Raytheon

High Performance, Low Noise, Dual Operational Amplifier

RC2041

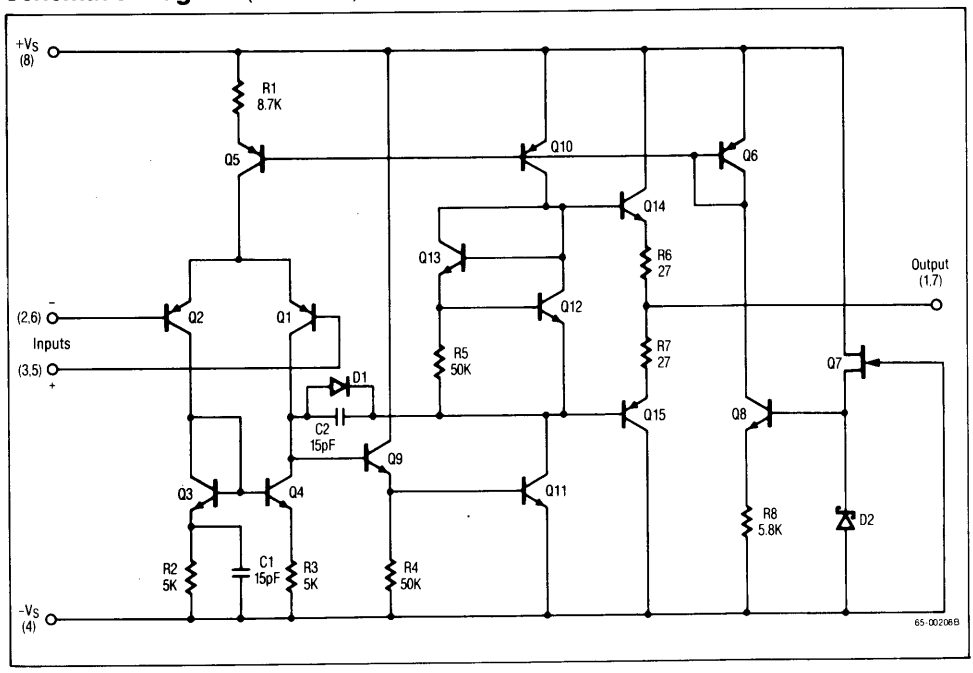
Features

- 7.0MHz unity gain bandwidth (A_V = 1)
- 3.0V/μS slew rate
- 6.0nV/√Hz noise voltage at 1kHz
- 0.3pA/√Hz noise current at 1kHz
- ±10V output into 400Ω loads (±25mA)
- 0.3mV input offset voltage
- 10nA input offset current
- 200nA input bias current
- Unity gain frequency compensated
- Output short circuit protected

Description

The 2041 integrated circuit is a high gain, wide-bandwidth, low noise dual operational amplifier capable of driving 20V peak-to-peak into 400Ω loads. The 2041 combines many of the features of the 4558 as well as providing a wider bandwidth, lower noise, higher slew rate and higher output drive. The combination of low noise and wide bandwidth make the 2041 ideal for audio preamplifiers, active filters, telecommunications, and many instrumentation applications. The availability of the 2041 in the surface mounted micro package allows very high packing densities in critical applications.

Schematic Diagram (1/2 Shown)



RC2041

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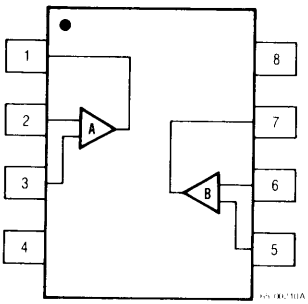
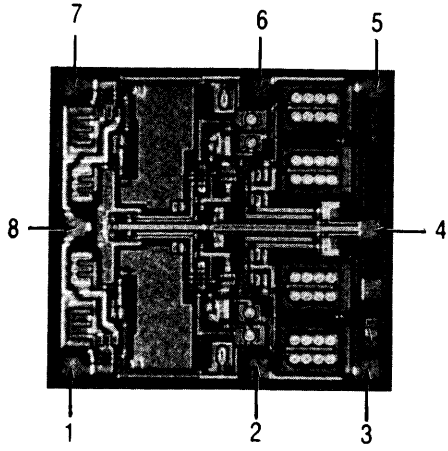
Connection Information

