

VA733

DIFFERENTIAL VIDEO AMPLIFIER

T-74-07-01

FEATURES

- 80MHz Bandwidth at $A_v = 400$
- Selectable Gains of 10, 100 and 400
- No Frequency Compensation Required
- Low Input Noise: Broadband Noise $4\mu V_{rms}$
Spot Noise $0.9nV/\sqrt{Hz}$

DESCRIPTION

The VA733 is a two-stage differential input, differential output wideband video amplifier. It offers jumper selectable gain configurations of 10, 100 and 400 or adjustable gains from 10 to 400 with the use of an external resistor. The amplifier has a bandwidth in excess of 80MHz for all three gain configurations without any gain compensating components.

The VA733 is intended for use as a high quality video and pulse processing amplifier for the communications and computer industries. For example, the large gain bandwidth product and low input noise level of $4\mu V_{rms}$ makes the amplifier an excellent choice as a read amplifier in tape and disk data recovery applications.

ABSOLUTE MAXIMUM RATINGS

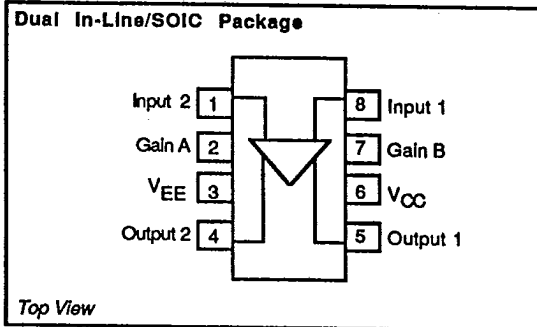
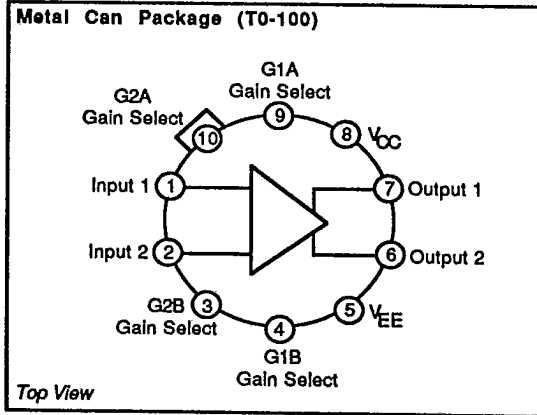
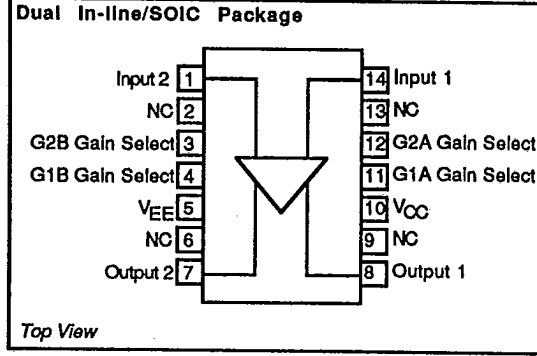
Supply Voltages	$\pm 8V$
Differential Input Voltages	$\pm 5V$
Common Mode Input Voltage	$\pm 6V$
Output Current	10mA
Junction Temperature	150°C
Storage Temperature Range	-65° to 150°C
Power Dissipation ($T_A = 70^\circ C$, Note 1)	550mW
Operating Temperature Range:	
Commercial (733J)	0° to 70°C
Military (733S)	-55° to +125°C
Storage Temperature Range	-65° to +150°C
Lead Temperature (Soldering to 60 sec.)	300°C

Note 1: Power derating above $T_A = 70^\circ C$ to be based on a maximum junction temperature of 150°C and the thermal resistance factors of $\theta_{JC} = 75^\circ C/W$ and $\theta_{JA} = 145^\circ C/W$

PACKAGE TYPES AVAILABLE

- 8-Pin Plastic DIP
- 8-Pin SOIC
- 8-Pin Cerdip
- 14-Pin Plastic DIP
- 14-Pin SOIC
- 10-Pin Metal Can, TO-99

CONNECTION DIAGRAMS



LSP FAMILY DATA SHEETS

VA733

T-74-07-01

ELECTRICAL CHARACTERISTICS $V_{CC} = +6.0VDC$, $V_{EE} = -6.0Vdc$, at $T_A = 25^\circ C$ (unless otherwise stated)

