

POWER OVER ETHERNET

MPS PSE AND PD SOLUTIONS



MPS
MonolithicPower.com

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Application & PoE Standard Evolution

			
			
			
1999 ≤10W PoL	2003 ≤15W IEEE 802.3af (PoE)	2009 30W IEEE 802.3at (PoE+)	2018 90W IEEE 802.3bt (PoE++)

PoE Power Classification

Standard	802.3af				802.3at	802.3bt			
Class	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Type	1	1	1	1	2	3	3	4	4
PSE Output Power	15.4W	4W	7W	15.4W	30W	45W	60W	75W	90W
PSE Output Voltage	44V to 57V				50V to 57V	50V/52V to 57V			
PD Input Power	13W	3.84W	6.49W	13W	25.5W	40W	51W	62W	71.3W
PD Input Voltage	37V to 57V				42.5V to 57V	44V to 57V			

PoE Power increases to 90W, with Class 5 through Class 8 power levels.

MPS PoE Products Selection Guide

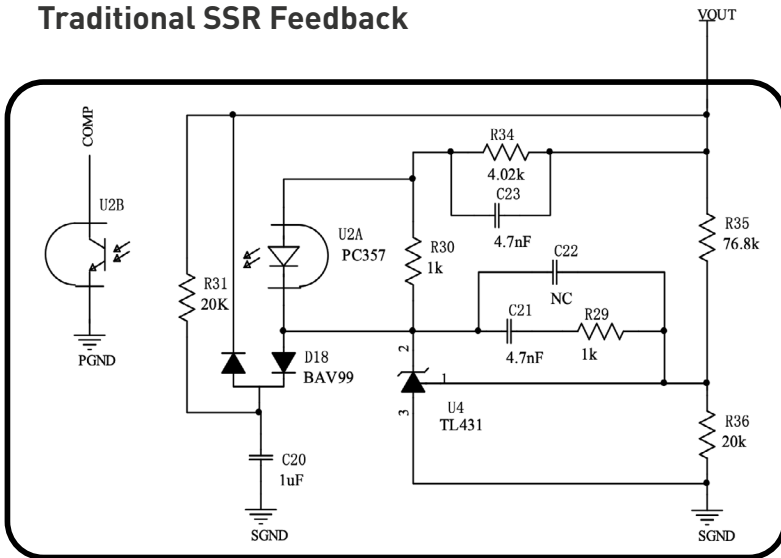
● Recommended for New Design

	IEEE 802.3af 13W	IEEE 802.3at 25.5W	IEEE 802.3bt 71.3W
PSE		<p>● MP3924 4-Port PSE Controller IEEE 802.3af/at Std</p>	
PD with Integrated DC/DC	<p>MP8004 802.3af PD with SSR Flyback Converter</p> <p>MP8007H 802.3af PD with PSR Flyback/Buck</p> <p>● MP8017 Next-Generation 802.3af PD with PSR/SSR Flyback</p>	<p>MP8008 802.3at PD Flyback Controller with SSR Regulation</p> <p>● MP8009 802.3at PD Flyback/Forward Controller with PSR/SSR Regulation</p>	<p>● MP8030 802.3bt PD Flyback/Forward Controller with PSR/SSR Regulation</p>
Non-Isolated DC/DC	<p>MP6004 3A I_{sw} PSR Flyback/Buck with 180V, 0.80 FET</p>	<p>MP4562 60V/2A Non-Synchronous Buck Converter</p> <p>MP9572 60V/2A Synchronous Buck Converter</p>	<p>MP9928 60V Buck Controller</p>
Isolated DC/DC		<p>MP6002 4A PWM Converter with 180V, 0.45Ω MOSFET</p> <p>MP3910 Flyback Controller with SSR Regulation</p>	<p>MP6005 Flyback/Forward Controller with PSR/SSR Regulation</p>
PD	<p>MP8001 13W, Internal FET IEEE 802.3af Std</p>	<p>MP8003A 25W, Internal FET IEEE 802.3at</p>	<p>MP8020 71W Internal + External FET IEEE 802.3bt</p>

Why Use MPS's Power over Ethernet Solutions?

