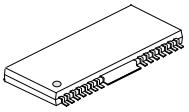
UA8954

LINEAR INTEGRATED CIRCUIT

4 CHANNEL BTL DRIVER FOR CD/CD-ROM



HSOP-28

■ FEATURES

* Wide dynamic range, (4.0V (typ.) at PreVcc=12V, PVcc=5V, R_L=8Ω)
* Level shift circuit built in.
* Thermal-shut-down circuit built in.
* UTC **UA8954** is a 4 channel driver for optical disc motor driver. Dual channel current feedback type drivers are built in, in addition to dual channel motor drivers.
* Stand-by mode built in.
* Separating Vcc into Pre+Power of sled motor, Power of loading motor and Power of actuator, can make better power efficiency, by low supply voltage drive.

<Actuator driver>
Current phase lag influenced load inductance is little, because this type is current feedback.

<Sled motor driver>
Input pins consist of (+) and (-), therefore various input types are available such as differential input.

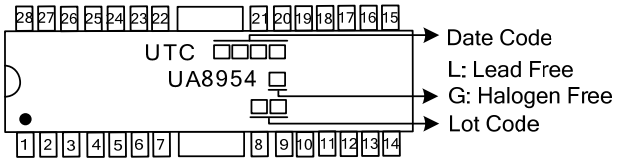
<Loading driver>
This is a single input linear BTL driver.

■ ORDERING INFORMATION

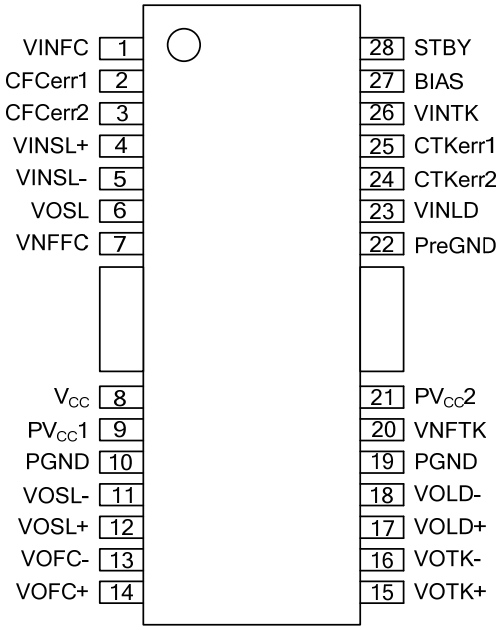
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UA8954L-SH1-T	UA8954G-SH1-T	HSOP-28	Tube

UA8954G-SH1-T (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) SH1: HSOP-28 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ PIN CONFIGURATION

