

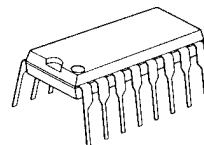
## BRUSH LESS DC MOTOR PRE-DRIVER

### ■GENERAL DESCRIPTION

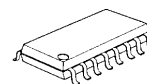
The **NJM2624A** is a 3-phase brushless DC motor pre-driver which requires external power-transistors suited to drive current of the motor.

The Run Enable function is used as PWM control besides of ON/OFF switched function.

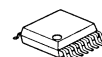
### ■PACKAGE OUTLINE



**NJM2624AD**



**NJM2624AM**

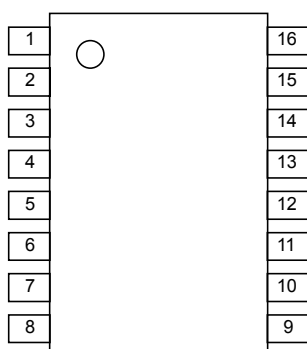


**NJM2624AV**

### ■FEATURES

- Operating Voltage (V<sup>+</sup>=4.5V to 18V)
- Low Operating Current (10mA max.)
- Run Enable
- Forward or Reverse Direction
- Output Switch Current (90mA typ.)
- Bipolar Technology
- Package Outline DIP16, DMP16, SSOP16

### ■PIN CONFIGURATION

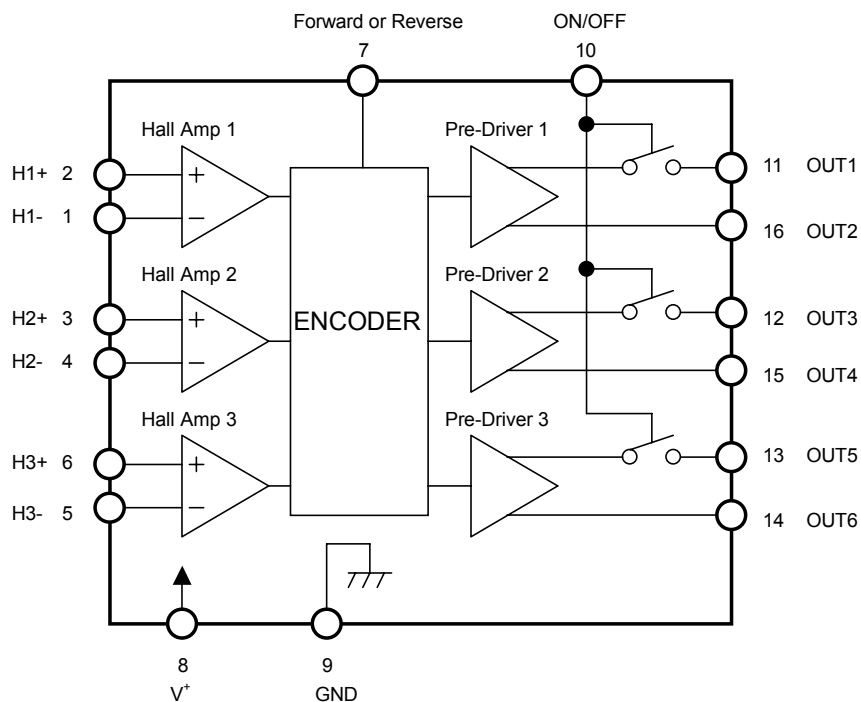


### PIN FUNCTION

|                  |           |
|------------------|-----------|
| 1.H1-            | 9.GND     |
| 2.H1+            | 10.ON/OFF |
| 3.H2+            | 11.OUT1   |
| 4.H2-            | 12.OUT3   |
| 5.H3-            | 13.OUT5   |
| 6.H3+            | 14.OUT6   |
| 7.FR             | 15.OUT4   |
| 8.V <sup>+</sup> | 16.OUT2   |

