



SANYO Semiconductors

## DATA SHEET

An ON Semiconductor Company

# LV59001M

Bi-CMOS LSI

## Output voltage changeable type Power Supply IC

### Overview

The LV59001M is output good transformation power supply IC of low consumption current, and is effective as a constant-voltage source of battery use apparatus.

### Features

- Low current consumption
- With on-off switch
- Output voltage changeable type ( $V_O$ : 0.8 to 3.5V)
- Output current of 1A obtainable

### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply	$V_{IN1}$		7	V
	$V_{IN2}$		7	V
Allowable power dissipation	$P_d \text{ max}$	Mounted on a specified board.*	1.45	W
Operating Temperature	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$

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

#### Recommended Operating Ranges at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
power supply	$V_{IN1}$	$V_{IN1}$ pin	1.6		6	V
	$V_{IN2}$	$V_{IN2}$ pin	1.8		6	V
Output voltage setting range	$V_O$		0.8		3.5	V
Output current	$I_O$		0		1	A

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment. The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for new introduction or other application different from current conditions on the usage of automotive device, communication device, office equipment, industrial equipment etc. , please consult with us about usage condition (temperature, operation time etc.) prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

# LV59001M

**Electrical Characteristics** at Ta = 25°C, VIN1 = VIN2 = 3V, VO=1.2V setting (unless otherwise specified)

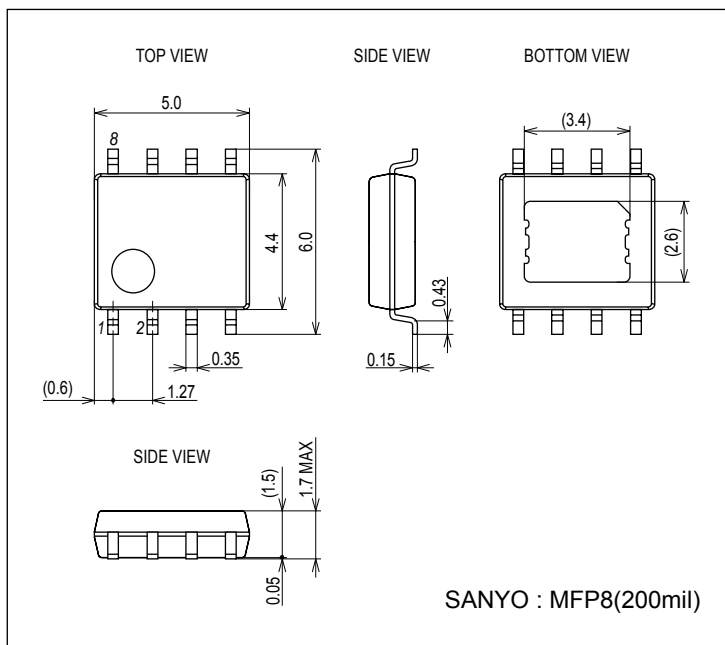
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I <sub>VIN</sub>	CTL=3V, I <sub>O</sub> = 0mA		120	170	μA
