High Speed Infrared Emitting Diodes, 940 nm, 
Surface Emitter Technology

FEATURES
- Package type: surface-mount
- Package form: side view
- Dimensions (L x W x H in mm): 3.0 x 2.51 x 1.2
- Peak wavelength: $\lambda_p = 940$ nm
- High reliability
- High radiant power
- Very high radiant intensity
- Angle of half intensity: $\varphi = \pm 9^\circ$
- Suitable for high pulse current operation
- Floor life: 168 h, MSL 3, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION
As part of the SurfLight™ portfolio, the VSMY14940 is an infrared, 940 nm, side looking emitting diode based on GaAlAs surface emitter chip technology with extreme high radiant intensities, high optical power and high speed, molded in clear, untinted PCB based package (with lens) for surface mounting (SMD).

APPLICATIONS
- Emitter for remote control (38 kHz)
- Learning remote control
- Photointerrupters
- Optical switch

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>$I_e$ (mW/sr)</th>
<th>$\varphi$ (deg)</th>
<th>$\lambda_p$ (nm)</th>
<th>$t_c$ (ns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSMY14940</td>
<td>90</td>
<td>± 9</td>
<td>940</td>
<td>5</td>
</tr>
</tbody>
</table>

Note
- Test condition see table “Basic Characteristics”

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>ORDERING CODE</th>
<th>PACKAGING</th>
<th>REMARKS</th>
<th>PACKAGE FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSMY14940</td>
<td>Tape and reel</td>
<td>MOQ: 1500 pcs, 1500 pcs/reel</td>
<td>Side view</td>
</tr>
</tbody>
</table>

Note
- MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25$ °C, unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage</td>
<td></td>
<td>$V_R$</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Forward current</td>
<td></td>
<td>$I_F$</td>
<td>70</td>
<td>mA</td>
</tr>
<tr>
<td>Surge forward current</td>
<td>$t_p = 100$ $\mu$s</td>
<td>$I_{FSM}$</td>
<td>0.7</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation</td>
<td></td>
<td>$P_V$</td>
<td>119</td>
<td>mW</td>
</tr>
<tr>
<td>Junction temperature</td>
<td></td>
<td>$T_J$</td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td></td>
<td>$T_{amb}$</td>
<td>-40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>$T_{stg}$</td>
<td>-55 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>According to Fig. 10, J-STD-020</td>
<td>$T_{sd}$</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction-to-ambient</td>
<td>J-STD-051, soldered on PCB</td>
<td>$R_{thJA}$</td>
<td>390</td>
<td>K/W</td>
</tr>
</tbody>
</table>
BASIC CHARACTERISTICS  \((T_{\text{amb}} = 25 \degree \text{C}, \text{unless otherwise specified})\)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward voltage</td>
<td>(I_F = 20 \text{ mA}, t_p = 20 \text{ ms})</td>
<td>(V_F)</td>
<td>1.1</td>
<td>1.3</td>
<td>1.5</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>(I_F = 70 \text{ mA}, t_p = 20 \text{ ms})</td>
<td>(V_F)</td>
<td>-</td>
<td>1.5</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>(I_F = 0.7 \text{ A}, t_p = 100 \mu\text{s})</td>
<td>(V_F)</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Temperature coefficient of (V_F)</td>
<td>(I_F = 20 \text{ mA})</td>
<td>(TK_{V_F})</td>
<td>-</td>
<td>-0.9</td>
<td>-</td>
<td>mV/K</td>
</tr>
<tr>
<td>Reverse current</td>
<td>(I_R)</td>
<td></td>
<td>Not designed for reverse operation</td>
<td>nA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction capacitance</td>
<td>(V_R = 0 \text{ V}, f = 1 \text{ MHz}, E = 0 \text{ mW/cm}^2)</td>
<td>(C_J)</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Radiant intensity</td>
<td>(I_F = 20 \text{ mA}, t_p = 20 \text{ ms})</td>
<td>(I_e)</td>
<td>15</td>
<td>25</td>
<td>-</td>
<td>mW/sr</td>
</tr>
<tr>
<td></td>
<td>(I_F = 70 \text{ mA}, t_p = 20 \text{ ms})</td>
<td>(I_e)</td>
<td>-</td>
<td>90</td>
<td>-</td>
<td>mW/sr</td>
</tr>
<tr>
<td></td>
<td>(I_F = 0.7 \text{ A}, t_p = 100 \mu\text{s})</td>
<td>(I_e)</td>
<td>-</td>
<td>560</td>
<td>-</td>
<td>mW/sr</td>
</tr>
<tr>
<td>Reverse light current</td>
<td>(E_e = 1 \text{ mW/cm}^2, \lambda = 950 \text{ nm}), (V_R = 5 \text{ V})</td>
<td>(I_{ra})</td>
<td>-</td>
<td>0.5</td>
<td>-</td>
<td>\mu A</td>
</tr>
<tr>
<td>Radiant power</td>
<td>(I_F = 70 \text{ mA}, t_p = 20 \text{ ms})</td>
<td>(\phi_e)</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>mW</td>
</tr>
<tr>
<td>Temperature coefficient of radiant power</td>
<td>(I_F = 70 \text{ mA})</td>
<td>(TK_{\phi_e})</td>
<td>-</td>
<td>-0.21</td>
<td>-</td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half intensity</td>
<td>(\phi)</td>
<td></td>
<td>\pm 9</td>
<td>-</td>
<td>-</td>
<td>deg</td>
</tr>
<tr>
<td>Peak wavelength</td>
<td>(I_F = 70 \text{ mA})</td>
<td>(\lambda_p)</td>
<td>920</td>
<td>940</td>
<td>960</td>
<td>nm</td>
</tr>
<tr>
<td>Spectral bandwidth</td>
<td>(I_F = 70 \text{ mA})</td>
<td>(\Delta\lambda)</td>
<td>-</td>
<td>55</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Temperature coefficient of (\lambda_p)</td>
<td>(I_F = 70 \text{ mA})</td>
<td>(TK_{\lambda})</td>
<td>0.28</td>
<td>-</td>
<td>-</td>
<td>nm/K</td>
</tr>
<tr>
<td>Rise time</td>
<td>(I_F = 70 \text{ mA}, 10 % \text{ to} 90 %)</td>
<td>(t_r)</td>
<td>-</td>
<td>5</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Fall time</td>
<td>(I_F = 70 \text{ mA}, 10 % \text{ to} 90 %)</td>
<td>(t_f)</td>
<td>-</td>
<td>6</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>
**BASIC CHARACTERISTICS**  \( (T_{\text{amb}} = 25 \degree \text{C}, \text{unless otherwise specified}) \)

