



3.5A, 40V, 150 kHz Synchronous Rectified Step-Down

Features

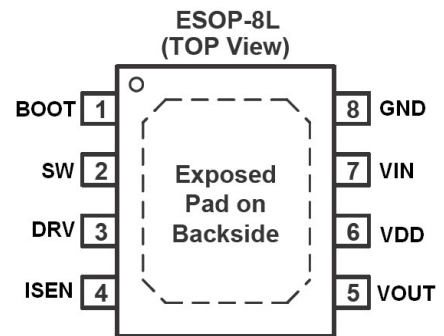
- 3.5A Output Current
- Wide 7V to 35V Operating Input Range
- Fixed 150KHZ Frequency
- Integrated Power MOSFET switches
- Up to 93% Efficiency
- Programmable Soft-Start
- Stable with Low ESR Ceramic Output Capacitors
- Cycle by Cycle Over Current Protection
- Short Circuit Protection
- Input Under Voltage Lockout
- Package: ESOP-8L

Applications

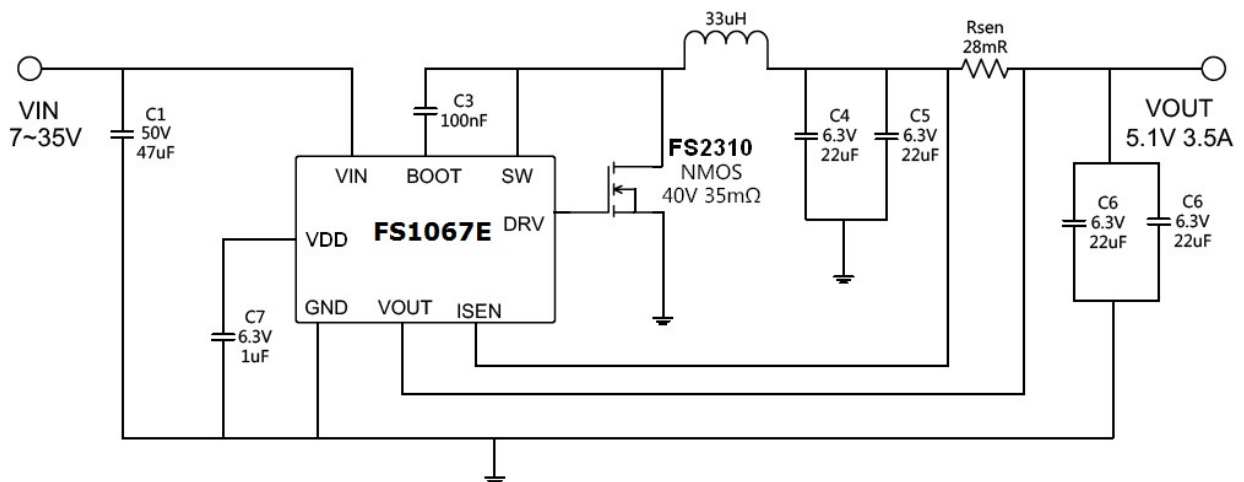
- TFT LCD Monitors
- Portable DVDs, Headphones, MP3 Players, etc.
- Car-Powered or Battery-Powered Equipment
- Set-Top Boxes
- Telecom Power Supplies
- DSL and Cable Modems and Routers

General Description

The FS1067E is a monolithic synchronous buck regulator. The device integrates 80 mΩ MOSFETS that provide 3.5A continuous load current over a wide operating input voltage of 7V to 35V. Current mode control provides fast transient response and cycle by cycle current limit. An adjustable soft-start prevents inrush current at turn on.



Typical Application





● PIN DESCRIPTIONS

PIN	NAME	DISCRIPTION
1	BOOT	Power to the internal high-side MOSFET gate driver. Connecta 22~100nF capacitor from BS pin to SW pin
2	SW	Power Switching Output to External Inductor
3	DRV	Driver of Lowside NMOS, Connect To The Gate Of NMOS
4	ISEN	Current Sense Input
5	VOUT	Output of DC/DC Converter, Connect To The Anodes OfOutput Capacitor
6	VDD	The Power Source Of Internal Control Circuits, Connect a 1uFCapacitor to GND
7	VIN	Power Supply Input. Bypass this pin with a 10μF ceramiccapacitor to GND, placed as close to the IC as possible.
8	GND	Ground
	Exposed Pad	Exposed Pad. Need to connect to GND pin.

