

DIFFERENTIAL VIDEO AMPLIFIER

μ A733/733C

DESCRIPTION

The 733 is a monolithic differential input, differential output, wideband 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.

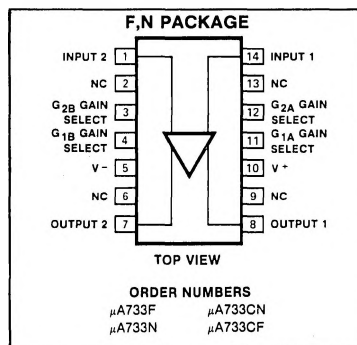
FEATURES

- 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

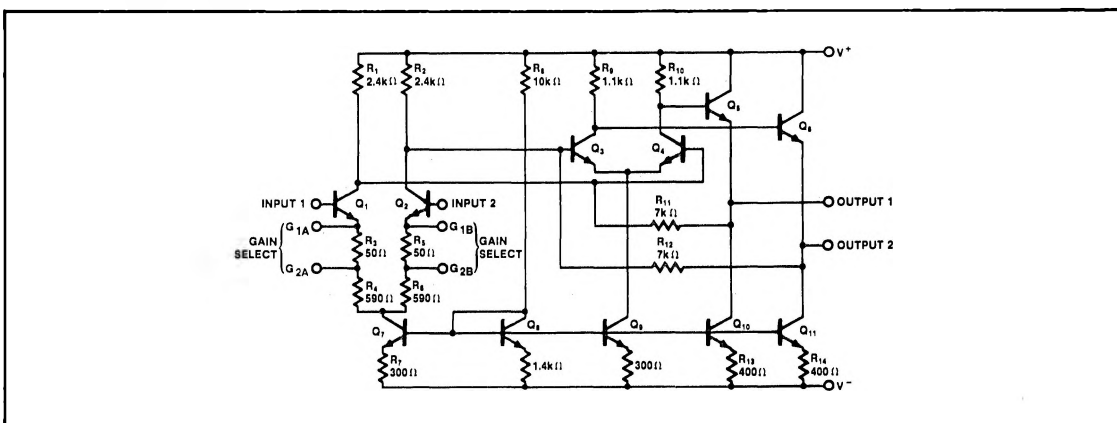
PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Differential input Voltage	± 5	V
Common mode input Voltage	± 6	V
V _{CC}	± 8	V
Output current	10	mA
Junction temperature	+150	°C
Storage temperature range	-65 to +150	°C
Operation temperature range		
μ A733C	0 to +75	°C
μ A733	-55 to +125	°C
P _D Power dissipation		
K package	500	mW
N, F package	670	mW