Standby current	I <sub>STBY</sub>	CTL = Low			1	μA
<b>Output</b>						
Output voltage	V <sub>O</sub>	I <sub>O</sub> = 10mA, R1=51kΩ, R2=255kΩ	1.176	1.2	1.224	V
ADJ pin voltage	V <sub>ADJ</sub>		0.196	0.2	0.204	V
Dropout voltage 1	V <sub>drop1_1</sub>	I <sub>O</sub> = 1A, V <sub>IN1</sub> = V <sub>IN2</sub>			1	V
	V <sub>drop1_2</sub>	I <sub>O</sub> = 0.3A, V <sub>IN1</sub> = V <sub>IN2</sub>			0.6	V
Dropout voltage 2	V <sub>drop2_1</sub>	I <sub>O</sub> = 1A, V <sub>IN2</sub> = 3V, V <sub>IN1</sub> dropout voltage			1	V
	V <sub>drop2_2</sub>	I <sub>O</sub> = 0.3A, V <sub>IN2</sub> = 3V, V <sub>IN1</sub> dropout voltage			0.4	V
0.8V≤V <sub>O</sub> ≤1.2V setting V <sub>IN1</sub> , V <sub>IN2</sub> voltage	V <sub>OSET1_1</sub>	I <sub>O</sub> = 1A, V <sub>IN1</sub> = V <sub>IN2</sub>	2.25			V
	V <sub>OSET1_2</sub>	I <sub>O</sub> = 0.3A, V <sub>IN1</sub> = V <sub>IN2</sub>	1.85			V
0.8V≤V <sub>O</sub> ≤1.2V setting V <sub>IN1</sub> voltage	V <sub>OSET2_1</sub>	I <sub>O</sub> = 1A, V <sub>IN2</sub> = 3V	2.25			V
	V <sub>OSET2_2</sub>	I <sub>O</sub> = 0.3A, V <sub>IN2</sub> = 3V	1.65			V
Load Regulation	V <sub>LD</sub>	I <sub>O</sub> = 5mA to 1A		10	50	mV
Line Regulation	V <sub>LN</sub>	V <sub>IN1</sub> = V <sub>IN2</sub> = 1.8V to 6V, I <sub>O</sub> = 10mA		10	50	mV
Voltage temperature coefficient	ΔVT	Ta = -30 to +85°C, I <sub>O</sub> = 10mA	*	±100		ppm/°C
Ripple Rejection	V <sub>RL</sub>	I <sub>O</sub> = 10mA, VRpp=1V, f <sub>RR</sub> = 1kHz	*	70		dB
Output Noise Voltage	V <sub>ON</sub>	20Hz < f < 20kHz	*	60		μVrms
<b>CTL pin</b>						
High level voltage	V <sub>CTLH</sub>		1.5		5	V
Low level voltage	V <sub>CTLL</sub>		0		0.3	V
Input current	I <sub>CTL</sub>	V <sub>CTL</sub> = 6V			8.5	μA

