Ordering number: ENA1973

SANYO Semiconductors
DATA SHEET

An ON Semiconductor Company

Bi-CMOS LSI

LV59001M — 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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply	$V_{IN}1$		7	V
	$V_{IN}2$		7	V
Allowable power dissipation	Pd max	Mounted on a specified board.*	1.45	W
Operating Temperature	Topr		-30 to +85	°C
Storage Temperature	Tstg		-40 to +125	°C

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

Recommended Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
power supply	$V_{IN}1$	$V_{IN}1$ pin	1.6		6	V
	$V_{IN}2$	$V_{IN}2$ pin	1.8		6	V
Output voltage setting range	V_O		0.8		3.5	V
Output current	I_O		0		1	A

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Electrical Characteristics at Ta = 25°C, $V_{IN}1 = V_{IN}2 = 3V$, V_O=1.2V setting (unless otherwise specified)

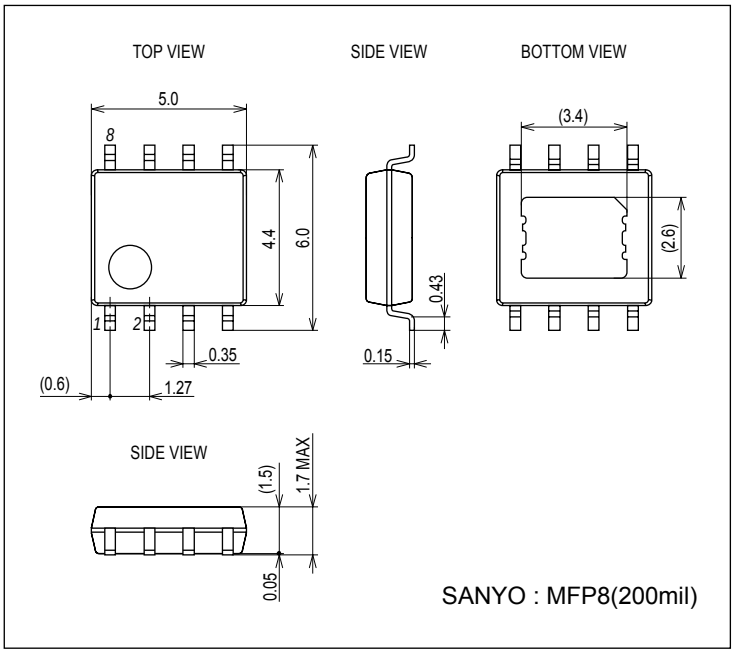
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{VIN}	CTL=3V, I_O = 0mA		120	170	μA
Standby current	I_{STBY}	CTL = Low			1	μA
Output						
Output voltage	V_O	I_O = 10mA, R1=51kΩ, R2=255kΩ	1.176	1.2	1.224	V
ADJ pin voltage	V_{ADJ}		0.196	0.2	0.204	V
Dropout voltage 1	Vdrop1_1	I_O = 1A, $V_{IN}1 = V_{IN}2$			1	V
	Vdrop1_2	I_O = 0.3A, $V_{IN}1 = V_{IN}2$			0.6	V
Dropout voltage 2	Vdrop2_1	I_O = 1A, $V_{IN}2$ = 3V, $V_{IN}1$ dropout voltage			1	V
	Vdrop2_2	I_O = 0.3A, $V_{IN}2$ = 3V, $V_{IN}1$ dropout voltage			0.4	V
0.8V≤V_O≤1.2V setting $V_{IN}1$, $V_{IN}2$ voltage	V_OSET1_1	I_O = 1A, $V_{IN}1 = V_{IN}2$	2.25			V
	V_OSET1_2	I_O = 0.3A, $V_{IN}1 = V_{IN}2$	1.85			V
0.8V≤V_O≤1.2V setting $V_{IN}1$ voltage	V_OSET2_1	I_O = 1A, $V_{IN}2$ = 3V	2.25			V
	V_OSET2_2	I_O = 0.3A, $V_{IN}2$ = 3V	1.65			V
Load Regulation	V_{LD}	I_O = 5mA to 1A		10	50	mV
Line Regulation	V_{LN}	$V_{IN}1 = V_{IN}2$ = 1.8V to 6V, I_O = 10mA		10	50	mV
Voltage temperature coefficient	ΔVT	Ta = -30 to +85°C, I_O = 10mA *		±100		ppm/°C
Ripple Rejection	V_{RL}	I_O = 10mA, VRpp=1V, f_{RR} = 1kHz *		70		dB
Output Noise Voltage	V_{ON}	20Hz < f < 20kHz *		60		μVrms
CTL pin						
High level voltage	V_{CTL}H		1.5		5	V
Low level voltage	V_{CTL}L		0		0.3	V
Input current	I_{CTL}	V_{CTL} = 6V			8.5	μA

