

# Application Note AN-2401

## SCALE-iFlex and HV IGBT Family

### - Cables and Connectors

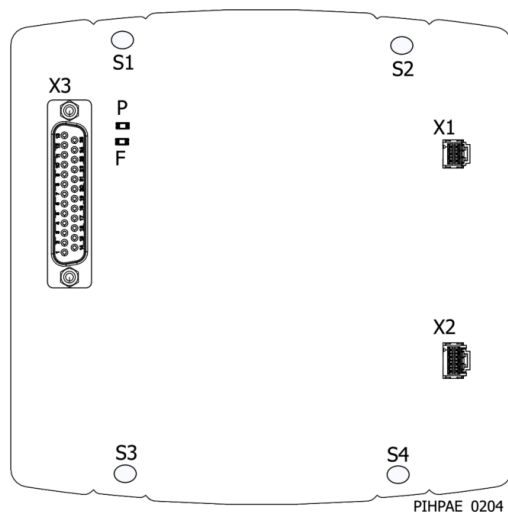


Cable assemblies and connectors overview for SCALE-iFlex family and 1SP0630x2M1R, 1SP0635x2x1R, 1SP0335x2x1R, 1SP0440V2M0C, ISO6125R, ISO5125R products

## Abstract

SCALE-iFlex gate drivers require cables to establish the electrical connection between superior controller and IMC as well as from the IMC to the first MAG and between paralleled MAGs. Similarly, cable assemblies are needed to operate 1SP0630x2M1R, 1SP0335x2x1R, 1SP0635x2x1R main and peripheral gate drivers 1SP0440V2M0C gate drivers and ISO5125R, ISO6125R DC-DC converters.

## SCALE-iFlex IMC



**Figure 1.** 2SI0400T2 IMC Pin Configuration

### Connector X1

IMC to MAG connector for gate driver channel 1.

- Manufacturer: Amphenol FCI
  - Part number: 10075025-G02-06ALF

### Connector X2

IMC to MAG connector for gate driver channel 2.

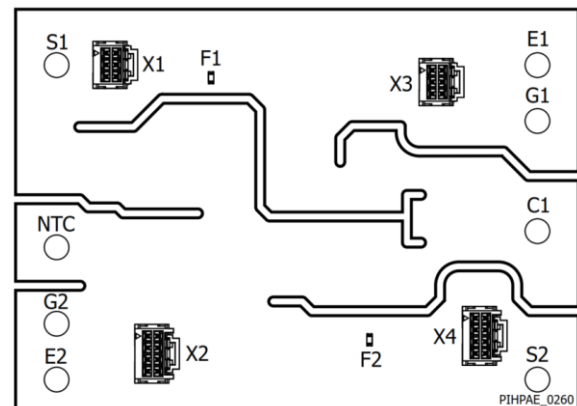
- Manufacturer: Amphenol FCI
  - Part number: 10075025-G02-08ALF

### Connector X3

Deltron D-sub connector from IMC to superior controller.

- Part number: DTS25PY/2M86UNB6.

## SCALE-iFlex MAGs



**Figure 2.** 2SM0120D2C MAG Pin Configuration

Connection to IMC or another MAG

### Connectors X1, X3

Interface of channel 1 to either IMC or to adjacent MAG in case of parallel connection of power modules.

- Manufacturer: Amphenol FCI
  - Part number: 10075025-G02-06ALF

### Connectors X2, X4

Interface of channel 2 to either IMC or to adjacent MAG in case of parallel connection of power modules.

- Manufacturer: Amphenol FCI
  - Part number: 10075025-G02-08ALF

Several cable connections must be established for proper system operation. These are:

- Cable from the system level controller to the primary-side IMC interface X3.
- Cables from the secondary-side IMC interface (X1, X2) to the first MAG (one per channel).
- In case of paralleling of power modules, the cables from one MAG to another MAG (one per channel).

The cables for IMC to MAG and MAG to MAG connection are available at Power Integrations.

