

Features

- Constant frequency or constant off-time operation
- Switch mode controller for single switch drivers:
Buck/Boost/Buck-boost/SEPIC
- Internal 450V linear regulator (can be extended using external zener diodes)
- Programmable MOSFET current limit
- Soft start
- +0.2A/-0.2A GATE drive

Applications

- RGB backlight applications
- Automotive LED driver application
- Battery Powered LED lamps

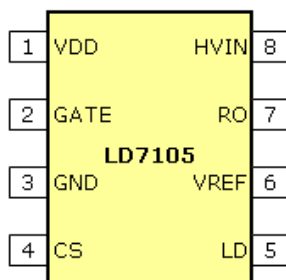
General Description

LD7105 is a current mode control LED driver IC. It has been designed for the purpose of controlling single switch PWM converters (buck, boost, buck-boost, or SEPIC) at a fixed frequency or fixed off-time mode. Programmable MOSFET current limit allows for current limiting during input under voltage and output overload conditions.

For high power applications, the IC also comprises a 0.2A source and 0.2A sink GATE driver. There is an internal 9 to 450V linear regulator which powers the IC. This makes it no longer necessary to separate power supply for the IC.

The LD7105 based LED driver ideally suited to RGB backlight applications with DC inputs. The LD7105 based LED lamp drivers can reach efficiency of more than 90% for buck and boost applications.

Package Pin Out



Ordering Information

Part No.	Package	Packing Options	
		Tube(TU)	Tape & Reel(TR)
LD7105	SOP-8	LD7105S1-TU	LD7105S1-TR

- Package material default is "Green" package.

Product Marking

LD8888	◇ Line 1 – "LD" is a fixed character
SSSSS...	8888: product name
●	◇ Line 2 – SSSSS...: lot number

Absolute Maximum Ratings

Parameter	Maximum	Unit
HVIN to GND	-0.5~ +450	V
VDD to GND	-0.3~ +13.5	V
CS to GND	-0.3~VDD+0.3	V
GATE to GND	-0.3~VDD+0.3	V
All other pins to GND	-0.3~VDD+0.3	V
Continuous Power Dissipation ($T_A = +25^\circ\text{C}$)		
8-Pin SOIC, de-rate 10.0mW/°C above +25°C	1000	mW
Junction to ambient thermal impedance	82	°C/W
Operating ambient temperature range	-40~ +85	°C
Junction temperature	+125	°C
Storage temperature range	-65~ +150	°C

The values beyond the boundaries of absolute maximum rating may cause the damage to the device. Functional operation in this context is not implied. Continuous use of the device at the absolute rating level might influence device reliability. All voltages have their reference to device ground.

Electrical Characteristics

HVIN=24V, $T_A=25^\circ\text{C}$ unless specified, otherwise minimum and maximum values are guaranteed by production testing requirements.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input						
Input DC supply voltage range	V_{INDC}	DC input voltage	9 ¹	–	450	V
Shut-down mode supply current	I_{INSD}	HVIN = 24V	–	1.0	2.0	mA
Internal Regulator						
Internally regulated voltage	VDD	HVIN = 9~450V, $I_{\text{DD}}(\text{ext}) = 0$	7.25	7.75	8.25	V
VDD under voltage lockout threshold	UVLO	VDD rising	6.4	7.0	7.6	V
VDD under voltage lockout hysteresis	ΔUVLO	–	–	500	–	mV
Steady state external voltage that can be applied at the VDD pin ²	VDD(ext)	–	–	–	12	V
Reference						
VREF pin voltage	V_{REF}	VREF bypassed with a 0.1 μF capacitor to GND; VDD = 7.75V	1.225	1.25	1.275	V
Line regulation of reference voltage	V_{REFLINE}	VREF bypassed with a 0.1 μF capacitor to GND; VDD = 7.25 – 8.25V	0	–	20	mV
Load regulation of reference voltage	V_{REFLOAD}	VREF bypassed with a 0.1 μF capacitor to GND	0	–	20	mV
GATE						
GATE short circuit current	I_{SOURCE}	$V_{\text{GATE}} = 0\text{V}$; VDD = 7.75V	0.2	–	0.5	A
GATE sinking current	I_{SINK}	$V_{\text{GATE}} = 7.75\text{V}$; VDD = 7.75V	-0.5	–	-0.2	A
GATE output rise time	T_{RISE}	$C_{\text{GATE}} = 1\text{nF}$; VDD = 7.75V	–	50	85	ns
GATE output fall time	T_{FALL}	$C_{\text{GATE}} = 1\text{nF}$; VDD = 7.75V	–	25	45	ns

Notes:

1. See application section for minimum input voltage

2. Parameters are not guaranteed to be within specifications if the external VDD voltage is greater than VDD(ext) or if VDD < 7.25V.

