

# AN5858K

## Color-TV AV-Switch IC

### ■ Overview

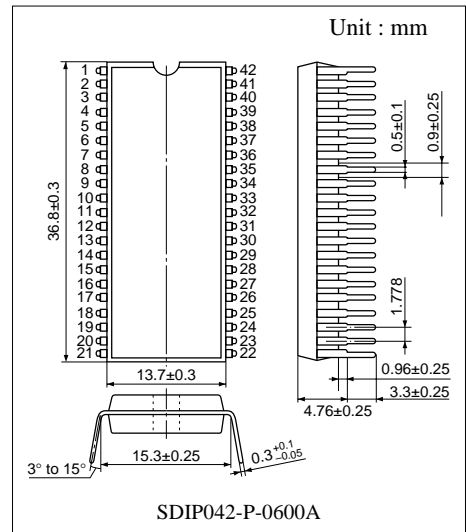
The AN5858K is an AV switch IC. It switches five inputs (V, SY, SC, R, and L), and two outputs (TV and monitor). It has the most S-input-pins in the industry and can support many kind of high grade multi-function TV.

### ■ Features

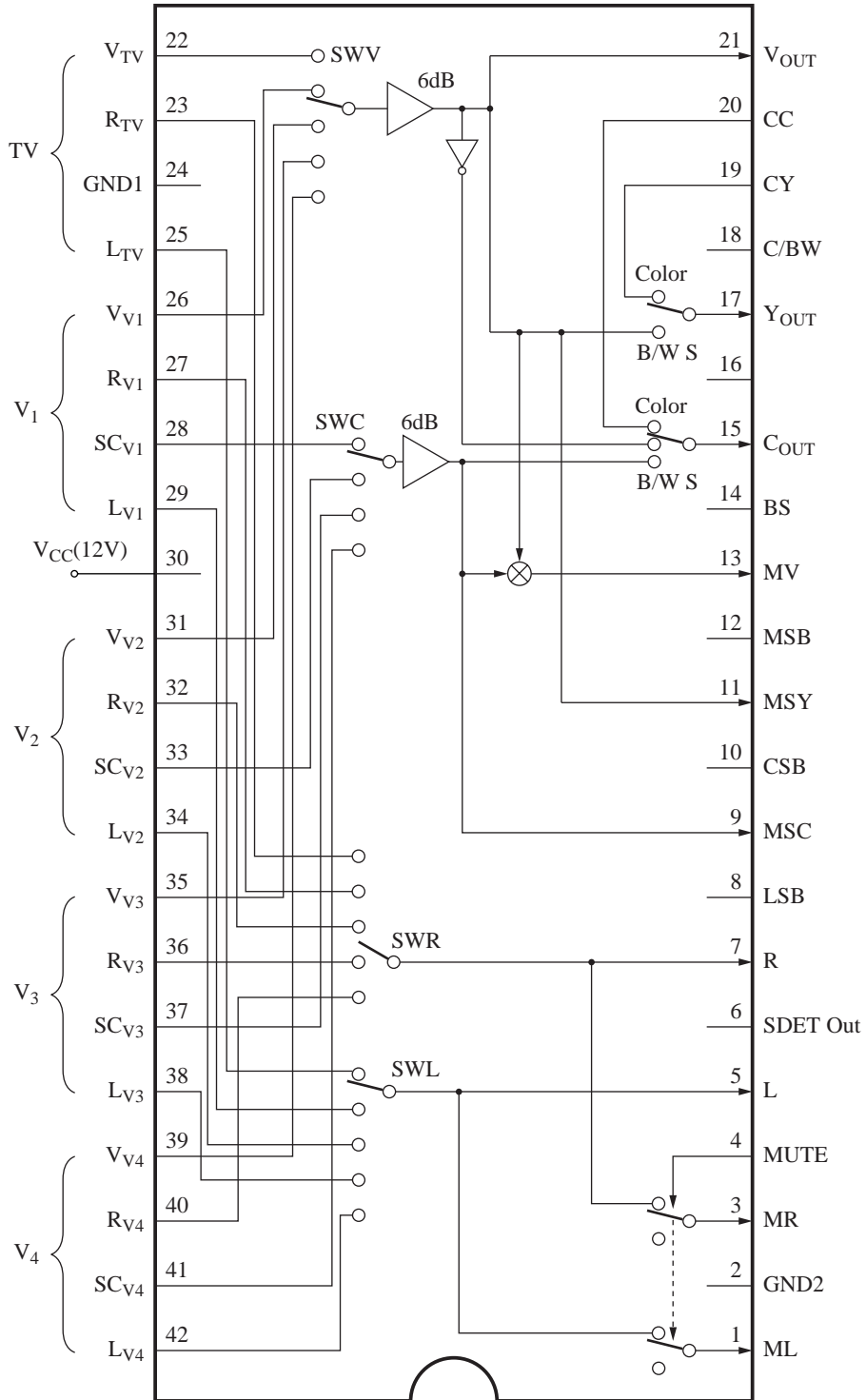
- Supporting TVs with a BS tuner
- 4 channels of S-input
- Audio muting circuit built-in
- Oscillation preventing circuit built-in
- Black and white, or color switching function built-in

