

# BTL Drive Single-phase Full-wave Fan Motor Driver

# AM4951/R/2

## Pin Configuration

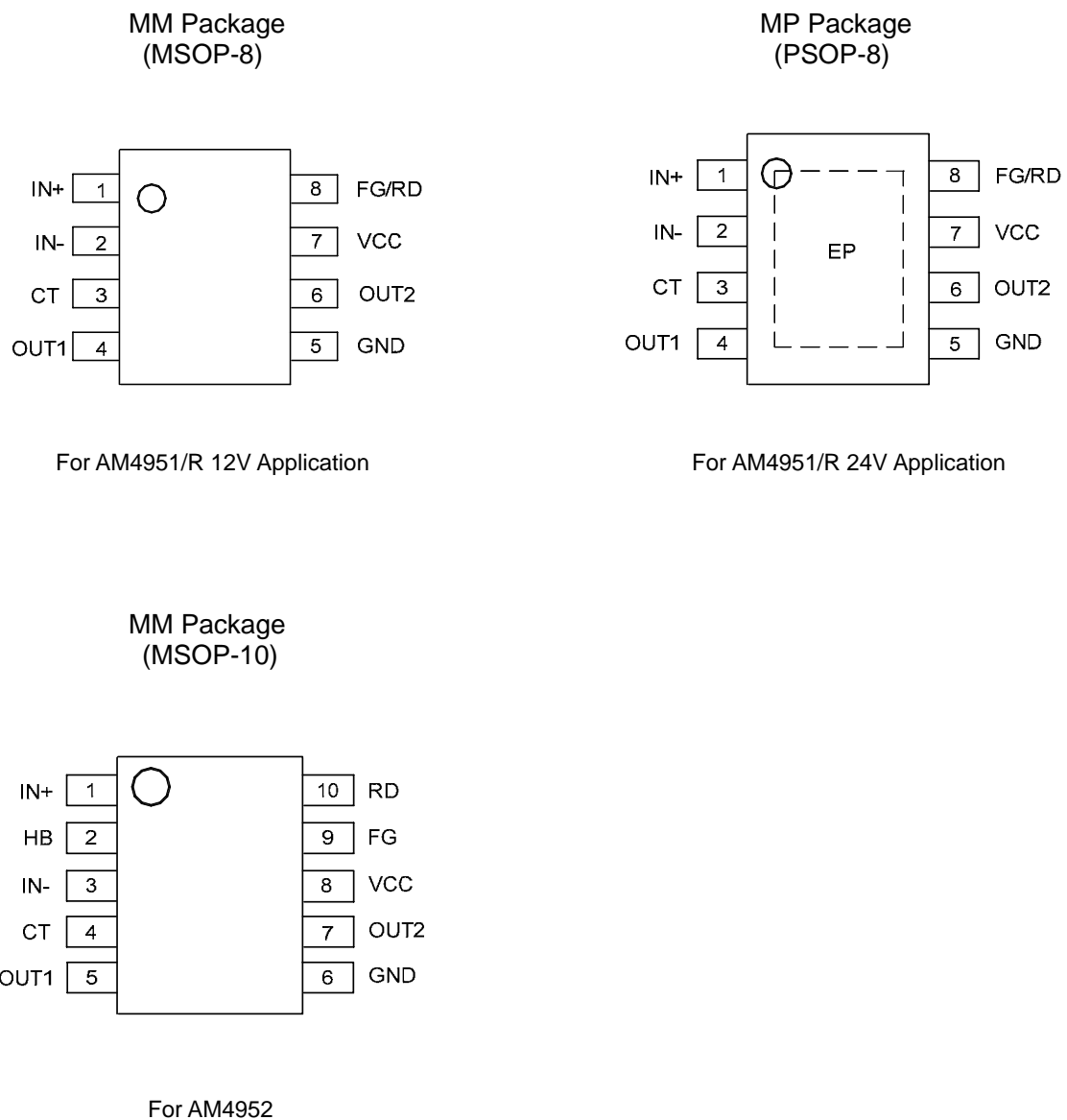
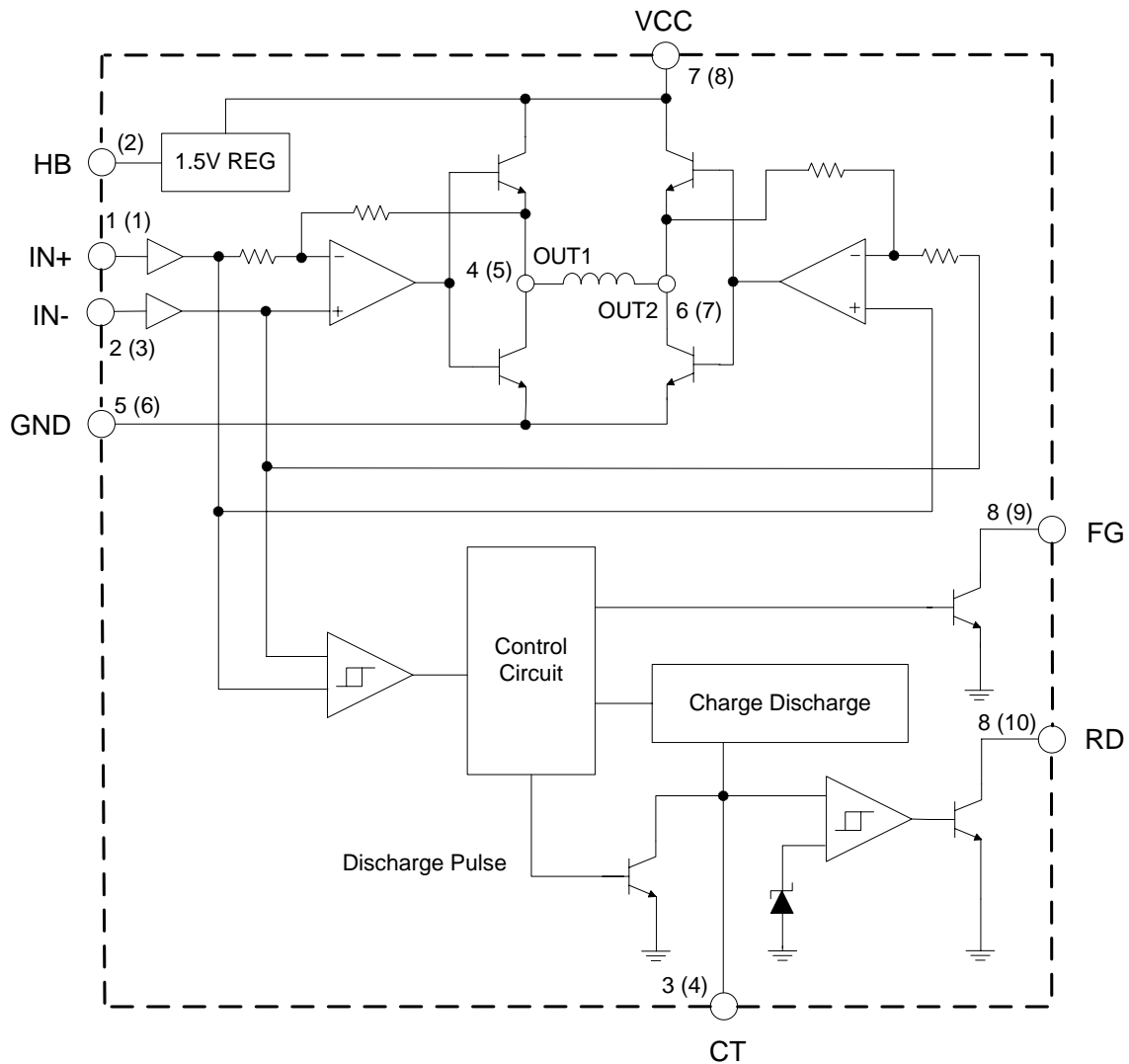


