



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LV5072M — Bi-CMOS IC 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} , P _{VIN}	-0.3 to 6.0	V
Input pin voltage	V _{INC}	GPI, ENDCO	-0.3 to 6.0	V
Output pin voltage	V _{OUT}	LX, GPO	-0.3 to 6.0	V
Allowable Power dissipation	P _{d max}	Ta = 25°C Mounted on a circuit board.*	1.5	W
Operating temperature	T _{opr}		-20 to +85	°C
Storage temperature	T _{stg}		-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%

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Operating Conditions at $T_a = 25^\circ\text{C}$

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

Electrical Characteristics, Current drain, unless otherwise specified at $T_a = 25^\circ\text{C}$, $V_{IN} = 5.0V$, no load

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

DC/DC, unless otherwise specified at $T_a = 25^\circ\text{C}$, $V_{IN} = 5.0V$, $V_{OUT} = 1.8V$, no load

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
FB voltage	VFB	$I_O = 10\text{mA}$	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	$I_O = 1\text{mA to } 2A$		25	70	mV
Frequency	Fosc		1.7	2.2	2.7	MHz
LX ON resistance	RLXP	$I_{OH} = -300\text{mA}, P_{ch}$		0.15		Ω
	RLXN	$I_{OL} = 300\text{mA}, N_{ch}$		0.15		Ω

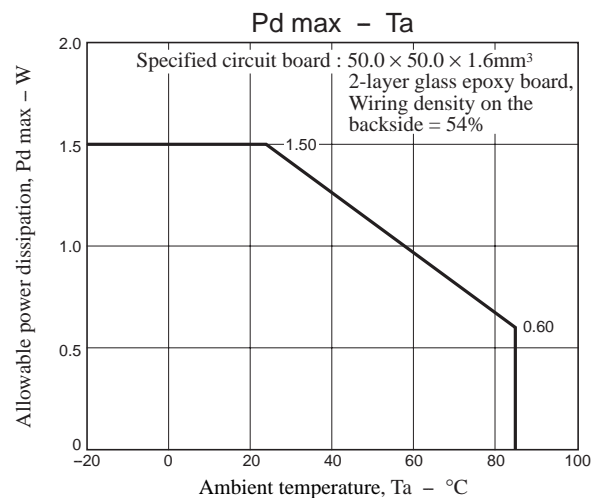
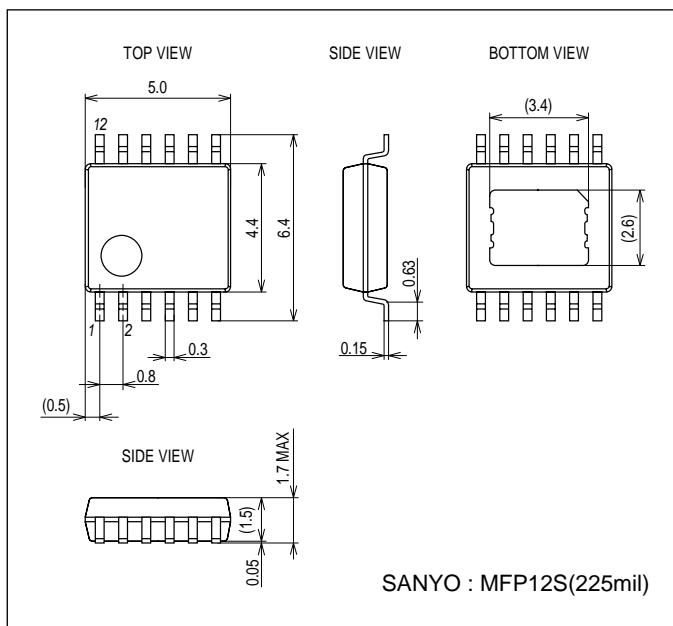
GPI, ENDCO Input, GPO Output, unless otherwise specified at $T_a = 25^\circ\text{C}$, $V_{IN} = 5.0V$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
GPO Output current	I_{gpo}	GPI = 0V, GPO = 1.5V	7.5	15	37.5	mA
GPO output voltage Low-level	V_{OL}	GPI = 0V, $I_{OL} = 5\text{mA}$		0.5	1	V
GPO output leakage current	ILK	GPO		0	10	μA
GPI/ENDCO input voltage High-level	V_{INH}	Input High-level GPI, ENDCO	1.5			V
GPI/ENDCO input voltage Low-level	V_{INL}	Input Low-level GPI, ENDCO	0		0.3	V

