

ST LED Driver Guide



LED Array Sink Drivers	DC Supply Step-up	DC supply Step-down	High Power Mains supply
STP04CM05	STLD20	L497x	VIPer12A
STP08CP05	STLD40	L597x	VIPer22A
STP08DP05	LED7706	L598x	VIPer17
STP16CP05	LED7707	L69xx	L6561D
STP16CPS05	L6920	ST1Sxx	L6562D
STP16DP05	STCF01	STCS1 / STCS1A	L6565
STP24DP05	STCF02 / STCF03 Buck-Boost	STCS2 / STCS2A	
STLED316S		STCS05	

LED Array Sink Drivers

Part	Description	Vdd	Io	Eval Board
STPIC6C595	Power Logic 8-Bit Shift Register with Over Voltage protection	5V	100mA Cont.	-
STPIC6D595	Power Logic 8-Bit Shift Register with Over Voltage Protection	5V	100mA Cont.	-
STP08CP05	8-bit C.C. LED Driver	3.3 – 5.5V	5 - 100mA	-
STP16CP05	16-bit C.C. LED driver	3.3 – 5.5V	5 – 100mA	STEVAL-ILL003V2
STP16CPS05	16-bit C.C. LED driver with Auto Power-Saving	3.3 – 5.5V	5 – 100mA	STEVAL-ILL003V2
STP08DP05	8-bit C.C. LED driver with Diagnostic Feature	3.3 – 5.5V	5 – 100mA	STEVAL-ILL002V3 STEVAL-ILL002V4
STP16DP05	16-bit C.C. LED driver with Diagnostic Feature	3.3 – 5.5V	5 – 100mA	-
STP04CM05	4-bit C.C. Power LED Driver	3.3 – 5.5V	80 – 400mA	STEVAL-ILL009V1
STP24DP05	24-bit C.C. LED driver with Diagnostic Feature	3.3 – 5.5V	3 – 80mA	STEVAL-ILL015V1

LED Array Sink Drivers – STP24DP05

Key Features

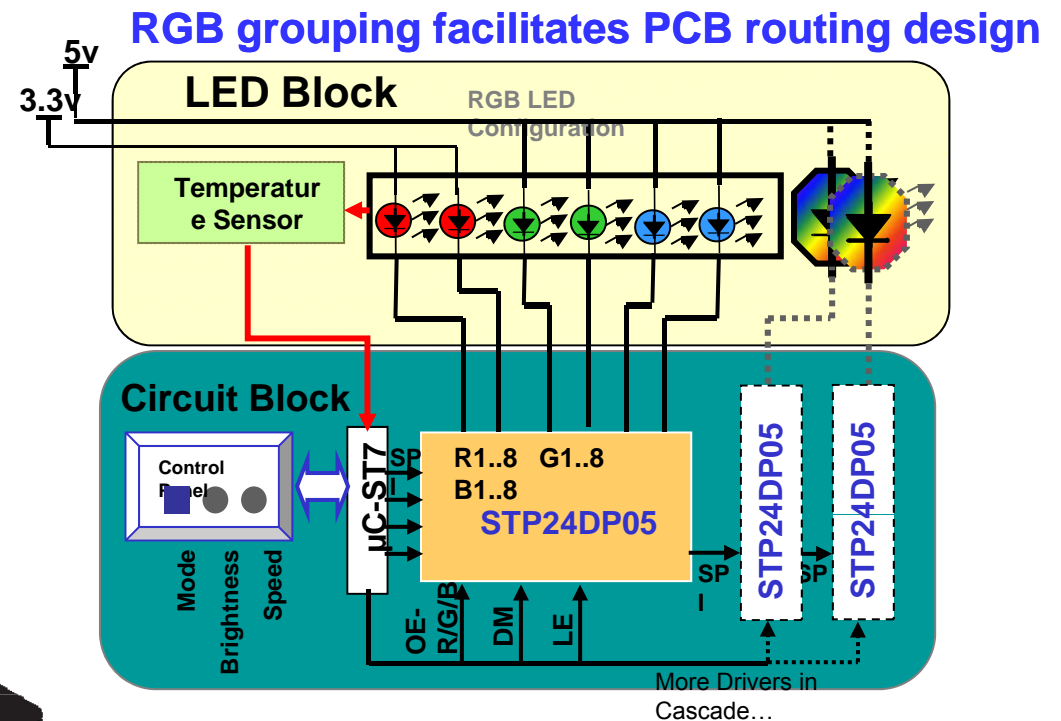
- Accept 3.3v and 5v micro driver
- 8 x 3 Channel groups of constant current output channels
- Adjustable output current through one external resistor for each group of 8-channel
- Short and Open Output Error Detection via SPI and flag pin
- Serial Data IN / Parallel Data OUT
- SPI Serial Interface
- Gradual Output Delay
- Thermal Shutdown with flag pin
- Excellent Current Accuracy
- Output Current: 5-80mA
- 25MHz Clock Frequency



