5-CHANNEL MOTOR DRIVER FOR DVD PLAYER AM5665

General Description

The AM5665 is a 5-channel BTL driver IC, in which two channels drive DC motor, two channels with current feedback drive the coils, such as the focus and the tracking actuator of DVD player, and the other one channel drives the bi-direction DC motor for tray.

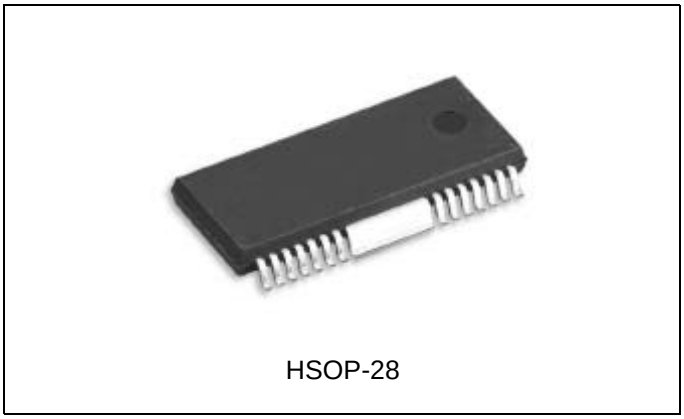
The AM5665 is available in standard HSOP-28 package.

Features

- 2-Channel DC Motor BTL Driver
- 2-Channel BTL Driver for Coils with Current Feedback
- 1-Channel Forward/Reverse Control DC Motor Driver
- Built-in Thermal Shutdown Circuit
- Built-in Standby Circuit
- Operating Voltage: 4.5 to 8.0V

Applications

- DVD Player



HSOP-28

Figure 1. Package Type of AM5665

Pin Configuration

M Package
(HSOP-28)

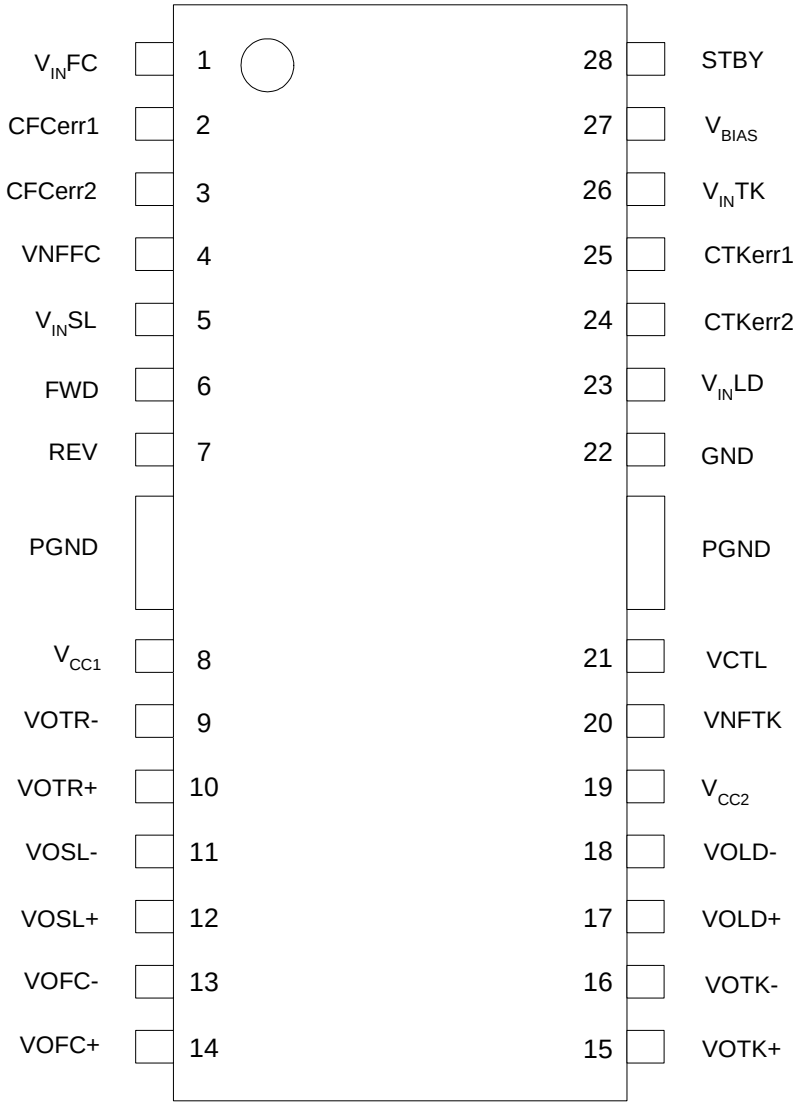


Figure 2. Pin Configuration of AM5665 (Top View)