Figure 2. Pin Configuration of AM4951/R/2 (Top View)

## BTL Drive Single-phase Full-wave Fan Motor Driver

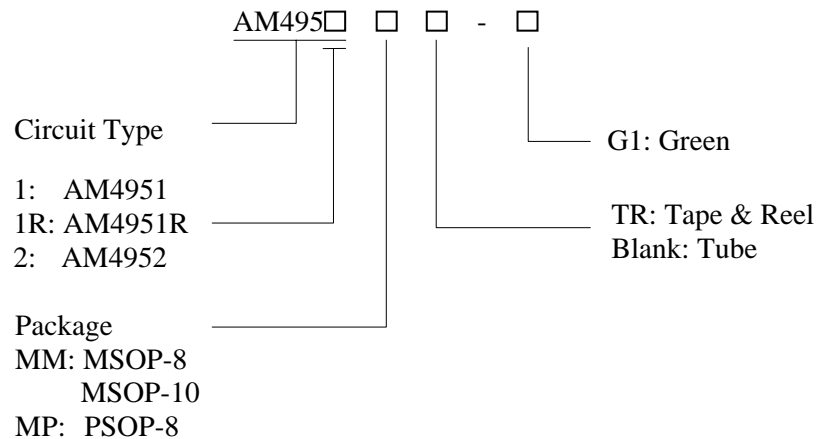
**AM4951/R/2**

## Functional Block Diagram



A (B)  
A for AM4951/R  
B for AM4952

Figure 3. Functional Block Diagram of AM4951/R/2

**BTL Drive Single-phase Full-wave Fan Motor Driver****AM4951/R/2****Ordering Information**

| Package | Temperature Range | Output Signal | Part Number    | Marking ID | Packing Type |
|---------|-------------------|---------------|----------------|------------|--------------|
| MSOP-8  | -40 to 105°C      | FG            | AM4951MM-G1    | 4951MM-G1  | Tube         |
|         |                   |               | AM4951MMTR-G1  | 4951MM-G1  | Tape & Reel  |
|         |                   | RD            | AM4951RMM-G1   | 4951RMM-G1 | Tube         |
|         |                   |               | AM4951RMMTR-G1 | 4951RMM-G1 | Tape & Reel  |
| PSOP-8  |                   | FG            | AM4951MP-G1    | 4951MP-G1  | Tube         |
|         |                   |               | AM4951MPTR-G1  | 4951MP-G1  | Tape & Reel  |
|         |                   | RD            | AM4951RMP-G1   | 4951RMP-G1 | Tube         |
|         |                   |               | AM4951RMPTR-G1 | 4951RMP-G1 | Tape & Reel  |
| MSOP-10 |                   | FG & RD       | AM4952MM-G1    | 4952MM-G1  | Tube         |
|         |                   |               | AM4952MMTR-G1  | 4952MM-G1  | Tape & Reel  |

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and green.

**BTL Drive Single-phase Full-wave Fan Motor Driver****AM4951/R/2****Absolute Maximum Ratings (Note 1, T<sub>A</sub>=25°C)**

| Parameter                                   | Symbol                           | Value      |     | Unit |
|---|----------------------------------|------------|-----|------|
| Supply Voltage                              | V <sub>CC</sub>                  | 28         |     | V    |
| Peak Output Current                         | I <sub>OUT</sub>                 | 500        |     | mA   |
| FG/RD Pull-up Voltage                       | V <sub>FG</sub> /V <sub>RD</sub> | 28         |     | V    |
| FG/RD Output Current                        | I <sub>FG</sub> /I <sub>RD</sub> | 10         |     | mA   |
| Thermal Resistance<br>(Junction to Ambient) | $\theta_{JA}$                    | MSOP-8     | 205 | °C/W |
|   |                                  | PSOP-8     | 110 |      |
|   |                                  | MSOP-10    | 195 |      |
| Thermal Resistance<br>(Junction to Case)    | $\theta_{JC}$                    | MSOP-8     | 48  | °C/W |
|   |                                  | PSOP-8     | 36  |      |
|   |                                  | MSOP-10    | 46  |      |
| Power Dissipation                           | P <sub>D</sub>                   | MSOP-8     | 585 | mW   |
|   |                                  | PSOP-8     | 960 | mW   |
|   |                                  | MSOP-10    | 585 | mW   |
| Operating Temperature                       | T <sub>OP</sub>                  | -40 to 125 |     | °C   |
| Storage Temperature                         | T <sub>STG</sub>                 | -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 <sub>CC</sub>  | 2.2 | 24                   | V    |
| Hall Input Voltage            | V <sub>ICM</sub> | 0   | V <sub>CC</sub> -1.5 | V    |
| Operating Ambient Temperature | T <sub>A</sub>   | -40 | 105                  | °C   |

**BTL Drive Single-phase Full-wave Fan Motor Driver****AM4951/R/2****Electrical Characteristics** $V_{CC}=12V$ ,  $T_A=25^{\circ}C$ , unless otherwise specified.

