

5-CHANNEL BTL DRIVER FOR DVD PLAYER

DESCRIPTION

The UTC **UA8868** is a five-channel BTL driver IC for driving the motors and actuators such as used in DVD player and CD-ROM.

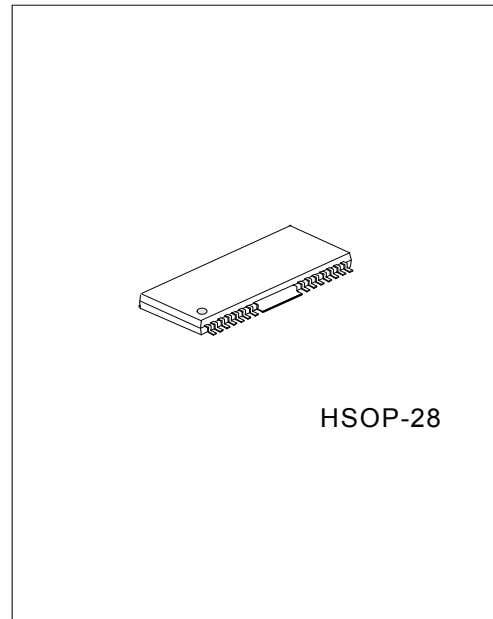
FEATURES

\* Built-in 5 channel drivers:

- Dual actuator drivers
- Sled motor driver
- Spindle driver
- Tray in-out driver

\* Built-in Two independent comparators

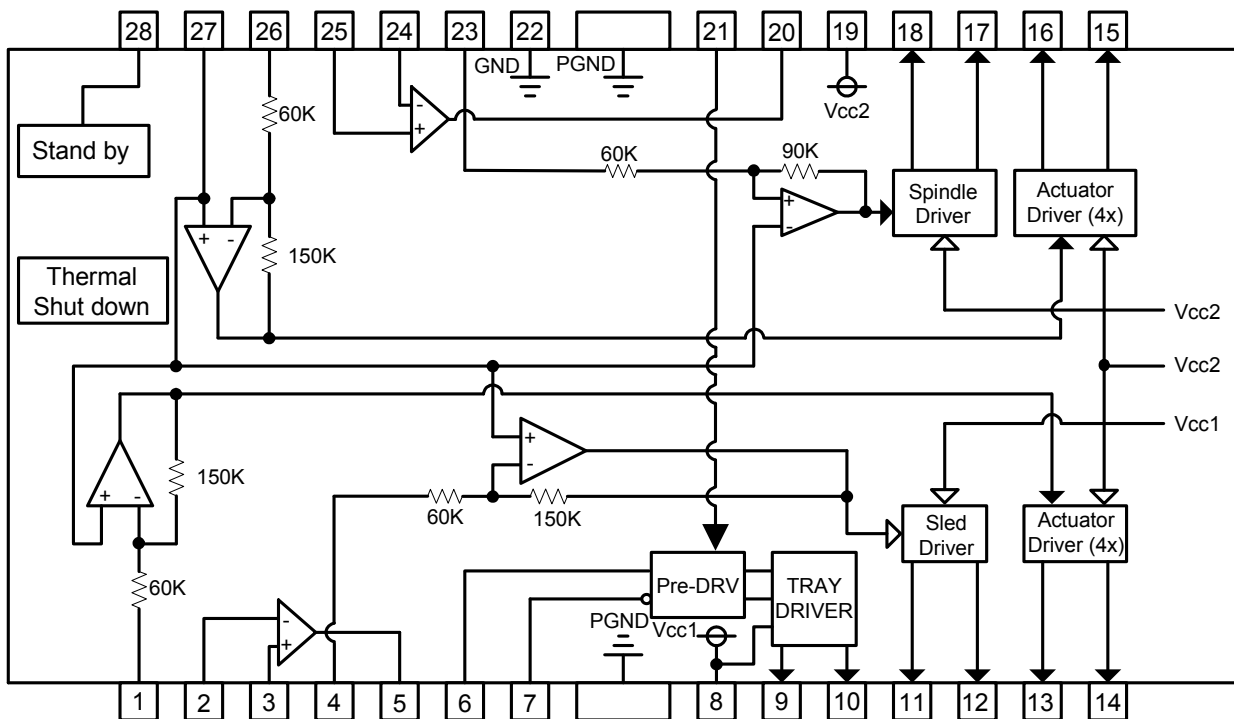
\* Thermal shut down and Mute circuit.



