PRELIMINARY

EB30005

30W Single DC/DC Converter

9.5-18V_{in} 6V_{out} @ 5 A

Key Features

- Efficiency up to 84%
- Six-sided shielding
- Output synchronous rectification
- 2:1 input voltage range
- Input-to-output isolation
- Soft start
- External synchronization
- Short circuit protection
- Thermal protection
- Industry standard pinout
- Output Voltage Adjust

Applications

Electronic Data Processing (EDP)

Instrumentation/Industrial/Medical

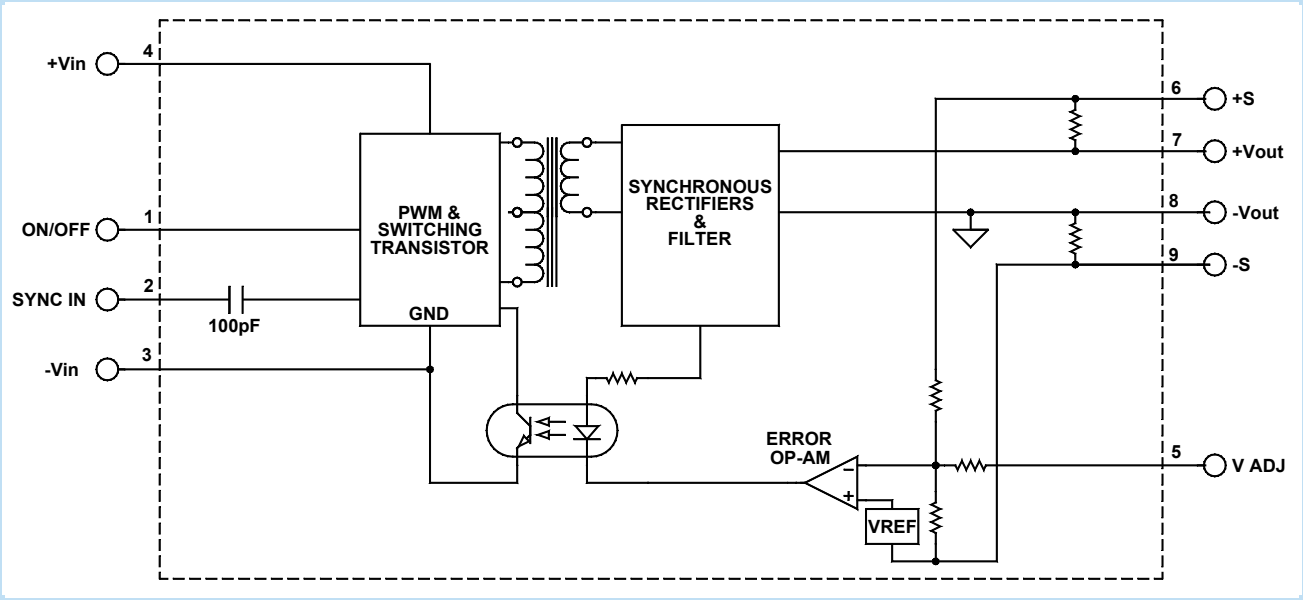
Communications

Computers

Fiber Optics

Functional Description

The EB30005 is an isolated 30W single output DC/DC converter that accepts 9.5 to 18V_{IN} and provides 6V_{OUT}@5A. It is designed to synchronize with a 50% duty cycle, AC-coupled, TTL sync input. The push-pull topology and output synchronous rectification allow for continuous operation even at low input voltage with maximum efficiency. Six-sided shielding with external synchronization minimizes EMI and RFI . Protection features allow the converter to operate in harsh environments.The output is designed to be adjusted from 4V to 8V, when a voltage source from 0V to 5V is applied at V_{OADJ} pin(pin5).



