

**Class 1**

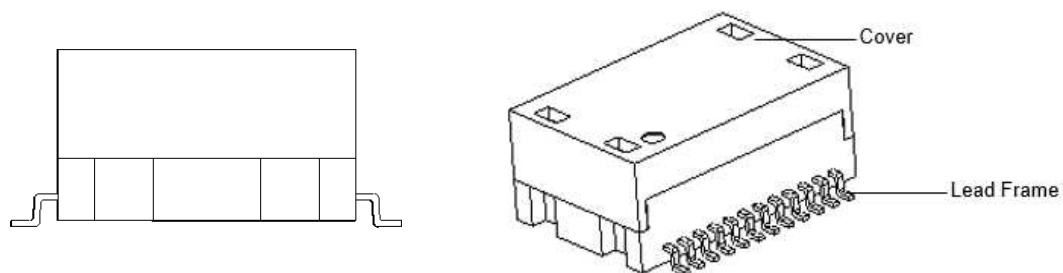
**Industrial Discrete Magnetics**

**1. INTRODUCTION**

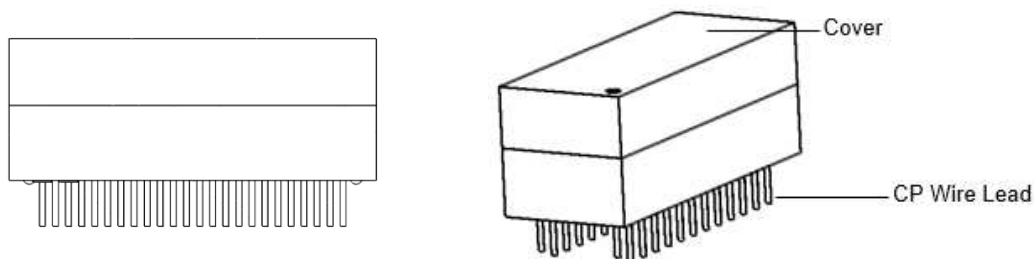
This specification covers the requirements for application of TE Industrial Discrete Magnetics designed to be mounted to a pc board. The LAN transformers are available in SMT and THT versions, for single-port or multi-port configuration in 12, 16, 24, 40 or 48 positions, with a head and cover design to keep the coils safer shielded designs to accommodate specific application requirements.

When corresponding with TE Personnel, use the terminology provided on this specification to help facilitate assistance. Basic terms and features of components are provided in

Figure 1: *Basic terms of components*



SMD Discrete Magnetics



THT Discrete Magnetics

Figure 1: *Basic terms of components*

## 2. REFERENCE MATERIAL

### 2.1. Revision summary

This paragraph is dedicated to a revision summary of changes and additions since the previous release of this application specification.

### 2.2. Customer Assistance

Reference Part Numbers 2337822, 2337823, 2337824, 2337825, 2337826, 2337827 and Product Code K842 identify the pc board mounted Discrete Magnetics. These numbers are used in a service network of customer service to access tooling and product application information. This service is provided by your local TE Representative or, after purchase, by calling the Tooling Assistance Center or Product Information number at the bottom of page 1.

### 2.3. Drawings

Customer Drawings for product numbers are available from the service network. The information on the customer drawing and this specification takes priority over any other document supplied by TE. If there is a conflict with the information on the customer drawing and this specification call either of the customer service numbers at the bottom of page 1 for assistance.

List of applicable parts:

See Product specification 108-94693.

### 2.4. Product Specifications

Product Specifications 108-94693 (Industrial Discrete Magnetics) covers test and performance requirements.

### 2.5. Soldering specification

Manual 402-40 is available upon request and can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

## 3. REQUIREMENTS

### 3.1. Safety

Do not stack component packages so high that the shipping containers buckle or deform.

