

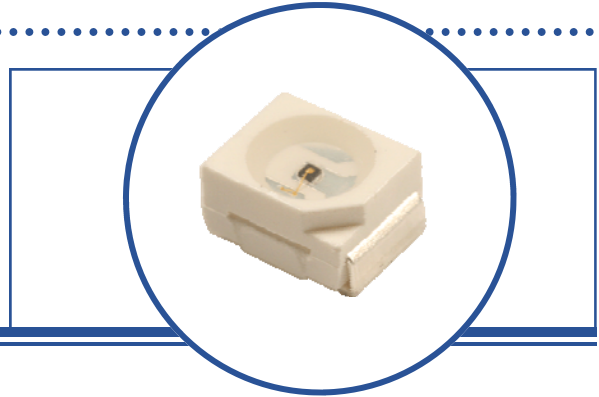
Infrared Light Emitting Diode

OP180 & OP280 Series



Features:

- High power GaAs—OP180, 940 nm center wavelength
- High power GaAlAs—OP280K and OP280KT, 875 nm center wavelength
- VCSEL GaAlAs—OP280V, 850 nm center wavelength
- Point Source GaAlAs—OP280PS, 850 nm center wavelength
- PLCC-2 package style with silicon encapsulation
- Half Power Beam angle from 18° to 100°
- Suitable for single device or array applications



Description:

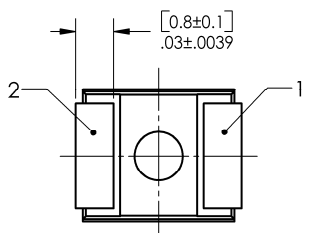
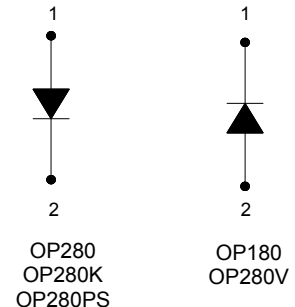
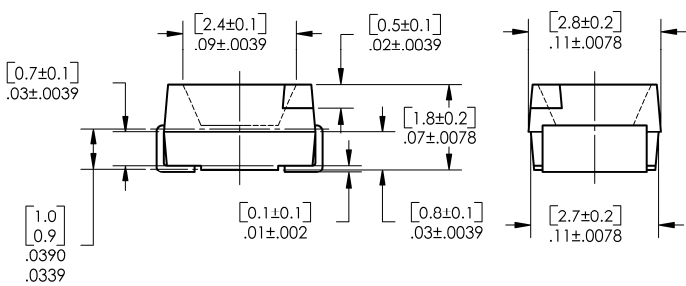
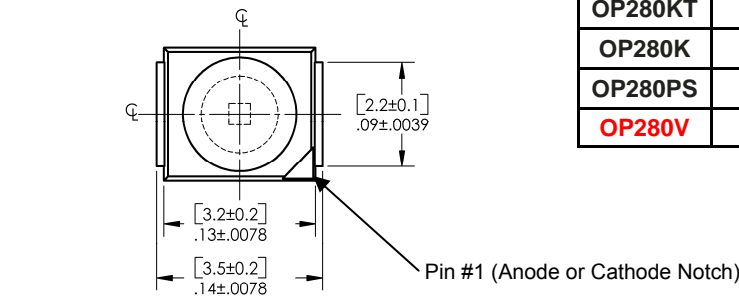
The **OP180** is a GaAs and the **OP280K**, **OP280KT** is a GaAlAs infrared LED mounted in plastic leadless PLCC-2 SMD package with a flat lens window that allows a wide beam angle. The major differentiator from the two High power GaAlAs LEDs is that **OP280KT** has reversed polarity terminals. The **OP280V** is incorporated into the group with a high performance 850nm invisible VCSEL (Class 1M) with silicon encapsulant. Its high speed, high output and narrow beam pattern (18°) makes it very suitable for high-speed data equipment applications. The **OP280PS** has a GaAlAs diode in a PLCC-2 package that features a narrow irradiance pattern. The PLCC-2 packaging is suitable for single device or array applications.

The 180 and 280 Series LEDs are mechanically and spectrally matched to OP580 series phototransistors.