HSOP-28

\*Pb-free plating product number: UA8868L

BLOCK DIAGRAM



## PIN DESCRIPTION

PIN NO	PIN NAME	FUNCTION
1	V <sub>INFC</sub>	Input for focus driver
2	OP2IN-	Comparator 2 input (-)
3	OP2IN+	Comparator 2 input (+)
4	V <sub>INSL+</sub>	OPAMP input (+) for the sled driver
5	OP2OUT	Comparator 2 output
6	FWD	Tray driver forward input
7	REV	Tray driver reverse input
8	V <sub>CC1</sub>	Vcc for pre-drive block and power block of sled and tray
9	V <sub>OTR-</sub>	Tray driver output (-)
10	V <sub>OTR+</sub>	Tray driver output (+)
11	V <sub>OSL-</sub>	Sled driver output (-)
12	V <sub>OSL+</sub>	Sled driver output (+)
13	V <sub>OFC-</sub>	Focus driver output (-)
14	V <sub>OFC+</sub>	Focus driver output (+)
15	V <sub>OTK+</sub>	Tracking driver output (+)
16	V <sub>OTK-</sub>	Tracking driver output (-)
17	V <sub>OLD+</sub>	Spindle driver output (+)
18	V <sub>OLD-</sub>	Spindle driver output (-)
19	V <sub>CC2</sub>	Vcc for power block of spindle, tracking and focus
20	OP1OUT	Comparator 1 output
21	V <sub>CTL</sub>	Speed control input of tray driver
22	GND	Ground
23	V <sub>INLD</sub>	Input for spindle driver
24	OP1IN-	Comparator 1 input (-)
25	OP1IN+	Comparator 1 input (+)
26	V <sub>INTK</sub>	Input for tracking driver
27	BIAS	Input for reference voltage
28	MUTE	Input for mute control

Notes: Pin Name of + and – (output of drivers) means polarity to input pin. (For example, if voltage of pin1 is high, pin14 is high.)

## ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC1</sub>	13.5	V
	V <sub>CC2</sub>		
Power Dissipation	P <sub>D</sub>	*1.7	W
Operating Temperature Range	T <sub>opr</sub>	-20 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	** -40 ~ +150	°C

\*When mounted on a 70mm × 70mm × 1.6mm glass epoxy board.

\*Reduced by 13.6mW for each increase in Ta of 1°C over 25°C

\*\*Should not exceed Pd or ASO and T<sub>j</sub>=150°C values

**GUARANTEED OPERATING CONDITIONS**

(Ta=25°C)

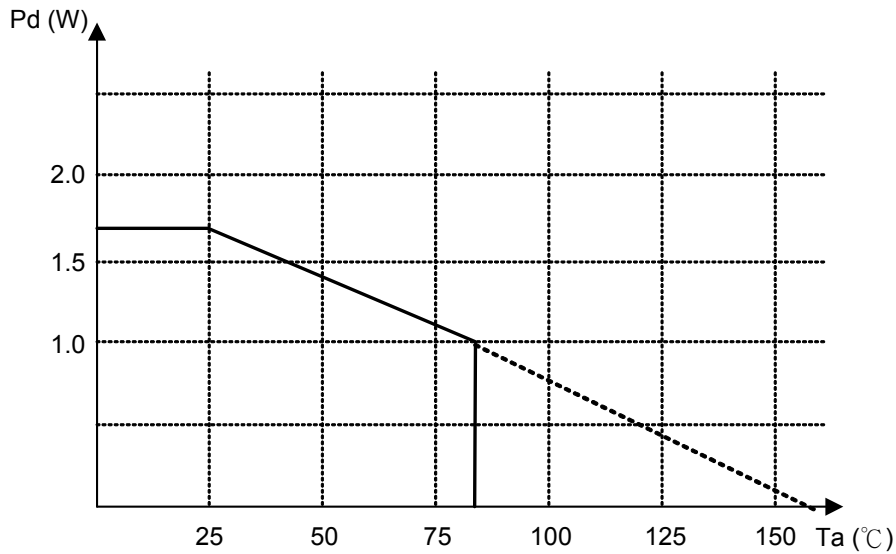
PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V <sub>cc1</sub>	4.3 ~ 13.2	V
	V <sub>cc2</sub>	4.3 ~ V <sub>cc1</sub>	V

