



## 60V 52KHZ Buck Converter

### ● Features

- $V_{IN}$  Max = 60V ,Cycle-by-cycle current limit
- $V_{FB}$  = 200mV,  $I_q$  < 3mA ,Thermal protection
- $I_{LED}$  up to 2.1A with PSOP-8L
- $I_{LED}$  up to 2.8A with TO-252-5L
- $I_{LED}$  up to 3.3A with TO263-5L

### ● Applications

- DC/DC LED driver applications
- Backlighting for flat panel displays
- General purpose constant current source
- 52KHZ,no noise to Automotive-CAR audio Chargers
- On/Off input may be used for the AnalogDimming , low=ON

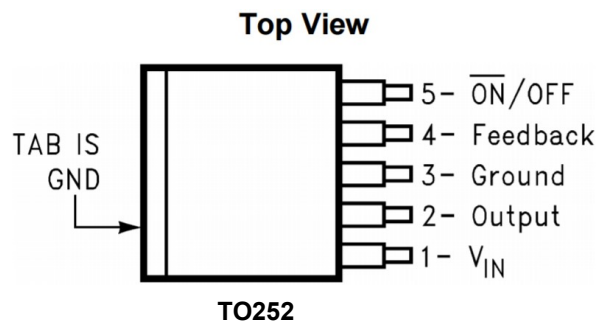
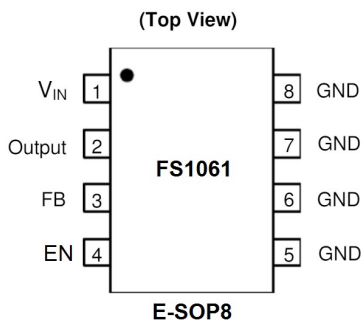
### ● General Description

FS1061 is the monolithic IC designed for step-down LED driver capable of driving 1.8A-3.3A load without additional transistor. The input voltage range is up to 60V. Its feedback voltage,  $V_{FB}$ , is 200mV. The chip operates at a switching frequency of 52kHz. The external shutdown function is controlled by a logic level on the ON/OFF pin and then the circuit comes into the standby mode with  $I_{STBY} \sim 50\mu A$  (typ.). 52KHZ will not affect the car radio.

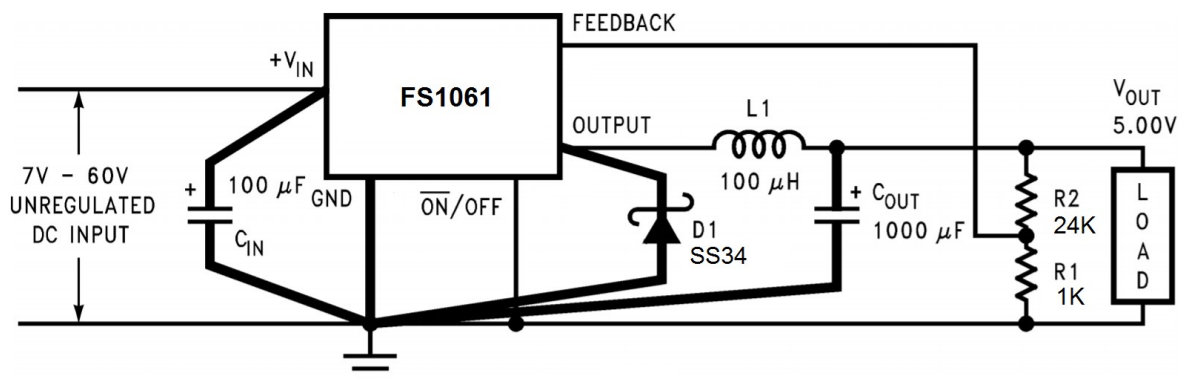
The ON/OFF pin may be used for the analog dimming. As the voltage on the ON/OFF pin is increased from 0.07V to 0.67V, the voltage on the FB pin falls from 200mV to 0. The self-protection features include a cycle-by-cycle current limit and a thermal protection. can output CC-constant current, and can output CV-constant voltage.

FS1061 is available in standard TO-263,TO252 and PSOP-8 with power pad package.

