

**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



Figure 1. Package Type of AM5665



5-CHANNEL MOTOR DRIVER FOR DVD PLAYER

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Pin Configuration

M Package
(HSOP-28)

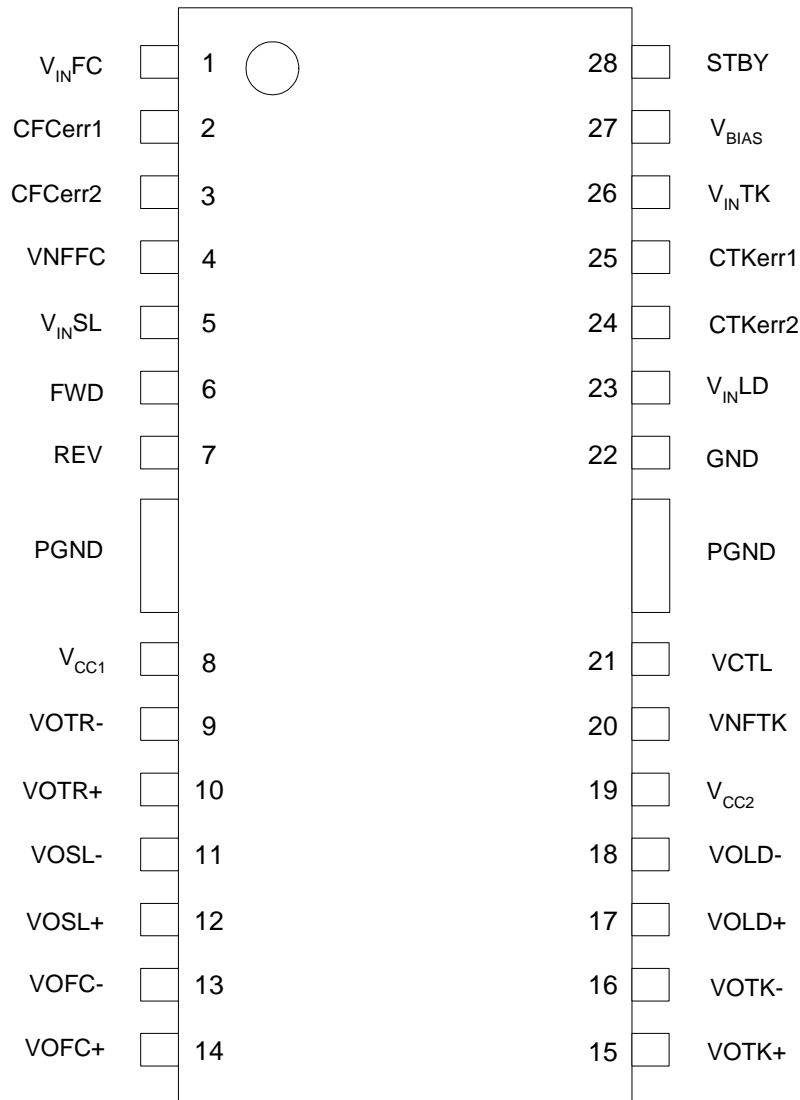


Figure 2. Pin Configuration of AM5665 (Top View)

**5-CHANNEL MOTOR DRIVER FOR DVD PLAYER****AM5665****Pin Description**

| Pin Number | Pin Name | Function |
|------------|-------------------|---|
| 1 | V _{INFC} | 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 _{INSL} | 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 _{INLD} | 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 _{INTK} | Tracking driver input |
| 27 | V _{BIAS} | VREF input pin |
| 28 | STBY | Stand-by control |