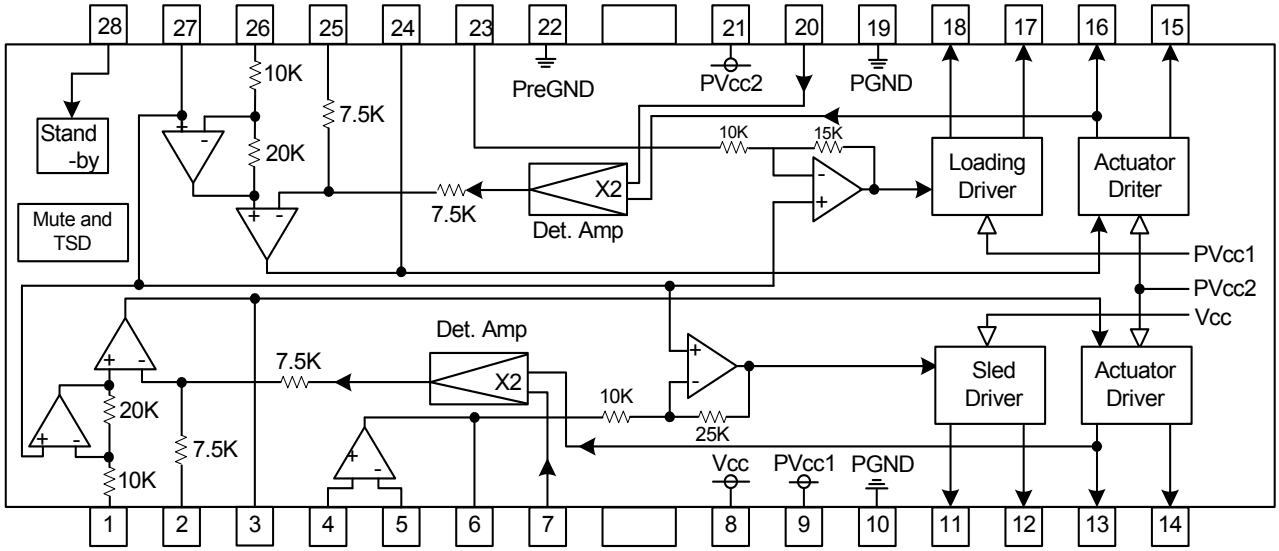


■ PIN DESCRIPTION

PIN NO.	PIN NAME	FUNCTION
1	VINFC	Input for focus driver
2	CFCerr1	Connection with capacitor
3	CFCerr2	For error amplifier
4	VINSL+	Non inverting Input for OP-amp
5	VINSL-	Inverting input for OP-amp
6	VOSL	Output of OP-amp
7	VNFFC	Feedback for focus driver
8	V_{CC}	V_{CC} for pre-drive block and power block of sled
9	$PV_{CC}1$	V_{CC} for power block of loading
10	PGND	GND for powr block
11	VOSL-	Inverted output of sled
12	VOSL+	Non inverted output of sled
13	VOFC-	Inverted output of focus
14	VOFC+	Non inverted output of focus
15	VOTK+	Non inverted output of tracking
16	VOTK-	Inverted output of tracking
17	VOLD+	Non inverted output of loading
18	VOLD-	Inverted output of loading
19	PGND	GND for power block
20	VNFTK	Feedback for tracking driver
21	PVcc2	V_{CC} for power block of actuator
22	PreGND	GND for pre-drive block
23	VINLD	Input for loading driver
24	CTKerr2	Connection with capacitor
25	CTKerr1	For error amplifier
26	VINTK	Input for tracking driver
27	BIAS	Input for reference voltage
28	STBY	Input for stand-by 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.)

■ BLOCK DAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}, $PV_{CC}1/2$	13.5	V
Power Dissipation	P_D	1.7 (Note 2)	W
Operating Temperature	T_{OPR}	-20 ~ +85	°C
Storage Temperature	T_{STG}	-65 ~ +125	°C

Notes: 1.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.
2. On less than 3% (percentage occupied by copper foil), 70×70mm^2 , t=1.6mm, glass epoxy mounting. Reduce power by 13.6mW for each degree above 25°C.

■ GUARANTEED OPERATING RANGES

(T_A=25°C, V_{CC}=5V, I_D=10mA, R_{CAL}=33KΩ, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	4.3 ~ 13.2	V
	P $V_{CC}1$	4.3 ~ V_{CC}	
	P $V_{CC}2$	4.3 ~ V_{CC}	

