AN5858K

Color-TV AV-Switch IC

■ Overview

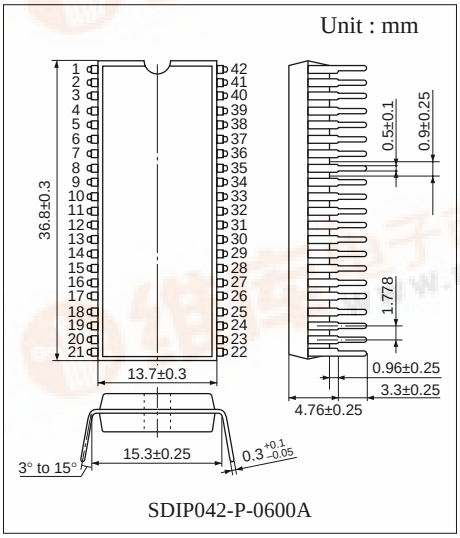
The AN5858K is an AV switch IC. It switches five inputs (V, SY, SC, R, and L), and two outputs (TV and monitor). It has the most S-input-pins in the industry and can support many kind of high grade multi-function TV.

■ Features

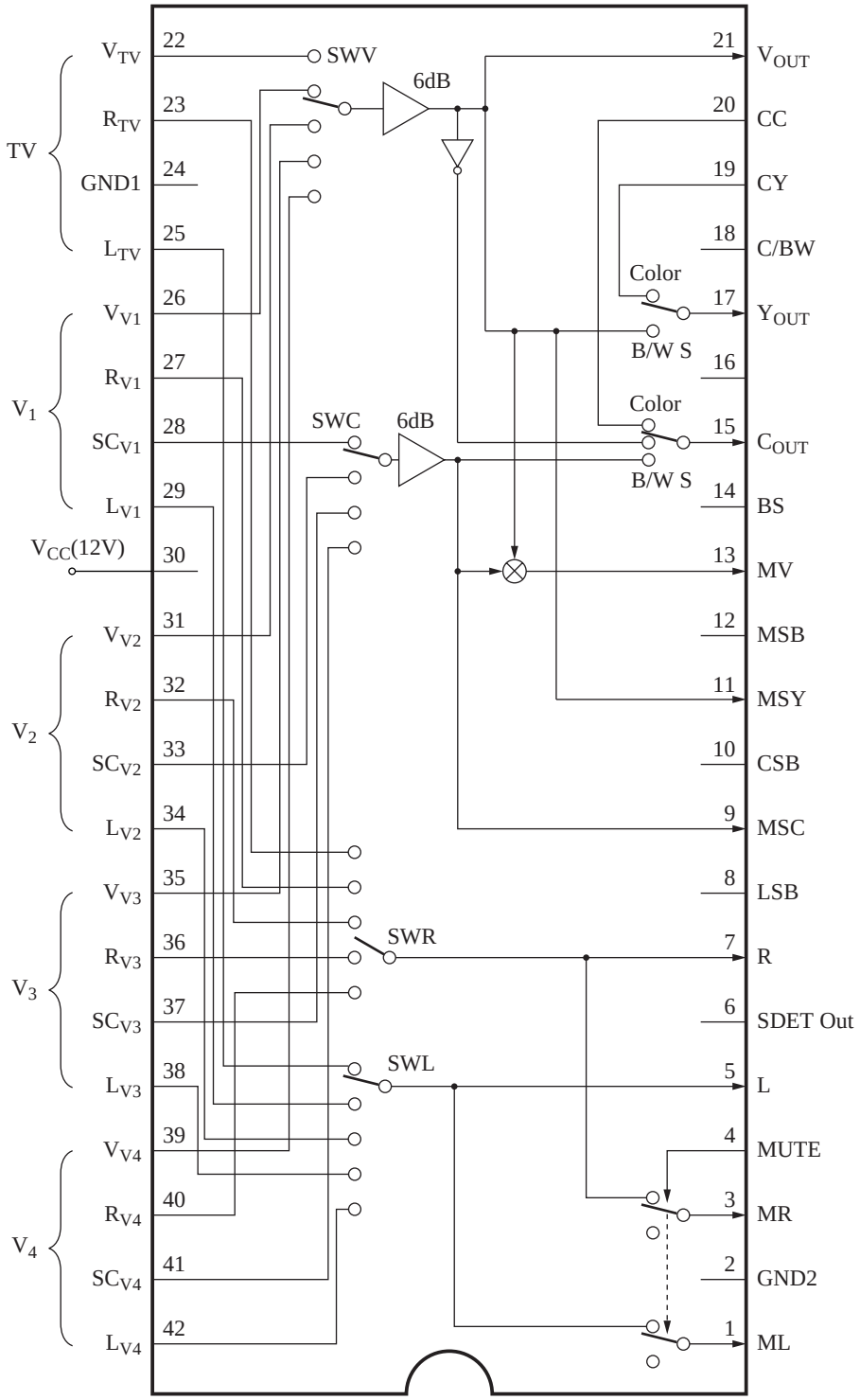
- Supporting TVs with a BS tuner
- 4 channels of S-input
- Audio muting circuit built-in
- Oscillation preventing circuit built-in
- Black and white, or color switchng function built-in

