide superior performance in integrator, summing amplifier, and general feedback applications.

8 DIP



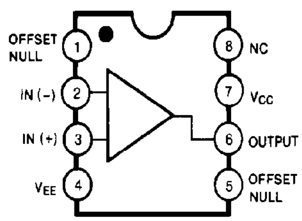
8 SOP



FEATURES

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

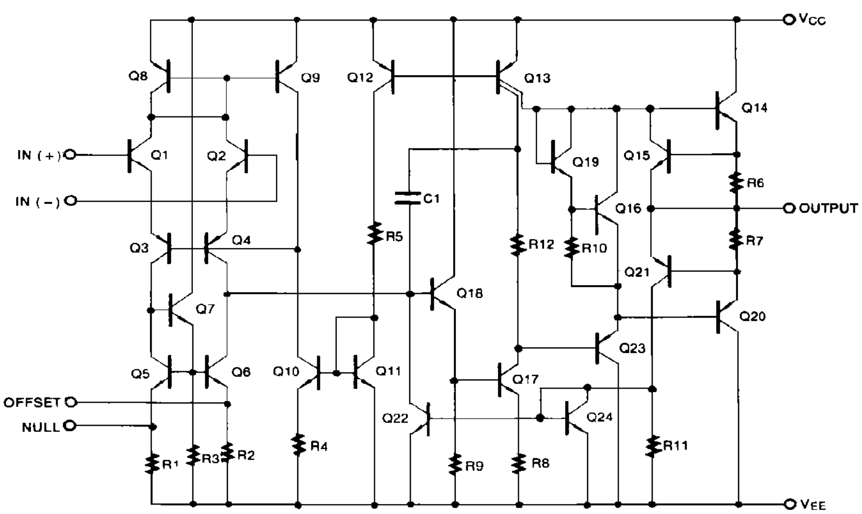
BLOCK DIAGRAM



ORDERING INFORMATION

Device	Package	Operating Temperature
LM741N LM741EN	8 DIP	0 ~ + 70°C
LM741M LM741EM	8 SOP	
LM741IN LM741EIN	8 DIP	-40 ~ +85 °C
LM741IM LM741EIM	8 SOP	

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_A=25 °C)

Characteristic	Symbol	LM741	LM741E	LM741I	Unit
Supply Voltage	V_{CC}	±18	±22	±18	V
Differential Input Voltage	$V_{I(DIFF)}$	30	30	30	V
Input Voltage	V_I	±15	±15	±15	V
Output Short Circuit Duration		Indefinite	Indefinite	Indefinite	
Power Dissipation	P_D	500	500	500	mW
Operating Temperature Range	T_{OPR}	0 ~ + 70	0 ~ + 70	-40 ~ + 85	°C
Storage Temperature Range	T_{STG}	-65 ~ + 150	-65 ~ + 150	-65 ~ + 150	°C

ELECTRICAL CHARACTERISTICS

(V_{CC} = 15V, V_{EE} = - 15V. T_A = 25 °C, unless otherwise specified)

Characteristic	Symbol	Test Conditions		LM741E			LM741/LM741I			Unit
				Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	V_{IO}	R_S≤10KΩ						2.0	6.0	mV
		R_S≤50Ω			0.8	3.0				
Input Offset Voltage Adjustment Range	$V_{IO(R)}$	V_{CC} = ±20V		±10				±15		mV
Input Offset Current	I_{IO}				3.0	30		20	200	nA
Input Bias Current	I_{BIAS}				30	80		80	500	nA
Input Resistance	R_I	V_{CC} =±20V		1.0	6.0		0.3	2.0		MΩ
Input Voltage Range	$V_{I(R)}$			±12	±13		±12	±13		V
Large Signal Voltage Gain	G_V	R_L≥2KΩ	V_{CC} =±20V, $V_{O(P.P)}$ =±15V	50						V/mV
			V_{CC} =±15V, $V_{O(P.P)}$ =±10V				20	200		
Output Short Circuit Current	I_{SC}			10	25	35		25		mA
Output Voltage Swing	$V_{O(P.P)}$	V_{CC} = ±20V	R_L≥10KΩ	±16						V
			R_L≥10KΩ	±15						
		V_{CC} = ±15V	R_L≥10KΩ				±12	±14		
			R_L≥10KΩ				±10	±13		
Common Mode Rejection Ratio	CMRR	R_S≤10KΩ, V_{CM} = ±12V					70	90		dB
		R_S≤50KΩ, V_{CM} = ±12V		80	95					
Power Supply Rejection Ratio	PSRR	V_{CC} = ±15V to V_{CC} = ±15V R_S≤50Ω		86	96					dB
		V_{CC} = ±15V to V_{CC} = ±15V R_S≤10KΩ					77	96		

