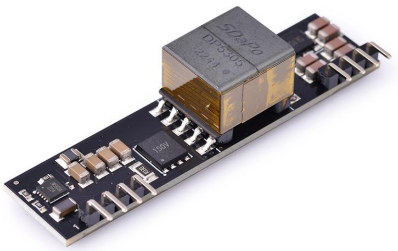
DESCRIPTION

PD (Powered Device) Integrated Module (Isolation Type)



FEATURES

- Fully supports IEEE802.3af/at (DP5300/5400)
- Fully supports IEEE802.3af/at/bt (DP5500)
- Small Single In-Line (SIL) package size –57.3mm (L) x 14mm (H)
- Input Voltage Range 44V to 57V
- Support PoE applications in both of Fast / Gigabit Ethernet environments.
- Short Circuit Protection
- Over-temperature Protection
- Programmable Classification (DP5300/5400 Default:Class 4 ;DP5500 Default:Class 8)
- High Efficiency
- Isolation level 1.5KVrms.
- Easy Installation and Low Cost (Isolation Type, Minimum External Devices required)
- Low Output Ripple and Noise
- Adjustable Output Voltage
- 1500Vrms Isolation (Input-Output)

APPLICATION AREAS

- Security and alarm systems
- Voice over IP phones
- Access control systems
- IP Cameras
- Displays, Net Monitors
- Public address systems
- Wireless access points
- Environmental control
- Telemetry
- Remote environmental monitoring

1 Product Overview

1.1 DP5300 Product Selector

Part Number	Nominal Output Voltage	Maximum Output Power *
DP5305	5.0V	25 Watts Peak 18 Watts Continuous
DP5405	5.0V	27 Watts Peak 23 Watts Continuous
DP5312	12.0V	27 Watts Peak 24 Watts Continuous
DP5412	12.0V	27 Watts Peak 24 Watts Continuous
DP5512	12.0V	42 Watts Peak 36 Watts Continuous
DP5324	24.0V	26 Watts Peak 24 Watts Continuous

