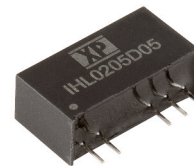


## 2 Watts

- High Isolation, 5200 V
- 250 VAC Working Voltage
- Single and Dual Outputs
- Bipolar Outputs for MOSFET and IGBT Drives
- SIP7 Package
- -40 °C to +95 °C Operation
- Full Load at 65 °C Ambient
- MTBF 2.5 Mhrs
- 3 Year Warranty



### Dimensions:

#### IHL02:

0.77 x 0.28 x 0.39" (19.5 x 7.2 x 10.0 mm)

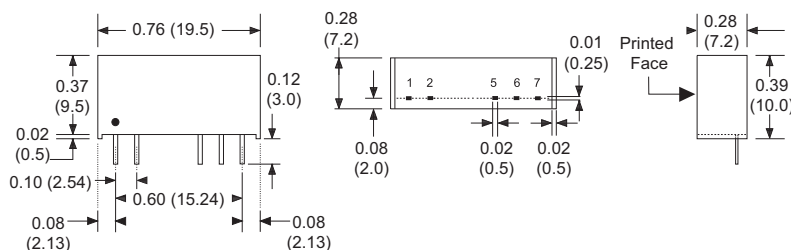
### Input

| Characteristic                 | Minimum | Typical | maximum | Units          | Notes & Conditions                                   |
|--------------------------------|---------|---------|---------|----------------|------------------------------------------------------|
| Input Voltage Range            | 4.5     |         | 5.5     | VDC            | 5 V nominal                                          |
|                                | 10.8    |         | 13.2    |                | 12 V nominal                                         |
|                                | 13.5    |         | 16.5    |                | 15 V nominal                                         |
|                                | 21.6    |         | 26.4    |                | 24 V nominal                                         |
| Input Reflected Ripple Current |         | 20      |         | mA pk-pk       | Through 12 $\mu$ H inductor and 47 $\mu$ F capacitor |
| Input Surge                    |         |         | 9       | VDC for 100 ms | 5 V nominal                                          |
|                                |         |         | 18      |                | 12 V nominal                                         |
|                                |         |         | 20      |                | 15 V nominal                                         |
|                                |         |         | 30      |                | 24 V nominal                                         |

### Output

| Characteristic           | Minimum | Typical | maximum   | Units    | Notes & Conditions                                                                                      |
|--------------------------|---------|---------|-----------|----------|---------------------------------------------------------------------------------------------------------|
| Output Voltage           | 3.3     |         | 30        | VDC      | See Models and Ratings table                                                                            |
| Initial Set Accuracy     |         |         | $\pm 5$   | %        | At full load                                                                                            |
| Minimum Load             | 10      |         |           | %        | Minimum load required to meet specified regulation                                                      |
| Line Regulation          |         |         | $\pm 1.2$ | %/1%     | Output changes by max of 1.2% for each 1% change in input voltage                                       |
| Load Regulation          |         |         | 12/10     | %        | For IHL0205S3V3 and IHL0205S05/Other Models. From 10% to full load, see application note                |
| Cross Regulation         |         | $\pm 5$ |           | %        | On dual output models, when one output is at 25% load and other is varied from 10% load to full load    |
| Ripple & Noise           |         |         | 150       | mV pk-pk | 20 MHz bandwidth. Measured using 10 $\mu$ F electrolytic in parallel with 0.1 $\mu$ F ceramic capacitor |
| Short Circuit Protection |         |         |           |          | Continuous                                                                                              |
| Maximum Capacitive Load  |         |         |           |          | See Models and Ratings table                                                                            |
| Temperature Coefficient  |         |         | 0.03      | %/°C     |                                                                                                         |

### Mechanical Details



### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.006 lbs (2.7 g) approx.
3. Pin diameter: 0.02 $\pm$ 0.002 (0.5 $\pm$ 0.05)

4. Pin pitch and length tolerance:  $\pm 0.014$  ( $\pm 0.35$ )
5. Case tolerance:  $\pm 0.02$  ( $\pm 0.5$ )

### Pin Connections

| Pin | Single | Dual   |
|-----|--------|--------|
| 1   | +Vin   | +Vin   |
| 2   | -Vin   | -Vin   |
| 5   | -Vout  | -Vout  |
| 6   | No Pin | Common |
| 7   | +Vout  | +Vout  |

