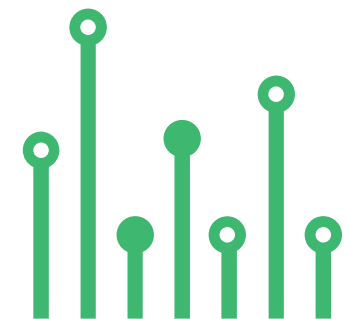


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POWER SUPPLY



Phase-Shifted Full-Bridge Controller with Synchronous Rectification **USING UCC28950**



SKU: EL144736

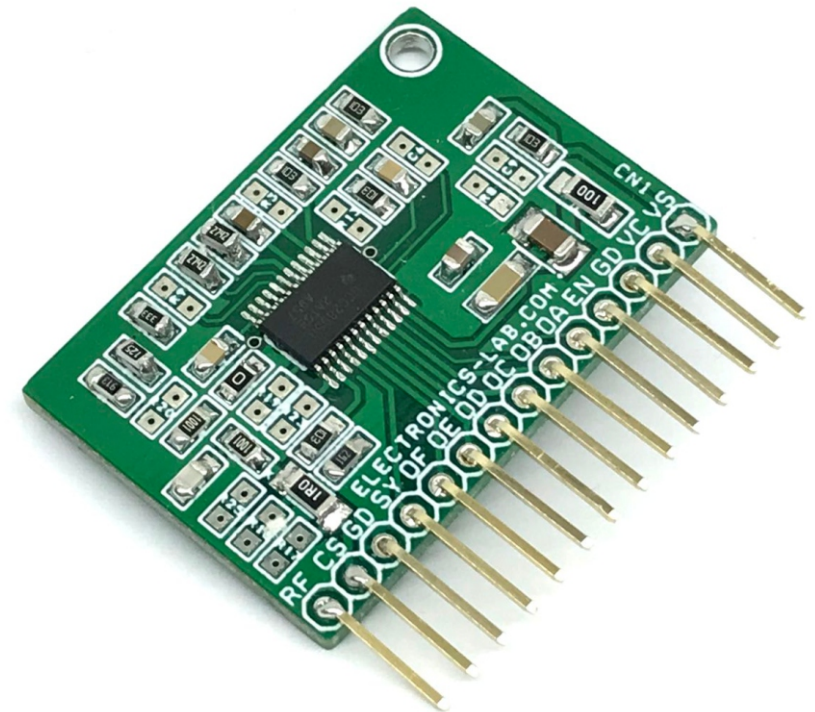
Phase-Shifted Full-Bridge Controller with Synchronous Rectification Using UCC28950



The Phase-shifted full-bridge controller with synchronous rectification carrier board contains all of the features necessary to implement a phase-shifted full-bridge with synchronous rectification topology power converter. All inputs and outputs pins are accessible using header connector. High efficiency DC-DC converter can be created using this carrier board + External H-Bridge and Transformer. Refer data sheet of UCC28950 and schematic to configure the various frequency, current feedback, voltage feedback and delays etc.

FEATURES

- Operating power supply 12V (Range 8V to 17V DC)
- Internal reference voltage 5V
- Converter switching frequency setting range, FSW (nom) 50-1000Khz
- Programmable delay range between OUTA, OUTB and OUTC, OUTD set by resistors DELAB and DELCD and parameter KA(1) : 30ns-1000ns
- Programmable delay range between OUTA, OUTF and OUTB, OUTE set by resistor DELEF, and parameter KEF(1): 30ns-1400ns
- Programmable DCM range as percentage of voltage at CS(1) : 5% – 30%
- Programmable TMIN range: 100ns-800ns
- Enhanced Wide Range Resonant Zero Voltage Switching (ZVS) Capability
- Direct Synchronous Rectifier (SR) Control
- Light-Load Efficiency Management Including
- Burst Mode Operation
- Discontinuous Conduction Mode (DCM), Dynamic SR On and Off Control with Programmable Threshold
- Programmable Adaptive Delay
- Average or Peak Current Mode Control with Programmable Slope Compensation and Voltage Mode Control
- Naturally Handles Pre-Biased Start Up with DCM Mode
- Closed Loop Soft Start and Enable Function
- Programmable Switching Frequency up to 1 MHz with Bi-Directional Synchronization



- ($\pm 3\%$) Cycle-by-Cycle Current Limit Protection with Hiccup Mode Support
- 150- μ A Start-Up Current
- VDD Undervoltage Lockout
- Wide Temperature Range -40°C to $+125^{\circ}\text{C}$
- PCB Dimensions 36.20 X 25.24MM

