

μ A733/733C 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.

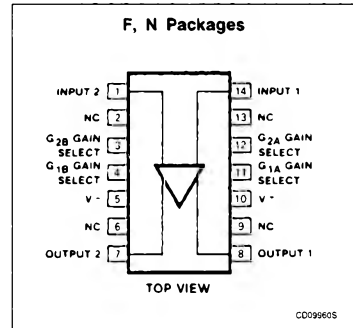
FEATURES

- 120MHz bandwidth
- 250k Ω 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

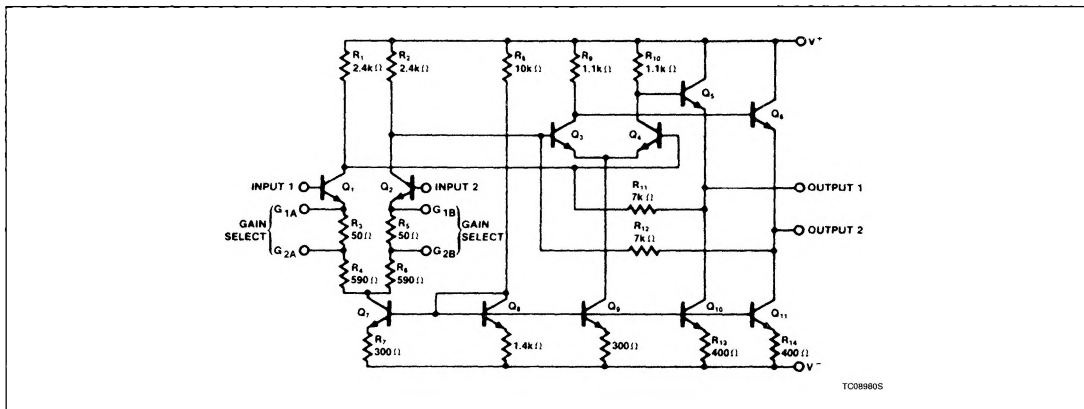
PIN CONFIGURATION



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE	ORDER CODE
14-Pin Ceramic DIP	-55°C to +125°C	μ A733F
14-Pin Plastic DIP	-55°C to +125°C	μ A733N
14-Pin Plastic DIP	0 to +70°C	μ A733CN
14-Pin Ceramic DIP	0 to +70°C	μ A733CF

CIRCUIT SCHEMATIC



Differential Video Amplifier

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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	$^{\circ}C$
T_{STG}	Storage temperature range	-65 to +150	$^{\circ}C$
T_A	Operating ambient temperature range $\mu A733C$ $\mu A733$	0 to +70 -55 to +125	$^{\circ}C$ $^{\circ}C$
$P_D \text{ MAX}$	Maximum power dissipation, 25 $^{\circ}C$ ambient temperature (still-air) ¹ F package N package	1190 1420	mW mW

NOTE:

1. The following derating factors should be applied above 25 $^{\circ}C$:F package at 9.5mW/ $^{\circ}C$ N package at 11.4mW/ $^{\circ}C$.DC ELECTRICAL CHARACTERISTICS $T_A = +25^{\circ}C$, $V_S = \pm 6V$, $V_{CM} = 0$, unless otherwise specified. Recommended operating supply voltages $V_S = \pm 6.0V$.

SYMBOL	PARAMETER	TEST CONDITIONS	$\mu A733C$			$\mu A733$			UNIT
			Min	Typ	Max	Min	Typ	Max	
	Differential voltage gain	$R_I = 2k\Omega$, $V_{OUT} = 3V_{P-P}$							
	Gain 1 ²		250	400	600	300	400	500	V/V
	Gain 2 ²		80	100	120	90	100	110	V/V
	Gain 3 ³		8	10	12	9	10	11	V/V
BW	Bandwidth								
	Gain 1 ¹			40			40		MHz
	Gain 2 ²			90			90		MHz
	Gain 3 ³			120			120		MHz
t_R	Rise time	$V_{OUT} = 1V_{P-P}$							
	Gain 1 ¹			10.5			10.5		ns
	Gain 2 ²			4.5	12		4.5	10	ns
	Gain 3 ³			2.5			2.5		ns
t_{PD}	Propagation delay	$V_{OUT} = 1V_{P-P}$							
	Gain 1 ¹			7.5			7.5		ns
	Gain 2 ²			6.0	10		6.0	10	ns
	Gain 3 ³			3.6			3.6		ns
R_{IN}	Input resistance								
	Gain 1 ²			4.0			4.0		k Ω
	Gain 2 ²		10	30		20	30		k Ω
	Gain 3 ³			250			250		k Ω
	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 1								
	Gain 2	$V_{CM} = \pm 1V$, $f \leq 100kHz$	60	86		60	86		dB
	Gain 2	$V_{CM} = \pm 1V$, $f = 5MHz$		60			60		dB
SVRR	Supply voltage rejection ratio	$\Delta V_S = \pm 0.5V$	50	70		50	70		dB
	Gain 2								