■ Applications

- TV



■ Block Diagram



■ Pin Descriptions

Pin No.	Pin Name	Pin No.	Pin Name
1	L signal output (monitor)	22	TV video signal input
2	GND2	23	TV R signal input
3	R signal output (monitor)	24	GND1
4	Mute signal input	25	TV L signal input
5	L signal output	26	V_1 brightness/video signal input
6	S mode discrimination output	27	V_1 R signal input
7	R signal output	28	V_1 chroma signal input
8	Mode change-over (LSB)	29	V_1 L signal input
9	Chroma signal output (monitor)	30	Power supply
10	Mode change-over (CSB)	31	V_2 brightness/video signal input
11	Brightness signal output (monitor)	32	V_2 R signal input
12	Mode change-over (MSB)	33	V_2 chroma signal input
13	Video signal output (monitor)	34	V_2 L signal input
14	Forced BS/V_1 defeat change-over	35	V_3 brightness/video signal input
15	Chroma signal output	36	V_3 R signal input
16	Defeat pulse generation	37	V_3 chroma signal input
17	Brightness signal output	38	V_3 L signal input
18	Color/black and white change-over	39	V_4 brightness/video signal input
19	Comb filter brightness signal input	40	V_4 R signal input
20	Comb filter chroma signal input	41	V_4 chroma signal input
21	Video signal output	42	V_4 L signal input

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	13.5	V
Supply current	I_{CC}	60	mA
Power dissipation *2	P_D	810	mW
Operating ambient temperature *1	T_{opr}	–20 to +70	°C
Storage temperature *1	T_{stg}	–55 to +150	°C
Mode change-over terminal voltage	$V_{8,10,12}$	– 0.3 to +5.5	V
Video signal input terminal voltage	$V_{22,26,31,35,39}$	– 0.3 to V_{30}+0.3	V
Chroma signal input terminal voltage	$V_{28,33,37,41}$	– 0.3 to V_{30}+0.3	V
R signal input terminal current	$I_{23,27,32,36,40}$	–15 to +15	mA
L signal input terminal current	$I_{25,29,34,38,42}$	–15 to +15	mA
Mute signal input terminal voltage	V_4	– 0.3 to +5.5	V
Forced BS/V_1 defeat change-over terminal voltage	V_{14}	– 0.3 to V_{30}+0.3	V
Color/black and white change-over terminal voltage	V_{18}	– 0.3 to V_{30}+0.3	V
S mode discrimination output change-over terminal voltage	V_6	0 to V_{30}+0.3	V
Comb filter brightness signal input terminal voltage	V_{19}	– 0.3 to V_{30}+0.3	V
Comb filter chroma signal input terminal voltage	V_{20}	– 0.3 to V_{30}+0.3	V

Note) Do not apply current or voltage from the outside to any pin not listed above.

In the circuit current, (+) means the current flowing into IC and(–) means the current flowing out of IC.

*1 : T_a = 25 °C except power dessipation, operating ambient temperature and storage temperature.

