

## LOW DROPOUT VOLTAGE REGULATOR WITH ON/OFF CONTROL

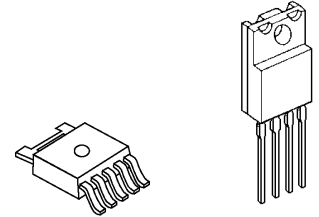
### ■ GENERAL DESCRIPTION

The NJM2386/88 is a general purpose low dropout voltage regulators with ON/OFF control.

The output current is up to 1.0A and dropout voltage is 0.2V typical at 500mA load.

It features high maximum input voltage of 35V for a wide application range including TV, home appliances and power modules.

### ■ PACKAGE OUTLINE



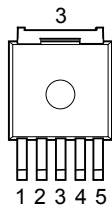
NJM2386DL3

NJM2388F

### ■ FEATURES

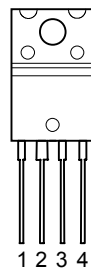
- High Maximum Input Voltage Up to 35V
- Low Dropout Voltage 0.2V typ. at  $I_o=0.5A$
- Output Current  $I_o(max.)=1.0A$
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Overvoltage Protection
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline TO-252-5(NJM2386), TO-220F-4(NJM2388)

### ■ PIN CONFIGURATION



NJM2386DL3

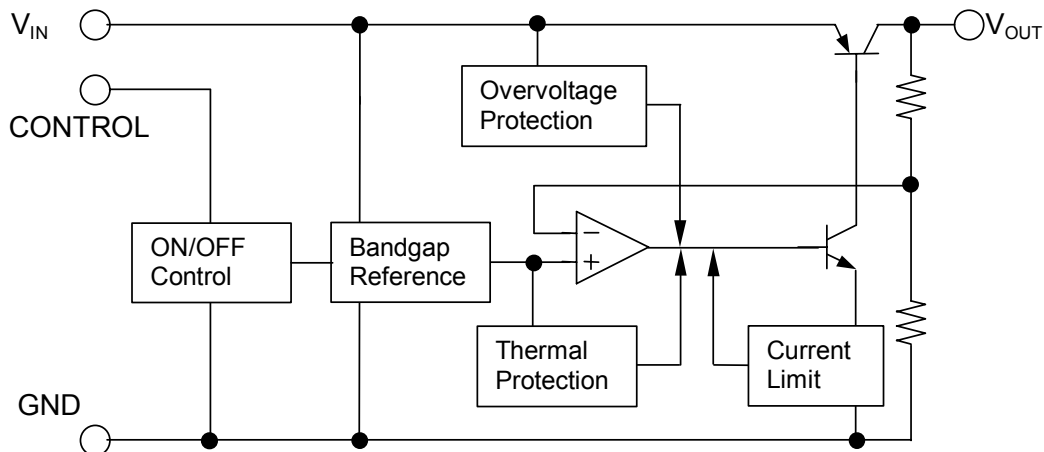
- PIN FUNCTION**
1.  $V_{IN}$
  2. ON/OFF CONTROL
  3.  $V_{OUT}$
  4. N.C.
  5. GND



NJM2388F

- PIN FUNCTION**
1.  $V_{IN}$
  2.  $V_{OUT}$
  3. GND
  4. ON/OFF CONTROL

### ■ EQUIVALENT CIRCUIT



# NJM2386/88

## ■ OUTPUT VOLTAGE RANK LIST

| Device Name   | V <sub>OUT</sub> |
|---------------|------------------|
| NJM2386DL3-33 | 3.3V             |
| NJM2386DL3-05 | 5.0V             |
| NJM2386DL3-63 | 6.3V             |
| NJM2386DL3-08 | 8.0V             |
| NJM2386DL3-09 | 9.0V             |
| NJM2386DL3-12 | 12.0V            |

| Device Name | V <sub>OUT</sub> |
|-------------|------------------|
| NJM2388F33  | 3.3V             |
| NJM2388F05  | 5.0V             |
| NJM2388F63  | 6.3V             |
| NJM2388F08  | 8.0V             |
| NJM2388F84  | 8.4V             |
| NJM2388F09  | 9.0V             |
| NJM2388F10  | 10.0V            |
| NJM2388F12  | 12.0V            |

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER                            | SYMBOL            | RATINGS    |                          | UNIT |
|--------------------------------------|-------------------|------------|--------------------------|------|
| Input Voltage                        | V <sub>IN</sub>   | +35        |                          | V    |
| Control Voltage                      | V <sub>CONT</sub> | +35(*1)    |                          | V    |
| Output Current                       | I <sub>o</sub>    | 1.0        |                          | A    |
| Power Dissipation                    | P <sub>D</sub>    | NJM2386    | 10(Tc<25°C) / 1(Ta<25°C) | W    |
|                                      |                   | NJM2388    | 18(Tc<50°C)              |      |
| Operating Junction Temperature Range | T <sub>j</sub>    | -40 ~ +150 |                          | °C   |
| Operating Temperature Range          | T <sub>opr</sub>  | -40 ~ +85  |                          | °C   |
| Storage Temperature Range            | T <sub>stg</sub>  | -50 ~ +150 |                          | °C   |

(\*1): When input voltage is less than +35V, the absolute maximum control voltage is equal to the input voltage.

