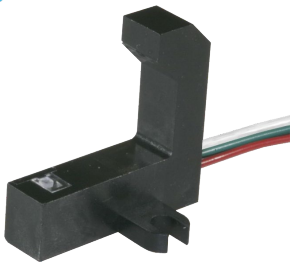


# Slotted Optical Switch

## OPB420AZ, OPB420BZ



**Features:**

- Non-contact switching
- Right Angle Sensor: LED in tower, photosensor in base
- Choice of output configuration
- Optical line can be broken in three axis
- 24” minimum, #26 AWG UL rated wire leads

**Description:**

The OPB420 series optical switch consists of an infrared emitting diode (LED) and a phototransistor. The LED is mounted on the tower with the phototransistor mounted on the base of a right angle shape package. The L-Shape or right angle package configuration allows for an opaque object to block the light beam from a multitude of directions including the X-axis, Y-axis and Z-axis. The optical center line between the emitter and photosensor is at 45° from the mounting base of the device. The OPB420AZ utilizes a phototransistor with a current output proportional to the input drive current of the LED. The OPB420BZ utilizes a phototransistor with a base-emitter resistance (RBE) which provides protection from low level ambient light conditions. The OPB420BZ is ideal for applications that require an enhanced contrast ratio and immunity to background irradiance, such as detection of semi-transparent media.

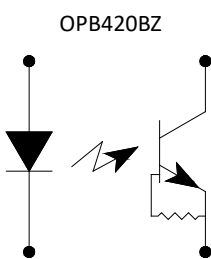
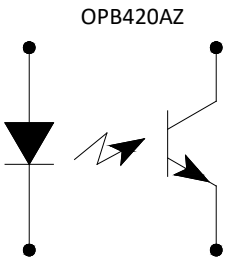
For application information, refer to Application Bulletins 248 and 213.

Custom electrical, wire and cabling and connectors are available. Contact your local representative or OPTEK for more information.

**Applications:**

- Non-contact interruptive object sensing
- Tray-out sensor
- Low paper tray sensor
- Corner sensor
- Printers
- Copying machines
- Paper sorting equipment
- Amusement gaming equipment
- Door sensor
- Optical Switch

| Part #   | LED Wavelength | Photo-Sensor                    |
|----------|----------------|---------------------------------|
| OPB420AZ | 890 nm         | Phototransistor                 |
| OPB420BZ |                | R <sub>BE</sub> Phototransistor |



