



DC TAIL ROTOR MOTOR, STEERING GEAR MOTOR DRIVE CIRCUIT

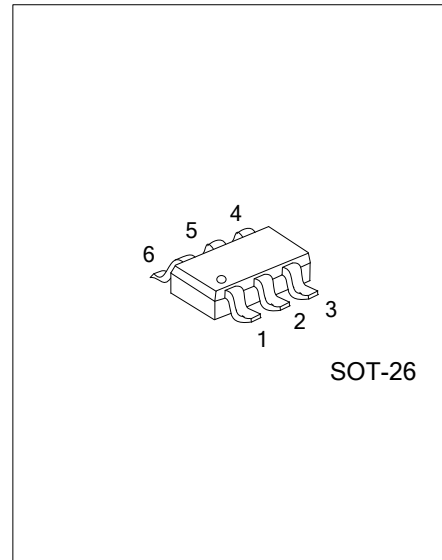
DESCRIPTION

UTC **UMD9114** is an integrated brush DC motor drive solution for battery-powered toys, low-voltage or battery-powered motion control applications. It has H bridge driver and uses the PMOS and NMOS power transistors with low output resistance. Low on-resistance ensures the circuit to consume lower power in operating at a continuous current, and ensures the circuit to operate stably for a long time. The circuit has a wide working voltage range from 2.5V to 5V. The maximum continuous output current reaches 0.5A, and the maximum peak output current can be 0.8A when V_{DD} is 4V.

UTC **UMD9114** has on-chip temperature protection function. When load motor with low internal resistance is in locked rotor, UTC **UMD9114** output current will increase momentarily, power dissipation of the circuit will go up sharply, and the chip temperature will soar. But, when the chip temperature exceeds a maximum temperature point (typically 160°C) set by internal temperature protection circuit, the internal circuit will switch off the on-chip power switching transistor of UTC **UMD9114**, and switch off load current, preventing potential safety hazards such as fuming, igniting of plastic package caused by over temperature etc. Only after having confirmed that the circuit has returned to safety temperature, the on-chip temperature hysteresis circuit can be allowed to re-control the circuit.

FEATURES

- * Low standby current (0.1µA typ.)
- * PMOS and NMOS power transistors with low output resistance
 - If I_O is 100mA, R_{ON} of power transistor is 1.5Ω
 - If I_O is 200mA, R_{ON} of power transistor is 1.6Ω
 - If I_O is 300mA, R_{ON} of power transistor is 1.7Ω
- * Built-in Subsequent stream diode
 - No external diode required
- * Low input current
 - Pull-down resistance is 1.8MΩ typical
 - 1.6µA input current when input voltage is 3V
- * On-chip thermal shut down (TSD) with hysteresis

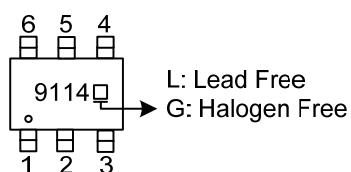


ORDERING INFORMATION

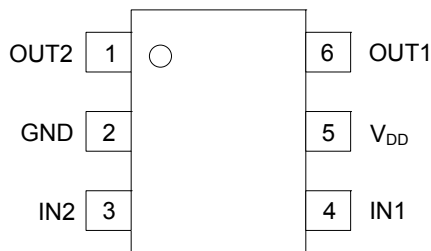
| Ordering Number | | Package | Packing |
|-----------------|----------------|---------|-----------|
| Lead Free | Halogen Free | | |
| UMD9114L-AG6-R | UMD9114G-AG6-R | SOT-26 | Tape Reel |

| | |
|--|---|
| <p>UMD9114G-AG6-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--|---|

