

## Overview

The LA12 Magnetic Direct Current Sensors (MDCS™) use our proprietary magnetic material and hall element for magnetic detection of direct current (DC), alternating current (AC), and pulse current. The output voltage varies in proportion to the strength of the current measured.

## Applications

Typical applications include inverter-based home appliances (air conditioners); general-purpose inverters; AC variable-speed drives and servo drives; industrial machinery; UPSs; and DC motor controls.

## Benefits

- Detection of DC, AC, and pulse currents
- Limited fluctuations in output from changes in the power supply voltage and the ambient temperature
- Excellent linearity of the measured current and the converted power output
- Insulation of measured current and secondary output side
- Compact and lightweight
- RoHS compliant

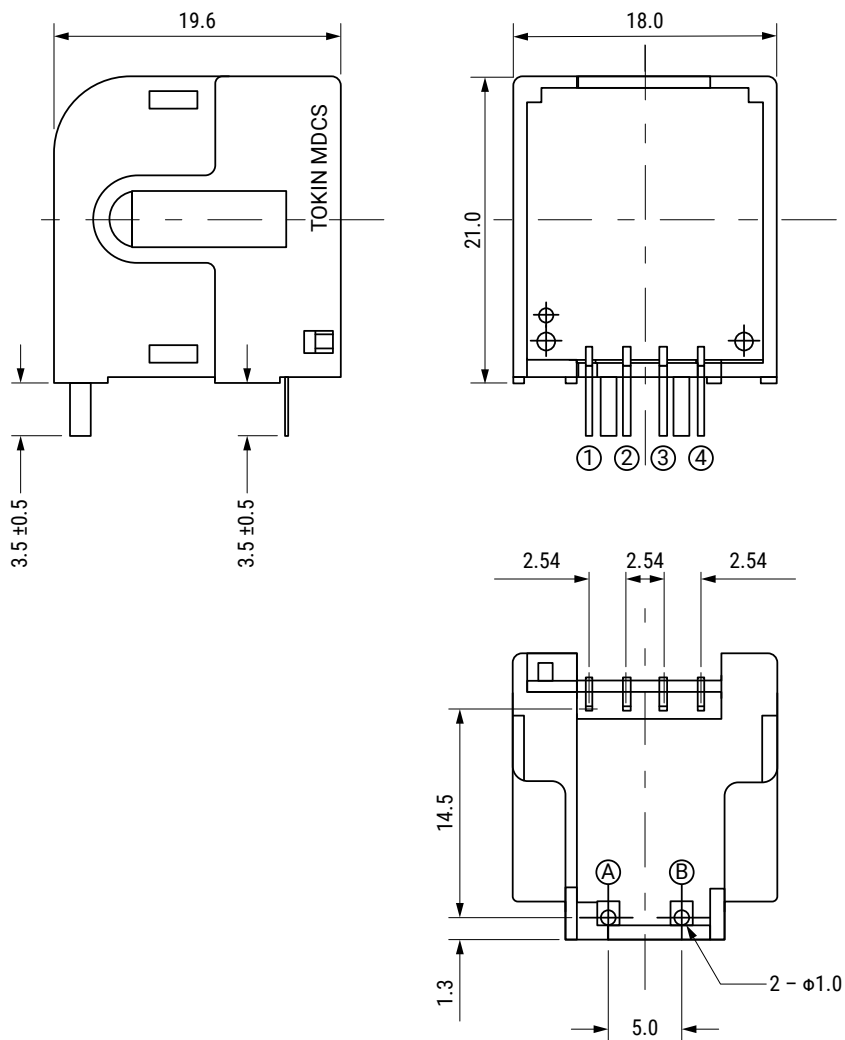


## Ordering Information

| LA12-  | 10                   | V21                |
|--------|----------------------|--------------------|
| Series | Rated Current AC (A) | Output Voltage (V) |
| LA12   | 10<br>48<br>50<br>60 | V21 = 2            |