PARAMETER	SYM	TEST CONDITIONS	VA733J			VA733S			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Differential Voltage Gain, Gain 1 (Note 1) Gain 2 (Note 2) Gain 3 (Note 3)	A _{vd}	R _{OD} = 2kΩ V _{OD} = 1V	250 75 7.5	380 85 8.5	600 110 11	300 75 7.5	380 85 8.5	500 100 10	V/V
Bandwidth Gain 1 Gain 2 Gain 3	BW	R _S = 50Ω	- - -	80 80 90	- - -	- - -	80 80 90	- - -	MHz
Rise Time Gain 1 Gain 2 Gain 3	t _{TLH} t _{THL}	R _S = 50Ω V _{OUT} = 1V _{p-p}	- - -	6.0 5.0 5.0	- 12 -	- - -	6.0 5.0 5.0	- 10 -	ns
Propagation Delay Gain 1 Gain 2 Gain 3	t _{PLH} t _{PHL}	R _S = 50Ω V _{OUT} = 1V _{p-p}	- - -	4.8 4.8 4.3	- 10 -	- - -	4.8 4.8 4.3	- 10 -	ns
Input Resistance Gain 1 Gain 2 Gain 3	R _{in}		- 4 -	1.5 7 70	- - -	- 4 -	1.5 7 70	- - -	kΩ
Input Capacitance (Gain 2)	C _{in}		-	9	-	-	9	-	pF
Input Offset Current (Gain 3)	I _{IO}		-	0.4	10	-	0.4	10	μA
Input Bias Current (Gain 3)	I _{IB}		-	45	100	-	45	100	μA
Input Noise Voltage Broadband (Gain 1)	V _n	R _S = 50Ω BW = 1kHz to 10MHz	-	4	-	-	4	-	μV(rms)
Input Noise Voltage Spot Noise (Gain 1)		BW = 20Hz f = 1kHz to 20MHz	-	0.9	-	-	0.9	-	nV/√Hz
Input Voltage Range (Gain 3)	V _{in}		±1.0	+1.4 -3.2		±1.0	+1.4 -3.2		V
Common-Mode Rejection Ratio Gain 2 Gain 2	CMRR	V _{CM} ± 1V, f < 100kHz V _{CM} ± 1V, f = 5MHz	60 -	88 50	- -	60 -	88 50	- -	dB
Supply Voltage Rejection Ratio Gain 2	PSRR	(ΔV _S = ±0.5V)	50	70	-	50	70	-	dB
Output Offset Voltage Gain 1 Gain 2 and Gain 3	V _{OO}		- -	0.2 0.2	1.5 1	- -	0.2 0.2	1.5 1	V V
Output Common-Mode Voltage Gain 3	V _{CMO}		2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing (Gain 2)	V _O		3.0	4.0	-	3.0	4.0	-	V _{p-p}
Output Sink Current (Gain 2)	I _O		2.5	3.6	-	2.5	3.6	-	mA
Output Resistance	R _{out}		-	35	-	-	35	-	Ω
Power Supply Current (Gain 2)	I _D		-	17	24	-	17	24	mA

LSP FAMILY DATA SHEETS

VA733

F-74-07-01

ELECTRICAL CHARACTERISTICS (continued)

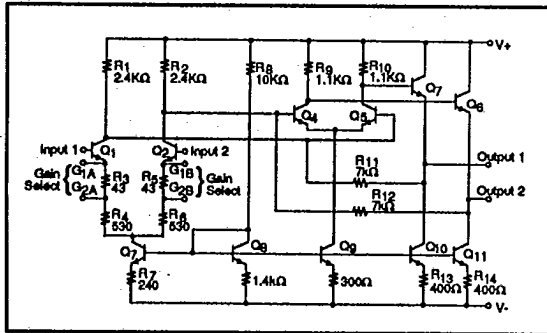
VCC = +6.0Vdc, VEE = -6.0Vdc, at TA = THIGH to TLOW (unless otherwise stated) (Note 4)

