High-performance 6-channel video driver IC for progressive DVD

BH7862FS

BH7862FS is a 6-channel video driver IC developed for progressive DVD player/recorder. Special filters adjusted to each band of various video signals are incorporated into a single chip. Extended definition, size reduction, and high cost performance can be achieved in DVD players.

●Application

DVD players, DVD recorders

●Features

1) Each high-performance filter, 6dB amplifier, and 75Ω driver for DVD are incorporated into a single chip.
2) Driver 6ch (Y, C, MIX, and PY, Pb, Pr for progressive)
3) Group delay difference between chroma signal and luminance signal is a small number of nsec.
4) Drive 2 lines of each signal
5) Operating by 5V single power supply
6) Built-in mute circuit

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Impressed voltage	V_{CC} max	6.0	V
Power dissipation	Pd	0.95*	W
Operating temperature range	Topr	–10~+70	°C
Storage temperature range	Tstg	–55~+150	°C

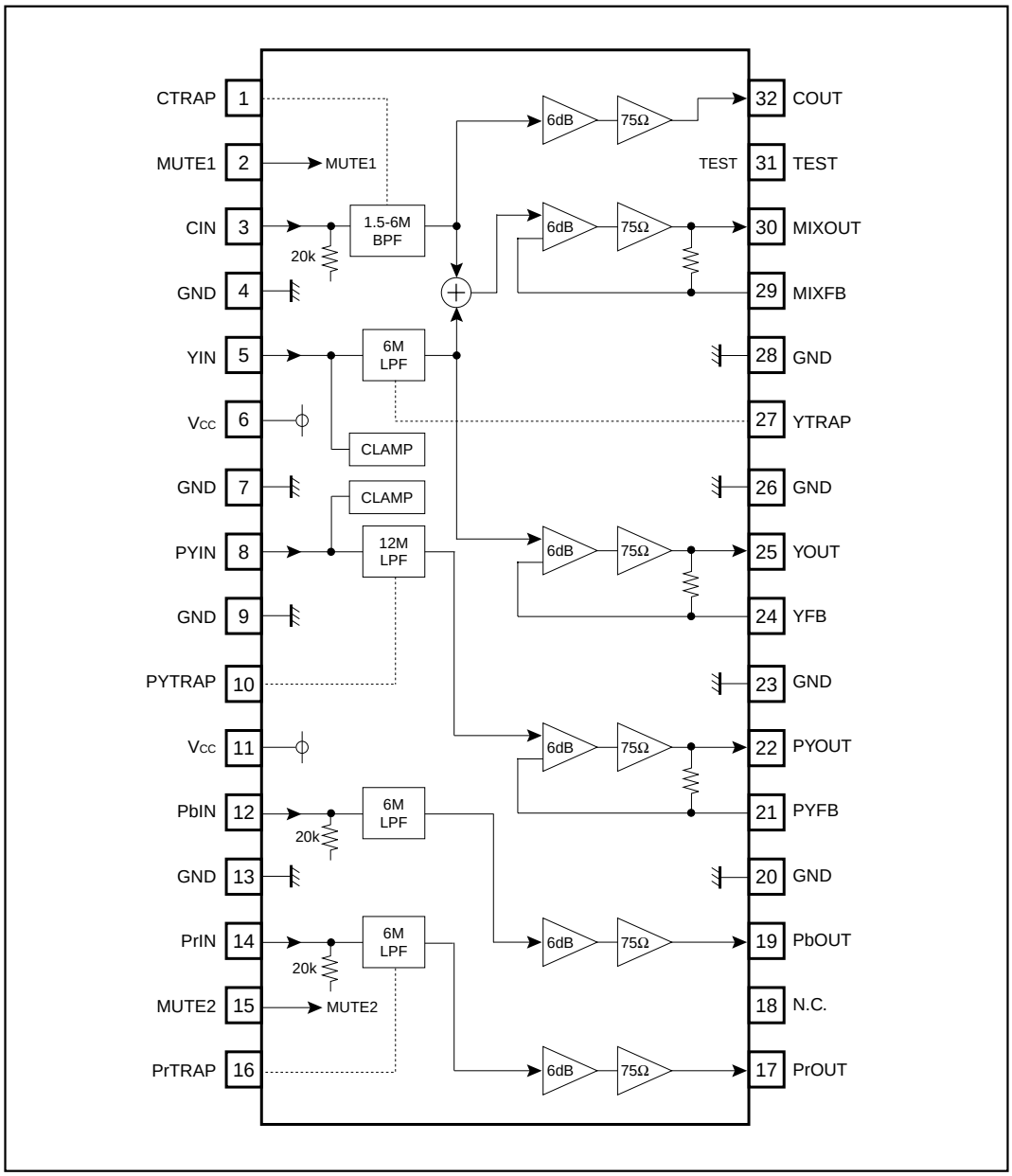
* Reduced by –7.6mW for each increase in Ta of 1°C over 25°C.
PCB (70mm×70mm, t=1.6mm) glass epoxy mounting.