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



Pin	Function
1	A Output
2	A -Input
3	A +Input
4	$-V_S$
5	B +Input
6	B -Input
7	B Output
8	$+V_S$

Mask Pattern



Die Size: 52 x 61 mils
Min. Pad Dimensions: 4 x 4 mils
65-02067A

Absolute Maximum Ratings

Supply Voltage ..... ±18V
Differential Input Voltage 30V
Input Voltage[1] ..... ±15V
Operating Temperature
Range ..... -20°C to +75°C
Lead Soldering Temperature (10 Sec)
RC2041NB ..... +300°C
RC2041M ..... +260°C
Output Short Circuit Duration[2] ..... Indefinite

Notes: 1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground on one amp only. Rating applies to +75°C ambient temperature.

Ordering Information

Part Number	Package	Operating Temperature Range
RC2041M	Micro-Plastic	-20°C to +75°C
RC2041NB	Plastic	-20°C to +75°C

Thermal Characteristics

	8-Lead Micro-Pak Plastic DIP	8-Lead Plastic DIP
Max. Junction Temp.	125°C	125°C
Max. P_D $T_A < 50°C$	300mW	468mW
Therm. Res. θ_{JC}	—	—
Therm. Res. θ_{JA}	240°C/W	160°C/W
For $T_A > 50°C$ Derate at	4.17mW per °C	6.25mW per °C

Matching Characteristics

($V_S = \pm 15V$, $T_A = +25°C$)

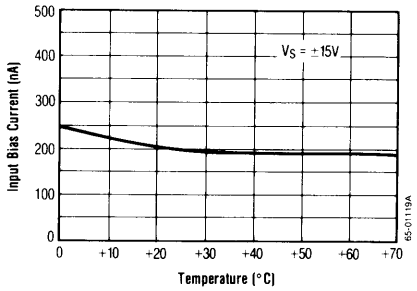
Parameter	Conditions	Typ	Units
Voltage Gain	$R_L \geq 2k\Omega$	±1.0	dB
Input Bias Current		±15	nA
Input Offset Current		±7.5	nA
Input Offset Voltage	$R_L \geq 10k\Omega$	±0.2	mV

Electrical Characteristics (V_S = ±15V, T_A = +25°C unless otherwise specified)

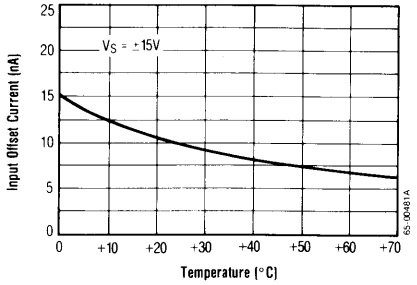
Parameters	Test Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_S \leq 10k\Omega$		0.3	3.0	mV
Input Offset Current			10	200	nA
Input Bias Current			200	500	nA
Input Resistance (Differential Mode)		0.3	1.0		MΩ
Large-Signal Voltage Gain	$R_L \geq 2k\Omega$, V_{OUT} = ±10V	20	300		V/mV
Output Voltage Swing	$R_L \geq 10k\Omega$	±12	±14		V
	I_O = 25mA	±10	±11.5		
Input Voltage Range		±12	±14		V
Common Mode Rejection Ratio	$R_S \leq 10k\Omega$	70	100		dB
Power Supply Rejection Ratio	$R_S \leq 10k\Omega$	76	100		dB
Power Consumption	$R_L = \infty$		180	240	mW
Transient Response Rise Time	V_{IN} = 20mV, R_L = 2kΩ		50		nS
Overshoot	$C_L \leq 100pF$		40		%
Slew Rate	$R_L \geq 2k\Omega$		3.0		V/μS
Channel Separation	f = 10kHz, R_S = 1kΩ, Gain = 100		90		dB
Unity Gain Bandwidth	Gain = 1	4.0	7.0		MHz
The following specifications apply for -20°C ≤ T_A ≤ +75°C					
Input Offset Voltage	$R_S \leq 10k\Omega$			4.5	mV
Input Offset Current				300	nA
Input Bias Current				800	nA
Large Signal Voltage Gain	$R_L \geq 2k\Omega$, V_{OUT} = ±10V	15			V/mV
Output Voltage Swing	$R_L \geq 2k\Omega$	±10			V
Power Consumption	T_A = +75°C		160	220	mW
	T_A = -20°C		210	260	

