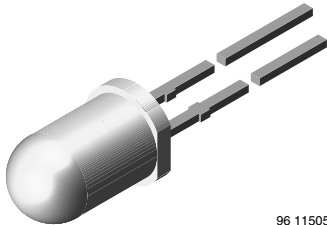


## High Power Infrared Emitting Diode, RoHS Compliant, 940 nm, GaAlAs/GaAs



96 11505

### DESCRIPTION

TSAL5100 is an infrared, 940 nm emitting diode in GaAlAs/GaAs technology with high radiant power, molded in a blue-gray plastic package.

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Leads with stand-off
- Peak wavelength:  $\lambda_p = 940$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\varphi = \pm 10^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Good spectral matching with Si photodetectors
- Lead (Pb)-free component in accordance with RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

- Infrared remote control units with high power requirements
- Free air transmission systems
- Infrared source for optical counters and card readers
- IR source for smoke detectors
- Smoke-automatic fire detectors

### PRODUCT SUMMARY

| COMPONENT | $I_e$ (mW/sr) | $\varphi$ (deg) | $\lambda_p$ (nm) | $t_r$ (ns) |
|-----------|---------------|-----------------|------------------|------------|
| TSAL5100  | 130           | $\pm 10$        | 940              | 800        |

#### Note

Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

| ORDERING CODE | PACKAGING | REMARKS                      | PACKAGE FORM      |
|---------------|-----------|------------------------------|-------------------|
| TSAL5100      | Bulk      | MOQ: 4000 pcs, 4000 pcs/bulk | T-1 $\frac{3}{4}$ |

#### Note

MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                           | TEST CONDITION                        | SYMBOL     | VALUE         | UNIT       |
|-------------------------------------|---------------------------------------|------------|---------------|------------|
| Reverse voltage                     |                                       | $V_R$      | 5             | V          |
| Forward current                     |                                       | $I_F$      | 100           | mA         |
| Peak forward current                | $t_p/T = 0.5$ , $t_p = 100$ $\mu$ s   | $I_{FM}$   | 200           | mA         |
| Surge forward current               | $t_p = 100$ $\mu$ s                   | $I_{FSM}$  | 1.5           | A          |
| Power dissipation                   |                                       | $P_V$      | 160           | mW         |
| Junction temperature                |                                       | $T_j$      | 100           | $^\circ$ C |
| Operating temperature range         |                                       | $T_{amb}$  | - 40 to + 85  | $^\circ$ C |
| Storage temperature range           |                                       | $T_{stg}$  | - 40 to + 100 | $^\circ$ C |
| Soldering temperature               | $t \leq 5$ s, 2 mm from case          | $T_{sd}$   | 260           | $^\circ$ C |
| Thermal resistance junction/ambient | J-STD-051, leads 7 mm soldered on PCB | $R_{thJA}$ | 230           | K/W        |

