HEWLETT® PACKARD

10 mm (0.40 inch) Seven Segment Displays

Technical Data

HDSP-F00X Series
HDSP-F15X Series
HDSP-F20X Series
HDSP-F30X Series
HDSP-F40X Series
HDSP-F50X Series
HDSP-G00X Series
HDSP-G15X Series
HDSP-G20X Series
HDSP-G30X Series
HDSP-G40X Series
HDSP-G50X Series

Features

- **Industry Standard Size**
- **Industry Standard Pinout**
  7.6 mm (0.3 inch) DIP Single
  15.24 mm (0.6 inch) DIP Dual
  Leads on 2.54 mm
  (0.1 inch) Centers
- **Choice of Colors**
  Red, AlGaAs Red, High Efficiency Red, Orange, Yellow, Green
- **Excellent Appearance**
  Evenly Lighted Segments
  Mitered Corners on Segments
  Gray Package Gives Optimum Contrast
  ± 50° Viewing Angle
- **Design Flexibility**
  Common Anode or
  Common Cathode
  Single and Dual Digits
  Right Hand Decimal Point
  ± 1. Overflow Character
- **Categorized for Luminous Intensity**
  Yellow and Green Categorized for Color
  Use of Like Categories Yields a Uniform Display
- **High Light Output**
- **High Peak Current**
- **Excellent for Long Digit String Multiplexing**



- **Intensity and Color Selection Option**
- **Sunlight Viewable AlGaAs**

Devices

Red HDSP-	AlGaAs Red[1] HDSP-	HER HDSP-	Orange HDSP-	Yellow HDSP-	Green HDSP-	Description	Package Drawing
F001	F151	F201	F401	F301	F501	Common Anode Right Hand Decimal	A
F003	F153	F203	F403	F303	F503	Common Cathode Right Hand Decimal	B
F007	F157	F207	F407	F307	F507	Common Anode ± 1. Overflow	C
F008	F158	F208	F408	F308	F508	Common Cathode ± 1. Overflow	D
G001	G151	G201	G401	G301	G501	Two Digit Common Anode Right Hand Decimal	E
G003	G153	G203	G403	G303	G503	Two Digit Common Cathode Right Hand Decimal	F

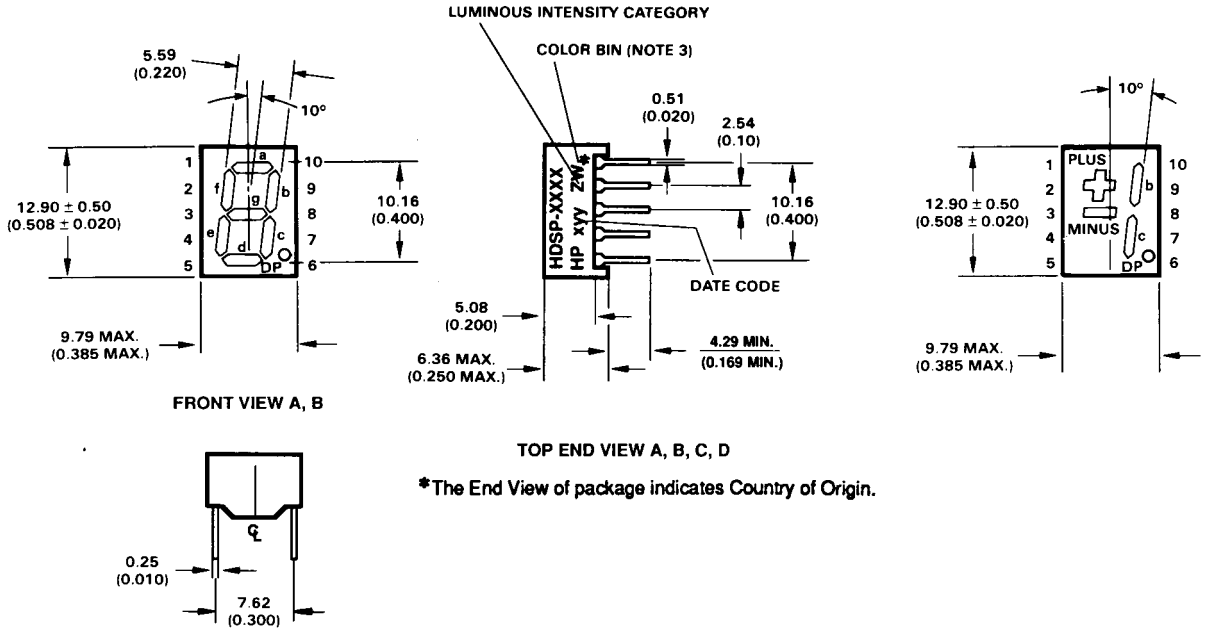
Note:
1. These displays are recommended for high ambient light operation. Please refer to the HDSP-F10X data sheet for low current operation.

