

Supertex Express

JAN/FEB 2014

In This Issue:
In This Issue:

Product Introductions

HV264

High Voltage MEMS Driver

HV9910C

Universal, High Brightness LED Driver

HV9803B

LED Driver with Constant Current Average Mode Control

MD1823

High Speed Four Channel MOSFET Driver

MD0200

Quad Channel Transmit/Receive Switch

MD0201

Quad Channel Cross-Point T/R Switch

HV9150

High Voltage Output Hysteretic Mode Step Up DC/DC Controller

HV2802/HV2902

32-Channel High Voltage Analog Switches

PS30

Dimmable LED Driver

Demoboards

HV264DB1

$\pm 60V$ AC Switch with Current Fold-Back Protection Demoboard

MD1823DB1

Eight Channel $\pm 60V$, $\pm 1.0A$, Ultrasound Pulser Demoboard

HV9150DB1

20mA 10VDC/265VAC LED Driver Demoboard

PS30DB1

Dimmable LED Driver Demoboard

Events

Corporate Updates

Supertex Contact Information

The Supertex Express is published by Supertex specifically for use by its Field Sales and Manufacturer's Representatives.

Contact MarCom: mktg@supertex.com

Optical Networking Market

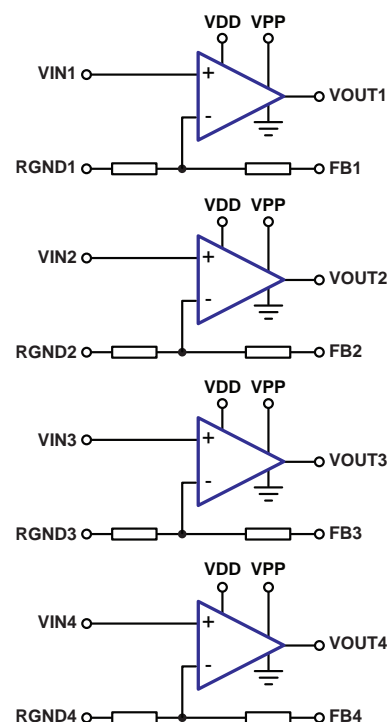
High Voltage MEMS Driver

HV264 Quad 200V Amplifier Array for High Voltage Drive Applications



MEMS applications continue to evolve and have an ever increasing impact on products and our daily lives in most major electronics markets, from high reliability, optical datacom, and medical, to industrial and consumer. Supertex is expanding its standard and custom product development to drive MEMS solutions. Supertex will increase its driver products for optical switching applications, as well as expand into a broader range of MEMS solutions. Our products will find use in communications, diagnostics and analysis, manufacturing, fabrication, and more.

The HV264 will find use in a variety of MEMS and other High Voltage Drive applications, such as driving optical MEMS and piezoelectric transducers. Versus the large amplifier array of most available solutions, the base of 4 amplifiers offers significant advantages in design layout and modularization to engineers tackling the large mix of applications for MEMS and Piezoelectric solutions. Some areas of application are MEMS micro mirror drives as seen in optical networking and communications, test and measurement, printing, component alignment, 3D position tracking and positioning such as for gaming, laser marking, small and transparent displays, biomedical instrumentation and imaging, and more. Potential piezoelectric applications include security sensors, fluid measurement, and more.



The four channels of the HV264 consist of four independent high voltage amplifiers, capable of inverting or non-inverting configurations. The outputs can swing at $9V/\mu s$, measured with a 200V supply and a 15pF load. The HV264 operates with a 200V and a 5V supply. With an integrated high value gain setting resistor for internal feedback ($66.7V/V$), no external passives for feedback are needed. Internal voltage swing is designed to proceed between 50mV and 2.85V on the input, with the output ranging from $3.33V$ to $V_{PP} - 10V$ (the DC supply voltage minus 10V.) Supertex has been a key supplier of solutions in this space, and the Company is working to expand its relationship with other key MEMS suppliers. Supertex will continue to improve its unique process capabilities, and provide increasing levels of service and value to its base of MEMS customers. ■

Optical Networking, Power Conversion Market

High Voltage Output Hysteretic Mode Step Up DC/DC Controller

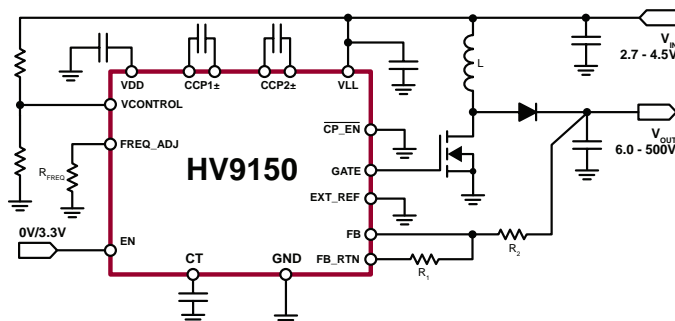
HV9150 Boost Controller for Battery Level Inputs



The HV9150 is a power management IC, a hysteretic controller that is intended to simply and easily provide a non-isolated, regulated high voltage output (6V to 500V) from a battery level input (2.7V to 4.5V). In today's world of improved battery technology and equipment portability, portable instrumentation and other industrial applications requiring high voltage often requires complex, high component count circuitry to create the necessary high voltage bias supplies. As part of its ongoing commitment to the high voltage market, the HV9150 was created to simplify high voltage regulation for these applications, in supplement to its strategy of developing next generation solutions for optical switching applications, as well as other high voltage applications.

