ISO5125R-xx
For SCALE™-2 Family

High Voltage Insulated DC-DC Power Supply for Railway Line Gate Driver Families

Product Highlights

Highly Integrated, Compact Footprint

- ISO5125R-45 is a ready-to-use DC-DC converter for IGBT drivers up to 4500V
- ISO5125R-65 is a ready-to-use DC-DC converter for IGBT drivers up to 6500V
- ISO5125R-100 is a ready-to-use DC-DC converter for IGBT drivers up to 6500V for multilevel applications
- ISO5125R-120 is a ready-to-use DC-DC converter for IGBT drivers up to 6500V
- Electrical primary-side interface with basic insulation
- 5 W output power at maximum ambient temperature
- Rugged connectors
- -40 °C to 85 °C operating ambient temperature

Protection / Safety Features

- Creepage distance 60 mm
- Clearance distance 52 mm
- No electrolytic capacitors
- Outstanding coupling capacitance of 4 pF
- Applied double-sided conformal coating (by using ELPEGUARD SL 1307 FLZ/2 from Lackwerke Peters)

Full Safety and Regulatory Compliance

- 100% production partial discharge and HIPOT test of transformer
- RoHS compliant

Applications

- Traction inverter
- HVDC
- Flexible AC transmission Systems (FACTS)
- Industrial drives
- Other industrial applications

Description

The ISO5125R-xx is a single-channel insulated DC-DC converter. It is a reliable and compact power supply designed for up to 4500 and 6500 V high voltage IGBT gate drivers.

Figure 1. Product Photo of ISO5125R.

Pin Functional Description

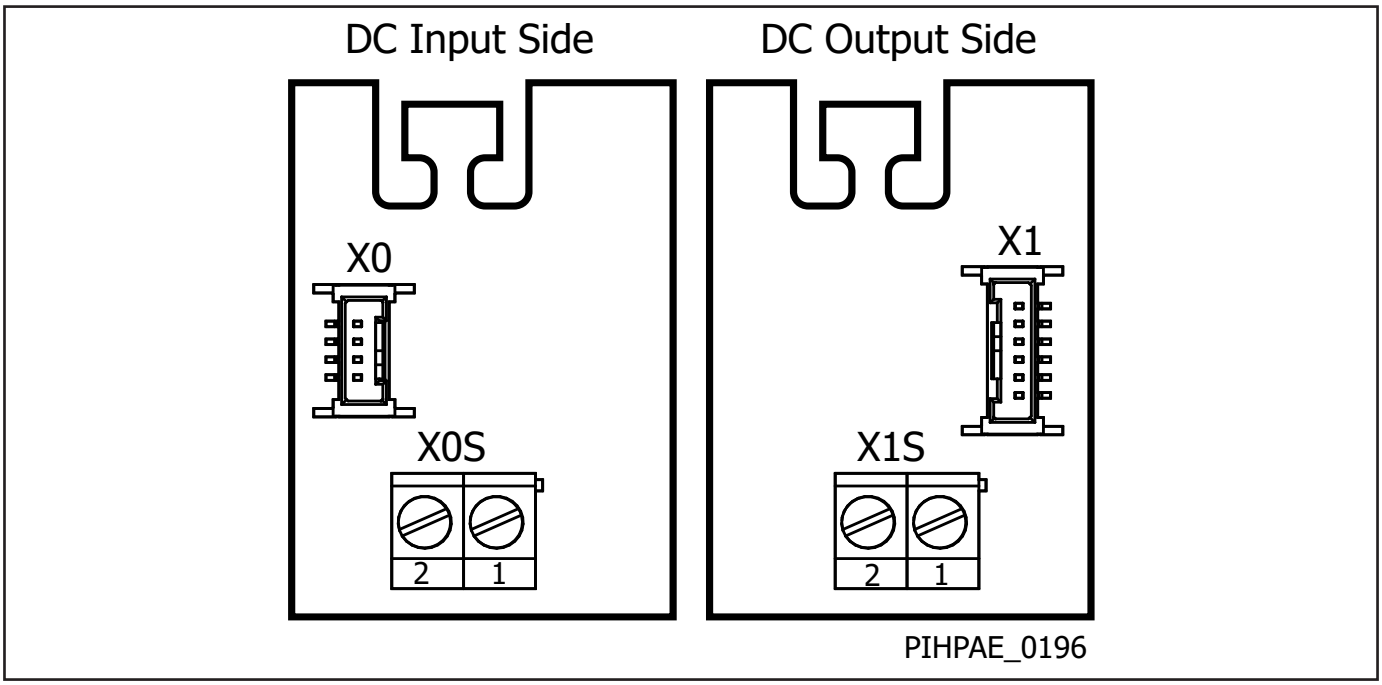

Figure 2. Pin Configuration of ISO5125R

Connector X0

ERNI MicroBridge 504385 input connector (4 pin, vertical male).

