Ordering number : ENA1670

SANYO Semiconductors
DATA SHEET

An ON Semiconductor Company

Bi-CMOS IC

LV5072M — DC/DC Converter IC

Overview

The SANYO LV5072M is a DC/DC converter IC that has a step-down DC/DC converter output and an externally-controllable GPO output for discharging the output capacitor.

Features

- One channel of synchronous rectifying PWM controlled step-down DC/DC converter output (0.8V to 3.3V/2A)
- One channel of externally controllable GPO output for discharging the output capacitor
- Built-in thermal shutdown circuit
- Built-in hiccup recovery

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{IN}	V_{IN}, PV_{IN}	-0.3 to 6.0	V
Input pin voltage	$V_{IN}C$	GPI, ENDCO	-0.3 to 6.0	V
Output pin voltage	V_{OUT}	LX, GPO	-0.3 to 6.0	V
Allowable Power dissipation	Pd max	Ta = 25°C Mounted on a circuit board.*	1.5	W
Operating temperature	Topr		-20 to +85	°C
Storage temperature	Tstg		-40 to +125	°C

* Specified circuit board : 50.0mm × 50.0mm × 1.6mm, 2-layer glass epoxy printed circuit board, Wiring density on the backside = 54%

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{IN}	$V_{IN} = PV_{IN}$, 0.8V ≤ V_{OUT} ≤ 1.3V	2.95 to 5.5	V
		$V_{IN} = PV_{IN}$, 1.3V ≤ V_{OUT} ≤ 1.9V	3.2 to 5.5	V
		$V_{IN} = PV_{IN}$, 1.9V ≤ V_{OUT} ≤ 3.3V	4.5 to 5.5	V
Input pin voltage	$V_{IN}C$	GPI, ENDCO	-0.3 to V_{IN}	V

Electrical Characteristics, Current drain, unless otherwise specified at Ta = 25°C, V_{IN} = 5.0V, no load

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current drain	$I_{CC}SB$	GPI = ENDCO = Low		0.5	10	μA
Current drain DCDC ON	$I_{CC}FL$	GPI = ENDCO = High, V_{OUT} = 1.8V		12	16	mA

DC/DC, unless otherwise specified at Ta = 25°C, V_{IN} = 5.0V, V_{OUT} = 1.8V, no load

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
FB voltage	VFB	I_O = 10mA	0.49	0.50	0.51	V
Current limit peak value	CLIMIT		2.3			A
Efficiency 1	EF1	I_O = 0.5A, V_{OUT} = 3.3V		90		%
Efficiency 2	EF2	I_O = 0.5A, V_{OUT} = 1.8V		82		%
Load regulation	VL	I_O = 1mA to 2A		25	70	mV
Frequency	Fosc		1.7	2.2	2.7	MHz
LX ON resistance	RLXP	I_OH = -300mA, Pch		0.15		Ω
	RLXN	I_OL = 300mA, Nch		0.15		Ω

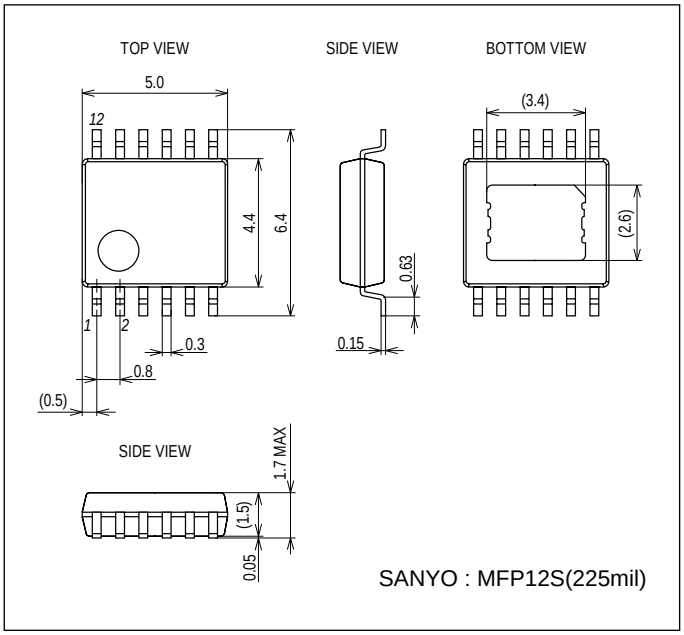
GPI, ENDCO Input, GPO Output, unless otherwise specified at Ta = 25°C, V_{IN} = 5.0V

