PWM Boost DC-DC Controller

Description

The FP6791 is a CMOS step-up switching controller incorporates a reference voltage circuit, an oscillator, an error amplifier, a PWM controller, an under voltage lockout circuit (UVLO) and a timer latch short-circuit protection circuit.

The switching frequency can be controlled by the resistor connected to the ROSC pin and the maximum duty ratio can be controlled by the resistor connected to the RDuty pin.

In addition, the FP6791 provides adjustable short-circuit protection delay time with an external capacitor connected to the CSP pin. If the maximum duty condition continues because of short-circuiting, the capacitor externally connected to the CSP pin is charged, and oscillation stops after a specific time. This condition is cleared by re-application of power. This controller IC allows various settings and employs a small package, making it very easy to use.

Features

- Programmed Switching Frequency
- Programmed Maximum Duty Ratio
- Reference Voltage：1.0V ±1.5%
- UVLO (Under-Voltage Lockout) Function：
  - Detection Voltage 2.2V
  - Hysteresis Width 0.3V
- Timer Latch Short-Circuit Protection Circuit：
  Delay Time Set by an External Capacitor.
- Internal Soft-Start Function
- External Compensation Network
- Small Package：8-pin TSSOP
- RoHS Compliant

Applications

- LCD Panel
- Portable Equipments

Pin Assignment

TSSOP Package (TSSOP-8)

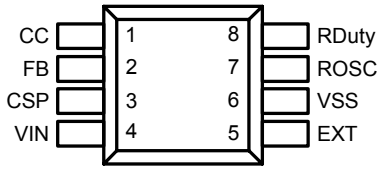


Figure 1. Pin Assignment of FP6791

Ordering Information

FP6791□□□

- TR: Tape / Reel
  Blank: Tube
- P: Pb Free with Commercial Standard (RoHS Compliant)
- Package Type
  TS: TSSOP-8

Typical Application Circuit

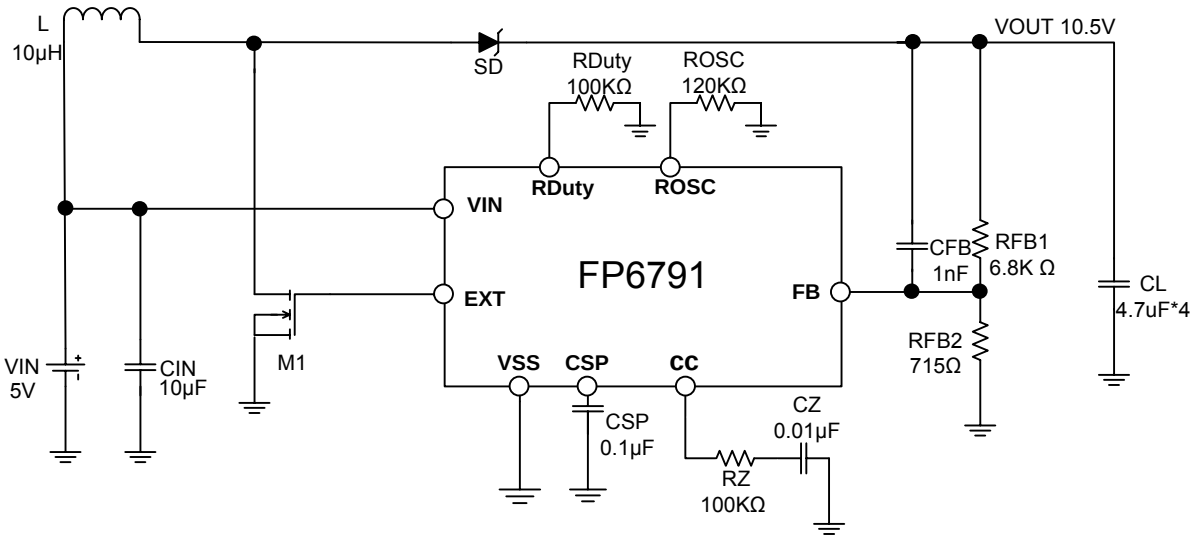


Figure 2. Typical Application Circuit of FP6791

Functional Pin Description

Pin Name	Pin Function
CC	Error amplifier circuit output and phase compensation pin
FB	Output voltage feedback pin
CSP	Short-circuit protection delay time setting pin
VIN	Power supply input pin
EXT	External transistor connection pin
VSS	GND pin
ROSC	Oscillation frequency setting resistor connection pin
RDuty	Maximum duty setting resistor connection pin