Package Dimensions

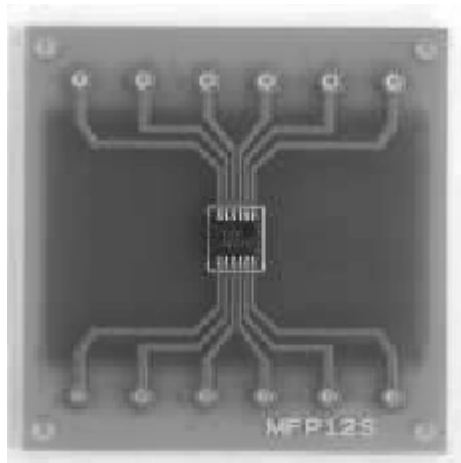
unit : mm (typ)

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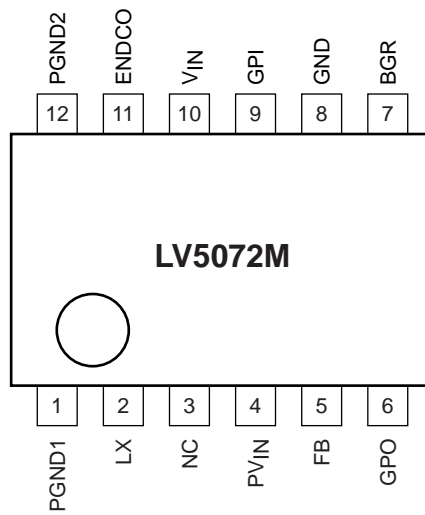


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Specified board for Pd max measurement

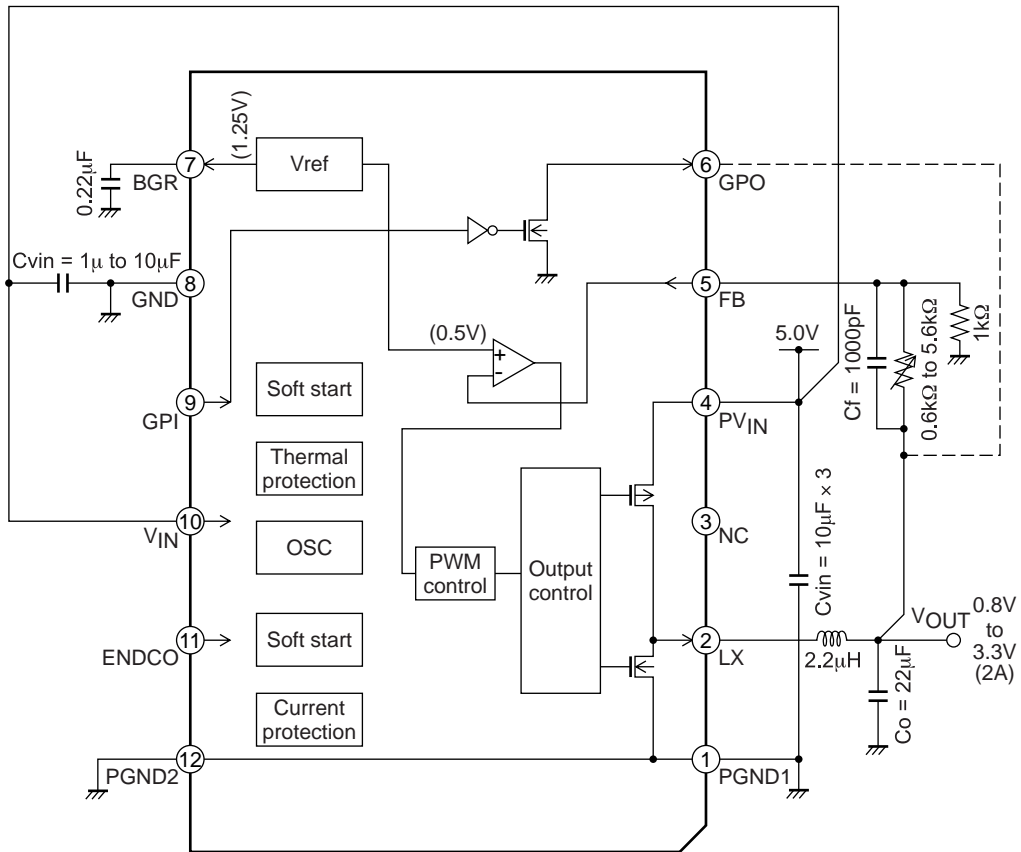


Pin Assignment



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	PVIN	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	VIN	Signal system power supply
11	ENDCO	DC/DC output control pin. Low : OFF, High : ON
12	PGND2	DC/DC power dedicated ground