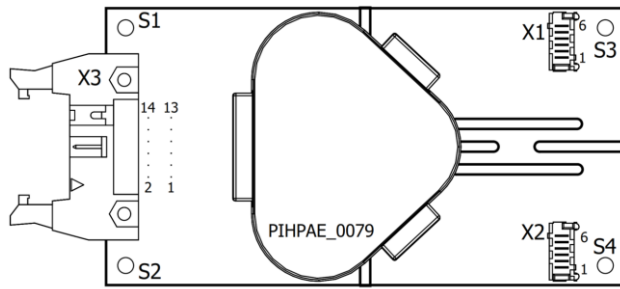
**Ordering codes:**

- IMCCS-050-1
  - Cable set (channel 1 and 2)  
SCALE-iFlex IMC to MAG; 500 mm
- IMCCS-025-1
  - Cable set (channel 1 and 2)  
SCALE-iFlex IMC to MAG; 250 mm
- MAGCS-015-1
  - Cable set (channel 1 and 2)  
SCALE-iFlex MAG to MAG; 150 mm, including common mode choke ferrites

It is recommended to use cables which are as short as mechanically possible.

For more details, refer to related datasheets of each cable.

## SCALE-iFlex LT IMC



**Figure 3.** 2SIL1200T2 IMC Pin Configuration

### Connector X3

Eject latch header connector from IMC to superior controller.

- Manufacturer: Harting
  - Part number: 09185146903

### X3 Mating Connector

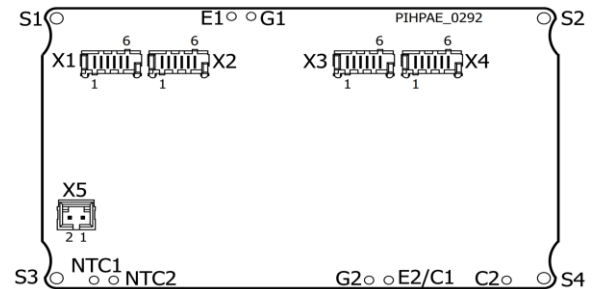
- Manufacturer: Harting (or similar)
  - Part numbers: 09185146813, 09185146814, 09185147813, 09185147814 (or similar)

### Connectors X1, X2

IMC to MAG connectors for gate driver channels 1 and 2.

- Manufacturer: Molex
  - Series: Picoflex header, 6 pin
  - Part number: 90779-0002

## SCALE-iFlex LT MAG



**Figure 4.** 2SML0220D2E MAG Pin Configuration

### Connectors X1, X2

IMC to MAG connectors for gate driver channel 1.

- Manufacturer: Molex
  - Series: Picoflex header, 6 pin
  - Part number: 90779-0002

### Connectors X3, X4

IMC to MAG connectors for gate driver channel 2.

- Manufacturer: Molex
  - Series: Picoflex header, 6 pin
  - Part number: 90779-0002

### Connector X5

NTC connector for module internal NTC read out.

- Manufacturer: Molex
  - Part number: 171971-0002

### Mating NTC Connector

- Manufacturer: Molex
  - Part number: 50579402

Several cable connections must be established for proper system operation. These are:

- Cable from the system level controller to the primary-side IMC interface X3.
- Cables from the secondary-side IMC interface (X1, X2) to the first MAG (one per channel).
- In case of paralleling of power modules, the cables from one MAG to another MAG (one per channel).

The cables for IMC to MAG and MAG to MAG connection are standard cable assemblies from Molex and can be bought on the open market.

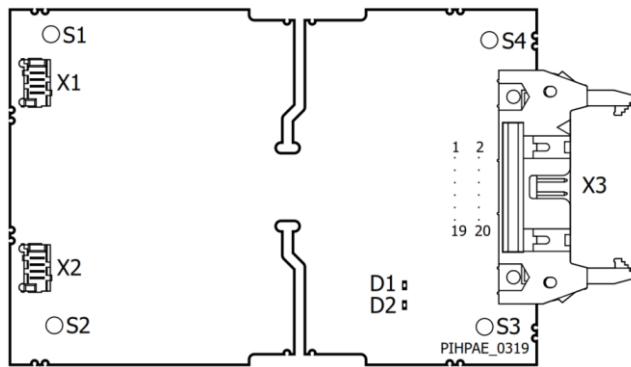
**Ordering codes:**

- 92315-0610
  - Picoflex 6 pin cable; 100 mm
- 92315-0615
  - Picoflex 6 pin cable; 150 mm
- 92315-0620
  - Picoflex 6 pin cable; 200 mm
- 92315-0630
  - Picoflex 6 pin cable; 300 mm

This is a non-exhaustive list; several other lengths are available.

It is recommended to use cables which are as short as mechanically possible.

