

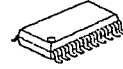
Video Amplifier with 75 ohms Driver

■ 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

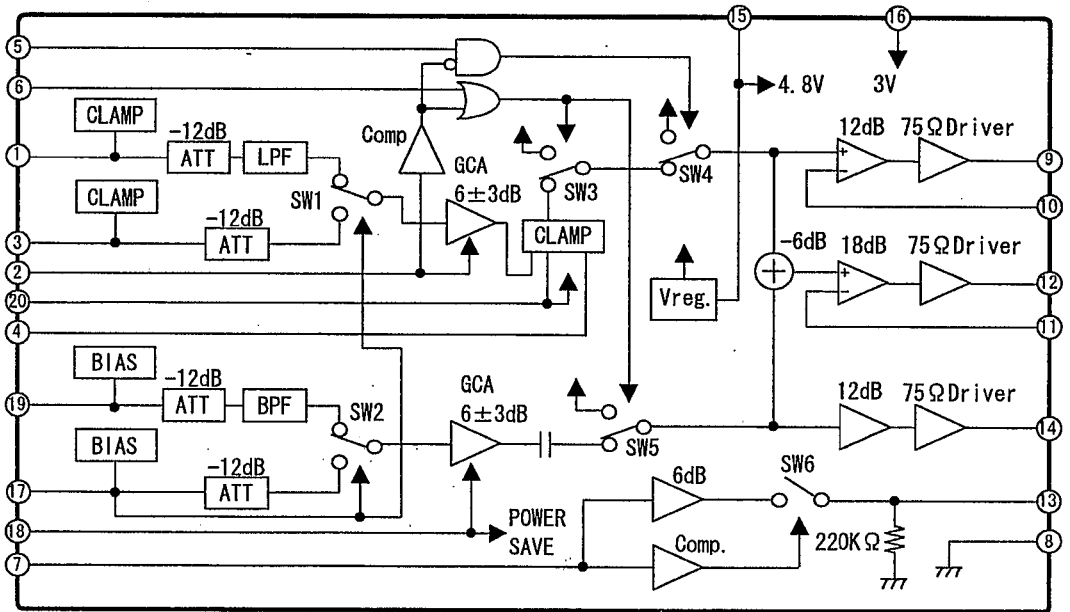


NJM2538V

■ FEATURES

- Operating Voltage $V^*1=4.5\sim 5.3V$, $V^*2=2.7\sim 5.3V$
- 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_{IN1} | 11. V_{SAG} |
| 2. GCA CTL1/MUTE | 12. V_{OUT} |
| 3. Y_{IN2} | 13. SDC $_{OUT}$ |
| 4. CLAMP | 14. C_{OUT} |
| 5. CHARA | 15. V^*1 |
| 6. BLANK | 16. V^*2 |
| 7. WIDE | 17. $C_{IN2}/INSEL$ |
| 8. GND | 18. GCA CTL2/POWER SAVE |
| 9. Y_{OUT} | 19. C_{IN1} |
| 10. Y_{SAG} | 20. CLAMP REF. |

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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage	V [*]	7.0	V
Power Dissipation	P _D	300	mW
Operating Temperature Range	Topr	-20~+85	°C
Storage Temperature Range	Tstg	-40~+125	°C

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, V^{*}1=4.8V, V^{*}2=3.0V, R_L=150Ω)

PARAMETERS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I _{CC1}	V [*] 1=4.8V, No Signal	—	18.0	28.0	mA
Quiescent Current (Power Save Mode)	I _{save1}	V [*] 1=4.8V, Power Save	—	3.0	3.5	mA
Operating Current 2	I _{CC2}	V [*] 2=3.0V, No Signal	—	7.6	12.0	mA
Quiescent Current (Power Save Mode)	I _{save2}	V [*] 2=3.0V, Power Save	—	0.5	1	mA

<Y Amplifier>

Voltage Gain 1	G _{VY1}	Y _{IN1} , Y _{IN2} → Y _{OUT} , G _{CACTLY} =0.5V 100kHz, 0.5Vp-p @ Sine Wave	-3.0	0	+3.0	dB
Voltage Gain 2	G _{VY2}	Y _{IN1} , Y _{IN2} → Y _{OUT} , G _{CACTLY} =2.5V 100kHz, 0.5Vp-p @ sine wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	G _{fY}	10MHz/100kHz(100mVp-p @ Sine Wave)	-3.0	0	+3.0	dB

<V Amplifier>

Voltage Gain	G _{VV1}	Y _{IN1} , Y _{IN2} → V _{OUT} , G _{CACTLY} =0.5V 100kHz, 0.5Vp-p @ Sine Wave	+3.0	+6.0	+9.0	dB
Voltage Gain	G _{VV2}	Y _{IN1} , Y _{IN2} → V _{OUT} , G _{CACTLY} =2.5V 100kHz, 0.5Vp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	G _{fV}	10MHz/100kHz(100mVp-p @ Sine Wave)	-3.0	0	+3.0	dB

