

High Voltage Green-Mode PWM Controller with Over Temperature Protection

Rev. 00

General Description

The LD7750R integrates several functions of protections, and EMI-improved solution in a SOP-7, SOP-8 or DIP-8 package to minimize the component counts and the circuit space.

The device provides functions of low startup current, green-mode power-saving operation, leading-edge blanking of the current sensing and internal slope compensation. Also, the LD7750R features more protections like OLP (Over Load Protection), OVP (Over Voltage Protection), and OTP (Over Temperature Protection) to prevent the circuit being damaged under the abnormal conditions. The LD7750R features built-in auto-recovery function for OVP on Vcc pin and OLP.

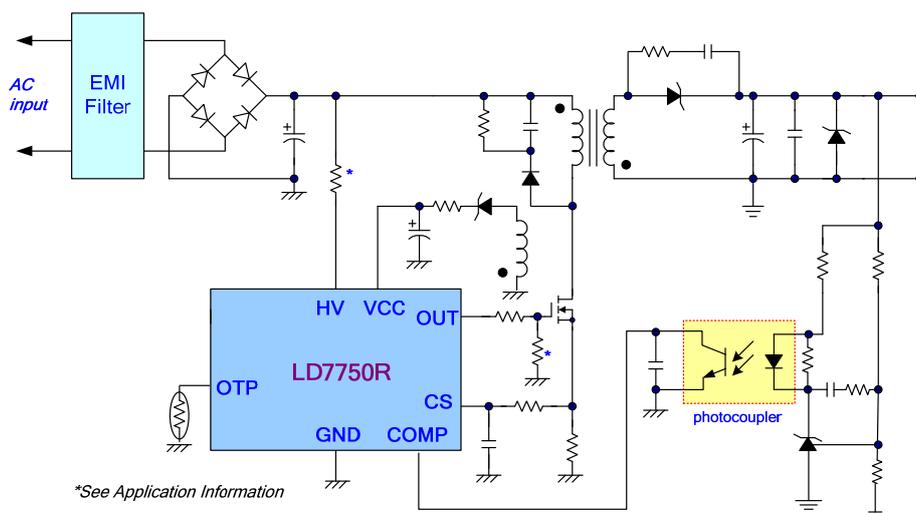
Features

- High-Voltage (500V) Startup Circuit
- Current Mode Control
- Green Mode Control
- UVLO (Under Voltage Lockout)
- LEB (Leading-Edge Blanking) on CS Pin
- Internal Frequency Swapping
- Internal Slope Compensation
- Internal Over Current Protection
- OVP (Over Voltage Protection) on Vcc
- OLP (Over Load Protection)
- External OTP through a NTC
- 500mA Driving Capability

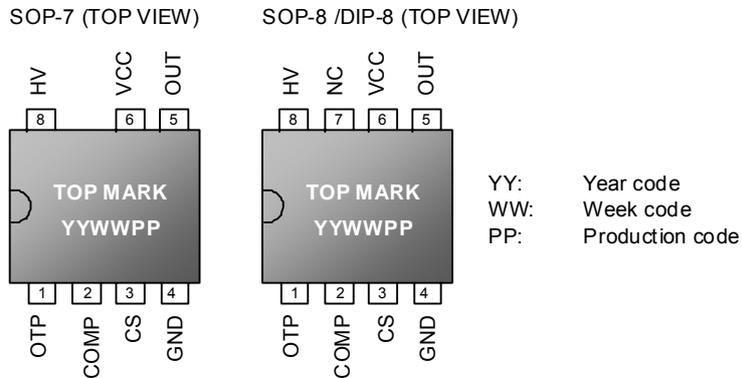
Applications

- Switching AC/DC Adaptor and Battery Charger
- Open Frame Switching Power Supply
- LCD Monitor/TV Power

Typical Application



Pin Configuration



Ordering Information

Part number	Switching Freq.	Package		Top Mark	Shipping
LD7750R GS	65kHz	SOP-8	Green package	LD7750R GS	2500 /tape & reel
LD7750R GR	65kHz	SOP-7	Green package	LD7750R GR	2500 /tape & reel
LD7750R GN	65kHz	DIP-8	Green package	LD7750R GN	3600 /tube /Carton

The LD7750R is ROHS compliant.

