

## 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

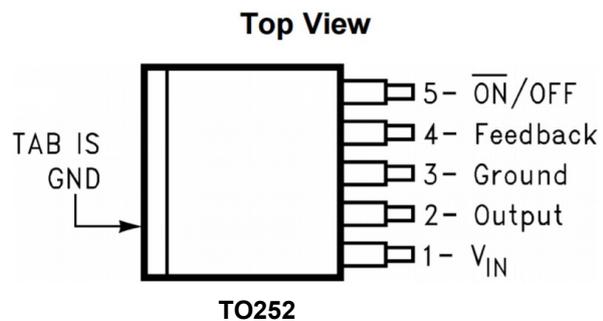
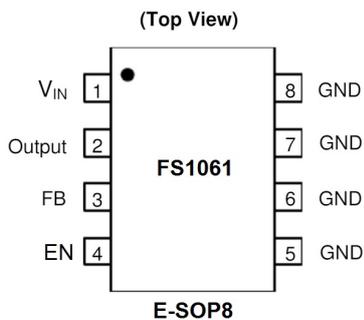
### ● General Description

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.

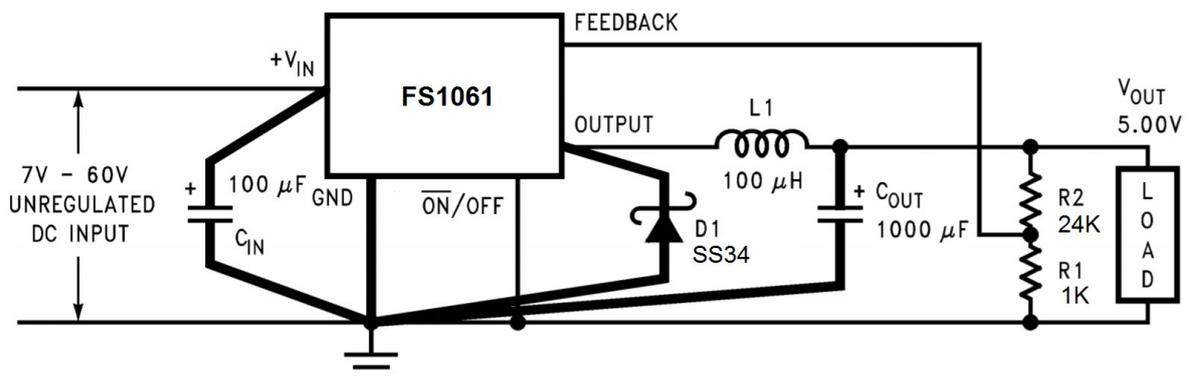
The ON/OFF pin may be used for the analog dimming. As the voltage on the ON/OFF pin is increased from 0.07V to 0.67V, the voltage on the FB pin falls from 200mV to 0. The self-protection features include a cycle-by-cycle current limit and a thermal protection. can output CC-constant current, and can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

