## Distance Measuring Sensor Lineup

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Output</th>
<th>Detected distance</th>
<th>Features</th>
<th>Model No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSD, 2PD</td>
<td>1-bit digital output according to distance measuring</td>
<td>5 cm</td>
<td>Battery drive compatible, compact, 1-bit digital output</td>
<td>GP2Y0D805Z0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 cm</td>
<td>Battery drive compatible, compact, 1-bit digital output</td>
<td>GP2Y0D810Z0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 cm</td>
<td>Battery drive compatible, compact, 1-bit digital output</td>
<td>GP2Y0D815Z0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13 cm</td>
<td>1-bit digital output</td>
<td>GP2Y0D413K0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 cm</td>
<td>1-bit digital output</td>
<td>GP2Y0D21YK0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80 cm</td>
<td>1-bit digital output</td>
<td>GP2Y0D02YK0F</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Analog voltage output according to distance measuring</td>
<td>1.5 to 15 cm</td>
<td>Analog output</td>
<td>GP2Y0AF15 series</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 to 15 cm</td>
<td>Analog output</td>
<td>GP2Y0A51SK0F</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 to 30 cm</td>
<td>Analog output</td>
<td>GP2Y0A41SK0F / GP2Y0AF30 series</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 to 80 cm</td>
<td>Analog output</td>
<td>GP2Y0A21YK0F</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 to 150 cm</td>
<td>Analog output</td>
<td>GP2Y0A02YK0F</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 to 550 cm</td>
<td>Analog output</td>
<td>GP2Y0A710K0F</td>
<td>38</td>
</tr>
<tr>
<td>CMOS</td>
<td>Analog voltage output according to distance measuring (including I²C output)</td>
<td>4 to 50 cm</td>
<td>Compact size, high-precision measurement</td>
<td>Analog output</td>
<td>GP2Y0E02A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I²C output</td>
<td>GP2Y0E02B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Analog, I²C output</td>
<td>GP2Y0E03</td>
</tr>
<tr>
<td>ToF</td>
<td>I²C output</td>
<td>10 to 120 cm</td>
<td>Compact size, high-precision measurement</td>
<td>IR laser</td>
<td>☆GP2AP01VTx0F</td>
</tr>
</tbody>
</table>

## Dust Sensor Unit Lineup

<table>
<thead>
<tr>
<th>Output</th>
<th>Features</th>
<th>Model No.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog output</td>
<td>Pulse analog output, single-shot detection of house dust, general purpose</td>
<td>GP2Y1010AU0F</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Pulse analog output, single-shot detection of house dust, high sensitivity</td>
<td>GP2Y1012AU0F</td>
<td>40</td>
</tr>
<tr>
<td>Digital output</td>
<td>Digital (PWM) output, built-in microprocessor controller, single-shot detection of house dust, high sensitivity</td>
<td>GP2Y1023AU0F</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Digital (UART) output, built-in microprocessor controller, single-shot detection of house dust, high concentration</td>
<td>GP2Y1026AU0F</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Digital (UART) output, built-in microprocessor controller, sensing can discriminate between PM2.5 and PM10, internal cleaning possible</td>
<td>GP2Y1030AU0F</td>
<td>40</td>
</tr>
</tbody>
</table>
### Distance Measuring Sensors (1) PSD, 2PD Type

#### Digital Output

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Detected distance (cm)</th>
<th>Features</th>
<th>Absolute maximum ratings</th>
<th>Electro-optical characteristics*1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vcc (V)</td>
<td>ToPr (°C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VoH (V) MIN.</td>
<td>VoL (V) MAX.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y0D805Z0F</td>
<td>5</td>
<td>Light detector (2PD), infrared LED and signal processing circuit, short distance measuring type, battery drive compatible (operating power supply: 2.7 to 6.2 V)</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
<tr>
<td>GP2Y0D810Z0F</td>
<td>10</td>
<td>Light detector (2PD), infrared LED and signal processing circuit, short distance measuring type, battery drive compatible (operating power supply: 2.7 to 6.2 V)</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
<tr>
<td>GP2Y0D815Z0F</td>
<td>15</td>
<td>Light detector (2PD), infrared LED and signal processing circuit, short distance measuring type, battery drive compatible (operating power supply: 2.7 to 6.2 V)</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
<tr>
<td>GP2Y0D413K0F</td>
<td>13</td>
<td>Distance measuring sensor united with PSD*2, infrared LED and signal processing circuit, digital voltage output according to the measured distance</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
<tr>
<td>GP2Y0D21YK0F</td>
<td>24</td>
<td>Distance measuring sensor united with PSD*2, infrared LED and signal processing circuit, digital voltage output according to the measured distance</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
<tr>
<td>GP2Y0D02YK0F</td>
<td>80</td>
<td>Distance measuring sensor united with PSD*2, infrared LED and signal processing circuit, long distance measuring type (No external control signal required), digital voltage output according to the measured distance</td>
<td>−0.3 to +7</td>
<td>−10 to +60</td>
</tr>
</tbody>
</table>