RoHS

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# Slotted Optical Switch

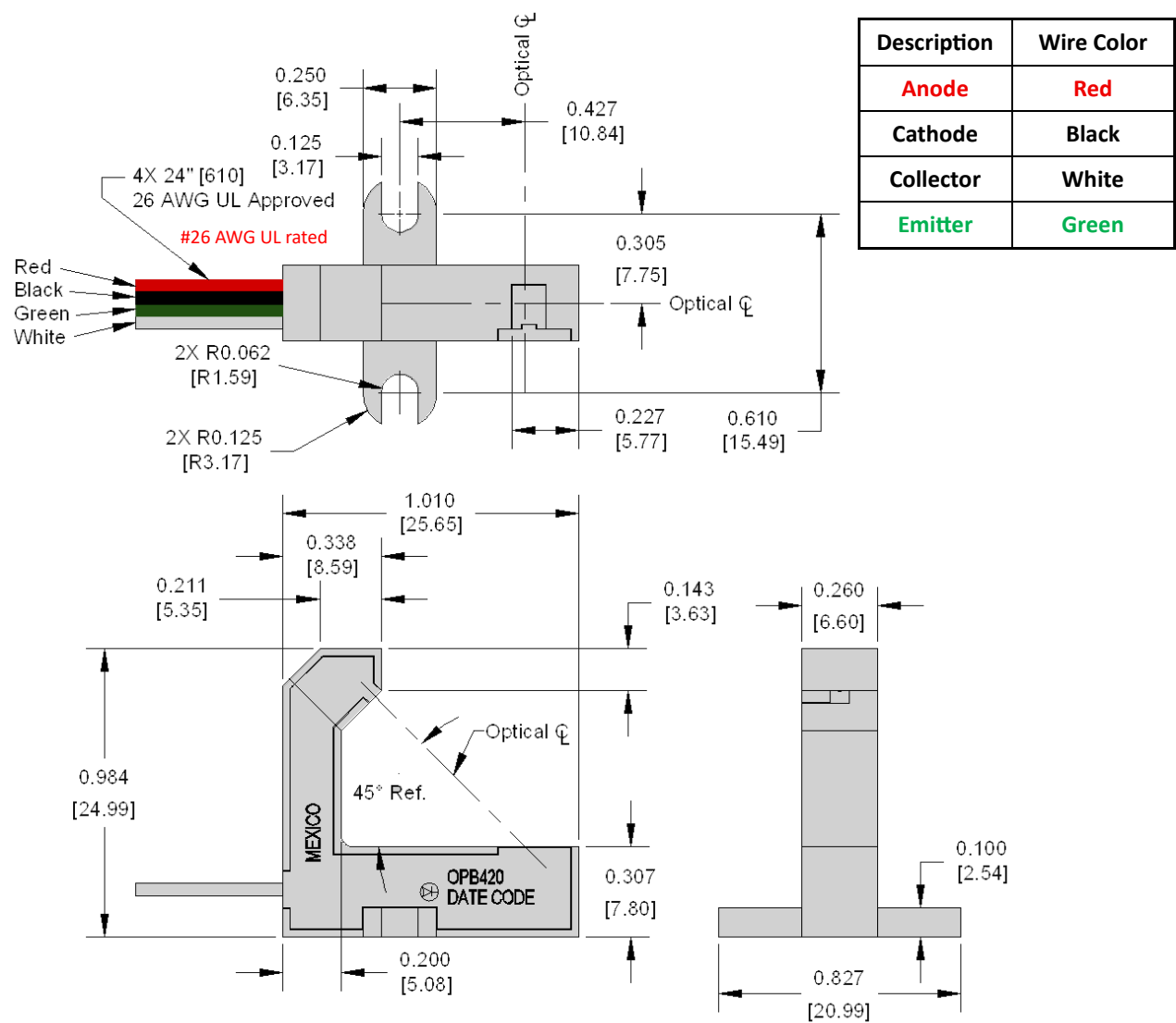
## OPB420AZ, OPB420BZ



### Packaging

#### Mechanical Package Information

Custom electrical, wire and cabling and connectors are available. Contact your local representative or OPTEK for more information.



Dimensions are in Inches [Millimeters]  
Tolerances  $\pm 0.010$  [0.25 mm]

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### Electrical Specifications

#### Phototransistor Version

#### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

|                                                                                                                |                  |
|----------------------------------------------------------------------------------------------------------------|------------------|
| Storage & Operating Temperature Range                                                                          | -40° C to +85° C |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from the case for 5 sec. with soldering iron] <sup>(1)(3)</sup> | 260° C           |
| <b>Input Diode</b>                                                                                             |                  |
| Continuous Forward Current                                                                                     | 50 mA            |
| Peak Forward Current (1 $\mu\text{s}$ pulse width, 300 pps)                                                    | 1 A              |
| Reverse Voltage                                                                                                | 2 V              |
| Power Dissipation <sup>(2)</sup>                                                                               | 100 mW           |
| <b>Output Phototransistor</b>                                                                                  |                  |
| Collector-Emitter Breakdown Voltage<br>OPB420AZ<br>OPB420BZ                                                    | 30 V<br>24 V     |
| Power Dissipation <sup>(2)</sup>                                                                               | 100 mW           |

#### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted) <sup>(4)</sup>

| SYMBOL                        | PARAMETER                            | MIN | TYP | MAX  | UNITS         | TEST CONDITIONS                                            |
|-------------------------------|--------------------------------------|-----|-----|------|---------------|------------------------------------------------------------|
| <b>Input Diode</b>            |                                      |     |     |      |               |                                                            |
| $V_F$                         | Forward Voltage                      | 1.2 | -   | 1.7  | V             | $I_F = 20\text{ mA}$                                       |
| $I_R$                         | Reverse Current                      | -   | -   | 100  | $\mu\text{A}$ | $V_R = 2\text{ V}$                                         |
| <b>Output Phototransistor</b> |                                      |     |     |      |               |                                                            |
| $V_{(BR)CEO}$                 | Collector-Emitter Breakdown Voltage  |     |     |      |               |                                                            |
|                               | OPB420AZ                             | 30  | -   | -    | V             | $I_C = 1\text{ mA}$                                        |
|                               | OPB420BZ                             | 24  | -   | -    |               | $I_C = 100\text{ }\mu\text{A}$                             |
| $V_{(BR)ECO}$                 | Emitter-Collector Breakdown Voltage  |     |     |      |               |                                                            |
|                               | OPB420AZ                             | 5.0 | -   | -    | V             | $I_E = 100\text{ }\mu\text{A}$                             |
|                               | OPB420BZ                             | 0.4 | -   | -    |               |                                                            |
| $I_{CEO}$                     | Collector-Emitter Dark Current       | -   | -   | 100  | nA            | $V_{CE} = 10\text{ V}$ , $I_F = 0$ , $E_E = 0$             |
| <b>Combined</b>               |                                      |     |     |      |               |                                                            |
| $V_{CE(SAT)}$                 | Collector-Emitter Saturation Voltage | -   | -   | 0.4  | V             | $I_C = 250\text{ }\mu\text{A}$ , $I_F = 20\text{ mA}$      |
| $I_{C(ON)}$                   | On-State Collector Current           | 1.0 | -   | 10.0 | mA            | $V_{CE} = 5.0\text{ V}$ , $I_F = 20\text{ mA}$             |
| $I_{C(OFF)}$                  | Off-State Collector Current—OPB420BZ | -   | -   | 450  | $\mu\text{A}$ | $V_{CE} = 5\text{ V}$ , $I_F = 1\text{ mA}$ <sup>(5)</sup> |

