

Befact Technologies Embedded Tiny High Power Quad Port PSE Module PSE-HQD

1. General Description

The PSE-HQD module is a high power quad port power sourcing equipment (PSE), power sourcing manager and backward compatible to Power over Ethernet (IEEE802.3af standard). PSE-HQD module works with normal power / high power powered devices (PD) to complete PoE links (4 PoE links, simultaneously) and provides power to remote device via conventional Category 5 Ethernet cable.

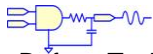
PSE-HQD supports IEEE 802.3af power classification, class 0 to class 4, including high power mode, for IEEE 802.3af compliant normal power / high power powered device (PD) and equips maximum total power protection (160W) to prevent damage from short circuit or over current condition to provide more safely operation on PoE application. Tiny size, 92mm (L) X 25.1mm (W) X 24mm (H), input voltage is from 39Vdc to 60Vdc. Operation ambient temperature is from -15°C to 55°C @ full load.

2. Feature

- IEEE802.3af compliant.
- Support PoE application in both of Fast / Gigabit Ethernet environments.
- Support end-point and mid-span mode
- Per Port 650mA (maximum current).
- Support high power mode and backward compatible to normal power mode.
- Maximum total power protection.
- Support PD power classification from class 0 to class 4.
- Per port over/under voltage protection.
- Per port short circuit protection.
- Per port over current protection.
- Thermal cut off.
- Equip common mode choke (per port)

3. Applications

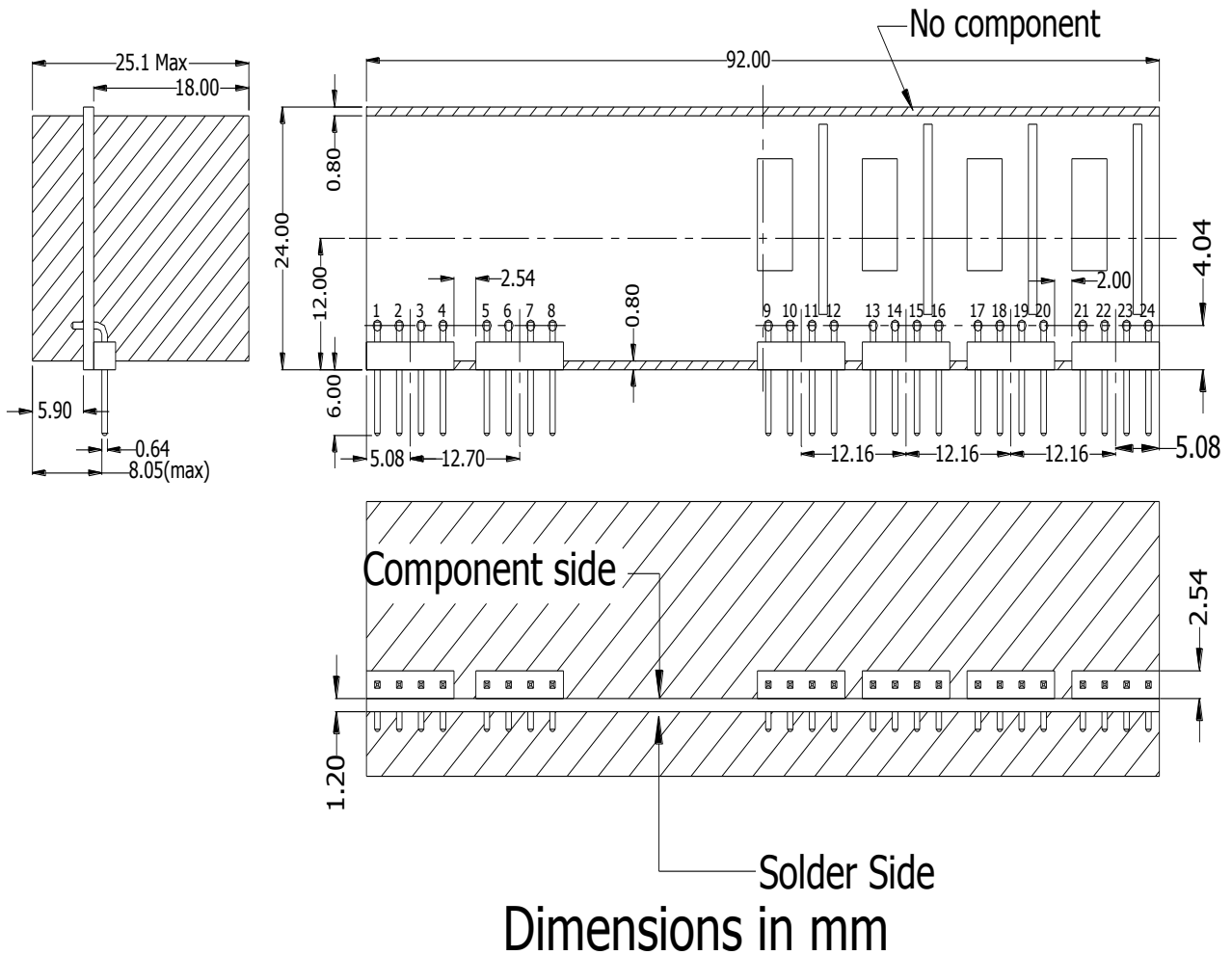
- Fast Ethernet Gateway / Router
- Gigabit Ethernet Gateway / Router
- Fast Ethernet Switch
- Gigabit Ethernet Switch
- VoIP Gateway
- Media Gateway
- Integrated Access Device (IAD)
- Video Server in Surveillance System
- Security System Central Controller
- Point of Sale (POS) System
- Media Converter
- Stand Alone PoE⁺ Injector