The HV9150 is designed as a versatile, simple hysteretic controller, working at a fixed, user set frequency (40kHz to 400kHz) and duty cycle (50% to 87.5%, 4 options). This 'burst-mode' or hysteretic controller is very simple in operation, with regulation achieved through a valve-control approach, where the pulse chain is gated for drive of the main power switch in response to a droop in output voltage. Given its hysteretic nature, the controller is naturally stable, with no feedback compensation requirements to consider.

Designed to work with an external MOSFET, the HV9150 is designed to support power levels of up to 5W. The gate voltage for the off-board MOSFET can be generated from a lower voltage with an on board charge pump, or from a higher off board voltage through an on board linear regulator. Other features include a ground switch in the feedback path for power savings when the chip is in the low power state and provision for an external reference voltage. ■

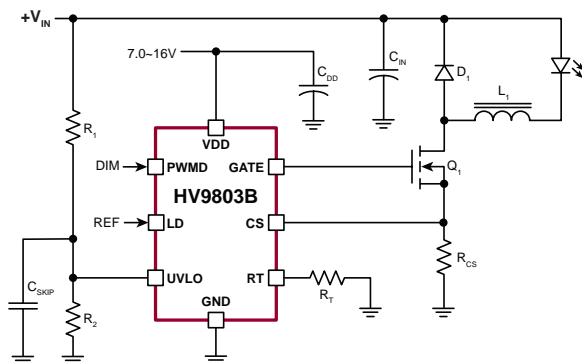


LED Lighting, LED Display Backlight Market

LED Driver Delivers High Current Accuracy via Average Mode Control

HV9803B Achieves High Accuracy without High-Side Current Sensing

The HV9803B is an open loop average-mode current control LED driver IC operating in a constant off-time mode. The IC features $\pm 2\%$ current accuracy, tight line and load regulation of the LED current without any need for loop compensation or high-side current sensing. Its auto-zero circuit cancels the effect of both the input offset voltage and the propagation delay in the current sense comparator.



The HV9803B can be powered from a 7.0 to 16V supply. The IC features fast PWM dimming response. The linear dimming input LD can accept a reference voltage from 0 to 3.0V. ■

LED Lighting, LED Display Backlight Market

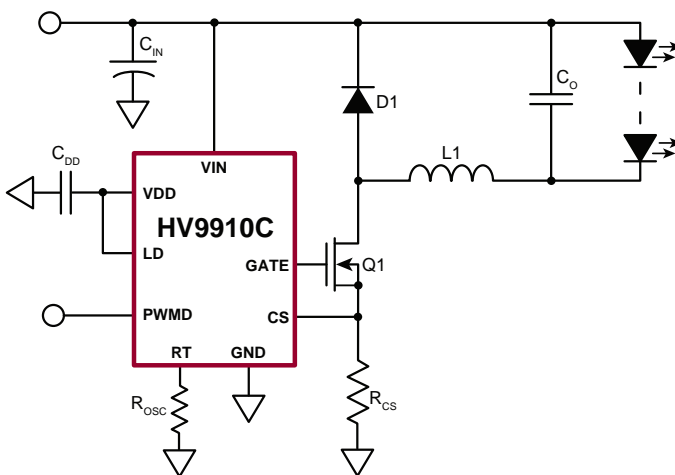
Universal, High Brightness LED Driver Offers Increased Flexibility and Efficiency

HV9910C Offers a Simple, Cost Effective Design Solution



The HV9910C is an open loop, current mode, control LED driver IC. The HV9910C can be programmed to operate in either a constant frequency or constant off-time mode. It includes a 15V – 450V linear regulator which allows it to work from a wide range of input voltages without the need for an external low voltage supply. HV9910C includes a TTL compatible PWM dimming input that can accept an external control signal with a duty ratio of 0 – 100% and a frequency of up to a few kilohertz. It also includes a 0 – 250mV linear dimming input which can be used for linear dimming of the LED current. As opposed to the HV9910B, the HV9910C is equipped with built-in thermal-shutdown protection.

