General purpose operational amplifier — μA741/μA741C/SA741C

DESCRIPTION

The μA741 is a high performance operational amplifier with high open-loop gain, internal compensation, high common mode range and exceptional temperature stability. The μA741 is short-circuit-protected and allows for nulling of offset voltage.

FEATURES

- Internal frequency compensation
- Short circuit protection
- Excellent temperature stability
- High input voltage range

PIN CONFIGURATION

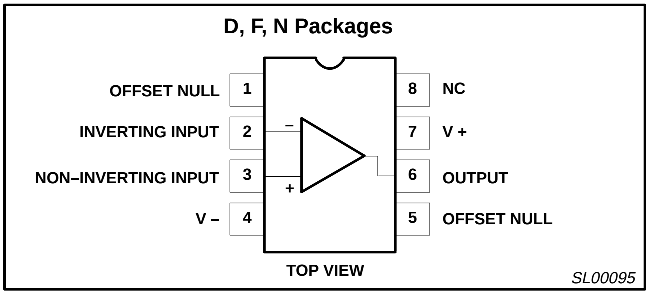

Figure 1. Pin Configuration

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
8-Pin Plastic Dual In-Line Package (DIP)	-55°C to +125°C	μA741N	SOT97-1
8-Pin Plastic Dual In-Line Package (DIP)	0 to +70°C	μA741CN	SOT97-1
8-Pin Plastic Dual In-Line Package (DIP)	-40°C to +85°C	SA741CN	SOT97-1
8-Pin Ceramic Dual In-Line Package (CERDIP)	-55°C to +125°C	μA741F	0580A
8-Pin Ceramic Dual In-Line Package (CERDIP)	0 to +70°C	μA741CF	0580A
8-Pin Small Outline (SO) Package	0 to +70°C	μA741CD	SOT96-1

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_S	Supply voltage		
	μA741C	±18	V
	μA741	±22	V
P_D	Internal power dissipation		
	D package	780	mW
	N package	1170	mW
	F package	800	mW
V_{IN}	Differential input voltage	±30	V
V_{IN}	Input voltage[1]	±15	V
I_{SC}	Output short-circuit duration	Continuous	
T_A	Operating temperature range		
	μA741C	0 to +70	°C
	SA741C	-40 to +85	°C
	μA741	-55 to +125	°C
T_{STG}	Storage temperature range	-65 to +150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	300	°C

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

DC ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_S = ±15V, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	µA741			µA741C			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Offset voltage	R_S=10kΩ		1.0	5.0		2.0	6.0	mV
		R_S=10kΩ, over temp.		1.0	6.0			7.5	mV
$\Delta V_{OS}/\Delta T$				10			10		µV/°C
I_{OS}	Offset current			20	200		20	200	nA
		Over temp.						300	nA
		T_A=+125°C		7.0	200				nA
		T_A=-55°C		20	500				nA
$\Delta I_{OS}/\Delta T$				200			200		pA/°C
I_{BIAS}	Input bias current			80	500		80	500	nA
		Over temp.						800	nA
		T_A=+125°C		30	500				nA
		T_A=-55°C		300	1500				nA
$\Delta I_B/\Delta T$				1			1		nA/°C
V_{OUT}	Output voltage swing	R_L=10kΩ	±12	±14		±12	±14		V
		R_L=2kΩ, over temp.	±10	±13		±10	±13		V
A_{VOL}	Large-signal voltage gain	R_L=2kΩ, V_O=±10V	50	200		20	200		V/mV
		R_L=2kΩ, V_O=±10V, over temp.	25			15			V/mV
	Offset voltage adjustment range			±30			±30		mV
PSRR	Supply voltage rejection ratio	R_S≤10kΩ					10	150	µV/V
		R_S≤10kΩ, over temp.		10	150				µV/V
CMRR	Common-mode rejection ratio					70	90		dB
		Over temp.	70	90					dB
I_{CC}	Supply current			1.4	2.8		1.4	2.8	mA
		T_A=+125°C		1.5	2.5				mA
		T_A=-55°C		2.0	3.3				mA
V_{IN}	Input voltage range	(µA741, over temp.)	±12	±13		±12	±13		V
R_{IN}	Input resistance		0.3	2.0		0.3	2.0		MΩ
P_D	Power consumption			50	85		50	85	mW
		T_A=+125°C		45	75				mW
		T_A=-55°C		45	100				mW
R_{OUT}	Output resistance			75			75		Ω
I_{SC}	Output short-circuit current		10	25	60	10	25	60	mA