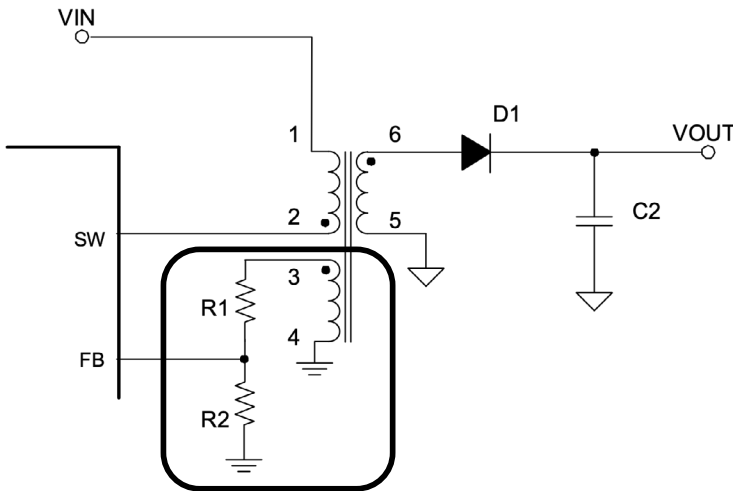
1. Optimized PSR Feedback

Traditional SSR Feedback



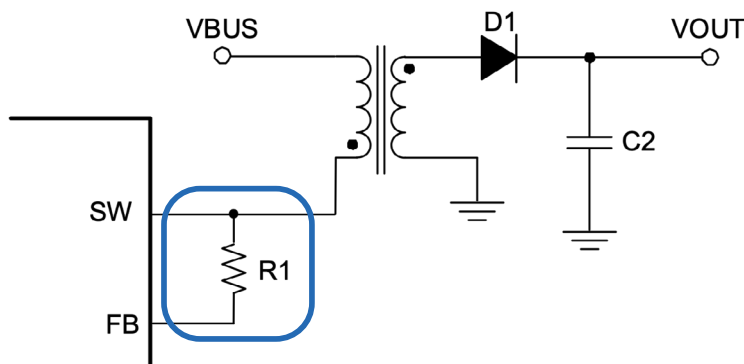
Traditional Solution
(Complex TL431 / optocoupler)

Gen 1 PSR Feedback



Gen 1 Solution
(Aux winding + FB resistor dividers)

Gen 2 PSR Feedback



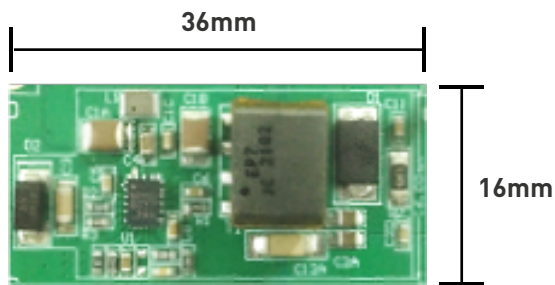
MPS Solution
(Only one resistor)

Advantages:

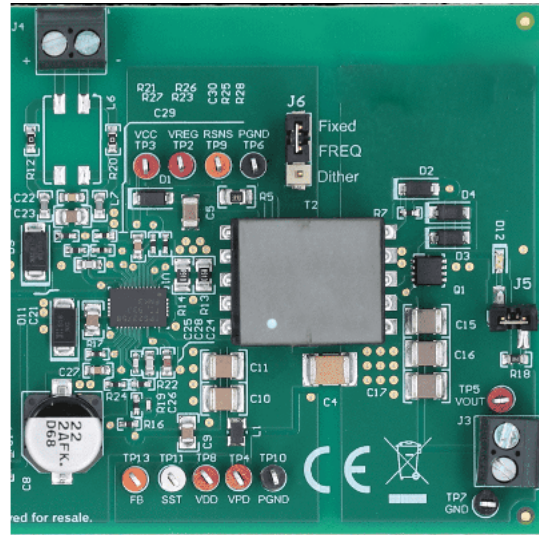
- Simple BOM and easy design
- Lower transformer cost without aux winding
- Larger primary-side and secondary-side winding to improve efficiency with the same core

Why Use MPS's Power over Ethernet Solutions?

