Signetics

μA733/733C
Differential Video Amplifier

Product Specification

Linear Products

DESCRIPTION

The 733 is a monolithic differential input, differential output, wide-band video amplifier. It offers fixed gains of 10, 100, or 400 without external components, and adjustable gains from 10 to 400 by the use of an external resistor. No external frequency compensation components are required for any gain option. Gain stability, wide bandwidth, and low phase distortion are obtained through use of the classic series-shunt feedback from the emitter-follower outputs to the inputs of the second stage. The emitter-follower outputs provide low output impedance, and enable the device to drive capacitive loads. The 733 is intended for use as a high-performance video and pulse amplifier in communications, magnetic memories, display and video recorder systems.

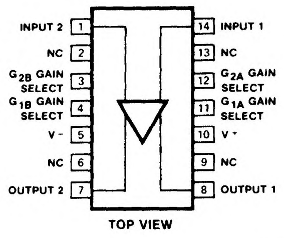
FEATURES

- **120MHz bandwidth**
- **250kΩ input resistance**
- **Selectable gains of 10, 100, and 400**
- **No frequency compensation required**
- **MIL-STD-883A, B, C available**

APPLICATIONS

- **Video amplifier**
- **Pulse amplifier in communications**
- **Magnetic memories**
- **Video recorder systems**

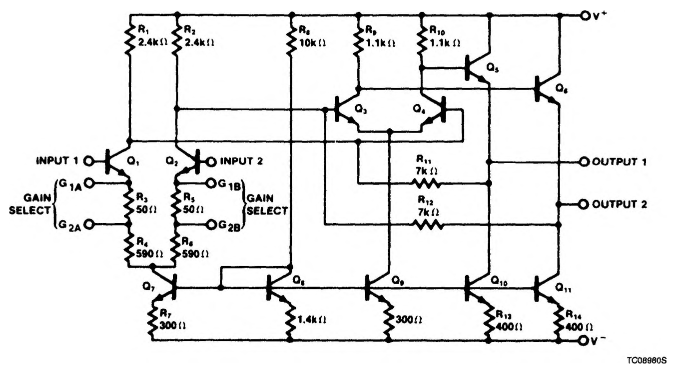
PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE	ORDER CODE
14-Pin Ceramic DIP	-55°C to +125°C	μA733F
14-Pin Plastic DIP	-55°C to +125°C	μA733N
14-Pin Plastic DIP	0 to +70°C	μA733CN
14-Pin Ceramic DIP	0 to +70°C	μA733CF

CIRCUIT SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{DIFF}	Differential input voltage	±5	V
V_{CM}	Common-mode input voltage	±6	V
V_{CC}	Supply voltage	±8	V
I_{OUT}	Output current	10	mA
T_J	Junction temperature	+150	°C
T_{STG}	Storage temperature range	-65 to +150	°C
T_A	Operating ambient temperature range μA733C μA733	 0 to +70 -55 to +125	 °C °C
P_{MAX}	Maximum power dissipation[1] 25°C ambient temperature (still-air) F package N package	 1190 1420	 mW mW

NOTE:
1. The following derating factors should be applied above 25°C:
   F package at 9.5mW/°C
   N package at 11.4mW/°C.

DC ELECTRICAL CHARACTERISTICS

T_A = +25°C, V_S = ±6V, V_{CM} = 0, unless otherwise specified. Recommended operating supply voltages V_S = ±6.0V.