The HV9910C is ideally suited for buck LED drivers. Since the HV9910C operates in open loop current mode control, the controller achieves good output current regulation without the need for any loop compensation. Also, being an open loop controller, PWM dimming response is limited only by the rate of rise of the inductor current, enabling a very fast rise and fall times of the LED current. The HV9910C requires only three external components (apart from the power stage) to produce a controlled LED current, making it an ideal solution for low cost LED drivers. ■



LED Lighting Market

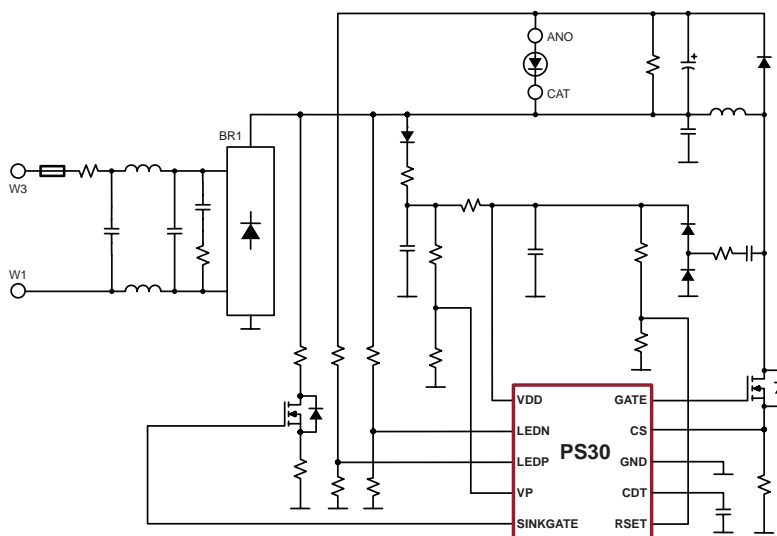
Dimmable LED Driver Provides a Low Cost Solution for Dimmable Light Bulbs/Tubes

PS30 LED Driver is Compatible with Leading and Trailing Edge Dimmers as well as Two-Wire Digital Dimmers



The PS30 LED driver IC provides a low cost driver solution for dimmable LED light bulbs/tubes. The solution offers smooth dimming to extinction for a wide variety of dimmer types such as leading edge, trailing edge, and dimmers with microprocessor controls.

The driver IC may be employed in isolated and non-isolated designs. Non-isolated designs may use a simple off the shelf inductor. Isolated designs may use a simple two winding transformer and do not require secondary side regulation circuitry or an optoisolator. ■



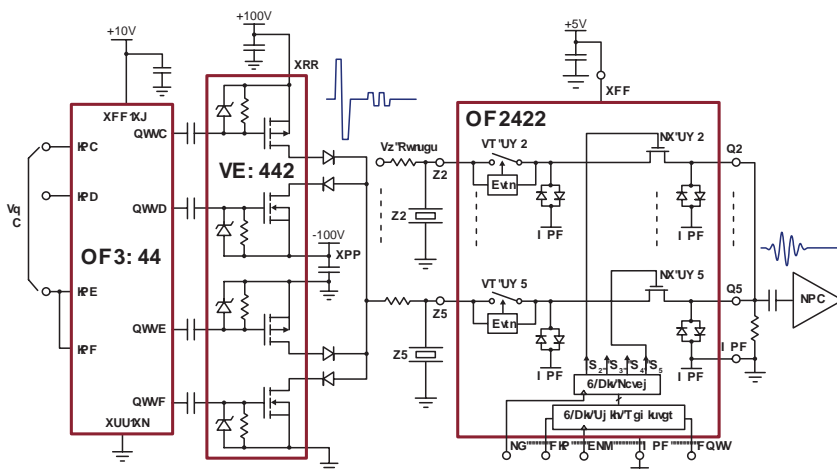
Ultrasound Market

Quad Channel Transmit/Receive Switch

MD0200 with Multiplex Functionality

The MD0200 is a high voltage, four-channel T/R switch, with a low voltage analog multiplexer designed for medical ultrasound imaging applications.

The MD0200 consists of four $\pm 130V$ T/R switches followed by four low voltage analog switches with a serial logic controlled interface. The only supply voltage needed is 5V for the logic control.



The device features a typical T/R switch resistance of 17Ω for low insertion loss. Once the T/R switch detects a voltage magnitude greater than $\pm 1.0V$, it will automatically start to turn off. In the off state, the T/R switch can withstand up to $\pm 130V$ to protect the inputs of the low noise receivers. A low voltage multiplexer is included to enable users the flexibility to route the echo signals to different receivers to optimize the image. ■