*At 25°C with V_{IN} = 52V

Table 1: Ordering Information

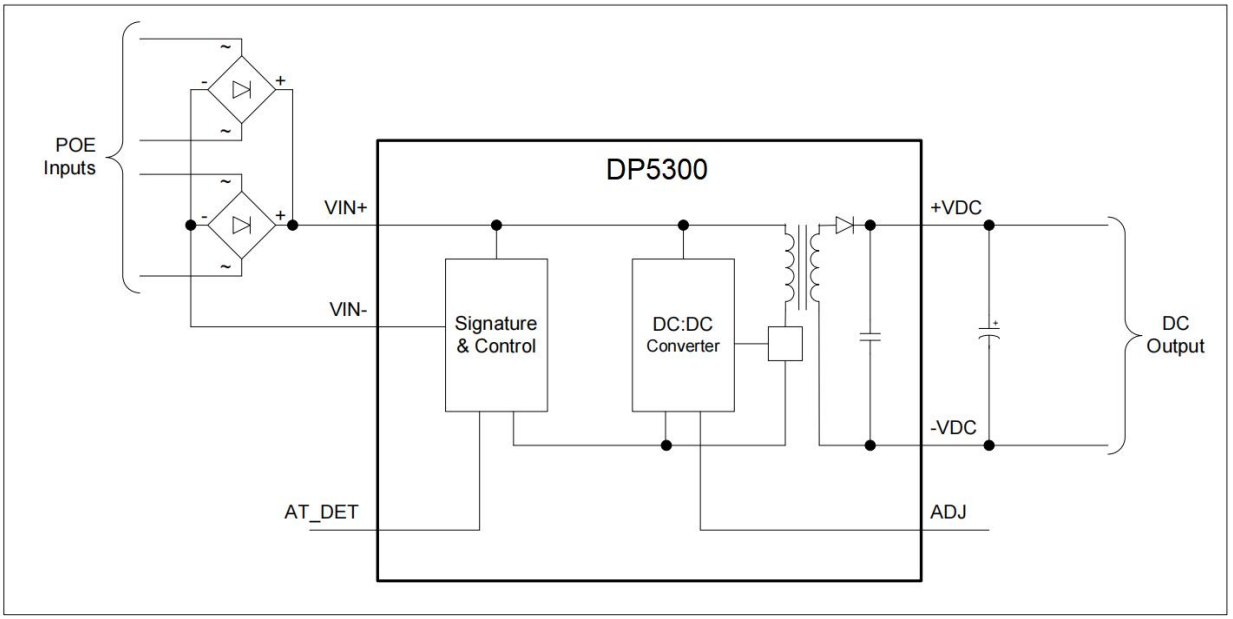


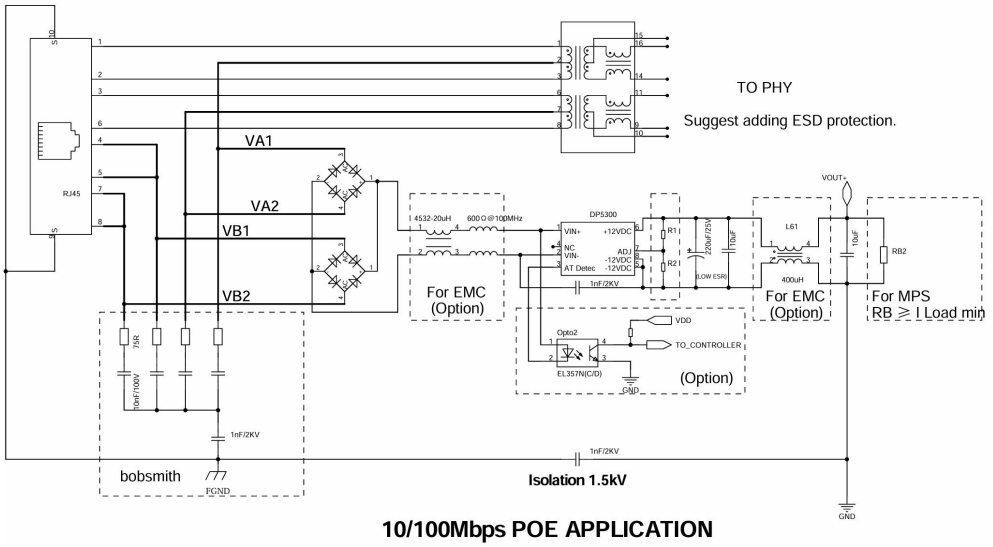
Figure 1: Block Diagram

1.2 Pin Description

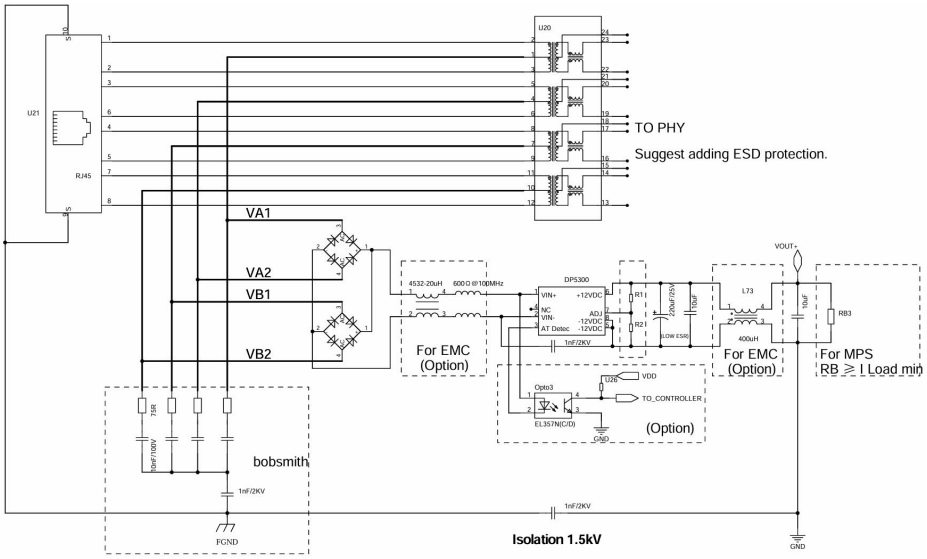
1	VIN+	**POE Direct Input +**. This pin connects to the positive (+) output of the POE input bridge rectifiers.
2	VIN-	**POE Direct Input -**. This pin connects to the negative (-) output of the POE input bridge rectifiers.
3	TYP 2	**Class4 Detect Output.** This pin indicates if an Class4 PSE is supplying power to the DP5300/5400/5500;
4	TYP 3	**Class5/6 Detect Output.** This pin indicates if an class5/6 PSE is supplying power to the DP5500; **(Only DP5500)**
5	-VDC	**Negative DC Output.** This pin provides the negative regulated output from the Ag5300 and is internally connected to pin 8.
6	+VDC	**Positive DC Output.** This pin provides the positive regulated output from the DP5300.
7	ADJ	**Output Adjust.** The output voltage can be adjusted from its nominal value, by connecting an external resistor from this pin to either the +VDC pin or the -VDC pin.