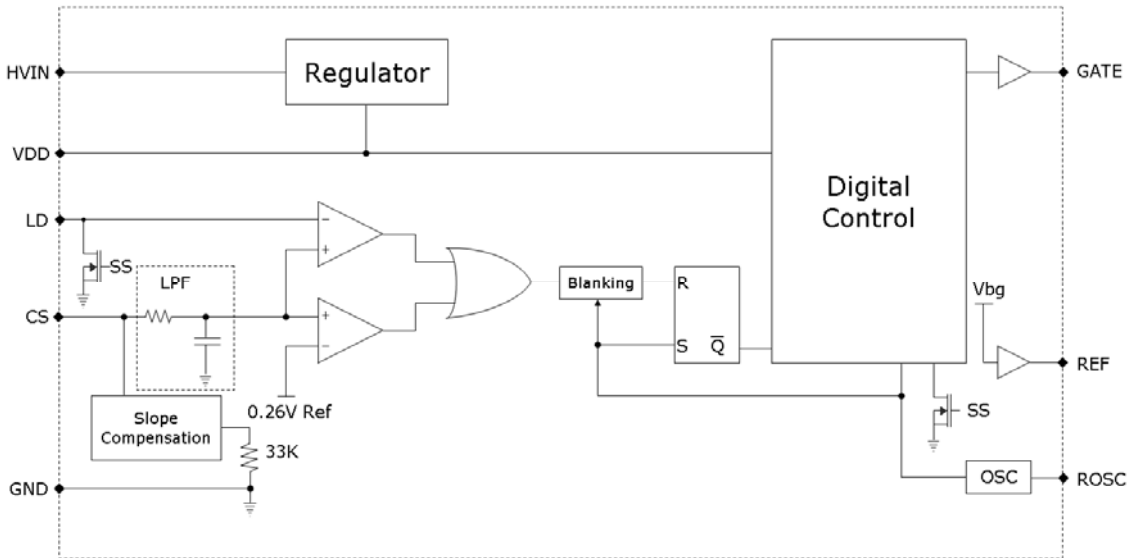
Electrical Characteristics (Continued)HVIN=24V, T_A=25°C unless specified, otherwise minimum and maximum values are guaranteed by production testing requirements.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Current Sense Comparator						
Current sense threshold voltage	V _{CS}	Bin1 Category	225	230	235	mV
		Bin2 Category	235	240	245	
		Bin3 Category	245	250	255	
		Bin4 Category	255	260	265	
Offset voltage for LD comparator	V _{OFFSET}	–	-20	–	20	mV
Leading edge blanking	T _{BLANK}	V _{CS} = 310mV	100	420	600	ns
Delay to output	T _{DELAY}	LD = VDD ; V _{CS} = 0 to 310mV to GATE step down	–	180	360	ns
Oscillator						
Oscillator frequency	f _{OSC1}	RO = 2MΩ, HVIN<450VDC	40	45	50	KHz
	f _{OSC2}	RO = 220KΩ, HVIN<450VDC	400	430	460	
Linear Dimming						
Linear dimming input voltage	V _{LD}	HVIN = 12V	0	–	250	mV