● Absolute Maximum Ratings @T_A=25°C unless otherwise noted

Characteristics	Symbol	Rating	Unit
IN to GND		-0.3 to 40	V
LX to GND		-1 to VIN + 1	V
BS to GND		VLX - 0.3 to VLX + 7	V
FB, SENSE1, SENSE2,COMPLDGto GND		-0.3 to + 6	V
Junction to Ambient Thermal Resistance		105	°C/W
Operating Junction Temperature		-40 to 150	°C
Storage Junction Temperature		-55 to 150	°C
Lead Temperature (Soldering 10 sec.)		300	°C
Thermal Resistance from Junction to case	θJC	15	°C/W
Thermal Resistance from Junction to ambient	θJA	40	°C/W

(Note: Exceeding these limits may damage the device. Even the duration of exceeding is very short. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

Recommended Operating Conditions

Parameter	Min	Max	Unit
Input Supply Voltage	4.5	27 ⁽¹⁾	V
Operating Junction Temperature	-20	+125 ⁽²⁾	°C

(Note (1):

Operating the IC over this voltage is very easy to cause over voltage condition to VIN pin, SW pin, BS pin & EN pin)

(Note (2):

If the IC experienced OTP, then the temperature may need to drop to <125 degree C to let the IC recover.)



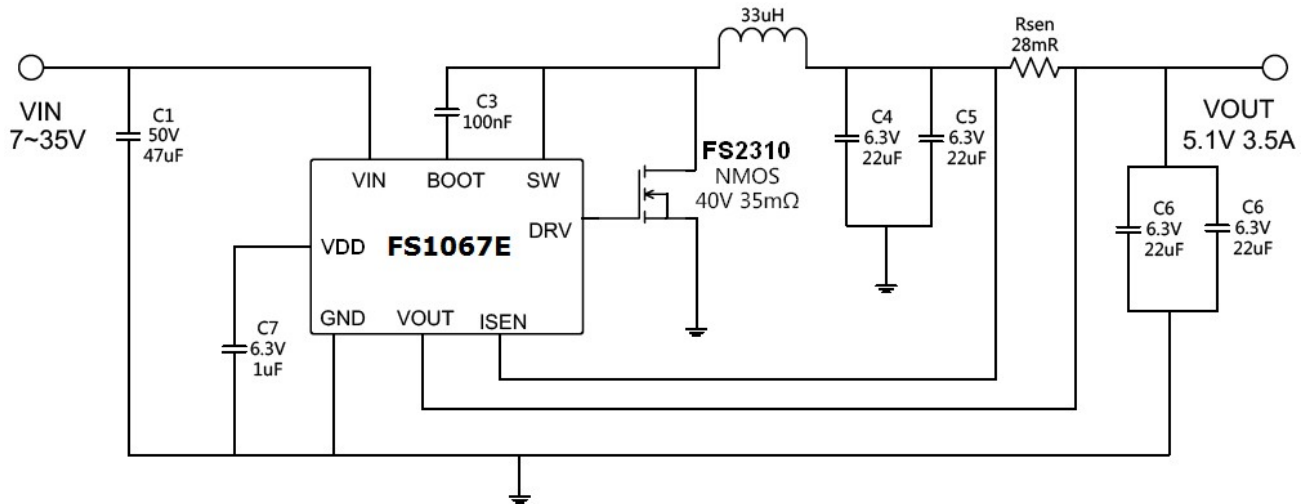
● Electrical Characteristics @ $T_A=25^{\circ}\text{C}$ unless otherwise noted

Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage	VIN		7	-	40	V
Input OVP Threshold	VOVP-VIN		33	35	36	V
UVLO Voltage	VUVLO		6	6.5	7	V
UVLO Hysteresis			0.3	0.5	0.8	V
Output OVP detect Voltage	VOVP-VSEN	Internal define	-	6	-	V
Quiescent Current	ICCQ RDSON	VFB = 1.5V, force driver off.	-	750	-	μA
Standby Current	ISB	No Load	-	1.5	2	mA
Output Voltage			5.05	5.1	5.15	V
High-Side Switch On Resistance	RDSON	VIN=12V, IOU = 1A		85	-	m Ω
Low-Side Switch On Resistance	RDSON	VIN=12V	-	10	-	Ω
Switching Frequency		IOU=200mA	135	150	165	KHz
Maximum Duty Cycle			85	90	-	%
Minimum On-Time			-	120	-	ns
Cable Voltage Compensation	VCab-FS1067EA	$V_{ISEN}-V_{VSEN} = 100\text{mV}$		0		mV
	VCab-FS1067EA1			100		mV
	VCab-FS1067EA3			300		mV
	VCab-FS1067EA5			500		mV
Secondary Cycle-by-Cycle Current Limit		Minimum Duty Cycle, no CC	-	5.5	-	A
Sense Voltage	VSENSE	VISEN-VVSEN	97	100	103	mV
VOUT-Short	VOUT-Short		1.9	2	2.1	V
VDD Regulated Voltage	VVDD		5.0	5.2	5.5	V
DRV MAX Current	IMAXSINK	VDD=5.2V	-	-	1.2	A
IMAXPULL	VDD=5.2V	-	-	700		mA
MAX Cg of Low Side MOS	CgMAX		-	-	2	nF
Thermal shutdown Temp	TSD		-	140	-	$^{\circ}\text{C}$
Thermal Shutdown Hysteresis	TSH		-	30	-	$^{\circ}\text{C}$

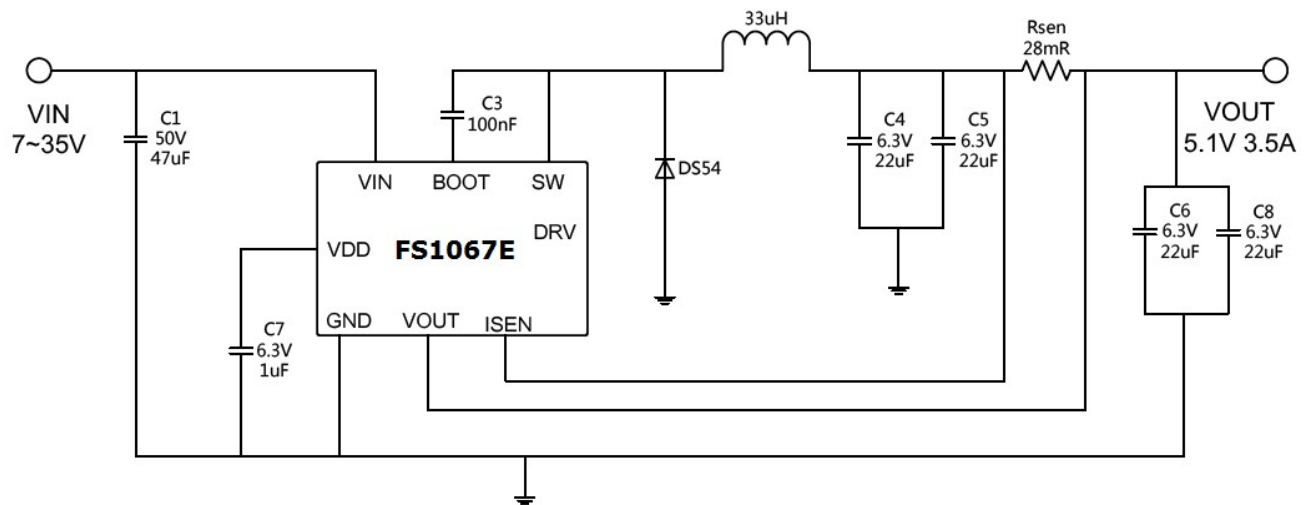
Note: * Guaranteed by design, not tested



Application Description



FS1067E application circuit, 5V/3.5A synchronous output.



FS1067E application circuit, 5.1V/3.5A asynchronous output

The ceramic capacitors are recommended in all application here. C1,C4,C5,C6,C8 also can be combinations of 2.2μF ceramic capacitor and a 100μF electrolytic capacitor.

If FS1067E operating in asynchronous condition,DRV can be connectionless.



