

### 2 Watts

- Single Output
- SMD Package
- Industry Standard Pinout
- Operating Temperature -40 °C to +105 °C
- 1500 VDC Isolation, 3000 VDC Option
- 3 Year Warranty



#### Dimensions:

**ISH:**  
0.500 x 0.44 x 0.285" (12.7 x 11.2 x 7.25 mm)

### Models & Ratings

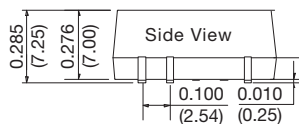
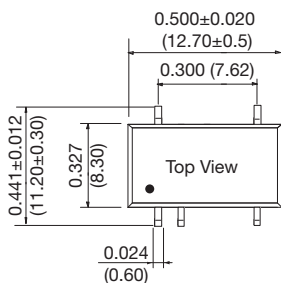
| Input Voltage | Output Voltage | Output Current | Input Current <sup>(2)</sup> |           | Maximum Capacitive Load | Efficiency <sup>(3)</sup> | Model Number <sup>(1,4)</sup> |
|---------------|----------------|----------------|------------------------------|-----------|-------------------------|---------------------------|-------------------------------|
|               |                |                | No Load                      | Full Load |                         |                           |                               |
| 4.5-5.5       | 3.3V           | 400 mA         | 30 mA                        | 506 mA    | 220 µF                  | 72%                       | ISH0503A <sup>(1)</sup>       |
|               | 5V             | 400 mA         | 30 mA                        | 506 mA    | 220 µF                  | 79%                       | ISH0505A <sup>(1)</sup>       |
|               | 9V             | 222 mA         | 30 mA                        | 506 mA    | 220 µF                  | 82%                       | ISH0509A <sup>(1)</sup>       |
|               | 12V            | 167 mA         | 30 mA                        | 506 mA    | 220 µF                  | 82%                       | ISH0512A <sup>(1)</sup>       |
|               | 15V            | 133 mA         | 30 mA                        | 506 mA    | 220 µF                  | 83%                       | ISH0515A <sup>(1)</sup>       |
| 10.8-13.2     | 5V             | 400 mA         | 25 mA                        | 212 mA    | 220 µF                  | 79%                       | ISH1205A <sup>(1)</sup>       |
|               | 9V             | 222 mA         | 25 mA                        | 212 mA    | 220 µF                  | 82%                       | ISH1209A                      |
|               | 12V            | 167 mA         | 25 mA                        | 212 mA    | 220 µF                  | 82%                       | ISH1212A <sup>(1)</sup>       |
|               | 15V            | 133 mA         | 25 mA                        | 212 mA    | 220 µF                  | 83%                       | ISH1215A <sup>(1)</sup>       |
|               | 24V            | 83 mA          | 25 mA                        | 212 mA    | 220 µF                  | 84%                       | ISH1224A <sup>(1)</sup>       |
| 13.5-16.5     | 15V            | 133 mA         | 18 mA                        | 169 mA    | 220 µF                  | 83%                       | ISH1515A <sup>(1)</sup>       |
| 21.6-26.4     | 5V             | 400 mA         | 15 mA                        | 105 mA    | 220 µF                  | 79%                       | ISH2405A <sup>(1)</sup>       |
|               | 12V            | 167 mA         | 15 mA                        | 105 mA    | 220 µF                  | 82%                       | ISH2412A <sup>(1)</sup>       |
|               | 15V            | 133 mA         | 15 mA                        | 105 mA    | 220 µF                  | 83%                       | ISH2415A <sup>(1)</sup>       |
|               | 24V            | 83 mA          | 15 mA                        | 105 mA    | 220 µF                  | 86%                       | ISH2424A <sup>(1)</sup>       |

### Notes

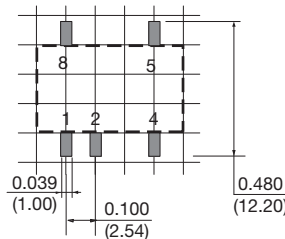
- For optional 3000 VDC isolation add suffix '-H' to end of part number e.g. ISH1224A-H.
- Input currents measured at nominal input voltage.