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

### ● Pin Configurations



### ● Typical Application



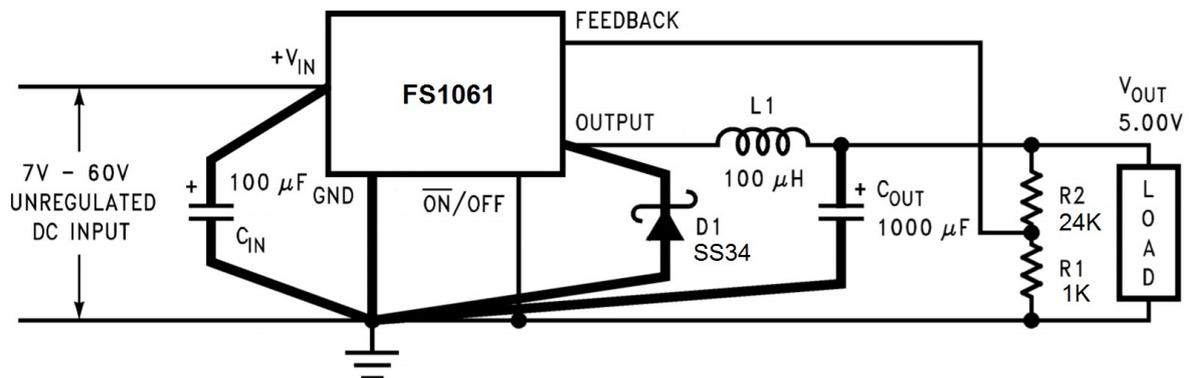
# FS1061

## ● 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			

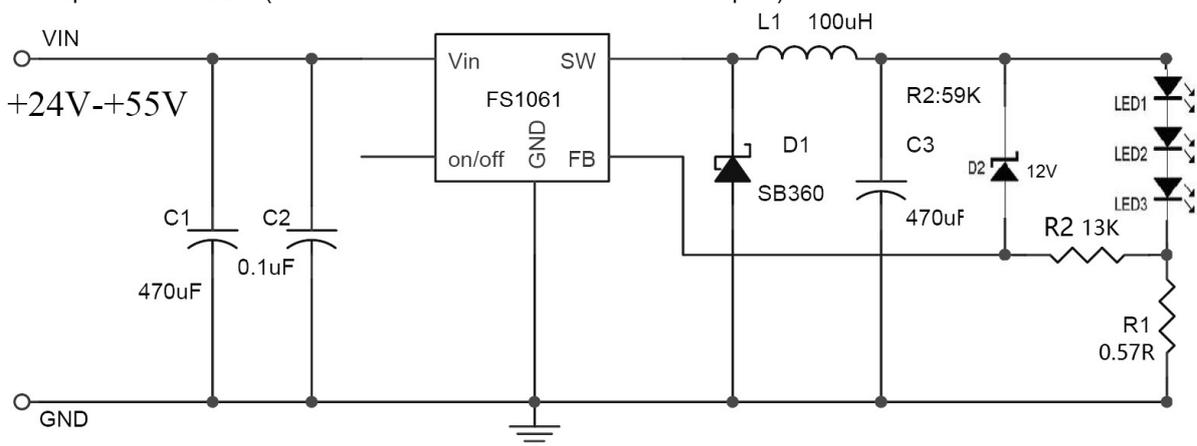
Pin (ESOP-8L)	Pin (TO252-5)	Symbol	Description
1	1	VIN	Supply Voltage Input
2	2	SW	Switch
3	4	FB	Feedback
4	5	DIM	ON/Off and Linear Dimming
5~8	3	GND	Ground with Heat Sink

## ● 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 (C<sub>IN</sub>)

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

#### B). Catch Diode selection(D1)

# FS1061

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( $C_{OUT}$ )

$C_{OUT}$ =680uF to 2000uF standard aluminum electrolytic.

### D). Inductor Selection ( $L1$ )

Inductor value required 100uH,

### E). Adjustable Output Voltage Versions

Programming Output Voltage (Selecting  $R_1$  and  $R_2$ , as shown in CV-constant)

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

$R_1$  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	$V_{IN}$	63	V
ON/OFF and Dimming Voltage	DIM	-0.3~ $V_{IN}$	V
SW Voltage	SW	-0.8	V
FB Voltage	FB	-0.3~ $V_{IN}$	V
Operating Temperature	$T_{OPR}$	-40~125	°C
Maximum Junction Temperature	$T_{J(Max)}$	150	°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$ (TO263-5)	30	°C/W
	$R_{\theta JA}$ (PSOP-8L)	50	°C/W
Storage Temperature	$T_s$	-65~150	°C

## ● Electrical Characteristics

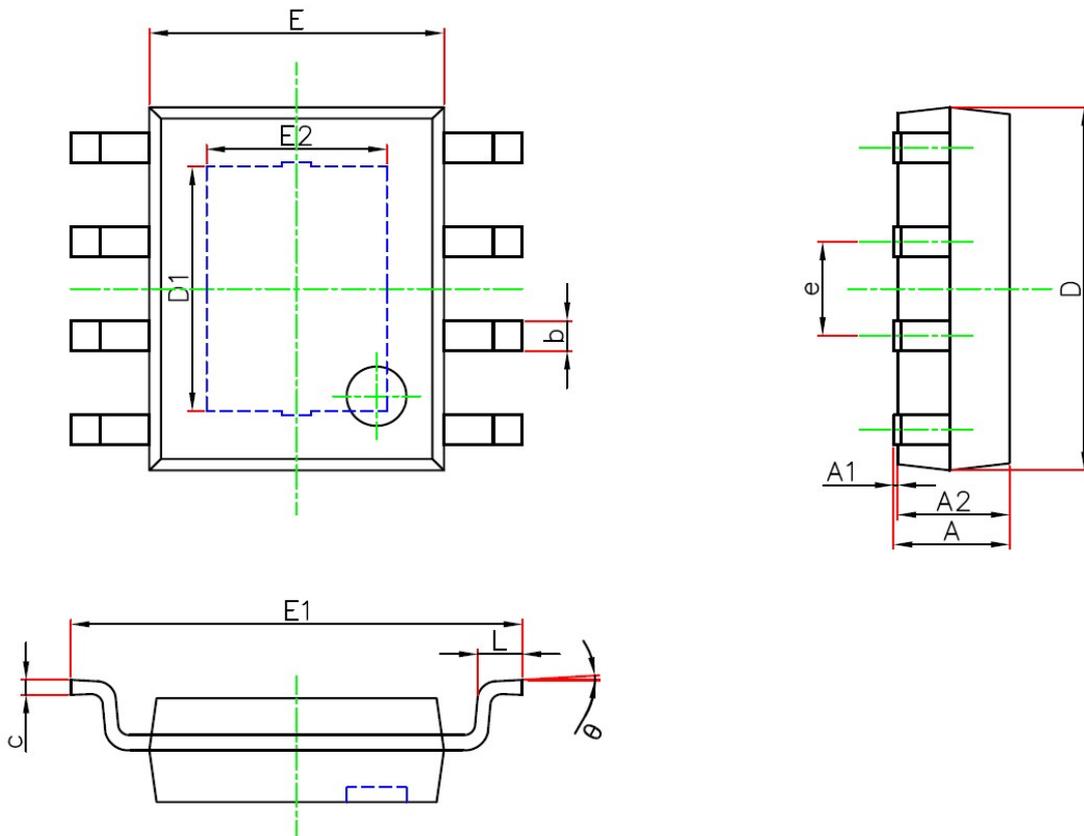
$T_J = 25^\circ\text{C}$ ,  $V_{IN} = 12V$  for the Adjustable version,  $V_{IN} = 25V$  for the 12V version.  $I_{LOAD} = 500\text{ mA}$ ,