Pin Description

Pin Number	Pin Name	Function
1	$V_{IN}FC$	Focus driver input
2	CFCerr1	Capacitor connection 1 for the error amp filter of focus channel
3	CFCerr2	Capacitor connection 2 for the error amp filter of focus channel
4	VNFFC	Focus driver feedback pin
5	$V_{IN}SL$	Sled driver input
6	FWD	Tray driver forward input
7	REV	Tray driver reverse input
8	V_{CC1}	Power supply 1
9	VOTR-	Tray driver output (-)
10	VOTR+	Tray driver output (+)
11	VOSL-	Sled driver output (-)
12	VOSL+	Sled driver output (+)
13	VOFC-	Focus driver output (-)
14	VOFC+	Focus driver output (+)
15	VOTK+	Tracking driver output (+)
16	VOTK-	Tracking driver output (-)
17	VOLD+	Loading driver output (+)
18	VOLD-	Loading driver output (-)
19	V_{CC2}	Power supply 2
20	VNFTK	Tracking driver feedback pin
21	VCTL	Tray driver speed control pin
22	GND	Ground
23	$V_{IN}LD$	Loading driver input
24	CTKerr2	Capacitor connection 2 for the error amp filter of tracking channel
25	CTKerr1	Capacitor connection 1 for the error amp filter of tracking channel
26	$V_{IN}TK$	Tracking driver input
27	V_{BIAS}	VREF input pin
28	STBY	Stand-by control

Functional Block Diagram

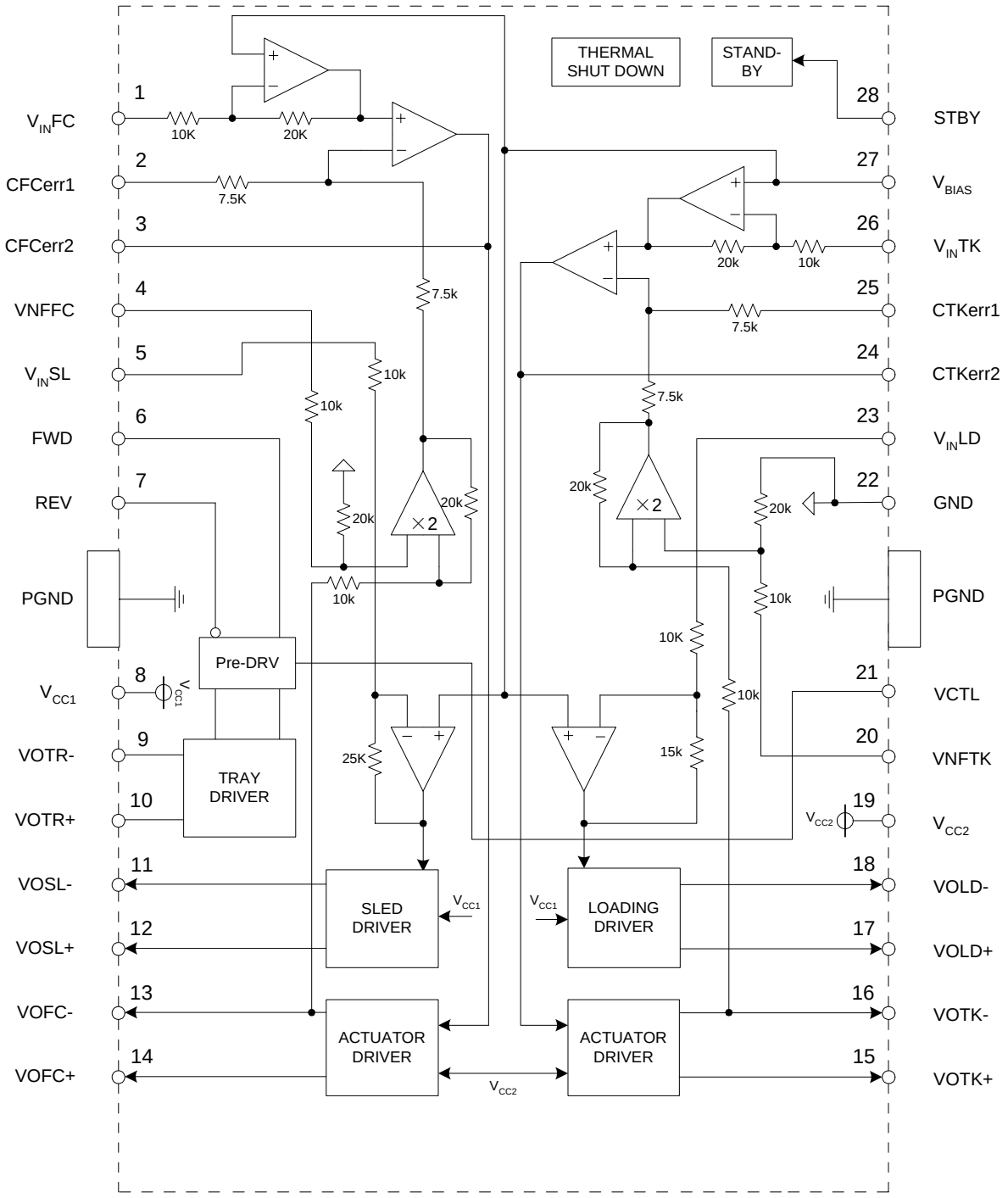
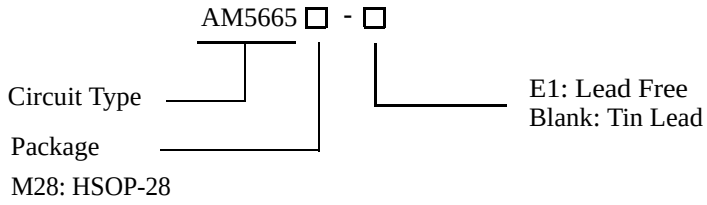


