Alfa-MOS Technology

AF1860

60V 1.5A 52KHZ PWM Step Down DC-DC LED Driver

General Description

AF1860 is the monolithic IC designed for a step-down DC/DC converter capable of driving 1.5A load without an additional transistor. The input voltage range is up to 60V. Its feedback voltage, V_{FB}, is 200mV. The AF1860 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} ~ 50μA (typ.). 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 0V.

The self-protection features include a cycle-by-cycle current limit and a thermal protection.

The AF1860 is available in standard SOP-8EP package.

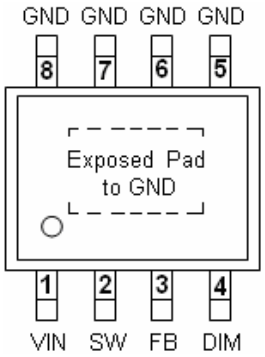
Features

- $V_{IN\ Max}$ = 60V
- V_{FB} = 200mV
- Frequency 52kHz
- $I_{LED\ Max}$ 1.5A (SOP-8EP)
- On/Off input may be used for the Analog Dimming
- Thermal protection
- Cycle-by-cycle current limit

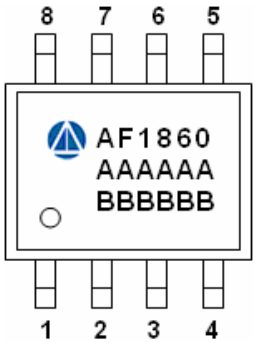
Application

- DC-DC or AC-DC LED driver applications
- Back lighting of flat panel displays
- General purpose constant current source
- Automotive
- Chargers

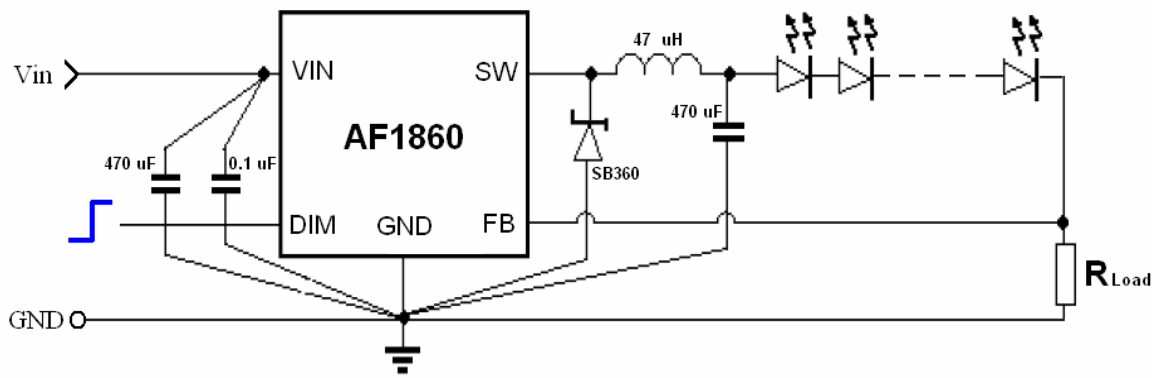
Pin Define (SOP-8EP)



Marking Information (SOP-8EP)