<C Amplifier>

Voltage Gain 1	G _{VC1}	C _{IN2} → C _{OUT} , G _{CACTLY} =0.5V 4MHz, 143mVp-p @ Sine Wave	-3.0	0	+3.0	dB
Voltage Gain 2	G _{VC2}	C _{IN2} → C _{OUT} , G _{CACTLY} =2.5V 4MHz, 143mVp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	G _{fC}	7MHz/4MHz(143mVp-p @ Sine Wave)	-3.0	0	+3.0	dB

<Filter Characteristics>

L P F (YIN1)	G _{fY6M}	6MHz/100kHz, 200mVp-p @ Sine Wave	-0.5	0	—	dB
	G _{fY7.2M}	7.2MHz/100kHz, 200mVp-p @ Sine Wave	-1.0	0	—	dB
	G _{fY20M}	20MHz/100kHz, 200mVp-p @ Sine Wave	—	-30	-20	dB
	DL _Y	Group Delay : GD3MHz-GD6MHz	—	10	100	nsec
B P F (CIN1)	G _{fC4M}	4MHz, 200mVp-p @ Sine Wave	—	0	—	dB
	G _{fC±1M}	±1MHz/4MHz, 200mVp-p @ Sine Wave	-0.5	0	—	dB
	G _{fC±1.6M}	±1.6MHz/4MHz, 200mVp-p @ Sine Wave	—	-15	-10	dB
	G _{fC20M}	20MHz/4MHz, 200mVp-p @ Sine Wave	—	-25	-10	dB
	DL _C	Group Delay : GD2MHz-GD6MHz	—	60	90	nsec