## ■ ELECTRICAL CHARACTERISTICS (V<sub>IN</sub>=V<sub>O</sub>+1V, I<sub>o</sub>=0.5A, C<sub>IN</sub>=0.33μF, C<sub>o</sub>=22μF, Ta=25°C)

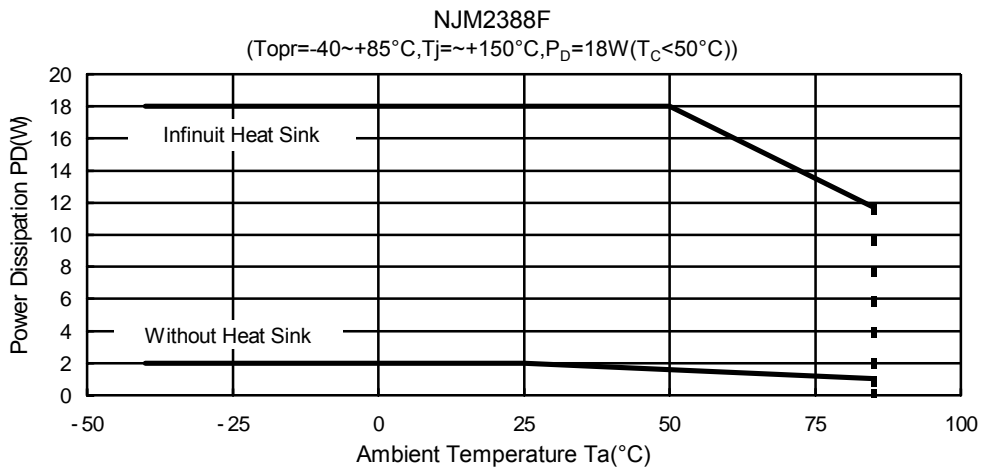
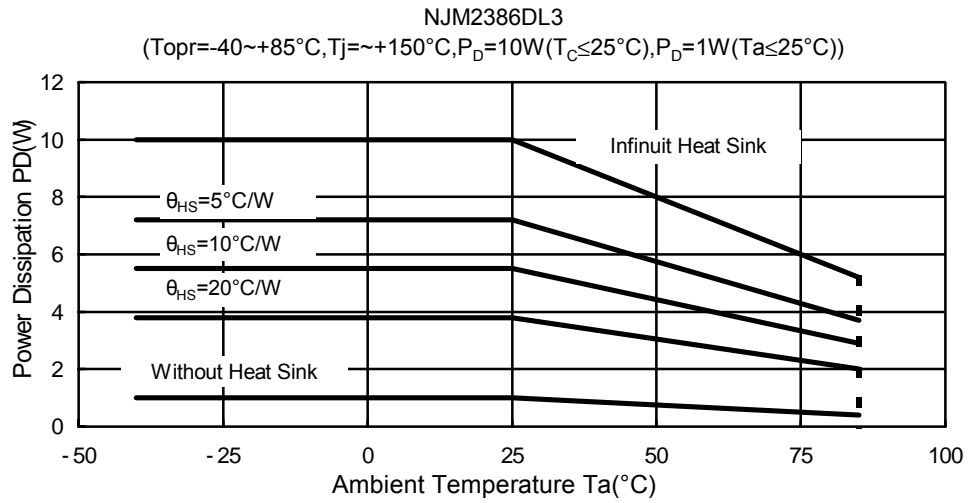
Measurement is to be conducted is pulse testing.