Ultrasound Market

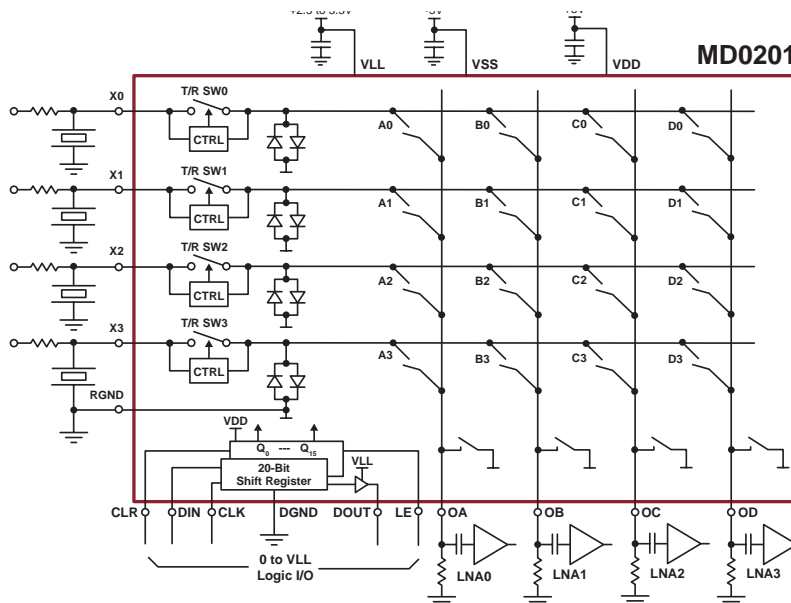
Quad Channel Cross-Point T/R Switch

MD0201 Features 4x4 Switching Topology



The MD0201 is a low voltage four-channel T/R analog cross point switch designed for medical ultrasound imaging applications. The MD0201 includes low voltage CMOS analog switches and digital control logic for serial interface control circuits, as well as provision of voltage limiting diodes and output shunt switches. The analog switches have low insertion loss, low noise, wide frequency response, high off-isolation and low channel-to-channel crosstalk.

The output shunt switches prevent overloading the low noise amplifier. Inputs are connected to the output of the two terminal type ultrasound T/R switches, with the two back-to-back diodes providing voltage limiting. The buffered serial interface data registers allows maximum design flexibility to connect multiple channels for better signal routing. ■



Ultrasound Market

High Speed Four Channel MOSFET Driver

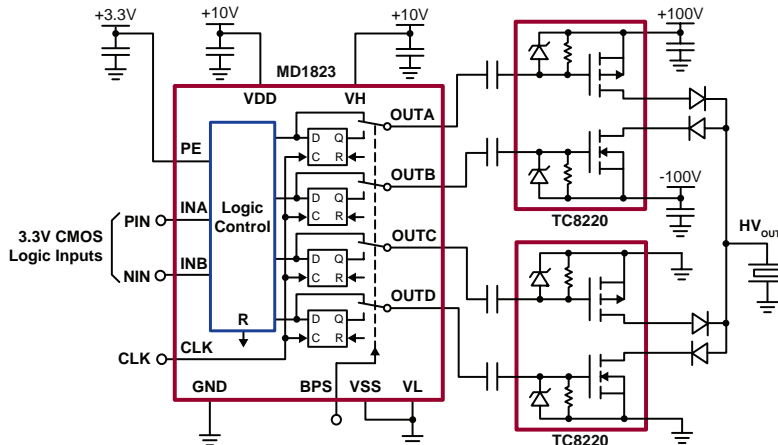
MD1823 Minimizes Delay Time Errors and Clock Jitter



The MD1823, a high-speed, four channel, MOSFET driver designed to drive high voltage N- and P-channel MOSFETs for medical ultrasound imaging applications and other applications requiring a high output current for a capacitive load.

The MD1823 features a clock input pin to help realign the input control pins to a master clock signal. This will help minimize delay time errors and clock jitter.

A logic input pin, BPS, can be tied high for users not wanting to use the clock realignment feature (if BPS = 1, the clock and registers are ignored). Additionally, the MD1823 only uses two input pins for the three level RTZ ultrasound pulser MOSFET gate driver. This feature reduces the FPGA I/O requirement, which simplifies the PCB layout. ■

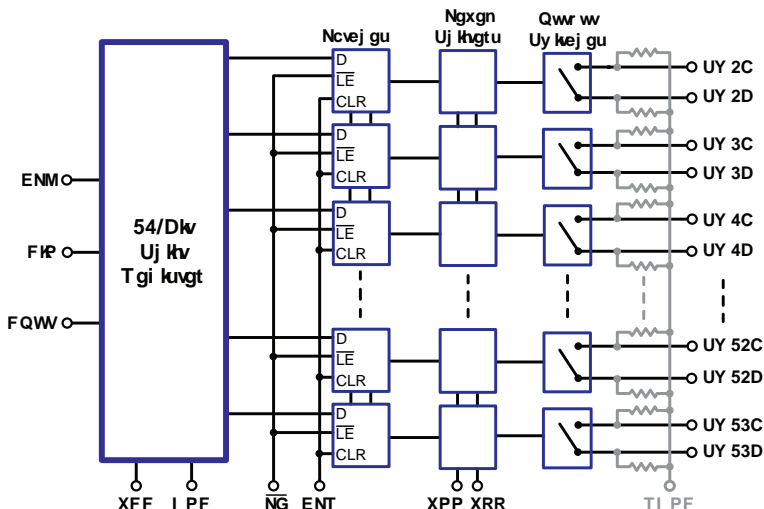


Ultrasound Market

32-channel High Voltage Analog Switches Enhance Image Quality for Medical Ultrasound Applications

HV2802/HV2902 Feature SPST Configuration

The HV2802 and HV2902 are low charge injection, 32-channel, high voltage analog switches intended for use in applications requiring high voltage switching controlled by low voltage control signals, such as medical ultrasound imaging, driving piezoelectric transducers, and printers. The HV2902 has bleed resistors, which eliminate voltage built up on capacitive loads such as piezoelectric transducers.