to reduce EMI.

- Enhance current surge protection.
- Per port PSE status indication.

4. Package



5. Pin Definition

Function	Pin Number	Symbol	Description
Power Input	1	V48_IN	+48V power input from power supply
	2	V48_IN	+48V power input from power supply
	3	V48_IN	+48V power input from power supply
	4	V48_IN	+48V power input from power supply
	5	V48_GND	Input Power ground
	6	V48_GND	Input Power ground
	7	V48_GND	Input Power ground
	8	V48_GND	Input power ground
Port 1	9	P1_NO	Port 1 PoE negative voltage output
	10	P1_PO	Port 1 PoE positive voltage output
	11	P1_LED+	Port 1 PSE status indicator+, LED power source connects to anode of LED. <u>Keep it being floated when LED is not applied.</u>
	12	P1_LED-	Port 1 PSE status indicator-, LED power source return connects to cathode of LED. <u>Keep it being floated when LED is not applied.</u>
Port 2	13	P2_NO	Port 2 PoE negative voltage output
	14	P2_PO	Port 2 PoE positive voltage output
	15	P2_LED+	Port 2 PSE status indicator+, LED power source connects to anode of LED. <u>Keep it being floated when LED is not applied.</u>
	16	P2_LED-	Port 2 PSE status indicator-, LED power source return connects to cathode of LED. <u>Keep it being floated when LED is not applied.</u>
Port 3	17	P3_NO	Port 3 PoE negative voltage output
	18	P3_PO	Port 3 PoE positive voltage output
	19	P3_LED+	Port 3 PSE status indicator+, LED power source connects to anode of LED. <u>Keep it being floated when LED is not applied.</u>
	20	P3_LED-	Port 3 PSE status indicator-, LED power source return connects to cathode of LED. <u>Keep it being floated when LED is not applied.</u>
Port 4	21	P4_NO	Port 4 PoE negative voltage output

	22	P4_PO	Port 4 PoE positive voltage output
	23	P4_LED+	Port 4 PSE status indicator+, LED power source connects to anode of LED. <u>Keep it being floated when LED is not applied.</u>
	24	P4_LED-	Port 4 PSE status indicator-, LED power source return connects to cathode of LED. <u>Keep it being floated when LED is not applied.</u>

6. PSE Status Indicator Installation Guide

LED is applied to implement the PSE status indicator to show the PoE link status. PoE link is activated when LED is bright and PoE link is de-activated when LED is dark. A blanking LED means PSE is doing PD detection.

A. The formula for LED current setting is

$$(V_{in} - 24V - V_{f_LED}) / R = I_{f_LED}.$$

Note. V_{in} is the PSE-QD input voltage, 48Vdc normally.

V_{f_LED} is the forward voltage of LED.

I_{f_LED} is the current of LED.

R is the external LED current limit resistor.

Example

$V_{in} = 44V \sim 55V$ (Typical voltage is 48V).