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Functional Block Diagram

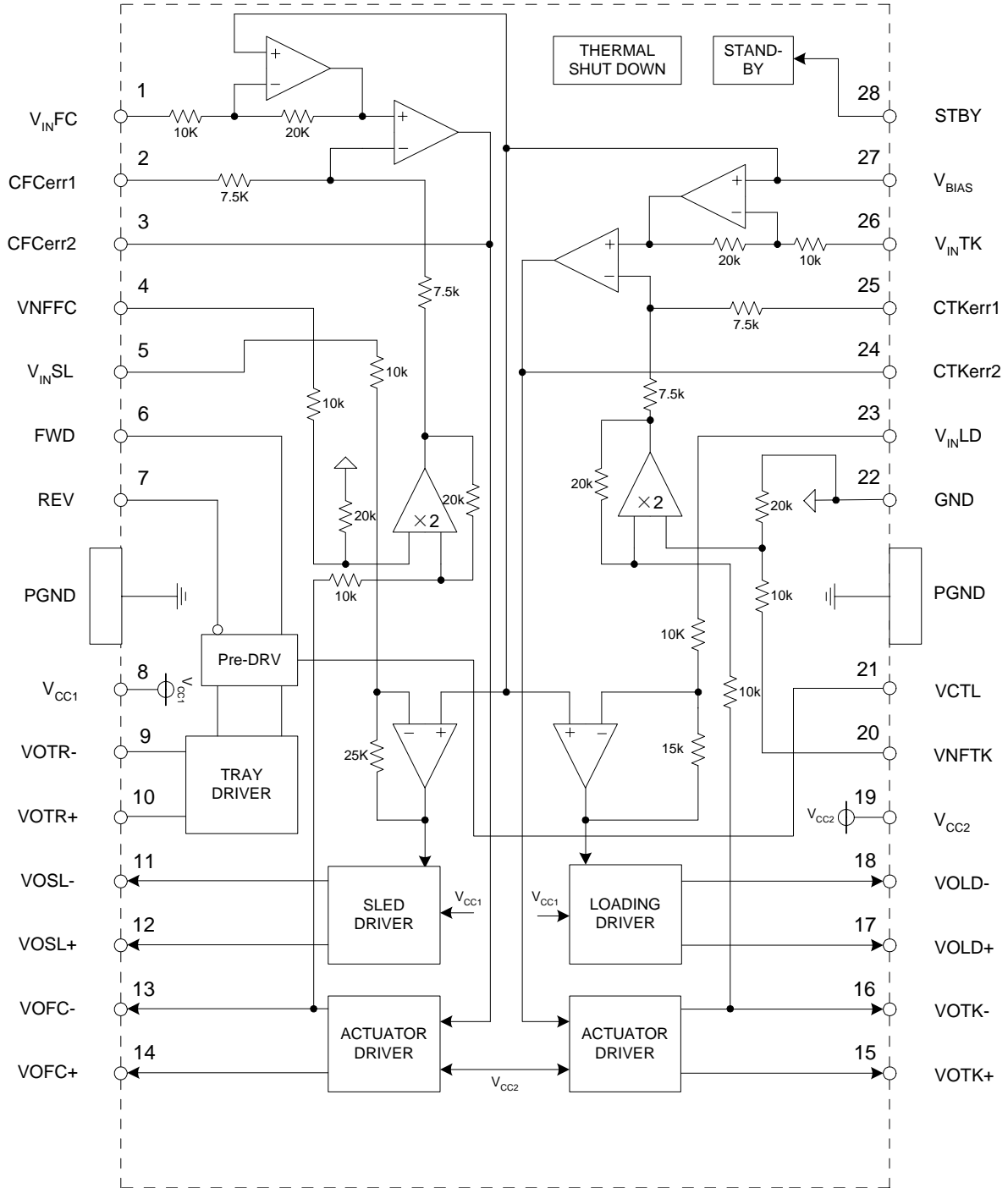


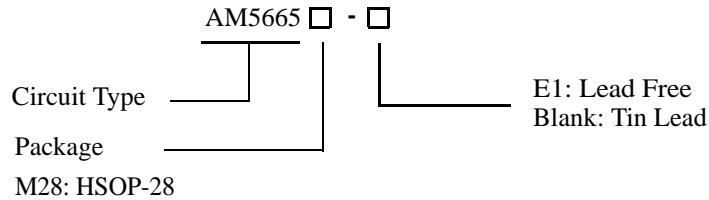
Figure 3. Functional Block Diagram of AM5665