Block Diagram

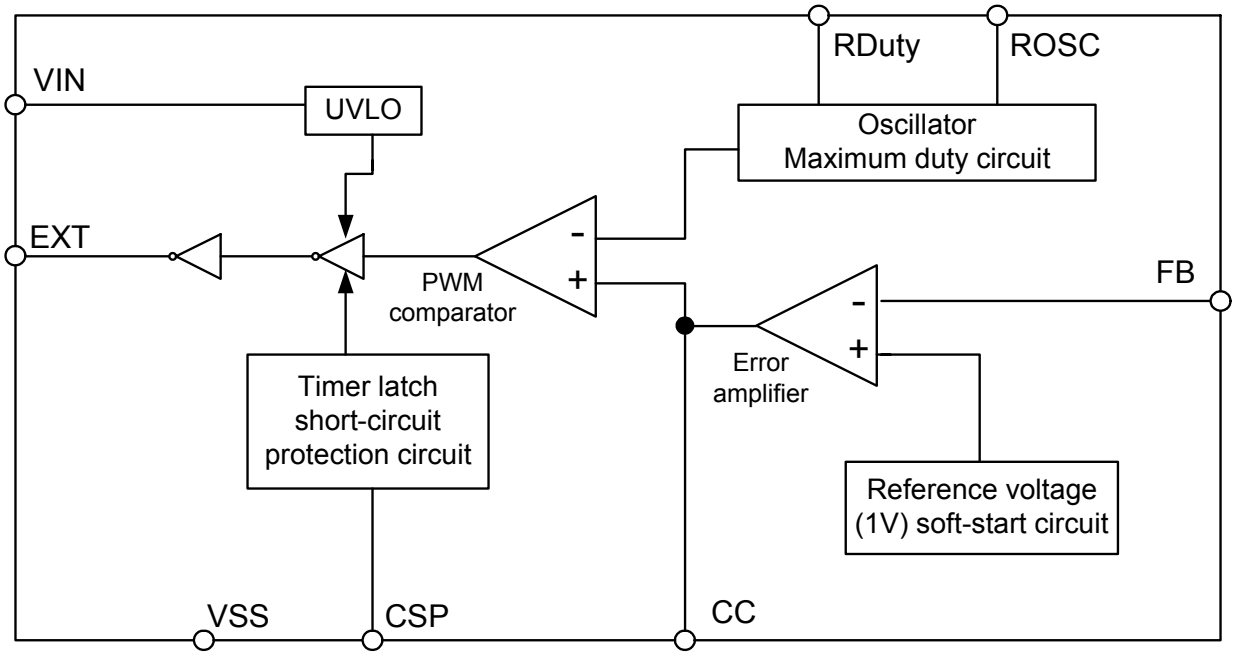


Figure 3. Block Diagram of FP6791

Absolute Maximum Ratings

- Supply Voltage (V_{IN})---------- -0.3V to + 6.5V
- FB pin voltage (V_{FB})---------- -0.3V to + 6.5V
- EXT pin voltage (V_{EXT})---------- -0.3V to + 6.5V
- CSP pin voltage (V_{CSP})---------- -0.3V to + 6.5V
- CC pin voltage (V_{CC})---------- -0.3V to + 6.5V
- CC pin current (I_{CC})---------- ±10mA
- ROSC pin voltage (V_{ROSC})---------- -0.3V to + 6.5V
- ROSC pin current (I_{ROSC})---------- ±10mA
- RDuty pin voltage (V_{RDuty})---------- -0.3V to +6.5V
- RDuty pin current (I_{RDuty})---------- ±10mA
- Storage temperature (T_{stg})---------- -40 to + 125 ℃
- Power dissipation (P_D), 8-Pin TSSOP---------- 300mW

Note：Stresses beyond those listed under “Absolute Maximum Ratings" may cause permanent damage to the device.

