RM741
General Purpose Operational Amplifier

Description

The RM741 integrated circuit is a high-performance, high-gain, internally compensated monolithic operational amplifier fabricated on a single silicon chip using an advanced epitaxial process.

High common-mode voltage range and absence of latch-up tendencies make the RM741 ideal for use as a voltage follower. High gain and wide ranges of operating voltages provide superior performance in integrator, summing amplifier and general feedback applications.

The RM741 is pin compatible with the LM101A. The RM741 operates over a temperature range from -55°C to +125°C.

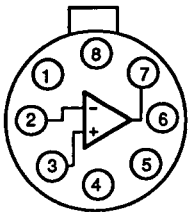
Features

- Supply voltage
  RM741 — ±22V
- Offset voltage null capability
- Short-circuit protection
- No frequency compensation required
- No latch-up
- Large common-mode and differential voltage ranges
- Low power consumption

RM741

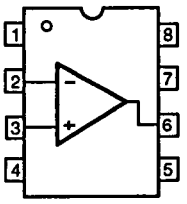
Connection Information

8-Lead
TO-99 Metal Can
(Top View)



65-03205

8-Lead
Dual In-Line Package
(Top View)



65-03206A

Pin	Function
1	V_{OS} Trim
2	- Input
3	+ Input
4	$-V_S$
5	V_{OS} Trim
6	Output
7	$+V_S$
8	NC

Ordering Information

Part Number	Package	Operating Temperature Range
RM741D	D	-55°C to +125°C
RM741D/883B	D	-55°C to +125°C
RM741T	T	-55°C to +125°C
RM741T/883B	T	-55°C to +125°C

Notes: 883B suffix denotes Mil-Std-883, Level B processing
D = 8 lead ceramic DIP
T = 8-lead metal can TO-99

Absolute Maximum Ratings

Supply Voltage
RM741 .....±22V
Differential Input Voltage 30V
Input Voltage[1] .....±15V
Output Short Circuit Duration ..Indefinite
Storage Temperature
Range .....-65°C to +150°C
Operating Temperature Range
RM741 .....-55°C to +125°C
Lead Soldering Temperature
(60 sec) .....+300°C

Note:
1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Thermal Characteristics

	8-Lead Ceramic DIP	8-Lead TO-99 Metal Can
Max. Junction Temp.	+175°C	+175°C
Max. P_D T_A <50°C	833 mW	658 mW
Therm. Res θ_{JC}	45°C/W	50°C/W
Therm. Res. θ_{JA}	150°C/W	190°C/W
For T_A >50°C Derate at	8.33 mW/°C	5.26 mW/°C

Electrical Characteristics

(V_S = ±15V and T_A = +25°C unless otherwise noted)

Parameters	Test Conditions	Min	Typ	Max	Units
Input Offset Voltage[1]	$R_S \leq 10$ kΩ		1.0	5.0	mV
Input Offset Current			20	200	nA
Input Bias Current			80	500	nA
Input Resistance (Differential Mode)		0.3	2.0		MΩ
Large Signal Voltage Gain	$R_L \geq 2$ kΩ, V_{OUT} = ±10V	50	200		V/mV
Output Voltage Swing	$R_L \geq 10$ kΩ	±12	±14		V
	$R_L \geq 2$ kΩ	±10	±13		
Input Voltage Range		±12	±13		V
Common Mode Rejection Ratio	$R_S \leq 10$ kΩ	70	90		dB
Power Supply Rejection Ratio	$R_S \leq 10$ kΩ	76	90		dB
Power Consumption			50	85	mW
Transient Response Rise Time	V_{IN} = 20 mV, R_L = 2kΩ		0.3		µS
Over shoot	$C_L \leq 100$ pF		5.0		%
Slew Rate	$R_L \geq 2$ kΩ		0.5		V/µS

Note: 1. Offset voltage is nulled by connecting a 10kΩ potentiometer across the Vos trim pins and connecting the wiper pin to $-V_S$.

