

## LoopBack Relay

### LB363 Series

*With Built-in AC Bypass Capacitors*

| SERIES DESIGNATION | RELAY TYPE  |
|--------------------|---|
| LB363              | LoopBack Relay, Sensitive Coil, thru-hole with AC Bypass Capacitors |

#### DESCRIPTION

The LoopBack Series relay combines two DPDT electromechanical relays in one package that includes an internal bypass path for Automated Test Equipment (ATE) applications. The LoopBack combines the technology of two Teledyne RF/GRF303 Series relays which eliminates the need for external PCB traces in loop back test applications. This innovation results in superior signal integrity and RF performance while taking minimal board space. The LB363 Series is designed for digital signaling application and provides excellent signal integrity up to 16 Gbps data rates.

The internal in-line capacitors allow you to eliminate the footprints for external components, while performing AC bypass functions internal to the relay. The capacitors used feature excellent signal integrity as well as low loss high frequency performance.

A typical loop-back load board application uses the Device Under Test (DUT) to test itself. In this method, the transmitter from the DUT is connected through a loop back path to the receiver of the DUT. The double pole design of the LoopBack relay is perfectly suited

for differential signaling, allowing the relay to provide transmit and receive signals and their inversions to the DUT or through the bypass path.

The internal structure of the LoopBack relay reduces the number of discontinuities and shortens the signal path during loop back testing, providing lower insertion loss and higher signal integrity performance than two RF/GRF303 Series relays. In the normally closed mode (de-energized) the LoopBack relay provides four normally closed contacts. When energized, the moving contacts are connected together across the loop back structure to provide two through paths. The normally closed contacts have similar performance to RF/GRF303 Series relays.

This LoopBack relay is available in a surface mount ground shield and stub pins/or J-lead configuration to provide improve high data rate and high frequency performance, as well as improved repeatability.

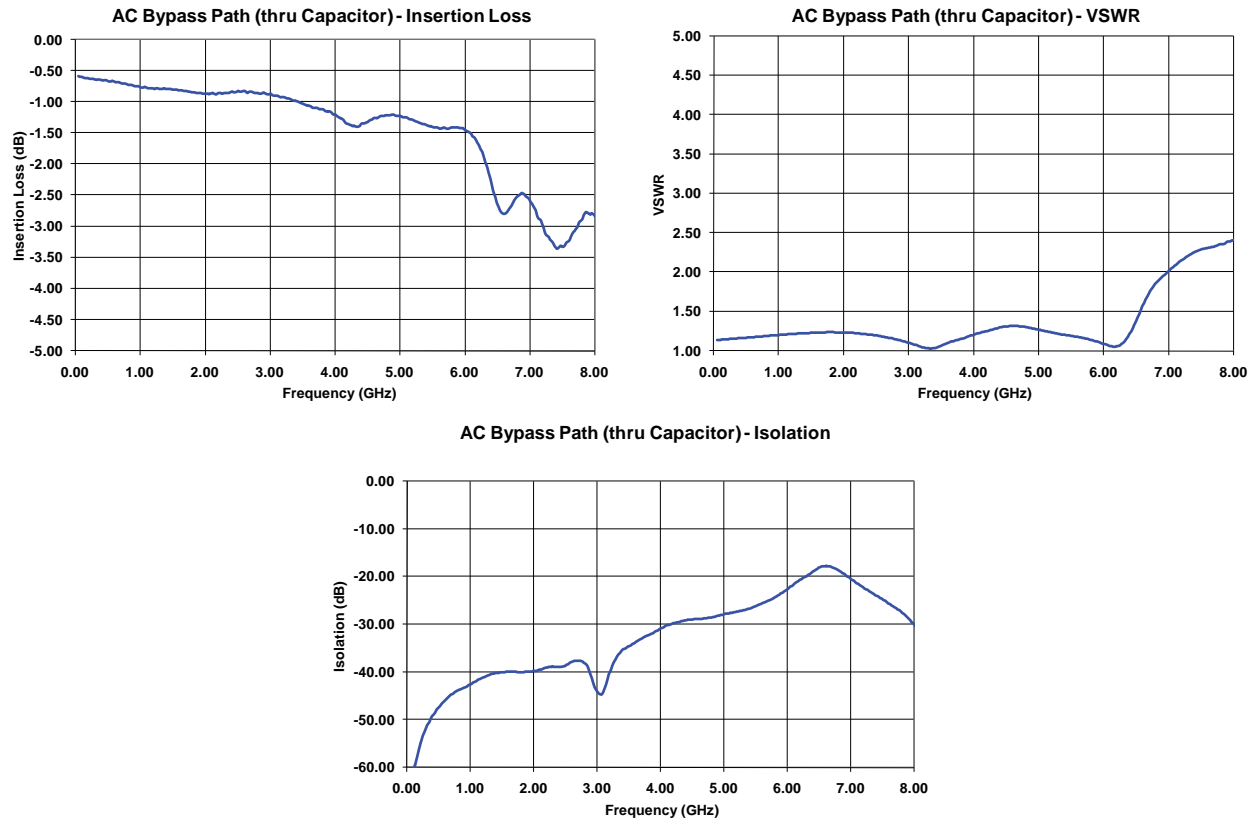
The DC LoopBack configuration provides internally shorted paths to allow “auxiliary” full spectrum signal routing.

#### ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS

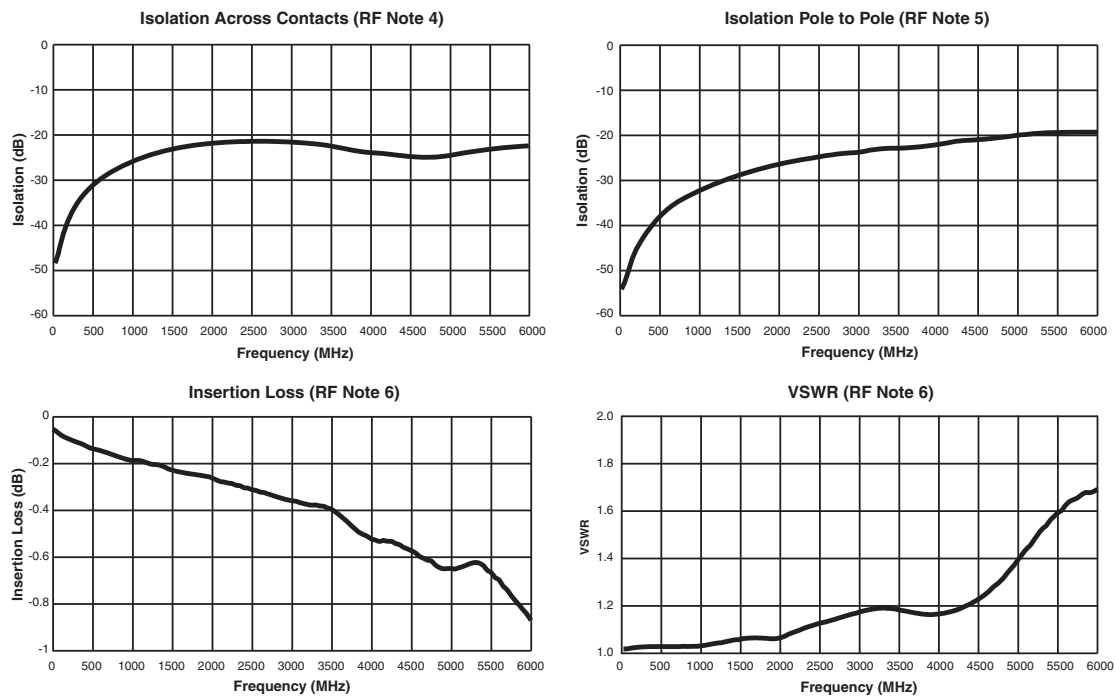
| Temperature<br>(Ambient)      | Storage   | –65°C to +125°C       | Enclosure                 | Hermetically sealed      |
|-------------------------------|-----------|-----------------------|---------------------------|--------------------------|
|                               | Operating | –55°C to +85°C        |                           |                          |
| Vibration<br>(General Note 1) |           | 10 g's to 500 Hz      | Shock<br>(General Note 1) | 30 g's,<br>6ms half sine |
| Weight                        | LB363     | 0.16 oz. (4.53g) max. | GLB363                    | 0.18 oz. (5.10g) max.    |