*2 : Power dissipation of the package at T_a = 70 °C.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Operating supply voltage range	V_{CC}	10.8 to 13.2	V

■ Electrical Characteristics at T_a = 25 °C ±2 °C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply current	I_{30}	Pin30	25	34	43	mA
Video signal input terminal voltage	V_{IV}	Pin22, 26, 31, 35	2.5	3.0	3.5	V
Chroma signal input terminal voltage	V_{IC}	Pin28, 33, 37, 41	6.7	7.2	7.7	V
Audio signal input terminal voltage (R)	V_{IR}	Pin23, 27, 32, 36	6	6.5	7	V
Audio signal input terminal voltage (L)	V_{IL}	Pin25, 29, 34, 38	6	6.5	7	V
Comb filter luminance signal input terminal voltage	V_{I19}	Pin19	8.1	8.6	9.1	V
Comb filter chroma signal input terminal voltage	V_{I20}	Pin20	5.9	6.4	6.9	V
Video signal output terminal voltage	V_{O21}	Pin21	7.2	7.7	8.2	V
Video signal output terminal voltage (monitor)	V_{O13}	Pin13	6.5	7.0	7.5	V
Luminance signal output terminal voltage	V_{O17}	Pin17	7.2	7.7	8.2	V
Luminance signal output terminal voltage (monitor)	V_{O11}	Pin11	7.2	7.7	8.2	V
Chroma signal output terminal voltage	V_{O15}	Pin15	5.1	5.6	6.1	V
Chroma signal output terminal voltage (monitor)	V_{O9}	Pin9	7.1	7.6	8.1	V
Mode change-over terminal threshold voltage	V_{MOD}	Pin8, 10, 12	0.5	1.0	1.5	V
Mute terminal threshold voltage	V_{MUT}	Pin4	0.5	0.85	1.2	V
Forced BS threshold voltage	V_{BS}	Pin14	2.7	3.3	3.8	V
V_1 defeat threshold voltage	V_{DEF}	Pin14	0.6	0.9	1.2	V
Color/black and white change-over terminal voltage	$V_{C/W}$	Pin18	0.6	1.6	2.6	V
S-mode discrimination threshold voltage	V_S	Pin28, 33, 37, 41	4.5	5.3	6	V
S-mode discrimination output voltage	V_{SO}	Pin6	0	0.2	0.5	V
Video signal output offset voltage	ΔV_{21}	Pin21	0	5	100	mV
Video signal output offset voltage (monitor)	ΔV_{13}	Pin13	0	5	100	mV
Luminance signal output offset voltage	ΔV_{17}	Pin17	0	5	100	mV
Luminance signal output offset voltage (monitor)	ΔV_{11}	Pin11	0	5	100	mV
Chroma signal output offset voltage	ΔV_{15}	Pin15	0	5	100	mV
Chroma signal output offset voltage (monitor)	ΔV_9	Pin9	0	5	100	mV

