

GENERAL DESCRIPTION

OB5656 is a high power factor (PF>0.9) linear driver with high voltage start-up and advanced features to provide high precision current output for TRIAC dimmable LED lighting applications. It offers intelligent bleeder control for high efficiency and high PF.

OB5656 offers programmable thermal foldback function feature to make the system flicker-free when the ambient temperature is high.

OB5656 is offered in ESOP8 package.

FEATURES

- Excellent TRIAC dimming performance
- High Power Factor (PF >0.9)
- Low THD
- HV startup
- Intelligent bleeder control for high efficiency and high PF
- High precision constant current regulation
- No inductance , No EMI issue
- Low system cost
- Programmable thermal foldback function

APPLICATIONS

- LED lighting
- Down Light

TYPICALICAL APPLICATION

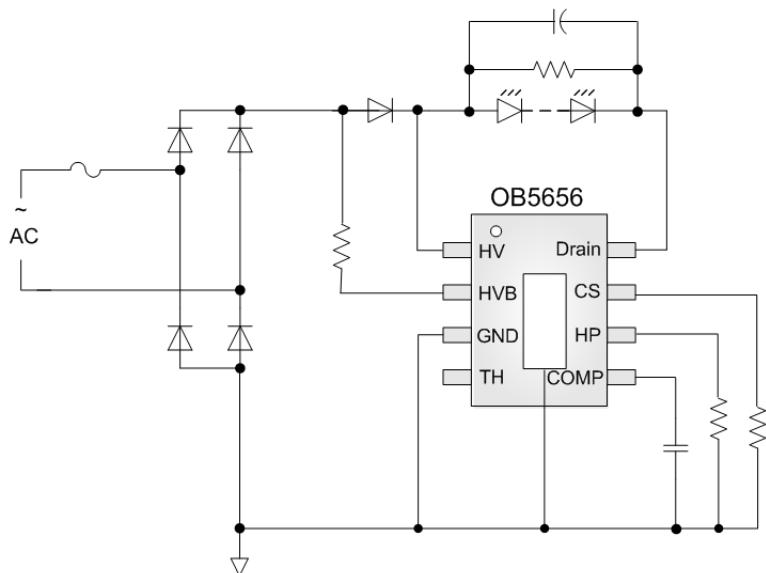
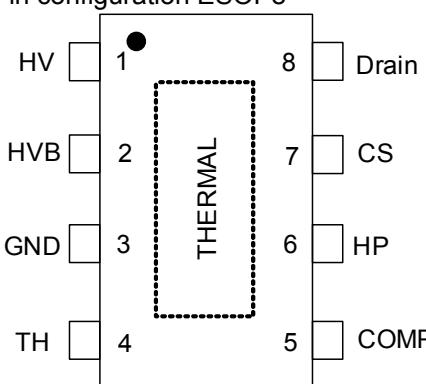


Figure1: OB5656 Typical Application Schematic

GENERAL INFORMATION

Terminal Assignment

Pin configuration ESOP8



Package Thermal Characteristics

Package	R _{θJA} (°C/W)
ESOP8	80

Absolute Maximum Ratings

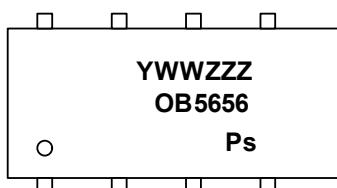
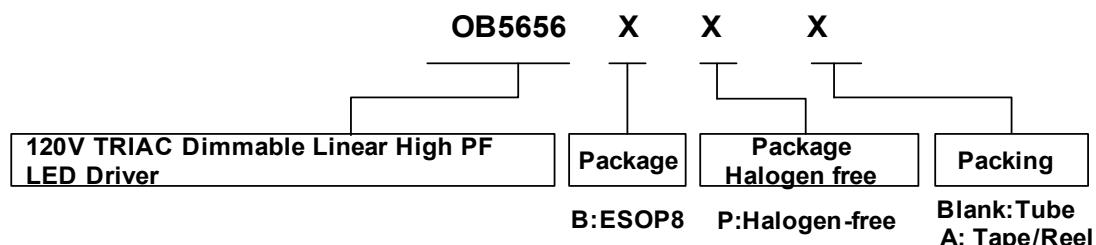
Parameter	Value
Drain/HV/HVB Pin to GND	-0.3V to 500V
TH/HP/COMP/CS pin to GND	-0.3V to 9V
Operating Ambient Temp. T _A	-40°C--85°C
Operating Junction Temp. T _J	-40°C--150°C
Min/Max Storage Temp. T _{stg}	-55°C--150°C
Lead Temp. (Soldering, 10 secs)	260°C