## Models &amp; Ratings

| Input Voltage | Output Voltage | Output Current | Input current |           | Maximum Capacitive Load | Efficiency | Model Number |
|---------------|----------------|----------------|---------------|-----------|-------------------------|------------|--------------|
|               |                |                | No Load       | Full Load |                         |            |              |
| 4.5-5.5V      | 3V3            | 500 mA         | 40 mA         | 435 mA    | 1000 $\mu$ F            | 76%        | IHL0205S3V3  |
|               | 5 V            | 400 mA         | 40 mA         | 505 mA    | 470 $\mu$ F             | 79%        | IHL0205S05   |
|               | 9 V            | 222 mA         | 40 mA         | 480 mA    | 470 $\mu$ F             | 83%        | IHL0205S09   |
|               | 12 V           | 167 mA         | 40 mA         | 475 mA    | 220 $\mu$ F             | 84%        | IHL0205S12   |
|               | 15 V           | 133 mA         | 40 mA         | 470 mA    | 220 $\mu$ F             | 85%        | IHL0205S15   |
|               | $\pm 5$ V      | $\pm 200$ mA   | 40 mA         | 505 mA    | $\pm 220$ $\mu$ F       | 79%        | IHL0205D05   |
|               | $\pm 9$ V      | $\pm 111$ mA   | 40 mA         | 490 mA    | $\pm 220$ $\mu$ F       | 82%        | IHL0205D09   |
|               | $\pm 12$ V     | $\pm 83.3$ mA  | 40 mA         | 480 mA    | $\pm 100$ $\mu$ F       | 83%        | IHL0205D12   |
|               | $\pm 15$ V     | $\pm 66.7$ mA  | 40 mA         | 475 mA    | $\pm 100$ $\mu$ F       | 84%        | IHL0205D15   |
| 10.8-13.2V    | +15/-9 V       | +66.7/-111 mA  | 40 mA         | 480 mA    | +100/-220 $\mu$ F       | 83%        | IHL0205D1509 |
|               | 3V3            | 500 mA         | 30 mA         | 185 mA    | 1000 $\mu$ F            | 74%        | IHL0212S3V3  |
|               | 5 V            | 400 mA         | 30 mA         | 210 mA    | 470 $\mu$ F             | 79%        | IHL0212S05   |
|               | 9 V            | 222 mA         | 30 mA         | 205 mA    | 470 $\mu$ F             | 82%        | IHL0212S09   |
|               | 12 V           | 167 mA         | 30 mA         | 205 mA    | 220 $\mu$ F             | 82%        | IHL0212S12   |
|               | 15 V           | 133 mA         | 30 mA         | 200 mA    | 220 $\mu$ F             | 83%        | IHL0212S15   |
|               | $\pm 5$ V      | $\pm 200$ mA   | 30 mA         | 210 mA    | $\pm 220$ $\mu$ F       | 79%        | IHL0212D05   |
|               | $\pm 9$ V      | $\pm 111$ mA   | 30 mA         | 205 mA    | $\pm 220$ $\mu$ F       | 81%        | IHL0212D09   |
|               | $\pm 12$ V     | $\pm 83.3$ mA  | 30 mA         | 200 mA    | $\pm 100$ $\mu$ F       | 83%        | IHL0212D12   |
| 13.5-16.5V    | $\pm 15$ V     | $\pm 66.7$ mA  | 30 mA         | 200 mA    | $\pm 100$ $\mu$ F       | 83%        | IHL0212D15   |
|               | +15/-9V        | +66.7/-111 mA  | 30 mA         | 210 mA    | +100/-220 $\mu$ F       | 80%        | IHL0212D1509 |
|               | 3V3            | 500 mA         | 25 mA         | 150 mA    | 1000 $\mu$ F            | 74%        | IHL0215S3V3  |
|               | 5 V            | 400 mA         | 25 mA         | 170 mA    | 470 $\mu$ F             | 78%        | IHL0215S05   |
|               | 9 V            | 222 mA         | 25 mA         | 165 mA    | 470 $\mu$ F             | 81%        | IHL0215S09   |
|               | 12 V           | 167 mA         | 25 mA         | 165 mA    | 220 $\mu$ F             | 82%        | IHL0215S12   |
|               | 15 V           | 133 mA         | 25 mA         | 160 mA    | 220 $\mu$ F             | 83%        | IHL0215S15   |
|               | $\pm 5$ V      | $\pm 200$ mA   | 25 mA         | 170 mA    | $\pm 220$ $\mu$ F       | 79%        | IHL0215D05   |
|               | $\pm 9$ V      | $\pm 111$ mA   | 25 mA         | 165 mA    | $\pm 220$ $\mu$ F       | 81%        | IHL0215D09   |
| 21.6-26.4V    | $\pm 12$ V     | $\pm 83.3$ mA  | 25 mA         | 160 mA    | $\pm 100$ $\mu$ F       | 83%        | IHL0215D12   |
|               | $\pm 15$ V     | $\pm 66.7$ mA  | 25 mA         | 165 mA    | $\pm 100$ $\mu$ F       | 82%        | IHL0215D15   |
|               | +15/-9V        | +66.7/-111 mA  | 25 mA         | 165 mA    | +100/-220 $\mu$ F       | 81%        | IHL0215D1509 |
|               | 3V3            | 500 mA         | 20 mA         | 95 mA     | 1000 $\mu$ F            | 73%        | IHL0224S3V3  |
|               | 5 V            | 400 mA         | 20 mA         | 105 mA    | 470 $\mu$ F             | 78%        | IHL0224S05   |
|               | 9 V            | 222 mA         | 20 mA         | 105 mA    | 470 $\mu$ F             | 81%        | IHL0224S09   |
|               | 12 V           | 167 mA         | 20 mA         | 105 mA    | 220 $\mu$ F             | 81%        | IHL0224S12   |
|               | 15 V           | 133 mA         | 20 mA         | 105 mA    | 220 $\mu$ F             | 81%        | IHL0224S15   |
|               | $\pm 5$ V      | $\pm 200$ mA   | 20 mA         | 105 mA    | $\pm 220$ $\mu$ F       | 79%        | IHL0224D05   |
|               | $\pm 9$ V      | $\pm 111$ mA   | 20 mA         | 105 mA    | $\pm 220$ $\mu$ F       | 80%        | IHL0224D09   |
|               | $\pm 12$ V     | $\pm 83.3$ mA  | 20 mA         | 105 mA    | $\pm 100$ $\mu$ F       | 81%        | IHL0224D12   |
|               | $\pm 15$ V     | $\pm 66.7$ mA  | 20 mA         | 100 mA    | $\pm 100$ $\mu$ F       | 82%        | IHL0224D15   |
|               | +15/-9V        | +66.7/-111 mA  | 20 mA         | 105 mA    | +100/-220 $\mu$ F       | 80%        | IHL0224D1509 |

