

# RGB Video Amplifier for Monitors

## Monolithic IC MM1375

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### Outline

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This IC is a wideband RGB video amplifier with DC control, developed for use in monitors. It has a differential input comparator for brightness adjustment, and three matched DC control attenuators for contrast adjustment. All DC control input is high impedance, and the operating range is set for easy interface with serial bus control systems, at 0~4V. Also, the building-in blanking circuit clamps video output to less than 0.2V during blanking, enabling blanking on the CRT cathode.

### Features

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1. Low power consumption ( $V_{CC}=8V$ ,  $I_{CC}=68mA$ )
2. Smaller capacity for clamping capacitor ( $0.1\mu F$ )
3. High band video amp 100MHZ @-3dB
4. Matched ( $\pm 0.1dB$ ) contrast adjustment attenuators built in
5. Built-in cutoff and brightness adjustment input comparators using external gate control
6. Built-in high input impedance DC contrast control, 0~4V
7. Output blanking function
8. Output can drive hybrid or discrete CRT driver directly

### Package

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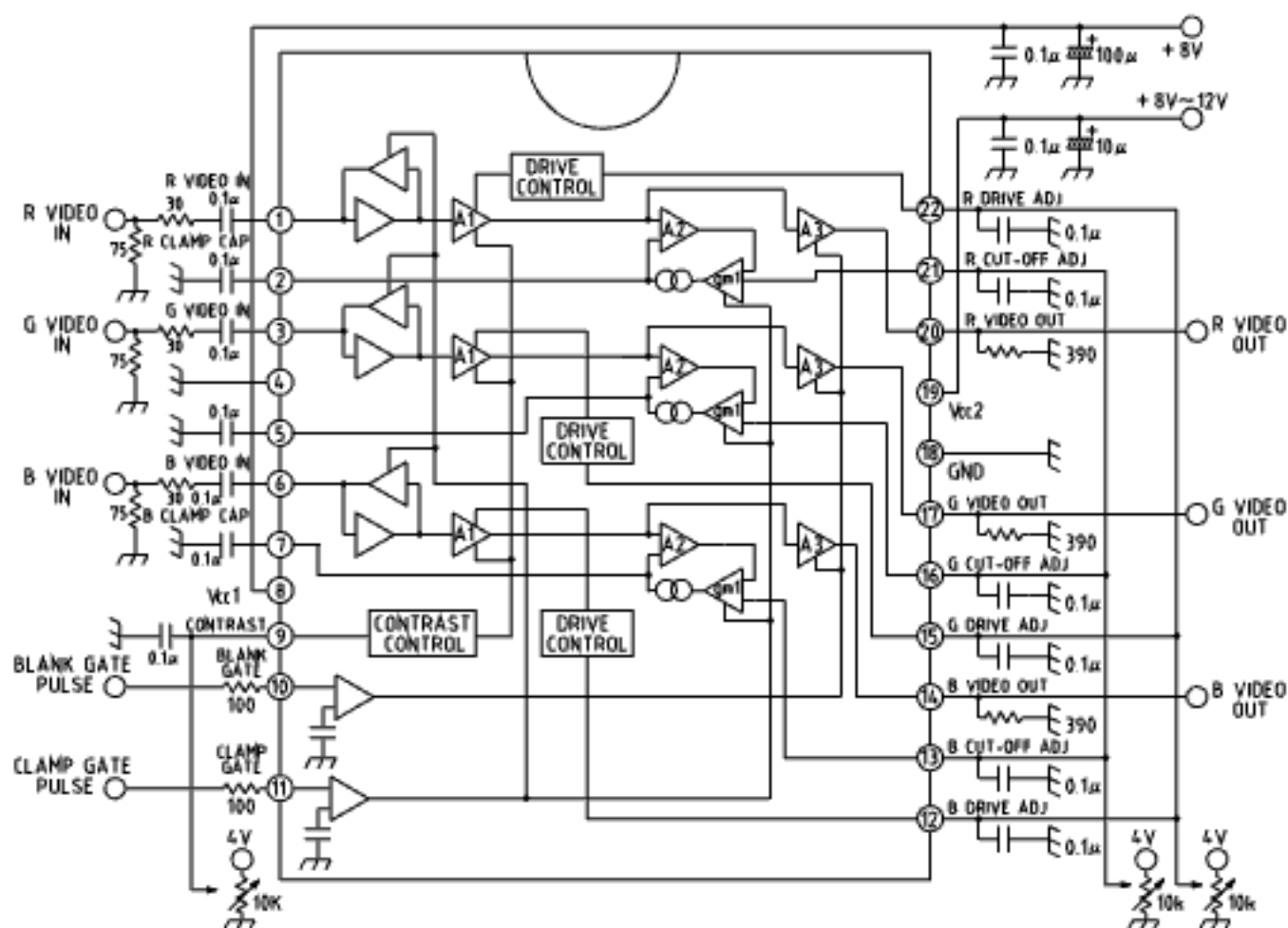
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### Applications

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1. High resolution RGB CRT monitors
  2. AGC amps for video
  3. Gain and DC offset control high bandwidth amps
  4. Interface amps for LCD or CCD systems
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Block Diagram