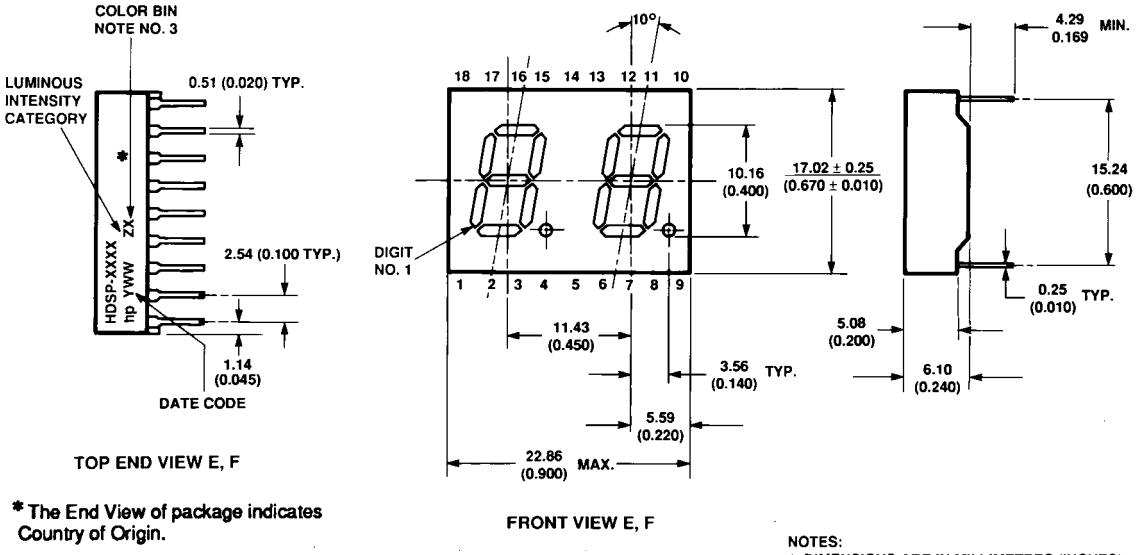
Description

The 10 mm (0.40 inch) LED seven segment displays are HP's most space-efficient character size. They are designed for viewing distances up to 4.5 metres (15 feet). These devices use an industry standard size package and pinout. The dual numeric, single numeric, and ± 1. overflow devices feature a right hand decimal point. All devices are available as either common anode or common cathode.

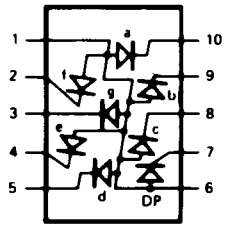
Typical applications include instruments, point of sale terminals, and appliances.

Package Dimensions

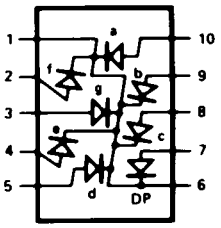




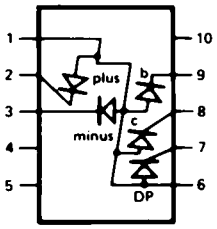
NOTES:
1. DIMENSIONS ARE IN MILLIMETRES (INCHES).
2. ALL UNTOLERANCED DIIMENSIONS ARE FOR REFERENCE ONLY.
3. WHERE APPLICABLE.