## Notes

Input currents measured at nominal input voltage.

## General

| Characteristic             | Minimum         | Typical     | maximum | Units             | Notes & Conditions           |
|----------------------------|-----------------|-------------|---------|-------------------|------------------------------|
| Efficiency                 |                 | 80          |         | %                 | See Models and Ratings table |
| Isolation: Input to Output | 5200            |             |         | VDC               |                              |
| Isolation Working Voltage  |                 |             | 250     | VAC               |                              |
| Isolation Resistance       | 10 <sup>9</sup> |             |         | $\Omega$          |                              |
| Isolation Capacitance      |                 | 7           |         | pF                |                              |
| Switching Frequency        | 50              |             | 100     | kHz               |                              |
| Power Density              |                 |             | 23.7    | W/in <sup>3</sup> |                              |
| Mean Time Between Failure  | 3.3             |             |         | MHrs              | MIL-HDBK-217F, +25 °C GB     |
| Weight                     |                 | 0.006 (2.7) |         | lb (g)            |                              |

## Environmental

| Characteristic        | Minimum | Typical | maximum | Units | Notes & Conditions                                     |
|-----------------------|---------|---------|---------|-------|--------------------------------------------------------|
| Operating Temperature | -40     |         | +95     | °C    | Derate Linearly from 100% at 65 °C to no load at 95 °C |
| Storage Temperature   | -40     |         | +125    | °C    |                                                        |
| Case Temperature      |         |         | +100    | °C    |                                                        |
| Humidity              | 2.5     |         | 95      | %RH   | Non-condensing                                         |
| Cooling               |         |         |         |       | Natural convection                                     |

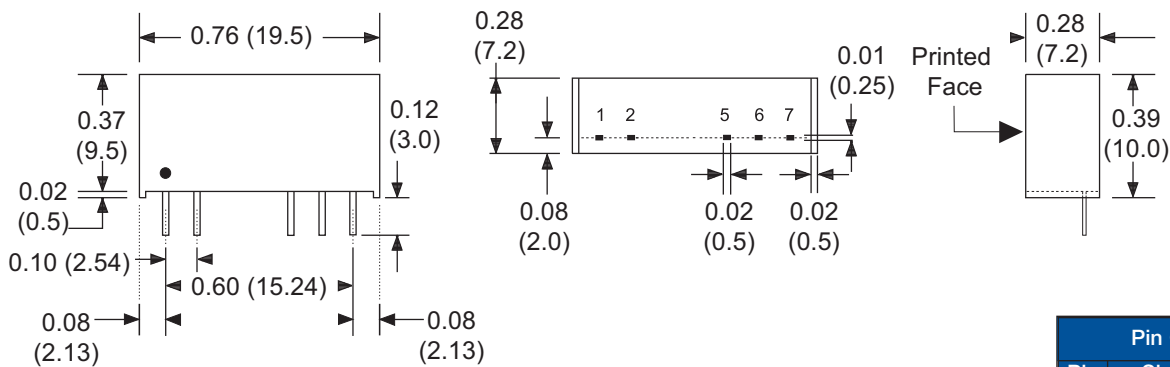
## EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions   |
|------------|----------|------------|----------------------|
| Conducted  | EN55032  | Class B    | See Application Note |
| Radiated   | EN55032  | Class B    |                      |