Recommended Operating Conditions

- Supply Voltage (V_{IN})---------- +2.6V to +6V
- Operation Temperature Range (T_{opr})---------- -40°C to +85°C

Electrical Characteristics

V_{IN}=+5V, T_A=25℃, unless otherwise specified. (Note.1)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Input Voltage	V_{IN}		2.6	5	6	V
FB Voltage	V_{FB}		0.985	1	1.015	V
Current Consumption (V_{IN}=3.3V)	I_{ss1}	Fosc = 1.1MHz；V_{FB} = 0.95V	-	700	900	uA
EXT Pin Output Current(V_{IN}=3.3V)	I_{EXT}	V_{EXT}=V_{IN} - 0.4V		100	-60	mA
	I_{EXT}	V_{EXT}= 0.4V	100	160		
FB Voltage Temperature Coefficient	$\Delta V_{FB}/\Delta T_a$	T_a = -40 ºC to +85 ºC		100		ppm/ ºC
Oscillation Frequency	F_{OSC}	Rosc=120KΩ	1.02	1.133	1.246	MHz
Oscillation Frequency Temperature Coefficient	$\Delta F_{OSC}/\Delta T_a$	T_a = -40 ºC to +85 ºC Fosc = 1.1MHz		500		ppm/ ºC
Maximum Duty Cycle	MaxDuty	RDuty=100KΩ	80.6	84.9	94	%
Soft-Start Time	t_{ss}		15	20	30	ms
UVLO Detection Voltage	V_{UVLO}		2.09	2.2	2.31	V
UVLO Hysteresis Width	$V_{UVLOHYS}$		0.18	0.3	0.42	V
Short-circuit protection delay time	T_{PRO}	CSP=0.1uF	33	50	75	ms
CC Pin Output Current	I_{CCH}	V_{FB} =2V		50		uA
	I_{CCH}	V_{FB} =0V		-50		
Timer Latch Reset Voltage	V_{RTLT}		0.7	1	1.3	V

Note 1：Specifications are production tested at T_A=25 ºC. Specifications over the -40 ºC to 85 ºC operating temperature range are guaranteed by design.