● Typical Performance Characteristics (for VOUT=5V)

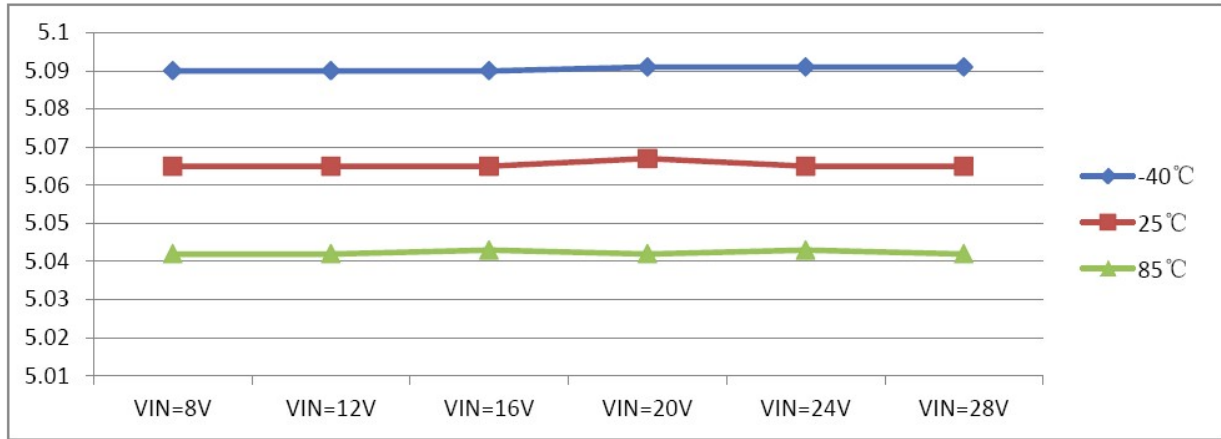


Figure1:output Voltage vs Input Voltage

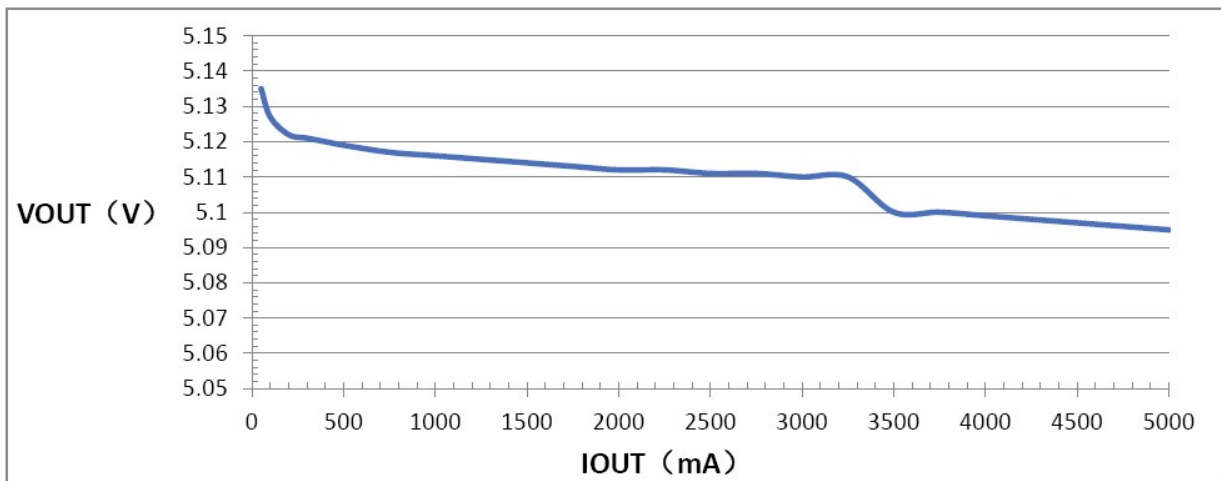


Figure2:Output Voltage vs Output Current

