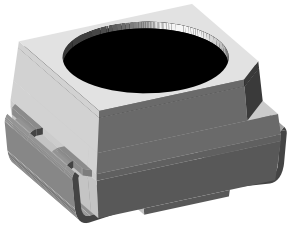
Silicon NPN Phototransistor

Description

TEMT3700F is a high speed silicon NPN epitaxial planar phototransistor in a miniature PLCC-2 package with integrated IR band pass filter (950 nm).



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Features

- High sensitivity
- IR Filter (950 nm band pass)
- Suitable for near infrared radiation
- Extra wide viewing angle $\varphi = \pm 60°$
- Fast response times
- PLCC-2 SMD package
- Package notch = collector
- No base terminal
- Matched to IR emitter TSMS3700 and TSML3710
- Lead-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Applications

Touch sensors
Transmissive sensors
Reflective sensors

Parts Table

Part	Ordering code	Remarks
TEMT3700F-GS08	TEMT3700F-GS08	MOQ: 7500 pc (5 reels)
TEMT3700F-GS18	TEMT3700F-GS18	MOQ: 8000 pc (1 reel)

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Collector Emitter Voltage		V_{CEO}	70	V
Emitter Collector Voltage		V_{ECO}	5	V
Collector current		I_C	50	mA
Collector peak current	$t_p/T \leq 0.1$, $t_p \leq 10$ µs	I_{CM}	100	mA
Total Power Dissipation	$T_{amb} \leq 55$ °C	P_{tot}	100	mW
Junction Temperature		T_j	100	°C
Storage Temperature Range		T_{stg}	- 40 to + 100	°C
Soldering Temperature	$t \leq 3$ s	T_{sd}	260	°C
Thermal Resistance Junction/ Ambient		R_{thJA}	450	K/W

Electrical Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector Emitter Breakdown Voltage	I_C = 1 mA	$V_{(BR)CEO}$	70			V
Collector-emitter dark current	V_{CE} = 20 V, E = 0	I_{CEO}		1	200	nA
Collector-emitter capacitance	V_{CE} = 5 V, f = 1 MHz, E=0	C_{CEO}		3		pF

Optical Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector Light Current	E_e = 1 mW/cm², λ = 950 nm, V_{CE} = 5 V	I_{ca}	0.25	0.5		mA
Angle of Half Sensitivity		φ		± 60		deg
Wavelength of Peak Sensitivity		λ_p		940		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		860 to 1050		nm
Collector Emitter Saturation Voltage	E_e = 1 mW/cm², λ = 950 nm, I_C = 0.1 mA	V_{CEsat}		0.15	0.3	V
Rise Time / Fall Time	V_S = 5 V, I_C = 1 mA, λ = 950 nm, R_L = 1 kΩ	t_r / t_f		6		µs
	V_S = 5 V, I_C = 1 mA, λ = 950 nm, R_L = 100 Ω	t_r / t_f		2		µs
Cut-Off Frequency	V_S = 5 V, I_C = 2 mA, R_L = 100 Ω	f_c		180		kHz

Typical Characteristics (Tamb = 25 °C unless otherwise specified)