Figure 3. Functional Block Diagram of AM5665

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
HSOP-28	0 to 70°C	AM5665M28	AM5665M28-E1	AM5665M28	AM5665M28-E1	Tube

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC1, 2}$	9.6	V
ESD (HBM)	ESD	2000	V
Power Dissipation	P_D	1.7	W
Storage Temperature Range	T_{STG}	-55 to +150	℃

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC1}	4.5	8.0	V
	V_{CC2}	4.5 to V_{CC1}		V
Operating Temperature	T_A	0	70	℃

Electrical Characteristics

(T_A=25°C, V_{CC1}=V_{CC2}=5V, V_{BIAS}=1.65V, R_{L1}=R_{L2}=8Ω, R_{L3}=R_{L4}=12Ω, R_{L5}=45Ω, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent Current	I_{CC}	No load		18	27	mA
Standby Current	I_{ST}			2.3	4.0	mA
Standby on Voltage	V_{STON}		0		0.5	V
Standby off Voltage	V_{STOFF}		2.0		5.0	V
Actuator Driver						
Output Offset Current	$I_{OO1,2}$		-10		+10	mA
Maximum Output Voltage	$V_{O1,2MAX}$	V_{IN}=V_{BIAS} ± 1.5V	3.3	3.5		V
Transmission Gain	gm	V_{IN}=V_{BIAS} ± 0.2V	1.3	1.5	1.7	A/V
Sled Motor Driver						
Output Offset Voltage	V_{OOSL}		-100		100	mV
Maximum Output Voltage	V_{O3MAX}	V_{IN}=V_{BIAS} ± 1.5V	3.3	3.5		V
Closed-Loop Voltage Gain	G_{VSL}	V_{IN}=V_{BIAS} ± 0.2V	18.0	20.0	22.0	dB
Loading Motor Driver						
Output Offset Voltage	V_{OOLD}		-50		50	mV
Maximum Output Voltage	V_{O4MAX}	V_{IN}=V_{BIAS} ± 5.5V	3.3	3.5		V
Closed-Loop Voltage Gain	G_{VLD}	V_{IN}=V_{BIAS} ± 0.2V	14	16	18	dB
Gain Error by Polarity	△ G_{VLD}		0	1	2	dB
Tray Motor Driver						
Output Offset Voltage	V_{OOTR}	R_{L5}=45Ω, R_{VCTL}=0Ω	-50	0	50	mV
Maximum Output Voltage	V_{O5MAX1}	R_{L5}=45Ω, R_{VCTL}=400Ω	1.3	1.5	1.7	V
	V_{O5MAX2}	R_{L5}=45Ω, R_{VCTL}=0Ω	3.8	4.0	4.2	V
Input High Level Voltage	V_{IH}		2.0		5.0	V
Input Low Level Voltage	V_{IL}		0		0.8	V