#### Notes:

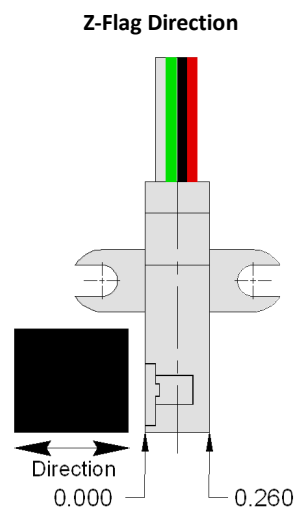
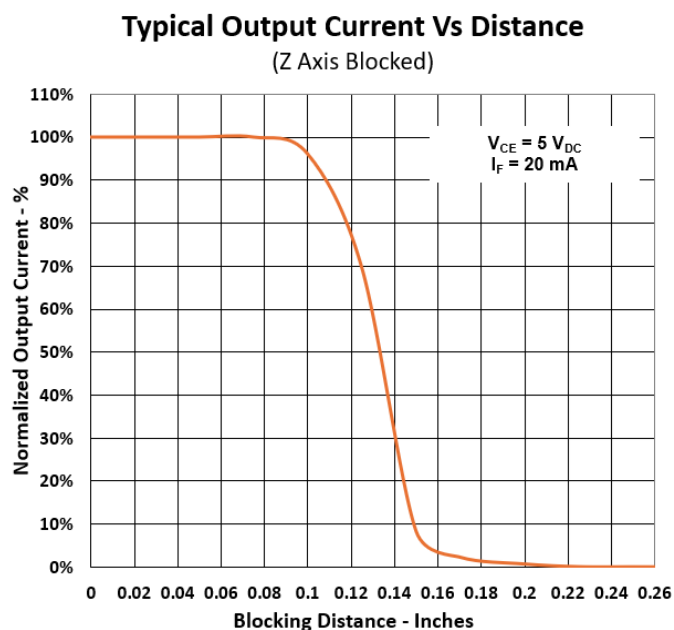
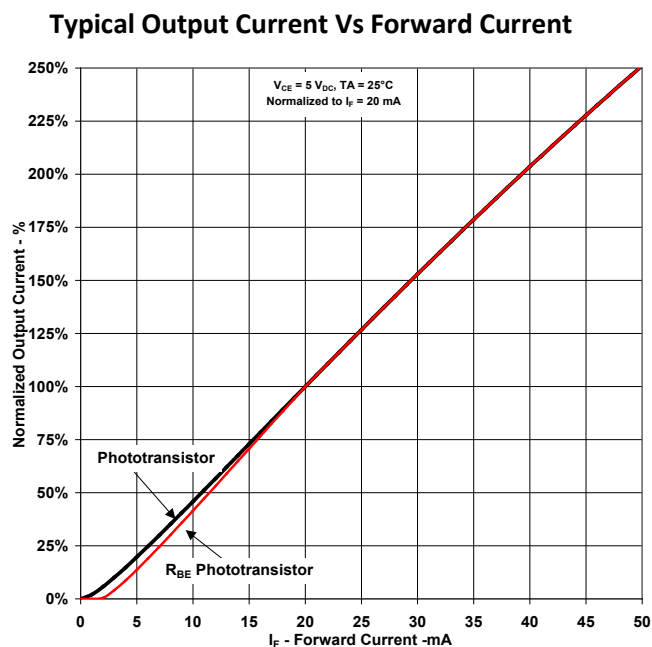
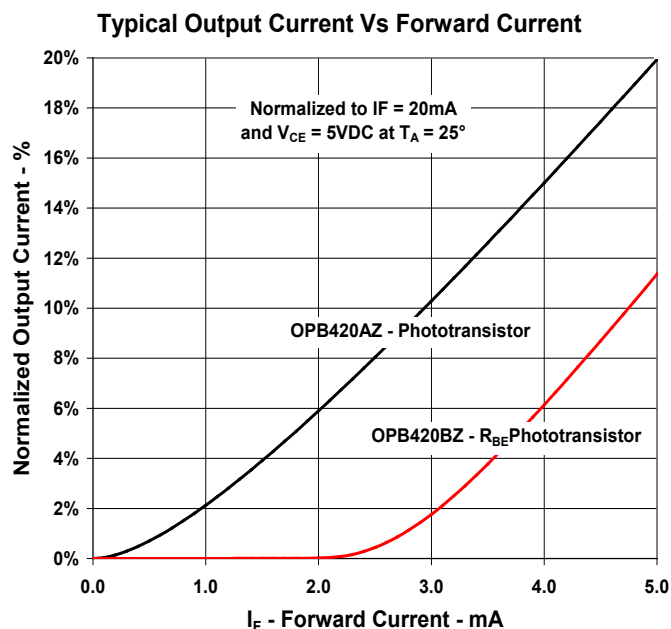
- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.33 mW/°C above 25° C.
- (3) Methanol or isopropanol are recommended as cleaning agents. Plastic housing is soluble in chlorinated hydrocarbons and ketones.
- (4) All parameters were tested using pulse technique.
- (5) Simulated optical path blocked with infrared semi-transparent object.

