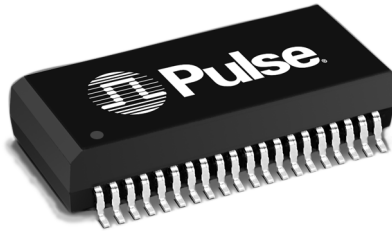


10BASE-T QUAD SMT TRANSFORMER MODULES



- Family of parts – common footprint and pinout with a choice of filtering for customized EMI performance
- IC grade transfer-molded package withstands 235°C peak temperature performance
- Space-efficient – 12 ports across 3.6 inches for optimal PCB layout

Electrical Specifications @ 25°C — Operating Temperature 0°C to 70°C

Part Number	Transformer Turns Ratio (±2%)	Sine Wave Inductance OCL (μH MIN) ¹	Interwinding Capacitance C _{ww} (pF MAX) ²	Leakage Inductance L _L (μH MAX) ²	Return Loss 5 to 10 MHz (dB MIN)		Common Mode Rejection TX (dB MIN)					Hipot (VRMS MIN)
					100 Ω	98 ±13 Ω	5 MHz	10 MHz	50 MHz	100 MHz	200 MHz	
PE-68049L	1CT:1CT	150	10	0.30	-20	-15	-60	-50	-35	-25	-20	1500
PE-68050L	1CT:1CT	150	10	0.30	-20	-15	-60	-50	-35	-25	-20	1500
PE-68051 ³	1CT:1CT	100	—	—	-20	-15	-55	-50	-35	-25	-15	1500
PE-68062L	1CT:√2CT	150	10	0.30	-20	-15	-60	-50	-30	-25	-20	1500
PE-68065L	1CT:√2CT	150	10	0.30	-20	-15	-60	-50	-30	-20	-15	1500
E5001 ³	1CT:2CT	200	—	—	-19	-15	-55	-50	-35	-25	-15	1500
E5002	1CT:2CT	180	10	0.30	-20	-15	-50	-40	-30	-20	-14	1500
E5007	1CT:1CT	150	10	0.30	-20	-15	-60	-50	-34	-25	-18	1500

NOTES:

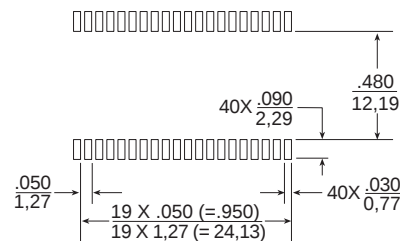
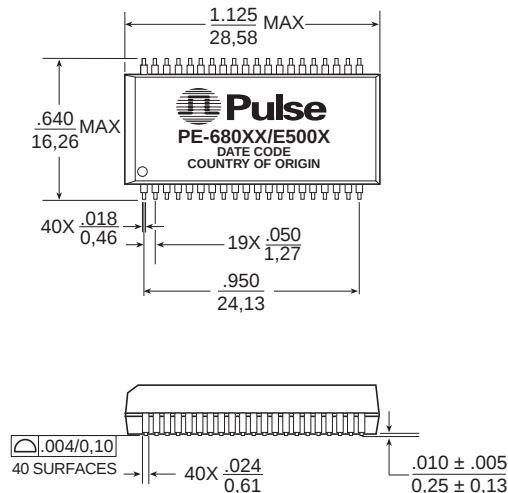
- OCL are measured at 20 mVrms, 100 KHz.
- C_{ww} and L_L are measured at 20 mVrms, 100 KHz.
- PE-68051 and E5001 contain additional low pass filtering.

GENERAL SPECIFICATIONS:

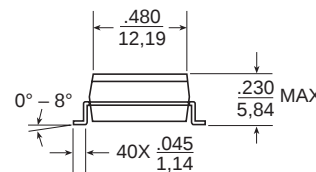
- Insertion Loss:** Typically -0.5 dB maximum from 1 to 10 MHz.
PE-68051 and E5001 typically are -1 dB maximum.
- Crosstalk:** From 1 to 10 MHz is -35 dB minimum.