### ● Pin Configurations



### ● Typical Application



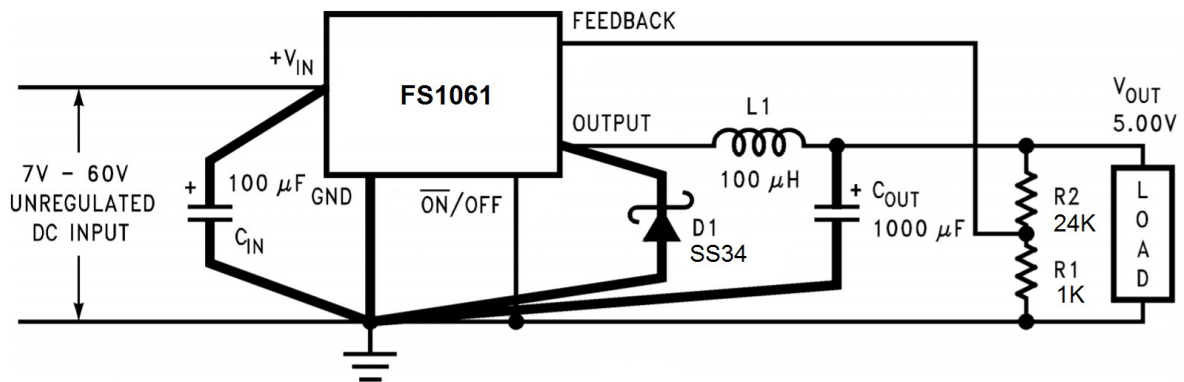


● Pin Configuration

ON/OFF (DIM)	0V – 0.07V	0.07V--0.67V	>2V
ESOP8	ON, Enable	DIMMING , PWM can control this pin to let FB voltage from 200mV down to 0V. Use 1K-2K PWM to dim	OFF Disable
TO252			

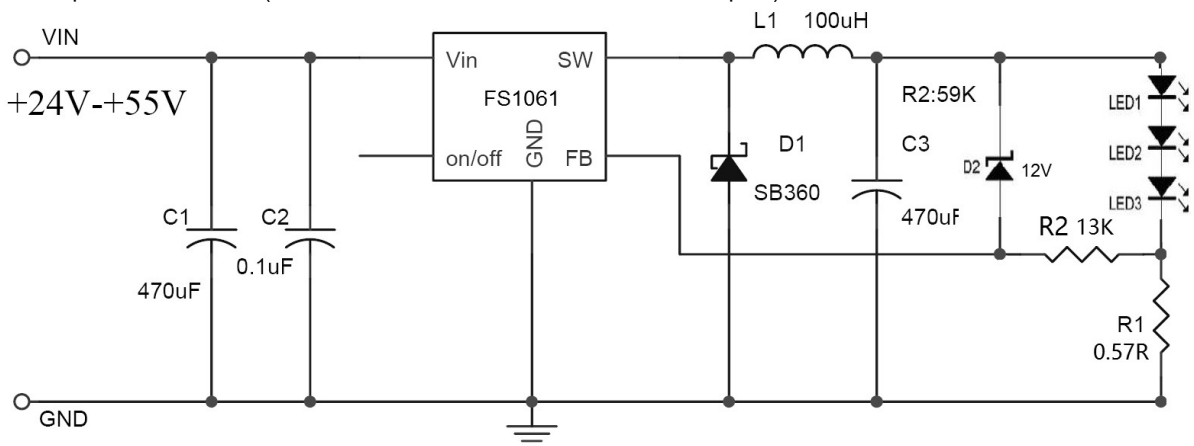
Pin (ESOP-8L)	Pin (TO252-5)	Symbol	Description
1	1	VIN	Supply Voltage Input
2	2	SW	Switch
3	4	FB	Feedback
4	5	DIM	ON/Off and Linear Dimming
5~8	3	GND	Ground with Heat Sink

● Typical Application



If the input voltage is high, the input capacitor C1, the larger the better, 100-2200uF.

The V-dropout is around 2V. (min. difference between Vin and Vout = V-dropout)



LED driver circuit (CC-constant current)

Application Note:

A) Input Capacitor (CIN)

A 100 uF aluminum electrolytic capacitor located near the input and ground pins provides sufficient bypassing

B). Catch Diode selection(D1)



For this example, a 3A current rating is adequate. Use a 20V IN5823 or SS34 Schottky diode for input voltage less than 20V, otherwise high rated voltage needed

**C). Output Capacitor Selection(C<sub>OUT</sub>)**

C<sub>OUT</sub>=680uF to 2000uF standard aluminum electrolytic.