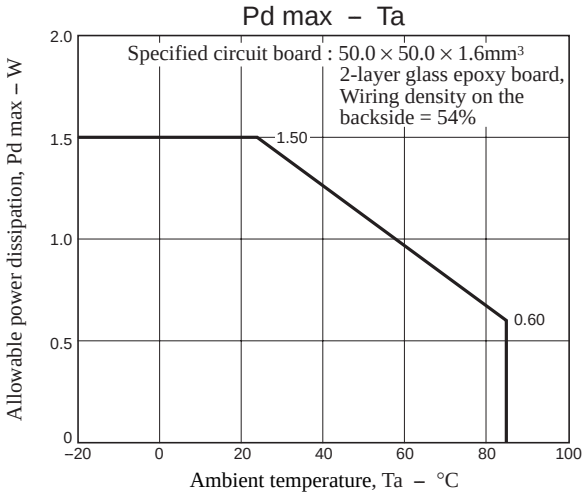
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
GPO Output current	Igpo	GPI = 0V, GPO = 1.5V	7.5	15	37.5	mA
GPO output voltage Low-level	V_OL	GPI = 0V, I_OL = 5mA		0.5	1	V
GPO output leakage current	ILK	GPO		0	10	μA
GPI/ENDCO input voltage High-level	V_{IN}H	Input High-level GPI, ENDCO	1.5			V
GPI/ENDCO input voltage Low-level	V_{IN}L	Input Low-level GPI, ENDCO	0		0.3	V

Package Dimensions

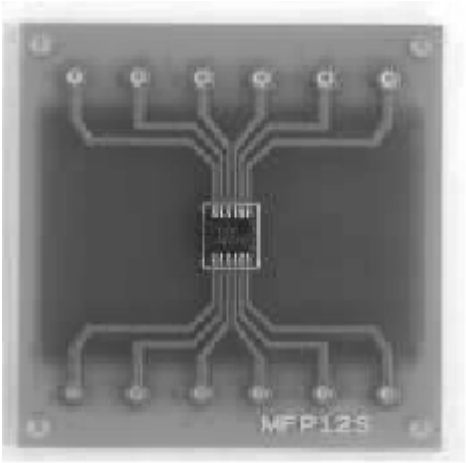
unit : mm (typ)

