Structure : Silicon Monolithic Integrated Circuit

Product Series : Power Driver for Compact disc player

type : BD8224EFV

Feature :
- 4CH BTL Driver.
- Employs the HTSSOP-B24PIN power package for compaction.
- Has a wide dynamic range. (PowVcc1=8V, RL=8Ω、CH1,2 ⇒ 6.0V(typ.))
- The thermal shutdown circuit contained.
- Switches CH2 input by Control input terminal(CNT).
- Incorporates mute function by CNT terminal and MUTE terminal.

○Absolute maximum ratings(Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	PowVcc 1,PowVcc 2	15	V
Reset detection terminal	RSTDET	PowVcc 2	V
Input terminal	IN1,2-1,2-2,3,4	PowVcc 2	V
CNT terminal	CNT	PowVcc 2	V
MUTE terminal	MUTE	PowVcc 2	V
Power dissipation	Pd	1.1*1	W
		4.0*2	
Operating temperature range	Topr	-40～+85	℃
Storage temperature	Tstg	-55～+150	℃
Junction temperature	Tjmax	+150	℃

*1 70mm×70mm×1.6mm, occupied copper foil is less than 3%,one layer substrate(back copper foil 0mm×0mm)
Reduce power by 8.8mW for each degree above 25℃.

*2 70mm×70mm×1.6mm, occupied copper foil is less than 3%,four layer substrate(back copper foil 70mm×70mm)
Reduce power by 32.0mW for each degree above 25℃.

○Operating conditions

(Set the power supply voltage taking allowable dissipation into considering.)

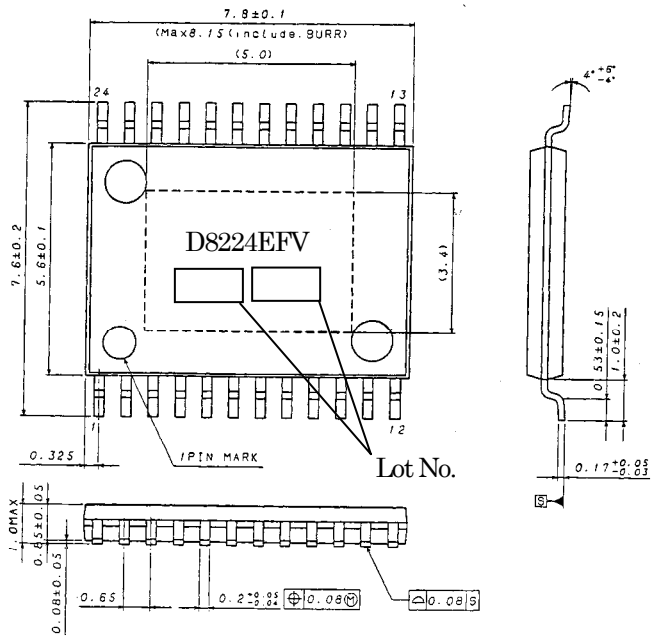
PowVcc 1,2	4.5～10 (V)

Please use it with PowVcc 1= PowVcc 2

○ Electrical characteristics （Unless otherwise noted, Ta=25℃, PreVcc=PowVcc=8V, BIAS=2.5V, RL=8Ω）