**D). Inductor Selection (L1)**

Inductor value required 100uH,

**E). Adjustable Output Voltage Versions**

Programming Output Voltage (Selecting R1 and R2,as shown in CV-constant)

$$V_{OUT} = V_{REF} \left(1 + \frac{R_2}{R_1}\right) \text{ Where } V_{REF}=0.2V$$

R1 can be between 1k and 5k.(For best temperature coefficient and stability with time, use 1% metal film resistors)

$$R_2 = R_1 \left(\frac{V_{OUT}}{V_{REF}} - 1\right)$$

● **Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
DC Supply Voltage	V <sub>IN</sub>	63	V
ON/OFF and Dimming Voltage	DIM	-0.3~V <sub>IN</sub>	V
SW Voltage	SW	-0.8	V
FB Voltage	FB	-0.3~V <sub>IN</sub>	V
Operating Temperature	T <sub>OPR</sub>	-40~125	°C
Maximum Junction Temperature	T <sub>J(Max)</sub>	150	°C
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub> (TO263-5)	30	°C/W
	R <sub>θJA</sub> (PSOP-8L)	50	°C/W
Storage Temperature	T <sub>S</sub>	-65~150	°C

● **Electrical Characteristics**

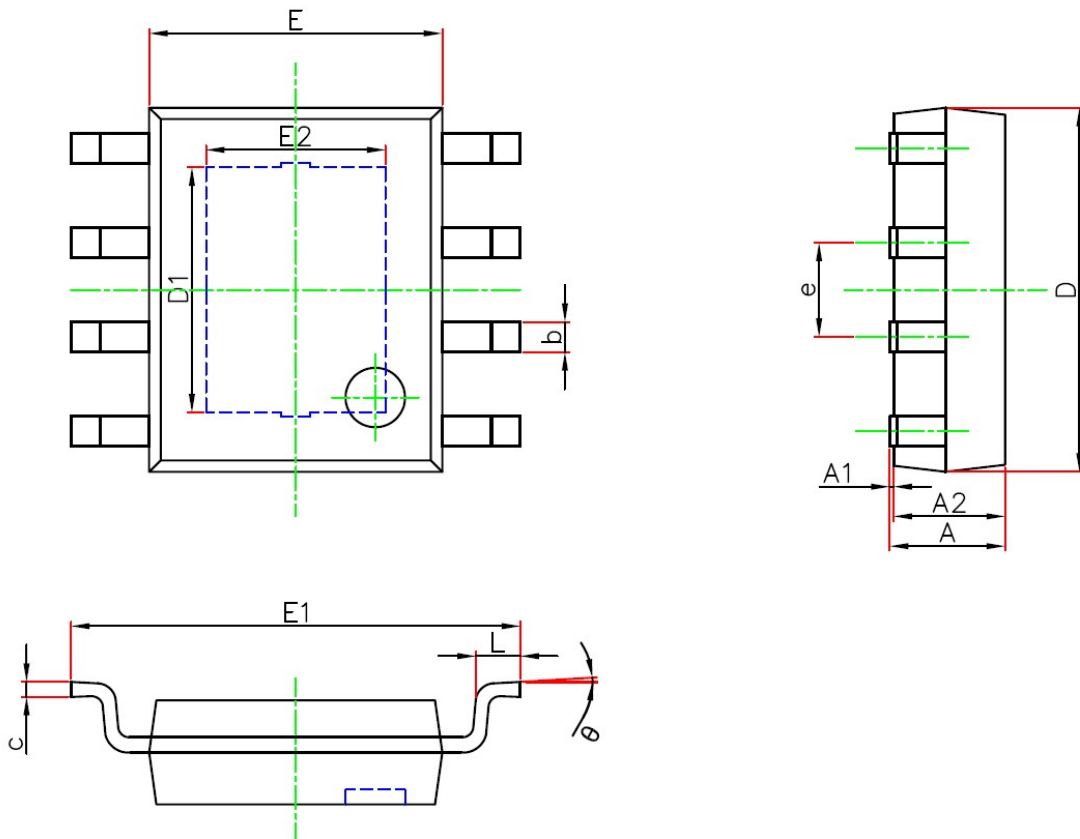
T<sub>J</sub> = 25°C, V<sub>IN</sub> = 12V for the Adjustable version, V<sub>IN</sub> = 25V for the 12V version. I<sub>LOAD</sub> = 500 mA,