Applications:

- Non-contact position sensing
- Machine automation
- Datum detection
- Optical encoding

| Ordering Information | | | | |
|----------------------|---------------------------------------|---------------------|---------------------|------------------|
| Part Number | Apertured Power (mW/cm ²) | I _F (mA) | LED Peak Wavelength | Half Power Angle |
| OP180 | 0.50 | 20 | 940 nm | 100° |
| OP280KT | 0.85 | 20 | 850 nm | 90° |
| OP280K | 0.85 | 20 | 875 nm | 90° |
| OP280PS | 0.15 | 20 | 850 nm | 50° |
| OP280V | 2.50 | 7 | 850 nm | 18° |



| Pin # | OP180 | OP280KT | OP280K | OP280PS | OP280V |
|-------|---------|---------|---------|---------|---------|
| 1 | Cathode | Cathode | Anode | Anode | Cathode |
| 2 | Anode | Anode | Cathode | Cathode | Anode |



RoHS

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

Infrared Light Emitting Diode

OP180 & OP280 Series



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

| | |
|---|------------------------------------|
| Storage Temperature Range | -40° C to +100° C |
| Operating Temperature Range—OP180, OP280K, OP280KT, OP280PS OP280V | -25° C to +85° C 0° C to +70° C |
| Reverse Voltage OP180, OP280PS, OP280V OP280K, OP280KT | 5.0 V 4.0 V |
| Peak Forward Current [1µs pulse width, 300 pps] | 1.0 A |
| Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 seconds with soldering iron] | 260° C ⁽¹⁾ |
| Power Dissipation | 130 mW ⁽²⁾ |

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

Input Diode

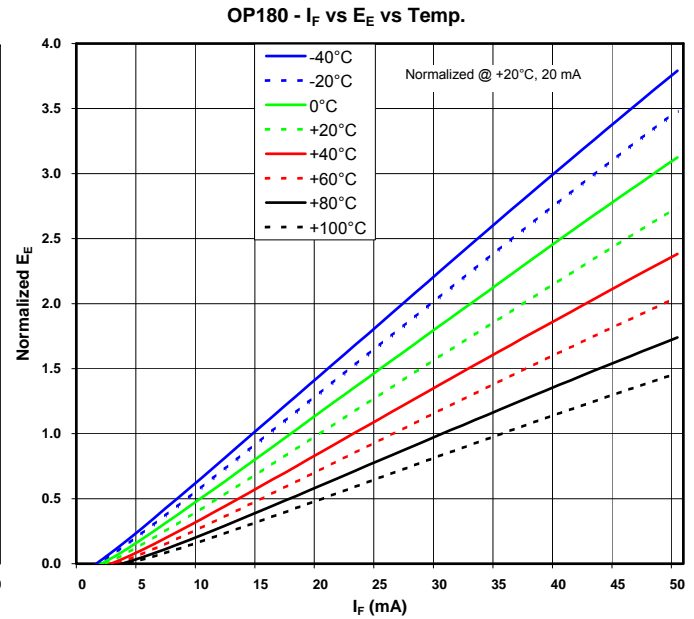
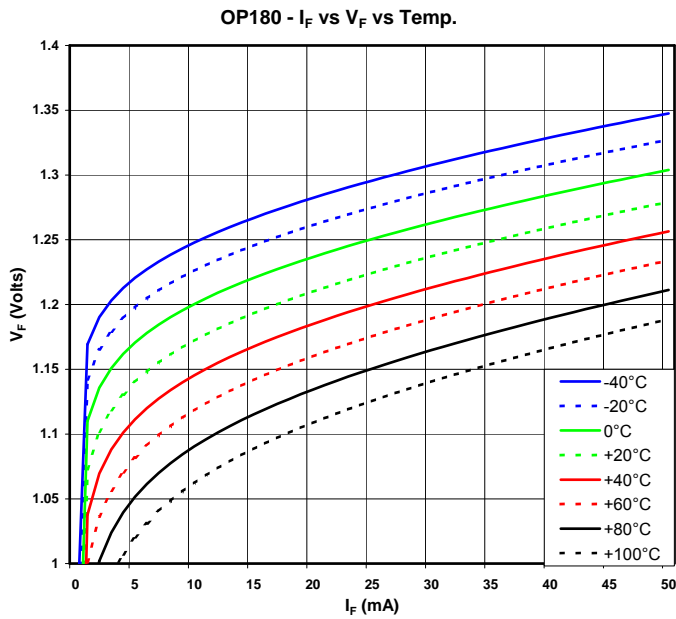
| | | | | | | |
|---------------|--|-----------------------------------|--------------------------------------|--------------------------------------|--------------------|---|
| $E_{E(APT)}$ | Radiant Incidence OP180 OP280 OP280K OP280PS OP280V | 1.5 0.5 20.0 2.8 1.05 | - - 24.0 3.5 - | - - - - - | mW/cm ² | $I_F = 20\text{ mA}$ $I_F = 20\text{ mA}^{(3)}$ $I_F = 20\text{ mA}$ $I_F = 20\text{ mA}$ $I_F = 7\text{ mA}$ |
| V_F | Forward Voltage OP180 OP280K OP280KT OP280V OP280PS | - - - - - | 1.28 1.50 1.55 1.95 1.50 | 1.60 1.80 1.80 2.50 1.80 | V | $I_F = 20\text{ mA}$ $I_F = 20\text{ mA}$ $I_F = 50\text{ mA}$ $I_F = 7\text{ mA}$ $I_F = 20\text{ mA}$ |
| I_R | Reverse Current | - | - | 100 | µA | $V_R = 5.0\text{ V}$ |
| λ_P | Wavelength at Peak Emission OP180 OP280KT OP280PS, OP280K OP280V | - - - - | 940 875 850 | - - - | nm | $I_F = 20\text{ mA}$ $I_F = 7\text{ mA}$ |
| θ_{HP} | Emission Angle at Half Power Points OP180, OP280K, OP280KT OP280PS OP280V | - - - | 100 90 18 | - - - | Degree | $I_F = 20\text{ mA}$ $I_F = 20\text{ mA}$ $I_F = 7\text{ mA}$ |
| t_r | Output Rise Time OP180, OP280K, OP280KT, OP280PS | - | 25 | - | ns | $I_{F(PK)}=50\text{ mA}$, $PW=10\text{ }\mu\text{s}$, and $D.C.=10.0\%$ |
| t_f | Output Fall Time OP180, OP280K, OP280KT, OP280PS | - | 25 | - | ns | |

