



UA8888S

LINEAR INTEGRATED CIRCUIT

5-CHANNEL BTL DRIVER FOR DVD PLAYER

DESCRIPTION

The UTC **UA8888S** is a 5-channel BTL driver IC for DVD player. It is developed to driving the motors and actuators and consists of two independent precision voltage regulators with adjustable range from 1.5V~4V.

FEATURES

- * Voltage-type BTL drivers:
 - two channels : actuators of tracking and focus
 - two channels : sled and spindle motors.
 - one channel : bi-direction DC motor driver for tray.
- * Wide dynamic range:
 - 9.0V (typ.) when $V_{CC1}=V_{CC2}=12V$, at $R_L=20\Omega$ load.
 - 4.0V (typ.) when $V_{CC1}=12V, V_{CC2}=5V$, at $R_L=15\Omega$ load
- * Separating power of V_{CC1} and V_{CC2} is to improve power efficiency by a low supply voltage for tracking, focus, and spindle.
- * Built-in level shift circuit and mute mode.
- * Thermal shutdown protection.
- * Differential inputs for signal addition are provided by input OPs. The output structure for dual actuator driver is two power OP Amps in bridge configuration, and one OP Amp for Sled Motor Driver.
- * Spindle driver is a single input linear BTL driver. The output structure is two power OP Amps in bridge configuration.
- * Tray in-out driver functions as a DC motor driver supports forward/reverse control for tray motor.
- * Built-in regulator controllers: Adjustable range 1.5V ~ 4V

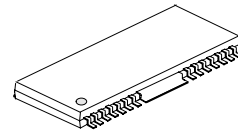
ORDERING INFORMATION

Ordering Number		Package	Packing
Normal	Lead Free Plating		
UA8888S-SH1-R	UA8888SL-SH1-R	HSOP-28	Tape Reel
UA8888S-SH1-T	UA8888SL-SH1-T	HSOP-28	Tube

UA8888SL-SH1-R

- (1)Packing Type
- (2)Package Type
- (3)Lead Plating

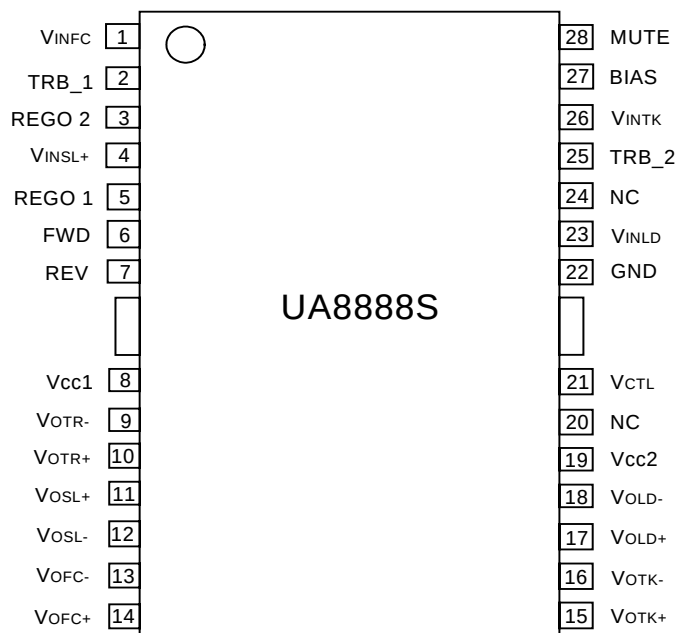
- (1) R: Tape Reel, T: Tube
- (2) SH1: HSOP-28
- (3) L: Lead Free Plating, Blank: Pb/Sn



