High Speed Infrared Emitting Diodes, 850 nm, Surface Emitter Technology

DESCRIPTION
As part of the SurfLight™ portfolio, the VSMY1850 is an infrared, 850 nm emitting diode based on GaAlAs surface emitter chip technology with high radiant intensity, high optical power and high speed, molded in clear, untinted 0805 plastic package for surface mounting (SMD).

FEATURES
- Package type: surface mount
- Package form: 0805
- Dimensions (L x W x H in mm): 2 x 1.25 x 0.85
- Peak wavelength: \( \lambda_p = 850 \) nm
- High reliability
- High radiant power
- High radiant intensity
- High speed
- Angle of half sensitivity: \( \phi = \pm 60^\circ \)
- Suitable for high pulse current operation
- 0805 standard surface-mountable package
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS
- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Emitter source for proximity sensors
- IR touch panels
- IR Flash
- IR illumination
- 3D TV

PRODUCT SUMMARY

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>( I_e ) (mW/sr)</th>
<th>( \phi ) (deg)</th>
<th>( \lambda_p ) (nm)</th>
<th>( t_r ) (ns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSMY1850</td>
<td>10</td>
<td>( \pm 60 )</td>
<td>850</td>
<td>10</td>
</tr>
</tbody>
</table>

Note
- Test conditions 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>VSMY1850</td>
<td>Tape and reel</td>
<td>MOQ: 3000 pcs, 3000 pcs/reel</td>
<td>0805</td>
</tr>
</tbody>
</table>

Note
- MOQ: minimum order quantity
### ABSOLUTE MAXIMUM RATINGS \((T_{\text{amb}} = 25 \, ^{\circ}\text{C}, \text{unless otherwise specified})\)

<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>100</td>
<td>mA</td>
</tr>
<tr>
<td>Peak forward current</td>
<td>(t_p/T = 0.5, , t_p = 100 , \mu\text{s})</td>
<td>(I_{\text{FM}})</td>
<td>200</td>
<td>mA</td>
</tr>
<tr>
<td>Surge forward current</td>
<td>(t_p = 100 , \mu\text{s})</td>
<td>(I_{\text{FSM}})</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation</td>
<td></td>
<td>(P_V)</td>
<td>190</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_{\text{amb}})</td>
<td>-40 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>(T_{\text{stg}})</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>According to Fig. 7, J-STD-020</td>
<td>(T_{\text{sd}})</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction / ambient</td>
<td></td>
<td>(R_{\text{thJA}})</td>
<td>270</td>
<td>K/W</td>
</tr>
</tbody>
</table>

![Fig. 1 - Power Dissipation Limit vs. Ambient Temperature](image1)

![Fig. 2 - Forward Current Limit vs. Ambient Temperature](image2)

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

<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 = 100 , \text{mA}, , t_p = 20 , \text{ms})</td>
<td>(V_F)</td>
<td>-</td>
<td>1.65</td>
<td>1.9</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>(I_F = 1 , \text{A}, , t_p = 100 , \mu\text{s})</td>
<td>(V_F)</td>
<td>-</td>
<td>2.9</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Temperature coefficient of (V_F)</td>
<td>(I_F = 1 , \text{mA})</td>
<td>(\text{TK}_{\text{VF}})</td>
<td>-</td>
<td>-1.4</td>
<td>-</td>
<td>mV/K</td>
</tr>
<tr>
<td></td>
<td>(I_F = 10 , \text{mA})</td>
<td>(\text{TK}_{\text{VF}})</td>
<td>-</td>
<td>-1.18</td>
<td>-</td>
<td>mV/K</td>
</tr>
<tr>
<td>Reverse current</td>
<td>(I_R)</td>
<td>Not designed for reverse operation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>μA</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>125</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Radiant intensity</td>
<td>(I_F = 100 , \text{mA}, , t_p = 20 , \text{ms})</td>
<td>(I_e)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>mW/sr</td>
</tr>
<tr>
<td></td>
<td>(I_F = 1 , \text{A}, , t_p = 100 , \mu\text{s})</td>
<td>(I_e)</td>
<td>-</td>
<td>85</td>
<td>-</td>
<td>mW/sr</td>
</tr>
<tr>
<td>Radiant power</td>
<td>(I_F = 100 , \text{mA}, , t_p = 20 , \text{ms})</td>
<td>(\phi_e)</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>mW</td>
</tr>
<tr>
<td>Temperature coefficient of radiant power</td>
<td>(I_F = 100 , \text{mA})</td>
<td>(\text{TK}_{\text{he}})</td>
<td>-</td>
<td>-0.35</td>
<td>-</td>
<td>%/K</td>
</tr>
<tr>
<td>Angle of half intensity</td>
<td>(\varphi)</td>
<td>-</td>
<td>± 60</td>
<td>-</td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>Peak wavelength</td>
<td>(I_F = 100 , \text{mA})</td>
<td>(\lambda_p)</td>
<td>840</td>
<td>850</td>
<td>870</td>
<td>nm</td>
</tr>
<tr>
<td>Spectral bandwidth</td>
<td>(I_F = 30 , \text{mA})</td>
<td>(\Delta\lambda)</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>nm</td>
</tr>
<tr>
<td>Temperature coefficient of (\lambda_p)</td>
<td>(I_F = 30 , \text{mA})</td>
<td>(\text{TK}_{\text{ip}})</td>
<td>-</td>
<td>0.25</td>
<td>-</td>
<td>nm/K</td>
</tr>
<tr>
<td>Rise time</td>
<td>(I_F = 100 , \text{mA}, , 20 % \text{ to } 80 %)</td>
<td>(t_r)</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Fall time</td>
<td>(I_F = 100 , \text{mA}, , 20 % \text{ to } 80 %)</td>
<td>(t_f)</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Virtual source diameter</td>
<td>(d)</td>
<td>-</td>
<td>0.5</td>
<td>-</td>
<td>mm</td>
<td></td>
</tr>
</tbody>
</table>
**BASIC CHARACTERISTICS** \((T_{amb} = 25 \, ^{\circ}\mathrm{C}, \text{unless otherwise specified})\)

![Graph of Forward Current vs. Forward Voltage](image1)

\(I_F = 100 \, \mu\text{s}\)

\(V_F - \text{Forward Voltage (V)}\)

\(I_F - \text{Forward Current (A)}\)

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**REFLOW SOLDER PROFILE**

![Graph of Lead (Pb)-free Reflow Solder Profile](image2)

Max. ramp up 3 °C/s

Max. ramp down 6 °C/s

Max. 260 °C

Max. 245 °C

Max. 240 °C

Max. 227 °C

Max. 220 °C

Max. 217 °C

Max. 210 °C

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**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.

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**FLOOR LIFE**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

- Moisture sensitivity: level 3
- Floor life: 168 h

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

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**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

Cathode  Bottom view  Anode

Side View

Top View

Recommended solder pad footprint

Drawing-No.: 6.541-5083.01-4
Issue: 2; 10.09.2013

technical drawings specifications according to DIN

Not indicated tolerances ± 0.1
**BLISTER TAPE DIMENSIONS** in millimeters

**REEL DIMENSIONS** in millimeters

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**Drawing-No.:** 9.700-5352.01-4  
**Issue:** 1; 13.04.10  
**22112**

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**Drawing-No.:** 9.800-5096.01-4  
**Issue:** 2; 26.04.10  
**20875**

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For technical questions, contact: emittertechsupport@vishay.com

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