Notes:

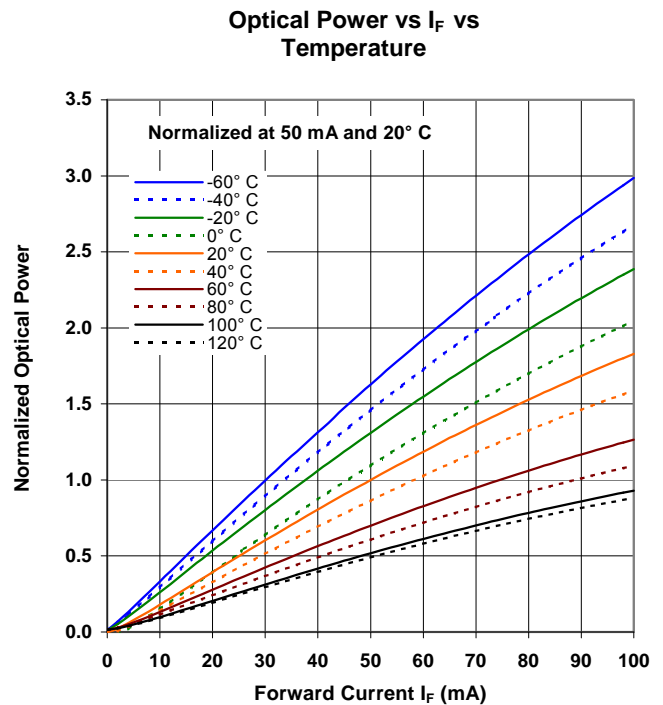
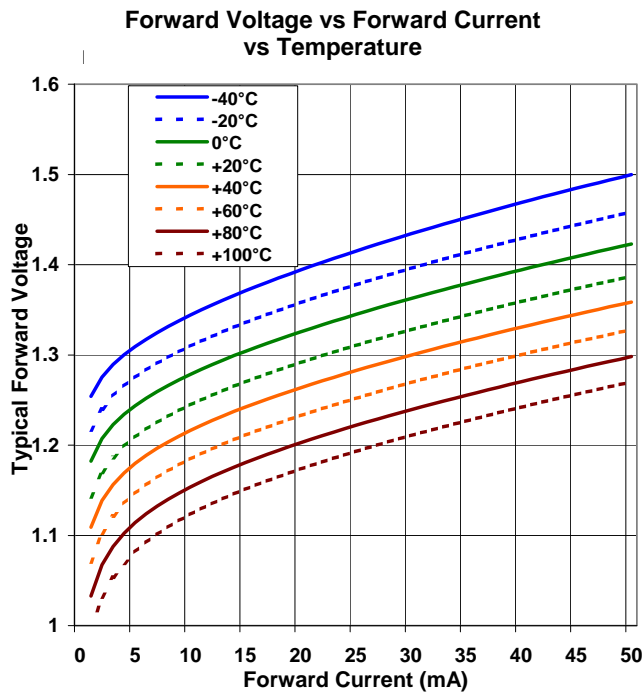
- Solder time less than 5 seconds at temperature extreme.
- Derate linearly at 2.17 mW/° C above 25° C.
- $E_{E(APT)}$ is a measurement of the apertured radiant incidence upon a sensing area 0.081" (2.06 mm) in diameter, perpendicular to and centered on the mechanical axis of the lens and 0.590" (14.99 mm) from the measurement surface. $E_{E(APT)}$ is not necessarily uniform within the measured area.