Typical Performance Curves

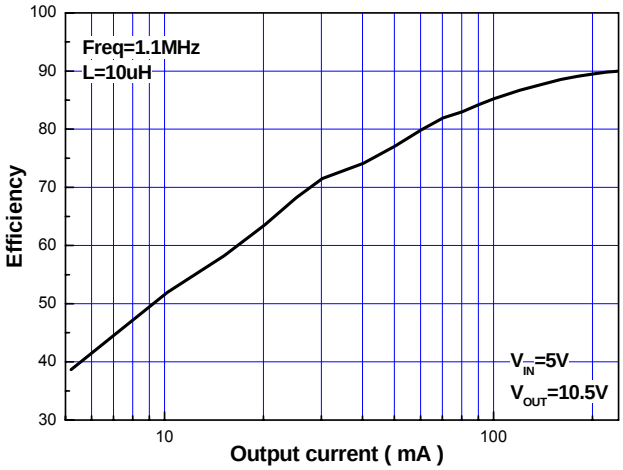


Figure 1. Efficiency vs. Output Current

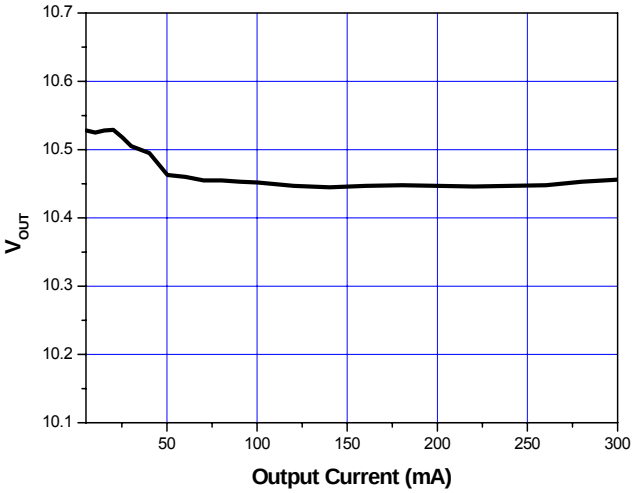


Figure 2. Output Voltage vs. Output Current

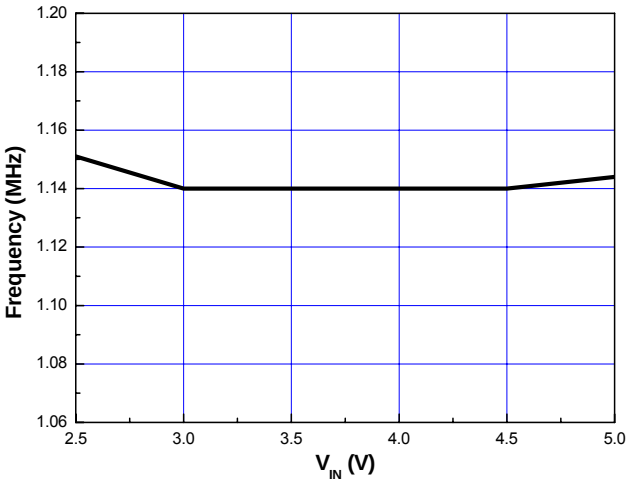


Figure 3. Frequency vs. Input Voltage

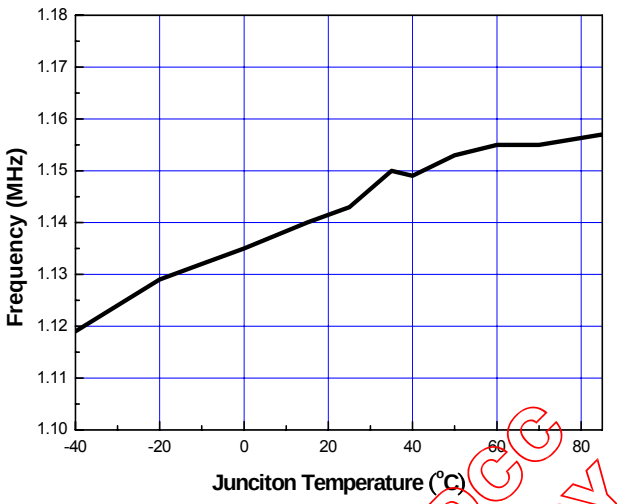


Figure 4. Frequency vs. Junction Temperature

