

PBL 380 85

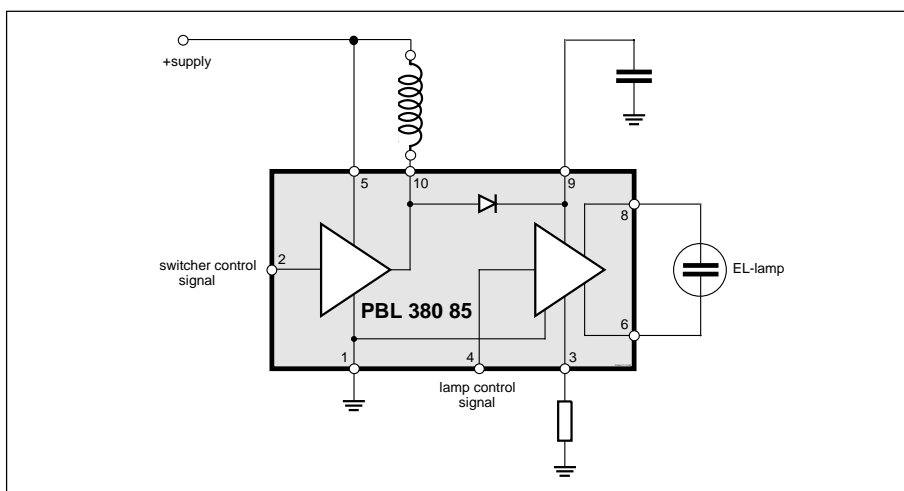
Integrated circuit for transformerless driving of battery powered EL (electroluminicent) lamps

Description.

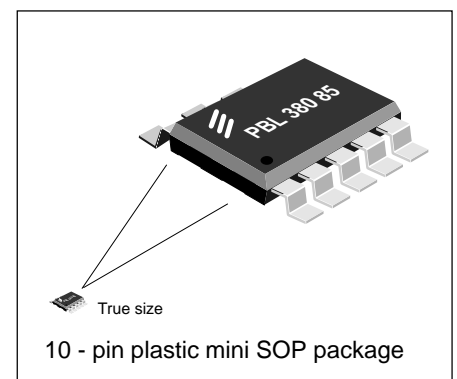
PBL 380 85 is a monolithic integrated circuit for supplying power to an EL (electroluminicent) lamp. This is intended to replace the LCD background illumination system in battery powered handheld equipment with a low power EL- lamp. Especially suitable for mobile phones where current saving is highly important, as background illumination for both LCD and keyboard. Output voltage max. 190V, min. 170V at max. 2mA constant current charge / discharge of the EL- lamp. Application dependent parameters such as charge / discharge current are set by an external resistor. Two control signals are needed one for the switcher and one for the lamp. The output voltage is set under 170V by the duty cycle and the switching frequency of the control signal, over 170V by an amplitude limiter that switches the switcher off. The switching frequency is app. 50 kHz. The light intensity is controlled by the dutycycle of the switcher control signal. The lamp control signal is divided by two by the circuit. The wave form of the output AC-signal is either triangular or trapezoid depending of the capacitance of the EL-lamp, charge / discharge current and frequency of the lamp control signal. The triangular or trapezoid wave form of the EL-lamp driving voltage and the high switching frequency minimizes audible noise from the lamp and also reduces upcoming electrical noise and harmonics.

Key features.

- Minimum number of external components for function: 1 choke, 1 filter-capacitor and 1 resistor.
- Easy adaption to various lamp specifications.
- Easy dimming function by controlling the duty cycle.
- Extensive current saving feature compared with LEDs.
- Power down function $<<1\mu\text{A}$.
- Supply voltage down to 3V.
- Comes in a 3x3 mm package
- Lights up to 20nF lamp capacitance area depending on lamp parameter nF/cm^2 .



Functional diagram.



Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply voltage, continuous	V+	0	90	V
All inputs (zener protection)			6.5	V
Operating temperature range	T _{Amb}	-30	+85	°C
Storage temperature range	T _{Stg}	-55	+150	°C

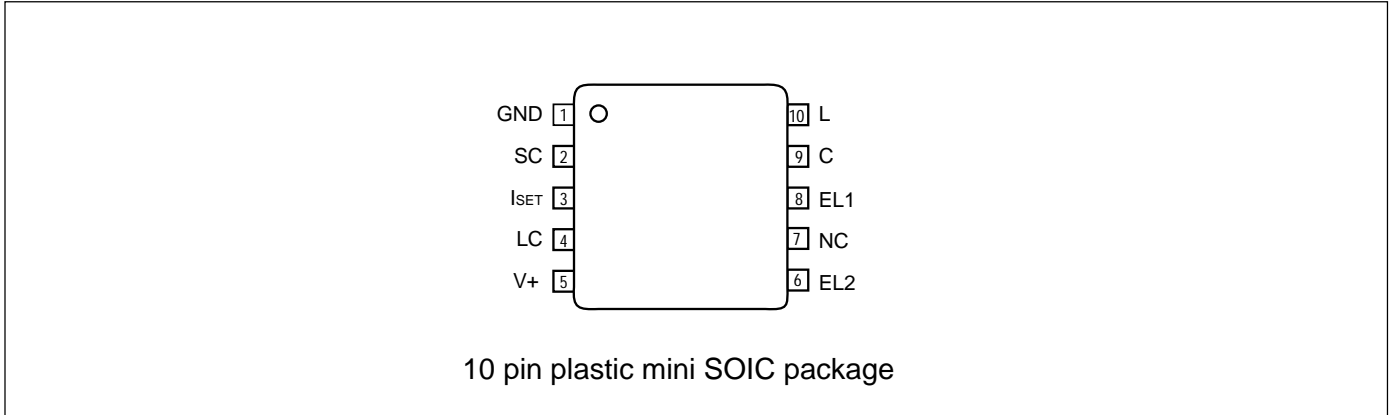
Electrical Characteristics

At T_{Amb} = 25°C V+ = 2.75 V if no otherwise stated. For further conditions see figure.

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Battery voltage		V _{Bat}	1.5	3.6	65*	V
V _{BAT} quiescent current	V+ off				0.1	µA
Logic supply voltage		V+	2.4	2.75	5.5	V
V+ operating supply current	SC + LC 50% 50%					
V+ quiescent supply current	SC = 0 ; LC = 0			5	µA	
Logic low level input voltage					0.3xV+	V
Logic high level input voltage			0.7xV+			V
Logic low level input current			-100		100	µA
DC/DC converter:						
Booster output voltage, int.limited				90		V
Switch transistor sat. voltage	80mA inductor current				0.6	V
Switching frequency, set by the SC-signal frequency				50		kHz
H - BRIDGE:						
Output voltage EL1 - EL2			170			V _{pp}
Output unbalance voltage EL1 - EL2			-5		+5	V
Output sink/source current range lower limit					0.1	mA
Output sink/source current range upper limit			1.5			mA
Output current x resistance product (note1)		I _{SET} * R _{SET}	9.5	10	10.5	V
Output drive frequency, set by the LC-signal frequency				250		Hz

Note1: This product is the EL1/EL2 output current multiplied by the resistor value connected to I_{SET}. Voltage at the I_{SET} pin is dependent of the V+ voltage as it is a quota of that voltage.

* Battery voltage max. 65V requires correctly chosen duty cycle and inductance.

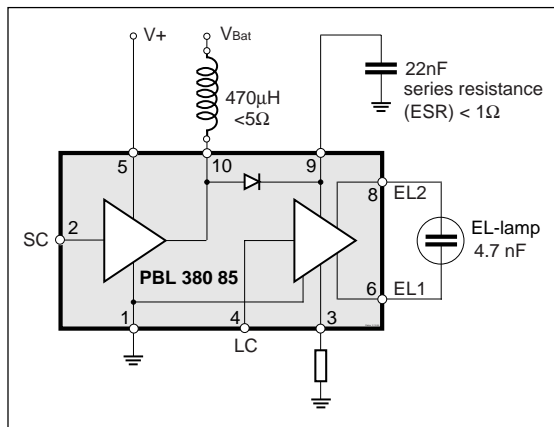


Pin configuration.