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

OP180



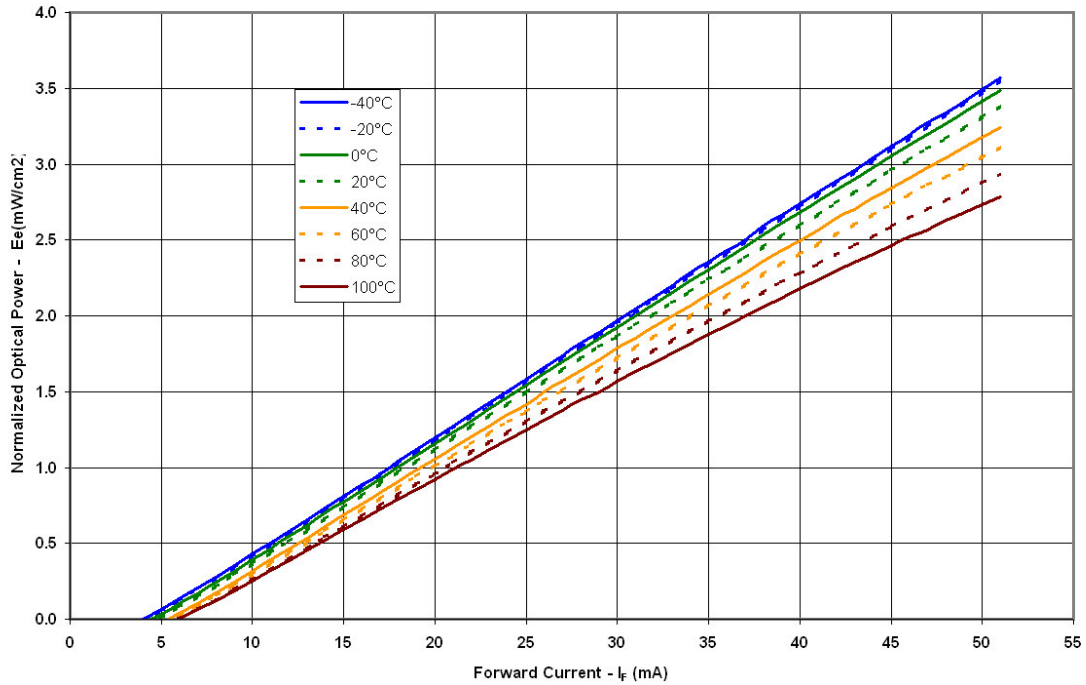
OP280



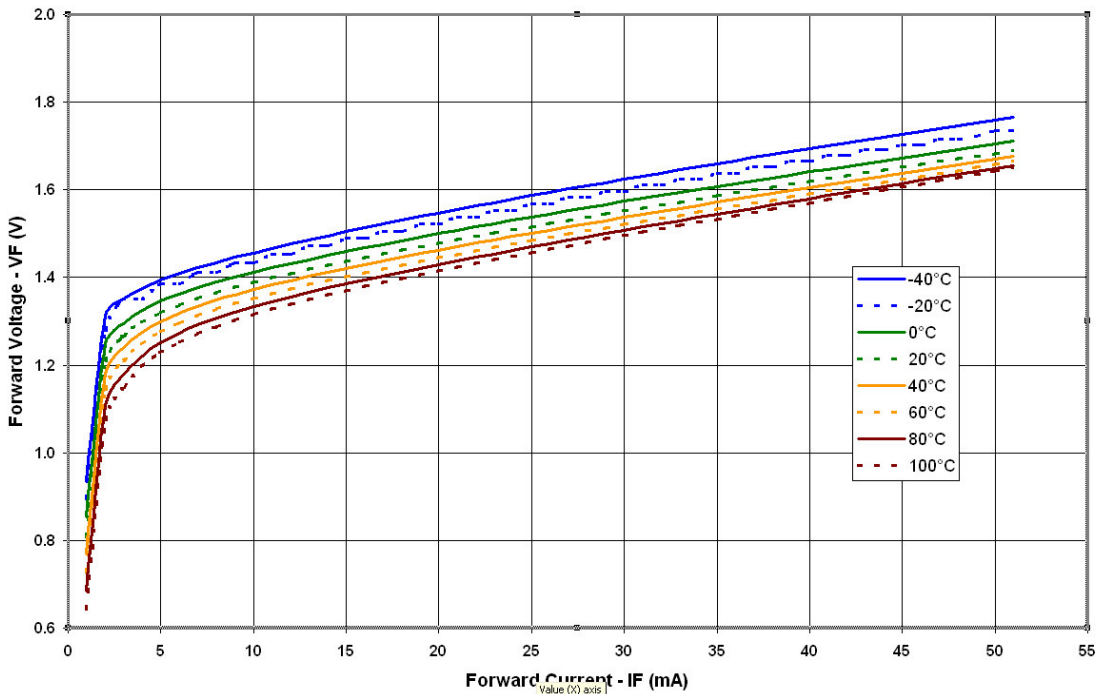
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OP280K