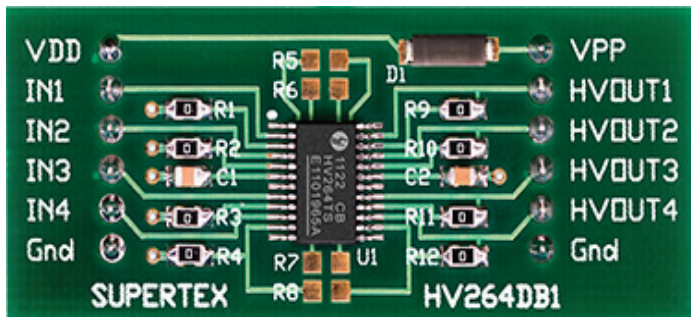


Input data are shifted into a 32-bit shift register that can then be retained in a 32-bit latch. To reduce any possible clock feed through noise, the latch enable bar should be left high until all bits are clocked in. Data are clocked in during the rising edge of the clock. Using HVC MOS technology, this device combines high voltage bilateral DMOS switches and low power CMOS logic to provide efficient control of high voltage analog signals. ■

JX4: 24" JX4: 24"

Optical Networking Market**HV264DB1: Quad, High Voltage Amplifier Array Demoboard**

The HV264TS-G is a quad high voltage amplifier array device in a 24-pin TSSOP package.



Parameter	Value
V_{PP} high voltage supply	200V
V_{DD} low voltage supply	4.5 to 5.5V
HV_{OUT} output voltage swing	1.0V to $V_{PP} - 10V$
V_{IN} Input signal range	0 to $V_{DD} - 1.5V$
A_v closed loop gain	66.7V/V with internal feedback resistors
Typical SR output slew rate	9.0V/ μ s
I_{PEAK} output peak current	3.0mA

The HV264DB1 demo board provides a platform to evaluate this device. This demoboard requires only a minimum setup including a VDD low voltage supply, a VPP high voltage supply, and a signal source. The demoboard provides the input/output connections through two 6-pin headers.

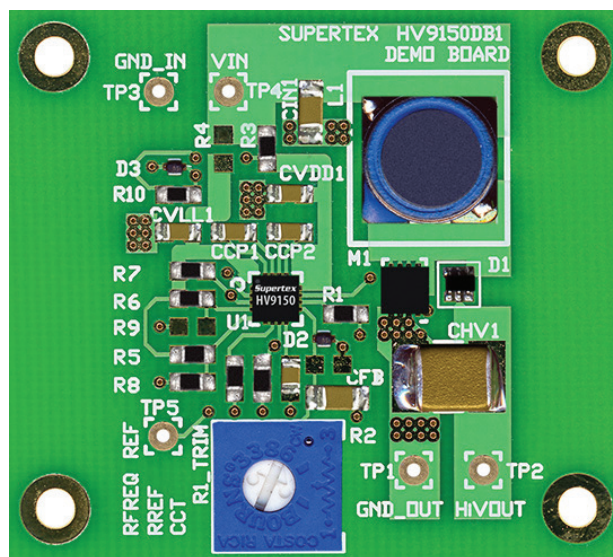
For detailed electrical performance, please refer to the HV264 datasheet. ■

Optical Networking, Power Conversion Market**HV9150DB1: Hysteretic DC/DC Controller Demoboard**

The Supertex HV9150DB1 demoboard is for the evaluation of the HV9150 hysteretic DC/DC controller. This demoboard consists of all necessary components to create a 5V to 200V step up converter capable of providing 600mW of output power.

This DC/DC converter has a single voltage input and a single voltage output. The demoboard is configured to use the internal voltage reference. In addition, the user also has access to an external voltage reference pin if it is preferred. The output voltage can be adjusted from 50V to 200V by adjusting the potentiometer next to the output terminals. The potentiometer is used in the resistor feedback network for demonstration purposes.