VDC (Pins 2, 3)
These pins are the input side supply voltage connection.

GND (Pins 1, 4)
These pins are the connection for input side ground potential.

Connector X0S

SAURO MSB02005 input terminal connector.

VDC (Pin 2)
This pin is the input side supply voltage connection.

GND (Pin 1)
This pin is the connection for input side ground potential.

Connector X1

ERNI MicroBridge 504425 output connector (6 pin, vertical male).

VISO (Pins 1, 5)
These pins are the output side positive supply voltage connection.

COM (Pins 2, 4)
These pins are the output side negative supply voltage connection.

NC (Pins 3, 6)
These pins are connected to COM with 100k resistors. They can remain floating or be connected to any other signal.

Connector X1S

SAURO MSB02005 output terminal connector.

VISO (Pin 2)
This pin provides output side positive supply voltage.

COM (Pin 1)
This pin provides output side negative supply voltage.

Absolute Maximum Ratings

Parameter	Symbol	Conditions T_A = -40 °C to 85 °C	Min	Max	Units
Absolute Maximum Ratings[1]					
Input Voltage	V_{DC}	VDC to GND	0	16	V
Average Input Current[2]	I_{DC}	Average supply current at full load		500	mA
Average Output Current	$I_{VISO-COM}$	Average output current at full load		200	mA
Output Power[3]	P_{OUT}	ISO5125R-xx		5	W
Test Voltage Primary-Side to Secondary-Side	$V_{ISO(PS)}$	ISO5125R-45 (50 Hz, 60 s)		7400	V_{RMS}
		ISO5125R-65 (50 Hz, 60 s)		10200	
		ISO5125R-100 (50 Hz, 60 s)		15200	
		ISO5125R-120 (50 Hz, 60 s)		18000	
Storage Temperature[4]	T_{ST}		-40	50	°C
Operating Ambient Temperature	T_A		-40	85	°C
Surface Temperature[5]	T			125	°C
Relative Humidity	H_R	No condensation		93	%
Altitude of Operation[6]	A_{OP}			2000	m

Recommended Operating Conditions

Parameter	Symbol	Conditions T_A = -40 °C to 85 °C	Min	Typ	Max	Units
Power Supply						
Input Voltage	V_{DC}	VDC to GND	14.5	15	15.5	V

Characteristics

Parameter	Symbol	Conditions V_{DC} = 15 V, T_A = 25 °C	Min	Typ	Max	Units
Input Characterisitics						
Supply Current	I_{DC}	Without load	30	55	130	mA
		I_{OUT} = I_{VISO} = 50 mA		142		
		I_{OUT} = I_{VISO} = 100 mA		230		
		I_{OUT} = I_{VISO} = 200 mA		395		
Power-On Threshold				11.9		V
Power-Off Threshold				11.7		V
Output Characterisitics						
Output Voltage	$V_{VISO-COM}$	Without load		32		V
		I_{OUT} = I_{VISO} = 50 mA		26.4		
		I_{OUT} = I_{VISO} = 100 mA		26		
		I_{OUT} = I_{VISO} = 200 mA		24.8		
Internal Blocking Capacitance		Between V_{OUT} and COM		23		µF
Electrical Isolation						
Test Voltage (50Hz/1s)[7]	$V_{ISO(PS)}$	Primary to secondary side (ISO5125R-45)		7.4		kV_{RMS}
		Primary to secondary side (ISO5125R-65)		10.2		
		Primary to secondary side (ISO5125R-65)		15.2		
		Primary to secondary side (ISO5125R-65)		18.0		
Partial Discharge Extinction Voltage[8]	PD_{P-S}	Primary to secondary side (ISO5125R-45)	3.6			kV_{RMS}
		Primary to secondary side (ISO5125R-65)	5.1			
		Primary to secondary side (ISO5125R-100)	7.8			
		Primary to secondary side (ISO5125R-120)	9.4			
Creepage Distance	CPG_{P-S}	Primary side to secondary side	60			mm
Clearance Distance	CLR_{P-S}	Primary side to secondary side	52			mm
Coupling Capacitance	C_{IO}			4		pF

NOTES:

1. Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device.
2. Refers to the static case. The input current increases with decreasing temperature. The maximum value refers to an operating temperature of -40°C.
3. The DC-DC converter is not protected against overload.
4. The storage temperature inside the original package or in case the coating material of coated products may touch external parts must be limited to the given value. Otherwise, it is limited to 85°C.
5. The component surface temperature, which may strongly vary depending on the operating condition, must be limited to the given value to ensure long-term reliability of the product.
6. Operation above this level requires a voltage derating to ensure proper isolation coordination.
7. The transformer of every production sample has undergone 100% testing at the given value (but limited to 15kV) for 1s.
8. Partial discharge measurement is performed on each transformer.