●Recommended operating conditions (Ta = 25°C)

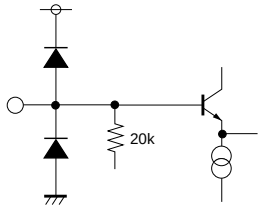
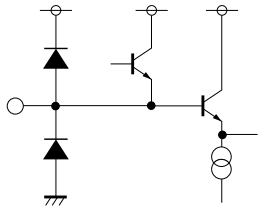
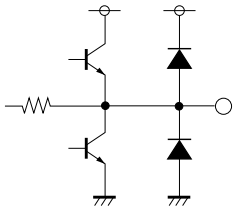
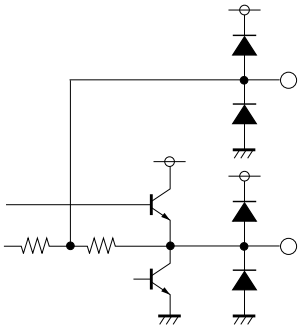
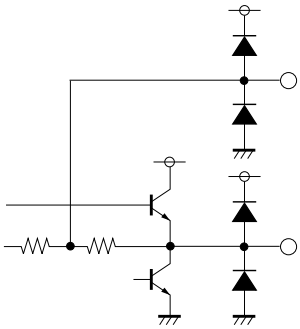
Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{CC}	4.5	–	5.5	V

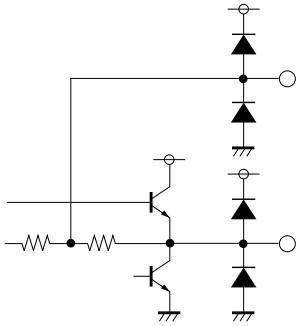
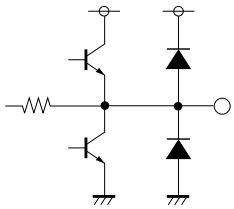
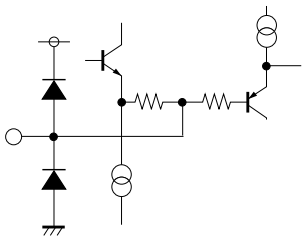
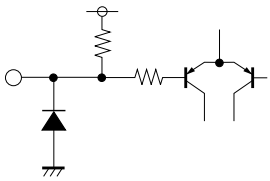
◎Radiation resistance is not included in the design.

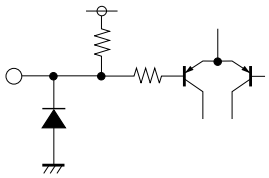
●**Block diagram**



●Pin descriptions and Input / output circuits

Pin No.	Pin name	Input/output equivalent circuit	Pin description
3 12 14	CIN PbIN PrIN		Signal input terminal. Input terminal for chroma signal and color-difference signal. Bias type input. The input impedance is 20kΩ.
5 8	YIN PYIN		Signal input terminal. Input terminal for luminance signal. Di clamp input.
32	COUT		Signal output terminal. Output terminal for chroma signal.
29 30	MIXFB MIXOUT		Signal output terminal. Output terminal for Y/C MIX signal.
24 25	YFB YOUT		Signal output terminal. Output terminal for luminance signal (interlaced type).

