HEMT-3301/HEMT-1001

940 nm High Radiant Emitters

Data Sheet

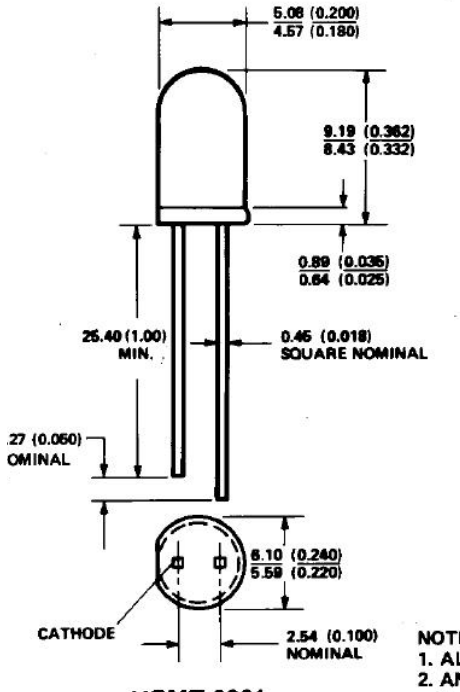
Description

The HEMT-3301 and HEMT-1001are infrared emitters, using amesa structure GaAs on GaAs infrared diode, IRED, optimized for maximum quantum efficiency at a peak wavelength of 940 nm. The HEMT-3301 and HEMT-1001emitters are untinted, undiffused plastic packages with medium wide radiation patterns. These medium-wide and wide radiation patterns eliminate the beam focusing problems that are encountered with emitters that have narrow radiation patterns. Applications include optical transducers, optical part counters, smoke detectors, covert identification, paper tape and card readers, and optical encoders.

Features

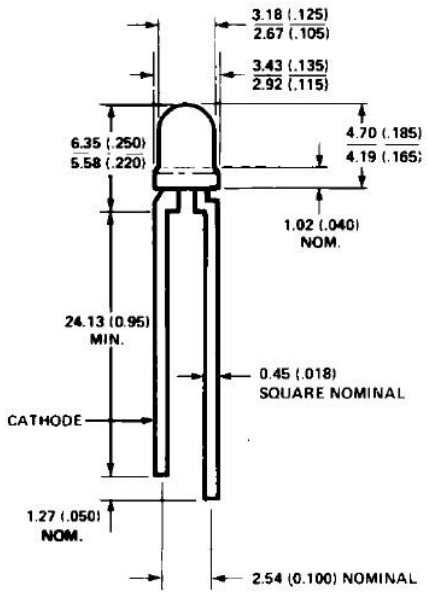
- Nonsaturating, High Radiant Flux Output
- Efficient at Low Currents, Combined with High Current Capability
- Three Package Styles
- Operating Temperature Range -40°C to +100°C
- Medium-Wide Radiation Patterns
- Radiated Spectrum Matches Response of Silicon Photodetectors

Package Dimensions



HEMT-3301

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES (INCHES).
2. AN EPOXY MENISCUS MAY EXTEND ABOUT 1 mm (0.040") DOWN THE LEADS.



HEMT-1001

Absolute Maximum Ratings at $T_A = 25°C$

Description	Min.	Typ.	Max.	Units	Notes
Power Dissipation		150		mW	
DC Forward Current		100		mA	Derate as specified in Figure 6
Peak Forward Current		1000		mA	Time average current as determined from Figure 7
IRED Junction Temperature		110		°C	
Operating Temperature	-40		+100	°C	
Storage Temperature	-40		+100	°C	
Lead Soldering Temperature		260		°C for 5 seconds	1.6 mm (0.063 in.) from emitter body

