



T-41-49  
**Spectra-Band  
 Photocell Series**

A series of spectral-response silicon photocells designed for unique product applications.

### VIO-BLUE

Enhanced violet and blue response. Also can be used in U.V. detection because of high sensitivity to short wavelength radiation.

### GREEN BLAZE

Photopic curve response for use in innumerable light response applications — with high reliability and low cost.

### INFRA-R

Visible cut-off, high infrared response. Solves ambient light problems in IR activated photoelectric applications.

### FEATURES

- Select spectral response
- No bias power source needed
- High temperature stability and high sensitivity through silicon construction
- Low noise
- High reliability
- A wide variety of sizes and packages, special geometries available

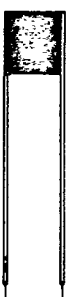
### APPLICATIONS

- Photographic equipment
- Color, pattern recognition equipment
- Light discriminating systems

### SPECTRA-BAND PHOTOCELLS

TOIs' special spectral response photocells are designed for the photographic industry, photometric instrumentation, and photoelectric control/switching applications.

### MECHANICAL SPECIFICATIONS

| Spectra-Band Cell Configurations |  |  |  |  |  |  |  |
|----------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                  | Part Number                                                                        | Part Number                                                                        | Part Number                                                                        | Part Number                                                                        | Part Number                                                                          | Part Number                                                                          | Part Number                                                                          |
| GREEN BLAZE                      | GB02505EPL                                                                         | GB0505EPL                                                                          | GB1010EPL                                                                          | GB1020EPL                                                                          | GBTO-18                                                                              | GBTO-5                                                                               | GBTO-8                                                                               |
| INFRA-R                          | FR02505EPL                                                                         | FR0505EPL                                                                          | FR1010EPL                                                                          | FR1020EPL                                                                          | FRTO-18                                                                              | FRTO-5                                                                               | FRTO-8                                                                               |
| VIO-BLUE                         | VB02505EPL                                                                         | VB0505EPL                                                                          | VB1010EPL                                                                          | VB1020EPL                                                                          | VBTO-18                                                                              | VBTO-5                                                                               | VBTO-8                                                                               |
| Package                          | Coated Cell                                                                        | Coated Cell                                                                        | Coated Cell                                                                        | Coated Cell                                                                        | Modified TO-18                                                                       | TO-5                                                                                 | TO-8                                                                                 |
| Lead Termination                 | 6" Length Std.                                                                     | 6" Length Std.                                                                     | 6" Length Std.                                                                     | 6" Length Std.                                                                     | Leads                                                                                | Leads                                                                                | Leads                                                                                |
| Cell Dimensions                  | In.                                                                                | 0.1 x 0.2                                                                          | 0.2 x 0.2                                                                          | 0.4 x 0.4                                                                          | 0.4 x 0.8                                                                            | 0.055 x 0.055                                                                        | 0.1 x 0.2                                                                            |
|                                  | Cm.                                                                                | 0.25 x 0.5                                                                         | 0.5 x 0.5                                                                          | 1.0 x 1.0                                                                          | 1.0 x 2.0                                                                            | 0.14 x 0.14                                                                          | 0.25 x 0.5                                                                           |
| Active Area (Sq. Cm.)            | 0.1                                                                                | 0.2                                                                                | 0.9                                                                                | 1.8                                                                                | 0.018                                                                                | 0.1                                                                                  | 0.5                                                                                  |



