

**Features**

- 2 channels of DC motor BTL driver
- 2 channels of BTL driver for coils with current feedback
- Built-in suspension function.
- Built-in thermal shutdown circuit.
- Operating voltage: 4.5V~13.2V

**Description**

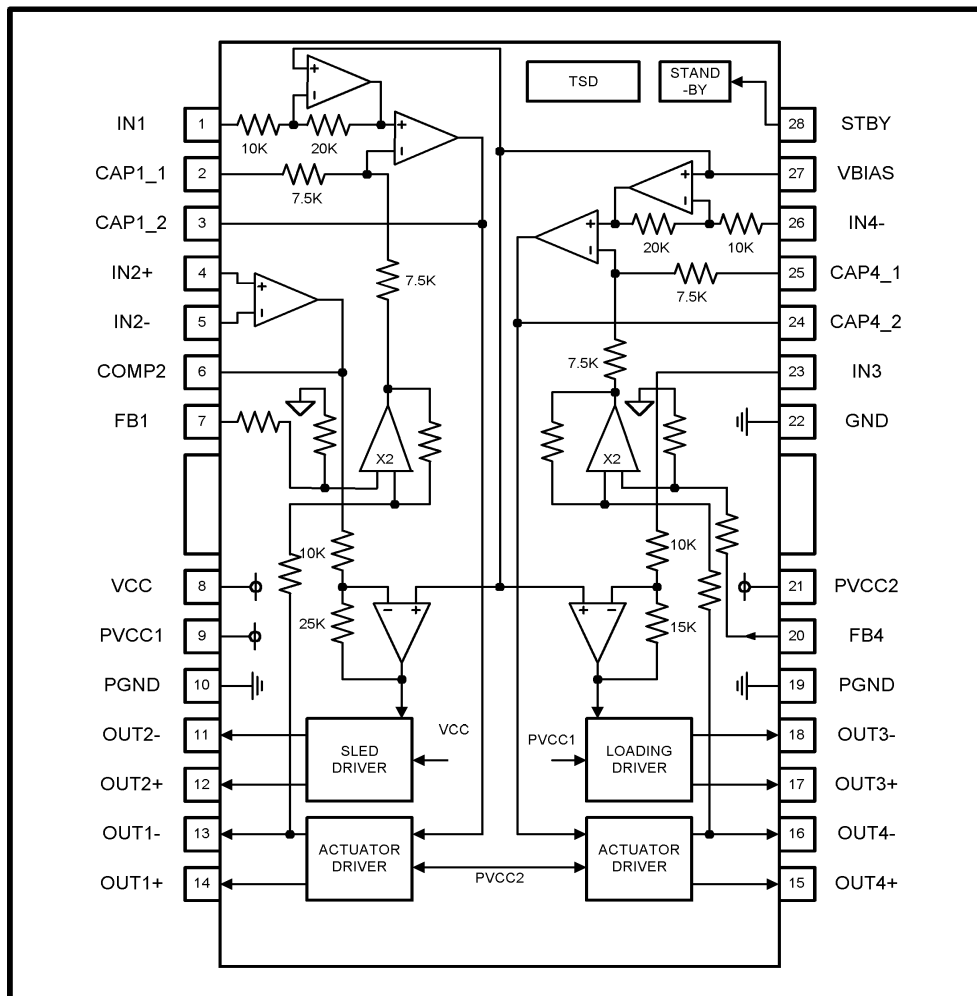
The AT5654 is a 4-channel BTL driver IC. Two of them can drive DC motors and two can drive coils, such as the focus and tracking actuators of a CD-ROM/DVD-ROM/DVD-Player system, with current feedback.

**Applications**

CD-ROM/DVD-ROM/CD-RW drives  
DVD player.

*\* Protected by TW IC Layout/Reg. No. 927*

**Block Diagram**



**Aimtron reserves the right without notice to change this circuitry and specifications.**

**Pin Descriptions**

Pin No.	Pin name	Function
1	IN1	CH1(Focus coil) input
2	CAP1_1	CH1 error amplifier filter capacitor connection 1
3	CAP1_2	CH1 error amplifier filter capacitor connection 2
4	IN2+	CH2(Sled driver) input (+)
5	IN2-	CH2(Sled driver) input (-)
6	COMP2	CH2(Sled driver) pre-amplifier output
7	FB1	CH1(Focus coil) feedback pin
8	VCC	Power Supply
9	PVCC1	Power Supply 2
10	PGND	Ground
11	OUT2-	CH2(Sled driver) output (-)
12	OUT2+	CH2(Sled driver) output (+)
13	OUT1-	CH1(Focus coil) output (-)
14	OUT1+	CH1(Focus coil) output (+)
15	OUT4+	CH4(Tracking coil) output (+)
16	OUT4-	CH4(Tracking coil) output (-)
17	OUT3+	CH3(Loader) output (+)
18	OUT3-	CH3(Loader) output (-)
19	PGND	Ground
20	FB4	CH4(Tracking coil) feedback pin
21	PVCC2	Power Supply 2
22	GND	Ground
23	IN3	CH3(Loader) input
24	CAP4_2	CH4 error amplifier filter capacitor connection 2
25	CAP4_1	CH4 error amplifier filter capacitor connection 1
26	IN4-	CH4 (Tracking driver) input
27	VBIAS	VREF input pin
28	STBY	Stand-by control pin

Notes: The indicated polarities for the output pins are under the condition that all inputs are (+).  
The power supplies for the driver output are PVcc1 for the loader, PVcc2 for focus and tracking drivers, and Vcc for pre-block and sled driver. Therefore, make sure  $V_{cc} \geq PV_{cc1,2}$ .