PARAMETER	SYMBOL	VA733J			VA733S			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Differential Voltage Gain	A _{vd}	250		600	200		600	V/V
Gain 1 (Note 1)		65		110	65		110	
Gain 2 (Note 2)		6.5		11	6.5		11	
Gain 3 (Note 3)								
Input Resistance (Gain 2)	R _{in}	3K			2.5K			kΩ
Input Offset Current (Gain 3)	I _{IO}	-	-	20	-	-	20	μA
Input Bias Current (Gain 3)	I _{IB}	-	-	200	-	-	200	μA
Input Voltage Range (Gain 3)	V _{IN}	± 1.0	-	-	±1.0	-	-	V
Common Mode Rejection Ratio	CMRR	50	-	-	50	-	-	dB
Supply Voltage Rejection Ratio	PSRR	50	-	-	50	-	-	dB
Gain 2 (ΔV _S = ± 0.5V)								
Output Offset Voltage	V _{OO}	-	-	1.5	-	-	1.5	V
Gain 1		-	-	1.5	-	-	1.2	
Gain 2 and Gain 3								
Output Voltage Swing (Gain 2)	V _O	2.5	-	-	2.5	-	-	Vp-p
Output Sink Current (Gain 2)	I _O	2.5	-	-	2.2	-	-	mA
Power Supply Current (Gain 2)	I _D	-		27	-		27	mA

LSP FAMILY DATA SHEETS

- 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
 4. T_{LOW} = 0°C for VA733J, -55°C for VA733S
 T_{HIGH} = 70°C for VA733J, +125°C for VA733S

SIMPLIFIED SCHEMATIC



VA733

T-74-07-01

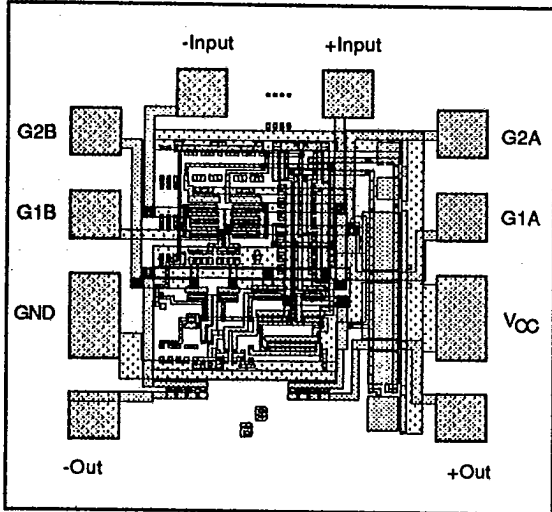
DIE INFORMATION

WAFER TEST LIMITS $V_{CC} = +6.0\text{ Vdc}$, $V_{EE} = -6.0\text{ Vdc}$, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

PARAMETER	SYMBOL	VA733			UNITS
		MIN	TYP	MAX	
Differential Voltage Gain	A_{vd}	300	380	500	V/V
Gain 1 (Note 1)		75	85	100	
Gain 2 (Note 2)		7.5	8.5	10	
Gain 3 (Note 3)					
Input Resistance (Gain 2)	R_{in}	4	7		$k\Omega$
Input Offset Current (Gain 3)	$ I_{IO} $	-	-	10	μA
Input Bias Current (Gain 3)	I_{IB}	-	-	100	μA
Input Voltage Range (Gain 3)	V_{IN}	± 1.0	-	-	V
Common Mode Rejection Ratio	CMRR	50	-	-	dB
Supply Voltage Rejection Ratio	PSRR	50	-	-	dB
Gain 2 ($\Delta V_S = \pm 0.5\text{V}$)					
Output Offset Voltage	V_{OO}	-	-	1.5	V
Gain 1					
Gain 2 and Gain 3				1.2	
Output Voltage Swing (Gain 2)	V_O	2.5	-	-	V_{p-p}
Output Sink Current (Gain 2)	I_O	2.2	-	-	mA
Power Supply Current (Gain 2)	I_D	-	17	24	mA

Notes: 1. Gain Option 1, Gain-adjust pin G1A is connected to pin G1B, and pins G2A and G2B are open.
 2. Gain Option 2, Gain-adjust pin G1A and G1B are open, and pin G2A is connected to pin G2B.
 3. Gain Option 3, All four gain-adjust pins are open.

DIE



Die size = 0.046 X 0.046 inch (2116 sq mils)
 = 1.17 X 1.17mm (1.37sq mm)

DICE POLICY

Electrical Characteristics

Each die is electrically tested to the commercial or military grade DC parameters to guard band limits at 25°C to guarantee operation over the full temperature range.

Quality Assurance

All dice are 100% visually inspected to the requirement of MIL-STD-883C, Method 2010.2, Condition 3.

All dice are glass passivated with only the bonding pads exposed to provide scratch protection.

All dice are provided with gold backing.

Shipping Packages/Order Information

All dice are packaged in die crates with individual compartments which prevent damage to the die during shipping. Minimum order for dice is 100, supplied only in multiples of 100.