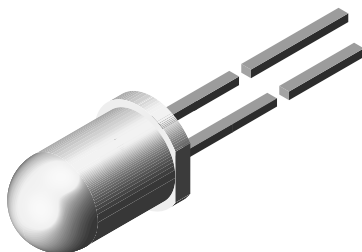


# High Power Infrared Emitting Diode, 940 nm, GaAlAs, MQW



94 8389

## FEATURES

- Package type: leaded
- Package form: T-1¾
- Dimensions (in mm): Ø 5
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\phi = \pm 25^\circ$
- 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**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(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) | $\phi$ (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-1¾         |

### 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              |

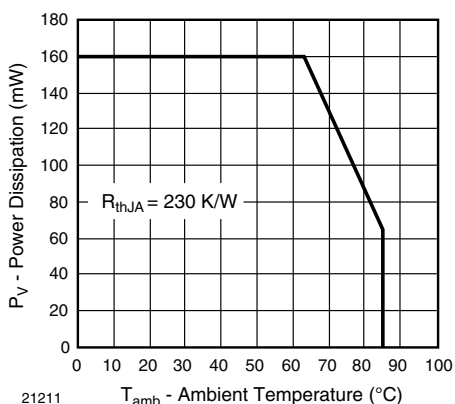


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

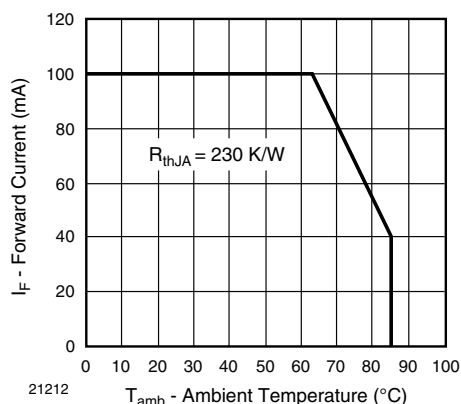


Fig. 2 - Forward Current Limit vs. Ambient Temperature

| BASIC CHARACTERISTICS ( $T_{amb} = 25^{\circ}\text{C}$ , 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                                                              |                                                     | $\phi$           |      | $\pm 25$ |      | 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            |

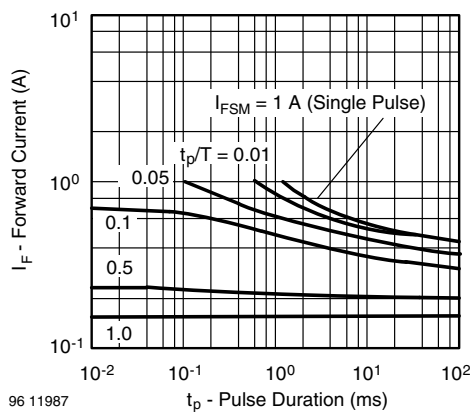
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 3 - Pulse Forward Current vs. Pulse Duration



