

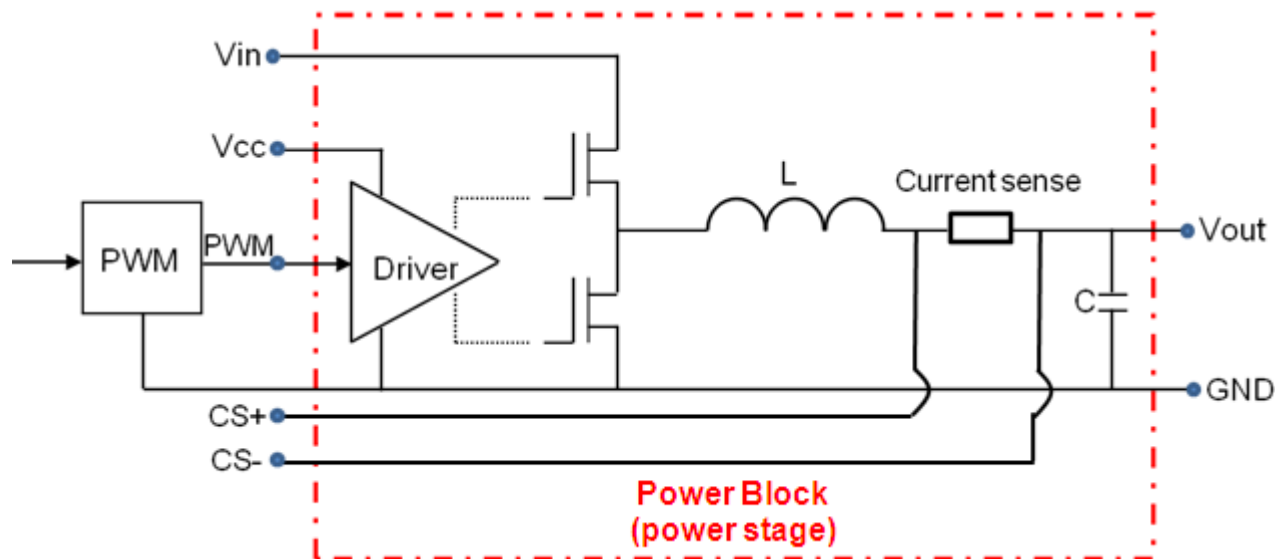


## Application Note for Power Block

Power Block DC-DC modules are developed to address the ever-growing demands of increased current and power densities in mission critical applications while providing maximum flexibility for system configuration.

### What is Power Block?

Power Block is not a stand along DCDC converter. It contains the necessary power stage components of a POL converter, such as MOSFETs, output inductor and driver. Adding PWM controller (either digital or analog ones) and necessary control circuit components to Power Block, a full functioning POL converter is obtained.



### Basic operation and features

Delta Power Block is designed to operate from a typical intermediate bus voltage (7V ~13.2V), and provide an output voltage adjustable from 0.6~3.3V. The product is in SMD package with a very small footprint (for example, the dimension of a 80A Power Block is 0.5" Wx1.0"Lx 0.48"H, the power density is up to 890W/in<sup>3</sup>).

Multiple Power Block modules can be applied to power system in parallel fasion to

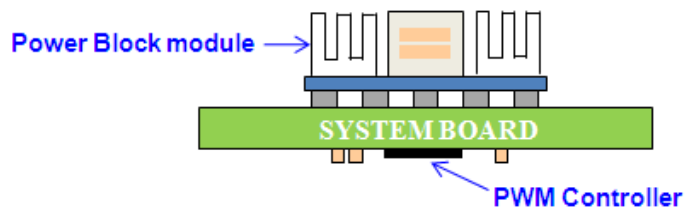
provide higher output power. Also in some of Delta's Power Block design, multiple power train is integrated in one Power Block module, which can provide either an interleaved single output, or independent multiple outputs with one Power Block.

For example, Delta's 45A Power Block D12S1R845D has two 22.5A independent channels. If the customer needs two different output voltages, they can set one channel at one output voltage and the other channel with a different output voltage, and both can output 22.5A current. In addition, customer can set the two channels interleave to obtain a total of 45A output current. By paralleling two 45 A Power Block modules, one can obtain up to 90A output current. This flexibility makes it possible to obtain different output power with a single Power Block module. Therefore the number of different POL design is reduced.

## What benefits bring from Power Block?

### ❖ Higher efficiency and power density

- Full space for power train to get much higher efficiency.
- To use space vertically from system level (3 layers of PWB for POL).



### ❖ Easier thermal and EMI management for system board

- Self-contained thermal management.
- The EMI generator components are separated from control circuit.

