

PM8805 PoE powered device interface, evaluation board

Introduction

This document describes the characteristics and functionality of the evaluation board, which is intended as a learning and development tool.

Electrical measurements are reported in order to show the capabilities of the reference device.

Description

The evaluation board is designed to allow the testing of the PM8805 features and to verify the behavior of the component. See PM8805 datasheet DS12813 Rev.2 for device description (see www.st.com).

The board is to be used as a functional block in a complete PD design, having all possible features available to implement a demanding application circuit.



Figure 1. Evaluation board

Features

- 74x66 mm (3x2.6 inch) P.C.B. dimension optimized to allow probe connection, component replacing, additional wiring.
- Data & power input plus Data output RJ45 Ethernet connectors joined to a PoE signal path transformer, to meet Gbit and IEEE Std. 802.3 requirements.
- Chassis ground plane connection, with 1.6 mm (65 mils) creepage distance to the Ethernet wire connections.
- Adequate components available for EMC compliance and circuit setting in critical working conditions.
- Classification resistors and dip switch available, for PD's Class and Type selection.
- Eight LEDs and two push-buttons placement, for PD's status display and setting.
- Single connector presence, for Rear or Frontal auxiliary source implementation.
- Return path of the output voltage sectioned by MOSFET, with control provided by the PG signal.
- Twenty two test points or turrets, for signals monitoring and board output connection.



1 Electrical schematic

NOTE for Capacitors
Where not indicated the body is 0603,
the voltage is 100V
material XTR and blerance 10%
100nF 100V is XTR 10% 0805. NOTE for Resistors Where not indicated the body is 0603 and tolerance 5% DATA OUTPUT C19 NM 0805 J2 RJ45 C18 100mF 0805 RAUX R21 100k 0805 Red O Chassis Chassis R19 100k 0805 2KV R3 ₽ ' C12 100V 0603 C14 100V 0603 R13 33R W 0805 AgiH Y8T2 100F 100V 2KV 1812 ର <u>କ୍</u>ରୀ R16 NM 0805 essiOotuA 20 d ₹ 000 10 P C13 100V 0603 100 100 0603 88 <u>₹</u>88 R52 NM 0805
WW. R52A NM 1206
R64 OR 0805
WR64 NM 1206 23 C1 080 080 080 \rightarrow AUX Rear/Front TP8 Red R14 47k N 7 NM 1812 06 NM 1812 2 Passes & DATA & POWER INPUT F2 45

Figure 2. Electrical schematic - page 1

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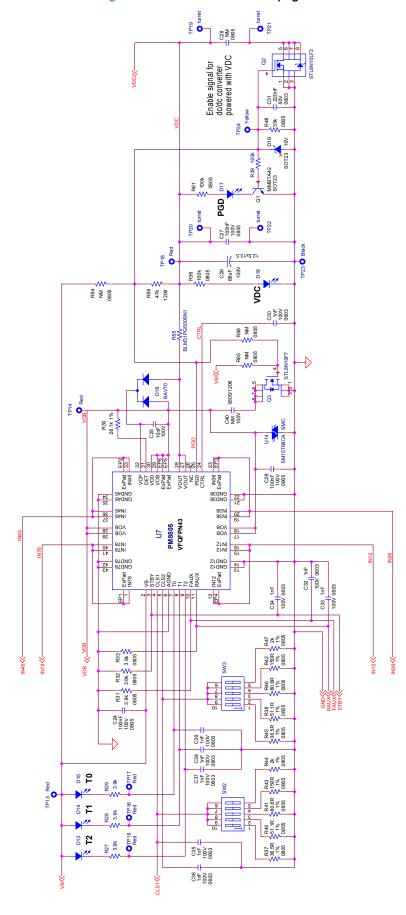


Figure 3. Electrical schematic - page 2

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2 Component layout

Figure 4. Component layout - top side

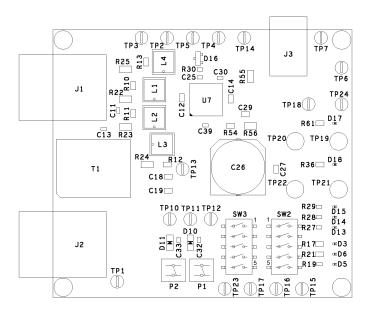
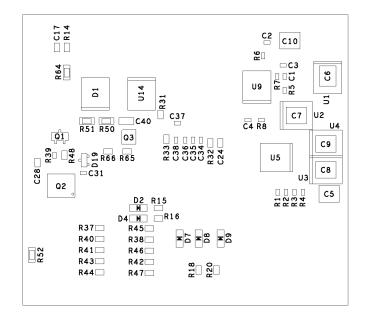


Figure 5. Component layout - bottom side



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3 Board bill of material

Table 1. Board bill of material.

| Q.ty | Reference designator | Value | Description | Package | Manufacturer code | Manufacturer |
|------|--|-----------------------|---|------------------|-----------------------------------|--------------------|
| 5 | C1, C2, C3, C4, C25 | 10nF 100V X7R | SMT capacitor | Size 0603 | - | Several |
| 2 | C5, C10 | 2.2nF 2kV X7R | SMT capacitor | Size 1812 | C4532X7R3D222K130KA or equivalent | TDK |
| 4 | C6, C7, C8, C9 | NM | SMT capacitor | Size 1812 | - | - |
| 2 | C12, C14 | 1nF 100V COG (NP0) | SMT capacitor | Size 0805 | - | Several |
| 3 | C17, C19, C40 | NM | SMT capacitor | Size 0805 | - | - |
| 5 | C18, C24, C27, C28, C29 | 100nF 100V X7R | SMT capacitor | Size 0805 | - | Several |
| 1 | C26 | 68uF 100V | SMT capacitor | Diam. 12.5X13 | EEEFK2A680AQ or equivalent | Panasonic |
| 11 | C11, C13, C30, C32, C33, C34, C35, C36, C37, C38, C39 | 1nF 100V X7R | SMT capacitor | Size 0603 | - | Several |
| 1 | C31 | 220nF 16V X7R | SMT capacitor | Size 0603 | - | Several |
| 1 | D1 | STPS4S200S | 4A - 200V power Schottky rectifier | SMC | STPS4S200S | STMicroelectronics |
| 7 | D2, D4, D7, D8, D9, D10, D11 | BAS16 | Silicon Switching Diode | SOD323 | BAS16-03W or equivalent | Infineon |
| 1 | D3 | STBY | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D5 | FAUX | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D6 | RAUX | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D13 | T2 | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D14 | T1 | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D15 | ТО | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D16 | BAV70 | Dual Switching Diode Common Cathode | SOT23 | BAV70LT1G / T3G or equivalent | ON Semiconductor |
| 1 | D17 | PGD | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |
| 1 | D18 | VDC | 1.0X0.5mm SMD CHIP LED | Size 0402 | KPHHS-1005MGCK or equivalent | Kingbright |

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| Q.ty | Reference designator | Value | Description | Package | Manufacturer code | Manufacturer |
|------|--------------------------------------|--------------------|---|----------------------|-----------------------------|---------------------|
| 1 | D19 | BZX84C10 | 350mW SURFACE MOUNT ZENER DIODE | SOT23 | BZX84C10 or equivalent | Diodes Incorporated |
| 1 | J1 | Data & Power input | Eight contact, Eight position shielded Jack | | SS-7188S-A-NF or equivalent | Stewart Connector |
| 1 | J2 | Data output | Eight contact, Eight position shielded Jack | | SS-7188S-A-NF or equivalent | Stewart Connector |
| 1 | J3 | AUX Rear/ Front | Receptacle for 6.3mm power jack, 2mm pin | | RAPC722 or equivalent | Switchcraft |
| 4 | L1, L2, L3, L4 | 10uH | SMT Power Inductors – SD54 Series | SD54 | SD54-103ML_x or equivalent | Coilcraft |
| 1 | P1 | Sleep/WKUP | 7914 4 mm SMD & Through-hole Sealed Key Switch | 7914J | 7914J-1-000E or equivalent | Bourns |
| 1 | P2 | SHDN | 7914 4 mm SMD & Through-hole Sealed Key Switch | 7914J | 7914J-1-000E or equivalent | Bourns |
| 1 | Q1 | MMBTA42 | Small signal NPN transistor | SOT23 | MMBTA42 or equivalent | Several |
| 1 | Q2 | STL8N10LF3 | N-channel 100V, 25mΩ, 7.8A, MOSFET | PowerFLAT 5x6 | STL8N10LF3 | STMicroelectronics |
| 1 | Q3 | STL8N10F7 | N-channel 100V, 17mΩ, 8A, MOSFET | PowerFLAT 3.3x3.3 | STL8N10F7 | STMicroelectronics |
| 8 | R1, R2, R3, R4, R5, R6, R7, R8 | 75R | SMT resistor | Size 0603 | - | Several |
| 4 | R10, R11, R12, R13 | 33R | SMT resistor | Size 0805 | - | Several |
| 1 | R14 | 47K | SMT resistor | Size 0805 | - | Several |
| 4 | R15, R21, R36, R61 | 100k | SMT resistor | Size 0805 | - | Several |
| 2 | R16, R17 | NM | SMT resistor | Size 0805 | - | - |
| 2 | R18, R20 | 1K | SMT resistor | Size 0805 | - | Several |
| 2 | R19, R39 | 100k | SMT resistor | Size 0603 | - | Several |
| 3 | R27, R28, R29 | 3.9K | SMT resistor | Size 0603 | - | Several |
| 1 | R30 | 26.1K 1% | SMT resistor | Size 0603 | - | Several |
| 3 | R31, R32, R33 | 3.9k | SMT resistor | Size 0805 | - | Several |
| 2 | R37, R45 | 35.6R 1% | SMT resistor | Size 0805 | - | Several |
| 2 | R38, R40 | 51.1R 1% | SMT resistor | Size 0805 | - | Several |
| 2 | R41, R46 | 80.6R 1% | SMT resistor | Size 0805 | - | Several |
| 2 | R42, R43 | 150R 1% | SMT resistor | Size 0805 | - | Several |