Parameter	Value
V_{IN} input voltage	4.75V to 5.25V
V_{OUT} output voltage	50V to 200V
I_{OUT} output current	3mA max at 200V
Operating frequency	200kHz typical

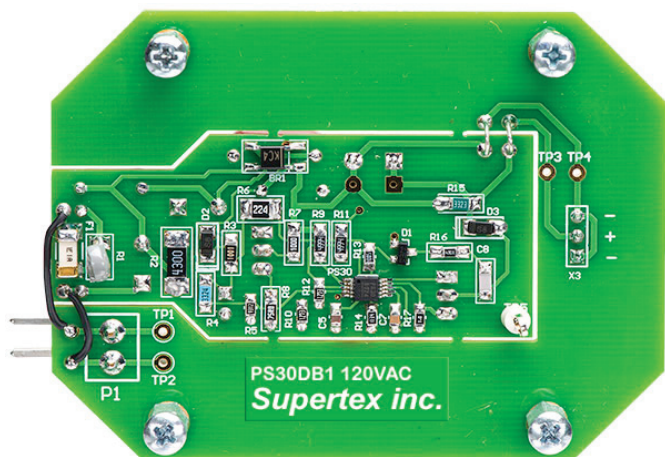


The demoboard shows that all necessary components for this 600mW converter can be packed into a square inch, single sided, PCB area. To ensure a stable operation of the DC/DC converter, it is recommended that a low ESR bulk decoupling capacitor be connect at the input voltage supply. ■

LED Lighting Market

PS30DB1: Dimmable LED Driver Demoboard

The Supertex PS30DB1 demoboard design features the PS30 LED driver for operating a 6W load on a 100VAC or 120VAC line. No flicker is observed for a wide variety of leading edge and trailing edge dimmers.



Parameter	Specification
-----------	---------------

LED Load

Voltage	90VDC
Current	70mADC
Power	6.3W
Current Ripple	33%

AC Line

Voltage	120VRMS $\pm 15\%$
Current	65mARMS
Power	7.8W
PF	92%
THD	EN61000-3-2 Class C
EMI	CISPR 15

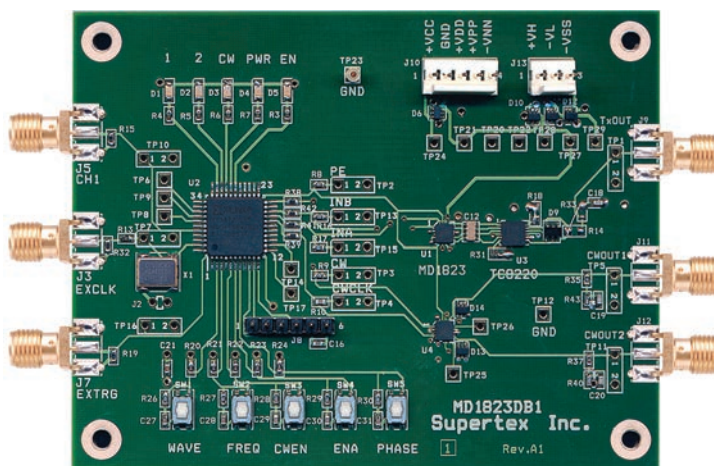
The PS30 is capable of driving the LED load in a non-isolated configuration, as demonstrated here, and in an isolated configuration by replacing the inductor with a transformer. In the isolated configuration current is controlled at the primary side, and consequently no optoisolator is required. ■

Ultrasound Market

MD1823DB1: Three Level High Speed $\pm 100V$ 2.5A Pulser Demoboard

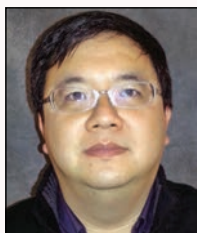
The MD1823DB1 is a demoboard for a three level $\pm 100V$ 2.5A pulser chip-set of the MD1823 MOSFET driver and the TC8220 MOSFET. The demoboard consists of one MD1823 in the 3x3mm 16-lead QFN package driving the TC8220 which has two pairs of high speed and high voltage complimentary P- and N-MOSFETs in one 4x4mm 12-lead DFN package. This circuit is an ideal, cost-optimized, high voltage and high current RTZ ultrasound transmit pulser.

There is a second MD1823 wired as low jitter synchronized CW waveforms generator. The supply voltages for the CW demo waveforms can be varied from ± 2.375 to $\pm 5.5V$. The CPLD-programmable logic circuit, with 40MHz crystal oscillator, generates accurately timed high-speed waveforms on a separate CPL board. Multiple frequency and waveform combinations can be selected as bipolar pulse waveforms. An external clock input can be used if the on-board oscillator is disabled. The external trigger input can be used to synchronize the output waveforms. There are five push buttons for selecting demonstration waveform, frequency, phase, and mode functions. Color LEDs indicate the demo selection states. Jumpers on the board can select either the 330pF/2.5k on-board load or user test loads. ■



New Technical Marketing Manager

Ultrasound Product Line



Contact information

Chris Cheung
Technical Marketing Manager
Ultrasound Product Line
(408) 222-4849
E-mail: ChrisC@supertex.com

Please join us in welcoming Chris Cheung as our new Technical Marketing Manager. His primary focus will be on our ultrasound product line. Chris earned his BSEE in Electrical and Computer Engineering from University of Wisconsin and has over 15 years of experience in the ultrasound industry. Prior to Supertex, he served as an Ultrasound Hardware Engineering Manager in the research and development department of Ultrasonix Medical Corporation located in Canada.

Throughout his career he has been involved in developing five successful medical ultrasound platforms including the SonixRP system, which is widely used by medical ultrasound researchers.