TQFP48

Package

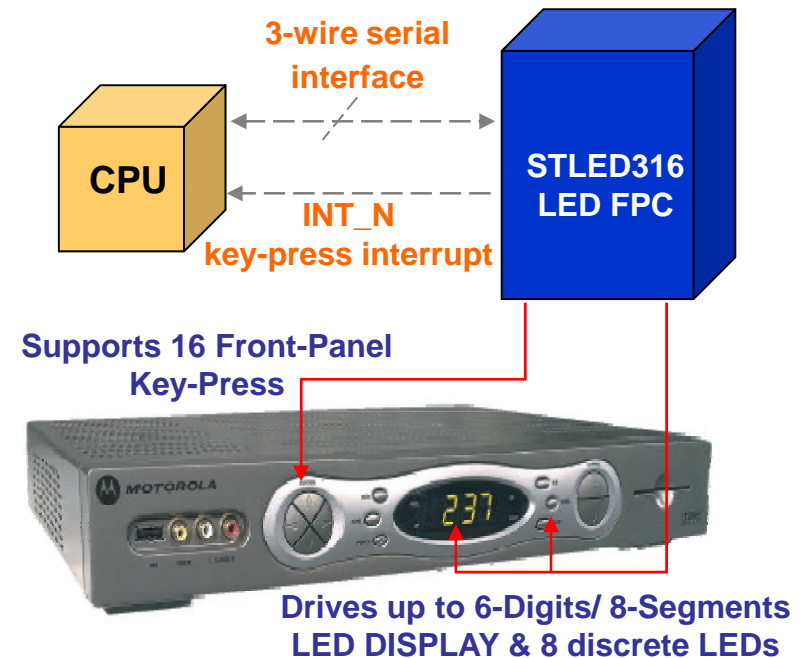
- STP24DP05BTR (TQFP48 7.0 x 7.0mm)
- Demo Board available in June 2008



STLED316 LED Display Driver

Features

- LED controller with 6 digits and 8 segments with up to 40mA of load current.
- LED controller dedicated to drive 8 discrete LEDs with individual brightness control
- 16 (8x2 matrix) Key-scanning
- Simultaneous multiple key-presses
- Low Power Consumption in Standby Mode
- 3-wire Serial Bus Interface (DIN/DOUT, CLK, STB)
- One external resistor to set the maximum output current
- 8-step dimming circuit to control the display brightness
- Inputs with Schmitt trigger give superior noise immunity
- >2kV HBM ESD protection



DC Supply – Step up

DEVICE	IOUT(A)	VOUT (V)	VIN(V)	Fsw(MHz)
L6920D	Up to 1	Adj from 2V to 5.2V	0.6V to 5.5V	PFM
L6920DB	Up to 0.8	Adj from 1.8V to 5.5V	0.8 to 5.5V	PFM
STCF01	Up to 300mA	Adj from 8V to 16.5V	2.6 to 5.5V	1.5
STCF02	Up to 600mA	Adj from 2.7 to 5.5V	2.7 to 5.5V	1.8
STLD20D	20mA	Up to 15V	2.8 to 4.2V	PFM
STLD40D	20mA	Up to 37V	2.7 to 4.2V	PFM
LED7706	Up to 30mA per channel	Up to 36V	4.7 to 36V	From 200kHz to 1Mhz
LED7707	Up to 85mA per channel	Up to 36V	4.7 to 36V	From 200kHz to 1Mhz
ST8R00	Up to 1A	Adj from 6 to 12V	4 to 6V	1.2MHz or 600Khz