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| Q.ty | Reference designator | Value | Description | Package | Manufacturer code | Manufacturer |
|------|---|------------|---------------------------------------|---------------------------|---------------------------------------|------------------------|
| 2 | R44, R47 | 2K 1% | SMT resistor | Size 0805 | - | Several |
| 1 | R48 | 33K | SMT resistor | Size 0805 | - | Several |
| 5 | R50, R52, R54, R65, R66 | NM | SMT resistor | Size 0805 | - | - |
| 2 | R51, R64 | 0R | SMT resistor | Size 0805 | - | Several |
| | R55 | 50Ohm | Bead Impeder | Size 1206 | BLM31PG500SN1 | Murata |
| 4 | R22, R23, R24, R25 | 0R | SMT resistor | Size 1206 | - | Several |
| 1 | R56 | 47K | SMT resistor | Size 1206 | - | Several |
| 2 | SW2, SW3 | A6S-5104-H | Slide DIP Switch | | A6S-5104-H or equivalent | Omron |
| 15 | TP1, TP2, TP3, TP4, TP5, TP6, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18 | Red | Red bead terminal, diam. 1.32mm | Diam. 2,9 , Hole 1.6mm | 20-313141 or equivalent | Vero Technologies |
| 2 | TP7, TP23 | Black | Black bead terminal, diam. 1.32mm | Diam. 2,9 , Hole 1.6mm | 20-2136 or equivalent | Vero Technologies |
| 4 | TP19, TP20, TP21, TP22 | Turret | SOLDER TERMINAL TURRETS | 2501 | 2501-2-00-80-00-00-07-0 or equivalent | MILL-MAX |
| 1 | TP24 | Yellow | Yellow bead terminal, diam. 1.32mm | Diam. 2,9 , Hole 1.6mm | 20-313141 or equivalent | Vero Technologies |
| 1 | T1 | WA8704-AL | POE Signal Path Transformer | | WA8704-ALD or equivalent | Coilcraft |
| 7 | U1, U2, U3, U4, U5, U9, U14 | SM15T68CA | 1500 W TVS Diode | SMC | SM15T68CA | STMicroelectronics |
| 1 | U7 | PM8805 | IEEE 802.3bt PoE-PD interface | VFQFPN 8X8X1.0 43L | PM8805TR | STMicroelectronics |
| 4 | - | - | Plastic support for P.C.B. | - | PST-6-01 or equivalent | Essentra Components |
| 1 | - | - | FR4 four layers P.C.B. | 66x73.81 mm | - | - |

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4 P.C.B. layout

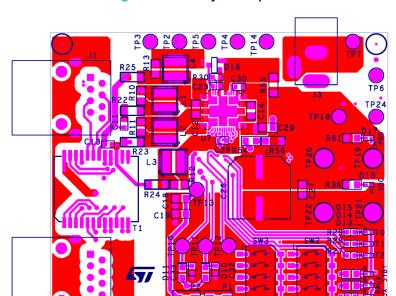
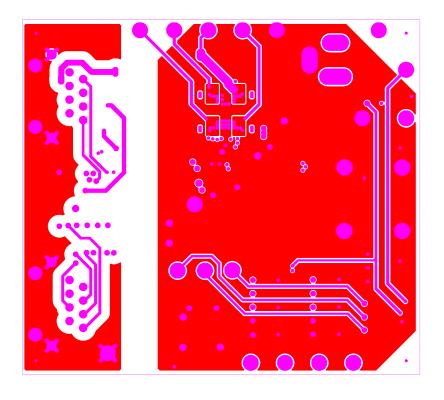


Figure 6. P.C.B. layout - top side





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Figure 8. P.C.B. layout - layer 3

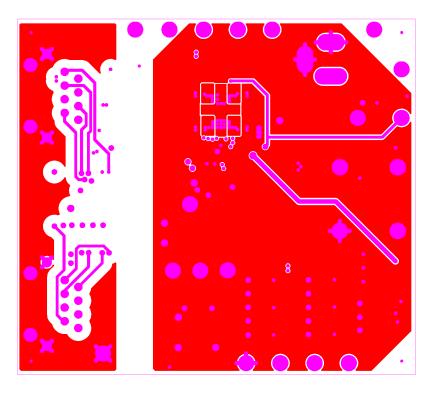
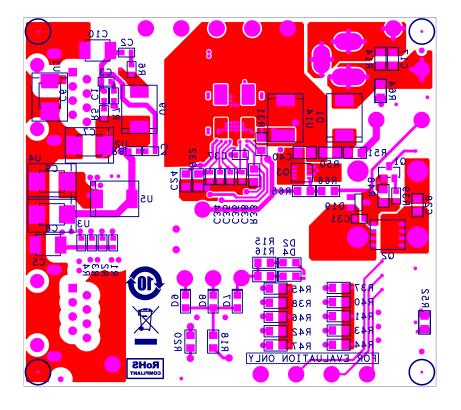


Figure 9. P.C.B. layout - bottom side



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5 Board details

The following sections list the operative points available on the evaluation board, for testing and developing activities.

See Figure 2, Figure 3, Figure 5 and PM8805 datasheet DS12813 as reference on www.st.com.

5.1 Board connectors

This section provides a list of the connectors present on the board and their purpose:

Table 2. Board connectors

| Reference designator | Туре | Description |
|-------------------------|------|---|
| J1 | RJ45 | Data and Power input connector, satisfying IEEE Std. 802.3bt requirement, with metallic shield connected to Chassis ground plane. |
| J2 | RJ45 | Data output connector, satisfying IEEE Std. 802.3bt requirement, with metallic shield connected to Chassis ground plane. |
| J3 | Jack | Auxiliary input connector, with 2 mm internal male pin, suitable for 6.3 mm bipolar power jack, configurable to perform Rear or Frontal auxiliary source. |

5.2 Board test points and turrets

The following list explains the board test points function:

Table 3. Board test points and turrets

| Reference designator | Туре | Description |
|----------------------|----------------------|---|
| TP1 | Red pin | Chassis ground connection |
| | | Test points connected to the four input Ethernet Pairs, |
| TP2, TP3, TP4, TP5 | Red pins | at the input bridges connection points, |
| | | for the PM8805 inputs monitoring |
| TP6, TP7 | Red / black pins | Monitoring points at J3 auxiliary input voltage |
| TP10 | Red pin | RAUX signal (PM8805) |
| TP11 | Red pin | FAUX signal (PM8805) |
| TP12 | Red pin | STBY signal (PM8805) |
| TP13 | Red pin | VB signal, internal reference voltage (PM8805) |
| TP14 | Red pin | VOB voltage, internal active bridges positive output voltage (PM8805) |
| TP15, TP16, TP17 | Red pins | T2, T1, T0 signals (PM8805) |
| TP18, TP19, TP20 | Red pin and turrets | Board positive output voltage |
| TP21 | Turret | Board output voltage return |
| TP22, TP23 | Turret and black pin | GND signal, internal active bridges output voltage return (PM8805) |
| TP24 | Yellow pin | PGD signal (PM8805) |

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5.3 Board signaling LEDs

The following is a list of LEDs present on the board:

