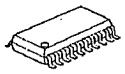
Video Amplifier with 75 ohms Driver

■ GENERAL DESCRIPTION

THE NJM2538B is a video amplifier with 75ohms drivers, which includes LPF and BPF of both Y and C system.

THE NJM2538B 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

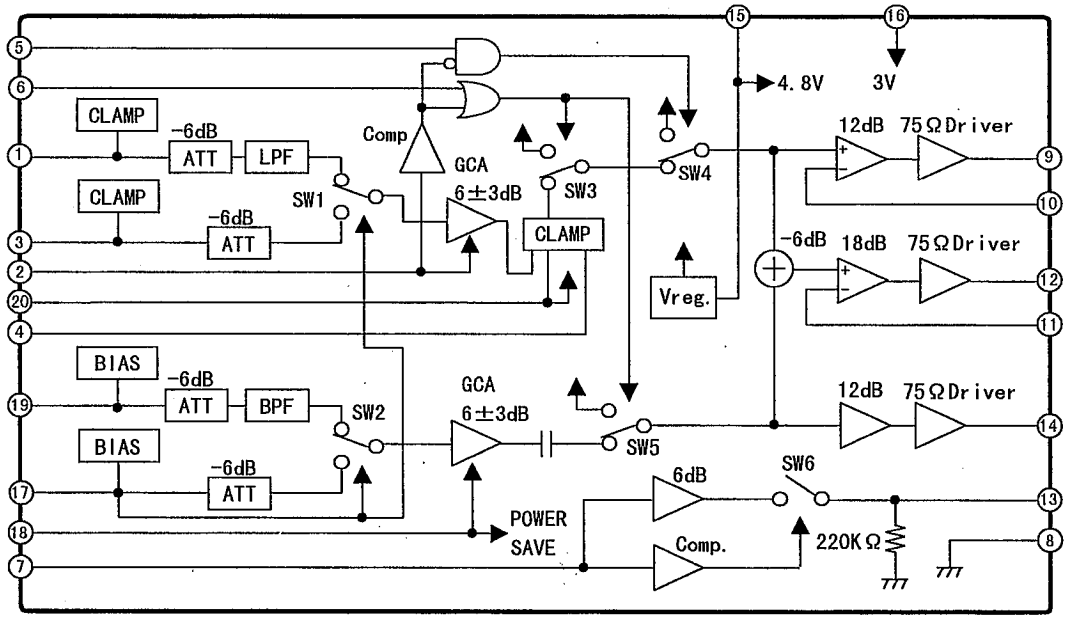


NJM2538BV

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

■ ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	7.0	V
Power Dissipation	P_D	300	mW
Operating Temperature Range	Topr	−20～+85	℃
Storage Temperature Range	Tstg	−40～+125	℃

■ ELECTRICAL CHARACTERISTICS (Ta=25℃, 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	+6.0	+9.0	dB
Voltage Gain 2	Gv_Y2	$Y_{IN}1, Y_{IN}2 \rightarrow Y_{OUT}$, GCACTLY=2.5V 100kHz, 0.5Vp-p @ sine wave	+13.0	+15.0	+17.0	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	+13.0	+15.0	+17.0	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	+6.0	+9.0	dB
Voltage Gain 2	Gv_C2	$C_{IN}2 \rightarrow C_{OUT}$, GCACTLY=2.5V 4MHz, 143mVp-p @ Sine Wave	+13.0	+15.0	+17.0	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, 100mVp-p @ Sine Wave	-1.0	0	-	dB
	$Gf_{Y7.2M}$	7.2MHz/100kHz, 100mVp-p @ Sine Wave	-1.5	0	-	dB
	Gf_{Y20M}	20MHz/100kHz, 100mVp-p @ Sine Wave	-	-30	−20	dB
	DL_Y	Group Delay : | GD3MHz-GD6MHz|	-	60	100	nsec
B P F (CIN1)	$Gf_{C\pm1M}$	±1MHz/4MHz, 100mVp-p @ Sine Wave	-1.0	0	-	dB
	$Gf_{C\pm1.6M}$	±1.6MHz/4MHz, 100mVp-p @ Sine Wave	-3.0	0	-	dB
	Gf_{C100k}	500kHz/4MHz, 100mVp-p @ Sine Wave	-	-15	-10	dB
	Gf_{C20M}	20MHz/4MHz, 100mVp-p @ Sine Wave	-	-25	-10	dB
	DL_C	Group Delay : | GD3MHz-GD6MHz |	-	60	90	nsec
<YC Delay>						
YC Delay	T_{YC}	$T_{YOUT} - T_{COUT}$ at 4MHz	−	+25	−	nsec