Note: Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability

Ordering Information

Part Number	Description
OB5656BP	ESOP8, Halogen-free in Tube
OB5656BPA	ESOP8, Halogen-free in T&R

Marking Information



Y: Year Code
WW: Week Code (01-52)
ZZZ:Lot Code
P: Halogen-free Package
s: Internal Code

Terminal Assignment

No.	Name	I/O	Pin Function
1	HV	P	High voltage input
2	HVB	I/O	High voltage for bleeding input
3	GND	P	Ground
4	TH	I/O	Thermal foldback point setting
5	COMP	I/O	Loop compensation pin. A capacitor is connected between COMP and GND.
6	HP	I/O	High PF setting
7	CS	I/O	Current sense pin
8	Drain	I/O	Drain of Internal MOSFET
	Thermal pad	P	Suggest connected to ground. Thermal pad should be soldered down to PCB ground pad with adequate copper area for improved thermal performance.

Functional Block Diagram

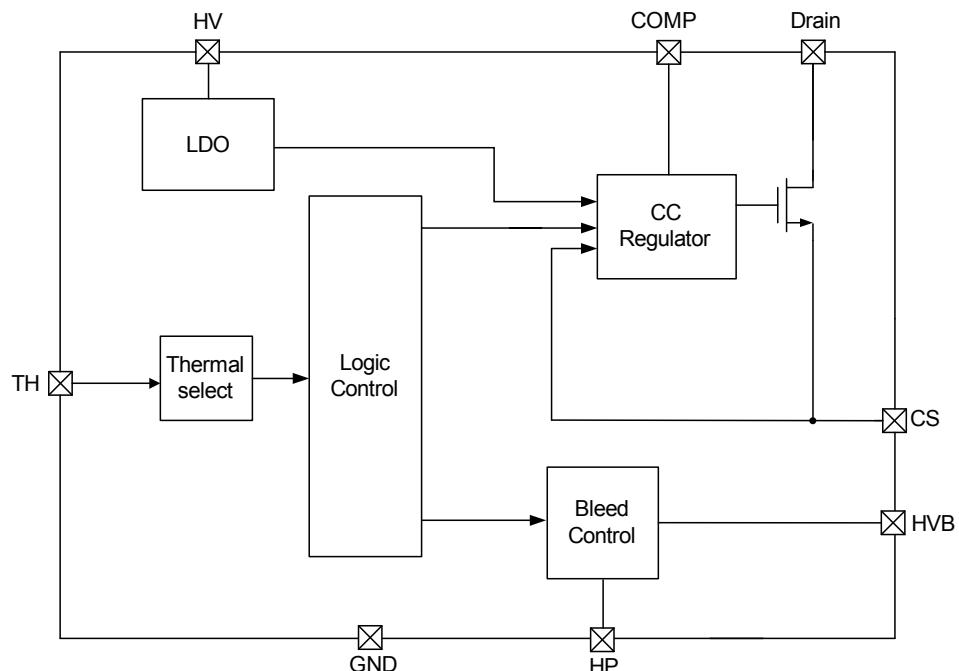
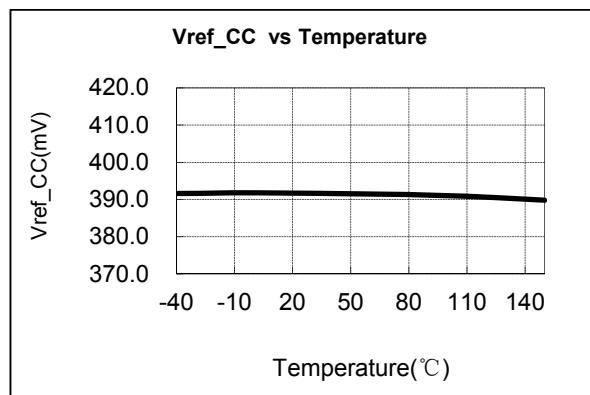
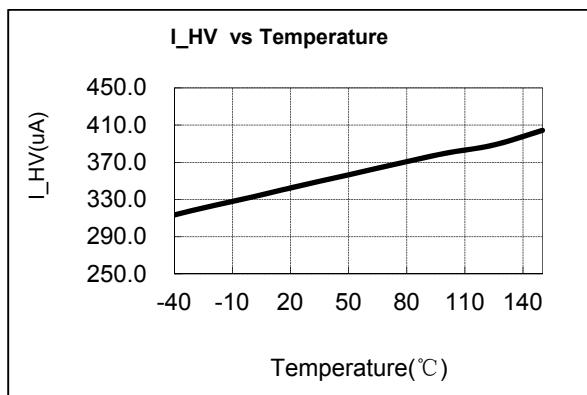