| Parameter                               | Symbol       | Conditions          | Min  | Typ  | Max  | Unit    |
|---|--------------|---------------------|------|------|------|---------|
| Supply Current                          | $I_{CC1}$    | $V_{CT}=L$          | 3    | 6    | 9    | mA      |
|   | $I_{CC2}$    | $V_{CT}=H$          | 2.5  | 5    | 7.5  | mA      |
| CT Charge Current                       | $I_{CHG}$    |                     | 0.9  | 1.3  | 1.5  | $\mu A$ |
| CT Discharge Current                    | $I_{DHG}$    |                     | 0.1  | 0.15 | 0.25 | $\mu A$ |
| CT Charge/Discharge Current Ratio       | $R_{CT}$     | $I_{CHG} / I_{DHG}$ | 6    | 8    | 10   |         |
| CT Clamp Voltage                        | $V_{CL}$     |                     | 1.3  | 1.5  | 1.7  | V       |
| CT Comparator Voltage                   | $V_{CP}$     |                     | 0.3  | 0.5  | 0.7  | V       |
| OUT Low Saturation Voltage              | $V_{SAT\_L}$ | $I_{OUT}=200mA$     |      | 0.25 | 0.45 | V       |
| OUT High Saturation Voltage             | $V_{SAT\_H}$ | $I_{OUT}=200mA$     |      | 0.95 | 1.2  | V       |
| Hall Input Sensitivity                  | $V_{HN}$     |                     |      | 7    | 15   | mV      |
| FG Low Level Voltage<br>(For AM4951/2)  | $V_{FG}$     | $I_{FG}=5mA$        |      | 0.15 | 0.3  | V       |
| FG Leakage Current<br>(For AM4951/2)    | $I_{FGL}$    | $V_{FG}=15V$        |      | 1    | 30   | $\mu A$ |
| RD Low Level Voltage<br>(For AM4951R/2) | $V_{RD}$     | $I_{RD}=5mA$        |      | 0.15 | 0.3  | V       |
| RD Leakage Current<br>(For AM4951R/2)   | $I_{RDL}$    | $V_{RD}=15V$        |      | 1    | 30   | $\mu A$ |
| HB Voltage<br>(For AM4952)              | $V_{HB}$     | $I_{HB}=1mA$        | 1.35 | 1.5  | 1.65 | V       |

