



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 $T_a = 25^\circ\text{C}$

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	$T_a = 25^\circ\text{C}$ Mounted on a circuit board.*	1.5	W
Operating temperature	T_{opr}		-20 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

* 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}	$V_{IN} = PV_{IN}$, $0.8\text{V} \leq V_{OUT} \leq 1.3\text{V}$	2.95 to 5.5	V
		$V_{IN} = PV_{IN}$, $1.3\text{V} \leq V_{OUT} \leq 1.9\text{V}$	3.2 to 5.5	V
		$V_{IN} = PV_{IN}$, $1.9\text{V} \leq V_{OUT} \leq 3.3\text{V}$	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 $T_a = 25^\circ\text{C}$, $V_{IN} = 5.0\text{V}$, 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, $V_{OUT} = 1.8\text{V}$		12	16	mA

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

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

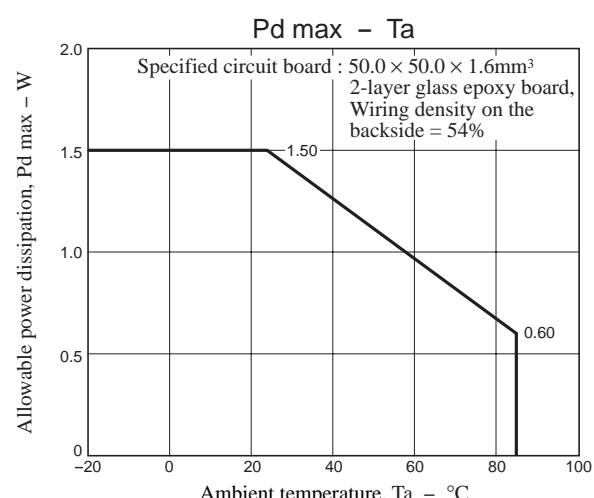
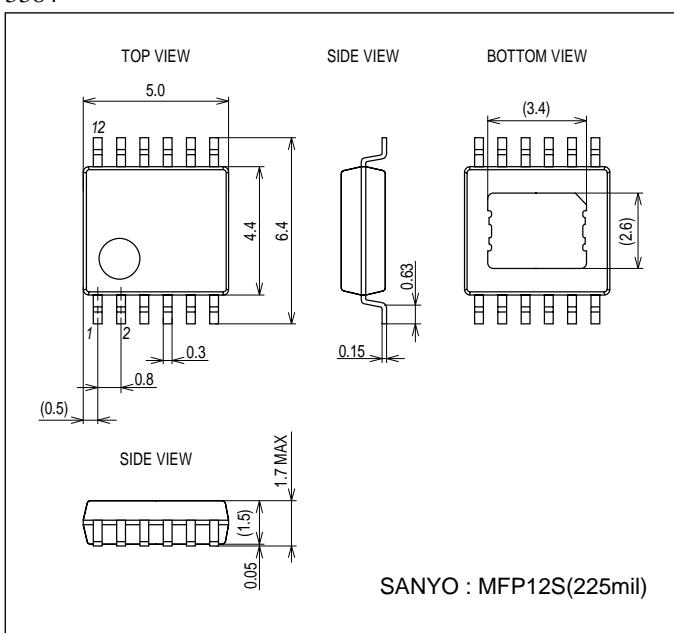
GPI, ENDCO Input, GPO Output, unless otherwise specified at $T_a = 25^\circ\text{C}$, $V_{IN} = 5.0\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
GPO Output current	I_{GPO}	$GPI = 0\text{V}$, GPO = 1.5V	7.5	15	37.5	mA
GPO output voltage Low-level	V_{OL}	$GPI = 0\text{V}$, $I_{OL} = 5\text{mA}$		0.5	1	V
GPO output leakage current	I_{LK}	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