HSOP-28

*Pb-free plating product number: UA8888SL

PIN CONFIGURATION

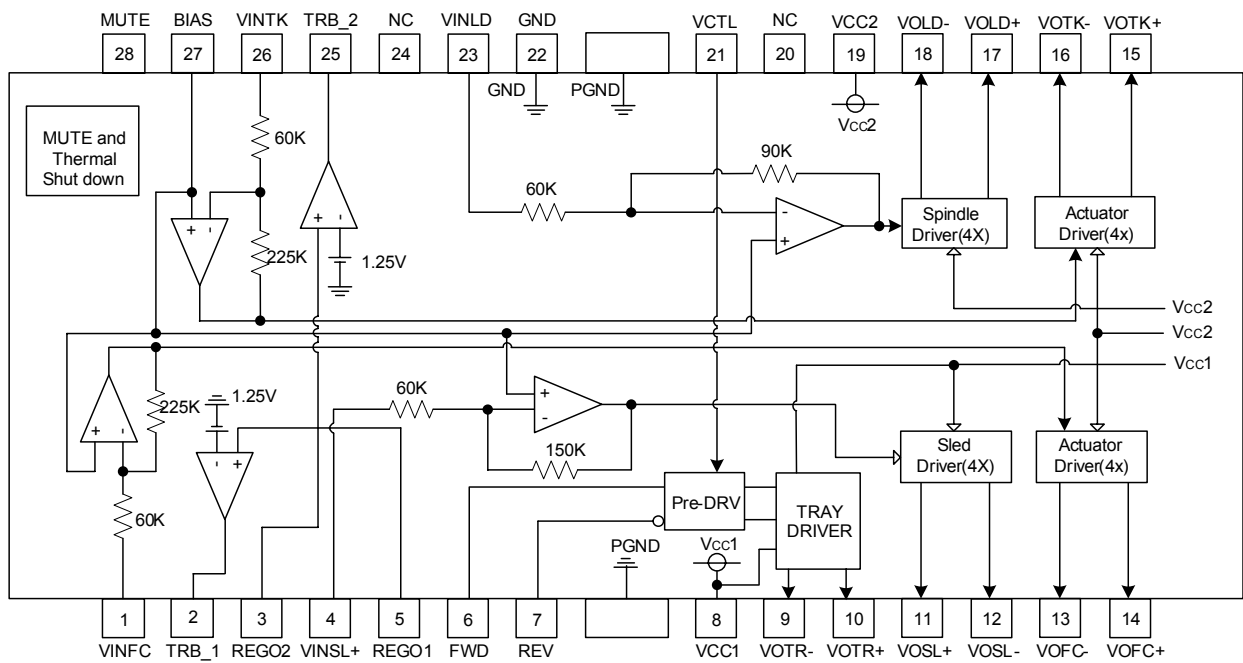


PIN DESCRIPTION

PIN NO.	PIN NAME	FUNCTION
1	V _{INFC}	Input for focus driver
2	TRB_1	Connect to external transistor base
3	REGO2	Regulator voltage output, connect to external transistor collector
4	V _{INSL+}	Input for the sled driver
5	REGO1	Regulator voltage output, connect to external transistor collector
6	FWD	Tray driver forward input
7	REV	Tray driver reverse input
8	V _{CC1}	Vcc for pre-drive block and power block of sled and tray
9	V _{OTR-}	Tray driver output (-)
10	V _{OTR+}	Tray driver output (+)
11	V _{OSL+}	Sled driver output (+)
12	V _{OSL-}	Sled driver output (-)
13	V _{OFC-}	Focus driver output (-)
14	V _{OFC+}	Focus driver output (+)
15	V _{OTK+}	Tracking driver output (+)
16	V _{OTK-}	Tracking driver output (-)
17	V _{OLD+}	Spindle driver output (+)
18	V _{OLD-}	Spindle driver output (-)
19	V _{CC2}	Vcc for power block of spindle, tracking and focus
20	NC	No Connection
21	V _{CTL}	Speed control input of tray driver
22	GND	Ground
23	V _{INLD}	Input for spindle driver
24	NC	No Connection
25	TRB_2	Connect to external transistor base
26	V _{INTK}	Input for tracking driver
27	BIAS	Input for reference voltage
28	MUTE	Input for mute control

Notes: Symbol of + and – (output of drivers) means polarity to input pin. (Ex. if voltage of pin1 is high, pin14 is high.)

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	15	V
Power Dissipation (Note) Derating Rate Ta>25°C	P _D	1.7 13.6	W mW / °C
Operate Temperature	T _{OPR}	-35 ~ +85	°C
Storage Temperature	T _{STG}	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ GUARANTEED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V _{CC1}	4.5~13.2	V
	V _{CC2}	4.5~V _{CC1}	V

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V_{CC1}=12V, V_{CC2}=5V, Bias=2.5V, R_L=8Ω/10Ω/20Ω/45Ω, unless otherwise specified.)