## SCALE-iFlex LT NTC IMC

**Figure 5.** 2SILT1200T2 IMC Pin Configuration**Connector X3**

Eject latch header connector from IMC to superior controller.

- Manufacturer 1: Amphenol FCI
  - Part number: 71922-120LF
- Manufacturer 2: 3M
  - Part number: N3428-5302RB

**X3 Mating Connector**

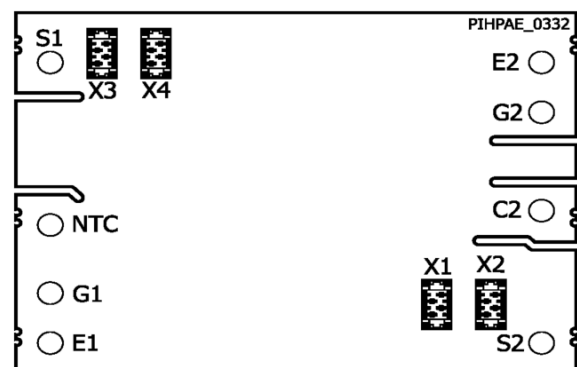
- Manufacturer: Amphenol FCI (or similar)
  - Part number: 69830-020LF (or similar)

**Connectors X1, X2**

IMC to MAG connector for gate driver channels 1 and 2.

- Manufacturer 1: TE Connectivity
  - Series: Micro-MaTch header, 4 pin
  - Part number: 338068-4
- Manufacturer 2: Würth
  - Series: WR-MM header, 4 pin
  - Part number: 690367190472

## SCALE-iFlex LT NTC MAG

**Figure 6.** 2SMLT0220D2C MAG Pin Configuration**Connectors X1, X2**

IMC to MAG connector for gate driver channel 1.

- Manufacturer 1: TE Connectivity
  - Series: Micro-MaTch header, 4 pin
  - Part number: 338068-4
- Manufacturer 2: Würth
  - Series: WR-MM header, 4 pin
  - Part number: 690367190472

**Connectors X3, X4**

IMC to MAG connector for gate driver channel 2.

- Manufacturer 1: TE Connectivity
  - Series: Micro-MaTch header, 4 pin
  - Part number: 338068-4
- Manufacturer 2: Würth
  - Series: WR-MM header, 4 pin
  - Part number: 690367190472

Several cable connections must be established for proper system operation. These are:

- Cable from the system level controller to the primary-side IMC interface X3.
- Cables from the secondary-side IMC interface (X1, X2) to the first MAG (one per channel).
- In case of paralleling of power modules, the cables from one MAG to another MAG (one per channel).

The cables for IMC to MAG and MAG to MAG connection are standard cable assemblies from TE Connectivity and can be bought on the open market.

### Ordering codes:

- 2205060-1
  - Micro-MaTch 4 pin cable; 75 mm
- 2205060-2
  - Micro-MaTch 4 pin cable; 150 mm
- 2205060-3
  - Micro-MaTch 4 pin cable; 200mm

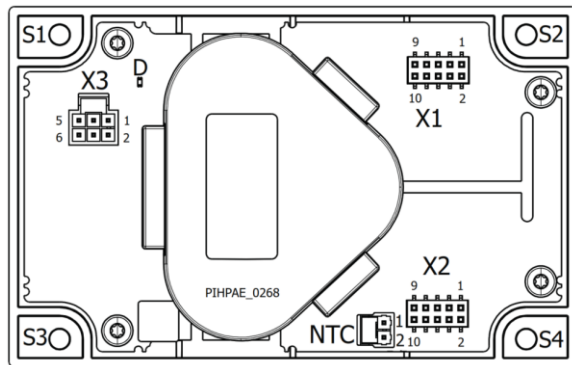
Furthermore, cable assemblies can be self-made in individual lengths by using TE MicroMaTch connectors and 4 position flat ribbon cables, AWG 28.

### Ordering code:

- 7-215083-4
  - Micro-MaTch 4 pin IDC connector

It is recommended to use cables which are as short as mechanically possible.

## SCALE-iFlex Single Low Voltage



**Figure 7.** 2SIS0400T2 IMC Pin Configuration

### Connector X3

Connector from IMC to superior controller.