**ELECTRICAL CHARACTERISTICS**(Ta=25°C, V<sub>cc1</sub>=12V, V<sub>cc2</sub>=5V, BIAS=2.5V, R<sub>L</sub>=8Ω/10Ω/45Ω)

PARAMETER	SYMBOL	TEST CONDITONS	MIN	TYP	MAX	UNIT
Quiescent Current	I <sub>cc</sub>			30		mA
Voltage For Mute ON	V <sub>ston</sub>		0		0.5	V
Voltage For Mute OFF	V <sub>stoff</sub>		2.0		5	V
<b>Actuator Drivers</b>						
Output Offset Voltage	V <sub>oo</sub>				±50	mV
Maximum Output Voltage	V <sub>om</sub>	@10Ω Load	3.6	4.0		V
Voltage Gain	G <sub>v</sub>	V <sub>IN</sub> =BIAS+0.2V <sub>pp</sub> ac @1KHz		20		dB
<b>Sled Motor Driver</b>						
Output Offset Voltage	V <sub>oofsl</sub>				±100	mV
Maximum Output Voltage	V <sub>omsl</sub>	@ 8Ω Load	7.5	9.0		V
Closed Loop Voltage Gain	G <sub>vsl</sub>	V <sub>IN</sub> =BIAS+0.2V <sub>pp</sub> ac @1KH	18	20	22	dB
<b>Spindle Motor Driver</b>						
Output Offset Voltage	V <sub>oofld</sub>				±50	mV
Maximum Output Voltage	V <sub>omax</sub>	@ 8Ω Load	3.6	4.0		V
Voltage Gain	G <sub>vld</sub>	V <sub>IN</sub> =BIAS+0.2V <sub>pp</sub> ac @1KHz	13.3	15.5	17.5	dB
Gain Error By Polarity	ΔG <sub>vld</sub>	V <sub>IN</sub> =BIAS+0.2V <sub>pp</sub> ac @1KHz	0	1	2	dB
<b>Tray Motor Driver</b>						
Output Saturation Voltage 1	V <sub>SAT1</sub>	Upper+Lower saturation, I <sub>L</sub> =200mA	0.7	1.1	1.5	V
Output Saturation Voltage Between F&R	ΔV <sub>SAT1</sub>	Output saturation voltage 1 between FWD and REV			0.1	V
Output Saturation Voltage 2	V <sub>SAT2</sub>	Upper+Lower saturation, I <sub>L</sub> =500mA	1.0	1.55	2.2	V
Output Adjustable Gain On "H" Side Voltage	V <sub>VtrH</sub>	"H" Side output for input (V <sub>TCL</sub> )	7.4	9.2	11	dB
<b>Tray Motor Driver Input Logic</b>						
High Level Input Voltage	V <sub>IH</sub>		1.5		V <sub>CC</sub>	V
Low Level Input Voltage	V <sub>IL</sub>		-0.3		0.5	V
High Level Input Current	I <sub>IH</sub>	V <sub>FWD</sub> =V <sub>REV</sub> =5V		180	270	μA
<b>Comparator</b>						
Input Offset Voltage	V <sub>oofc</sub>				±2.0	mV
Input Common-mode Voltage Range	V <sub>CMC</sub>		0		V <sub>CC1</sub> ±1.5	V
Voltage Gain	G <sub>VC</sub>	R <sub>L</sub> ≥ 15kΩ	50			V/mV
Output Sink Current	I <sub>osc</sub>	V <sub>out</sub> < 1.5V		6.0		mA
Saturation Voltage	V <sub>sc</sub>	I <sub>osc</sub> ≤ 4mA			400	mV

\* This device is not designed for protection against radioactive rays.

**POWER DISSIPATION CURVE**



\*70mm 70mm 1.6mm glass epoxy board.

\*Debating in done at 17.6mW /°C for operating above Ta=25°C

**OPERATING NOTES**

- (1) The built-in thermal shutdown circuit will shutdown the output current when the chip junction temperature reaches 150 °C (typ.).The hysteresis is set to 25°C (typ.), so the circuit will restart up if the chip temperature falled down below 125°C (typ.)
- (2) If mute pin is setted to under 0.5V or NC, output current is off (except for spindle driver). Mute pin voltage should be higher than 2.0V for normal application.
- (3) Bias pin (pin 27) should be set to more than 1.2V for proper working. If the bias pin voltage is fall below 0.9V (typ.), the output current will be muted.
- (4) Insert the bypass capacitor (~ 0.1 μ F ) between Vcc pin and GND pin as close as possible.
- (5) when Vcc1 voltage drop to below 3.8V, functions are muted. The function will return to work when Vcc1 increase to over a hysteresis of 03.V (typ.)
- (6) Heat dissipation fins are connected to the GND of the chip. Make sure to connect them to power supply GND.