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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 | °C |

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 | °C |



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Electrical Characteristics

($T_A=25^\circ\text{C}$, $V_{CC1}=V_{CC2}=5\text{V}$, $V_{BIAS}=1.65\text{V}$, $R_{L1}=R_{L2}=8\Omega$, $R_{L3}=R_{L4}=12\Omega$, $R_{L5}=45\Omega$, 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 | $V_{O1,2MAX}$ | $V_{IN}=V_{BIAS} \pm 1.5\text{V}$ | 3.3 | 3.5 | | V |
| Transmission Gain | gm | $V_{IN}=V_{BIAS} \pm 0.2\text{V}$ | 1.3 | 1.5 | 1.7 | A/V |
| Sled Motor Driver | | | | | | |
| Output Offset Voltage | V_{OOSL} | | -100 | | 100 | mV |
| Maximum Output Voltage | V_{O3MAX} | $V_{IN}=V_{BIAS} \pm 1.5\text{V}$ | 3.3 | 3.5 | | V |
| Closed-Loop Voltage Gain | G_{VSL} | $V_{IN}=V_{BIAS} \pm 0.2\text{V}$ | 18.0 | 20.0 | 22.0 | dB |
| Loading Motor Driver | | | | | | |
| Output Offset Voltage | V_{OOLD} | | -50 | | 50 | mV |
| Maximum Output Voltage | V_{O4MAX} | $V_{IN}=V_{BIAS} \pm 5.5\text{V}$ | 3.3 | 3.5 | | V |
| Closed-Loop Voltage Gain | G_{VLD} | $V_{IN}=V_{BIAS} \pm 0.2\text{V}$ | 14 | 16 | 18 | dB |
| Gain Error by Polarity | ΔG_{VLD} | | 0 | 1 | 2 | dB |
| Tray Motor Driver | | | | | | |
| Output Offset Voltage | V_{OOTR} | $R_{L5}=45\Omega$, $R_{VCTL}=0\Omega$ | -50 | 0 | 50 | mV |
| Maximum Output Voltage | V_{O5MAX1} | $R_{L5}=45\Omega$, $R_{VCTL}=400\Omega$ | 1.3 | 1.5 | 1.7 | V |
| | V_{O5MAX2} | $R_{L5}=45\Omega$, $R_{VCTL}=0\Omega$ | 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 |