U.S. Patent No. 5,015,981

Mechanical



SUGGESTED PAD LAYOUT



Dimensions: Inches
mm

Unless otherwise specified, all tolerances are ± .010
0,25

Weight: 4.0 grams
Tube 15/tube
Tape & Reel 250/reel

10BASE-T QUAD SMT TRANSFORMER MODULES



Application Notes

Pulse's 10BASE-T Quad SMT Transformer Modules are designed to interface with transceiver chips offered with internal wave shaping and filtering. Pulse developed the Modules working closely with IC chip vendors for this "filter-on-chip" application such as: AMD, Crystal, Level One, National Semiconductor and Texas Instruments. The Pulse Modules are available with varying turns ratios optimized for the transceiver chips available. A cross-reference table listing chip vendor and part number by Pulse part number is illustrated below.

The Pulse modules offer different levels of electrical performance to meet all applications.

The Pulse **PE-68050L**, **PE-68065L** and **E5007** contain transmit and receive isolation transformers to maintain signal integrity, suppress common mode noise, and supply equipment isolation per the IEEE 802.3 standard.

The Pulse **PE-68049L**, **PE-68062L** and **E5002** provide transmit and receive isolation transformers as well as the high impedance common mode chokes. The common mode chokes are incorporated for added EMI suppression and are often necessary for FCC and CISPR 22 Class B certification.

The Pulse **E5001** provides transmit and receive transformers and transmit chokes in addition to a low pass receive channel filter for superior noise immunity. The Pulse **PE-68051** also provides transmit and receive transformers, transmit chokes and includes a low pass filter on each transmit path. This added transmit filtering when combined with the internal filtering of the IC improves the attenuation for designers striving to achieve compliance with the IEEE 802.3 standard.

In typical multiport applications, many channels are in close proximity. User compliance with FCC/CISPR 22 Class B requirements can be achieved by applying rigorous design guidelines to suppress noise mechanisms. Attention to high frequency signal paths, good PCB grounding techniques, and component placement are critical. Refer to the suggested layout on page 8.

All eight modules are encapsulated in a 40-pin surface mountable package. Mechanical features include:

1. **Lightweight** - approximately 4 grams for rapid pick-and-place.
2. **Compliant leads** - provide excellent solder joint reliability.
3. **Low profile** - under 6 mm to accommodate industry standard pick and place equipment capabilities.
4. **Compact form factor** - footprint allows the user to lay out four ports within the space of two double-stacked RJ-45 connectors or a total of 12 ports to a high density 50-pin connector.

Modules are packaged in tubes unless Tape & Reel is specified. Please add the suffix "**T**" such as PE-68049LT for **Tape & Reel** packaging, in increments of 250 pieces.

Pulse also offers a full line of 10Base-T filter modules, designed to IEEE specifications. We provide other pin-out configurations within this package. For more information, please contact one of the locations listed on the back page of this publication or check our **web site at <http://www.pulseeng.com>**.

IC Manufacturers

Pulse Part Number	AMD's QUIET™, QuEST™, eIMR™, eIMR+™	Crystal Semiconductor's CS8904	Level One's LXT 901/944 and LXT 914 through 918	National Semiconductor's DP 83953	Texas Instrument's TNETE2004
PE-68049L	Yes				
PE-68050L	Yes				
PE-68051	Yes				
PE-68062L		Yes	Yes		Yes
PE-68065L		Yes	Yes		Yes
E5001				Yes	
E5002				Yes	
E5007	Yes				