| PARAMETER   | SYMBOL                            | CONDITIONS  | MIN.    | TYP.  | MAX. | UNIT |
|---|-----------------------------------|---|---------|-------|------|------|
| Output Voltage                                    | V <sub>o</sub>                    | V <sub>IN</sub> =V <sub>O</sub> +1V   | -2%     | -     | +2%  | V    |
| Line Regulation                                   | ΔV <sub>o</sub> /ΔV <sub>IN</sub> | V <sub>IN</sub> =V <sub>O</sub> +1V ~ V <sub>O</sub> +17V                       | -       | 0.04  | 0.16 | %/V  |
| Load Regulation                                   | ΔV <sub>o</sub> /ΔI <sub>o</sub>  | V <sub>IN</sub> =V <sub>O</sub> +2V, I <sub>o</sub> =0A ~ 1.0A                  | -       | 0.2   | 1.4  | %/A  |
| Average Temperature Coefficient of Output Voltage | ΔV <sub>o</sub> /ΔT               | T <sub>j</sub> =0 ~ +125°C  | -       | ±0.02 | -    | %/°C |
| Quiescent Current                                 | I <sub>Q</sub>                    | I <sub>o</sub> =0A  | -       | -     | 5    | mA   |
| Quiescent Current at Control OFF(*2)              | I <sub>Q(OFF)</sub>               | V <sub>CONT</sub> =0V   | -       | -     | 500  | μA   |
| Dropout Voltage                                   | ΔV <sub>I-O</sub>                 | I <sub>o</sub> =0.5A  | -       | 0.2   | 0.5  | V    |
| Ripple Rejection                                  | NJM238**33                        | RR<br>V <sub>IN</sub> =V <sub>O</sub> +2V,<br>e <sub>in</sub> =0.5Vrms, f=120Hz | 54      | 67    | -    | dB   |
|   | NJM238**05                        |   | 54      | 67    | -    |      |
|   | NJM238**63                        |   | 54      | 67    | -    |      |
|   | NJM238**08                        |   | 52      | 65    | -    |      |
|   | NJM238**84                        |   | 52      | 65    | -    |      |
|   | NJM238**09                        |   | 52      | 65    | -    |      |
|   | NJM238**10                        |   | 50      | 63    | -    |      |
| NJM238**12  | 50                                | 63  | -       |       |      |      |
| ON Control Voltage                                | V <sub>CONT(ON)</sub>             |   | 2.0(*3) | -     | -    | V    |
| OFF Control Voltage                               | V <sub>CONT(OFF)</sub>            |   | -       | -     | 0.4  | V    |
| ON Control Current                                | I <sub>CONT(ON)</sub>             | V <sub>C</sub> =2.7V  | -       | -     | 20   | μA   |
| OFF Control Current                               | I <sub>CONT(OFF)</sub>            | V <sub>C</sub> =0.4V  | -       | -     | -20  | μA   |

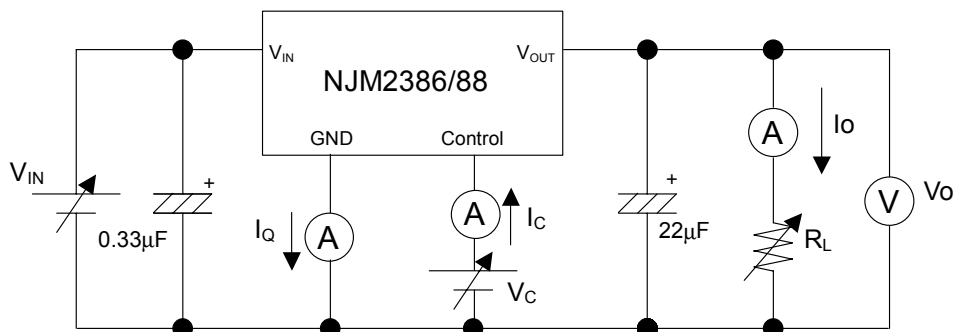
(\*2) This electrical characteristics is applied to NJM2388.

(\*3): When ON/OFF CONTROL Terminal is open, Output Voltage is ON.