\* Design guarantee

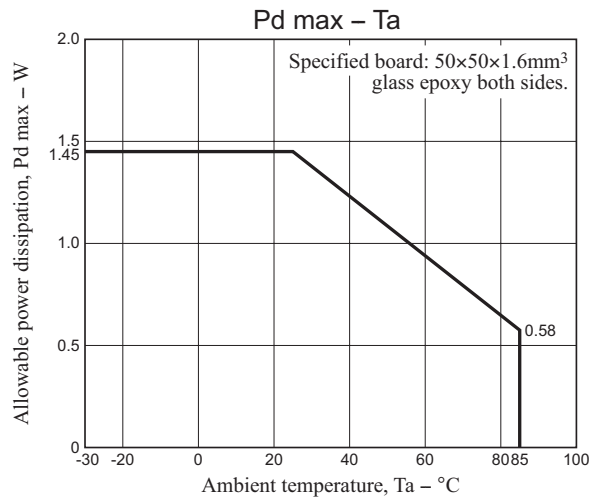
## Package Dimensions

unit : mm (typ)

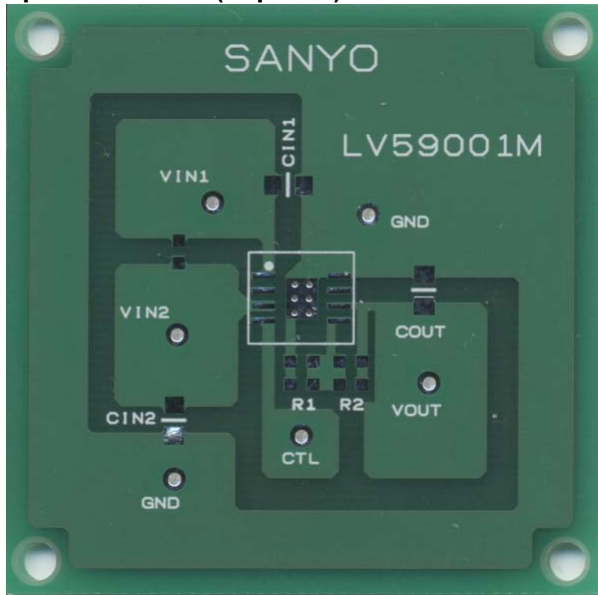
3372A



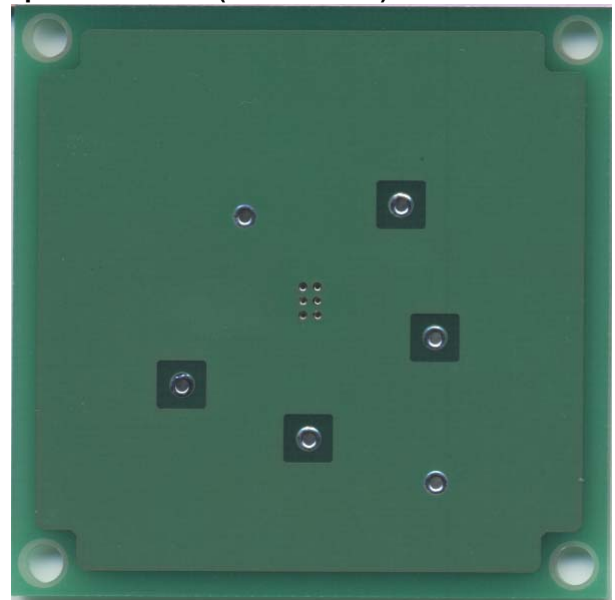
# LV59001M



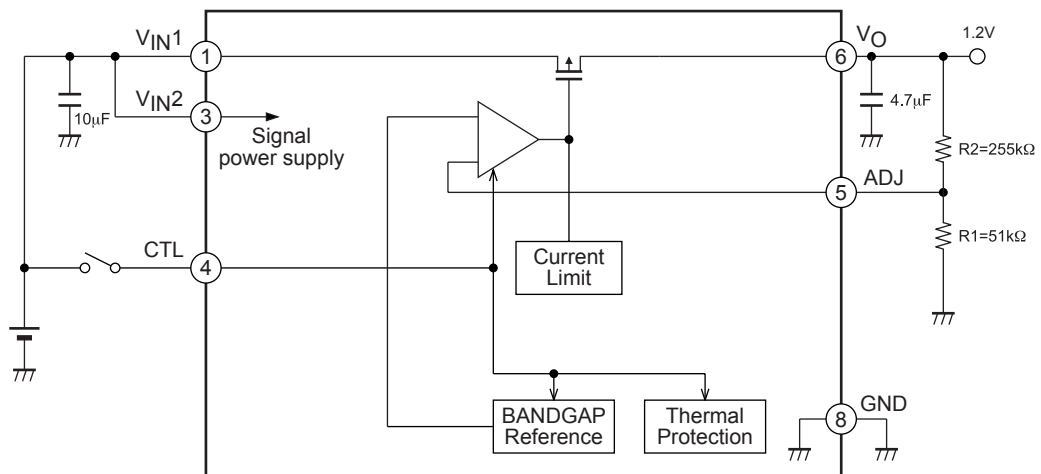