# NJM2624A

## ■BLOCK DIAGRAM



## ■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER                   | SYMBOL    | RATINGS                                    | UNIT |
|-----------------------------|-----------|--------------------------------------------|------|
| Supply Voltage              | $V^+$     | 20                                         | V    |
| Output Current              | $I_O$     | 100                                        | mA   |
| Power Dissipation           | $P_D$     | (DIP16) 700<br>(DMP16) 350<br>(SSOP16) 300 | mW   |
| Operating Temperature Range | $T_{opr}$ | -25 ~ +85                                  | °C   |
| Storage Temperature Range   | $T_{stg}$ | -40 ~ +150                                 | °C   |

## ■ELECTRICAL CHARACTERISTICS (V<sup>+</sup>=12V, Ta=25°C)

### Total Device

| PARAMETER      | SYMBOL          | TEST CONDITONS               | MIN. | TYP. | MAX. | UNIT |
|----------------|-----------------|------------------------------|------|------|------|------|
| Supply Voltage | V <sup>+</sup>  |                              | 4.5  | —    | 18   | V    |
| Supply Current | I <sub>CC</sub> | RL=∞<br>ON/OFF Terminal=OPEN | —    | 3.7  | 10   | mA   |

### Hall Sensor Section

|                                 |                  |         |      |   |      |    |
|---------------------------------|------------------|---------|------|---|------|----|
| Input Offset Voltage            | V <sub>IO</sub>  | RL=470Ω | -4.2 | — | 4.2  | mV |
| Input Common mode Voltage range | V <sub>ICM</sub> | RL=470Ω | 1.5  | — | 10.5 | V  |
| Input Bias Current              | I <sub>B</sub>   |         | —    | — | 600  | nA |

### Output Section

|                          |                   |                              |     |     |   |    |
|--------------------------|-------------------|------------------------------|-----|-----|---|----|
| Output Voltage 1         | V <sub>OUT1</sub> | RL=470Ω, V <sup>+</sup> =12V | 8.9 | 9.5 | — | V  |
| Output Voltage 2         | V <sub>OUT2</sub> | RL=470Ω, V <sup>+</sup> =5V  | —   | 3.5 | — | V  |
| Maximum Output Current 1 | I <sub>OUT1</sub> | RL=100Ω, V <sup>+</sup> =12V | 50  | 90  | — | mA |
| Maximum Output Current 2 | I <sub>OUT2</sub> | RL=100Ω, V <sup>+</sup> =5V  | —   | 30  | — | mA |
| Output Leak Current      | I <sub>LEAK</sub> |                              | —   | —   | 5 | μA |

### Run Enable Section

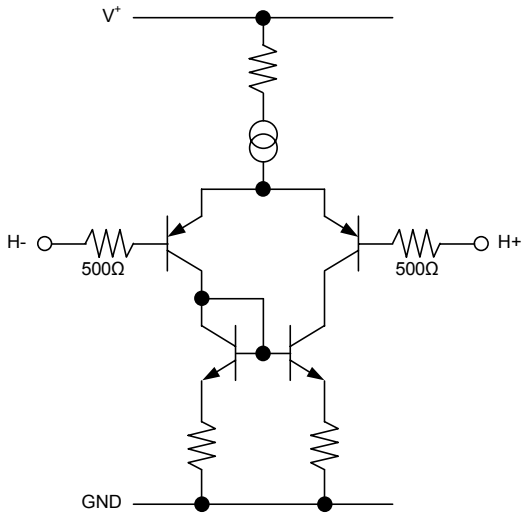
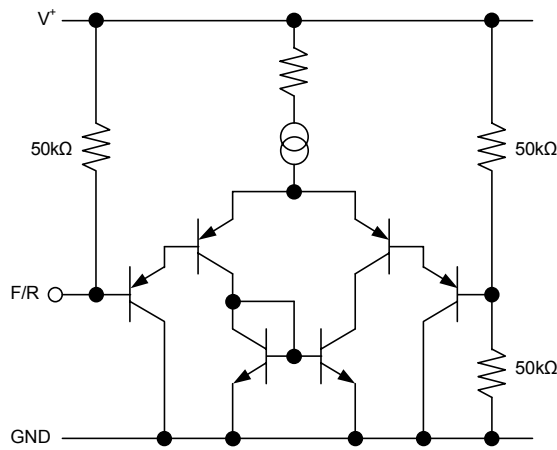
|                               |                      |                     |                        |                   |                        |    |
|-------------------------------|----------------------|---------------------|------------------------|-------------------|------------------------|----|
| Run Enable Voltage            | V <sub>ON</sub>      | RL=470Ω             | 1/2V <sup>+</sup> +0.5 | —                 | —                      | V  |
| Run Disable Voltage           | V <sub>OFF</sub>     | RL=470Ω             | —                      | —                 | 1/2V <sup>+</sup> -0.5 | V  |
| Output Voltage Undefined Area | V <sub>O-undef</sub> | RL=470Ω             | 1/2V <sup>+</sup> -0.5 | 1/2V <sup>+</sup> | 1/2V <sup>+</sup> +0.5 | V  |
| Source Current 1              | I <sub>ON1</sub>     | ON/OFF Terminal=GND | —                      | 250               | 400                    | μA |

