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DOCUMENT DESCRIPTION
Component Placement Checklist for the LAN83C185, 64-pin TQFP Package

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Component Placement Checklist for LAN83C185

Information Particular for the 64-pin TQFP Package

LAN83C185 TQFP Phy Interface:

1. Place the $49.9\ \Omega$ TX termination pull-up (TXP, pin 51) as close to the magnetics as possible.
2. Place the $49.9\ \Omega$ TX termination pull-up (TXN, pin 50) as close to the magnetics as possible.
3. Place the (2) $6.8\ \text{nF}$ RX Channel series AC coupling capacitors as close to the LAN83C185 TQFP device as possible (pins 55 & 54).
4. Place the (2) $49.9\ \Omega$ RX termination resistors and the $0.01\ \mu\text{F}$ capacitor (C_{rxterm}) (RXP, pin 55 & RXN, pin 54) as close to the LAN83C185 TQFP as possible. The combination of the (2) $49.9\ \Omega$ resistors form the necessary 100-ohm termination for the RX channel.

LAN83C185 TQFP Magnetics:

1. Place the $10.0\ \Omega$ TX Channel Center Tap feed resistor as close to the magnetics as possible.
2. Place the $0.022\ \mu\text{F}$ TX Channel Center Tap termination capacitor as close to the magnetics as possible.
3. Place the $75\ \Omega$ cable side center tap termination resistors and the $1000\ \text{pF}$, 2KV capacitor (C_{magterm}) cap as close to the magnetics as possible.

RJ45 Connector:

1. Place the RJ45 connector, the magnetics and the LAN83C185 TQFP as close together as possible.
2. If No. 1 is not possible, keep the RJ45 connector and the magnetics as close as possible. This will allow remote placement of the LAN83C185 TQFP.
3. Select and place the magnetics as to set up the best routing scheme from the LAN83C185 TQFP to the magnetics to the RJ45 connector. There are many styles and sizes of magnetics with different pin outs to facilitate this operation. Investigate Tab-Up & Tab-Down RJ45 connectors in order to facilitate layout.
4. Place the Unused Wire Pair termination resistors and the 1000 μ F, 2KV capacitor (C_{rterm}) as close to the RJ45 connector as possible.
5. Make sure to not place any other components in or near the TX Channel & RX Channel lanes of the PCB. These lanes should be clear of any other signals and components.

Power Supply Connections:

1. Place the (3) VDD decoupling capacitors for the LAN83C185 TQFP as close to each separate power pin as possible. Using an SMD_0603 package will make this task easier.
2. Place the (4) AVDD decoupling capacitors for the LAN83C185 TQFP as close to each separate power pin as possible. Using an SMD_0603 package will make this task easier.
3. Place the (1) VREG decoupling capacitor for the LAN83C185 TQFP as close to the power pin as possible. Using an SMD_0603 package will make this task easier.

Ground Connections:

1. There are no component placement issues associated with the LAN83C185 TQFP ground connections. Since the PCB design has an all encompassing digital ground plane, the ground plane connections will automatically be as short as possible.

VDD_CORE:

1. VDD_CORE (pin 14) requires a 0.01 μ F decoupling capacitor and a low ESR 10 μ F bulk capacitor placed as close as possible to pin 14.

Crystal Connections:

1. Place the 25 MHz crystal, the zero ohm series EMI resistor and the associated 15 – 33 pF capacitors as close together as possible and as close to the LAN83C185 TQFP (XTAL1, pin 23 & XTAL2, pin 22) as possible. They should form a tight loop. Keep the crystal circuitry away from any other sensitive circuitry (address lines, data lines, Ethernet traces, etc.)
2. Place all the crystal components on the component side of the PCB with a digital ground plane layer on the next layer. This will minimize vias in the circuit connections and assure that all crystal components are referenced to the same reference plane.

EXRES1 Resistor:

1. Place the EXRES1 resistor as close to pin 59 of the LAN83C185 TQFP as possible.

MII Interface:

1. If the designer has elected to use impedance matching terminations in his design, these series resistors should be placed as close as possible to the source of the driving signal.

Required External Pull-ups:

1. There are no component placement issues associated with the LAN83C185 TQFP External Pull-up connections.

Mode Pins:

1. There are no component placement issues associated with the LAN83C185 TQFP Mode Pin connections.

Phy Address Pins:

1. There are no component placement issues associated with the LAN83C185 TQFP Phy Address Pin connections.

LED Pins:

1. There are no component placement issues associated with the LAN83C185 TQFP LED Pin connections.

Miscellaneous:

1. Place the SMD_1210 Digital Ground / Chassis Ground shorting resistor near the RJ45 in a logical place to short the two planes.
2. Bulk capacitors for each power plane can reside anywhere on the plane they serve.