



STK740-441

3.3V/5A Single Output Separate Excitation Chopper Regulator

Overview

The STK740-441 is a separate-excitation step-down chopper regulator hybrid IC for the secondstage circuit and optimal as a 3.3V local power supply for use in logic circuit that includes both 5V and 3.3V systems. This IC incorporates in the package all the necessary circuits for a chopper regulator including power switch, error amplifier, soft start, shutdown type output short protection, low-voltage malfunction prevention, on/off, and snubber circuits. Therefore, external components required are input and output capacitors and choke coil only and this allows this IC to be used to construct a large-current (5A) chopper regulator as if a 3-pin regulator were used.

Applications

- 3.3V local power supply for the logic circuit where both 5V and 3.3V systems are constructed together.

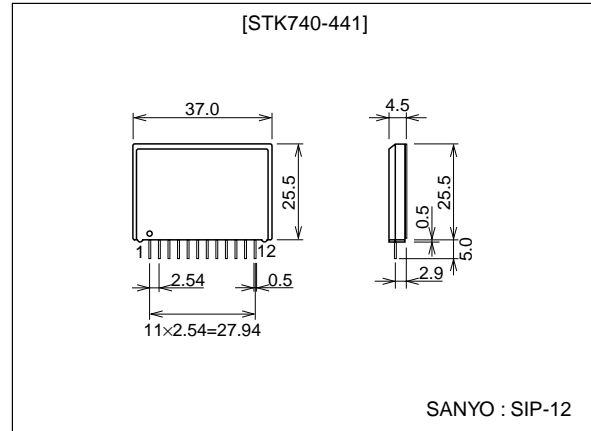
Features

- Adoption of Sanyo IMST ; Insulated Metal Substrate Technology, allows the circuit to be operated without using a heat sink (see “No Fin Output Current Derating” chart in the page 6).
- Slim package reduces mounting space.
- Typical efficiency of 88% at DC 5V input, 2.5A output.
- Fine adjustment of output voltage enable.
- 50 kHz operating frequency.
- Low- R_{ON} resistance power MOSFET adopted.
- Low- V_F Schottky barrier diode adopted.

Package Dimensions

unit:mm

4171-SIP12



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63099RM (KT) No.6106-1/10

STK740-441

Series Construction

This product is listed in a product series due to its property such as output voltage, output current, package, and other similar items. Since some products listed in the table below is under development, please refer to your Sanyo sales representative for details.

Type number	Input voltage	Output voltage	Output current	Package dimensions (output pins not included)
* STK740-411	4 to 8V	2.5V	5A	26 × 37 × 4.5mm, 12pins
* STK740-420	4 to 8V	2.5V	10A	25.5 × 46.6 × 8.5mm, 12pins
STK740-441	4 to 8V	3.3V	5A	26 × 37 × 4.5mm, 12pins
STK740-450			10A	25.5 × 46.6 × 8.5mm, 12pins
STK740-471	8 to 18V	5.0V	5A	26 × 37 × 4.5mm, 12pins
STK740-470			5A	25.5 × 46.6 × 8.5mm, 12pins
STK740-480			10A	25.5 × 46.6 × 8.5mm, 12pins
STK740-490			15A	25.5 × 46.6 × 8.5mm, 12pins

* : Under planning

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$, $T_c = 25^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Conditions	Ratings	Unit
Operating IC substrate temperature	$T_c \text{ max}$		+105	$^\circ\text{C}$
Operating temperature	T_{opr}		-10 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-30 to +115	$^\circ\text{C}$
DC input voltage	$V_{IN} \text{ max}$	Pins 6, 11, and 12	10	V