Optical Power - E_e (mW/cm²) vs Forward Current - I_F
 vs Temperature - T_A



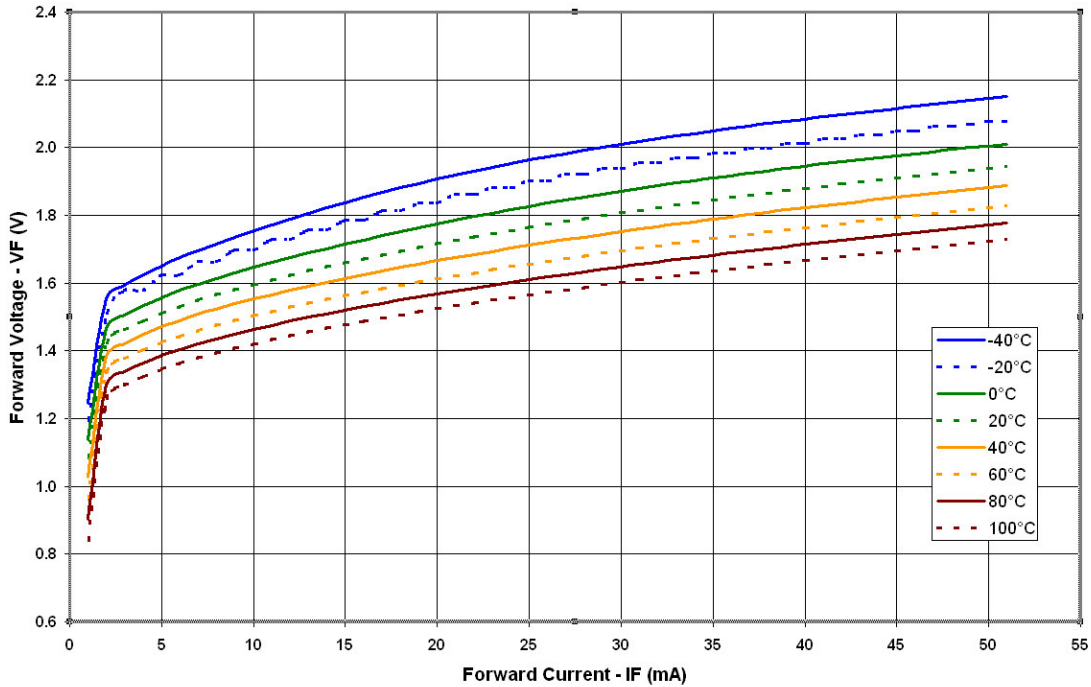
Forward Voltage - V_F vs Forward Current - I_F vs
 Temperature - T_A