Protection Mode

Part number	Switching Freq.	VCC OVP	OLP	OTP Pin
LD7750R	65kHz	Auto recovery	Auto recovery	Latch

Pin Descriptions

SOP-8	SOP-7	NAME	FUNCTION
1	1	OTP	Pulling this pin below 0.95V will shutdown the controller to enter latch mode until the AC power-on recycles. Connecting a NTC between this pin and ground will achieve OTP protection function. Let this pin float to disable the latch protection.
2	2	COMP	Voltage feedback pin. By connecting a photo-coupler to close the control loop can achieve the regulation.
3	3	CS	Current sense pin, for sensing the MOSFET current.
4	4	GND	Ground.
5	5	OUT	Gate drive output to drive the external MOSFET.
6	6	VCC	Supply voltage pin.
7		NC	Unconnected Pin.
8	8	HV	Connect this pin to a positive terminal of bulk capacitor to provide the startup current for the controller. When Vcc voltage trips the UVLO(on), this HV loop will be turned off to reduce the power loss on the startup circuit.

Electrical Characteristics

($T_A = +25^\circ\text{C}$ unless otherwise stated, $V_{CC}=15.0\text{V}$)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
High-Voltage Supply (HV Pin)					
High-Voltage Current Source	$V_{CC} < UVLO(\text{on})$, HV=500V	0.5	1.0	1.5	mA
Off-State Leakage Current	$V_{CC} > UVLO(\text{off})$, HV=500V			35	μA
Supply Voltage (Vcc Pin)					
Startup Current		200	320	400	μA
Operating Current (with 1nF load on OUT pin)	$V_{COMP}=0\text{V}$		1.2		mA
	$V_{COMP}=3\text{V}$,		2.3		mA
	OLP tripped		0.61		mA
	OVP tripped, $V_{CC}=OVP$		0.70		mA
UVLO (off)		9.0	10.0	11.0	V
UVLO (on)		15.0	16.0	17.0	V
OVP Level		25.0	26.0	27.0	V
Voltage Feedback (COMP Pin)					
Short Circuit Current	$V_{COMP}=0\text{V}$	0.20	0.26	0.32	mA
Open Loop Voltage	COMP pin open	5.5	6.0		V
Green Mode Threshold VCOMP			2.75		V
Zero Duty			1.8		V
Current Sensing (CS Pin)					
Maximum Input Voltage, V_{cs_off}		0.80	0.85	0.90	V
Leading Edge Blanking Time			250		ns
Input impedance		1			$M\Omega$
Delay to Output			100		ns

Electrical Characteristics

(T_A = +25°C unless otherwise stated, V_{CC}=15.0V)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Oscillator for Switching Frequency					
Frequency		61.0	65.0	69.0	KHz
Green Mode Frequency			20		KHz
Trembling Frequency			±4		kHz
Temp. Stability	-20°C~85°C		5		%
Voltage Stability	(V _{CC} =11V-25V)			1	%
OTP Pin Latch Protection (OTP Pin)					
OTP Pin Source Current		92	100	108	μA
Turn-On Trip Level		1.00	1.05	1.10	V
Turn-Off Trip Level		0.90	0.95	1.0	V
De-latch V _{CC} Level	(PDR, Power Down Reset)		8.0		V
Gate Drive Output (OUT Pin)					
Output Low Level	V _{CC} =15V, I _o =20mA			1	V
Output High Level	V _{CC} =15V, I _o =20mA	9			V
Rising Time	Load Capacitance=1000pF		100	160	ns
Falling Time	Load Capacitance=1000pF		30	60	ns
OLP (Over Load Protection)					
OLP Trip Level		4.8	5.0	5.2	V
OLP Delay Time			64		ms
Soft Start Duration					
Soft Start Duration			2		ms
On Chip OTP (Internal Over Temperature Protection, Auto-Recovery)					
OTP Level			140		°C
OTP Hysteresis			30		°C