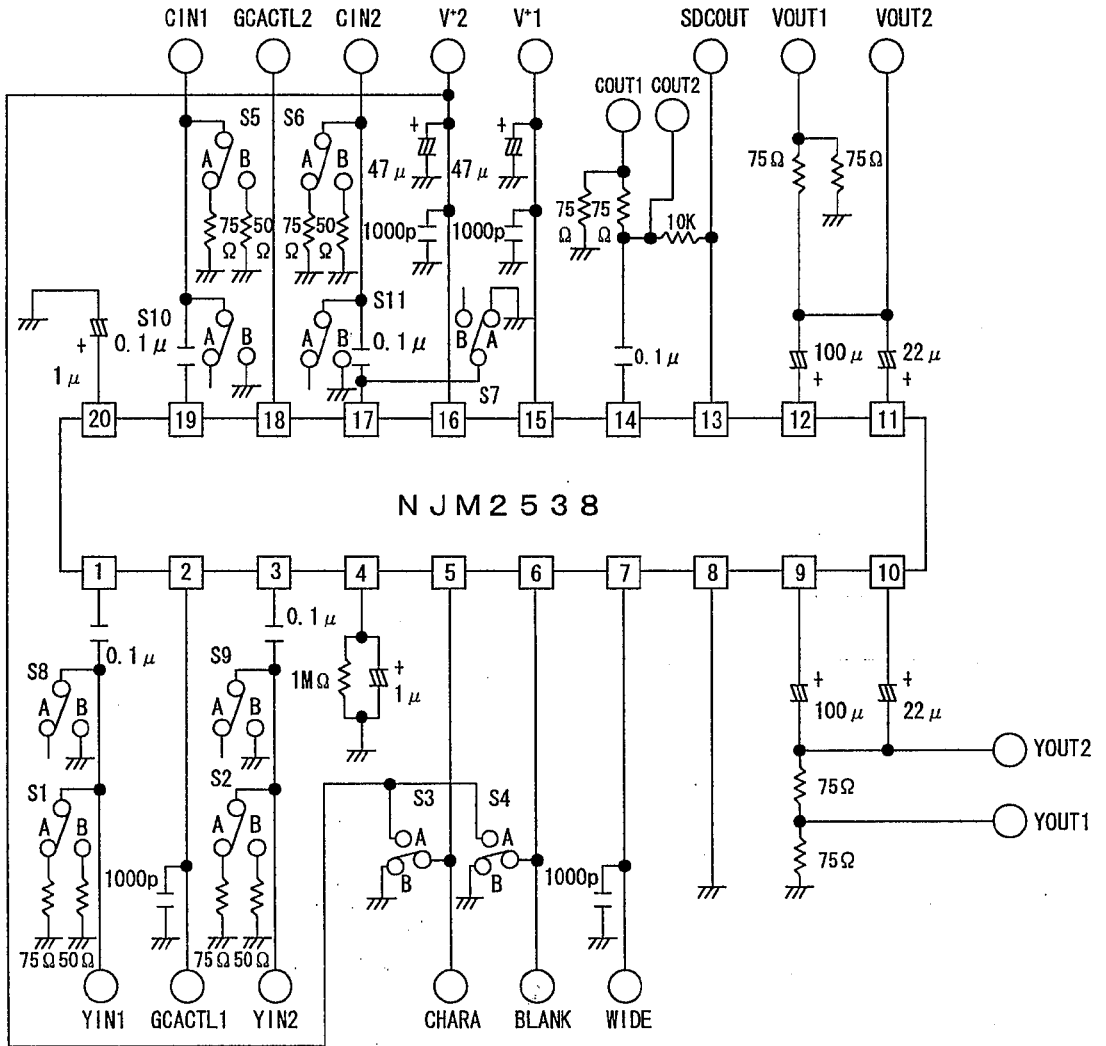
<YC Delay>

YC Delay	T _{YC}	T _{YOUT} - T _{CCOUT} at 4MHz	—	+25	—	nsec
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■ ELECTRICAL CHARACTERISTICS (Ta=25°C, V⁺1=4.8V, V⁺2=3.0V, R_L=150Ω)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<YC Cross Talk>						
Cross Talk 1	CT1	Y _{IN1,2} →C _{OUT} 3.58MHz (Red Field Video Signal)	—	-40	—	dB
Cross Talk 2	CT2	C _{IN1,2} →Y _{OUT} 3.58MHz (Red Field Video Signal)	—	-40	—	dB
(S/N)						
Y Signal Output	SN _Y	Bandwidth 100kHz~6MHz, R _L =75Ω 100% White Video Signal.	—	-50	—	dB
V Signal Output	SN _V	Bandwidth 100kHz~6MHz, R _L =75Ω 100% White Video Signal.	—	-50	—	dB
C Signal Output	SN _{CAM}	Bandwidth 100kHz~500kHz, AM, R _L =75Ω Red Field Video Signal.	—	-58	—	dB
	SN _{CPM}	Bandwidth 100kHz~500kHz, PM, R _L =75Ω, Red Field Video Signal.	—	-53	—	dB
<Maximum Output Swing>						
Y-OUT	V _{OYM}	100kHz, Sine Wave, R _L =75Ω	1.2	—	—	Vp-p
V-OUT	V _{OVM}	100kHz, Sine Wave, R _L =75Ω	1.2	—	—	Vp-p
C-OUT	V _{OCM}	100kHz, Sine Wave, R _L =75Ω	1.08	—	—	Vp-p
<2nd. Distortion>						
Y, V Output	H _Y , H _V	3.58MHz (Red Field Video Signal)	—	-40	-25	dB
C Output	H _C	3.58MHz (Red Field Video Signal)	—	-40	-25	dB
<Super Impose>						
Word Level	V _{CHA}	Voltage Swing 1Vp-p: 100IRE /SYNC: 40IRE	70	80	95	IRE
Border Level	V _{SET}	Voltage Swing 1Vp-p: 100IRE /SYNC: 40IRE	0	5	18	IRE
<INCEL Control Signal>						
Low Level	V _{SL}	Low Level Voltage	GND	—	0.2	V
<Impose Control Signal>						
High Level	V _{CH}	High Level Voltage	1.4	—	3.0	V
Low Level	V _{CL}	Low Level Voltage	GND	—	0.6	V
<GCA Control Signal>						
GCACTLY	V _{GC1}	GCA Control Voltage	0.5	—	3.0	V
	V _{GL1}	MUTE Voltage	GND	—	0.3	V
GCACTLC	V _{GC2}	GCA Control Voltage	0.5	—	3.0	V
	V _{GL2}	Power Down Voltage	GND	—	0.3	V
<SDC>						
WIDE1	V _{SDC1}	WIDE→SDC Gain, WIDE=0.5~3.0V	5.5	6.0	6.5	dB
WIDE2	V _{SDC2}	SDC High impedance Voltage	—	—	0.3	V
Output Impedance	R _{SDC}	SDCOUT High Impedance	—	220	—	kΩ
Maximum Output Voltage	V _{SDC3}	R _L =110kΩ	4.0	—	—	V

TEST CIRCUIT



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■ EQUIVALENT CIRCUIT

PIN No.	PIN NAME	FUNCTION	INSIDE EQUIVALENT CIRCUIT
1 3	YIN 1 YIN 2	Input terminal for Y signal.	
2	GCA CTL1/ MUTE	Control terminal for variable amplifier.	
4	CLAMP	Capacity terminal for clamp.	
5 6	CHARA BLANK	Input terminal for character signal.	
7	WIDE	Input terminal for DC Voltage.	

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■ EQUIVALENT CIRCUIT

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

■ EQUIVALENT CIRCUIT

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

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MEMO

[CAUTION]

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