We are pleased that Chris has joined our Marketing Department and look forward to his contributions in both strategic and tactical marketing activities for our organization.

New Field Application Engineer

Eastern & Central North America Region

Supertex proudly presents our new Field Applications Engineer, John Billingsley. John is based in Arlington, Texas, covering the Eastern and Central North America Sales Region and will be responsible for providing technical support to our sales staff and customers.

John has a BS in Electrical Engineering from Texas A&M University and a BS in Physics from Sam Houston State University. He is an experienced leader with technical expertise in power conversion, design tool development, analog/digital hardware design, software design, and electromagnetic compliance. Having a strong focus on customer satisfaction, John is an effective communicator, is innovative, and has strong teaming and leadership skills. A 30-year veteran of the personal computer, networking, datacom / telecom, semiconductor, and defense industries, he has served companies such as Texas Instruments, Micron, AMD, Dell, Intersil, Zilker Labs, Texas Microsystems and Xplore Technologies.



Contact information

John Billingsley
Field Application Engineering
Eastern & Central North America
Tel: (817) 385-0652
E-mail: JohnB@supertex.com

New Marketing Manager

Asia Pacific Region



Contact information

Ricky Chin
Marketing Manager
Asia Pacific Region
Tel: +852 2350 7360
E-mail: rickychin@supertex.com

Supertex is pleased to present Ricky Ching, our new Marketing Manager for the Asia Pacific Region. Ricky has over 16 years combined marketing and engineering experience in the semiconductor industry. Prior to Supertex, Ricky has held senior marketing and engineering roles at Texas Instruments, National Semiconductor, and ON-Semiconductor/Motorola. Ricky has earned an MSEE in IC Design Engineering at the Hong Kong University of Science & Technology

(HKUST) and a BSEE at Cal Poly San Luis Obispo. We are confident that Ricky will drive and explore new business in the region to meet our corporate strategies.

Strategies in Light

Strategies in Light - Japan
Yokohama, Japan
October 16-18, 2013

Supertex displayed and demonstrated its latest LED products at Strategies in Light in Yokohama, Japan. This conference & exhibition is held annually in addition to the original US event and brings new focus to the LED market in Japan.

For the past 4 consecutive years, LED Japan/ Strategies in Light maintains a robust attendance of more than 5,000 attendees. LED Japan/ Strategies in Light 2013 provided insight into the rapidly developing markets for incandescent and fluorescent replacement, decorative and industrial light fixtures, traffic signals and street lamps, automotive lighting, television and monitor display backlighting as well as other major trends in applications, industry structure, government policies, and technologies that will affect the industry's future.



Yoichi Onodera (left) and Takashi Abe (right) of Supertex.



LUX live 2013
London, England
October 20-21, 2013

LUX Live is an exhibition held in London, UK. It covers all aspects of lighting, including booths aimed at lamp fixture designers and building lighting designers - more art than engineering. However, there were booths showing electronic components, heatsinks, PCBs and materials for making LED lamps.



Steve Winder (left) and Juan Sivelo (right) of Supertex.

This year the exhibition had grown, with more booths than before. Supertex shared a booth with our UK distributor, Anglia Components, and we saw a number of both existing and potential new customers.

On display was the PS30 demo, with a phase dimmer that showed smooth dimming over its entire range. In addition, we took a HV9805 demo with Cree LEDs that was enclosed in a clear plastic box, powered from the AC line (230V AC) - allowing visitors to see the circuit without being electrocuted! Many were fascinated by the CL8800 circuit driving 96 LEDs, and its operation was described many times during the show.



InterLight - Moscow

Moscow, Russia
November 5-8, 2013

Interlight Moscow powered by Light+Building is a significant lighting exhibition in Moscow, which covers decorative and technical lighting, electrical engineering, home and building automation.



From left to right: Galina Polozova (Galant), Alexey Khirsa (Galant), Rudi Hauser (Supertex), Savva Shaposhnikov (Galant), and Juan Sivelo (Supertex).



From left to right: Leonid Krasnopolyanskiy (Galant), Alexey Khirsa (Galant), Rudi Hauser (Supertex), Savva Shaposhnikov (Galant), and Juan Sivelo (Supertex).

This year the total number of visitors for this exhibition reached over 37,000 visits. Together with our Russian Distributor, Galant, we presented our latest LED driver products such as the CL8800, the HV9805, and the PS30. We had meetings with several new potential customers and displayed CL8800 and HV9805 demos at our booth.



Forum LED Europe

Paris, France
November 26-27, 2013

Forum LED is a joint conference and exhibition held in Paris, France. The conference presents science and engineering papers on LEDs and LED system engineering. The exhibition had booths from component distributors (we shared a booth with our French distributor, Aptech).



Steve Winder of Supertex.

Other booths had design consultants, instrumentation companies, and engineering companies providing LED driver modules.

Along with the PS30 demonstration, we took a different HV9805 demo, in the same type of clear plastic box, but this time using Lextar LEDs because our French distributor also represents Lextar. We showed a different CL8800 circuit; this one having just 11 COB LEDs from Osram. A few pre-arranged meetings were also held at our booth.