**Specified Board (Top side)**



**Specified Board (Bottom side)**

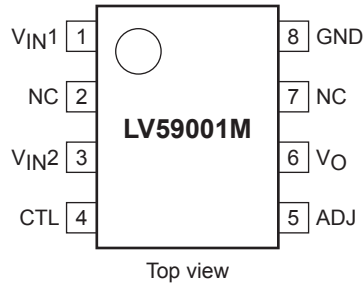


## Block Diagram



# LV59001M

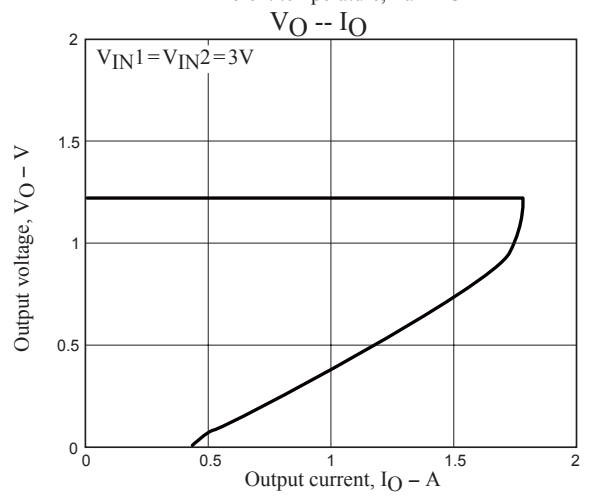
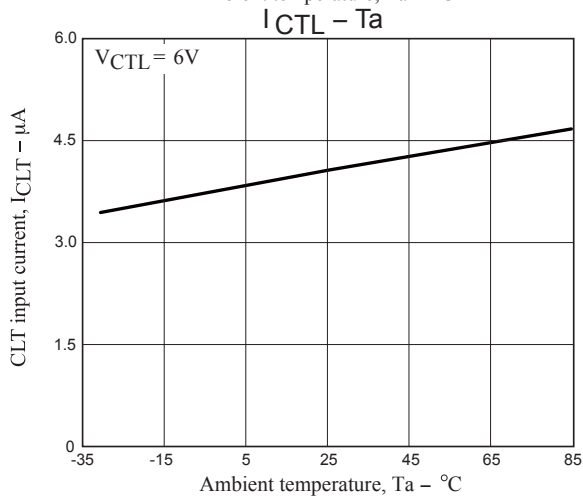
