High- Efficiency Step- Down Constant Current Regulator for LED 4105

Description

The 4105 is a Step-Down constant current regulator for driving LED with low quiescent current and low dropout voltage. The Max drive capability is to 3W LED.

Switching frequency is internally set at 500 KHz, allowing the use of small surface mount inductors and capacitors. The internal synchronous switch increases efficiency and eliminates the need for an external Schottky diode. The 4105 is available in SOP-8L package.

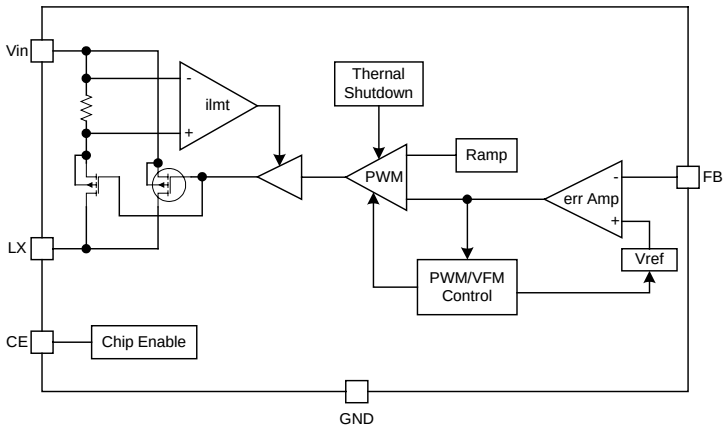
Features

- Max drive capability: 3W LED
- Power supply voltage: 2.5-16V
- High Efficiency: Up to 94%
- 500KHz Constant Frequency Operation
- DC dimming
- Low feedback voltage: 200mV
- Built-in power MOSFET
- Internal current limit
- SOP-8L Package

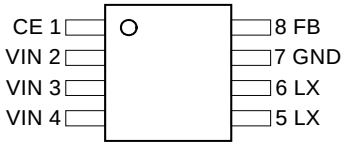
Applications

- Power Led driver

Block Diagram



Pin Configuration (Top View)

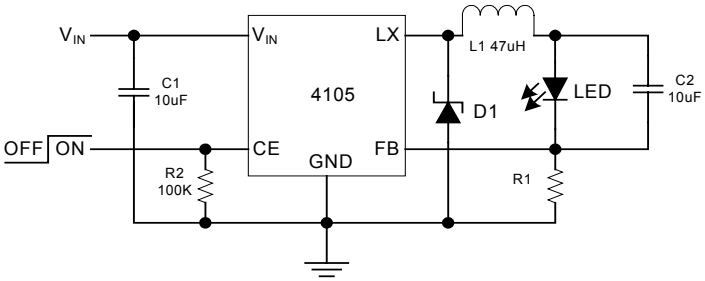


SOP-8L Package

Pin Description

Symbol	Pin Name	Pin NO.	Description
CE	Chip Enable Pin	1	High-level voltage enables the device, and low-level voltage shuts down the device. When the function isn't used, connecting CE with VIN to start up automatically the chip. Do not leave CE floating.
VIN	Main Supply Pin	2,3,4	Must be closely decoupled to GND.
LX	Power MOSFET Output Pin	5,6	LX is the drain of internal MOSFET, connected with power inductor and output regulator. Shorten layout area to reduce EMI.
GND	Ground Pin	7	Connect this pin to system GND.
FB	Feedback Pin	8	Feedback input. 4105 adjusts the voltage on the resistor which sampling current. Connect in series the resistor between the bottom of LED chain and GND.

