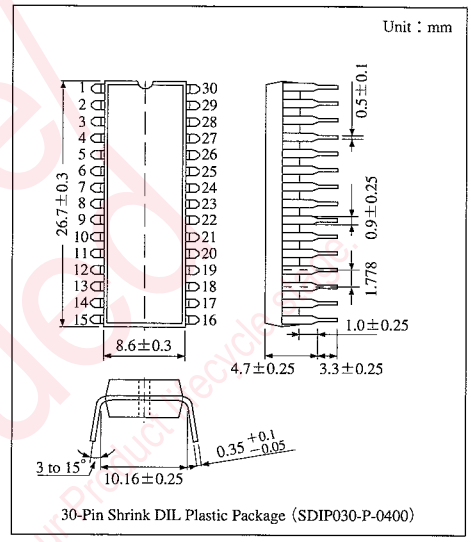
AN2661NK

Video Signal Processing IC for Multi-laser Player

■ Overview

The AN2661NK is a video signal processing IC for multi-laser player. Its functions include FM demodulation, dropout-detection and compensation, noise canceling, and fade effect.



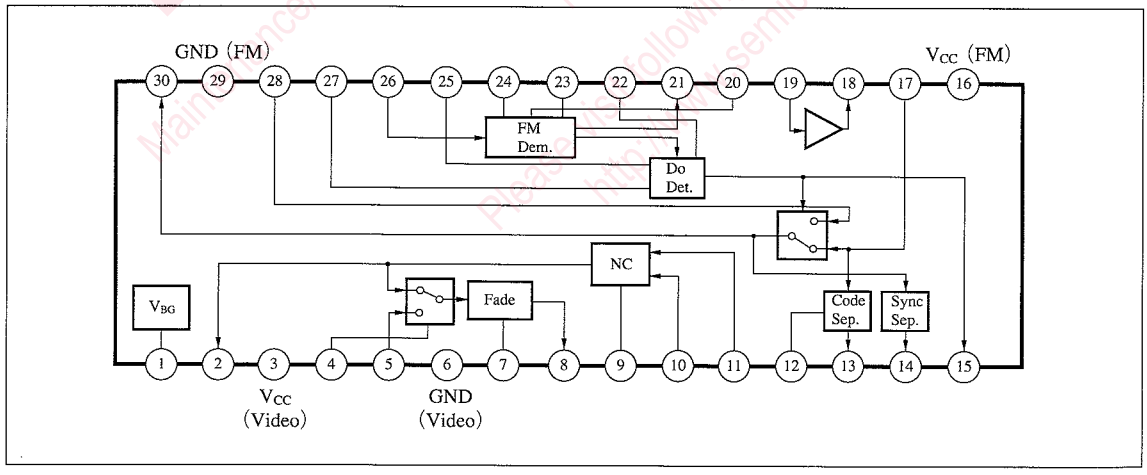
30-Pin Shrink DIL Plastic Package (SDIP030-P-0400)

■ Features

- 5V single power supply operation
- Wide bandwidth FM-demodulation with a built-in delay circuit
- Detection of dropout, and its compensation after demodulation by identification RF signal amplitude, lower frequency and higher frequency
- Detection of code signal and synchronous signal
- Built-in noise-canceling function
- Black fading-effect are easily obtained without any gate pulses
- Able to switch external video signal
- Half-picture-function that makes surrounding frame for character.

ICs for Laser Disk

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	6	V
Supply current	I_{CC}	90	mA
Power dissipation	P_D	540	mW
Operating ambient temperature	T_{opr}	−20 to +70	℃
Storage temperature	T_{stg}	−55 to +150	℃