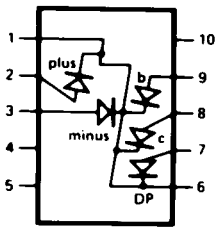
A



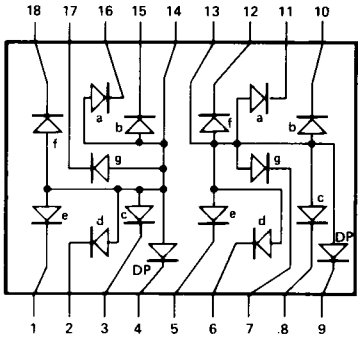
B



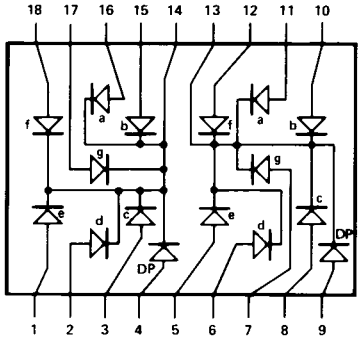
C



D

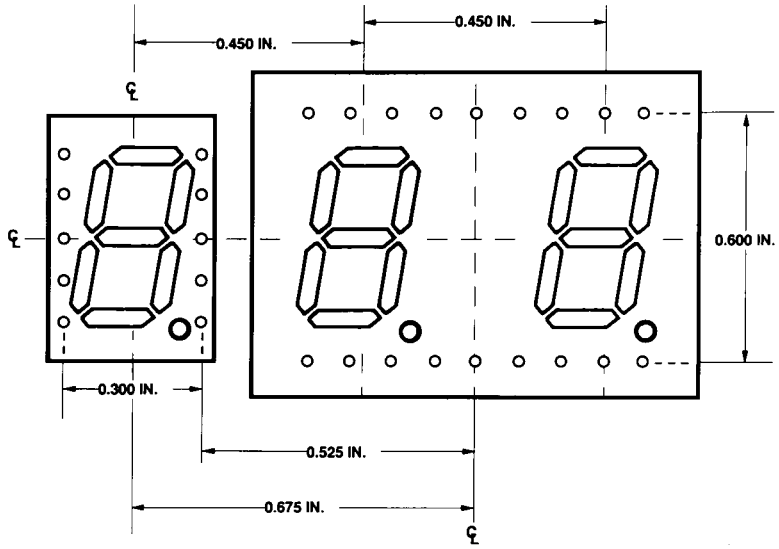


E



F

PIN	FUNCTION E	FUNCTION F
1	E CATHODE NO. 1	E ANODE NO. 1
2	D CATHODE NO. 1	D ANODE NO. 1
3	C CATHODE NO. 1	C ANODE NO. 1



Absolute Maximum Ratings

Description	Red HDSP-F00X/G00X Series	AlGaAs Red HDSP-F15X/G15X Series	HER/Orange HDSP-F20X/G20X/G40X Series	Yellow HDSP-F30X/G30X Series	Green HDSP-F50X/G50X Series	Units
Average Power per Segment or DP	82	96	105	80	105	mW
Peak Forward Current per Segment or DP	150[1]	160[3]	90[7]	60[7]	90[9]	mA
DC Forward Current per Segment or DP	25[2]	40[4]	30[6]	20[8]	30[10]	mA
Operating Temperature Range	-40 to +100	-20 to +100[11]		-40 to +100		°C
Storage Temperature Range			-55 to +100			°C
Reverse Voltage per Segment or DP			3.0			V
Lead Solder Temperature for 3 Seconds (1.59 mm [0.63 in.] below seating plane)			260			°C

Electrical/Optical Characteristics at T_A = 25°C

AlGaAs Red

Device Series	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
	Luminous Intensity/Segment[1,2,5] (Digit Average)	I_V	7.5	15.0		mcd	I_F = 20 mA
	Forward Voltage/Segment or DP	V_F		1.8	2.2	V	I_F = 20 mA
HDSP-F15X/ G15X	Peak Wavelength	λ_{PEAK}		645		nm	
	Dominant Wavelength[3]	λ_d		637		nm	
	Reverse Voltage/Segment or DP[4]	V_R	3.0	15		V	I_R = 100 µA
	Temperature Coefficient of V_F/Segment or DP	ΔV_F/°C		-2		mV/°C	
	Thermal Resistance LED Junction-to-Pin	$R\theta_{J\text{-}PIN}$		320		°C/W/Seg	

Orange

Device Series	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
HDSP-F40X/ G40X	Luminous Intensity/Segment[1,2] (Digit Average)	I_V	420	1200		µcd	I_F = 5 mA
	Forward Voltage/Segment or DP	V_F		2.0	2.5	V	I_F = 20 mA
	Peak Wavelength	l_{PEAK}		600		nm	
	Dominant Wavelength[3]	l_d		603		nm	
	Reverse Voltage/Segment or DP[4]	V_R	3.0	30		V	I_R = 100 µA
	Temperature Coefficient of V_F/Segment or DP	ΔV_F/°C		-2		mV/°C	
	Thermal Resistance LED Junction-to-Pin	Rl\q$_{J\text{-}PIN}$		320		°C/W/Seg	