Typical Application Circuit



SOP-8EP Pin Description

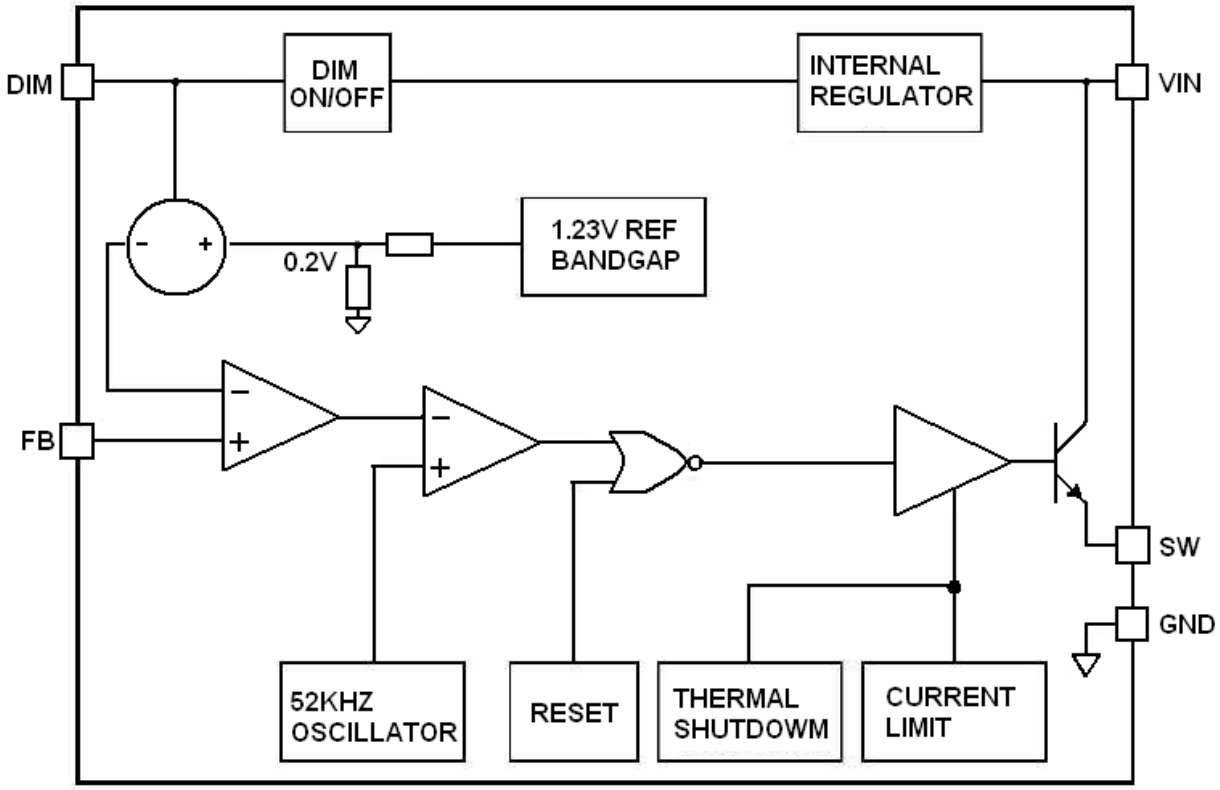
Pin	Symbol	Description
1	VIN	Supply Voltage Input
2	SW	Switching
3	FB	Feedback
4	DIM	On/Off & Dimming
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

Ordering Information

Part Ordering No.	Part Marking	Package	Unit	Quantity
AF1860S8EPRG	AF1860	SOP-8EP (Exposed Pad)	Tape & Reel	2500 EA

※ A Lot Code
※ B Date Code
※ AF1860S8EPRG : 13” Tape & Reel ; Pb- Free ; Halogen- Free

Block Diagram



Absolute Maximum Ratings (T_A=25℃ Unless otherwise noted)

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	℃
Maximum Junction Temperature	$T_{J(Max)}$	150	℃
Storage Temperature	T_S	-65～150	℃

The IC has a protection circuit against static electricity (> 2KV). Do not apply high static electricity or high voltage that exceeds the performance of the protection circuit to the IC.