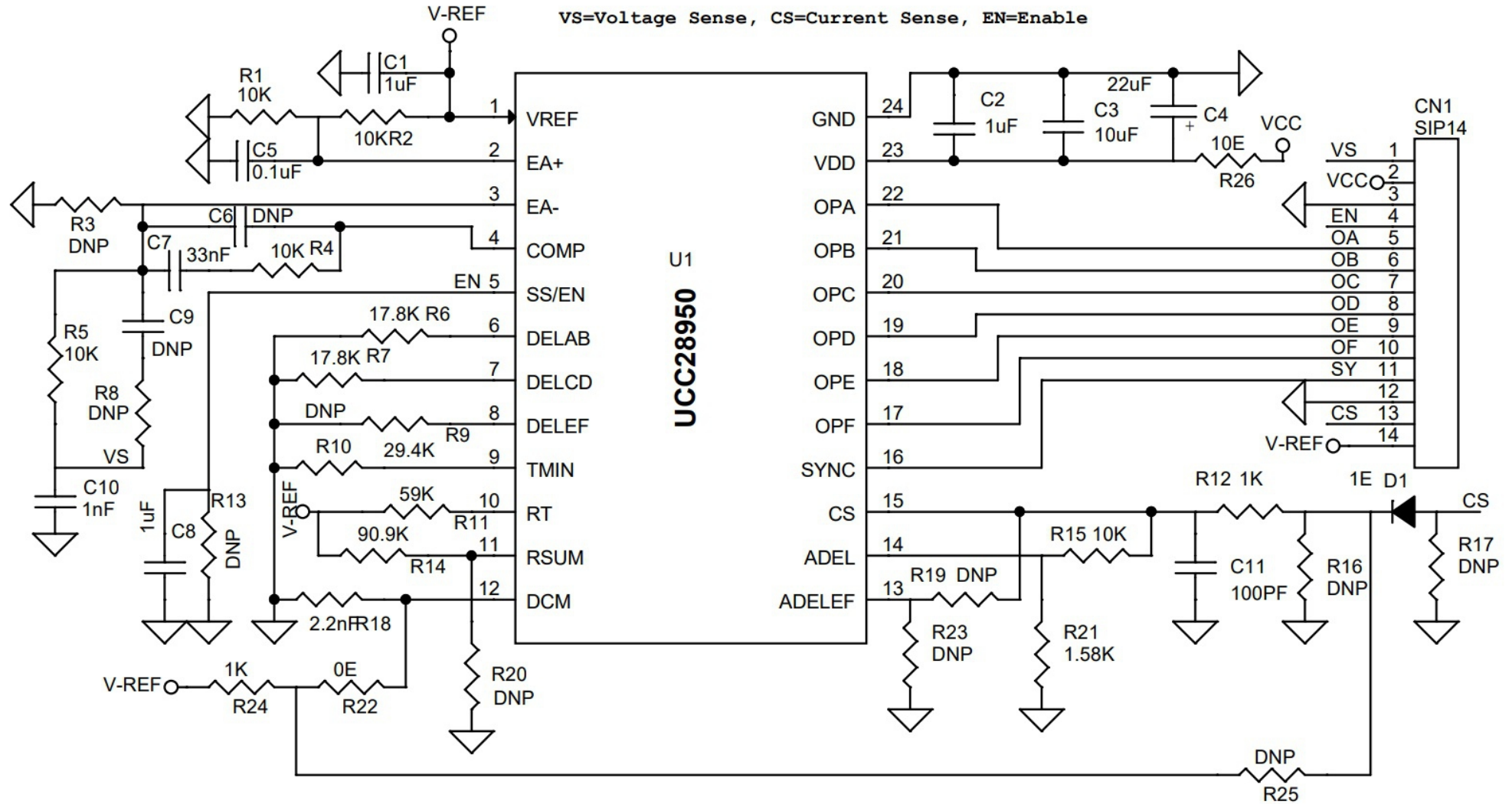
The UCC28950 enhanced phase-shifted controller builds upon Texas Instrument's industry standard UCCxx8950 phase-shifted controller family with enhancements that offer best-in-class efficiency in today's high-performance power systems. The UCC28950 implements advanced control of the full-bridge along with active control of the synchronous rectifier output stage.

The primary-side signals allow programmable delays to ensure ZVS operation over wide-load current and input voltage range, while the load current naturally tunes the secondary-side synchronous rectifiers switching delays, maximizing overall system efficiency.

