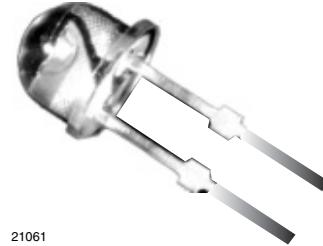


High Speed Infrared Emitting Diode, 870 nm, GaAIAs Double Hetero

Description

TSFF5510 is an infrared, 870 nm emitting diode in GaAIAs double hetero (DH) technology with high radiant power and high speed, molded in a clear, untinted, plastic package.



Features

- Package type: leaded
- Dimensions: T-1 $\frac{3}{4}$ (\varnothing 5 mm)
- Peak wavelength: $\lambda_p = 870$ nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: $\varphi = \pm 38^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth
- Good spectral matching to Si photodetectors
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



Applications

- Infrared video data transmission between camcorder and TV set
- Free air data transmission systems with high modulation frequencies or high data transmission

Product Summary

Component	Symbol	Value	Unit
TSFF5510	ϕ_e	55	mW
	I_e	32	mW/sr
	t_r, t_f	15	ns
	φ	± 38	deg
	λ_p	870	nm

Ordering Information

Ordering code	Packing	Remarks
TSFF5510	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk

Note:

MOQ: minimum order quantity

Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	5	V
Forward current		I_F	100	mA
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu\text{s}$	I_{FM}	200	mA
Surge forward current	$t_p = 100 \mu\text{s}$	I_{FSM}	1	A
Power dissipation		P_V	170	mW
Junction temperature		T_j	100	$^\circ\text{C}$
Operating temperature range		T_{amb}	- 40 to + 85	$^\circ\text{C}$
Storage temperature range		T_{stg}	- 40 to + 100	$^\circ\text{C}$
Soldering temperature	$t \leq 5$ s, 2 mm from case	T_{sd}	260	$^\circ\text{C}$
Thermal resistance junction/ambient	J-STD-051, leads 7 mm soldered on PCB	R_{thJA}	250	K/W

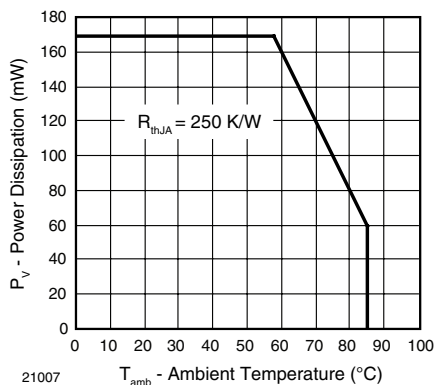


Figure 1. Power Dissipation Limit vs. Ambient Temperature

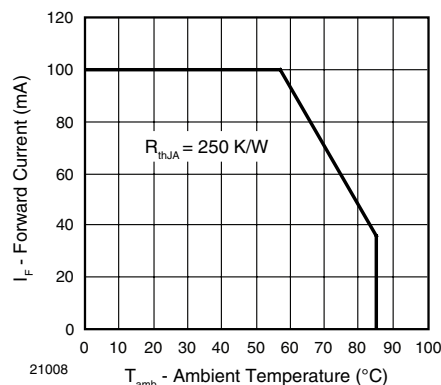


Figure 2. Forward Current Limit vs. Ambient Temperature

Electrical Characteristics

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

Parameter	Test condition	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	V_F	1.3	1.45	1.7	V
	$I_F = 450\text{ mA}$, $t_p = 100\text{ }\mu\text{s}$	V_F	1.5	1.75	2.1	V
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F		2.1		V
Temperature coefficient of V_F	$I_F = 1\text{ mA}$	TK_{V_F}		-1.8		mV/K
Reverse current	$V_R = 5\text{ V}$	I_R			10	μA
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$	C_j		110		pF

Optical Characteristics

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

Parameter	Test condition	Symbol	Min.	Typ.	Max.	Unit
Radiant intensity	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	I_e		32		mW/sr
Radiant power	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	ϕ_e	44	55	89	mW
	$I_F = 450\text{ mA}$, $t_p = 100\text{ }\mu\text{s}$	ϕ_e	200	247	400	mW
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	ϕ_e		550		mW
Temperature coefficient of ϕ_e	$I_F = 100\text{ mA}$	TK_{ϕ_e}		-0.35		%/K
Angle of half intensity		φ		± 38		deg
Peak wavelength	$I_F = 100\text{ mA}$	λ_p		870		nm
Spectral bandwidth	$I_F = 100\text{ mA}$	$\Delta\lambda$		55		nm
Temperature coefficient of λ_p	$I_F = 100\text{ mA}$	TK_{λ_p}		0.25		nm/K
Rise time	$I_F = 100\text{ mA}$	t_r		15		ns
Fall time	$I_F = 100\text{ mA}$	t_f		15		ns
Cut-off frequency	$I_{DC} = 70\text{ mA}$, $I_{AC} = 30\text{ mA pp}$	f_c		23		MHz