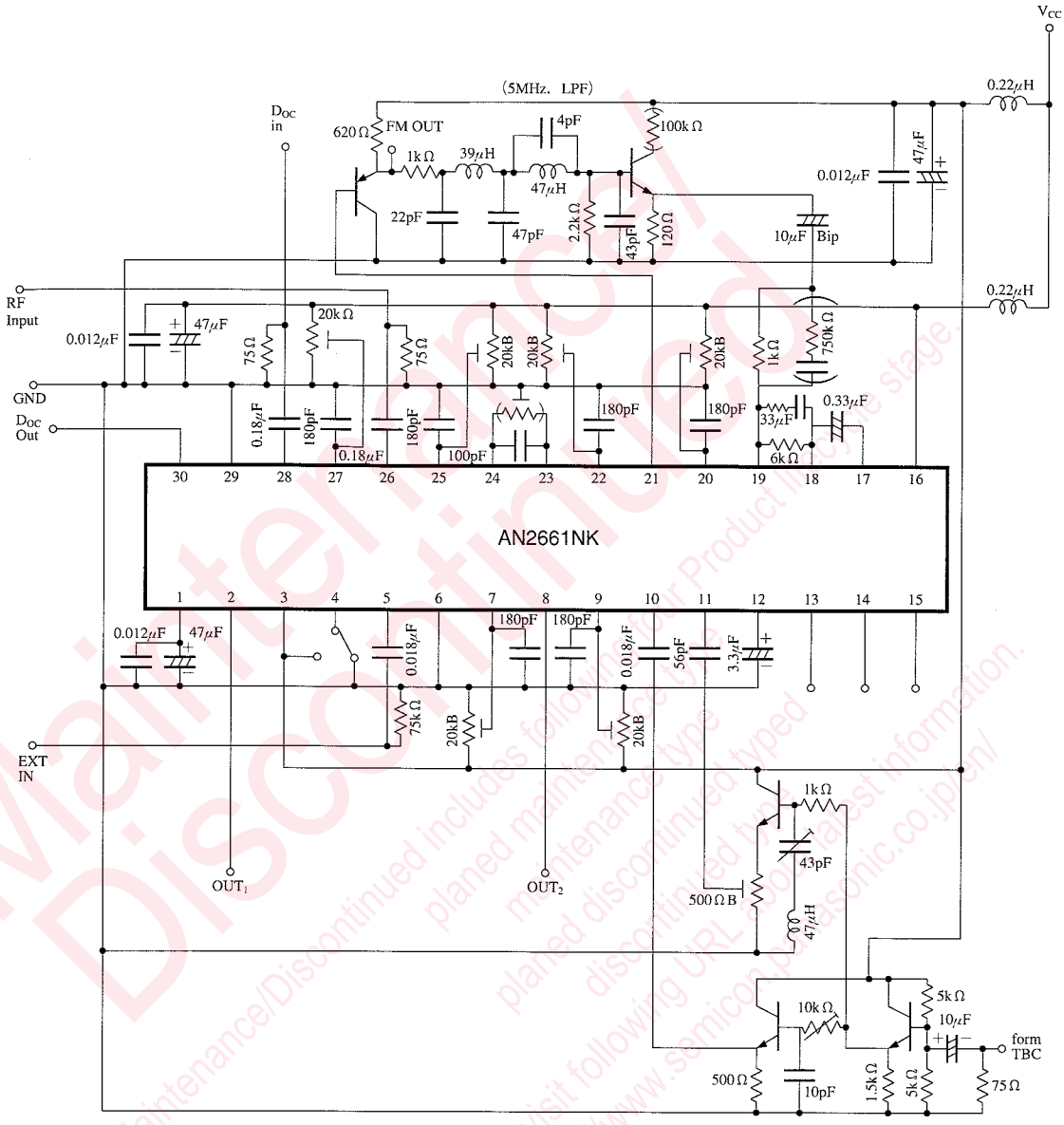
■ Recommended Operating Range (Ta=25℃)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC}	4.5V to 5.5V

