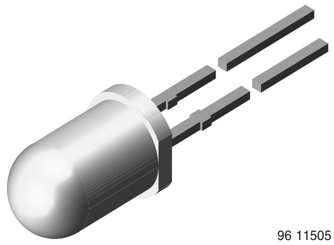
GaAs/GaAlAs IR Emitting Diode in ∅ 5 mm (T-1¾) Package

Description

TSAL5300 is a high efficiency infrared emitting diode in GaAlAs on GaAs technology, molded in clear, blue-grey tinted plastic packages.

In comparison with the standard GaAs on GaAs technology these emitters achieve more than 100 % radiant power improvement at a similar wavelength.

The forward voltages at low current and at high pulse current roughly correspond to the low values of the standard technology. Therefore these emitters are ideally suitable as high performance replacements of standard emitters.



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Features

- Extra high radiant power and radiant intensity
- Low forward voltage
- Suitable for high pulse current operation
- Standard T-1¾ (∅ 5 mm) package
- Angle of half intensity $\varphi = \pm 22°$
- Peak wavelength $\lambda_p = 940$ nm
- High reliability
- Good spectral matching to Si photodetectors
- Lead-free device

Applications

Infrared remote control units with high power requirements

Free air transmission systems

Infrared source for optical counters and card readers

IR source for smoke detectors

Absolute Maximum Ratings

T_{amb} = 25 °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	$t_p/T = 0.5$, $t_p = 100$ µs	I_{FM}	200	mA
Surge Forward Current	$t_p = 100$ µs	I_{FSM}	1.5	A
Power Dissipation		P_V	210	mW
Junction Temperature		T_j	100	°C
Operating Temperature Range		T_{amb}	- 55 to + 100	°C
Storage Temperature Range		T_{stg}	- 55 to + 100	°C
Soldering Temperature	t ≤ 5sec, 2 mm from case	T_{sd}	260	°C
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

Electrical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward Voltage	I_F = 100 mA, t_p = 20 ms	V_F		1.35	1.6	V
	I_F = 1 A, t_p = 100 µs	V_F		2.6	3	V
Temp. Coefficient of V_F	I_F = 100 mA	TK_{VF}		- 1.875		mV/K
Reverse Current	V_R = 5 V	I_R			10	µA
Junction capacitance	V_R = 0, f = 1 MHz, E = 0	C_j		25		pF

Optical Characteristics

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

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Radiant Intensity	I_F = 100 mA, t_p = 20 ms	I_e	30	45		mW/sr
	I_F = 1 A, t_p = 100 µs	I_e	260	350		mW/sr
Radiant Power	I_F = 100 mA, t_p = 20 ms	ϕ_e		35		mW
Temp. Coefficient of ϕ_e	I_F = 20 mA	$TK_{\phi e}$		- 0.6		%/K
Angle of Half Intensity		φ		± 22		deg
Peak Wavelength	I_F = 100 mA	λ_p		940		nm
Spectral Bandwidth	I_F = 100 mA	$\Delta\lambda$		50		nm
Temp. Coefficient of λ_p	I_F = 100 mA	$TK_{\lambda p}$		0.2		nm/K
Rise Time	I_F = 100 mA	t_r		800		ns
	I_F = 1 A	t_r		500		ns
Fall Time	I_F = 100 mA	t_f		800		ns
	I_F = 1 A	t_f		500		ns
Virtual Source Diameter	method: 63 % encircled energy	∅		2.1		mm

Typical Characteristics (T_{amb} = 25 °C unless otherwise specified)