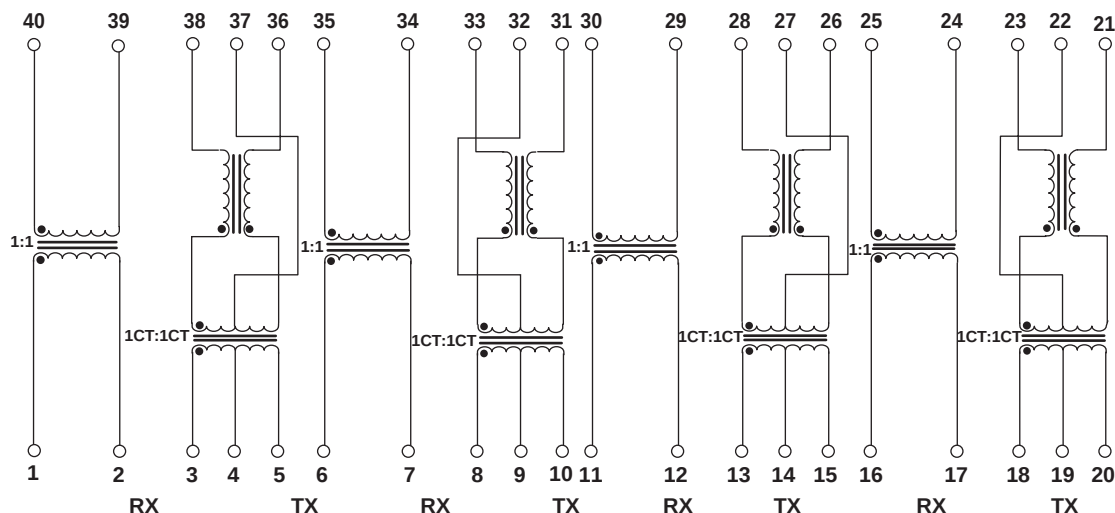
10BASE-T QUAD SMT TRANSFORMER MODULES

For AMD's QuIET™, QuEST™, eIMR™,
and eIMR+™ Device Chipsets

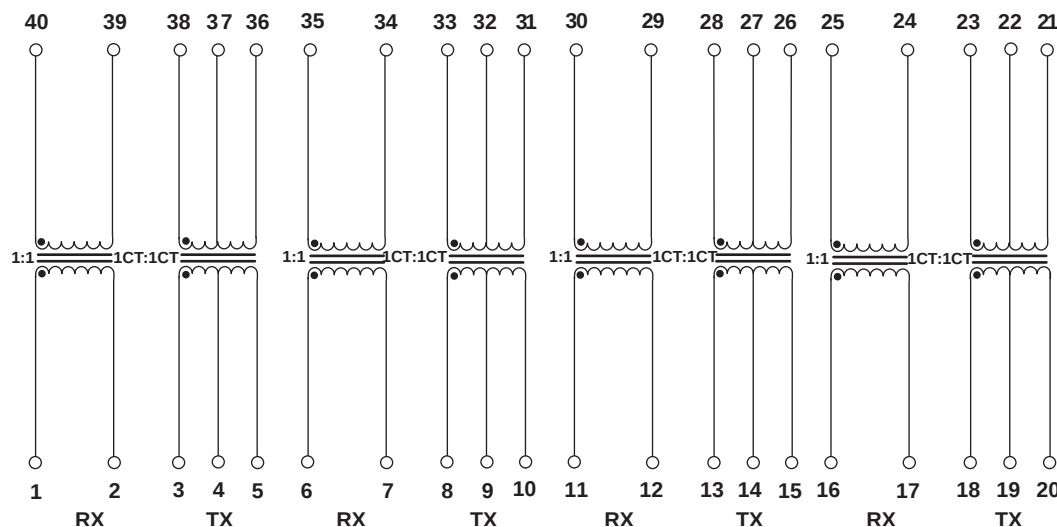


Schematics

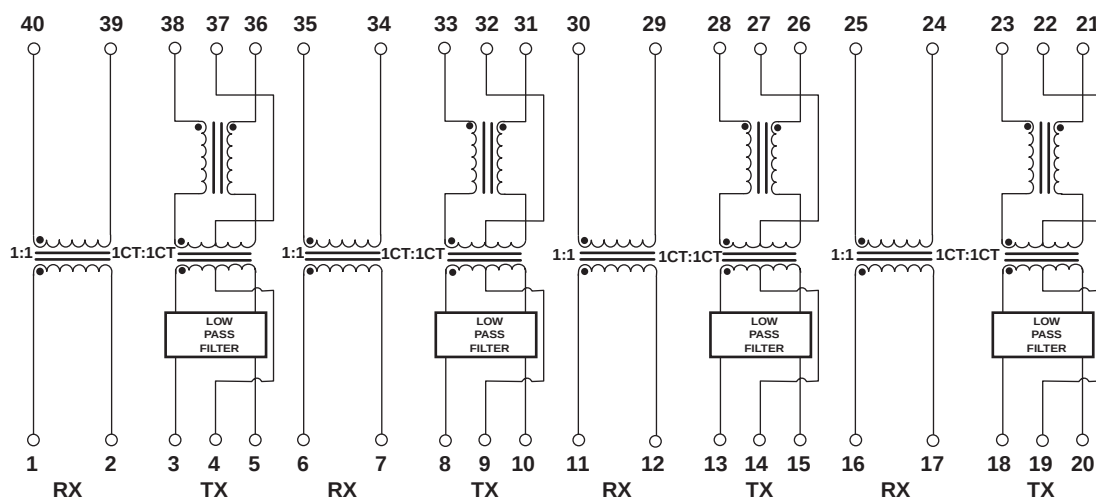
PE-68049L



PE-68050L



PE-68051



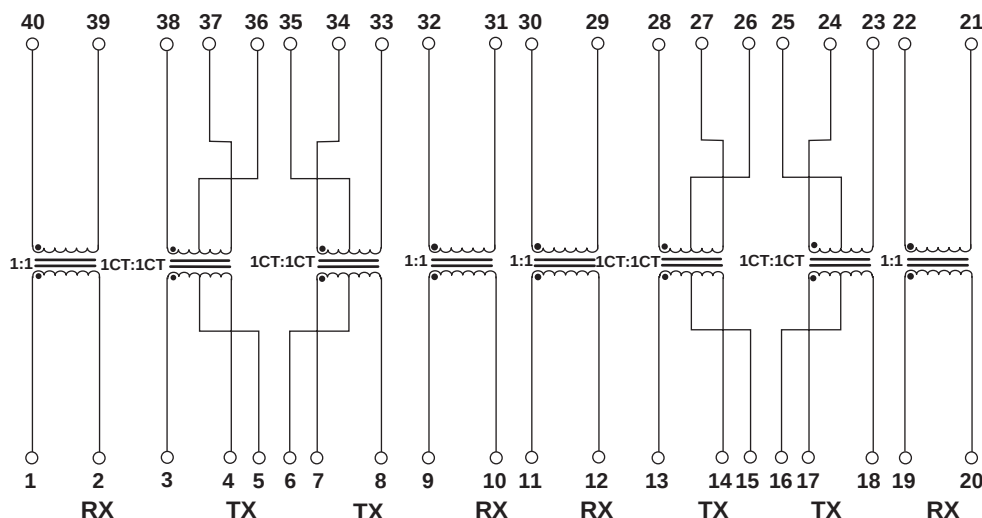