#### Note

$T_{amb} = 25$   $^\circ$ C, unless otherwise specified

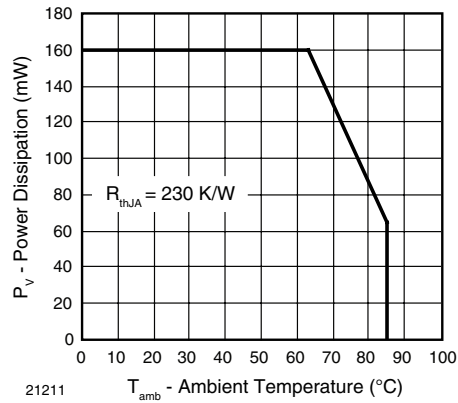


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

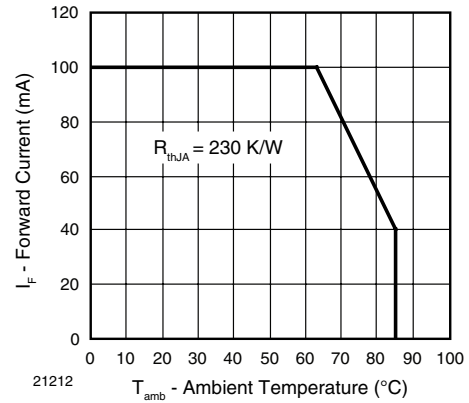


Fig. 2 - Forward Current Limit vs. Ambient Temperature

**BASIC CHARACTERISTICS**

| PARAMETER                                 | TEST CONDITION                                  | SYMBOL                      | MIN. | TYP.  | MAX. | UNIT  |
|-------------------------------------------|-------------------------------------------------|-----------------------------|------|-------|------|-------|
| Forward voltage                           | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | V <sub>F</sub>              |      | 1.35  | 1.6  | V     |
|                                           | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs   | V <sub>F</sub>              |      | 2.6   | 3    | V     |
| Temperature coefficient of V <sub>F</sub> | I <sub>F</sub> = 1 mA                           | TK <sub>V<sub>F</sub></sub> |      | - 1.8 |      | mV/K  |
| Reverse current                           | V <sub>R</sub> = 5 V                            | I <sub>R</sub>              |      |       | 10   | μA    |
| Junction capacitance                      | V <sub>R</sub> = 0 V, f = 1 MHz, E = 0          | C <sub>j</sub>              |      | 25    |      | pF    |
| Radiant intensity                         | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | I <sub>e</sub>              | 80   | 130   | 400  | mW/sr |
|                                           | I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs   | I <sub>e</sub>              | 650  | 1000  |      | mW/sr |
| Radiant power                             | I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms | φ <sub>e</sub>              |      | 35    |      | 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                         | λ <sub>p</sub>              |      | 940   |      | nm    |
| Spectral bandwidth                        | I <sub>F</sub> = 100 mA                         | Δλ                          |      | 50    |      | nm    |
| Temperature coefficient of λ <sub>p</sub> | 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>              |      | 800   |      | ns    |
| Fall time                                 | I <sub>F</sub> = 100 mA                         | t <sub>f</sub>              |      | 800   |      | ns    |
| Virtual source diameter                   | method: 63 % encircled energy                   | d                           |      | 3.7   |      | mm    |

