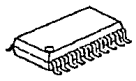
Video Amplifier with 75 ohms Driver

■ 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

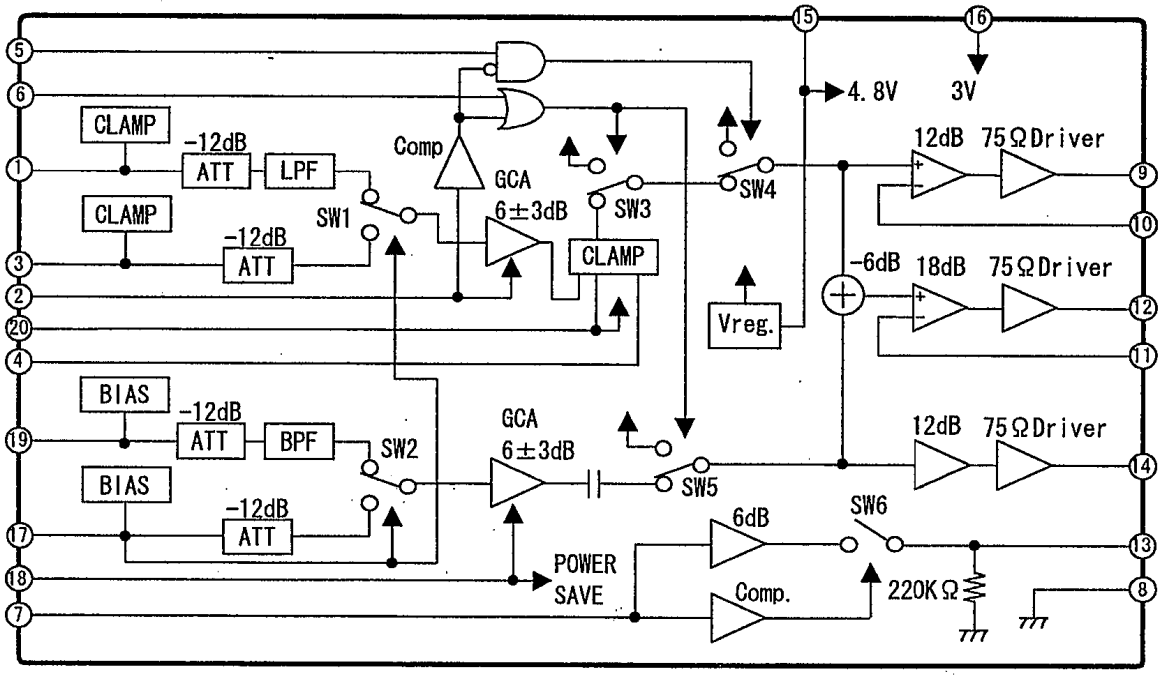


NJM2538V

■ FEATURES

- Operating Voltage V^+1=4.5~5.3V、V^+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.$Y_{IN}1$
2.GCA CTL1/MUTE
3.$Y_{IN}2$
4.CLAMP
5.CHARA
6.BLANK
7.WIDE
8.GND
9.Y_{OUT}
10.Y_{SAG}
11.V_{SAG}
12.V_{OUT}
13.SDC_{OUT}
14.C_{OUT}
15.V^+1
16.V^+2
17.$C_{IN}2$/INSEL
18.GCA CTL2/POWER SAVE
19.$C_{IN}1$
20.CLAMP REF.