Electrical/Optical Characteristics at $T_A = 25°C$

Symbol	Description	Min.	Typ.	Max.	Units	Test Conditions	Fig.
I_e	Radiant Intensity HEMT-3301 HEMT-1001	 2.5 1.0	 4.0 2.0		mW/sr	I_F = 20 mA	4, 5
$\Delta I_e/\Delta T$	Temperature Coefficient for Radiant Intensity[1]		-0.58		%/°C	Measured at λ_{PEAK}	1
$\Delta\lambda/\Delta T$	Temperature Coefficient for Peak Wavelength[2]		0.3		nm/°C	Measured at λ_{PEAK}	1
λ_{PEAK}	Peak Wavelength		940		nm	Measured at λ_{PEAK}	1
$2\theta_{1/2}$	Half Intensity[3] Total Angle HEMT-3301 HEMT-1001		 50 60		deg.	I_F = 20 mA	8 9
t_r	Output Rise Time (10% to 90%)		1700		ns	λ_{PEAK} = 20 mA	
t_f	Output Fall Time (90% to 10%)		700		ns	λ_{PEAK} = 20 mA	
C	Capacitance		30		pf	V_F = 0; f = 1 MHz	
V_R	Reverse Breakdown Voltage	5.0			V	I_R = 10 mA	
V_F	Forward Voltage		1.30 1.15	1.50	V	I_F = 100 mA I_F = 20 mA	2
$R\theta_{J\text{-}PIN}$	Thermal Resistance HEMT-3301 HEMT-1001		 260 290		°C/W	IRED Junction to to Cathode Lead	

Notes:

1. Radiant intensity at ambient temperature $I_e(T_A) = I_e(25°C) + (\Delta I_e/\Delta T)\ (T_A - 25°C)/100$.
2. Peak wavelength at ambient temperature: $\lambda_{PEAK}(T_A) = \lambda_{PEAK}(25°C) + (\Delta\lambda/\Delta T)\ (T_A - 25°C)$.
3. $\theta_{1/2}$ is the off-axis angle from emitter centerline where the radiant intensity is half the on-axis value.
4. Approximate radiant flux output within a cone angle of 2θ: $\phi_e(2\theta) = [\phi_e(\theta)/I_e(0)]\ I_e\ (T_A)$; $\phi_e(\theta)/I_e(0)$ obtained from Figure 8 or 9.

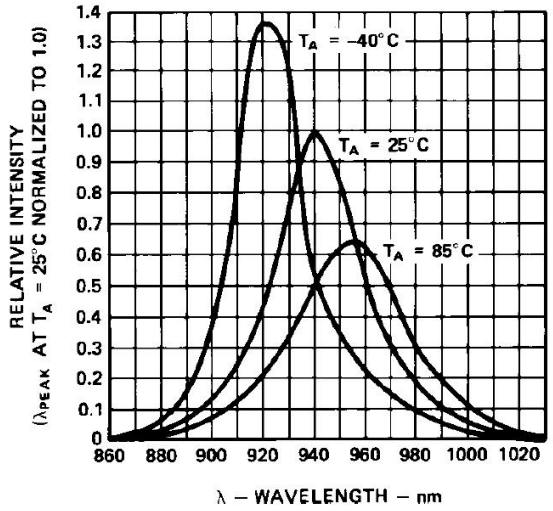


Figure 1. Radiated Spectrum.

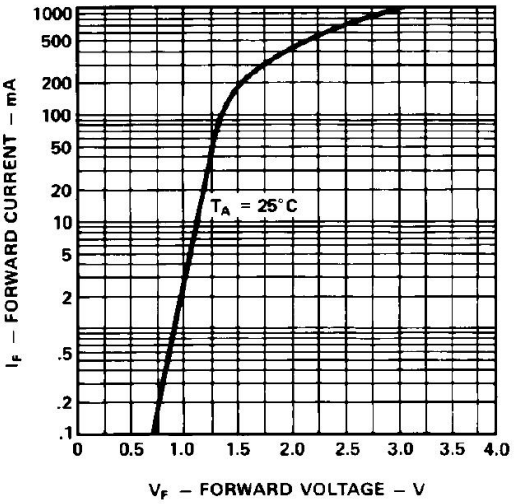


Figure 2. Forward Current vs. Forward Voltage.

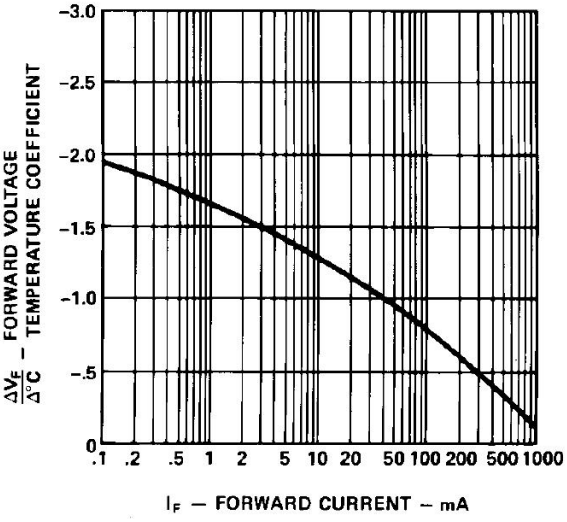


Figure 3. Forward Voltage Temperature Coefficient vs. Forward Current.