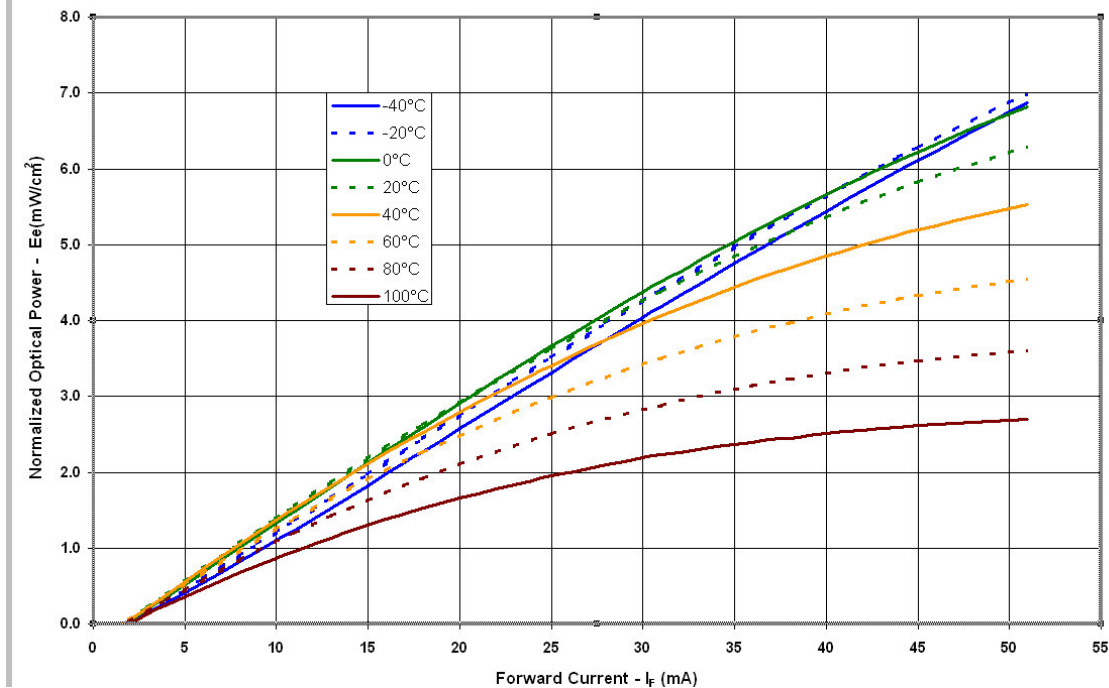
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OP280KT

Forward Voltage - V_F vs Forward Current - I_F vs Temperature - T_A



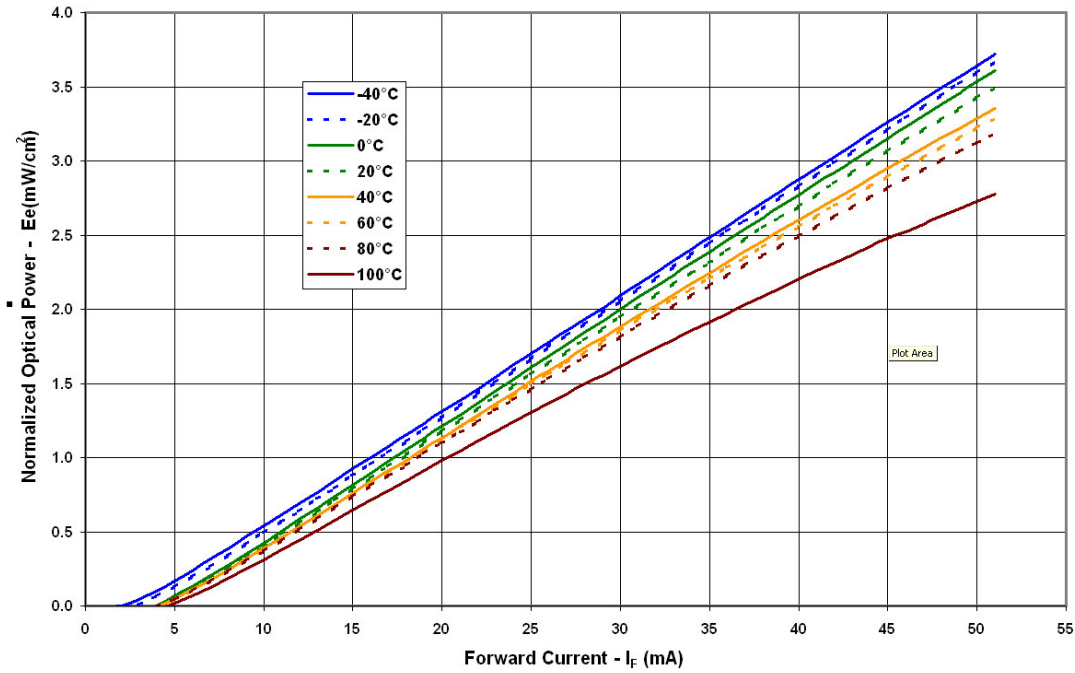
Optical Power - E_e (mW/cm²) vs Forward Current - I_F vs Temperature - T_A