**Fig. 3** - Forward Current vs. Forward Voltage

**Fig. 4** - Forward Voltage vs. Ambient Temperature

**Fig. 5** - Relative Forward Voltage vs. Ambient Temperature

**Fig. 6** - Relative Radiant Intensity vs. Forward Current

**Fig. 7** - Relative Radiant Intensity vs. Ambient Temperature

**Fig. 8** - Relative Radiant Intensity vs. Wavelength
**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 on MBB label:

Floor life: 168 h

Conditions: $T_{\text{amb}} < 30 \, ^\circ\text{C}, \, \text{RH} < 60 \, %$

Moisture sensitivity level 3, according to J-STD-020.

**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 at 40 °C (+ 5 °C), RH < 5 %.
PACKAGE DIMENSIONS in millimeters: VSMY14940

Recommended Solder Pad

Not indicated tolerances ± 0.1 mm
TAPING AND REEL DIMENSIONS in millimeters: VSMY14940

Anode

Cathode

R0.50

8.00 ± 0.10

4.00 ± 0.10

4.00 ± 0.10

2.00 ± 0.05

Ø 1.00 ± 0.10

3.00 ± 0.10

1.8

0.25 ± 0.02

1.40 ± 0.10

Cathode mask

Ø 1.50 ± 0.10

1.75 ± 0.10

3.50 ± 0.05

2.00 ± 0.05

Ø 1.00 ± 0.10

2.00 ± 0.05

Ø 1.50 ± 0.10

1.75 ± 0.10

0.25 ± 0.02

1.40 ± 0.10

R0.50

8.00 ± 0.10

4.00 ± 0.10

4.00 ± 0.10

2.00 ± 0.05

Ø 1.00 ± 0.10

3.00 ± 0.10

1.8

14.40

7.0 ± 0.08

2.36 ± 0.039

60.0 ± 1.0

13.0 ± .512

TYP.
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