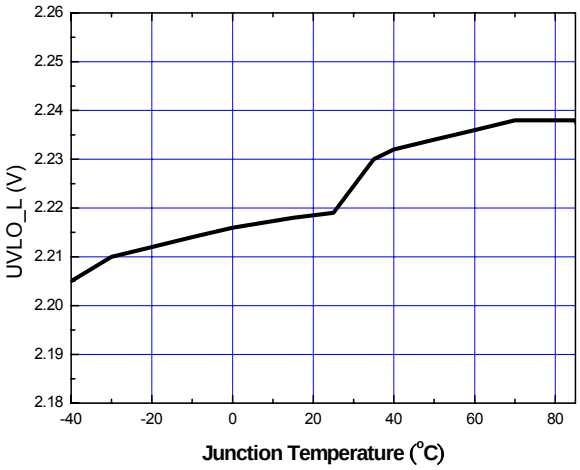


Figure 5. UVLO Low Level vs. Junction Temperature

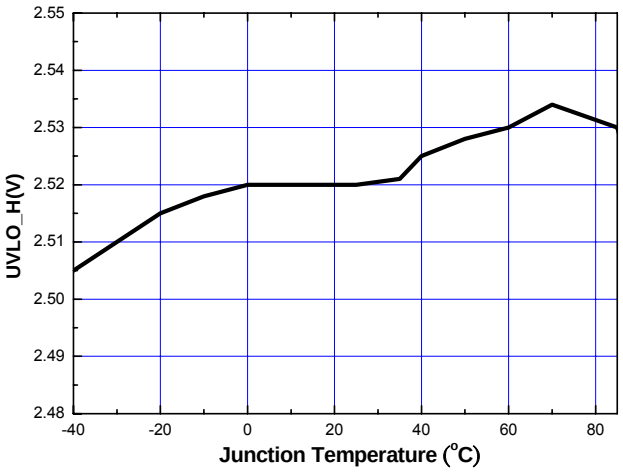


Figure 6. UVLO High Level vs. Junction Temperature

Typical Performance Curves (Continued)

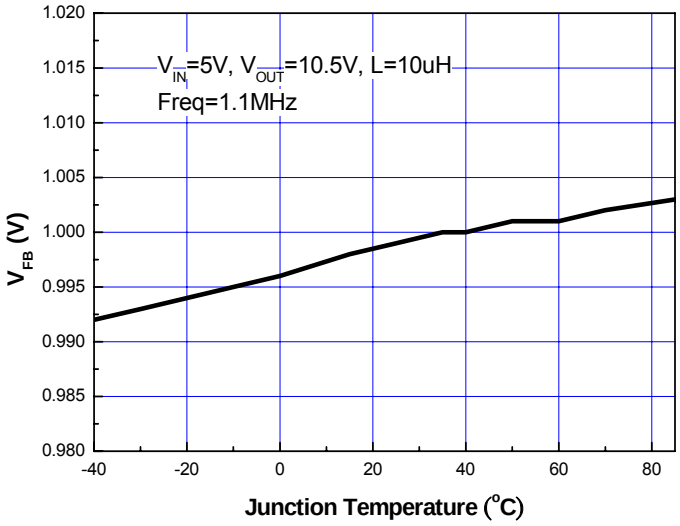
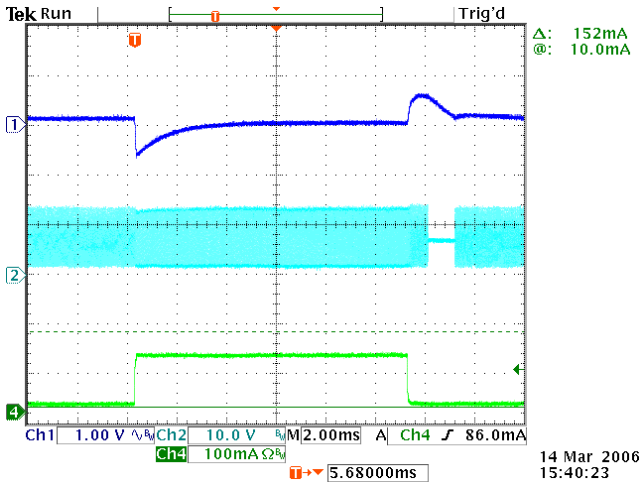
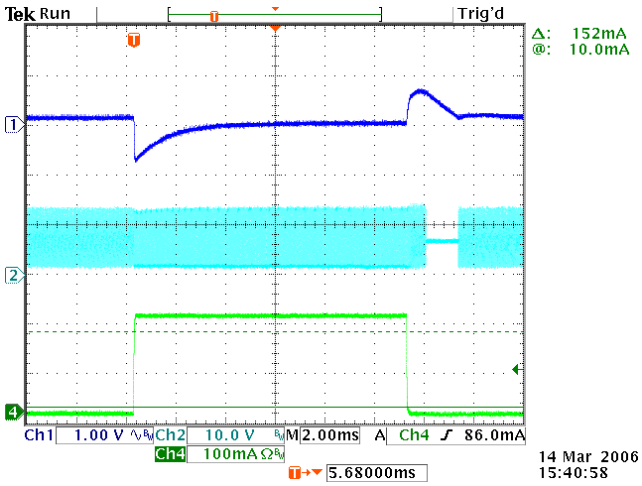


