



SANYO Semiconductors

# DATA SHEET

## LV59012M — Bi-CMOS LSI For Potable Electronic Devices 1.2V Constant-Voltage Power Supply IC

### Overview

The LV59012M is a constant-voltage power supply IC for potable electronic devices incorporating the output ON/OFF function, which offers advantages such as small current drain when output OFF and saves power dissipation of the equipment.

### Features

- Output voltage ON/OFF function with the control pin (active, high)
- Output current of 1A obtainable
- Small current drain (1 $\mu$ A max) when output OFF and optimum for power saving
- MFP8 (200mil) package, ensuring easy mounting design
- Full compliment of protection circuits incorporated (including overcurrent protection, thermal protection)

### Specifications

#### Absolute Maximum Ratings at Ta = 25°C

| Parameter                   | Symbol           | Conditions                     | Ratings     | Unit |
|-----------------------------|------------------|--------------------------------|-------------|------|
| Maximum power supply        | V <sub>IN1</sub> | V <sub>IN1</sub> pin           | 6.2         | V    |
|                             | V <sub>IN2</sub> | V <sub>IN2</sub> pin           | 6.2         | V    |
| Allowable power dissipation | Pd max           | Mounted on a specified board.* | 1.45        | W    |
| Operating Temperature       | T <sub>opr</sub> |                                | -30 to +85  | °C   |
| Storage Temperature         | T <sub>stg</sub> |                                | -40 to +150 | °C   |

\* Specified board: 50mm × 50mm × 1.6mm, glass epoxy both sides

#### Recommended Operating Ranges at Ta = 25°C

| Parameter      | Symbol           | Conditions           | Ratings  | Unit |
|----------------|------------------|----------------------|----------|------|
| power supply   | V <sub>IN1</sub> | V <sub>IN1</sub> pin | 1.6 to 6 | V    |
|                | V <sub>IN2</sub> | V <sub>IN2</sub> pin | 1.8 to 6 | V    |
| Output current | I <sub>O</sub>   |                      | 0 to 1   | A    |