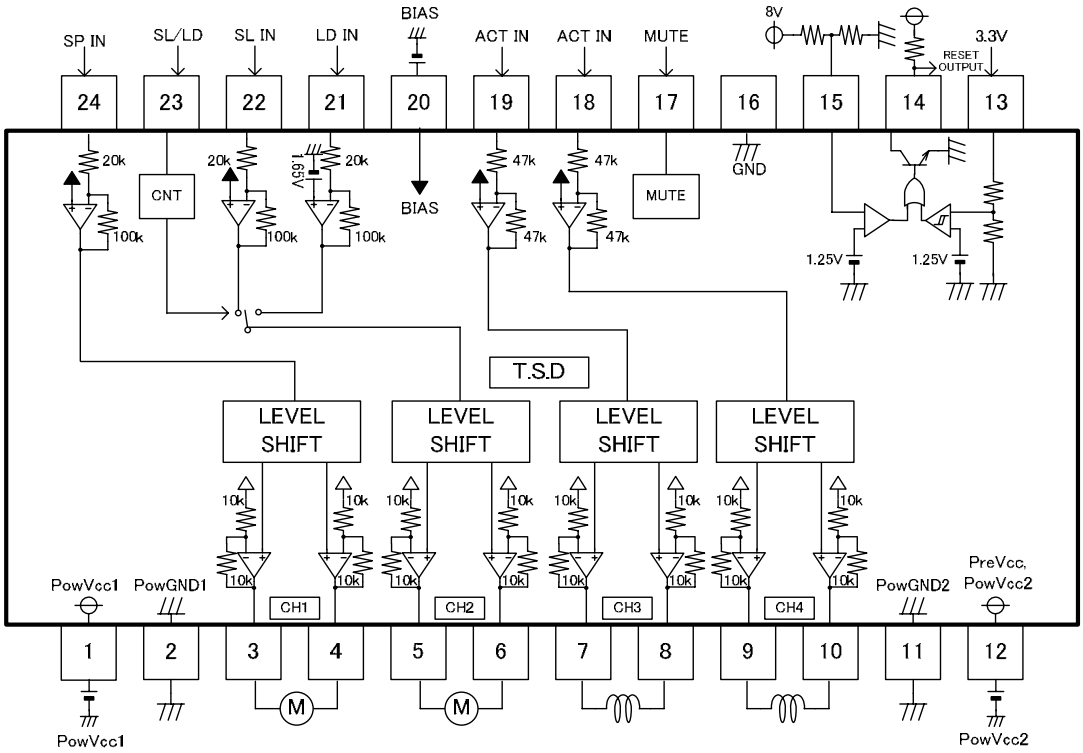
Parameter	Symbol	MIN	TYP	MAX	Unit	Condition
Quiescent dissipation current	IQ	15	30	45	mA	RL=∞
<Driver>						
Output offset voltage (CH3,4)	Voof 34	-50	0	50	mV	
Output offset voltage (CH1,2)	Voof 12	-100	0	100	mV	
Maximum output amplitude (CH3,4)	VOM 34	4.7	5.3	—	V	
Maximum output amplitude (CH1,2)	VOM 12	5.4	6.0	—	V	
Closed circuit voltage gain (CH3,4)	Gv 34	10.0	11.7	13.4	dB	
Closed circuit voltage gain (CH1,2)	Gv 12	24.3	26.0	27.7	dB	
MUTE terminal low level input voltage	VML	—	—	0.5	V	
MUTE terminal high level input voltage	VMH	2.0	—	—	V	
CNT terminal low level input voltage	VCNTL	—	—	0.5	V	
CNT terminal high level input voltage	VCNTH	2.0	—	—	V	
LDIN voltage of terminal (SLED at input)	VLDIN	—	0.1	0.3	V	CNT='L'
Voltage of internal bias	VBIN	1.53	1.65	1.77	V	CNT='H'
<Reset：Vcc>						
Reset detection voltage	VDET 1	1.20	1.25	1.30	V	Voltage in Pin15
Detection terminal outflow current	ICMP	—	50	150	nA	
<Reset：3.3V>						
Reset release voltage	VDET 2	2.75	2.95	3.15	V	
Hysteresis voltage	△VDET	10	25	40	mV	

○Package outlines：HTSSOP-B24



HTSSOP-B24(UNIT：mm)

○Block diagram



T.S.D：Thermal Shut-Down

○Pin description

No.	Symbol	Description	No.	Symbol	Description
1	PowVcc1	CH1,2 power supply terminal	13	RSTIN	Detection power supply input terminal
2	PowGND1	Power GND 1	14	RSTOUT	Reset output
3	VO1(-)	Driver CH1 negative output	15	RSTDET	Reset detection comparator input
4	VO1(+)	Driver CH1 positive output	16	PreGND	PreGND
5	VO2(-)	Driver CH2 negative output	17	MUTE	MUTE terminal
6	VO2(+)	Driver CH2 positive output	18	IN4	CH4 input
7	VO3(-)	Driver CH3 negative output	19	IN3	CH3 input
8	VO3(+)	Driver CH3 positive output	20	BIAS	BIAS input terminal
9	VO4(-)	Driver CH4 negative output	21	IN2-2	CH2-2 input
10	VO4(+)	Driver CH4 positive output	22	IN2-1	CH2-1 input
11	PowGND2	Power GND 2	23	CNT	Control input terminal
12	PowVcc2	Pre block and Reset block , and CH3,4 power supply input terminal	24	IN1	IN1 input

○ Cautions in using the IC

1. Absolute maximum ratings

We are careful enough for quality control about this IC. So, there is no problem under normal operation, excluding that it exceeds the absolute maximum ratings. However, this IC might be destroyed when the absolute maximum ratings, such as impressed voltages or the operating temperature range, is exceeded, and whether the destruction is short circuit mode or open circuit mode cannot be specified. Please take into consideration the physical countermeasures for safety, such as fusing, if a particular mode that exceeds the absolute maximum rating is assumed.

2. Reverse polarity connection

Connecting the power line to the IC in reverse polarity (from that recommended) will damage the part. Please utilize the direction protection device as a diode in the supply line and motor coil line.