■ Electrical Characteristics (V_{CC}=5V, Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
Total current	I_{16}	Pin③+Pin⑯	40	60	80	mA
FM demodulation output voltage	V_{f10}	Voltage after LPF when the input is 10MHz, 50mVrms	1.2	1.37	1.55	V
FM demodulation sensitivity	α	An average per 1MHz of the output difference between 10MHz and 6MHz input	−130	−113	−96	mV/MHz
Sensitivity adjustment	ΔV_{f6}	Difference of outputs at the control terminals 1.5V and 4V	170	220	270	mV
NORMAL detection	V_H	NORMAL detection when control terminal is opened.	4.6	4.78	5.1	V
Amplitude detection	V_{AL}	Abnormal detection of amplitude when detection control is 2V	−0.1	0.07	0.4	V
Low frequency detection	V_{LL}	Abnormal detection of low frequency when detection control is 2V	−0.1	0.07	0.4	V
High frequency detection	V_{HL}	Abnormal detection of high frequency when detection control is 2V	−0.1	0.07	0.4	V
Detecting off 1	V_{HH}	Release of detection at the abnormal input of high frequency	4.6	4.78	5.1	V
Detecting off 2	V_{LH}	Release of detection at the abnormal input of low frequency	4.6	4.78	5.1	V
De-emphasis gain	G_{DE}	OP Amp gain of external 1kΩ and 10kΩ at the input 1MHz, 35mVrms	17	19.5	22	dB
NORMAL gain	G_{D1}	Gain at the time of : input $1V_{PP}$ video signal and normal DO detection	−1.5	0.2	1.5	dB
Dropout gain	G_{D2}	Gain at the time of : normal DO detection and input $0.5V_{PP}$ video signal	5	6.6	8	dB
Sync. separation H	V_{SYH}	Sync separation at : DO detection-=abnormal input $0.5V_{PP}$ video signal	4.05	4.38	4.75	V
Sync. separation L	V_{SYL}	Sync separation at : DO detection-=abnormal input $0.5V_{PP}$ video signal	0.1	0.54	1	V
Code separation H	V_{CDH}	Input $1V_{PP}$ video signal code separation	4.75	4.94	5.1	V
Code separation L	V_{CDL}	Input $1V_{PP}$ video signal code separation	−0.1	0.1	0.4	V
Noise cancellation gain	G_{NC1}	Gain at the time of noise cancellation off (control voltage V_{CC})	4	5.7	7	dB
Noise cancellation amount	ΔG_{NC}	Gain difference between above and max. noise cancel (control voltage GND)	0.2	1.5	2.8	dB
Main gain	G_{V1}	Input video signal $0.5V_{PP}$	5.5	7.25	9	dB
Fade main gain	G_{V2}	Input video signal $0.5V_{PP}$	5.5	7.35	9	dB
Fade sub-gain	G_{V3}	Input video signal $1V_{PP}$	−0.5	0.9	2.5	dB
Fade sync	v_{V4}	Input video signal $1V_{PP}$, control GND	260	298	340	mV_{PP}
Fade offset	v_{V5}	Input video signal $1V_{PP}$, control GND	15	70	115	mV_{PP}
Half picture gain	G_{V6}	Gain at control V_{CC}	−6.5	−5.2	−3.5	dB

■ Application Circuit



■ Supplementary Explanation

• Block Functions

(1) FM demodulator

This demodulates the RF signal that is FM-modulated.

For outputs, LPF that can pass video signals is required. Demodulation sensitivity can be adjusted by Pin⑳.

(2) Dropout detection

This detects defective RF signals.

The ways of detection are : a. amplitude detection, b. low frequency detection, c. high frequency detection

a : Amplitude detection

When the amplitude of RF signals goes smaller than a certain level, it will be detected as a dropout. The detection level can be adjusted by Pin㉗. The detection can be released by setting Pin㉗ to V_{CC}.

b : Low frequency detection

When the RF signal frequency goes lower than a certain level, it will be detected as a dropout. The detection level can be adjusted by Pin㉕. Detection can be released by setting Pin㉕ to V_{CC}.

c : High frequency detection

When RF signal frequency goes higher than a certain level, it will be detected as a dropout. Detection level can be adjusted by Pin㉒. Detection can be released by setting Pin㉒ to V_{CC}.

The result of each detection is outputted as Low on dropout at Pin⑮ and also controls switch for dropout compensation.

(3) De-emphasis

Pin⑲ - input, Pin⑱ output and + input form an internally-setting OP amp. Its gain and frequency characteristics can be set by resistors installed externally.

(4) Dropout compensation

Changeover of inputs between Pin⑰ and Pin㉘ is done in response to Pin⑮ outputs. Pin⑰ signals are normally outputted and Pin㉘ signals are outputted on dropout. Both Pin⑰ and Pin㉘ are equipped with DC regenerators. Pin㉘ has gains about twice as much as that of Pin⑰. Outputs are Pin㉚.

(5) Code separation

Codes of Pin⑰ input signals are detected by about 50IRE level and outputted at Pin⑬.

(6) Sync separation

Sync signals after dropout compensation are detected by about −26IRE level and output at Pin⑭.

(7) Noise cancellation

High frequency noise is removed by adding at high-frequency signal in reverse phase at Pin⑪ to input signals at Pin⑩. The amplitude limit of high-frequency signals can be adjusted by Pin⑨ and outputted to Pin②. It is also inputted to the switch that performs a changeover to external videos. Pin⑩ has gains about twice as much.

(8) Changeover for external videos

In case of Pin④ Low (or open), the signal that have passed through noise canceling are outputted to fade. When Pin④ is High, the input signals of Pin⑤ are outputted.

(9) Fading effects and half picture

The gains of video signals are controlled in response to voltage levels of Pin⑦. However, sync signals and burst remain uncontrolled. When setting Pin⑦ to V_{CC}, the gain becomes 1/2 all the way through. Those controlled signals are outputted to Pin⑧.

(10) Reference voltage generation

About 2.4V is generated by using the band gap.

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