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

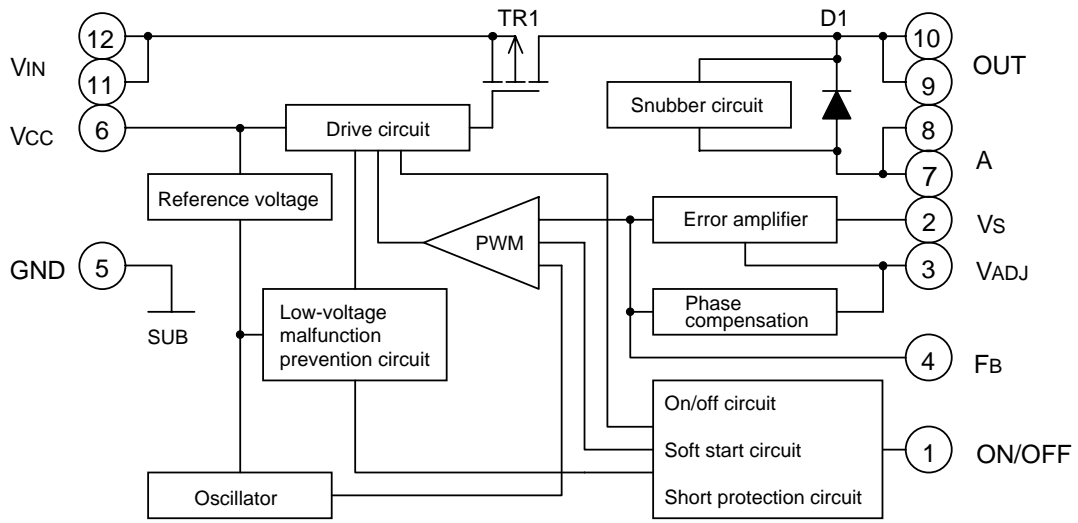
Parameter	Symbol	Conditions	Ratings	Unit
Operating IC substrate temperature	T_c		0 to +85	$^\circ\text{C}$
DC input voltage	V_{IN}	In the recommended circuit	4.5 to 6.5	V
Load current	I_o	In the recommended circuit	1 to 5	A

Electrical Characteristics at $T_c = 25^\circ\text{C}$, in the specified circuit, $V_{IN} = 5\text{V}$, $I_O = 1\text{A}$, unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output voltage	V_o		3.2	3.3	3.4	V
Load regulation	ΔV_O	$I_o=1\text{A to }5\text{A}$			50	mV
Efficiency	η	$I_o=2.5\text{A}$		88		%
Operating frequency	f_{osc}		45	50	55	kHz
Cutoff current	I_{CUT}	6pin, latch mode		1.6		mA
On/off circuit	V_{off}	1pin		0.22	0.32	V
Output voltage temperature coefficient	T_{CVO}	$T_c=+25 \text{ to } +85^\circ\text{C}$		± 1.7		mV/ $^\circ\text{C}$

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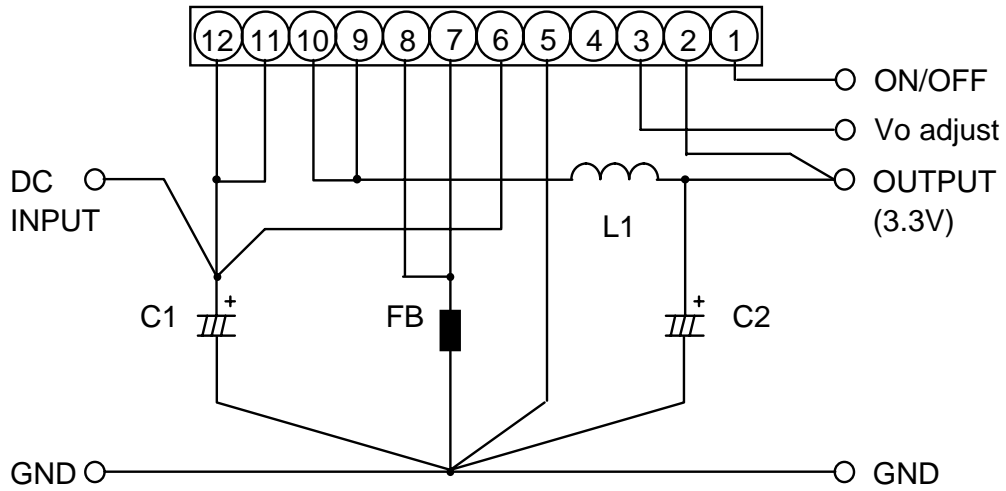
Block Diagram



Pin Descriptions

Number	Pin name	Description
1	ON/OFF	On/off control pin
2	VS	VS pin
3	VADJ	VADJ pin
4	FB	Feedback pin
5	GND	Ground pin
6	VCC	VCC pin
7	A	A pin
8	A	A pin
9	OUT	Output pin
10	OUT	Output pin
11	VIN	VIN pin
12	VIN	VIN pin