Table 4. Board signaling LEDs

| Reference designator | Function | Description |
|-------------------------|-----------------------------------|--|
| | | STBY signal monitor, this LED is ON if polarized through R17 path only. |
| D3 | (LED ON) = (STBY=1=active) | Use R17 pads, to implement the STBY signal driving and obtain the special operation condition, described in the PM8805 datasheet DS12813 on www.st.com |
| D5 | (LED ON) = (FAUX=1=active) | FAUX signal monitor, this LED is ON if the Auxiliary Frontal input voltage is selected and present. |
| D6 | (LED ON) = (RAUX=1=active) | RAUX signal monitor, this LED is ON if the Auxiliary Rear input voltage is selected and present. |
| | (LEDs ON) = (T2/T1/T0=0=NOT | T2, T1 and T0 signals monitors. |
| D13, D14, D15 | active). | These LEDs are ON if the relative PM8805 signals are NOT active. |
| | (LEDs OFF) = (T2/T1/T0=0=active). | These LEDs are OFF if the relative PM8805 signals are active. |
| D17 | (LED ON) = (PGD=1=active) | PGD monitor, this LED is ON if the PGD signal is active. |
| D18 | (LED ON) = (VOUT=VDC=present) | VOUT=VDC voltage monitor, this LED is ON if the PM8805 output voltage (VOUT) is present. |
| | | VDC is the recognition mark printed on the evaluation board. |

5.4 Board push-buttons

The following push-buttons are present on the board:

Table 5. Board push-buttons.

| Reference designator | Function | Description |
|----------------------|------------|--|
| P1 | SLEEP/WKUP | Pushing this button, three signals are asserted at one, RAUX, FAUX and STBY. |
| FI | | See DS12813 on www.st.com, for PM8805 behavior description. |
| P2 | SHDN | Pushing this button, two signals are asserted at one, RAUX and FAUX. |
| P2 | SHUN | See DS12813 on www.st.com, for PM8805 behavior description. |

5.5 Board dip switches

Two groups of five dip switches, SW2 and SW3 are foreseen on the board, to allow the selection of the classification resistors connected to the PM8805.

CLS1 and CLS2 classification pins connected to the necessary resistors value to GND, set up the PD class request, during classification process.

See datasheet DS12813 on www.st.com, for classification process understanding.

Looking at Figure 3 and Figure 4, it is possible to verify dip switches operation and resistors correspondence. Both figures report the position of switches 1 and 5 on SW2 and SW3.

5.6 Additional wires

Four 0 Ω resistors, R22, R23, R24, and R25, placed near the J1 connector, on the board top side, can be replaced by four insulated wires, to allow a probe insertion for current measurement.

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6 Board electrical specifications

The following table reports the most important electrical specifications of the evaluation board.

Table 6. Board electrical specification.

| Parameter | Description | Min. | Max. | Unit |
|-----------|--|------|------|------|
| Vin | Input voltage at J1 connector | 35 | 57 | V |
| lin | Input current at J1 connector for each Ethernet Pair | | 1 | Α |
| Vout | Output voltage at TP19 and TP21 turrets | 34 | 57 | V |
| lout | Output current at TP19 and TP21 turrets | | 2 | Α |
| Pout | Outpur power at TP19 and TP21, turrets | | 100 | W |
| η% | Overall efficiency at lout=2 A | 97 | | % |
| VFront | Voltage at J3 connector as Frontal auxiliary input | 35 | 57 | V |
| IFront | Current at J3 connector as Frontal auxiliary input | | 2 | Α |
| VRear | Voltage at J3 connector as Rear auxiliary input | 35 | 57 | V |
| IRear | Current at J3 connector as Rear auxiliary input | | 2 | Α |
| Tamb | Operating ambient temperature | 0 | 50 | °C |

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7 Operation details

The following sections list the board functional capabilities, explaining the operative procedures.

Those features are obtained with dedicated circuitry or components, foreseen to tackle specific subjects of the application field.

See Figure 2, Figure 3, Figure 4, Figure 5 and PM8805 datasheet DS12813 on www.st.com as reference.

7.1 Input section

The input section is composed by the connectors J1, J2, and the coupling transformer T1.

A proper ground plane connected to the connectors shield is foreseen and it is designed with a creepage distance of 1.6 mm (65 mils), to be connected to the Protective Earth.

Use TP1 for clip connection to this copper plane.

7.2 Input lines circuitry

Four input lines are available, after the coupling transformer T1, to derive current from the four wire pairs of the Ethernet line.

The four input lines are connected to the eight input pins of the PM8805, through a dedicated circuitry.

This is to prevent the input abnormal electrical events, characteristic of the communication lines, to protect the Powered Device electrical circuit.

The following list explains the components' purpose:

- U1, U2, U3, U4, Transient Voltage Suppressors, to clamp input common mode overvoltage (voltage surge), between the four Ethernet wire pairs and the Chassis ground plane, usually connected to the Protective Earth conductor
- U5, U9, TVSs, to clamp input differential mode overvoltage, between two Ethernet wire pairs.
- L1, L2, L3, L4, four inductors to limit the current through the PD electrical circuit, during common mode overvoltage transient (voltage surge).
- R10, R11, R12, R13, four dumping resistors, used along with previous inductors.
- C11, C12, C13, C14, four filtering capacitors, for high frequency, differential mode noise filtering.

The presence of these components allows the test of the board and the test of additional application circuits connected to the board output, which make up a complete PD circuitry.

It is possible to verify the PM8805 working condition, during the abnormal electrical transient application. See Design tip DT0149 on www.st.com "Power over Ethernet application circuits, line surge analysis and treatment", for a better understanding of the topic.

7.3 Rear/Front auxiliary input

The J3 connector can be configured to implement both Rear or Frontal auxiliary input.

- Rear auxiliary configuration; it is the normal setting present on the board:
 - R51= 0Ω and R50=N.M., to select the PM8805's output voltage (Vout/VDC) as insertion point of the auxiliary input.
 - $R64=0\Omega$ and R52=N.M., to select the Rear auxiliary configuration and the Maintaining Power Signature function, on the PM8805's pins.
- Frontal auxiliary configuration; it is possible to apply this setting as follows: $R50=0\Omega$ and R51=N.M., to select the PM8805's VOB voltage as insertion point of the auxiliary input. $R52=0\Omega$ and R64=N.M., to select the Frontal auxiliary configuration to the PM8805's pins.

See the PM8805 datasheet DS12813 on www.st.com, for a correct learning of these features.

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7.4 Board output

The Powered Devices must respect a proper timing before drawing current from the Ethernet line.

The circuitry following the PM8805 can start drawing current after the PDG signal assertion.

The PGD is an open collector, high active signal.

If the output voltage is obtained from TP20 and TP22 turrets, the following PD circuits must use the PGD signal, to enable the PD's operation. The PGD signal is available on TP24.

Using these output points, connected in parallel to C26=68µF, all the capacitance connected is charged using a controlled current, during startup phase.

If the output voltage is obtained from TP19 and TP21 turrets, the PD circuitry is supplied after the PDG assertion only, because the Q2 MOSFET is driven by this signal.

Using these output points, the capacitance present in the PD circuits, is not charged using a limited current, because the startup phase has already expired.

See the PM8805 datasheet DS12813 on www.st.com for a complete description of the startup phase.

7.5 VOB fast transient protection

The PM8805's VOB signal can be subjected to a very fast voltage transient, depending on the application circuit type and working condition.

If the voltage transient has a falling edge with an amplitude higher than 10 V and a duration lower than 1 μ s, there is the possibility to have the PM8805's circuitry reset.

An example of these conditions is the presence of a common mode inductor along the output voltage path, without a proper capacitor on the VOUT pins.

The leakage inductance of the inductor can generate a voltage transient, when crossed by high and fast current peak.

Even without the common mode inductor, during an input line surge injection, the current flowing back through the C26 capacitor can generate a fast voltage transition, on VOUT and VOB.

If it is not possible to avoid the root cause of the VOB voltage transient, it is possible to limit the transition applying a ceramic capacitor on the VOB pins.

The capacitor should be large enough to be effective, but it must be considered that it is forbidden to have more than 100 nF between the input lines during the PD classification process. (This is a requirement of IEEE Std. 802.3bt standard).

The transistor Q3 is foreseen on the board to connect the C40 capacitor, between VOB and GND signals.

Connecting 1 μ F, 100 V capacitor, after the assertion of PGD signal or the rising of VB voltage, it is possible to protect VOB, without influencing the PD classification procedure.

Q3 is always available on the board, C40=1 µF and R65 or R66 can be placed if necessary.