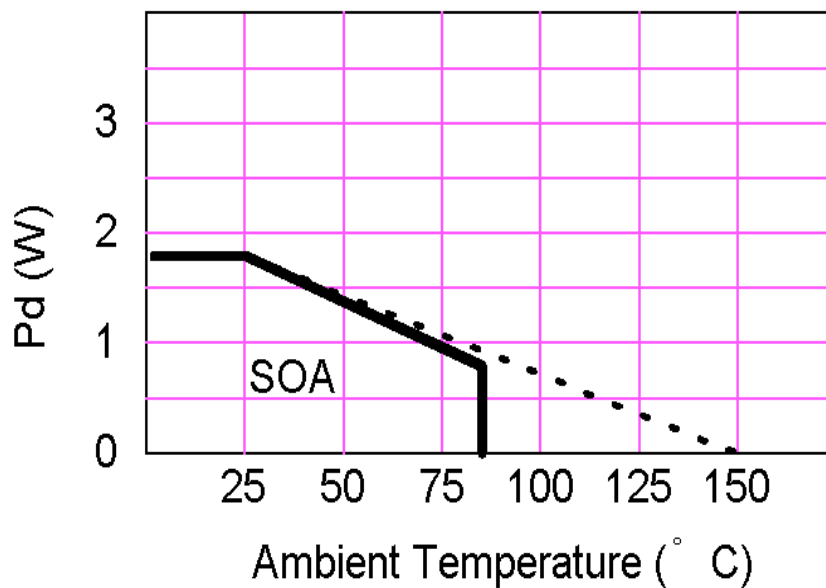
**Pin Out**



**Ordering Information**

Part number	Package	Marking
AT5654H	28-pin HSOP	AT5654H
AT5654H_PBF	28-pin HSOP, PB-Free	AT5654H, Date Code with one bottom line

**Power Dissipation (Ta = 25°C)**



Condition: mount on 50x50 mm<sup>2</sup> t=1.0mm paper phenol PCB

**Absolute maximum ratings (Ta = 25°C)**

Parameter	Symbol	Limits	unit
Power supply voltage	VCC,PVCC1,2	13.5	V
Power dissipation	P <sub>d</sub>	1.7	W
Operating temperature	T <sub>opr</sub>	-30~+80	°C
Storage temperature	T <sub>stg</sub>	-55~+150	°C

**Recommended operating conditions (Ta = 25°C)**

Parameter	Symbol	Limits	unit
Power supply voltage	VCC	4.0~13.2	V
	PVCC1	4.0~Vcc	V
	PVCC2	4.0~Vcc	V

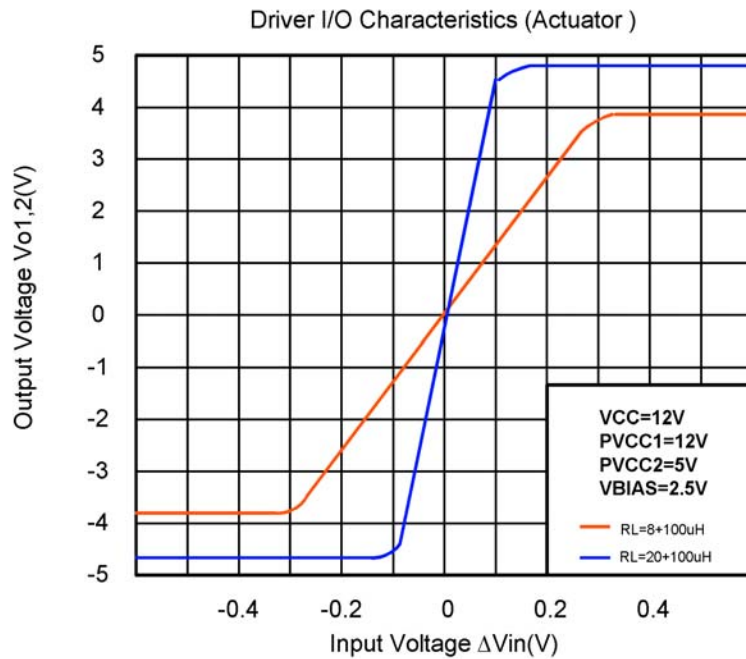
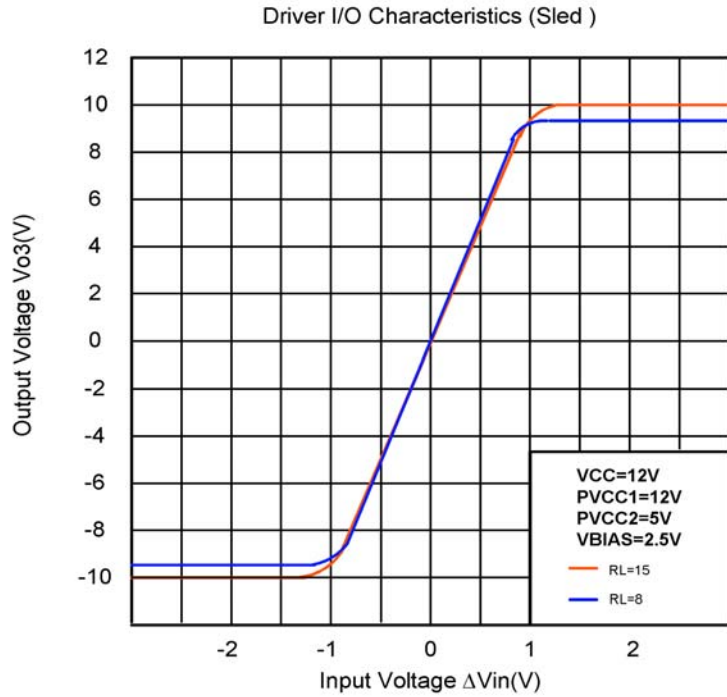
**Electrical characteristics**