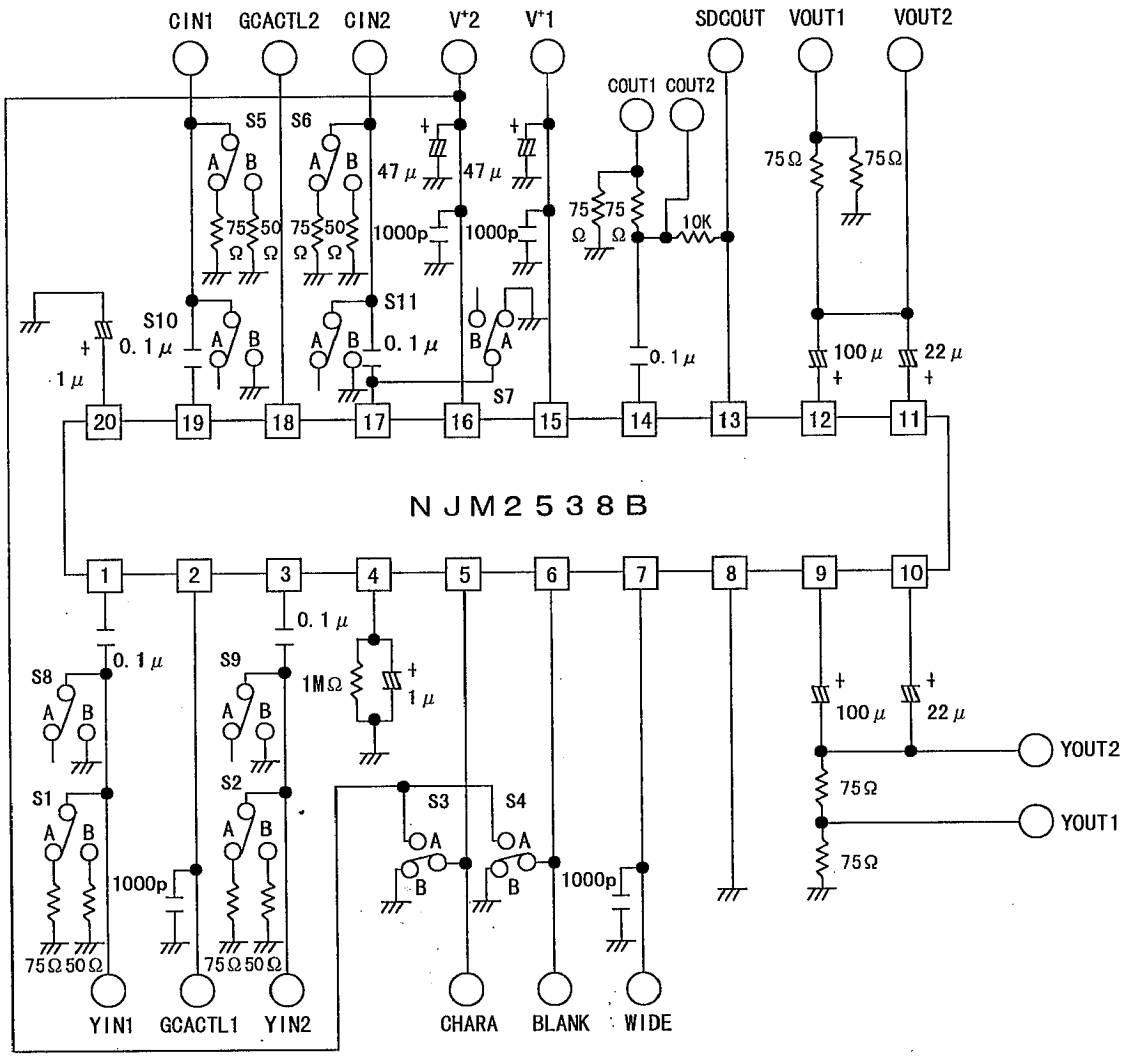
5

■ **ELECTRICAL CHARACTERISTICS** ($Ta=25°C, V^+1=4.8V, V^+2=3.0V, R_L=150\Omega$)