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### Typical Performance



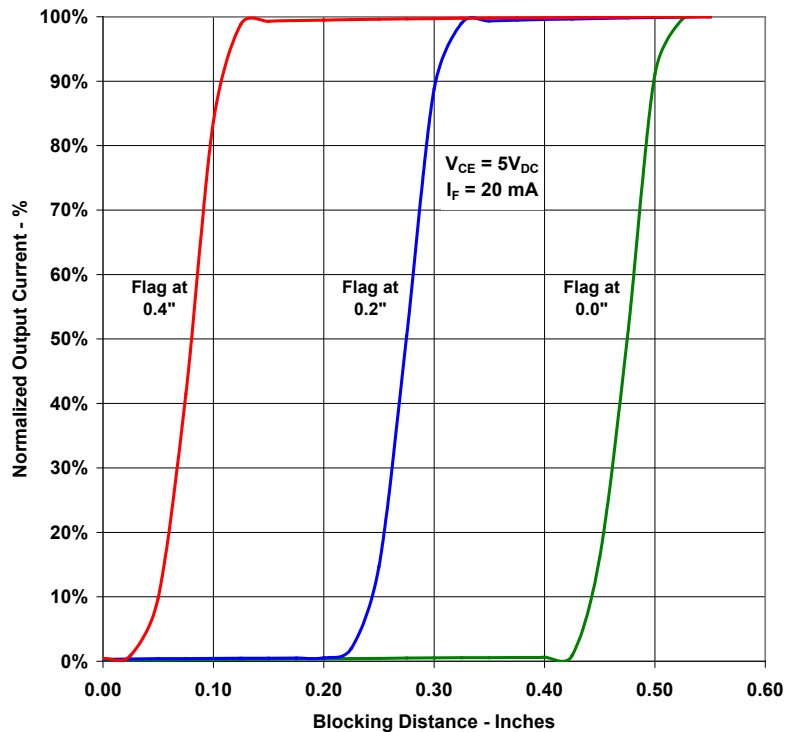
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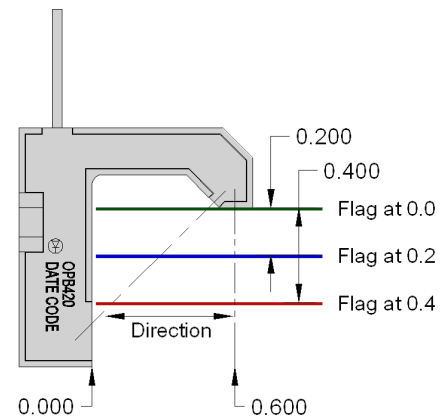
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## Typical Performance

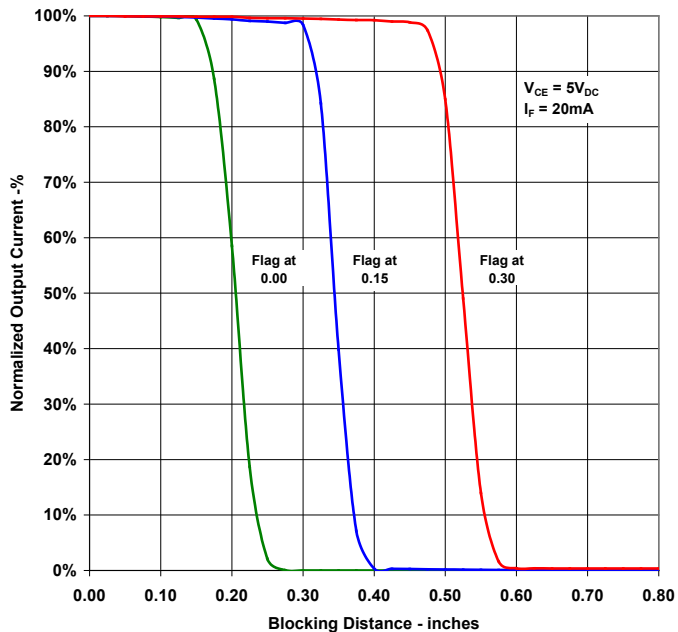
Typical Output Current Vs Distance (Y-Axis Blocked)