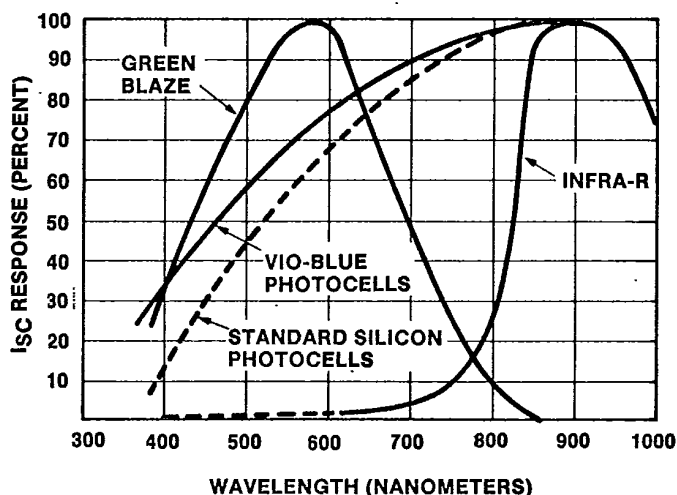
# Spectra-Band Photocell Series

## TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

| INFRA-R SERIES        |          |         |                                              |            |           |           |           |         |        |        |
|-----------------------|----------|---------|----------------------------------------------|------------|-----------|-----------|-----------|---------|--------|--------|
| Parameter             | Symbol   | Unit    | Test Condition                               | FR02505EPL | FR0505EPL | FR1010EPL | FR1020EPL | FRT0-18 | FRT0-5 | FRT0-8 |
| Short Circuit Current | $I_{SC}$ | mA      | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 1.3        | 2.6       | 11.5      | 23.0      | 0.3     | 1.3    | 6.4    |
| Open Circuit Voltage  | $V_{OC}$ | Volts   | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.55       | 0.55      | 0.55      | 0.55      | 0.55    | 0.55   | 0.55   |
| Forward Voltage       | $V_F$    | Volts   | $I_F = 1$ mA                                 | 0.50       | 0.50      | 0.45      | 0.40      | 0.50    | 0.50   | 0.45   |
| Dark Current          | $I_D$    | $\mu$ A | $V_R = 0.1$ V                                | 0.2        | 0.4       | 0.8       | 0.9       | 0.2     | 0.2    | 0.5    |
| Capacitance           | $C_T$    | pF      | $V_R = 0$ V                                  | 1.0        | 3.0       | 10.0      | 15.0      | 1.0     | 1.0    | 8.0    |
| Responsivity          | $R_e$    | A/W     | $\lambda_p = 900$ nm, $V_R = 0$              | 0.45       | 0.45      | 0.45      | 0.45      | 0.40    | 0.40   | 0.40   |

| VIO-BLUE SERIES       |          |         |                                              |            |           |           |           |         |        |        |
|-----------------------|----------|---------|----------------------------------------------|------------|-----------|-----------|-----------|---------|--------|--------|
| Parameter             | Symbol   | Unit    | Test Condition                               | VB02505EPL | VB0505EPL | VB1010EPL | VB1020EPL | VBTO-18 | VBTO-5 | VBTO-8 |
| Short Circuit Current | $I_{SC}$ | mA      | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 2.3        | 4.7       | 21.0      | 42.0      | 0.5     | 2.3    | 11.6   |
| Open Circuit Voltage  | $V_{OC}$ | Volts   | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.55       | 0.55      | 0.55      | 0.55      | 0.55    | 0.55   | 0.55   |
| Forward Voltage       | $V_F$    | Volts   | $I_F = 1$ mA                                 | 0.50       | 0.50      | 0.45      | 0.40      | 0.50    | 0.50   | 0.45   |
| Dark Current          | $I_D$    | $\mu$ A | $V_R = 0.1$ V                                | 0.2        | 0.4       | 0.8       | 0.9       | 0.2     | 0.2    | 0.5    |
| Capacitance           | $C_T$    | pF      | $V_R = 0$ V                                  | 1.0        | 3.0       | 10.0      | 15.0      | 1.0     | 1.0    | 8.0    |
| Responsivity          | $R_e$    | A/W     | $\lambda_p = 900$ nm, $V_R = 0$              | 0.48       | 0.48      | 0.48      | 0.48      | 0.44    | 0.44   | 0.44   |