DC ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_S = ±15V, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	SA741C			UNIT
			Min	Typ	Max	
V_{OS}	Offset voltage	R_S=10kΩ		2.0	6.0	mV
		R_S=10kΩ, over temp.			7.5	mV
$\Delta V_{OS}/\Delta T$				10		μV/°C
I_{OS}	Offset current			20	200	nA
		Over temp.			500	nA
$\Delta I_{OS}/\Delta T$				200		pA/°C
I_{BIAS}	Input bias current			80	500	nA
		Over temp.			1500	nA
$\Delta I_B/\Delta T$				1		nA/°C
V_{OUT}	Output voltage swing	R_L=10kΩ	±12	±14		V
		R_L=2kΩ, over temp.	±10	±13		V
A_{VOL}	Large-signal voltage gain	R_L=2kΩ, V_O=±10V	20	200		V/mV
		R_L=2kΩ, V_O=±10V, over temp.	15			V/mV
	Offset voltage adjustment range			±30		mV
PSRR	Supply voltage rejection ratio	R_S≤10kΩ		10	150	μV/V
CMRR	Common mode rejection ration		70	90		dB
V_{IN}	Input voltage range	Over temp.	±12	±13		V
R_{IN}	Input resistance		0.3	2.0		MΩ
P_d	Power consumption			50	85	mW
R_{OUT}	Output resistance			75		Ω
I_{SC}	Output short-circuit current			25		mA

AC ELECTRICAL CHARACTERISTICS

T_A=25°C, V_S = ±15V, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	μA741, μA741C			UNIT
			Min	Typ	Max	
R_{IN}	Parallel input resistance	Open-loop, f=20Hz	0.3			MΩ
C_{IN}	Parallel input capacitance	Open-loop, f=20Hz		1.4		pF
	Unity gain crossover frequency	Open-loop		1.0		MHz
	Transient response unity gain	V_{IN}=20mV, R_L=2kΩ, C_L≤100pF				
t_R	Rise time			0.3		μs
	Overshoot			5.0		%
SR	Slew rate	C≤100pF, R_L≥2kΩ, V_{IN}=±10V		0.5		V/μs