ELECTRICAL CHARACTERISTICS (Continued)

Characteristic		Symbol	Test Conditions	LM741E			LM741/LM741I			Unit
				Min	Typ	Max	Min	Typ	Max	
Transient Response	Rise Time	t_R	Unity Gain		0.25	0.8		0.3		μs
	Overshoot	OS			6.0	20		10		%
Bandwidth		BW		0.43	1.5					MHz
Slew Rate		SR	Unity Gain	0.3	0.7			0.5		V/μs
Supply Current		I_{CC}	$R_L = \infty\Omega$					1.5	2.8	mA
Power Consumption		P_C	$V_{CC} = \pm 20V$		80	150				mW
			$V_{CC} = \pm 15V$					50	85	

ELECTRICAL CHARACTERISTICS

(-40 °C $\le T_A \le$85 °C for the KA741I °C $\le T_A \le$70 °C for the LM741 and LM741E. $V_{CC} = \pm 15V$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		LM741E			LM741/LM741I			Unit
				Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	V_{IO}	$R_S \le 50\Omega$				4.0				mV
		$R_S \le 10K\Omega$							7.5	
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$				15					μV/°C
Input Offset Current	I_{IO}					70			300	nA
Input Offset Current Drift	$\Delta I_{IO}/\Delta T$					0.5				nA/°C
Input Bias Current	I_{BIAS}					0.21			0.8	μA
Input Resistance	R_I	$V_{CC} = \pm 20V$		0.5						MΩ
Input Voltage Range	$V_{I(R)}$			±12	±13		±12	±13		V
Output Voltage Swing	$V_{O(P.P)}$	$V_{CC} = \pm 20V$	$R_S \ge 10K\Omega$	±16						V
			$R_S \ge 2K\Omega$	±15						
		$V_{CC} = \pm 15V$	$R_S \ge 10K\Omega$				±12	±14		
			$R_S \ge 2K\Omega$				±10	±13		
Output Short Circuit Current	I_{SC}			10		40	10		40	mA
Common Mode Rejection Ratio	CMRR	$R_S \le 10K\Omega$, $V_{CM} = \pm 12V$					70	90		dB
		$R_S \le 50K\Omega$, $V_{CM} = \pm 12V$		80	95					
Power Supply Rejection Ratio	PSRR	$V_{CC} = \pm 20V$ to $\pm 5V$	$R_S \le 50\Omega$	86	96					dB
			$R_S \le 10K\Omega$				77	96		
Large Signal Voltage Gain	G_V	$R_S \ge 2K\Omega$	$V_{CC} = \pm 20V$, $V_{O(P-P)} = \pm 15V$	32						V/mV
			$V_{CC} = \pm 15V$, $V_{O(P.P)} = \pm 10V$				15			
			$V_{CC} = \pm 15V$, $V_{O(P-P)} = \pm 2V$	10						

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 7 OUTPUT RESISTANCE vs FREQUENCY