## POWER DISSIPATION vs. AMBIENT TEMPERATURE



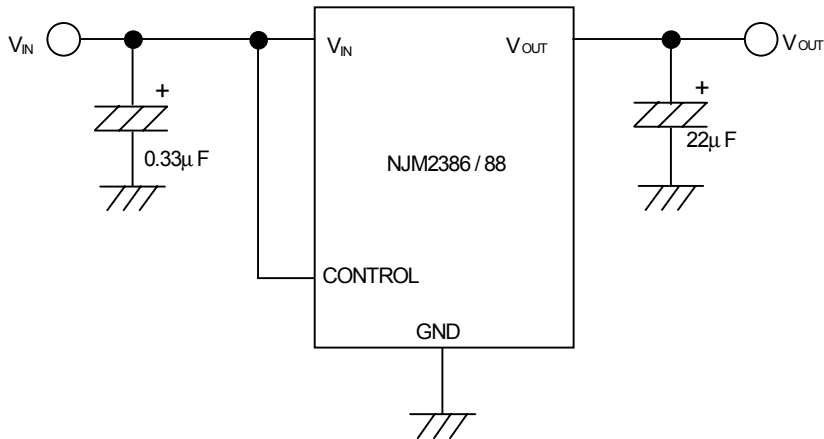
## TEST CIRCUIT



# NJM2386/88

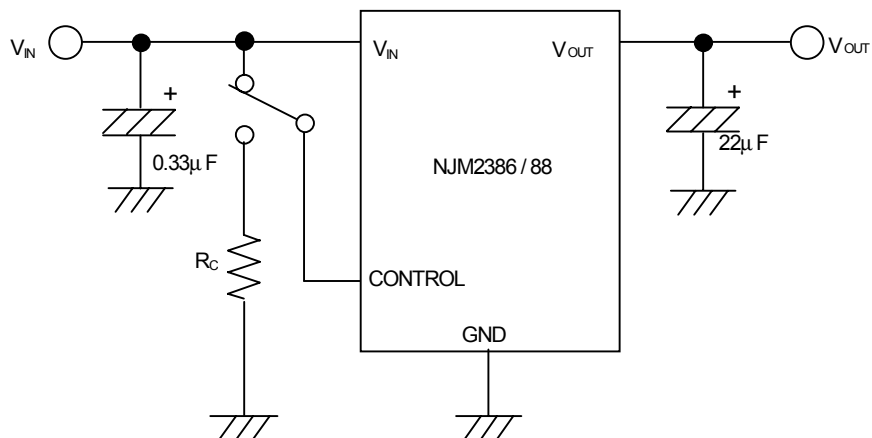
## ■ TYPICAL APPLICATION

① In the case where ON/OFF Control is not required:



Connect control terminal to  $V_{IN}$  terminal or open.