Test Circuit

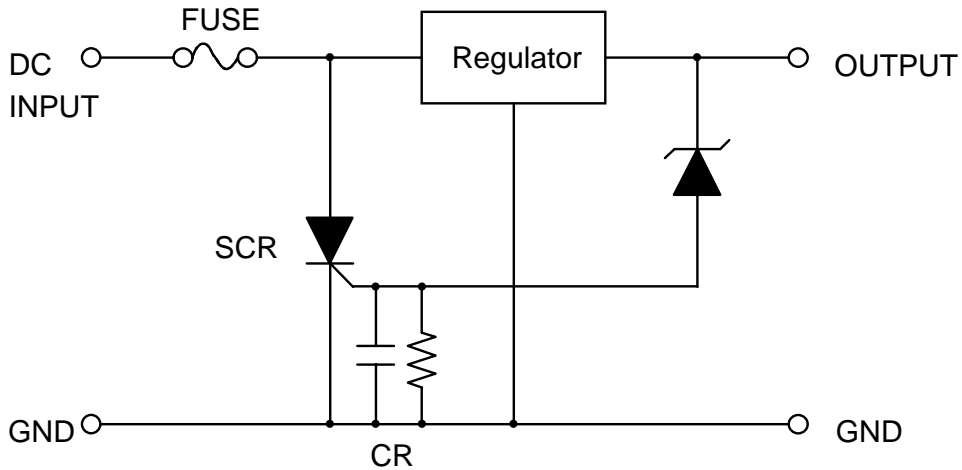


- C1 : 220µF/10V (OS capacitor)
- C2 : 2200µF/6.3V
- L1 : 30µH
- FB : Ferrite-bead core