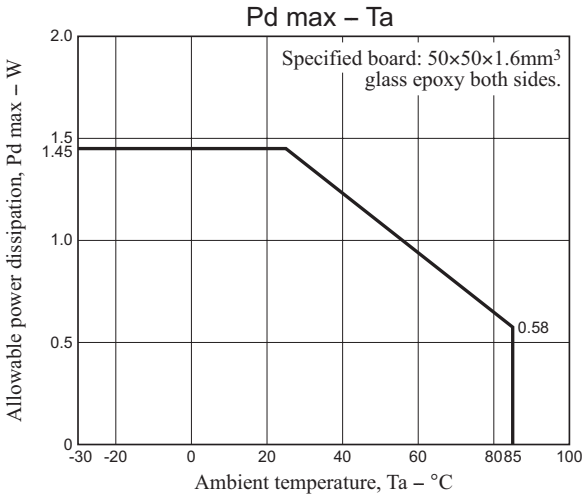
* Design guarantee

Package Dimensions

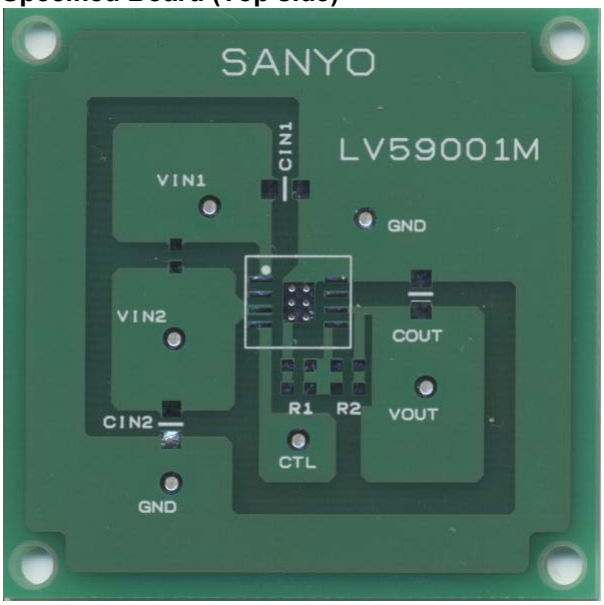
unit : mm (typ)