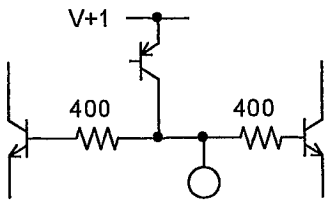
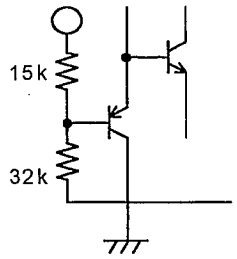
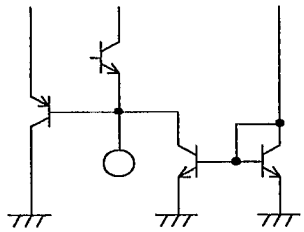
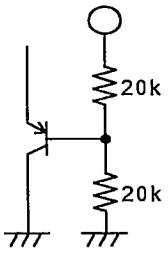
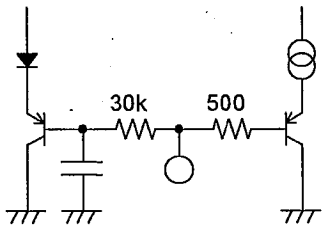
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<YC Cross Talk>						
Closs Talk 1	CT1	$Y_{IN}1,2 \rightarrow C_{OUT}$ 3.58MHz (Red Field Video Signal)	—	−40	—	dB
Cross Talk 2	CT2	$C_{IN}1,2 \rightarrow Y_{OUT}$ 3.58MHz (Red Field Video Signal)	—	−40	—	dB
(S/N)						
Y Signal Output	SN_Y	Bandwidth 100kHz~6MHz, $R_L=75\Omega$ 100% White Video Signal.	—	−50	—	dB
V Signal Output	SN_V	Bandwidth 100kHz~6MHz, $R_L=75\Omega$ 100% White Video Signal.	—	−50	—	dB
C Signal Output	SN_{CAM}	Bandwidth 100kHz~500kHz,AM, $R_L=75\Omega$ Red Field Video Signal.	—	−58	—	dB
	SN_{CPM}	Bandwidth 100kHz~500kHz,PM, $R_L=75\Omega$, Red Field Video Signal.	—	−53	—	dB
<Maximum Output Swing>						
Y-OUT	V_{OYM}	100kHz,Sine Wave, $R_L=75\Omega$	1.2	—	—	Vp-p
V-OUT	V_{OVM}	100kHz,Sine Wave, $R_L=75\Omega$	1.2	—	—	Vp-p
C-OUT	V_{OCM}	100kHz,Sine Wave, $R_L=75\Omega$	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	$V_{SDC}3$	$R_L=110k\Omega$	4.0	—	—	V

5

■TEST CIRCUIT

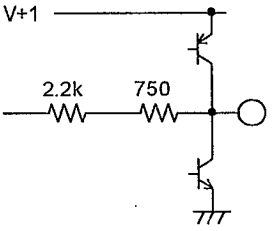
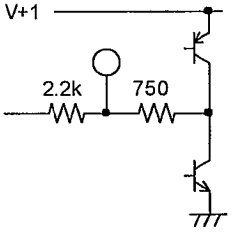
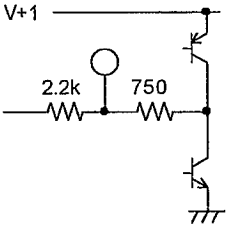
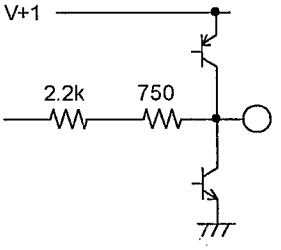
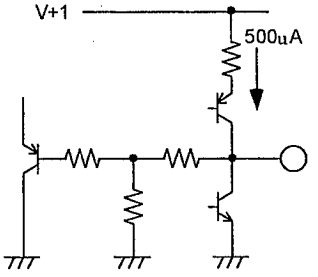


■ **EQUIVALENT CIRCUIT**

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.	

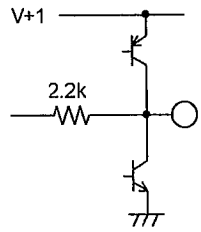
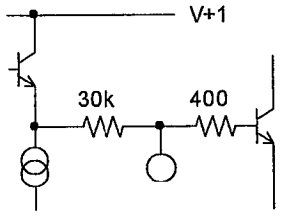
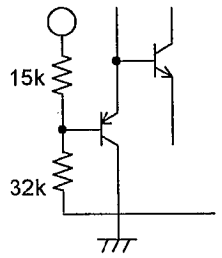
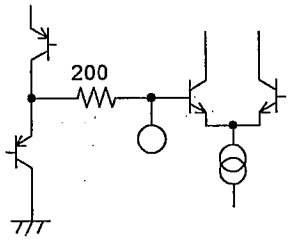
5

■ 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