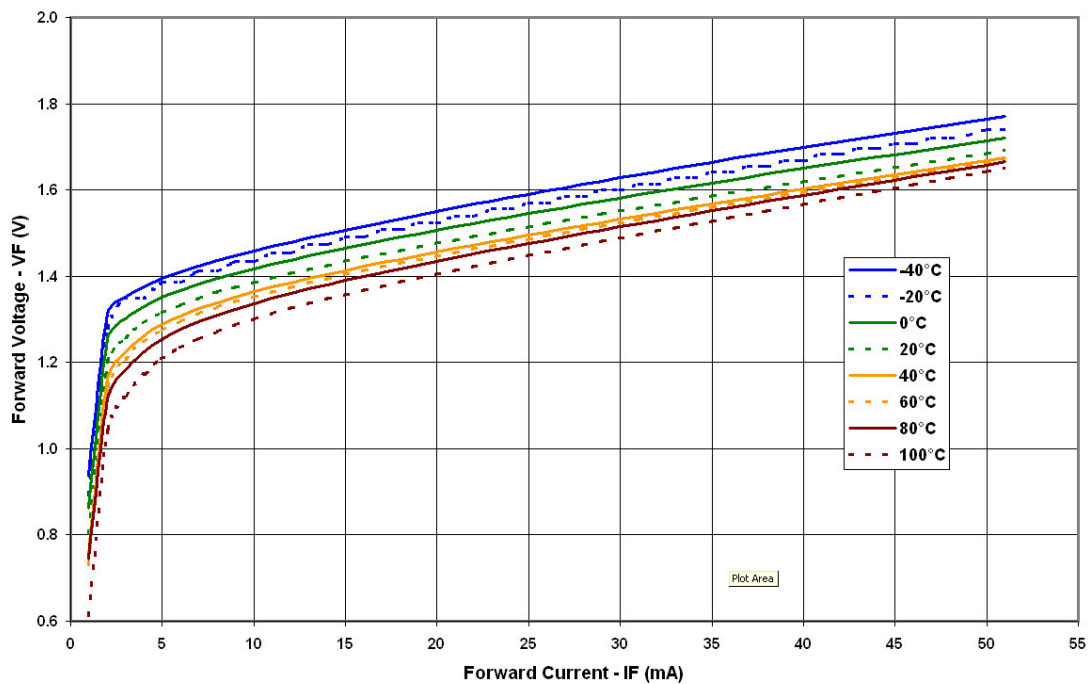
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OP280PS