(unless otherwise noted, Ta = 25°C, VCC = PVCC1 = 12V, PVCC2 = 5V, VBIAS = 2.5V, R<sub>L1</sub> = R<sub>L2</sub> = 8Ω, R<sub>L3</sub> = R<sub>L4</sub> = 15Ω)

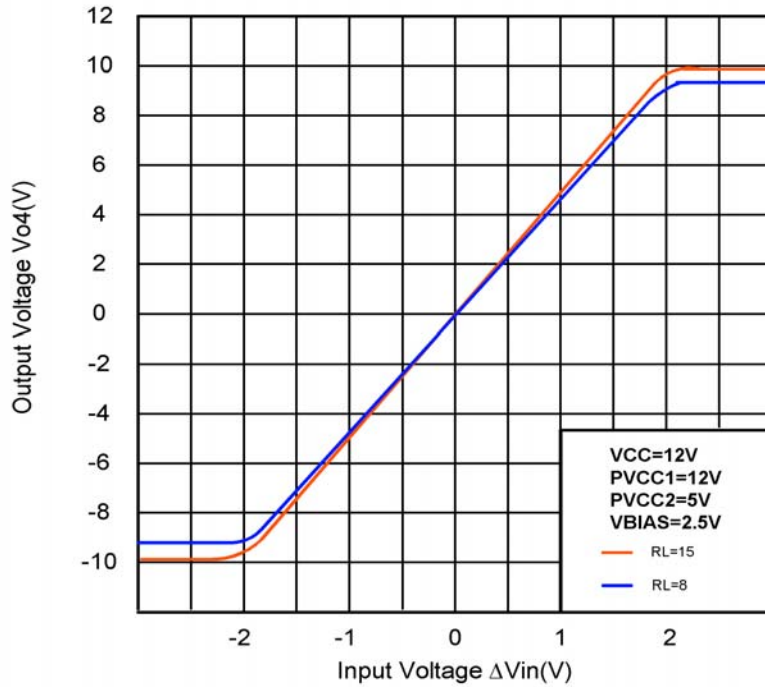
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I <sub>OC</sub>	-	18	27	mA	
Stand-by quiescent current	I <sub>OSB</sub>	-	-	0.5	mA	
Stand-by ON voltage	V <sub>SBON</sub>	0	-	0.5	V	
Stand-by OFF voltage	V <sub>SBOFF</sub>	2.0	-	-	V	
<b>&lt;Actuator driver&gt;</b>						
Output current offset	I <sub>O1,2</sub>	-6	-	6	mA	
Maximum output voltage	V <sub>O1,2</sub>	3.6	4.0	-	V	V <sub>IN</sub> = VBIAS ±1.5V
Gain	G <sub>m</sub>	1.3	1.5	1.7	A/V	V <sub>IN</sub> = VBIAS ±0.2V
<b>&lt;Sled motor driver/Pre OP-amp&gt;</b>						
Input common mode range	V <sub>ICM</sub>	-0.3	-	11.0	V	VBIAS = 6V
	V <sub>ICM</sub>	-0.3	-	4.0	V	VCC = PVCC = 5V
Input bias current	I <sub>B</sub>	-	-30	-300	nA	
Low level output voltage	V <sub>OLOP</sub>	-	0.1	0.3	V	
Output source current	I <sub>SOURCE</sub>	-0.3	-0.5	-	mA	
Output sink current	I <sub>SINK</sub>	-	-	-	mA	
<b>&lt;Sled motor driver&gt;</b>						
Output voltage offset	V <sub>OFFSL</sub>	-100	0	100	mV	
Maximum output voltage	V <sub>O3MAX</sub>	7.5	9.0	-	V	V <sub>IN</sub> = VBIAS ±1.5V
Closed loop gain	G <sub>VSL</sub>	18.0	20.0	22.0	dB	V <sub>IN</sub> = VBIAS ±0.2V
<b>&lt;Loader motor driver&gt;</b>						
Output voltage offset	V <sub>OFFLD</sub>	-50	0	50	mV	
Maximum output voltage	V <sub>O4max1</sub>	7.5	9.0	-	V	V <sub>IN</sub> = VBIAS ±2.0V
Maximum output voltage	V <sub>O4max2</sub>	3.6	4.0	-	V	V <sub>IN</sub> = VBIAS ±1.5V VCC = PVCC1 = 5V
Closed loop gain	G <sub>VLD</sub>	13.5	15.5	17.5	dB	V <sub>IN</sub> = VBIAS ±0.2V
Gain error	ΔG <sub>VLD</sub>	0	1	2	dB	V <sub>IN</sub> = VBIAS ±0.2V

