Standard Type  Toner Quantity Sensor

The amount of attached toner above the detection was measured by this sensor. Useful for color copier and color laser printer.

- **Applications**
  - For color copier
  - For color laser printer

**< Standard type >**

- **Part Number:** ZHDA1319

**Characteristics**

- Sensor output is not influenced by a color of toner and quantity of toner was detected by this sensor stably.
- Sensor output is analog voltage and can be gained in proportion of the toner unattached area.
- Nichicon can design custom-made toner quantity sensor, based on the specific demand from the customer.
  
  For example)
  - The supported sensor output rate can be changed
  - The sensor output values can be optionally configured
  - Miniaturized with high performance by COB technology.
  - The sensor has a structure to prevent stray light and reduces error of the output.
  - Adapted to the RoHS directive (2011/65/EU).

**Dimensions (Top mount connector)**
FUNCTION MODULES

(Side mount connector)

(Side Assembly Type by JST)

(Height of assembly components) 3MAX.

(Front view)

(Rear view)

(Thin form side mount connector)

(Thin form Side Assembly Type by JST)

(Height of assembly components) 3MAX.
<Low price version>

- Part Number: ZHDA1350R

- Characteristics
  - Low price version has the same performance as Standard type, and the cost is low.
  - Sensor outputs are analog voltage separates P-polarized and S-polarized.
  - Sensor outputs are not influenced by a color of toner and quantity of toner was detected by this sensor stably.
    ※By calculating sensor output P voltage and S voltage, can be gained in proportion of the toner unattached area.
  - Nichicon can design custom-made toner quantity sensor, based on the specific demand from the customer.
    For example:  • The supported sensor output rate can be changed
    • The sensor output values can be optionally configured
    • LED lights, the frequency and brightness can be adjusted
  - Miniaturized with high performance by COB technology.
  - The sensor has a structure to prevent stray light and reduces error of the output.
  - Adapted to the RoHS directive (2011/65/EU).

- Dimensions (Top mount connector)
FUNCTION MODULES

• Absolute maximum ratings (Ta : 25°C)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Range</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>0 to + 5.5</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Topr</td>
<td>0 to + 55</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>−20 to + 70</td>
<td>°C</td>
</tr>
</tbody>
</table>

• Recommendation operating conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Range</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>+5.0 ± 0.1</td>
<td>V</td>
</tr>
<tr>
<td>Detection distance</td>
<td>Leng</td>
<td>6.5 to 7.5</td>
<td>mm</td>
</tr>
</tbody>
</table>

• LED properties

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Range</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation frequency</td>
<td>λd</td>
<td>619 to 629</td>
<td>nm</td>
</tr>
<tr>
<td>Peak radiation frequency (If = 20mA)</td>
<td>λp</td>
<td>631</td>
<td>nm</td>
</tr>
</tbody>
</table>

※LED properties can be altered upon request.

Senor output, toner quantity characteristics (example)

Specifically, when setting each color of toner, regardless of the color, it is possible to adjust to closely similar properties.
Low price version obtains the characteristics of the graph by calculating the output P voltage and the S voltage.
 FUNCTION MODULES

### Standard Type  DC-DC Converter

(1.5W  3W)

SIP type is resin coating for small space, and DIP type is resin case, steer cover and resin coating for low profile application.

#### Characteristics

1. Thin and lightweight
2. Excellent heat radiation and miniaturization due to alumina substrate
3. Excellent isolation ability between input and output
4. No attachment necessary
5. Circuit with built-in excess current protection
6. Adapted to the RoHS directive (2011/65/EU)