LED7706

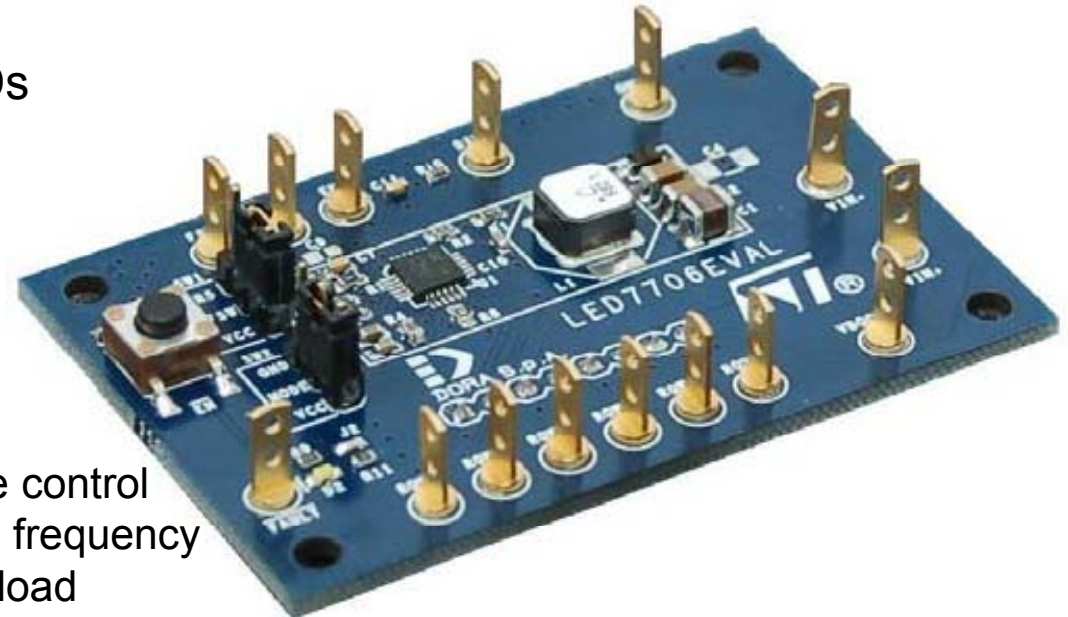
New monolithic step-up to drive LEDs

Boost section

- 4.5 V to 36 V input voltage range
- Internal +5 V LDO for device supply
- Up to 36 V output voltage
- Constant frequency peak current-mode control
- 250 kHz to 1 MHz adjustable switching frequency
- Pulse-skip power saving mode at light load
- Programmable soft-start

Backlight driver section

- Six rows with 30 mA maximum current capability (adjustable)
- Parallel-able rows for higher current
- $\pm 2\%$ current matching between rows
- LED failure (open and short-circuit)



DC Supply – Step Down

DEVICE	IOUT(A)	VOUT (V)	VIN(V)	Fsw(MHz)
ST1S03	1.5	Adj from 0.8V to 12V	3 to 17V	1.5
ST1S03A ST1S03AI	1.5	Adj from 0.8V to 5.5V	2.5 to 7V	1.5
ST1S06 ST1S06A	1.5	Adj from 0.8V to 5.5V	2.5 to 7V	1.5
ST1S09 ST1S09I	2	Adj from 0.8 to 5V	4.5 to 5.5V 2.7 to 5.5V	1.5
ST1S12	0.7	Adj from 0.7	2.5 to 6V	1.7
ST1S10	3	Adj from 0.8 to 15V	2.5 to 18V	1
L597X	Up to 2A	Adj from 1.235V to 36V	4.5 to 36V	250kHz*
L598X	Up to 2A	Adj from 0.6V to 18V	2.9 to 18V	1
L497X	Up to 3.5A	ADJ from 5V to 50V	8 to 55V	300kHz
L6902	1	Adj from 1.235V to 34V	8 to 36V	250kHz

STCS1A Constant Current Linear Controller

- Adjustable current set from 0.1A to 1.5A, set by an external resistor.
- Adjustable turn on ramp up from 10msec to 10msec, set with external capacitor to reduce the EMI noise.
- Microprocessor compatible dimming input. This input turns on/off the LED current.
- 40V Maximum Input Voltage
- MLP 3x3-8L, PowerSO-8 package.



