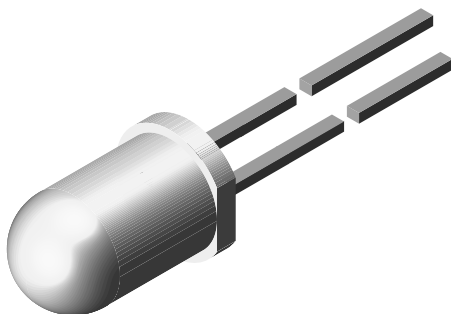




## High Speed Infrared Emitting Diode, 870 nm, GaAlAs Double Hetero



### DESCRIPTION

TSFF6410 is an infrared, 870 nm emitting diode in GaAlAs double hetero (DH) technology with high radiant power and high speed, molded in a clear, untinted plastic package.

### FEATURES

- Package type: leaded
- Package form: T-1 $\frac{3}{4}$
- Dimensions (in mm):  $\varnothing$  5
- Peak wavelength:  $\lambda_p = 870$  nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity:  $\varphi = \pm 22^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- High modulation bandwidth:  $f_c = 24$  MHz
- Good spectral matching to 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)

### APPLICATIONS

- Infrared video data transmission between camcorder and TV set
- Free air data transmission systems with high modulation frequencies or high data transmission rate requirements

### PRODUCT SUMMARY

COMPONENT	$I_e$ (mW/sr)	$\varphi$ (°)	$\lambda_p$ (nm)	$t_r$ (ns)
TSFF6410	70	$\pm 22$	870	15

#### Note

- Test conditions see table "Basic Characteristics"

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
TSFF6410	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1 $\frac{3}{4}$
TSFF6410-ASZ	Ammopack	MOQ: 5000 pcs, 1000 pcs/box	T-1 $\frac{3}{4}$

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25$ °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	$t_p/T = 0.5, t_p = 100 \mu s$	$I_{FM}$	200	mA
Surge forward current	$t_p = 100 \mu s$	$I_{FSM}$	1	A
Power dissipation		$P_V$	180	mW
Junction temperature		$T_j$	100	°C
Operating temperature range		$T_{amb}$	-40 to +85	°C
Storage temperature range		$T_{stg}$	-40 to +100	°C
Soldering temperature	$t \leq 5$ s, 2 mm from case	$T_{sd}$	260	°C
Thermal resistance junction to ambient	J-STD-051, leads 7 mm, soldered on PCB	$R_{thJA}$	230	K/W