2. High Integration Reduces BOM Cost



MP8017



Market Solution

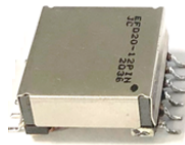
Items		MPS MP8017	Market Solution
Description		PD + PSR/SSR flyback	PD + PSR/SSR flyback
Input/Output Capacitor		Small with 500kHz	Large bulk capacitor with 250kHz
BOM	Transformer	EP7	EP13
	Sense Resistor	Not needed	Needed (increases power loss and cost)
	Resistor Number	7	20
	Diode Number	1	4
	Small Capacitor Number	8	14
Soft-Start Control		Programmable	Fixed
Flyback OCP/SCP		Cycle-by-cycle limiting, hiccup mode	Cycle-by-cycle limiting, V_c UVLO
Package		QFN-19 (3mmx4mm)	VSON-24 (4mmx6mm)

3. Differentiated Performance



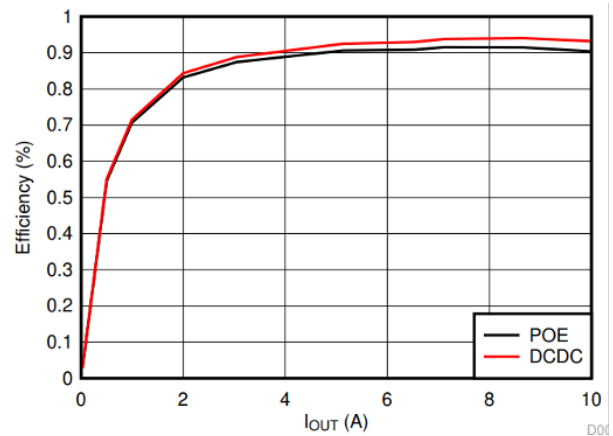
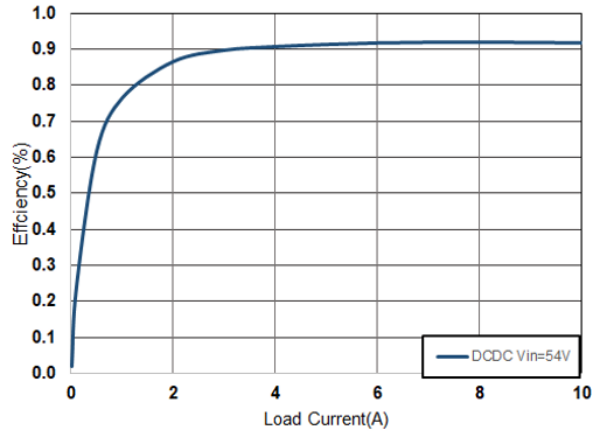
(EP13 XFMR)

17.7mmx13.5mm



(EFD20 XFMR)

29mmx23mm



With the same level of efficiency, the MP8030 XFMR (EP13) is only 40% of the size of the competitor transformer (EFD20)!



MP8030

150mmx50mm



Market Solution

150mmx95mm

4. Strong Design Support

MPS supports all power levels for Golden Design, and provides:

1. Schematic
2. PCB Layout
3. BOM
4. Transformer Selection Guide
5. Test Report

Golden Design List

Power Rating	PN	V _{OUT} (V)	Topology	Transformer	Efficiency
13W	MP8017	5V	Flyback	EP7	85.2%
	MP8017	12V	Flyback	EP7	86.6%
25W	MP8009	5V	Flyback	EPD20	91.0%
	MP8009	12V	Flyback	EP13	91.4%
51W	MP8030	5V	Forward	EP13	91.9%
	MP8030	12V	Forward	EP13	92.0%
71W	MP8030	5V	Forward	EPD20	92.2%
	MP8030	12V	Flyback	EPD25	93.2%