## Dimensions in mm

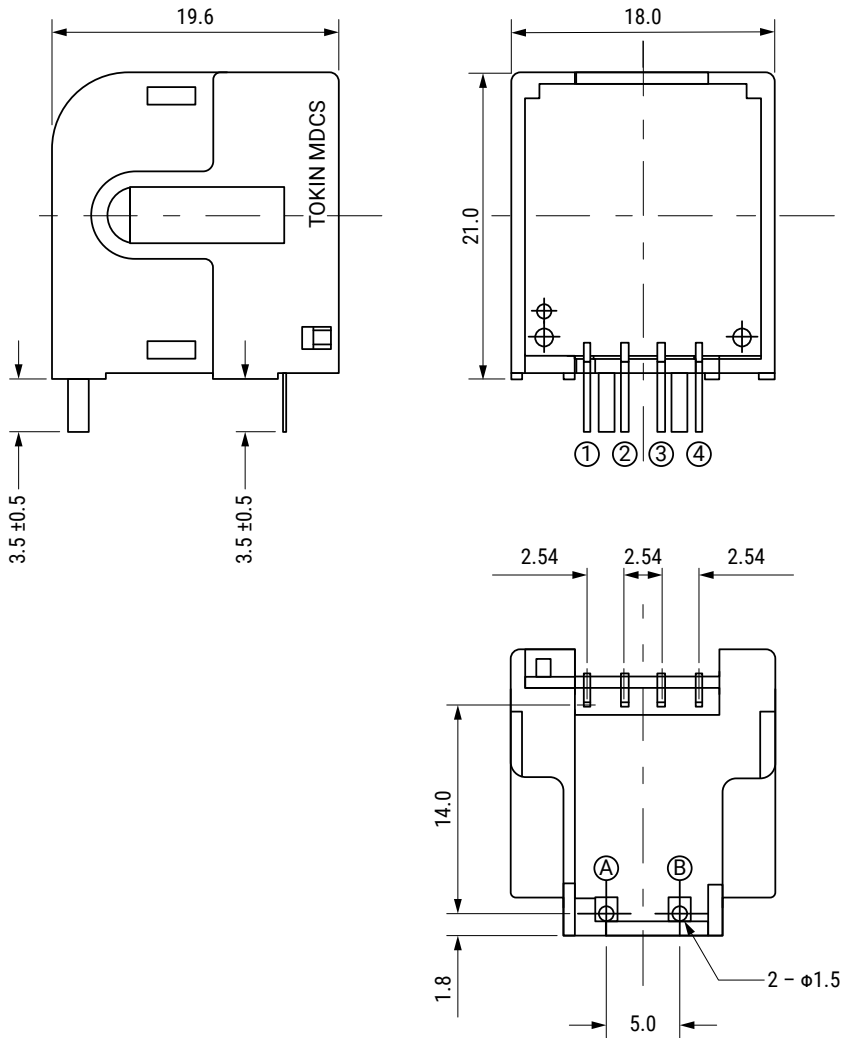
### LA12-10V21



| Pin Number | LA12                             |
|------------|----------------------------------|
| 1          | NC                               |
| 2          | GND (ground pin)                 |
| 3          | Vcc (+12 V)                      |
| 4          | $V_{out}$ (output voltage pin)   |
| A          | (measured current $\oplus$ pin)  |
| B          | (measured current $\ominus$ pin) |

## Dimensions in mm cont.

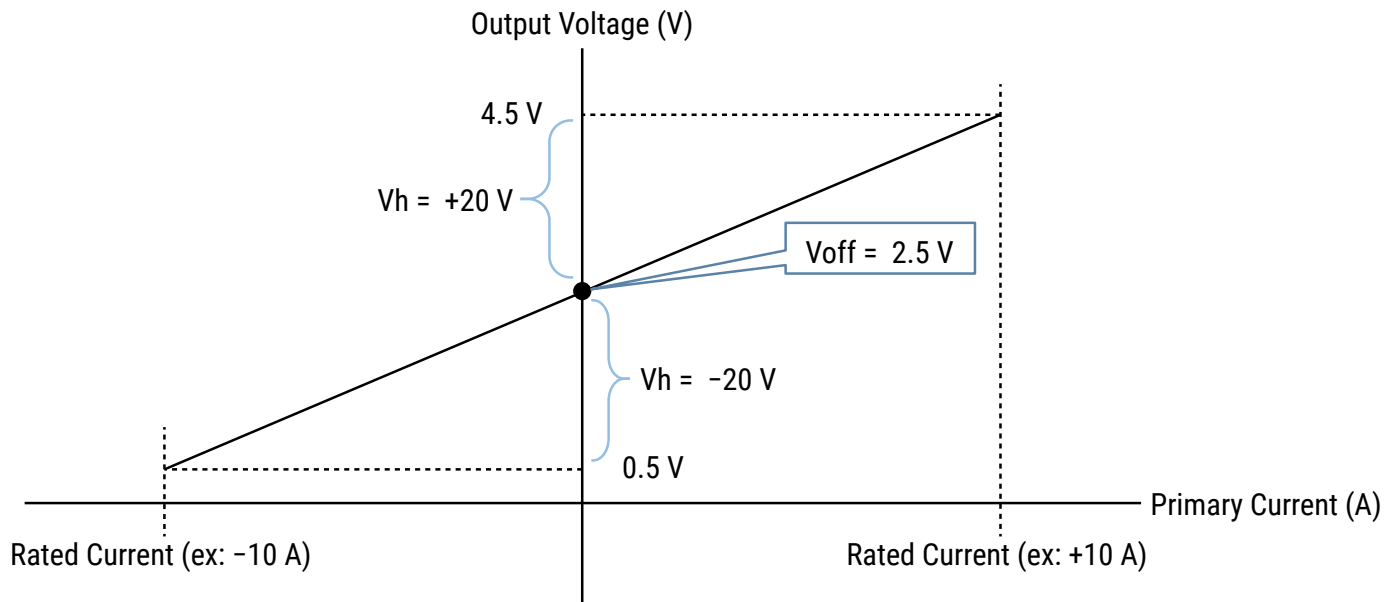
### LA12-48V21, LA12-50V21, & LA12-60V21



| Pin Number | LA12                                  |
|------------|---------------------------------------|
| 1          | NC                                    |
| 2          | GND (ground pin)                      |
| 3          | Vcc (+12 V)                           |
| 4          | V <sub>out</sub> (output voltage pin) |
| A          | (measured current ⊕ pin)              |
| B          | (measured current ⊖ pin)              |

## AC Output Characteristics

### Output Voltage Example LA12-10V21



## Environmental Compliance

All LA12 sensors are RoHS compliant.