3372A

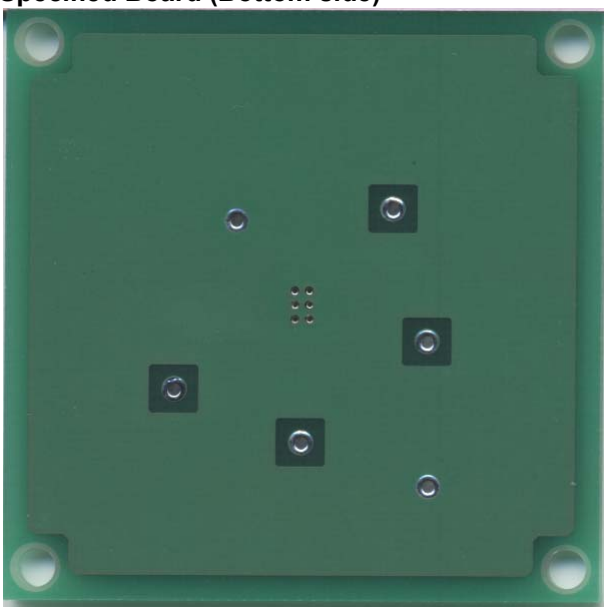




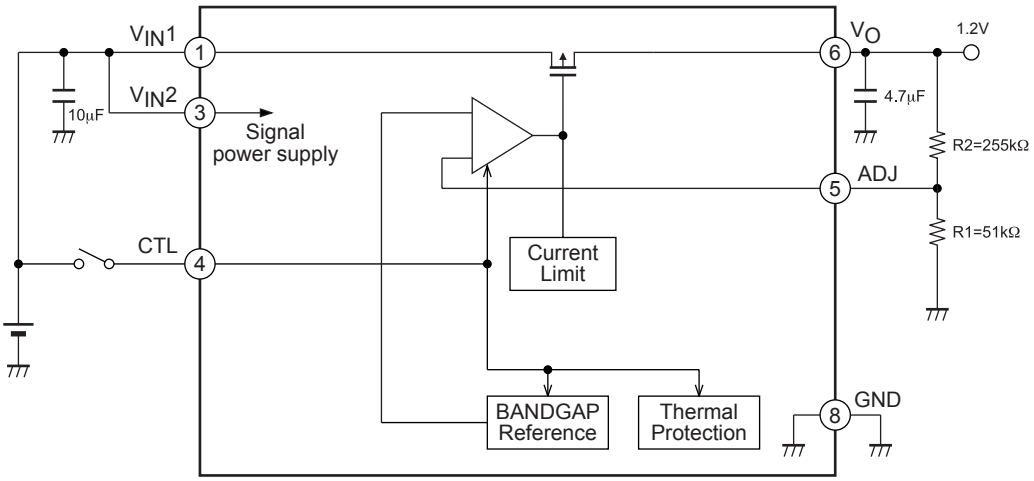
Specified Board (Top side)



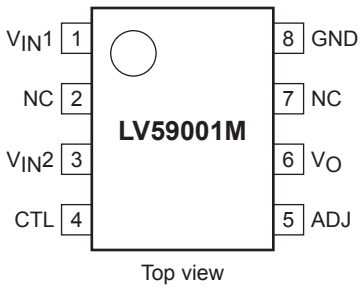
Specified Board (Bottom side)



Block Diagram

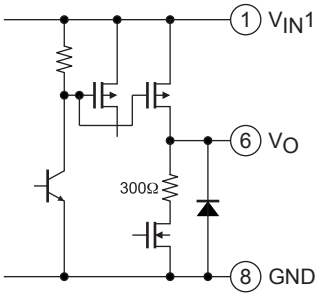
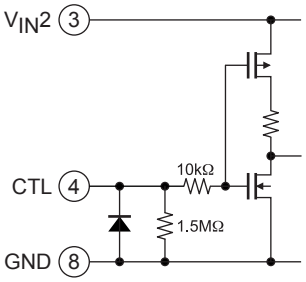
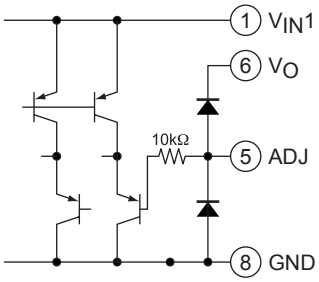


