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DEVICE SPECIFICATIONS

# NI PXI-2598

## 26.5 GHz Dual Transfer Switch 50 Ω Relay Module

This document lists specifications for the NI PXI-2598 (PXI-2598) relay module. All specifications are subject to change without notice. Visit *ni.com/manuals* for the most current specifications.

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## About These Specifications

*Specifications* characterize the warranted performance of the instrument under the stated operating conditions. Data in this document are *Specifications* unless otherwise noted.

*Typical Specifications* are specifications met by the majority of the instrument under the stated operating conditions and are tested at 23 °C ambient temperature. Typical specifications are not warranted.

All voltages are specified in DC, $AC_{pk}$, or a combination unless otherwise specified.

| | |
|---|---|
| Topology | Dual transfer |

Refer to the *NI Switches Help* at *ni.com/manuals* for detailed topology information.

**Caution** The protection provided by the PXI-2598 can be impaired if it is used in a manner not described in this document.


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# Input Characteristics



**Hazardous Voltage** This icon denotes a warning advising you to take precautions to avoid electrical shock.

| | |
|---|---|
| Maximum voltage (cold-switching only) | 65 Vrms, CAT I |



**Caution** This module is rated for Measurement Category I and intended to carry signal voltages no greater than 100 V. This module can withstand up to 500 V impulse voltage. Do not use this module for connection to signals or for measurements within Categories II, III, or IV. Do not connect to MAINs supply circuits (for example, wall outlets) of 115 or 230 VAC.[1]



**Caution** When hazardous voltages (>42.4 $V_{pk}$/60 VDC) are present on any channel, safety low-voltage (≤42.4 $V_{pk}$/60 VDC) cannot be connected to any other channel.



**Note** NI recommends against switching active RF signals. As a relay actuates, the channel is momentarily unterminated. Some RF sources can be damaged by reflections if their outputs are not properly terminated. Refer to your RF source documentation for more information.



**Note** National Instruments recommends against switching RF signals below -35 dBm with this device.

| | |
|---|---|
| Maximum carry current (per channel) | 1.25 $A_{rms}$ |
| Maximum RF carry power (50 Ω load) | 75 W |
| Minimum switch load | -35 dBm |

# RF Performance Characteristics

| | |
|---|---|
| Characteristic impedance ($Z_0$) | 50 Ω, nominal |
| Insertion loss | |
| ≤3 GHz | <0.2 dB |
| ≤8 GHz | <0.3 dB |
| ≤12.4 GHz | <0.4 dB |
| ≤18 GHz | <0.5 dB |
| ≤26.5 GHz | <0.7 dB |

[1] Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

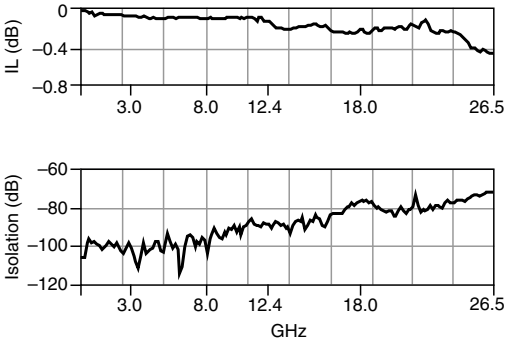


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| | |
|---|---|
| Voltage standing wave ratio (VSWR) | |
| ≤3 GHz | <1.2 |
| ≤8 GHz | <1.3 |
| ≤12.4 GHz | <1.4 |
| ≤18 GHz | <1.5 |
| ≤26.5 GHz | <1.7 |
| Open channel isolation | |
| ≤3 GHz | >80 dB |
| ≤8 GHz | >70 dB |
| ≤12.4 GHz | >65 dB |
| ≤18 GHz | >60 dB |
| ≤26.5 GHz | >50 dB |
| RF carry power | |
| ≤3 GHz | 75 W |
| ≤8 GHz | 50 W |
| ≤12.4 GHz | 35 W |
| ≤18 GHz | 30 W |
| ≤26.5 GHz | 25 W |

Refer to the following figure for the typical insertion loss and isolation of the PXI-2598.

**Figure 1.** Insertion Loss and Isolation, Typical

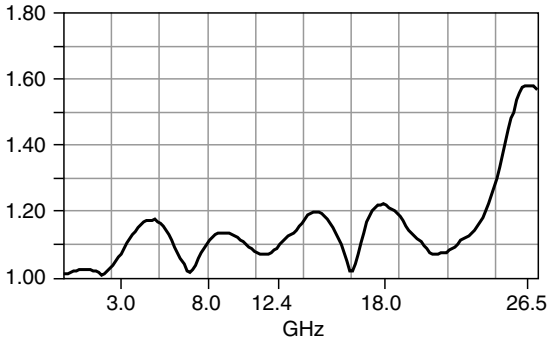



Refer to the following figure for the typical VSWR of the PXI-2598.