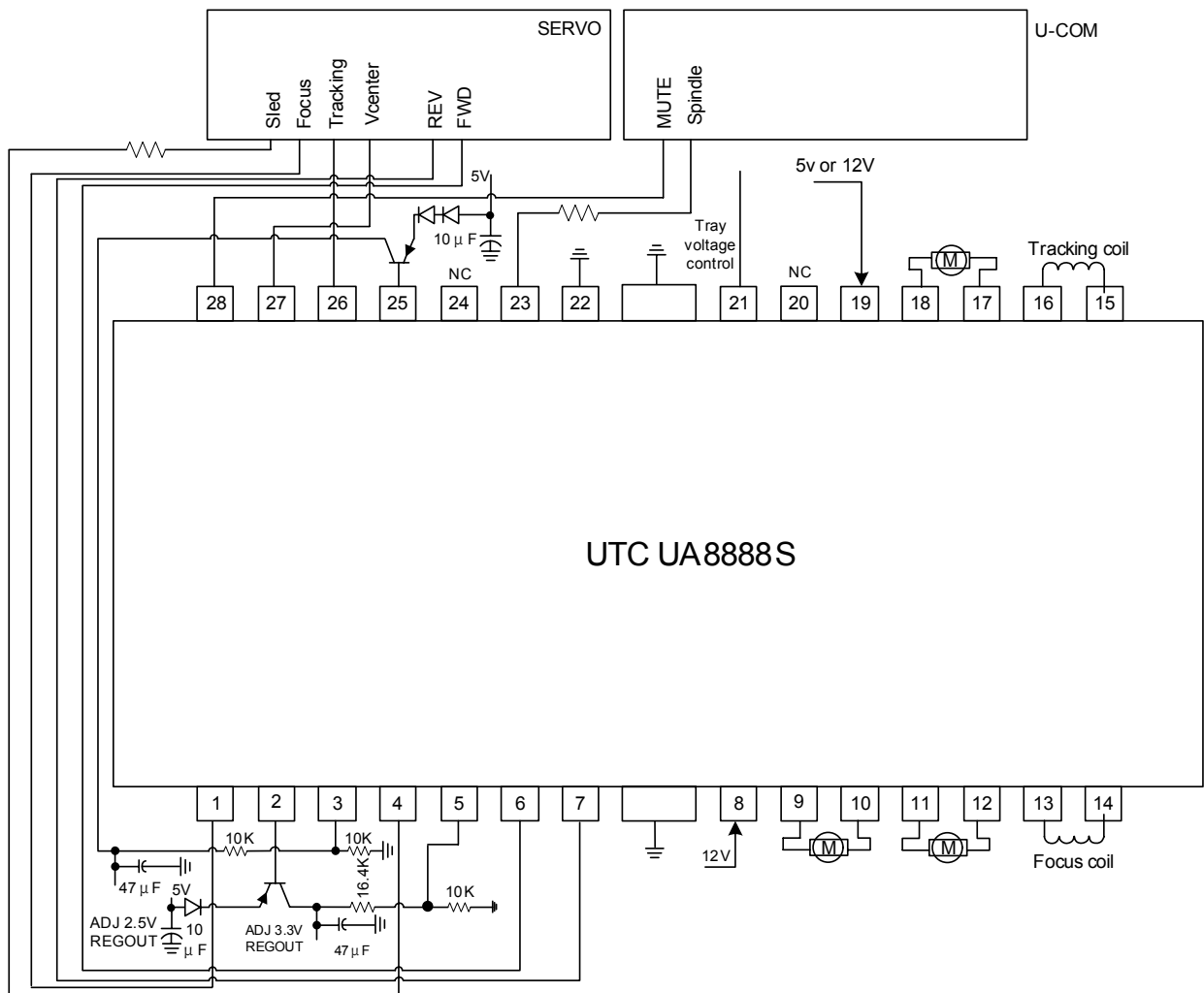
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Voltage for Mute	ON	V _{STON}		0		0.5	V
	OFF	V _{STOFF}		2.0		5	V
Quiescent Current		I _Q			25		mA
Actuator Drivers							
Output Offset Voltage		V _{O(OFF)}				±50	mV
Maximum Output Voltage		V _{O(MAX)}	@10Ω Load	3.6	4.0		V
Voltage Gain		G _V	V _{IN} =Bias+0.2Vpp ac @1KHz		23.5		dB
Sled Motor Driver							
Output Offset Voltage		V _{O(OFF)}				±100	mV
Maximum Output Voltage		V _{O(MAX)}	@20Ω Load	7.5	9.0		V
Closed Loop Voltage Gain		G _{V(CL)}	V _{IN} =Bias+0.2Vpp ac @1KHz	18	20	22	dB
Spindle Motor Driver							
Output Offset Voltage		V _{O(OFF)}				±50	mV
Maximum Output Voltage		V _{O(MAX)}	@8Ω Load		3.5		V
Voltage Gain		G _V	V _{IN} =Bias+0.2Vpp ac @1KHz	13.3	15.5	17.5	dB
Gain Error by Polarity		ΔG _V	V _{IN} =Bias+0.2Vpp ac @1KHz	0	1	2	dB
Tray Motor Driver							
Output Saturation Voltage		V _{O(SAT1)}	Upper + Lower saturation I _L =200mA	0.7	1.1	1.5	V
		V _{O(SAT2)}	Upper + Lower saturation I _L =500mA	1.0	1.55	2.2	V
Output Saturation Voltage Between F&R		ΔV _{O(SAT1)}	Output saturation voltage 1 between FWD and REV			0.1	V
Output Adjustable Gain on "H" Side Voltage		G _{V(ADJ)}	V _{CTL} =2V	7.4	9.2	11	dB
Tray Motor Driver Input Logic							
Level Input Voltage	High	V _{I(H)}		1.5		V _{CC}	V
	Low	V _{I(L)}		-0.3		0.5	V
High Level Input Current		I _{I(H)}	V _{FWD} =V _{REV} =5V		180	270	μA
Regulator (Note 2)							
Output Voltage		V _{OUT}	I _L = 500mA(Note 3)	1.5		4.0	V
Output Load Differential		ΔV _{O(DIFF)}	I _L = 0 ~ 500mA	-50	0	50	mV
Power supply Voltage Differential		ΔV _{VCC}	(V _{CC} =4.5~8V), I _L = 500mA	-25	0	25	mV