- Typical value at full load.
- For optional tape & reel option add suffix '-TR' to the end of the p/n. Reel quantity = 500

### Mechanical Details



Recommended Footprint  
Top View grid: 0.1 x 0.1 in (2.54 x 2.54 mm)



| PIN CONNECTIONS |               |
|-----------------|---------------|
| Pin             | Function      |
| 1               | GND           |
| 2               | +Vin          |
| 4               | 0 V           |
| 5               | +Vout         |
| 8               | No Connection |

### Notes

- All dimensions are in inches (mm)
- Weight: 0.003 lbs (1.5 g) typical.
- Pin diameter: 0.02 ±0.002 (0.5 ±0.005)
- Pin pitch and length tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)

### Input

| Characteristic         | Minimum   | Typical | Maximum | Units       | Notes & Conditions                                   |
|------------------------|-----------|---------|---------|-------------|------------------------------------------------------|
| Input Voltage Range    | 4.50      |         | 5.50    | VDC         | 5 V nominal                                          |
|                        | 10.80     |         | 13.20   | VDC         | 12 V nominal                                         |
|                        | 13.50     |         | 16.50   | VDC         | 15 V nominal                                         |
|                        | 21.60     |         | 26.40   | VDC         | 24 V nominal                                         |
| Input Current          |           |         |         |             | See Models and Ratings table                         |
| Input Reflected Ripple |           | 15      |         | mA pk-pk    | Through 12 $\mu$ H inductor and 47 $\mu$ F capacitor |
| Input Surge            |           |         | 9       | VDC for 1 s | 5 V models                                           |
|                        |           |         | 18      | VDC for 1 s | 12 V models                                          |
|                        |           |         | 21      | VDC for 1 s | 15 V models                                          |
|                        |           |         | 30      | VDC for 1 s | 24 V models                                          |
| Input Filter           | Capacitor |         |         |             |                                                      |

### Output

| Characteristic           | Minimum | Typical | Maximum    | Units           | Notes & Conditions                                                                                  |
|--------------------------|---------|---------|------------|-----------------|-----------------------------------------------------------------------------------------------------|
| Output Voltage           | 3.3     |         | 24         | VDC             | See Models and Ratings table                                                                        |
| Initial Set Accuracy     |         |         | -7.5, +2.5 | %               | At 70% load                                                                                         |
| Minimum Load             | 10      |         |            | %               |                                                                                                     |
| Line Regulation          |         |         | $\pm 1.2$  | %               | Per 1% change of input voltage ( $\pm 1.5\%$ for 3V3 output)                                        |
| Load Regulation          |         |         |            | %               | See graph                                                                                           |
| Start Up Delay           |         | 2       |            | ms              |                                                                                                     |
| Ripple and Noise         |         | 100     |            | mV pk-pk        | 20 MHz bandwidth, measured using 0.1 $\mu$ F capacitor                                              |
| Transient Response       |         |         | 3          | % deviation     | Recovery to within 1% in 500 $\mu$ s for a 25% load change (5% max. deviation for 3.3 & 5 V models) |
| Short Circuit Protection |         |         |            |                 | Continuous, with auto recovery, except 1 s max for 24 input V models                                |
| Maximum Capacitive Load  |         |         | 220        | $\mu$ F         |                                                                                                     |
| Temperature Coefficient  |         |         | 0.03       | %/ $^{\circ}$ C |                                                                                                     |

### General

| Characteristic             | Minimum                | Typical     | Maximum | Units            | Notes & Conditions                                                                           |
|----------------------------|------------------------|-------------|---------|------------------|----------------------------------------------------------------------------------------------|
| Efficiency                 |                        |             |         |                  | See Models and Ratings table                                                                 |
| Isolation: Input to Output | 1500                   |             |         | VDC              | For optional high isolation versions, 3000 VDC input to output add suffix -H to model number |
| Switching Frequency        | 100                    | 115         | 135     | kHz              |                                                                                              |
| Isolation Resistance       | $10^9$                 |             |         | $\Omega$         | Input to output, tested at 500 VDC                                                           |
| Isolation Capacitance      |                        | 20          |         | pF               | Input to output                                                                              |
| Power Density              |                        |             | 31.8    | Win <sup>3</sup> |                                                                                              |
| Mean Time Between Failure  | 3500                   |             |         | kHrs             | MIL-HDBK-217F, +25 $^{\circ}$ C GB                                                           |
| Weight                     |                        | 0.003 (1.5) |         | lb (g)           |                                                                                              |
| Recommended Solder Profile | IPC/JEDEC J-STD-020D.1 |             |         |                  |                                                                                              |

### Environmental

| Characteristic        | Minimum | Typical | Maximum | Units        | Notes & Conditions                                                         |
|-----------------------|---------|---------|---------|--------------|----------------------------------------------------------------------------|
| Operating Temperature | -40     |         | +105    | $^{\circ}$ C | Derate from 100% load at +100 $^{\circ}$ C to 80% load at 105 $^{\circ}$ C |
| Storage Temperature   | -55     |         | +125    | $^{\circ}$ C |                                                                            |
| Case Temperature      |         |         | +115    | $^{\circ}$ C |                                                                            |
| Operating Humidity    |         |         | 95      | % RH         | Non-condensing                                                             |
| Cooling               |         |         |         |              | Natural convection                                                         |