### Forward or Reverse Direction Section

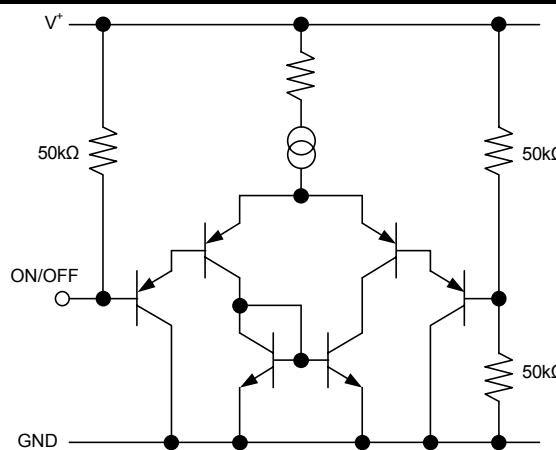
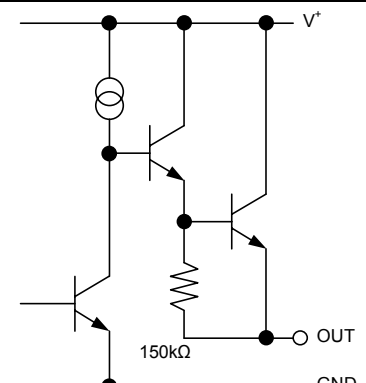
|                          |                       |                                 |                        |                   |                        |    |
|--------------------------|-----------------------|---------------------------------|------------------------|-------------------|------------------------|----|
| Forward Direction        | V <sub>F</sub>        | RL=470Ω                         | 1/2V <sup>+</sup> +0.5 | —                 | —                      | V  |
| Reverse Direction        | V <sub>R</sub>        | RL=470Ω                         | —                      | —                 | 1/2V <sup>+</sup> -0.5 | V  |
| F/R Logic Undefined Area | V <sub>SW-undef</sub> | RL=470Ω                         | 1/2V <sup>+</sup> -0.5 | 1/2V <sup>+</sup> | 1/2V <sup>+</sup> +0.5 | V  |
| Source Current 2         | I <sub>ON2</sub>      | Forward or Reverse Terminal=GND | —                      | 250               | 400                    | μA |