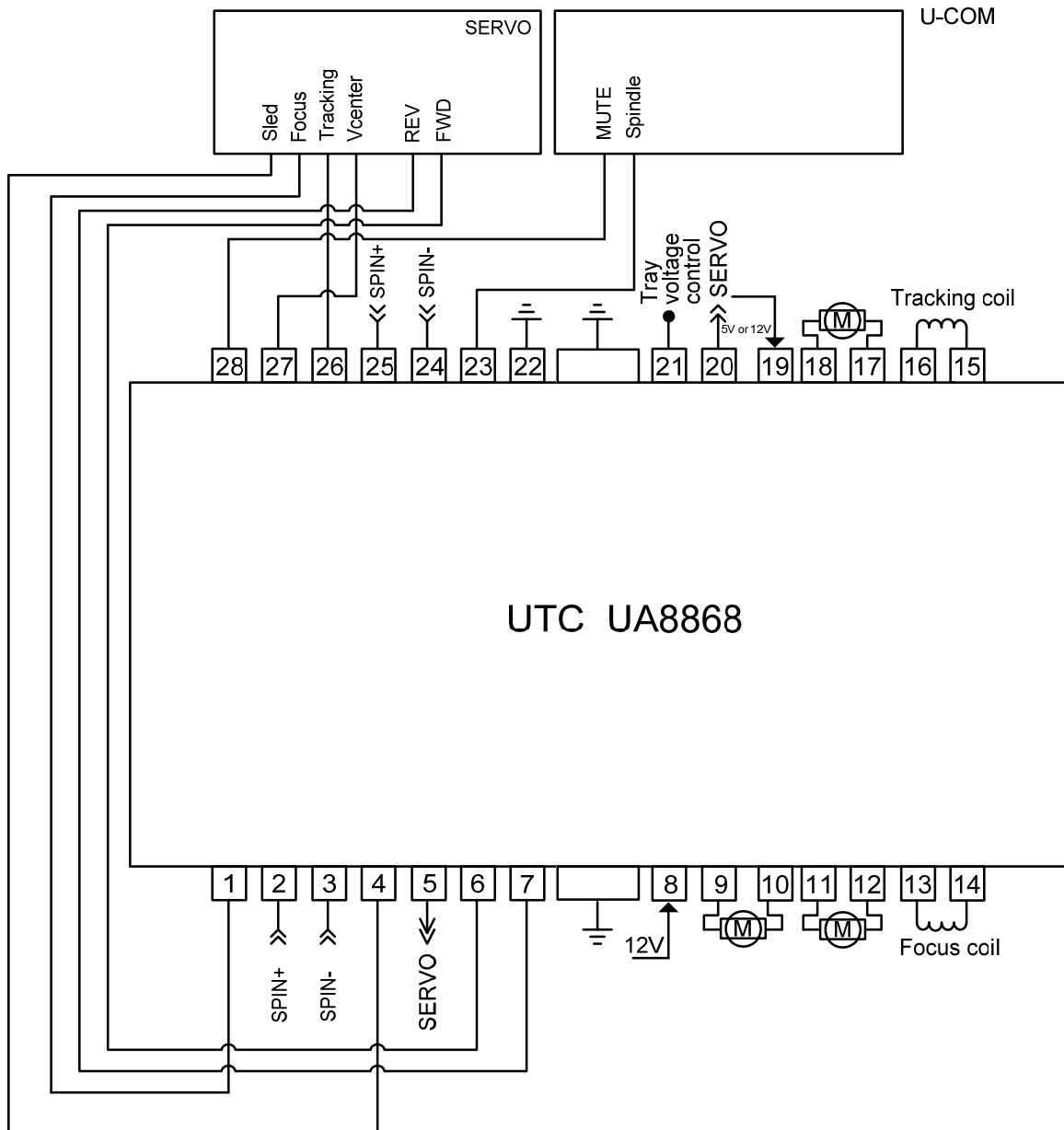
Tray driver logic input:

FWD (pin6)	REV (pin7)	VOL+ (pin10)	VOL- (pin9)	Function
L	L	OPEN	OPEN	Open mode
L	H	L	H	Reverse mode
H	L	H	L	Forward mode
H	H	L	L	Brake mode