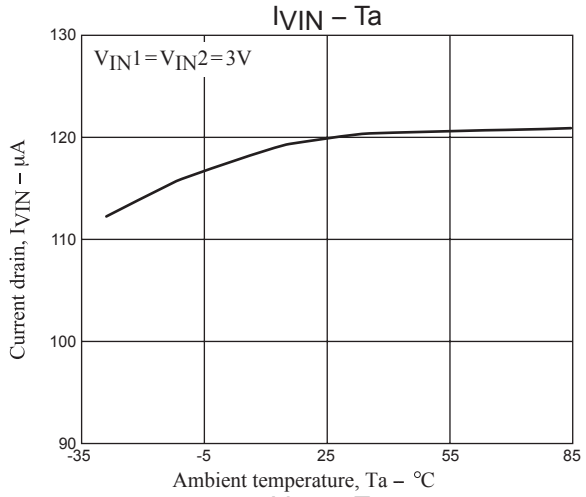
Pin Assignment

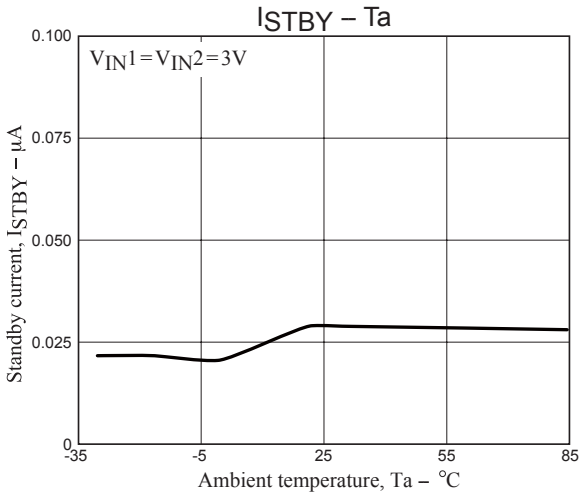


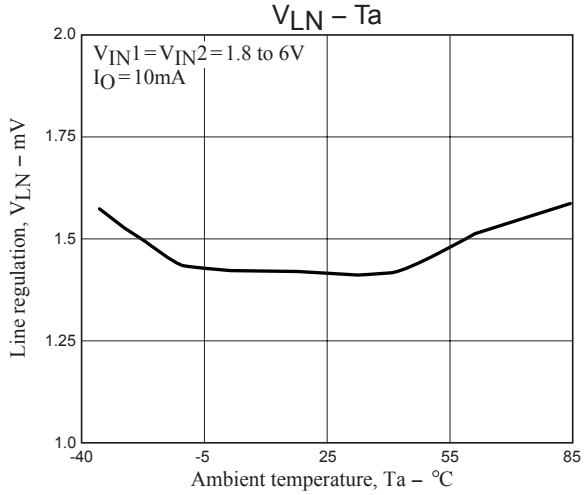
Top view

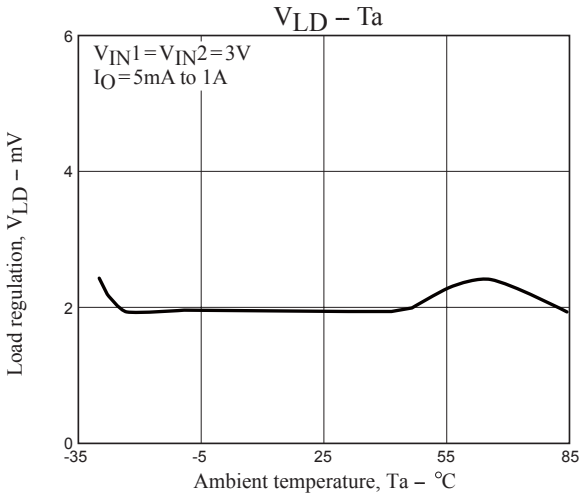
Pin Function

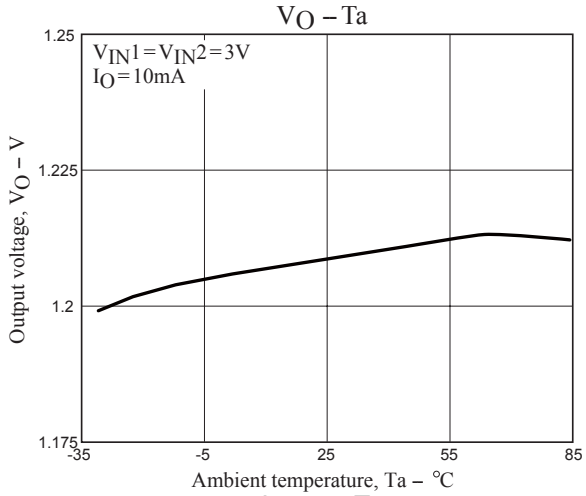
Pin No.	Pin name	Function	Equivalent circuit
1	$V_{IN}1$	Power system supply input pin.	
6	V_O	Output voltage pin.	
2	NC	No contact.	
3	$V_{IN}2$	Signal system supply input pin.	
4	CTL	ON/OFF control pin.	
5	ADJ	Adjust pin	
7	NC	No contact.	
8	GND	Ground pin.	