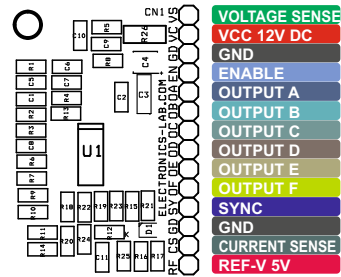
The UCC28950 also offers multiple light-load management features including burst mode and dynamic SR on/off control when transitioning in and out of Discontinuous Current Mode (DCM) operation, ensuring ZVS operation is extended down to much lighter loads.

In addition, the UCC28950 includes support for current or voltage mode control. Programmable switching frequency up to 1 MHz and a wide set of protection features including cycle-by-cycle current limit, UVLO and thermal shutdown. A 90-degree phase-shifted interleaved synchronized operation can be easily arranged between two converters.

Schematic



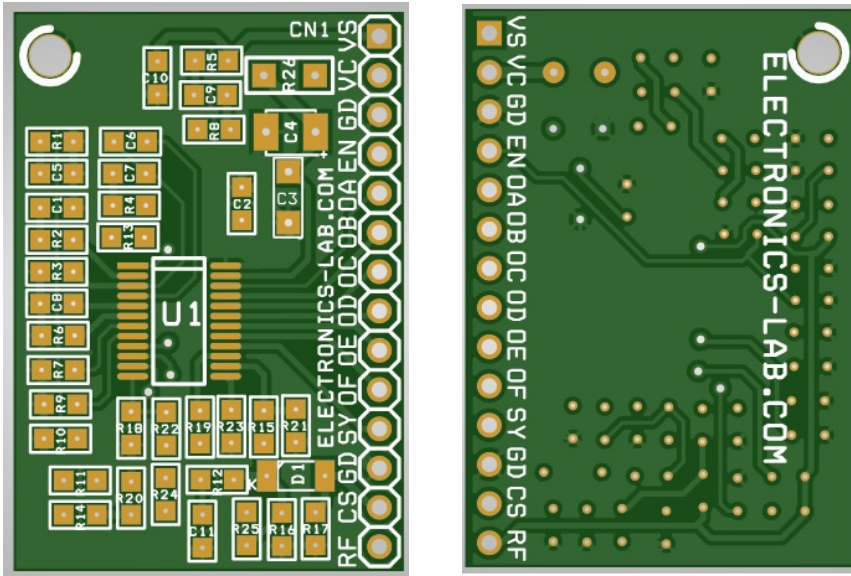
Connections



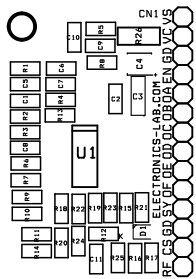
Connections: Connectors Cn1

- Pin 1 VS = Voltage Sense (Voltage Feedback)
- Pin 2 VCC = Power Supply 12V DC (Range 8V-17VDC)
- Pin 3 = GND
- Pin 4 = Enable/Softstart
- Pin 5 = Output A
- Pin 6 = Output B
- Pin 7 = Output C
- Pin 8 = Output D
- Pin 9 = Output E
- Pin 10 = Output F
- Pin 11 = SYNC
- Pin 12 = GND
- Pin 13 = Current Sense (Current Feedback)
- Pin 14 = VREF 5V DC

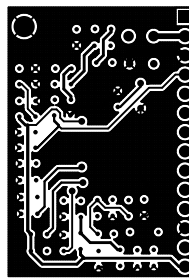
PCB



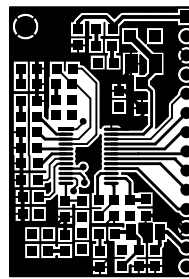
PCB GERBER
FILES
AVAILABLE



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB Dimensions 36.20 X 25.24MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	14 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5325-ND
2	3	C1,C2,C8	1uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
3	1	C3	10uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
4	1	C4	22uF/25V CERAMIC SMD SIZE 1210	YAGEO/MURATA	DIGIKEY	
5	1	C5	0.1uF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	12	R3,C6,R8,R9,C9,R13,R16,R17,R19,R20,R23,R25	DNP	YAGEO/MURATA	DIGIKEY	
7	1	C7	33nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
8	1	C10	1nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
9	1	C11	100PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	D1	1E 5% SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
11	5	R1,R2,R4,R5,R15	10K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	2	R6,R7	17.8K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R10	29.4K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	R11	59K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
15	2	R12,R24	1K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
16	1	R14	90.9K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
17	1	R18	2.2nF/50V SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
18	1	R21	1.58K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
19	1	R22	0E SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
20	1	R26	10E 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
21	1	U1	UCC28950	TI	DIGIKEY	296-34760-5-ND

All Optional/DNP capacitors and resistors are SMD size 0805



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