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**Figure 2.** VSWR, Typical




## Dynamic Characteristics

| | |
|---|---|
| Relay operate/release time | 15 ms |

**Note** Certain applications may require additional time for proper settling. Refer to the *NI Switches Help* at *ni.com/manuals* for more information about including additional settling time.

| | |
|---|---|
| Recommended cycle speed | 5 channels/s |
| Expected mechanical relay life | $2.5 \times 10^6$ cycles |
| Insertion loss repeatability | <0.03 dB, typical |

## Trigger Characteristics

| | |
|---|---|
| Input trigger | |
| Sources | PXI trigger lines <0...7> |
| Minimum pulse width | 150 ns |

**Note** The PXI-2598 can recognize trigger pulse widths less than 150 ns if you disable digital filtering. Refer to the *NI Switches Help* at *ni.com/manuals* for information about disabling digital filtering.

| | |
|---|---|
| Output trigger | |
| Destinations | PXI trigger lines <0...7> |
| Pulse width | Programmable (1 µs to 62 µs) |

## Physical Characteristics

| | |
|---|---|
| Relay manufacturer/PN | Radiall/R577 series |
| Relay type | Electromechanical, latching |



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| | |
|---|---|
| Contact material | Beryllium copper, gold-plated |
| I/O connector | 8 SMA jacks |
| SMA torque | 0.8 N · m to 1.1 N · m<br>(7 in. · lbs to 10 in. · lbs) |
| PXI power requirement | 2.5 W at 3.3 V<br>1 W at 5 V<br>4 W at 12 V |
| Dimensions (L × W × H) | 3U, two slot, PXI/cPCI module,<br>21.6 cm × 4.1 cm × 13.0 cm<br>(8.5 in. × 1.6 in. × 5.1 in.) |
| Weight | 302 g (10.6 oz) |

**Caution** Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

# Environment

| | |
|---|---|
| Maximum altitude | 2,000 m (at 25 °C ambient temperature) |
| Pollution Degree | 2 |

Indoor use only.

## Operating Environment

| | |
|---|---|
| Ambient temperature range | 0 °C to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.) |
| Relative humidity range | 10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.) |

## Storage Environment

| | |
|---|---|
| Ambient temperature range | -40 °C to 70 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.) |
| Relative humidity range | 5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.) |

# Shock and Vibration

| | |
|---|---|
| Operational shock | 30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.) |



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| | |
|---|---|
| Random vibration | |
| Operating | 5 Hz to 500 Hz, 0.31 $g_{rms}$ (Tested in accordance with IEC 60068-2-64.) |
| Nonoperating | 5 Hz to 500 Hz, 2.46 $g_{rms}$ (Tested in accordance with IEC 60068-2-64. Test profile exceeds the requirements of MIL-PRF-28800F, Class 3.) |

# Compliance and Certifications

## Safety

This product is designed to meet the requirements of the following electrical equipment safety standards for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

**Note** For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

## Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.

**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

**Note** For EMC declarations and certifications, refer to the *Online Product Certification* section.



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## CE Compliance CE

This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

## Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit *ni.com/certification*, search by model number or product line, and click the appropriate link in the Certification column.

## Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at *ni.com/environment*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

### Waste Electrical and Electronic Equipment (WEEE)

**EU Customers** At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

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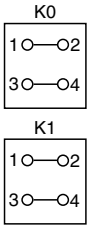
# Diagrams

Refer to the following figure for the power-on state diagram of the PXI-2598.



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**Figure 3.** PXI-2598 Power-On State

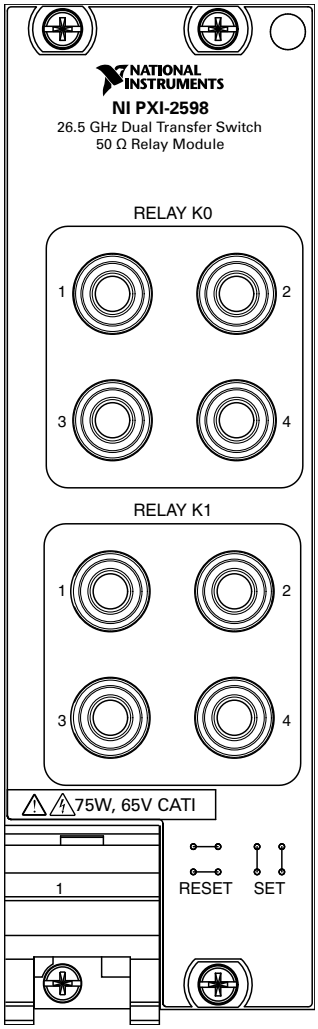



Refer to the following figure for the front panel connectors of the PXI-2598.



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**Figure 4.** PXI-2598 Front Panel




**Note** For topology-specific connection information, refer to your device in the *NI Switches Help* at *ni.com/manuals* and the installation instructions for any associated cables or terminal blocks.

# Accessories

Visit *ni.com* for more information about the following accessories.



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**Table 1.** NI Accessories for the PXI-2598

| Accessory | Part Number |
|---|---|
| SMA 100, SMA male to SMA male flexible cable, 0.15 m | 763443-01 |
| SMA 100, SMA male to SMA male flexible cable, 0.45 m | 763444-01 |
| Torque wrench for SMA connectors (1 N · m) | 187106-01 |

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