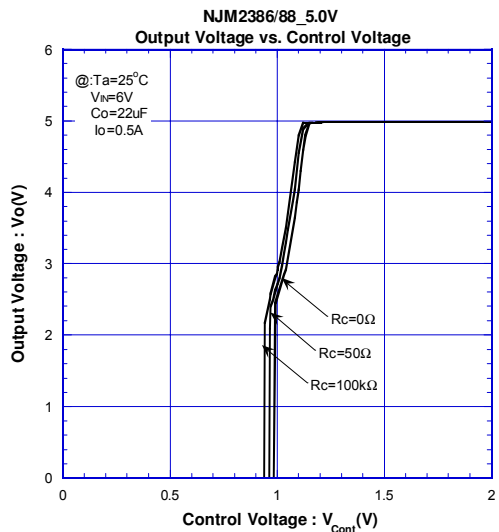
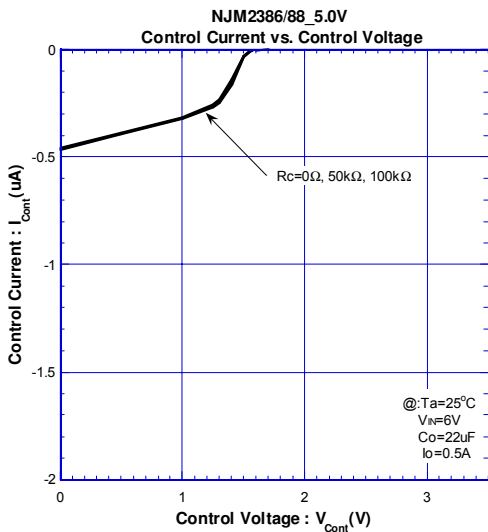
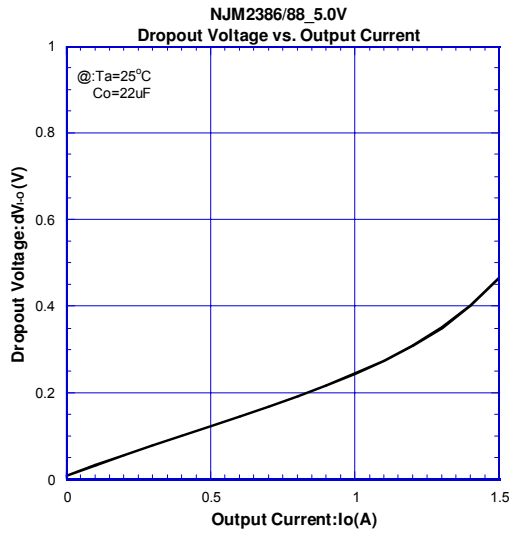
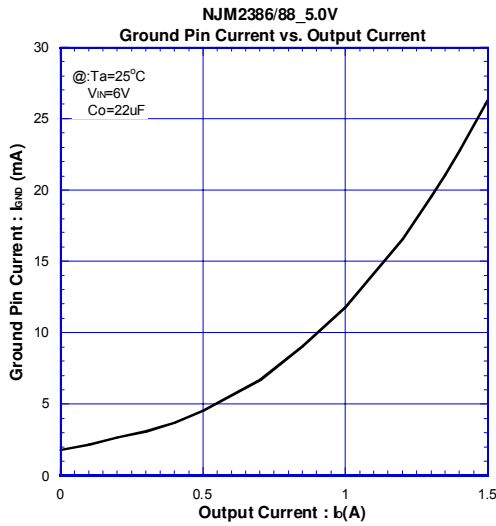
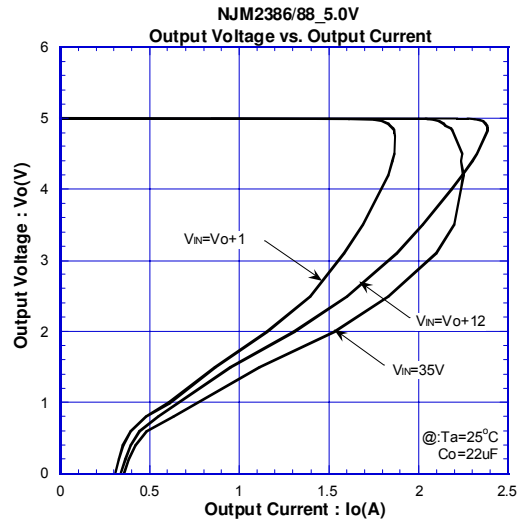
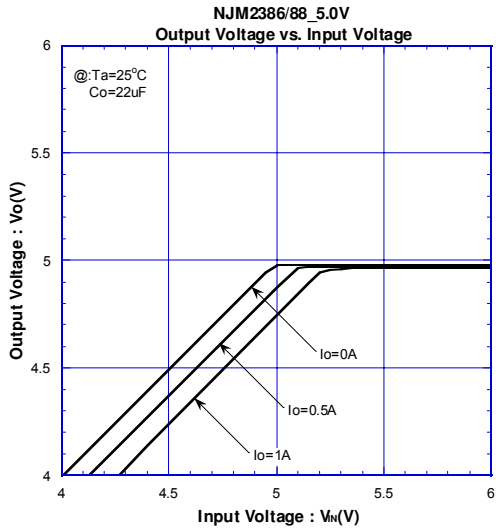
② In use of ON/OFF CONTROL:



State of control terminal:

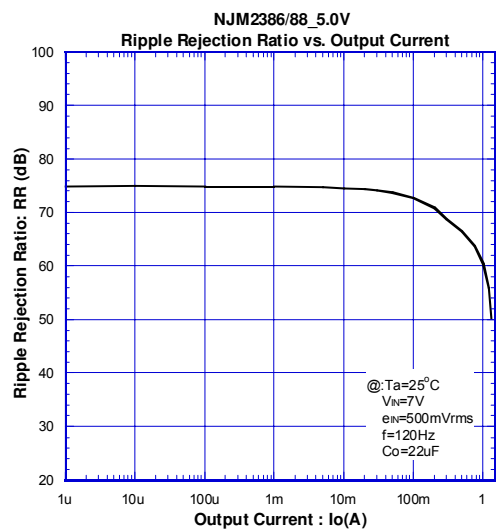
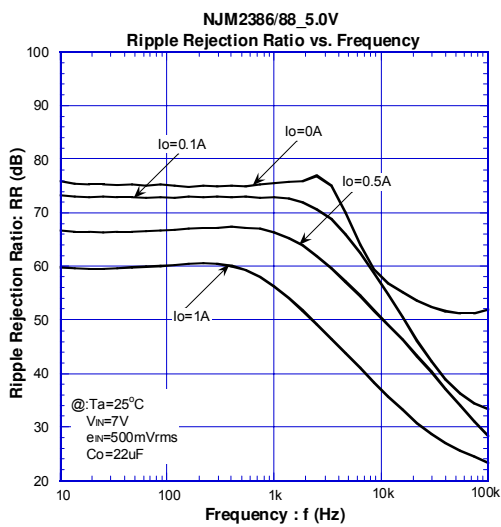
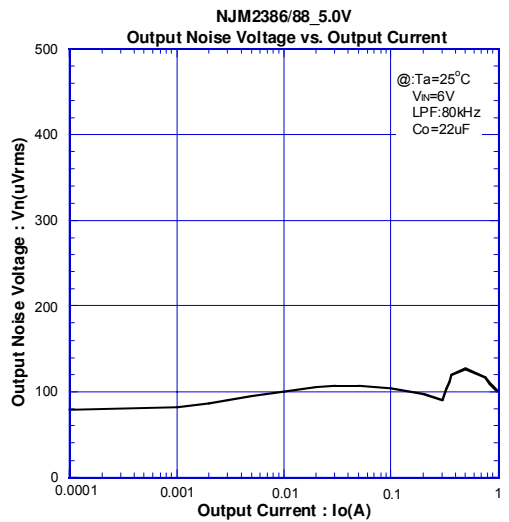
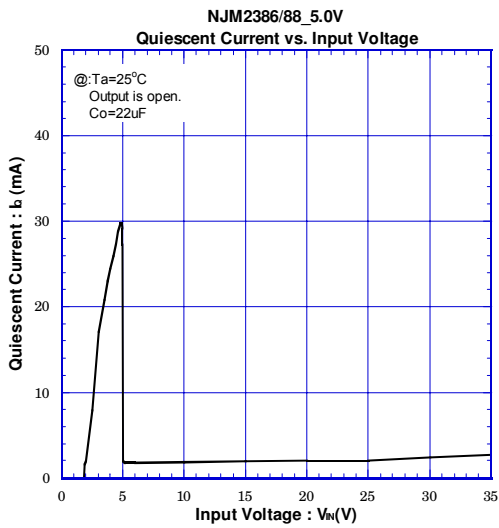
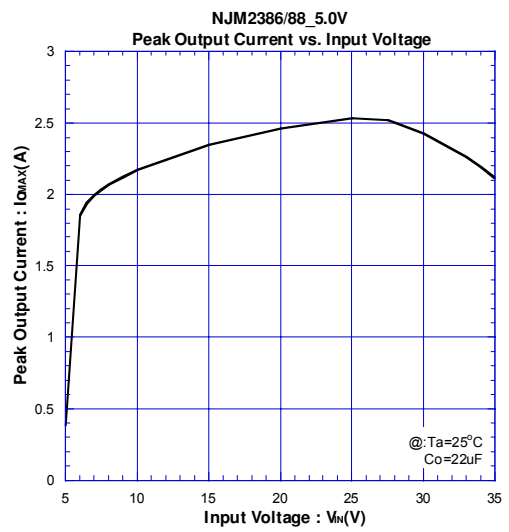
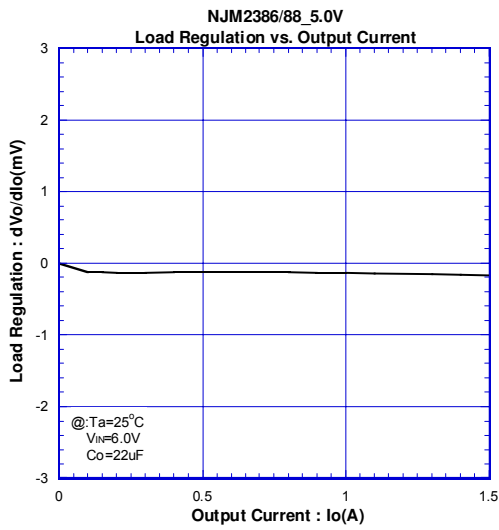
- “H” or “open” → output is enabled.
- “L” → output is disabled.