# BTL Drive Single-phase Full-wave Fan Motor Driver

AM4951/R/2

## Typical Performance Characteristics

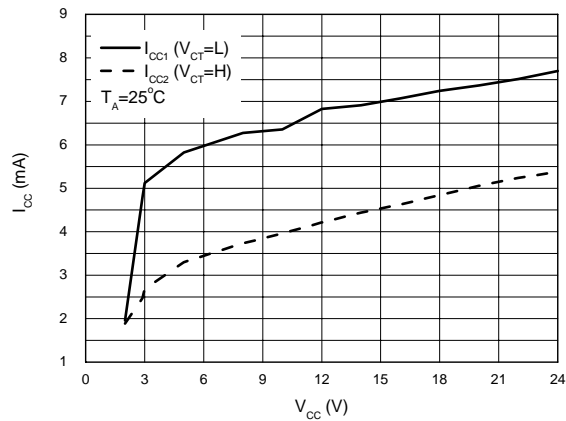


Figure 4. Supply Current vs. Supply Voltage

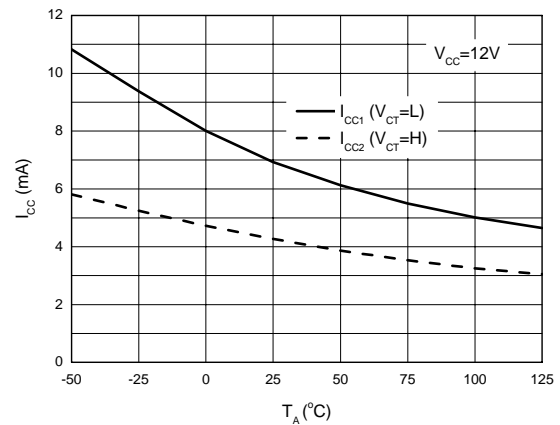


Figure 5. Supply Current vs. Ambient Temperature

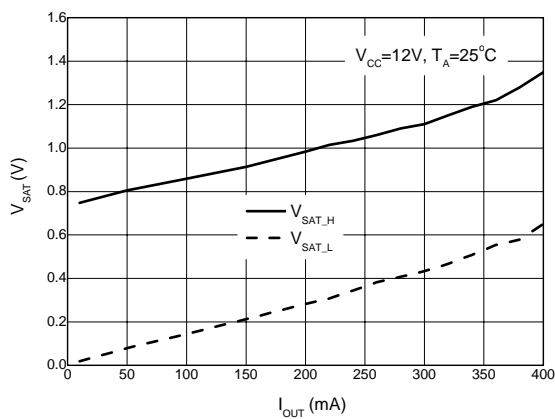


Figure 6. Saturation Voltage vs. Output Current

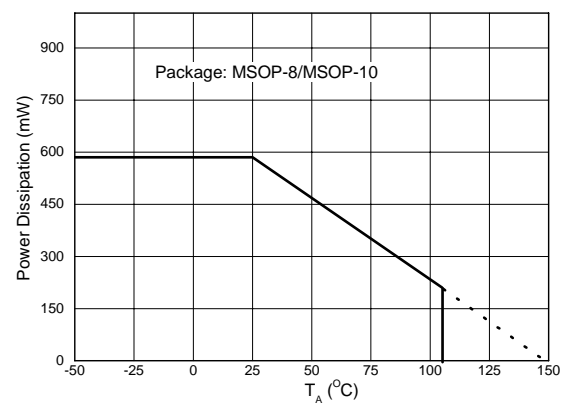


Figure 7. Power Dissipation vs. Ambient Temperature

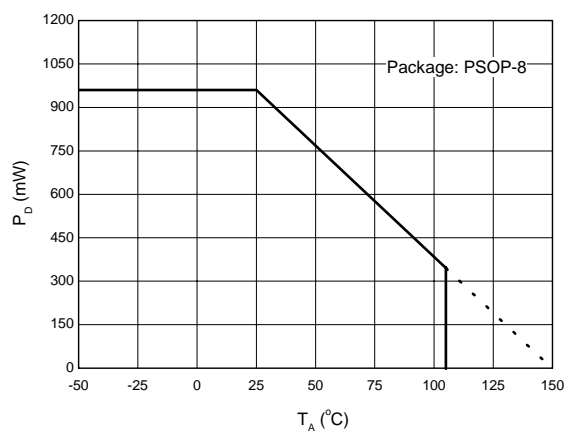
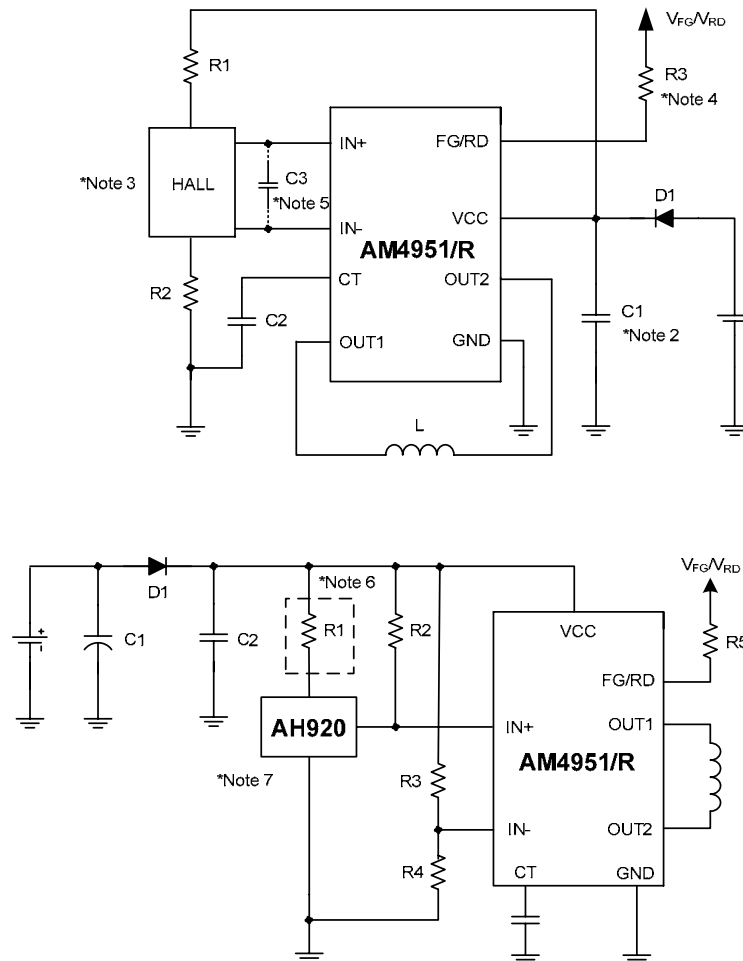
**Typical Performance Characteristics (Continued)**

Figure 8. Power Dissipation vs. Ambient Temperature

# BTL Drive Single-phase Full-wave Fan Motor Driver

**AM4951/R/2**

## Typical Application



Note 2: Adding D1 can protect the IC from destruction by reverse connection. If D1 is used, it is necessary to insert a capacitor C1 to provide a regenerative current route. Similarly, if there is no nearby capacitor on the fan power supply line, C1 will also be necessary to improve reliability. Its capacity should be larger than 2.2μF.

Note 3: If the Hall sensor bias is taken from V<sub>CC</sub>, A 1/2 V<sub>CC</sub> bias, as shown in the figure must be used. Adjusting the value of R1 and R2 may achieve better startup characteristics and efficiency, even quiet operation.