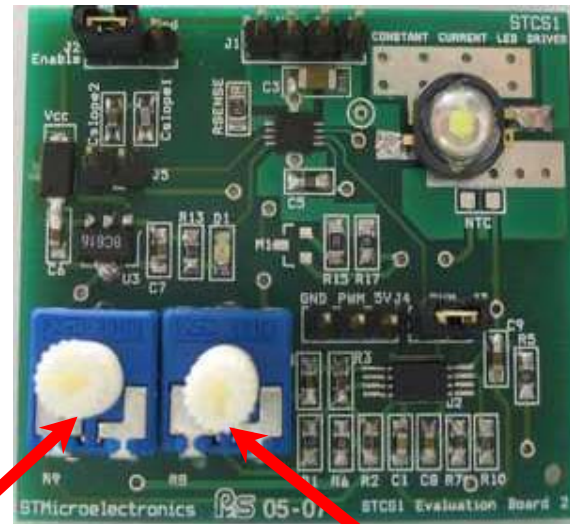
4.5V to 40V



STEVAL-ILLO14V1

Demo board features:

- Input voltage (VIN): 4.5 V to 40 V
- Less than 0.5 V voltage overhead
- Up to 1.5 A output current
- PWM dimming pin
- Shutdown pin
- LED disconnection diagnostic



Duty Cycle

PWM Frequency

STCS1A

High Voltage Supply

Realised in high voltage technology, they combine a dedicated current mode PWM controller with a high voltage power MOSFET in the same silicon chip

VIPERX2

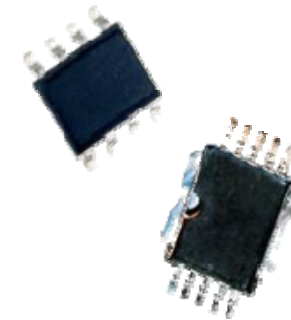
Pout = 5 to 20 W
 Vds(sw) 730V
 Rdson = 30 Ω / 17 Ω
 Idlim = 400mA/700mA
 Freq = 60k Hz
 SO8 and DIP8 packages

VIPER17

Pout = 5 to 10 W
 Vds(sw) 800V
 Rdson = 20 Ω
 Idlim = 400mA
 Freq = 60 / 120 k Hz
 SO8 and DIP8 packages

VIPER53

Pout = 30 to 65 W
 Vds(sw) 620V
 Rdson = 1 Ω
 Idlim = 2A
 Freq = set by ext. comp.
 DIP8 and PSO10 packages



These controllers can drive power MOSFETs

L6562A

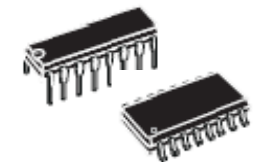
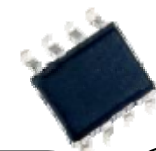
Transition-mode PFC controller
 Disable function
 On-chip RC filter on curr. sense
 Improved THD (L6562)
 Low ($\leq 70\mu\text{A}$) start-up current
 SO8 and DIP8 packages