$V_{f_LED} = 2V.$

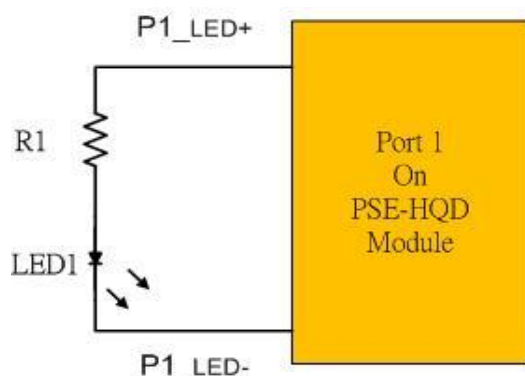
$R = 3.3K\Omega$

$I_{f_LED} = (55-24-2) / 3.3K = 8.7mA$ (Maximum current)

$I_{f_LED} = (44-24-2) / 3.3K = 5.4mA$ (Minimum current)

$I_{f_LED} = (48-24-2) / 3.3K = 6.6mA$ (Typical current)

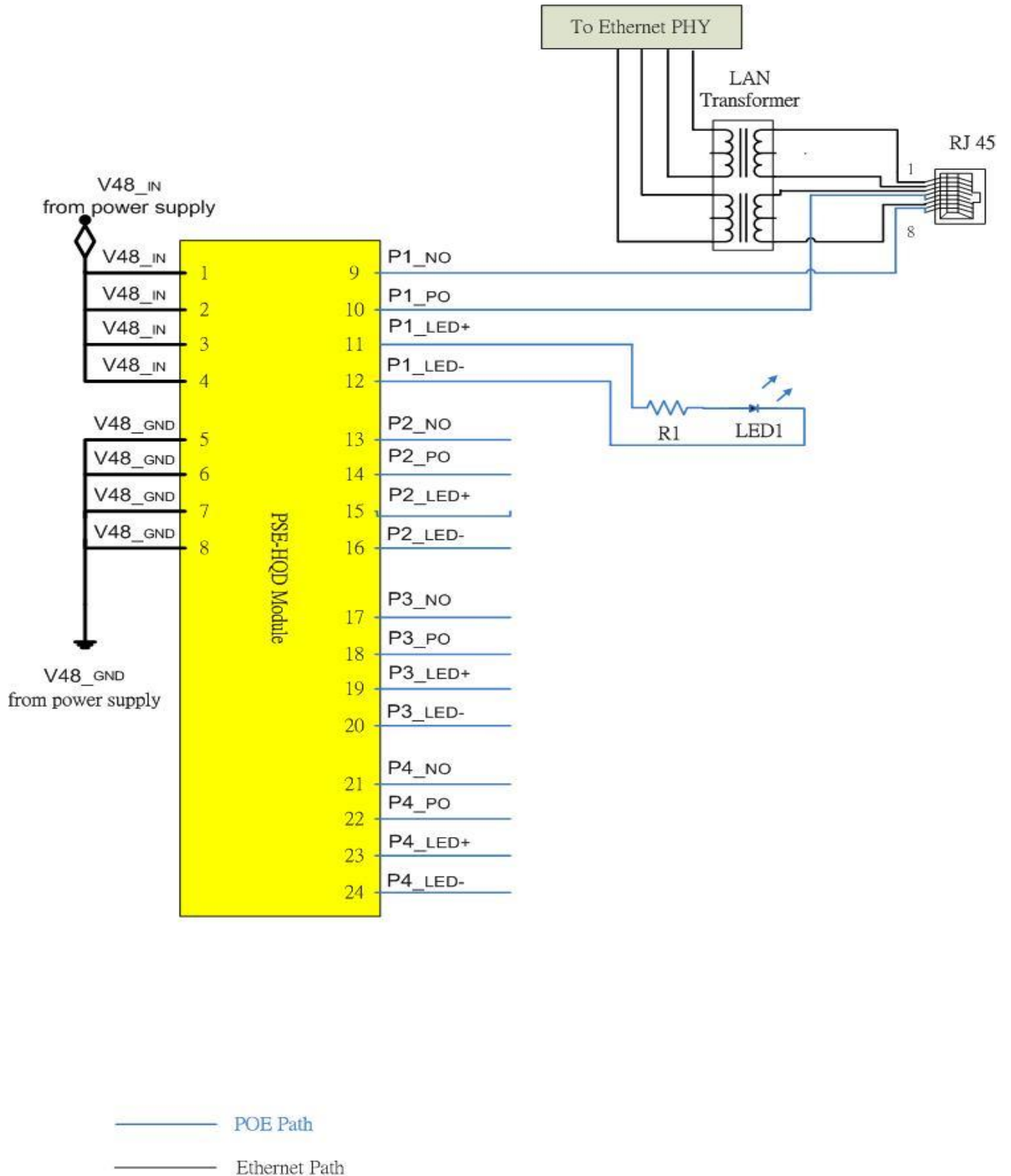