5

■ 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	$I_{CC}1$	V^+1=4.8V,No Signal	—	18.0	28.0	mA
Quiescent Current (Power Save Mode)	Isave1	V^+1=4.8V,Power Save	—	3.0	3.5	mA
Operating Current 2	Icc2	V^+2=3.0V,No Signal	—	7.6	12.0	mA
Quiescent Current (Power Save Mode)	Isave2	V^+2=3.0V,Power Save	—	0.5	1	mA
<Y Amplifier>						
Voltage Gain 1	Gv_Y1	$Y_{IN}1, Y_{IN}2 \rightarrow Y_{OUT}$,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave	−3.0	0	+3.0	dB
Voltage Gain 2	Gv_Y2	$Y_{IN}1, Y_{IN}2 \rightarrow Y_{OUT}$,GCACTLY=2.5V 100kHz,0.5Vp-p @ sine wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	Gf_Y	10MHz/100kHz(100mVp-p @ Sine Wave)	−3.0	0	+3.0	dB
<V Amplifier>						
Voltage Gain	Gv_V1	$Y_{IN}1, Y_{IN}2 \rightarrow V_{OUT}$,GCACTLY=0.5V 100kHz,0.5Vp-p @ Sine Wave	+3.0	+6.0	+9.0	dB
Voltage Gain	Gv_v2	$Y_{IN}1, Y_{IN}2 \rightarrow V_{OUT}$,GCACTLY=2.5V 100kHz,0.5Vp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	Gf_v	10MHz/100kHz(100mVp-p @ Sine Wave)	−3.0	0	+3.0	dB
<C Amplifier>						
Voltage Gain 1	Gv_C1	$C_{IN}2 \rightarrow C_{OUT}$,GCACTLY=0.5V 4MHz,143mVp-p @ Sine Wave	−3.0	0	+3.0	dB
Voltage Gain 2	Gv_C2	$C_{IN}2 \rightarrow C_{OUT}$,GCACTLY=2.5V 4MHz,143mVp-p @ Sine Wave	+7.0	+9.0	+11.0	dB
Frequency Response(IN 2)	Gf_C	7MHz/4MHz(143mVp-p @ Sine Wave)	−3.0	0	+3.0	dB
<Filter Characteristics>						
L P F (YIN1)	Gf_{Y6M}	6MHz/100kHz,200mVp-p @ Sine Wave	−0.5	0	—	dB
	$Gf_{Y7.2M}$	7.2MHz/100kHz,200mVp-p @ Sine Wave	−1.0	0	—	dB
	Gf_{Y20M}	20MHz/100kHz,200mVp-p @ Sine Wave	—	−30	−20	dB
	DL_Y	Group Delay : | GD3MHz-GD6MHz|	—	10	100	nsec
B P F (CIN1)	Gf_{C4M}	4MHz,200mVp-p @ Sine Wave	—	0	—	dB
	$Gf_{C\pm1M}$	±1MHz/4MHz,200mVp-p @ Sine Wave	−0.5	0	—	dB
	$Gf_{C\pm1.6M}$	±1.6MHz/4MHz,200mVp-p @ Sine Wave	—	−15	−10	dB
	Gf_{C20M}	20MHz/4MHz,200mVp-p @ Sine Wave	—	−25	−10	dB
	DL_C	Group Delay : | GD2MHz-GD6MHz |	—	60	90	nsec
<YC Delay>						
YC Delay	T_{YC}	$T_{YOUT} - T_{COUT}$ at 4MHz	—	+25	—	nsec