Pin Description

Pin no.	Pin name	Internal equivalent circuit diagram
1 3 6	R VIDEO IN G VIDEO IN B VIDEO IN	
2 5 7	R CLAMP CAP G CLAMP CAP B CLAMP CAP	
8	Vcc1	
4, 18	GND	
9 22 15 12	CONTRAST R DRIVE G DRIVE B DRIVE	
10 11	BLANK GATE CLAMP GATE	
20 17 14	R VIDEO OUT G VIDEO OUT B VIDEO OUT	
19	Vcc2	
21 16 13	R CUT-OFF ADJ G CUT-OFF ADJ B CUT-OFF ADJ	

**Absolute Maximum Ratings** (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-20~+80	°C
Power supply voltage 1	V <sub>CC1</sub>	10	V
Power supply voltage 2	V <sub>CC2</sub>	15	V
Input voltage range	V <sub>IN</sub>	GND ≤ V <sub>IN</sub> ≤ V <sub>CC1</sub>	V
Video output current	I <sub>o</sub>	28	mA
Allowable loss	P <sub>d</sub>	1.6	W
Electrostatic breakdown		2	kV
Pin temperature		265 *	°C

Note : Solder for 10S

**Recommended Operating Conditions** (Ta=25°C)

Item	Symbol	Min.	Typ.	Max.	Units
Operating power supply voltage 1	V <sub>CC1</sub>	7.6	8.0	8.4	V
Operating power supply voltage 2	V <sub>CC2</sub>	7.6		12.6	V

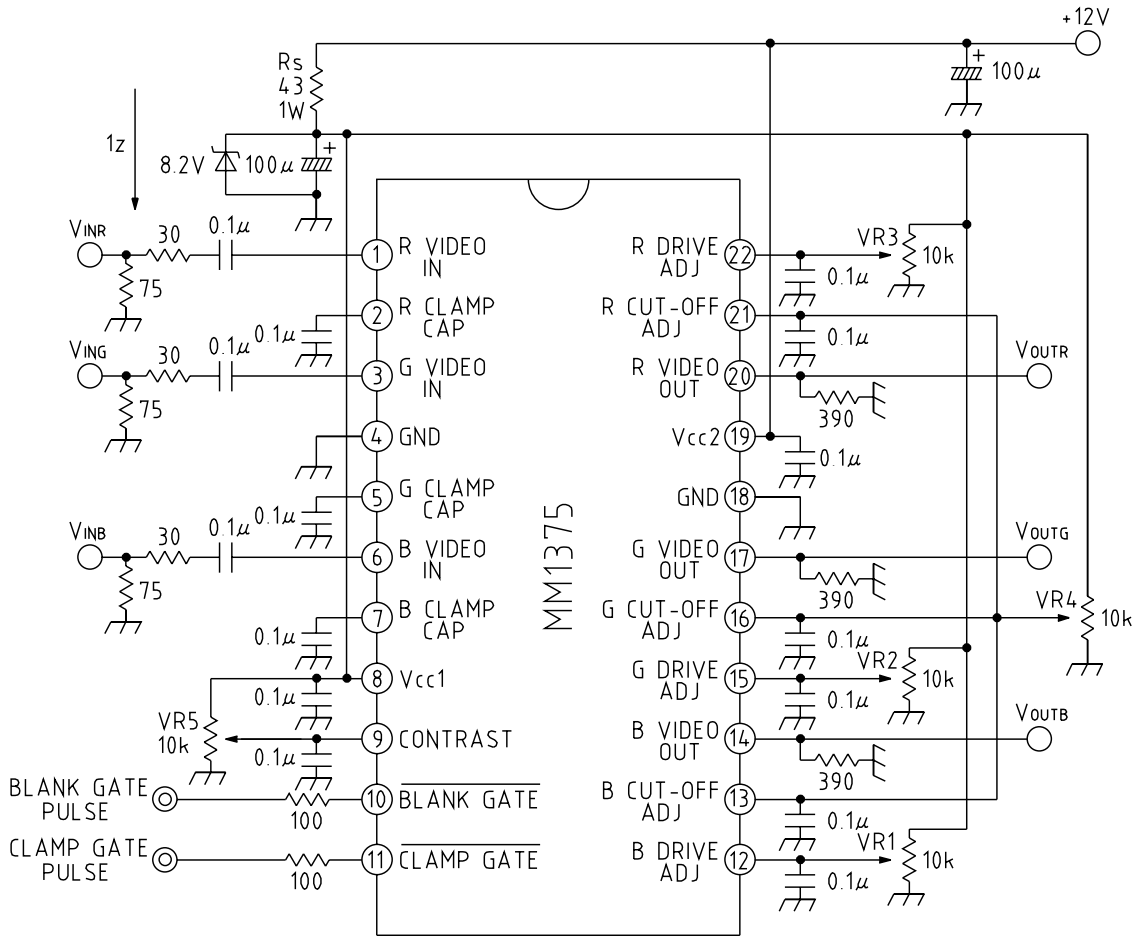
**DC Electrical Characteristics** (Except where noted otherwise, Ta=25°C, V<sub>CC1</sub>=8V, V<sub>CC2</sub>=8~12V, V<sub>9</sub>=4V, V<sub>10</sub>=4V, V<sub>11</sub>=0V, V<sub>C-O</sub>=1.0V, V<sub>DRV</sub>=4V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Power supply current	I <sub>CC1</sub>	V <sub>CC1</sub> +V <sub>CC2</sub>		68	80	mA
Video amp input voltage	V <sub>B</sub>			2.2		V
Video input resistance	R <sub>B</sub>			100		kΩ
Clamp gate input voltage L	V <sub>CGL</sub>		0.8	1.2		V
Clamp gate input voltage H	V <sub>CGH</sub>			1.6	2.0	V
Clamp gate input current L	I <sub>CGL</sub>	V <sub>11</sub> =0V		-0.5	-5.0	μA
Clamp gate input current H	I <sub>CGH</sub>	V <sub>11</sub> =8V		0.01	1.0	μA
Input charging current	I <sub>IN+</sub>		0.75	1.0		mA
Input discharge current	I <sub>IN-</sub>		-0.75	-1.0		mA
Clamp cap charge current	I <sub>CL+</sub>		0.75	1.0		mA
Clamp cap discharge current	I <sub>CL-</sub>		-0.75	-1.0		mA
Clamp cap bias discharge current	I <sub>CLB</sub>			50		nA
Blanking gate input voltage L	V <sub>BGL</sub>		0.8	1.2		V
Blanking gate input voltage H	V <sub>BGH</sub>			1.6	2.0	V
Blanking gate input current L	I <sub>BGL</sub>	V <sub>10</sub> =0V		-1.0	-5.0	μA
Blanking gate input current H	I <sub>BGH</sub>	V <sub>10</sub> =8V		0.01	1.0	μA
Video output voltage L	V <sub>OL</sub>	V <sub>C-O</sub> =0V		0.15	0.5	V
Video output voltage H	V <sub>OH</sub>	V <sub>C-O</sub> =6V	5.0	5.5		V
Black level output voltage	V <sub>O</sub>	V <sub>C-O</sub> =1V		1.0		V
ΔBlack level output voltage	ΔV <sub>O</sub>	V <sub>C-O</sub> =1V		±100		mV
Output blanking voltage	V <sub>OBLK</sub>	V <sub>10</sub> =0V		100	300	mV
Contrast control input current	I <sub>9</sub>	V <sub>9</sub> =4V		190		μA
Drive control input current	I <sub>DBV</sub>	V <sub>DBV</sub> =4V		190		μA
Cutoff control input current	I <sub>C-O</sub>	V <sub>C-O</sub> =0~4V		-500		nA