Typical Performance Characteristics

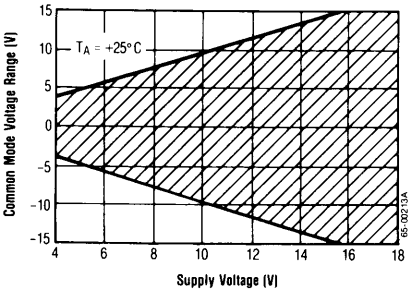
Input Bias Current as a Function of Ambient Temperature



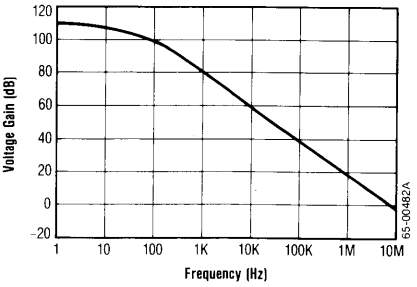
Input Offset Current as a Function of Ambient Temperature



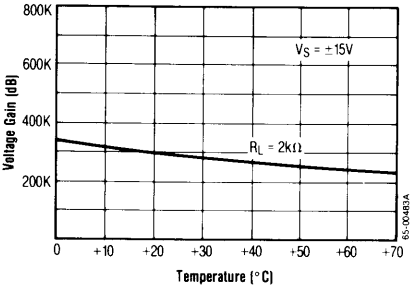
Common Mode Range as a Function of Supply Voltage



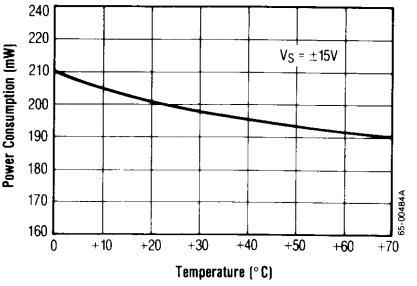
Open Loop Voltage Gain as a Function of Frequency



Open Loop Gain as a Function of Temperature

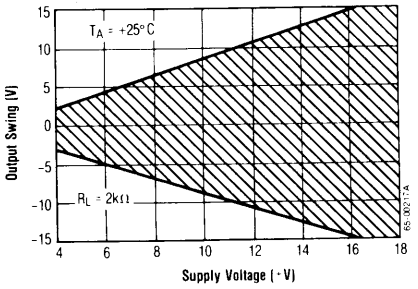


Power Consumption as a Function of Ambient Temperature

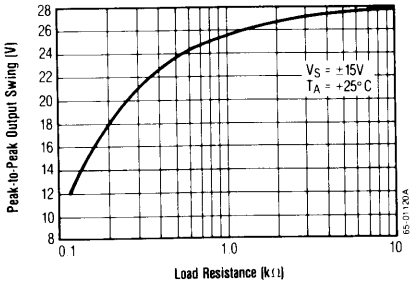


Typical Performance Characteristics (Continued)

