RoHS

**HALOGEN** 

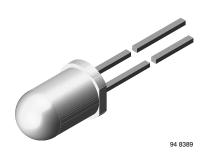
**FREE** 

GREEN (5-2008)



## Vishay Semiconductors

# High Power Infrared Emitting Diode, 940 nm, GaAlAs, MQW



#### **DESCRIPTION**

TSAL6100 is an infrared, 940 nm emitting diode in GaAlAs multi quantum well (MQW) technology with high radiant power and high speed molded in a blue-gray plastic package.

#### **FEATURES**

Package type: leaded
Package form: T-1¾
Dimensions (in mm): Ø 5

• Dimensions (in mim): Ø 5

• Peak wavelength:  $\lambda_p = 940 \text{ nm}$ 

· High reliability

• High radiant power

· High radiant intensity

• Angle of half intensity:  $\phi = \pm 10^{\circ}$ 

Low forward voltage

· Suitable for high pulse current operation

Good spectral matching with Si photodetectors

 Material categorization: For definitions of compliance please see <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **APPLICATIONS**

- Infrared remote control units with high power regirements
- Free air transmission systems
- · Infrared source for optical counters and card readers
- IR source for smoke detectors

| PRODUCT SUMMARY |                        |         |                     |                     |  |
|-----------------|------------------------|---------|---------------------|---------------------|--|
| COMPONENT       | I <sub>e</sub> (mW/sr) | φ (deg) | λ <sub>p</sub> (nm) | t <sub>r</sub> (ns) |  |
| TSAL6100        | 170                    | ± 10    | 940                 | 15                  |  |

#### Note

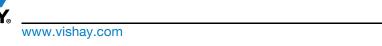
· Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |           |                              |              |  |
|----------------------|-----------|------------------------------|--------------|--|
| ORDERING CODE        | PACKAGING | REMARKS                      | PACKAGE FORM |  |
| TSAL6100             | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1¾         |  |

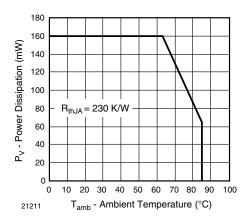
#### Note

• MOQ: minimum order quantity

| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                       |                   |             |      |  |
|---|---------------------------------------|-------------------|-------------|------|--|
| PARAMETER   | TEST CONDITION                        | SYMBOL            | VALUE       | UNIT |  |
| Reverse voltage   |                                       | V <sub>R</sub>    | 5           | V    |  |
| Forward current   |                                       | l <sub>F</sub>    | 100         | mA   |  |
| Peak forward current  | $t_p/T = 0.5$ , $t_p = 100 \mu s$     | I <sub>FM</sub>   | 200         | mA   |  |
| Surge forward current   | t <sub>p</sub> = 100 μs               | I <sub>FSM</sub>  | 1.5         | Α    |  |
| Power dissipation   |                                       | P <sub>V</sub>    | 160         | mW   |  |
| Junction temperature  |                                       | Tj                | 100         | °C   |  |
| Operating temperature range   |                                       | T <sub>amb</sub>  | -40 to +85  | °C   |  |
| Storage temperature range   |                                       | T <sub>stg</sub>  | -40 to +100 | °C   |  |
| Soldering temperature   | t ≤ 5 s, 2 mm from case               | T <sub>sd</sub>   | 260         | °C   |  |
| Thermal resistance junction/ambient   | J-STD-051, leads 7 mm soldered on PCB | R <sub>thJA</sub> | 230         | K/W  |  |



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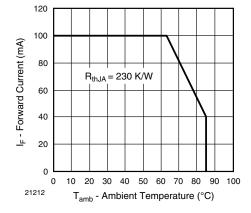