3384

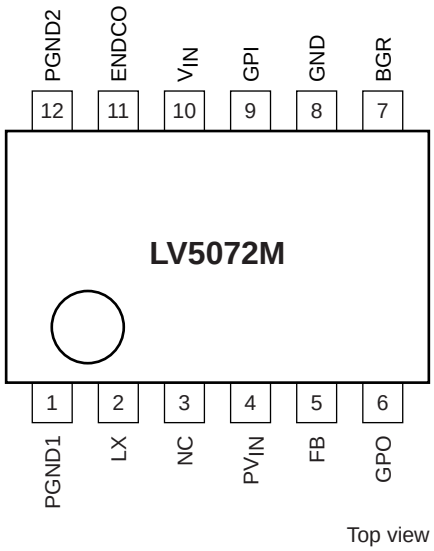




Specified board for Pd max measurement

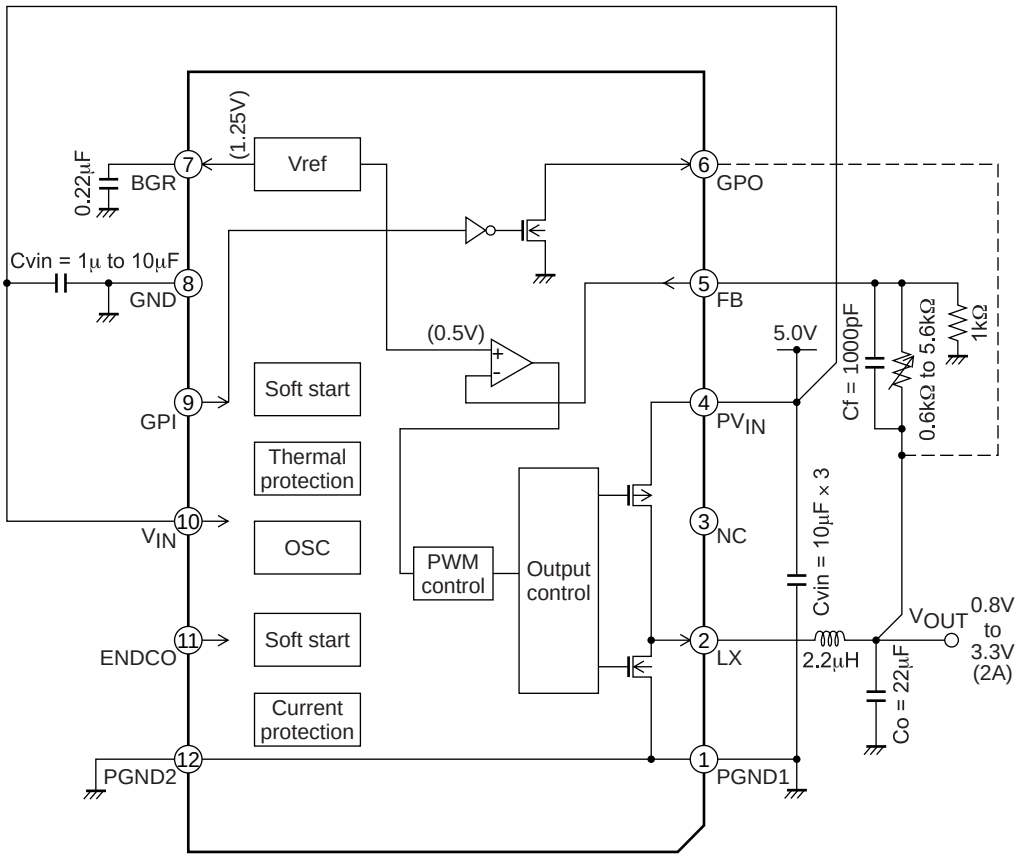


Pin Assignment



Top view

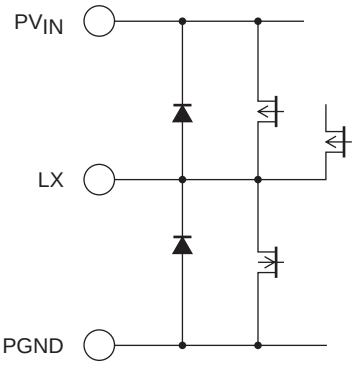
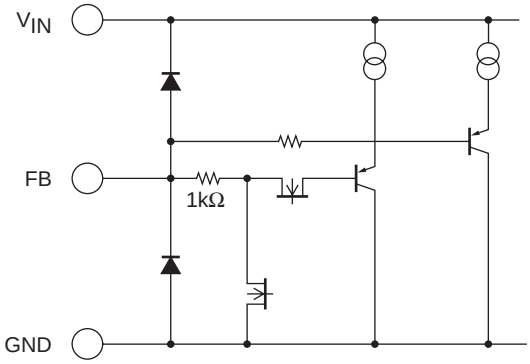
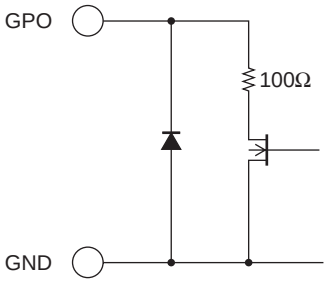
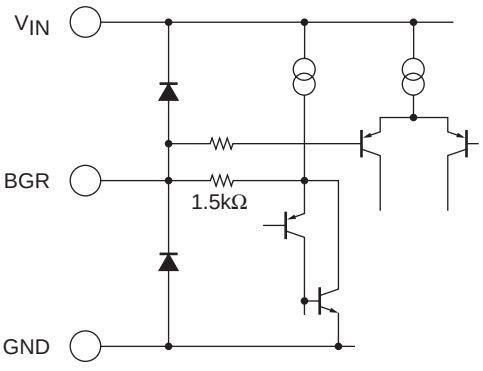
Block Diagram