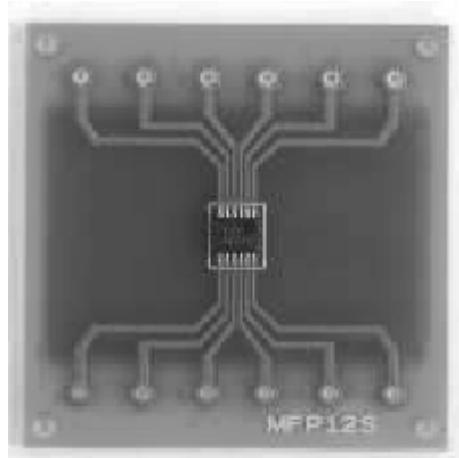
Package Dimensions

unit : mm (typ)

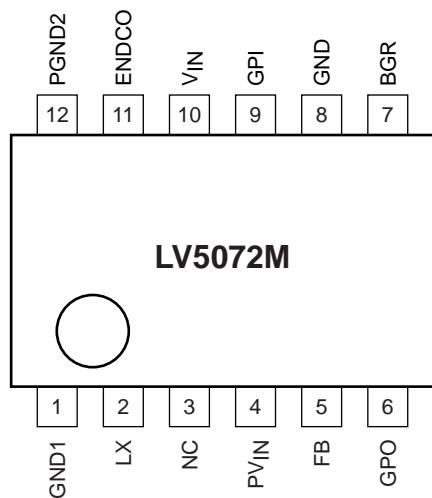
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Specified board for Pd max measurement