B. Typical PSE indicator installation



7. Fast Ethernet Typical Application

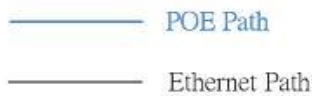
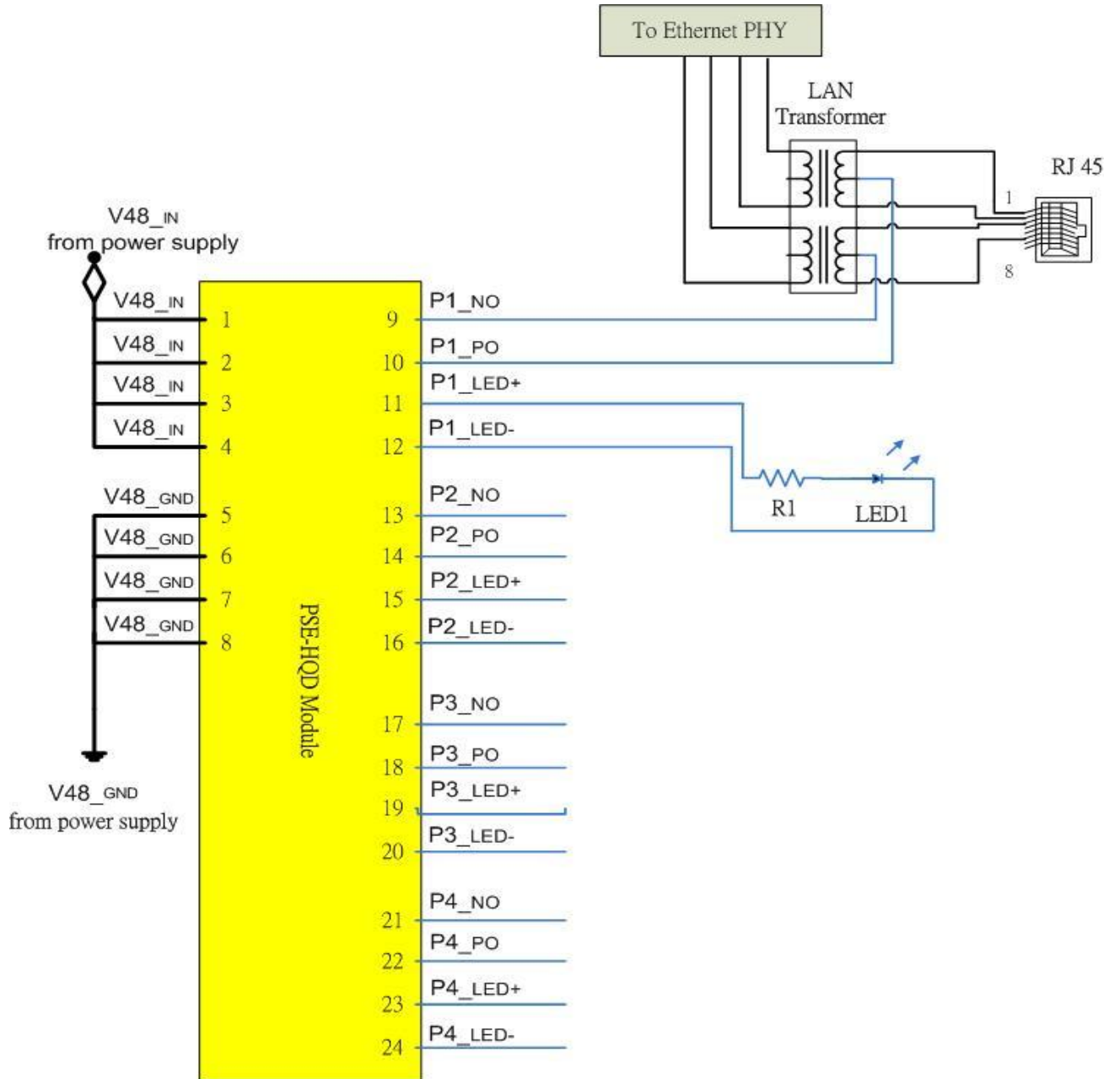
A. Mid-Span Configuration (Example in One Port)

- Pin 4 & 5 of RJ45 connect to Pn_PO (n = 1 ~ 4); Pin 7 & 8 of RJ45 connect to Pn_NO(n = 1 ~ 4).



