

General Description

The TPS7A4001 device is a very high voltage-tolerant linear regulator that offers the benefits of a thermally-enhanced package (EMSOP8), and is able to withstand continuous DC or transient input voltages of up to 100V. The TPS7A4001 device is stable with output capacitance greater than 2.2 μ F and any input capacitance greater than 0.47 μ F (over temperature and tolerance). Therefore, implementations of this device require minimal board space because of its miniaturized packaging (EMSOP8) and a potentially small output capacitor. In addition, the TPS7A4001 device offers an enable pin (EN) compatible with standard CMOS logic to enable low-current shutdown mode.

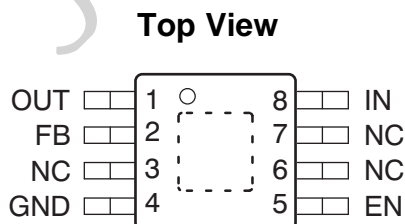
The TPS7A4001 device has an internal thermal shutdown and current limiting to protect the system during fault conditions. The EMSOP8 packages has an operating temperature range of $T_J = -40^{\circ}\text{C}$ to 125°C . In addition, the TPS7A4001 device is ideal for generating a low-voltage supply from intermediate voltage rails in telecom and industrial applications; not only can it supply a well-regulated voltage rail, but it can also withstand and maintain regulation during very high and fast voltage transients. These features translate to simpler and more cost-effective electrical surge-protection circuitry for a wide range of applications, including PoE, bias supply, and LED lighting.

Features

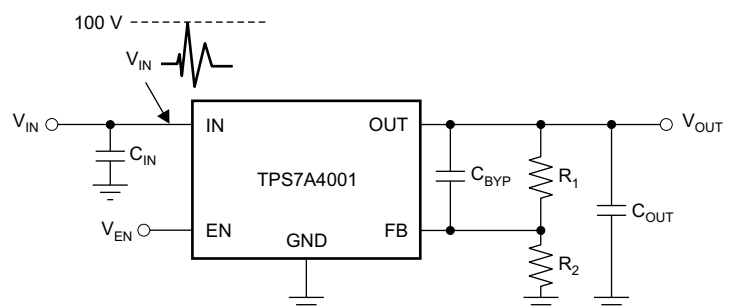
- VIN Range 7 to 100V
- Output Voltage Tolerances of $\pm 1.5\%$
- Output Current of 50 mA
- Low Quiescent Current 23 μ A
- Quiescent Current at Shutdown 8 μ A
- Dropout Voltage 2.8V at $I_{OUT} = 50$ mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit
- Adjustable Output Voltage from 1.2 to 90V

Applications

- Microprocessors, Microcontrollers Powered by Industrial Busses With High Voltage Transients
- Industrial Automation
- Telecom Infrastructure
- Automotive
- Power over Ethernet (PoE)
- LED Lighting