Test Circuit

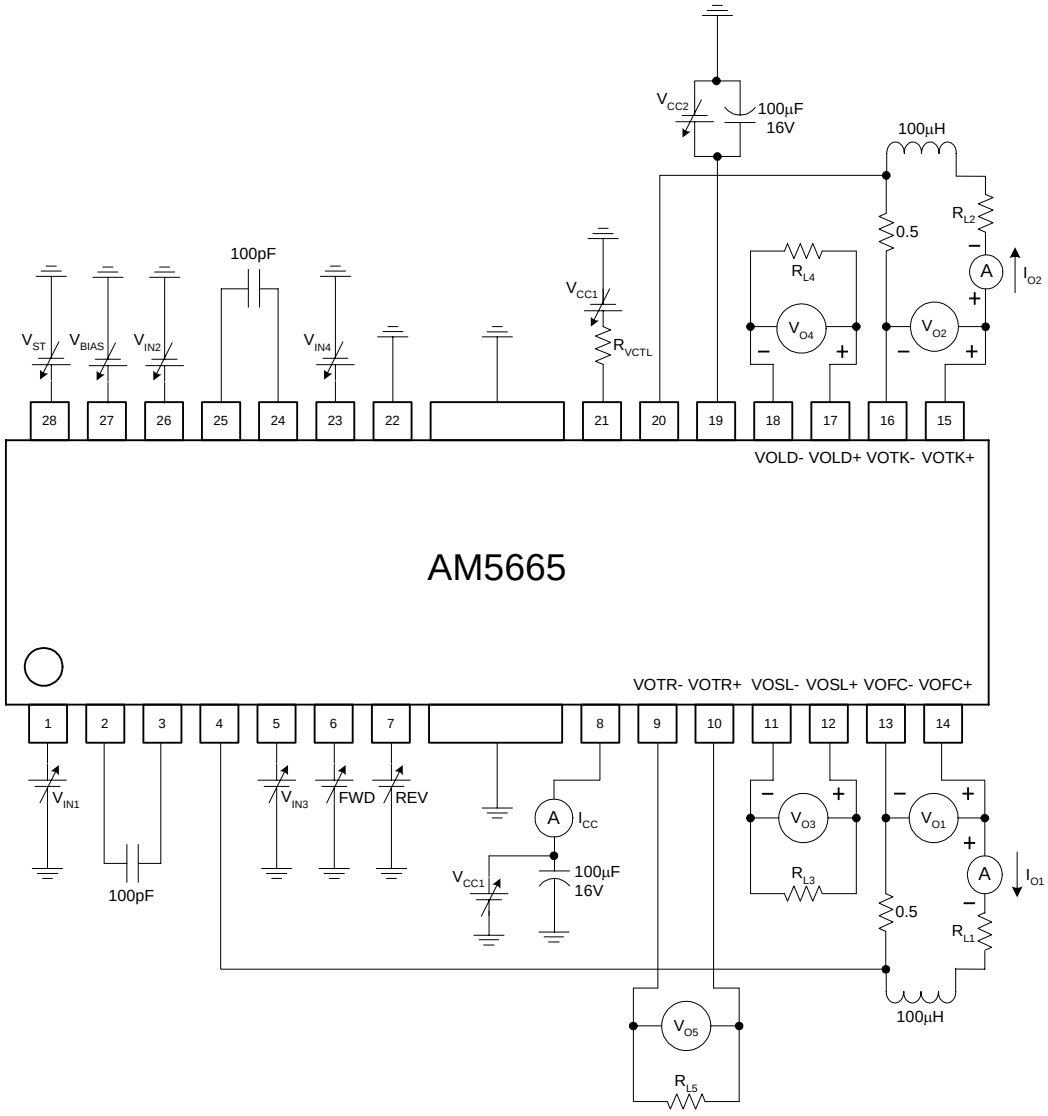


Figure 4. Test Circuit of AM5665

Typical Performance Characteristics (Note 2)