### ■ 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 <sub>1</sub> brightness/video signal input
6	S mode discrimination output	27	V <sub>1</sub> R signal input
7	R signal output	28	V <sub>1</sub> chroma signal input
8	Mode change-over (LSB)	29	V <sub>1</sub> L signal input
9	Chroma signal output (monitor)	30	Power supply
10	Mode change-over (CSB)	31	V <sub>2</sub> brightness/video signal input
11	Brightness signal output (monitor)	32	V <sub>2</sub> R signal input
12	Mode change-over (MSB)	33	V <sub>2</sub> chroma signal input
13	Video signal output (monitor)	34	V <sub>2</sub> L signal input
14	Forced BS/V <sub>1</sub> defeat change-over	35	V <sub>3</sub> brightness/video signal input
15	Chroma signal output	36	V <sub>3</sub> R signal input
16	Defeat pulse generation	37	V <sub>3</sub> chroma signal input
17	Brightness signal output	38	V <sub>3</sub> L signal input
18	Color/black and white change-over	39	V <sub>4</sub> brightness/video signal input
19	Comb filter brightness signal input	40	V <sub>4</sub> R signal input
20	Comb filter chroma signal input	41	V <sub>4</sub> chroma signal input
21	Video signal output	42	V <sub>4</sub> 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 :  $T_a = 25\text{ °C}$  except power dissipation, operating ambient temperature and storage temperature.

\*2 : Power dissipation of the package at  $T_a = 70\text{ °C}$ .

### ■ Recommended Operating Range

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

**■ Electrical Characteristics at  $T_a = 25\text{ }^\circ\text{C} \pm 2\text{ }^\circ\text{C}$** 

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	$\Delta V_{21}$	Pin21	0	5	100	mV
Video signal output offset voltage (monitor)	$\Delta V_{13}$	Pin13	0	5	100	mV
Luminance signal output offset voltage	$\Delta V_{17}$	Pin17	0	5	100	mV
Luminance signal output offset voltage (monitor)	$\Delta V_{11}$	Pin11	0	5	100	mV
Chroma signal output offset voltage	$\Delta V_{15}$	Pin15	0	5	100	mV
Chroma signal output offset voltage (monitor)	$\Delta V_9$	Pin9	0	5	100	mV

