



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



94 8389

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\varphi = \pm 25^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching with Si photodetectors
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
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(5-2008)

### DESCRIPTION

TSAL6400 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.

### APPLICATIONS

- Infrared remote control units with high power requirements
- Free air transmission systems
- Infrared source for optical counters and card readers

| PRODUCT SUMMARY |               |                 |                  |            |
|-----------------|---------------|-----------------|------------------|------------|
| COMPONENT       | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
| TSAL6400        | 50            | $\pm 25$        | 940              | 15         |

#### Note

- Test conditions see table "Basic Characteristics"

| ORDERING INFORMATION |           |                              |                   |
|----------------------|-----------|------------------------------|-------------------|
| ORDERING CODE        | PACKAGING | REMARKS                      | PACKAGE FORM      |
| TSAL6400             | Bulk      | MOQ: 4000 pcs, 4000 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   | $t_p = 100 \mu\text{s}$               | $I_{FSM}$  | 1.5         | A                |
| Power dissipation   |                                       | $P_V$      | 160         | 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              |

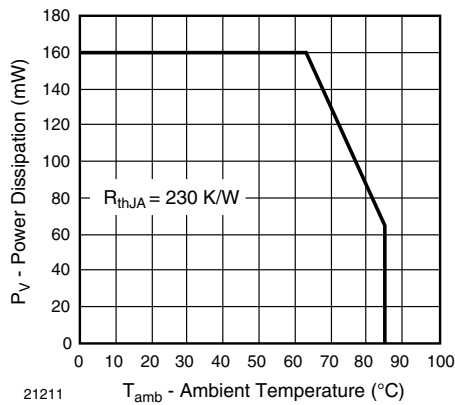


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

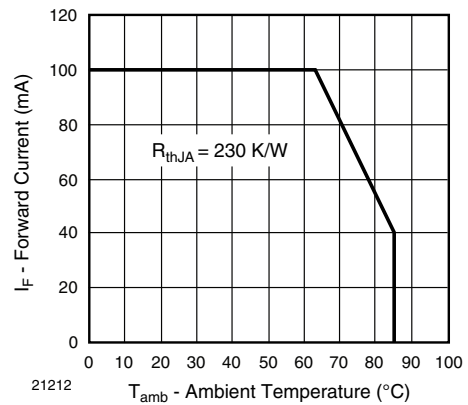


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| <b>BASIC CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |   |                  |      |          |      |               |
|---|---|------------------|------|----------|------|---------------|
| PARAMETER   | TEST CONDITION                                      | SYMBOL           | MIN. | TYP.     | MAX. | UNIT          |
| Forward voltage   | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$        | $V_F$            |      | 1.35     | 1.6  | V             |
|   | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$ | $V_F$            |      | 2.2      | 3    | V             |
| Temperature coefficient of $V_F$  | $I_F = 1\text{ mA}$                                 | $TK_{V_F}$       |      | -1.8     |      | mV/K          |
| Reverse current   | $V_R = 5\text{ V}$                                  | $I_R$            |      |          | 10   | $\mu\text{A}$ |
| Junction capacitance  | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$   | $C_j$            |      | 40       |      | pF            |
| Radiant intensity   | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$        | $I_e$            | 25   | 50       | 125  | mW/sr         |
|   | $I_F = 1\text{ A}$ , $t_p = 100\text{ }\mu\text{s}$ | $I_e$            | 220  | 420      |      | mW/sr         |
| Radiant power   | $I_F = 100\text{ mA}$ , $t_p = 20\text{ ms}$        | $\phi_e$         |      | 40       |      | mW            |
| Temperature coefficient of $\phi_e$   | $I_F = 20\text{ mA}$                                | $TK_{\phi_e}$    |      | -0.6     |      | %/K           |
| Angle of half intensity   |   | $\varphi$        |      | $\pm 25$ |      | deg           |
| Peak wavelength   | $I_F = 100\text{ mA}$                               | $\lambda_p$      |      | 940      |      | nm            |
| Spectral bandwidth  | $I_F = 100\text{ mA}$                               | $\Delta\lambda$  |      | 30       |      | nm            |
| Temperature coefficient of $\lambda_p$  | $I_F = 100\text{ mA}$                               | $TK_{\lambda_p}$ |      | 0.2      |      | nm/K          |
| Rise time   | $I_F = 100\text{ mA}$                               | $t_r$            |      | 15       |      | ns            |
| Fall time   | $I_F = 100\text{ mA}$                               | $t_f$            |      | 15       |      | ns            |

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

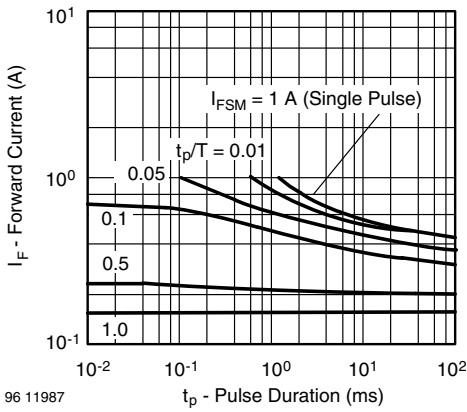


Fig. 3 - Pulse Forward Current vs. Pulse Duration



Fig. 6 - Radiant Power vs. Forward Current



Fig. 4 - Forward Current vs. Forward Voltage



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



Fig. 5 - Radiant Intensity vs. Forward Current



Fig. 8 - Relative Radiant Power vs. Wavelength



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Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters



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