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

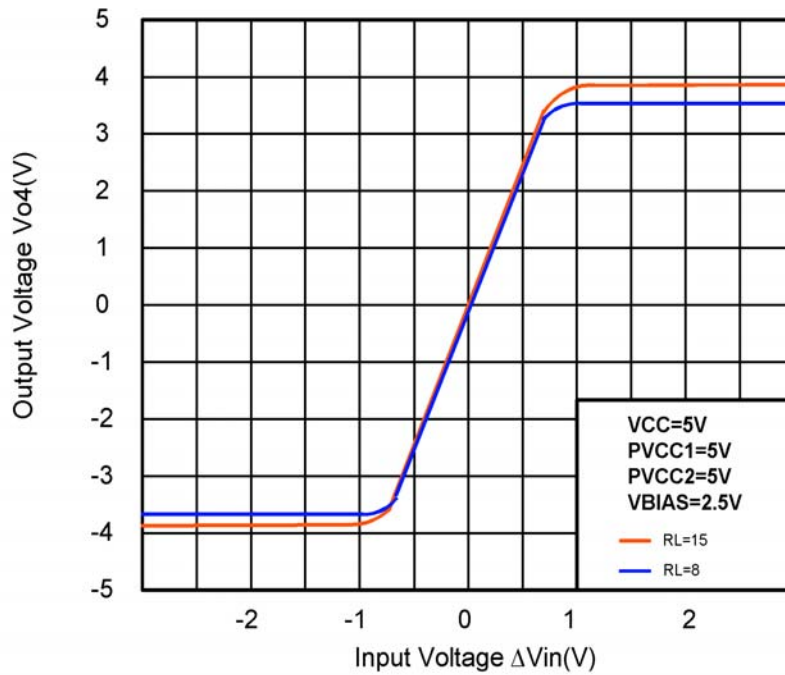
Typical Curve

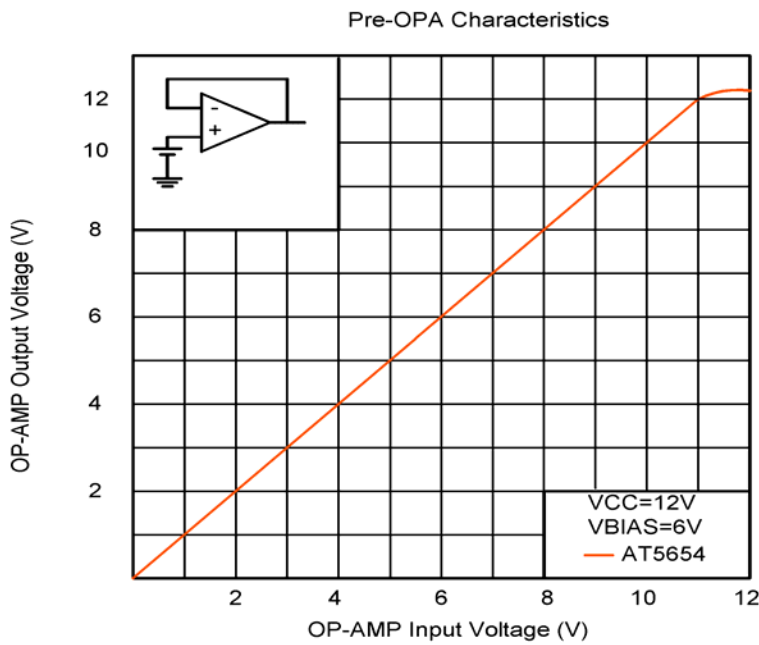
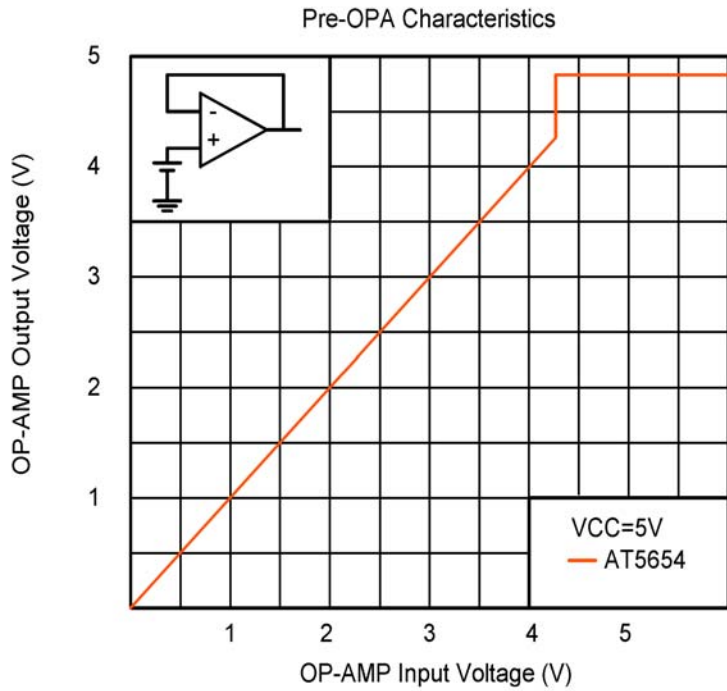