- Manufacturer: Molex
  - Part number: 105310-1106

### X3 Mating Connector

- Manufacturer: Molex
  - Part number: 105308-1206

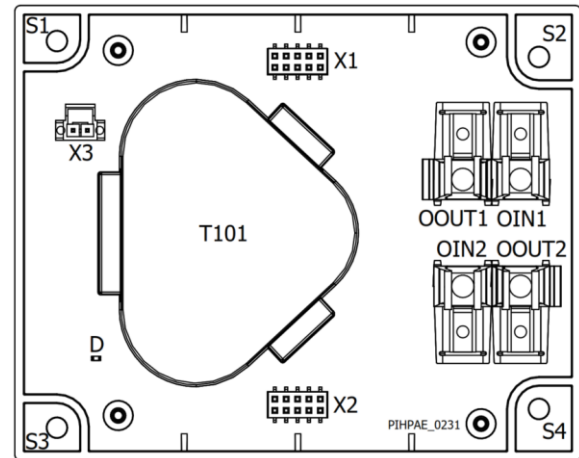
### NTC Connector

- Manufacturer: Molex
  - Part number: 171971-0002

### NTC Mating Connector

- Manufacturer: Molex
  - Part number: 50579402

## SCALE-iFlex Single High Voltage



**Figure 8.** 2SIS0400V2 IMC Pin Configuration

### Connector X3

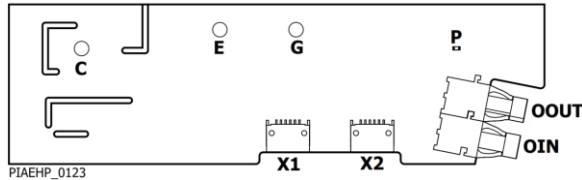
Connector for external power supply.

- Manufacturer: Molex
  - Part number: 105311-1202

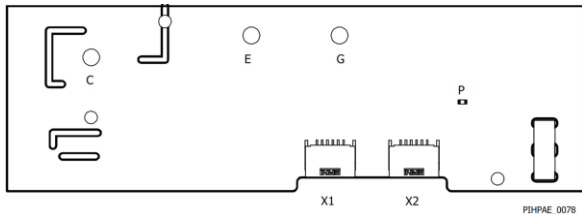
### X3 Mating Connector

- Manufacturer: Molex
  - Part number: 105307-1202

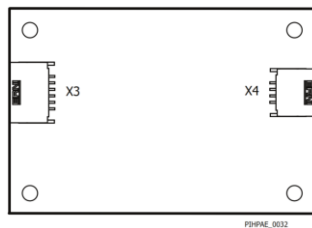
## 1SP0630x2x1R, 1SP0635D2S1R, ISO6125R-xx



**Figure 8.** 1SP0630V2M1R Pin Configuration



**Figure 9.** 1SP0635D2S1R Pin Configuration



**Figure 10.** ISO6125R-xx

### Connector X1 and X2

Connectors for DC-DC to driver connection or for main driver to peripheral driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504275-E

### Connector X3

Connector for DC-DC to driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504275-E

### Connector X4

Connector for external power supply to DC-DC connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504255-E

The cables for external power supply to DC-DC (ISO6125R-xx) and DC-DC to main driver (1SP0630x2M1R) and main driver to peripheral driver (1SP0635D2S1R), as well as peripheral driver to peripheral driver connection are available at Power Integrations.

### Ordering codes:

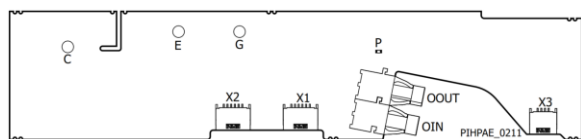
- RLC-IMS-61-030-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 300 mm
- RLC-IMS-61-050-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 500 mm
- RLC-IMS-61-080-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 800 mm
- RLC-IMS-61-130-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 1300 mm
- RLC-PSI-41-050-0
  - 4 Pin cable, external power supply to DC-DC, 500 mm
- RLC-PSI-41-075-0
  - 4 Pin cable, external power supply to DC-DC, 750 mm
- RLC-PSI-41-110-0
  - 4 Pin cable, external power supply to DC-DC, 1100 mm

It is recommended to use cables which are as short as mechanically possible.

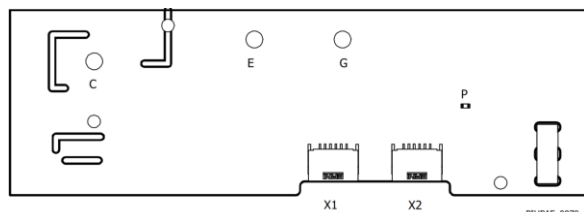
For more details, refer to related datasheets of each cable.