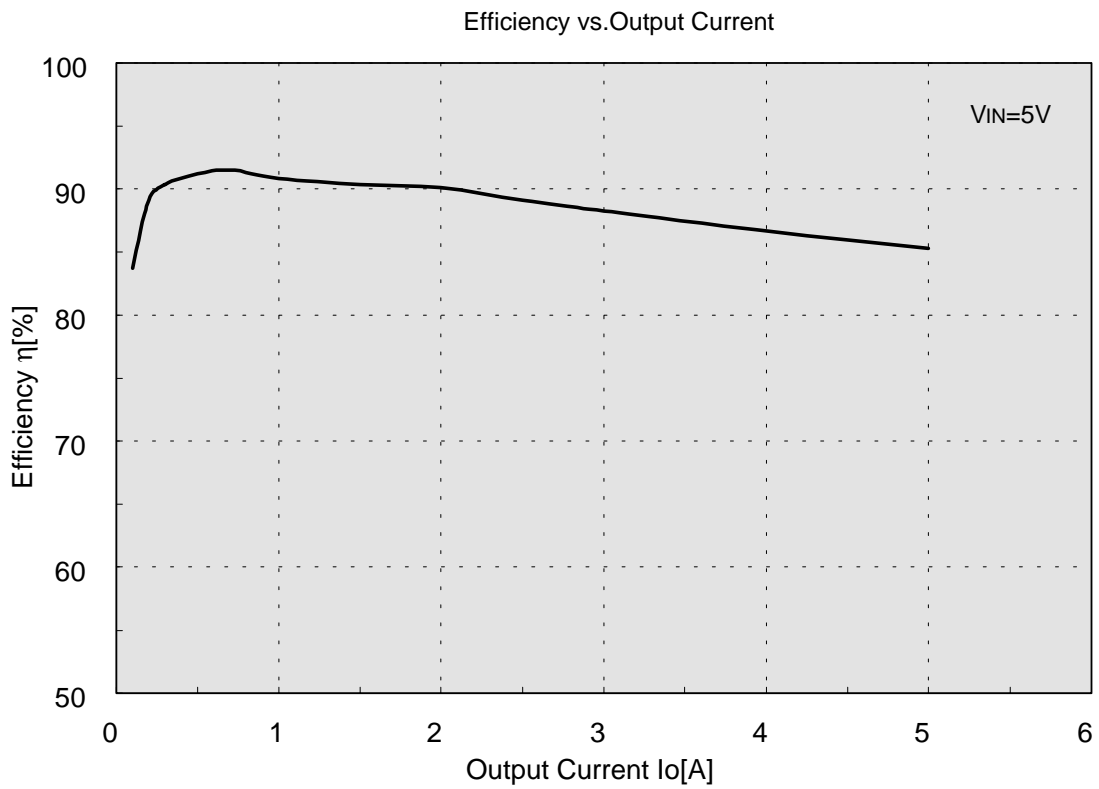
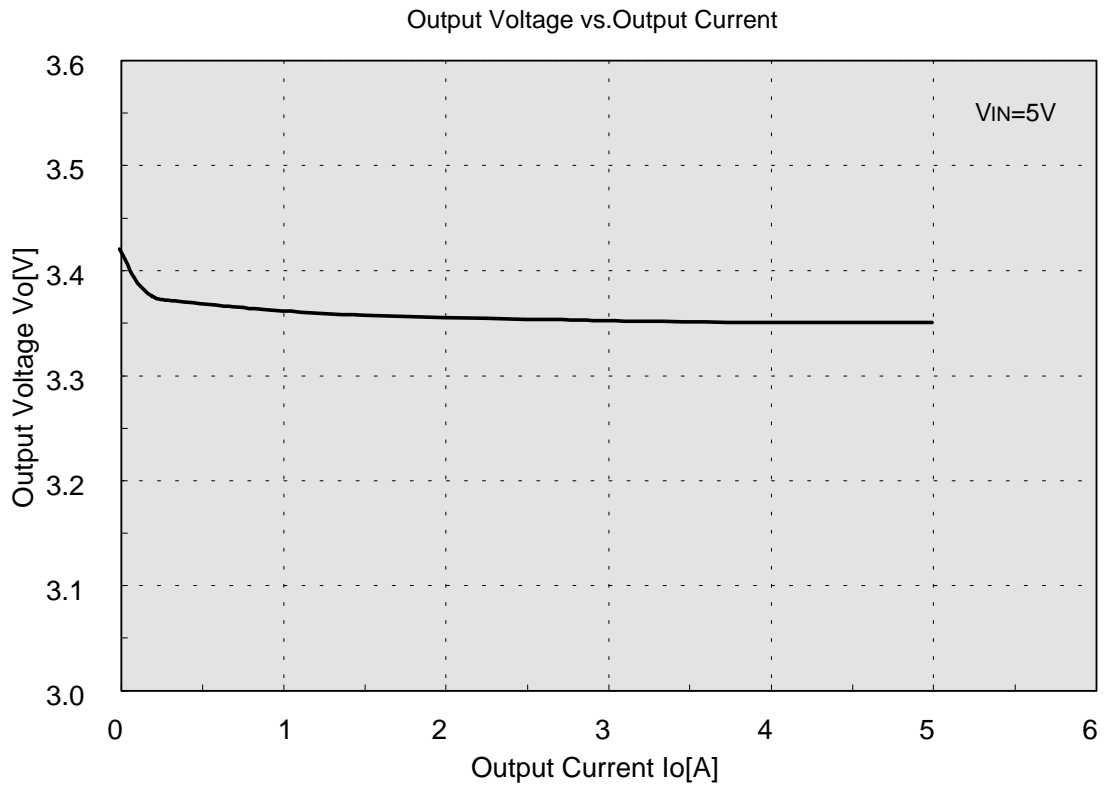
Overvoltage Protection Circuit