---

#### Output Power

<table>
<thead>
<tr>
<th>Output Voltage</th>
<th>Output Current</th>
<th>Efficiency</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V</td>
<td>300mA</td>
<td>68%</td>
<td>ZHMR1505055</td>
</tr>
<tr>
<td>12V</td>
<td>125mA</td>
<td>70%</td>
<td>0512R</td>
</tr>
<tr>
<td>15V</td>
<td>100mA</td>
<td>71%</td>
<td>0515R</td>
</tr>
<tr>
<td>5V</td>
<td>300mA</td>
<td>72%</td>
<td>1205R</td>
</tr>
<tr>
<td>12V</td>
<td>125mA</td>
<td>73%</td>
<td>1212R</td>
</tr>
<tr>
<td>15V</td>
<td>100mA</td>
<td>74%</td>
<td>1215R</td>
</tr>
<tr>
<td>5V</td>
<td>300mA</td>
<td>73%</td>
<td>2405R</td>
</tr>
<tr>
<td>12V</td>
<td>125mA</td>
<td>76%</td>
<td>2412R</td>
</tr>
<tr>
<td>15V</td>
<td>100mA</td>
<td>76%</td>
<td>2415R</td>
</tr>
<tr>
<td>5V</td>
<td>±63mA</td>
<td>70%</td>
<td>ZHRP1505051</td>
</tr>
<tr>
<td>12V</td>
<td>±63mA</td>
<td>68%</td>
<td>0515R</td>
</tr>
<tr>
<td>15V</td>
<td>±50mA</td>
<td>71%</td>
<td>1212R</td>
</tr>
<tr>
<td>12V</td>
<td>±63mA</td>
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<tr>
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</tr>
<tr>
<td>5V</td>
<td>±63mA</td>
<td>72%</td>
<td>2415R</td>
</tr>
</tbody>
</table>

### Output Tolerance

- ±5%

### Over Current Protection

- Functions at 105% or more of the rated output current - Automatically restored

### Withstanding Voltage

- Between input and output terminals DC500V for 1 minute 5mA

---

#### Output Power

<table>
<thead>
<tr>
<th>Measurement</th>
<th>L</th>
<th>W</th>
<th>H</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5W</td>
<td>26.5</td>
<td>±0.2</td>
<td>17.4</td>
<td>±0.2</td>
</tr>
<tr>
<td></td>
<td>28.0</td>
<td>MAX</td>
<td>18.7</td>
<td>MAX</td>
</tr>
<tr>
<td>1.5W</td>
<td>26.0</td>
<td>MAX</td>
<td>16.5</td>
<td>MAX</td>
</tr>
<tr>
<td>3W</td>
<td>34.5</td>
<td>±0.2</td>
<td>24.7</td>
<td>±0.2</td>
</tr>
<tr>
<td></td>
<td>36.0</td>
<td>MAX</td>
<td>26.0</td>
<td>MAX</td>
</tr>
<tr>
<td></td>
<td>34.0</td>
<td>MAX</td>
<td>23.5</td>
<td>MAX</td>
</tr>
</tbody>
</table>

---

#### Insulation Resistance

- Between input and output terminals DC500V, more than 100MΩ

#### Operating Temperature/Humidity

- -10 to +71°C  20 to 95%RH (No dewdrops)

#### Storage Temperature/Humidity

- -40 to +85°C  20 to 95%RH (No dewdrops)

---

Output Tolerance : ±5%
Over Current Protection : Functions at 105% or more of the rated output current - Automatically restored
Withstanding Voltage : Between input and output AC500V for 1 minute 5mA

---

CAT.8100H
### Exterior and Measurement Map (unit: mm)

<table>
<thead>
<tr>
<th></th>
<th>1.5W</th>
<th>3W</th>
<th>Notes</th>
</tr>
</thead>
</table>
| **SIP Type** | ![Image](image1.png) | ![Image](image2.png) | **Style No.E**  
Phenol Resin Coating  
- Horizontal Type,  
Space Saver |
| **DIP Type** | ![Image](image3.png) | ![Image](image4.png) | **Style No.B**  
Resin Case  
- Standard Type |
| **Style No.C** | ![Image](image5.png) | ![Image](image6.png) | **Style No.C**  
Steel Cover  
- Reduce Radiation Noise |
| **Style No.D** | ![Image](image7.png) | ![Image](image8.png) | **Style No.D**  
Without Coating  
- DIP Style |
Custom-made Function Modules

Nichicon can design and manufacture custom-made Function Modules with special function, shape and rational design, based on the specific circuitry from the customer. Function Modules is available with either miniature molded semiconductors or chip-bonded semiconductors for high density mounting.