**Optical Power - $E_e(\text{mW}/\text{cm}^2)$ vs Forward Current - I_F
vs Temperature - T_A**



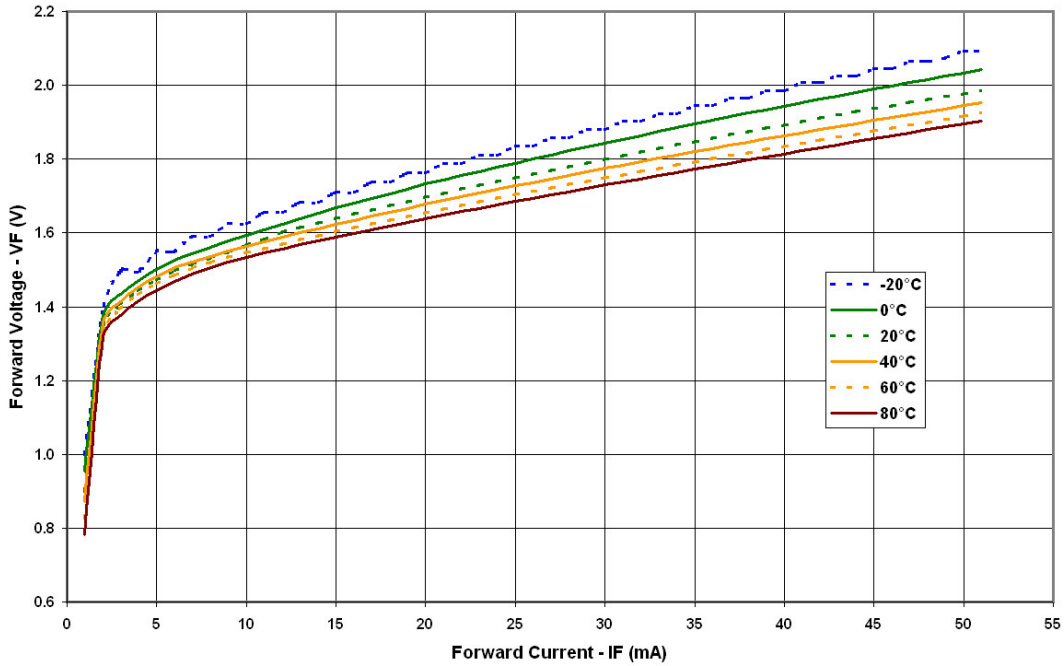
**Forward Voltage - V_F vs Forward Current - I_F vs
Temperature - T_A**



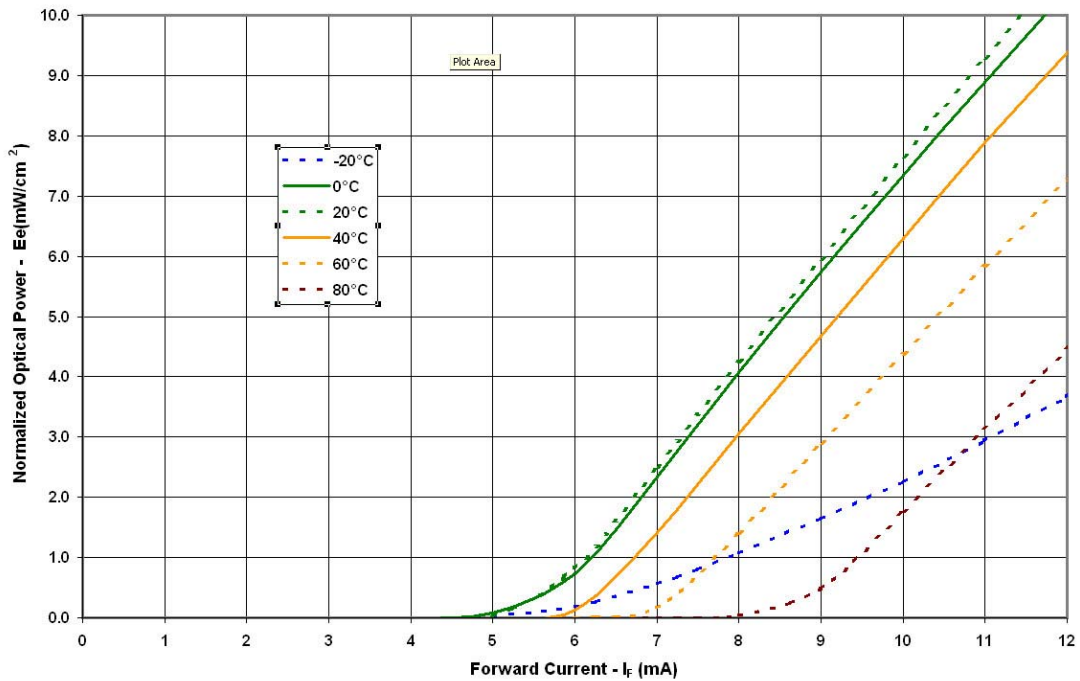
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OP280V

Forward Voltage - V_F vs Forward Current - I_F vs Temperature - T_A



Optical Power - E_e (mW/cm²) vs Forward Current - I_F vs Temperature - T_A



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