| GREEN-BLAZE SERIES    |          |         |                                              |            |           |           |           |         |        |        |
|-----------------------|----------|---------|----------------------------------------------|------------|-----------|-----------|-----------|---------|--------|--------|
| Parameter             | Symbol   | Unit    | Test Condition                               | GB02505EPL | GB0505EPL | GB1010EPL | GB1020EPL | GBTO-18 | GBTO-5 | GBTO-8 |
| Short Circuit Current | $I_{SC}$ | mA      | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.27       | 0.55      | 2.5       | 5.0       | 0.06    | 0.27   | 1.38   |
| Open Circuit Voltage  | $V_{OC}$ | Volts   | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.47       | 0.47      | 0.47      | 0.47      | 0.47    | 0.47   | 0.47   |
| Forward Voltage       | $V_F$    | Volts   | $I_F = 1$ mA                                 | 0.50       | 0.45      | 0.45      | 0.40      | 0.50    | 0.50   | 0.45   |
| Dark Current          | $I_D$    | $\mu$ A | $V_R = 0.1$ V                                | 0.3        | 0.4       | 0.8       | 1.0       | 0.3     | 0.3    | 0.5    |
| Capacitance           | $C_T$    | pF      | $V_R = 0$ V                                  | 1.0        | 2.0       | 3.0       | 5.0       | 1.0     | 1.0    | 2.0    |
| Responsivity          | $R_e$    | A/W     | $\lambda_p = 555$ nm                         | 0.20       | 0.20      | 0.20      | 0.20      | 0.19    | 0.19   | 0.19   |



TYPICAL SPECTRAL RESPONSE CHARACTERISTICS  
— NORMALIZED

## TYPICAL SHORT CIRCUIT CURRENT ( $I_{SC}$ ) RESPONSE

- Standard Silicon Photovoltaic Cell (at 900 nm) ~ 0.48 A/W
- Vio-Blue (at 900 nm) ~ 0.48 A/W
- Green Blaze (at 555 nm) ~ 0.20 A/W
- Infra-R (at 900 nm) ~ 0.45 A/W



Texas Optoelectronics, Inc.

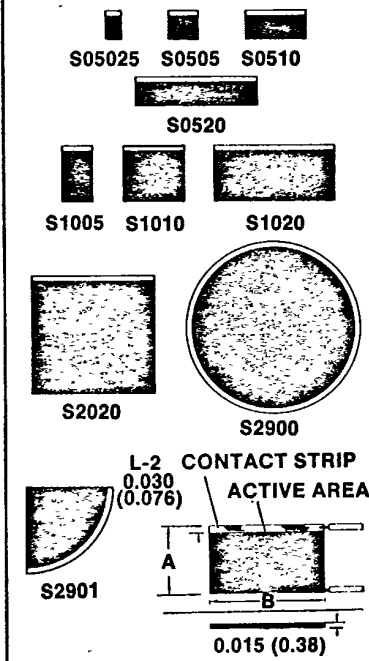
# Silicon Photocell Sensors

## SILICON PHOTOCELL SENSORS

TOI silicon photocells are employed in photometer, switching, position detection, tape and disc EOT-BOT sensing, solar energy conversion, and other numerous applications. Silicon photosensors with special geometries, spectral response and switching characteristics, are available on a custom basis, and are widely used in the optical encoder, character recognition, and optical instrumentation fields.

### STANDARD CELL OUTLINES

Also available as gridded type.



| Standard Size Part Numbers | Cell Dimensions          |            | Photo Active Area |                 | (1) Test Voltage (Volts) |
|----------------------------|--------------------------|------------|-------------------|-----------------|--------------------------|
|                            | in.                      | cm.        | in. <sup>2</sup>  | cm <sup>2</sup> |                          |
| S05025                     | 0.20 x 0.10              | 0.5 x 0.25 | .017              | 0.1             | .43                      |
| S0505                      | 0.20 x 0.20              | 0.5 x 0.5  | .034              | 0.2             | .43                      |
| S0510                      | 0.20 x 0.40              | 0.5 x 1.0  | .068              | 0.4             | .43                      |
| S0520                      | 0.20 x 0.80              | 0.5 x 2.0  | .136              | 0.8             | .43                      |
| S1005                      | 0.40 x 0.20              | 1.0 x 0.5  | .074              | 0.4             | .43                      |
| S1010                      | 0.40 x 0.40              | 1.0 x 1.0  | .148              | 0.9             | .43                      |
| S1020                      | 0.40 x 0.80              | 1.0 x 2.0  | .296              | 1.9             | .43                      |
| S2020                      | 0.80 x 0.80              | 2.0 x 2.0  | .620              | 3.8             | .43                      |
| S2900                      | 1.125 Dia.               | 2.86       | .88               | 5.7             | .43                      |
| S2901                      | Quarter Section of S2900 | —          | .22               | 1.4             | .43                      |

NOTE: (1) Irradiance: 100 mW/cm<sup>2</sup>, AM1 solar radiation.