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# LV59012M

**Electrical Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{IN1} = V_{IN2} = 3\text{V}$

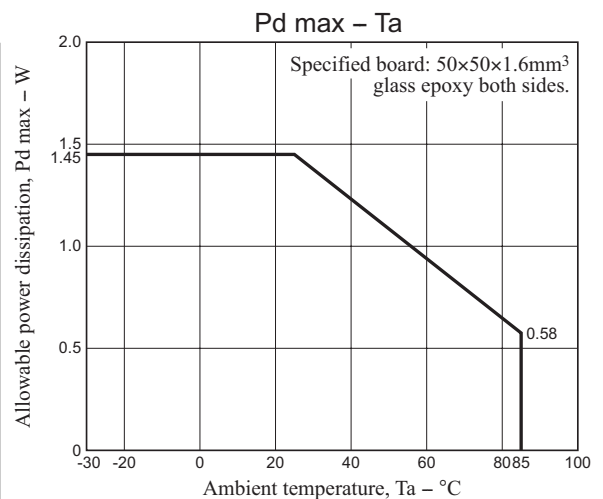
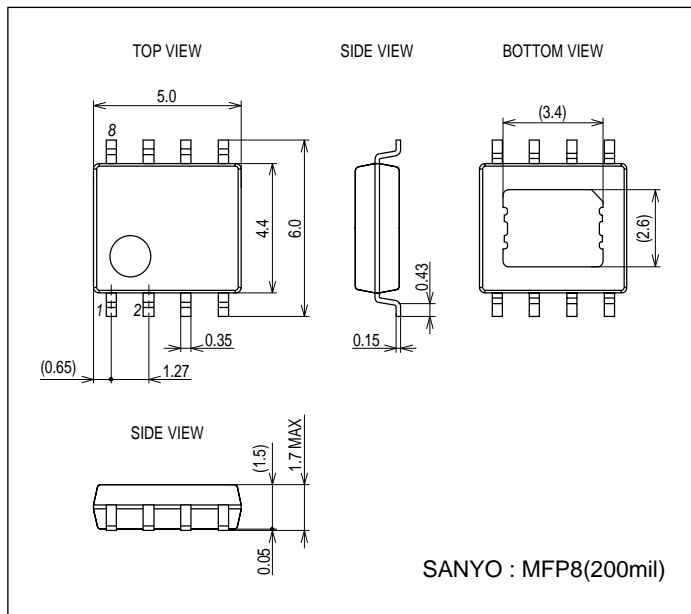
| Parameter                       | Symbol         | Conditions                                                              | Ratings |           |       | Unit                  |
|---------------------------------|----------------|-------------------------------------------------------------------------|---------|-----------|-------|-----------------------|
|                                 |                |                                                                         | min     | typ       | max   |                       |
| Current drain                   | $I_{VIN}$      | LDO ON                                                                  |         | 110       | 160   | $\mu\text{A}$         |
| Standby current                 | $I_{STBY}$     | CTL = Low                                                               |         |           | 1     | $\mu\text{A}$         |
| <b>Output</b>                   |                |                                                                         |         |           |       |                       |
| Output voltage                  | $V_O$          | $I_O = 10\text{mA}$                                                     | 1.176   | 1.2       | 1.224 | V                     |
| Dropout voltage 1               | $V_{drop1\_1}$ | $I_O = 1\text{A}$ , $V_{IN1} = V_{IN2}$                                 |         |           | 1     | V                     |
|                                 | $V_{drop1\_2}$ | $I_O = 0.3\text{A}$ , $V_{IN1} = V_{IN2}$                               |         |           | 0.6   | V                     |
| Dropout voltage 2               | $V_{drop2\_1}$ | $I_O = 1\text{A}$ , $V_{IN2} = 3\text{V}$ , $V_{IN1}$ dropout voltage   |         |           | 1     | V                     |
|                                 | $V_{drop2\_2}$ | $I_O = 0.3\text{A}$ , $V_{IN2} = 3\text{V}$ , $V_{IN1}$ dropout voltage |         |           | 0.4   | V                     |
| Load Regulation                 | $V_{LD}$       | $I_O = 5\text{mA}$ to $1\text{A}$                                       |         | 10        | 50    | mV                    |
| Line Regulation                 | $V_{LN}$       | $V_{IN1} = V_{IN2} = 1.8\text{V}$ to $6\text{V}$ , $I_O = 10\text{mA}$  |         | 10        | 50    | mV                    |
| Voltage temperature coefficient | $\Delta VT$    | $T_a = -30$ to $+85^\circ\text{C}$ , $I_O = 10\text{mA}$                | *       | $\pm 100$ |       | ppm/ $^\circ\text{C}$ |
| Ripple Rejection                | $V_{RL}$       | $I_O = 10\text{mA}$ , $V_{Rpp} = 1\text{V}$ , $f_{RR} = 1\text{kHz}$    | *       | 70        |       | dB                    |
| Output Noise Voltage            | $V_{ON}$       | $I_O = 10\text{mA}$ , $20\text{Hz} < f < 20\text{kHz}$                  | *       | 60        |       | $\mu\text{Vrms}$      |
| <b>CTL pin</b>                  |                |                                                                         |         |           |       |                       |
| High level voltage              | $V_{CTLH}$     |                                                                         | 1.5     |           | 5     | V                     |
| Low level voltage               | $V_{CTL L}$    |                                                                         | 0       |           | 0.3   | V                     |
| Input current                   | $I_{CTL}$      | $V_{CTL} = 6\text{V}$                                                   |         |           | 8.5   | $\mu\text{A}$         |

\* Design guarantee

## Package Dimensions

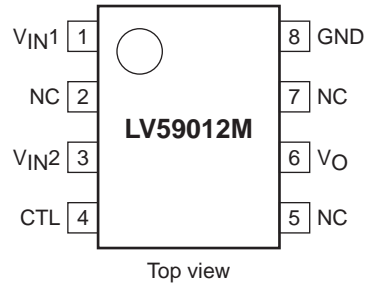
unit : mm (typ)