Yellow

Device Series	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
HDSP-F30X/ G30X	Luminous Intensity/Segment[1,2] (Digit Average)	I_V	290	800		µcd	I_F = 5 mA
	Forward Voltage/Segment or DP	V_F		2.2	2.5	V	I_F = 20 mA
	Peak Wavelength	λ_{PEAK}		583		nm	
	Dominant Wavelength[3,6]	λ_d	581.5	586	592.5	nm	
	Reverse Voltage/Segment or DP[4]	V_R	3.0	40		V	I_R = 100 µA
	Temperature Coefficient of V_F/Segment or DP	ΔV_F/°C		-2		mV/°C	
	Thermal Resistance LED Junction-to-Pin	R$\theta_{J\text{-}PIN}$		320		°C/W/Seg	

High Performance Green

Device Series	Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
HDSP-F50X/ G50X	Luminous Intensity/Segment[1,2] (Digit Average)	I_V	1030	3500		µcd	I_F = 10 mA
	Forward Voltage/Segment or DP	V_F		2.1	2.5	V	I_F = 10 mA
	Peak Wavelength	λ_{PEAK}		566		nm	
	Dominant Wavelength[3,6]	λ_d		571	577	nm	
	Reverse Voltage/Segment or DP[4]	V_R	3.0	50		V	I_R = 100 µA
	Temperature Coefficient of V_F/Segment or DP	ΔV_F/°C		-2		mV/°C	
	Thermal Resistance LED Junction-to-Pin	$R\theta_{J\text{-}PIN}$		320		°C/W/Seg	

Notes:
1. Case temperature of device immediately prior to the intensity measurement is 25°C.
2. The digits are categorized for luminous intensity. The intensity category is designated by a letter on the side of the package.
3. The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and is that single wavelength which defines the color of the device.
4. Typical specification for reference only. Do not exceed absolute maximum ratings.
5. For low current operation, the AlGaAs HDSP-F10X, G10X series displays are recommended. They are tested at 1 mA dc/segment and are pin for pin compatible with the HDSP-F15X/G15X series.
6. The Yellow (HDSP-F30X/G30X) series and Green (HDSP-F50X/G50X) series displays are categorized for dominant wavelength. The category is designated by a number adjacent to the luminous intensity category letter.

RED, AlGaAs Red

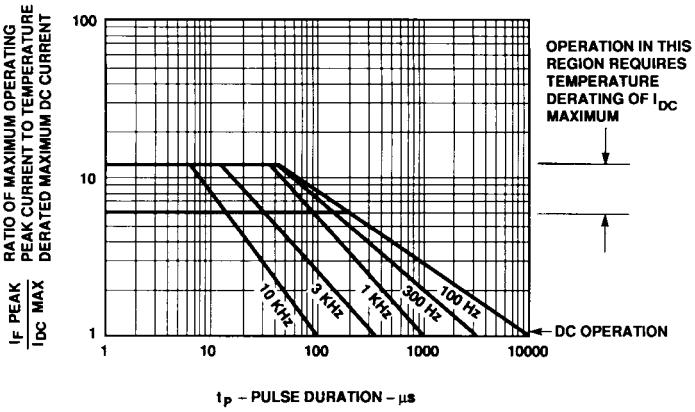


Figure 1. Maximum Tolerable Peak Current vs. Pulse Duration – Red.

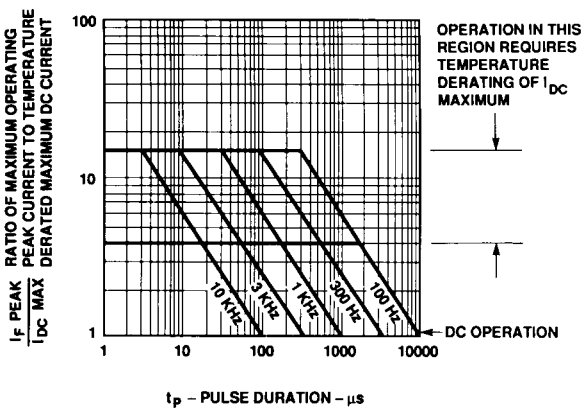


Figure 2. Maximum Tolerable Peak Current vs. Pulse Duration – AlGaAs Red.