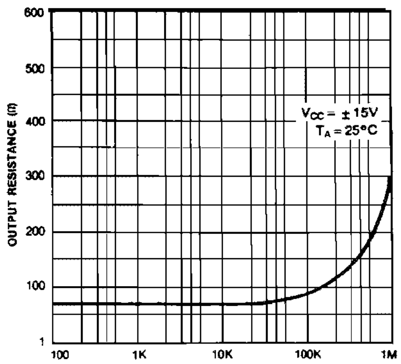


Fig. 8 INPUT RESISTANCE AND INPUT CAPACITANCE vs FREQUENCY

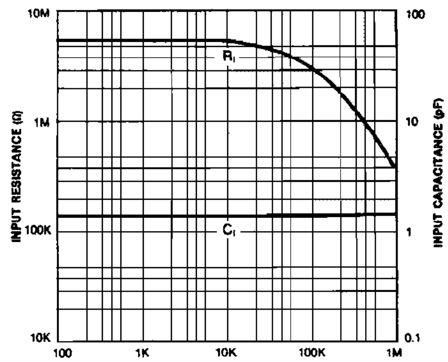


Fig. 9 INPUT BIAS CURRENT vs AMBIENT TEMPERATURE

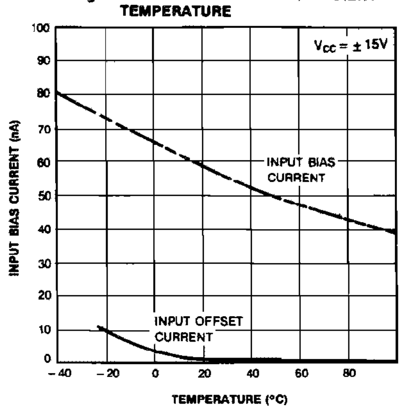


Fig. 10 POWER CONSUMPTION vs AMBIENT TEMPERATURE

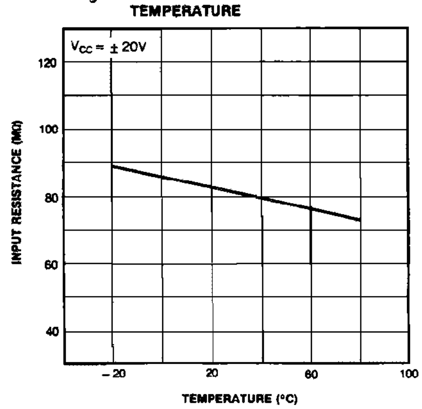


Fig. 11 INPUT OFFSET CURRENT vs AMBIENT TEMPERATURE

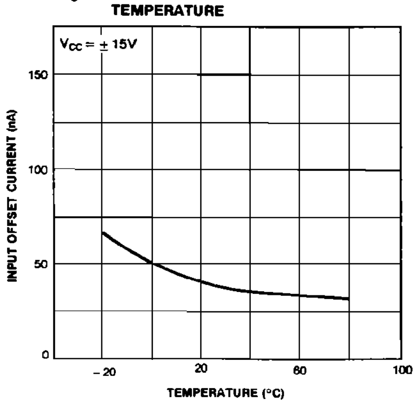


Fig. 12 INPUT RESISTANCE vs AMBIENT TEMPERATURE

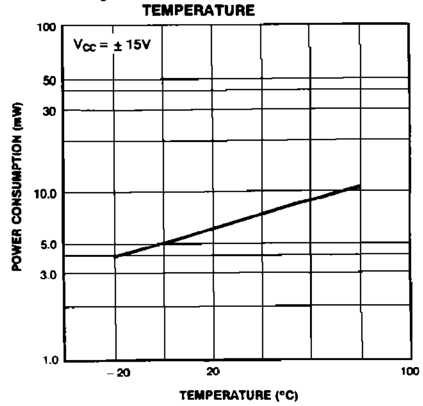


Fig. 13 NORMALIZED DC PARAMETERS vs AMBIENT TEMPERATURE

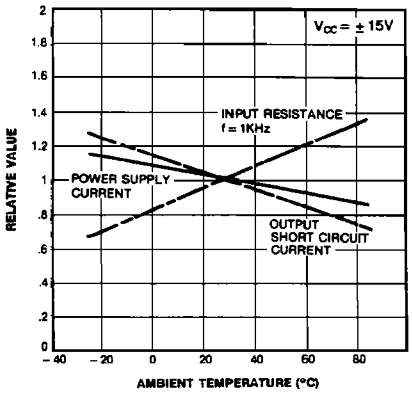


Fig. 14 FREQUENCY CHARACTERISTICS vs AMBIENT TEMPERATURE