Figure2: OB5656 Functional Block Diagram

Electrical Characteristics
 $T_A=25^\circ\text{C}$, if not otherwise note

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Unit
Supply Voltage Section						
I_{HV}	Static Current			370		uA
LED Constant Current Section						
$V_{\text{ref cc}}$	Current sensing threshold		383	395	407	mV
$V_{\text{cs_min}}$	Minimum CS voltage		300			mV
Bleed Control Section						
$I_{\text{bleed_max}}$	Maximum bleeding output current			60		mA
Power MOSFET Section						
BV_{dss}	MOSFET break down voltage		500			V
I_{max}	Maximum conductive current	$\text{@ } T_A=125^\circ\text{C}$ $V_{\text{Drain}}=10\text{V}$	240			mA
Thermal Foldback Select						
Thermal inflexion		TH connected 200K to GND		135		$^\circ\text{C}$
		TH floating		145		$^\circ\text{C}$
		TH connected to GND		175		$^\circ\text{C}$
Thermal slope				10		$\text{mV/}^\circ\text{C}$

TYPICAL PERFORMANCE CHART


OPERATION DESCRIPTION

General Operation

OB5656 is a linear driver with high voltage start-up and advanced features to provide high PF for no dimming and high precision current output for TRIAC dimmable LED lighting applications. And it offers intelligent bleeder control for high efficiency.

Start up

OB5656 gets power supply directly from HV pin and generates internal supply voltage for the circuits. When the voltage of the HV pin is larger than 30V, the chip starts to normal operation.

Setting the Linear Regulation Current

OB5656 can maintain constant current within reasonable output voltage range.

The linear regulation current can be set with a resistor from CS to GND pin.

$$I_{LED} = \frac{V_{ref_CC}}{R_{CS}}$$

R_{CS} — The sensing resistor connected between the CS pin and the GND pin of IC.

V_{ref_CC} — The internal reference voltage

PF Control

OB5656 controls bleeding current (HVB current) PF for >0.9 applications. Bleeding current can be set by resistor outside from HP pin to ground.

The suggest HP resistor Values, on the chart.

Output voltage (V)	Output current (mA)	PF	HP (KOhm)
120	75	0.91	24
125			16
130			12

The higher PF requirement, the smaller HP resistor needed. The tradeoff between PF and efficiency needs to be considered in applications. The HVB current varies with voltage of HVB voltage and HP resistor.