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

SYMBOL	PARAMETER	TEST CONDITIONS	$\mu A733C$			$\mu A733$			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	$R_L = 2\text{k}\Omega$	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			$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$			$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$			
	Differential voltage gain Gain 1 ¹ Gain 2 ² Gain 3 ³	$R_L = 2\text{k}\Omega$, $V_{OUT} = 3V_{P,P}$	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			$\text{k}\Omega$
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	$V_{CM} = \pm V$, $F \leq 100\text{kHz}$	50			50			dB
SVRR	Supply voltage rejection ratio Gain 2	$\Delta V_S = \pm 0.5\text{V}$	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	$R_L = 2\text{k}\Omega$	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

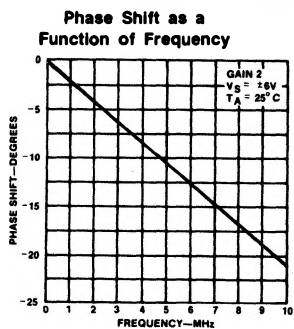
NOTES:

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

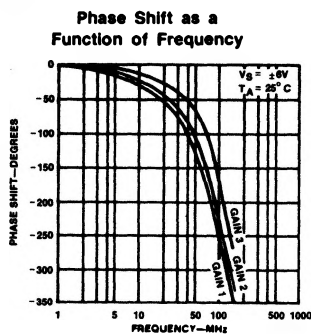
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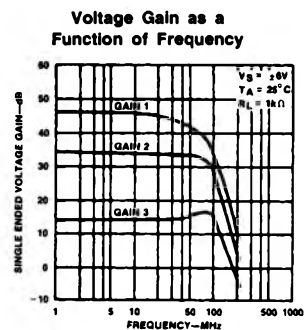
TYPICAL PERFORMANCE CHARACTERISTICS



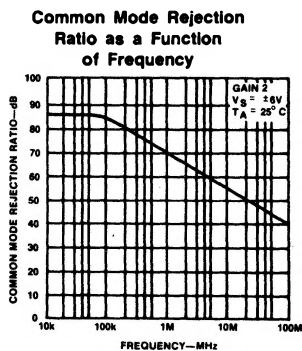
OP056205



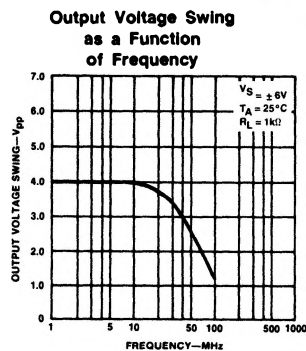
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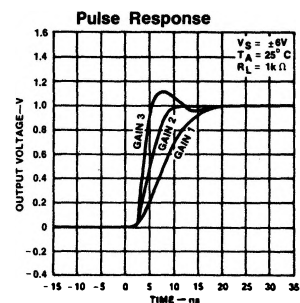
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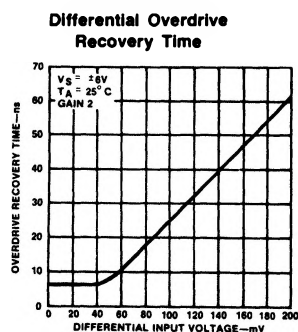
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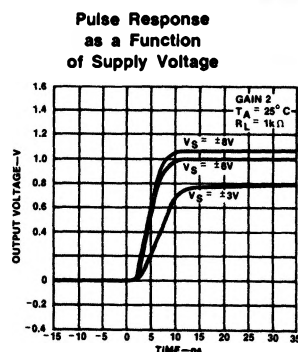
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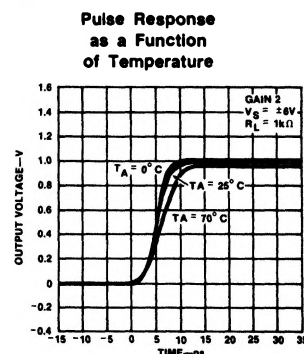
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OP056805