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

# FS1061

- Package Information

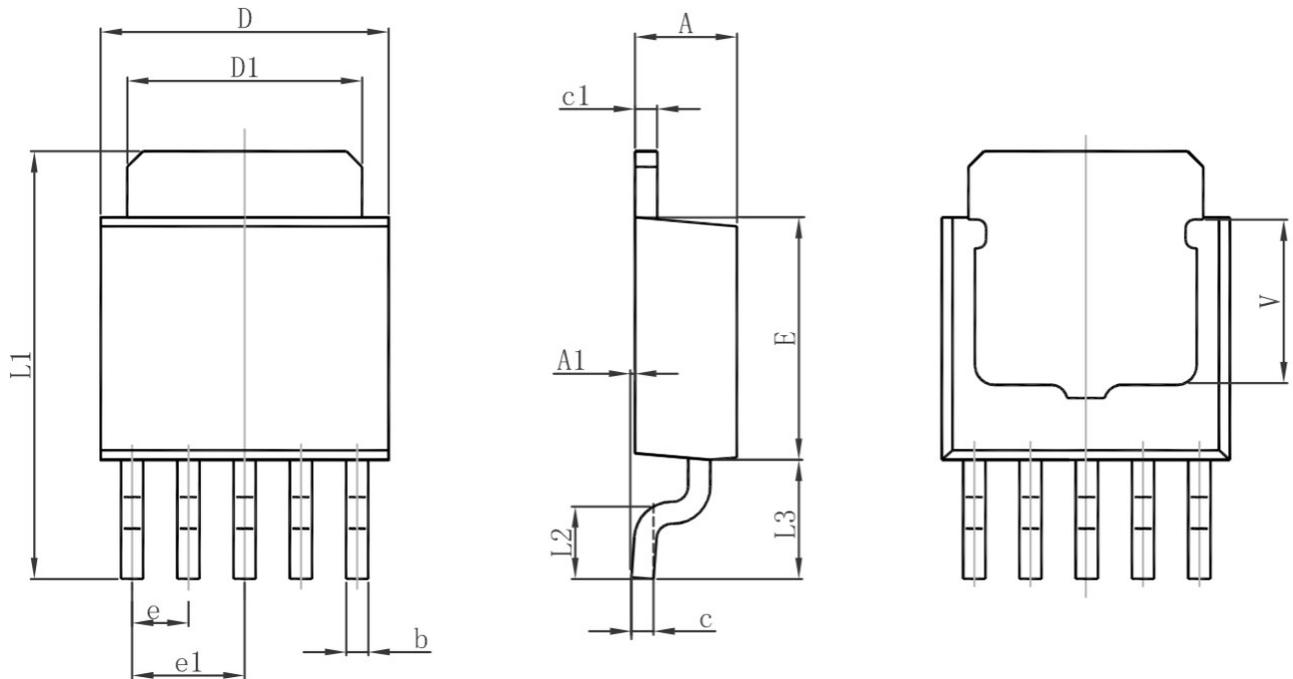
E-SOP8



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°

# FS1061

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	