### 3.2. Material

The Industrial Discrete Magnetics cover is made of high temperature thermoplastic, UL94-V-0. The Header is made of Black WH-9100, UL94V-0 for SMT variant and Black PF2A5-151J, UL-94-V0 for THT variant. The wound cores consist of magnet wire winding on a manganese-zinc ferrite toroid.

### 3.3. Storage

#### Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the Discrete Magnetics.

#### Lead Frame Life

Discrete Magnetics should remain in the shipping containers until ready for use to prevent damage. The products should be used on a first in, first out basis to avoid storage contamination that could adversely affect signal transmissions and degrade lead frame or pin appearance.

#### Chemical Exposure

Do not store Discrete Magnetics near any chemicals listed below, as they may cause stress corrosion cracking in the components.

Alkalies	Ammonia	Citrates	Phosphates	Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites		Tartrates

### Soldering ability over time

To ensure a good solderability of Discrete Magnetics, conditions below should be followed:

Table 1: Storage time and conditions

Packaging type	Condition	Maximal storage time
Tube	Original and unopened package, at temperature $\leq 30^{\circ}\text{C}$	1 year
Tray		
Reel		

If storage time exceeds one year, a complete quality check on function & mechanical before shipment should be done.

### Moisture Sensitivity Level (MSL)

All Discrete Magnetics pass MSL1.

## 3.4. Maximum Ratings

Table 2: Absolute Maximum Ratings

Parameter	Min	Max
Operating temperature	-40 °C	+85 °C (THT) / +105°C (SMT)
Storage temperature	-40 °C	+85 °C
DC Current / Voltage	N/A	720mA @57V (continuous)

Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

## 3.5. Coplanarity

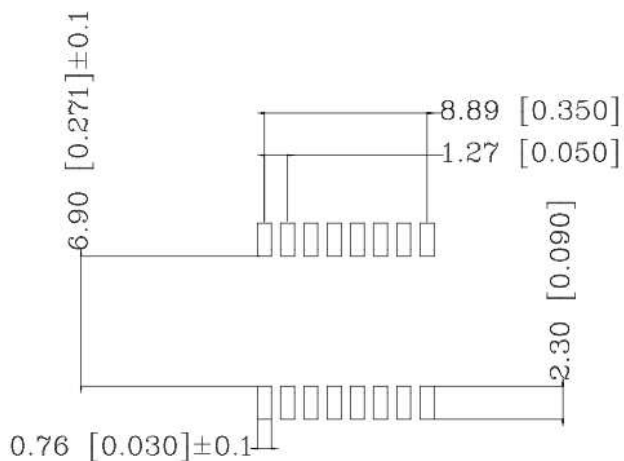
The surface coplanarity of all SMT Magnetics modules must be less than 0.1mm [0.004 Inch].

## 3.6. PC Board Layout

The PC Board layout for all 12, 16, 24, 40 and 48 position Discrete Magnetics in SMT or THT variant is typical for all with comparable positions. The pc board layout views shown in the next section represent the component side of the pc board.

### A. SMT Discrete Ethernet Magnetics

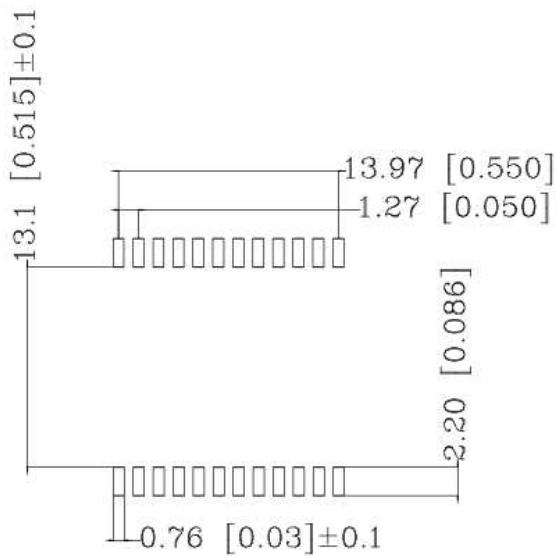
The pad patterns that apply to all SMT Discrete Transformers are provided in the following figures.