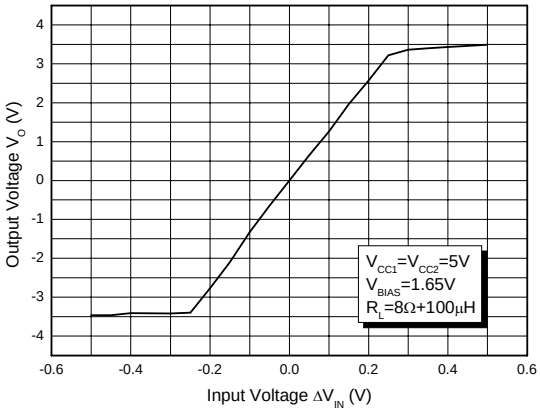


Figure 5. Driver I/O Characteristics (Focus)

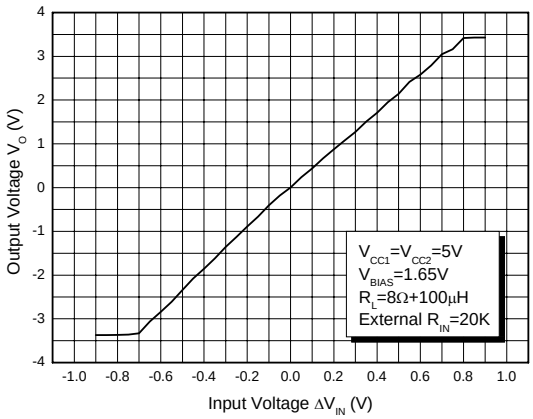


Figure 6. Driver I/O Characteristics (Focus)

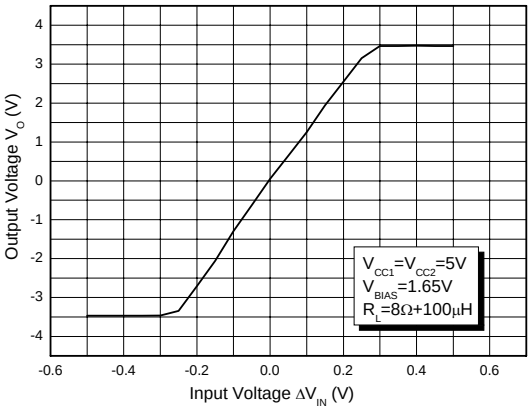


Figure 7. Driver I/O Characteristics (Track)

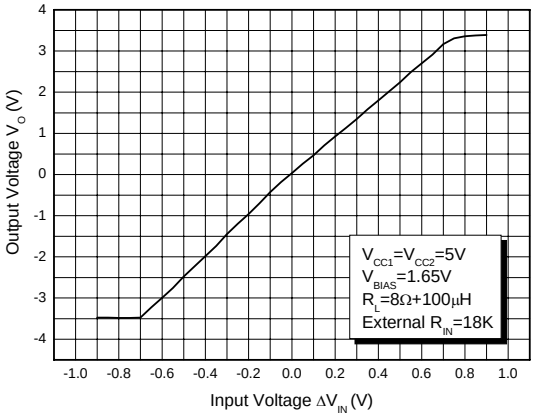


Figure 8. Driver I/O Characteristics (Track)

Typical Performance Characteristics (Continued)

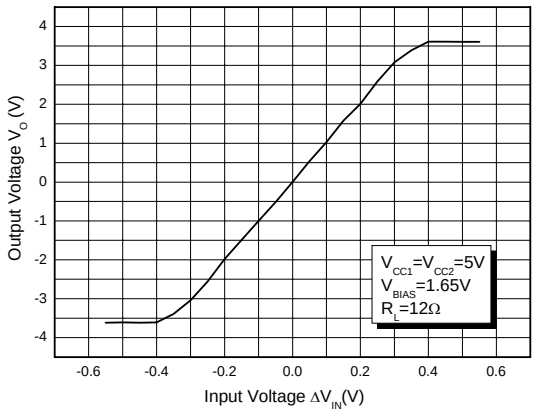


Figure 9. Driver I/O Characteristics (Sled)