3372

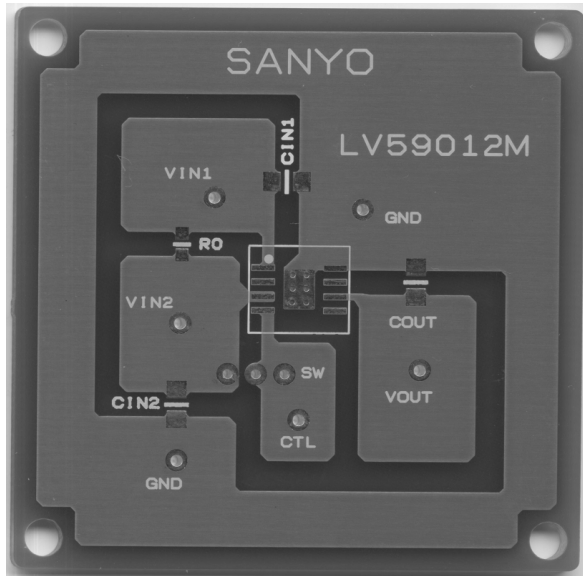


# LV59012M

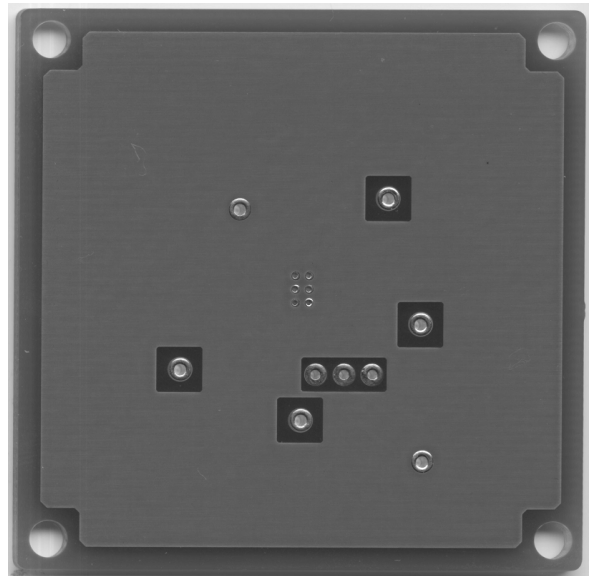
## Pin Assignment



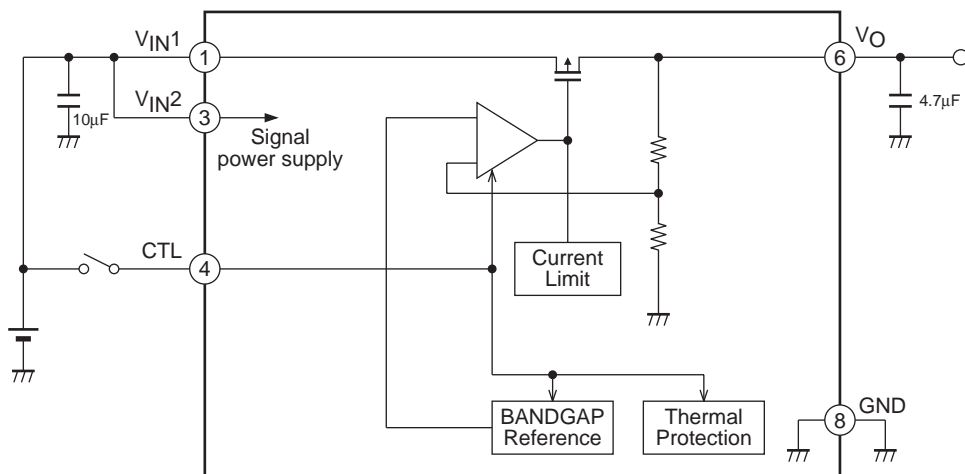
Specified Board (Top side)