Pin Descriptions

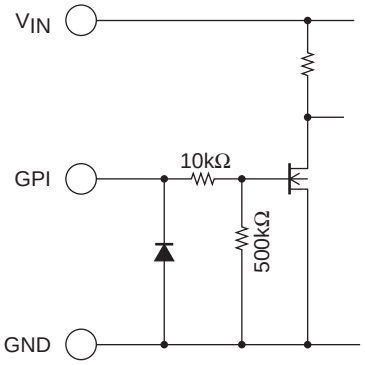
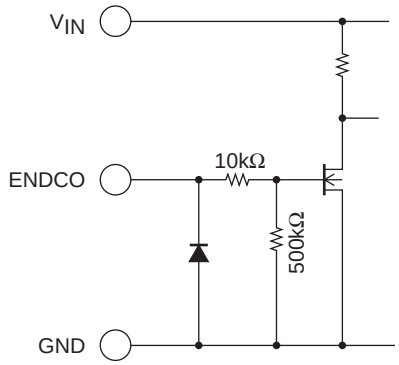
Pin No.	Pin name	Description
1	PGND1	DC/DC power-dedicated ground
2	LX	Switching regulator PWM output pin
3	NC	NC
4	PV_{IN}	DC/DC power dedicated power pin
5	FB	DC/DC feedback voltage input pin
6	GPO	GPO output for discharging the output capacitor
7	BGR	Internal reference voltage output pin
8	GND	Signal ground
9	GPI	GPO output control pin. L : Output capacitor discharge
10	V_{IN}	Signal system power supply
11	ENDCO	DC/DC output control pin. Low : OFF, High : ON
12	PGND2	DC/DC power dedicated ground

Pin Functions

Pin No.	Pin Name	Pin function	Equivalent Circuit
2	LX	Switching regulator PWM signal output	
5	FB	Switching regulator Feedback voltage input	
6	GPO	GPO output for discharging the output capacitor	
7	BGR	Reference voltage output	

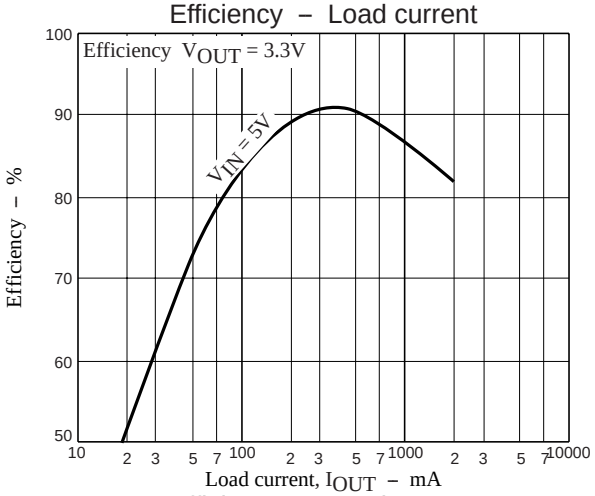
Continued on next page.

Continued from preceding page.