Thermal Foldback

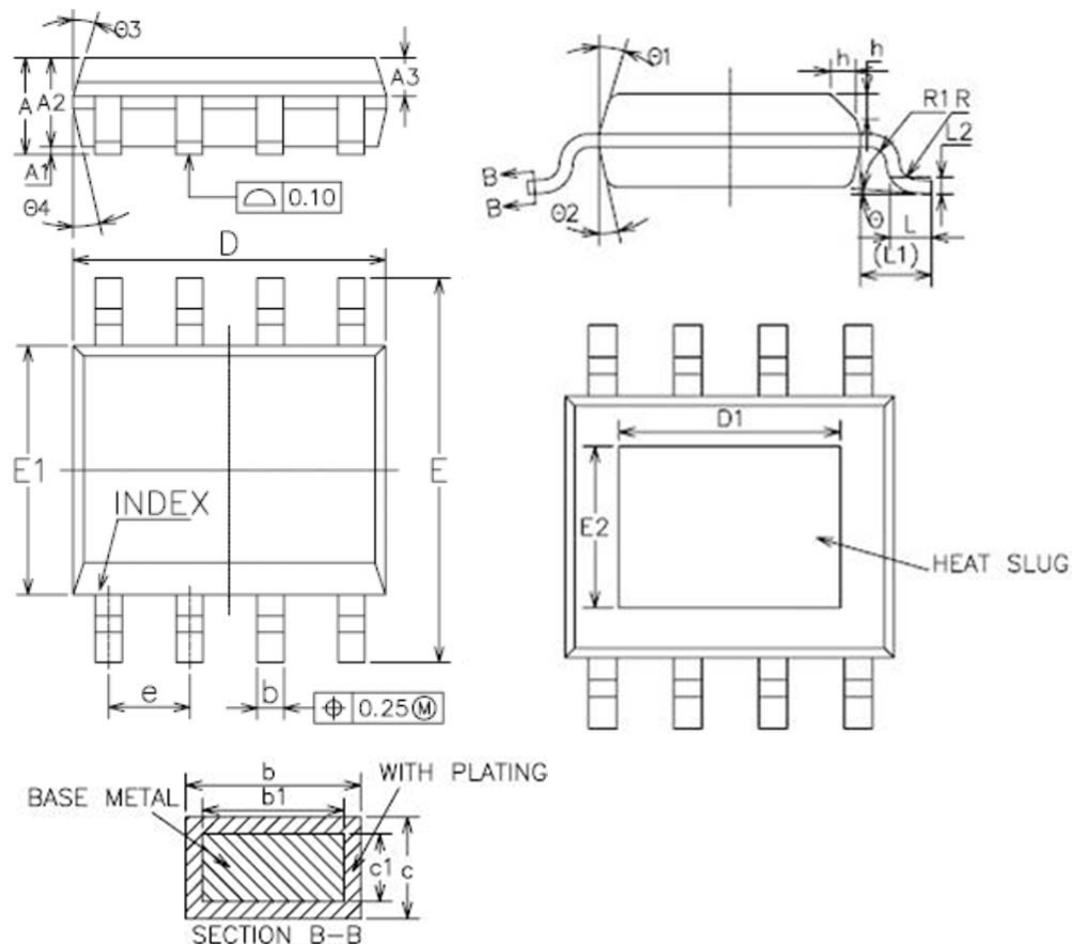
OB5656 provides a programmable thermal foldback function to control LED output current. The thermal foldback point can be set by TH pin.

TH	200 KOhm res to GND	Floating	GND
Thermal point	135°C	145°C	175°C

It reduces the output current when temperature reaches the set thermal point by adjusting the reference of CS. The LED current will reduce with the temperature rising up. When the temperature is below the setting thermal point, the output current returns to the full level.

PACKAGE MECHANICAL DATA

8-Pin Plastic ESOP (ESOP8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.000	0.250	0.000	0.010
A2	1.250	1.650	0.049	0.065
b	0.310	0.510	0.012	0.020
c	0.100	0.250	0.004	0.010
D	4.700	5.150	0.185	0.203
D1	3.100	3.500	0.122	0.138
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
E2	2.200	2.600	0.087	0.102
e	1.27(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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