

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

D, F, N Packages

TOP VIEW

SL00095

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.



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DC ELECTRICAL CHARACTERISTICS

 $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	μ A741			μ A741C			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Offset voltage	$R_S = 10\text{k}\Omega$		1.0	5.0		2.0	6.0	mV
$\Delta V_{OS}/\Delta T$		$R_S = 10\text{k}\Omega$, over temp.		1.0	6.0			7.5	mV
				10			10		$\mu\text{V}/^\circ\text{C}$
I_{OS}	Offset current	Over temp.		20	200		20	200	nA
		$T_A = +125^\circ\text{C}$		7.0	200			300	nA
		$T_A = -55^\circ\text{C}$		20	500				nA
$\Delta I_{OS}/\Delta T$				200			200		$\text{pA}/^\circ\text{C}$
I_{BIAS}	Input bias current	Over temp.		80	500		80	500	nA
		$T_A = +125^\circ\text{C}$		30	500			800	nA
		$T_A = -55^\circ\text{C}$		300	1500				nA
$\Delta I_B/\Delta T$				1			1		$\text{nA}/^\circ\text{C}$
V_{OUT}	Output voltage swing	$R_L = 10\text{k}\Omega$	± 12	± 14		± 12	± 14		V
		$R_L = 2\text{k}\Omega$, over temp.	± 10	± 13		± 10	± 13		V
A_{VOL}	Large-signal voltage gain	$R_L = 2\text{k}\Omega$, $V_O = \pm 10\text{V}$	50	200		20	200		V/mV
		$R_L = 2\text{k}\Omega$, $V_O = \pm 10\text{V}$, over temp.	25			15			V/mV
	Offset voltage adjustment range			± 30			± 30		mV
$PSRR$	Supply voltage rejection ratio	$R_S \leq 10\text{k}\Omega$					10	150	$\mu\text{V/V}$
		$R_S \leq 10\text{k}\Omega$, over temp.		10	150				$\mu\text{V/V}$
$CMRR$	Common-mode rejection ratio					70	90		dB
		Over temp.	70	90					dB
I_{CC}	Supply current	$T_A = +125^\circ\text{C}$		1.4	2.8		1.4	2.8	mA
		$T_A = -55^\circ\text{C}$		1.5	2.5				mA
				2.0	3.3				mA
V_{IN}	Input voltage range	(μ A741, over temp.)	± 12	± 13		± 12	± 13		V
R_{IN}	Input resistance		0.3	2.0		0.3	2.0		M Ω
P_D	Power consumption	$T_A = +125^\circ\text{C}$		50	85		50	85	mW
		$T_A = -55^\circ\text{C}$		45	75				mW
				45	100				mW
R_{OUT}	Output resistance			75			75		Ω
I_{SC}	Output short-circuit current		10	25	60	10	25	60	mA

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SYMBOL	PARAMETER	TEST CONDITIONS	SA741C			UNIT
			Min	Typ	Max	
V_{OS}	Offset voltage	$R_S=10\text{k}\Omega$		2.0	6.0	mV
$\Delta V_{OS}/\Delta T$		$R_S=10\text{k}\Omega$, over temp.		10	7.5	mV/ $^\circ\text{C}$
I_{OS}	Offset current	Over temp.		20	200	nA
$\Delta I_{OS}/\Delta T$				200	500	nA/ $^\circ\text{C}$
I_{BIAS}	Input bias current	Over temp.		80	500	nA
$\Delta I_B/\Delta T$				1	1500	nA/ $^\circ\text{C}$
V_{OUT}	Output voltage swing	$R_L=10\text{k}\Omega$	± 12	± 14		V
		$R_L=2\text{k}\Omega$, over temp.	± 10	± 13		V
A_{VOL}	Large-signal voltage gain	$R_L=2\text{k}\Omega$, $V_O=\pm 10\text{V}$	20	200		V/mV
		$R_L=2\text{k}\Omega$, $V_O=\pm 10\text{V}$, over temp.	15			V/mV
	Offset voltage adjustment range			± 30		mV
PSRR	Supply voltage rejection ratio	$R_S \leq 10\text{k}\Omega$		10	150	$\mu\text{V/V}$
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		M Ω
P_d	Power consumption			50	85	mW
R_{OUT}	Output resistance			75		Ω
I_{SC}	Output short-circuit current			25		mA