Note 4: This pin must be left open if unused.

Note 5: If the line between Hall sensor output and Hall sensor input of IC is long, the noise may occur in this line. But it can be eliminated by adding a capacitor C3.

Note 6: Each of R2, R3, R4 and R5 (AM4951/R only) is recommended to be 51kΩ typical. R1 is recommended to be 2k and must be added when V<sub>CC</sub> is larger than 20V.

Note 7: The package of AH920 is SOT-23-3. If it is packaged in TO-92S-3, please exchange IN- with IN+.

Figure 9. Typical Application of AM4951/R

## BTL Drive Single-phase Full-wave Fan Motor Driver

AM4951/R/2

## Typical Application (Continued)

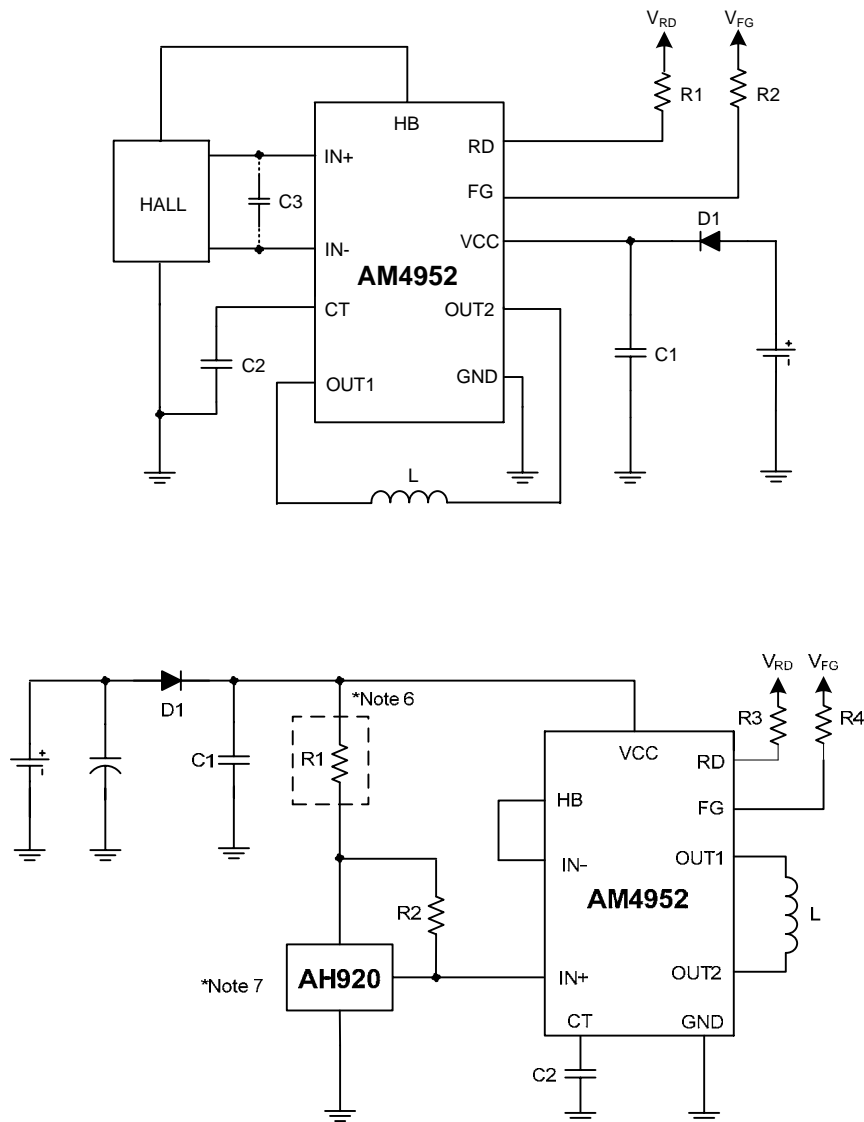


Figure 10. Typical Application of AM4952

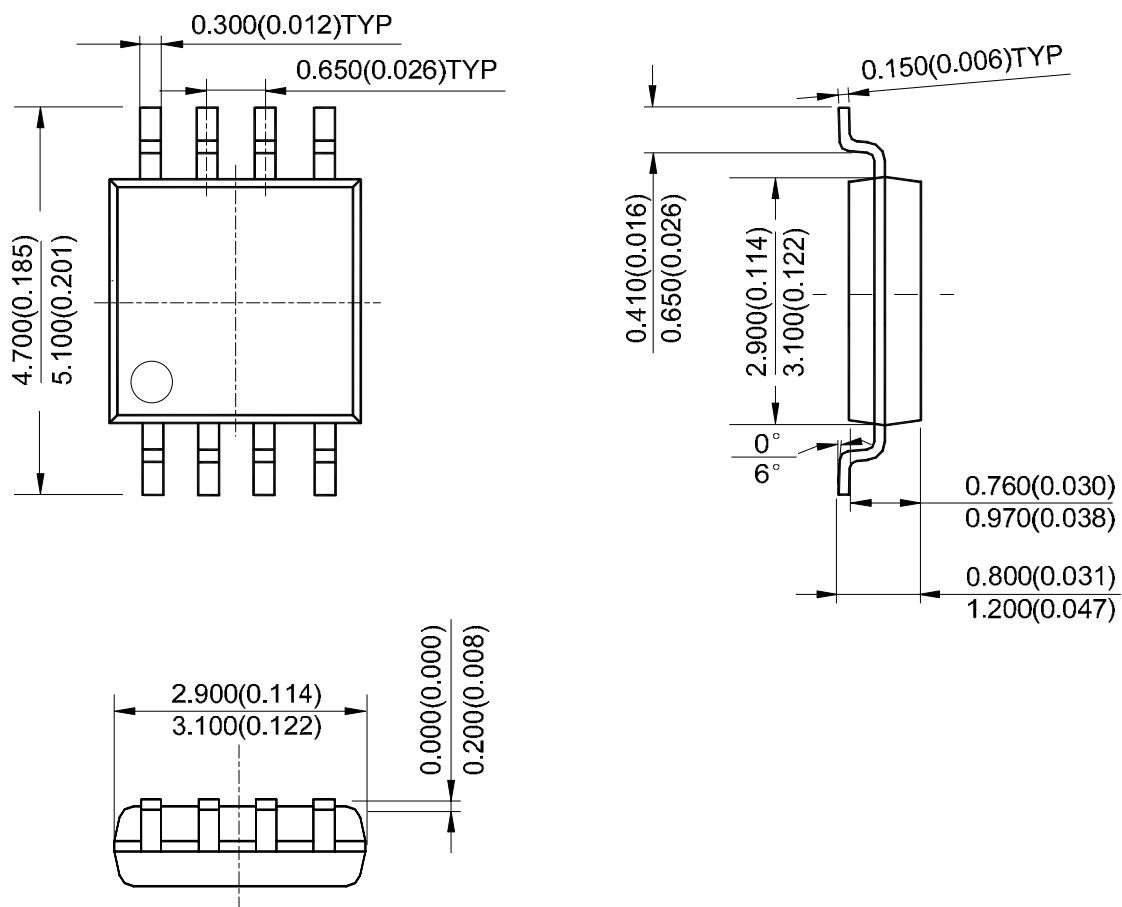
# BTL Drive Single-phase Full-wave Fan Motor Driver

AM4951/R/2

## Mechanical Dimensions

MSOP-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.

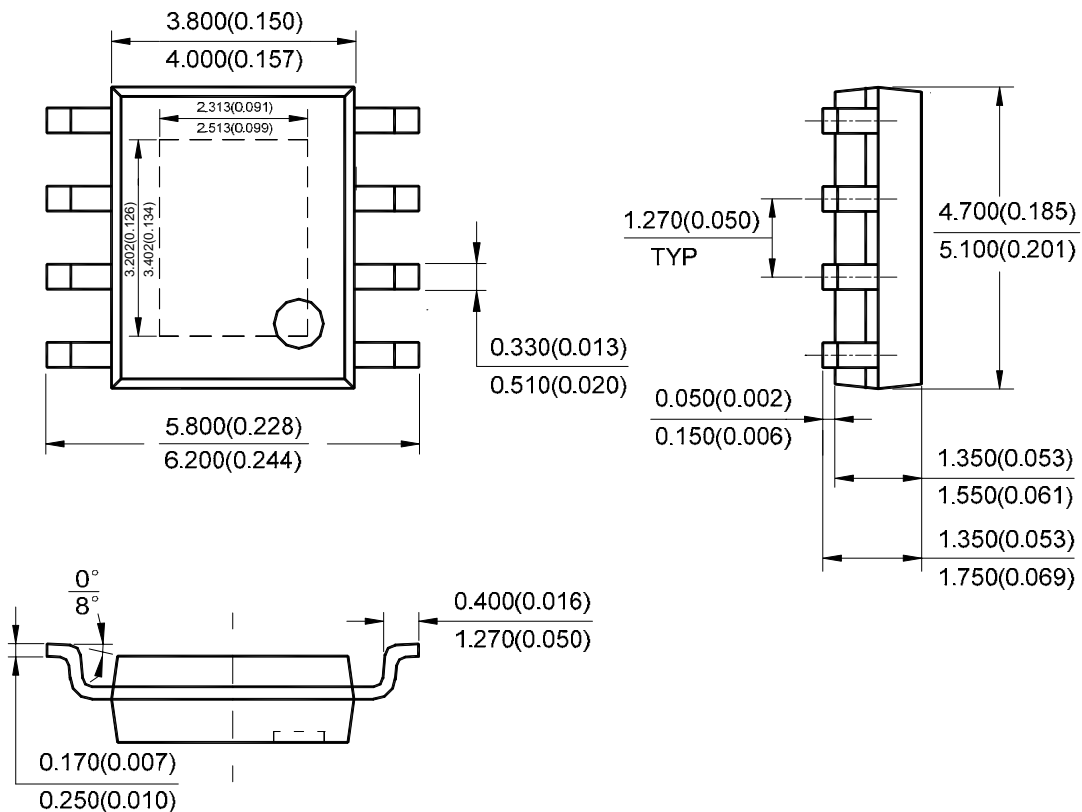
# BTL Drive Single-phase Full-wave Fan Motor Driver