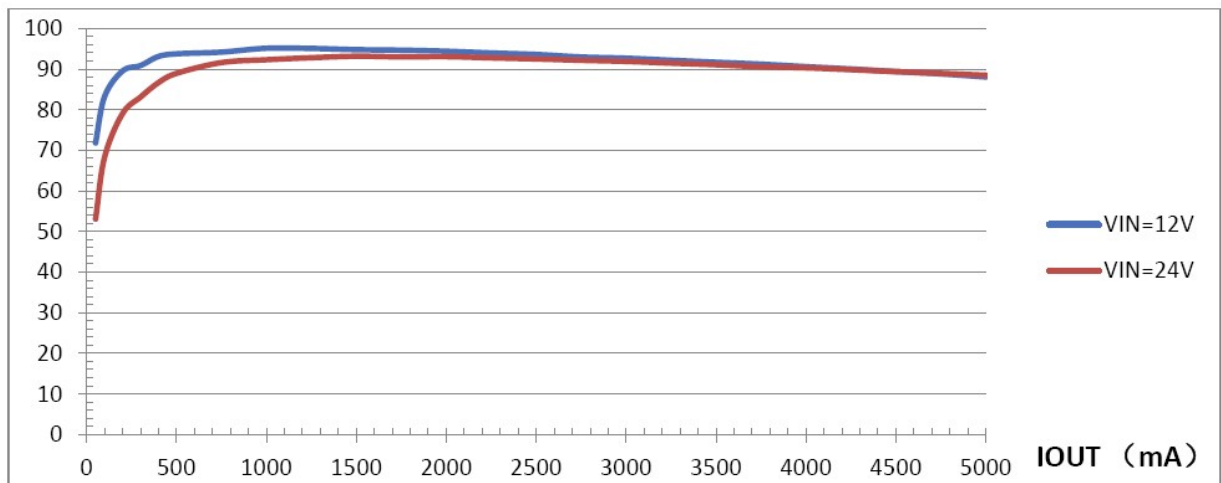


Figure3:Efficiency vs Output Current (VOUT=5.1V)

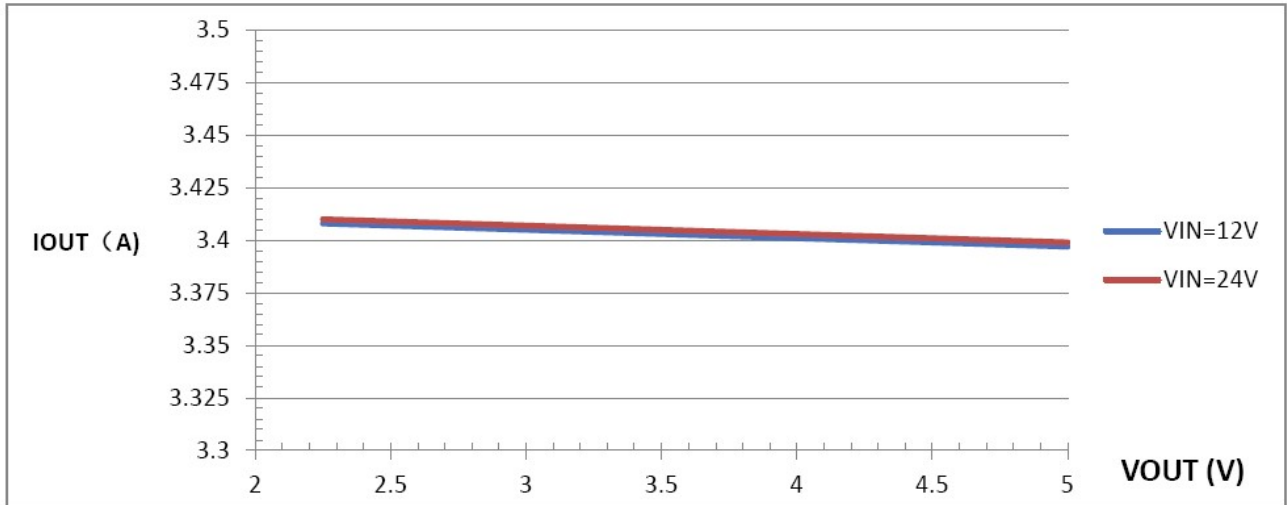


Figure4: Constant Current vs Output Voltage (VIN=12V/24V Rsen=33mΩ)

