

Ambient Light Sensor in 0805 Package



DESCRIPTION

TEMT6200FX01 ambient light sensor is a silicon NPN epitaxial planar phototransistor in a miniature transparent 0805 package for surface mounting. It is sensitive to visible light much like the human eye and has peak sensitivity at 550 nm.

FEATURES

- Package type: surface mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- AEC-Q101 qualified
- High photo sensitivity
- Adapted to human eye responsivity
- Supression filter for near infrared radiation
- Angle of half sensitivity: $\phi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, acc. J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

- Automotive sensors
- Ambient light sensor for display backlight dimming in:
 - Mobile phones
 - Notebook computers
 - PDAs
 - Cameras
 - Dashboards

PRODUCT SUMMARY

| COMPONENT | I_{PCE} (μA) | ϕ (deg) | $\lambda_{0.5}$ (nm) |
|--------------|-----------------------|--------------|----------------------|
| TEMT6200FX01 | 23 | ± 60 | 450 to 610 |

Note

- Test condition see table "Basic Characteristics"

ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS | PACKAGE FORM |
|---------------|---------------|---|--------------|
| TEMT6200FX01 | Tape and reel | MOQ: 3000 pcs, 3000 pcs/reel. Label with I_{PCE} group on each reel. Specifications of group A/B/C see table "Type Dedicated Characteristics" | 0805 |

Note

- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25^\circ C$, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|-------------------------------------|--|------------|-------------|------------|
| Collector emitter voltage | | V_{CEO} | 6 | V |
| Emitter collector voltage | | V_{ECO} | 1.5 | V |
| Collector current | | I_C | 20 | mA |
| Power dissipation | | P_V | 100 | mW |
| Junction temperature | | T_j | 100 | $^\circ C$ |
| Operating temperature range | | T_{amb} | -40 to +100 | $^\circ C$ |
| Storage temperature range | | T_{stg} | -40 to +100 | $^\circ C$ |
| Soldering temperature | Acc. reflow profile fig. 9 | T_{sd} | 260 | $^\circ C$ |
| Thermal resistance junction/ambient | Soldered on PCB with pad dimensions: 4 mm x 4 mm | R_{thJA} | 450 | K/W |



Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|---|---|-----------------|------|------------|------|---------------|
| PARAMETER | TEST CONDITION | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Collector emitter breakdown voltage | $I_C = 0.1\text{ mA}$ | V_{CEO} | 6 | | | V |
| Collector dark current | $V_{CE} = 5\text{ V}$, $E = 0\text{ lx}$ | I_{CEO} | | 3 | 50 | nA |
| Collector emitter capacitance | $V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ lx}$ | C_{CEO} | | 16 | | pF |
| Photo current | $E_V = 20\text{ lx}$, CIE illuminant A, $V_{CE} = 5\text{ V}$ | I_{PCE} | | 4.6 | | μA |
| | $E_V = 100\text{ lx}$, CIE illuminant A, $V_{CE} = 5\text{ V}$ | I_{PCE} | 7.5 | 23 | 39 | μA |
| Temperature coefficient of I_{PCE} | CIE illuminant A | TK_{IPCE} | | 1.18 | | %/K |
| | LED, white | TK_{IPCE} | | 0.9 | | %/K |
| Angle of half sensitivity | | ϕ | | ± 60 | | deg |
| Wavelength of peak sensitivity | | λ_p | | 550 | | nm |
| Range of spectral bandwidth | | $\lambda_{0.5}$ | | 450 to 610 | | nm |
| Collector emitter saturation voltage | $E_V = 20\text{ lx}$, $0.45\text{ }\mu\text{A}$ | V_{CEsat} | | 0.1 | | V |

| TYPE DEDICATED CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | |
|--|---|--------------|-----------|------|------|---------------|
| PARAMETER | TEST CONDITION | BINNED GROUP | SYMBOL | MIN. | MAX. | UNIT |
| Photo current | $E_V = 100\text{ lx}$, CIE illuminant A, $V_{CEtZ51} = 5\text{ V}$ | A | I_{PCE} | 7.5 | 15 | μA |
| | | B | I_{PCE} | 12 | 24 | μA |
| | | C | I_{PCE} | 19.5 | 39 | μA |

Note

- Each 3000 piece packing unit will contain a single group. The label on the bag will indicate which binned group is in the bag. A specific group cannot be ordered. Production shipments containing multiple bags will likely include multiple groups. Please design accordingly.