AM4951/R/2

## Mechanical Dimensions (Continued)

PSOP-8

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.

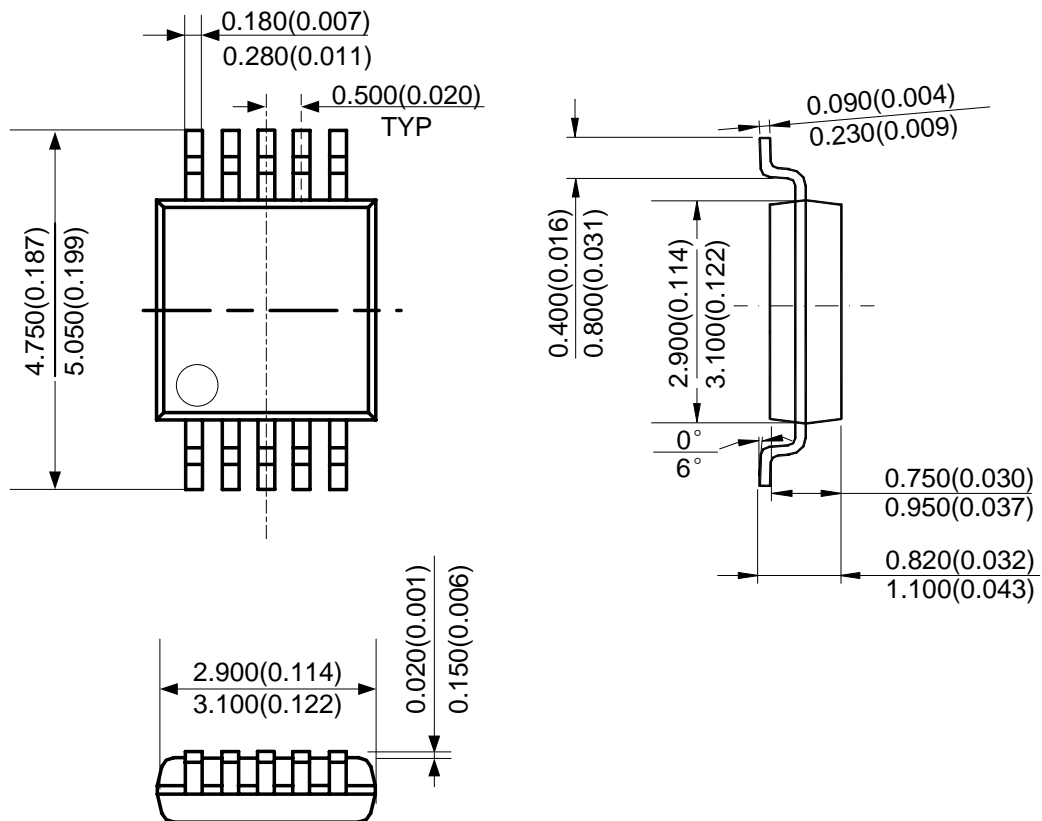
# BTL Drive Single-phase Full-wave Fan Motor Driver

# AM4951/R/2

## Mechanical Dimensions (Continued)

MSOP-10

Unit: mm(inch)



Note: Eject hole, oriented hole and mold mark is optional.



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