# NJM2624A

## ■TERMINAL DESCRIPTION

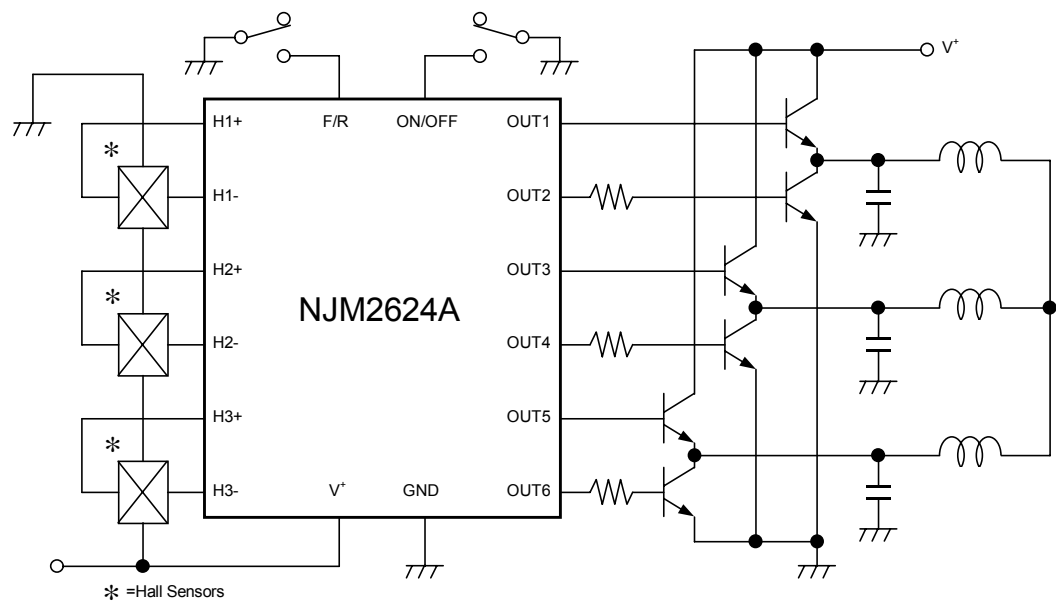
| Pin No, | SYMBOL | FUNCTION                                 | INSIDE EQUIVALENT CIRCUIT                                                                                                                                                                                                                                                                                                                                                                        |
|---------|--------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2       | H1+    | Sensor Input 1<br>Non-Inverting Terminal |  <p>The diagram shows a differential input stage with two input pairs. The top pair (H1+, H2+) is non-inverting, and the bottom pair (H1-, H2-) is inverting. Each input is connected to a 500Ω resistor. The circuit is powered by V+ and GND. A central node is connected to a resistor and a capacitor.</p> |
| 3       | H2+    | Sensor Input 2<br>Non-Inverting Terminal |                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6       | H3+    | Sensor Input 3<br>Non-Inverting Terminal |                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1       | H1-    | Sensor Input 1<br>Inverting Terminal     |                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4       | H2-    | Sensor Input 2<br>Inverting Terminal     |                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5       | H3-    | Sensor Input 3<br>Inverting Terminal     |  <p>The diagram shows a differential input stage with two input pairs. The top pair (F/R) is connected to a 50kΩ resistor. The circuit is powered by V+ and GND. A central node is connected to a resistor and a capacitor.</p>                                                                               |
| 7       | F/R    | Forward or Reverse<br>Direction Terminal |                                                                                                                                                                                                                                                                                                                                                                                                  |