Driver I/O Characteristics (Loading )

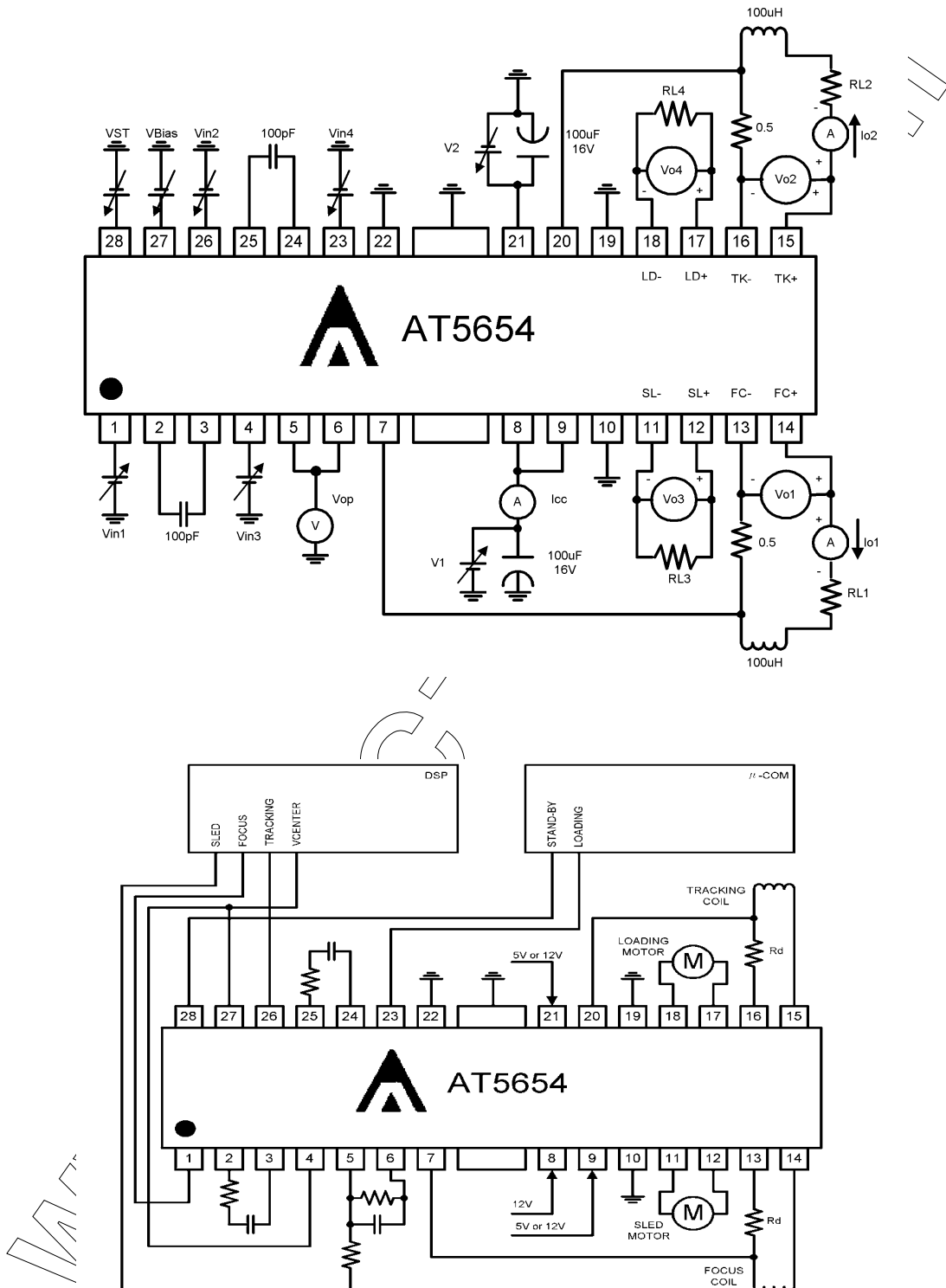


Driver I/O Characteristics (Loading )