Fig. 6 - Radiant Power vs. Forward Current

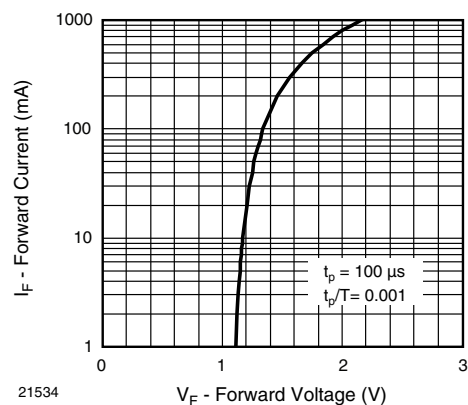


Fig. 4 - Forward Current vs. Forward Voltage

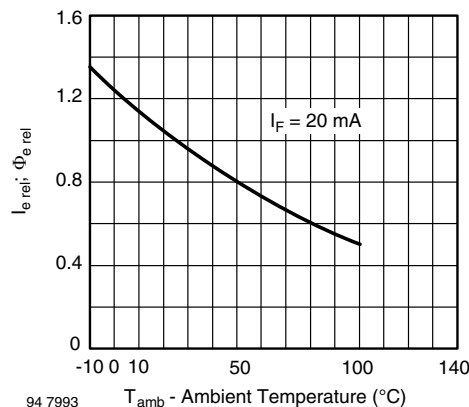


Fig. 7 - Relative Radiant Intensity/Power vs. Ambient Temperature

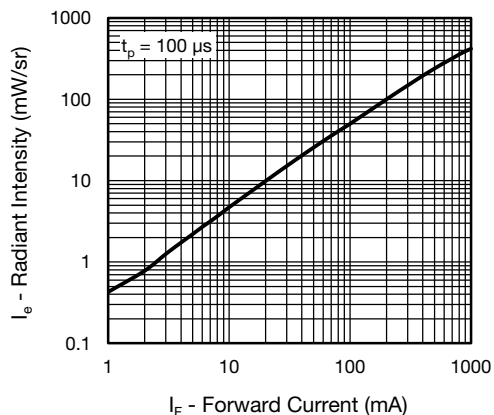


Fig. 5 - Radiant Intensity vs. Forward Current

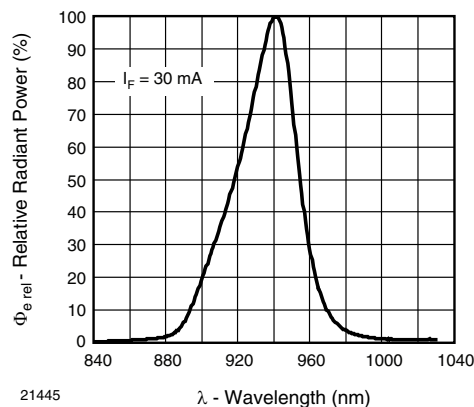


Fig. 8 - Relative Radiant Power vs. Wavelength

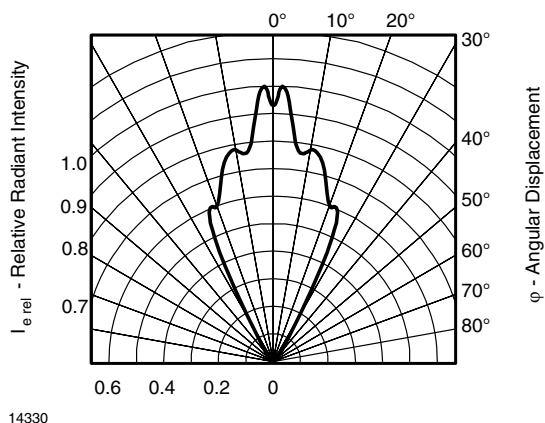
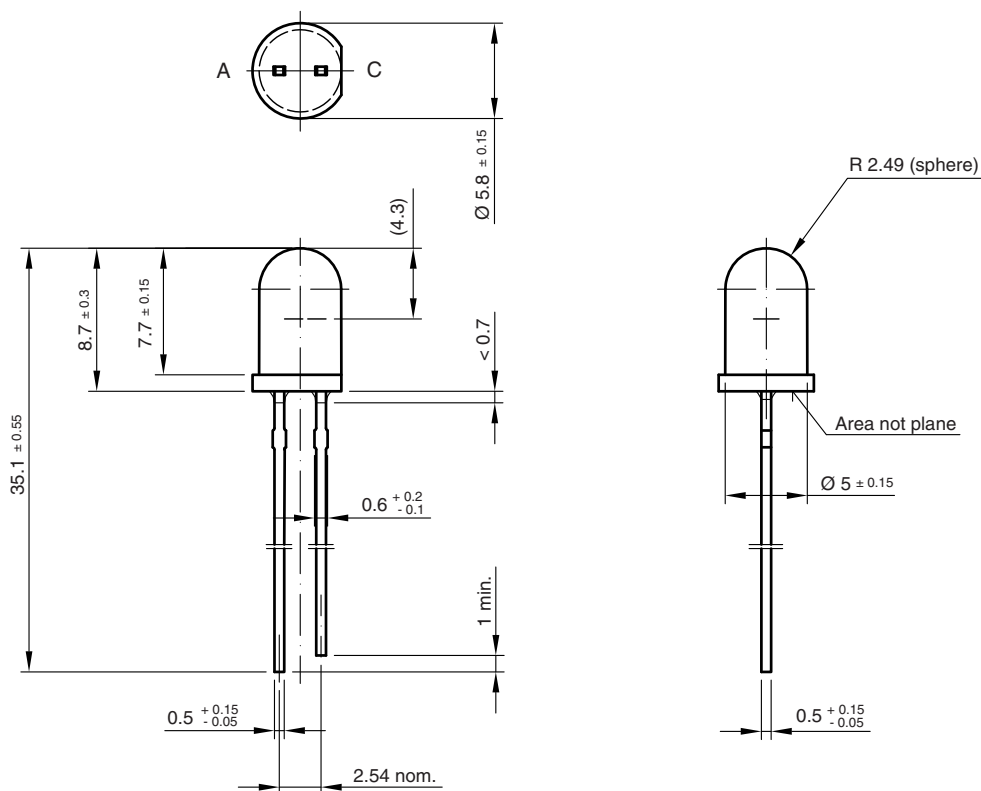


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

### PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5259.07-4

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