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)



Fig. 2 - Collector Dark Current vs. Ambient Temperature



Fig. 5 - Photo Current vs. Collector Emitter Voltage



Fig. 3 - Relative Photo Current vs. Ambient Temperature

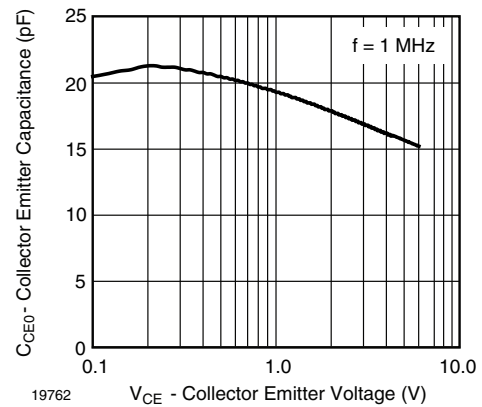


Fig. 6 - Collector Emitter Capacitance vs. Collector Emitter Voltage

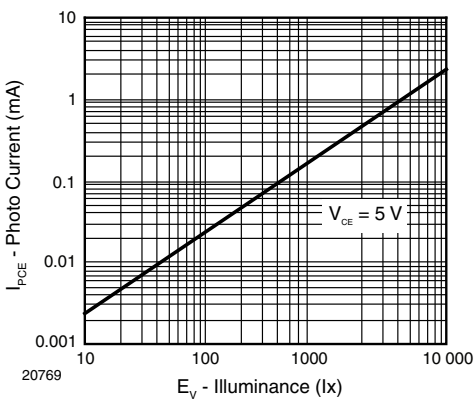


Fig. 4 - Photo Current vs. Illuminance

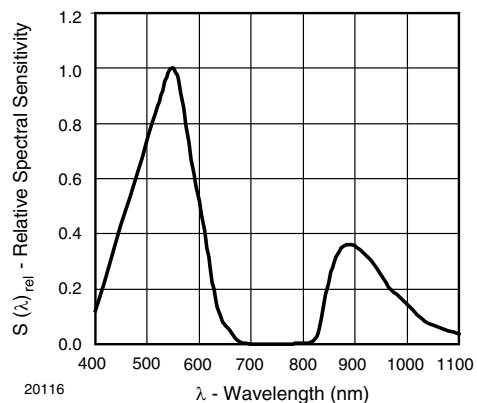


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

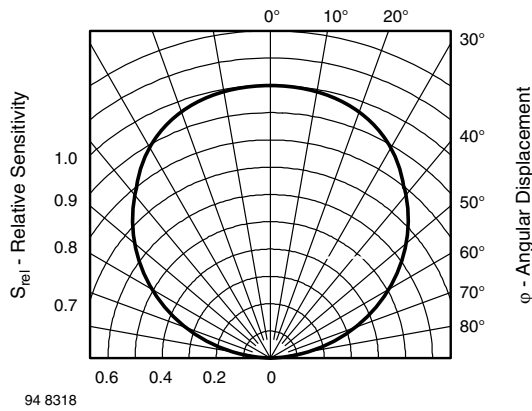


Fig. 8 - Relative Radiant Sensitivity vs. Angular Displacement

REFLOW SOLDER PROFILE

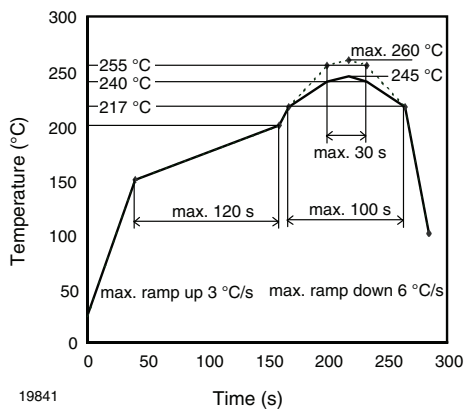


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

DRYPACK

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

FLOOR LIFE

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

Floor life: 168 h