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

Fig. 2 - Forward Current Limit vs. Ambient Temperature

| PARAMETER                                 | TEST CONDITION                                  | SYMBOL           | MIN. | TYP. | MAX. | UNIT  |
|---|---|------------------|------|------|------|-------|
| Forward voltage                           | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$     | V <sub>F</sub>   |      | 1.35 | 1.6  | V     |
|   | $I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$     | V <sub>F</sub>   |      | 2.2  | 3    | V     |
| Temperature coefficient of V <sub>F</sub> | I <sub>F</sub> = 1 mA                           | TK <sub>VF</sub> |      | -1.8 |      | mV/K  |
| Reverse current                           | V <sub>R</sub> = 5 V                            | I <sub>R</sub>   |      |      | 10   | μΑ    |
| Junction capacitance                      | $V_R = 0 \text{ V, } f = 1 \text{ MHz, } E = 0$ | Cj               |      | 40   |      | pF    |
| Radiant intensity                         | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$     | l <sub>e</sub>   | 80   | 170  | 400  | mW/sr |
|   | $I_F = 1 \text{ A}, t_p = 100 \mu \text{s}$     | l <sub>e</sub>   | 650  | 1450 |      | mW/sr |
| Radiant power                             | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$     | фe               |      | 40   |      | mW    |
| Temperature coefficient of φ <sub>e</sub> | I <sub>F</sub> = 20 mA                          | TKφ <sub>e</sub> |      | -0.6 |      | %/K   |
| Angle of half intensity                   |   | φ                |      | ± 10 |      | deg   |
| Peak wavelength                           | I <sub>F</sub> = 100 mA                         | $\lambda_{p}$    |      | 940  |      | nm    |
| Spectral bandwidth                        | I <sub>F</sub> = 100 mA                         | Δλ               |      | 30   |      | nm    |
| Temperature coefficient of $\lambda_p$    | I <sub>F</sub> = 100 mA                         | TKλ <sub>p</sub> |      | 0.2  |      | nm/K  |
| Rise time                                 | I <sub>F</sub> = 100 mA                         | t <sub>r</sub>   |      | 15   |      | ns    |
| Fall time                                 | I <sub>F</sub> = 100 mA                         | t <sub>f</sub>   |      | 15   |      | ns    |



### **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

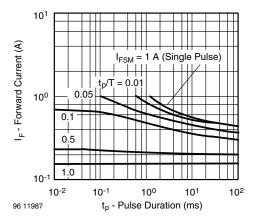


Fig. 3 - Pulse Forward Current vs. Pulse Duration

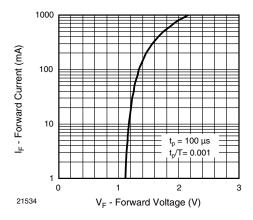


Fig. 4 - Forward Current vs. Forward Voltage

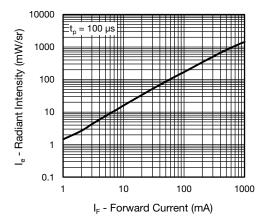


Fig. 5 - Radiant Intensity vs. Forward Current

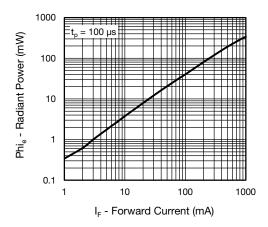


Fig. 6 - Radiant Power vs. Forward Current

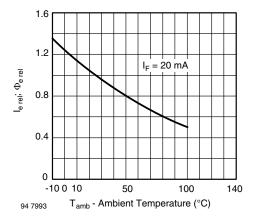


Fig. 7 - Rel. Radiant Intensity/Power vs. Ambient Temperature

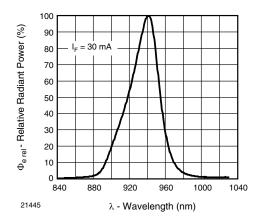


Fig. 8 - Relative Radiant Power vs. Wavelength



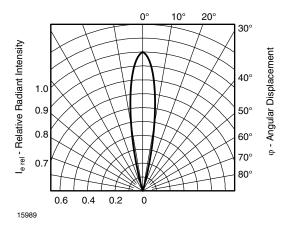
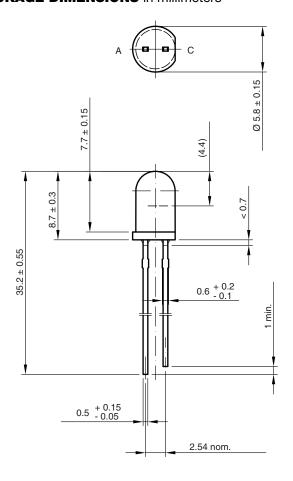
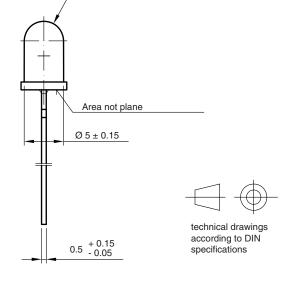


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

### **PACKAGE DIMENSIONS** in millimeters





R2.49 (sphere)

6.544-5259.08-4 Issue: 3; 19.05.09 14436



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