**AC Electrical Characteristics** (Except where noted otherwise, Ta=25°C, Vcc1=8V, Vcc2=8~12V)

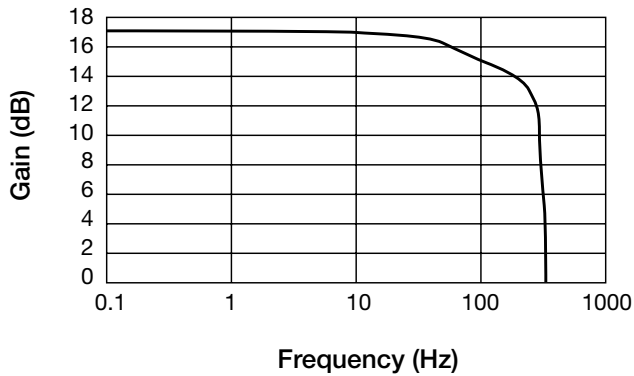
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Video amp gain	Av max.	VIN=635mVP-P, V9=4V VDRV=4V	5.4	7.0		V/V
			14.6	16.9		dB
Gain attenuation 1	∠Av1	VIN=635mVP-P, V9=2V		-6		dB
Gain attenuation 2	∠Av2	VIN=635mVP-P, V9=0.5V		-38		dB
Drive control range	∠AVDRV	VDRV=0~4V, V9=4V		6		dB
Gain matching	AVMAT	V9=VDRV=4V		0.3		dB
Gain change between amps	∠AVMAT	V9=4~2V		0.1		dB
Video amp distortion	THD	VOUT=1VP-P		1		%
Video amp frequency bandwidth	fBW	VOUT=4VP-P, V9=VDRV=4V		100		MHz
Output rise time	tr	VOUT=4VP-P		3		nS
Output fall time	tf	VOUT=4VP-P		4		nS
Video amp isolation 1 (fIN=10kHz)	VSEP1	V9=4V		-70		dB
Video amp isolation 2 (fIN=10MHz)	VSEP2	V9=4V		-50		dB
Blanking output fall time	tr	VOUT=1VP-P		7		nS
Blanking output fall time	tf	VOUT=1VP-P		7		nS
Back-porch clamping pulse width	tpw			200		nS

Application Circuits



Characteristics

Gain vs Frequency



Pulse reaction

