SPECIFICATIONS

SLSC-12252

8-Channel, 30 A Fault Insertion Module

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the performance met by a majority of models.
- *Nominal* specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

Design Standards and Compatibility

Switch Load and Signal Conditioning Module Design Specifications version	1.2
SLSC compliance level	2
Rear I/O compatibility category	None (custom)
Required RTI	RTI-12306
Earliest driver version	NI-SLSC 18.5

Input Characteristics

All input characteristics are DC, AC_{rms}, or a combination unless otherwise specified.

Maximum switching voltage (any polarity)	100 V_{peak}

Notice Steady state voltages applied to the SLSC-12252 between any two I/O connector pins in excess of the maximum switching voltage specification may damage the module.

Note Signal connections through the SLSC-12252 are intended to go through the DUTn pin connections. Signal paths that do not use the DUTn pin connections bypass the internal overcurrent limiting features and may exceed the module's thermal capabilities. For more information, refer to the *SLSC-12251 and SLSC-12252 User Guide.*

Maximum continuous current	
Each channel	30 A_{rms}
Sum of all channels	60 A_{rms}
Each BusA, BusB	60 A_{rms}
Maximum channel pulsed current (<1 ms, 25 °C)	200 A_{peak}

Notice Exceeding the maximum pulsed current can damage the module.

Number of bidirectional channels	8
Channel resistance (at 25 °C ambient)[1]	
DUTn to LOADn	5 mΩ to 9 mΩ
DUTn to BusA or BusB	7 mΩ to 9 mΩ
DUTn to DUTn+1 (n = even)	12 mΩ to 16 mΩ
Channel resistance (maximum)	
DUTn to LOADn	12 mΩ
DUTn to BusA or BusB	12 mΩ
DUTn to DUTn+1 (n = even)	19 mΩ
Channel resistance temperature coefficients (nominal)	
DUTn to LOADn, BusA, or BusB	0.032 mΩ/°C
DUTn to DUTn+1 (n = even)	0.094 mΩ/°C

[1] Resistance generally increases with higher channel number since the path is longer. Nominal conditions were a digital temperature sensor reading of 42 °C to 45 °C with 25 °C ambient temperature. Maximums given are manufacturing test limits at 25 °C ambient.

Leakage Current, Open Switches (µA)	25 °C	50 °C	85 °C
LOADn	0.3	1.4	5.0
BusA or BusB	1.6	6.0	8.5
DUTn to DUTn+1 (n = even)	0.1	0.6	3.7

Channel bandwidth (50 Ω system)	>750 kHz
Overcurrent fault setpoints	
DUT high current limit	88 A ± 8%
DUT high current limit delay time	1 ms
DUT low current limit	33 A ± 5%
DUT low current limit delay time	1 s
Bus high current limit	88 A ± 8%
Bus high current limit delay time	1 ms
Overtemperature fault setpoints	
High temperature digital setpoint	>125 °C for a minimum of 1 s
High temperature analog transition range	115 °C to 138 °C
Current measurement accuracy (0 °C to 40 °C ambient)	
Full range	± 75 A ± 3%
± 30 A Subrange after calibration	
Typical	± 1.11% of reading ± 67 mA
Maximum	± 1.86% of reading ± 150 mA
Current measurement bandwidth	100 kHz
Current measurement voltage output	
(+) Terminal, ± full scale output	±2 V centered at Vcm
(-) Terminal = Vcm	2.5 V

Switch Characteristics

FET used for LOAD and Bus connections	IPT015N10N5
Avalanche energy, single pulse (85 °C)	300 mJ
FET used for (n, n+1) shorting pairs	IPT059N15N3
Avalanche energy, single pulse (85 °C)	175 mJ

Switch type	Dual FET
Typical switch life	Unlimited, when operated within specified limits
Maximum switching rate (software dependent)	30 Hz
Power-on or reset configuration	All switches open
Switch transition time	
Open	5.0 µs
Close	3.6 µs
Switch transition sequence[2]	
t = 0.12 ms	Connect LOADs to DUTs
t = 0.32 ms	Disconnect DUTs from BusA/B and pair channels
t = 0.52 ms	Connect DUTs to BusA/B and pair channels
t = 0.72 ms	Disconnect LOADs from DUTs

Note Timing jitter is nominally 0.01 ms.

Digital Temperature Sensor Characteristics

Sensor used	LM95071CIMF
Datasheet accuracy (-40 °C to 150 °C)	± 2 °C

Note The digital temperature sensor is not calibrated by NI.

Calibration

Recommended warm-up time	1 hour
Calibration interval	2 years

Power Requirements

Power consumption from backplane	21 W
Thermal dissipation	<50 W

[2] Start sequence upon execution of `NI.FIU.Update` command.

Physical Characteristics

SLSC slots	1
Dimensions	175 mm × 31 mm × 336 mm (6.89 in. × 1.19 in. × 13.21 in.)
Weight	1,010 g (35.6 oz)
Front I/O connectors	
DUT	1x male 8-pin Positronic Scorpion
LOAD	1x female 8-pin Positronic Scorpion
Rear I/O connectors to the RTI-12306	1x 40-pin Hard Metric type B8, 2x Radsok Socket 3 mm ST

Environmental Characteristics

Temperature and Humidity

Operating temperature	0 °C to 40 °C[3]
Storage temperature range	-40 °C to 85 °C
Operating relative humidity range	10% to 90%, noncondensing
Storage relative humidity range	5% to 95%, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient)

Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse
Operating vibration, random	5 Hz to 500 Hz, 0.3 g_{rms}
Non-operating vibration, random	5 Hz to 500 Hz, 2.4 g_{rms}

Accessories

Visit `ni.com` for more information about SLSC-12252 accessories.

