

## High Speed Infrared Emitting Diode, 940 nm, Surface Emitter Technology



22114



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- Narrow angle of half intensity:  $\varphi = \pm 3^\circ$
- Suitable for high pulse current operation
- Good spectral matching with CMOS cameras
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### APPLICATIONS

- Infrared radiation source for operation with CMOS cameras
- High speed IR data transmission
- Smoke-automatic fire detectors
- IR Flash

### DESCRIPTION

As part of the [SurfLight™](#) portfolio, the VSLY5940 is an infrared, 940 nm emitting diode based on GaAlAs surface emitter chip technology with extreme high radiant intensity, high optical power and high speed, molded in a clear, untinted plastic package, with a parabolic lens.

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\varphi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSLY5940	600	$\pm 3$	940	10

#### Note

- Test conditions see table “Basic Characteristics”

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSLY5940	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
VSLY5940-CS21	Reel	MOQ: 5000 pcs, 1000 pcs/bulk	T-1 $\frac{3}{4}$

#### 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		$P_V$	190	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	$R_{thJA}$	230	K/W

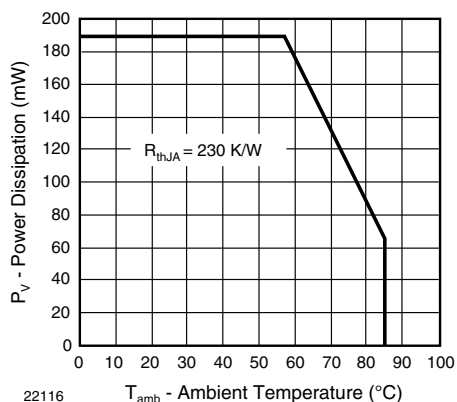


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

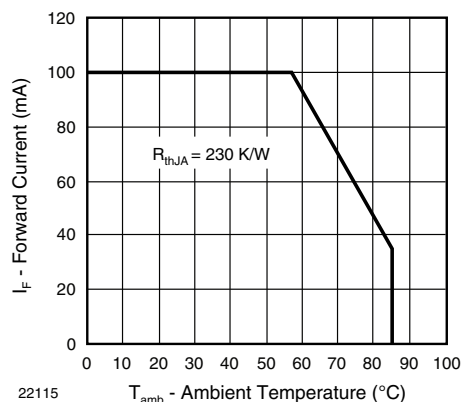


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$		1.65	1.9	V
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$V_F$		2.9		V
Temperature coefficient of $V_F$	$I_F = 1\text{ mA}$	$TK_{VF}$		-1.45		mV/K
	$I_F = 10\text{ mA}$	$TK_{VF}$		-1.25		mV/K
Reverse current		$I_R$	not designed for reverse operation			$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_j$		125		pF
Radiant intensity	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$I_e$	300	600	900	mW/sr
	$I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$	$I_e$		5100		mW/sr
Radiant power	$I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$	$\phi_e$		55		mW
Temperature coefficient of $\phi_e$	$I_F = 100\text{ mA}$	$TK_{\phi_e}$		-0.35		%/K
Angle of half intensity		$\varphi$		$\pm 3$		deg
Peak wavelength	$I_F = 100\text{ mA}$	$\lambda_p$	920	940	960	nm
Spectral bandwidth	$I_F = 100\text{ mA}$	$\Delta\lambda$		35		nm
Temperature coefficient of $\lambda_p$	$I_F = 100\text{ mA}$	$TK_{\lambda_p}$		0.25		nm/K
Rise time	$I_F = 100\text{ mA}$	$t_r$		10		ns
Fall time	$I_F = 100\text{ mA}$	$t_f$		10		ns

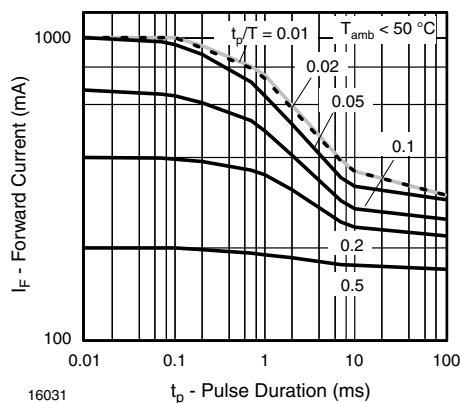
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Pulse Forward Current vs. Pulse Duration