**■ Electrical Characteristics at  $T_a = 25\text{ }^\circ\text{C} \pm 2\text{ }^\circ\text{C}$  (continued)**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Audio signal output offset voltage	$\Delta V_A$	Pin5, 7	0	5	100	mV
Audio signal output offset voltage (monitor)	$\Delta V_{MA}$	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 ( $\bar{S}$ )	$G_Y$	Pin17	-1	0	1	dB
Luminance signal voltage gain (S)	$G_{YS}$	Pin11, 17	5	6	7	dB
Chroma signal voltage gain ( $\bar{S}$ )	$G_C$	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 <sub>V</sub>	Pin11, 13, 17, 21	—	0.07	1.0	%
Crosstalk (audio)	CT <sub>A</sub>	Pin1, 3, 5, 7	—	-100	-80	dB
Crosstalk (luminance)	CT <sub>Y</sub>	Pin11, 13, 17, 21	—	-64	-50	dB
Crosstalk (chroma)	CT <sub>C</sub>	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	—	MHz
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 Characteristics at $T_a = 25\text{ }^\circ\text{C} \pm 2\text{ }^\circ\text{C}$ (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	$\text{mV}_{\text{rms}}$
Video output noise voltage (monitor)	$V_{NMV}$	Pin13 bandwidth 10 MHz	0	0.5	1.0	$\text{mV}_{\text{rms}}$
Luminance output noise voltage	$V_{NY}$	Pin17 bandwidth 10 MHz	0	0.5	1.0	$\text{mV}_{\text{rms}}$
Luminance output noise voltage (monitor)	$V_{NMY}$	Pin11 bandwidth 10 MHz	0	0.5	1.0	$\text{mV}_{\text{rms}}$
Chroma output noise voltage	$V_{NC}$	Pin15 bandwidth 10 MHz	0	0.5	1.0	$\text{mV}_{\text{rms}}$
Chroma output noise voltage (monitor)	$V_{NMC}$	Pin9 bandwidth 10 MHz	0	0.5	1.0	$\text{mV}_{\text{rms}}$
Audio output noise voltage	$V_{NA}$	Pin5, 7 bandwidth 15 kHz	0	5	50	$\mu\text{V}_{\text{rms}}$
Audio output noise voltage (monitor)	$V_{NMA}$	Pin1, 3 bandwidth 15 kHz	0	5	50	$\mu\text{V}_{\text{rms}}$
Input impedance 1	$R_{IA}$	Pin23, 25, 27, 29, 32, 34, 36, 38, 40, 42	55	75	95	$\text{k}\Omega$
Input impedance 2	$R_{IY}$	Pin19, 22, 26, 31, 35, 39	16	21	26	$\text{k}\Omega$
Input impedance 3	$R_{IC}$	Pin20, 28, 33, 37, 41	16	21	26	$\text{k}\Omega$
Output impedance 1	$R_{OA}$	Pin1, 3, 5, 7	30	60	90	$\Omega$
Output impedance 2	$R_{OV}$	Pin21	22	45	68	$\Omega$
Output impedance 3	$R_{OY}$	Pin11, 13, 15, 17	30	60	90	$\Omega$
Output impedance 4	$R_{OC}$	Pin9	80	160	240	$\Omega$
Total harmonics distortion rate (Audio)	$\text{THD}_A$	Pin1, 3, 5, 7	—	0.005	0.01	%
Video signal input dynamic range	$D_{IY}$	$f = 10\text{ kHz}$ , distortion rate 1 % Pin22, 26, 31, 35, 39	2.2	2.6	—	V
Chroma signal input dynamic range	$D_{IC}$	$f = 10\text{ kHz}$ , distortion rate 1 % Pin28, 33, 37, 41	1.1	1.3	—	V
Audio signal input dynamic range (R)	$D_{IR}$	$f = 1\text{ kHz}$ , distortion rate 1 % Pin23, 27, 32, 36	7.2	8.0	—	V
Audio signal input dynamic range (L)	$D_{IL}$	$f = 1\text{ kHz}$ , distortion rate 1 % Pin25, 29, 34, 38	7.2	8.0	—	V
Comb filter Y input dynamic range	$D_{I19}$	$f = 10\text{ kHz}$ , distortion rate 1 % Pin19	6.0	—	—	V
Comb filter C input dynamic range	$D_{I20}$	$f = 10\text{ kHz}$ , distortion rate 1 % Pin20	6.0	—	—	V

■ Basic Circuit