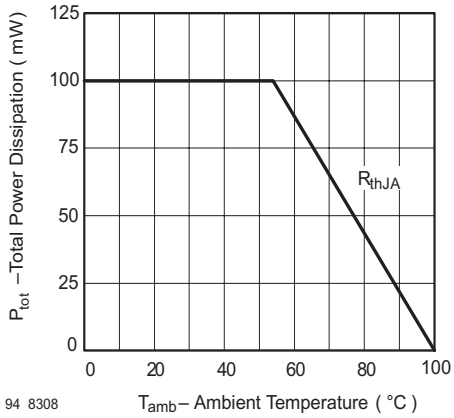

Figure 1. Total Power Dissipation vs. Ambient Temperature

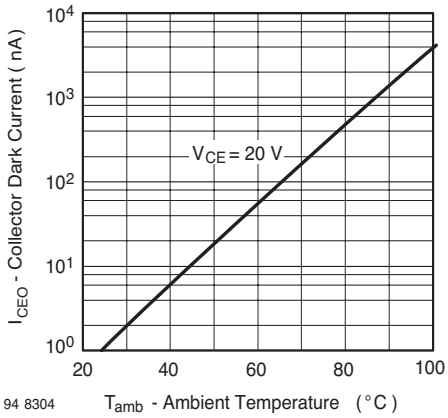

Figure 2. Collector Dark Current vs. Ambient Temperature

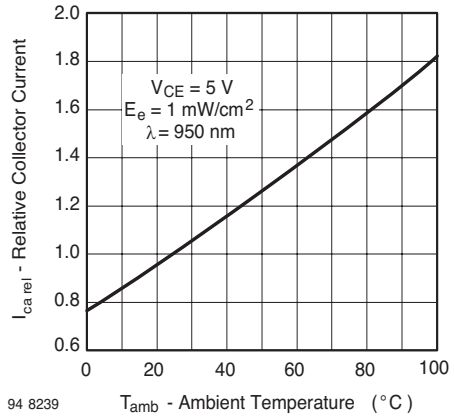

Figure 3. Relative Collector Current vs. Ambient Temperature

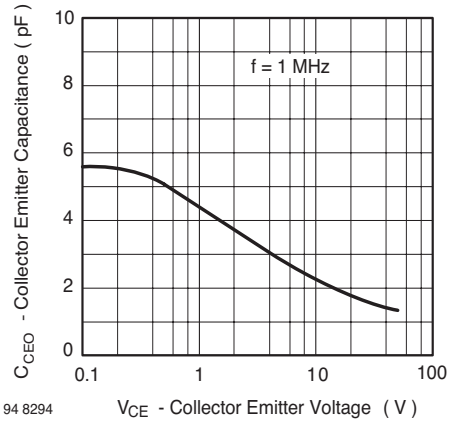

Figure 6. Collector Emitter Capacitance vs. Collector Emitter Voltage

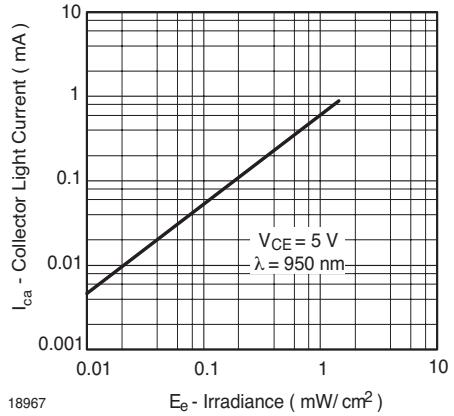

Figure 4. Collector Light Current vs. Irradiance

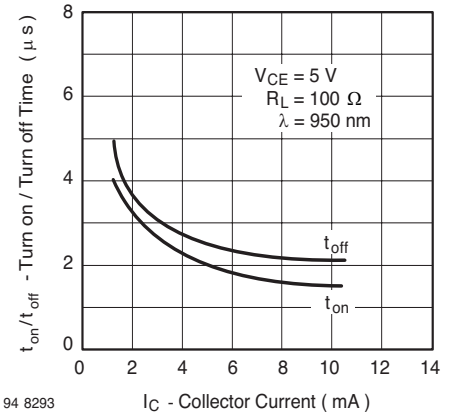

Figure 7. Turn On/Turn Off Time vs. Collector Current