3. Power supply line

Due to return of regenerative current by reverse electromotive force, using electrolytic and ceramic suppress filter capacitors (0.1μF) close to the IC power input terminals (Vcc and GND) are recommended. Please note the electrolytic capacitor value decreases at lower temperatures and examine to dispense physical measures for safety.
And, for ICs with more than one power supply, it is possible that rush current may flow instantaneously due to the internal powering sequence and delays. Therefore, give special consideration to power coupling capacitance, power wiring, width of GND wiring, and routing of wiring.

4. GND line

Please keep the GND line the lowest potential always, and check the GND voltage when transient voltages are connected to the IC.

5. Thermal design

Do not exceed the power dissipation (Pd) of the package specification rating under actual operation, and please design enough temperature margins. This product has exposed the frame to the back side of the package, but please note that it is assumed to use heat radiation efficiency by the heat radiation for this part. Please take the heat radiation pattern on not only the surface of the substrate but also the back of the substrate widely.

6. Short circuit mode between terminals and wrong mounting

Do not mount the IC in the wrong direction and displacement, and be careful about the reverse-connection of the power connector. Moreover, this IC might be destroyed when the dust short the terminals between them or GND.

7. Radiation

Strong electromagnetic radiation can cause operation failures.

8. ASO (Area of Safety Operation)

Do not exceed the maximum ASO and the absolute maximum ratings of the output driver.

9. TSD (Thermal Shut-Down)

The TSD is activated when the junction temperature (Tj) exceeds Tjmax, and the output terminal is switched to OPEN.
The guarantee and protection of set are not purpose. Therefore, please do not use this IC after TSD circuit operates, nor use it for assumption that operates the TSD circuit.

10. Capacitor between output driver and GND

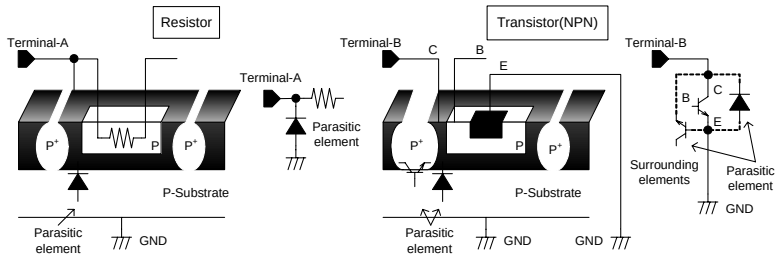
If a large capacitor is connected between the output driver and GND, this IC might be destroyed when Vcc becomes 0V or GND, because the electric charge accumulated in the capacitor flows to the output driver. Please set said capacitor to smaller than 0.1μF.

11. Inspection by the set circuit board

The stress might hang to IC by connecting the capacitor to the terminal with low impedance. Then, please discharge electricity in each and all process. Moreover, when attaching or detaching from jig in the inspection process, please turn off the power before mounting the IC, and turn on after mounting the IC, and vice versa. In addition, please take into consideration the countermeasures for electrostatic damage, such as giving the earth in assembly process, transportation or preservation.

12. Input terminal

This IC is a monolithic IC, and has P^+ isolation and P substrate for the element separation. Therefore, a parasitic PN junction is firmed in this P-layer and N-layer of each element. For instance, the resistor or the transistor is connected to the terminal as shown in the figure below. When the GND voltage potential is greater than the voltage potential at Terminals A on the resistor, at Terminal B on the transistor, the PN junction operates as a parasitic diode. In addition, the parasitic NPN transistor is formed in said parasitic diode and the N layer of surrounding elements close to said parasitic diode. These parasitic elements are formed in the IC because of the voltage relation. The parasitic element operating causes the interference of circuit operation, then the wrong operation and destruction. Therefore, please be careful so as not to operate the parasitic elements by impressing to input terminals lower voltage than GND (P substrate). Please do not apply the voltage to the input terminal when the power-supply voltage is not impressed. Moreover, please impress each input terminal lower than the power-supply voltage or equal to the specified range in the guaranteed voltage when the power-supply voltage is impressing.



Simplified structure of IC

13. Earth wiring pattern

If small signal GND and large current GND exist, disperse their pattern. In addition, for voltage change by pattern wiring impedance and large current not to change voltage of small signal GND, each ground terminal of IC must be connected at the one point on the set circuit board. As for GND of external parts, it is similar to the above-mentioned.

14. About the RESET output

Please set 14PIN:RESET output terminal and set the voltage which is the pull-up below the voltage of 12PIN:PowVcc2. 14PIN flows and the current flows to protection Di for the serge absorption when the voltage which is the pull-up is higher than the voltage of 12PIN.

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