10BASE-T QUAD SMT TRANSFORMER MODULES

For AMD's QuIET™, QuEST™, eIMR™,
and eIMR+™ Device Chipsets

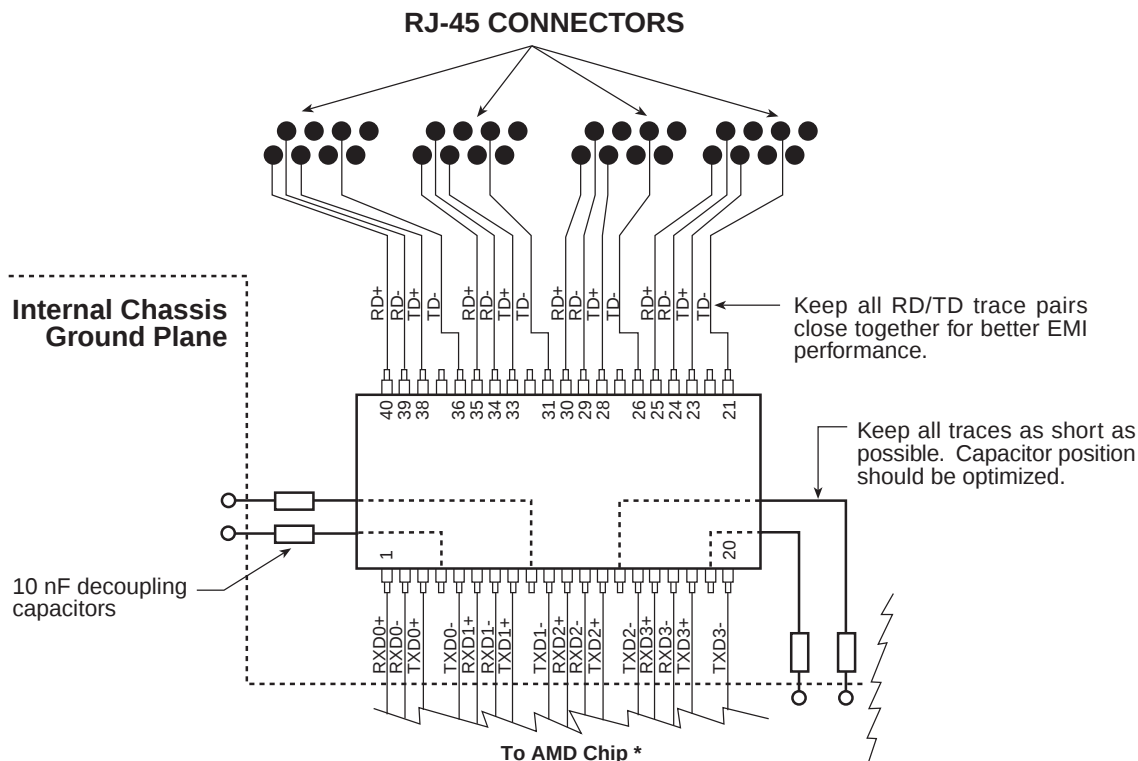


Schematic

E5007



Recommended Layout



***Note:**
QuIET™ (Am 79C988), QuEST™ (Am79C989), eIMR™ (Am 79C984A), or
eIMR+™ (Am 79C985). See AMD application notes for more detailed information.