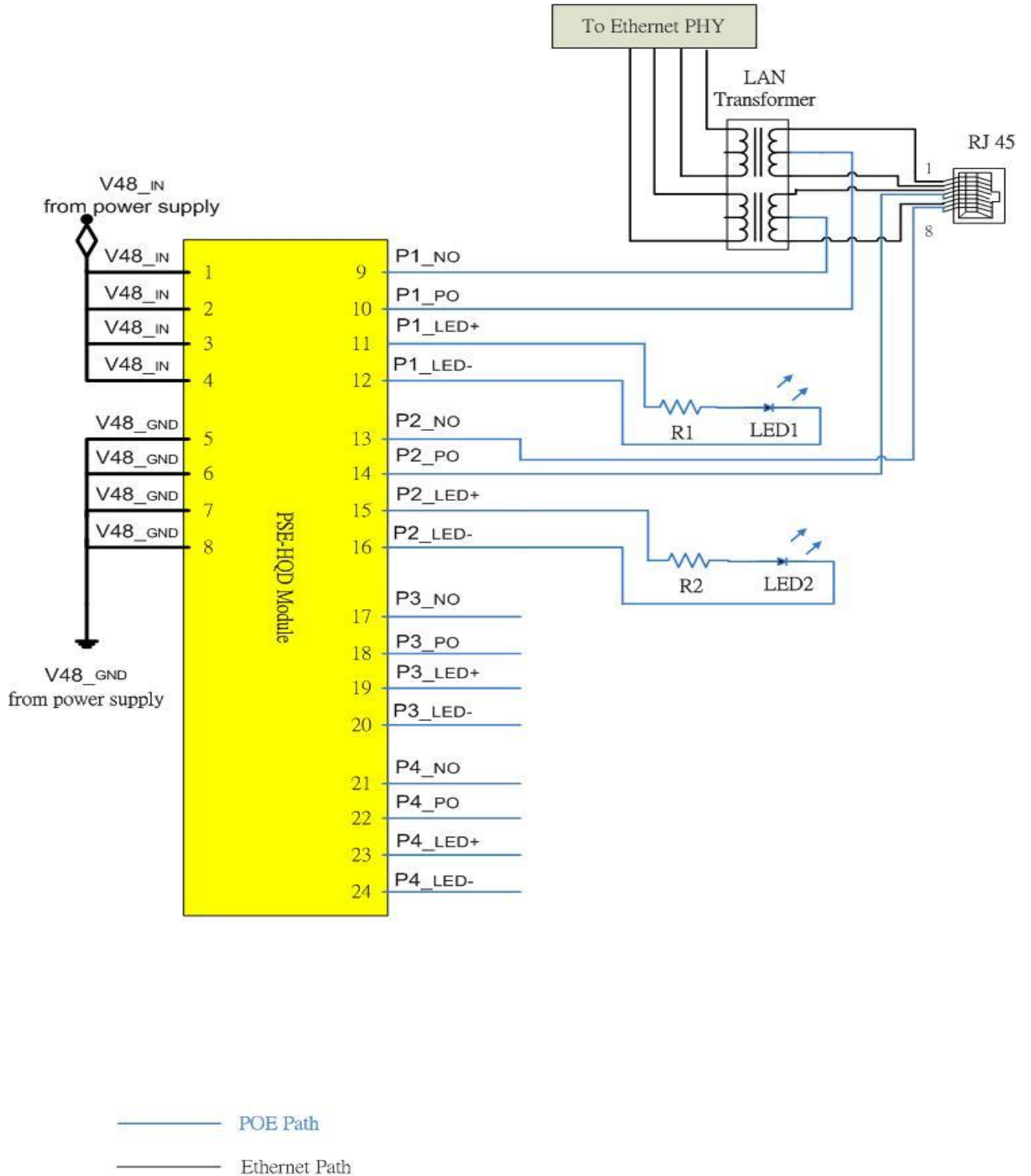
B. End-Point Configuration (Example in One Port)

- Pin 1 & 2 of RJ45 connect to Pn_PO (n=1 ~ 4); Pin 3 & 6 of RJ45 connect to Pn_NO(n=1 ~ 4).



