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The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, TE Connectivity (TE) makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

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## **Discrete Magnetics**

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### **1. SCOPE**

#### 1.1. Content

This specification covers the performance, tests and quality requirements for Discrete Magnetics for Ethernet applications.

#### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Paragraph 3.3 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

### **2. APPLICABLE DOCUMENTS AND FORMS**

The following documents and forms constitute a part of this specification to the extent specified herein.

#### 2.1. TE Documents

##### A. Application Specifications

114-94555 Application Specification

##### B. Test Reports

501-19265 Engineering Report

#### 2.2. Standards

IEEE 802-3 Local Area Networks: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specification

MIL-STD-202 Test Methods for Electronic and Electrical Component Parts  
General – Applicable publications

ETSI EN 300 019 Environmental Conditions and Environmental Tests for Telecommunications  
Equipment

### **3. REQUIREMENTS**

#### 3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

### 3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

	SMT Parts	THT Parts
Lead Frame / THT Lead	C5191-HV170-190°	CP Wire
Cover	LCP Black, UL-94-V0	Black PF2A5-151J, UL-94-V0
Header	Black WH-9100, UL-94-V0	Black PF2A5-151J, UL-94-V0
Magnetics	Common mode choke cores, Isolation transformer cores. Wound cores consist of magnet wire winding on a manganese-zinc ferrite toroid.	

### 3.3. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Visual examination	Meet requirements of product drawing. There shall be no cracks or burrs	comply with IEC 60512-1-1 Test 1a
Coplanarity	< 0.1mm	EIA-364-18B
<b>ELECTRICAL</b>		
HI Pot (Isolation voltage)	1500 VAC / 10mA for 60s No flashovers may occur visually or audibly on the sample or any breackdowns with a maximum allowed of current 2mA. Comply with IEEE802.3 isolation requirements: IEC 60512-4-1 Test 4a	Between the contacts on the jack side and the contacts on the PHY side.
Turn ratio (Chip: cable)	TX = 1:1; RX = 1:1 @100kHz, 100mV	Define by chipset
POE+	The temperature should not exceed 85°C on 1A Comply with IEEE802.3at	In accordance with IEEE802.3at
<b>MECHANICAL</b>		
Vibration	No physical evidence of damage	ETSI 300 019 Class 2.2  Displacement: 3,5 mm Acceleration: 15 m/s <sup>2</sup> Frequency range: 9 – 200 Hz Sweep cycles: 3x5 Duration: 30 min
<b>ENVIRONMENTAL</b>		
Thermal shock	No physical evidence of damage	MIL-STD-202-107  T <sub>a</sub> = -40°C      t <sub>a</sub> = 30 min T <sub>b</sub> = +125° C    t <sub>b</sub> = 30 min Number of cycles: 5

**TRANSMISSION PERFORMANCE**

Insertion Loss	-1.0 dB MAX. from 1 MHz to 100 MHz	In accordance with IEC 60512-27-100
Return Loss	-18 dB MIN. from 1 MHz to 30 MHz -14.4 dB MIN. at 40 MHz -13.1 dB MIN. at 50 MHz -12 dB MIN. at 80 MHz -10 dB MIN. at 100 MHz	In accordance with IEC 60512-27-100
Cross-Talk	-40 dB MIN. at 30 MHz -35 dB MIN. at 60 MHz -30 dB MIN. at 100 MHz	In accordance with IEC 60512-27-100
Common- to- Common Mode Attenuation	-40 dB MIN. at 30 MHz -35 dB MIN. at 60 MHz -30 dB MIN. at 100 MHz	In accordance with IEC 60512-27-100
DC Resistance	1.2 Ohms MAX.	

**SOLDERABILITY**

Solderability test	The part must be solderable using the applicable JEDEC profile (STD-20D for SMT)  THT part must be solderable using Wave Soldering process: Max. temp = +260 ± 5°C, 10 ± 1s	MIL-STD-202-208
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**NOTE**

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Paragraph 3.4.

## 3.4. Test Sequence of product qualification

TEST OR EXAMINATION	TEST GROUP				
	I	II	III	IV	V
Visual examination	1,9 <sup>(a)</sup>	1,4	1,4	1,3	1,3
HI Pot (Isolation voltage)	7				
Turn ratio (Chip: cable)	2				
DC Resistance	8	3	3		
POE+					2
Vibration		2			
Thermal shock			2		
Insertion Loss	3				
Return Loss	4				
Near-End Cross-Talk (NEXT)	5				
Common-to-Common Mode Attenuation	6				
Solderability test				2	

(a) Numbers indicate sequence in which tests are performed.

#### **4. QUALITY ASSURANCE PROVISIONS**

##### **4.1. Qualification Testing**

###### **A. Sample Selection**

The samples shall be prepared in accordance with product drawings. They shall be selected at random from current production.

###### **B. Test Sequence**

The tests realization must be in accordance with test groups as shown in section 3.4.

##### **4.2. Re-Qualification Testing**

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/ product, quality, and reliability engineering.

##### **4.3. Acceptance**

Acceptance is based on verification that the product meets the requirements of section 3.3. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken, and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

##### **4.4. Quality Conformance Inspection**

The applicable TE quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.