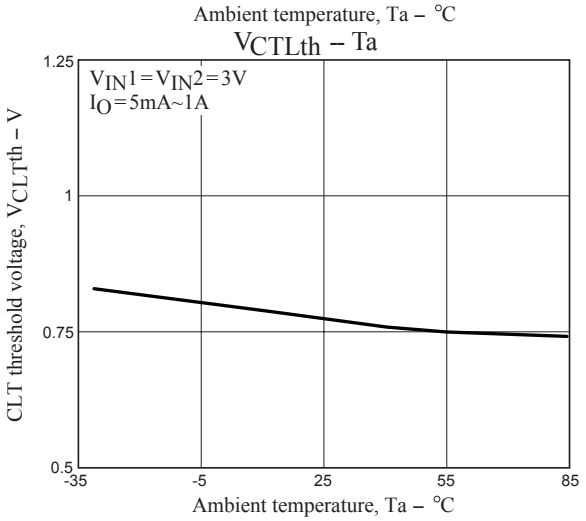

IVIN – Ta
VIN1=VIN2=3V
Current drain, IVIN – μA
130
120
110
100
90
-35
-5
25
55
85
Ambient temperature, Ta – °C

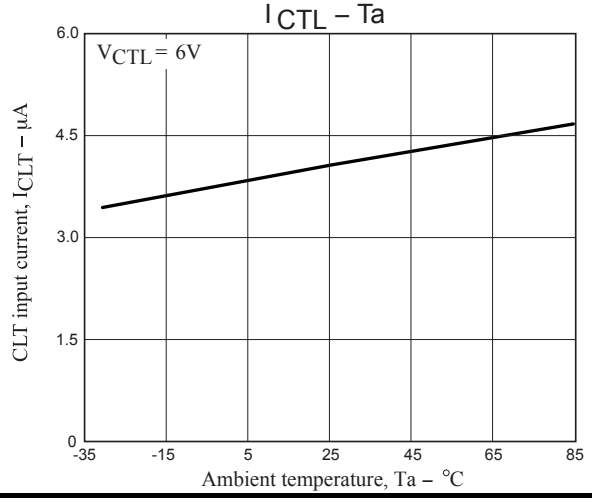

ISTBY – Ta
VIN1=VIN2=3V
Standby current, ISTBY – μA
0.100
0.075
0.050
0.025
0
-35
-5
25
55
85
Ambient temperature, Ta – °C

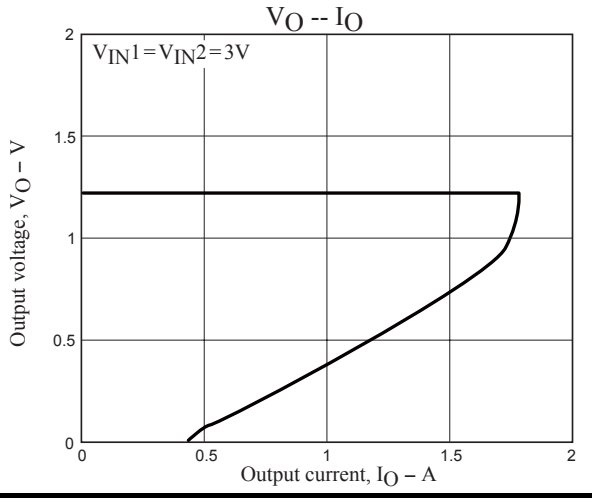

VLN – Ta
VIN1=VIN2=1.8 to 6V
IO=10mA
Line regulation, VLN – mV
2.0
1.75
1.5
1.25
1.0
-40
-5
25
55
85
Ambient temperature, Ta – °C