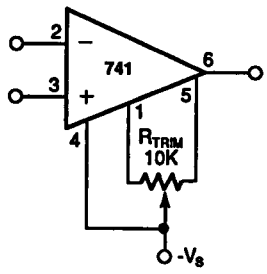
Electrical Characteristics

($V_S = \pm 15V$, $-55°C \leq T_A \leq +125°C$)

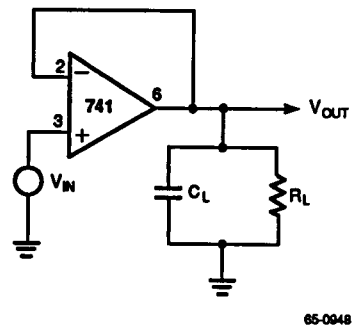
Parameters	Test Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_L \geq 10\ k\Omega$			6.0	mV
Input Offset Current				200	nA
Input Bias Current				500	nA
Large Signal Voltage Gain	$R_L \geq 2\ k\Omega$, $V_{OUT} = \pm 10V$	25			V/mV
Output Voltage Swing	$R_L \geq 10\ k\Omega$		±12		V
	$R_L \geq 2\ k\Omega$		±10		
Common Mode Rejection Ratio	$R_S \leq 10\ k\Omega$		70		dB
Supply Voltage Rejection Ratio	$R_S \leq 10\ k\Omega$		76		dB
Supply Current	+125°C				mA
	-55°C				
Power Consumption	+125°C				mW
	-55°C				

