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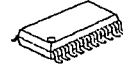
## Video Amplifier with 75 ohms Driver

### 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

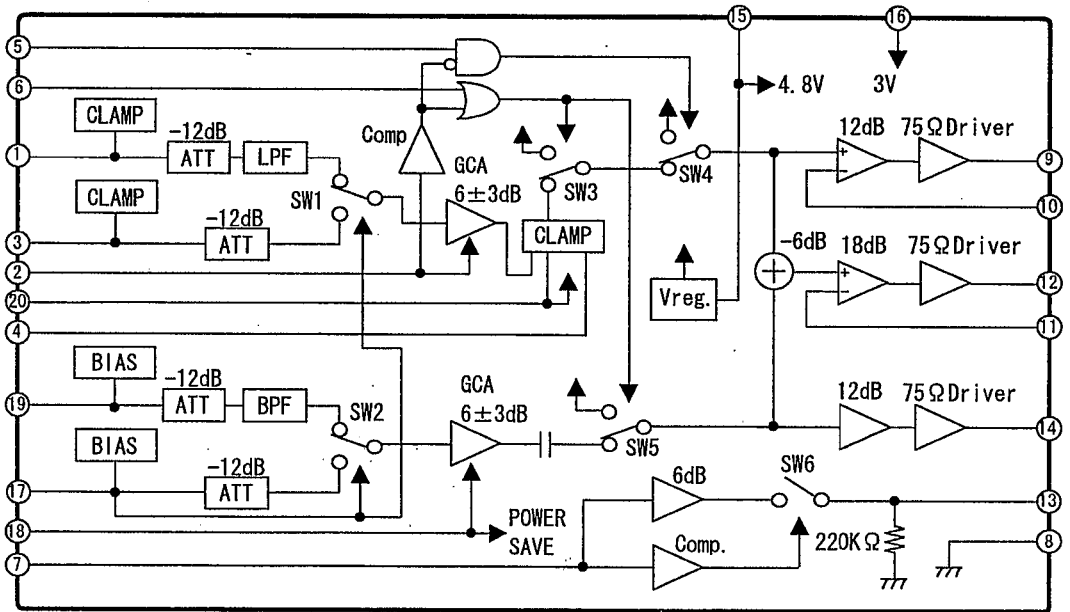


NJM2538V

### 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 <sub>IN1</sub>  | 11. V <sub>SAG</sub>        |
| 2. GCA CTL1/MUTE     | 12. V <sub>OUT</sub>        |
| 3. Y <sub>IN2</sub>  | 13. SDC <sub>OUT</sub>      |
| 4. CLAMP             | 14. C <sub>OUT</sub>        |
| 5. CHARA             | 15. V <sup>*</sup> 1        |
| 6. BLANK             | 16. V <sup>*</sup> 2        |
| 7. WIDE              | 17. C <sub>IN2</sub> /INSEL |
| 8. GND               | 18. GCA CTL2/POWER SAVE     |
| 9. Y <sub>OUT</sub>  | 19. C <sub>IN1</sub>        |
| 10. Y <sub>SAG</sub> | 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 <sub>D</sub>	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<sub>L</sub>=150Ω)

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

### <Y Amplifier>

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

### <V Amplifier>

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

### <C Amplifier>

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

### <Filter Characteristics>

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

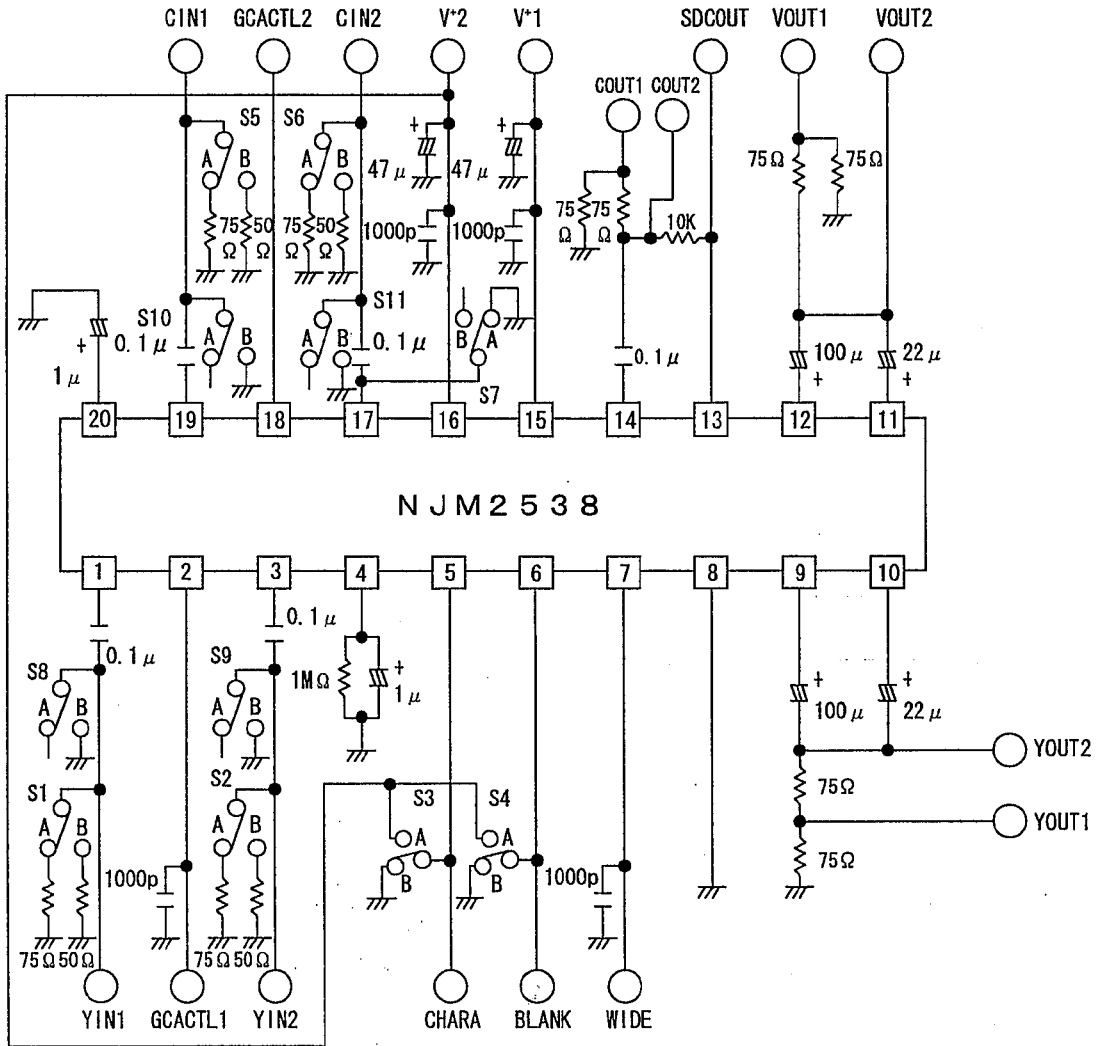
### <YC Delay>

YC Delay	T <sub>YC</sub>	T <sub>YOUT</sub> - T <sub>CCOUT</sub> at 4MHz	—	+25	—	nsec
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■ ELECTRICAL CHARACTERISTICS (Ta=25°C, V<sup>+</sup>1=4.8V, V<sup>+</sup>2=3.0V, R<sub>L</sub>=150Ω)

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