L6565

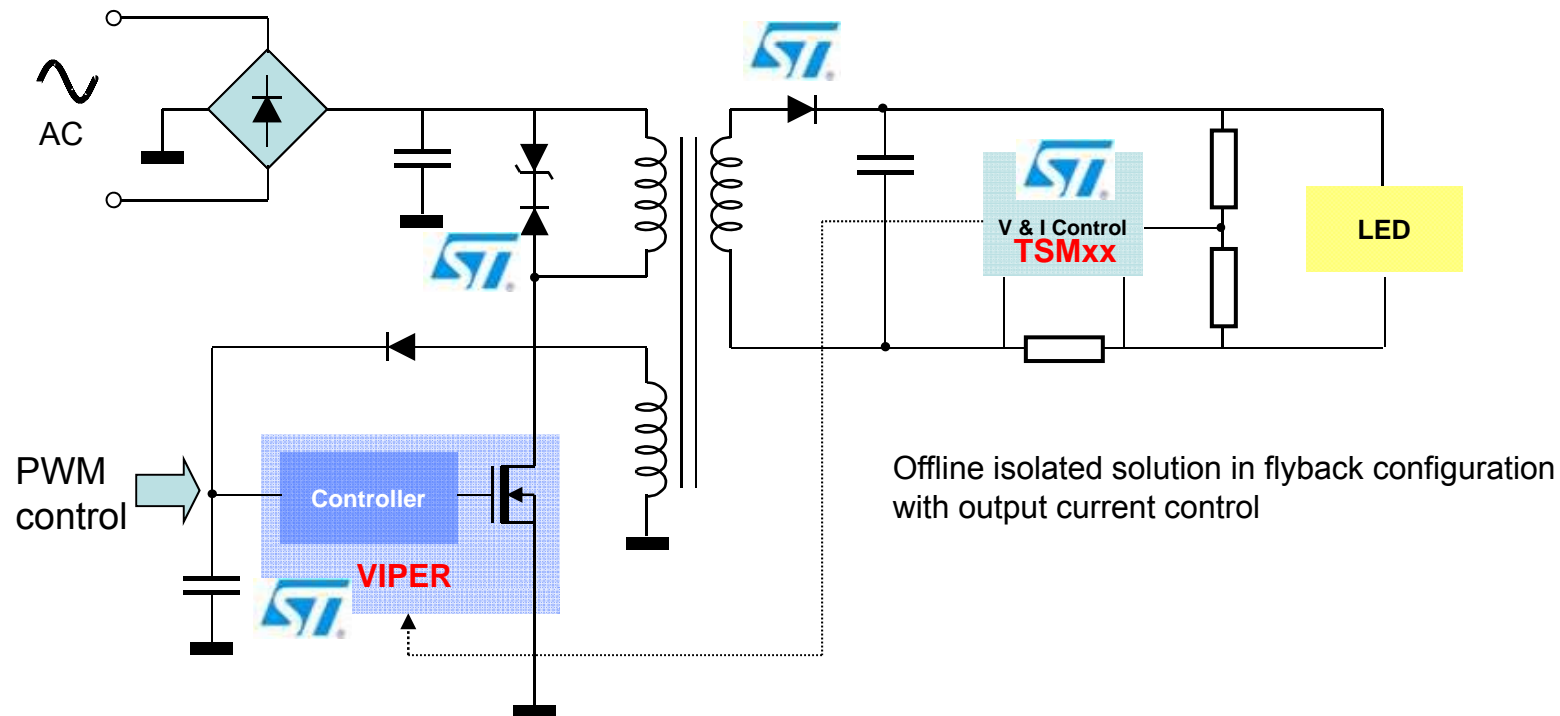
Quasi resonant SMPS controller
 Micropower start-up current ($< 75 \mu\text{A}$)
 Low quiescent current (3 mA typ.)
 Frequency foldback function
 Line voltage feedforward function
 Pulse-by-pulse overcurrent protection
 2nd overcurrent level with latched shutdown
 SO8 and Minidip8 packages

L6599

Resonant controller
 Up to 500kHz operating frequency
 Low quiescent current (1.5 mA typ.)
 Burst-mode operation at light load
 Latched disable input
 PFC Interface
 High-accuracy oscillator
 SO16N and dip16 packages



Driving LED's Using Viper Solution



Offline isolated solution in flyback configuration with output current control

- Power up to 20W
- It can drive one LED string
- Dimmable through a PWM control (down to 10%)
- Current and voltage loop
- Suitable for landscape, street and garden lighting, large area display, ...

Eval Boards & Reference Designs

<http://www.st.com/stonline/stappl/st/com/selector/index.html#querycriteria=RNP139=1081>