Typical Application Circuit

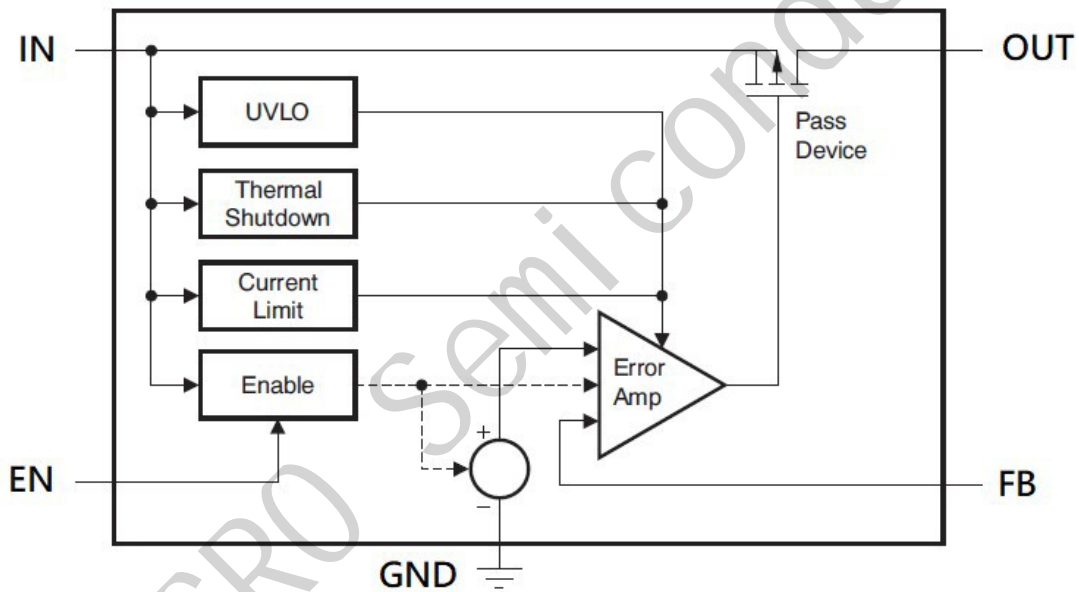


Ceramic Capacitor Stable

Pin Assignment

Pin Name	PSOP8 Pin No		Pin Function
OUT	1		Output Voltage Pin
FB	2		Feedback
NC	3,6,7		Non Connect
GND	4		Ground
EN	5		Enable
IN	8		Input Voltage pin.

Function Block Diagram



Absolute Maximum Ratings (Note1)

V_{IN}	-0.3V to 110V
V_{OUT}	-0.3V to 110V
FB	-0.3V to 5.5V
EN	-0.3V to 110V
Junction Temperature.....	125°C
Lead Temperature (Soldering, 10 sec.).....	300°C
Storage Temperature	-65°C to 150°C

Recommended Operating Conditions

Input Voltage, V_{IN}	7V to 100V
Output Voltage, V_{OUT}	1.2V to 90V
Enable Voltage, V_{EN}	0V to 100V
Output Current, I_{OUT}	0mA to 50mA
Junction Temperature	-40°C to 125°C