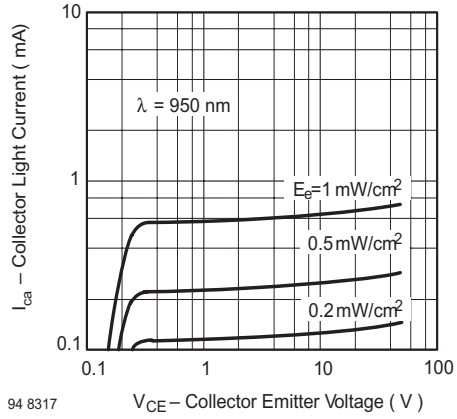

Figure 5. Collector Light Current vs. Collector Emitter Voltage

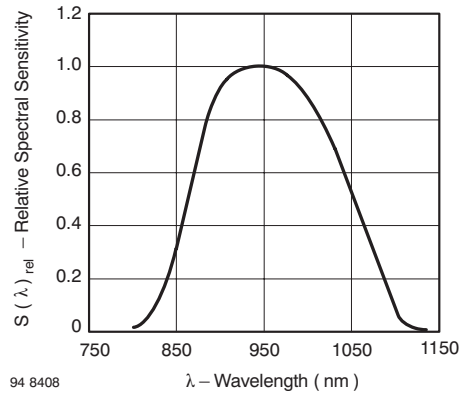

Figure 8. Relative Spectral Sensitivity vs. Wavelength

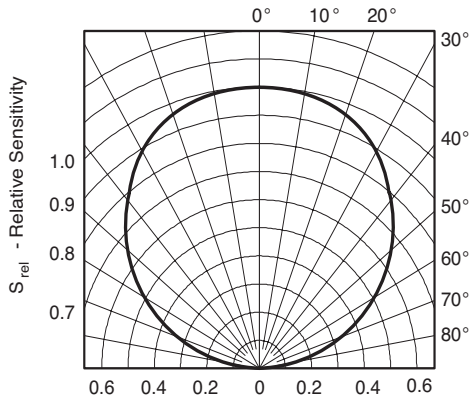

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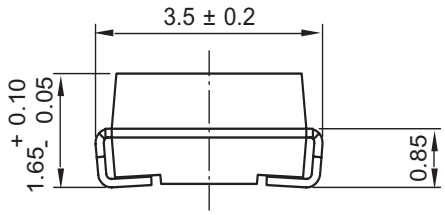
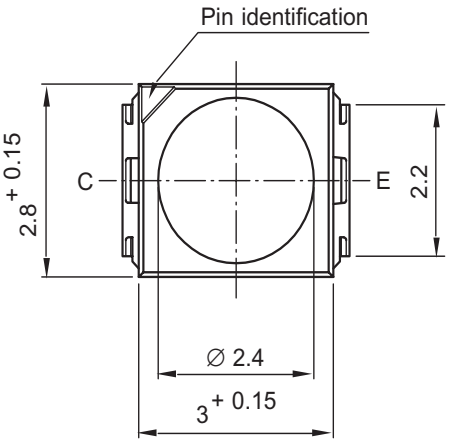
Figure 9. Relative Radiant Sensitivity vs. Angular Displacement

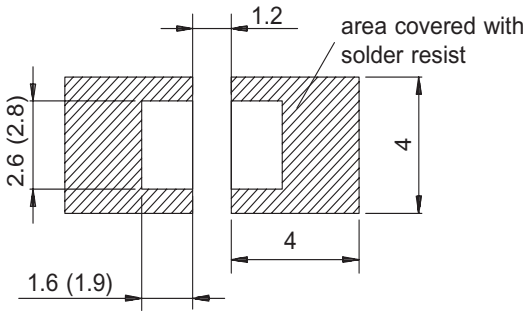
Package Dimensions in mm



technical drawings
according to DIN
specifications



Mounting Pad Layout



Dimensions: IR and Vaporphase
(Wave Soldering)

