# Video Amplifier with 75 ohms Driver

#### ■ GENERAL DESCRIPTION

THE NJM2538 is a video amplifier with 75ohms drivers, which includes LPF and BPF of both Y and C system.

THE NJM2538 can compose the output circuit of digital video items with a little external components, because it prepares black and white 2 level imposer, gain controller, Y/C mixer, and SDC interface. It is suitable for portable items.

#### **■ PACKAGE OUTLINE**

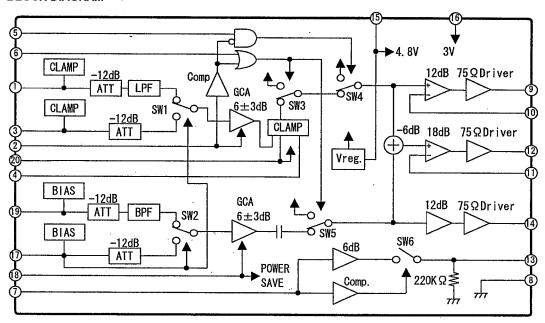


**NJM2538V** 

# **■ FEATURES**

- Operating Voltage
- V<sup>†</sup>1=4.5~5.3V, V<sup>†</sup>2=2.7~5.3V
- ●Low Power
- 110mW
- Internal Black and White 2 Level Imposer
- Internal Gain Controller
- ●Internal SDC Interface
- Bipolar Technology
- Package Outline
- SSOP20

### BLOCK DIAGRAM



- 1.Y<sub>IN</sub>1
- 2.GCA CTL1/MUTE
- 3.Y<sub>IN</sub>2
- 4.CLAMP
- 5.CHARA
- 6.BLANK
- 7.WIDE
- 8.GND
- 9.Yout
- 10.Y<sub>SAG</sub>

- 11.V<sub>SAG</sub>
- 12.Vout
- 13.SDC<sub>OUT</sub>
- 14.C<sub>OUT</sub>
- 15.V<sup>†</sup>1
- 16.V<sup>+</sup>2 <sup>-</sup>
- 17.CIN2/INSEL
- 18.GCA CTL2/POWER SAVE
- 19.C<sub>IN</sub>1
- 20.CLAMP REF.

# ■ ABSOLUTE MAXIMUM RATINGS

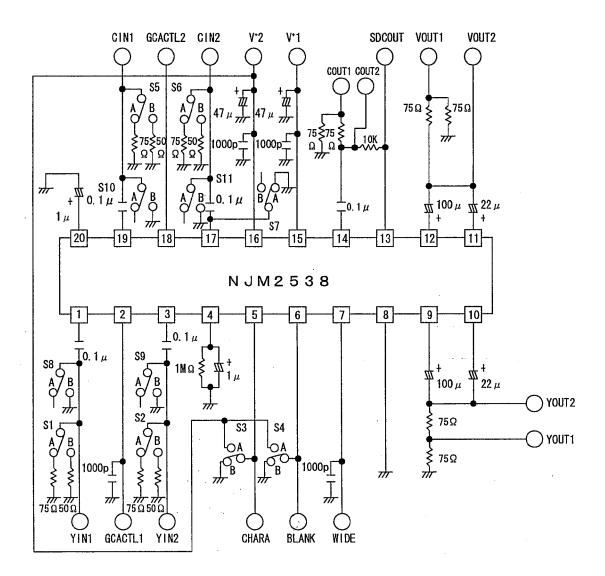
(Ta=25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	7.0	V
Power Dissipation	P <sub>D</sub>	300	mW
Operating Temperature Range	Topr	-20~+85	°C
Storage Temperature Range	Tstg	-40 <b>~</b> +125	°C