### Part Number Code for Ordering Silicon Light Sensors

EXAMPLE:

| Silicon       | "A" Width                                                         | "B" Length | Gridded Type                                            | Device Type | Minimum Conversion Efficiency | Leads If Desired     |
|---------------|-------------------------------------------------------------------|------------|---------------------------------------------------------|-------------|-------------------------------|----------------------|
| (Outline L-2) | 05 = 0.20" (0.5 cm)<br>10 = 0.40" (1.0 cm)<br>20 = 0.80" (2.0 cm) |            | Add "G" for cells 0.4" x 0.4" (1.0 x 1.0 cm) and larger | "E" P on N  | 5% to 10% (6 = 6%, etc.)      | PL — (Pigtail Leads) |

## TYPICAL PERFORMANCE CHARACTERISTICS

### STANDARD SILICON PHOTOCELL

| Parameter             | Symbol          | Unit  | Test Condition                               | S05025 | S0505 | S0510 | S0520 | S1005 |
|-----------------------|-----------------|-------|----------------------------------------------|--------|-------|-------|-------|-------|
| Short Circuit Current | I <sub>SC</sub> | mA    | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 1.8    | 3.8   | 7.5   | 15.0  | 7.5   |
| Short Circuit Current | I <sub>SC</sub> | mA    | 100 fc, Tungsten @ 2870°K                    | 0.07   | 0.13  | 0.27  | 0.54  | 0.27  |
| Open Circuit Voltage  | V <sub>OC</sub> | Volts | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.43   | 0.43  | 0.43  | 0.43  | 0.43  |
| Forward Voltage       | V <sub>F</sub>  | Volts | I <sub>F</sub> = 1 mA                        | 0.50   | 0.50  | 0.42  | 0.42  | 0.42  |
| Dark Current          | I <sub>D</sub>  | μA    | V <sub>R</sub> = 0.1 V                       | 0.3    | 0.5   | 0.6   | 0.8   | 0.6   |
| Capacitance           | C <sub>T</sub>  | pF    | V <sub>R</sub> = 0 V                         | 1.5    | 2.4   | 5.0   | 10.0  | 5.0   |
| Responsivity          | R <sub>e</sub>  | A/W   | λ <sub>p</sub> = 900 nm                      | 0.48   | 0.48  | 0.48  | 0.48  | 0.48  |

### STANDARD SILICON PHOTOCELL (Continued)

| Parameter             | Symbol          | Unit  | Test Condition                               | S1010 | S1020 | S2020 | S2900 | S2901 |
|-----------------------|-----------------|-------|----------------------------------------------|-------|-------|-------|-------|-------|
| Short Circuit Current | I <sub>SC</sub> | mA    | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 17.0  | 35.0  | 72.0  | 105.0 | 27.0  |
| Short Circuit Current | I <sub>SC</sub> | mA    | 100 fc, Tungsten @ 2870°K                    | 0.55  | 1.10  | 2.2   | 3.3   | 0.8   |
| Open Circuit Voltage  | V <sub>OC</sub> | Volts | 100 mW/cm <sup>2</sup> , AM1 Solar Radiation | 0.43  | 0.43  | 0.43  | 0.43  | 0.43  |
| Forward Voltage       | V <sub>F</sub>  | Volts | I <sub>F</sub> = 1 mA                        | 0.42  | 0.40  | 0.30  | 0.25  | 0.40  |
| Dark Current          | I <sub>D</sub>  | μA    | V <sub>R</sub> = 0.1 V                       | 0.8   | 1.8   | 25.0  | 100.0 | 100.0 |
| Capacitance           | C <sub>T</sub>  | pF    | V <sub>R</sub> = 0 V                         | 20.0  | 25.0  | 70.0  | 90.0  | 25.0  |
| Responsivity          | R <sub>e</sub>  | A/W   | λ <sub>p</sub> = 900 nm                      | 0.48  | 0.48  | 0.48  | 0.48  | 0.48  |