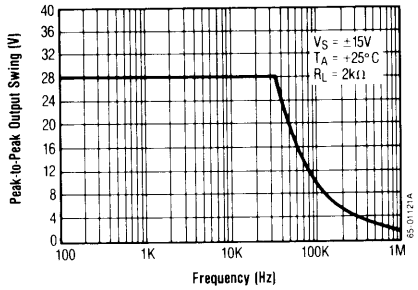
Typical Output Voltage as a Function of Supply Voltage



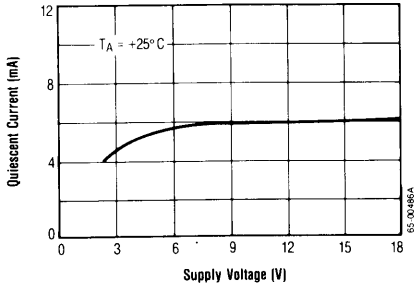
Output Voltage Swing as a Function of Load Resistance



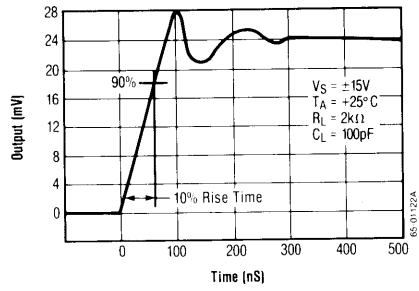
Output Voltage Swing as a Function of Frequency



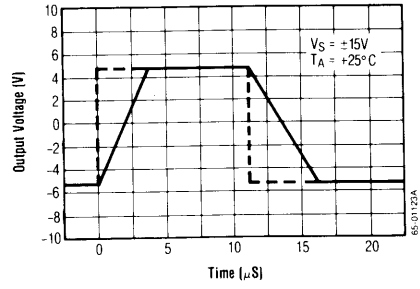
Quiescent Current as a Function of Supply Voltage



Transient Response

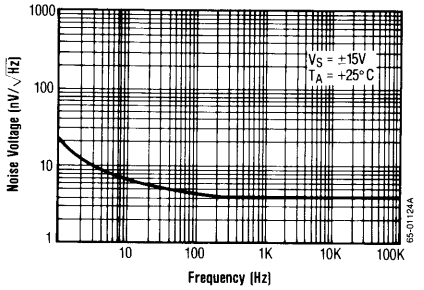


Voltage Follower Large Signal Pulse Response

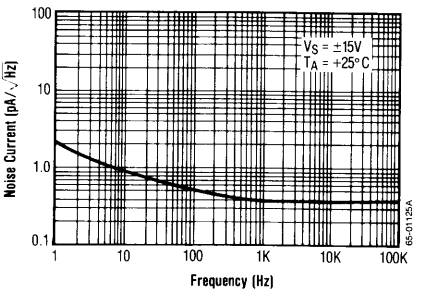


Typical Performance Characteristics (Continued)

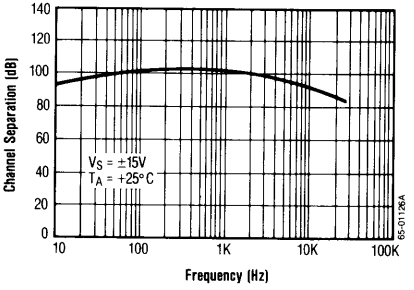
Input Noise Voltage as a Function of Frequency



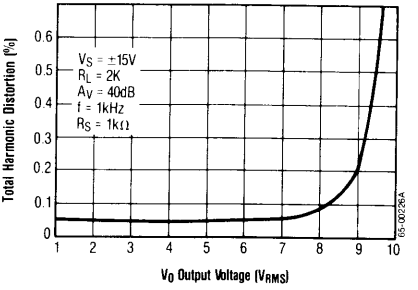
Input Noise Current as a Function of Frequency



Channel Separation



Total Harmonic Distortion vs. Output Voltage



Distortion vs. Frequency