SYMBOL	PARAMETER	TEST CONDITIONS	μA733C			μA733			UNIT
			Min	Typ	Max	Min	Typ	Max	
	Differential voltage gain Gain 1[2] Gain 2[2] Gain 3[3]	R_l = 2kΩ, V_{OUT} = $3V_{P-P}$	 250 80 8	 400 100 10	 600 120 12	 300 90 9	 400 100 10	 500 110 11	 V/V V/V V/V
BW	Bandwidth Gain 1[1] Gain 2[2] Gain 3[3]			 40 90 120			 40 90 120		 MHz MHz MHz
t_R	Rise time Gain 1[1] Gain 2[2] Gain 3[3]	V_{OUT} = $1V_{P-P}$		 10.5 4.5 2.5	 12 		 10.5 4.5 2.5	 10 	 ns ns ns
t_{PD}	Propagation delay Gain 1[1] Gain 2[2] Gain 3[3]	V_{OUT} = $1V_{P-P}$		 7.5 6.0 3.6	 10 		 7.5 6.0 3.6	 10 	 ns ns ns
R_{IN}	Input resistance Gain 1[2] Gain 2[2] Gain 3[3]		 10 	 4.0 30 250		 20 	 4.0 30 250		 kΩ kΩ kΩ
	Input capacitance[2]	Gain 2		2.0			2.0		pF
I_{OS}	Input offset current			0.4	5.0		0.4	3.0	μA
I_{BIAS}	Input bias current			9.0	30		9.0	20	μA
V_{NOISE}	Input noise voltage	BW = 1kHz to 10MHz		12			12		μV_{RMS}
V_{IN}	Input voltage range		±1.0			±1.0			V
CMRR	Common-mode rejection ratio Gain 2 Gain 2	 V_{CM} = ±1V, f ≤ 100kHz V_{CM} = ±1V, f = 5MHz	 60 	 86 60		 60 	 86 60		 dB dB
SVRR	Supply voltage rejection ratio Gain 2	ΔV_S = ±0.5V	50	70		50	70		dB

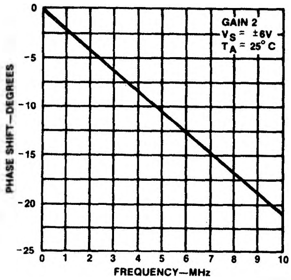
DC ELECTRICAL CHARACTERISTICS (Continued) $T_A = +25°C$, $V_S = \pm 6V$, $V_{CM} = 0$, unless otherwise specified.
Recommended operating supply voltages $V_S = \pm 6.0V$.

SYMBOL	PARAMETER	TEST CONDITIONS	μA733C			μA733			UNIT
			Min	Typ	Max	Min	Typ	Max	
	Output offset voltage Gain 1[1] Gain 2 and 3[2, 3]	$R_L = \infty$		 0.6 0.35	 1.5 1.5		 0.6 0.35	 1.5 1.0	 V V
V_{CM}	Output common-mode voltage	$R_L = \infty$	2.4	2.9	3.4	2.4	2.9	3.4	V
	Output voltage swing, differential	$R_L = 2k\Omega$	3.0	4.0		3.0	4.0		V_{P-P}
I_{SINK}	Output sink current		2.5	3.6		2.5	3.6		mA
R_{OUT}	Output resistance			20			20		Ω
I_{CC}	Power supply current	$R_L = \infty$		18	24		18	24	mA
THE FOLLOWING SPECIFICATIONS APPLY OVER TEMPERATURE			$0°C \leq T_A \leq 70°C$			$-55°C \leq T_A \leq 125°C$			
	Differential voltage gain Gain 1[1] Gain 2[2] Gain[3]	$R_l = 2k\Omega$, $V_{OUT} = 3V_{P-P}$	 250 80 8		 600 120 12	 200 80 8		 600 120 12	 V/V V/V V/V
R_{IN}	Input resistance Gain 2[2]		 8			 8			 kΩ
I_{OS}	Input offset current				6			5	μA
I_{BIAS}	Input bias current				40			40	μA
V_{IN}	Input voltage range		±1.0			±1.0			V
CMRR	Common-mode rejection ratio Gain 2	$V_{CM} = \pm V$, $F \leq 100kHz$	 50			 50			 dB
SVRR	Supply voltage rejection ratio Gain 2	$\Delta V_S = \pm 0.5V$	 50			 50			 dB
V_{OS}	Output offset voltage Gain 1[1] Gain 2 and 3[2, 3]	$R_L = \infty$			 1.5 1.5			 1.5 1.2	 V V
V_{DIFF}	Output voltage swing, differential	$R_L = 2k\Omega$	2.8			2.5			V_{P-P}
I_{SINK}	Output sink current		2.5			2.2			mA
I_{CC}	Power supply current	$R_L \pm \infty$			27			27	mA

NOTES:
1. Gain select pins G_{1A} and G_{1B} connected together.
2. Gain select pins G_{2A} and G_{2B} connected together.
3. All gain select pins open.