Figure 7. VFB vs. Junction Temperature



CH1: Output Voltage, AC-Coupled
CH2: Switch Point
CH4: Loading Current
V_{IN}=5V, V_{OUT}=10.5V, I_{LOAD} form 1mA to 100mA,
L=10uH, FREQ=1.1MHz, C_{OUT}=4.7uF*4+0.1uF*2

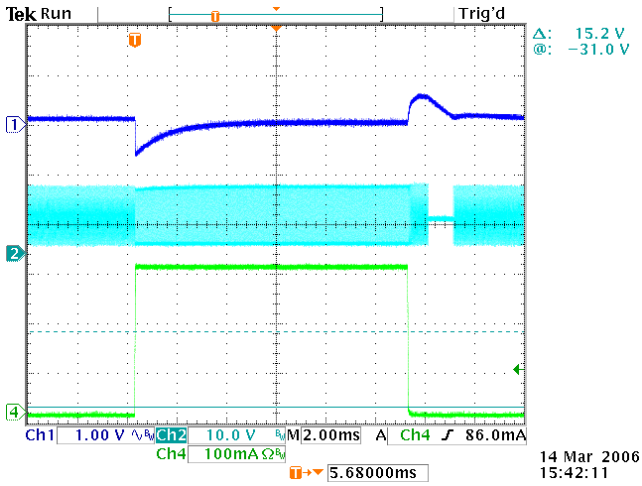
Figure 8. Load transient Response



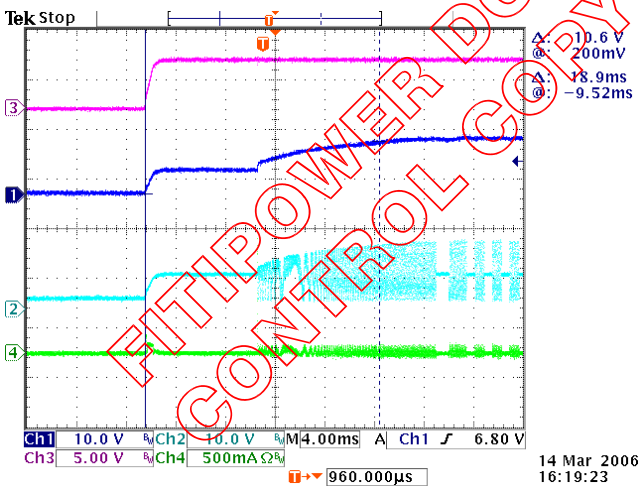
CH1: Output Voltage, AC-Coupled
CH2: Switch Point
CH4: Loading Current
V_{IN}=5V, V_{OUT}=10.5V, I_{LOAD} form 1mA to 200mA,
L=10uH, FREQ=1.1MHz, C_{OUT}=4.7uF*4+0.1uF*2

Figure 9. Load transient Response

Typical Performance Curves (Continued)