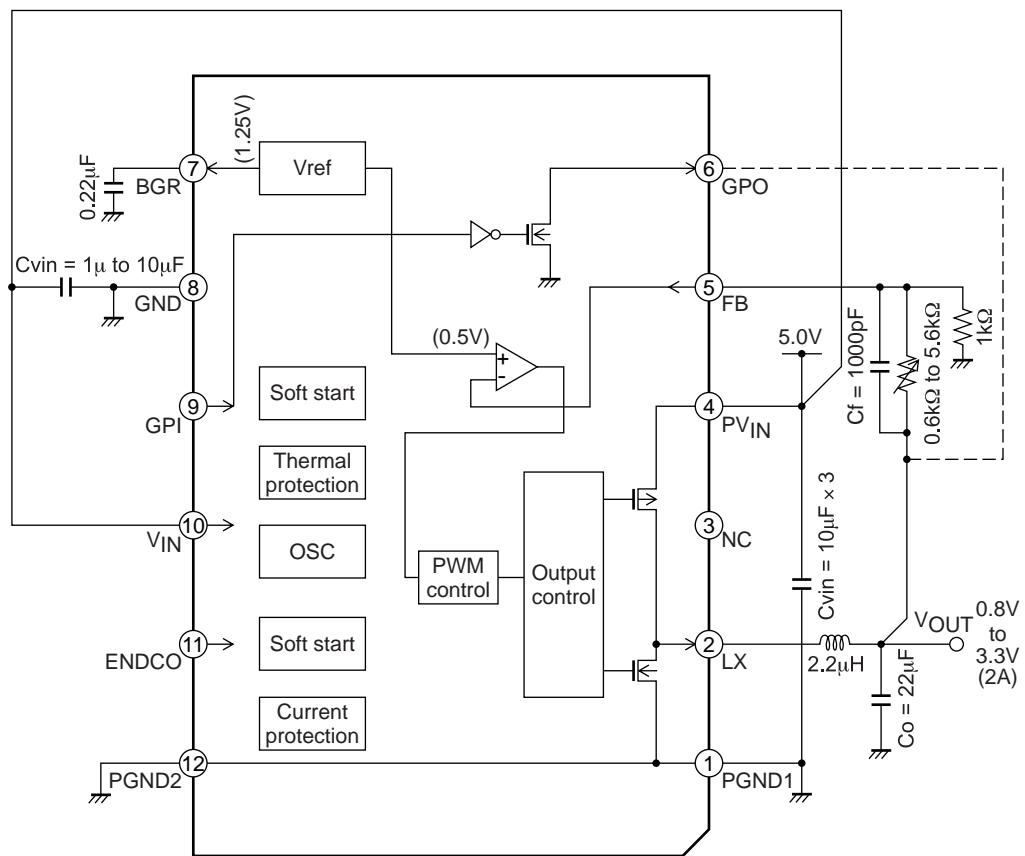


Pin Assignment



Top view

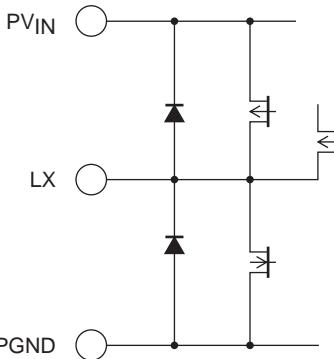
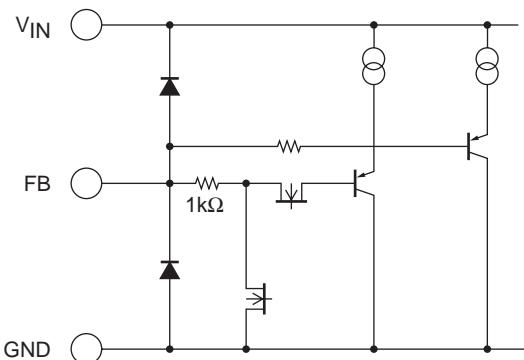
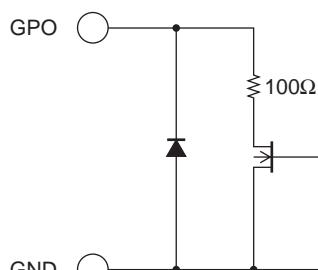
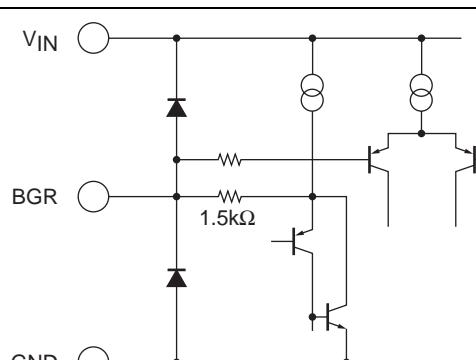
Block Diagram



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

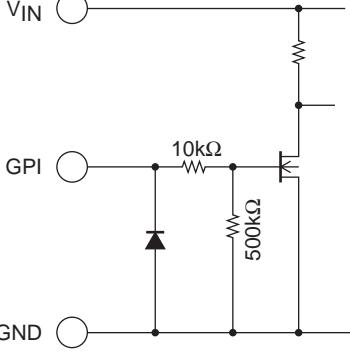
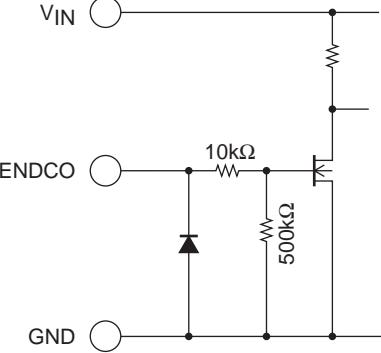
Pin Functions