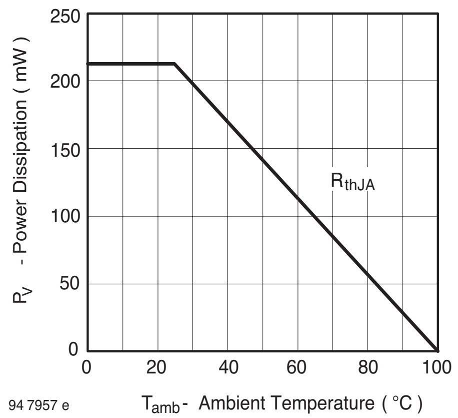

Fig. 1 Power Dissipation vs. Ambient Temperature

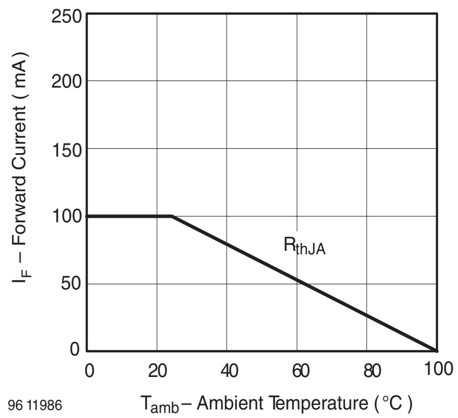

Fig. 2 Forward Current vs. Ambient Temperature

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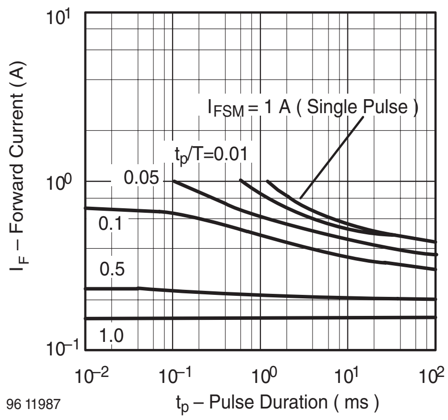