CIRCUIT SCHEMATIC



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

PARAMETER	TEST CONDITIONS	μ A733C			μ A733			UNITS
		Min	Typ	Max	Min	Typ	Max	
Differential voltage gain	$R_I = 2\text{k}\Omega$, $V_{OUT} = 3V_{p-p}$	250	400	600	300	400	500	V/V
Gain 1 ²		80	100	120	90	100	110	V/V
Gain 2 ²		8	10	12	9	10	11	V/V
Gain 3 ³								
Bandwidth	$V_{OUT} = 1V_{p-p}$		40			40		MHz
Gain 1 ¹			90			90		MHz
Gain 2 ²			120			120		MHz
Gain 3 ³								
Rise time			10.5			10.5		ns
Gain 1 ¹			4.5	12		4.5	10	ns
Gain 2 ²			2.5			2.5		ns
Gain 3 ³								
Propagation delay	$V_{OUT} = 1V_{p-p}$		7.5			7.5		ns
Gain 1 ¹			6.0	10		6.0	10	ns
Gain 2 ²			3.6			3.6		ns
Gain 3 ³								
Input resistance	Gain 2 BW = 1kHz to 10MHz	10	4.0		20	4.0		k Ω
Gain 1 ²			30			30		k Ω
Gain 2 ²			250			250		k Ω
Gain 3 ³			2.0			2.0		pF
Input capacitance ²			0.4	5.0		0.4	3.0	μ A
Input offset current			9.0	30		9.0	20	μ A
Input bias current			12			12		μ Vrms
Input noise voltage		± 1.0			± 1.0			V
Input voltage range								
Common mode	$V_{CM} = \pm 1\text{V}$, $f \leq 100\text{kHz}$ $V_{CM} = \pm 1\text{V}$, $F = 5\text{MHz}$	60	86		60	86		dB
Rejection ratio			60			60		dB
Gain 2								
Supply voltage	$\Delta V_S = \pm 0.5\text{V}$	50	70		50	70		dB
Rejection ratio								
Gain 2								
Output offset voltage	$R_L = \infty$		0.6	1.5		0.6	1.5	V
Gain 1 ¹			0.35	1.5		0.35	1.0	V
Gain 2 and 3 ^{2,3}	$R_L = \infty$	2.4	2.9	3.4	2.4	2.9	3.4	V
Output common mode voltage	$R_L = 2\text{k}$	3.0	4.0		3.0	4.0		V_{pK-pK}
Output voltage swing, differential		2.5	3.6		2.5	3.6		mA
Output sink current			20			20		Ω
Output resistance			18	24		18	24	mA
Power supply current	$R_L \pm \infty$							
THE FOLLOWING SPECS 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	$R_I = 2\text{k}\Omega$, $V_{OUT} = 3V_{p-p}$	250		600	200		600	V/V
Gain 1 ¹		80		120	80		120	V/V
Gain 2 ²		8		12	8		12	V/V
Gain 3 ³								

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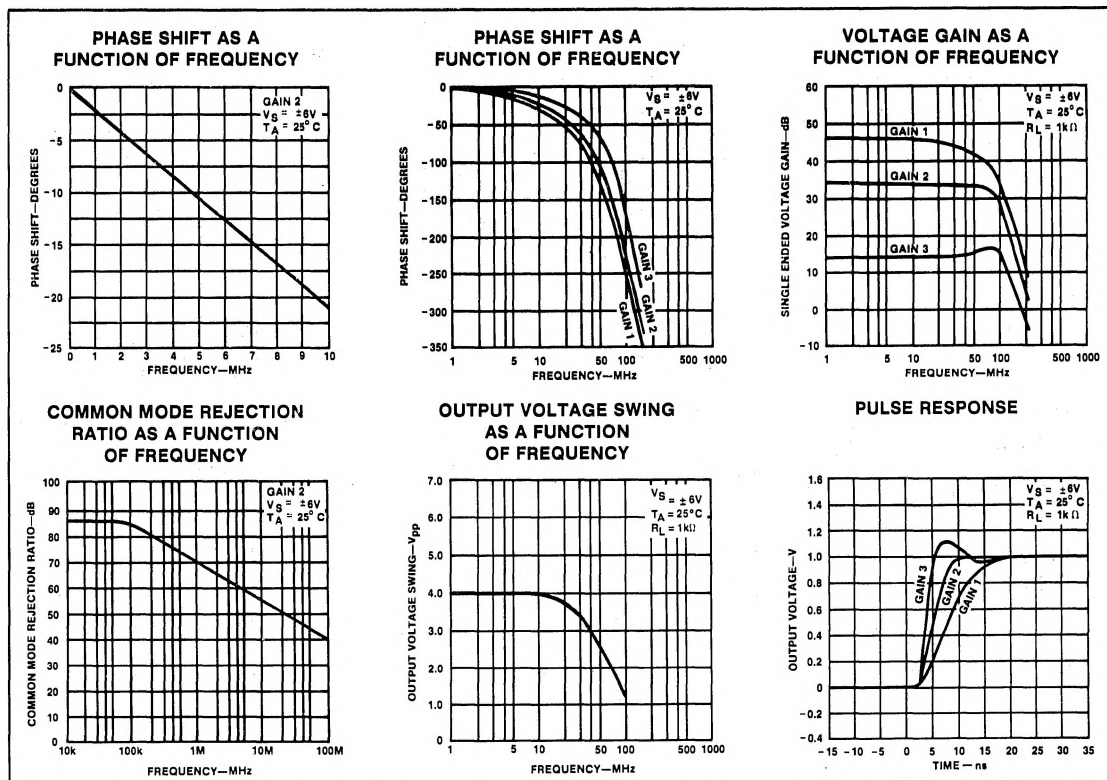
DC ELECTRICAL CHARACTERISTICS (Continued)