Typical Performance Characteristics

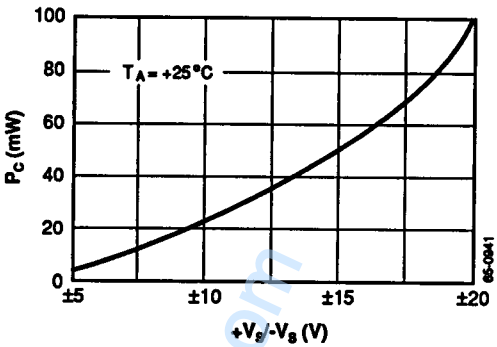
Input Offset Voltage
Trim Circuit



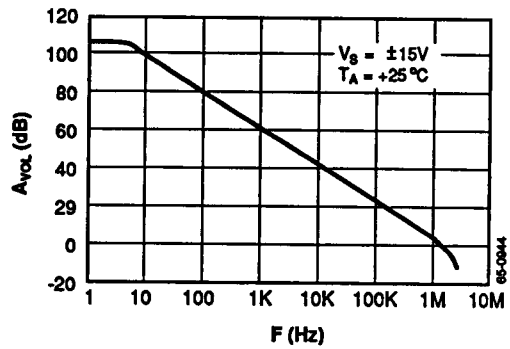
Transient Response
Test Circuit



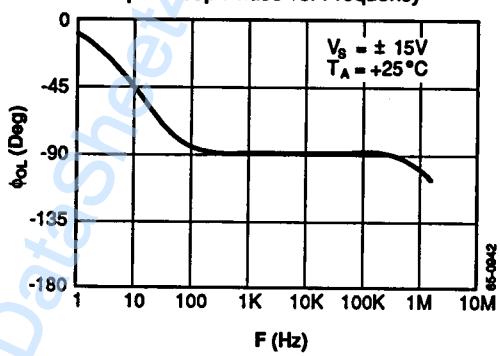
Power Consumption vs. Supply Voltage



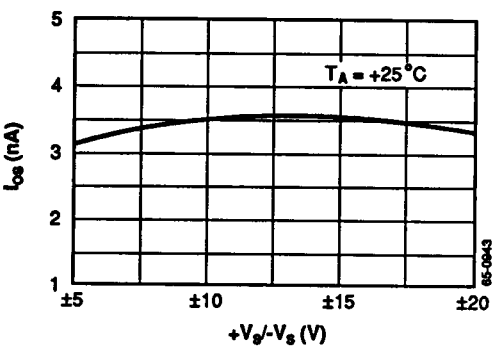
Open Loop Gain Vs. Frequency



Open Loop Phase vs. Frequency



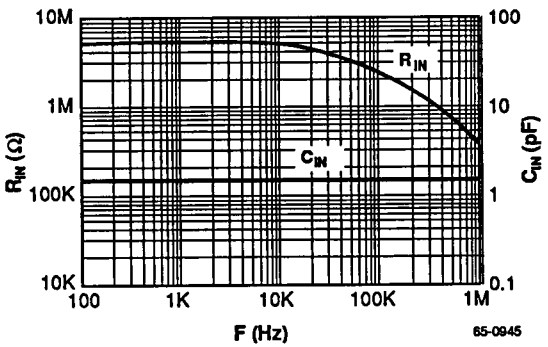
Input Offset Current vs. Supply Voltage



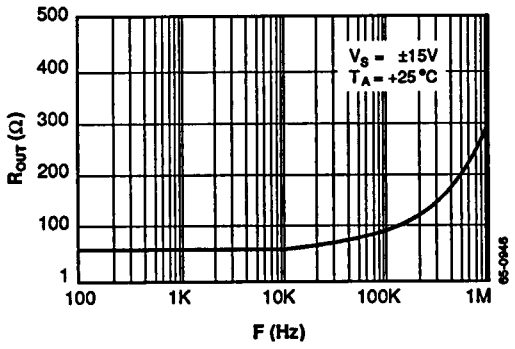
Linear

Typical Performance Characteristics (Continued)

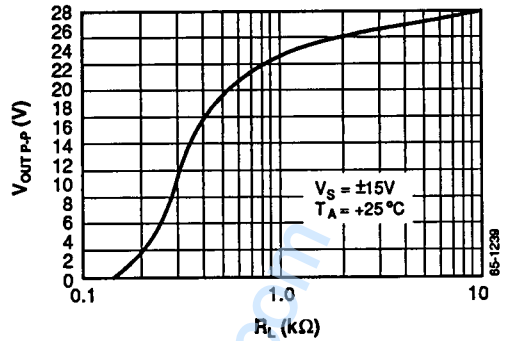
Input Resistance, Capacitance vs. Frequency



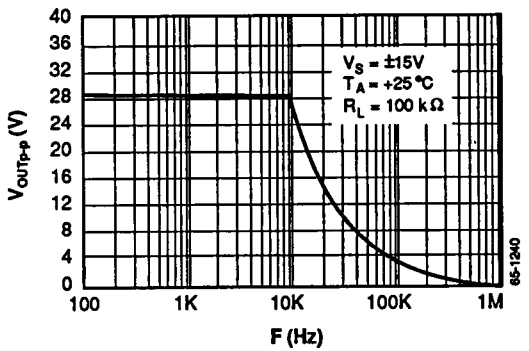
Output Resistance vs. Frequency



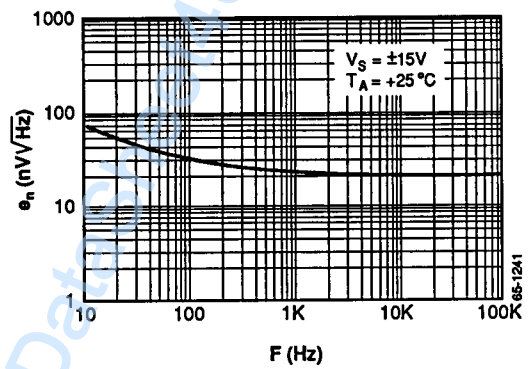
Output Voltage Swing vs. Load Resistance