You must install mating connectors according to local safety codes and standards and according to the specifications provided by the manufacturer. You are responsible for verifying the safety compliance of third-party connectors and their usage according to the relevant standard(s), including UL and CSA in North America and IEC and VDE in Europe.

[3] The chassis internal ambient temperature may reach 85 °C with all slots at the maximum allowed power dissipation. In the SLSC-12001 chassis this corresponds to an external ambient of 40° C.

Safety

Caution Observe all instructions and cautions in the user documentation. Using the product in a manner not specified can damage the product and compromise the built-in safety protection. Return damaged products to NI for repair.

Attention Suivez toutes les instructions et respectez toutes les mises en garde de la documentation d'utilisation. L'utilisation du produit de toute autre façon que celle spécifiée risque de l'endommager et de compromettre la protection de sécurité intégrée. Renvoyez les produits endommagés à NI pour réparation.

Safety Voltages

Connect only voltages that are below these limits.

Channel-to-channel isolation	
Continuous working voltage[4]	100 V peak
Channel-to-earth isolation	
Continuous working voltage	100 V peak
Transient overvoltage[5]	920 V peak

Caution If you are using the SLSC-12252 with voltages greater than 60 V_{dc}, the SLSC chassis must be made touch safe by panel mounting it in a closed rack to prevent user access to the rear of the device.

Attention Si vous utilisez le SLSC-12252 avec des tensions supérieures à 60 V_{dc}, le châssis SLSC doit être sécurisé contre les contacts. Pour cela, il est nécessaire de le monter sur panneau dans un rack fermé pour empêcher l'utilisateur d'accéder à l'arrière de l'appareil.

These test and measurement circuits are rated for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS.

MAINS is a hazardous live electrical supply system to which equipment is designed to be connected to for the purpose of powering equipment. This product is rated for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

[4] Working voltage rating is the highest RMS value of the AC or DC voltage across the insulation that can continuously occur when the equipment is supplied at rated voltage.

[5] The short duration overvoltage of a few milliseconds or less, oscillatory or non-oscillatory, usually highly damped.

Safety Guidelines for Hazardous Voltages

Caution Ensure that hazardous voltage wiring is performed only by qualified personnel adhering to local electrical standards.

Attention S'assurer que le câblage à tension dangereuse est effectué par du personnel qualifié respectant les normes électriques locales.

Caution Do not mix hazardous voltage circuits and human-accessible circuits on the same module.

Attention Ne pas combiner des circuits de tension dangereuse et des circuits accessibles aux personnes sur le même module.

Caution When device terminals are hazardous voltage LIVE, you must ensure that devices and circuits connected to the device are properly insulated from human contact.

Attention Lorsqu'une haute tension dangereuse est appliquée aux bornes de l'appareil, s'assurer que les appareils et les circuits auxquels il est connecté sont correctement isolés de tout contact humain.

Caution All wiring must be insulated for the highest voltage used.

Attention Tout le câblage doit être isolé pour la plus haute tension utilisée.

Warning Do not connect the SLSC-12252 to signals or use for measurements within Measurement Categories II, III, or IV, or for measurements on MAINs circuits or on circuits derived from Overvoltage Category II, III, or IV which may have transient overvoltages above what the product can withstand. The product must not be connected to circuits that have a maximum voltage above the continuous working voltage, relative to earth or to other channels, or this could damage and defeat the insulation. The product can only withstand transients up to the transient overvoltage rating without breakdown or damage to the insulation. An analysis of the working voltages, loop impedances, temporary overvoltages, and transient overvoltages in the system must be conducted prior to making measurements.

Mise en garde Ne connectez pas le SLSC-12252 à des signaux dans les catégories de mesure II, III ou IV et ne l'utilisez pas pour des mesures dans ces catégories, ou des mesures sur secteur ou sur des circuits dérivés de surtensions de catégorie II, III ou IV pouvant présenter des surtensions transitoires supérieures à ce que le produit peut supporter. Le produit ne doit pas être raccordé à des circuits ayant une tension maximale supérieure à la tension de fonctionnement continu, par rapport à la terre ou à d'autres voies, sous risque d'endommager et de compromettre l'isolation. Le produit risque de tomber en panne et son isolation risque d'être endommagée si les

tensions transitoires dépassent la surtension transitoire nominale. Une analyse des tensions de fonctionnement, des impédances de boucle, des surtensions temporaires et des surtensions transitoires dans le système doit être effectuée avant de procéder à des mesures.

Safety Compliance Standards

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 C22.2 No. 61010-1

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

Electromagnetic Compatibility Standards

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

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 In Europe, Australia, and New Zealand (per CISPR 11) Class A equipment is intended for use in non-residential locations.

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)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit *ni.com/product-certifications*, search by model number, and click the appropriate link.

Environmental Guidelines

Notice This model is intended for use in indoor applications only.

Notice To meet the shock and vibration specifications in this document, you must panel mount the system.

Environmental Standards

This product meets the requirements of the following environmental standards for electrical equipment.

- IEC 60068-2-1 Cold
- IEC 60068-2-2 Dry heat
- IEC 60068-2-78 Damp heat (steady state)
- IEC 60068-2-64 Random operating vibration
- IEC 60068-2-27 Operating shock

Note To verify marine approval certification for a product, refer to the product label or visit *ni.com/certification* and search for the certificate.

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 *Commitment to the Environment* 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*.

电子信息产品污染控制管理办法（中国 RoHS）

NI 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 NI 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

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