Specified Board (Bottom side)



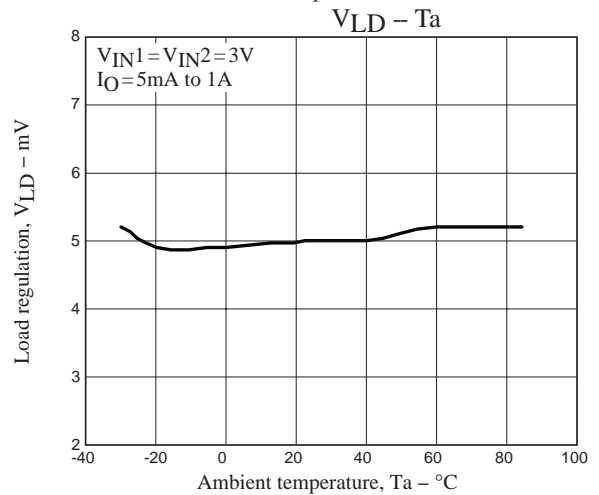
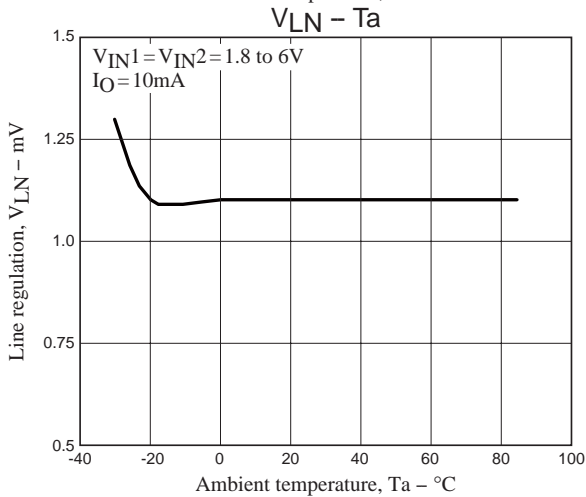
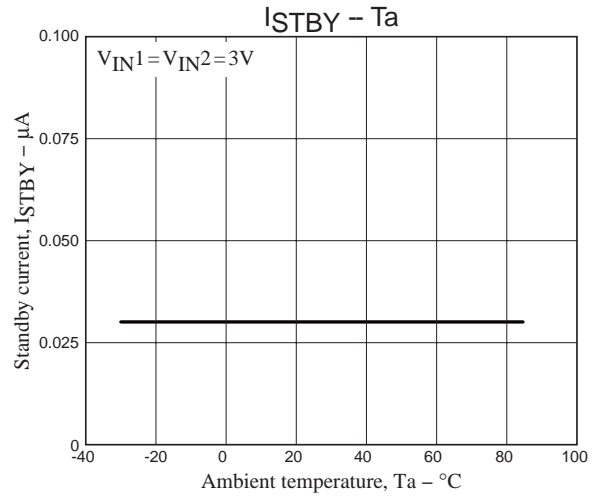
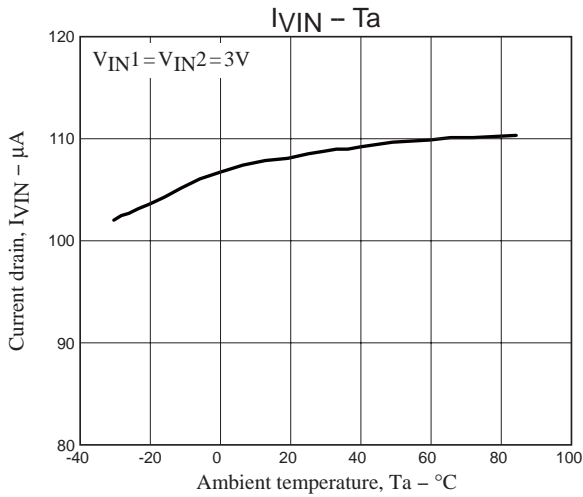
## Block Diagram