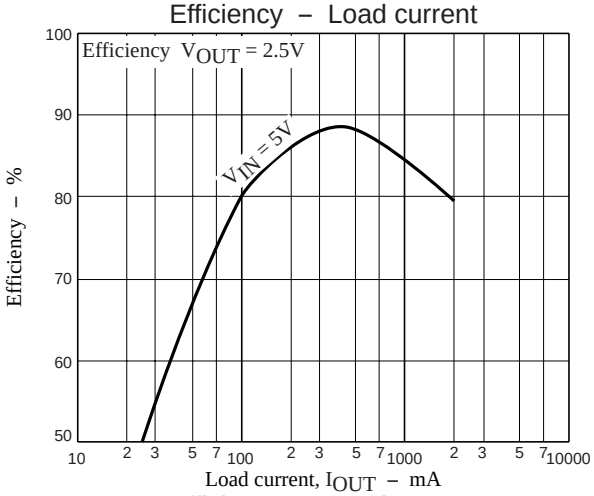
Pin No.	Pin Name	Pin function	Equivalent Circuit
9	GPI	GP0 output control pin (Low : Discharging the output capacitor)	
11	ENDCO	DC/DC on/off control (High : Converter ON)	

Evaluation Board

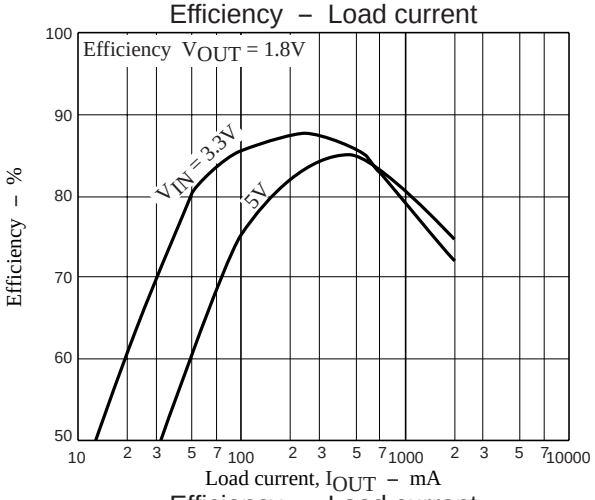
Efficiency – Load current