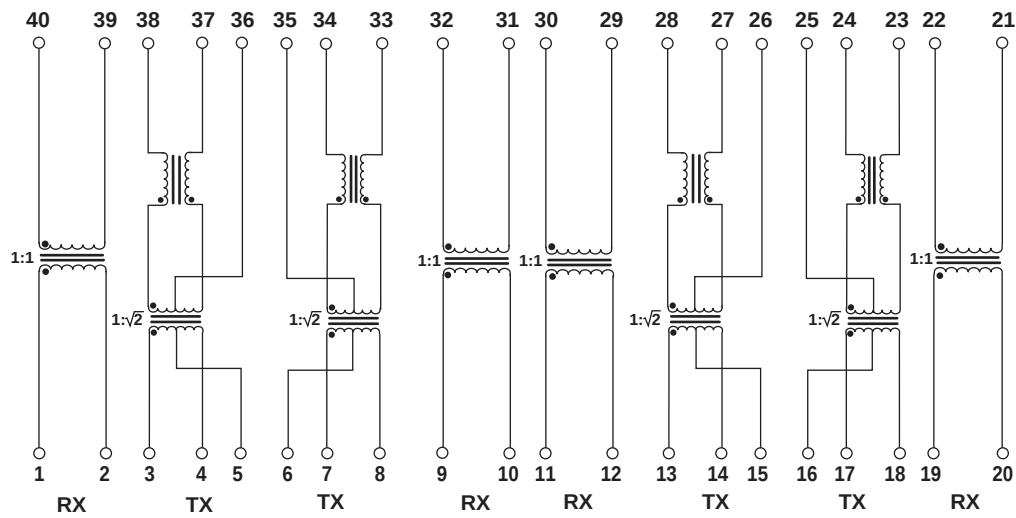
10BASE-T QUAD SMT TRANSFORMER MODULES

Designed for Level One, Texas
Instruments, and Crystal Multiport ICs

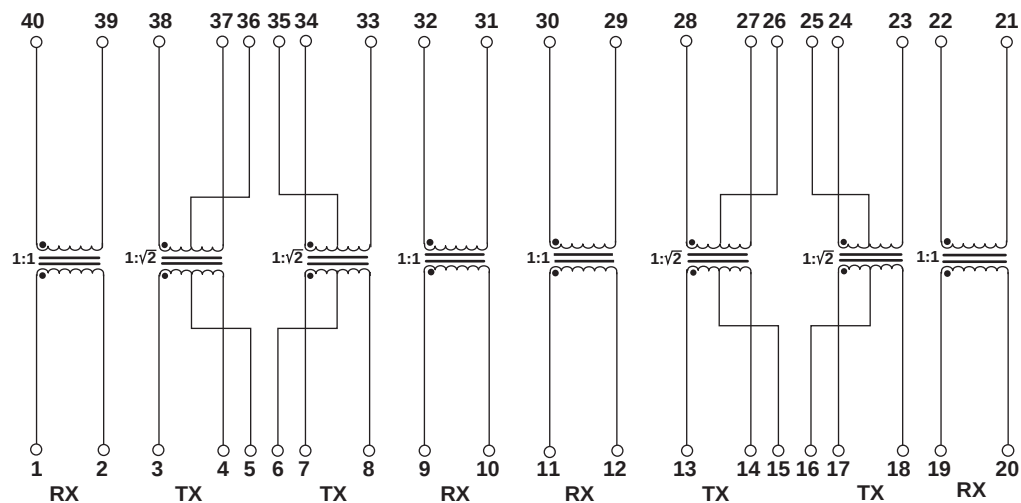


Schematics

PE-68062L



PE-68065L

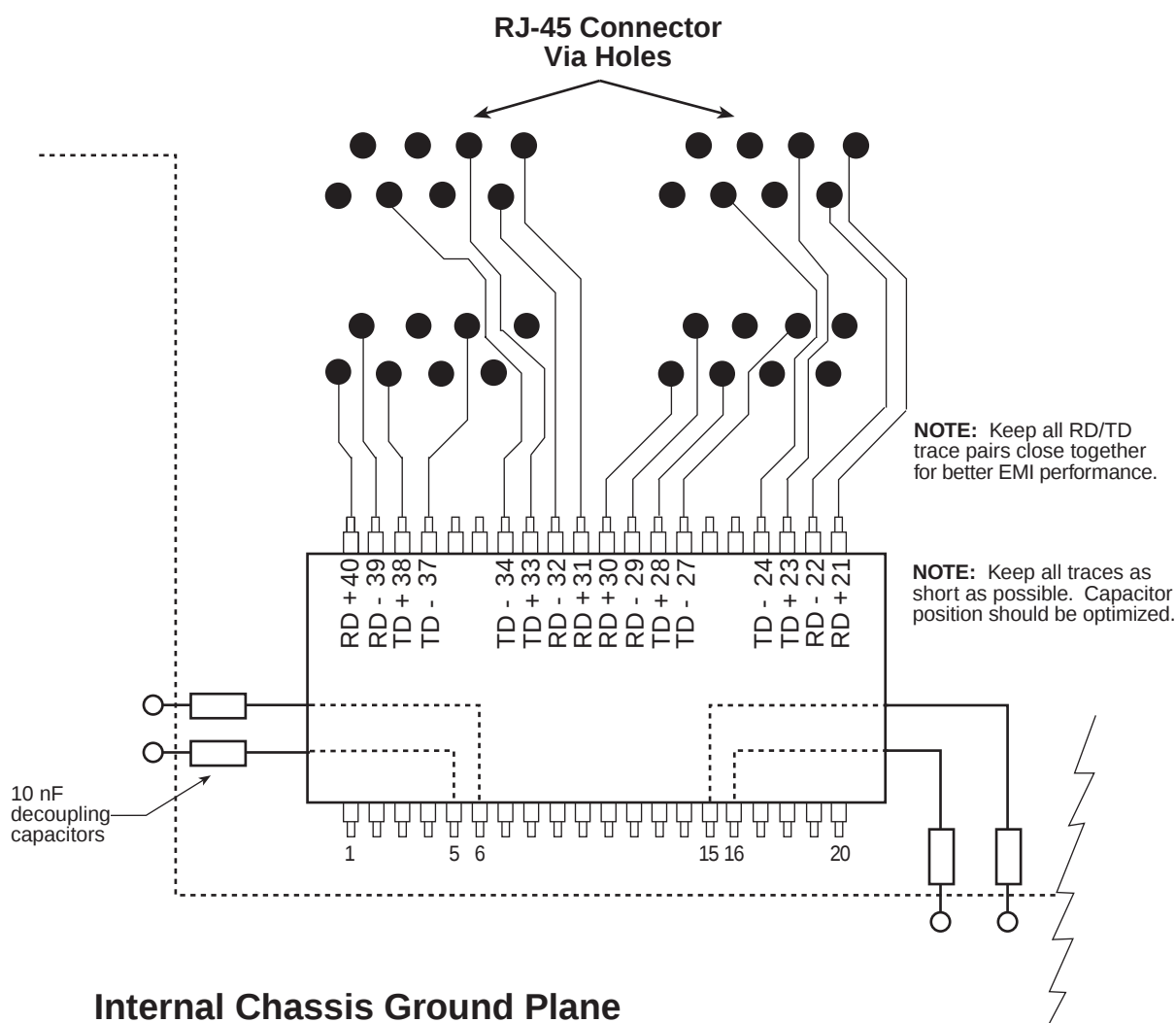


10BASE-T QUAD SMT TRANSFORMER MODULES

Designed for Level One, Texas
Instruments, and Crystal Multiport ICs