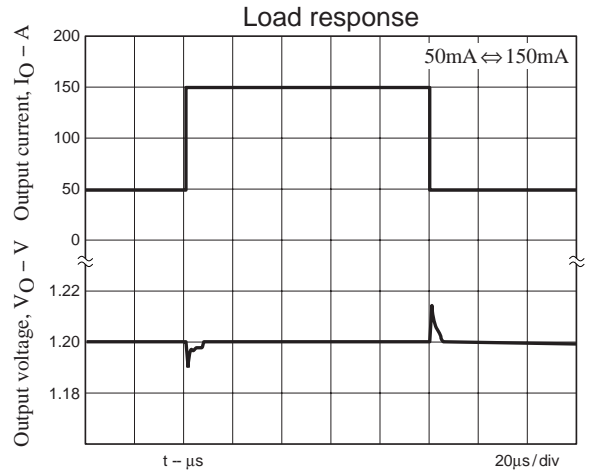
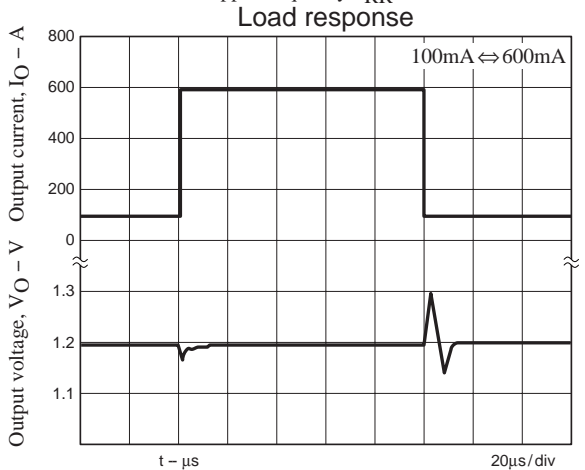
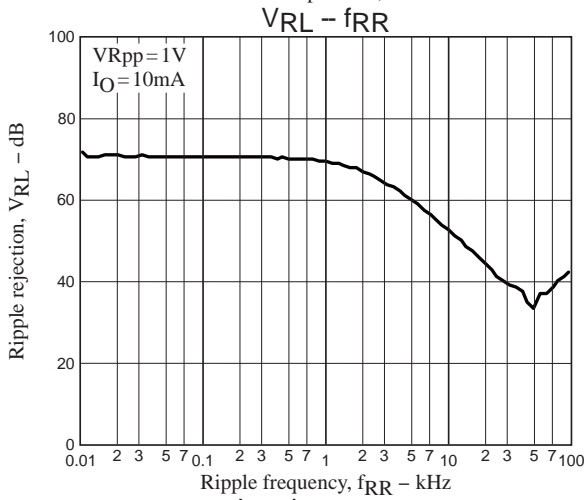
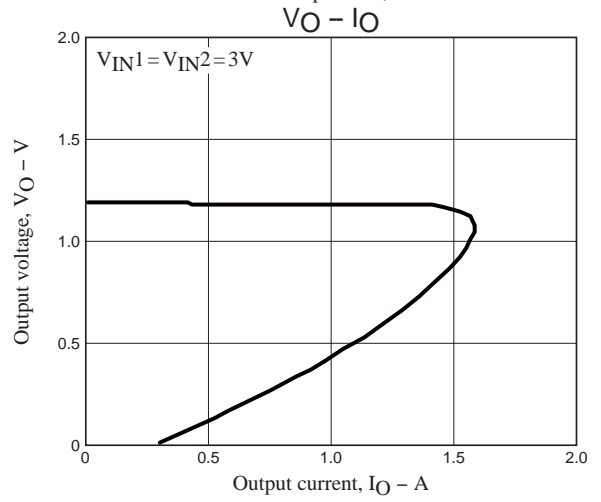