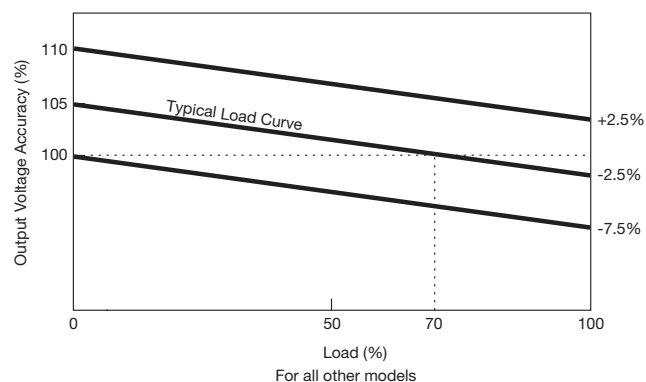
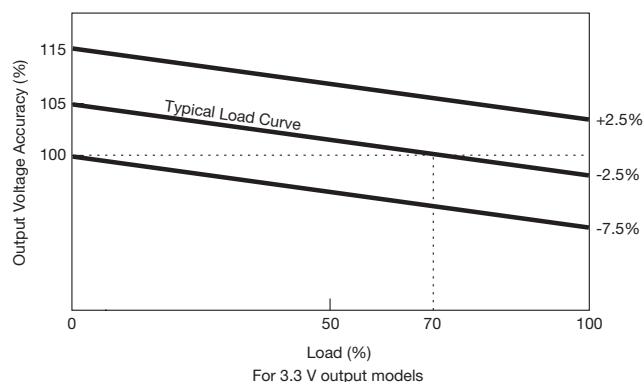
### EMC: Emissions

| Phenomenon | Standard | Test Level | Notes & Conditions                      |
|------------|----------|------------|-----------------------------------------|
| Conducted  | EN55022  | Class B    | See Application Note for Class B filter |
| Radiated   | EN55022  | Class B    | See Application Note for Class B filter |

### EMC: Immunity

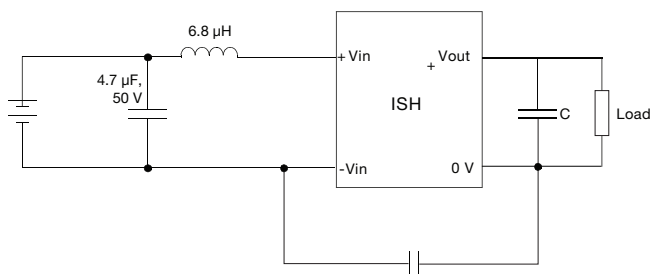
| Phenomenon         | Standard    | Test Level | Criteria | Notes & Conditions                                   |
|--------------------|-------------|------------|----------|------------------------------------------------------|
| ESD Immunity       | EN61000-4-2 | 3          | B        |                                                      |
| Radiated Immunity  | EN61000-4-3 | 3 V/m      | A        |                                                      |
| EFT/Burst          | EN61000-4-4 | 2          | B        | External input capacitor required, 330 $\mu$ F/100 V |
| Surge              | EN61000-4-5 | 2          | B        | External input capacitor required, 330 $\mu$ F/100 V |
| Conducted Immunity | EN61000-4-6 | 3 V rms    | A        |                                                      |
| Magnetic Fields    | EN61000-4-8 | 1 A/m      | A        |                                                      |

### Load Regulation



### Application Note

#### EMI Filter for Class B Emissions

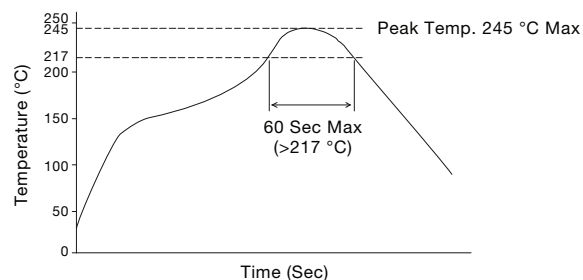


For ISH2424A model only, add Ycap, 470 pF, 3 kv

| Output Voltage | C             |
|----------------|---------------|
| 3.3            | 10.00 $\mu$ F |
| 5              | 10.00 $\mu$ F |
| 9              | 4.70 $\mu$ F  |
| 12             | 2.20 $\mu$ F  |
| 15             | 1.00 $\mu$ F  |
| 24             | 0.47 $\mu$ F  |

#### Solder Profile

It is recommended to refer to IPC/JEDEC J-STD-020D standard for reflow soldering curve. The recommended reflow soldering temperature graph for our products is as follows:



#### Note:

The curve is only suitable for hot air convection reflow soldering.



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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