Component Side of PC Board

Unit: mm [mil]

Figure 2: 16 position SMT Discrete Magnetics

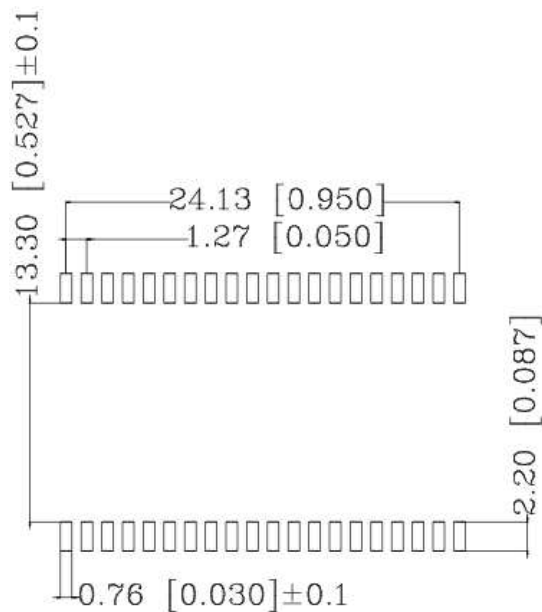


Component Side of PC Board

Unit: mm [mil]

Figure 3: 24 position SMT Discrete Magnetics

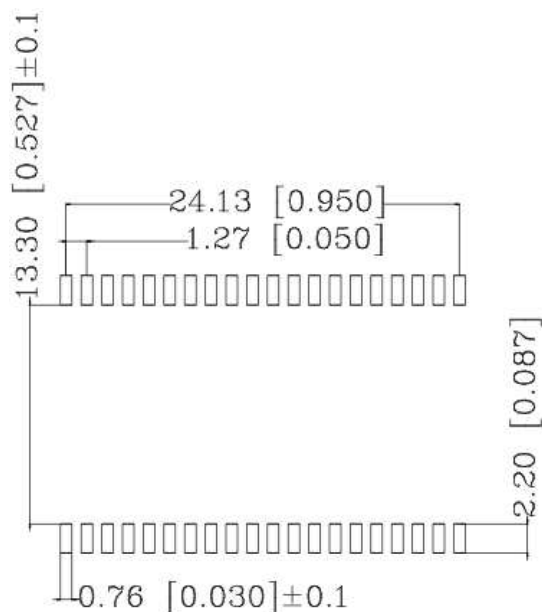
Component Side of PC Board



Unit: mm [mil]

Figure 4: 40 position SMT Discrete Magnetics

Component Side of PC Board

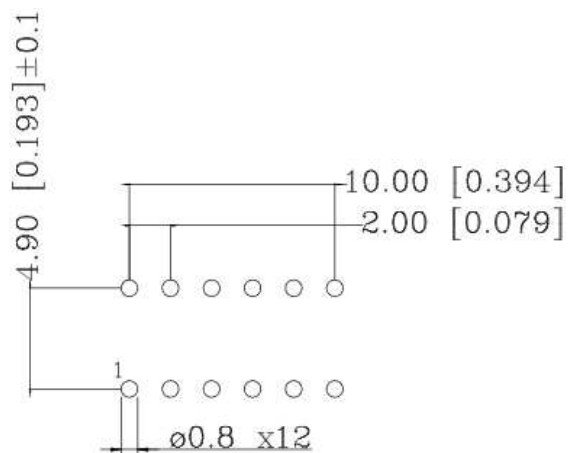


Unit: mm [mil]