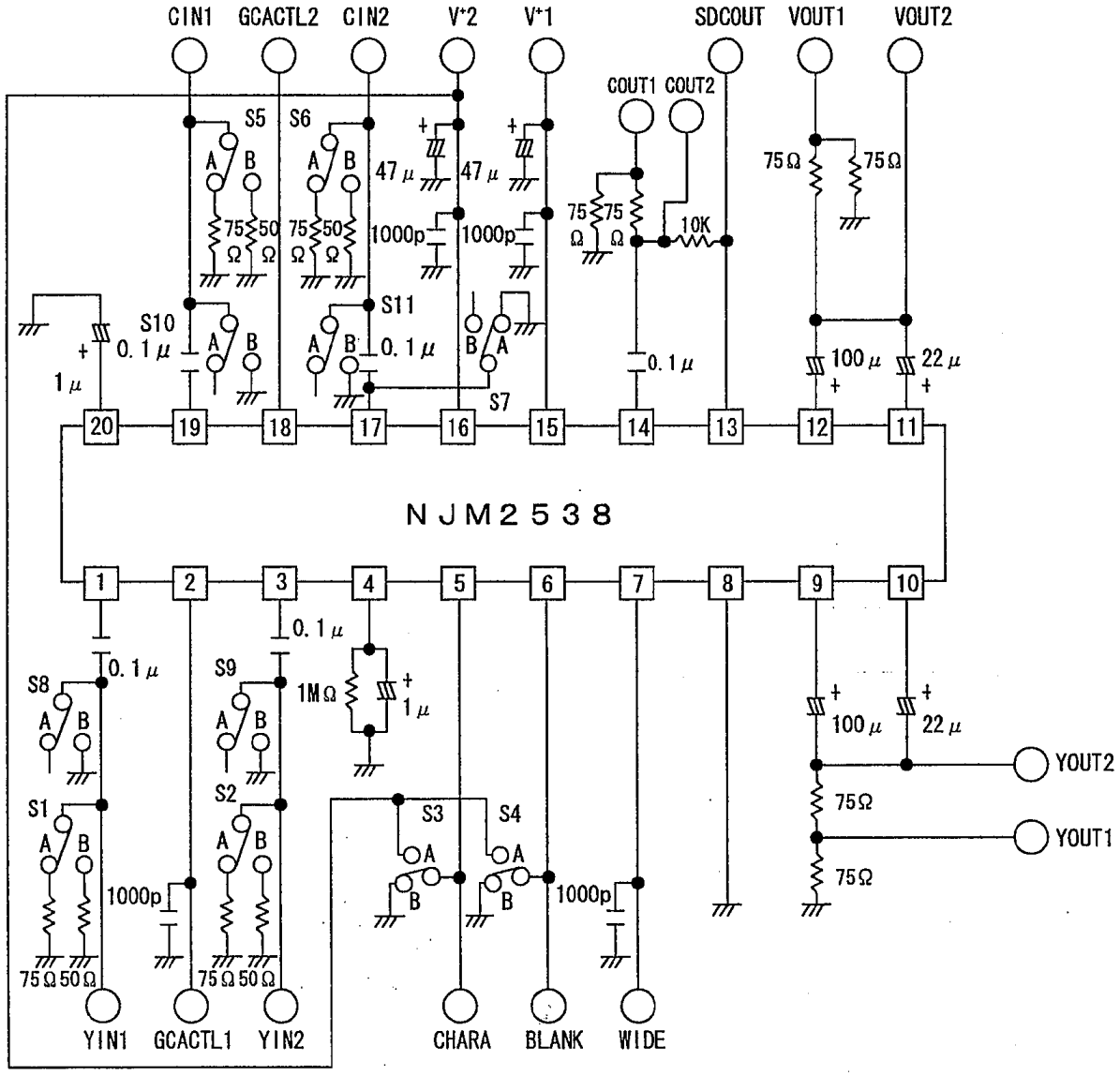
5

■ **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>						
Closs Talk 1	CT1	Y_{IN}1,2→C_{OUT} 3.58MHz (Red Field Video Signal)	—	−40	—	dB
Cross Talk 2	CT2	C_{IN}1,2→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}	VoltageSwing1Vp-p:100IRE /SYNC:40IRE	70	80	95	IRE
Border Level	V_{SET}	VoltageSwing1Vp-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_{GC}1	GCA Control Voltage	0.5	—	3.0	V
	V_{GL}1	MUTE Voltage	GND	—	0.3	V
GCACTLC	V_{GC}2	GCA Control Voltage	0.5	—	3.0	V
	V_{GL}2	Power Down Voltage	GND	—	0.3	V
<SDC>						
WIDE1	V_{SDC}1	WIDE→SDC Gain,WIDE=0.5~3.0V	5.5	6.0	6.5	dB
WIDE2	V_{SDC}2	SDC High impedance Voltage	—	—	0.3	V
Output Impedance	R_{SDC}	SDCOUT High Impedance	—	220	—	kΩ
Maximum Output Voltage	V_{SDC}3	R_L=110kΩ	4.0	—	—	V