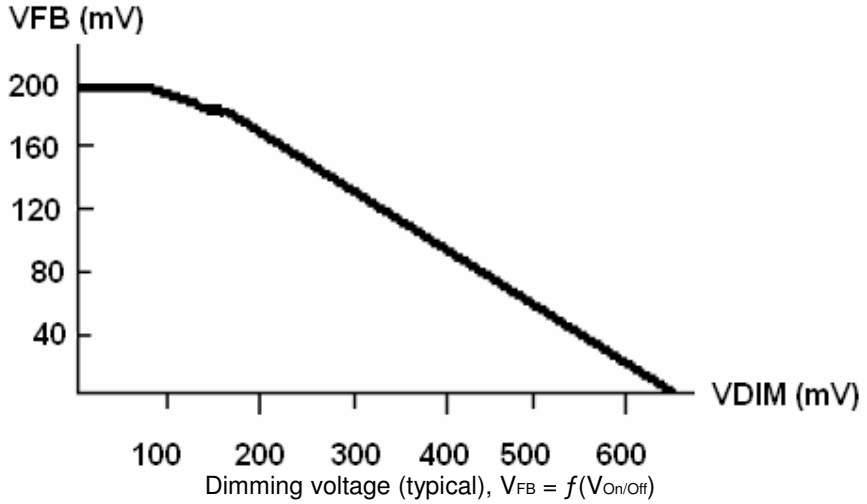
Electrical Characteristics

(T_j=25℃, V_{IN}=12V, I_{LOAD}=350mA Unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Operating Voltage		5.5		60	V
V_{FB}	Feedback Voltage	V_{IN} = 12V, I_{LOAD} = 350mA, DIM = 0V	190	200	210	mV
		V_{IN} = 5.5V~60V, I_{LOAD} = 350mA, V_{DIM} = 0V	180		220	mV
I_{FB}	Feedback Current	V_{FB} = 250mV, DIM= 0V	-150	-50	150	nA
F_{OSC}	Oscillator Frequency		47	52	58	KHz
V_{SAT}	Saturation Current	I_{SW}=1.5A		1.35	1.5	V
D_{MAX}	Max Duty				100	%
I_{LO}	SW Leakage Current	V_{IN}=50V, V_{FB} = 1.5V, V_{SW} = 0V	-0.3	-0.07		mA
C_L	Current Limit		1.5		4.0	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	$V_{On/Off}$ = 0 V	-1.0	-0.3	1.0	uA
I_Q	Quiescent Current	V_{FB} = 1.5V		5.3	10	mA
I_{STBY}	Standby Current	V_{IN}=50V, V_{DIM} = 5V		50	200	uA
V_{DIM}	Dimming Voltage	V_{IN} = 12V, I_{LOAD} = 0	600	670	750	mV

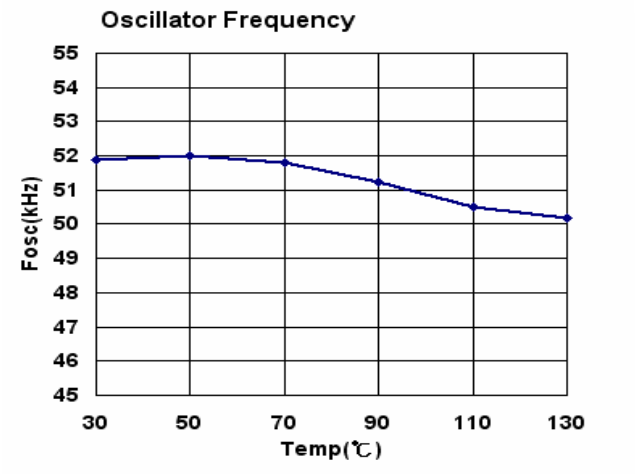
Note :

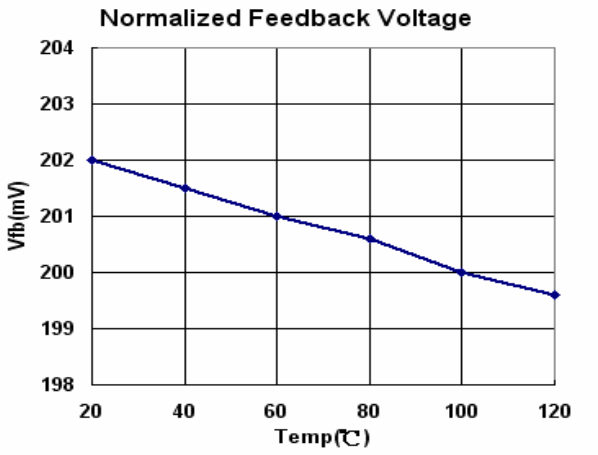
LED must be ensured with load current (I_{LOAD}) at $V_{IN\ Min.}$

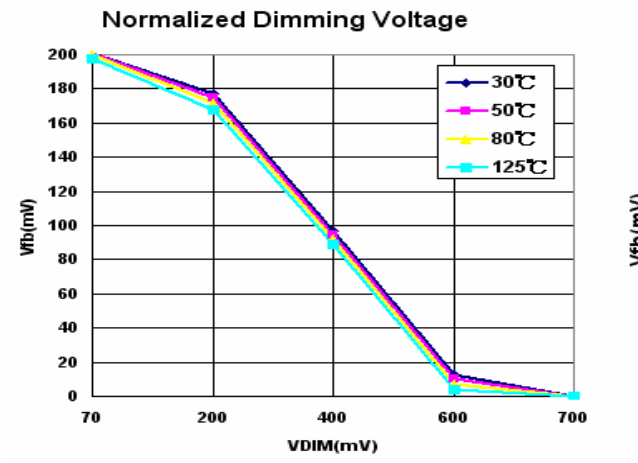


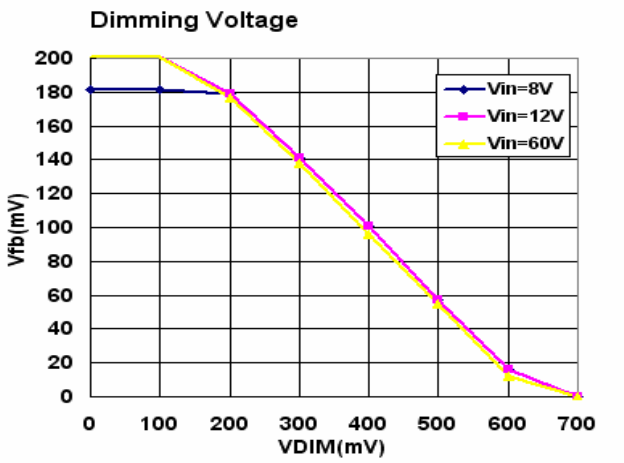
Dimming voltage (typical), $V_{FB} = f(V_{On/Off})$