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Test Circuit

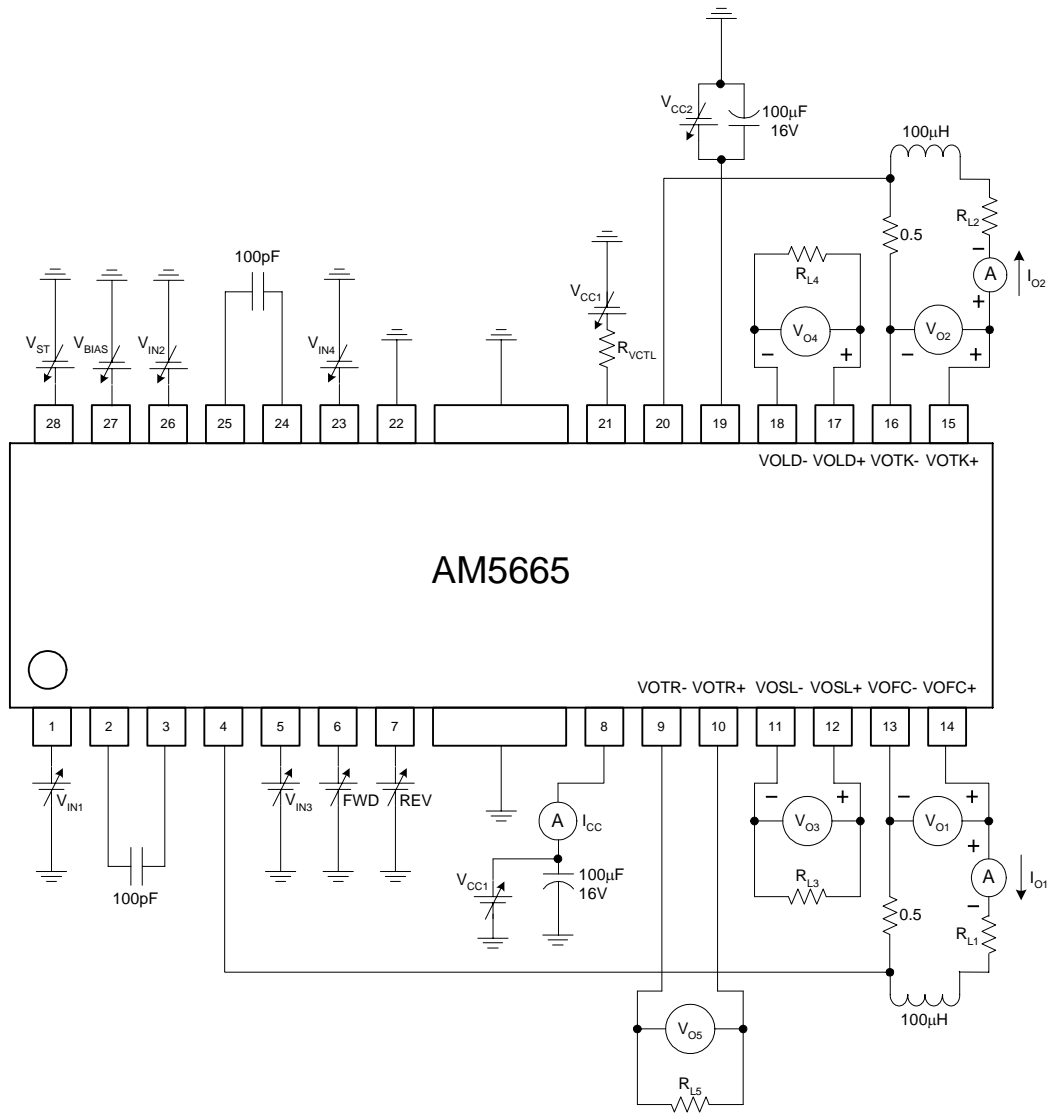


Figure 4. Test Circuit of AM5665



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Typical Performance Characteristics (Note 2)

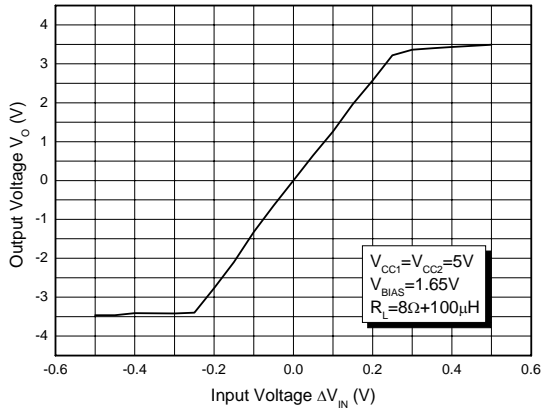


Figure 5. Driver I/O Characteristics (Focus)

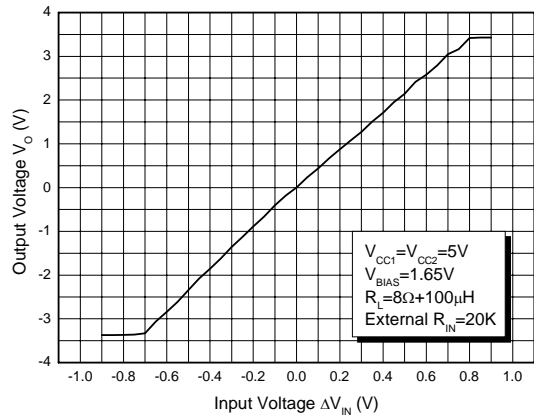


Figure 6. Driver I/O Characteristics (Focus)