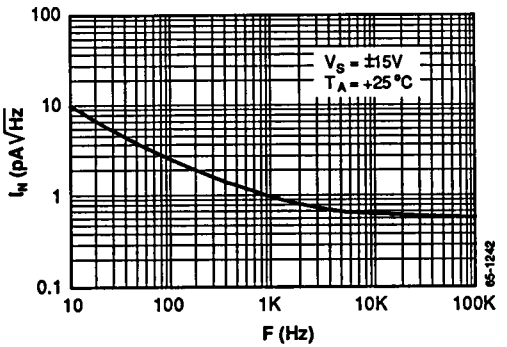
Output Voltage Swing vs. Frequency



Input Noise Voltage Density vs. Frequency

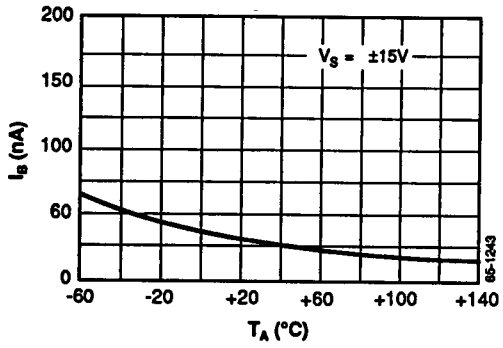


Input Noise Current Density vs. Frequency

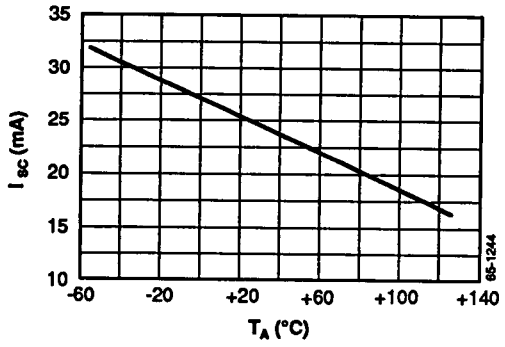


Typical Performance Characteristics (Continued)