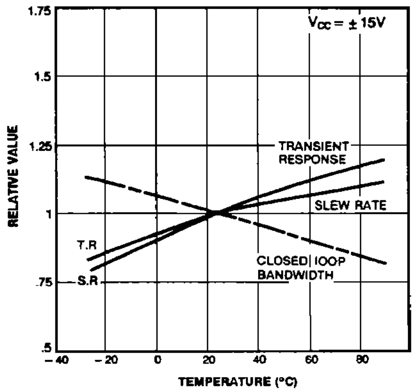


Fig. 15 FREQUENCY CHARACTERISTICS vs SUPPLY VOLTAGE

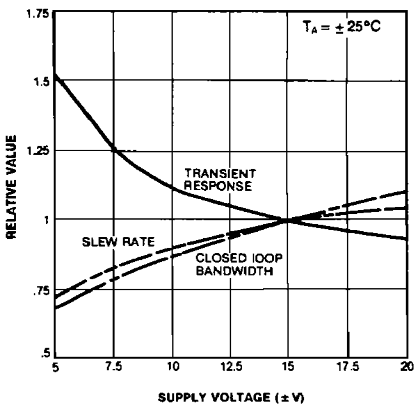


Fig. 16 OUTPUT SHORT CIRCUIT CURRENT vs AMBIENT TEMPERATURE

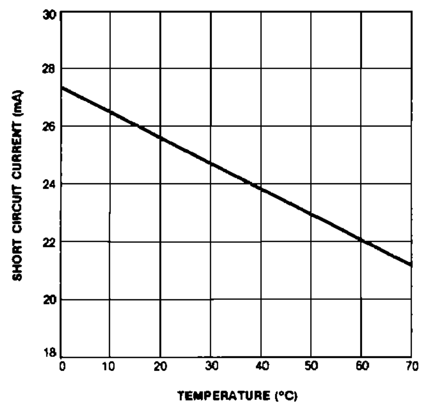


Fig. 17 TRANSIENT RESPONSE

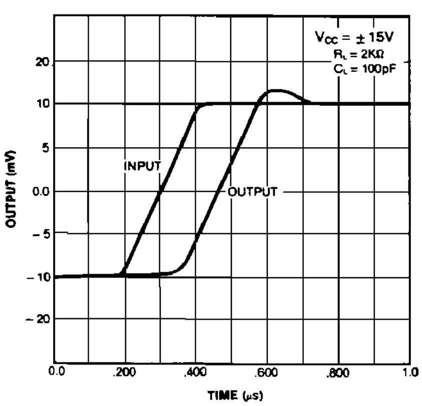


Fig. 18 COMMON-MODE REJECTION RATIO vs FREQUENCY

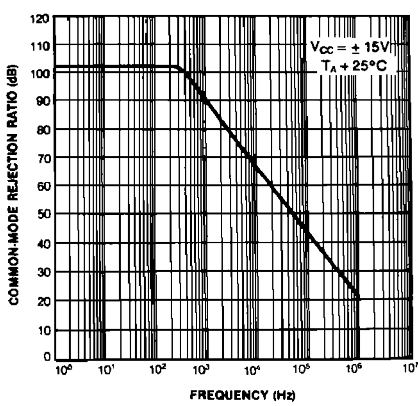


Fig. 18 VOLTAGE FOLLOWER LARGE SIGNAL PULSE RESPONSE

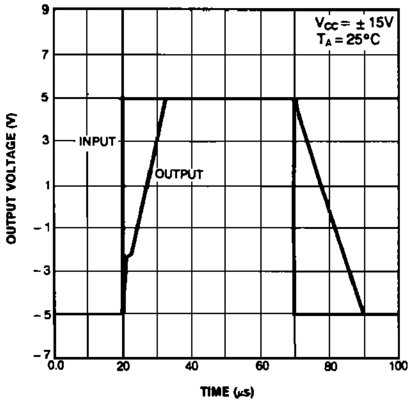
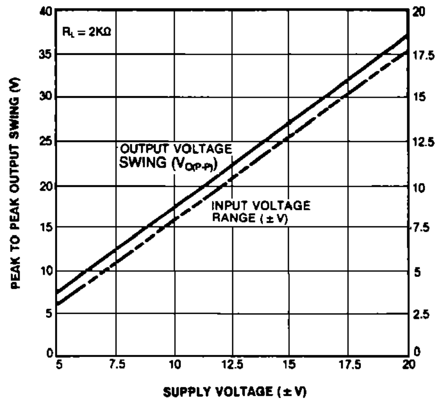


Fig. 19 OUTPUT SWING AND INPUT RANGE vs SUPPLY VOLTAGE



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