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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	

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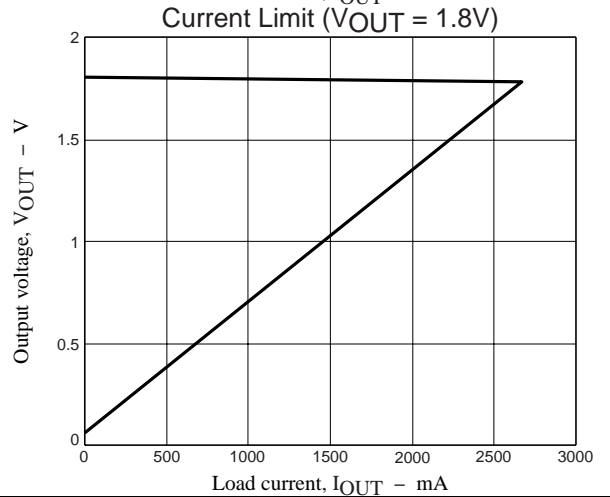
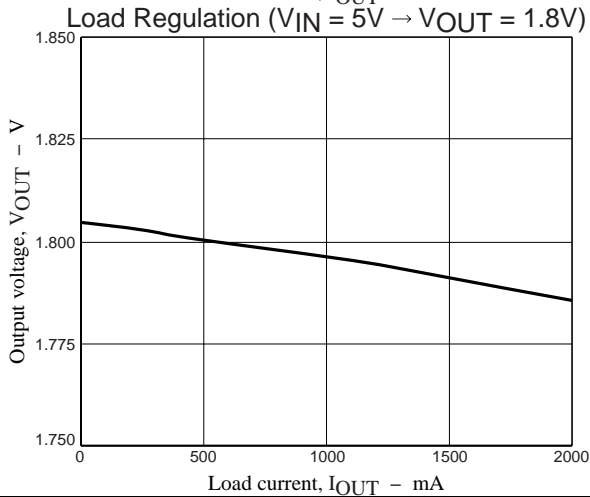
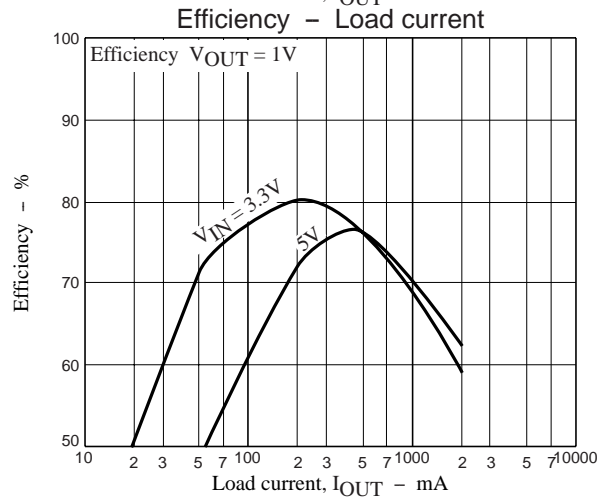
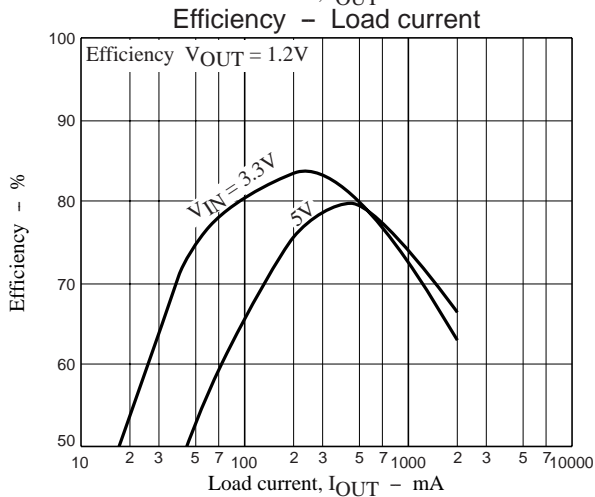
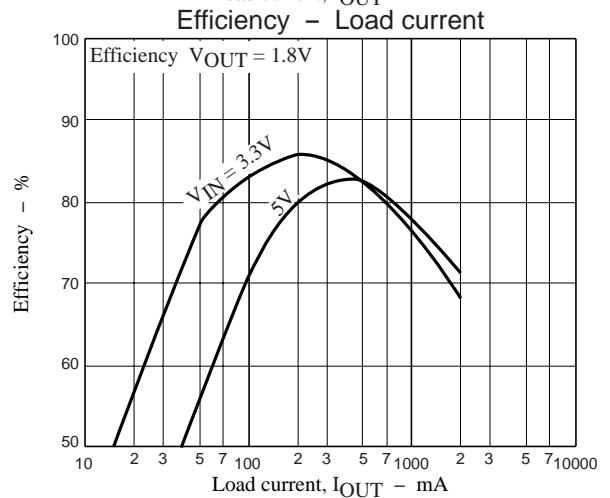
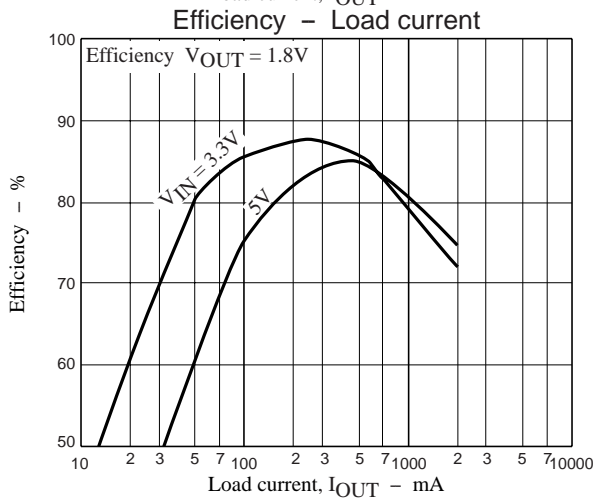
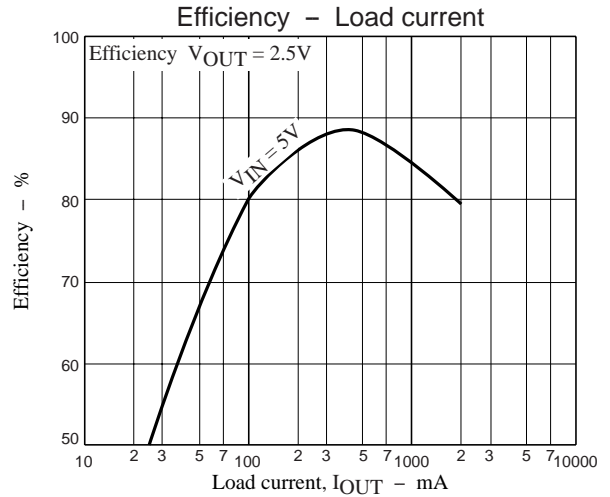
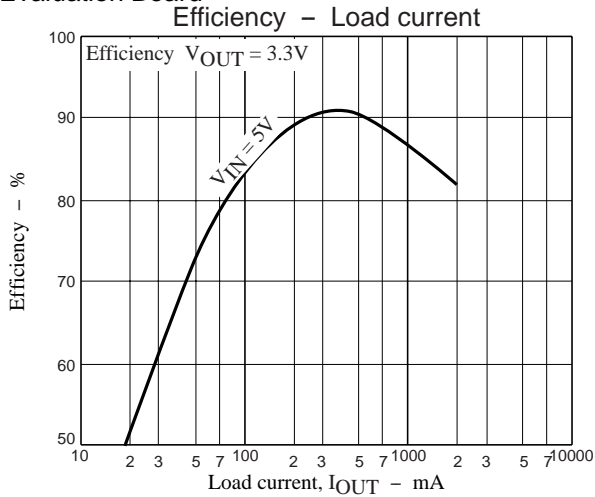
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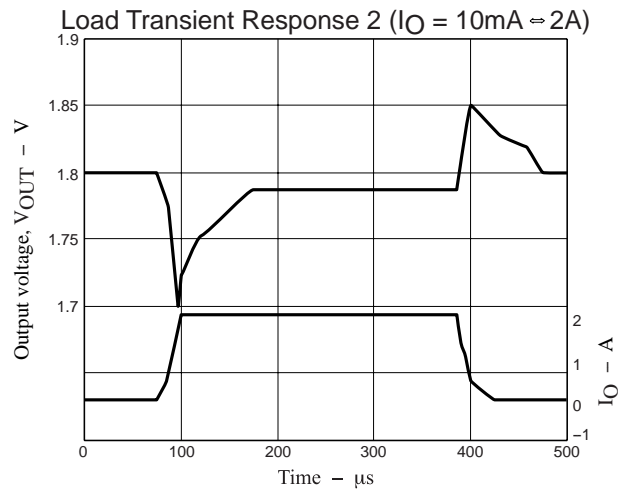