AC ELECTRICAL CHARACTERISTICS $T_A=25^\circ\text{C}$, $V_S = \pm 15\text{V}$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	μ A741, μ A741C			UNIT
			Min	Typ	Max	
R_{IN}	Parallel input resistance	Open-loop, $f=20\text{Hz}$	0.3			M Ω
C_{IN}	Parallel input capacitance	Open-loop, $f=20\text{Hz}$		1.4		pF
	Unity gain crossover frequency	Open-loop		1.0		MHz
t_R	Transient response unity gain	$V_{IN}=20\text{mV}$, $R_L=2\text{k}\Omega$, $C_L \leq 100\text{pF}$				
	Rise time			0.3		μs
	Overshoot			5.0		%
SR	Slew rate	$C \leq 100\text{pF}$, $R_L \geq 2\text{k}\Omega$, $V_{IN}=\pm 10\text{V}$		0.5		V/ μs

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EQUIVALENT SCHEMATIC

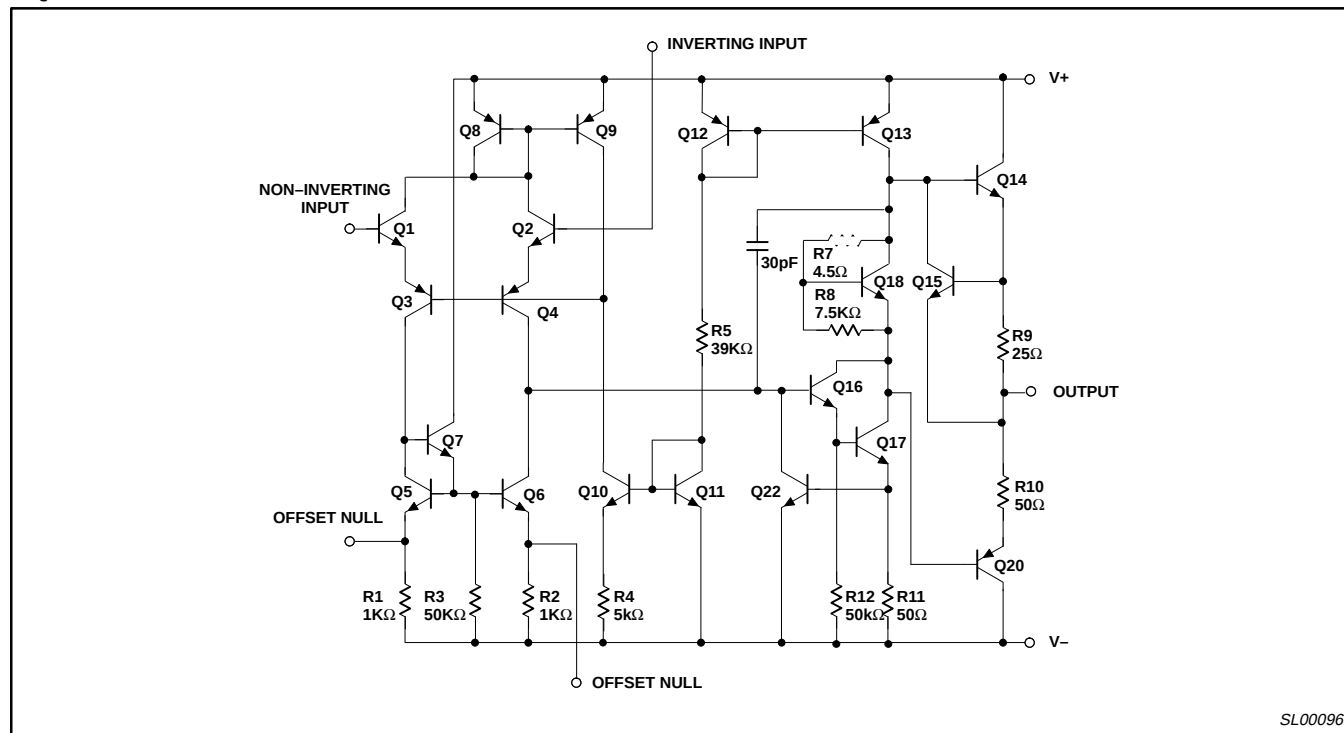
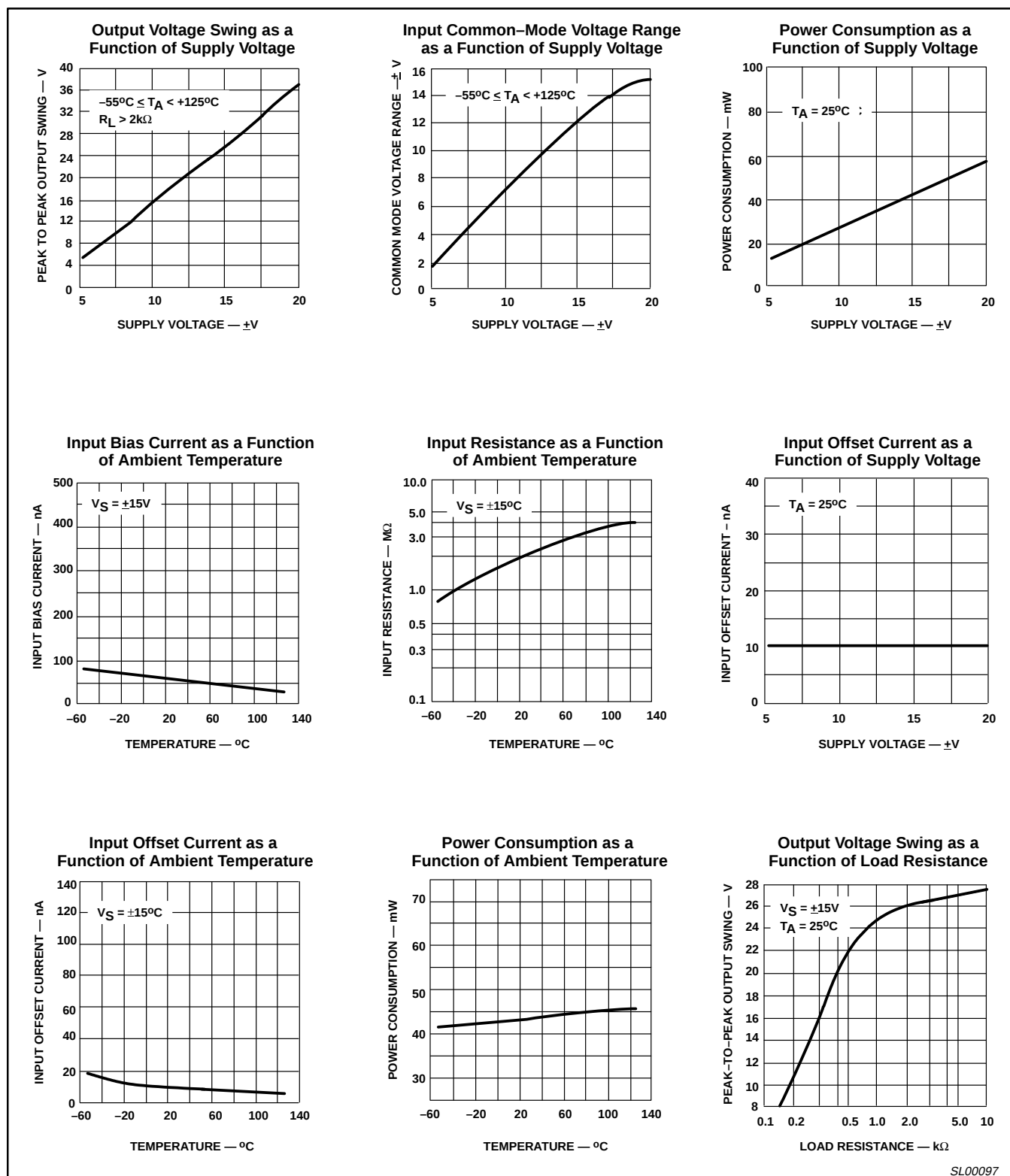


Figure 2. Equivalent Schematic

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TYPICAL PERFORMANCE CHARACTERISTICS