R65 supplies the Q3's gate bias from VB voltage.

R66 supplies the Q3's gate bias from PGD signal.

7.6 Noise reduction

The PD circuitry following the PM8805 interface can generate a lot of differential mode noise between VOUT/VDC and GND signals.

A small filter placed on R55 pads is used to reduce the high frequency noise reaching the PM8805's output section.

This bead impeder could be useful or not, depending on the application circuit condition.

Verify the effective necessity of this component, that is sometimes useful to avoid the circuitry reset during input line surge injection or during electrostatic discharge applied to the VDC voltage, on the output turrets.

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8 Evaluation measurements

The following paragraphs report some measurements performed on the evaluation board, to show the performances of the PM8805 and of the board itself.

8.1 Power losses

The following figure reports the PM8805 power losses, during a steady-state functioning.

The causes of greater loss of the device are the voltage drops on the input bridges and the voltage drop on the hot swap switch.

Measurements were conducted taking care to obtain the device losses only.

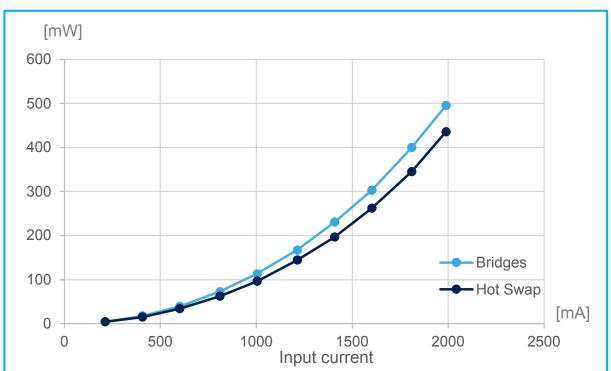


Figure 10. Input bridges and hot swap losses

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8.2 Board thermal measurement

The following figure shows the board performance as heat dissipation capability and resulting temperature of the PM8805 device.

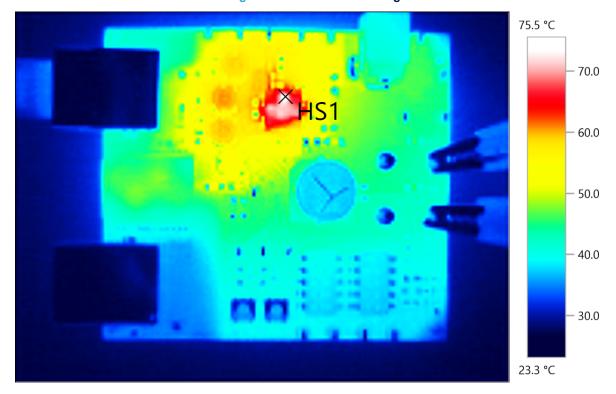


Figure 11. Board thermal image

Measurement conditions:

Tamb=23.3 °C, ambient temperature.

No cooling air flow.

Input=2 A, current flowing through the PM8805.

HS1=75.5 °C, PM8805 temperature.

8.3 Electro-magnetic compatibility

The following section reports the measurement conducted on the board, relative to the voltage surge application. Tests are performed using a proper Coupling and Decoupling Network (CDN), following the specification present in the IEC 61000-4-5 standard.

Tests reported in this application note are conducted using the 1.2/50 μ s surge, which is relative to the most common PoE application circuits that are connected to lines frequently classified as Unshielded and Symmetrical.

The scope of the test is to verify the presence of a failure risk, during the surge application.

Since the circuit foresees the presence of four TVS on the input lines (U1, U2, U3, U4), which limit the voltage transient amplitude on the board, a possible failure implies the presence of high currents flowing through the electrical paths.

It is very important to note that since the board output voltage is not isolated, there cannot be a ground connection of the output.

During the test, the ground connection was applied to the Chassis ground plane.

Considering the board circuitry, the most sensitive component is the PM8805, which can suffer high current flowing into its hot swap MOSFET.

To verify the amplitude of the current flowing through the PM8805, it is enough to measure the current flowing into the R55 bead impeder, which means the current flowing along the positive path of VOUT/VDC voltage.

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The tests report a safe effect of ±4 kV surges, showing IOUT= -20 A, maximum current peak during the Surge injection, flowing into the VOUT pins.

The input bridges present in the PM8805 are composed by MOSFETs, which open when sensing a reverse current flowing inside.

This method introduces a little opening delay of the input bridges, which can result in around 2 μ s, depending on the external circuitry and the effective reverse current shape.

That leads to high current flowing through the PM8805 during surge event, until the input bridges are opened. Four input inductors L1, L2, L3 and L4 limit that current and allow to sustain surge without failure.

The following two figures show the test results.

Notes:

- The presence of the four TVS' on the input lines, allows the injection of high voltage surge, even if the creepage distance maintained between input lines paths and the Chassis plane is 65 mils only.
- See design tip DT0149 "Power over Ethernet application circuits, line surge analysis and treatment", to
 obtain more information on the subject.

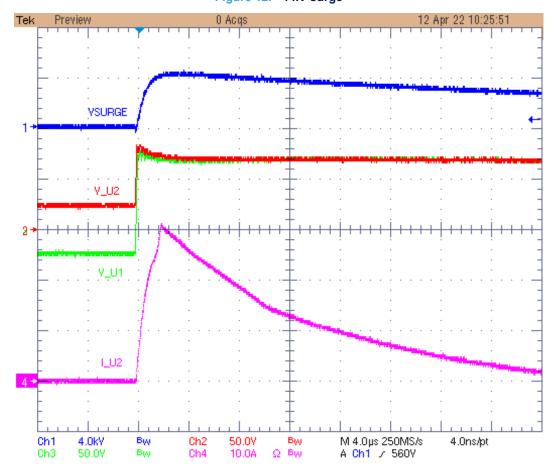


Figure 12. +4 kV surge

Ch1 blue trace, 4 kV/div, Surge voltage applied between input Ethernet lines and Chassis ground.

Ch2 red trace, 50 V/div, U2 voltage.

Ch3 green trace, 50 V/div, U1 voltage.

Ch4 purple trace, 10 A/div, U2 current.

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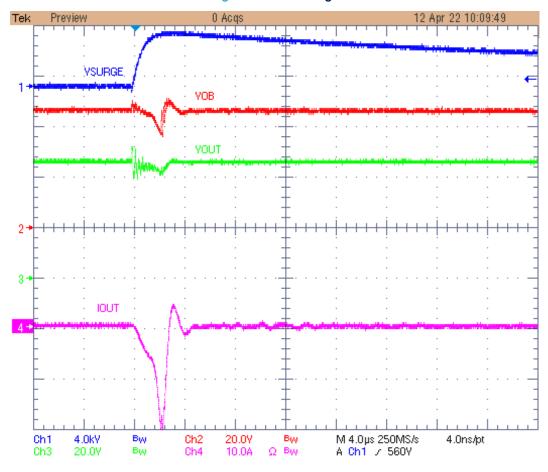


Figure 13. +4 kV surge

Ch2 red trace, 20 V/div, PM8805 VOB voltage. Ch3 green trace, 20 V/div, PM8805 VOUT voltage. Ch4 purple trace, 10 A/div, PM8805 IOUT current.

8.4 Electro-magnetic interferences

Conducted common mode disturbance.

The following figure reports the measurement carried out on the board, relative to the conducted common mode (asymmetric mode) disturbance at telecommunication ports, in the frequency range 0.15 MHz to 30 MHz, for class B equipment.

The measurement is performed using a proper Impedance Stabilization Network (ISN), following the specification present in the CISPR 22: 2008 and EN 55022: 2010 standards.

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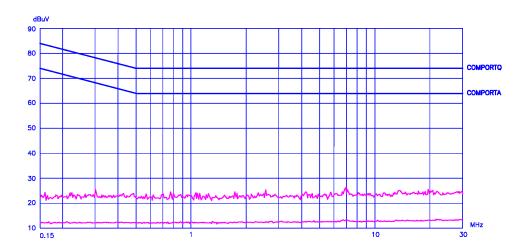


Figure 14. Conducted common mode disturbance

Measurement conditions:

Vinput= 48 V.

lout= 2 A, resistive load.

The previous figure demonstrates that the evaluation board with the PM8805 device does not add significant noise to the background level.

Radiated disturbance

The following figures report the measurement carried out on the board, relative to the radiated disturbance, in the frequency range 30 MHz to 1 GHz, for class B equipment.

The measurement is performed following the specification present in the CISPR 22: 2008 and EN 55022: 2010 standards.