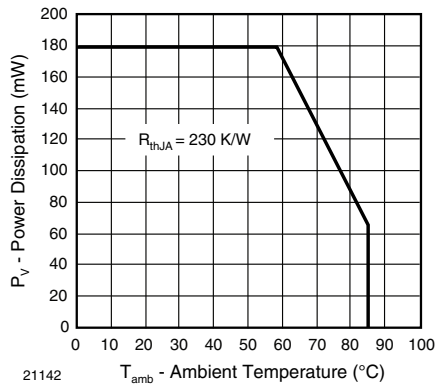


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

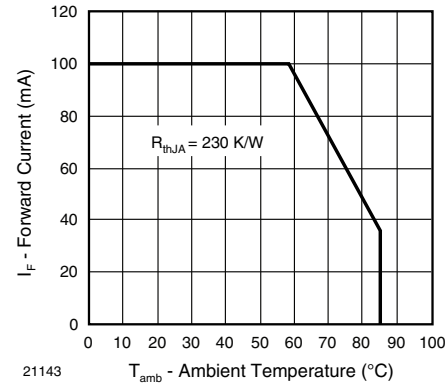


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
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>	-	1.5	1.8	V
	I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs	V <sub>F</sub>	-	2.3	3.0	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>	-	125	-	pF
Radiant intensity	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	I <sub>e</sub>	45	70	135	mW/sr
	I <sub>F</sub> = 1 A, t <sub>p</sub> = 100 μs	I <sub>e</sub>	-	700	-	mW/sr
Radiant power	I <sub>F</sub> = 100 mA, t <sub>p</sub> = 20 ms	φ <sub>e</sub>	-	50	-	mW
Temperature coefficient of φ <sub>e</sub>	I <sub>F</sub> = 100 mA	TK <sub>φ<sub>e</sub></sub>	-	-0.35	-	%/K
Angle of half intensity		φ	-	± 22	-	°
Peak wavelength	I <sub>F</sub> = 100 mA	λ <sub>p</sub>	-	870	-	nm
Spectral bandwidth	I <sub>F</sub> = 100 mA	Δλ	-	40	-	nm
Temperature coefficient of λ <sub>p</sub>	I <sub>F</sub> = 100 mA	TK <sub>λ<sub>p</sub></sub>	-	0.25	-	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
Cut-off frequency	I <sub>DC</sub> = 70 mA, I <sub>AC</sub> = 30 mA pp	f <sub>c</sub>	-	24	-	MHz
Virtual source diameter		d	-	2.1	-	mm