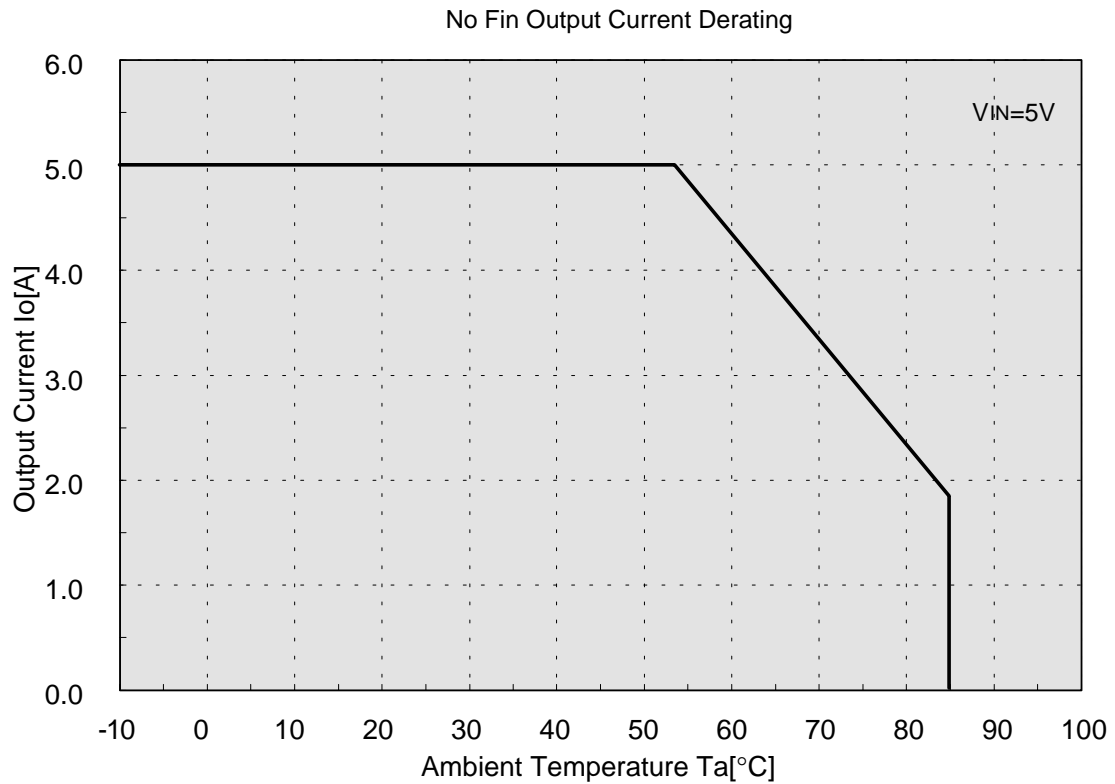
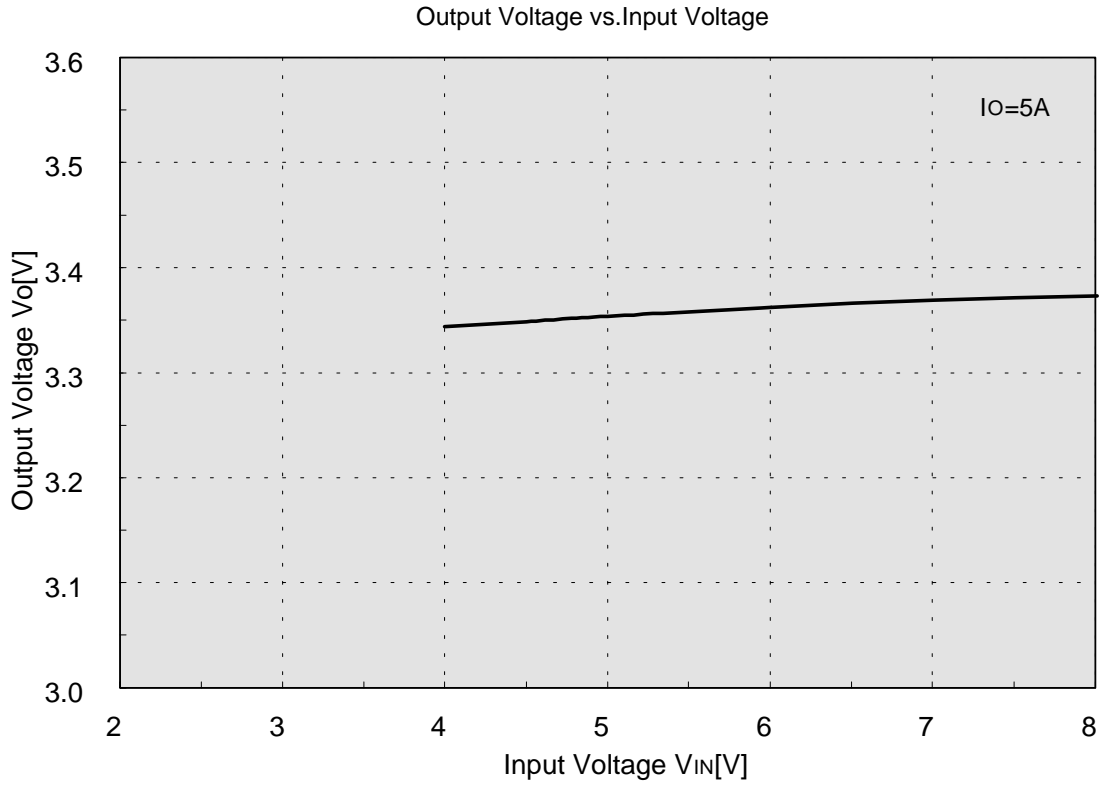
In a constant-voltage power supply circuit output voltage may generally exceed the stipulated rating (equivalent to input voltage) when the circuit is broken down or the IC and the printed circuit board is wrongly soldered. Therefore overvoltage protection circuit is recommended to use to minimize the damages caused by the overvoltage.