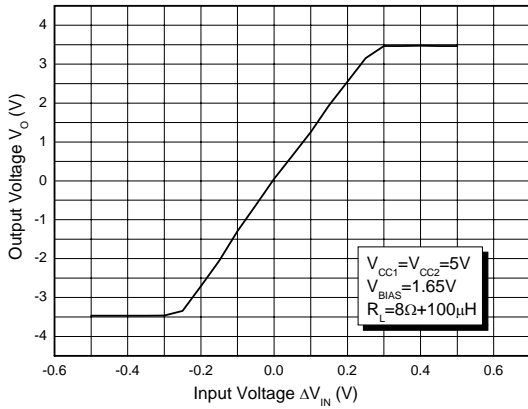


Figure 7. Driver I/O Characteristics (Track)

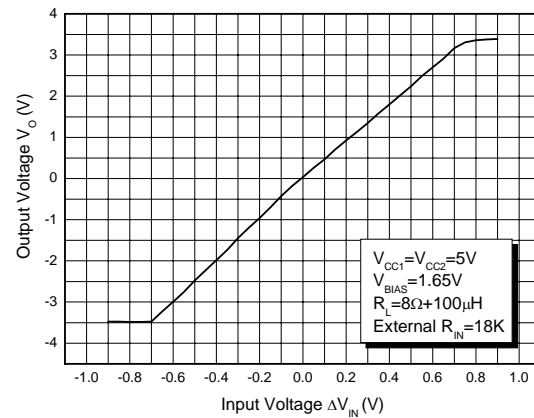


Figure 8. Driver I/O Characteristics (Track)



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Typical Performance Characteristics (Continued)

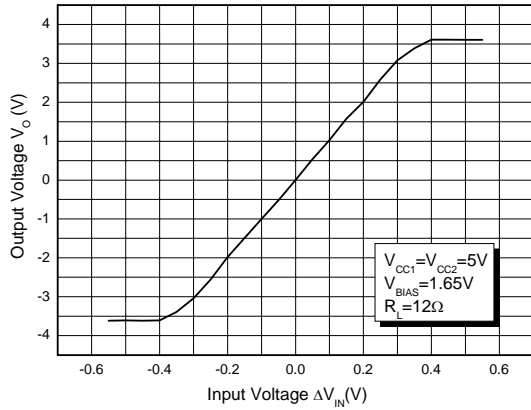


Figure 9. Driver I/O Characteristics (Sled)

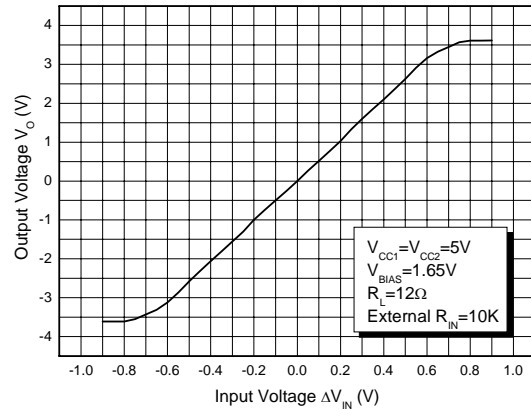


Figure 10. Driver I/O Characteristics (Sled)