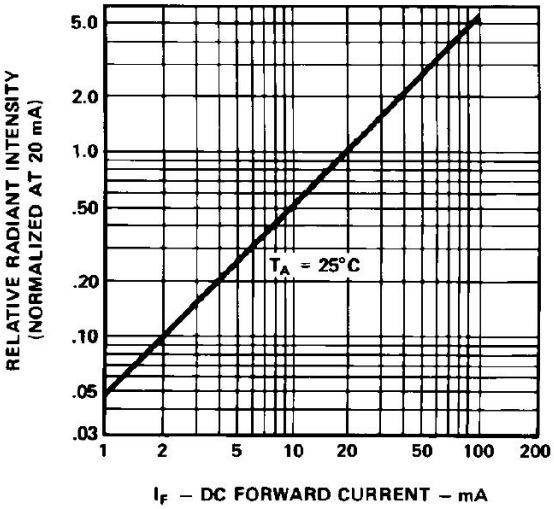


Figure 4. Relative Radiant Intensity vs. DC Forward Current.

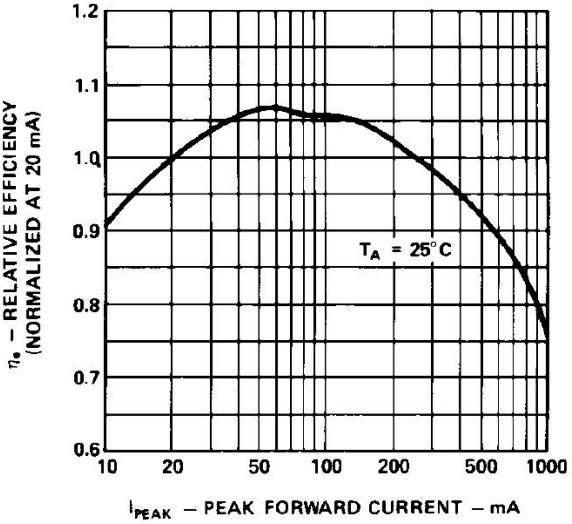


Figure 5. Relative Efficiency vs. Peak Forward Current.

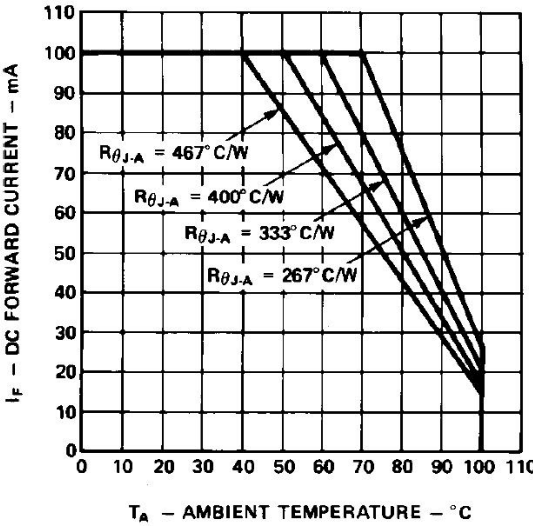


Figure 6. Maximum DC Forward Current vs. Ambient Temperature. Derating Based on TJMAX = 110°C.