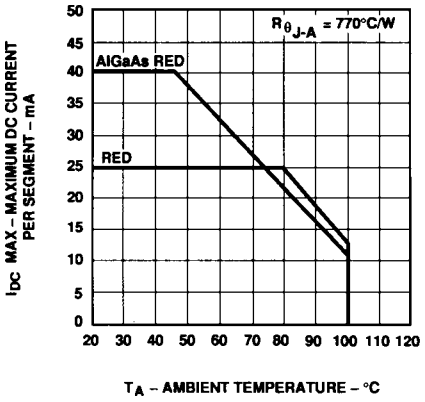


Figure 3. Maximum Allowable DC Current vs. Ambient Temperature.

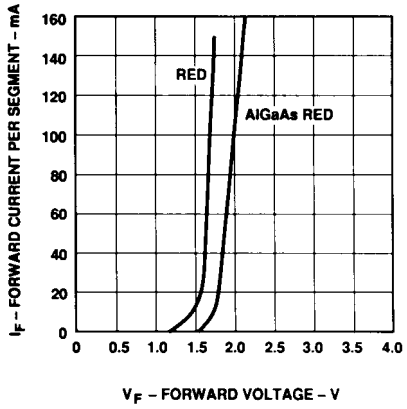


Figure 4. Forward Current vs. Forward Voltage.

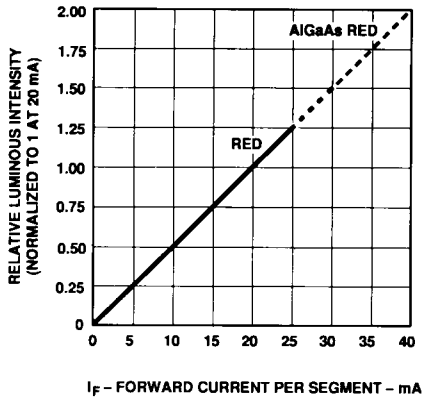


Figure 5. Relative Luminous Intensity vs. DC Forward Current.

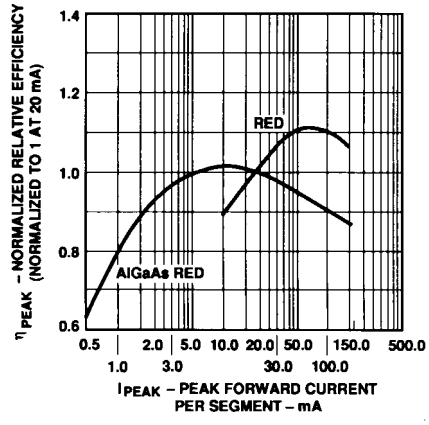


Figure 6. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

HER, Orange, Yellow, Green

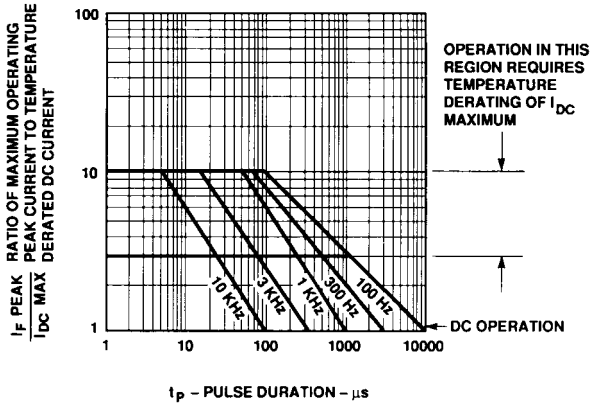


Figure 7. Maximum Tolerable Peak Current vs. Pulse Duration – HER, Orange.

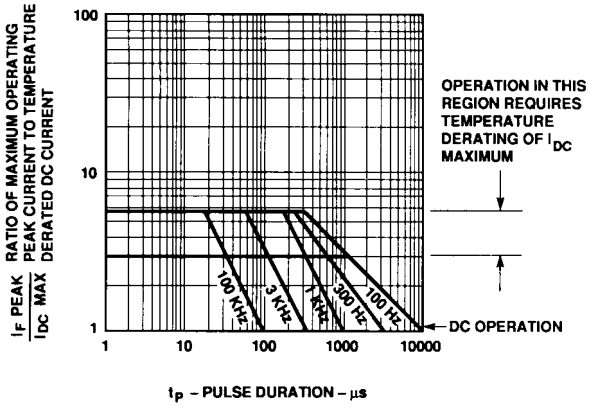


Figure 8. Maximum Tolerable Peak Current vs. Pulse Duration – Yellow.