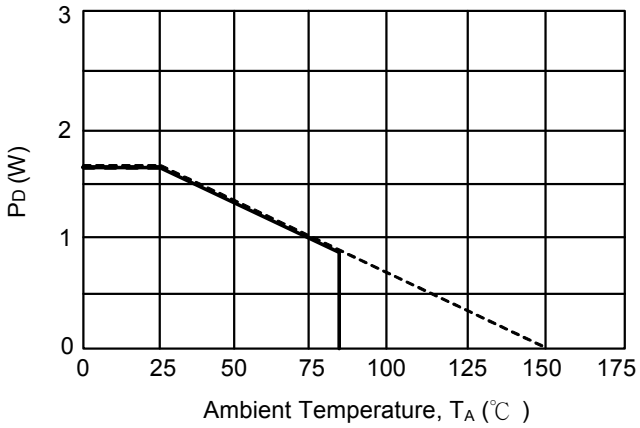
■ ELECTRICAL CHARACTERISTICS

(T_A=25°C, V_{CC}=12V, P $V_{CC}1$=P $V_{CC}2$=5V, BIAS=2.5V, R_L=8Ω, R_d=0.5Ω, C=100pF, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescont current	I_{CC}			18	27	mA
Stand-by quiescent current	I_{ST}				0.5	mA
Voltage for stand-by ON	V_{STON}				0.5	V
Voltage for stand-by OFF	V_{STOFF}		2.0			V
Actuator driver						
Output offset current	I_{OO}		-6		6	mA
Maximum output voltage	V_{OM}		3.6	4.0		V
Trans conductance	gm	V_{IN}= BIAS±0.2V	1.3	1.5	1.7	A/V
Sled motor driver/Pre OP-amp						
Common mode input range	V_{ICM}		-0.3		11.0	V
Input bias current	I_{BOP}			30	300	nA
Low Level output voltage	V_{OLOp}			0.1	0.3	V
Output source current	I_{SO}		0.3	0.5		mA
Output sink current	I_{ST}		1			mA
Sled motor driver						
Output offset voltage	V_{OOFSL}		-100	0	100	mV
Maximum output voltage	V_{OMLD}		7.5	9.0		V
Closed loop voltage gain	G_{VSL}	V_{IN}=±0.2V	18.0	20.0	22.0	dB
Loading motor driver						
Output offsct voltage	V_{OOFLD}		-50	0	50	mV
Maximum output voltage	V_{OMLD}		3.6	4.0		V
Closed loop voltage gain	G_{VLD}	V_{IN}= BIAS±0.2V	13.5	15.5	17.5	dB
Gain error by polarity	$\triangle G_{VLD}$	V_{IN}= BIAS±0.2V	0	1	2	dB

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

■ POWER DISSIPATION/ELECTRICAL CHARACTERISTIC CURVES



* On less than 3% (percentage occupied by copper foil), 70 ×70 mm^2 , t=1.6mm glass epoxy mounting.

■ SWITCH TABLE

PARAMETER	SW	INPUT VOLTAGE					CONDITIONS	MEASURE POINT
		VIN1	VIN2	VIN3	VIN4	VST		
Qulescent current	1	2.5V	2.5V	2.5V	2.5v	5.0V		IQ
Stand-by qulescent curront	1	2.5V	2.5V	2.5V	2.5V	0.5V		IQ
Voltage for stand-by ON	1	2.5V	2.5V	2.5V	2.5V	0.5V		IQ
Voltage for stand-by OFF	1	2.5V	2.5V	2.5V	2.5V	2.0V		IQ
Actuator driver								
Output offect current	1	2.5V	2.5V	2.5V	2.5V	5.0V		V01/2
Maximum output voltage	1	0V 5V	0V 5V	2.5V	2.5V	2.5V		V01/2
Trans conductance	1	2.3V 2.7V	2.3V 2.7V	2.5V	2.5V	2.5V		V01/2
Send motor driver								
nput bias current	2	2.5V	2.5V	2.5V	2.5V	5.0V		VBOP/1M
Low level output voltage	1	2.5V	2.5V	0V	2.5V	5.0V		VOOP
Output source current	1	2.5V	2.5V	2.5V	2.5V	5.0V	I_{OOP}= +0.2mA	VOOP
Output sink current	1	2.5V	2.5V	2.5V	2.5V	5.0V	I_{OOP}= -1mA	VOOP
Output offset voltage	1	2.5V	2.5V	2.5V	2.5V	5.0V		Vo3
Maximum output voltage	1	2.5V	2.5V	0V 5V	2.5V	5.0V		V_O3
Closed loop voltage gain	1	2.5V	2.5V	2.3V 2.7V	2.5V	5.0V		V_O3
Loading driver								
Output offsct voltage	1	2.5V	2.5V	2.5V	2.5V	5.0V		V_O4
Maximum output voltage	1	2.5V	2.5V	2.5V	0V 5V	5.0V		V_O4
Voltage Gain	1	2.5V	2.5V	2.5V	2.3V 2.7V	5.0V		V_O4

Notes on use:

1. Thermal-shut-down circuit built-in. In case IC chip temperature rise to 175°C (typ.), thermal-shut-down circuit operates and output current is muted. Next time IC chip temperature falls below 150°C (typ.), the driver blocks start.
2. In case stand-by –pin voltage under 0.5V or opened, quicscent current is muted. Stand-by-pin voltage should be over 2.0V for normal application.
3. In case supply voltage falls below 3.5V (typ.), output current is muted. Next time supply voltage reses to 3.7V (typ.), the driver blocks start.
4. Bias-pin (pin27) should be pulled up more than 1.2V, In case bias-pin voltage is pulled down under 0.9V (typ.), output current is muted.
5. Insert the by-pass capacitor between Vcc-pin and GND-pin of IC as possible as near (approximately 0.1μF).
6. Heat dissipation fins are attached to the GND on the inside of the package, Make sure to connect these to the external GND.