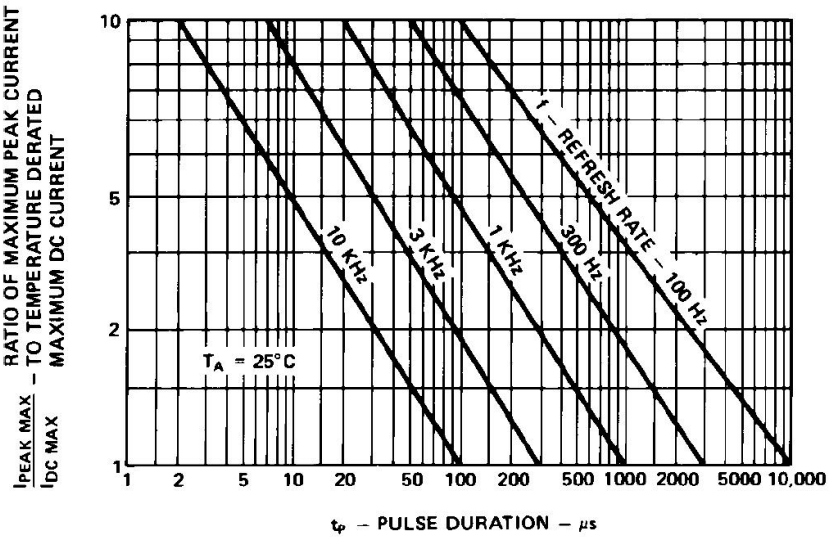


Figure 7. Maximum Tolerable Peak Current vs. Peak Determined from Temperature Derated IDC MAX).

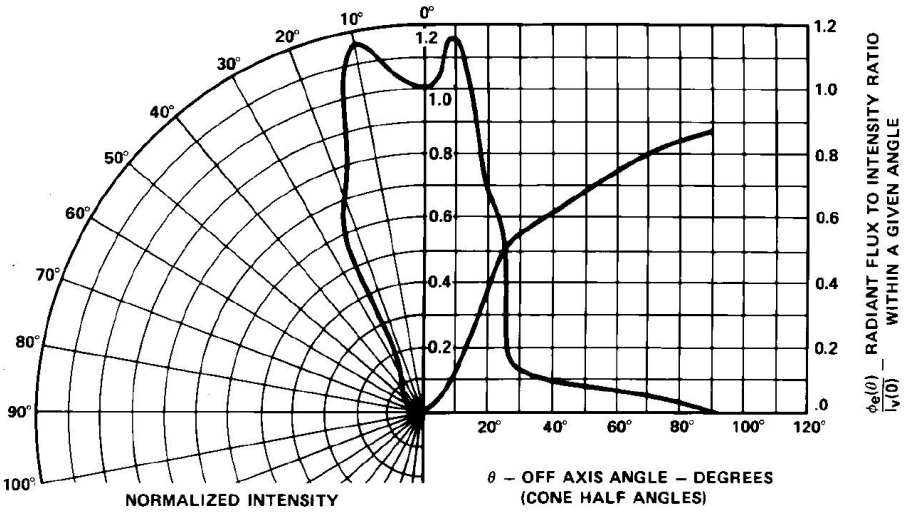


Figure 8. Far Field Radiation Pattern, HEMT-3301.

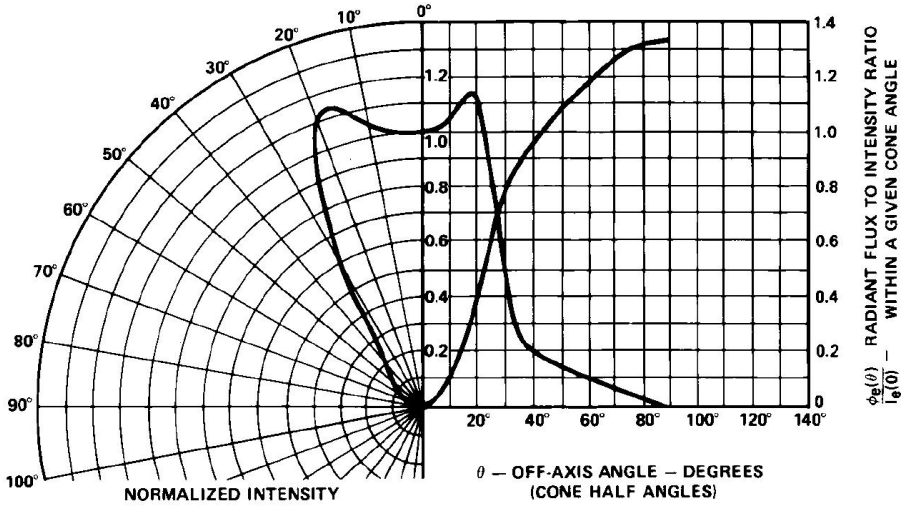


Figure 9. Far Field Radiation Pattern, HEMT-1001.

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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