Icc1 Isave1 Icc2 Isave2	V*1=4.8V,No Signal V*1=4.8V,Power Save  V*2=3.0V,No Signal V*2=3.0V,Power Save		18.0 3.0 7.6 0.5	28.0 3.5 12.0 1	mA mA mA
Icc2 Isave2	V*2=3.0V,No Signal V*2=3.0V,Power Save		7.6	12.0	mA
Isave2	V*2=3.0V,Power Save	-			
		_	0.5	1	mA
Gv <sub>Y</sub> 1	V 1 V 2 V CCACTI V-0 EV				
Gv <sub>Y</sub> 1	V 1 V 2 V CCACTI V-0 EV				
	Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→Y <sub>OUT</sub> ,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave	-3.0	0	+3.0	dB
Gv <sub>Y</sub> 2	Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→Y <sub>OUT</sub> ,GCACTLY=2.5V 100kHz,0.5Vp-p @ sine wave	+7.0	+9.0	+11.0	dB
Gf <sub>Y</sub>	10MHz/100kHz(100mVp-p @ Sine Wave)	-3.0	0	+3.0	dB
Gv <sub>v</sub> 1	Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave	+3.0	+6.0	+9.0	dB
Gv <sub>v</sub> 2	Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=2.5V 100kHz,0.5Vp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Gf₀	10MHz/100kHz(100mVp-p @ Sine Wave)	-3.0	0	+3.0	dB
Gv <sub>c</sub> 1	C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=0.5V 4MHz,143mVp-p @ Sine Wave	-3.0	0	+3.0	dB
Gv <sub>c</sub> 2	C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=2.5V 4MHz,143mVp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Gf <sub>C</sub>	7MHz/4MHz(143mVp-p @ Sine Wave)	-3.0	0	+3.0	dB
Gf <sub>Y6M</sub>	6MHz/100kHz,200mVp-p @ Sine Wave	-0.5	0		dB
Gf <sub>Y7.2M</sub>	7.2MHz/100kHz,200mVp-p @ Sine Wave	-1.0	0 -	_	dB
Gf <sub>Y20M</sub>	20MHz/100kHz,200mVp-p @ Sine Wave	-	-30	-20	dB
DL <sub>Y</sub>	Group Delay:   GD3MHz-GD6MHz		10	100	nsec
Gf <sub>C4M</sub>	4MHz,200mVp-p @ Sine Wave	_	0	-	dB
	±1MHz/4MHz,200mVp-p @ Sine Wave	-0.5	0	_	dB
Gf <sub>C±1.6M</sub>	±1.6MHz/4MHz,200mVp-p @ Sine Wave	-	<b>-15</b>	-10	dB
Gf <sub>C20M</sub>	20MHz/4MHz,200mVp-p @ Sine Wave		-25	-10	dB
DLc	Group Delay:   GD2MHz-GD6MHz	_	60	90	nsec
T <sub>YC</sub>	T <sub>YOUT</sub> —T <sub>COUT</sub> at 4MHz	_	+25	<u>  -</u> [	nsec
	Gv <sub>v</sub> 1 Gv <sub>v</sub> 2 Gf <sub>v</sub> Gv <sub>c</sub> 1 Gv <sub>c</sub> 2 Gf <sub>c</sub> Gf <sub>y6M</sub> Gf <sub>y7.2M</sub> Gf <sub>y20M</sub> DL <sub>y</sub> Gf <sub>c4M</sub> Gf <sub>c±1.6M</sub> Gf <sub>c±1.6M</sub> Gf <sub>c20M</sub> DL <sub>c</sub>	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Gf <sub>Y</sub> 10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0           GV <sub>V</sub> 1         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave         +3.0           GV <sub>V</sub> 2         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=2.5V 100kHz,0.5Vp-p @ Sine Wave         +7.0           Gf <sub>V</sub> 10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0           GV <sub>C</sub> 1         C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=0.5V 4MHz,143mVp-p @ Sine Wave         +7.0           GV <sub>C</sub> 2         C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=2.5V 4MHz,143mVp-p @ Sine Wave         +7.0           Gf <sub>C</sub> 7MHz/4MHz(143mVp-p @ Sine Wave)         −3.0           Gf <sub>Y2,2M</sub> 7.2MHz/100kHz,200mVp-p @ Sine Wave)         −3.0           Gf <sub>Y2,2M</sub> 7.2MHz/100kHz,200mVp-p @ Sine Wave         −1.0           Gf <sub>Y2,2M</sub> 7.2MHz/100kHz,200mVp-p @ Sine Wave         −1.0           Gf <sub>Y2,2M</sub> 20MHz/100kHz,200mVp-p @ Sine Wave         −0.5           Gf <sub>C4,1</sub> 4MHz,200mVp-p @ Sine Wave         −0.5           Gf <sub>C±1,6M</sub> ±16MHz/4MHz,200mVp-p @ Sine Wave         −0.5           Gf <sub>C2,1,6M</sub> ±1.6MHz/4MHz,200mVp-p @ Sine Wave         −0.5           Gf <sub>C2,20M</sub> 20MHz/4MHz,200mVp-p @ Sine Wave         −0.5           Gf <sub>C20M</sub> 20MHz/4MHz,200mVp-p @ Sine Wave         −0.5	Gf <sub>Y</sub> 10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0         0           GV <sub>V</sub> 1         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave         +3.0         +6.0           GV <sub>v</sub> 2         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=2.5V 100kHz,0.5Vp-p @ Sine Wave         +7.0         +9.0           Gf <sub>v</sub> 10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0         0           Gv <sub>C</sub> 1         C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=0.5V 4MHz,143mVp-p @ Sine Wave         +7.0         +9.0           Gv <sub>C</sub> 2         C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=2.5V 4MHz,143mVp-p @ Sine Wave         +7.0         +9.0           Gf <sub>C</sub> 7MHz/4MHz(143mVp-p @ Sine Wave)         −3.0         0           Gf <sub>Y2,0M</sub> 6MHz/100kHz,200mVp-p @ Sine Wave         −0.5         0           Gf <sub>Y2,2M</sub> 7.2MHz/100kHz,200mVp-p @ Sine Wave         −1.0         0           Gf <sub>Y2,2M</sub> 20MHz/100kHz,200mVp-p @ Sine Wave         −0.30           DL <sub>Y</sub> Group Delay :   GD3MHz-GD6MHz          −         10           Gf <sub>C±1M</sub> ±1MHz/4MHz,200mVp-p @ Sine Wave         −0.5         0           Gf <sub>C±1,6M</sub> ±1.6MHz/4MHz,200mVp-p @ Sine Wave         −0.5         0           Gf <sub>C20M</sub> 20MHz/4MHz,200mVp-p @ Sine Wave         −0.5         0           Gf <sub>C20M</sub> 20MHz/4MHz,200mV	Gf <sub>Y</sub> 10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0         0         +3.0           GVv1         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave         +3.0         +6.0         +9.0           Gv2         Y <sub>IN</sub> 1,Y <sub>IN</sub> 2→V <sub>OUT</sub> ,GCACTLY=2.5V 100kHz,0.5Vp-p @ Sine Wave         +7.0         +9.0         +11.0           Gf₀         10MHz/100kHz(100mVp-p @ Sine Wave)         −3.0         0         +3.0           Gvc1         C <sub>IN</sub> 2→C <sub>OUT</sub> ,GCACTLY=0.5V 4MHz,143mVp-p @ Sine Wave         +7.0         +9.0         +11.0           Gf₀         7MHz/4MHz(143mVp-p @ Sine Wave         +7.0         +9.0         +11.0           Gf₀         7MHz/4MHz(143mVp-p @ Sine Wave         -3.0         0         +3.0           Gfγ₂M         6MHz/100kHz,200mVp-p @ Sine Wave         -3.0         0         +3.0           Gfγ₂M         7.2MHz/100kHz,200mVp-p @ Sine Wave         -0.5         0         -           Gfγ₂M         20MHz/100kHz,200mVp-p @ Sine Wave         -1.0         0         -           Gf₂M         4MHz,200mVp-p @ Sine Wave         -0.0         -           Gf₂M         4MHz,200mVp-p @ Sine Wave         -0.5         0         -           Gf₂M         ±1.6MHz/4MHz,200mVp-p @ Sine Wave         -0.5         0         -