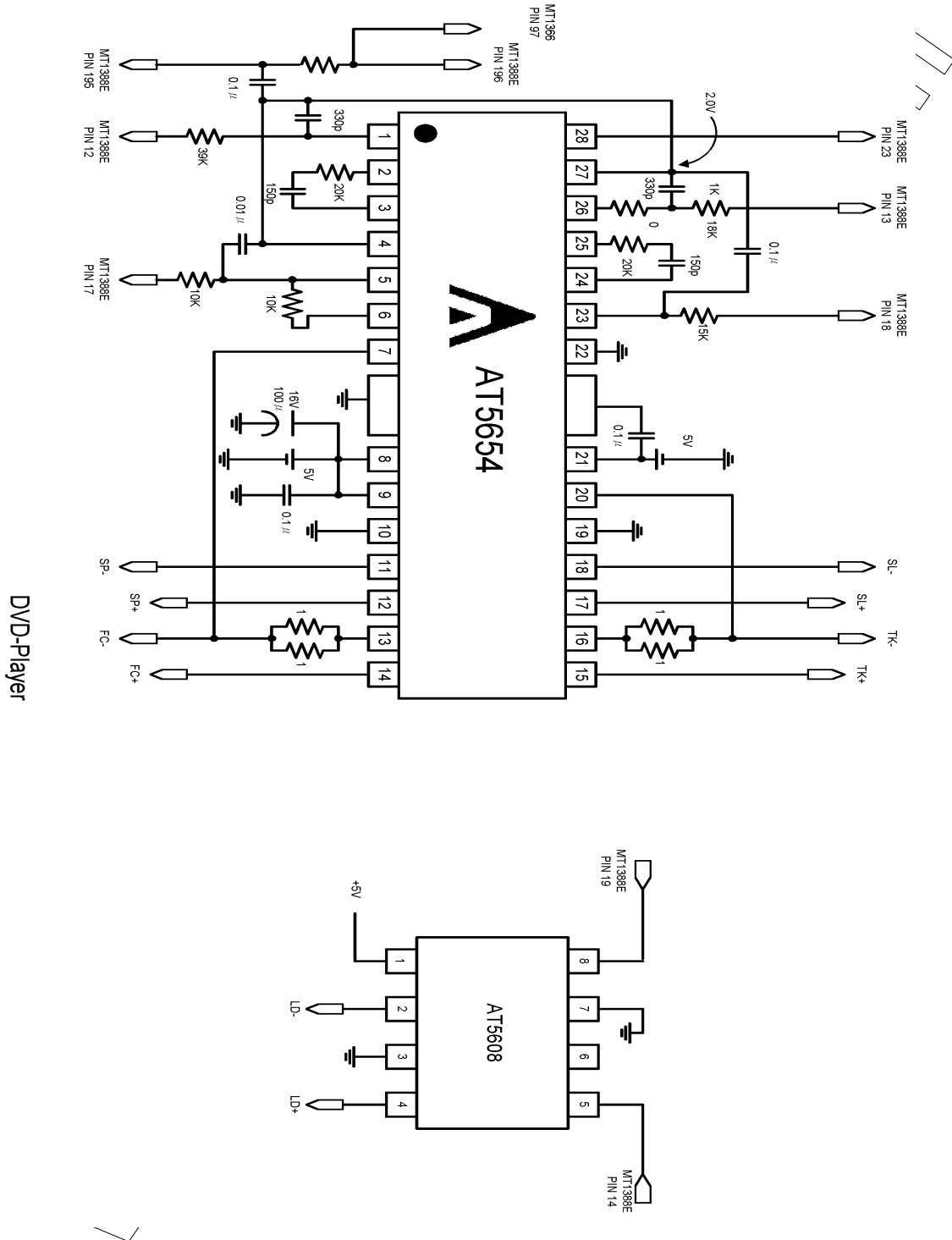


**Test Circuit**

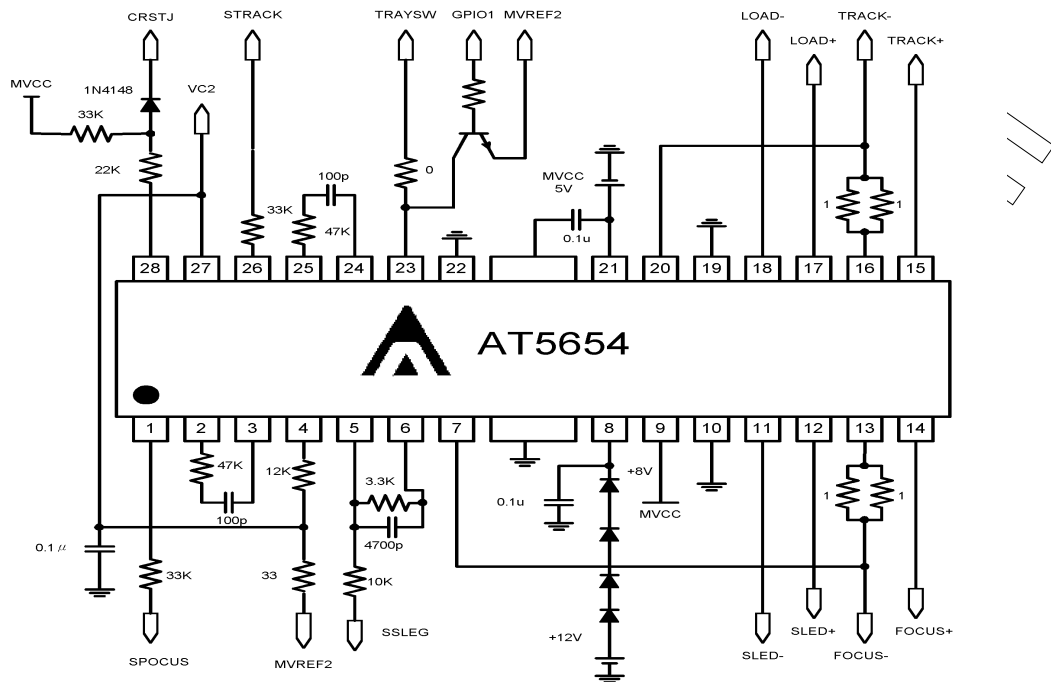




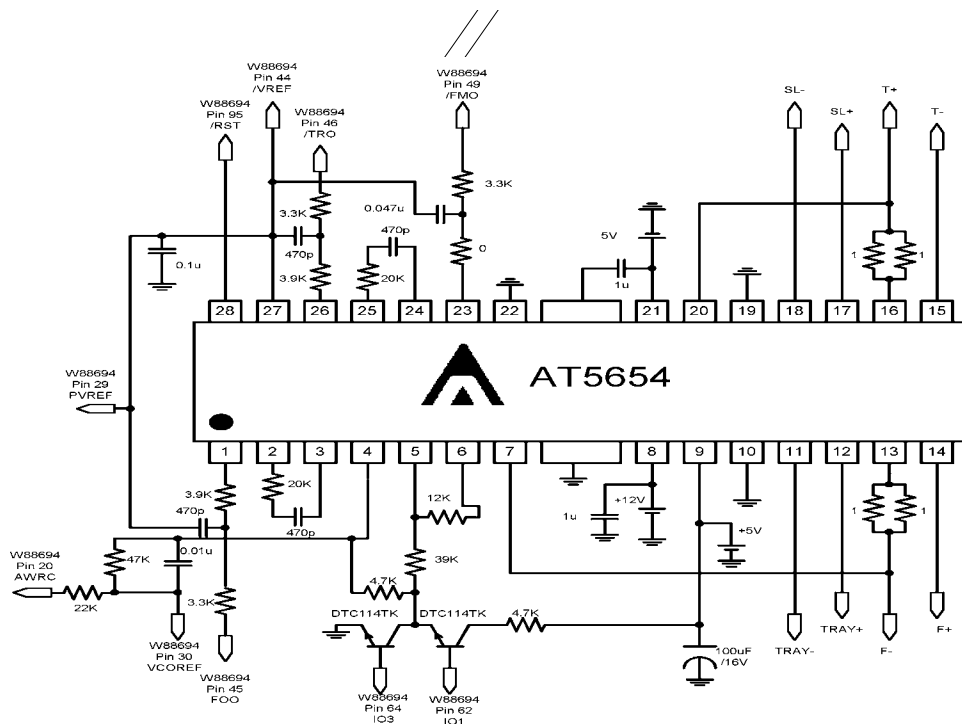
Application example