Corporate Headquarters

Corporate Headquarters

1235 Bordeaux Drive
Sunnyvale, CA 94089
Phone: (408) 222-8888
Fax: (408) 222-4800
E-mail: prodinfo@supertex.com
<http://www.supertex.com>

Factory Application Engineering

1235 Bordeaux Drive
Sunnyvale, CA 94089
Phone: (408) 222-8888
Fax: (408) 222-4895
E-mail: apps@supertex.com

Technical Support

North America - West

Rex Caballero

1235 Bordeaux Drive
Sunnyvale, CA 94089
Phone: (408) 222-4831
Fax: (408) 222-4895
E-mail: rex@supertex.com

North America - Central & East

John Billingsley

2401 Avenue J St.
Suite 244
Arlington, Texas 76006
Phone: 817 385-0652
Fax: 817 633-1184
E-mail: johnb@supertex.com

China South

Strong Li

Rm. No. 1512, Securities Building
5020 Binhe Road
Shenzhen, China 518033
Phone : +86 755 3334 8086
Fax: +86 755 3334 8086
E-mail: qli@supertex.com

China North

Ding Xing

Room 1805, Building B, Oasis Square
No.137 Bailan Road
Putuo District
Shanghai, China 200063
Phone: +86 21 6380 4350
Fax: +86 21 6380 4350
E-mail: xding@supertex.com

Europe

Rudi Hauser

Pasinger Str. 90
82166 Gräfelfing, Germany
Phone: +49 89 7090 7601
Fax: +49 89 7090 7602
E-mail: rudih@supertex.com

Steve Winder

"Hideaway" Tailor's Green
Bacton STOWMARKET
Suffolk, IP14 4LL
United Kingdom
Phone: +44 1449 782 930
Fax: +44 1449 782 980
E-mail: steve@supertex.com

Japan

Yoichi Onodera

Mitsuki Kotobuki-cho Building 3F
1-1-3 Kotobuki-cho Fuchu-shi
Tokyo, Japan 183-0056
Phone: +81 42 354 7277
Fax: +81 42 354 7278
E-mail: onodera@supertex.com

Korea

KS Jeong

C-2611 Intellige II,
JeongJa-Dong
BunDang-gu, SeongNam-Si
Kyungki-do, Korea 463-841
Phone: +82 16 315 -6034
E-mail: ksjeong@supertex.com

Taiwan & South Asia

Ray Huang

Room 310, 3F, No. 160, Sec. 2
Nan King E. Road
Taipei City, Taiwan R.O.C.
Phone: +8862 2517 9110
Fax: +8862 2517 9120
E-mail: rayh@supertex.com

Supertex Sales Offices

Worldwide Sales

Pete Petersen

2401 Avenue J St.
Suite 244
Arlington, Texas 76006
Phone: (817) 385-0201
Fax: (817) 633-1184
E-mail: petep@supertex.com

North America - East

Andy Sabol

344 Main Street
P.O. Box 108
Oley, PA 19547
Phone: (610) 987 3241
Fax: (610) 987 3264
E-mail: andys@supertex.com

North America - West

Rex Caballero

1235 Bordeaux Drive
Sunnyvale, CA 94089
Phone: (408) 222 4831
Fax: (408) 222 4895
E-mail: rex@supertex.com

Europe, Middle East, Africa

Juan Sivelo

Office 7, 9 Disraeli Road
London, SW15 2DR
United Kingdom
Phone: +44 (208) 780 0975
Fax: +44 (788) 468 9186
E-mail: juans@supertex.com

Taiwan & South Asia

Charles Hsu

Room 310, 3F, No. 160, Sec. 2
Nan King E. Road
Taipei City, Taiwan R.O.C.
Phone: +88 62 2517 9110
Fax: +88 62 2517 9120
E-mail: charlesh@supertex.com

China South

Simon Ni

Rm. No. 1512, Securities Building
5020 Binhe Road
Shenzhen, China 518033
Phone : +86 755 3334 8086
Fax: +86 755 8322 2952
E-mail: simonni@supertex.com

China North

Leo Yang

Rm. 1805, Building B, Oasis Square
No.137 Bailan Road
Putuo District
Shanghai, China 200063
Phone: +86 21 6380 4350
Fax: +86 21 6380 4350
E-mail: leoy@supertex.com

Japan

Takashi Abe

Mitsuki Kotobuki-cho Building 3F
1-1-3 Kotobuki-cho Fuchu-shi
Tokyo, Japan 183-0056
Phone: +81 42 354 7277
Fax: +81 42 354 7278
E-mail: t.abe@supertex.com

Korea

Peter Jeong

A-3308 Intellige II, JeongJa-dong
BunDang-gu, SeongNam-Si
Kyungki-do, Korea 463 841
Phone: +82 31 719 1994
Fax: +82 31 719 1985
E-mail: peterj@supertex.com