Custom-made Function Modules is to be designed and manufactured in the following stages:

<table>
<thead>
<tr>
<th>Customer</th>
<th>Nichicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning of new model</td>
<td>Inquiry</td>
</tr>
<tr>
<td>Study</td>
<td>Quotation</td>
</tr>
<tr>
<td>Designing</td>
<td>Sample order</td>
</tr>
<tr>
<td>Trial production</td>
<td>Sample submission</td>
</tr>
<tr>
<td>Preparation for mass production</td>
<td>Approval of specifications</td>
</tr>
<tr>
<td>Pre-production</td>
<td>Sample delivery for pre-production</td>
</tr>
</tbody>
</table>

Inquiring with circuit drawing, specific parts required, quantity basis, delivery schedule.

Pricing, structure, shape, dimension, etc. (Generally within 5 days)

Start of designing, Information on test method/regulations function of circuit requested.

Generally 10 pcs. of samples are to be submitted. (Generally within 3 weeks)

In case samples found good, final specifications for approval are to be submitted.

Final approval on samples and specifications

INDISPENSABLE INFORMATION

- CIRCUIT DRAWING
- SPECIFIC PARTS SHOULD BE USED
- QUANTITY BASIS

NEEDED INFORMATION

- PART CAN BE SUBSTITUTE
- DESCRIPTION OF CIRCUIT FUNCTION
- TEST METHOD / REGULATION SPECIFICATION

INFORMATION FOR A MORE STRICT ESTIMATE

- CIRCUIT DRAWING SURROUNDING TO THE SUBJECTED CIRCUIT
- DESCRIPTION OF SYSTEM FUNCTION

CIRCUIT INFORMATION

- STRUCTURE, DIMENSION, SHAPE, REQUIREMENTS
- PIN LAYOUT
- APPLICABLE SPECIFICATION (UL, ETC.)
- MARKING REQUIREMENT
- APPEARANCE REQUIREMENT

- INFORMATION OF SPACE SURROUNDING THE POSITION THAT HYBRID IC WILL BE INSTALLED
- STRUCTURE INFORMATION OF THE WHOLE UNIT

STRUCTURE INFORMATION

- PURPOSE OF USE
- AMBIENT CONDITIONS INFORMATION
- QUALITY ASSURANCE REQUIREMENT
- SCREENING REQUIREMENT

- WHETHER SPECIAL CONTRACT IS REQUIRED

REQUEST INFORMATION

- ANNUAL USAGE
- MASS-PRODUCTION STARTING DATE
- TARGET LIFE TIME
- DEVELOPING SCHEDULE
- NEW PROJECT OR CURRENT MODEL

- TOTAL USAGE OF OTHER UNIT INCLUDED
- PAST USAGE

PRODUCTION INFORMATION

Notice:
Confidential information given by the customer will be strictly kept secret without permission in writing.
# FUNCTION MODULES

## Function Modules Technologies

<table>
<thead>
<tr>
<th>Mount Technology Segment</th>
<th>Purpose and means</th>
<th>Application technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Board</td>
<td>High Reliability</td>
<td>Ceramic Board</td>
</tr>
<tr>
<td></td>
<td>High Density Wiring</td>
<td>Multilayer Resin Board</td>
</tr>
<tr>
<td>High Density Mounting</td>
<td>Extremely-compact Parts</td>
<td>Dissimilar Material composite Board</td>
</tr>
<tr>
<td>Bare-Chip Mounting</td>
<td>Unique Shaped Parts</td>
<td>Metal Base Board</td>
</tr>
<tr>
<td>Wire Bonding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Signal Line Type**
- Use Aluminum Wire
- Use Wedge Bonding
- Surface mounting parts mixed is available

**Power Line Type**
- Max. φ500μm wire usable
- Pb free solder joint
- High Density Materials compliant for Large electric power (Substrate and Heatsink)

**应用案例**

- **Thin Wire Bonding**
  - application case : Toner Quantity Sensor

- **Thick Wire Bonding**
  - application case : Power Module