## SERIES LB363

TYPICAL RF Characteristics (See RF Notes on next page)



## Normally Closed RF Performance



**SERIES LB363**  
**GENERAL ELECTRICAL SPECIFICATIONS (@ 25 °C unless otherwise noted)**

|                              |   |
|------------------------------|---|
| <b>Contact Arrangement</b>   | Special (See Schematic on page 5)                                 |
| <b>Rated Duty</b>            | Continuous  |
| <b>Contact Resistance</b>    | 0.200 $\Omega$ max. initial (measured 1/8" from the header)       |
| <b>Contact Load Rating</b>   | Resistive: 1Amp/28Vdc<br>Low level: 10 to 50 $\mu$ A, 10 to 50 mV |
| <b>Contact Life Ratings</b>  | 5,000,000 cycles (typical) at low level                           |
| <b>Operate Time</b>          | 4.0 mS max.   |
| <b>Release Time</b>          | 3.0 mS max.   |
| <b>Insulation Resistance</b> | 1,000 M $\Omega$ min. between mutually isolated terminals         |
| <b>Dielectric Strength</b>   | 350 Vrms (60 Hz) @ atmospheric pressure                           |

**DETAILED ELECTRICAL SPECIFICATIONS (@25°C)**

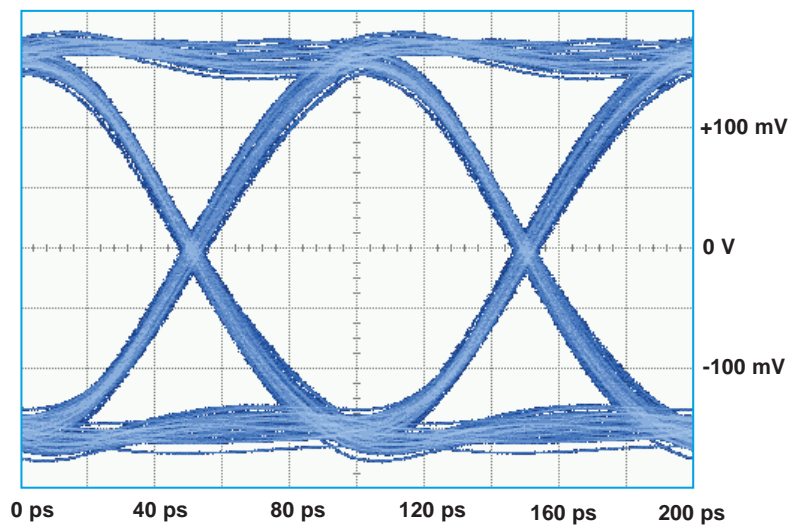
| BASE PART NUMBERS                                 | LB363-x-5 | LB363-x-12 |
|---|-----------|------------|
| <b>Coil Voltage, Nominal (Vdc)</b>                | 5.0       | 12.0       |
| <b>Coil Resistance (Ohms <math>\pm</math>20%)</b> | 56        | 400        |
| <b>Pick-up Voltage (Vdc max.)</b>                 | 3.6       | 9.0        |
| <b>Coil Operating Power (mW)</b>                  | 450       | 360        |

**RF NOTES**

- Test conditions:
  - Fixture: .031" copper clad, reinforced PTFE, RT/duroid® 6002 with SMA connectors. (RT/duroid® is a registered trademark of Rogers Corporation.)
  - Room ambient temperature.
  - Terminals not tested were terminated with 50-ohm load.
  - Contact signal level: -10 dBm.
  - No. of test samples: 4.
- Data presented herein represents typical characteristics and is not intended for use as specification limits.
- Data is per pole, except for pole-to-pole data.
- Data is the average from readings taken on all open contacts.
- Data is the average from readings taken on poles with coil energized and de-energized.
- Data is the average from readings taken on all closed contacts.
- Test fixture effect de-embedded from frequency and time response data.