Figure 5: 48 position SMT Discrete Magnetics

### B. THT Discrete Ethernet Magnetics

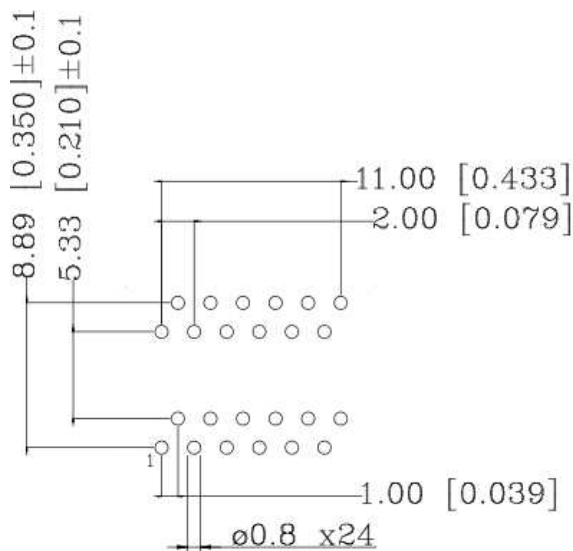
The pad patterns that apply to all THT Discrete Transformers are provided in the following figures.



Component Side of PC Board

Unit: mm [mil]

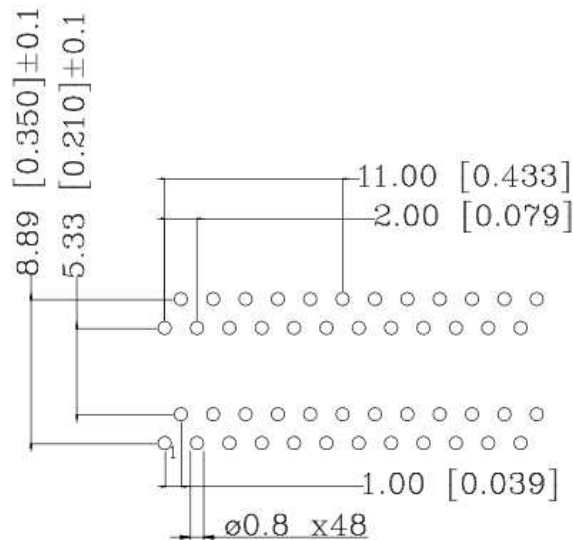
Figure 6: 12 position THT Discrete Magnetics



Component Side of PC Board

Unit: mm [mil]

Figure 7: 24 position THT Discrete Magnetics



Component Side of PC Board

Unit: mm [mil]

Figure 8: 48 position THT Discrete Magnetics

### 3.7. Component placement



The Discrete magnetics chip should be handled only by the housing to avoid deformation, contamination, or other damage of the contact solder tines

#### A. Alignment

The Discrete Ethernet Magnetics shall be flush and evenly seated on the pc board. A hold-down may be used to hold the magnetics module in place during the soldering process.

#### B. Position

Determine which pad or hole in the pc board is to receive the number one lead frame or solder pin, then orient the magnetics module so the number one lead frame/pin is aligned with its pad/hole. Afterwards carefully seat the SMT or THT module on the board.

### 3.8. Soldering Guidelines

The Discrete Ethernet Magnetics in SMT package can be soldered using reflow or equivalent soldering techniques according to IPC/JEDEC J-STD-020D. The temperatures and exposure time shall be within the ranges specified in table 3.

Table 3: Temperature and exposure time

SOLDERING PROCESS	TEMPERATURE		TIME (At Max Temp)
	CELSIUS	FAHRENHEIT	
Reflow Soldering	260	500	10 Seconds

### 3.9. Repair/Removal

If the Discrete Magnetics should become damaged, it must be replaced. It may be removed from the pc board by normal desoldering methods and replaced with a new magnetics module.



*When repairing or replacing a Discrete Ethernet Magnetics, be careful not to damage other pc board components during the desoldering process.*

## 4. QUALITY

Discrete Ethernet Magnetics are recognized by Underwriters Laboratories Incorporated (UL) in File tdb.

## 5. TOOLING

No special tooling is required for hand placement of Discrete Magnetics onto a pc board. However, a backup support that provides relief for protruding components is needed to prevent deformation of contact solder tines.



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