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	

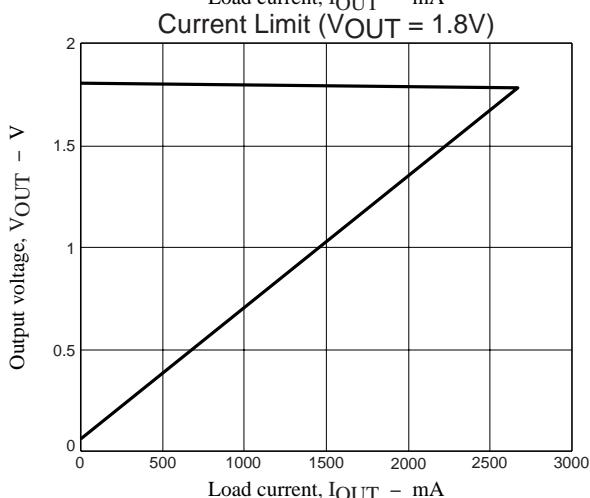
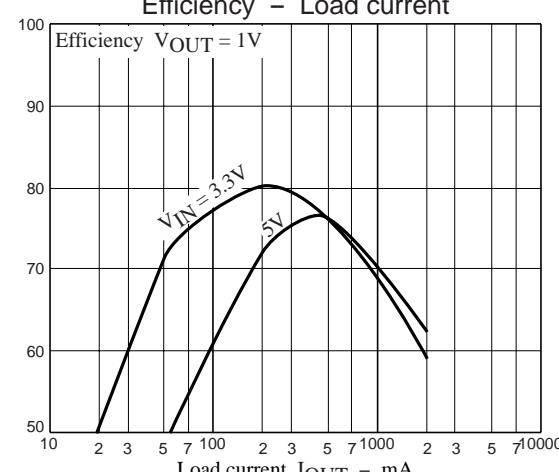
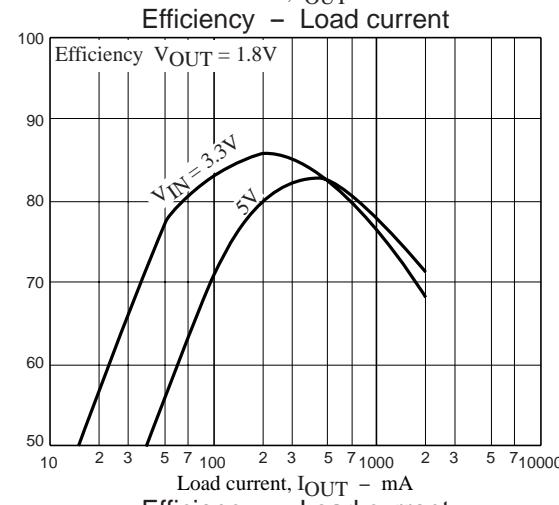
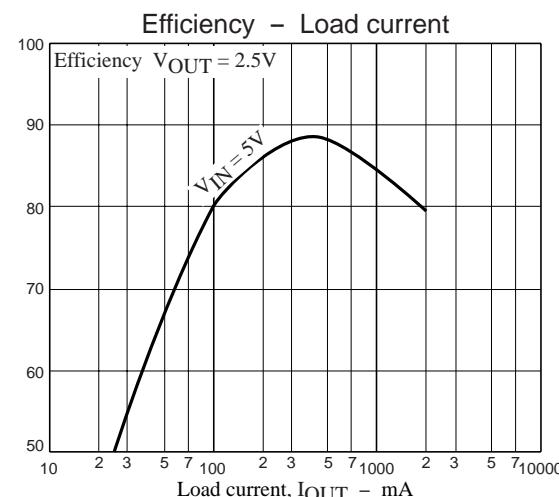
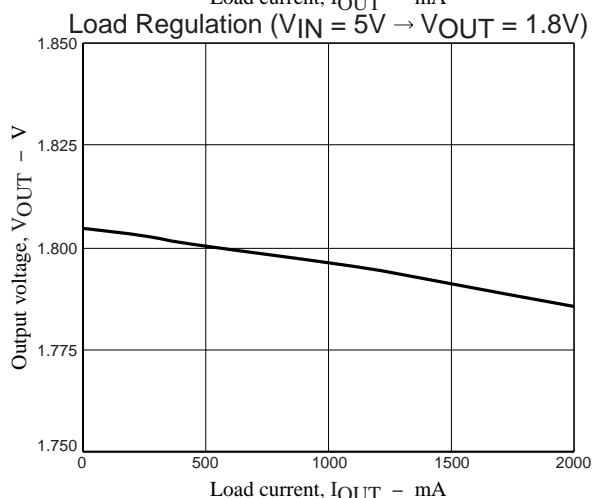
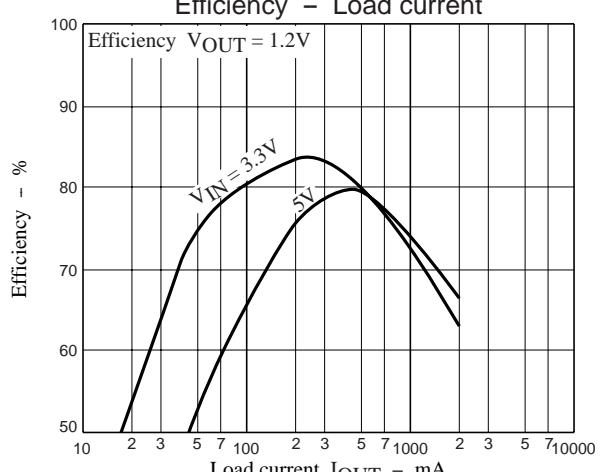