**SERIES LB363**  
**TYPICAL Single-Ended Signal Integrity Characteristics @ 10 Gbps**

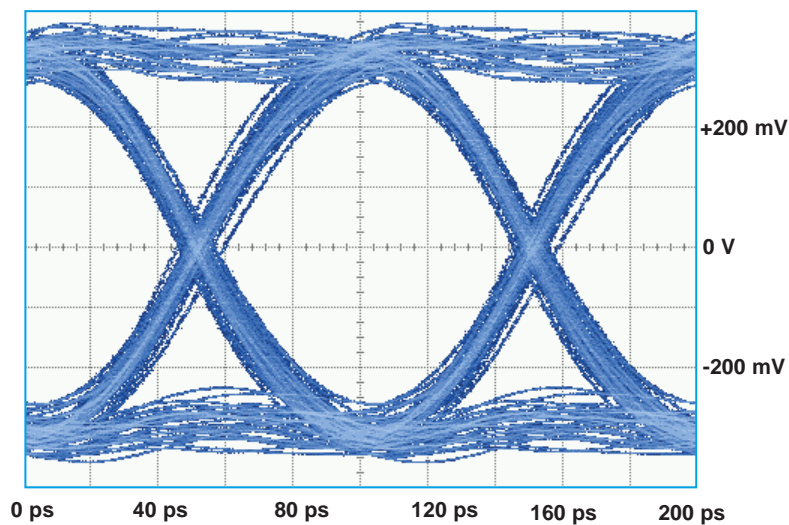
**AC Bypass Path**



| Bit Rate | Eye Height | Eye Width | Jitter <sub>p-p</sub> |
|----------|------------|-----------|-----------------------|
| 10 Gbps  | 254.3 mV   | 88.64 ps  | 8.89 ps               |

**SERIES LB363**  
**TYPICAL Differential Signal Integrity Characteristics @ 10 Gbps**

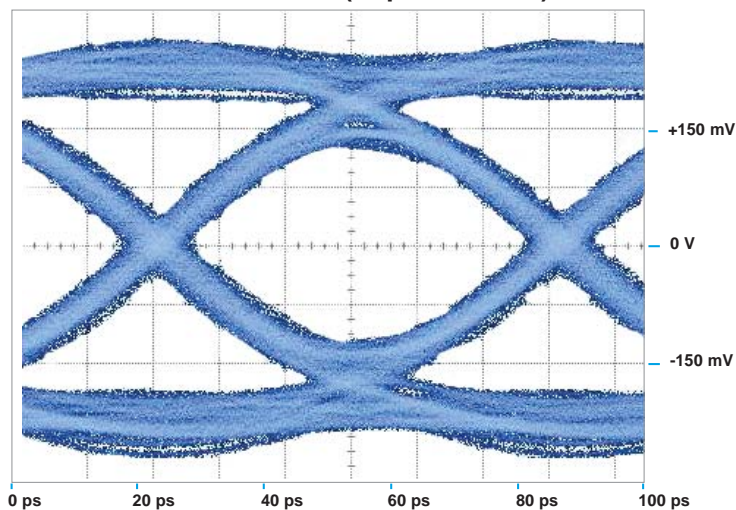
**AC Bypass Path**



| Bit Rate | Eye Height | Eye Width | Jitter <sub>p-p</sub> |
|----------|------------|-----------|-----------------------|
| 10 Gbps  | 492.1 mV   | 84.29 ps  | 15.55 ps              |

