

# HIGH SPEED LAN MAGNETICS

960008A

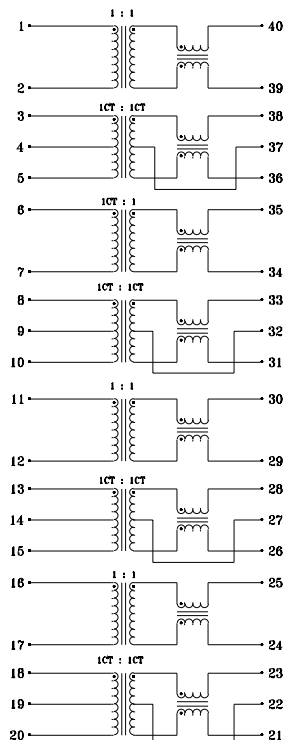
- Quad, 4-port designs offer best design layout and per port cost efficiencies
- Tested for use with multiple 10/100 Mbps and 100 Mbps PHY transceivers requiring 1:1 Tx and Rx transformers
- Impedance matched common mode termination not required
- Internal crossover design optimizes board layout for use with stacked RJ-45 connectors
- Low profile, SMT packaging, rated to withstand 225°C peak IR reflow temperature
- 2000 Vrms isolation

## ELECTRICALS AT 25°C

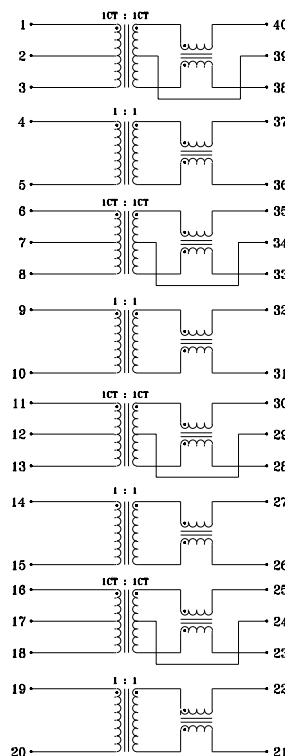
Part No.	Insertion Loss (dB) Typ	Return Loss (dB) Min	Return Loss (dB) Min	Return Loss (dB) Min	Crosstalk (dB) Min	Common to Diff Mode Rej (dB) Min		Common to Common Mode Rej (dB) Min		Schematic
	1MHz-100MHz	1MHz-30MHz	30MHz-60MHz	60MHz-80MHz	1MHz-100MHz	30MHz	100MHz	30MHz	100MHz	
S558-5999-74	-1.0	-16	$16-20\log(f/30\text{MHz})$	-10	-35	-50	-40	-40	-30	B
S558-5999-B2	-1.0	-16	$16-20\log(f/30\text{MHz})$	-10	-35	-50	-40	-40	-30	C
S558-5999-C0	-1.0	-16	$16-20\log(f/30\text{MHz})$	-10	-35	-50	-40	-40	-30	A

## SCHEMATICS

A



B

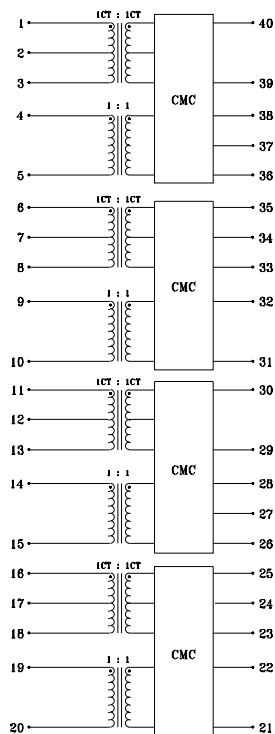


Specifications subject to change without notice.