■ Electrical Caracteristics at T_a = 25 °C ±2 °C (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Audio signal output offset voltage	ΔV_A	Pin5, 7	0	5	100	mV
Audio signal output offset voltage (monitor)	ΔV_{MA}	Pin1, 3	0	5	100	mV
Video signal voltage gain	G_V	Pin21	5	6	7	dB
Video signal voltage gain (monitor)	G_{MV}	Pin13	4.6	5.7	6.8	dB
Luminance signal voltage gain ($\overline{S}$)	G_Y	Pin17	–1	0	1	dB
Luminance signal voltage gain (S)	G_{YS}	Pin11, 17	5	6	7	dB
Chroma signal voltage gain ($\overline{S}$)	G_C	Pin15	–1	0	1	dB
Chroma signal voltage gain (S)	G_{CS}	Pin9, 15	4.4	5.8	7.2	dB
Audio signal voltage gain	G_A	Pin5, 7	–1	0	1	dB
Audio signal voltage gain (monitor)	G_{MA}	Pin1, 3	–1	0	1	dB
Total harmonics distortion rate (video)	THD_V	Pin11, 13, 17, 21	—	0.07	1.0	%
Crosstalk (audio)	CT_A	Pin1, 3, 5, 7	—	–100	–80	dB
Crosstalk (luminance)	CT_Y	Pin11, 13, 17, 21	—	–64	–50	dB
Crosstalk (chroma)	CT_C	Pin9, 15	—	–60	–46	dB
Defeat pulse charge current	I_{O16}	Pin16	– 0.13	– 0.1	– 0.07	mA
Defeat pulse discharge current	I_{I16}	Pin16	0.6	0.9	1.2	mA
Defeat pulse threshold voltage	V_{TH16}	Lowest voltage at which defeat pulse does not emerge	2.1	2.6	3.1	V
Video signal frequency characteristics	f_{CV}	Pin21, –3 dB	10	13	—	MHz
Video signal frequency characteristics (monitor)	f_{CMV}	Pin13, –3 dB	8	11	—	MHz
Luminance signal frequency characteristics	f_{CY}	Pin17, –3 dB	10	13	—	MHz
Luminance signal frequency characteristics (monitor)	f_{CMY}	Pin11, –3 dB	10	13	—	MH
Audio signal frequency characteristics	f_{CA}	Pin1, 3, 5, 7, –3 dB	1	—	—	MHz
Audio signal input terminal voltage (R_4, L_4)	V_{IA4}	Pin40, 42	6.5	7.0	7.5	V
Video signal input terminal voltage (V_4)	V_{IV4}	Pin39	3.2	3.7	4.2	V

■ Electrical Caracteristics at T_a = 25 °C ±2 °C (continued)

• Design reference data

Note) The characteristic values below are theoretical values for designing and not guaranteed.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Video output noise voltage	V_{NV}	Pin21 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Video output noise voltage (monitor)	V_{NMV}	Pin13 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Luminance output noise voltage	V_{NY}	Pin17 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Luminance output noise voltage (monitor)	V_{NMY}	Pin11 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Chroma output noise voltage	V_{NC}	Pin15 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Chroma output noise voltage (monitor)	V_{NMC}	Pin9 bandwidth 10 MHz	0	0.5	1.0	mV_{rms}
Audio output noise voltage	V_{NA}	Pin5, 7 bandwidth 15 kHz	0	5	50	μV_{rms}
Audio output noise voltage (monitor)	V_{NMA}	Pin1, 3 bandwidth 15 kHz	0	5	50	μV_{rms}
Input impedance 1	R_{IA}	Pin23, 25, 27, 29, 32, 34, 36, 38, 40, 42	55	75	95	kΩ
Input impedance 2	R_{IY}	Pin19, 22, 26, 31, 35, 39	16	21	26	kΩ
Input impedance 3	R_{IC}	Pin20, 28, 33, 37, 41	16	21	26	kΩ
Output impedance 1	R_{OA}	Pin1, 3, 5, 7	30	60	90	Ω
Output impedance 2	R_{OV}	Pin21	22	45	68	Ω
Output impedance 3	R_{OY}	Pin11, 13, 15, 17	30	60	90	Ω
Output impedance 4	R_{OC}	Pin9	80	160	240	Ω
Total harmonics distortion rate (Audio)	THD_A	Pin1, 3, 5, 7	—	0.005	0.01	%
Video signal input dynamic range	D_{IY}	f = 10 kHz, distortion rate 1 % Pin22, 26, 31, 35, 39	2.2	2.6	—	V
Chroma signal input dynamic range	D_{IC}	f = 10 kHz, distortion rate 1 % Pin28, 33, 37, 41	1.1	1.3	—	V
Audio signal input dynamic range (R)	D_{IR}	f = 1 kHz, distortion rate 1 % Pin23, 27, 32, 36	7.2	8.0	—	V
Audio signal input dynamic range (L)	D_{IL}	f = 1 kHz, distortion rate 1 % Pin25, 29, 34, 38	7.2	8.0	—	V
Comb filter Y input dynamic range	D_{I19}	f = 10 kHz, distortion rate 1 % Pin19	6.0	—	—	V
Comb filter C input dynamic range	D_{I20}	f = 10 kHz, distortion rate 1 % Pin20	6.0	—	—	V

■ Basic Circuit