## TYPICAL CHARACTERISTICS

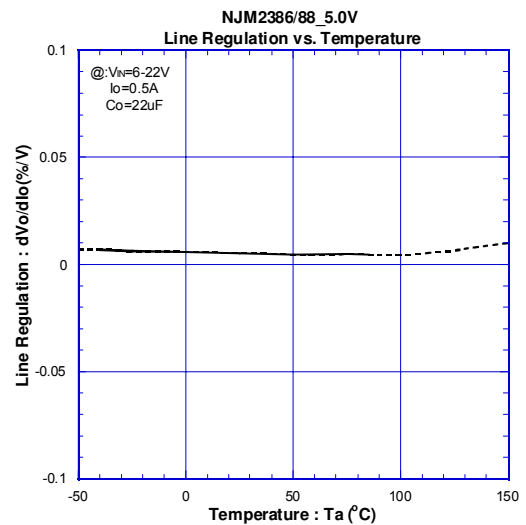
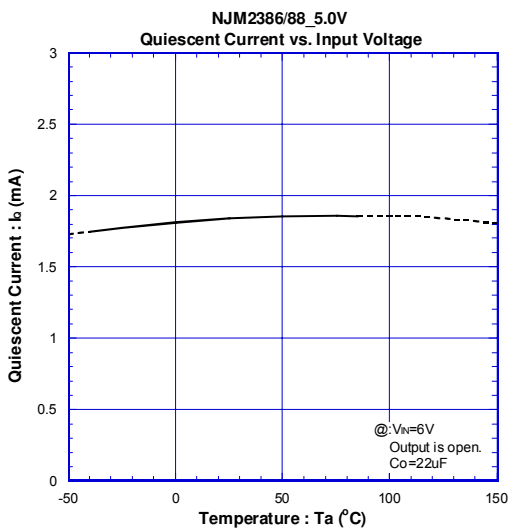
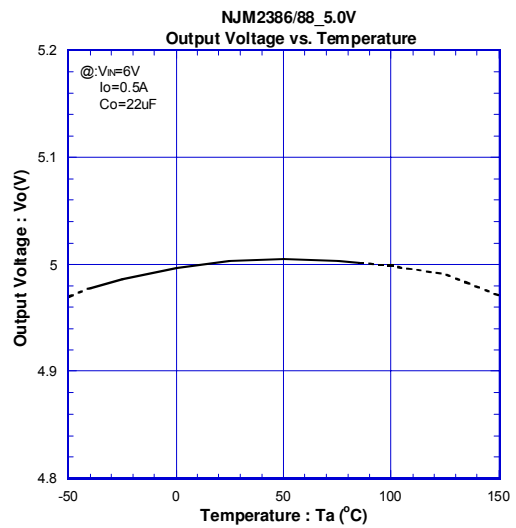
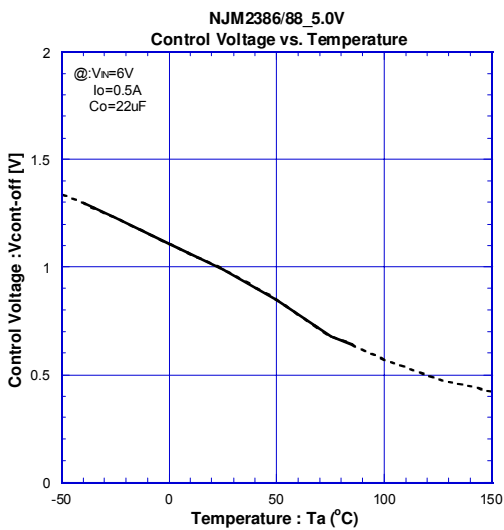
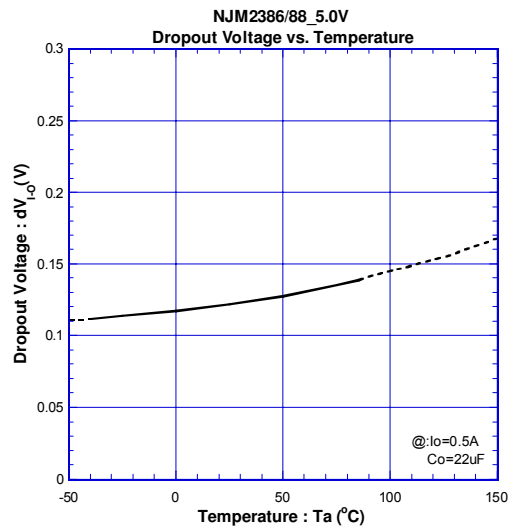
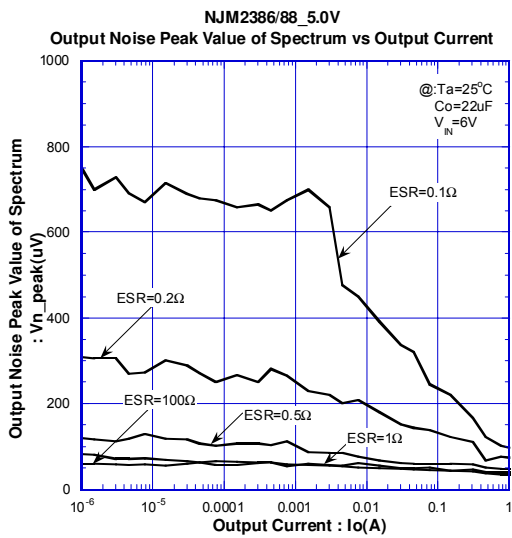