8	-VDC	**Negative DC Output.** This pin provides the negative regulated output from the Ag5300 and is internally connected to pin 5.

2 Functional Description

2.1 Typical Connections



10/100Mbps POE APPLICATION



1G/2.5G/5G/10G POE APPLICATION

Figure 2: Typical System Diagram

*Note: Suitable bridge rectifier for BR1 & BR2 would be a “MB210S” or equivalent.

2.2 Output Voltage Adjustment

The DP5300 series has an ADJ pin, which allows the output voltage to be increased or decreased.

Figure 3 shows how the ADJ pin is connected.

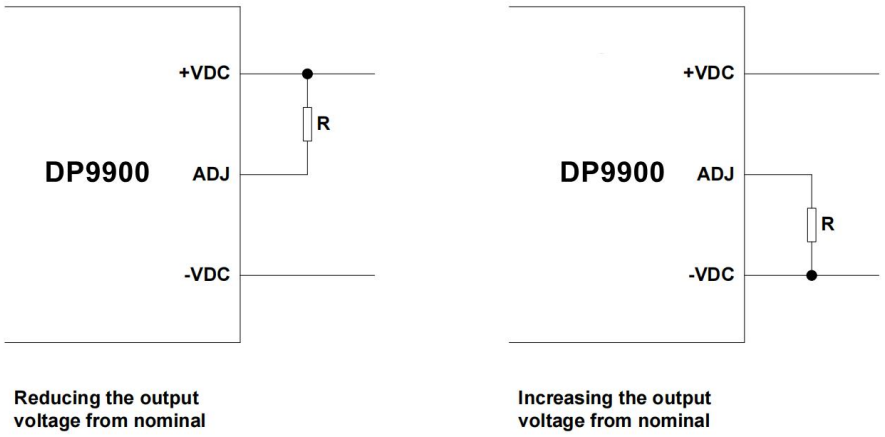


Figure 3: Output Adjustment

Reducing the output voltage, connect R between ADJ and +VDC			
Value of R	**DP5305 output**	**DP5312 Output**	**DP5324 Output**
Open Circuit	5.00V	12.07V	23.93V
0 Ohms	4.48V	10.0V	19.85V
100K	4.76V	11.15V	21.85V
470k	4.92V	11.76V	23.23V

Increasing the output voltage, connect R between ADJ and -VDC			
Value of R	**DP5305 output**	**DP5312 output**	**DP5324 Output**
Open Circuit	5.00V	12.07V	23.93V
0 Ohms	5.66V	12.75V	24.6V
100K	5.27V	12.34V	24.2V
470k	5.08V	12.16V	24.01V