Fig. 3 Pulse Forward Current vs. Pulse Duration

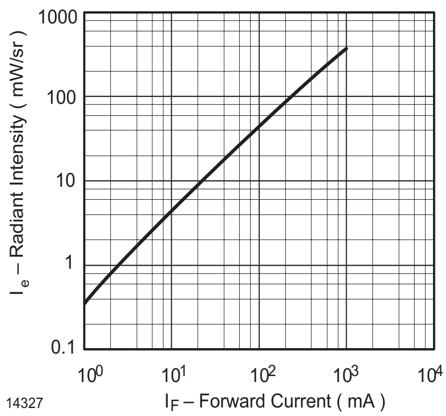


Fig. 6 Radiant Intensity vs. Forward Current

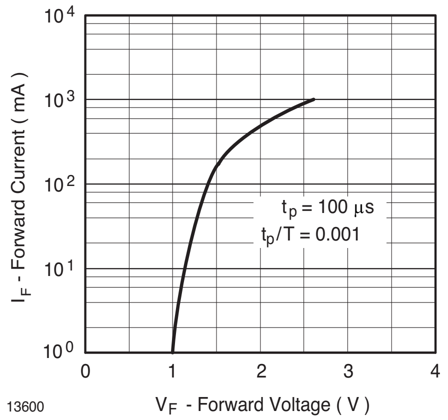


Fig. 4 Forward Current vs. Forward Voltage

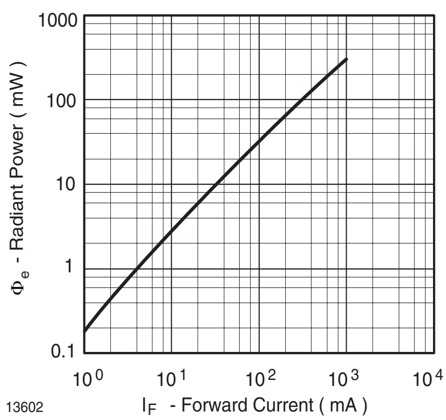


Fig. 7 Radiant Power vs. Forward Current

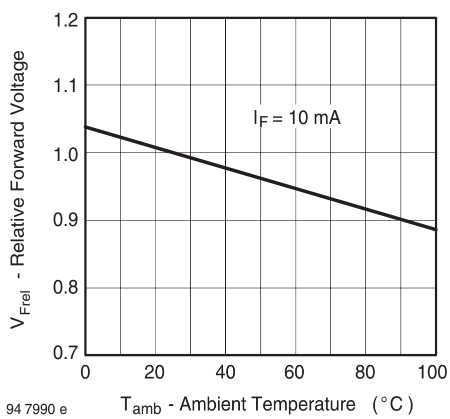


Fig. 5 Relative Forward Voltage vs. Ambient Temperature

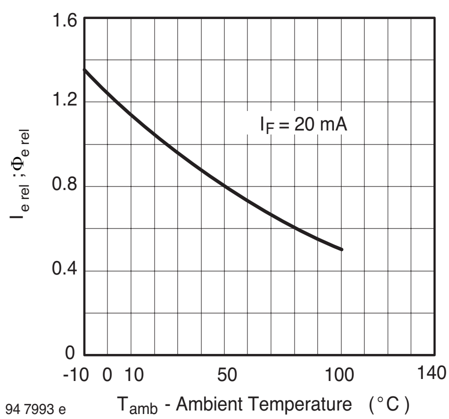


Fig. 8 Rel. Radiant Intensity/Power vs. Ambient Temperature

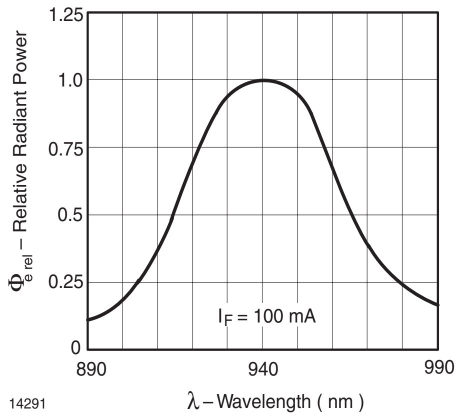


Fig. 9 Relative Radiant Power vs. Wavelength

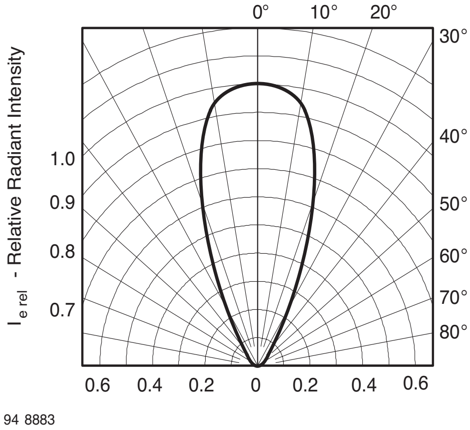
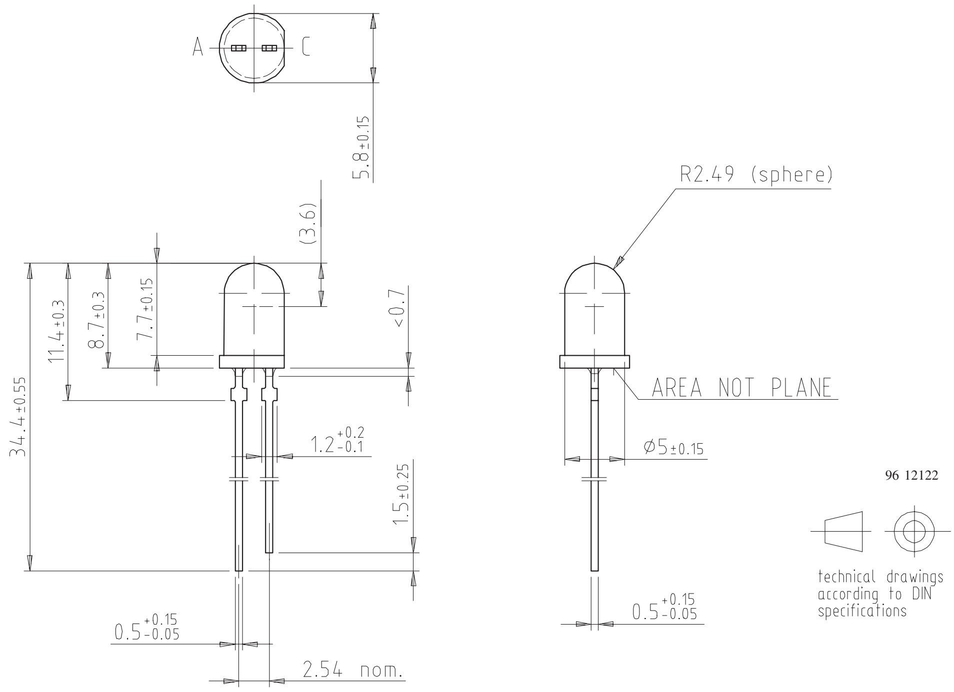


Fig. 10 Relative Radiant Intensity vs. Angular Displacement

Package Dimensions in mm



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.

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