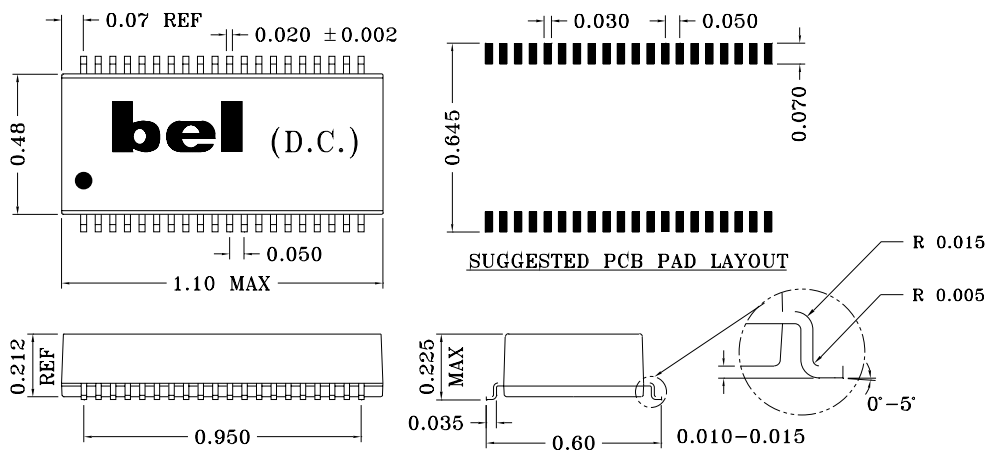
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### SCHEMATICS (CONT'D)

C



### MECHANICAL



Specifications subject to change without notice.

The schematic diagram illustrates a 10Mb/s UTP repeater circuit. Key components and connections include:

- DP83840 10/100 PHY:** Provides the input signals TXU+, TXU-, RXI+, and RXI-.
- DP83223A TWISTER:** The central repeater chip, featuring PMRD+, PMRD-, PMID+, PMID-, SD+, SD-, TX0+, and TX0- pins.
- 558-5999-C0:** A repeater chip with RX1+, RX1-, TX1+, TX1-, RX2+, RX2-, TX2+, TX2-, RX3+, RX3-, TX3+, TX3-, RX4+, RX4-, TX4+, and TX4- pins.
- Termination and Matching:** 10.5Ω resistors and 0.1μF capacitors are used for signal conditioning. 10Ω and 40Ω resistors are used for matching at the TWISTER input.
- Speed Detection:** A circuit involving transistors Q1, Q2, Q3, and Q4, along with resistors and capacitors, to detect the signal speed.
- Power and Grounding:** The circuit is powered by Vcc and grounded to GND. A 1000pF capacitor is used for decoupling.
- Connector:** The output is connected to an RJ45 SHIELDED connector.

*Specifications subject to change without notice.*



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### APPLICATION NOTES

- Bel has designed these part types for use in either 100 Mbps or 10/100 Mbps multi-port applications, where the PHY device requires 1:1 transmit and receive isolation transformer ratios. Please refer to the Bel short form catalog for recommendations of mating semiconductors. These quad, 4-port devices provide high isolation transformers, signal wave shaping, fast but controlled rise times, EMI and common mode noise suppression. All part types meet IEEE 802.3 standards, which includes a requirement for 350µH OCL (inductance) at 8mA DC bias applied. Use of these Bel part types provides optimum space and cost per port efficiency with no sacrifice in performance versus similar single port devices.
- The S558-5999-B2 was specifically designed for use with stacked RJ-45 connectors. The S558-5999-B2 performs the necessary trace crossovers internal to the magnetics module, which are normally found directly on the user's PC board. This unique crossover magnetics design approach has no performance degradation versus the straight through approach, allows for elimination of layers and via holes on the user's PC board, and may enhance noise suppression.
- Refer to Bel's application note on the background and proper use of the impedance matched common mode termination, which can be eliminated with use of the parts listed in this data sheet.
- Bel's low profile, surface mount packaging is ideal for high speed pick and place machinery. Parts can be shipped on tape and reel for high speed placement. Construction processes have been implemented for thermal compatibility with high temperature IR reflow assembly processing. Post dipping of leads assist with PC board solderability. Each part is optically inspected to meet rigid coplanarity requirements.

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