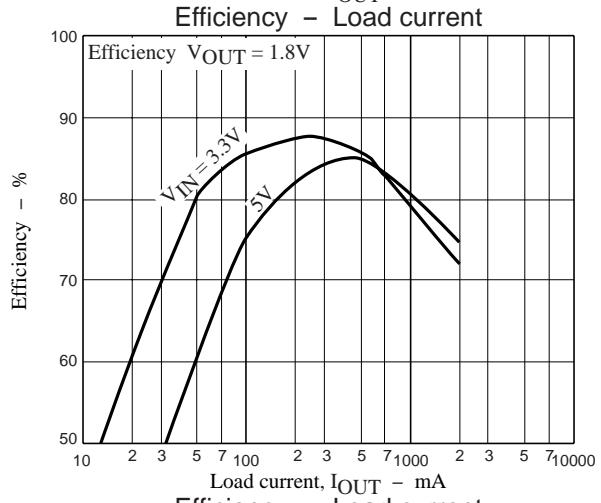
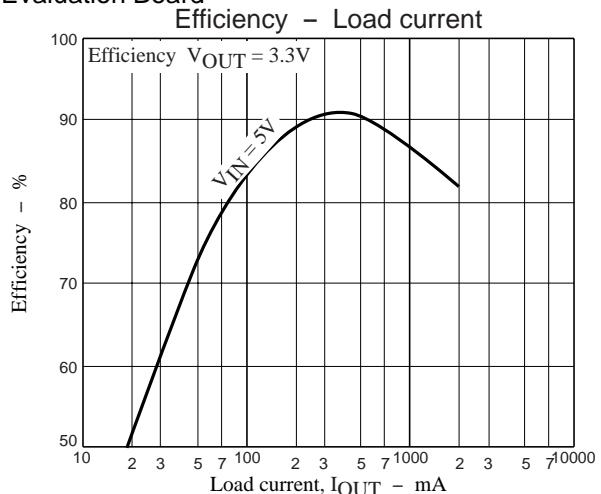
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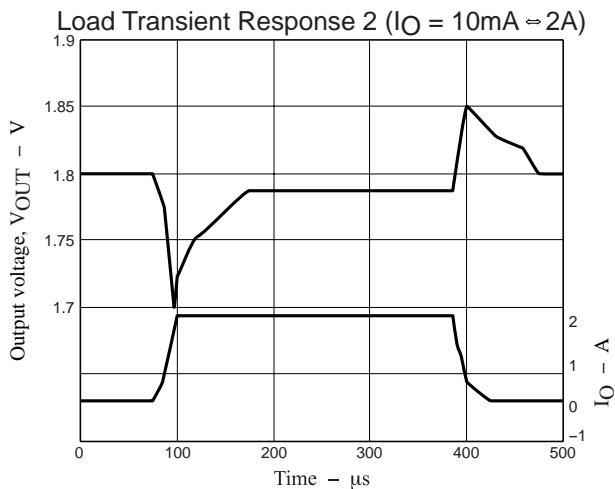
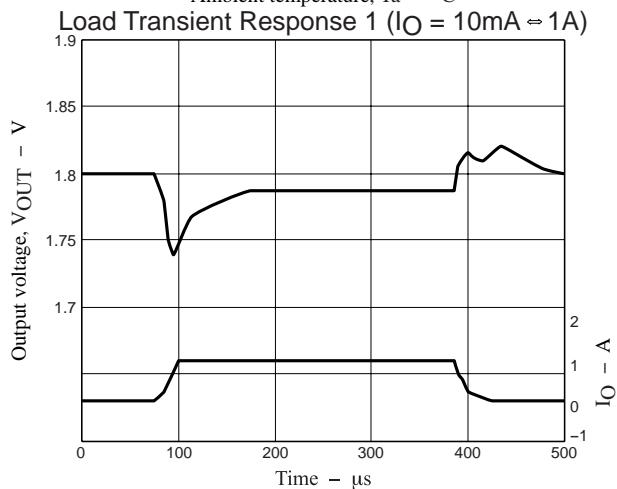
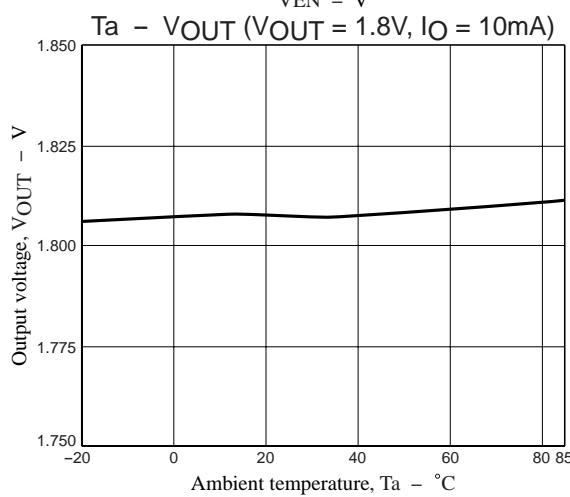