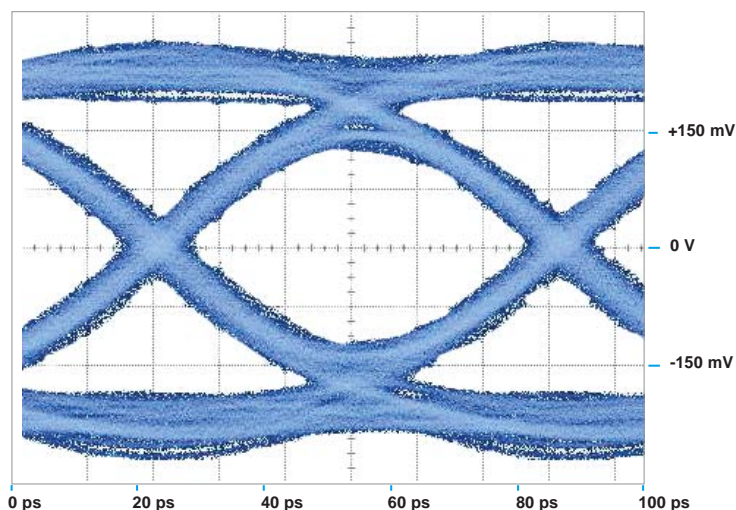
**SERIES LB363**  
**TYPICAL Single-Ended Signal Integrity Characteristics @ 16 Gbps**

**AC BYPASS PATH (Capacitor Path)**



| Bit Rate | Eye Height | Eye Width | Jitter <sub>P-P</sub> |
|----------|------------|-----------|-----------------------|
| 16 Gbps  | 173 mV     | 48.3 ps   | 12.67 ps              |

**Normally Closed Path (Through Path)**

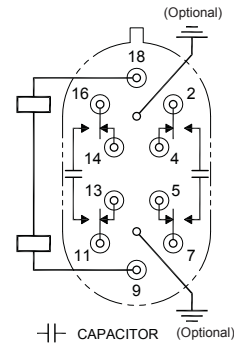
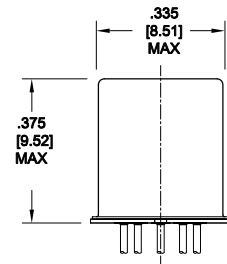
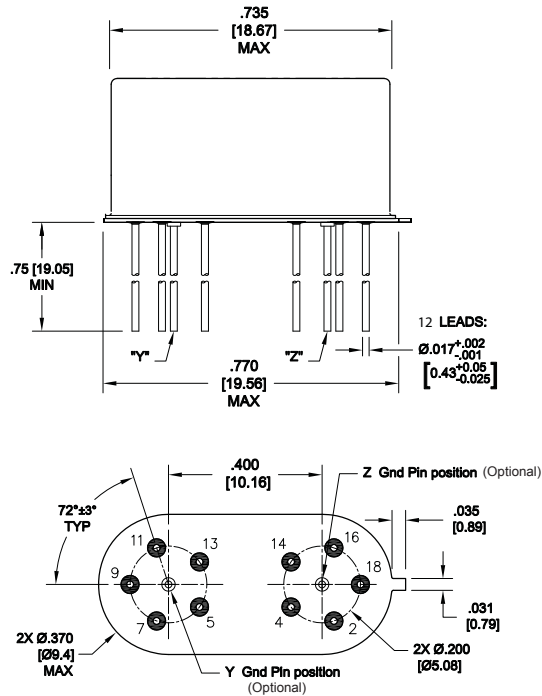


| Bit Rate | Eye Height | Eye Width | Jitter <sub>P-P</sub> |
|----------|------------|-----------|-----------------------|
| 16 Gbps  | 173 mV     | 48.3 ps   | 12.67 ps              |

**PATTERN GENERATOR SETTINGS**

- 16 Gbps Random Pulse Pattern Generator
- $2^{31} - 1$  PRBS signal
- PRBS output of 500 mV<sub>P-P</sub> (nominal)
- RF PCB effect (negligible) not removed from measurement
- Data shown is typical of both poles