MARKING



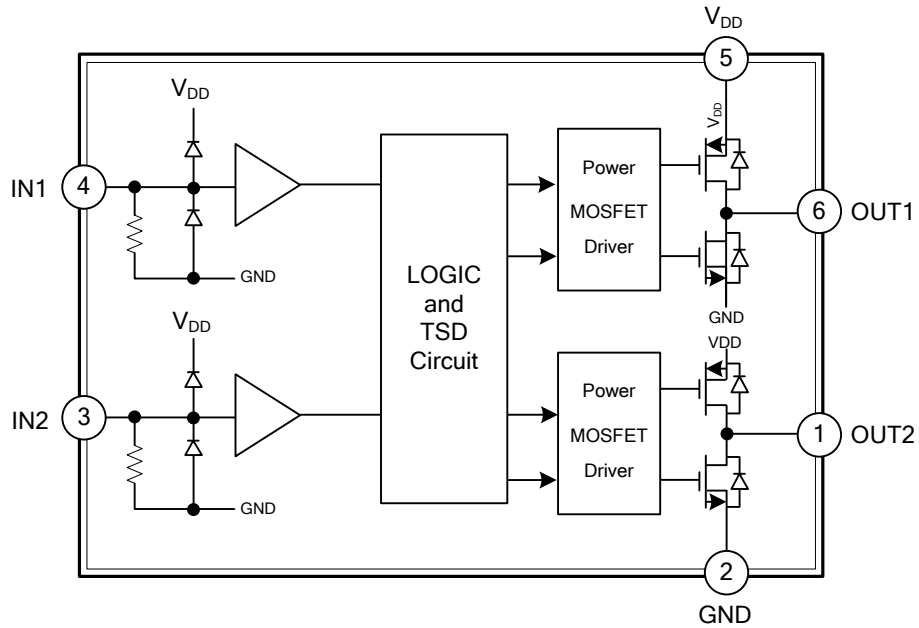
PIN CONFIGURATION



PIN DESCRIPTION

| PIN NO. | PIN NAME | DESCRIPTION |
|---------|-----------------|---------------------------|
| 1 | OUT2 | Reverse Drive Output Pin |
| 2 | GND | Ground |
| 3 | IN2 | Reverse Control Input Pin |
| 4 | IN1 | Forward Control Input Pin |
| 5 | V _{DD} | Supply Voltage |
| 6 | OUT1 | Forward Drive Output Pin |

■ BLOCK DIAGRAM



■ LOGIC TRUTH TABLE

| IN1 | IN2 | OUT1 | OUT2 | FUNCTION |
|-----|-----|------|------|-------------------|
| L | L | Z | Z | Standby (Stop) |
| H | L | H | L | Forward rotation |
| L | H | L | H | Backward rotation |
| H | H | L | L | Brake |

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------------|-----------------------|-----------------|------|
| Maximum Supply Voltage | V _{DD} | 5.5 | V |
| Maximum External Output Voltage | V _{OUT} | V _{DD} | V |
| Maximum External Input Voltage | V _{IN} | V _{DD} | V |
| Peak Output Current/Channel | I _{OUT PEAK} | 0.8 | A |
| Maximum continuous output current | I _{OUT} | 0.55 | A |
| Maximum power | P _D | 0.45 | W |
| Junction Temperature | T _J | +150 | °C |
| Operational Temperature Range | T _{OPR} | -20 ~ +85 | °C |
| Storage Temperature | T _{STG} | -55 ~ +150 | °C |

Note: 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.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|------------------|---------|------|
| Junction to Ambient | θ _{JAS} | 278 | °C/W |