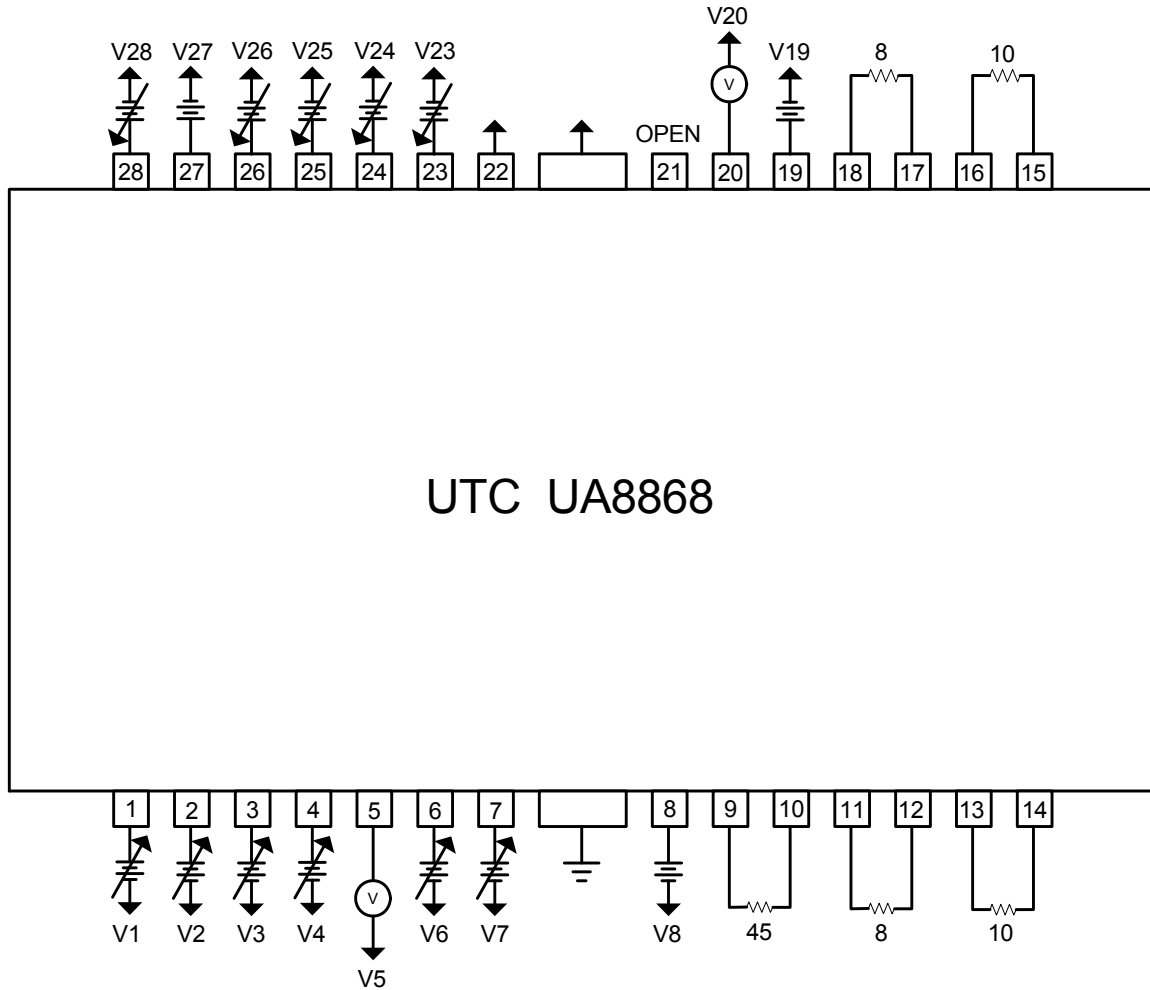
Input circuit of pin6 and pin7 is designed to avoid simultaneous activation of upper and lower output transistors.; however, in order to improve reliability, apply motor forward/reverse input once each input with time interval be longer than 10msec.

“H” Side output voltage (V<sub>OL+</sub>, V<sub>OL-</sub>) varies depending on output control terminal for tray (pin21),which is set about three times of V<sub>TCL</sub>(pin21) (9.2dB Typ.). And, “L” Side output voltage is equal to output saturation voltage for working mode. . And the “H” side and “L” side output voltage are both equal to V<sub>CC</sub>/2 when in open mode and brake mode.

APPLICATION CIRCUIT



TESTING CIRCUIT



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