EQUIVALENT SCHEMATIC

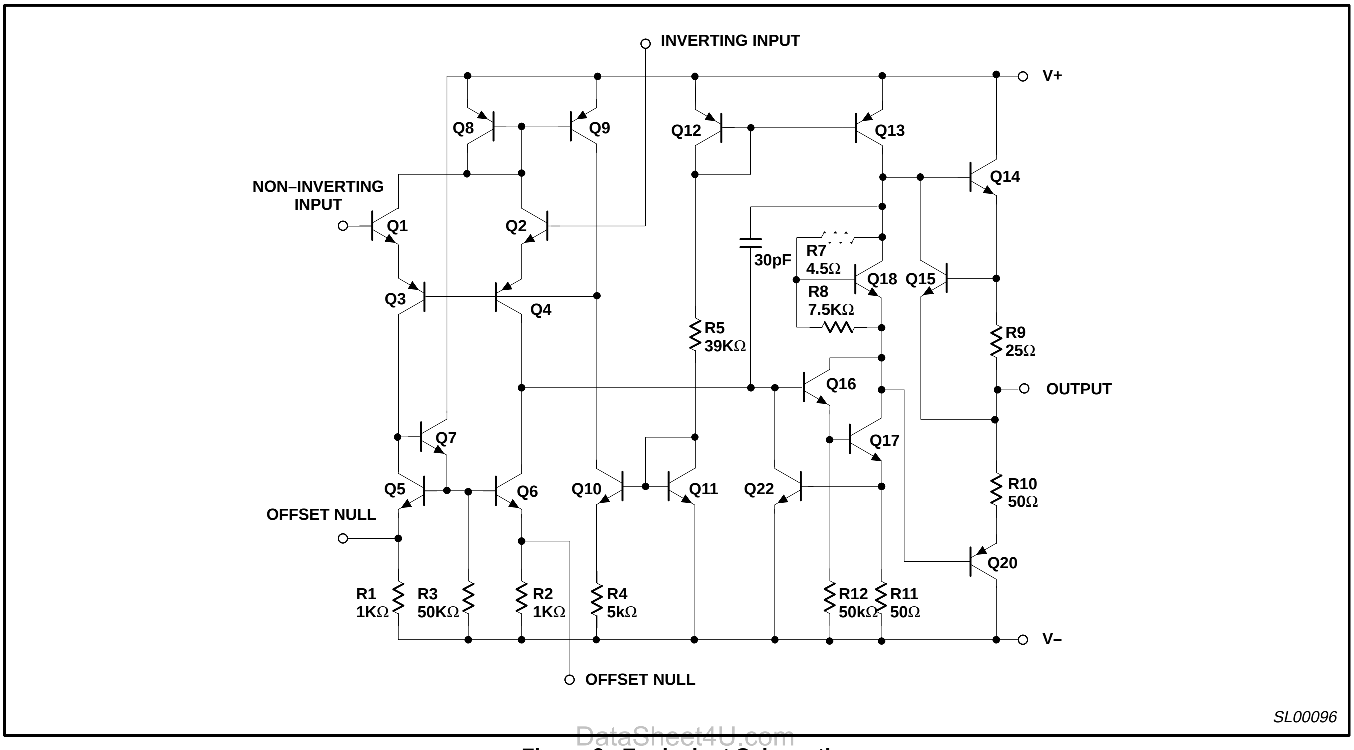

Figure 2. Equivalent Schematic

TYPICAL PERFORMANCE CHARACTERISTICS

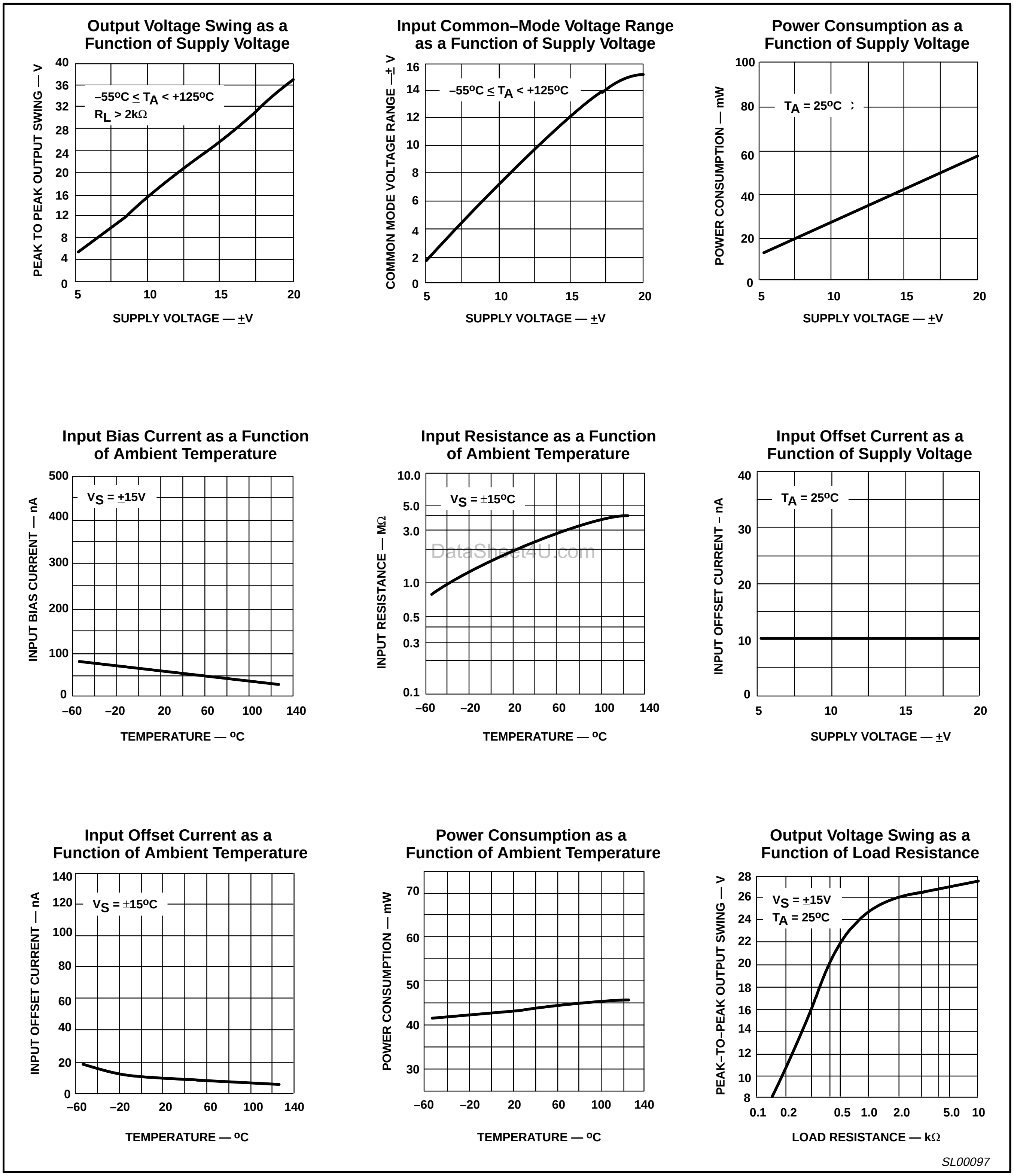

Figure 3. Typical Performance Characteristics

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