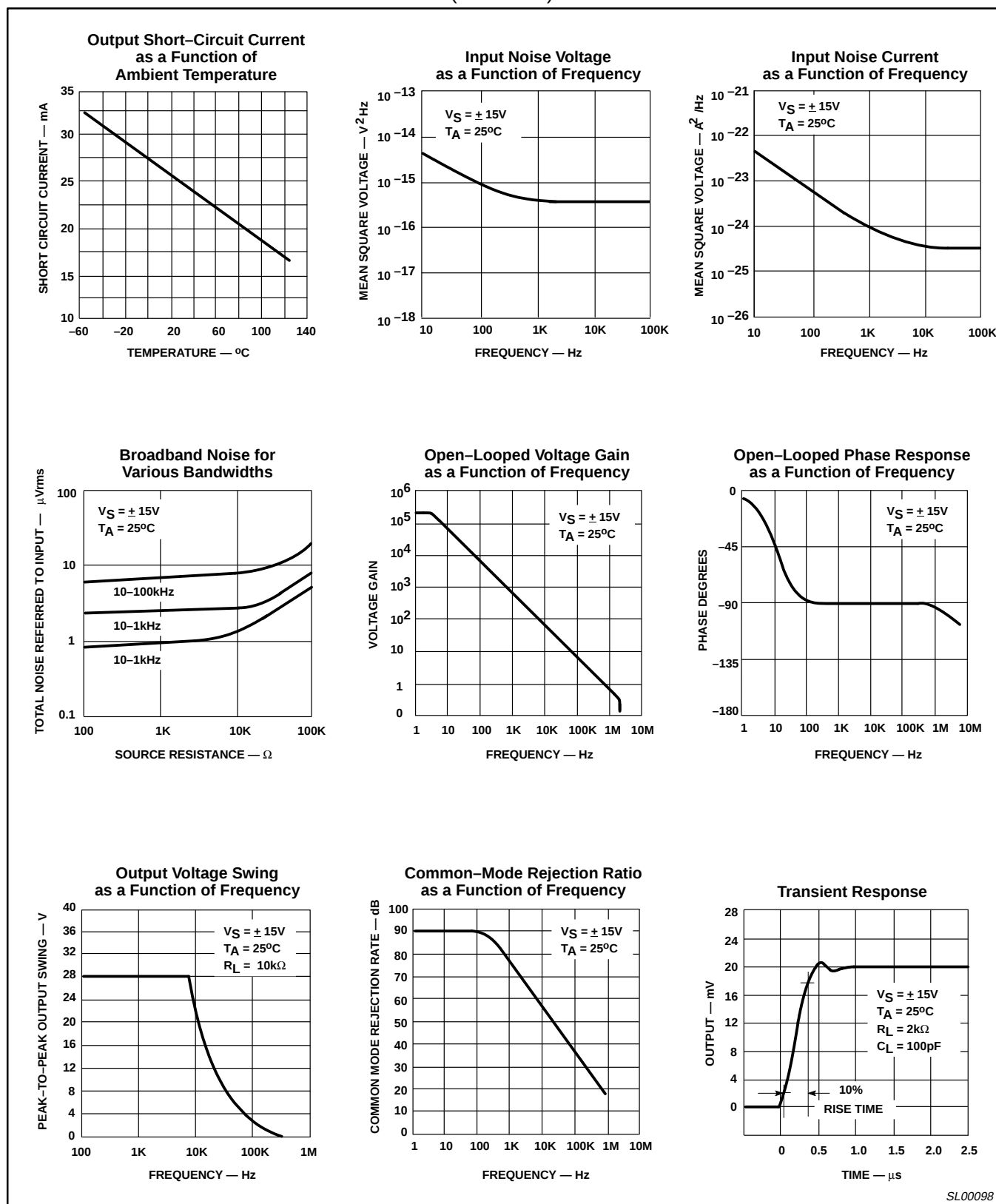
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Figure 3. Typical Performance Characteristics

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



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Figure 4. Typical Performance Characteristics (cont.)

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

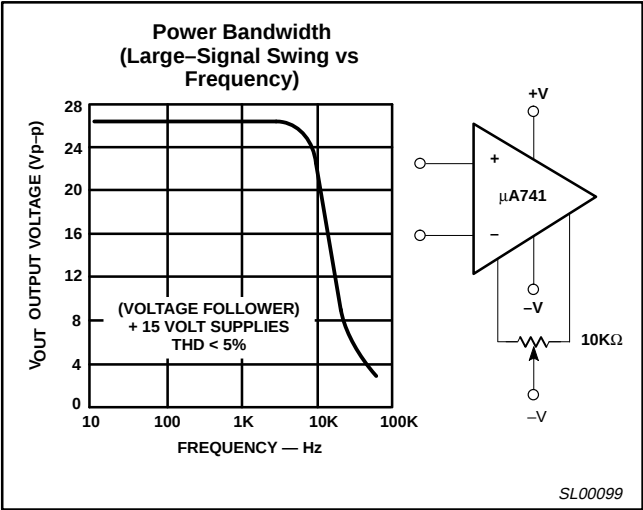


Figure 5. Typical Performance Characteristics (cont.)