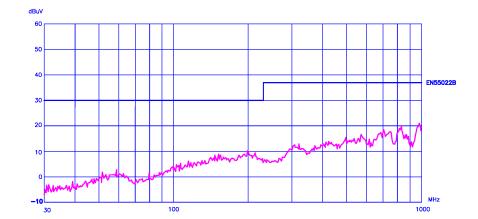


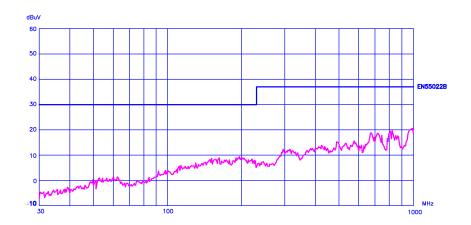
Figure 15. Radiated disturbance, background noise level

Measurement conditions: Evaluation board present but without input voltage.

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Measurement conditions:

Vinput= 57 V.

Iout= 2 A, resistive load.

The previous two figures show the radiated noise emissions of the evaluation board and of the PM8805 device, comparing the background noise level of the measurement equipment versus the board noise emission, with maximum output current and maximum input voltage.

The comparison demonstrates that the PM8805 and the board do not generate significant noise.

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9 IEEE Std 802.3bt compliance

The Institute of Electrical and Electronics Engineers (who develops industry standards, to establish the functionality and interoperability of products and services) has created the IEEE Std 802.3 standard, to regulate the Ethernet local area networks functionality.

The 802.3 standard is also composed by its amendments or projects (identified by two character suffixes 802.3xx), which correct or expand particular topics.

The 802.3at Amendment 3, Data Terminal Equipment (DTE), Power via the Media Dependent Interface (MDI) Enhancements, includes changes to IEEE Std 802.3-2008, to augment the capabilities of 802.3 with higher power levels and improved power management information.

The 802.3bt Amendment 2, Physical Layer and Management Parameters for Power over Ethernet over 4 Pairs, increases the maximum power available for the Powered Device (PD), to the IEEE Std 802.3-2018, by utilizing all four pairs in the specified structured wiring plant.

This represents a substantial change to the capabilities of Ethernet with standardized power. The power classification information exchanged during negotiation is extended to allow meaningful power management capability. These enhancements solve the problem of higher power and more efficient standardized Power over Ethernet (PoE) delivery systems.

One of the principal characteristics of a PoE interface is to be compliant with a proper standard, widely recognized and adopted, to guarantee the correct functionality of the PD using it.

The PM8805 device is designed to be compliant with the IEEE Std 802.3bt specification, maintaining compatibility and interoperability with the previous 802.3at amendment.

The Ethernet Alliance organization (that is an industry consortium dedicated to the success and advancement of Ethernet technologies) is considered a reference in the Ethernet compass.

EA has defined a measurement method and test procedure to verify compliance to the 802.3at (Gen 1) and 802.3bt (Gen 2) amendments.

The Sifos Technologies (a Company developing and producing PoE test instruments and software) has developed dedicated instruments to verify PD compliance with the IEEE standards, referring to Ethernet Alliance test procedure.

The following measurement, performed using an up to date measurement system connected to the evaluation board, demonstrates the PM8805 compliance with the 802.3bt and 802.3at requirements.

D PDA-600 BT TEST REPORT EA Cert. ALT A MD Type3 Phy Coverage: Sifos Status ALT B MDI Type4 Phy PDA Firmware: 2.08 3 Technologies Product Tested Report Ver: 3.6 **PASS** 4 EVL-POE007V1 PASS INFO Serial Number 604A0050 9 Detection Min. Max. Low Lim. High Lim. P/F 10 EA Test ID Meas Units Average Parameter 11 SigType 11.18.1 SINGLE SINGLE SINGLE 25.69 25.69 25.69 kohm 11.12.2 13 Rdet final A 25.59 kohm 25.59 25.59 25.5 23.70 26.30 Р 11.12.2 14 15 16 Rdet_unpwr_A 11.13.1,11.18.1 >99.00 kohm 99.00 99.00 99.00 >45.00 Р 25.29 26.22 25.29 26.22 Rdet at Vmin A 11.12.2 kohm 26.22 26.30 Р Rdet_at_Vmax_A 11.12.2 kohm Rdet Voffset A 17 VDC 0.0 1.9 Р 11.12.2 1 18 19 Cdet A 11.12.1 0.10 uF 0.10 0.10 0.10 0.05 0.12 Р Cdet_final_A 0.10 uF 0.10 0.10 0.10 0.05 0.12 11.12.1 25.78 25.71 23.70 20 21 22 23 24 25 25.78 Р Rdet_B kohm 26.30 Rdet final B 11.12.3 kohm 25.71 Р 99.00 25.16 >99.00 25.16 99.00 <12.00 Rdet unbwr B 11.13.2,11.18.2 kohm 99.00 >45.00 det at Vmin E 25.16 kohm 11.12.3 Rdet at Vmax B 11.12.3 25.70 25.70 25.70 25.70 23.70 Р Р Rdet_Voffset_B 11.12.3 1: VDC 13 13 1: 0.0 19 0.10 0.10 0.10 11.12.1

Figure 17. IEEE Std 802.3bt Conformance Test report

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Figure 18. IEEE Std 802.3bt Conformance Test report