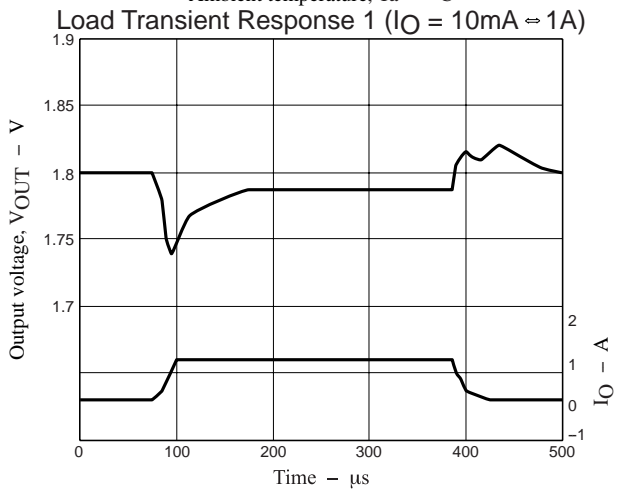
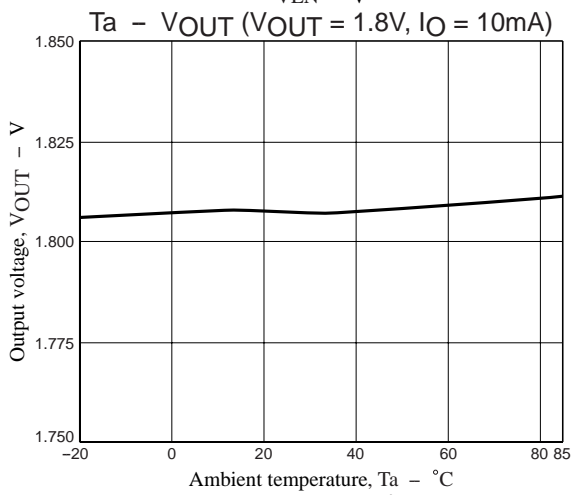
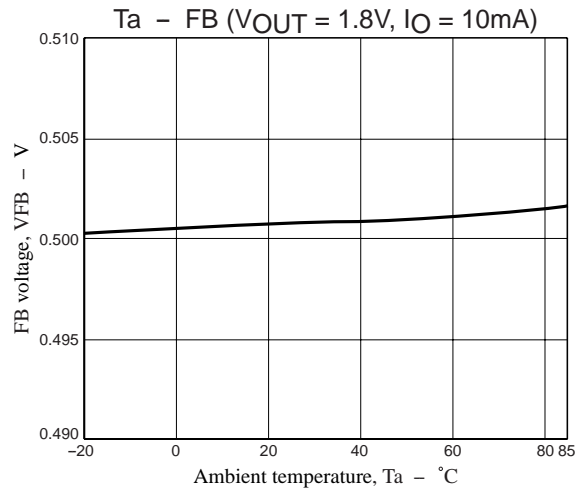
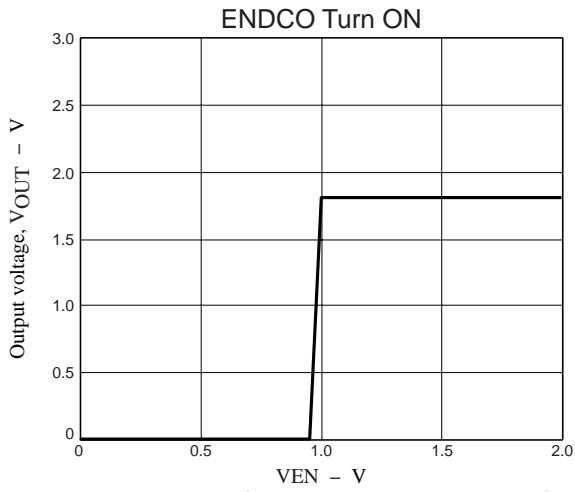
Pin No.	Pin Name	Pin function	Equivalent Circuit
9	GPI	GP0 output control pin (Low : Discharging the output capacitor)	<p>The diagram shows the equivalent circuit for the GPI pin. It features a pull-up resistor connected to the V_{IN} supply. The GPI pin is connected to a node that is also connected to V_{IN} through a $10k\Omega$ resistor, to GND through a diode, and to GND through a $500k\Omega$ resistor. A MOSFET gate is connected to this node, and its drain is connected to V_{IN} through a resistor.</p>
11	ENDCO	DC/DC on/off control (High : Converter ON)	<p>The diagram shows the equivalent circuit for the ENDCO pin. It features a pull-up resistor connected to the V_{IN} supply. The ENDCO pin is connected to a node that is also connected to V_{IN} through a $10k\Omega$ resistor, to GND through a diode, and to GND through a $500k\Omega$ resistor. A MOSFET gate is connected to this node, and its drain is connected to V_{IN} through a resistor.</p>