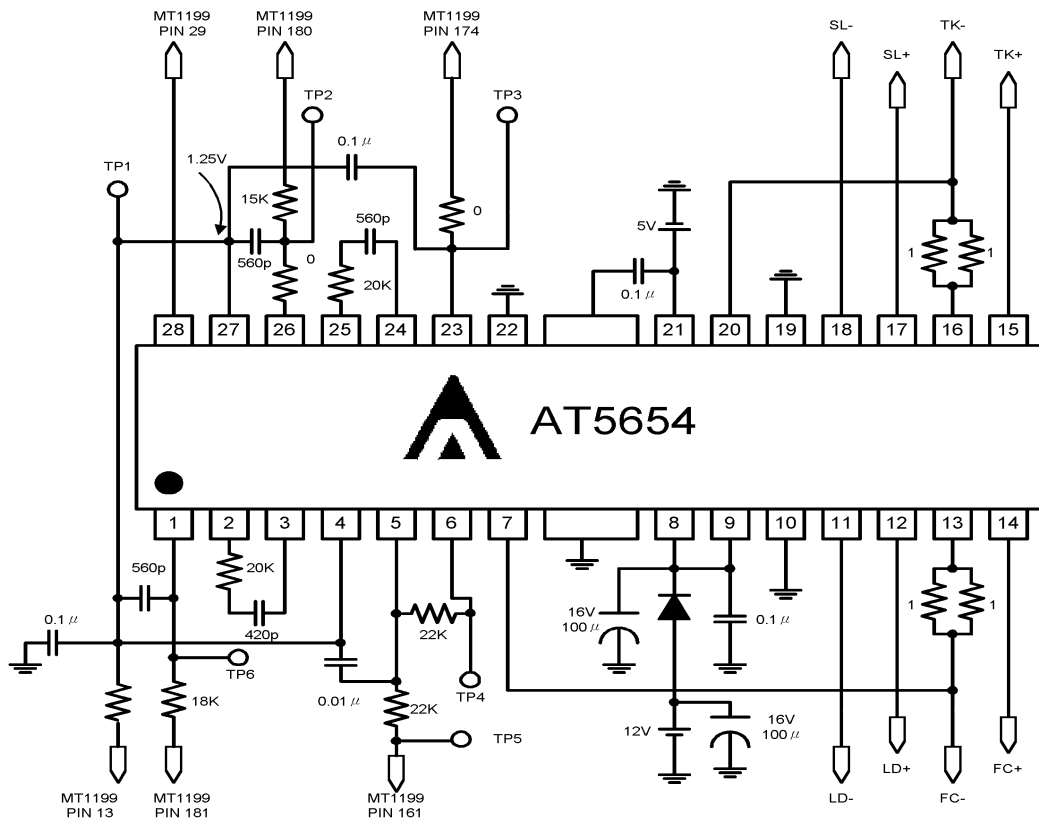
DVD-Player



DVD-PLAYER LOADER  
ALI Solution(AT5654+BA6849)



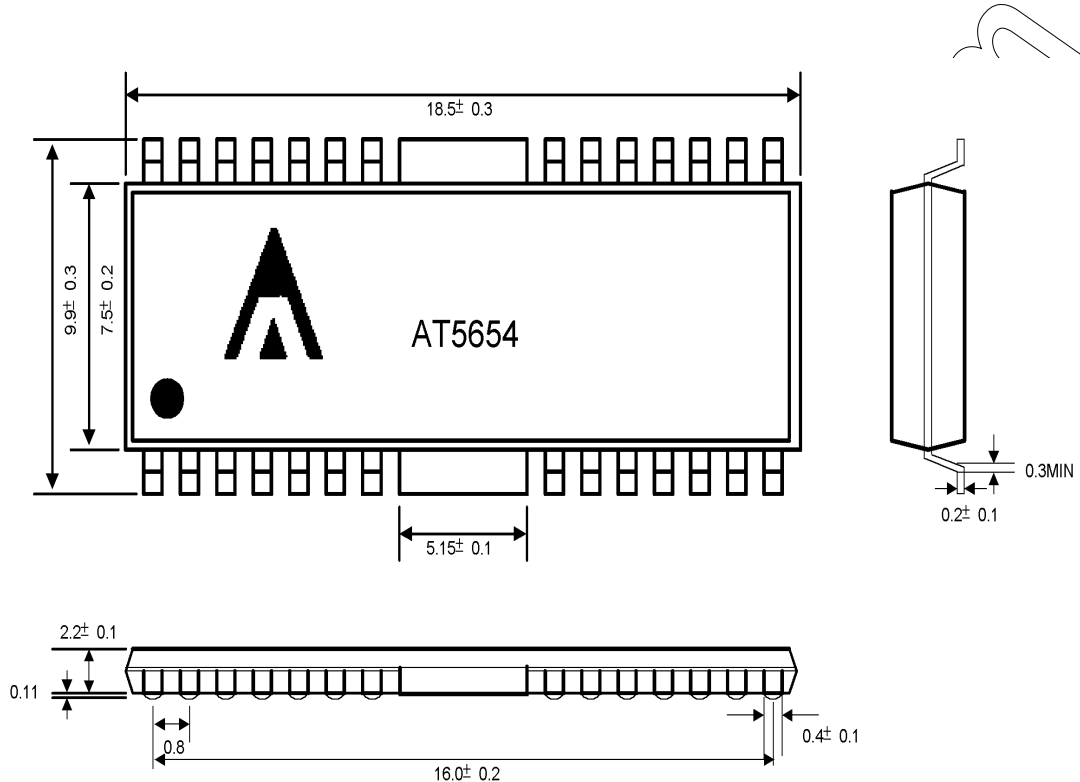
52X CD-ROM  
(Winbond W88227+W88694+AT5654+TA8499)



52X CD-ROM

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**Package Outlines (units:mm): HSOP-28**



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