Note: 1. This device is not designed for protection against radioactive rays.

2. Based on 8550C PNP application.

3. Based on 8550D.

■ TYPICAL APPLICATION CIRCUIT



■ OPERATION NOTES

- (1) The thermal shutdown function will be triggered while the chip junction temperature reach 150°C typical, and then the output current is muted. The hysteresis is set to 25°C typical, so the circuit will start up again when the chip temperature falling to 125°C typical.
- (2) In case mute pin voltage is under 0.5V or NC, output current is muted except for tray motor driver. Mute pin voltage should be more than 2.0V for normal application.
- (3) Pin 27(Bias pin) should be pulled up to more than 1.2V. In case the bias pin voltage is pulled down below 0.9V(typ.), the output current is muted.
- (4) Insert the bypass capacitor (~0.1μF) between V_{CC} pin and GND pin as close as possible.
- (5) Ground-plane wiring up to GND is performed and should tightly connect to external GND.
- (6) Pin 20 and 24 should be floated due to reserve for internal test only.
- (7) When V_{cc1} voltage drop to below 3.8V, schematic is muted. The schematic will return to work when V_{cc1} rise up with a hysteresis of 0.3V(typ.)

(8) Tray driver logic input:

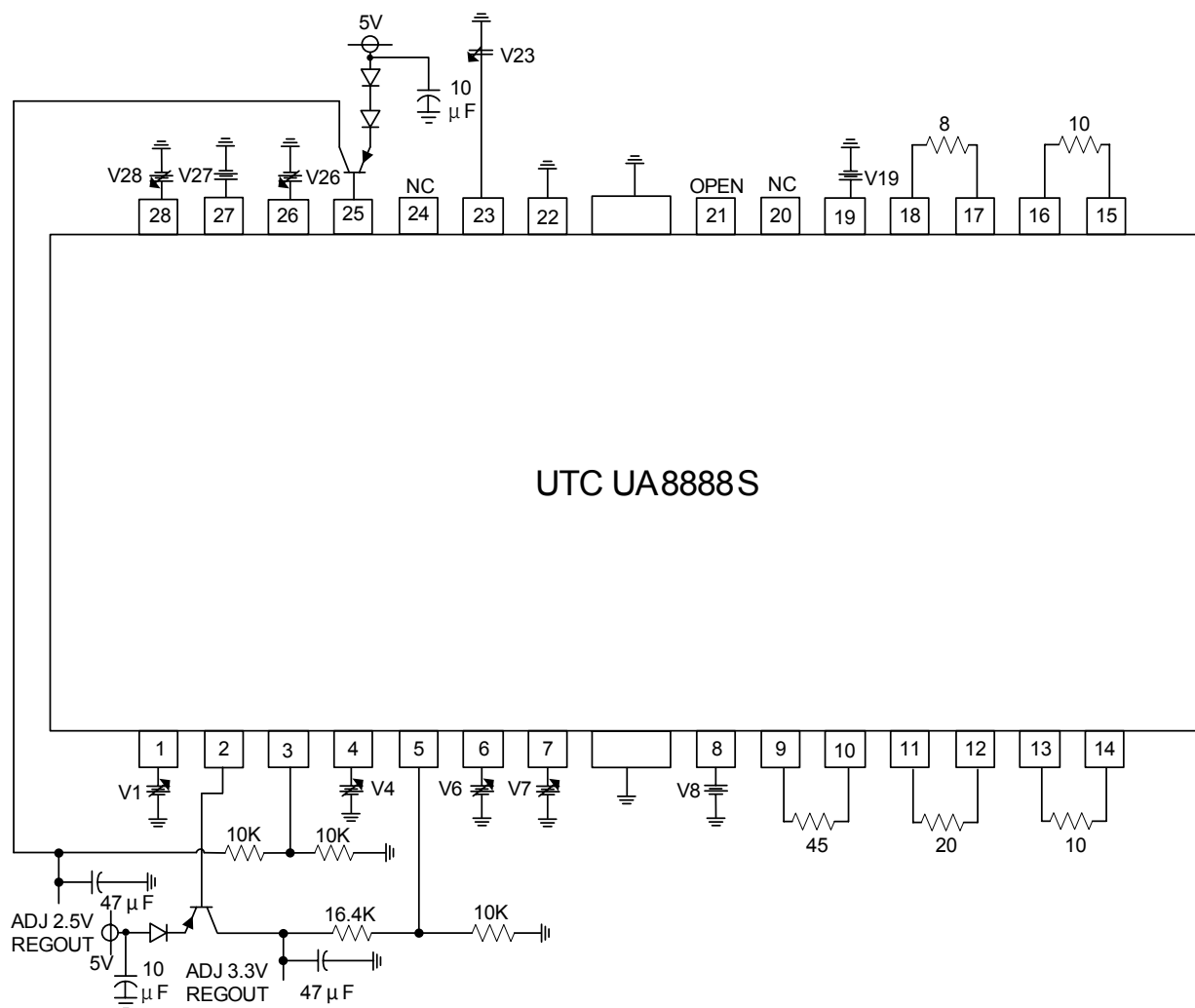
FWD (pin6)	REV (pin7)	V _{OTR+} (pin10)	V _{OTR-} (pin9)	Function
L	L	OPEN	OPEN	Open mode
L	H	L	H	Reverse mode
H	L	H	L	Forward mode
H	H	L	L	Brake mode

Pin 6 and Pin 7 are designed to avoid simultaneous activation of upper and lower output transistors, however, in order to improve reliability, apply motor forward/reverse input once through open mode.

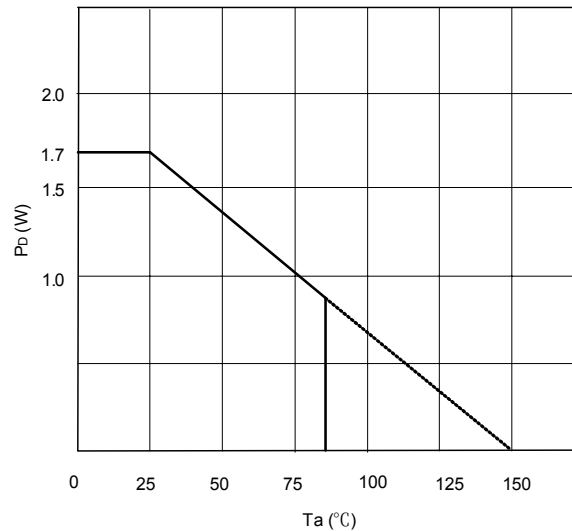
We recommend time period for open longer than 10msec.

The voltage between “H” side and “L” side output voltage is equal to three times(9.2dB Typ.) V_{TCL} voltage(Pin21). And the “H” side and “L” side output voltage both equal to V_{CC}/2 when in open mode and brake mode.

■ TESTING CIRCUIT



■ POWER DISSIPATION CURVE



- * 70mm×70mm×1.6mm glass epoxy board.
- * Reduced by 13.6mW /°C for operating in above 25°C.

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