PARAMETER	TEST CONDITIONS	μ A733C			μ A733			UNITS
		Min	Typ	Max	Min	Typ	Max	
Input resistance Gain 2 ²		8			8			k Ω
Input offset current				6			5	μ A
Input bias current				40			40	μ A
Input voltage range		± 1.0			± 1.0			V
Common mode Rejection ratio Gain 2	$V_{CM} = \pm V, F \leq 100\text{kHz}$	50			50			dB
Supply voltage Rejection ratio Gain 2	$\Delta V_S = \pm 0.5\text{V}$	50			50			dB
Output offset voltage Gain 1 ¹	$R_L = \infty$			1.5			1.5	V
Gain 2 and 3 ^{2,3}				1.5			1.2	V
Output voltage swing, differential	$R_L = 2\text{k}$	2.8			2.5			V _{pk-pk}
Output sink current		2.5			2.2			mA
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.

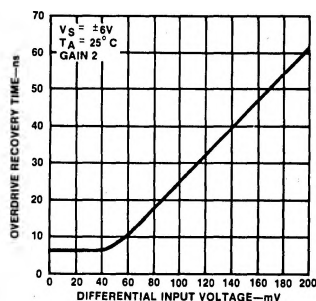
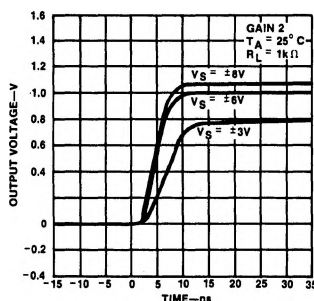
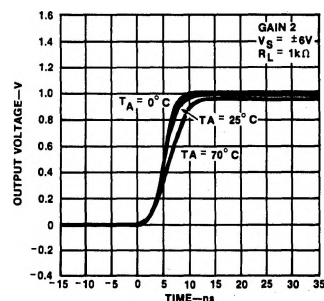
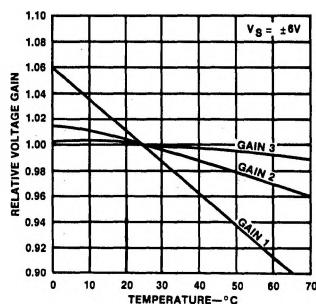
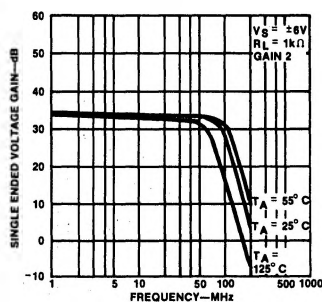
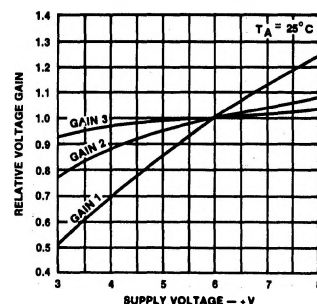
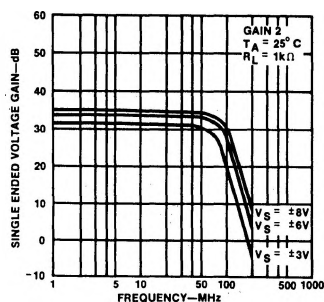
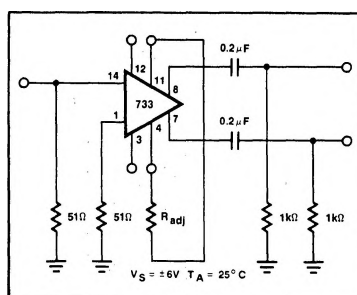
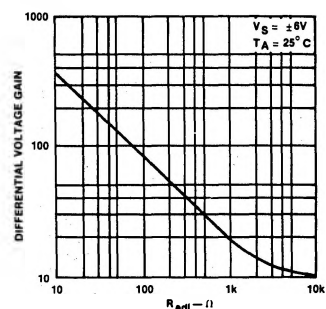
TYPICAL PERFORMANCE CHARACTERISTICS