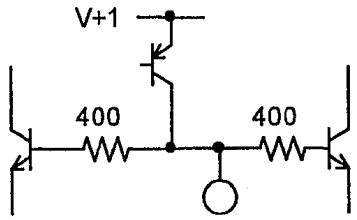
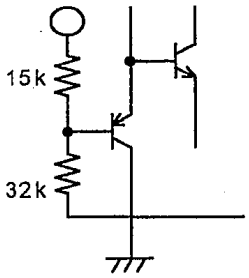
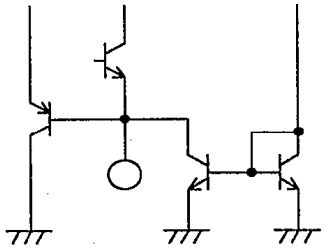
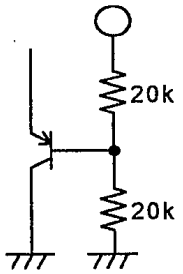
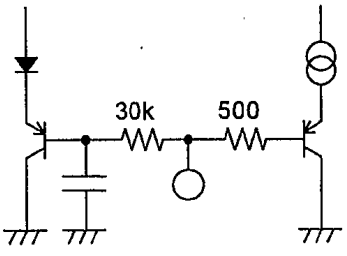
5

■TEST CIRCUIT



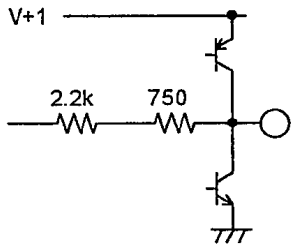
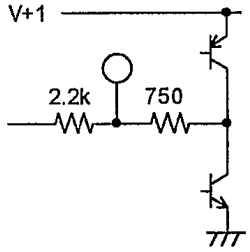
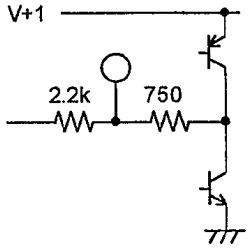
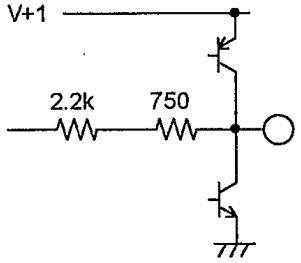
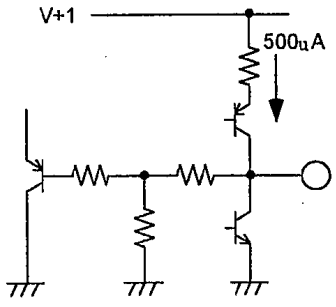
5

■ 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.	

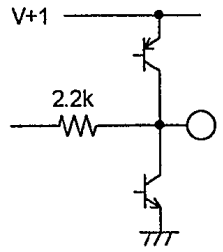
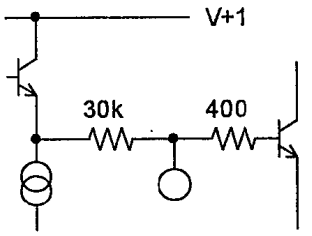
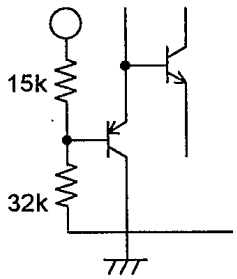
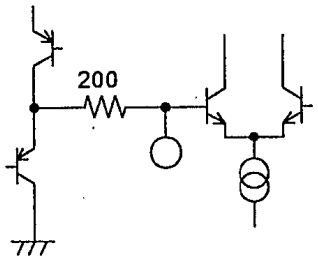
5

■ **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.	

5

■ 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.	

5

MEMO