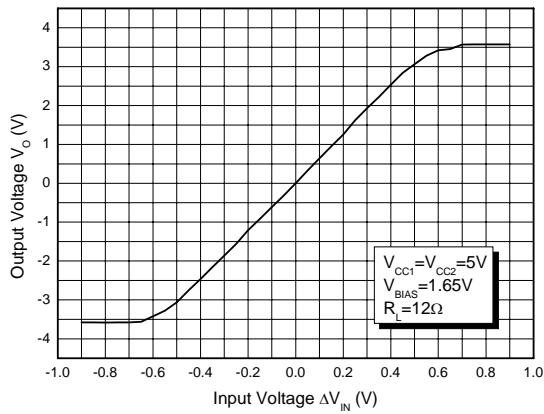


Figure 11. Driver I/O Characteristics (Loading)

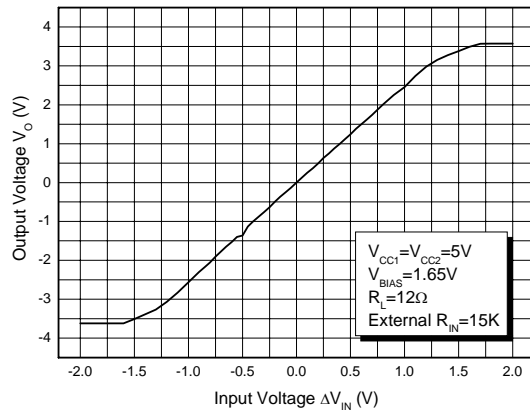


Figure 12. Driver I/O Characteristics (Loading)



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Typical Performance Characteristics (Continued)

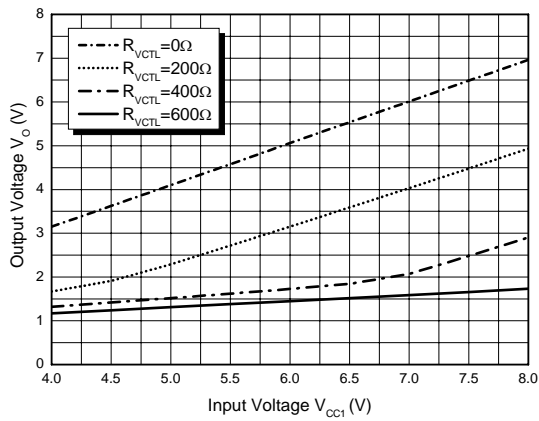


Figure 13. Tray Speed Control Characteristics

Note 2:

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



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Typical Application

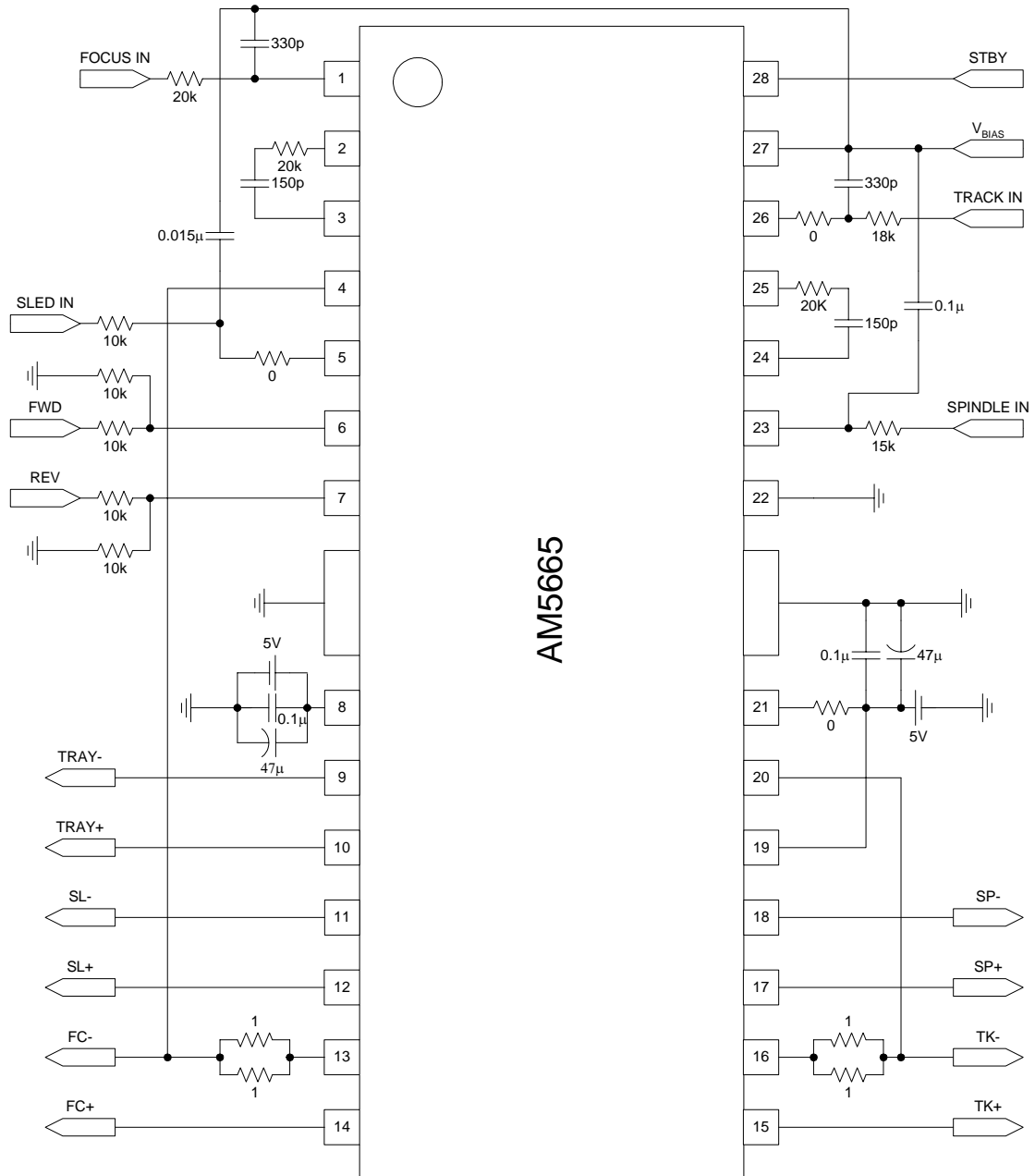


Figure 14. Typical Application of AM5665 in DVD Player



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Application Information

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

Tray Motor Driver

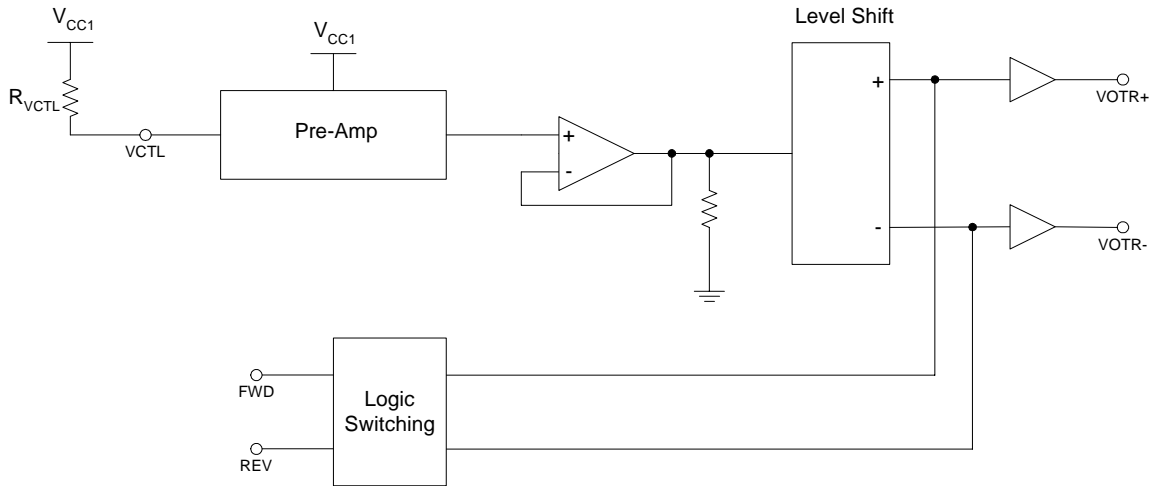


Figure 15. Tray Motor Driver Control Illustration

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.)