Basic Characteristics

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

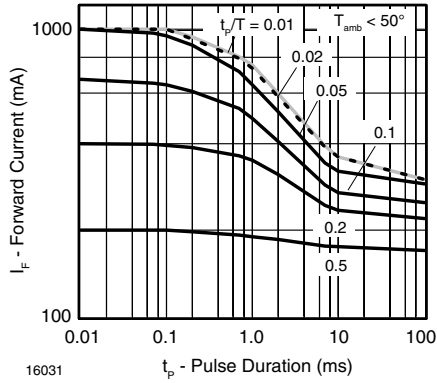


Figure 3. Pulse Forward Current vs. Pulse Duration

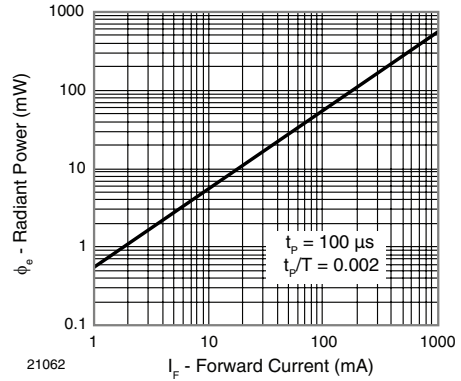


Figure 6. Radiant Power vs. Forward Current

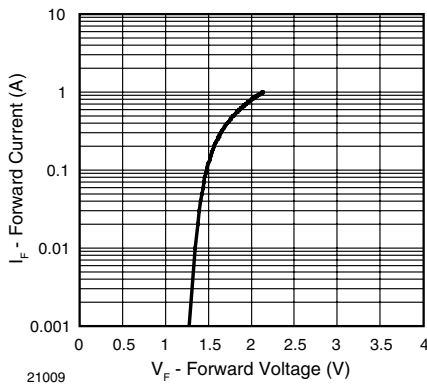


Figure 4. Forward Current vs. Forward Voltage

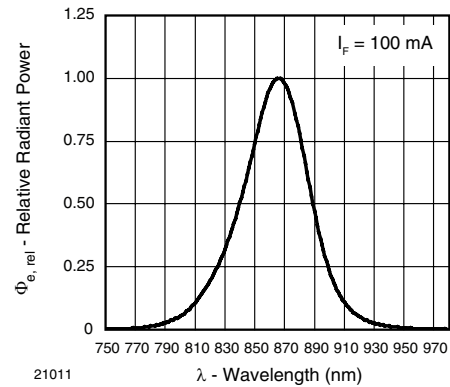


Figure 7. Relative Radiant Power vs. Wavelength

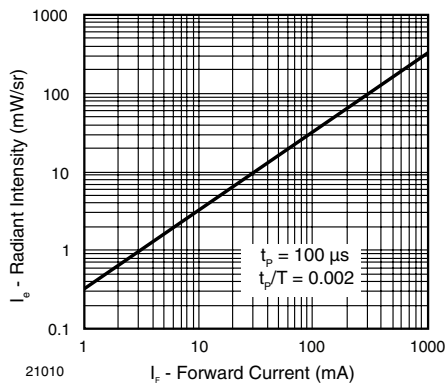


Figure 5. Radiant Intensity vs. Forward Current

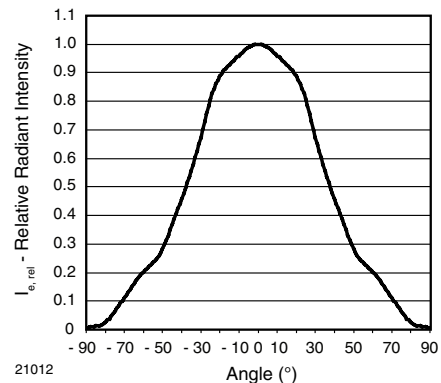


Figure 8. Relative Radiant Intensity vs. Angular Displacement

**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 operating systems 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.

We reserve the right to make changes to improve technical design
and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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