Typical Block Diagram

Electrical Specifications

INPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range		9.5	12	18	Vdc
Input Startup Voltage, $12V_{IN}$		8.2			Vdc
Undervoltage Shutdown, $12V_{IN}$		7.7			Vdc
Input Filter	Capacitor				
No Load Input Current			.128		A
Input Current			2.927		A
Input Surge Current (20µS Spike)				10	A
Short Circuit Current Limit			125	150	% I_{IN} Max
Off State Current			150		µA
Remote ON/OFF Control					
Supply ON	Pin 3 Open (Open circuit voltage: 10V Max.)				
Supply OFF		0		0.6	Vdc
Lofic Input Reference	TO -VIN				
Logic Compatibility	TTL Open Collector or CMOS Open Drain				

OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Voltage and Current Ratings			6		
Output Voltage Accuracy			1	2	%
Output Voltage Adjustment		4		8	V
Output Current			5.0		A
Ripple & Noise	See Figure1.		1	2	$\%V_{PP}$ of V_{OUT}
Line Regulation	Minimum V_{IN} to maximum V_{IN}		±0.04	±0.1	%
Load Regulation	NL to FL		0.05	0.1	%
Temperature Coefficient @ FL			0.02		%/°C
Transient Response Time	50% FL to FL to 50% FL, See Figure 3		25	100	µS
Short Circuit Protection	By input current limiting				
Turn On Delay with Soft Start			30	40	mS
Output Overvoltage Protection	None				

GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency (at full power)			84		%
Isolation Voltage (1 min.), Input to Output			1500		Vdc
Isolation Resistance			10^9		Ω
Isolation Capacitance			300		pF
Switching Frequency (F c)			150		kHz
External Sync Frequency (F e)	Fe > Fc See ***External Synchronization,*** Figure 5		300		kHz

ENVIRONMENTAL SPECIFICATIONS

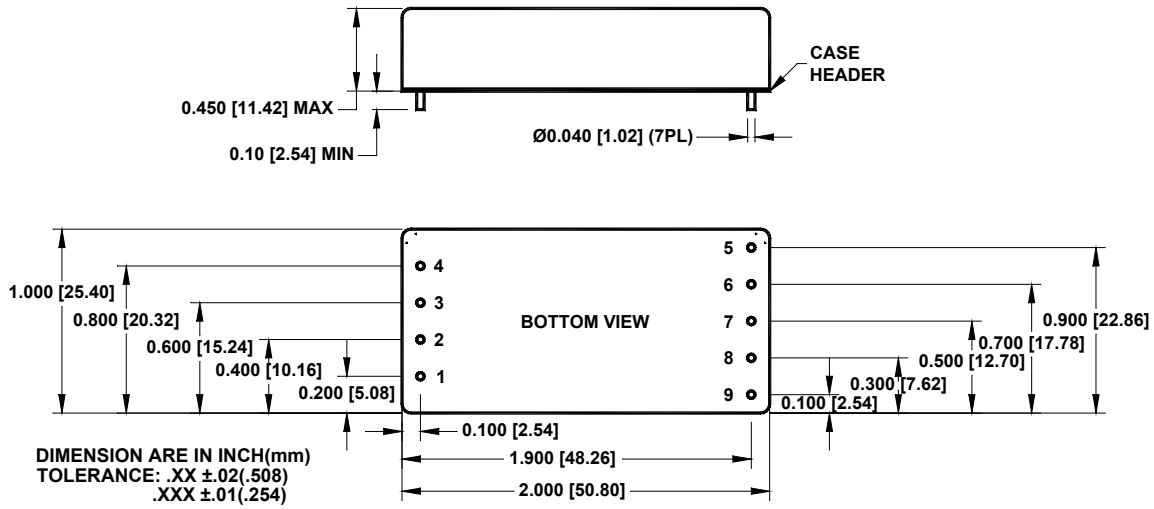
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)		-40		+71	°C
Storage Temperature Range		-55		+125	°C
Maximum Operating Case Temperature[1]				110	°C
Shielding Connection	-Vin				

PHYSICAL CHARACTERISTICS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (L×W×H)	2.00×1.00×0.450 in. (50.80×25.40×11.43mm)				
Weight	1.3 oz. (37g)				

[1] When the converter enters thermal protection mode, its duty cycle is reduced momentarilly and will resume after its internal temperature (PWM) drops a few degress (°C). The conveter's output behaves similar to a hiccup short circuit mode.
[2] See Application Note DC-004: Thermal Considerations for DC/DC Converters.