C. Double High Power Configuration (Connect to two PDs that can provide two times power on remote side) (Example in One Port)

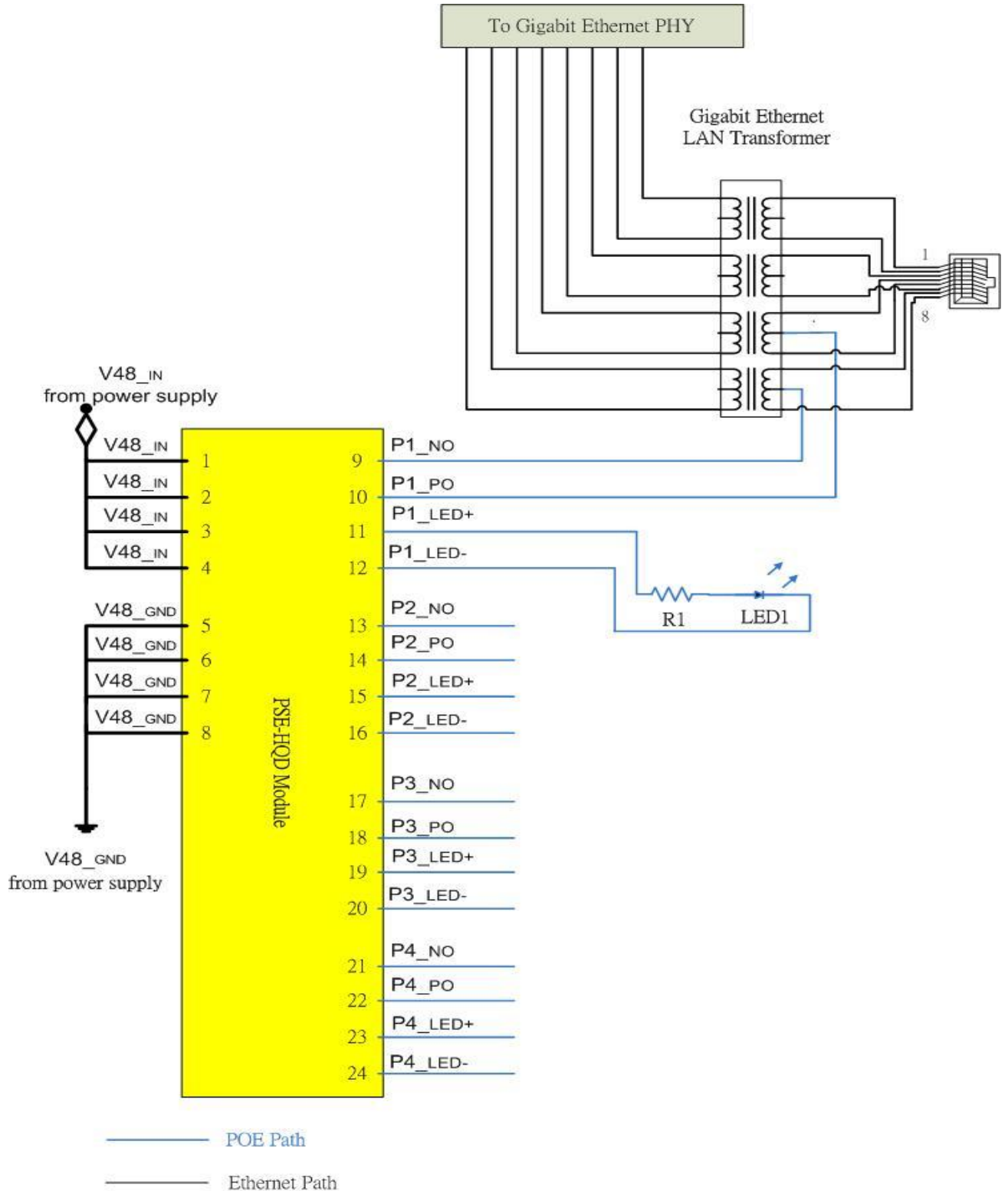
- Pin 1 & 2 of RJ45 connect to Pn_PO (n = 1 ~ 4); Pin 3 & 6 of RJ45 connect to Pn_NO (n = 1 ~ 4) for first PD.
- Pin 4 & 5 of RJ45 connect to Pn_PO (n = 1 ~ 4); Pin 7 & 8 of RJ45 connect to Pn_NO (n = 1 ~ 4) for second PD.