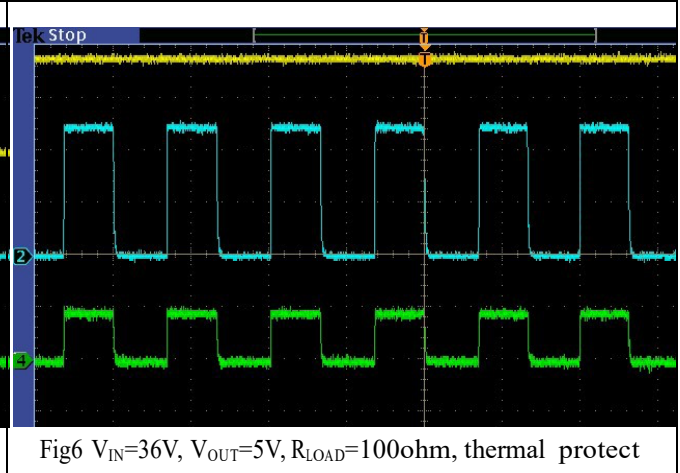
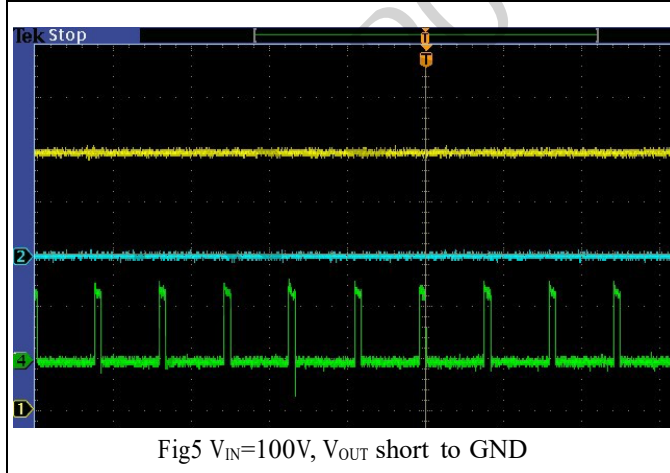
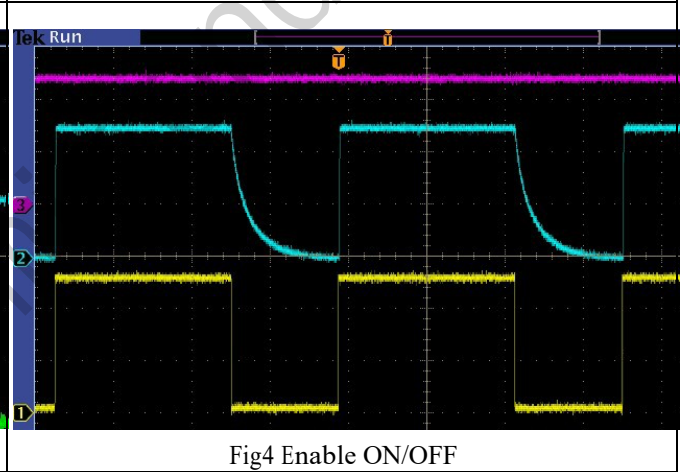
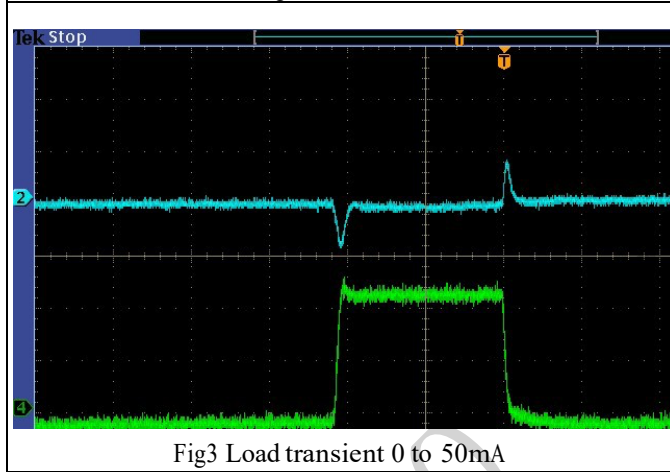
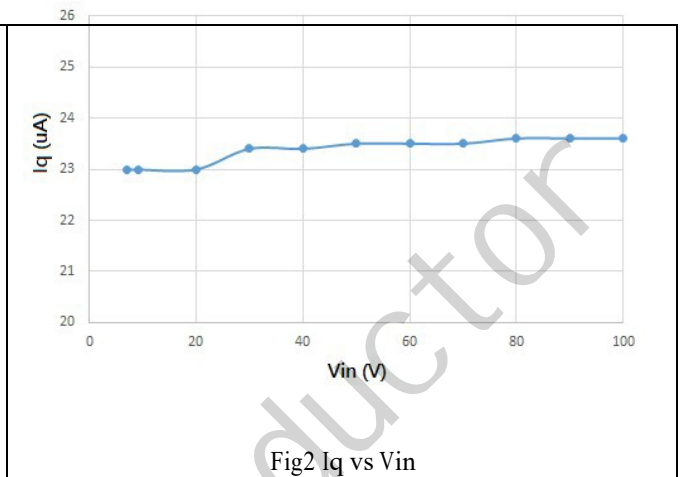
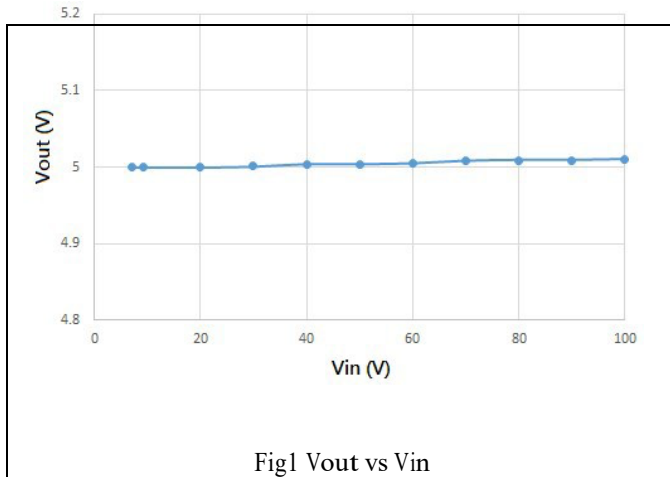
Electrical Characteristics

$V_{IN}=V_{OUT} + 3V$ or $V_{IN}=7V$ (whichever is greater), $I_{OUT}=100\mu A$, $C_{IN}=1\mu F$, $C_{OUT}=4.7\mu F$, $T_J=25^\circ C$, unless otherwise specified