## EMC: Immunity

| Phenomenon         | Standard    | Test Level | Criteria | Notes & Conditions                                  |
|--------------------|-------------|------------|----------|-----------------------------------------------------|
| ESD Immunity       | EN61000-4-2 | ±6/±8 kV   | A        | Contact/Air Discharge                               |
| Radiated Immunity  | EN61000-4-3 | 10 Vrms    | A        |                                                     |
| EFT/Burst          | EN61000-4-4 | 2 kV       | A        | External components required, see application notes |
| Conducted Immunity | EN61000-4-6 | 10 V rms   | A        |                                                     |
| magnetic Fields    | EN61000-4-8 | 1 A/m      | A        |                                                     |

## Mechanical Details



## Notes

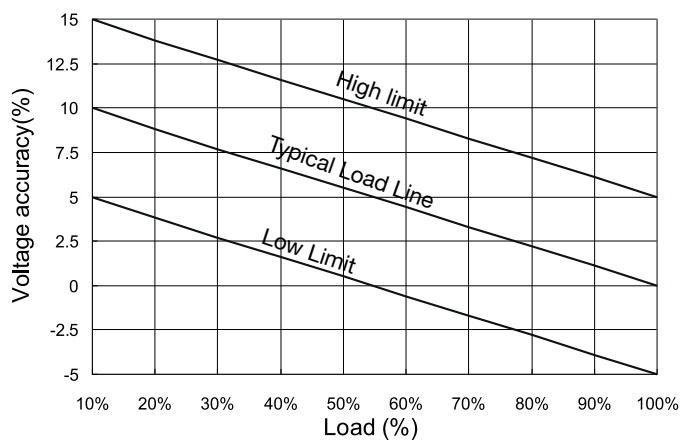
1. All dimensions are in inches (mm)
2. Weight: 0.006 lbs (2.7 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)

4. Pin pitch and length tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

| Pin Connections |        |        |
|-----------------|--------|--------|
| Pin             | Single | Dual   |
| 1               | +Vin   | +Vin   |
| 2               | -Vin   | -Vin   |
| 5               | -Vout  | -Vout  |
| 6               | No Pin | Common |
| 7               | +Vout  | +Vout  |

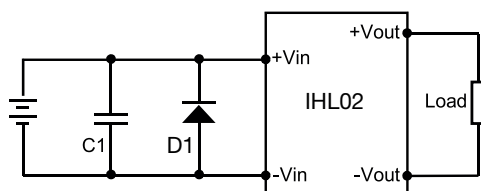
## Application Note

## Regulation



## EFT Filter

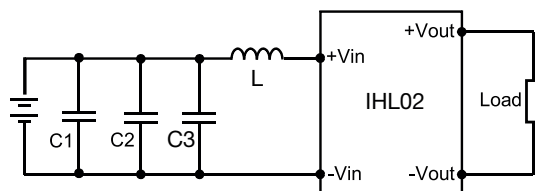
Input components C1 and D1 are used to help meet EFT and surge test requirements for the module.



|             | C1                | D1        |
|-------------|-------------------|-----------|
| IHL0205XXXX | 330 $\mu$ F/50 V  | SMDJ9.0 A |
| IHL0212XXXX | 330 $\mu$ F/50 V  | SMDJ13 A  |
| IHL0215XXXX | 330 $\mu$ F/50 V  | SMDJ18 A  |
| IHL0224XXXX | 1000 $\mu$ F/35 V | SMDJ24 A  |

## EMI Filter

Input filter components (C1,C2, C3 and L) are used to help meet conducted emissions requirements for the module. These components should be mounted as close as possible to the module, and all leads should be minimised to decrease radiated noise.



|             | C1                      | L           | C2                     | C3                     |
|-------------|-------------------------|-------------|------------------------|------------------------|
| IHL0205XXXX | 1206, 4.7 $\mu$ F/ 16 V | 6.8 $\mu$ H |                        |                        |
| IHL0212XXXX | 1206, 22 $\mu$ F/ 25 V  | 6.8 $\mu$ H |                        |                        |
| IHL0215XXXX | 1206, 22 $\mu$ F/ 25 V  | 6.8 $\mu$ H |                        |                        |
| IHL0224XXXX | 1210, 10 $\mu$ F/ 35 V  | 10 $\mu$ H  | 1210, 10 $\mu$ F/ 35 V | 1210, 10 $\mu$ F/ 35 V |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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