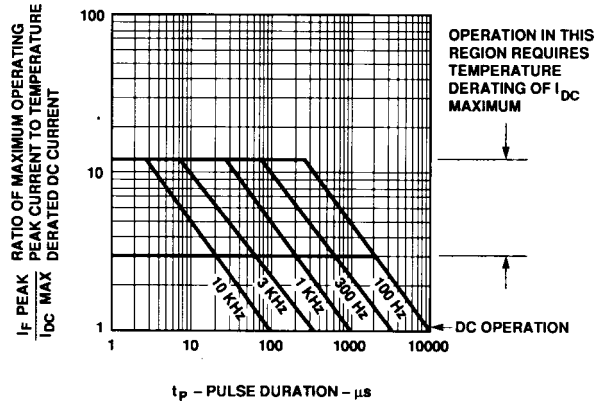


Figure 9. Maximum Tolerable Peak Current vs. Pulse Duration – Green.

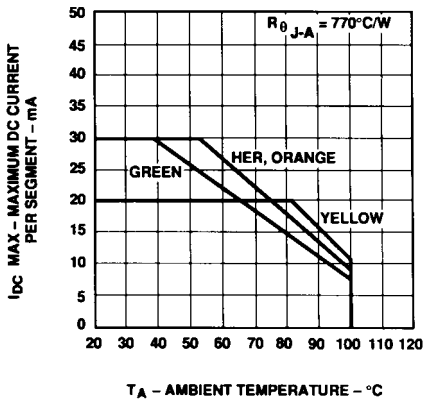


Figure 10. Maximum Allowable DC Current vs. Ambient Temperature.

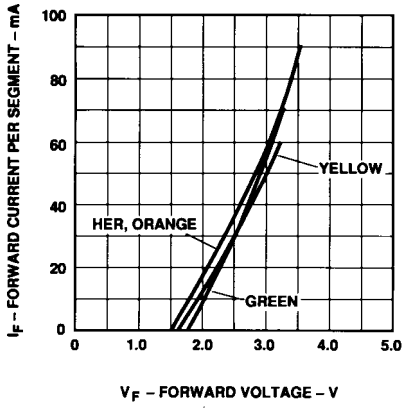


Figure 11. Forward Current vs. Forward Voltage Characteristics.

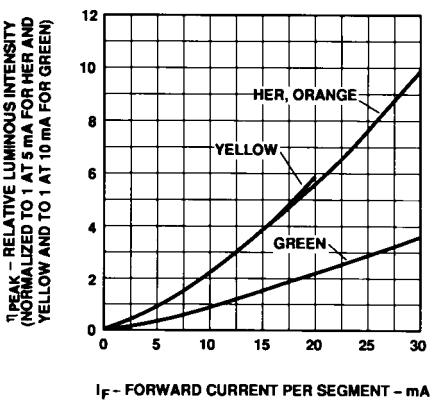


Figure 12. Relative Luminous Intensity vs. DC Forward Current.

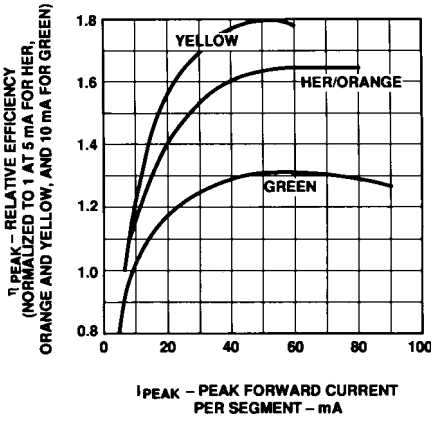


Figure 13. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

Contrast Enhancement

For information on contrast enhancement please see Application Note 1015.

Soldering/Cleaning

Cleaning agents from the ketone family (acetone, methyl ethyl ketone, etc.) and from the chlorinated hydrocarbon family (methylene chloride, trichloro-ethylene, carbon tetrachloride, etc.) are not recommended for cleaning LED parts. All of these various solvents attack or dissolve the encapsulating epoxies used to form the package of plastic LED parts.

For further information on soldering LEDs please refer to Application Note 1027.