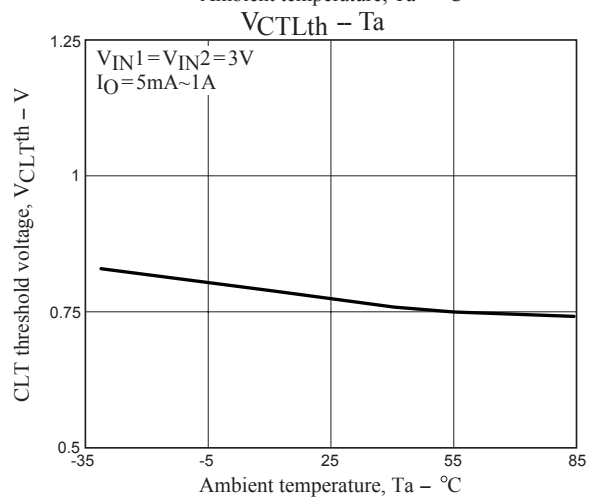
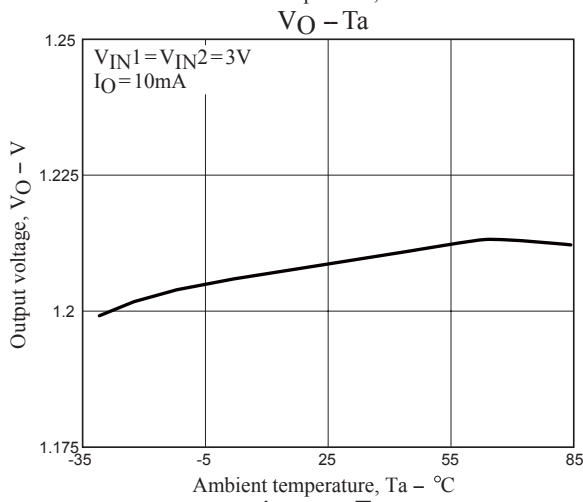
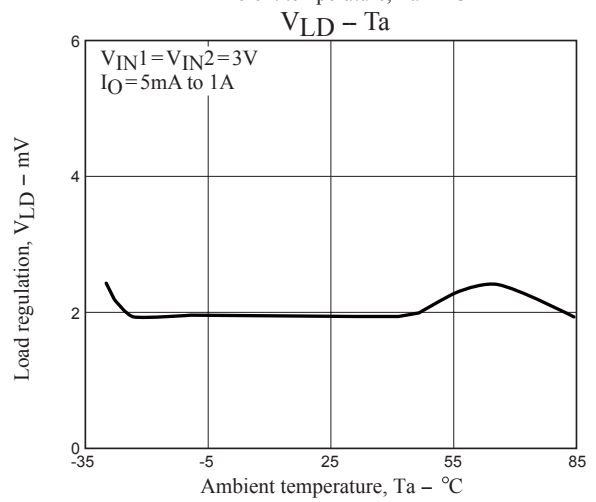
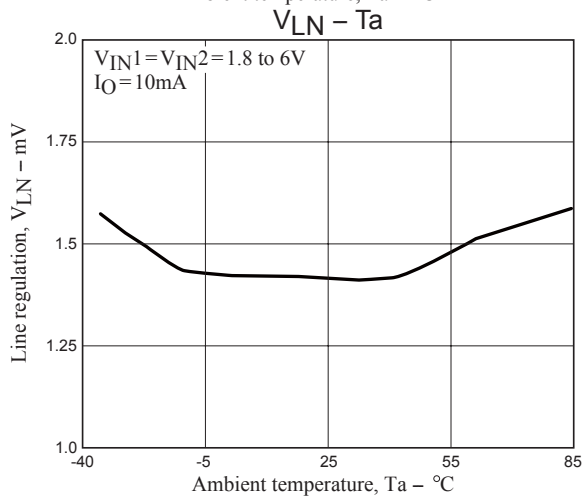
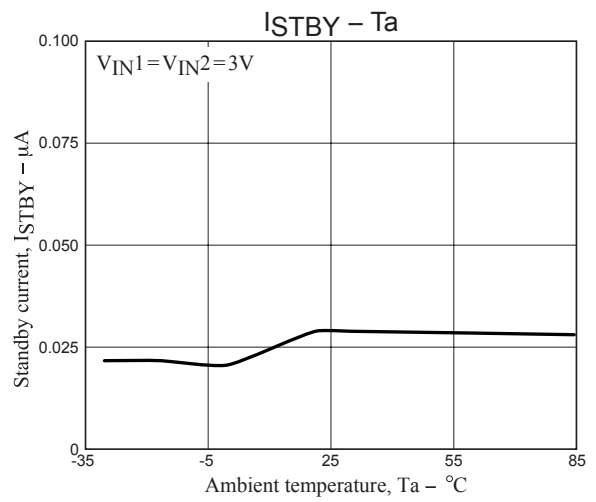
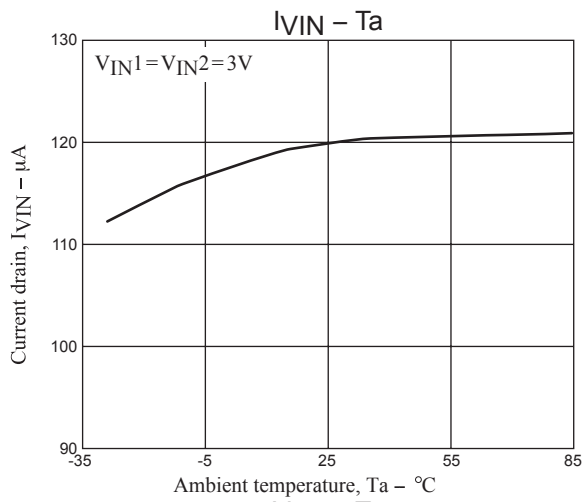
## Pin Assignment