MECHANICAL SPECIFICATIONS



Pin	Function
INPUTS	
1	ON/OFF
2	SYNC IN*
3	$-V_{IN}$
4	$+V_{IN}$
OUTPUTS	
6	+S
7	$+V_{OUT}$
8	$-V_{OUT}$
9	-S

* Optional pins,
See Ordering Guide

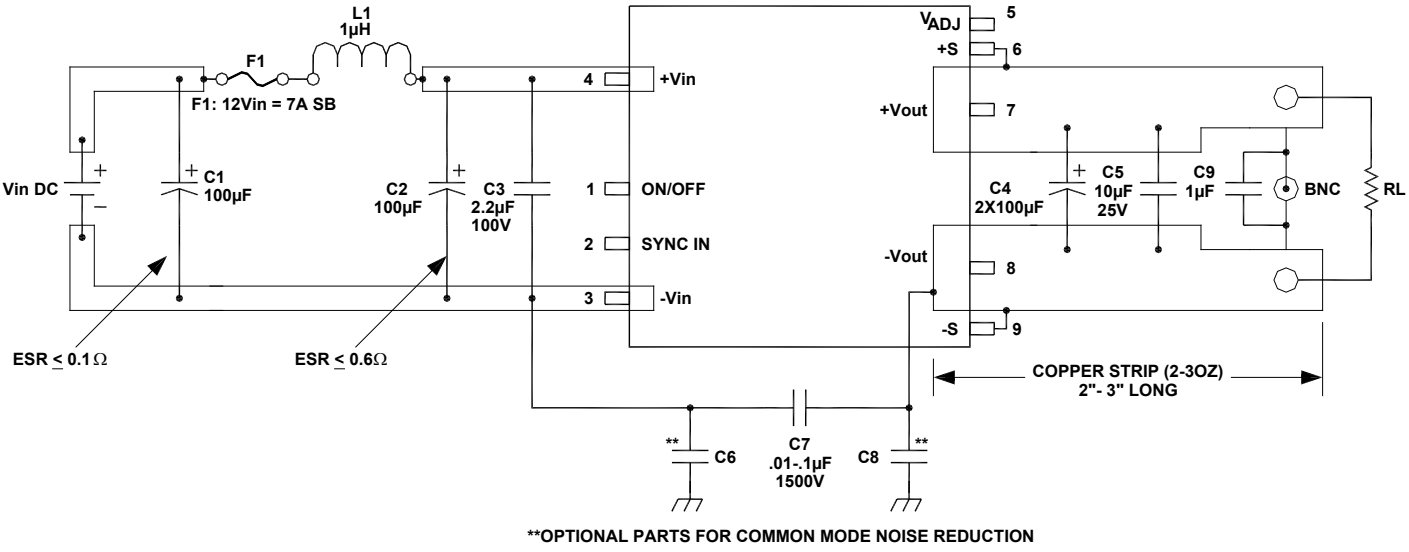


FIGURE 1. Set up for output ripple for the EB30005

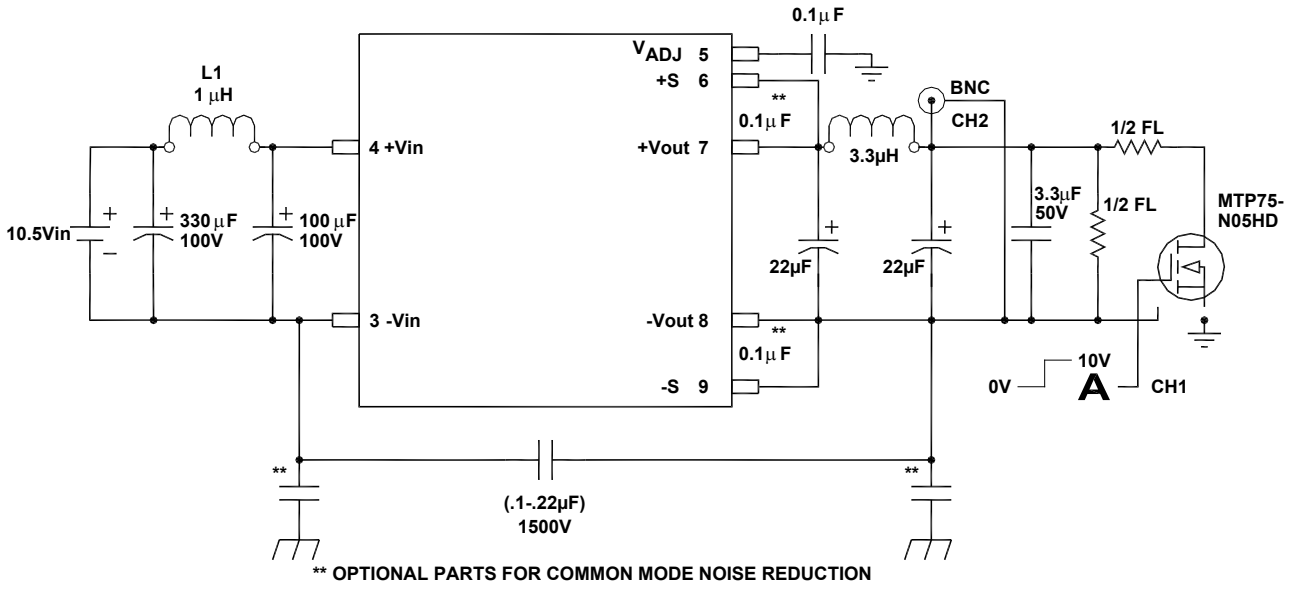


FIGURE 2. Setup for transient response measurements

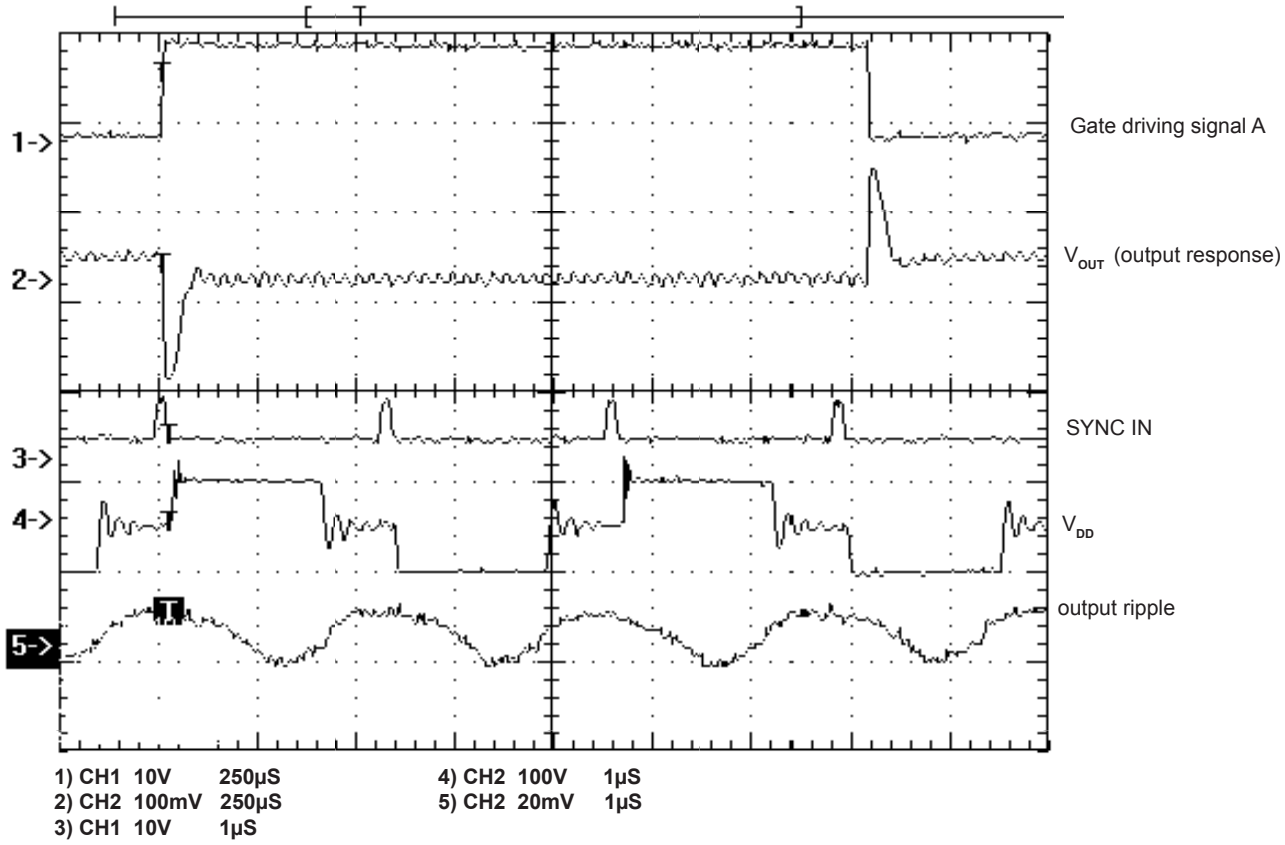