Pin No.	Pin name	Input/output equivalent circuit	Pin description
21 22	PYFB PYOUT		Signal output terminal. Output terminal for luminance signal (progressive type).
17 19	PrOUT PbOUT		Signal output terminal. Output terminal for color-difference signal.
1 27 10 16	CTPAP YTRAP PYTRAP PrTRAP		Terminal for LC resonance.
6 11	V_{CC}		Power supply voltage. V_{CC} is separated into 6 pin and 11 pin. That is to say, C, MIX and Y are partitioned by 6 pin and PY, Pb and Pr by 11 pin. They and not connected internally. Connect them externally when using.
4 7 9 13 20 23 26 28	GND		Grounding terminal.
2	MUTE1		Mute control terminal. C, MIX and Y are muted simultaneously by setting MUTE to "L".

Pin No.	Pin name	Input/output equivalent circuit	Pin description
12	MUTE2		Mute control terminal. PY, Pb and PR are muted simultaneously by setting MUTE to "L".
31	TEST		Test terminal. Usually, short-circuit this terminal to GND when using it.
18	N.C.		–

●**Electrical characteristics** (unless otherwise noted, Ta=25°C, V_{CC}=5.0V)
(∗The standard values (Typical values) below are design value for your reference.)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current 1	6CH ACTIVE	I_{CC1}	–	90	110	mA	No signal MUTE : OFF
Circuit current 2	MUTE	I_{CC2}	–	17	25	mA	No signal MUTE : ON
Maximum output level		V_{OM}	2.6	3.0	–	V_{PP}	CIN : f=3.58MHz, YIN, PYIN, PbIN, PrIN : f=1MHz ∗1 Output tertiary distortion : –30dB
Voltage gain	C	G_{VC}	5.0	6.0	7.0	dB	CIN : f=3.58MHz, 1V_{PP}
	MIX(C)	G_{VMIXC}	5.0	6.0	7.0	dB	CIN : f=3.58MHz, 1V_{PP}
	MIX(Y)	G_{VMIXY}	5.0	6.0	7.0	dB	YIN : f=1MHz, 1V_{PP}
	Y	G_{VY}	5.0	6.0	7.0	dB	YIN : f=1MHz, 1V_{PP}
	PY	G_{VPY}	5.0	6.0	7.0	dB	PYIN : f=1MHz, 1V_{PP}
	Pb	G_{VPb}	5.0	6.0	7.0	dB	PbIN : f=1MHz, 1V_{PP}
	Pr	G_{VPr}	5.0	6.0	7.0	dB	PrIN : f=1MHz, 1V_{PP}