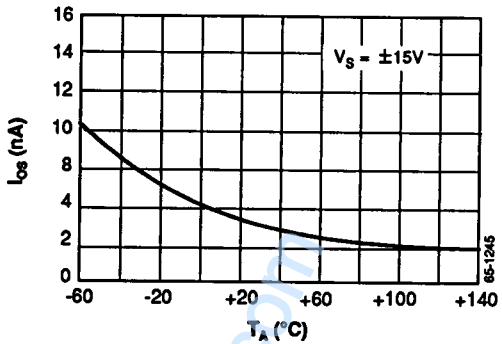
Input Bias Current vs. Temperature



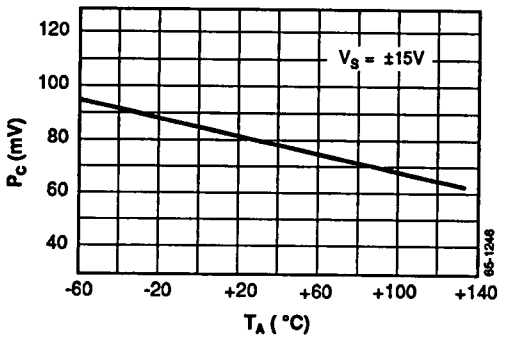
Short Circuit Current vs. Temperature



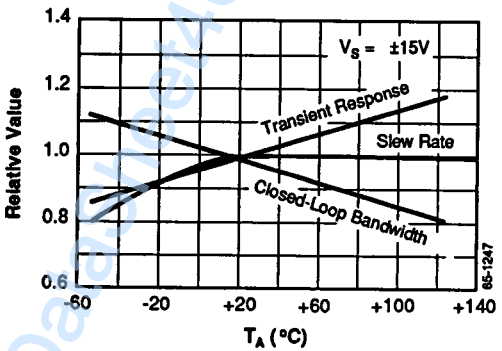
Input Offset Current vs. Temperature



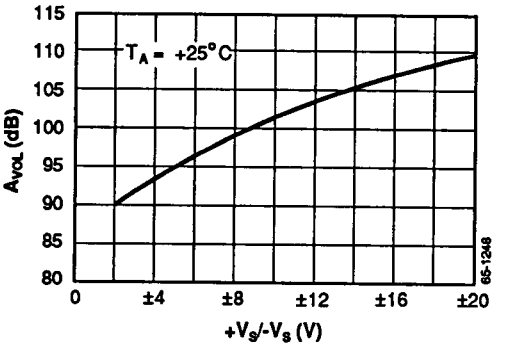
Power Consumption vs. Temperature



Frequency Characteristics vs. Temperature

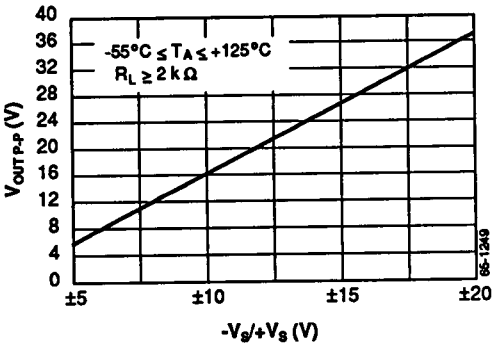


Open Loop Gain vs. Supply Voltage

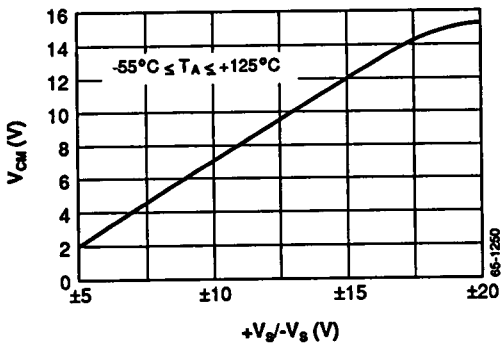


Typical Performance Characteristics (Continued)

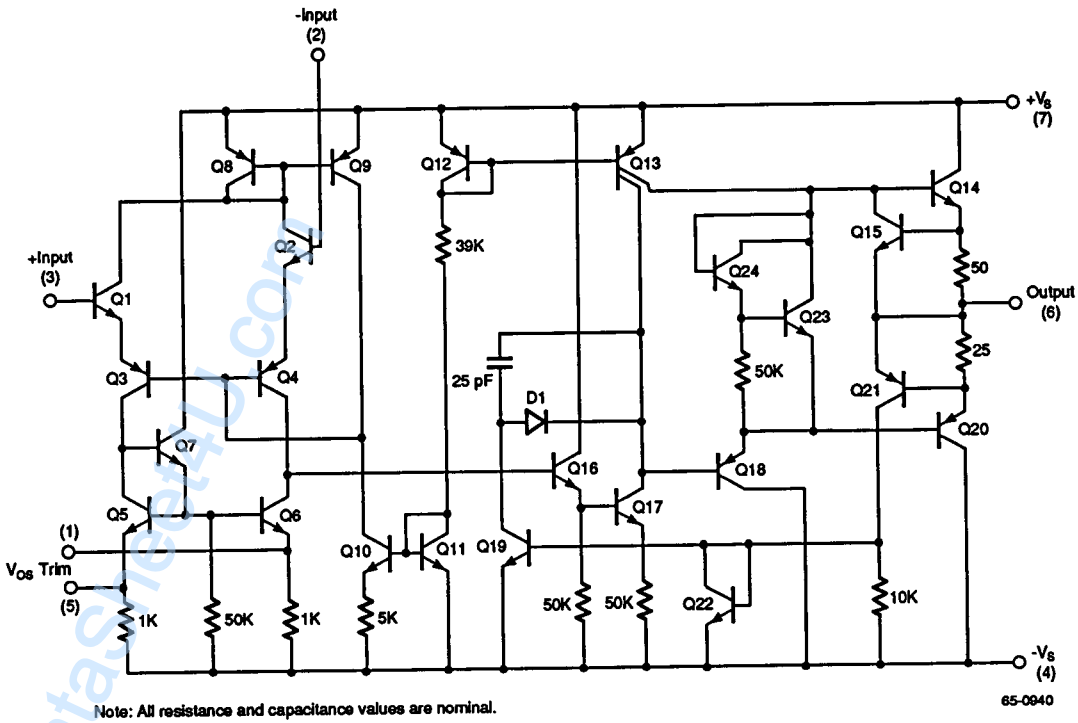
Output Voltage Swing vs. Supply Voltage



Common Mode Input Range vs. Supply Voltage



Schematic Diagram



Note: All resistance and capacitance values are nominal.