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TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

DIFFERENTIAL
OVERDRIVE
RECOVERY TIMEPULSE RESPONSE
AS A FUNCTION
OF SUPPLY VOLTAGEPULSE RESPONSE
AS A FUNCTION
OF TEMPERATUREVOLTAGE GAIN
AS A FUNCTION
OF TEMPERATUREGAIN vs FREQUENCY
AS A FUNCTION
OF TEMPERATUREVOLTAGE GAIN
AS A FUNCTION
OF SUPPLY VOLTAGEGAIN vs FREQUENCY
AS A FUNCTION
OF SUPPLY VOLTAGEVOLTAGE GAIN
ADJUST CIRCUITVOLTAGE GAIN
AS A FUNCTION
OF RADJ (FIGURE 3)

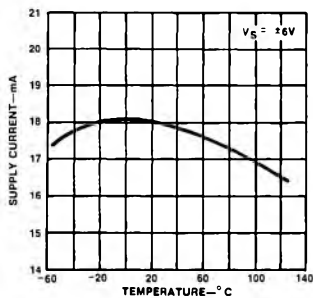
(Pin numbers apply to K Package)

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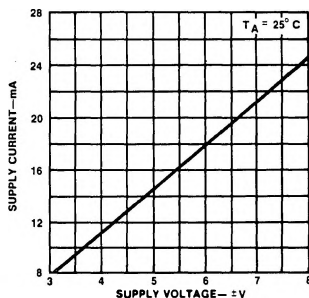
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TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

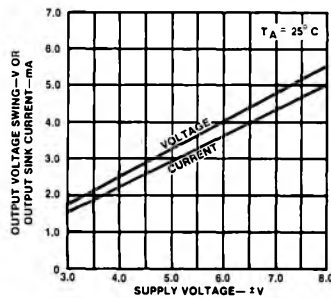
**SUPPLY CURRENT
AS A FUNCTION
OF TEMPERATURE**



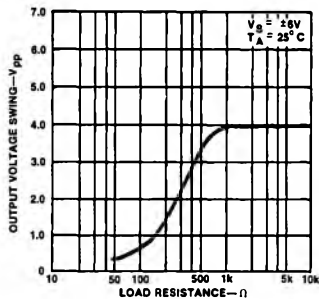
**SUPPLY CURRENT
AS A FUNCTION
OF SUPPLY VOLTAGE**



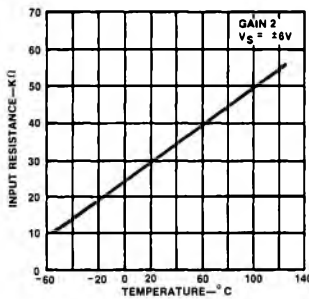
**OUTPUT VOLTAGE AND
CURRENT SWING AS A
FUNCTION OF
SUPPLY VOLTAGE**



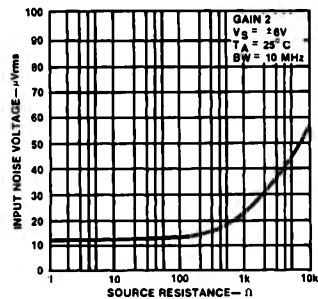
**OUTPUT VOLTAGE SWING
AS A FUNCTION
OF LOAD RESISTANCE**



**INPUT RESISTANCE
AS A FUNCTION
OF TEMPERATURE**



**INPUT NOISE VOLTAGE
AS A FUNCTION
OF SOURCE RESISTANCE**



TEST CIRCUITS $T_A = 25^\circ\text{C}$ unless otherwise specified.