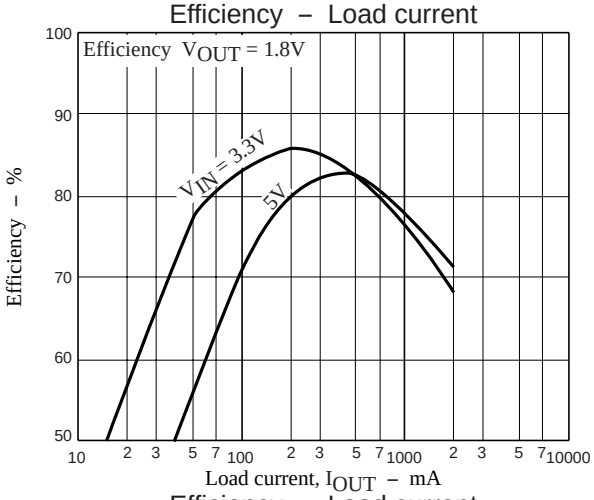
Efficiency – Load current



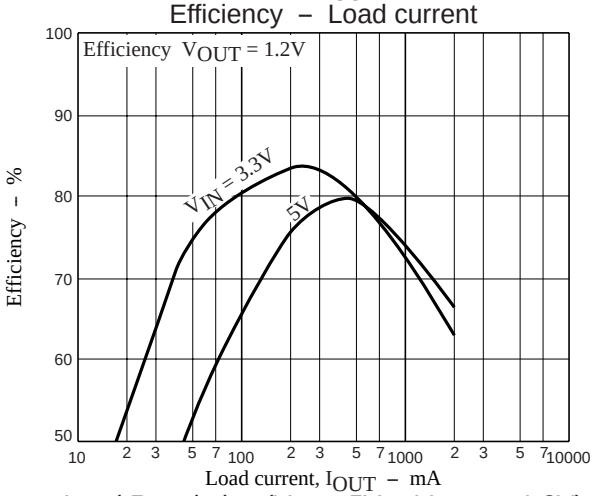
Efficiency – Load current



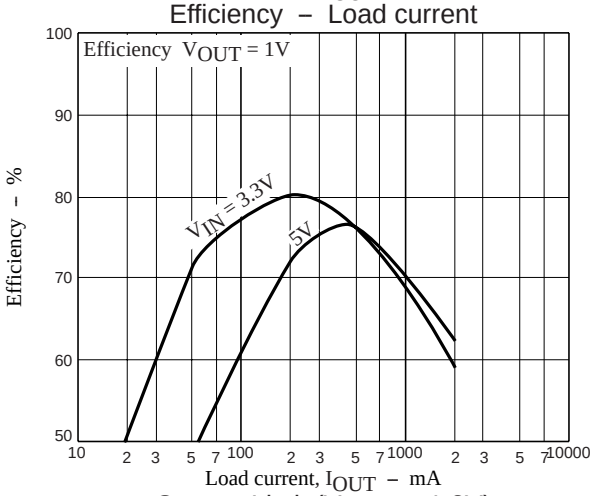
Efficiency – Load current



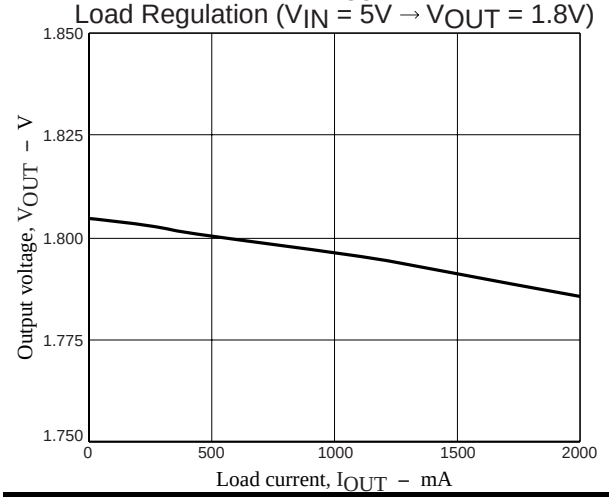
Efficiency – Load current



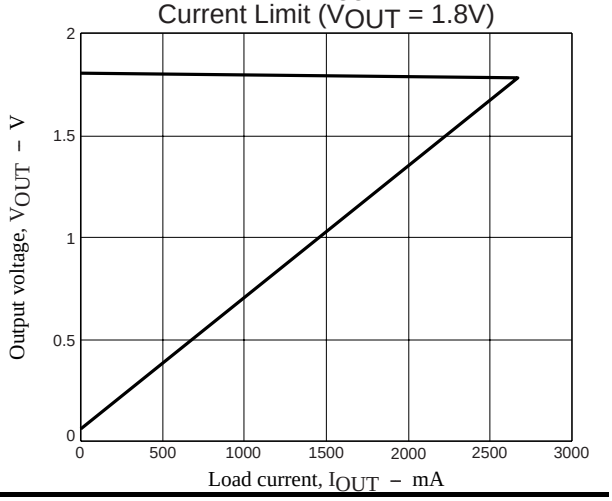
Efficiency – Load current