Table 3: Output Adjustment Resistor (R) Value

3 Electrical Characteristics

3.1Absolute Maximum Ratings

	Parameter	Symbol	Min	Max	Units
1	DC Supply Voltage	V_{CC}	-0.3	60	V
2	DC Supply Voltage Surge for 1ms	V_{SURGE}	-0.6	80	V
3	Storage Temperature	T_S	-40	+100	℃

3.2 Recommended Operating Conditions

	Parameter	Min	Typ	Max	Units
1	Input Supply Voltage	36	52	57	V
2	Under Voltage Lockout	30		36	V
3	Operating Temperature	-40	25	85	℃
4	IEEE 802.3at	Class 4 (DP5300/5400)			
	IEEE 802.3bt	Class 8 (DP5500)			

3.3 DC Electrical Characteristics

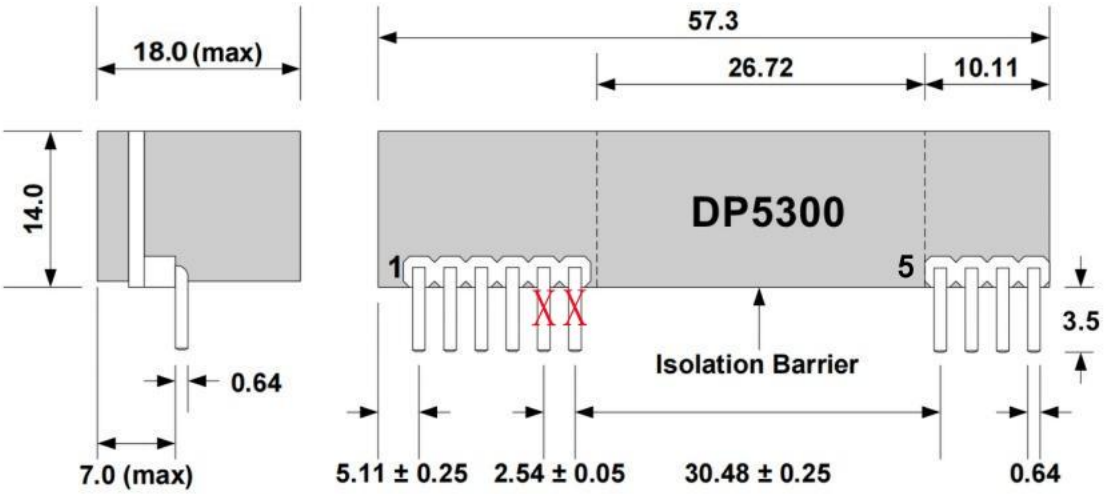
	DC Characteristic	Variant	Sym	Min	Typ[1]	Max	Units
1	Nominal Output Voltage	DP5X24	+VDC	23.5	23.9	24.3	V
		DP5X12		11.6	12	12.4	
		DP5X05		4.75	5	5.25	
2	Minimum Load[2]	DP5X24	I_{LOAD}	20			mA
		DP5X12		40			
		DP5X05		100			

3	Output Current (VIN = 48V)	DP5324	I_{out}		1		A
		DP5312			2		
		DP5412			2		
		DP5512			3		
		DP5305			3.6		
		DP5405			4.6		

	DC Characteristic	**Variant**	**Sym**	**Min**	**Typ[1]**	**Max**	**Units**
4	Line Regulation	DP5X24	V_{LINE}		0.15		%
		DP5X12			0.05		
		DP5X05			0.05		
5	Load Regulation – Min to Max (VIN = 48V)	DP5X24	V_{LOAD}		0.15		%
		DP5X12			0.1		
		DP5X05			0.1		
6	Output Ripple and Noise[4]	DP5324	V_{RN}		140	@1A	mV_{p-p}
		DP5312			135	@2A	
		DP5412			/	/	
		DP5512			/	/	
		DP5305			115	@4A	
		DP5405			140	@5A	
7	Peak Efficiency	DP5324	EFF		90.8	@1A	%
		DP5312			89.2	@2A	
		DP5412			/	/	
		DP5512			/	/	
		DP5305			86.5	@3.6A	
		DP5405			90	@4.6A	
8	Short-Circuit Duration[3]		T_{SC}			∞	sec
9	Isolation Voltage (I/O) - Impulse Test		V_{ISO}			1500	V_{PK}