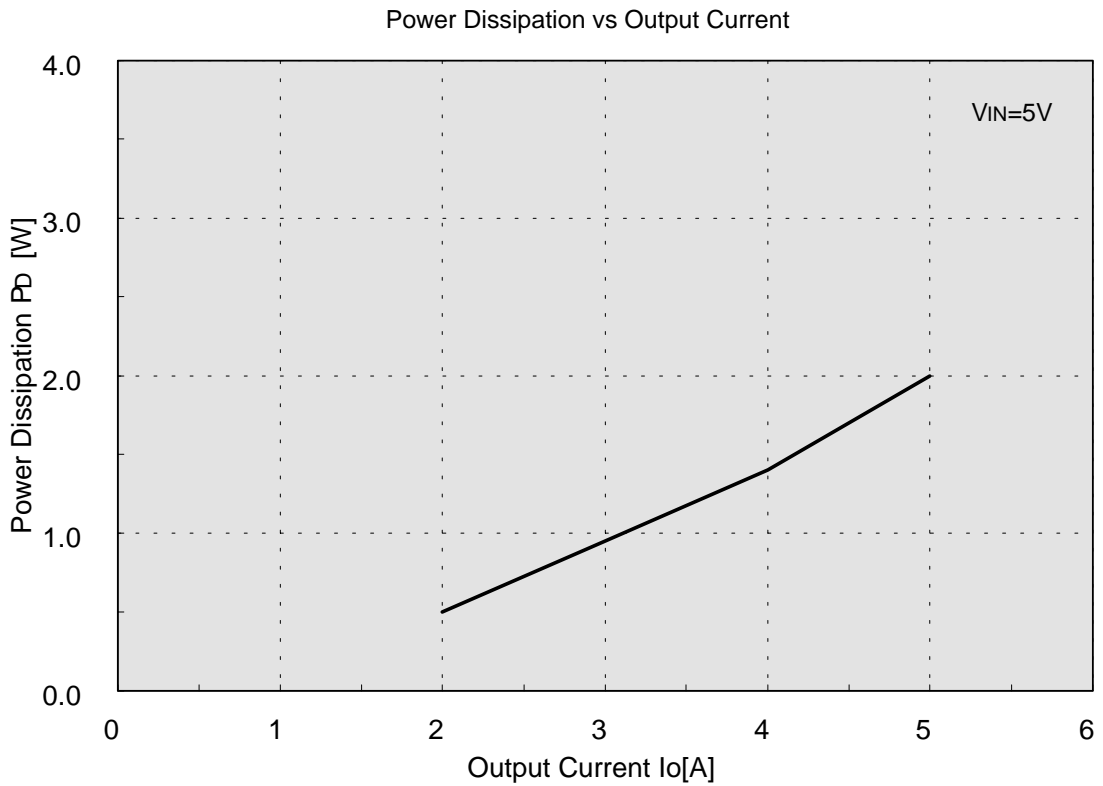
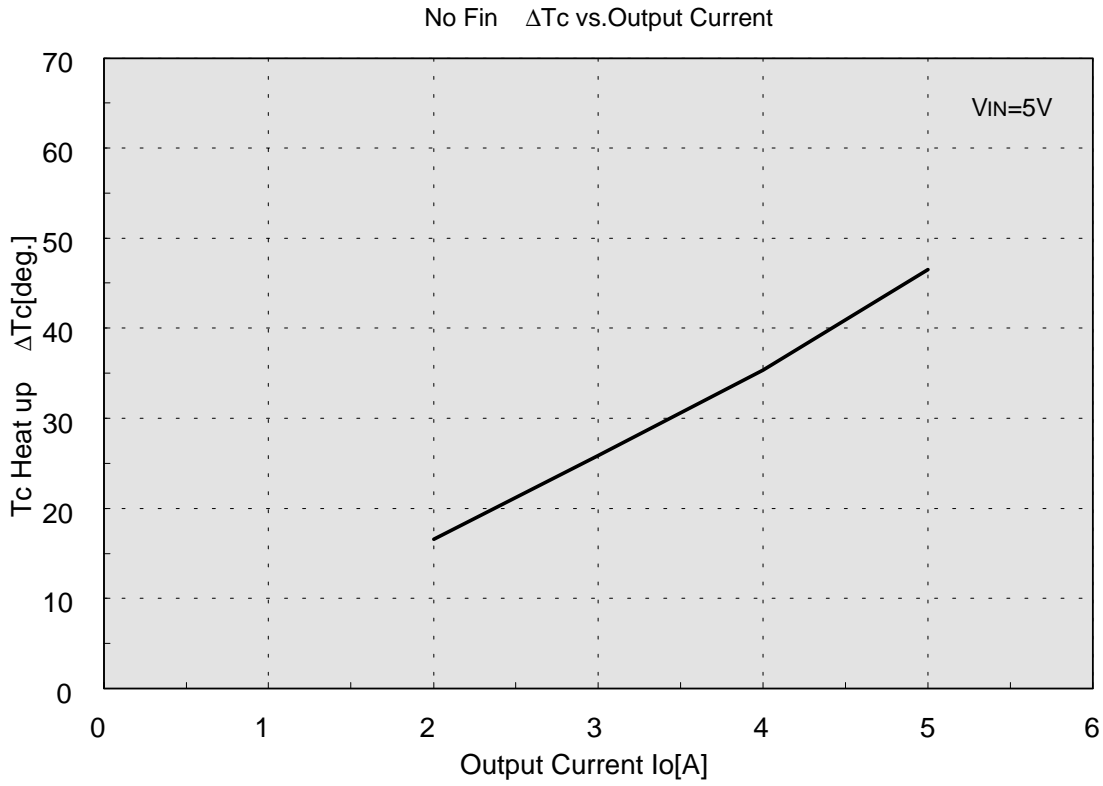
Sample the overvoltage protection circuit