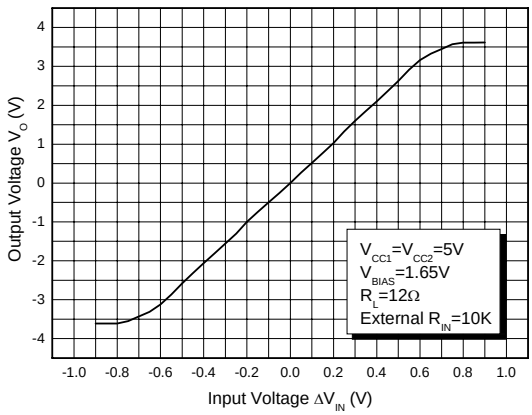


Figure 10. Driver I/O Characteristics (Sled)

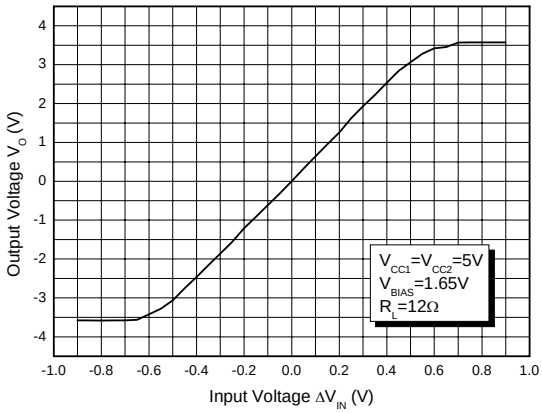


Figure 11. Driver I/O Characteristics (Loading)

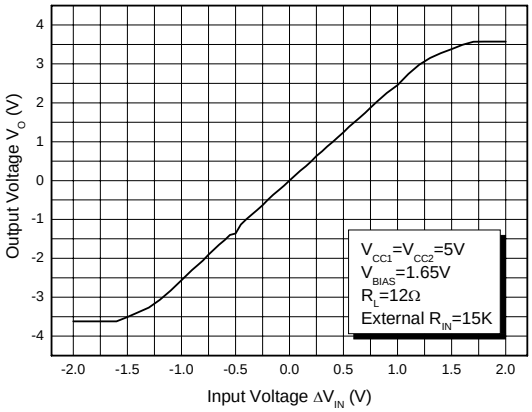


Figure 12. Driver I/O Characteristics (Loading)

Typical Performance Characteristics (Continued)

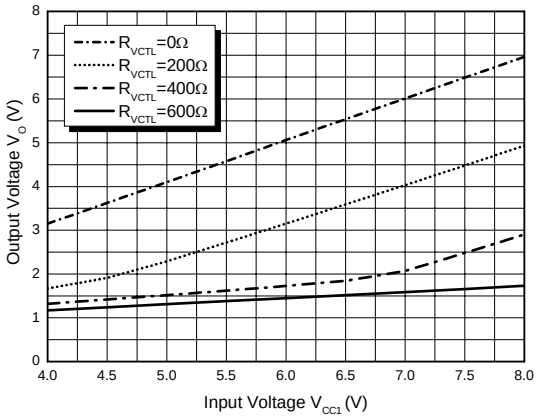


Figure 13. Tray Speed Control Characteristics

Note 2:
For the above figures 6, 8, 10, 12, please refer to the following "Typical Application" section.