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Temperature - Time Profile

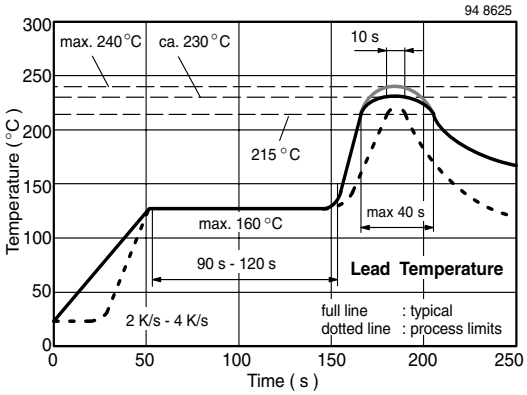

Figure 10. Lead Tin (SnPb) Reflow Solder Profile

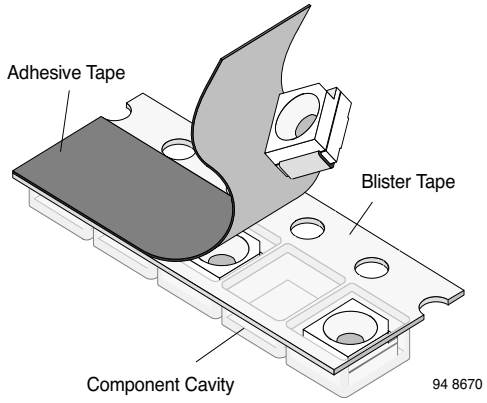

Figure 11. Blister Tape

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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated in J-STD-020. TEMT3700F is released for:
Moisture Sensitivity Level 2, according to JEDEC, J-STD-020
Floor Life: 1 year
Conditions: T_{amb} < 30 °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 @ 40 °C (+ 5 °C), RH < 5 %

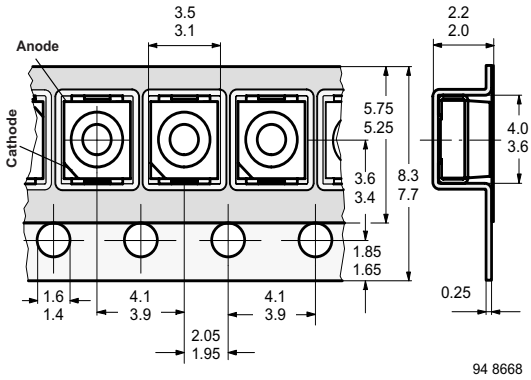

Figure 12. Tape Dimensions in mm for PLCC-2

Missing Devices

A maximum of 0.5 % of the total number of components per reel may be missing, exclusively missing components at the beginning and at the end of the reel. A maximum of three consecutive components may be missing, provided this gap is followed by six consecutive components.

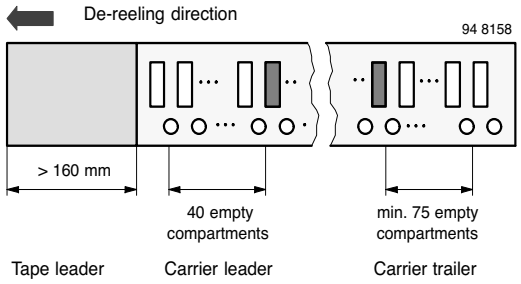

Figure 13. Beginning and End of Reel

The tape leader is at least 160 mm and is followed by a carrier tape leader with at least 40 empty compartements. The tape leader may include the carrier tape as long as the cover tape is not connected to the carrier tape. The least comoponent is followed by a carrier tape trailer with a least 75 empty compartements and sealed with cover tape.

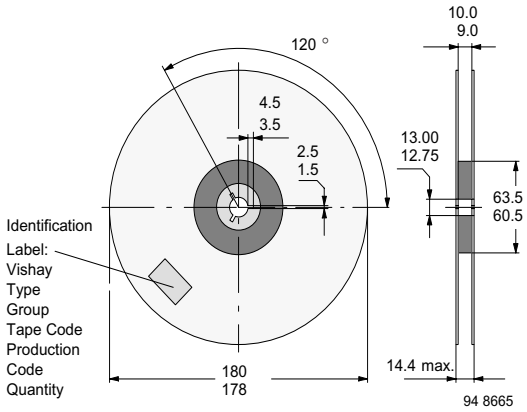

Figure 14. Dimensions of Reel

Cover Tape Removal Force

The removal force lies between 0.1 N and 1.0 N at a removal speed of 5 mm/s. In order to prevent components from popping out of the bliesters, the cover tape must be pulled off at an angle of 180 ° with regard to the feed direction.

Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423