### ❖ Easier System design and qualification

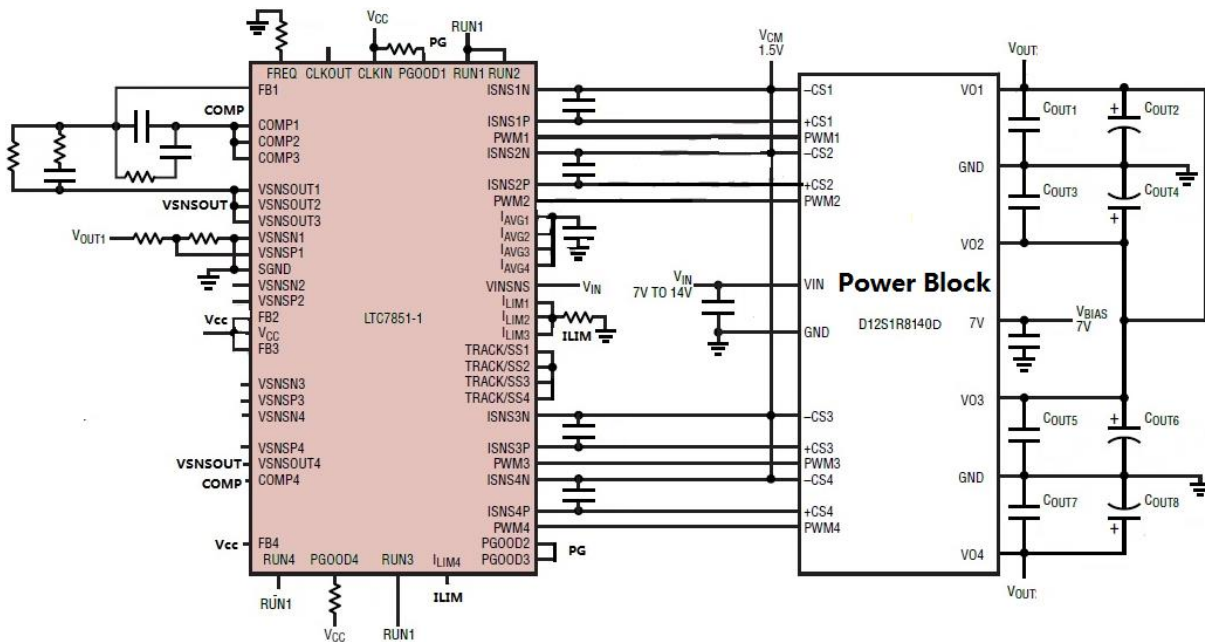
- Reducing the number of different POL designs.
- Standard firmware inside controller on system board
- Standard layout for Power Block on system board.
- Slight modification on control circuit to satisfy different specifications.

### ❖ Lower cost

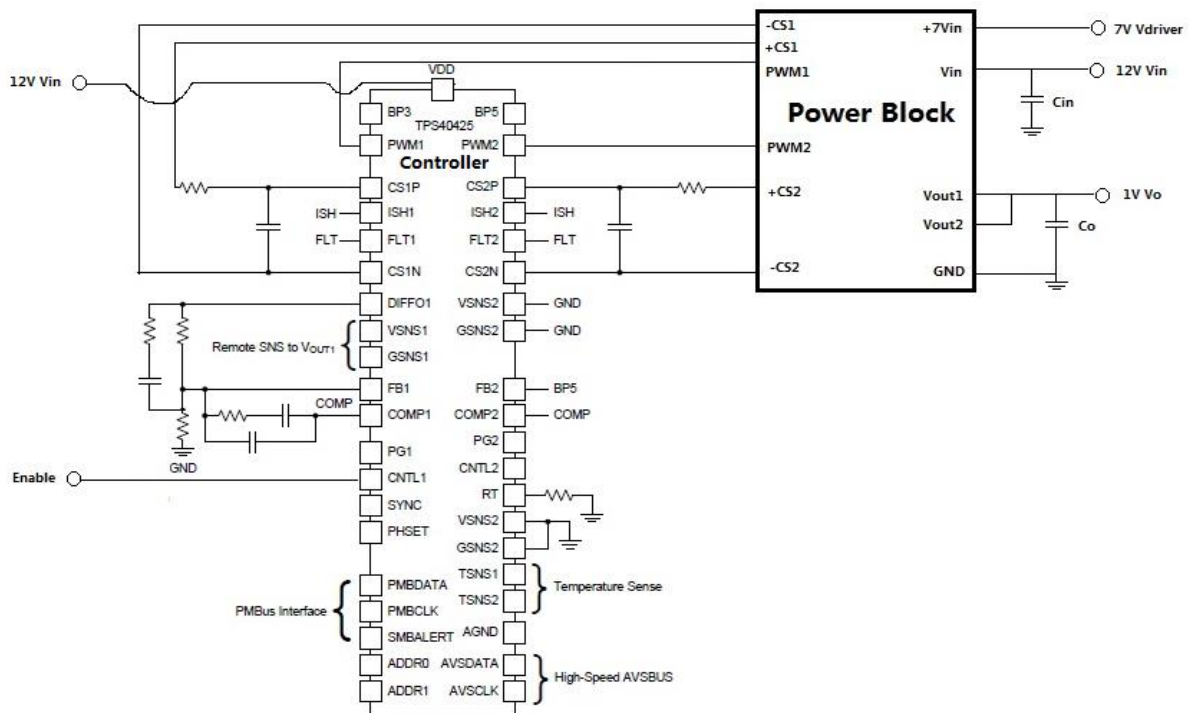
- PWB used for controller in POL was replaced by system board under Power Block.
- Customer benefit more when they purchase controller themselves.