Recommended Layout for Multi-Port Hubs with Double-Stacked RJ-45s



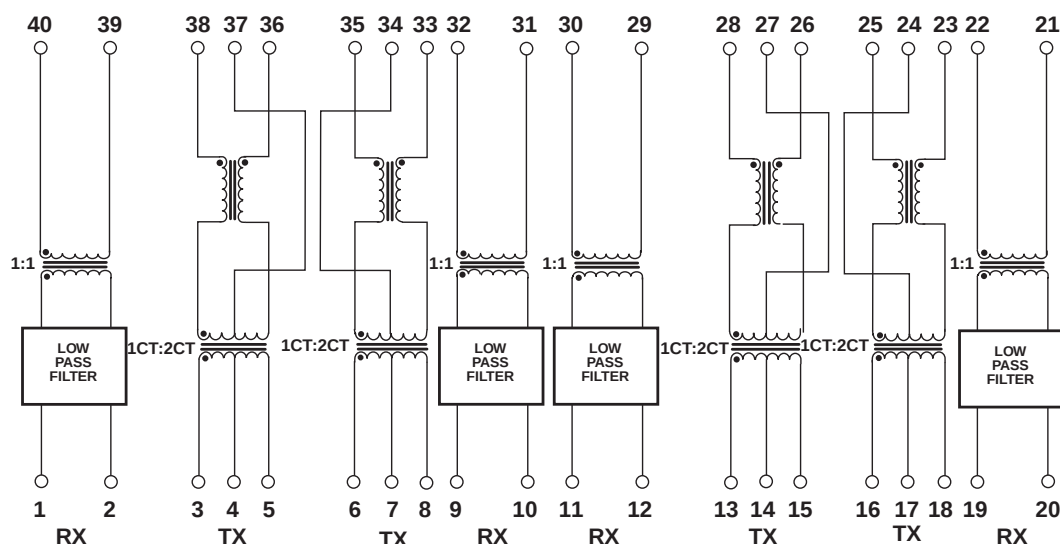
10BASE-T QUAD SMT TRANSFORMER MODULES

For Use with National Semiconductor's RIC IIA™

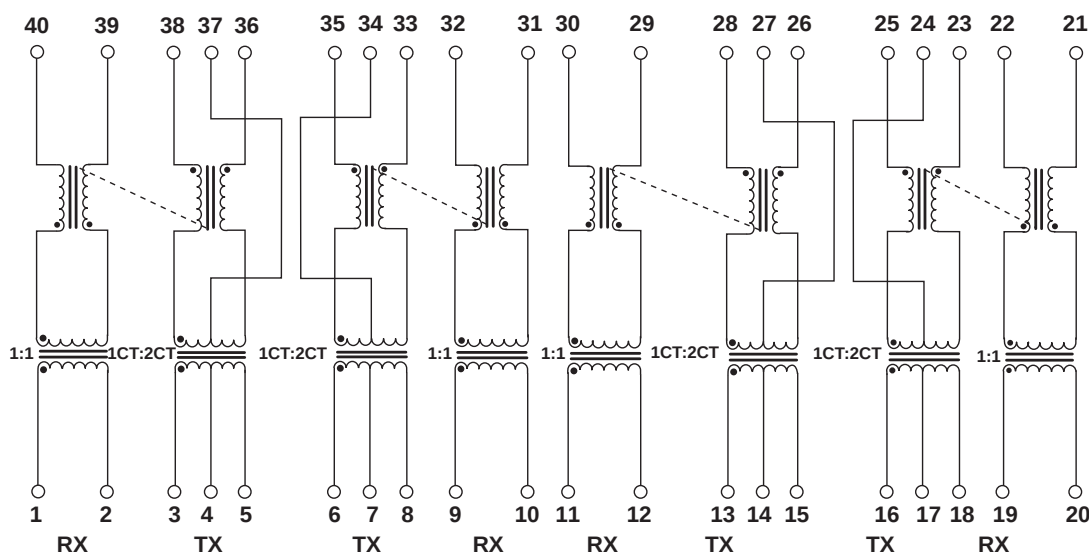


Schematics

E5001



E5002

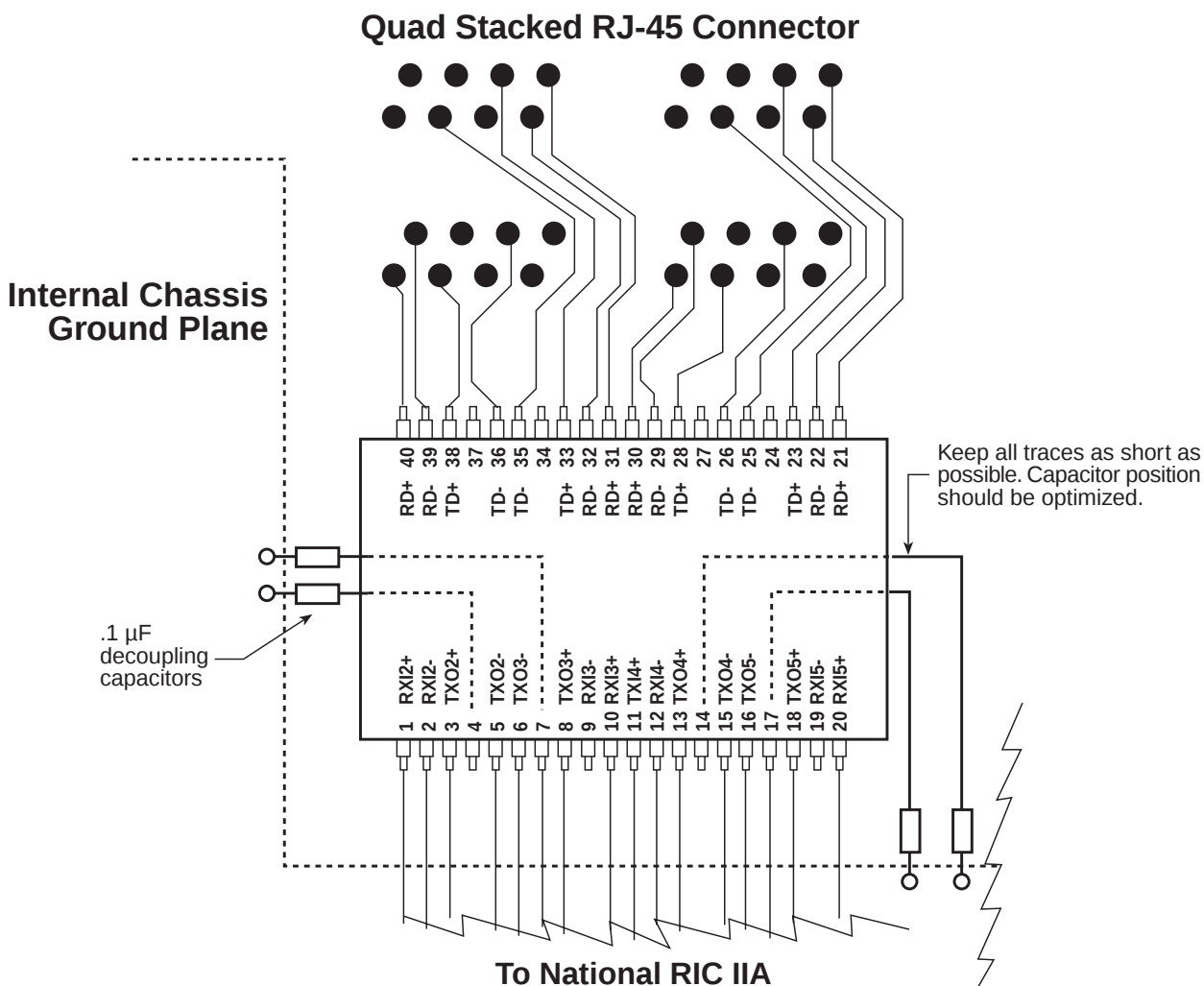


10BASE-T QUAD SMT TRANSFORMER MODULES

For Use with National Semiconductor's RIC IIA™



Recommended Layout



For More Information:

Corporate (U.S.A.)

12220 World Trade Drive
San Diego, CA 92128
Tel: 619 674 8100
FAX: 619 674 8262
Quick-Facts: 619 674 9672
<http://www.pulseeng.com>

U.K. (Northern Europe)

1 & 2 Huxley Road
The Surrey Research Park
Guildford, Surrey GU2 5RE
United Kingdom
Tel: 44 1483 401700
FAX: 44 1483 401701

France (Southern Europe)

Zone Industrielle
F-39270
Orgelet
France
Tel: 33 3 84 35 04 04
FAX: 33 3 84 25 46 41

Taiwan (Northern Asia)

3F-4, No. 81, Sec. 1
HsinTai Wu Road
Hsi-Chih, Taipei Hsien
Taiwan
Tel: 886 2 2698 0228
FAX: 886 2 2698 0948

Singapore (Southern Asia)

150 Kampong Ampat
#07-01/02
KA Centre
Singapore 368324
Tel: 65 287 8998
FAX: 65 280 0080

Distributor

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