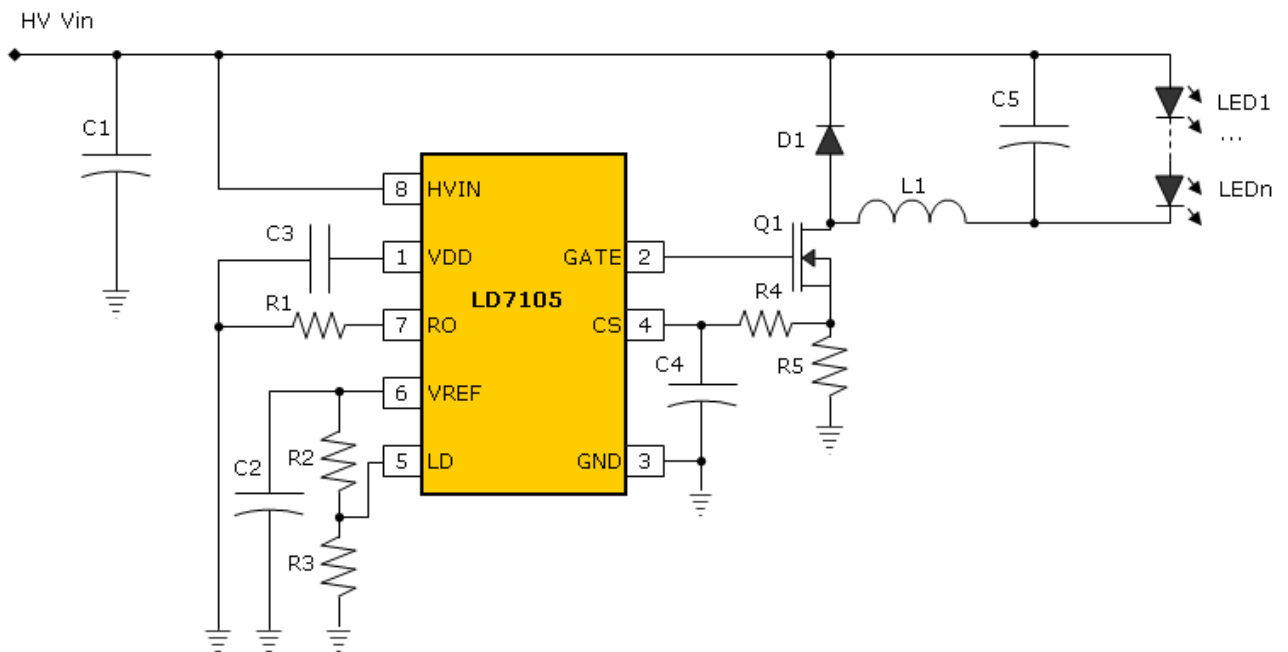
Pin Description

Pin #	Name	Description
1	VDD	This is a power supply pin for all internal circuits. It must be bypassed with a low ESR capacitor to GND (at least 0.1uF).
2	GATE	This pin is the output GATE driver for an external N-channel power MOSFET.
3	GND	Ground return for all circuits. This pin must be connected to the return path from the input.
4	CS	This pin is used to sense the drain current of the external power FET. It includes a built-in 100ns (min) blanking time.
5	LD	This pin provides a programmable input current limit for the converter. The current limit can be set by using a resistor divider from the VREF pin. Soft start can also be provided using this pin.
6	VREF	This pin provides 2% accurate reference voltage. It must be bypassed with at least a 10nF - 0.22uF capacitor to GND.
7	RO	This pin sets the frequency or the off-time of the power circuit. A resistor between RO and GND will program the circuit in constant frequency mode. A resistor between RO and GATE will program the circuit in a constant off-time mode.
8	HVIN	This pin is the input of a 450V high voltage regulator.

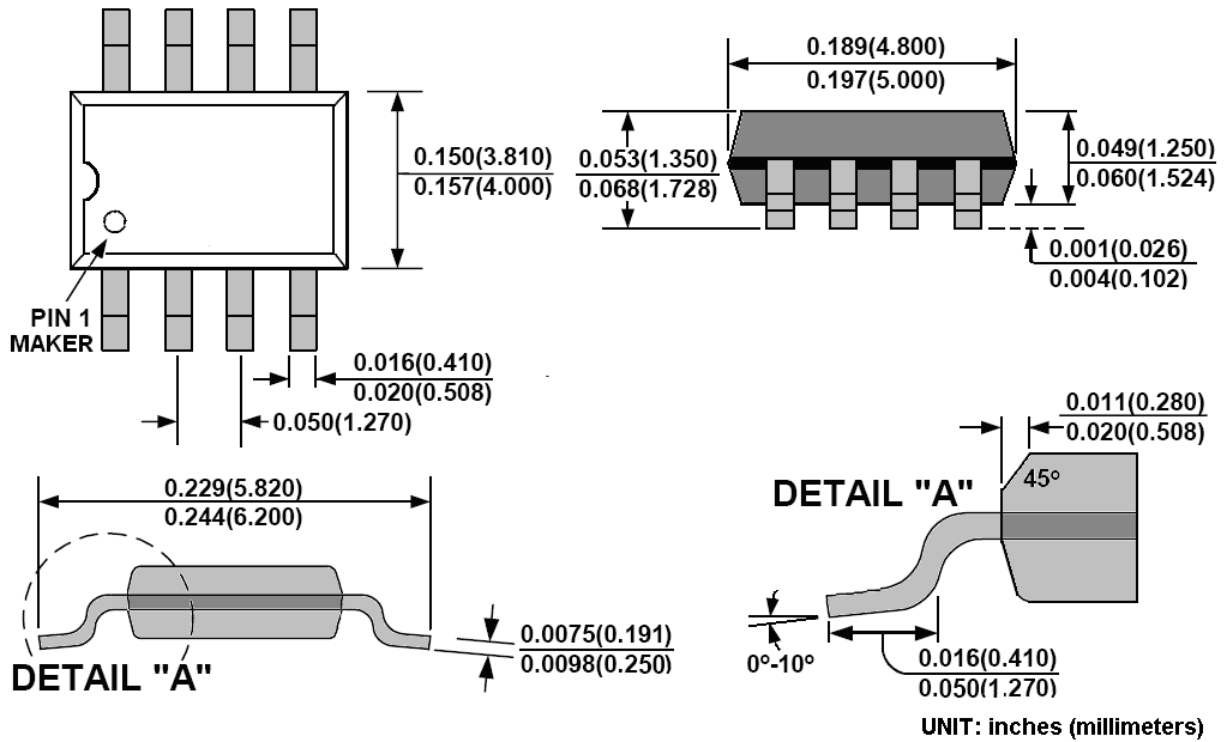
Functional Block Diagram



Typical Application Circuit



Package Outline



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