Product Dimensions

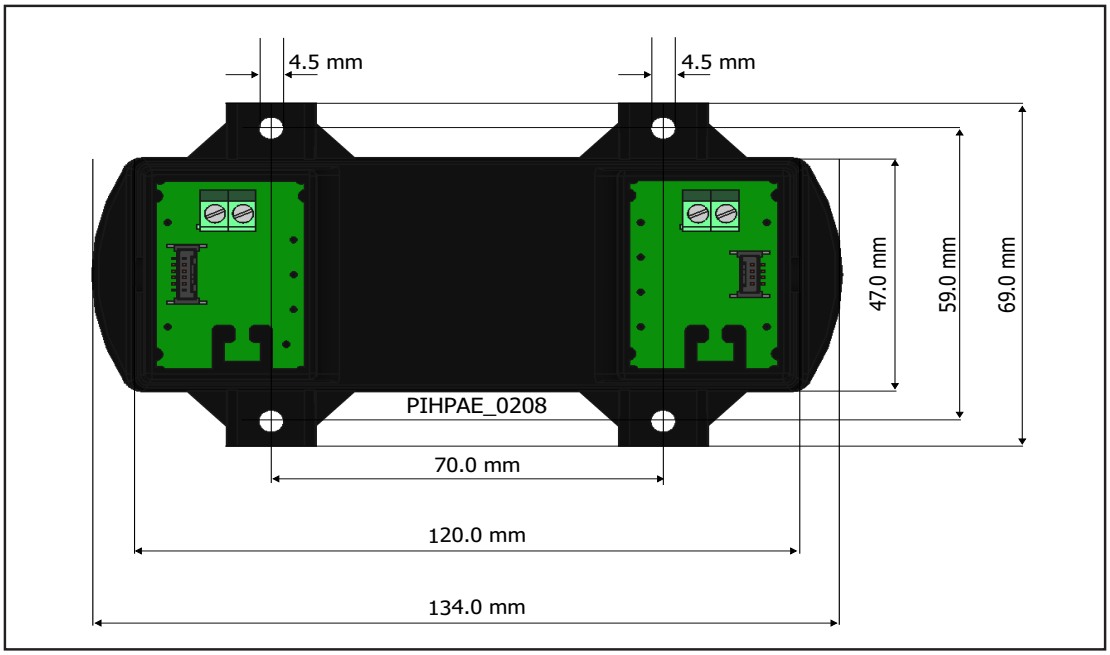

Figure 3. Top View of ISO5125R.

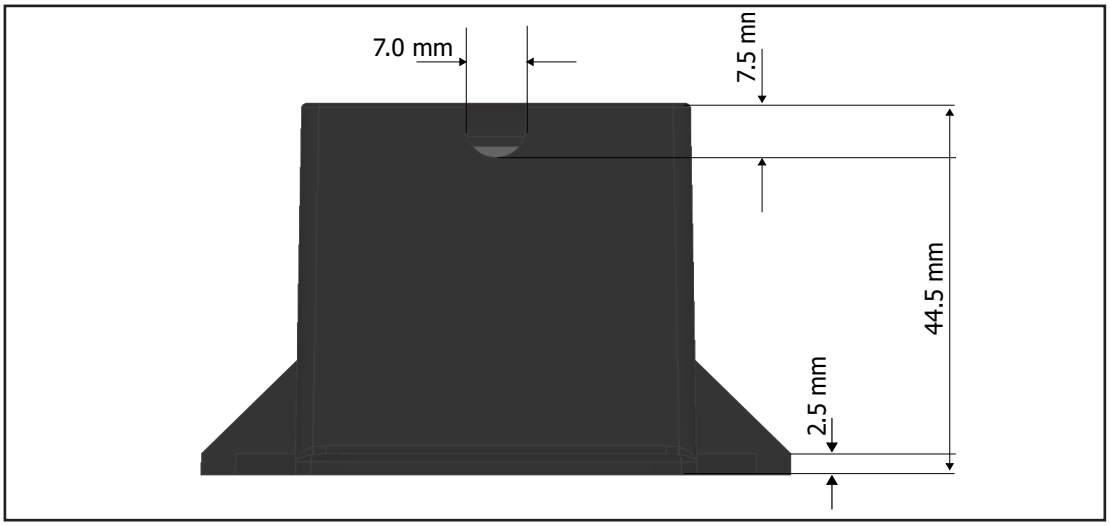

Figure 4. Side View of ISO5125R.