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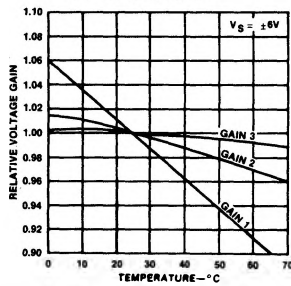


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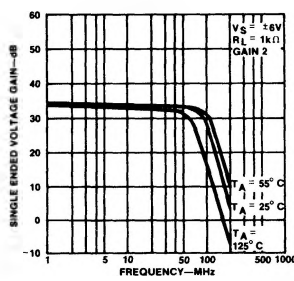
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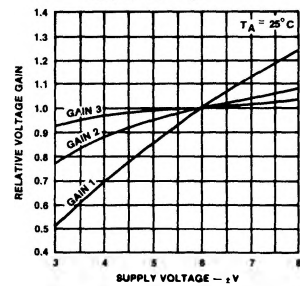
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

Voltage Gain
as a Function
of Temperature

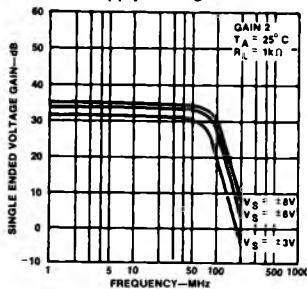
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Gain vs Frequency
as a Function
of Temperature

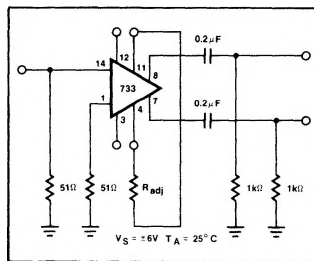
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Voltage Gain
as a Function of
Supply Voltage

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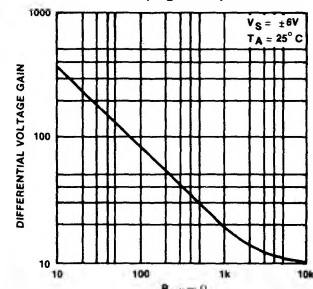
Gain vs Frequency
as a Function
of Supply Voltage

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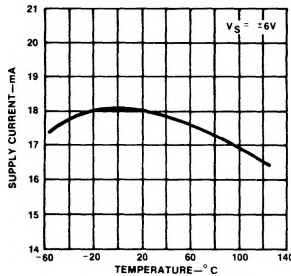
Voltage Gain
Adjust Circuit

(Pin numbers apply to K Package)

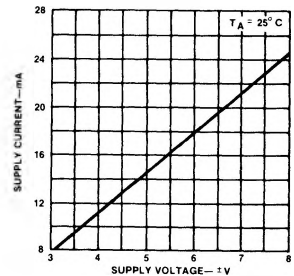
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Voltage Gain
as a Function
of R_{ADJ} (Figure 3)

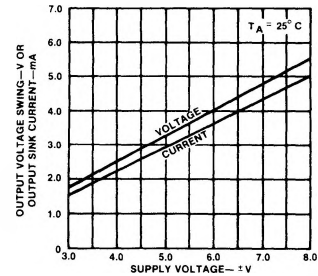
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Supply Current
as a Function
of Temperature

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Supply Current
as a Function
of Supply Voltage

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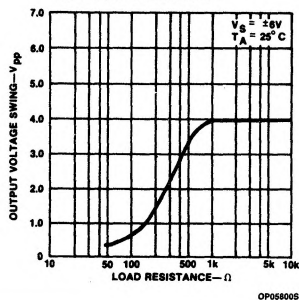
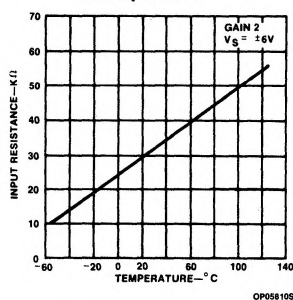
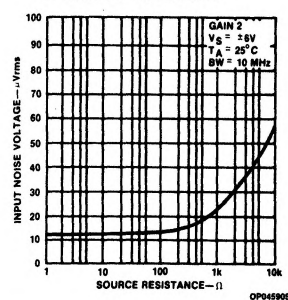
Output Voltage and Current
Swing as a Function
of Supply Voltage

OP057905

Differential Video Amplifier

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

Output Voltage Swing
as a Function
of Load ResistanceInput Resistance
as a Function
of TemperatureInput Noise Voltage
as a Function
of Source ResistanceTEST CIRCUITS $T_A = 25^\circ C$, unless otherwise specified.