*1  Vcc = 5 V

*2  PSD: Position Sensitive Detector
## Analog Output

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Distance measuring range (cm)</th>
<th>Features</th>
<th>Absolute maximum ratings</th>
<th>Electro-optical characteristics $^*$</th>
<th>Dissipation current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$V_{cc}$ (V)</td>
<td>$T_{opr}$ (°C)</td>
<td>$V_{OH}$ MIN.</td>
</tr>
<tr>
<td>GP2Y0AF15 series</td>
<td>1.5 to 15</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, short measuring cycle (16.5 ms), compact, lineup of various connector shapes</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 15$ cm), $\Delta V_{O}$ (TYP.) = $2.3$ V (at $L = 15$ cm → $1.5$ cm)</td>
</tr>
<tr>
<td>GP2Y0A51SK0F</td>
<td>2 to 15</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, short measuring cycle (16.5 ms)</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 15$ cm), $\Delta V_{O}$ (TYP.) = $2.5$ V (at $L = 15$ cm → $2$ cm)</td>
</tr>
<tr>
<td>GP2Y0AF30 series</td>
<td>4 to 30</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, short measuring cycle (16.5 ms), compact, lineup of various connector shapes</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 30$ cm), $\Delta V_{O}$ (TYP.) = $2.3$ V (at $L = 30$ cm → $4$ cm)</td>
</tr>
<tr>
<td>GP2Y0A41SK0F</td>
<td>4 to 30</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, short measuring cycle (16.5 ms)</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 30$ cm), $\Delta V_{O}$ (TYP.) = $2.5$ V (at $L = 30$ cm → $4$ cm)</td>
</tr>
<tr>
<td>GP2Y0A21YK0F</td>
<td>10 to 80</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, linear voltage output</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 80$ cm), $\Delta V_{O}$ (TYP.) = $2.0$ V (at $L = 80$ cm → $10$ cm)</td>
</tr>
<tr>
<td>GP2Y0A02YK0F</td>
<td>20 to 150</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, long distance measuring type (No external control signal required)</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $0.4$ V (at $L = 150$ cm), $\Delta V_{O}$ (TYP.) = $2.05$ V (at $L = 150$ cm → $20$ cm)</td>
</tr>
<tr>
<td>GP2Y0A710K0F</td>
<td>100 to 550</td>
<td>Distance measuring sensor united with PSD$^2$, infrared LED and signal processing circuit, long distance measuring type (No external control signal required)</td>
<td>$-0.3$ to $+7$</td>
<td>$-10$ to $+60$</td>
<td>$V_{O}$ (TYP.) = $2.5$ V (at $L = 100$ cm), $\Delta V_{O}$ (TYP.) = $0.7$ V (at $L = 100$ cm → $200$ cm)</td>
</tr>
</tbody>
</table>

$^*$ $V_{cc} = 5$ V  
$^2$ PSD: Position Sensitive Detector
DISTANCE MEASURING SENSORS