Typical Applications



C1, C2: X7R Ceramic Dielectric

R1: 0.57Ω (0.25W, for LUXREON-I)

R2: 100kΩ

D1: RB060M-30(ROHM) or Equivalent

LED: LUXREON-I/III

R1: 0.28Ω (0.25W, for LUXREON-III)

L1: CR75-470MC (Sumida, 47uH) or Equivalent

Absolute Maximum Ratings

Input Supply Voltage, V_{IN}..... ..... – 0.3V to 16V

Switch Voltages, V_{LX}..... -0.5V to 18V

Feedback Voltage, V_{FB}.....- 0.3V to 6V

Other I/O Port Voltage, V_{IO}.....GND-0.3 to V_{IN}+0.3V

SOP-8L package Thermal Resistor, P_{TR}

Θ_{JA}.....105W/°C

Θ_{JC}.....50W/°C

Operating Temperature Range, T_{opt} ..... – 40°C to 85°C

Storage Temperature Range, T_{stg}..... – 55°C to 150°C

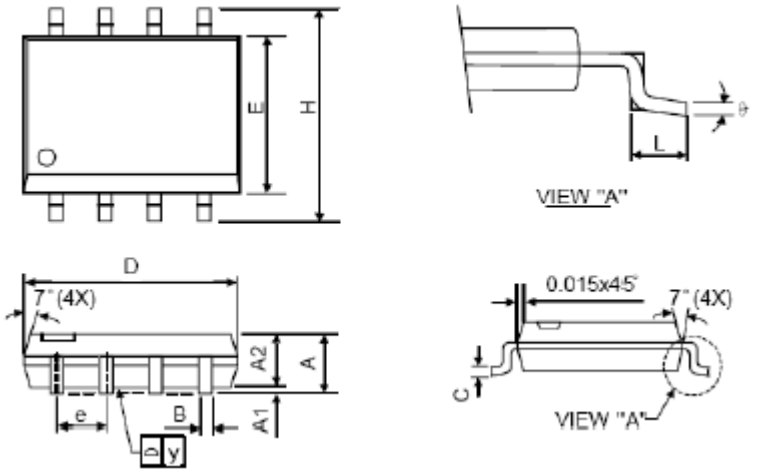
Lead Temperature (Soldering, 10sec), T_{solder}..... 260°C

Electrical Characteristics (T_A = 25°C)

Symbol	Parameter	Conditions	MIN	TYP	MAX	Units
V_{IN}	Operating Voltage		2.5		16	V
V_{FB}	Feedback Voltage	V_{IN}=V_{CE}=8V, I_{FB}=350mA	180	200	220	mV
$\Delta V_{FB}/\Delta T$	Feedback Voltage Temperature coefficient	-40°C<T_{opt}<85°C		±100		Ppm/°C
I_{Q1}	Supply Current	V_{IN}=V_{CE}=16V, V_{FB}=2V		100	200	μA
I_{Q2}	Shutdown Current	V_{IN}=16V, V_{CE}= V_{FB}=0V		0	1	μA
f_{OSC}	Oscillator Frequency	V_{IN}=V_{CE}=8V, I_{FB}=350mA	400	500	600	kHz
D_{MAX}	Maximum Duty Cycle		100			%
D_{MIN}	Minimum Duty Cycle				0	%
$R_{DS(ON)}$	Switch On Resistance	V_{IN}=16V		0.3		Ω
	Current Limit	V_{IN}=16V		2.3		A
V_{CEH}	CE ”H” Input Voltage	V_{IN}=8V, V_{FB}=0V	1.5			V
V_{CEL}	CE ”L” Input Voltage				0.3	V
T_{SS}	Delay time by soft-start	V_{IN}=8V,V_{CE}=0V->2.5V, I_{FB}=350mA	1	2	4	ms
T_{SD}	Thermal shutdown			160		°C

Package

Package Type: SOP-8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.60	1.75	0.055	0.063	0.069
A1	0.10	-	0.25	0.040	-	0.100
A2	1.30	1.45	1.50	0.051	0.057	0.059
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.010
D	4.80	5.05	5.30	0.189	0.199	0.209
E	3.70	3.90	4.10	0.146	0.154	0.161
e	-	1.27	-	-	0.050	-
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
y	-	-	0.10	-	-	0.004
θ	0°	-	8°	0°	-	8°