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>IN</sub>	Operating Voltage		5.5		60	V
V <sub>FB</sub>	Feedback Voltage	V <sub>IN</sub> = 12V, I <sub>LOAD</sub> = 350mA, DIM = 0V	190	200	210	mV
		V <sub>IN</sub> = 5.5V~60V, I <sub>LOAD</sub> = 350mA, V <sub>DIM</sub> = 0V	180		220	mV
I <sub>FB</sub>	Feedback Current	V <sub>FB</sub> = 250mV, DIM= 0V	-150	-50	150	nA
F <sub>OSC</sub>	Oscillator Frequency		47	52	58	KHz
V <sub>SAT</sub>	Saturation Current	I <sub>SW</sub> =1.5A PSOP-8L		1.35	1.5	V
		I <sub>SW</sub> =3.0A TO-263-5L		1.35	1.5	V
D <sub>MAX</sub>	Max Duty				100	%
I <sub>LO</sub>	SW Leakage Current	V <sub>IN</sub> =60V, V <sub>FB</sub> = 1.5V, V <sub>SW</sub> = 0V	-0.3	-0.07		mA
C <sub>L</sub>	Current Limit	PSOP-8L	2.5		4.5	A
		TO-263-5L	4.5		6.5	A
V <sub>TH</sub>	DIM Threshold Voltage		1.0	1.4	2.0	V
I <sub>IH</sub>	Input Current On/Off	V <sub>On/Off</sub> = 2.5V	-1.0	0.01	1.0	uA
I <sub>IL</sub>	Input Current On/Off	V <sub>On/Off</sub> = 0 V	-1.0	-0.3	1.0	uA
I <sub>Q</sub>	Quiescent Current	V <sub>FB</sub> = 0.2mV			3	mA
I <sub>STBY</sub>	Standby Current	V <sub>IN</sub> =60V, V <sub>DIM</sub> = 5V		50	200	uA
V <sub>DIM</sub>	Dimming Voltage	V <sub>IN</sub> = 12V, I <sub>LOAD</sub> = 0	600	670	750	mV



● Package Information

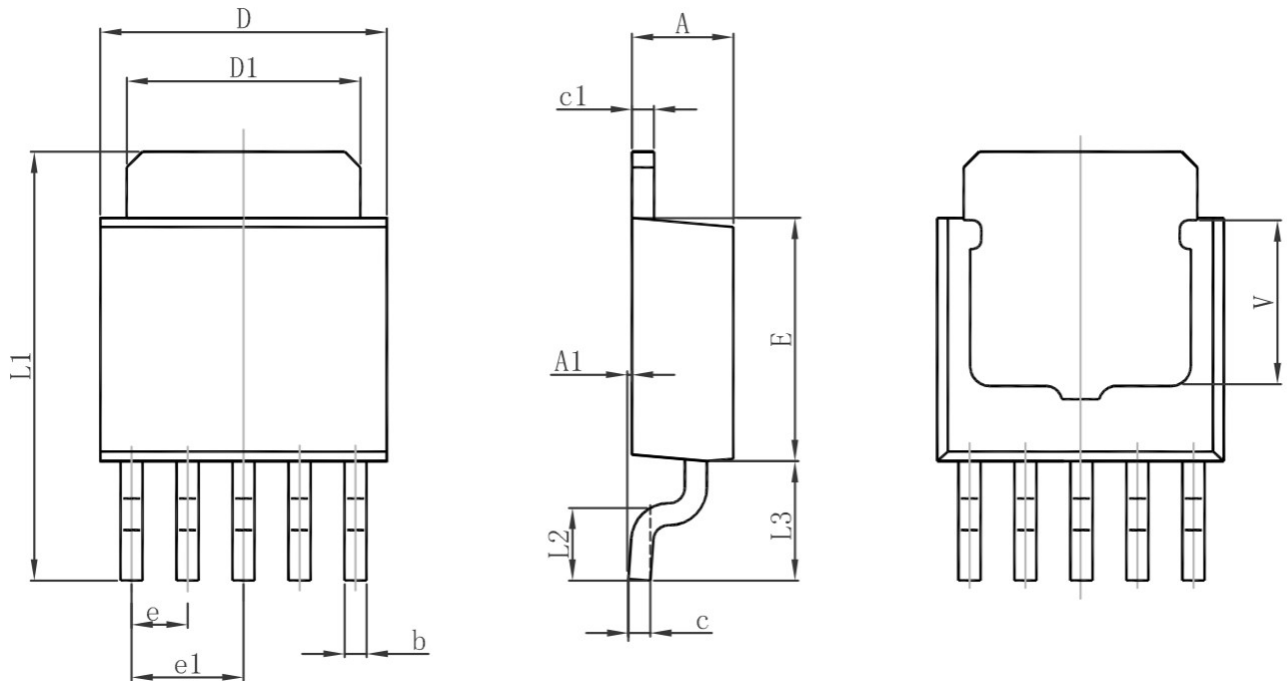
E-SOP8



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
θ	0°	8°	0°	8°



**TO252-5L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.400	0.600	0.016	0.024
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	1.270 TYP		0.050 TYP	
e1	2.540 TYP		1.000 TYP	
L1	9.500	9.900	0.374	0.390
L2	1.400	1.780	0.055	0.070
L3	2.550	2.900	0.100	0.114
V	3.45 REF		0.136 REF	