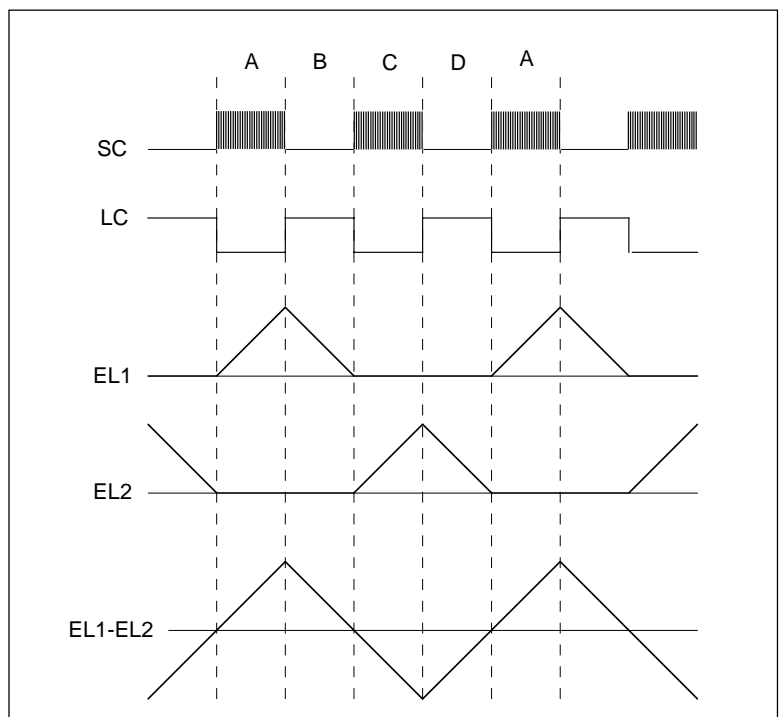
Pin Descriptions:

Refer to pin configuration.

SO	Name	Function	SO	Name	Function
1	GND	Ground connection	6	EL2	EL - lamp connection
2	SC	Switch control input	7	NC	No connection
3	ISET	Control input for lamp driving capability	8	EL1	EL - lamp connection
4	LC	Lamp frequency control input	9	C	Boost capacitor connection
5	V+	Supply voltage	10	L	Inductor connection

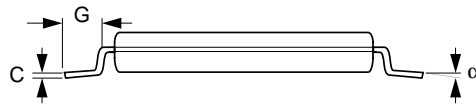
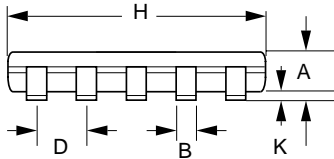
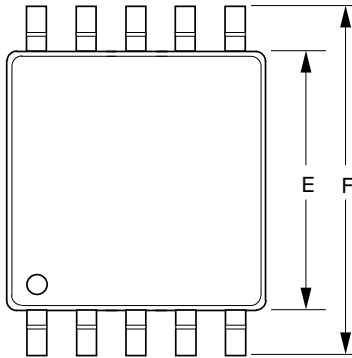


Reference picture.



Some circuit curve forms .

10 - pin mini SOP



Dim.	millimeters	tol.
A	1.10	max.
B	0.23	+0.07 -0.08
C	0.18	±0.05
D	0.50	BSC
E	3.00	±0.1
F	4.90	±0.15
G	0.55	±0.15
H	3.00	±0.1
K	0.10	±0.05
α	3.0°	±3.0°

Information given in this data sheet is believed to be accurate and reliable. However no responsibility is assumed for the consequences of its use nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Ericsson Components AB. These products are sold only according to Ericsson Components AB's general conditions of sale, unless otherwise confirmed in writing.

Specifications subject to change without notice.

1522-PBL 380 85/1 Uen Rev.A
© Ericsson Components AB
July 1999



Ericsson Components AB
S-164 81 Kista-Stockholm, Sweden
Telephone: (08) 757 50 00
www.ericsson.se/microe

Ordering Information

Package	Temp. Range	Part No.
10 pin plastic mini SOP	-30 to 85°C	PBL 380 85/1MSOT Tape and Reel