| | В | С | D | Е | F | G | Н | I | J | K |
|---|--|--|---|---|---|---|--|---|--|--|
| | assification | | | | | | | | | |
| 29 | ClassNum_A | 11.27 | 8 | | 8 | 8 | - | 8 | 8 | |
| 30 | class_sig_EV1-2_min_A | 11.27 | 39.5 | mA | 39.5 | 39.5 | 39.5 | 36.0 | 44.0 | Р |
| 31 | class_sig_EV1-2_max_A | 11.27 | 40.1 | mA | 40.1 | 40.1 | 40.1 | 36.0 | 44.0 | Р |
| 32 | class_sig_EV3-5_min_A | 11.27 | 27.9 | mA | 27.9 | 27.9 | 27.9 | 26.0 | 30.0 | Р |
| 33 | class_sig_EV3-5_max_A | 11.27 | 28.6 | mA | 28.6 | 28.6 | 28.6 | 26.0 | 30.0 | Р |
| 34 | Markl_A | 11.33 | 0.50 | mA | 0.50 | 0.50 | 0.50 | 0.25 | 4.00 | Р |
| 35 | Tclass_max_A | 11.29 | 3.4 | ms | 3.4 | 3.4 | 3.4 | 0.2 | 5.0 | Р |
| 36 | Iclass_EV1_at_Vmin_A | 11.27 | 39.7 | mA | 39.7 | 39.7 | 39.7 | 36.0 | 44.0 | Р |
| 37 | lclass_EV1_at_Vmax_A | 11.27 | 39.4 | mA | 39.4 | 39.4 | 39.4 | 36.0 | 44.0 | Р |
| 38 | Class_Reset_A | 11.27 | 1 | | 1 | 1 | - | 1 | 1 | Р |
| 39 | Autoclass | 11.35 | 0 | | 0 | 0 | - | 0 | 0 | |
| 40 | Tacs | 11.35 | 0.0 | ms | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Р |
| 41 | ClassNum_B | 11.27 | 8 | | 8 | 8 | - | 8 | 8 | Р |
| 42 | class_sig_EV1-2_min_B | 11.27 | 39.6 | mA | 39.6 | 39.6 | 39.6 | 36.0 | 44.0 | Р |
| 43 | class_sig_EV1-2_max_B | 11.27 | 40.1 | mA | 40.1 | 40.1 | 40.1 | 36.0 | 44.0 | Р |
| 44 | class_sig_EV3-5_min_B | 11.27 | 27.9 | mA | 27.9 | 27.9 | 27.9 | 26.0 | 30.0 | Р |
| 45 | class_sig_EV3-5_max_B | 11.27 | 28.4 | mA | 28.4 | 28.4 | 28.4 | 26.0 | 30.0 | Р |
| 46 | Markl_B | 11.33 | 0.60 | mA | 0.60 | 0.60 | 0.60 | 0.25 | 4.00 | Р |
| 47 | Tclass max B | 11.29 | 3.4 | ms | 3.4 | 3.4 | 3.4 | 0.2 | 5.0 | Р |
| 48 | Iclass EV1 at Vmin B | 11.27 | 39.6 | mA | 39.6 | 39.6 | 39.6 | 36.0 | 44.0 | Р |
| 49 | Iclass EV1 at Vmax B | 11.27 | 39.6 | mA | 39.6 | 39.6 | 39.6 | 36.0 | 44.0 | Р |
| 50 | Class Reset B | 11.27 | 1 | | 1 | 1 | - | 1 | 1 | Р |
| | ower-Up / Down | | | | | | | | | |
| 52 | Parameter | EA Test ID | Meas. | Units | Min. | Max. | Average | Low Lim. | High Lim. | P/F |
| 53 | linrush init | 11.51 | 81.6 | mA | 81.6 | 81.6 | 81.6 | 0.0 | | |
| 54 | linrush tdel | 11.51 | 126.500 | mA | 126.5 | 126.5 | 126.5 | 0.0 | 257.6 | P |
| 55 | Tinrush | | 50.0 | | 50.0 | 50.0 | 50.0 | 0.0 | 50.0 | P |
| | linrush init A | 11.51 | 38.8 | ms mA | 38.8 | 38.8 | 38.8 | 0.0 | 600.0 | |
| 56 57 | linrush_init_A | 11.51 | 62.100 | mA mA | 38.8 62.1 | 38.8 62.1 | 38.8 62.1 | 0.0 | 257.6 | |
| | | 11.51 | | | | | | | | P |
| 58 | Tinrush_A | 11.51 | 50.0 | ms | 50.0 | 50.0 | 50.0 | 0.0 | 50.0 | |
| 59 | linrush_init_B | 11.51 | 40.4 | mA | 40.4 | 40.4 | 40.4 | 0.0 | 600.0 | |
| 60 | linrush_tdel_B | 11.51 | 65.800 | mA | 65.8 | 65.8 | 65.8 | 0.0 | 257.6 | P |
| 61 | Tinrush_B | 11.51 | 50.0 | ms | 50.0 | 50.0 | 50.0 | 0.0 | 50.0 | P |
| 62 | Vrefl_A | 11.66 | 0.0 | VDC | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | Р |
| 63 | Vrefl_B | 11.66 | 0.0 | VDC | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | Р |
| 64 | Von | 11.39 | 39.1 | VDC | 39.1 | 39.1 | 39.1 | 30.0 | 42.0 | Р |
| 65 | Voff | 11.41 | 30.2 | VDC | 30.2 | 30.2 | 30.2 | 30.0 | 42.0 | Р |
| 66 | Vhyst | | 8.8 | VDC | 8.8 | 8.8 | 8.8 | 2.8 | 12.0 | |
| 67 | Vport_ext_A | 11.7 | -1.0 | VDC | -1.0 | -1.0 | -1.0 | 0.0 | 2.8 | NA |
| 68 | Vport_ext_B | 11.7 | -1.0 | VDC | -1.0 | -1.0 | -1.0 | 0.0 | 2.8 | NA |
| 69 2 | Pair Powered Type-1 PHY | | PSE | Emulation: | On Time: | 120 sec | Off Time: | 10 sec | Vport: | 56.0 |
| 70 | Parameter | EA Test ID | Meas. | Units | Min. | Max. | Average | Low Lim. | High Lim. | P/F |
| 71 | Minl_1 | 11.73 | 6.7 | mA | 6.7 | 6.7 | 6.7 | 0.0 | 258.5 | Р |
| =6 | | | | | 0.7 | 0.7 | 0.7 | 0.0 | 200.0 | |
| 72 | Vport_1 | 11.8 | 55.7 | VDC | 55.7 | 55.7 | 55.7 | 37.0 | 57.0 | INFO |
| | Vport_1 Ppeak 1 | | | | | | | | | |
| 72 73 74 | | 11.8 11.52 11.20,11.44* | 55.7 | VDC | 55.7 | 55.7 | 55.7 | 37.0 | 57.0 | INFO |
| 73 74 | Ppeak_1 Pport_1 | 11.52 11.20,11.44* | 55.7 12.04 11.95 | VDC W | 55.7 12.04 11.95 | 55.7 12.04 11.95 | 55.7 12.04 | 37.0 0.0 0.0 | 57.0 14.4 13.0 | INFO P P |
| 73 74 75 | Ppeak_1 Pport_1 PeakViolation_1 | 11.52 11.20,11.44* 11.52 | 55.7 12.04 11.95 0 | VDC W | 55.7 12.04 11.95 0 | 55.7 12.04 | 55.7 12.04 | 37.0 0.0 | 57.0 14.4 13.0 0 | INFO P P |
| 73 74 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 | 11.52 11.20,11.44* 11.52 11.73.1 | 55.7 12.04 11.95 0 | VDC W | 55.7 12.04 11.95 0 | 55.7 12.04 11.95 0 | 55.7 12.04 | 37.0 0.0 0.0 0 | 57.0 14.4 13.0 0 | INFO P P P |
| 73 74 75 76 77 | Ppeak_1 Pport_1 PeakViolation_1 PeskViolation_1 TcutWindowViolation_1 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 | 55.7 12.04 11.95 0 0 | VDC W | 55.7 12.04 11.95 0 0 | 55.7 12.04 11.95 0 | 55.7 12.04 | 37.0 0.0 0.0 0 | 57.0 14.4 13.0 0 0 | INFO P P P |
| 73 74 75 76 77 78 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 | 11.52 11.20,11.44* 11.52 11.73.1 | 55.7 12.04 11.95 0 0 0 | VDC W W | 55.7 12.04 11.95 0 0 0 | 55.7 12.04 11.95 0 0 0 | 55.7 12.04 11.95 - - - | 37.0 0.0 0.0 0 0 0 | 57.0 14.4 13.0 0 0 0 | INFO P P P P P P |
| 73 74 75 76 77 78 79 2 | Ppeak_1 Pport_1 PeakViolation_1 PeakViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 | 55.7 12.04 11.95 0 0 0 0 | VDC W W | 55.7 12.04 11.95 0 0 0 0 On Time: | 55.7 12.04 11.95 0 0 0 120 sec | 55.7 12.04 11.95 - - - Off Time: | 37.0 0.0 0.0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: | PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP |
| 73 74 75 76 77 78 79 2 80 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 TcutWindowViolation 1 Pair Powered Type-3 PHY Parameter | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 EA Test ID | 55.7 12.04 11.95 0 0 0 0 PSE Meas. | VDC W W | 55.7 12.04 11.95 0 0 0 0 On Time: | 55.7 12.04 11.95 0 0 0 120 sec Max. | 55.7 12.04 11.95 - - - Off Time: Average | 37.0 0.0 0.0 0 0 0 0 10 sec Low Lim. | 57.0 14.4 13.0 0 0 0 Vport: High Lim. | INFO P P P P P P P P P P P P P |
| 73 74 75 76 77 78 79 2 80 81 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Mini_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 EA Test ID | 55.7 12.04 11.95 0 0 0 0 0 PSE Meas. | VDC W W E Emulation: Units mA | 55.7 12.04 11.95 0 0 0 0 On Time: Min. | 55.7 12.04 11.95 0 0 0 0 120 sec Max. | 55.7 12.04 11.95 - - - Off Time: Average 4.3 | 37.0 0.0 0.0 0.0 0 0 0 0 10 sec Low Lim. | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 | INFO P P P P P P P P P P P P P P P P P P P |
| 73 74 75 76 77 78 79 2 80 81 82 | Ppeak_1 Pport_1 PeakViolation_1 PeakViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 EA Test ID 11.73 11.8 | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 4.3 | VDC W W Emulation: Units MA VDC | 55.7 12.04 11.95 0 0 0 0 On Time: Min. 4.3 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 | 37.0 0.0 0.0 0 0 0 0 10 sec Low Lim. 0.0 | 57.0 14.4 13.0 0 0 0 Vyort: High Lim. 655.0 | INFO P P P P P P P INFO |
| 73 74 75 76 77 78 79 2 80 81 82 83 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.52 | 55.7 12.04 11.95 0 0 0 0 <i>PSE</i> Meas. 4.3 43.5 | VDC W W W =============================== | 55.7 12.04 11.95 0 0 0 On Time: Min. 4.3 43.5 7.34 | 55.7 12.04 11.95 0 0 120 sec Max. 4.3 43.5 7.34 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 7.34 | 37.0 0.0 0.0 0.0 0 0 0 0 10 sec Low Lim. 0.0 42.5 | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 655.0 57.0 | INFO P P P P P P P INFO P |
| 73 74 75 76 77 78 79 2 80 81 82 83 84 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Pport_2 Pport_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.52 11.20,11.44* | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 4.3 43.5 7.34 7.25 | VDC W W Emulation: Units MA VDC | 55.7 12.04 11.95 0 0 0 0 On Time: Min. 4.3 43.5 7.34 7.25 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 | 37.0 0.0 0.0 0 0 0 0 0 10 sec Low Lim. 0.0 42.5 0.0 | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 655.0 28.3 25.5 | INFO P P P P P P INFO P INFO P P |