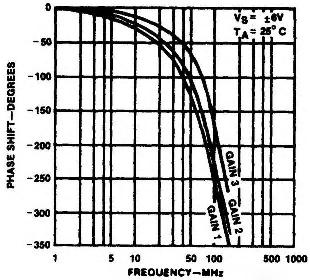
TYPICAL PERFORMANCE CHARACTERISTICS

Phase Shift as a Function of Frequency



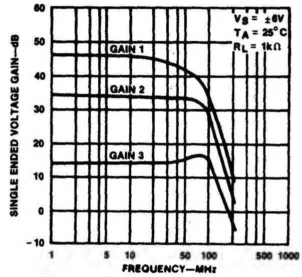
OP05620S

Phase Shift as a Function of Frequency



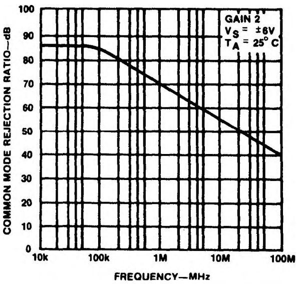
OP05630S

Voltage Gain as a Function of Frequency



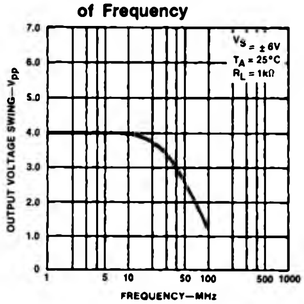
OP05640S

Common Mode Rejection Ratio as a Function of Frequency



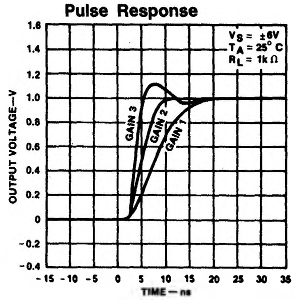
OP05650S

Output Voltage Swing as a Function of Frequency



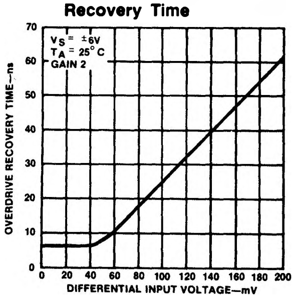
OP05660S

Pulse Response



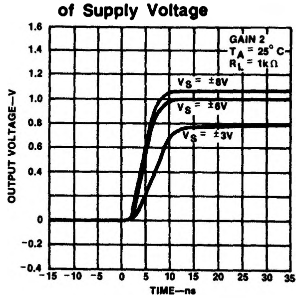
OP05670S

Differential Overdrive Recovery Time



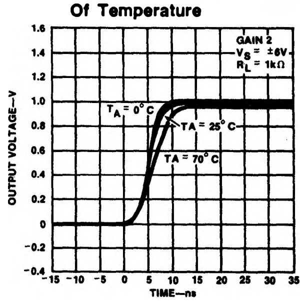
OP05680S

Pulse Response as a Function of Supply Voltage



OP05690S

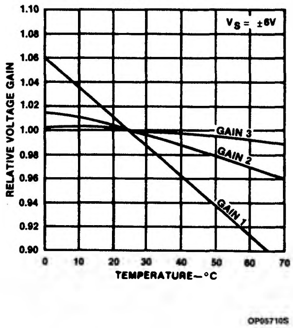
Pulse Response as a Function Of Temperature



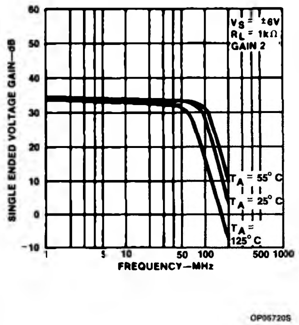
OP05700S

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

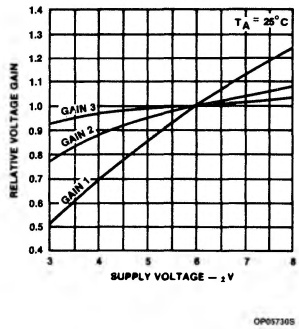
Voltage Gain as a Function of Temperature