## ■ TERMINAL DESCRIPTION

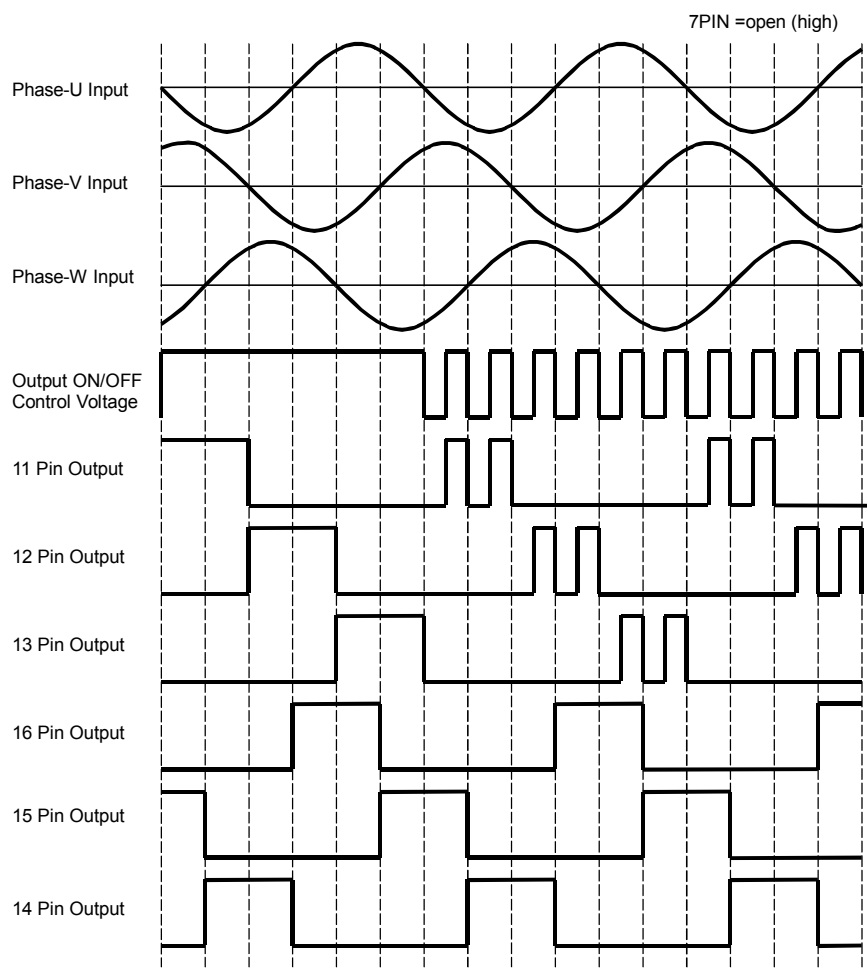
| Pin No,                          | SYMBOL                                       | FUNCTION                                          | INSIDE EQUIVALENT CIRCUIT                                                           |
|----------------------------------|----------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------|
| 8                                | V <sup>+</sup>                               | Power Supply                                      | —                                                                                   |
| 9                                | GND                                          | Ground                                            | —                                                                                   |
| 10                               | ON/OFF                                       | Output Run Enable Terminal                        |   |
| 11<br>16<br>12<br>15<br>13<br>14 | OUT1<br>OUT2<br>OUT3<br>OUT4<br>OUT5<br>OUT6 | Internal Switching Transistor<br>Emitter Follower |  |