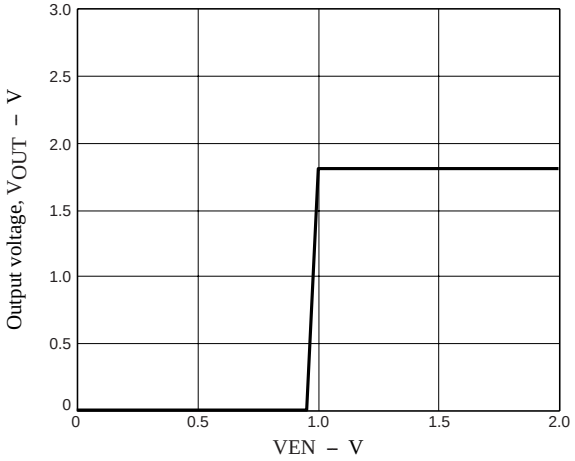
Load Regulation (V_{IN} = 5V → V_{OUT} = 1.8V)



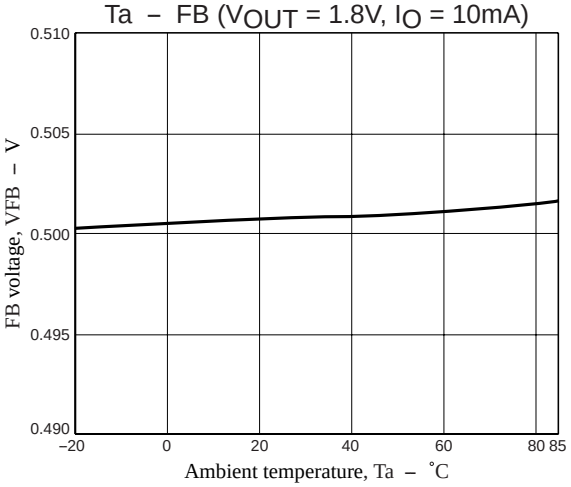
Current Limit (V_{OUT} = 1.8V)



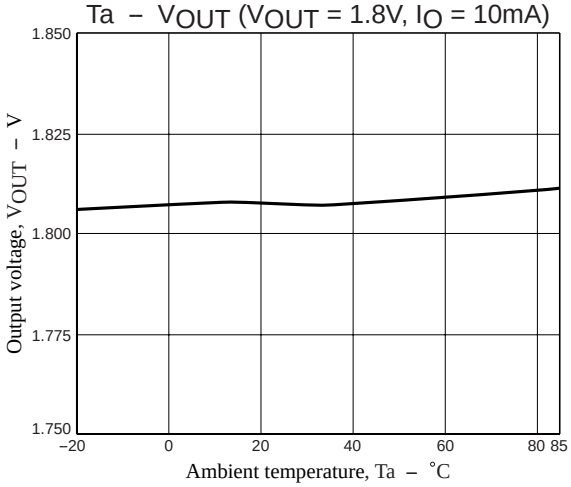
ENDCO Turn ON



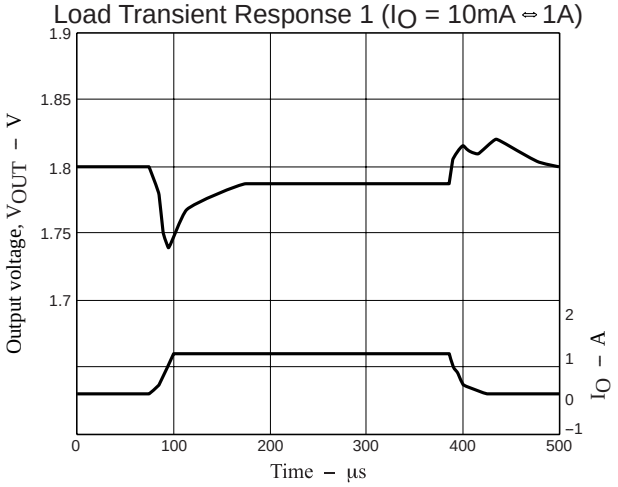
Ta – FB (V_{OUT} = 1.8V, I_O = 10mA)