## 1SP0635x2x1R, 1SP0635D2S1R



**Figure 11.** 1SP0635x2M1R Pin Configuration



**Figure 12.** 1SP0635D2S1R Pin Configuration

### Connector X1 and X2

Connectors for main driver to peripheral driver connection and peripheral driver to peripheral driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504275-E

The cables for main driver (1SP0635x2M1R) to peripheral driver (1SP0635D2S1R) and peripheral driver to peripheral driver connection are available at Power Integrations.

### Connector X3

Connector for external power supply to driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504255-E

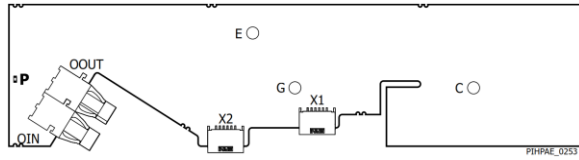
### Ordering codes:

- RLC-IMS-61-030-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 300 mm
- RLC-IMS-61-050-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 500 mm
- RLC-IMS-61-080-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 800 mm
- RLC-IMS-61-130-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 1300 mm
- RLC-PSI-41-050-0
  - 4 Pin cable, external power supply to DC-DC, 500 mm
- RLC-PSI-41-075-0
  - 4 Pin cable, external power supply to DC-DC, 750 mm
- RLC-PSI-41-110-0
  - 4 Pin cable, external power supply to DC-DC, 1100 mm

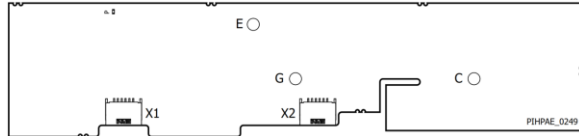
It is recommended to use cables which are as short as mechanically possible.

For more details, refer to related datasheets of each cable.

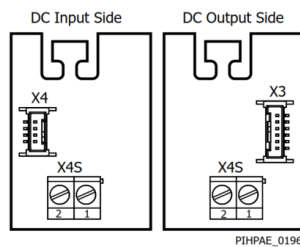
## 1SP0335x2x1R, ISO5125R-xx



**Figure 13.** 1SP0335x2M1R Pin Configuration



**Figure 14.** 1SP0335D2S1R Pin Configuration



**Figure 15.** ISO5125R-xx

### Connector X1 and X2

Connectors for main driver to peripheral driver connection and peripheral driver to peripheral driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504275-E

### Connector X3

Connector for DC-DC to driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504425-E

### Connector X4

Connector for external power supply to DC-DC connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504385-E

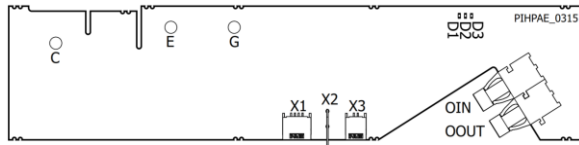
The cables for external power supply to DC-DC (ISO5125R-xx) and DC-DC to main driver (1SP0335x2M1R) and main driver to peripheral driver (1SP0335D2S1R), as well as peripheral driver to peripheral driver connection are available at Power Integrations.

## Ordering codes:

- RLC-IMS-61-030-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 300 mm
- RLC-IMS-61-050-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 500 mm
- RLC-IMS-61-080-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 800 mm
- RLC-IMS-61-130-0
  - 6 Pin cable, DC-DC to Main or Main to peripheral, 1300 mm
- RLC-PSI-41-050-0
  - 4 Pin cable, external power supply to DC-DC, 500 mm
- RLC-PSI-41-075-0
  - 4 Pin cable, external power supply to DC-DC, 750 mm
- RLC-PSI-41-110-0
  - 4 Pin cable, external power supply to DC-DC, 1100 mm

It is recommended to use cables which are as short as mechanically possible.

For more details, refer to related datasheets of each cable.

**1SP0635V2A0D, ISO6125R-xx****Figure 16.** 1SP0635V2A0D Pin Configuration**Connector X1**

Connector for DC-DC to driver connection.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504255-E

**Connector X3**

Connector for NTC measurement.