Frequency characteristics 1	C	G_{FC}	–2.0	0	2.0	dB	CIN : f=1.5/3.58MHz, 6/3.58MHz, 1V_{PP}
	MIX1	G_{FMIX1}	–2.0	0	2.0	dB	CIN : f=1.5/3.58MHz, 6/3.58MHz, 1V_{PP}
	MIX2	G_{FMIX2}	–2.0	0	2.0	dB	YIN : f=6/1MHz, 1V_{PP}
	Y	G_{FY}	–2.0	0	2.0	dB	YIN : f=6/1MHz, 1V_{PP}
	PY	G_{FPY}	–2.0	0	2.0	dB	PYIN : f=12/1MHz, 1V_{PP}
	Pb	G_{FPb}	–2.0	0	2.0	dB	PbIN : f=6/1MHz, 1V_{PP}
	Pr	G_{FPr}	–2.0	0	2.0	dB	PrIN : f=6/1MHz, 1V_{PP}
MUTE attenuation		M_T	–	–50	–	dB	CIN : f=3.58MHz, 1V_{PP} YIN, PYIN, PbIN, PrIN : f=1MHz, 1V_{PP}
Input impedance		Z_{IN}	16	20	24	kΩ	CIN, PbIN, PrIN input terminal ∗2
MUTE holding voltage		V_{T1HH}	4.0	–	V_{CC}	V	MUTE OFF
		V_{T1HL}	GND	–	1.0	V	MUTE ON
Frequency characteristics 2	C	G_{FCATT}	–	–40	–	dB	CIN : f=27/3.58MHz, 1V_{PP}
	MIX1	$G_{FMIX1ATT}$	–	–40	–	dB	CIN : f=27/3.58MHz, 1V_{PP}
	MIX2	$G_{FMIX2ATT}$	–	–40	–	dB	YIN : f=27/1MHz, 1V_{PP}
	Y	G_{FYATT}	–	–40	–	dB	YIN : f=27/1MHz, 1V_{PP}
	PY	G_{FPYATT}	–	–40	–	dB	PYIN : f=54/1MHz, 1V_{PP}
	Pb	G_{FPbATT}	–	–20	–	dB	PbIN : f=27/1MHz, 1V_{PP}
	Pr	G_{FPrATT}	–	–20	–	dB	PrIN : f=27/1MHz, 1V_{PP}
Group delay characteristics Y⇔C		ΔG_{D1}	–	5.0	–	ns	YIN : f=1MHz, V_{IN}=1V_{PP} CIN : f=3.58MHz, V_{IN}=1V_{PP} GD difference between Y and C
PY⇔Pb(Pr)		ΔG_{D2}	–	5.0	–	ns	PYIN : f=1MHz, V_{IN}=1V_{PP} PbIN(PrIN) : f=1MHz, V_{IN}=1V_{PP} GD difference between PY and Pb (Pr)
Differential gain		D_G	–	1.0	–	%	1 V_{PP} standard staircase signal
Differential phase		D_P	–	0.5	–	deg	1 V_{PP} standard staircase signal
Crosstalk between channels C⇔Y		C_{T1}	–	–50	–	dB	YIN : f=1MHz, 1V_{PP} CIN : f=3.58MHz, 1V_{PP}
Pb(Pr)⇔PY		C_{T2}	–	–60	–	dB	PYIN : f=1MHz, 1V_{PP} Pb(Pr) : f=1MHz, 1V_{PP}
Pb⇔Pr		C_{T3}	–	–60	–	dB	Pb(Pr) : f=1MHz, 1V_{PP}
C/N		V_N	–	–75	–	dB	100% white video signal