Note 1: Typical figures are at 25°C with a nominal 52V supply and are for design aid only. Not Guaranteed
Note 2: The module can emit an audible noise, if operated at less than the stated minimum I_{LOAD} and cause the PSE to fail its MPS.
Note 3: >200mohm short due to thermal limitation.
Note 4 : The output ripple and noise can be reduced with an external filter

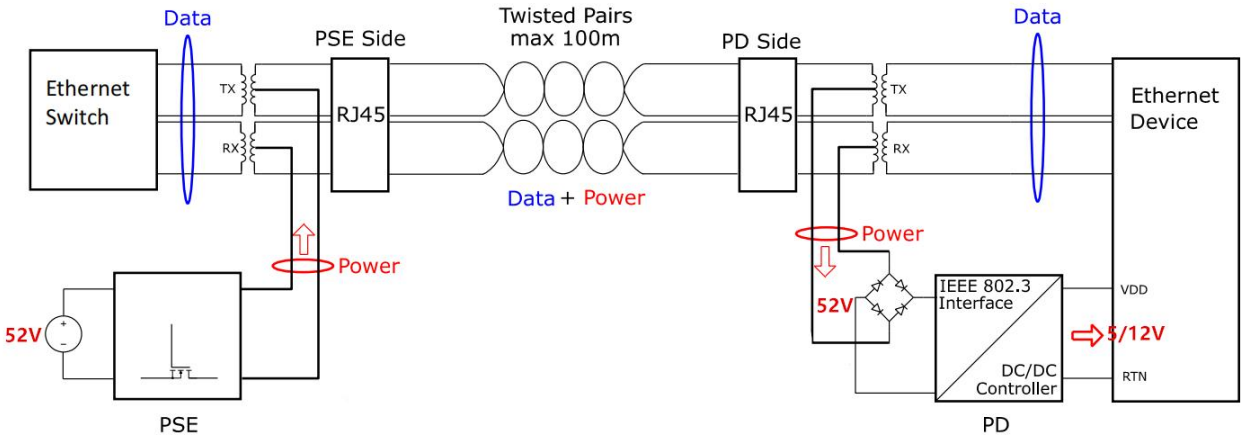
4 Package



(Recommended PCB hole diameter = 1.1 ± 0.05)

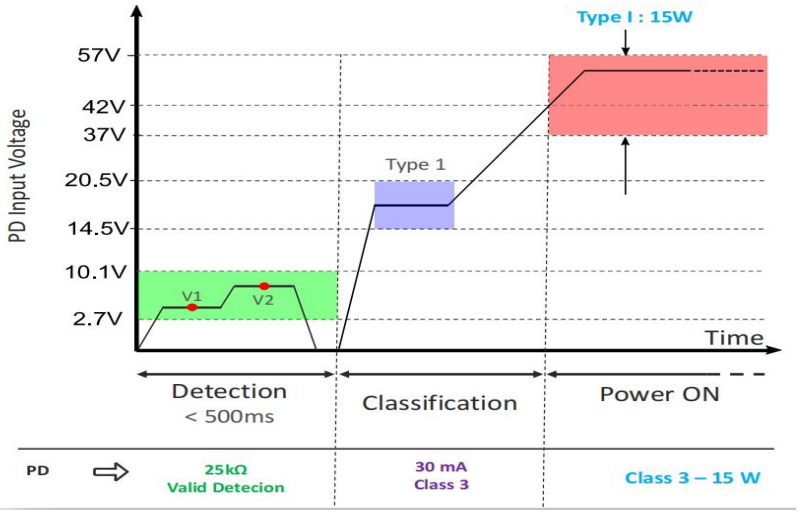
Dimensions (in mm) are nominal +/- 0.25 unless otherwise stated