Conformal Coating

The electronic components of the gate driver are protected by a layer of acrylic conformal coating with a typical thickness of 50 µm using ELPEGUARD SL 1307 FLZ/2 from Lackwerke Peters on both sides of the PCB. This coating layer increases the product reliability when exposed to contaminated environments.

Note: Standing water (e.g. condensate water) on top of the coating layer is not allowed as this water will diffuse over time through the layer. Eventually, it will form a thin film of conducting nature between PCB surface and coating layer, which will cause leakage currents. Such currents may lead to a disturbance in the performance of the gate driver.

Transportation and Storage Conditions

For transportation and storage conditions refer to Power Integrations' Application Note AN-1501.

RoHS Statement

We hereby confirm that the product supplied does not contain any of the restricted substances according to Article 4 of the RoHS Directive 2011/65/EU in excess of the maximum concentration values tolerated by weight in any of their homogeneous materials.

Additionally, the product complies with RoHS Directive 2015/863/EU (known as RoHS 3) from 31 March 2015, which amends Annex II of Directive 2011/65/EU.

Product Details

Part Number	Supported Gate Drivers	Voltage Class	Cable Interface Between Power Supply and Gate Driver
ISO5125R-45	1SP0440V2M0C	4500 V	RLC-PSI-641-xxx-0 (Refer to related datasheet)
ISO5125R-45	1SP0335x2x1R	4500 V	RLC-IMS-61-xxx-0 (Refer to related datasheet)
ISO5125R-65	1SP0335x2x1R	6500 V	RLC-IMS-61-xxx-0 (Refer to related datasheet)
ISO5125R-100	1SP0335x2x1R	10000 V (for up to 6500 V IGBT modules in multilevel applications)	RLC-IMS-61-xxx-0 (Refer to related datasheet)
ISO5125R-120	1SP0335x2x1R	12000 V (for up to 6500 V IGBT modules in multilevel applications)	RLC-IMS-61-xxx-0 (Refer to related datasheet)

Revision	Notes	Date
A	Final Datasheet.	01/24

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Power Integrations Worldwide Sales Support Locations

World Headquarters
5245 Hellyer Avenue
San Jose, CA 95138, USA
Main: +1-408-414-9200
Customer Service:
Worldwide: +1-65-635-64480
Americas: +1-408-414-9621
e-mail: usasales@power.com

China (Shanghai)
Rm 2410, Charity Plaza, No. 88
North Caoxi Road
Shanghai, PRC 200030
Phone: +86-21-6354-6323
e-mail: chinasales@power.com

China (Shenzhen)
17/F, Hivac Building, No. 2, Keji Nan
8th Road, Nanshan District,
Shenzhen, China, 518057
Phone: +86-755-8672-8689
e-mail: chinasales@power.com

Germany (AC-DC/LED Sales)
Einsteinring 24
85609 Dornach/Aschheim
Germany
Tel: +49-89-5527-39100
e-mail: eurosales@power.com

Germany (Gate Driver Sales)
HellwegForum 3
59469 Ense
Germany
Tel: +49-2938-64-39990
e-mail: igbt-driver.sales@power.com

India
#1, 14th Main Road
Vasanthanagar
Bangalore-560052 India
Phone: +91-80-4113-8020
e-mail: indiasales@power.com

Italy
Via Milanese 20, 3rd. Fl.
20099 Sesto San Giovanni (MI) Italy
Phone: +39-024-550-8701
e-mail: eurosales@power.com

Japan
Yusen Shin-Yokohama 1-chome Bldg.
1-7-9, Shin-Yokohama, Kohoku-ku
Yokohama-shi,
Kanagawa 222-0033 Japan
Phone: +81-45-471-1021
e-mail: japansales@power.com

Korea
RM 602, 6FL
Korea City Air Terminal B/D, 159-6
Samsung-Dong, Kangnam-Gu,
Seoul, 135-728, Korea
Phone: +82-2-2016-6610
e-mail: koreasales@power.com

Singapore
51 Newton Road
#19-01/05 Goldhill Plaza
Singapore, 308900
Phone: +65-6358-2160
e-mail: singaporesales@power.com

Taiwan
5F, No. 318, Nei Hu Rd., Sec. 1
Nei Hu Dist.
Taipei 11493, Taiwan R.O.C.
Phone: +886-2-2659-4570
e-mail: taiwansales@power.com

UK
Building 5, Suite 21
The Westbrook Centre
Milton Road
Cambridge
CB4 1YG
Phone: +44 (0) 7823-557484
e-mail: eurosales@power.com