## Simplified application circuit for Power Block

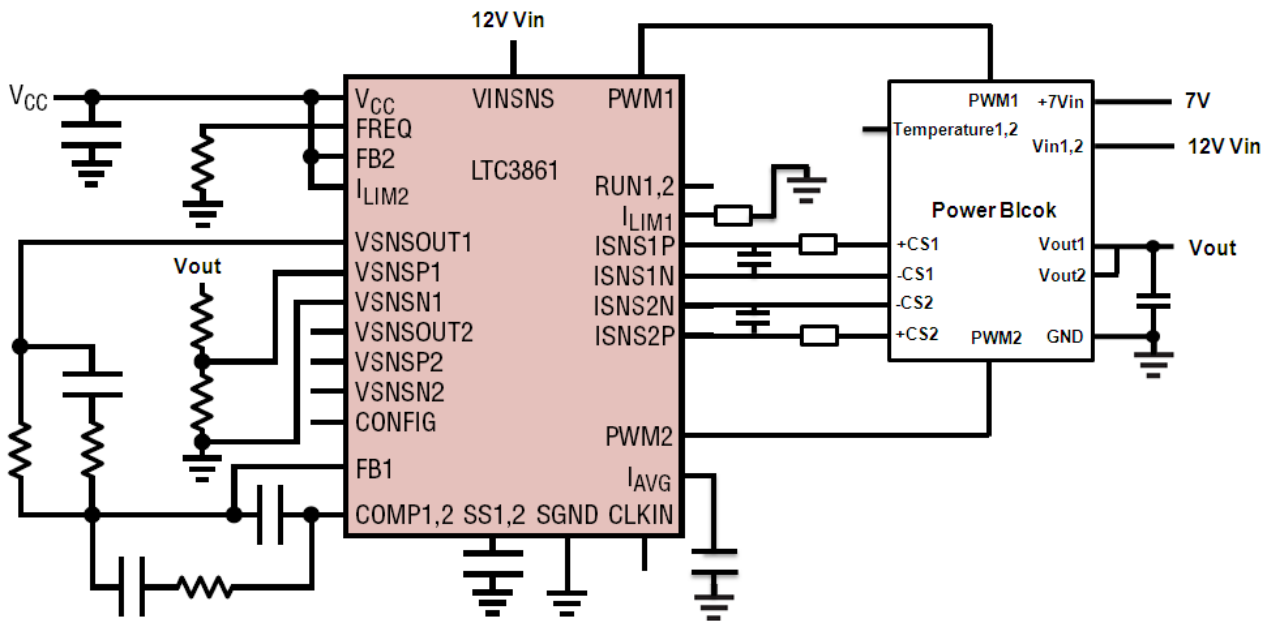
Power Block gets maximum flexibility and use in a wide variety of applications, ranging from 0.6~3.3V with slight modification on control circuit.