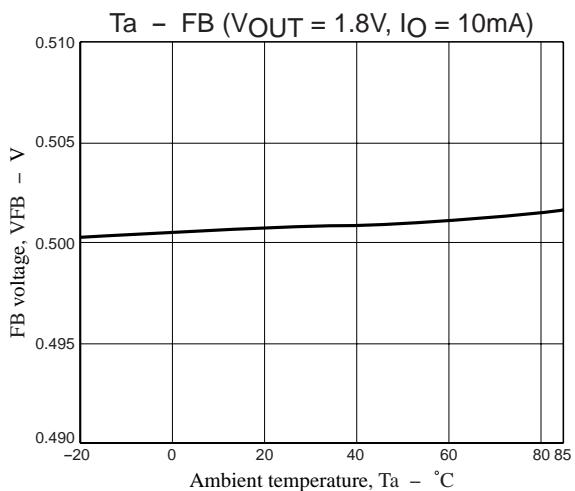
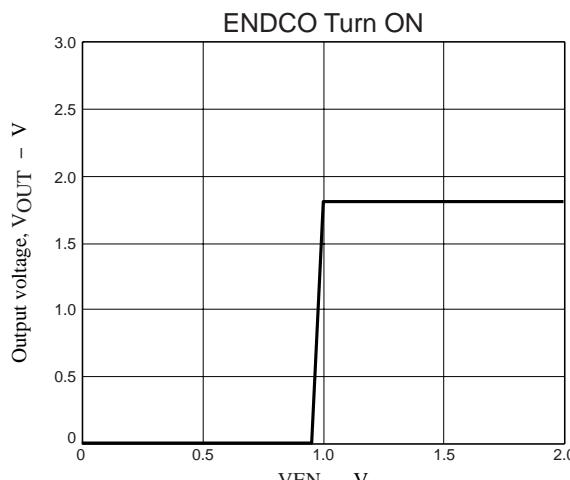
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Pin No.	Pin Name	Pin function	Equivalent Circuit
9	GPI	GP0 output control pin (Low : Discharging the output capacitor)	
11	ENDCO	DC/DC on/off control (High : Converter ON)	