CH1: Output Voltage, AC-Coupled



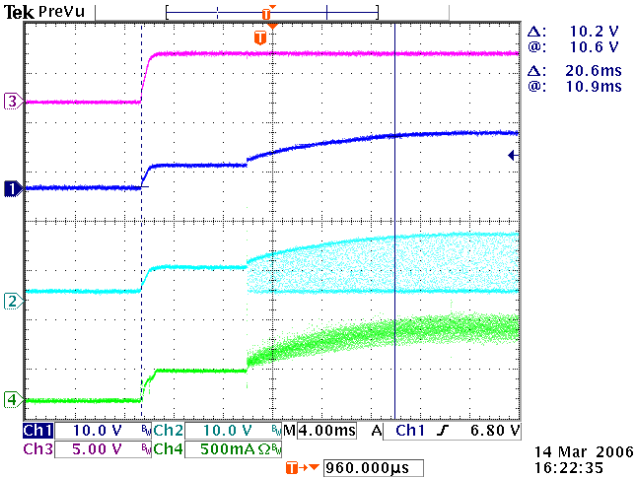
CH1: Output Voltage

CH2: Switch Point
CH4: Loading Current
V_{IN}=5V, V_{OUT}=10.5V, I_{LOAD} form 1mA to 300mA,
L=10uH, FREQ=1.1MHz, C_{OUT}=4.7uF*4+0.1uF*2

Figure 10. Load transient Response

CH2: Switch Point
CH3: VIN
CH4: Inductor Current
V_{IN}=5V, V_{OUT}=10.5V, L=10uH, I_{LOAD} =0mA,
FREQ=1.1MHz, C_{OUT}=4.7uF*4+0.1uF*2

Figure 11. Light Load Start-up Waveform

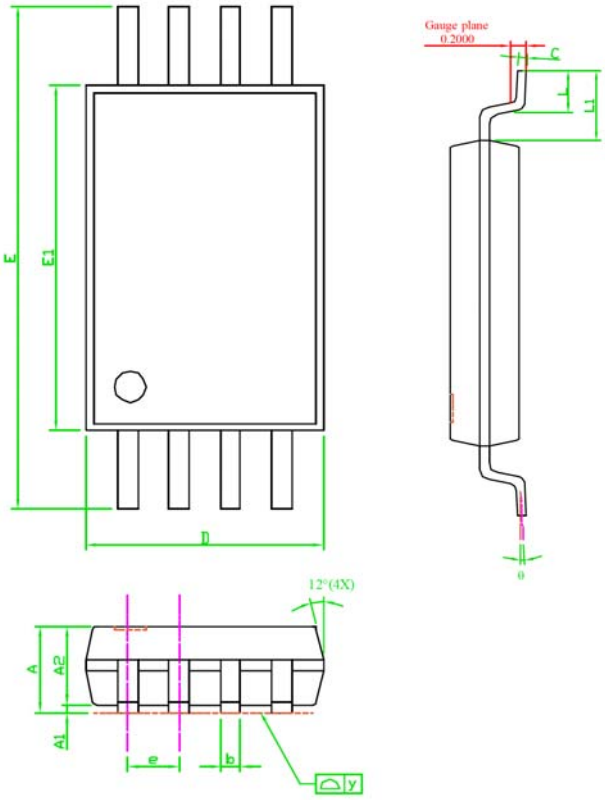


CH1: Output Voltage
CH2: Switch Point
CH3: VIN
CH4: Inductor Current
V_{IN}=5V, V_{OUT}=10.5V, L=10uH, FREQ=1.1MHz, I_{LOAD} =300mA, C_{OUT}=4.7uF*4+0.1uF*2

Figure 12. Heavy Load Start-up Waveform

Outline Information

TSSOP-8 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER		
	MIN	NOM	MAX
A	---	---	1.20
A1	0.05	---	0.15
A2	0.80	1.00	1.05
b	0.19	---	0.30
C	0.09	---	0.20
D	2.90	3.00	3.10
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	---	0.65	---
L	0.45	0.60	0.75
y	---	---	0.10
θ	0°	---	8°
L1	0.90	1.00	1.10

Note 1：Package Body Sizes Exclude Mold Flash and Protrusions or Gate Burrs.
Note 2：Tolerance ±0.1 mm Unless Otherwise Specified.
Note 3：Coplanarity：0.1mm
Note 4：Controlling Dimension Is Millimeter. Converted Inch Dimensions Are Not necessarily Exact.
Note 5：Followed from JEDEC MO-153.

Life Support Policy
Fitipower's products are not authorized for use as critical components in life support devices or other medical systems.