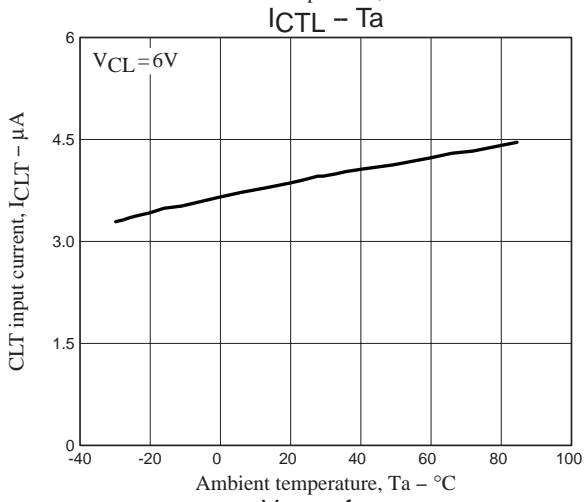
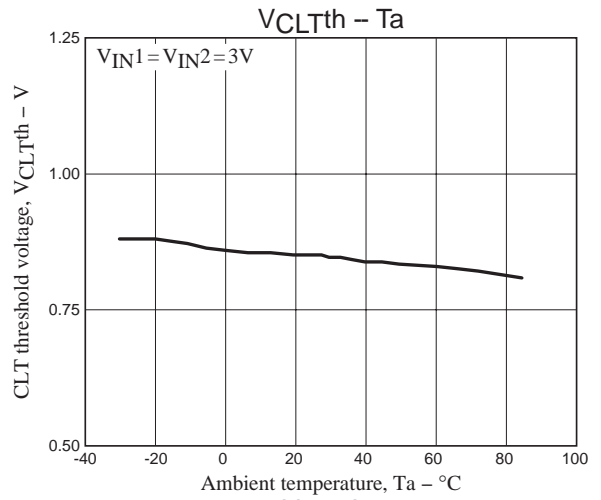
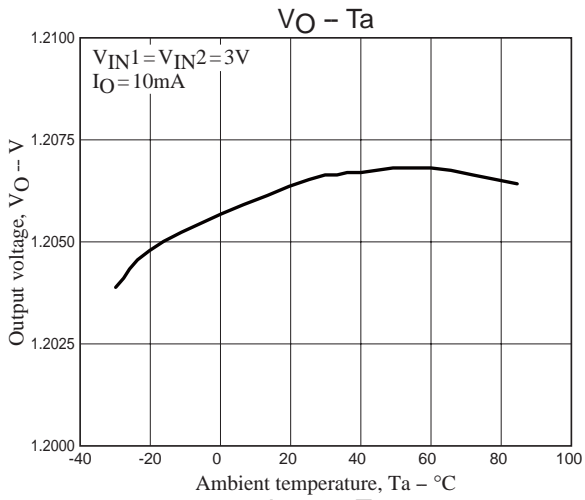
# LV59012M