Sample Characteristics at $T_a = 25^\circ\text{C}$, in the test circuit

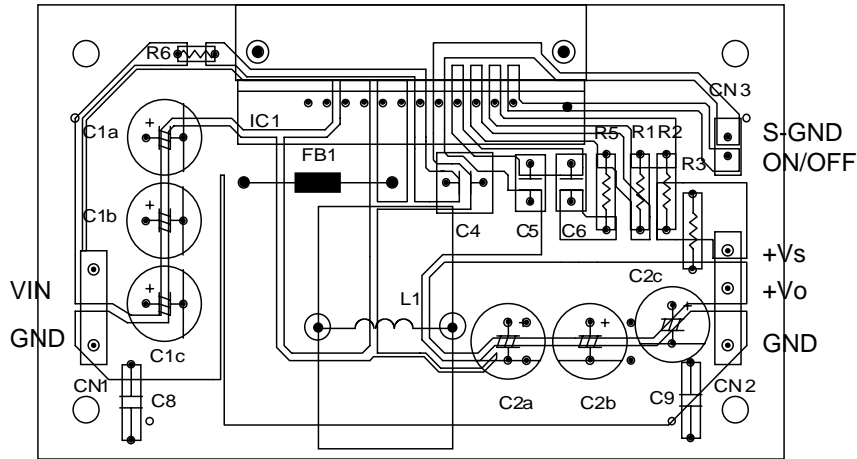




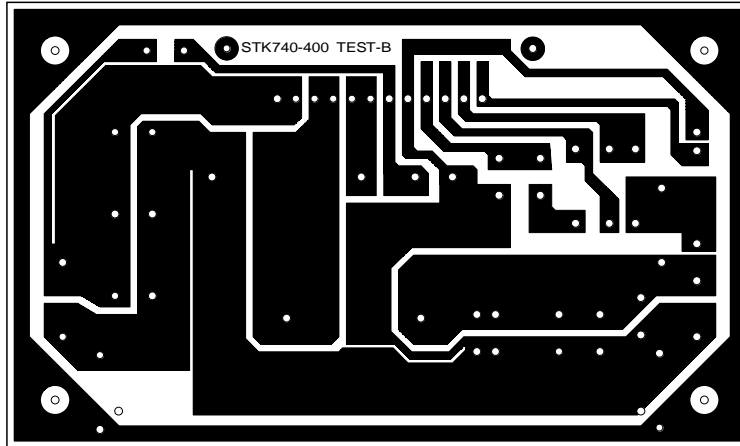


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◆ Perspective Wiring Layout (from soldered side)



◆ Circuit Pattern (soldered side)



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