**SERIES LB363  
OUTLINE DIMENSIONS**



SCHEMATIC - TERMINAL VIEW  
PIN NUMBERS ARE FOR REFERENCE  
ONLY, NOT MARKED ON RELAY

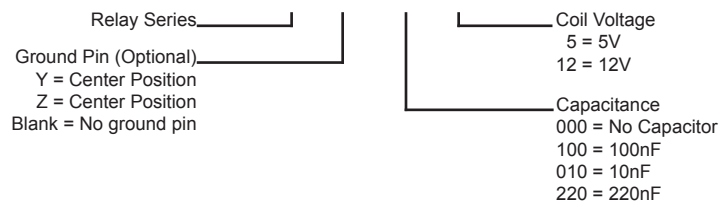
U.S. PATENT PENDING

**NOTES:**

1. DIMENSIONS ARE IN INCHES. METRIC EQUIVALENTS (MILLIMETERS) ARE SHOWN IN [X.XX]
2. TOLERANCE (UNLESS OTHERWISE SPECIFIED): ± .010 INCH [±0.25MM]

**Teledyne Part Numbering System for LoopBack Relays**

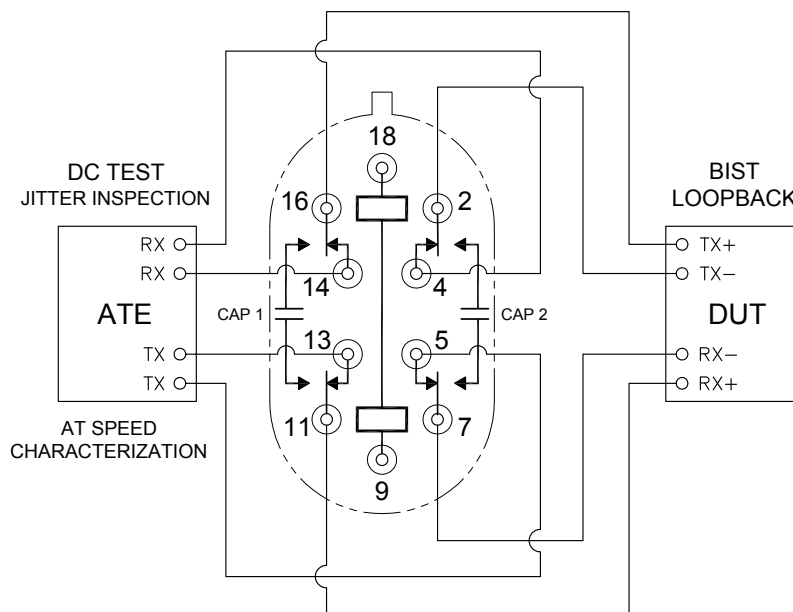
LB363 YZ - 100 - 5



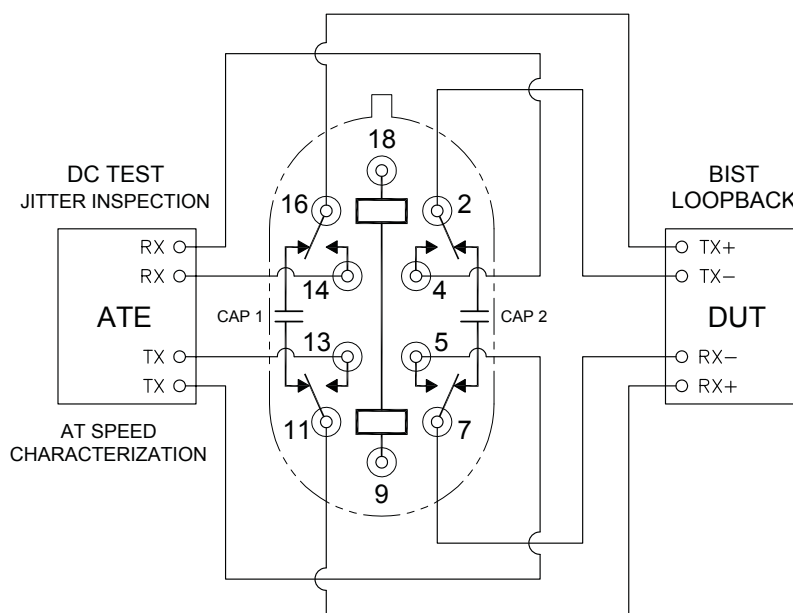
**NOTES**

Standard LoopBack Relays comes with gold plated leads (25-40 micro inches)  
For Solder (Sn60/Pb40) dipped leads add /Q at end of part number. EX LB363-100-5/Q  
For RoHS Solder add /R a end of part number EX. LB363-100-5/R  
RoHS Solder: (Sn 99.3/Cu 0.7)