## Pin Function

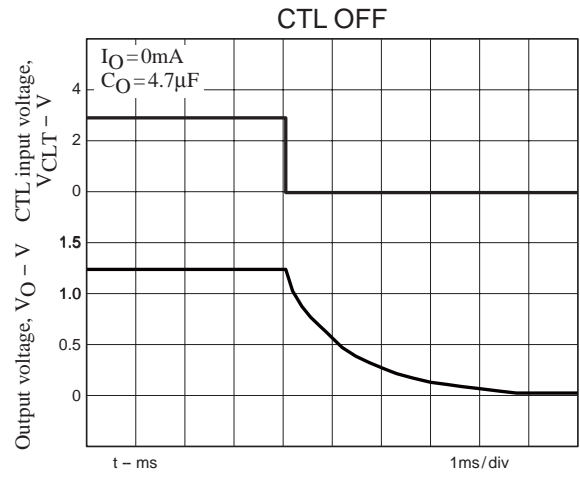
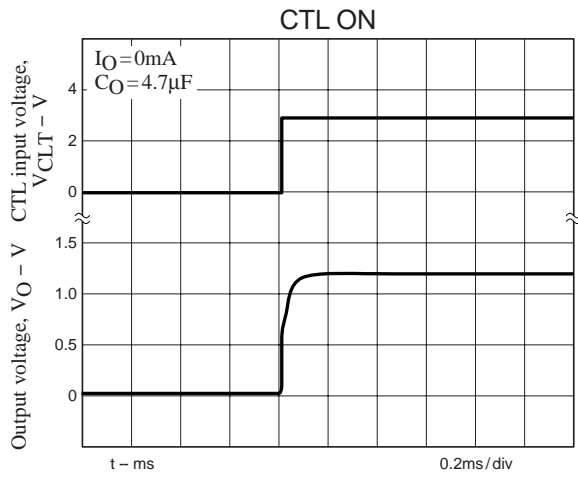
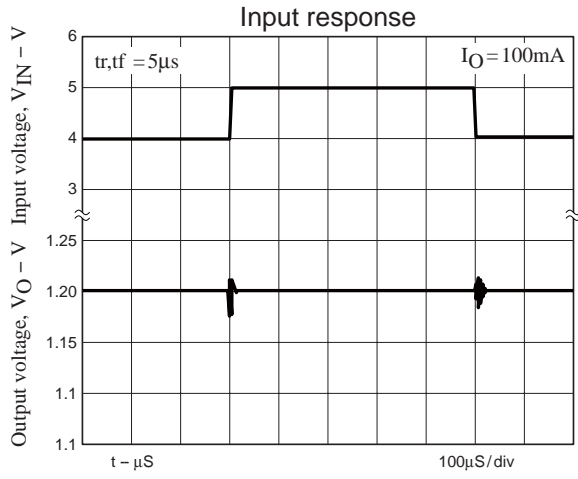
| Pin No. | Pin name         | Function                        | Equivalent circuit |
|---------|------------------|---------------------------------|--------------------|
| 1       | V <sub>IN1</sub> | Power system supply pin.        |                    |
| 6       | V <sub>O</sub>   | Output voltage pin.             |                    |
| 2       | NC               | No contact.                     |                    |
| 3       | V <sub>IN2</sub> | Signal system power supply pin. |                    |
| 4       | CTL              | ON/OFF control pin.             |                    |
| 5       | NC               | No contact.                     |                    |
| 7       | NC               | No contact.                     |                    |
| 8       | GND              | Ground pin.                     |                    |



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## Radiation Pad

- Radiation pad is high impedance and connected with a substrate of IC.
- Use radiation pad by GND or opening.

## V<sub>IN1</sub> and V<sub>IN2</sub>

The dropout voltage can be lowered by making V<sub>IN1</sub> and V<sub>IN2</sub> another power supply within a some current range. Refer to Figure 1.

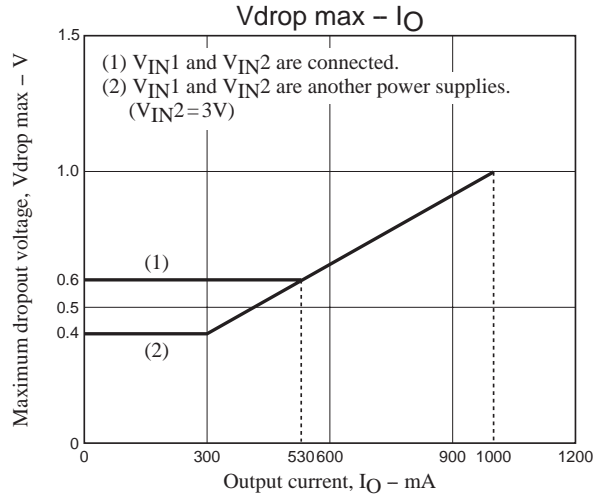


Figure 1

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