# NJM2624A

## ■TYPICAL APPLICATION

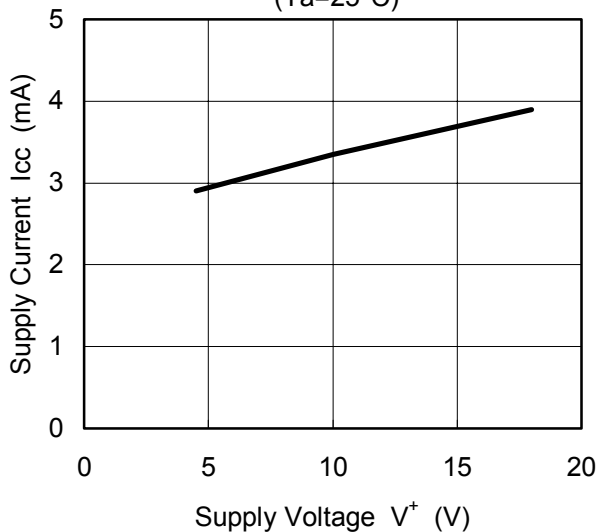


## ■TIMING CHART

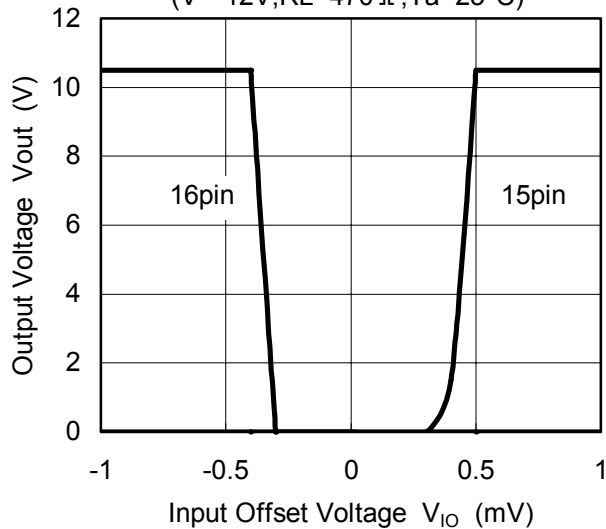


## TYPICAL CHARACTERISTICS

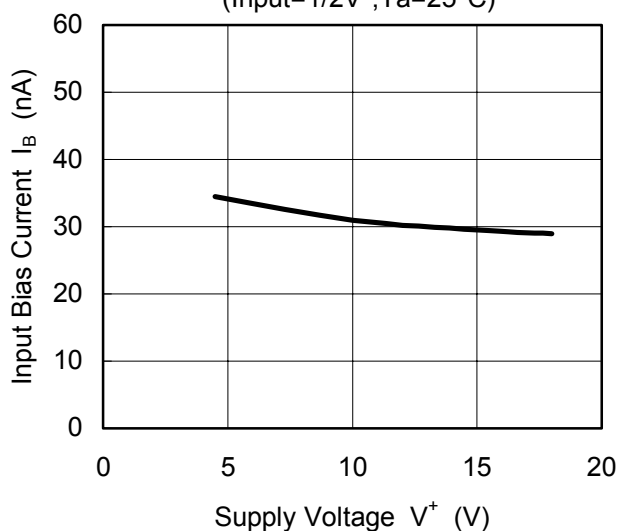
Supply Current vs. Supply Voltage  
( $T_a=25^\circ\text{C}$ )



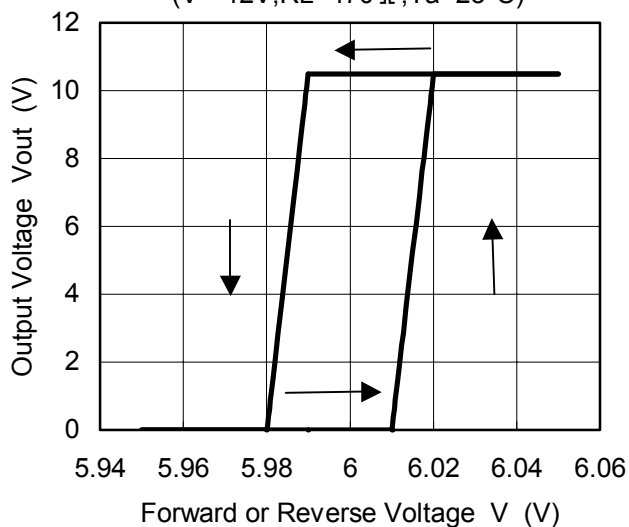
Input vs. Output (Offset)  
( $V^+=12\text{V}, R_L=470\ \Omega, T_a=25^\circ\text{C}$ )



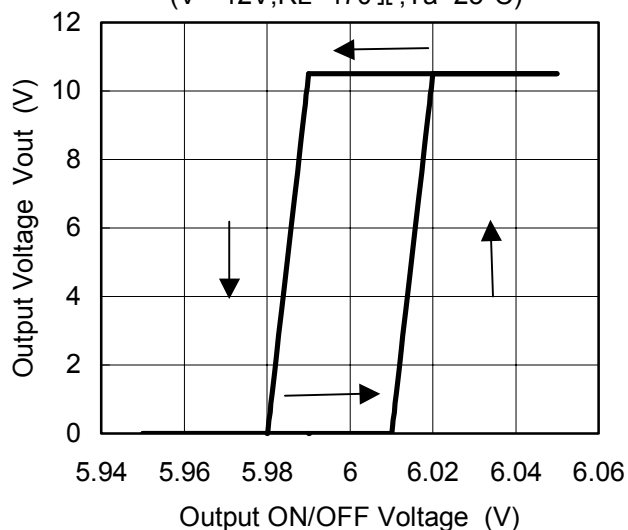
Input Bias Current vs. Supply Voltage  
(Input= $1/2V^+$ ,  $T_a=25^\circ\text{C}$ )