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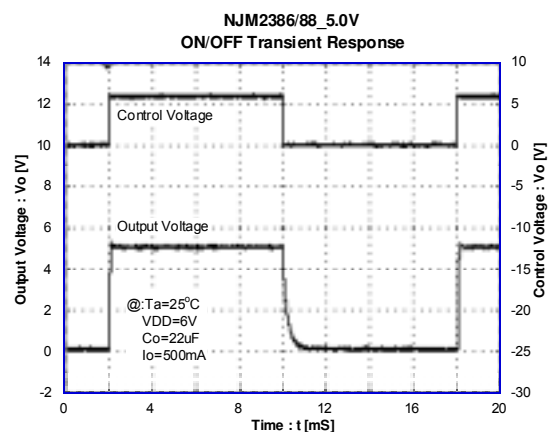
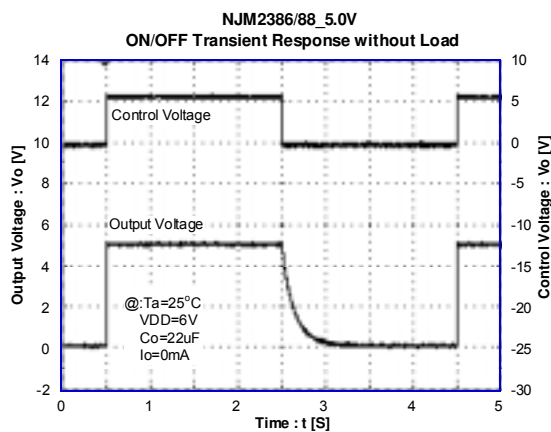
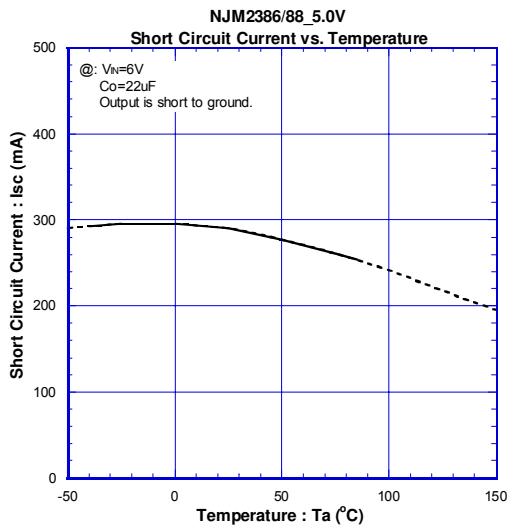
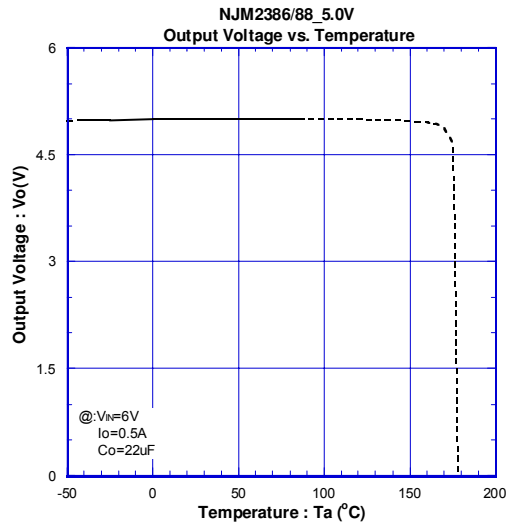
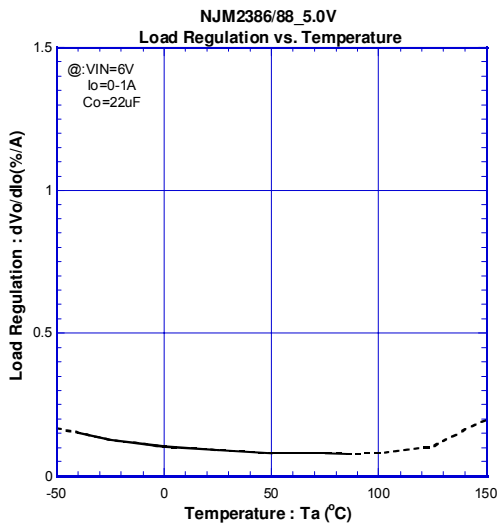


## TYPICAL CHARACTERISTICS



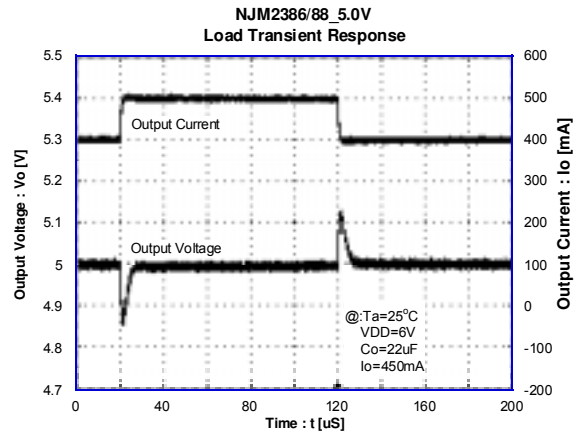
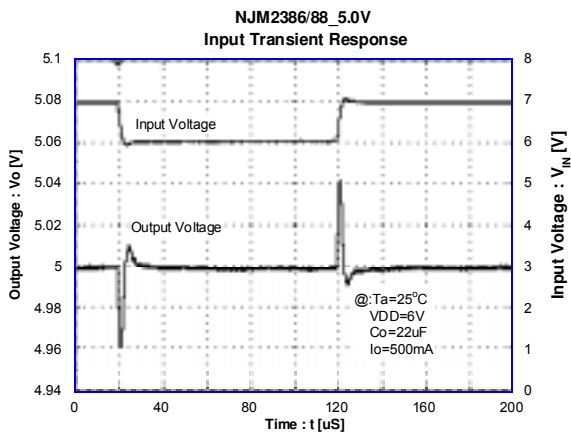
# NJM2386/88

## TYPICAL CHARACTERISTICS





## TYPICAL CHARACTERISTICS



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