

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



22114

## 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)



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

## 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.

## APPLICATIONS

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

## 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

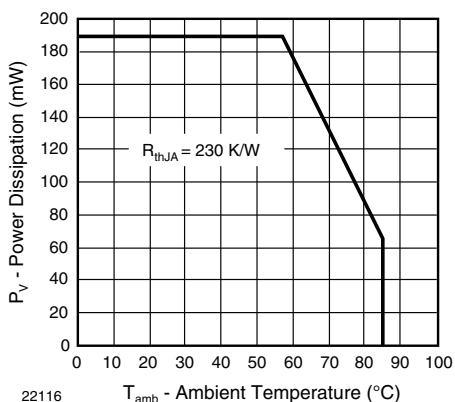


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

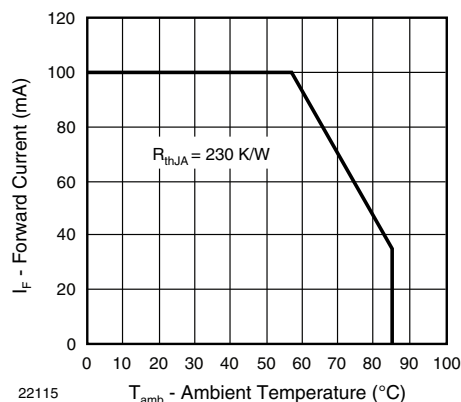


Fig. 2 - Forward Current Limit vs. Ambient Temperature

<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

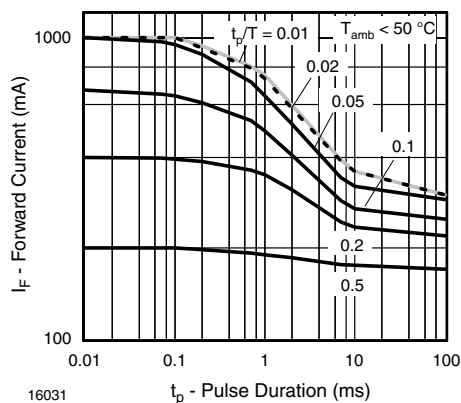
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Pulse Forward Current vs. Pulse Duration