**Note**T<sub>amb</sub> = 25 °C, unless otherwise specified

## BASIC CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

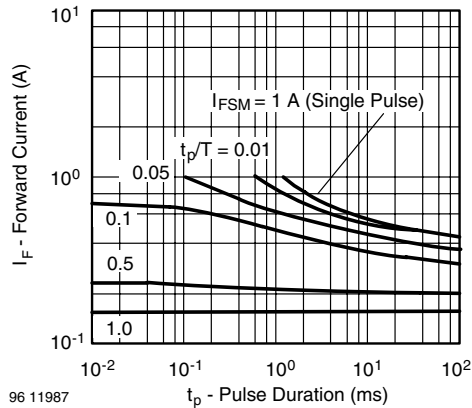


Fig. 3 - Pulse Forward Current vs. Pulse Duration

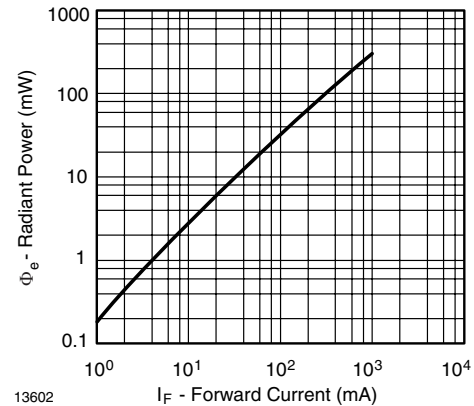


Fig. 6 - Radiant Power vs. Forward Current

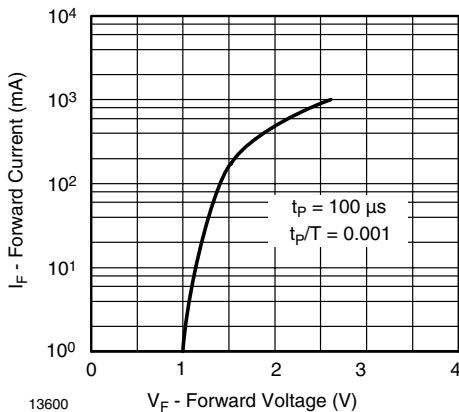


Fig. 4 - Forward Current vs. Forward Voltage

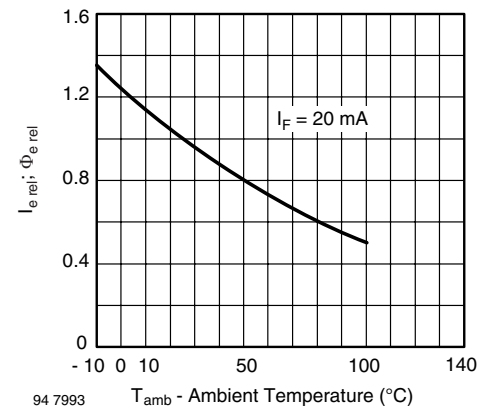


Fig. 7 - Rel. Radiant Intensity/Power vs. Ambient Temperature

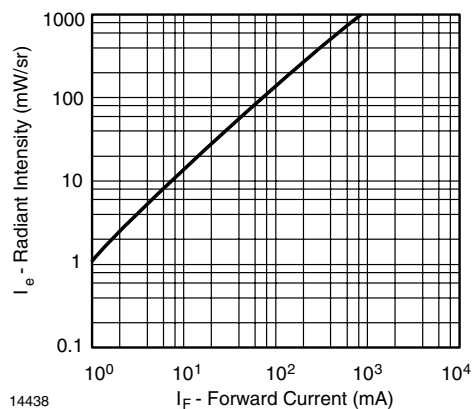


Fig. 5 - Radiant Intensity vs. Forward Current

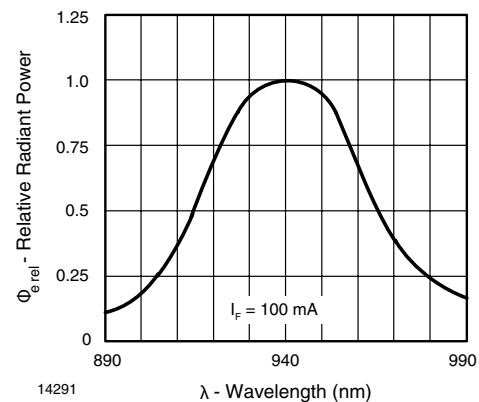


Fig. 8 - Relative Radiant Power vs. Wavelength

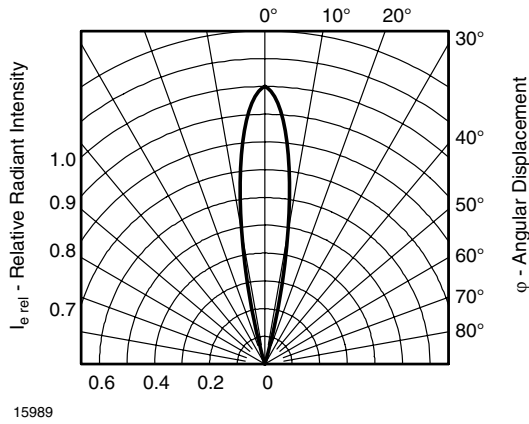
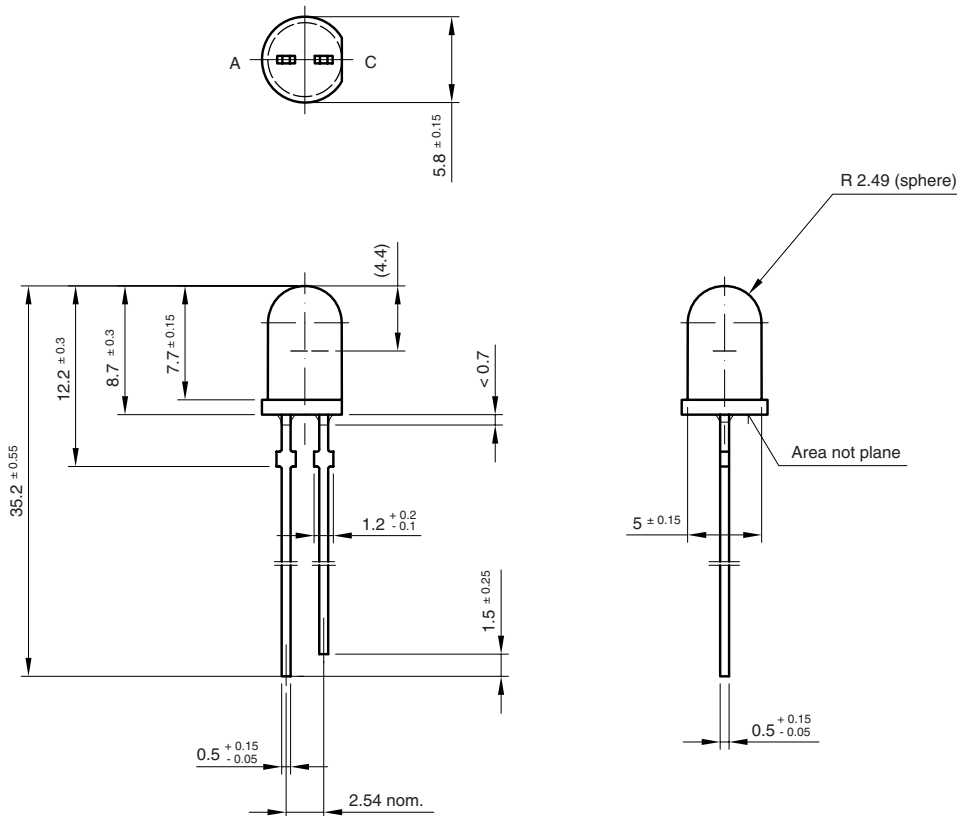
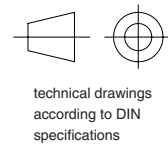


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

**PACKAGE DIMENSIONS** in millimeters

 6.544-5258.08-4  
 Issue: 3; 08.11.99  
 14435




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