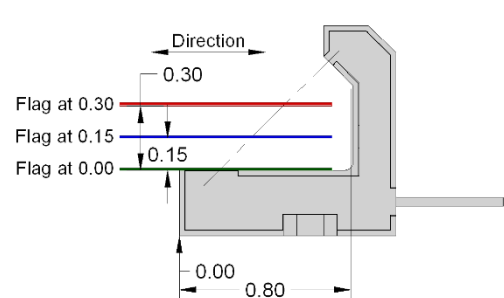
Y-Flag Direction



Typical Output Current Vs Distance X-Axis Blocked



X-Flag Direction

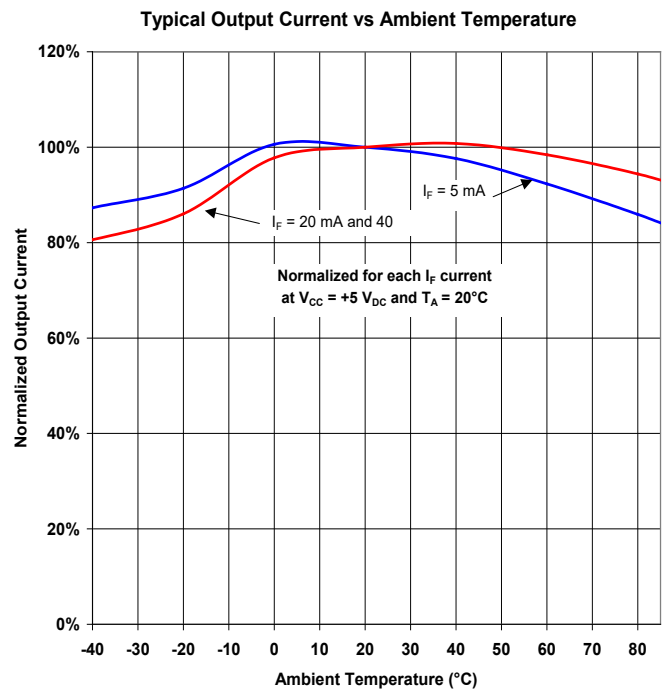
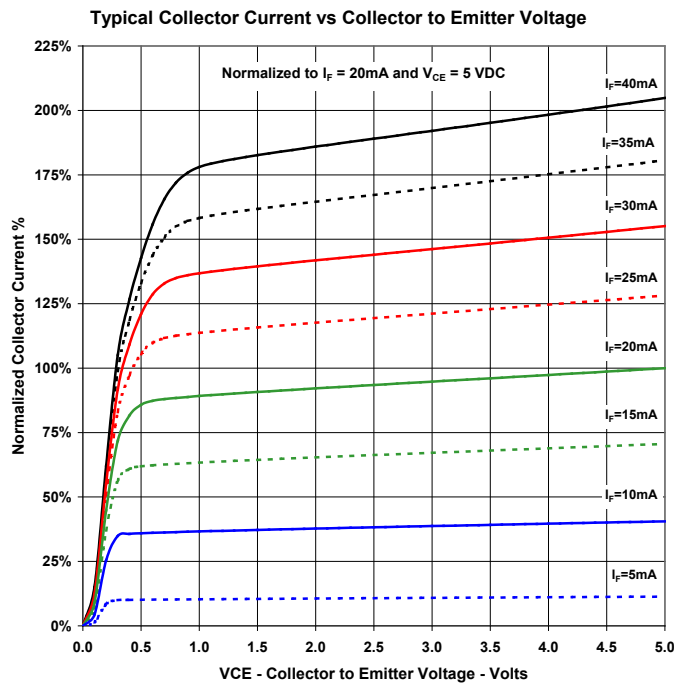


### General Note

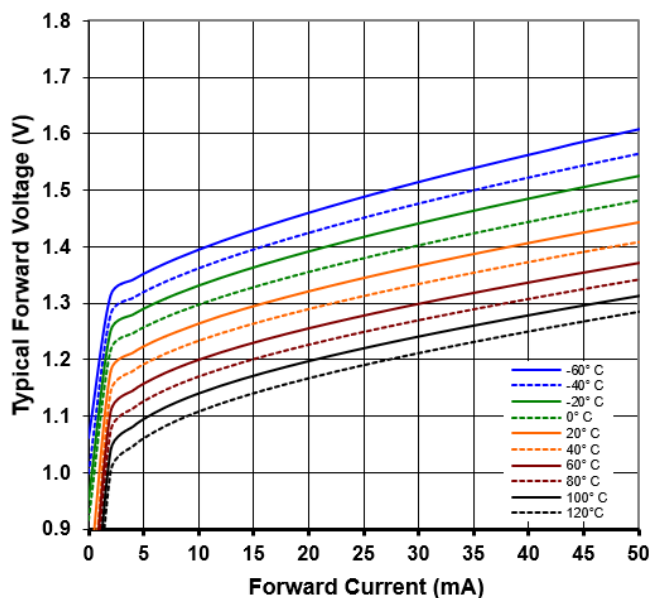
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## Typical Performance



## LED Forward Voltage vs Forward Current vs Temperature



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