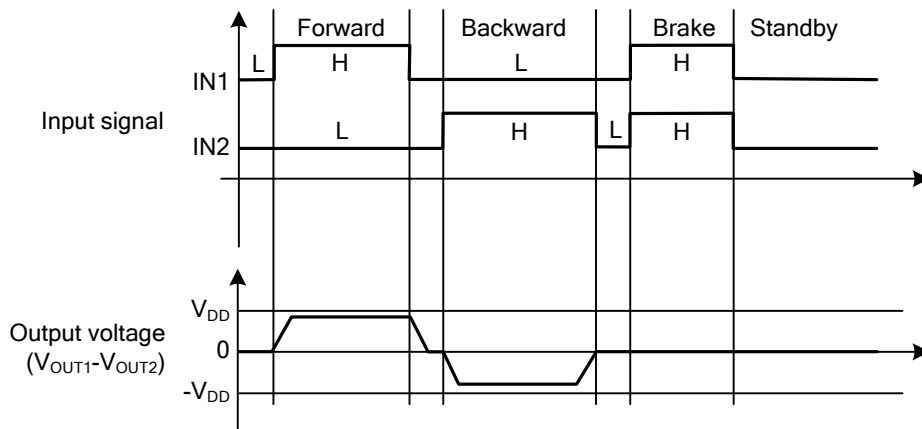
■ RECOMMENDED OPERATIONAL CONDITIONS (T_A=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|---|-----------------|-----|-----|-----------------|------|
| Supply Voltage | V _{DD} | 2.5 | | 5 | V |
| Input Voltage | V _{IN} | 0 | | V _{DD} | V |
| Output current from OUT1 to OUT2 when V _{DD} =4.5V | I _{OC} | | 300 | 500 | mA |

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, V_{DD}=3V, unless otherwise stated)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--------------------|---|---------------------|-----|---------------------|------|
| The Power Supply Parameters | | | | | | |
| VDD Standby Current | I _{VDDST} | IN1=IN2=L, V _{DD} =5.5V, Output opened | | | 4 | μA |
| VDD Static Supply Current | I _{VDD} | IN1=H or IN2=H; Output opened | | 100 | | μA |
| Input Logic Level | | | | | | |
| Input High Level | V _{INH} | V _{DD} =3V | 0.7×V _{DD} | | | V |
| Input Low Level | V _{INL} | V _{DD} =3V | | | 0.2×V _{DD} | V |
| Input High Level Current | I _{INH} | V _{INH} =3V, V _{DD} =3V | | 2.0 | | μA |
| Input the Pull-Down Resistor | R _{IN} | V _{INH} =3V, V _{DD} =3V | | 1.8 | | MΩ |
| The Power Tube Leads to Internal Resistance | | | | | | |
| Output Resistance | R _{ON} | I _O =±100mA, V _{DD} =3V | | 1.5 | | Ω |
| | | I _O =±200mA, V _{DD} =3V | | 1.6 | | |
| | | I _O =±300mA, V _{DD} =3V | | 1.7 | | |
| Protection Function Parameters | | | | | | |
| Protection Temperature | TSD | | | 160 | | °C |
| TSD Hysteresis | TSDH | | | 20 | | °C |

■ TYPICAL WAVEFORM

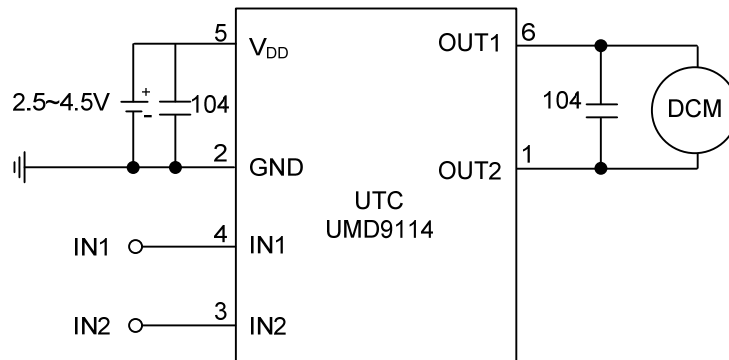


■ APPLICATION INFORMATION

Thermal shut down (TSD)

When Junction Temperature reaches 160°C, the internal circuit will switch off the on-chip power switching transistor of UTC **UMD9114**, preventing potential safety hazards caused by over temperature. The temperature hysteresis of TSD is 25°C typical.

■ TYPICAL APPLICATION CIRCUIT



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