FIGURE 3. Transient response 50% full load to full load to 50% full load output ripple of EB30005

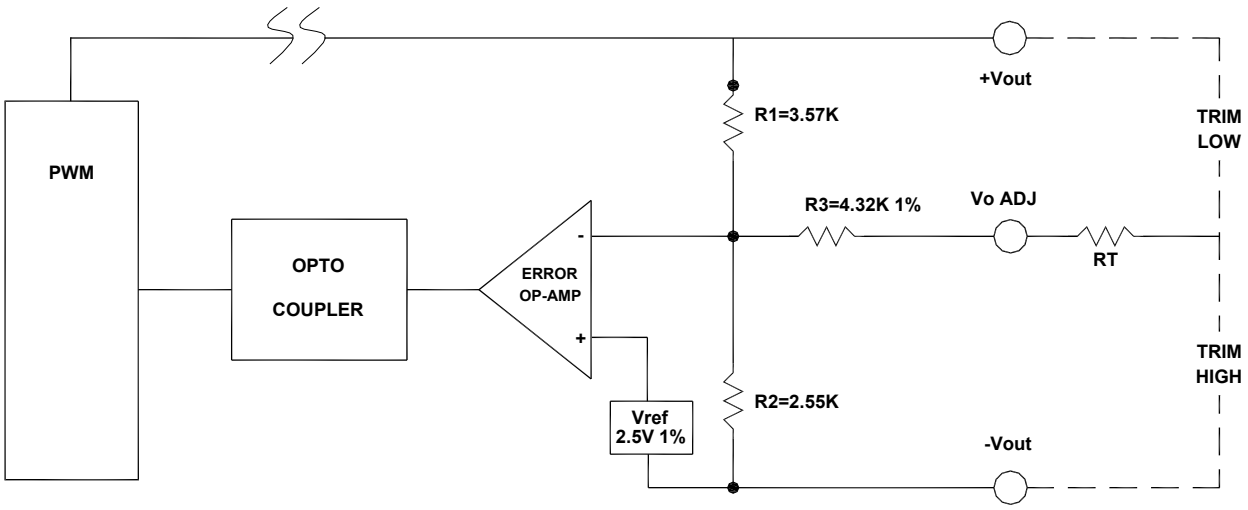


FIGURE 4. Output adjustable circuit

$V_o = V_{REF}*(1 + (R_1 /R_3)+ (R_1 /R_2)) - (R_1 /R_3)*V_{OADJ}$

$V_o = 8.066- 0.8264V_{OADJ}$

To trim V_O higher to V_O', where V_O is the actual measured value:

$$RT = \frac{R1*V_{REF}}{V_O'-V_O} - 4.32K$$

To trim V_O lower to V_O'', where V_O is the actual measured value:

$$RT = \left[\left(\frac{R_1^2*V_{REF}}{R_2(V_O-V_O'')} - R1 \right) - 4.32K \right]$$

EXTERNAL SYNCHRONIZATION

The converter can be synchronized to an external clock. The external clock MUST have a higher frequency than that of the converter's switching frequency. The amplitude of the external clock pulse must be 3.7 volts or greater and its duration between 15nS to 150nS for sync pulse detection.