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 504235-E

**X3 Mating Connector**

- Manufacturer: TE Connectivity (ERNI)
  - Part number: 524401-E or 504778-E

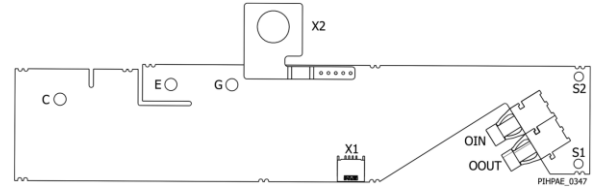
The cables for external power supply to DC-DC (ISO6125R-xx, see figure 10) and DC-DC to driver (1SP0635V2A0D) are available at Power Integrations.

**Ordering codes:**

- RLC-PSI-641-050-0
  - 6 Pin to 4 Pin cable, DC-DC to Driver, 500 mm
- RLC-PSI-41-050-0
  - 4 Pin cable, external power supply to DC-DC, 500 mm
- RLC-PSI-41-075-0
  - 4 Pin cable, external power supply to DC-DC, 750 mm
- RLC-PSI-41-110-0
  - 4 Pin cable, external power supply to DC-DC, 1100 mm

It is recommended to use cables which are as short as mechanically possible.

For more details, refer to related datasheets of each cable.

**1SP0440V2M0, ISO5125R-xx****Figure 17.** 1SP0440V2M0 Pin Configuration**Connector X1**

Connector for DC-DC to driver connection.

- Manufacturer: TE Connectivity (ERNI)
- Part number: 504255-E

The cables for external power supply to DC-DC (ISO5125R-xx, see figure 15) and DC-DC to driver (1SP0440V2M0) connection are available at Power Integrations.

**Ordering codes:**

- RLC-PSI-641-050-0
  - 6 Pin to 4 Pin cable, DC-DC to Driver, 500 mm
- RLC-PSI-41-050-0
  - 4 Pin cable, external power supply to DC-DC, 500 mm
- RLC-PSI-41-075-0
  - 4 Pin cable, external power supply to DC-DC, 750 mm
- RLC-PSI-41-110-0
  - 4 Pin cable, external power supply to DC-DC, 1100 mm

It is recommended to use cables which are as short as mechanically possible.

For more details, refer to related datasheets of each cable.

Revision	Notes	Date
1.0	Released by Power Integrations	12/24

**For the latest updates, visit our website: [www.power.com](http://www.power.com)**

Power Integrations reserves the right to make changes to its products at any time to improve reliability or manufacturability. Power Integrations does not assume any liability arising from the use of any device or circuit described herein. POWER INTEGRATIONS MAKES NO WARRANTY HEREIN AND SPECIFICALLY DISCLAIMS ALL WARRANTIES INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS.

**Patent Information**

The products and applications illustrated herein (including transformer construction and circuits external to the products) may be covered by one or more U.S. and foreign patents, or potentially by pending U.S. and foreign patent applications assigned to Power Integrations. A complete list of Power Integrations patents may be found at [www.power.com](http://www.power.com). Power Integrations grants its customers a license under certain patent rights as set forth at [www.power.com/ip.htm](http://www.power.com/ip.htm).

**Life Support Policy**

POWER INTEGRATIONS PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF POWER INTEGRATIONS. As used herein:

1. A Life support device or system is one which, (i) is intended for surgical implant into the body, or (ii) supports or sustains life, and (iii) whose failure to perform, when properly used in accordance with instructions for use, can be reasonably expected to result in significant injury or death to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Power Integrations, the Power Integrations logo, CAPZero, ChiPhy, CHY, DPA-Switch, EcoSmart, E-Shield, eSIP, eSOP, HiperPLC, HiperPFS, HiperTFS, InnoSwitch, Innovation in Power Conversion, InSOP, LinkSwitch, LinkZero, LYTSwitch, SENZero, TinySwitch, TOPSwitch, PI, PI Expert, PowiGaN, SCALE, SCALE-1, SCALE-2, SCALE-3 and SCALE-iDriver, are trademarks of Power Integrations, Inc. Other trademarks are property of their respective companies. ©2024, Power Integrations, Inc.

**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](mailto: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](mailto: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](mailto:chinasales@power.com)

**Germany (AC-DC/LED Sales)**

Einsteinring 24  
85609 Dornach/Aschheim  
Germany  
Tel: +49-89-5527-39100  
e-mail: [eurosales@power.com](mailto:eurosales@power.com)

**Germany (Gate Driver Sales)**

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

**India**

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

**Singapore**

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