| 73 74 75 76 77 78 79 80 81 82 83 84 85 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Pport_2 PeakViolation_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.52 11.20,11.44* 11.52 | 55.7 12.04 11.95 0 0 0 0 <i>PSE</i> Meas. 4.3 43.5 7.34 7.25 | VDC W W W =============================== | 55.7 12.04 11.95 0 0 0 0 0 On Time: Min. 4.3 43.5 7.34 7.25 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 7.34 | 37.0 0.0 0.0 0.0 0 0 0 0 10 sec Low Lim. 42.5 0.0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 57.0 28.3 25.5 | INFO P P P P P P INFO P P P P P P P P P P INFO P P P |
| 73 74 75 76 77 78 79 2 80 81 82 83 84 85 86 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Pport_2 PeakViolation_2 MPSViolation_2 MPSViolation_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 11.73 11.8 11.52 11.20,11.44* 11.52 11.20,11.44* | 55.7 12.04 11.95 0 0 0 0 0 PSE Meas. 4.3.5 7.34 7.25 0 | VDC W W W =============================== | 55.7 12.04 11.95 0 0 0 On Time: Min. 4.3 43.5 7.34 7.25 0 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 7.34 | 37.0 0.0 0.0 0.0 0 0 0 0 10 sec Low Lim. 0.0 42.5 0.0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 0 Vport: High Lim. 655.0 57.0 28.3 25.5 0 0 | INFO P P P P P P INFO P P P P P P P P P P P INFO P P P P P |
| 73 74 75 76 77 78 79 2 80 81 82 83 84 85 86 87 | Ppeak 1 Pport 1 PeakViolation_1 PeakViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Pport_2 PeakViolation_2 MPSViolation_2 MPSViolation_2 TcutWindowViolation_2 TcutWindowViolation_2 | 11.52 11.20,11.4* 11.52 11.73.1 11.54 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.52 11.20,11.44* 11.52 11.73.2 11.54 | 55.7 12.04 11.95 0 0 0 0 <i>PSE</i> Meas. 4.3.3 43.5 7.34 7.25 0 | VDC W W W =============================== | 55.7 12.04 11.95 0 0 0 0 On Time: Min. 4.3.5 7.34 7.25 0 | 55.7 12.04 11.95 0 0 0 0 120 sec Max. 4.3.5 7.34 7.25 0 | 55.7 12.04 11.95 - - - Off Time: Average 4.3 43.5 7.34 | 37.0 0.0 0.0 0 0 0 0 0 0 10 sec Low Lim. 0.0 42.5 0.0 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 655.0 57.0 28.3 25.5 0 0 | INFO P P P P P P P INFO P P P P P P P P INFO P P P P P P P P P P P P P P P P P P |
| 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 | Ppeak_1 Pport_1 PeakViolation_1 MPSViolation_1 TcutWindowViolation_1 ToutWindowViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Ppeak_2 Pport_2 PeakViolation_2 MPSViolation_2 TcutWindowViolation_2 DutyCycleViolation_2 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 11.73 11.8 11.52 11.20,11.44* 11.52 11.20,11.44* | 55.7 12.04 11.95 0 0 0 0 <i>PSE</i> Meas. 4.3.5 7.34 7.25 0 0 | VDC W W W Emulation: Units mA VDC W W | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 | 55.7 12.04 11.95 - - Off Time: Average 4.3 43.5 7.34 7.25 | 37.0 0.0 0.0 0.0 0 0 0 0 0 10 sec Low Lim. 0.0 42.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 655.0 57.0 28.3 25.5 0 0 0 | NFO |
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| 73 74 75 76 77 78 80 81 82 83 84 85 86 87 88 90 91 92 93 94 95 96 97 98 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 Pport_2 PeakViolation_2 MPSViolation_2 TcutWindowViolation_2 DutyCycleViolation_2 TcutWindowViolation_2 Parameter Minl_3 Vport-2P_3 A Vport-2P_3 A Vport-2P_3 A Vport-2P_3 B Ppeak_3 Ppeak_3 PeakViolation_3 MPSViolation_3 TcutWindowViolation_3 DutyCycleViolation_3 DutyCycleViolation_3 DutyCycleViolation_3 DutyCycleViolation_3 DutyCycleViolation_3 DutyCycleViolation_3 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.54 11.54 11.54 11.52 11.20,11.44* 11.52 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.52 11.54 11.55 11.73 11.8 11.8 11.8 11.8 11.52 11.20,11.44* 11.52 11.73.3 11.54 | 55.7 12.04 11.95 0 0 0 0 0 8 Meas. 4.3.3 43.5 7.34 7.25 0 0 0 0 0 8 8 8 8 8 12.22 12.10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | VDC W W W W Interpolation: Units MA VDC W W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 0 Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 0 | 55.7 12.04 11.95 Off Time: Average 4.3 43.5 7.34 7.25 Off Time: Average 11.4 55.7 55.8 12.22 12.10 | 37.0 0.0 0.0 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 57.0 28.3 25.5 0 0 Vport: High Lim. 57.0 57.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | INFO |
| 73 74 75 76 77 77 78 80 81 82 83 84 85 86 87 88 90 91 91 92 93 94 95 96 97 98 99 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Mini 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 DutyCycleViolation 2 Parameter Mini 3 Vport-2P 3 A Vport-2P 3 A Vport-2P 3 B Ppeak 3 Pport 3 PeakViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 TcutWindowViolation 3 Pair Powered Type-4 PHY | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.8 11.8 11.8 11.8 11.52 11.73.3 11.54 11.54 | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 43.3 43.5 7.34 7.25 0 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 PSE PSE PSE PSE PSE | VDC W W W W Emulation: Units MA VDC W W W W Emulation: Units MA VDC VDC VDC VDC W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 300 sec | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 10 sec | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 0 0 Vport: High Lim. 953.7 57.0 57.0 57.0 0 0 0 Vport: High Lim. 958.7 57.0 57.0 57.0 57.0 57.0 0 0 0 Vport: V | NFO |
| 73 74 75 76 77 78 79 2 80 81 82 83 84 85 86 87 88 89 91 92 93 94 95 96 97 98 99 99 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 DutyCycleViolation 2 Pair Powered Type-3 PHY Parameter Minl 3 Vport 2P 3 A Vport 2P 3 B Ppeak 3 Pport 3 PeakViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 Pair Powered Type-4 PHY Parameter | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.56 11.73 11.8 11.56 11.73 11.8 11.51 11.54 11.54 11.55 11.73 11.8 11.52 11.73 11.8 11.54 11.55 11.54 11.55 | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 4.3 43.5 7.34 7.25 0 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 PSE Meas. | VDC W W W W Interpolation: Units MA VDC W W W Interpolation: Units MA VDC W W Units MA VDC VDC VDC Units W Units Units Units Units Units | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 655.0 0 0 Vport: High Lim. 958.7 57.0 57.0 57.0 57.0 0 0 0 Vport: High Lim. High Lim. High Lim. High Lim. Vport: High Lim. High Lim. High Lim. Vport: | NFO |
| 73 74 75 76 77 78 79 80 81 82 83 84 85 88 86 87 88 89 90 91 92 93 99 99 90 4 99 99 90 100 4 | Ppeak 1 Pport 1 PeakViolation_1 PeakViolation_1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl_2 Vport_2 Ppeak_2 Pport_2 PeakViolation_2 MPSViolation_2 TcutWindowViolation_2 TcutWindowViolation_2 Pair Powered Type-3 PHY Parameter Minl_3 Vport_2P_3 A Vport_2P_3 A Vport_2P_3 A Vport_2P_3 B Ppeak_3 Ppeak_3 Pport_3 PeakViolation_3 MPSViolation_3 MPSViolation_3 TcutWindowViolation_3 DutyCycleViolation_3 Pair Powered Type-4 PHY Parameter Minl_4 Parameter | 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73 11.54 11.54 11.55 11.73 11.8 11.8 11.8 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.54 11.52 | 55.7 12.04 11.95 0 0 0 0 0 0 PSE Meas. 4.3.3 43.5 7.34 7.25 0 0 0 PSE Meas. 11.4.4 55.7 55.8 12.22 12.10 0 0 0 0 PSE Meas. 5.0 | VDC W W W in its | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. 55.7 55.8 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 4.3.5 7.34 7.25 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 300 sec Max. | 55.7 12.04 11.95 Off Time: Average 4.3 43.5 7.34 7.25 Off Time: Average 11.4 55.7 55.8 12.22 12.10 - Off Time: Average 5.0 | 37.0 0.0 0.0 0.0 0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 157.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | INFO |