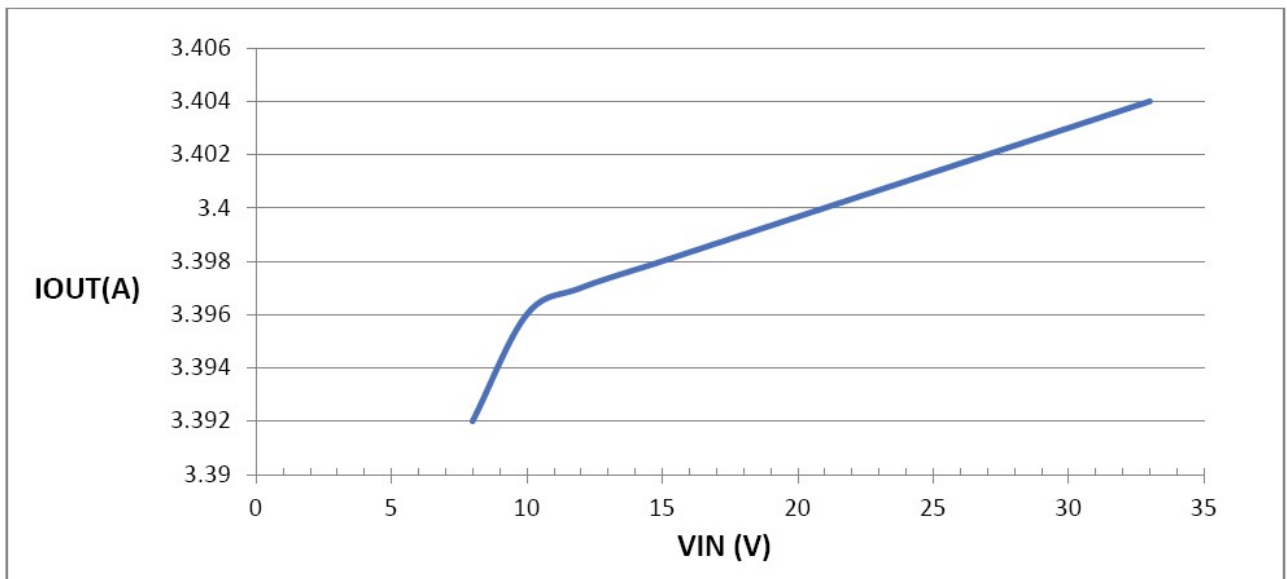
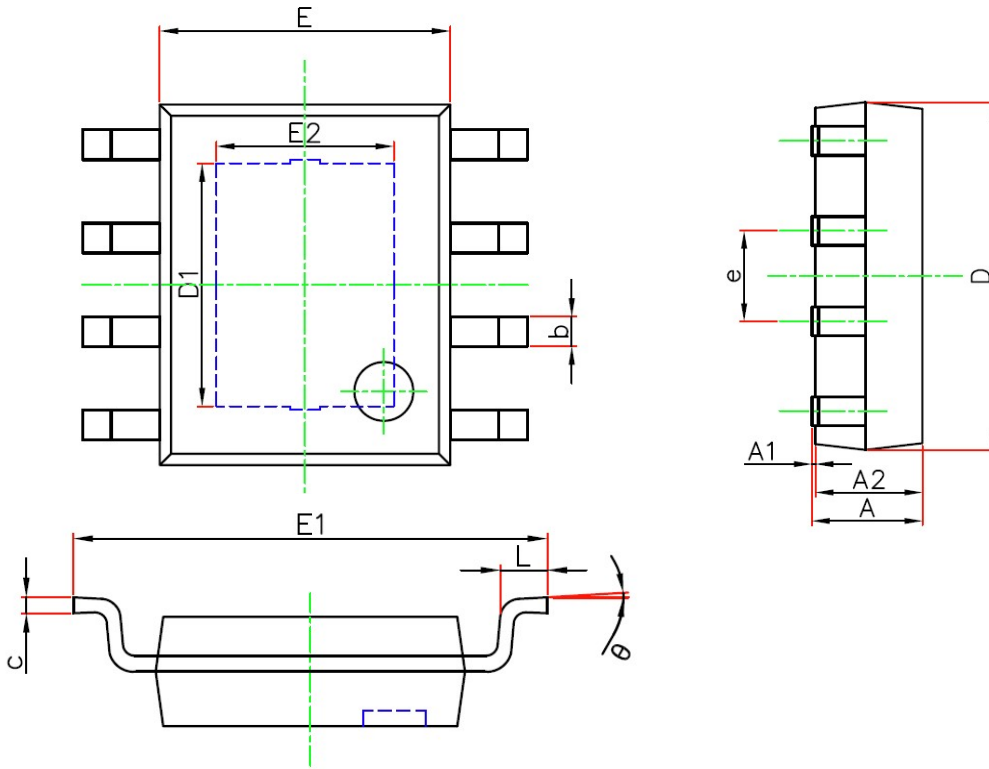


Figure5: Constant Current vs Input Voltage (Vout=4V Rsen=33mΩ)



● PACKAGE E-SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.300	1.700	0.051	0.067
A1	0.000	0.100	0.000	0.004
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°