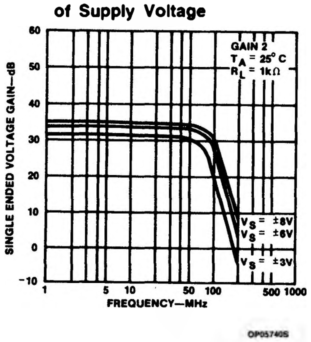
Gain vs Frequency of Temperature



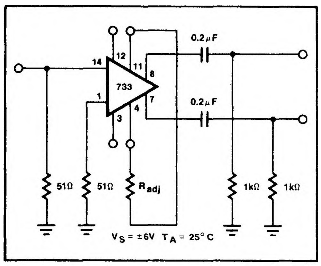
Gain vs Frequency as a Function of Temperature



Gain vs Frequency as a Function of Supply Voltage



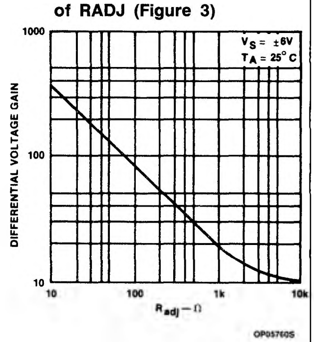
Voltage Gain Adjust Circuit



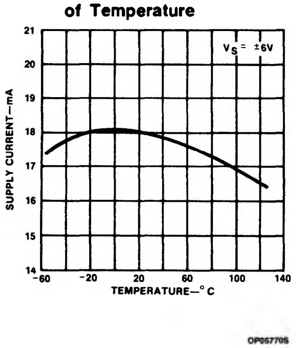
(Pin numbers apply to K Package)

OP05750S

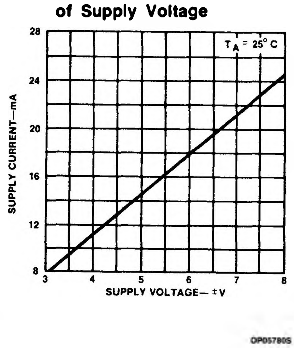
Voltage Gain as a Function of RADJ (Figure 3)



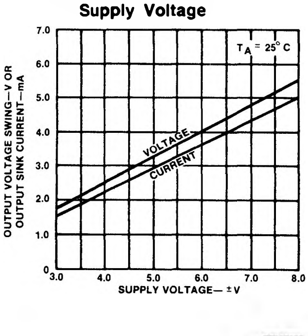
Supply Current as a Function of Temperature



Supply Current as a Function of Supply Voltage



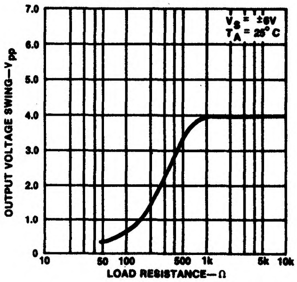
Output Voltage and Current Swing as a Function of Supply Voltage



Differential Video Amplifier μA733/733C

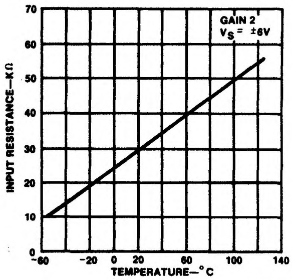
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

Output Voltage Swing as a Function of Load Resistance



OP05800S

Input Resistance as a Function of Temperature



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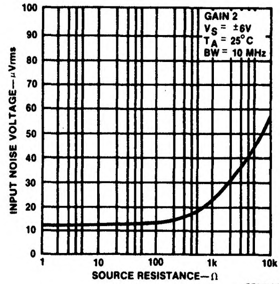
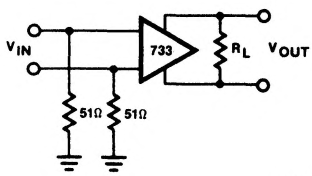
Input Noise Voltage as a Function of Source Resistance

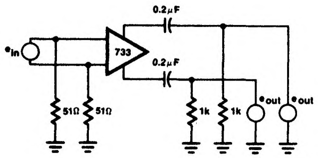


OP04590S

TEST CIRCUITS $T_A = 25°C$, unless otherwise specified.



TC08990S



TC09000S