<Supplement>

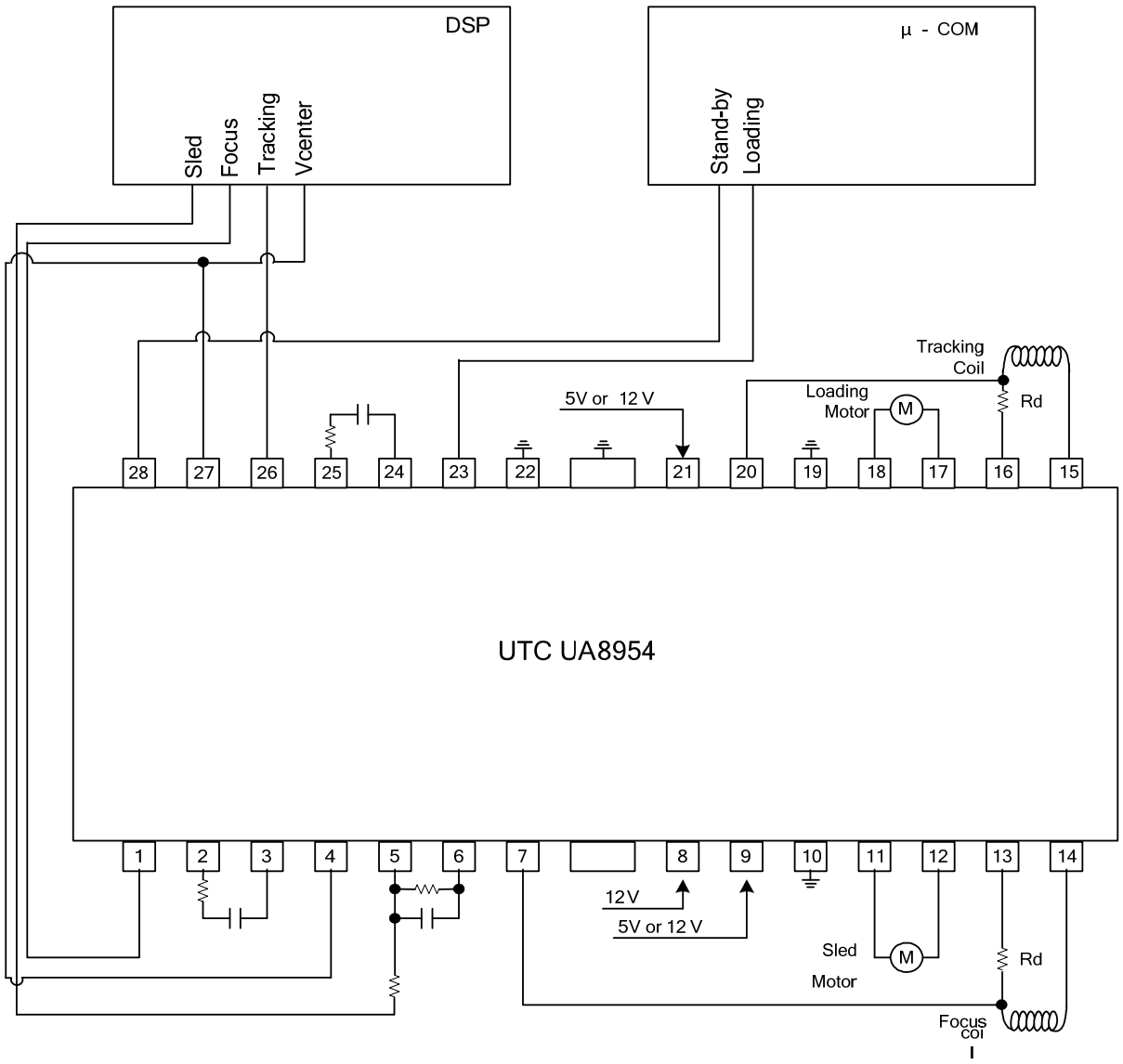
Current feedback driver

Trans conductance (output current /input voltage) is showed as follows.

$$g_m = \frac{1}{R_d + R_{wire}} \text{ (A / V)}$$

R_{wire}=0.15Ω (±0.05Ω): Au wire

■ APPLICATION CIRCUIT



■ TEST CIRCUIT