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

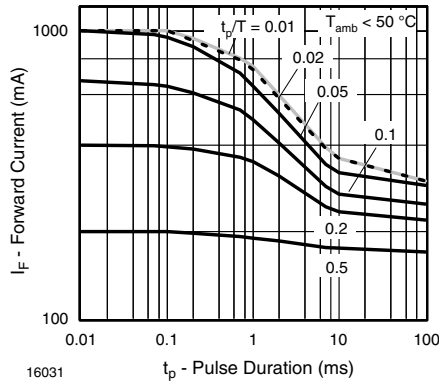


Fig. 3 - Pulse Forward Current vs. Pulse Duration

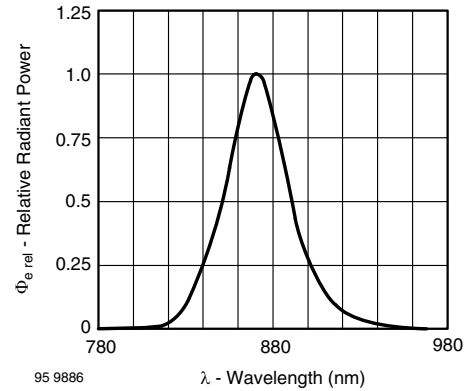


Fig. 6 - Relative Radiant Power vs. Wavelength

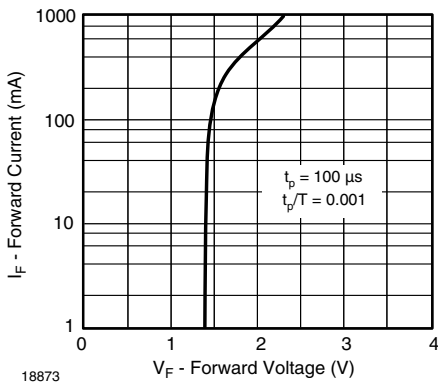


Fig. 4 - Forward Current vs. Forward Voltage

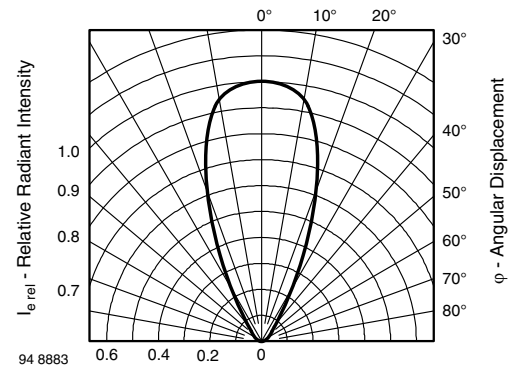


Fig. 7 - Relative Radiant Intensity vs. Angular Displacement

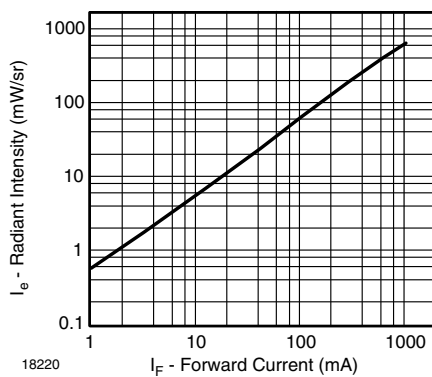


Fig. 5 - Radiant Intensity vs. Forward Current

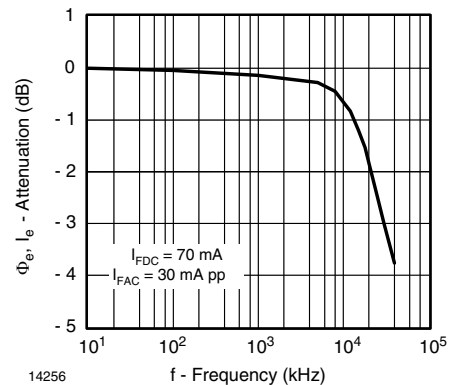
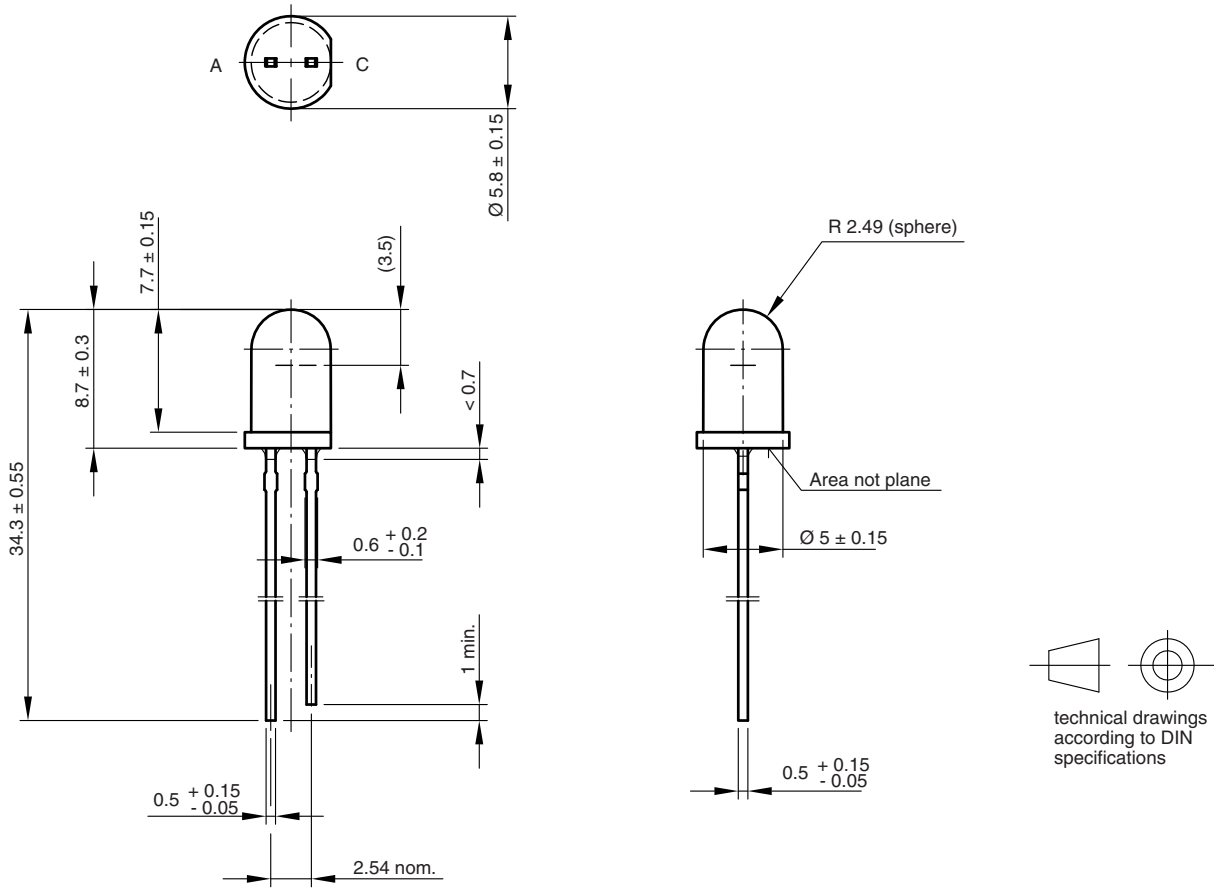


Fig. 8 - Attenuation vs. Frequency



**PACKAGE DIMENSIONS** in millimeters



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 19257



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