| 73 74 75 75 76 77 77 88 82 83 84 84 88 88 88 88 99 90 91 99 99 99 99 99 99 99 99 99 99 99 99 | Ppeak 1 Pport 1 Peport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Mini 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 MPSViolation 2 TcutWindowViolation 2 DutyCycleViolation 2 Pair Powered Type-3 PHY Parameter Mini 3 Vport-2P 3 A Vport-2P 3 A Vport-2P 3 B Ppeak 3 Pport 3 PeakViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 Pair Powered Type-4 PHY Parameter Mini 4 Vport-2P 4 A | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73 11.8 11.54 11.54 11.54 11.55 11.73 11.8 11.55 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.54 11.54 11.55 11.73 11.54 11.54 11.55 11.73 11.54 11.54 11.55 11.73 11.54 11.54 11.54 | 55.7 12.04 11.95 0 0 0 0 0 PSE Meas. 43.5 7.34 7.25 0 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 PSE Meas. 43.3 43.3 43.3 43.3 43.3 43.3 43.3 43 | VDC W W W W Inits VDC W W W W Inits W W W W Inits W W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. 55.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 300 sec Max. 5.0 43.3 | 55.7 12.04 11.95 Off Time: Average 4.3 43.5 7.34 7.25 Off Time: Average 11.4 55.7 55.8 12.22 12.10 Off Time: Average Off Time: Average 4.3 4.3 4.3 4.3 5.7 7.3 4.3 4.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6 | 37.0 0.0 0.0 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 0 0 Vport: High Lim. 958.7 57.0 57.0 57.0 0 0 0 Vport: High Lim. 958.7 57.0 57.0 57.0 57.0 57.0 57.0 57.0 57 | INFO |
| 73 74 75 75 76 77 78 79 2 80 81 82 83 84 85 86 87 88 99 91 91 92 93 94 95 96 97 98 99 91 100 4 | Ppeak 1 Pport 1 Peport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 Pair Powered Type-3 PHY Parameter Minl 3 Vport-2P 3 A Vport-2P 3 A Vport-2P 3 B Ppeak 3 Pport 3 PeakViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 Pair Powered Type-4 PHY Parameter Minl 4 Vport-2P 4 A Vport-2P 4 A | 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73 11.8 11.54 11.54 11.55 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 4.3.3 43.5 7.34 7.25 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 PSE Meas. 4.3.3 4.3.4 5.5.7 | VDC W W W W Emulation: Units MA VDC W W W Femulation: Units MA VDC Units MA VDC Units MA VDC VDC W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 0 On Time: Min. 4.3 43.4 43.4 43.4 43.4 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 0 300 sec Max. 43.3 43.4 | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 42.5 0.0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 0 0 10 sec Low Lim. 0.0 0 11 sec Low Lim. | 57.0 14.4 13.0 0 0 0 Vport: High Lim. 958.7 57.0 53.5 51.0 0 0 Vport: High Lim. 958.7 57.0 57.0 57.0 57.0 57.0 57.0 57.0 57 | NFO |
| 73 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation_1 DutyCycleViolation_1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 MPSViolation 2 TcutWindowViolation_2 DutyCycleViolation_2 Parameter Minl 3 Vport-2P 3 A Vport-2P 3 A Vport-2P 3 A Vport-2P 3 B Ppeak 3 Pport 3 PeakViolation 3 MPSViolation 3 TcutWindowViolation_3 DutyCycleViolation_3 Pair Powered Type-4 PHY Parameter Minl 3 Vport-2P 4 A Vport-2P 4 B Ppeak 4 Ppeak 4 Pport 4 | 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73.2 11.54 11.54 11.55 11.52 11.73 11.8 11.8 11.8 11.8 11.52 11.73.3 11.54 11.54 11.54 EA Test ID 11.73 11.8 11.8 11.52 11.73.3 11.54 11.54 11.54 11.54 | 55.7 12.04 11.95 0 0 0 0 0 PSE Meas. 4.3.3 43.5 7.34 7.25 0 0 0 PSE Meas. 11.4.7 55.8 12.22 12.10 0 0 0 PSE Meas. 4.3.3 4.3.4 7.3.5 5.8 12.22 12.10 10 10 10 10 10 10 10 10 10 10 10 10 1 | VDC W W W W in Emulation: Units MA VDC W W W in Emulation: Units MA VDC VDC W W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. 4.3 4.3 4.3 4.3 4.3 4.3 4.3 4.3 4.3 4. | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 300 sec Max. 43.3 43.4 7.42 7.35 | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 57.0 0 0 Vport: High Lim. 0 0 0 Vport: High Lim. 0 0 0 Vport: High Lim. 57.0 57.0 57.0 0 0 Vport: High Lim. 57.0 74.9 71.3 | INFO |
| 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 90 91 92 93 94 95 96 97 98 99 90 100 4 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Mini 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 Pair Powered Type-3 PHY Parameter Mini 3 Vport-2P 3 A Vport-2P 3 A Vport-2P 3 B Ppeak 3 Pport 3 PeakViolation 3 TcutWindowViolation 3 DutyCycleViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 TcutWindowViolation 3 Pair Powered Type-4 PHY Parameter Mini 4 Vport-2P 4 A Vport-2P 4 B Ppeak 4 Pport 4 PeakViolation 4 | 11.52 11.20,11.44* 11.52 11.73.1 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73 11.8 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73.3 11.54 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 11.55 11.73.3 11.54 | 55.7 12.04 11.95 0 0 0 0 PSE Meas. 4.3.3 43.5 7.34 7.25 0 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 0 PSE Meas. 4.3.3 4.3.4 7.42 7.425 7.425 7.425 | VDC W W W W in Emulation: Units MA VDC W W W in Emulation: Units MA VDC VDC W W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 43.5 7.34 7.25 0 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. 5.0 0 0 On Time: Min. 11.4 7.42 7.35 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 300 sec Max. 5.0 0 343.4 7.42 7.35 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 42.5 0.0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 Vport: High Lim. 655.0 0 0 Vport: High Lim. 958.7 57.0 57.0 0 0 Vport: High Lim. 97.0 57.0 57.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | INFO |
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| 73 | Ppeak 1 Pport 1 PeakViolation 1 MPSViolation 1 TcutWindowViolation 1 DutyCycleViolation 1 Pair Powered Type-3 PHY Parameter Minl 2 Vport 2 Ppeak 2 Pport 2 PeakViolation 2 MPSViolation 2 TcutWindowViolation 2 TcutWindowViolation 2 Pair Powered Type-3 PHY Parameter Minl 3 Vport 2P 3 A Vport 2P 4 B Ppeak 4 Pport 4 PeakViolation 4 MPSViolation 4 TcutWindowViolation 4 | 11.52 11.20,11.44* 11.54 11.54 11.54 11.54 11.54 11.54 11.55 11.73 11.8 11.52 11.20,11.44* 11.52 11.73 11.8 11.54 11.54 11.54 11.55 11.73 11.8 11.8 11.52 11.73 11.8 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.54 11.54 11.55 11.73 11.54 11.55 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 11.73 11.8 11.52 | 55.7 12.04 11.95 0 0 0 0 0 PSE Meas. 4.3.3 43.5 7.34 7.25 0 0 0 PSE Meas. 11.4 55.7 55.8 12.22 12.10 0 0 0 PSE Meas. 12.42 7.35 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | VDC W W W W in Emulation: Units MA VDC W W W in Emulation: Units MA VDC VDC W W W W W W W W W W W W W W W W W W W | 55.7 12.04 11.95 0 0 0 0 Time: Min. 4.3 4.3.5 7.34 7.25 0 0 On Time: Min. 11.4 55.7 55.8 12.22 12.10 0 0 On Time: Min. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 55.7 12.04 11.95 0 0 0 120 sec Max. 4.3 43.5 7.34 7.25 0 0 0 120 sec Max. 11.4 55.7 55.8 12.22 12.10 0 0 0 300 sec Max. 43.3 43.4 7.42 7.35 0 0 0 0 | 55.7 12.04 11.95 | 37.0 0.0 0.0 0.0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 10 sec Low Lim. 0.0 0 0 10 sec Low Lim. 0.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 57.0 14.4 13.0 0 0 0 0 0 Vport: High Lim. 655.0 57.0 0 0 Vport: High Lim. 0 0 0 Vport: High Lim. 57.0 57.0 57.0 0 Vport: High Lim. 0 0 0 Vport: High Lim. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | INFO |
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Revision history

Table 7. Document revision history

| Date | Version | Changes |
|-------------|---------|------------------|
| 19-Sep-2022 | 1 | Initial release. |

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