**SERIES LB363  
APPLICATION NOTE**



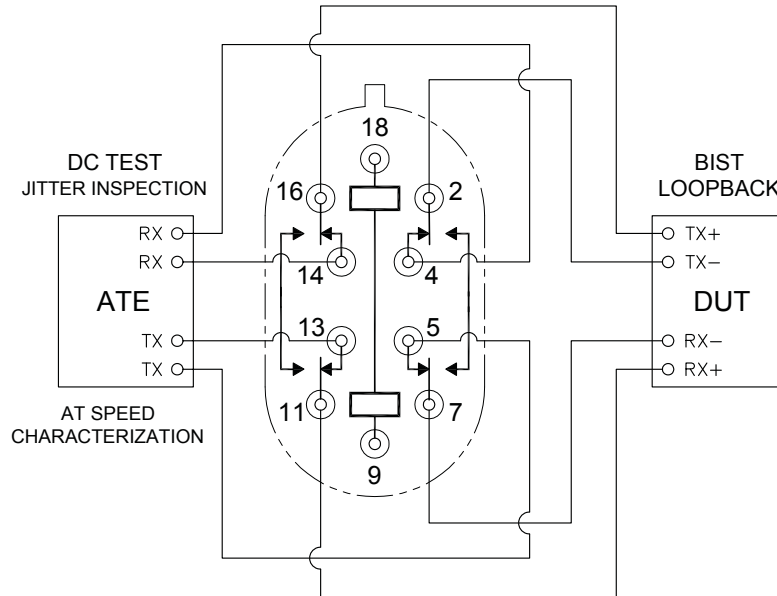
(Contacts shown in *De-Energized* position)



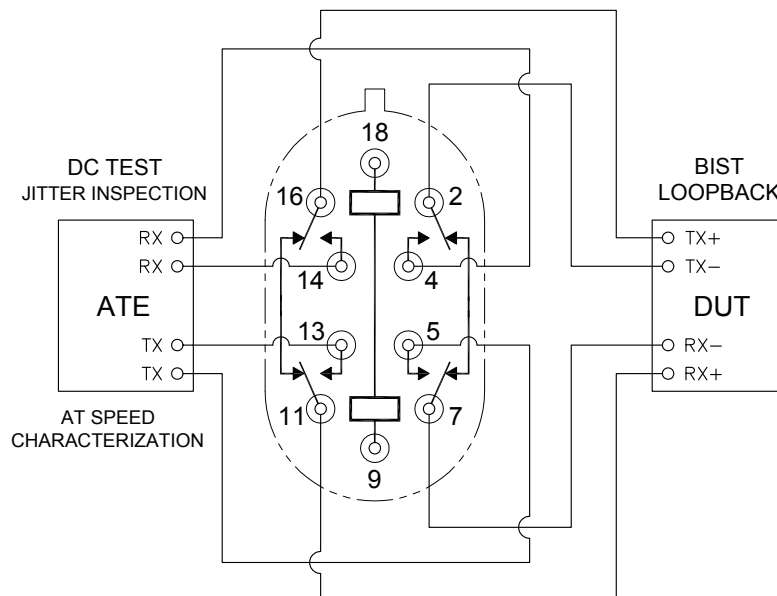
(Contacts shown in *Energized* position)

**NOTES:**  
Coil Pins 9&18 are not polarity sensitive.  
Pin assignment shown as terminal view.

**SERIES LB363**  
**APPLICATION NOTE (Applicable to No Capacitor Model)**



(Contacts shown in *De-Energized* position)



(Contacts shown in *Energized* position)

**NOTES:**  
Coil Pins 9&18 are not polarity sensitive.  
Pin assignment shown as terminal view.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Teledyne Relays:](#)

[LB363-100-5](#)