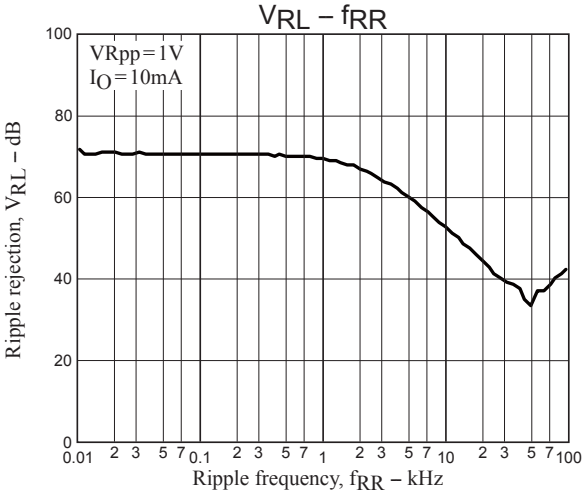

VLD – Ta
VIN1=VIN2=3V
IO=5mA to 1A
Load regulation, VLD – mV
6
4
2
0
-35
-5
25
55
85
Ambient temperature, Ta – °C

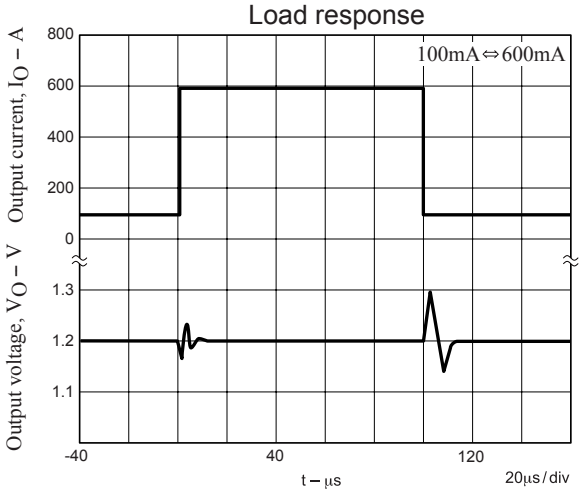

VO – Ta
VIN1=VIN2=3V
IO=10mA
Output voltage, VO – V
1.25
1.225
1.2
1.175
-35
-5
25
55
85
Ambient temperature, Ta – °C

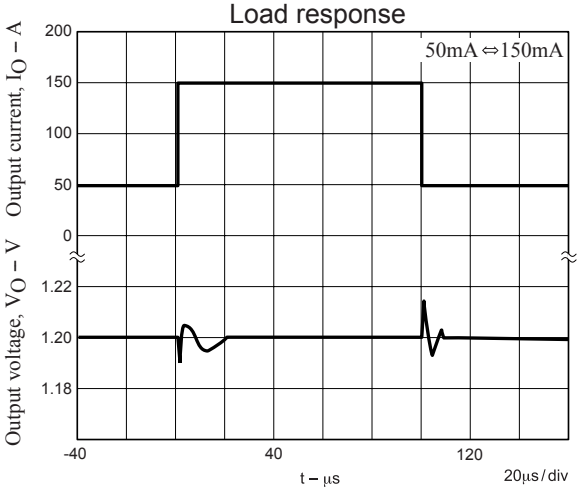

VCTLth – Ta
VIN1=VIN2=3V
IO=5mA~1A
CLT threshold voltage, VCLTth – V
1.25
1
0.75
0.5
-35
-5
25
55
85
Ambient temperature, Ta – °C

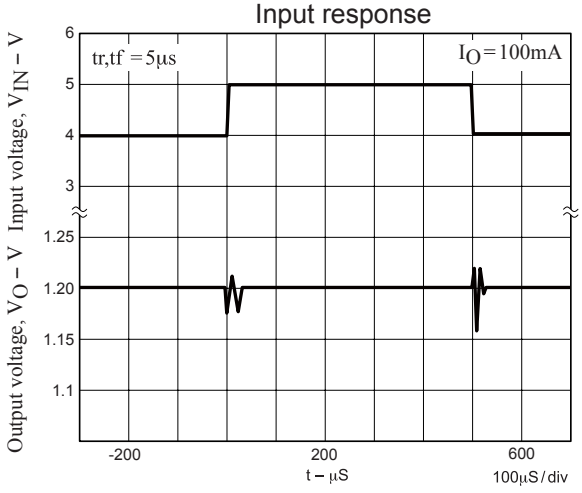

ICTL – Ta
VCTL= 6V
CLT input current, ICLT – μA
6.0
4.5
3.0
1.5
0
-35
-15
5
25
45
65
85
Ambient temperature, Ta – °C