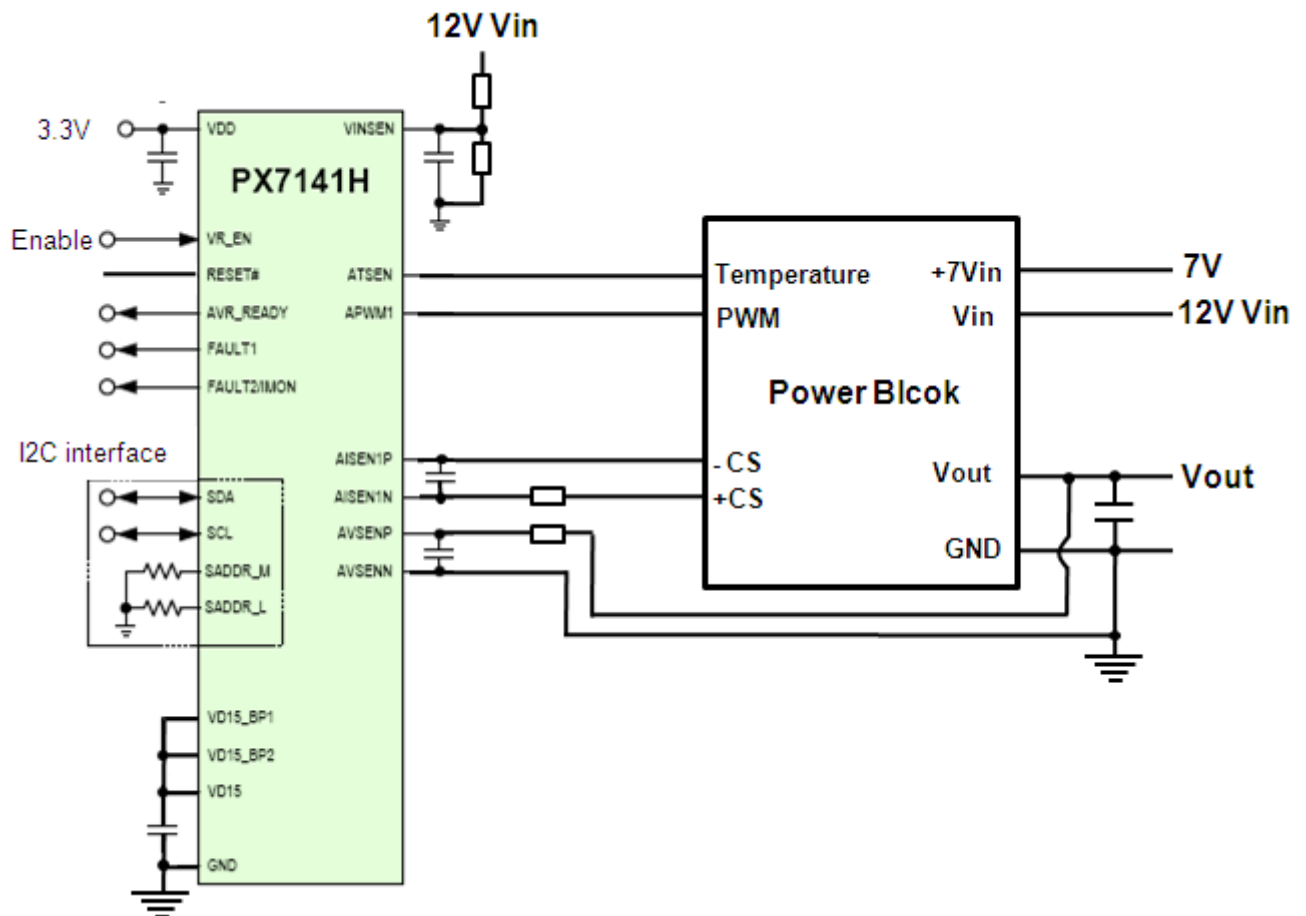
**140A Power Block with PWM controller LTC7851(LT)**



**60A,80A and 100A Power Block with PWM controller TPS40425(TI)**



**45A Power Block with PWM controller LTC3861(Linear)**



**30A Power Block with PWM controller PX7141(Infineon)**

## Delta Power Block Model list

MODEL NAME	INPUT	OUTPUT		EFF @ 100% LOAD,MAX VOUT	SIZE (mm) (LxWxH)	RECOMMENDED PWM CONTROLLER
D12S1R830D	7~13.2V	0.8~1.8V	max 30A	91.5% (11Vin)	25.4x12.7x12.2	PX7141H
D12S1R845D	7~13.2V	0.6~3.3V	max 45A	95.3% (11Vin)	25.4x12.7x12.2	TPS40425/LTC3861
D12S1R860D	7~13.2V	0.6~3.3V	max 60A	93.8% (11Vin)	25.4x12.7x12.2	TPS40425/LTC3861
D12S1R880D	7~13.2V	0.6~3.3V	max 80A	95.2% (11Vin)	25.4x12.7x12.2	TPS40425/LTC3861-1
D12S1R100D	7~13.2V	0.6~3.3V	Max100A	95.5% (11Vin)	25.4x12.7x12.2	TPS40425/LTC3861-1
D12S1R140D	7~13.2V	0.6~3.3V	Max140A	96.0% (11Vin)	30.0x11.9x12.2	LTC7851

- ✓ For more detail specification, please refer to Power Block datasheet or contact with Delta's technical support team.