8. Gigabit Ethernet Typical Application

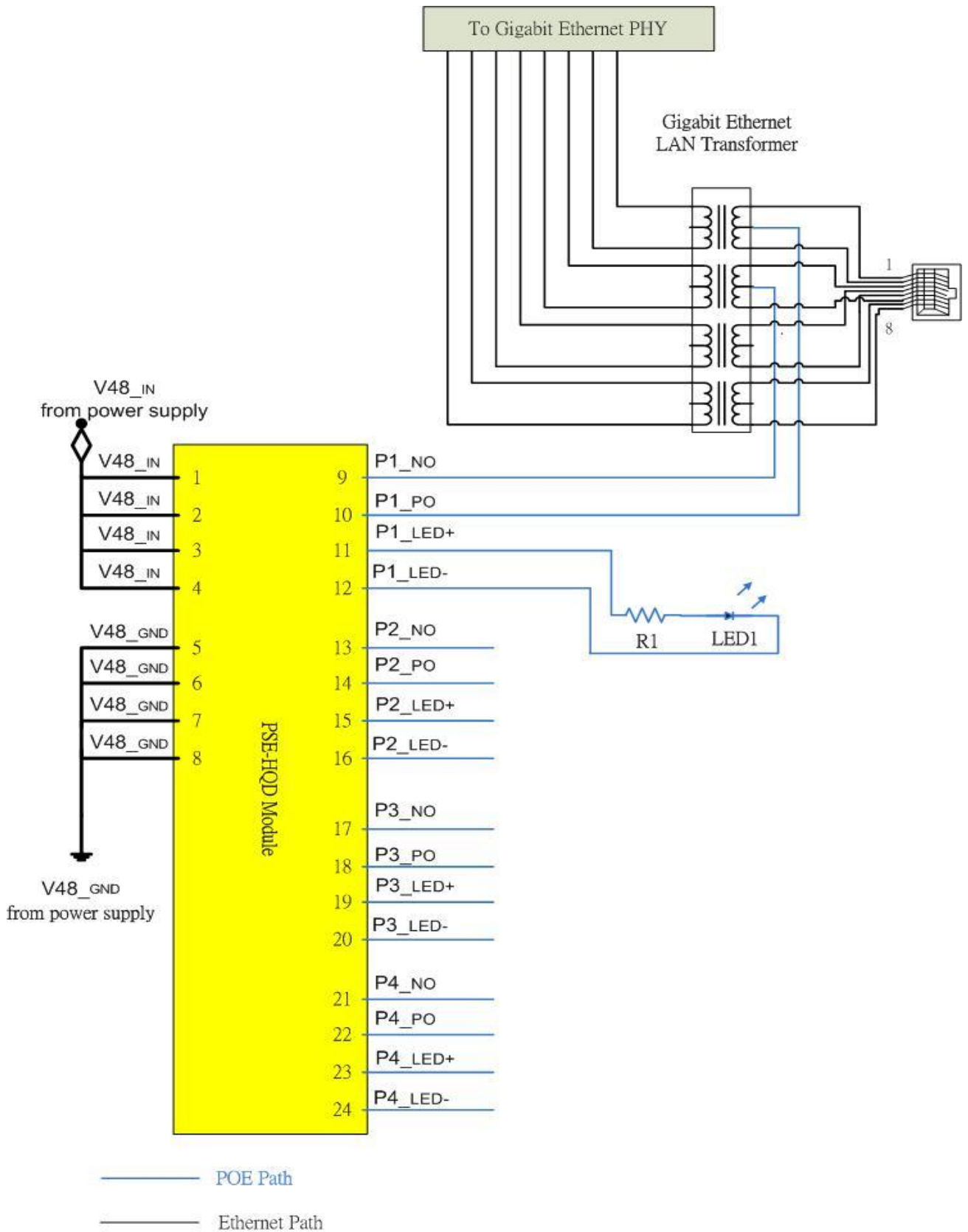
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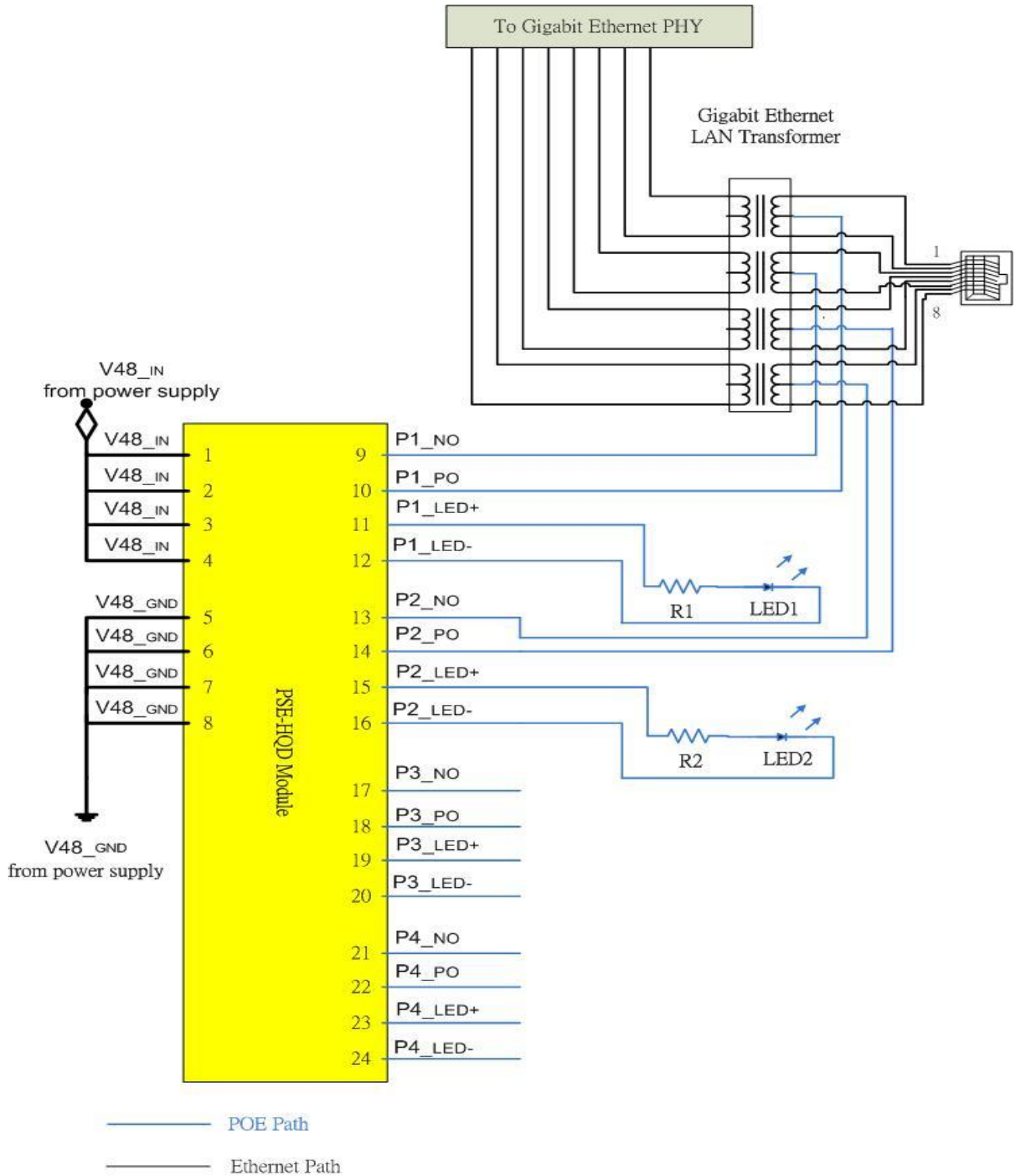
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C. Double High Power Configuration (Connect to two PDs that can provide two times power on remote side) (Example in One Port)

- Pin 1 & 2 of RJ45 connect to Pn_PO (n=1 ~ 4); Pin 3 & 6 of RJ45 connect to Pn_NO(n=1 ~ 4) for first PD.
- Pin 4 & 5 of RJ45 connect to Pn_PO (n=1 ~ 4); Pin 7 & 8 of RJ45 connect to Pn_NO(n=1 ~ 4) for second PD.



9. Electrical Characteristics

Item	DC Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
1	DC Power Input Voltage	V48_IN	39	48	60	V	
2	Under Voltage Lockout	VUV_Lock out			39	V	
3	Over Voltage Lock Out	VOV_Lock out		60		V	
4	Per Port Current Limitation	I_lim		615	650	mA	@ Full Load
5	Max. Total output Power Limitation	P_lim			160	W	
6	Total current consumption	I_Total			2.6	A	@ Full Load
7	Total Power Consumption	P_Total		146	160	W	@ Full Load
8	Soft Start Delay Time	T_ss		192		mS	
9	Input Power Fail Retry Delay Time	T_IN_fail		2		S	
10	Operating Temperature	T_OP	-15	25	55	°C	@ Full Load
11	Storage Temperature	T_Storage	-15	25	55	°C	