PARAMETER	SYMBOL	S (Ta=25°C,V <sup>+</sup> 1=4.8V,V <sup>+</sup> 2=3.0V,R <sub>L</sub> =150°	MIN.	TYP.	MAX.	UNIT
PAICHIVILIEN	OTIVIDOL	1 PEOT CONDITION	ivial t.		14.0 4.1	
<yc cross="" talk=""></yc>						
Closs Talk 1	CT1	Y <sub>IN</sub> 1,2→C <sub>OUT</sub> 3.58MHz (Red Field Video Signal)	_	-40	_	dB
Cross Talk 2	CT2	C <sub>IN</sub> 1,2→Y <sub>OUT</sub> 3.58MHz (Red Field Video Signal)	_	-40	-	dB
(S/N)						
	<u> </u>	Bandwidth 100kHz~6MHz,R <sub>L</sub> =75Ω	T			
Y Signal Output	tt SN <sub>Y</sub> Balldwidth Took 12 - 0km 12, N <sub>2</sub> - 7.5 st - 50		-50	_	dB	
		Bandwidth 100kHz~6MHz,R <sub>L</sub> =75Ω		-50		dB
V Signal Output	SN <sub>√</sub>	100% White Video Signal.		50		ub
	SN <sub>CAM</sub>	Bandwidth 100kHz~500kHz,AM, R <sub>L</sub> =75ΩRed Field Video Signal.	-	-58	_	dΒ
C Signal Output	SN <sub>CPM</sub>	Bandwidth 100kHz~500kHz,PM, R <sub>L</sub> =75Ω,Red Field Video Signal.	_	-53	_	dB
	l	The second secon	_1	L	· · · · · · · · · · · · · · · · · · ·	
<maximum output="" swing=""></maximum>	L 1/	Applies Cine Marie B =75 O	1.2	r	I I	Vp-p
Y-OUT V-OUT	V <sub>OYM</sub>	100kHz,Sine Wave,R <sub>L</sub> =75 Ω 100kHz,Sine Wave,R <sub>L</sub> =75 Ω	1.2			Vp-p Vp-p
C-OUT	Vovm	100kHz,Sine Wave,R <sub>L</sub> =75Ω	1.08			Vp-p
C-001	V <sub>OCM</sub>	TOOK 12,5 Me Wave, N75 &	1 1.00	<u> </u>	<u> </u>	· P P
<2nd. Distortion>						
Y,V Output	$H_{Y},H_{V}$	3.58MHz(Red Field Video Signal)		-40	-25	dB
C Output	H <sub>C</sub>	3.58MHz(Red Field Video Signal)		-40	-25	dB
<super impose=""></super>						
Word Level	V <sub>CHA</sub>	VoltageSwing1Vp-p:100IRE	70	80	95	IRE
Border Level	V <sub>SET</sub>	/SYNC:40IRE VoltageSwing1Vp-p:100IRE	0	5	18	IRE
Dolder Fever	VSET	/SYNC:40IRE				
JNOTI Control Cianals						
<incel control="" signal=""> Low Level</incel>	V <sub>SL</sub>	Low Level Voltage	GND	Γ_	0.2	V
LOW LOVOI	, SL I	Low Love, Foreign				l
<pre></pre>			1 4 4	7	1 0 0	
High Level	V <sub>CH</sub>	High Level Voltage	1.4		3.0	V
Low Level	V <sub>CL</sub>	Low Level Voltage	GND	ــــــــــــــــــــــــــــــــــــــ	0.6	V
<gca control="" signal=""></gca>						
	V <sub>GC</sub> 1	GCA Control Voltage	0.5	T -	3.0	V
GCACTLY	V <sub>GL</sub> 1	MUTE Voltage	GND		0.3	V
COACTIC	V <sub>GC</sub> 2	GCA Control Voltage	0.5		3.0	V
GCACTLC	V <sub>GL</sub> 2	Power Down Voltage	GND		0.3	V
1000		<del></del>				
<sdc> WIDE1</sdc>	V <sub>SDC</sub> 1	WIDE→SDC Gain,WIDE=0.5~3.0V	5.5	6.0	6.5	dB
WIDE2	V <sub>SDC</sub> 2	SDC High impedance Voltage	<del>  _</del>	<u> </u>	0.3	V
Output Impedance	R <sub>SDC</sub>	SDCOUT High Impedance	<del>  -</del>	220	T -	kΩ
Maximum Output Voltage	V <sub>SDC</sub> 3	R <sub>L</sub> =110kΩ	4.0	1=	_	V
	1 - 3000	1.5		1	.1	· · · · · · · · · · · · · · · · · · ·