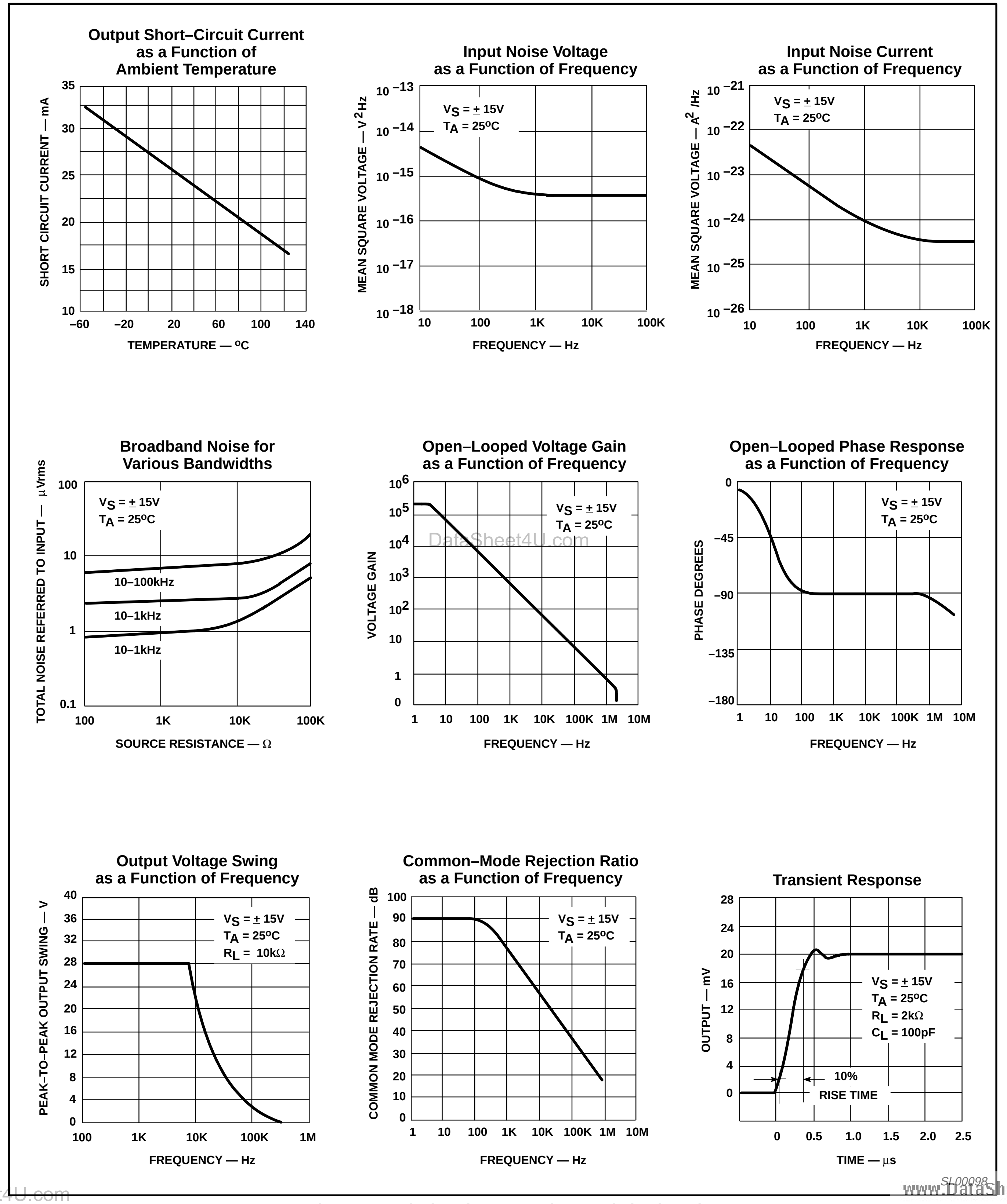

Figure 4. Typical Performance Characteristics (cont.)

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

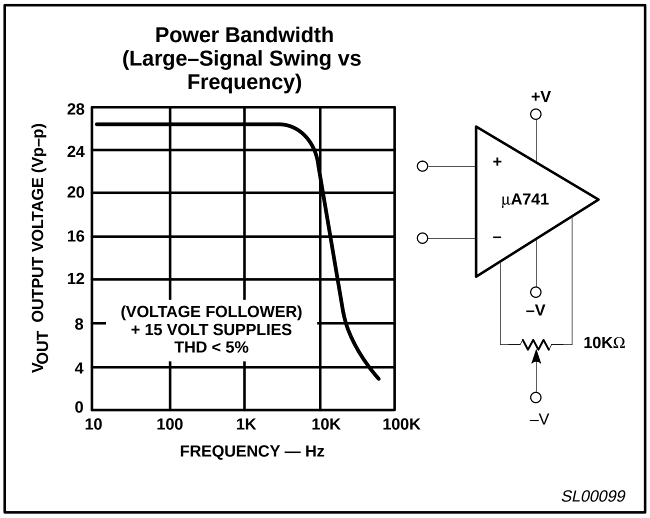

Figure 5. Typical Performance Characteristics (cont.)