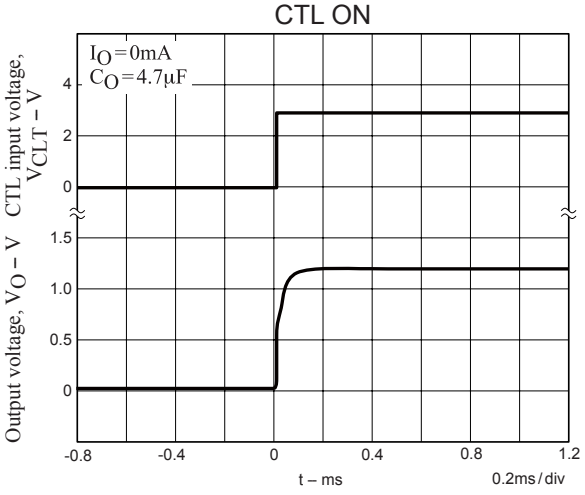

VO -- IO
VIN1=VIN2=3V
Output voltage, VO – V
2
1.5
1
0.5
0
0
0.5
1
1.5
2
Output current, IO – A

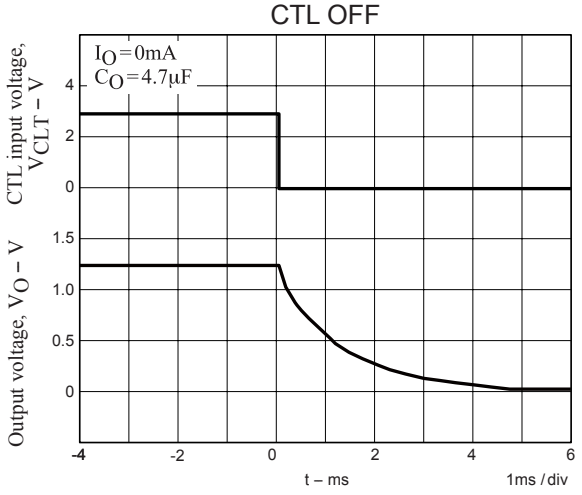












Output voltage setting method

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

Radiation Pad

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

$V_{IN}1$ and $V_{IN}2$

The dropout voltage can be lowered by making $V_{IN}1$ and $V_{IN}2$ another power supply within a some current range. Refer to Figure 1.

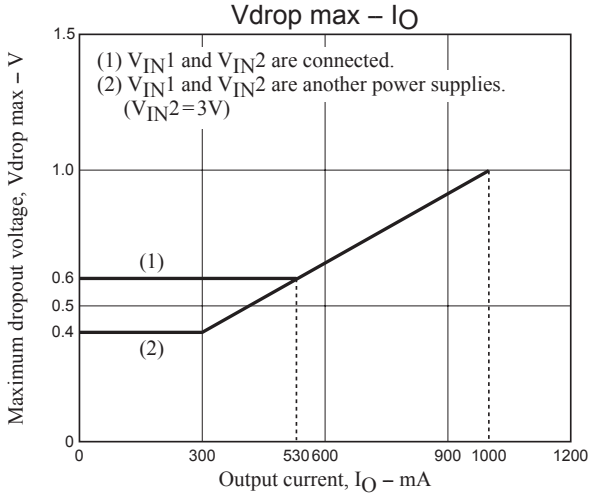


Figure 1

VIN1 and VIN2 voltage when setting it to $0.8V \leq V_O \leq 1.2V$

This IC provides for the lowest operation voltage in VIN1 and VIN2 when V_O is provided within the range of $0.8V \leq V_O \leq 1.2V$ though is possible the V_O output setting even as for 0.8V to 3.5V. Please refer to an electric specification.

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