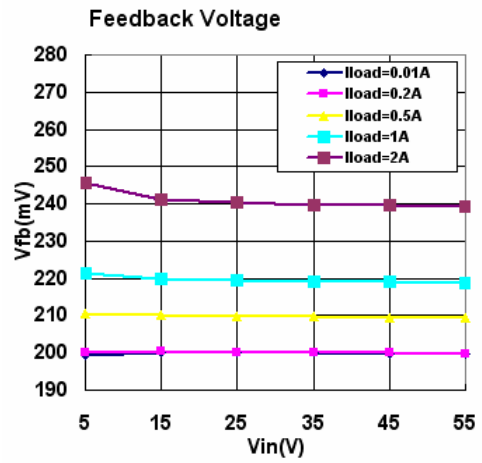
Typical Performance Characteristics

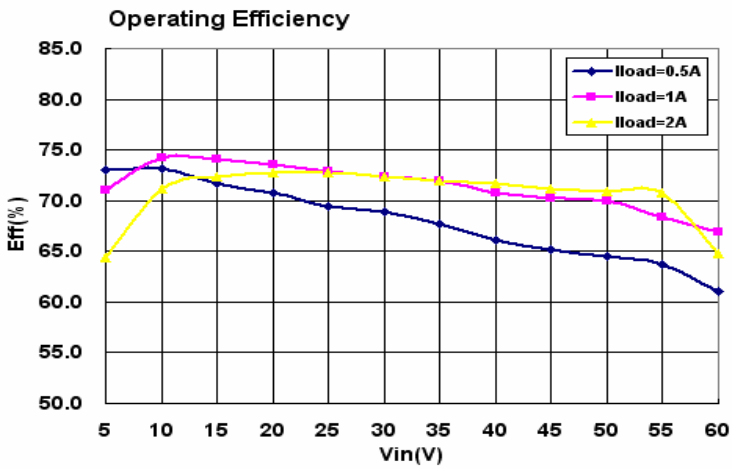




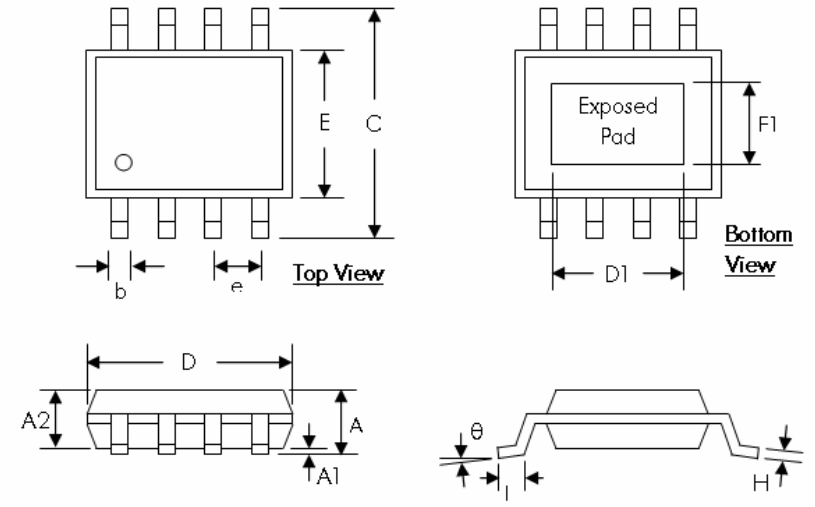








Package Information (SOP-8EP)



SYMBOLS	DIMENSION (MM)		DIMENSION (INCH)	
	MIN	MAX	MIN	MAX
A	1.30	1.70	0.051	0.067
A1	0.00	0.15	0.000	0.006
A2	1.25	1.52	0.049	0.060
b	0.33	0.51	0.013	0.020
C	5.80	6.20	0.228	0.244
D	4.80	5.11	0.189	0.201
D1	3.15	3.45	0.124	0.136
E	3.80	4.00	0.150	0.157
E1	2.26	2.56	0.089	0.101
e	1.27 BSC		0.050 BSC	
H	0.19	0.25	0.0075	0.0098
L	0.41	1.27	0.016	0.050
θ	0°	8°	0°	8°

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