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Evaluation Board

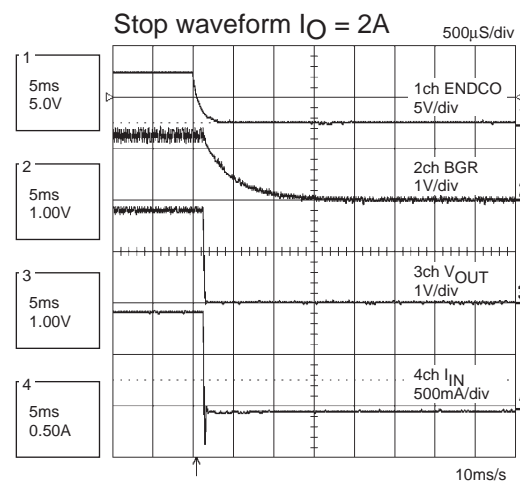
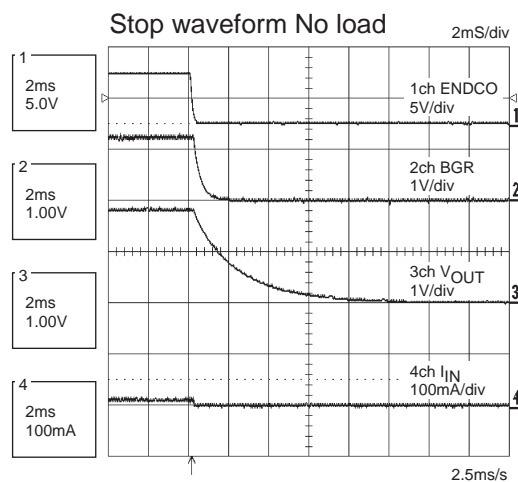
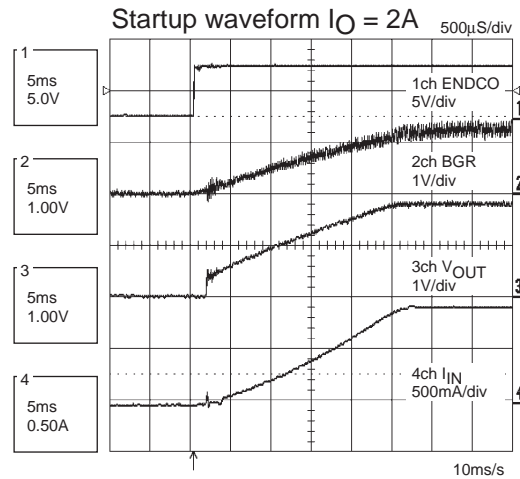
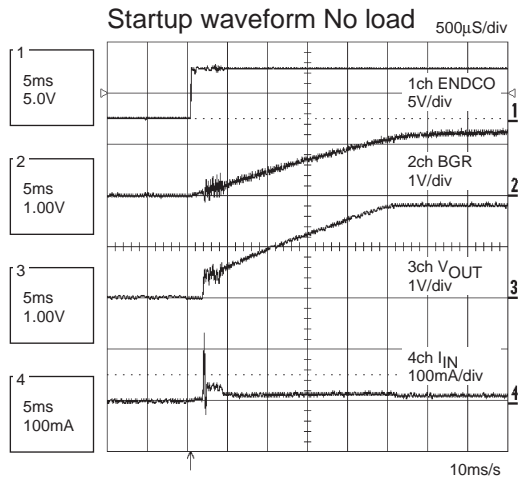


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ENDCO ON Waveforms. ($V_{OUT} = 1.8V$, $C_o = 22\mu F$, $C_{vin} = 1\mu F$, $C_{pvin} = 10\mu F \times 3$, $CBGR = 0.22\mu F$)



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