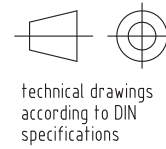
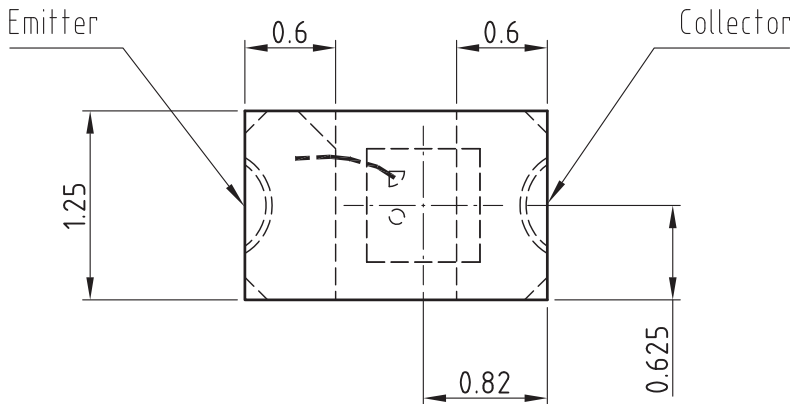
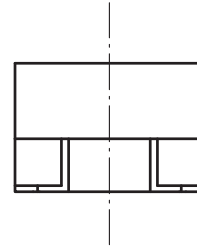
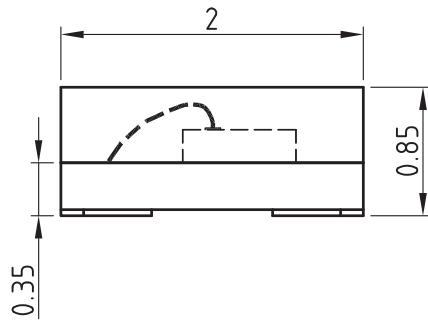
Conditions: $T_{amb} < 30\text{ }^{\circ}\text{C}$, $RH < 60\%$

DRYING

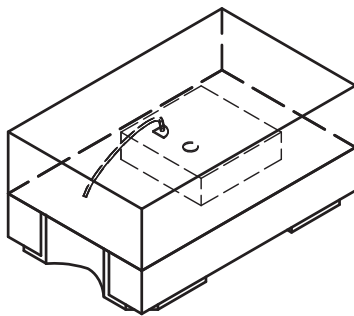
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at $40\text{ }^{\circ}\text{C} (+ 5\text{ }^{\circ}\text{C})$, $RH < 5\%$.



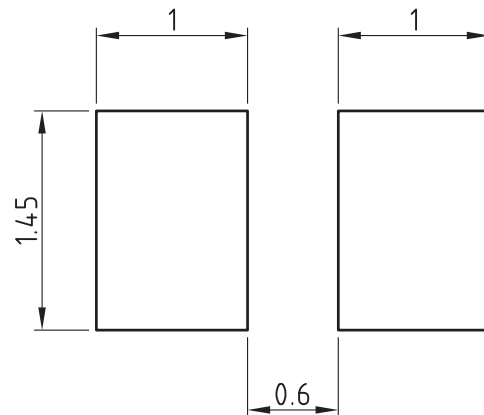
PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ±0.1



Recommended solder pad Footprint



Drawing-No.: 6.541-5063.01-4

Issue: 3; 23.02.07

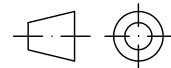
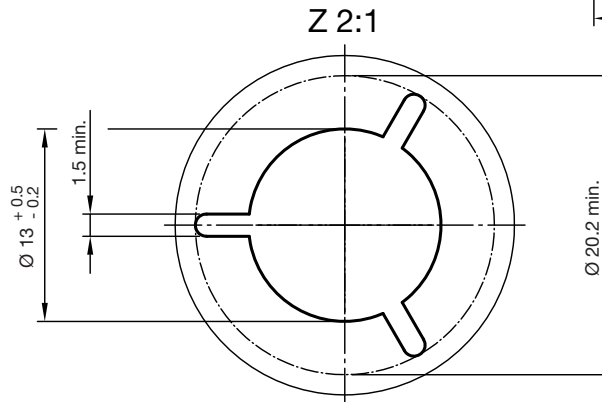
19757



REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.



technical drawings according to DIN specifications

Drawing-No.: 9.800-5096.01-4

Issue: 2; 26.04.10

20875



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