### **TEST CIRCUIT**



EQUIVALENT CIRCUIT							
PIN No.	PIN NAME	FUNCTION	INSIDE EQUIVALENT CIRCUIT				
1 3	YIN 1 YIN 2	Input terminal for Y signal.	V+1 400 400				
2	GCA CTL1/ MUTE	Control terminal for variable amplifier.	15k 32k 7777				
4	CLAMP	Capacity terminal for clamp.					
5	CHARA BLANK	Input terminal for character signal.	₩20k ₩20k				
7	WIDE	Input terminal for DC Voltage.	30k 500				

#### EQUIVALENT CIRCUIT

EQUIVALENT CIRCUIT							
PIN No.	PIN NAME	FUNCTION	INSIDE EQUIVALENT CIRCUIT				
8	GND	GND					
9	Y OUT	Output voltage for Y signal.	2.2k 750 —				
10	Y SAG	SAG trimming terminal for Y signal.	2.2k 750 				
11	V SAG	SAG input terminal for composite video signal.	2.2k 750				
12	V OUT	Output terminal for composite video signal.	2.2k 750 —				
13	SDC OUT	SDC output terminal.	V+1				

## **■** EQUIVALENT CIRCUIT

■ EQUIVALENT CIRCUIT							
PIN No.	PIN NAME	FUNCTION	INSIDE EQUIVALENT CIRCUIT				
14	C OUT	Output terminal for color signal.	2.2k				
15	<b>V</b> ⁺1	Power terminal for 4.8V.					
16	V <sup>+</sup> 2	Power terminal for 3V					
17 19	CIN 2/INSEL CIN 1	Input terminals for color signal.	V+1 30k 400				
18	GCA CTL 2/ PWRSAVE	Control terminal for valuable gain amplifier.	15k 32k				
20	CLAMP REF	De-couple voltage terminal.	200				

# **MEMO**

[CAUTION]
The specifications on this databook are only given for information , without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.