∗1 Add the sine wave of "f=1MHz (C : f=3.58MHz)" to the input. V_{IN} and adjust the input level so that the tertiary distortion of output can be -30dB.
Then, the output voltage shall be a maximum output level V_{OM} (V_{PP}).
∗2 Measure the input voltage V_{IN50} (V) and input open circuit voltage V_{IN} (V) when 50μA has applied to the input CIN, PbIN and PrIN. Then, the input impedance Z_{IN} is as follows : $Z_{IN}=|V_{IN50}-V_{IN}| / 50\mu$ [kΩ]

●**Measurement circuit**

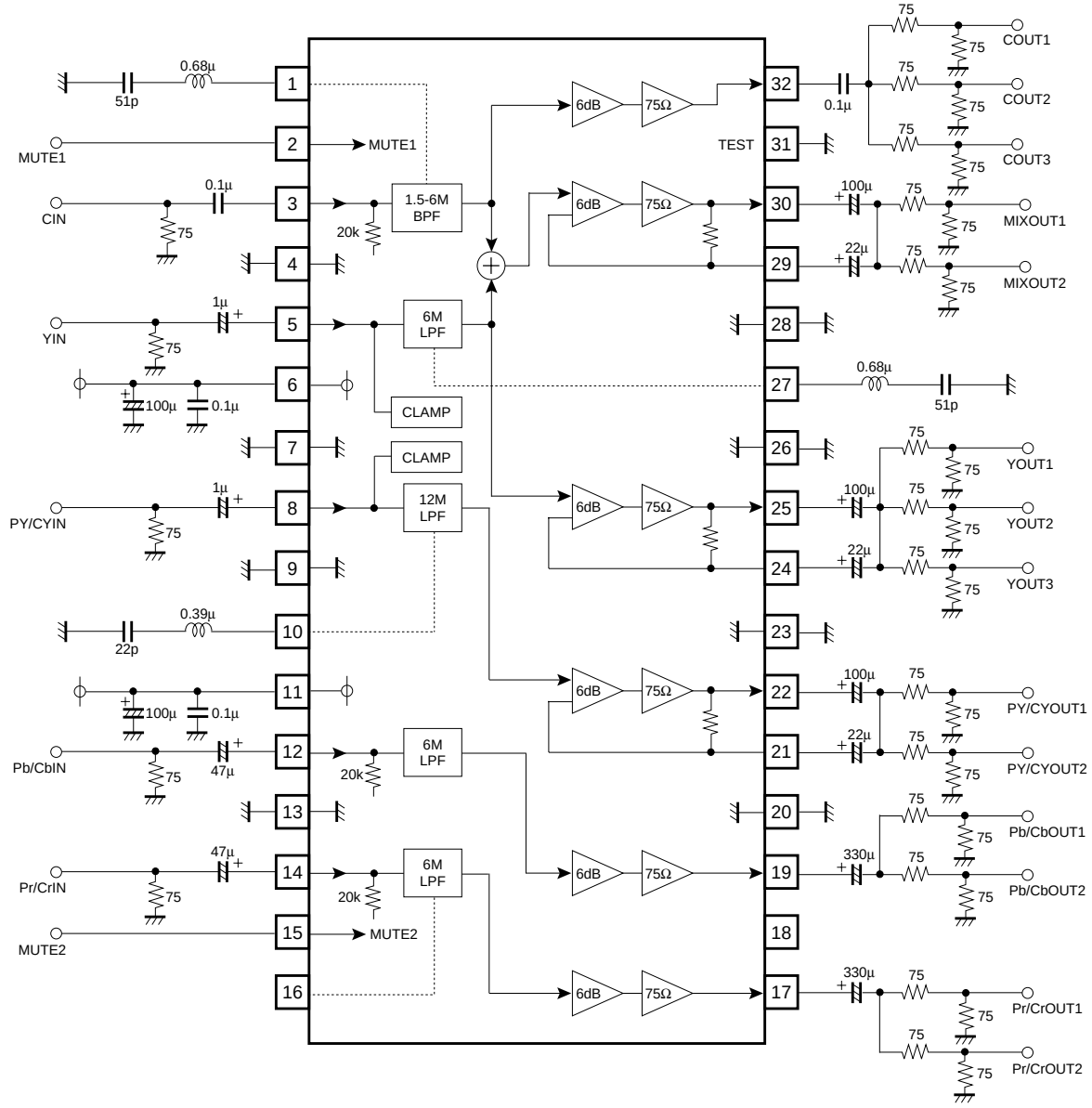


Fig.1

●**Application example**

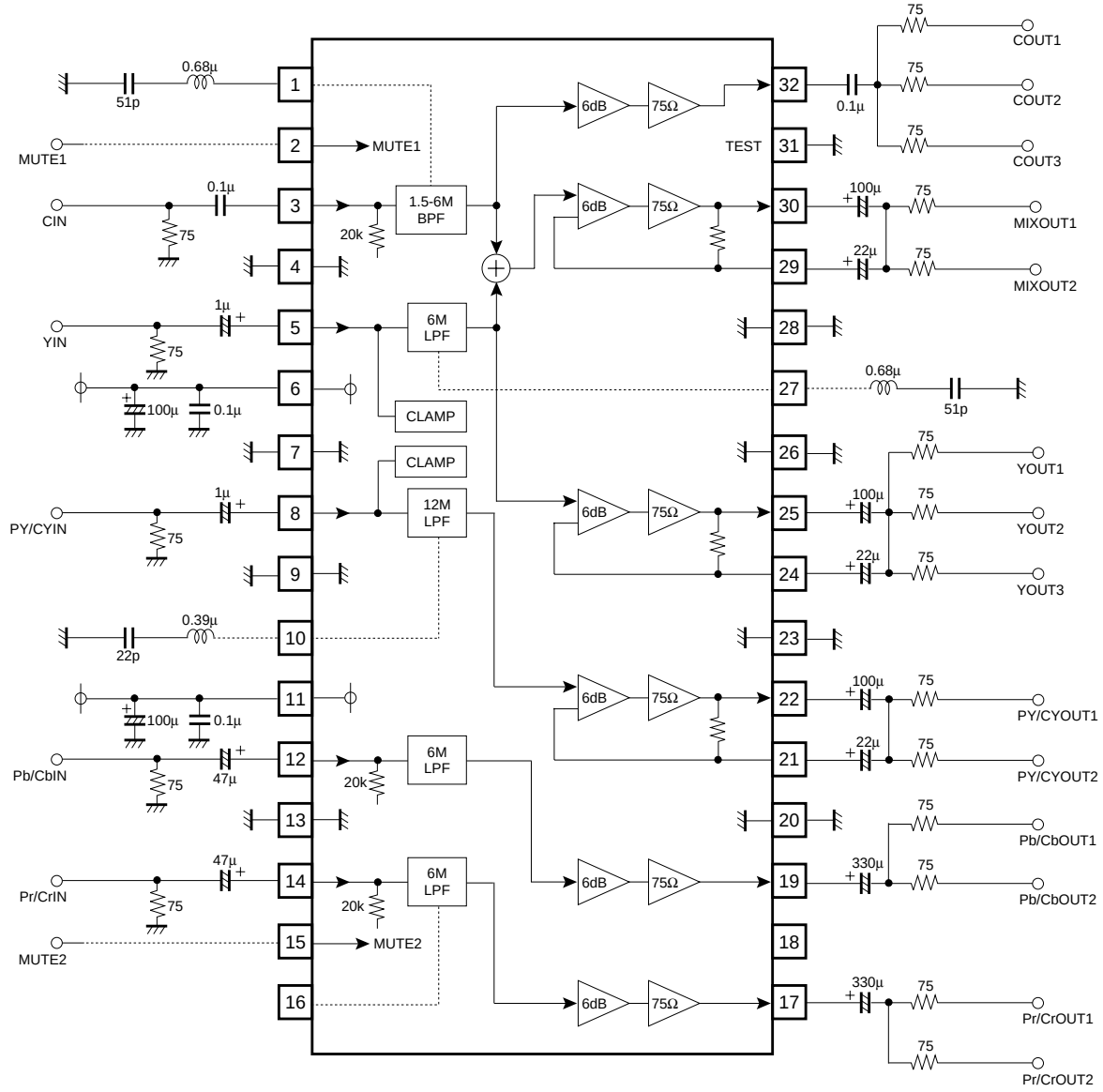


Fig.2