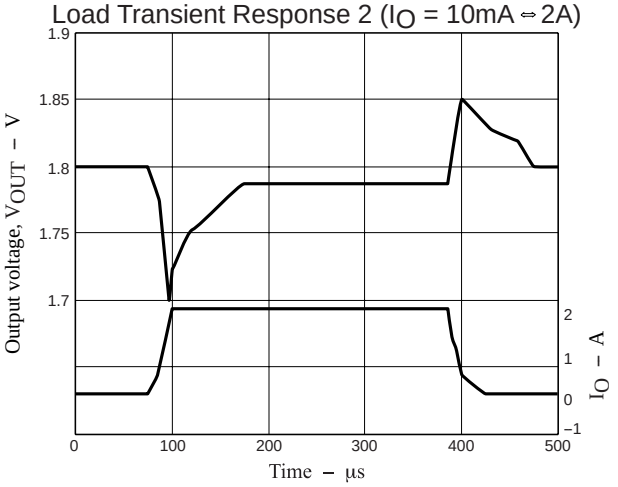
Ta – V_{OUT} (V_{OUT} = 1.8V, I_O = 10mA)



Load Transient Response 1 (I_O = 10mA ⇔ 1A)

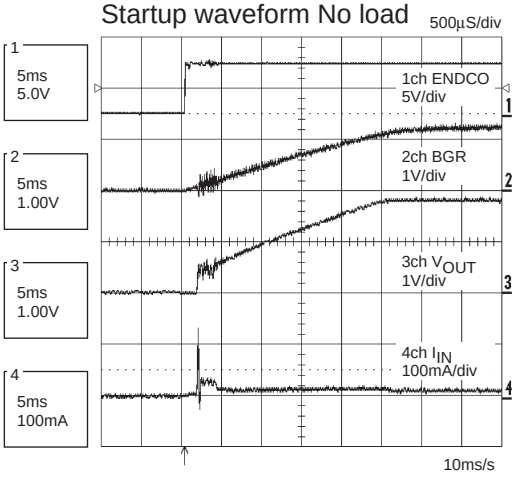


Load Transient Response 2 (I_O = 10mA ⇔ 2A)

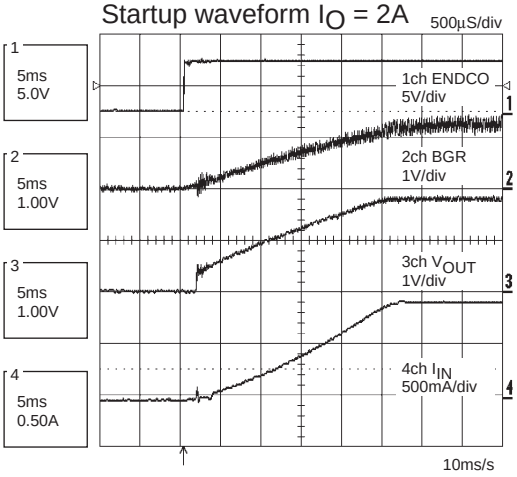


ENDCO ON Waveforms. (V_{OUT} = 1.8V, Co = 22μF, Cvin = 1μF, Cpvin = 10μF × 3, CBGR = 0.22μF)

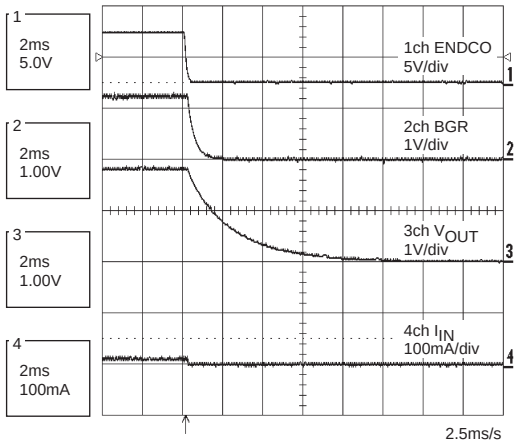
Startup waveform No load



Startup waveform I_O = 2A



Stop waveform No load



Stop waveform I_O = 2A