Typical Application

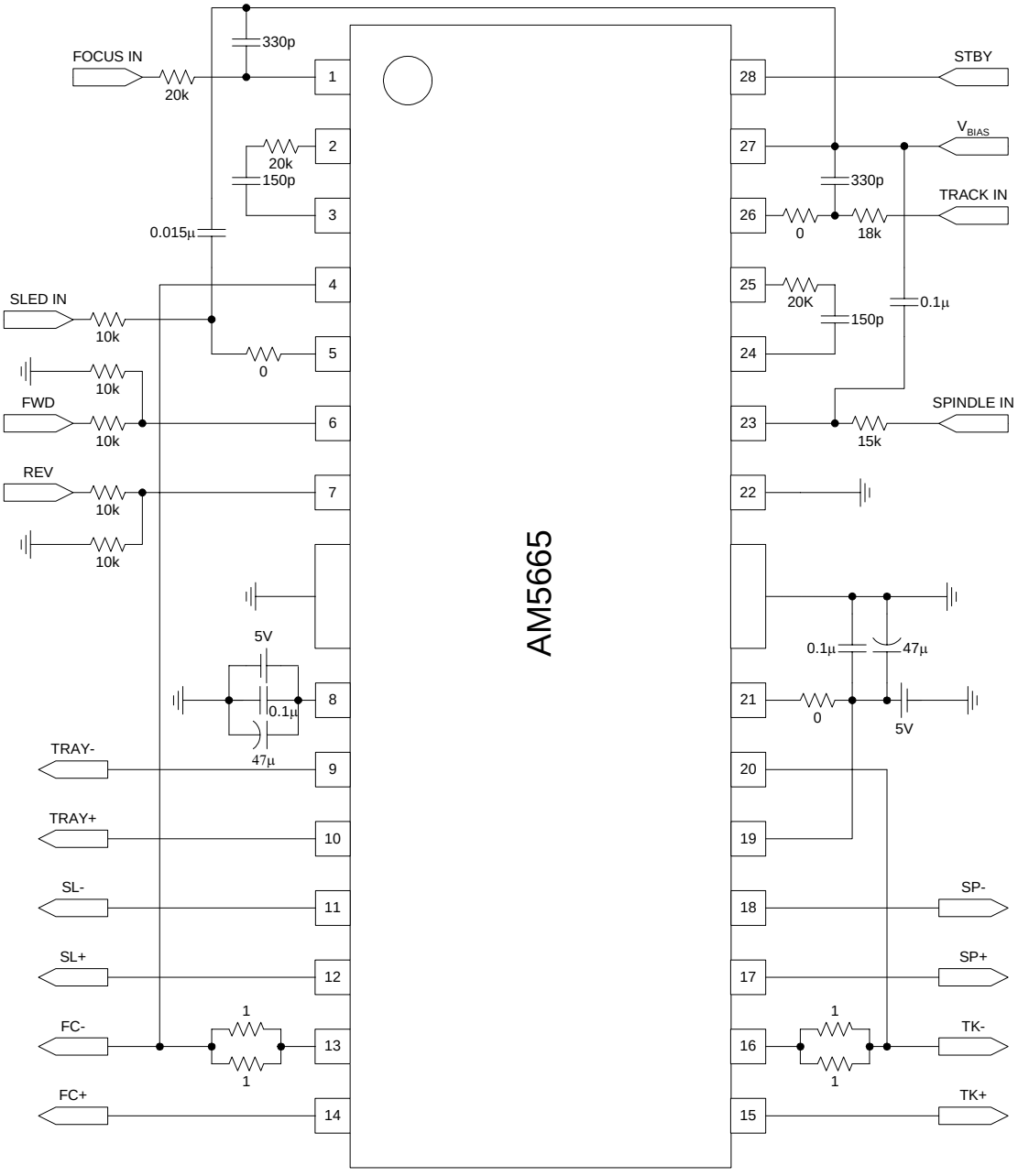


Figure 14. Typical Application of AM5665 in DVD Player

Application Information

This application information is only for the Tray Motor Driver section.