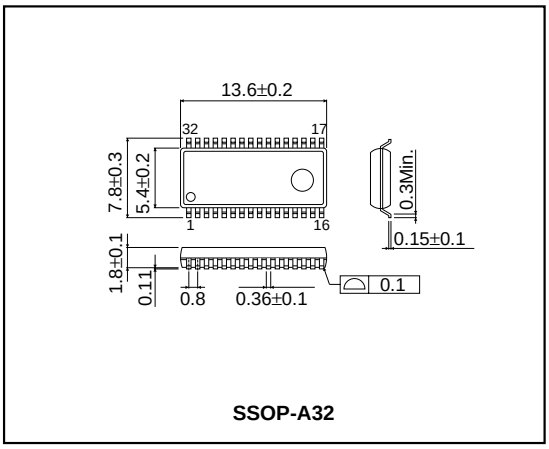
●**Operation notes**

(1) Output terminal load resistance can be driven in three channels in SY signal and in two channels in any other signals. Use it within the allowable dissipation range.

(2) Minimize the common impedance of power supply line of 6 pin and 11 pin.

(3) Inductor and capacitor of series resonance can be removed. Treat them with great care when removing them, because the terminal may catch noise component. Even if they are removed, attenuation in TRAP frequency are not expected so much.

●**External dimensions** (Units : mm)



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