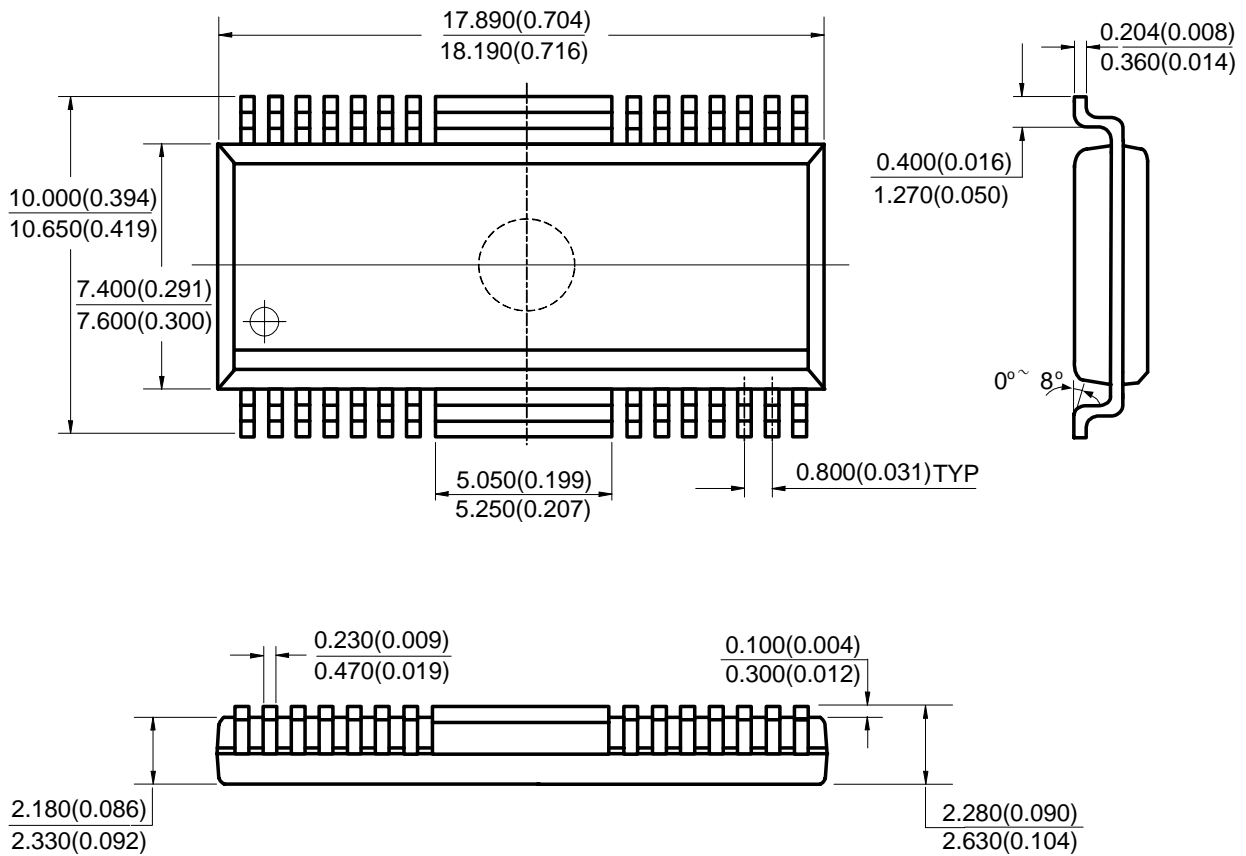
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Mechanical Dimensions

HSOP-28

Unit: mm(inch)





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