Tray Motor Driver

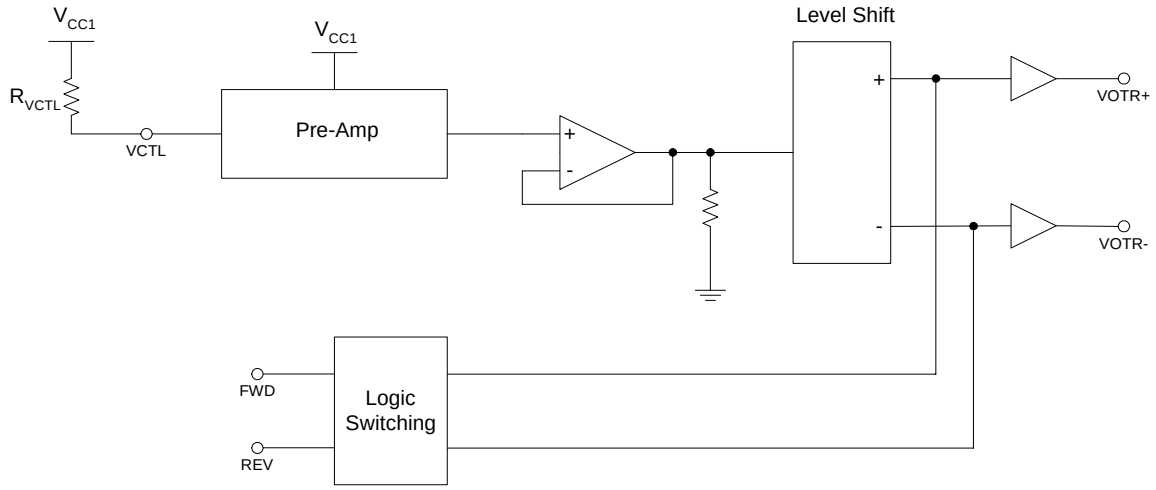


Figure 15. Tray Motor Driver Control Illustration

Output Status Control Table

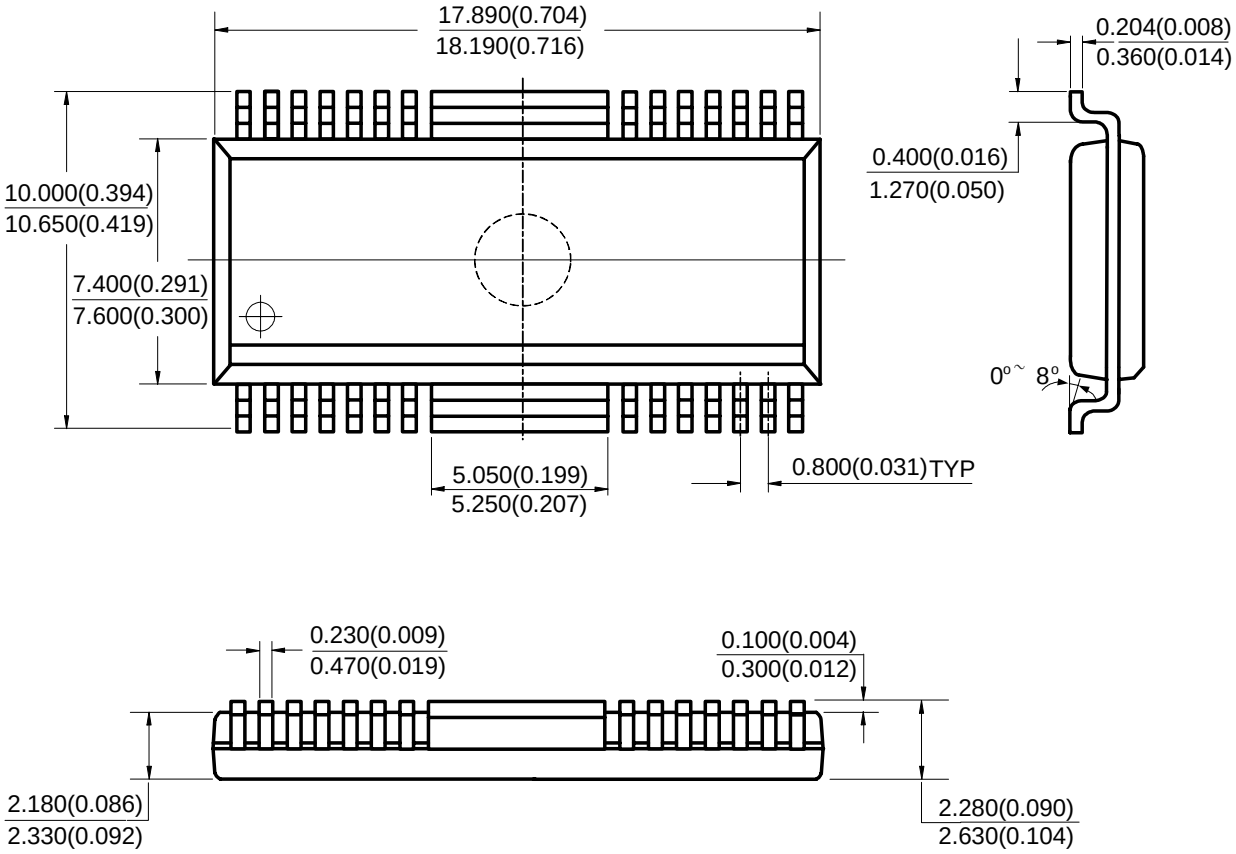
Input		Output		
FWD	**REV**	**VOTR+**	**VOTR-**	**Status**
High	High	Low	Low	Break
High	Low	High	Low	Forward
Low	High	Low	High	Reverse
Low	Low	Open	Open	Standby

Tray Motor Speed Control

The amplitude of output voltage depends on VCTL (pin 21). Connect a resistor between VCTL (pin 21) and $V_{CC1,}$ and you can obtain different output voltages for tray driver by changing the value of R_{VCTL}. (See Figure 4.)

Mechanical Dimensions

HSOP-28 **Unit: mm(inch)**





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