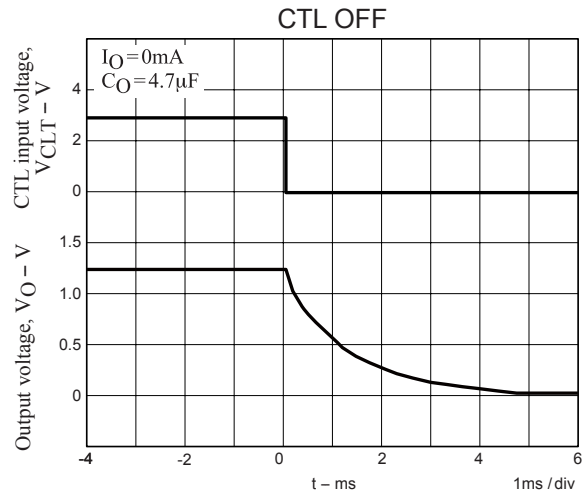
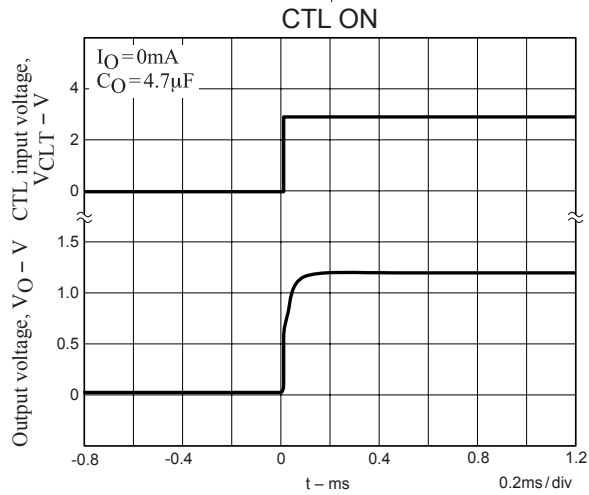
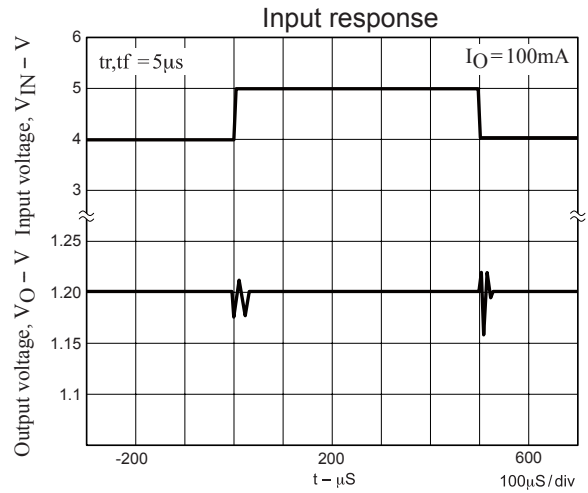
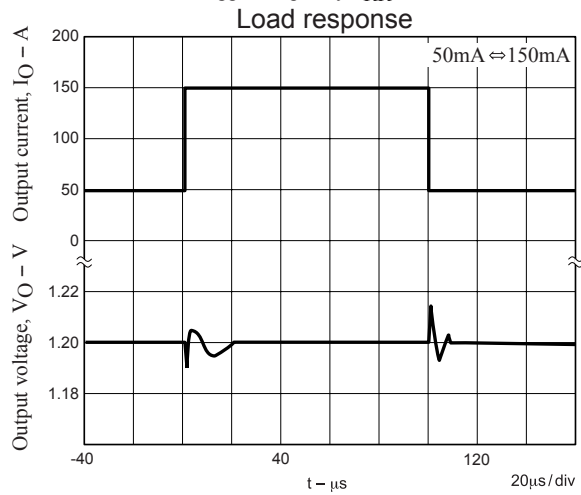
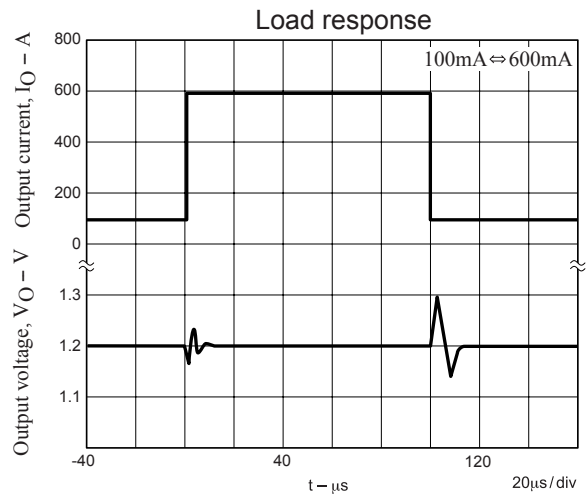
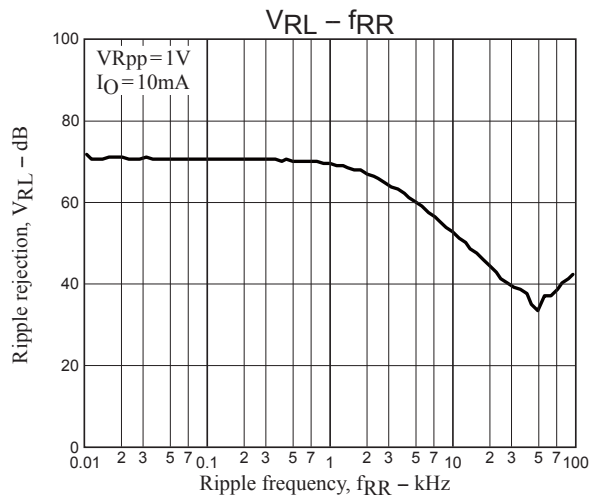