The circuit in Figure 5 can be used to produce a 50nS to 150nS pulse from a square wave. The circuit will be turned on by the negative edge of the square wave and will stay on for approximately 50nS (depending on the R2*C1 time constant) (See Figure 6).

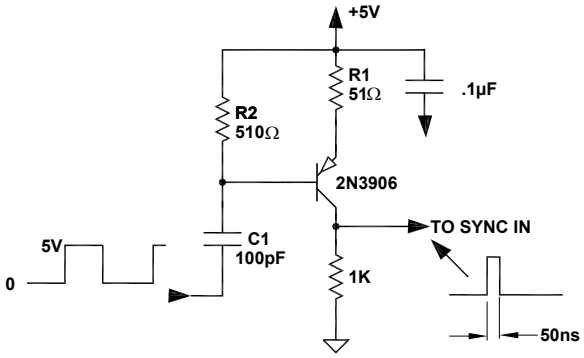


FIGURE . 50nS pulse generator from a square wave TTL/5V CMOS clock

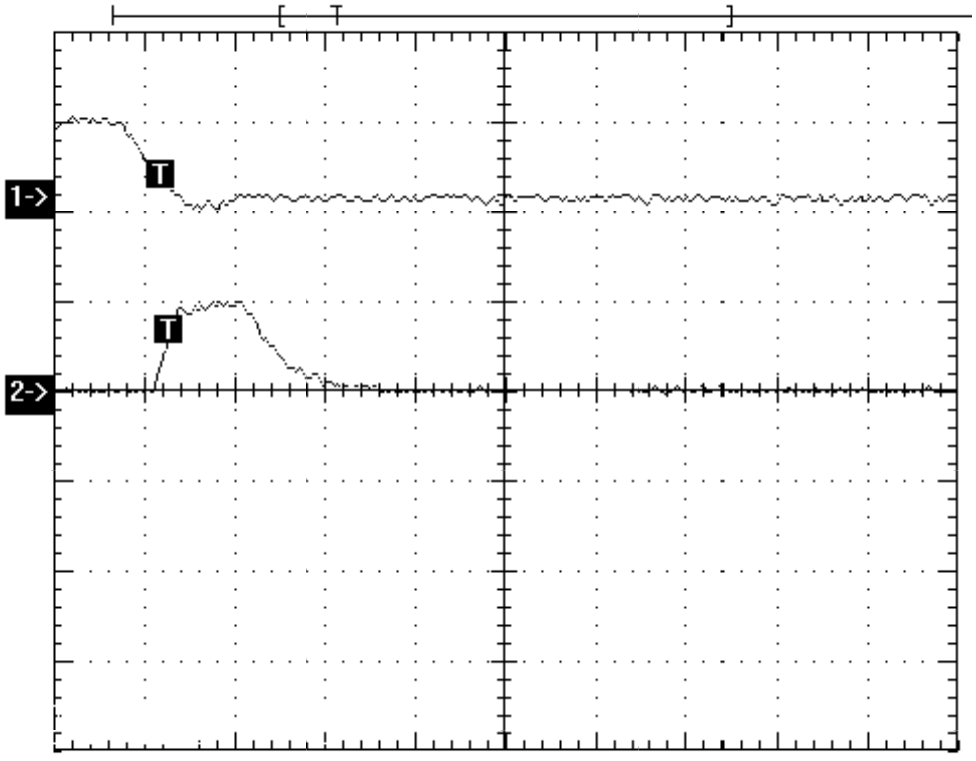


FIGURE 6. Waveforms generated from circuit in Figure 5