■ Distance Measuring Sensors (2) CMOS Type

◆ Analog Output (including I2C output) (Ta = 25°C)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Distance measuring range (cm)</th>
<th>Features</th>
<th>Absolute maximum ratings</th>
<th>Electro-optical characteristics*1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vcc (V)</td>
<td>Topr (°C)</td>
</tr>
<tr>
<td>GP2Y0E02A</td>
<td>4 to 50</td>
<td>Infrared LED and CMOS image sensor with built-in signal processing circuit, compact size (18.9 x 8 x 5.2 mm), high-precision measurement, analog output</td>
<td>0.3 to +3.6</td>
<td>-10 to +60</td>
</tr>
<tr>
<td>GP2Y0E02B</td>
<td>4 to 50</td>
<td>Infrared LED and CMOS image sensor with built-in signal processing circuit, compact size (18.9 x 8 x 5.2 mm), high-precision measurement, I2C output</td>
<td>0.3 to +3.6</td>
<td>-10 to +60</td>
</tr>
<tr>
<td>GP2Y0E03</td>
<td>4 to 50</td>
<td>Infrared LED and CMOS image sensor with built-in signal processing circuit, compact size (16.7 x 11 x 5.2 mm), high-precision measurement, analog / I2C output both compatible</td>
<td>0.3 to +5.5</td>
<td>-10 to +60</td>
</tr>
</tbody>
</table>

*1 Vcc = 5 V

---

■ ToF Type Distance Measuring Sensor (ToF = Time of Flight) (VDD = 2.8V, Ta = 25°C)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Features</th>
<th>VDD (V)</th>
<th>Tstg (°C)</th>
<th>Dissipation current (VDD) ICC_vcc(V) (mA) TYP</th>
<th>Dissipation current (VCSEL) ICC_vcasl (mA) TYP</th>
<th>VCSEL Peak emission wavelength (nm)</th>
<th>Possible measuring distance (white paper 120 cm) (cm)</th>
<th>Measurement accuracy (white paper 120 cm) (Racc %)</th>
<th>Detection time Domain (msec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☆GP2AP01VTx0F</td>
<td>Ultra miniature integrated light detector: 4.4 x 2.4 x 1.0 mm High-speed distance measuring in dark places through employment of IR laser I2C interface</td>
<td>3.6</td>
<td>-40 to +85</td>
<td>10</td>
<td>20</td>
<td>940</td>
<td>10 to 120</td>
<td>4</td>
<td>33</td>
</tr>
</tbody>
</table>

GP2AP01VTx0F

---

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### Dust Sensor Unit

(DTa = 25°C)

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Features</th>
<th>Operating supply voltage (V)</th>
<th>Dissipation current (mA)</th>
<th>Detection concentration μg/m³ (TYp.)</th>
<th>Sensitivity</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP2Y1010AU0F</td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td></td>
<td></td>
<td>0 to 600</td>
<td>0.5±0.15 V/ (0.1 mg/m³) Precision ±30%</td>
<td>Analog voltage</td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output: Analog voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y1012AU0F</td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td>4.5 to 5.5 TYP. 11</td>
<td>0 to 240</td>
<td>1.0±0.15 V/ (0.1 mg/m³) Precision ±15%</td>
<td>Analog voltage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output: Analog voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y1014AU0F</td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td></td>
<td></td>
<td>0 to 600</td>
<td>0.5±0.075 V/ (0.1 mg/m³) Precision ±15%</td>
<td>Analog voltage</td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output: Analog voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y1023AU0F</td>
<td>• High sensitivity</td>
<td>−10 to +65 TYP. 15</td>
<td>0 to 240</td>
<td>1.4±0.21 ms/ (0.1 mg/m³) Precision ±15%</td>
<td>Digital signal (PWM) Temperature correction Averaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in microcomputer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output: Digital signal output (PWM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y1026AU0F</td>
<td>• High concentration</td>
<td>4.75 to 5.25 TYP. 15</td>
<td>0 to 1 000</td>
<td>0.35±0.06 V/ (0.1 mg/m³) Precision ±15%</td>
<td>Digital signal (UART) Temperature correction Averaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in microcomputer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP2Y1030AU0F</td>
<td>• Built-in microcomputer</td>
<td>3 to 5.5 TYP. 25</td>
<td>0 to 500</td>
<td>Precision ±15%</td>
<td>Digital signal (UART)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in infrared emitting diode, photodiode and signal processing circuit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact, single-shot detection of house dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sensing can discriminate between PM2.5 and PM10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Internal cleaning possible</td>
<td></td>
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</tr>
</tbody>
</table>

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