## Specifications

| Item                         | Performance Characteristics                       |
|------------------------------|---------------------------------------------------|
| Rated Current                | 10 – 60 A                                         |
| Power Supply Voltage         | 12 V                                              |
| Consumption Current          | 40 mA Maximum                                     |
| Output Voltage               | 2,000 ±0.06 V                                     |
| Residual Voltage             | 2,500 ±0.06 V                                     |
| Hysteresis                   | 60 mV Maximum                                     |
| Pulse Response               | 20 µs maximum (di/dt = 100 AT/µs)                 |
| Linearity                    | -2 to 2                                           |
| Insulation Withstand Voltage | 2,000 VAC/1 minute                                |
| Insulation Resistance        | 500 VDC at 500 MΩ<br>(between wires and terminal) |
| Operating Temperature Range  | -10°C to +75°C                                    |
| Storage Temperature Range    | -15°C to +80°C                                    |

### Table 1 – Ratings & Part Number Reference

| Part Number | Rated Current (A) | Primary Side Windings (Turn) | Scope of Measurement       | Power Supply Voltage <sup>1</sup> (V) | Output Voltage <sup>2</sup> (V) | Residual Voltage <sup>3</sup> (V) | Insulation Withstand Voltage <sup>4</sup> | Insulation Resistance <sup>4</sup> | Weight (g) |
|-------------|-------------------|------------------------------|----------------------------|---------------------------------------|---------------------------------|-----------------------------------|-------------------------------------------|------------------------------------|------------|
| LA12-10V21  | 10                | 6                            | 0 to 100% of rated current | 12 ±5%                                | 2,000 ±0.06                     | 2,500 ±0.06                       | 2,000 VAC /1 minute                       | 500 MΩ                             | 9.0        |
| LA12-48V21  | 48                | 2                            |                            |                                       |                                 |                                   |                                           |                                    | 7.8        |
| LA12-50V21  | 50                | 2                            |                            |                                       |                                 |                                   |                                           |                                    | 7.8        |
| LA12-60V21  | 60                | 1                            |                            |                                       |                                 |                                   |                                           |                                    | 7.4        |

<sup>1</sup> A power supply voltage variation 30 mV maximum

<sup>2</sup> At rated current and RL = 10 kΩ, temperature characteristics ±0.15 %/°C

<sup>3</sup> At 0A and RL = 10 kΩ, temperature characteristics ±4 mV/°C

<sup>4</sup> At 500 VDC, between wire and terminals

## Soldering Process

### LA12-10V21, LA12-48V21, LA12-50V21, & LA12-60V21

|                         |                     |                   |
|-------------------------|---------------------|-------------------|
| <b>Reflow Soldering</b> | Heating temperature | 260°C             |
|                         | Heating time        | within 10 seconds |
| <b>Iron Soldering</b>   | Temperature of tip  | 350°C or lower    |
|                         | Worktime            | within 3 seconds  |

## Packaging

| Part Number | Packaging Type | Pieces Per Box |
|-------------|----------------|----------------|
| LA12-10V21  | Tray           | 400            |
| LA12-48V21  |                |                |
| LA12-50V21  |                |                |
| LA12-60V21  |                |                |

## Handling Precautions

### Precautions for Product Storage

Current sensors should be stored in normal working environments. While the sensors are quite robust in other environments, exposure to high temperatures, high humidity, corrosive atmospheres, and long-term storage degrade solderability.

KEMET recommends that maximum storage temperature not exceed 80°C and atmospheres should be free of chlorine and sulfur-bearing compounds. Temperature fluctuations should be minimized to avoid condensation on the parts. Avoid storage near strong magnetic fields, as they can magnetize the product and cause its characteristics to change. Limit ambient magnetic fields to 50e or less.

For optimized solderability, the stock of current sensors should be used within 12 months of receipt.

### Before Using Magnetic Direct Current Sensors

- Do NOT drop or apply any other mechanical stress, as such stresses may change performance characteristics.
- Do NOT exceed 260°C for 10 seconds when soldering. This is the maximum heat resistance grade of these sensors. Use a low-corrosion type flux when soldering.
- Do NOT allow strong static electricity near the sensor, as the circuit uses ICs. Static electricity can cause damage. Take static electricity precautions when handling.

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