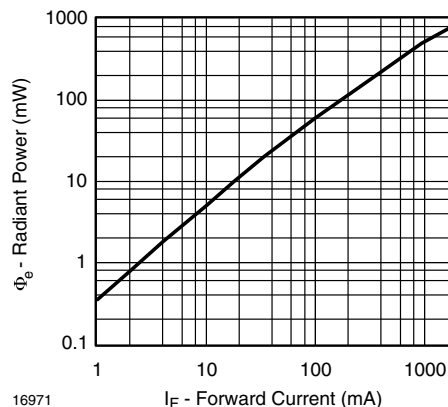


Fig. 6 - Radiant Power vs. Forward Current

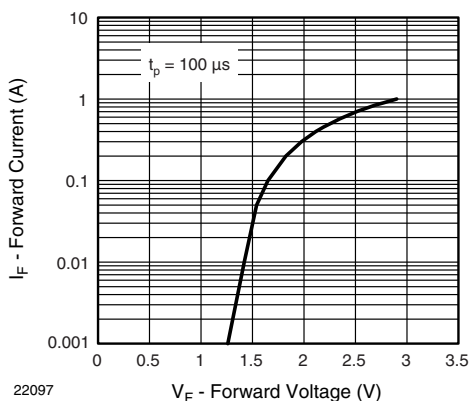


Fig. 4 - Forward Current vs. Forward Voltage

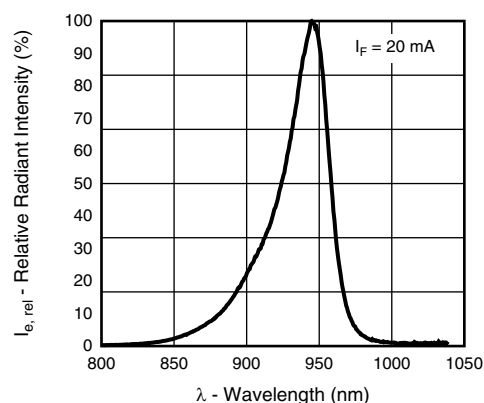


Fig. 7 - Relative Radiant Power vs. Wavelength

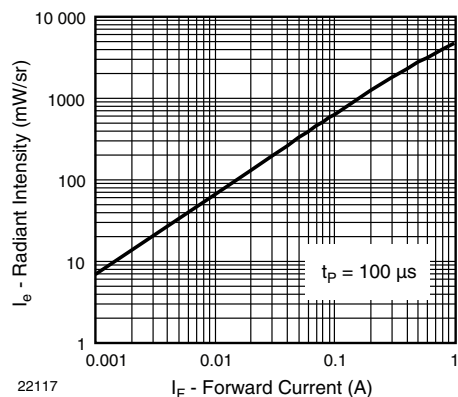


Fig. 5 - Radiant Intensity vs. Forward Current

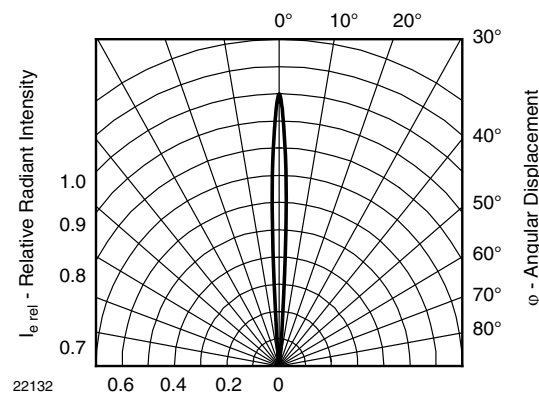
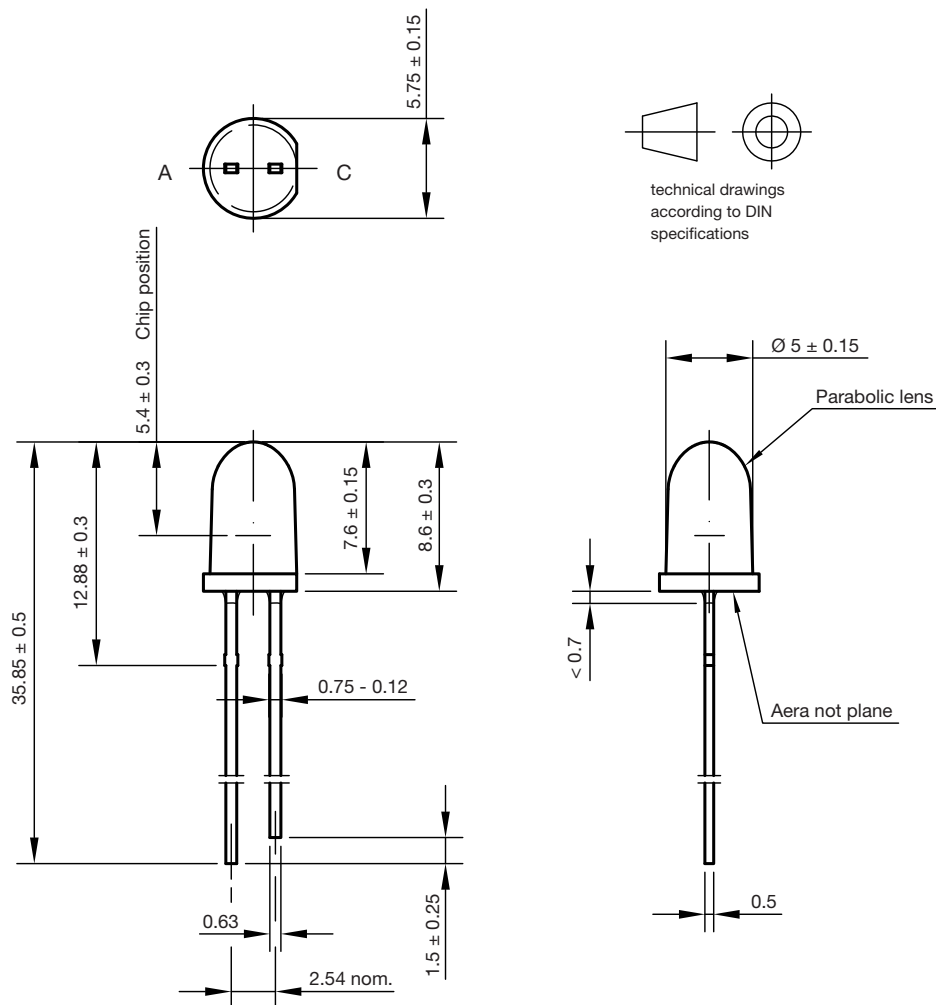


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**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  $\pm 0.1$



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