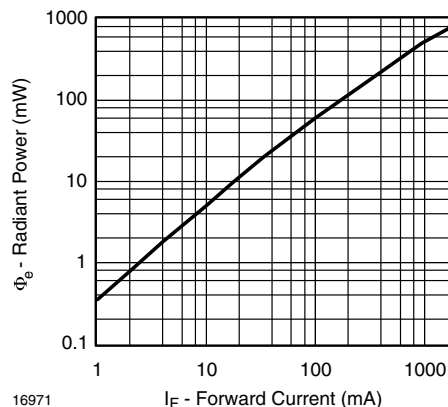


Fig. 6 - Radiant Power vs. Forward Current

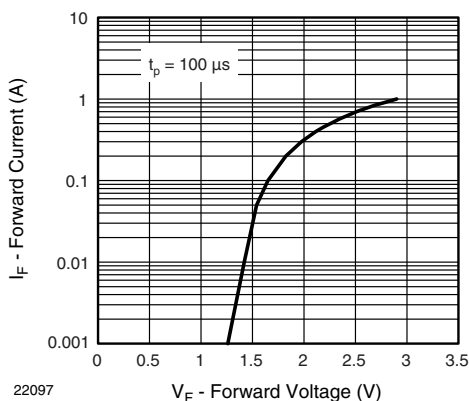


Fig. 4 - Forward Current vs. Forward Voltage

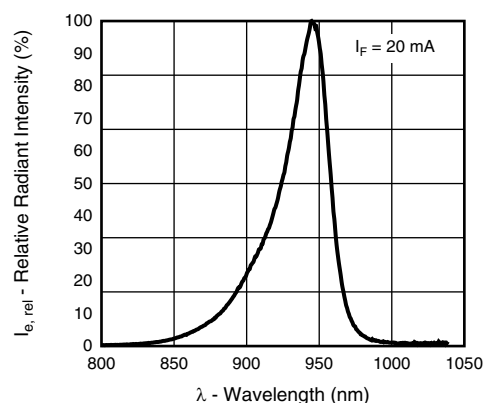


Fig. 7 - Relative Radiant Power vs. Wavelength

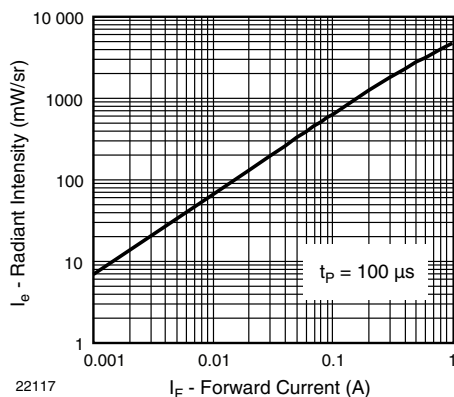


Fig. 5 - Radiant Intensity vs. Forward Current

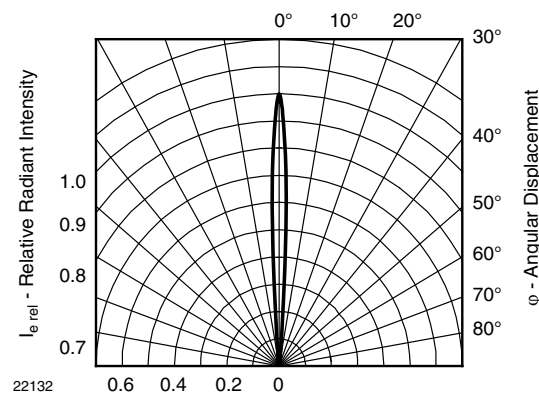
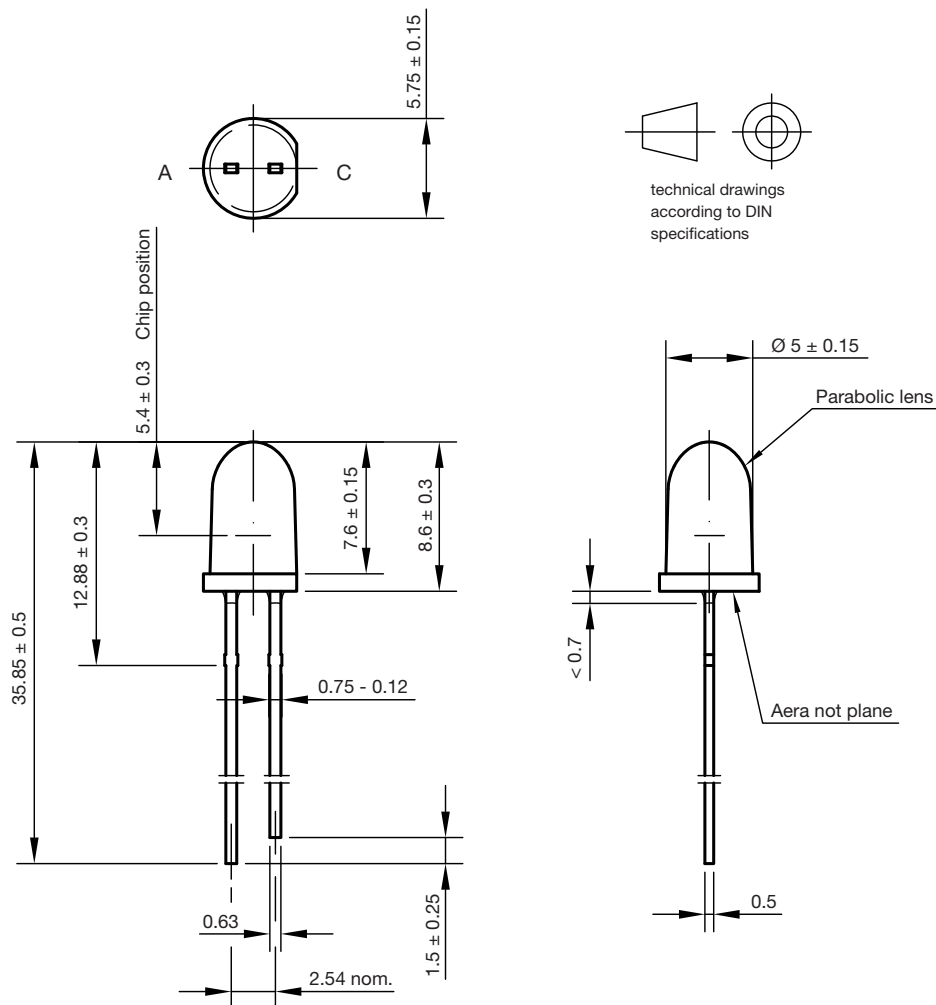


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters


technical drawings  
according to DIN  
specifications

Drawing-No.: 6.544-5385.01-4  
Issue: 2; 08.03.10  
20531

Not indicated tolerances  $\pm 0.1$



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.