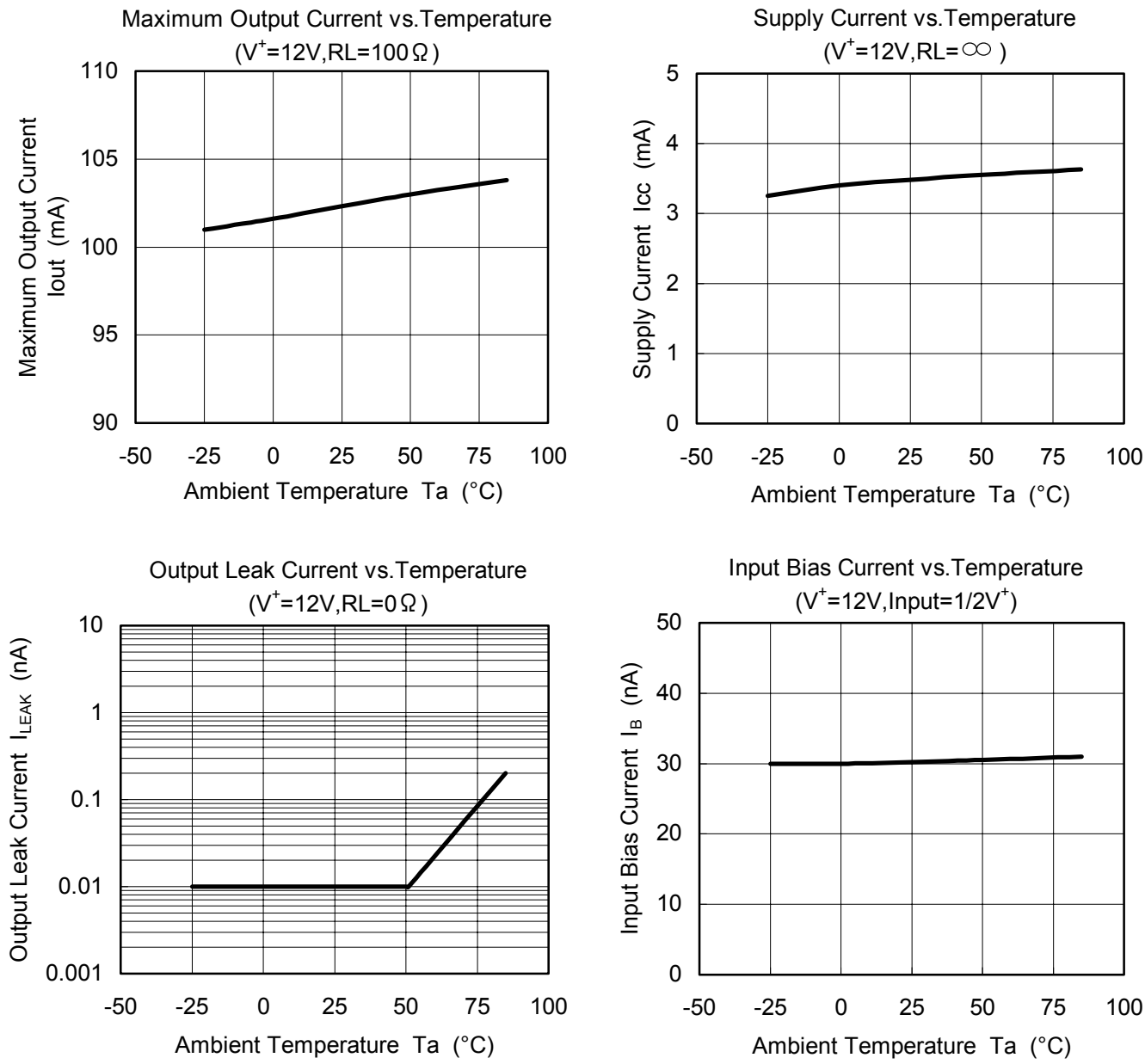
Output Voltage vs. Forward or Reverse Voltage  
( $V^+=12\text{V}, R_L=470\ \Omega, T_a=25^\circ\text{C}$ )



Output Voltage vs. Output ON/OFF Voltage  
( $V^+=12\text{V}, R_L=470\ \Omega, T_a=25^\circ\text{C}$ )



TYPICAL CHARACTERISTICS



[CAUTION]  
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