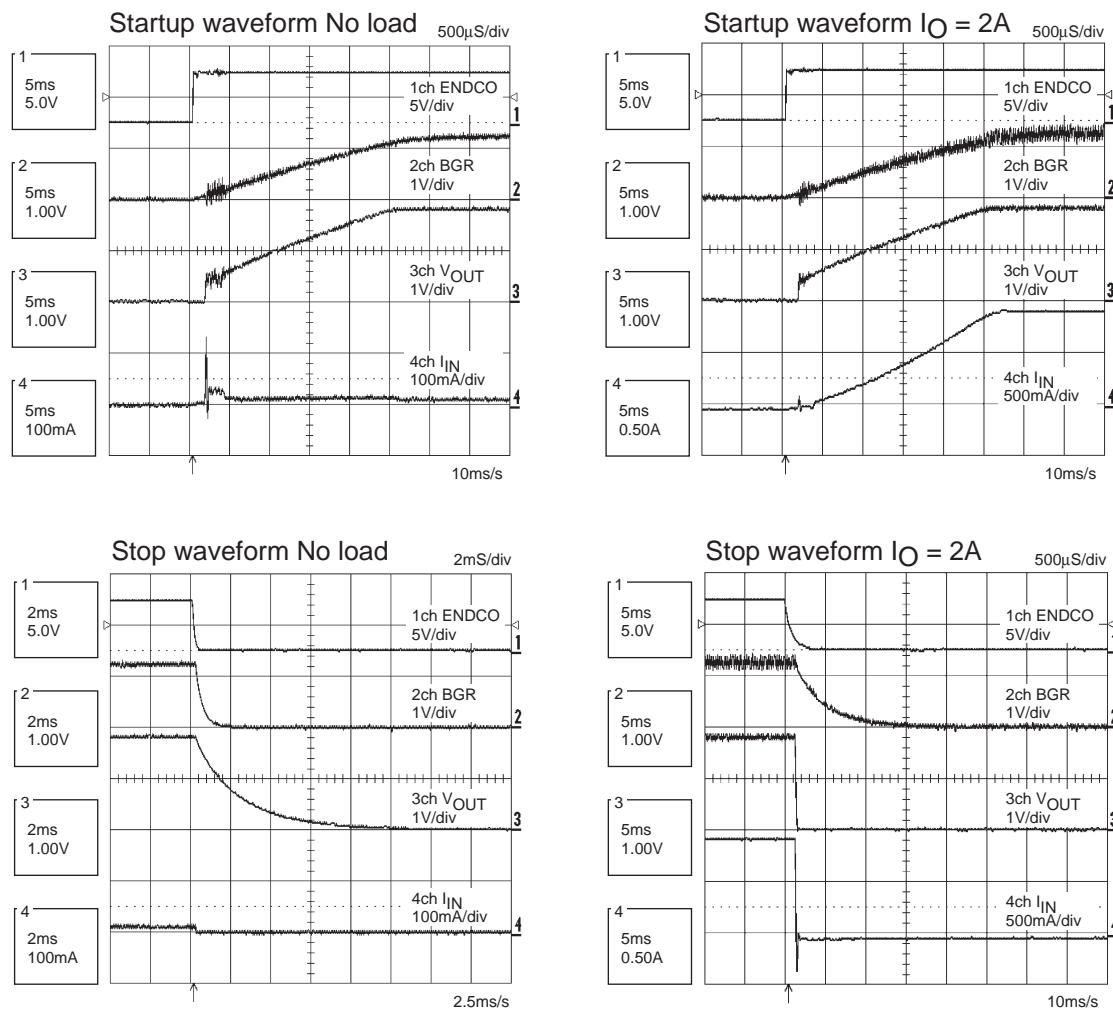
Evaluation Board





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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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