## Pin Function

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

# LV59001M





## Output voltage setting method

$$V_O = \left( \frac{R_2}{R_1} + 1 \right) \times V_{ADJ}$$

## 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.

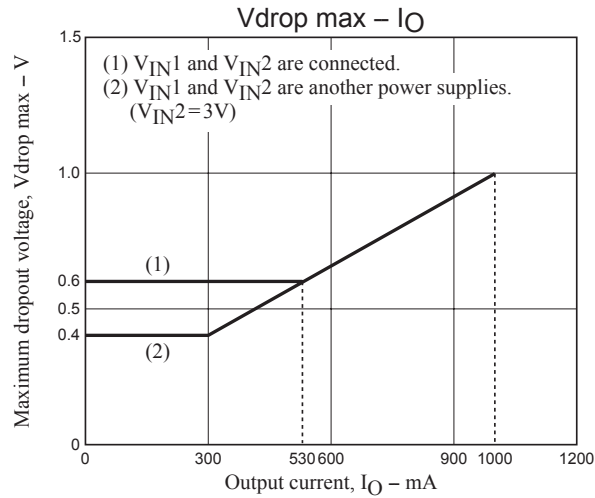


Figure 1

**V<sub>IN1</sub> and V<sub>IN2</sub> voltage when setting it to 0.8V ≤ V<sub>O</sub> ≤ 1.2V**

This IC provides for the lowest operation voltage in V<sub>IN1</sub> and V<sub>IN2</sub> when V<sub>O</sub> is provided within the range of 0.8V ≤ V<sub>O</sub> ≤ 1.2V though is possible the V<sub>O</sub> output setting even as for 0.8V to 3.5V. Please refer to an electric specification.

- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of September, 2011. Specifications and information herein are subject to change without notice.