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}		7		100	V
Internal Reference	V_{REF}		0.788	0.8	0.812	V
Line Regulation	ΔV_{LINE}	$V_{IN}=7V$ to 100V,		3	20	mV
Load Regulation	ΔV_{LOAD}	$100\mu A < I_{OUT} < 50mA$		20	50	mV
Dropout Voltage	V_{DROP}	$I_{OUT}=20mA$		1000		mV
		$I_{OUT}=50mA$		2800		mV
Quiescent Current	I_Q	$I_{OUT} = 0mA$		23	40	μA
Shutdown Current	I_{SD}	$V_{EN} = 0V$		8	15	μA
Current Limit	I_{CL}	$V_{OUT} = 90\% V_{OUT(NOM)}$	55	120	200	mA
Enable High Low Level	V_{ENHI}		1.0		V_{IN}	V
	V_{ENLO}		0		0.4	V
Enable Pin Current	I_{EN}	$7V < V_{IN} < 100V, V_{IN}=V_{EN}$		0.02	1	μA
Feedback Pin Current	I_{FB}			0.01	0.11	μA
Thermal Shutdown	T_{SD}	Shutdown, temperature increasing		160		$^\circ C$
		Reset, temperature decreasing		140		$^\circ C$

Typical Characteristics

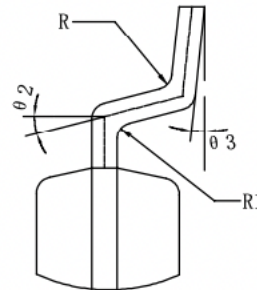
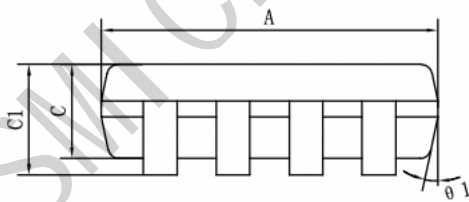
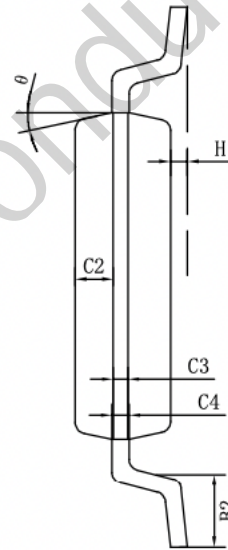
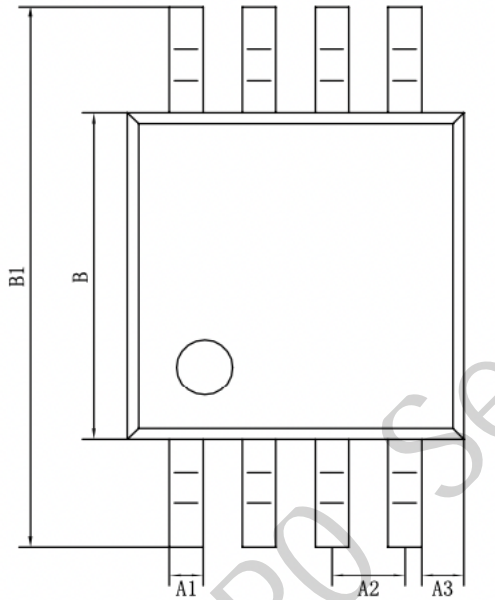
$V_{IN}=12V$, $V_{OUT}=5V$ $I_{OUT}=1mA$, $C_{IN}=0.47\mu F$, $C_{OUT}=2.2\mu F$, $T_J=25^\circ C$, unless otherwise specified



EMSOP8

标注	尺寸	最小(mm)	最大(mm)	标注	尺寸	最小(mm)	最大(mm)
A		2.90	3.10	C3		0.152	
A1		0.28	0.35	C4		0.15	0.23
A2		0.65TYP		H		0.00	0.09
A3		0.375TYP		θ		12° TYP4	
B		2.90	3.10	θ 1		12° TYP4	
B1		4.70	5.10	θ 2		14° TYP	
B2		0.45	0.75	θ 3		0° ~ 6°	
C		0.75	0.95	R		0.15TYP	
C1		--	1.10	R1		0.15TYP	
C2		0.328TYP					

* 注EMSOP8产品共用此图所有数据, Die pad exposure大小是根据引线框架设计。



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