1. Power Delivery in PoE Systems

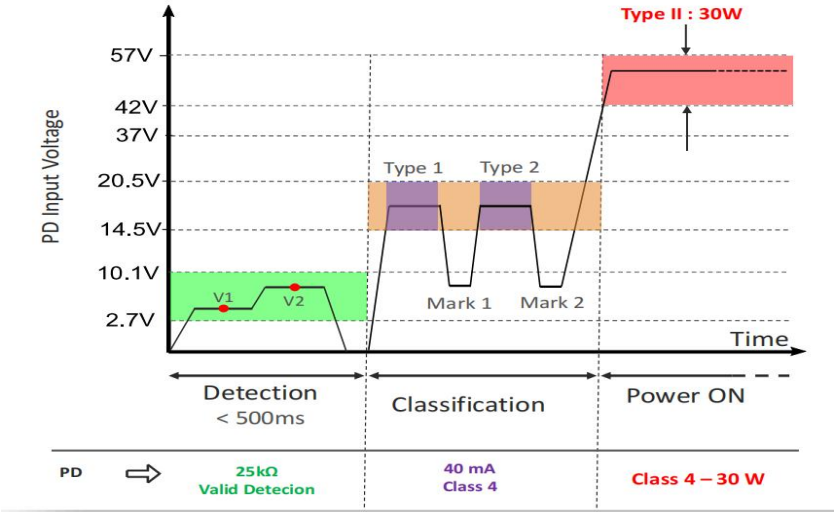
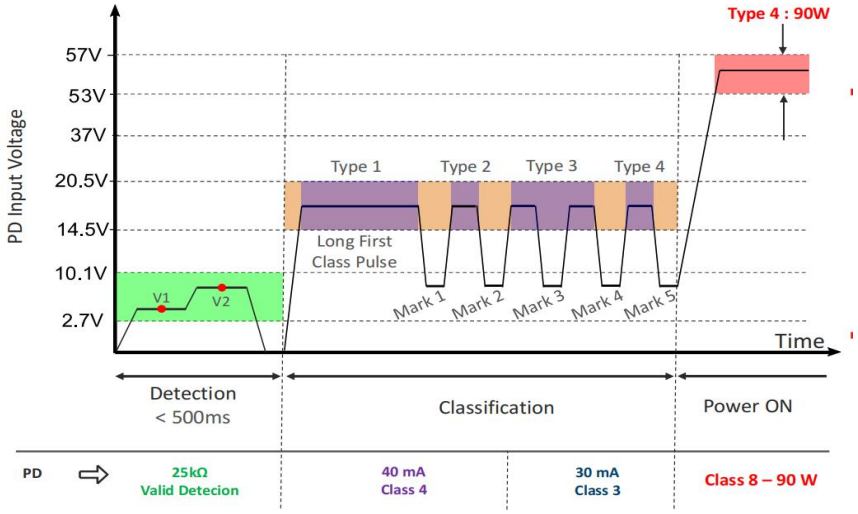


	Type 1 802.3af			Type 2 802.3at	Type 3 802.3bt		Type 4 802.3bt	
Power Class	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8
Power from PSE	4 W	7 W	15.4 W	30 W	45 W	60 W	75 W	90 W
Power delivered to PD	3.84 W	6.49 W	13 W	25.5 W	40 W	51 W	62 W	71.3 W

2. Establishing PoE Connection – Type 1 (IEEE 802.3af/PoE)



3. Establishing PoE Connection – Type 2 (IEEE 802.3at/PoE+)



4. Establishing PoE Connection – Type 3 and 4 (IEEE 802.3bt)