

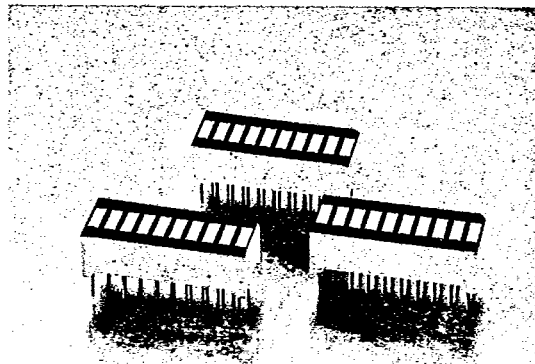


LTA-1000 SERIES

BAR GRAPH ARRAY

FEATURES

- LARGE SEGMENTS, CLOSELY SPACED.
- CHOICE OF SIX BRIGHT COLORS-RED/BRIGHT RED / GREEN / YELLOW / ORANGE / HIGH EFFICIENCY RED.
- END STACKABLE.
- FAST SWITCHING, EXCELLENT FOR MULTIPLEXING.
- LOW POWER REQUIREMENT.
- IC COMPATIBLE.
- WIDE VIEWING ANGLE.
- CATEGORIZED FOR LUMINOUS INTENSITY.
- EASY MOUNTING ON P.C. BOARD OR SOCKETS.



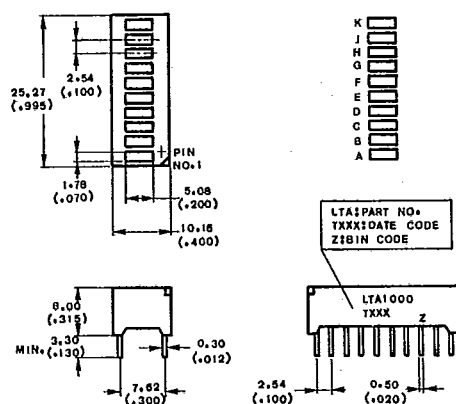
DESCRIPTION

The LTA-1000 series are ten rectangular light sources array displays designed for a variety of applications where a continuously large, bright source of light is required. The red series devices utilize LED chips which are made from GaAsP on a GaAs substrate. The bright red and green series devices utilize LED chips which are made from GaP on a transparent GaP substrate. The yellow, orange and high efficiency red series devices utilize LED chips which are made from GaAsP on a transparent GaP substrate. The red, bright red, green, yellow, and orange devices have gray face and white segment color. The high efficiency red devices have red face and red segment color.

DEVICES

PART NO. LTA--						DESCRIPTION
RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED	
1000R	1000P	1000G	1000Y	1000E	1000HR	Universal, Ten Rectangular Bar

PACKAGE DIMENSIONS



LED LIGHT BARS &
BAR GRAPH ARRAYS

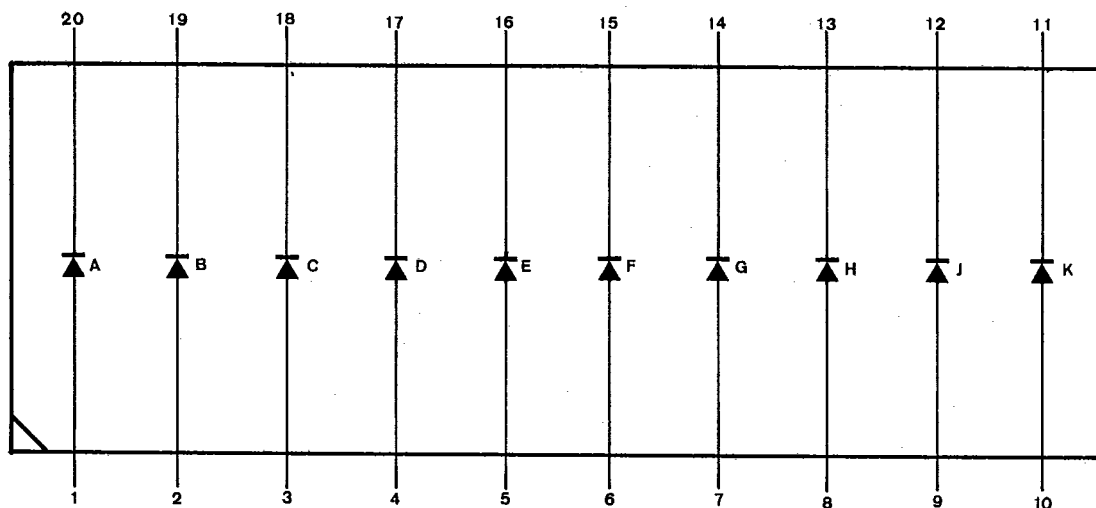
NOTE: All dimensions are in $\frac{\text{millimeters}}{(\text{inches})}$, tolerance is $\frac{0.25\text{mm}}{(0.010")}$ unless otherwise noted.

PIN CONNECTION

PIN NO.	CONNECTION	PIN NO.	CONNECTION
1	Anode A	11	Cathode K
2	Anode B	12	Cathode J
3	Anode C	13	Cathode H
4	Anode D	14	Cathode G
5	Anode E	15	Cathode F
6	Anode F	16	Cathode E
7	Anode G	17	Cathode D
8	Anode H	18	Cathode C
9	Anode J	19	Cathode B
10	Anode K	20	Cathode A

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INTERNAL CIRCUIT DIAGRAM

ABSOLUTE MAXIMUM RATINGS AT $T_A = 25^\circ\text{C}$

PARAMETER	RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED	UNIT
Power Dissipation Per Bar	55	40	75	60	75	75	mW
Peak Forward Current Per Bar (1/10 Duty Cycle, 0.1ms Pulse Width)	160	60	100	80	100	100	mA
Continuous Forward Current Per Bar	25	15	25	20	25	25	mA
Derating Linear From 25°C Per Bar	0.3	0.18	0.3	0.24	0.3	0.3	mA/°C
Reverse Voltage PerBar	5	5	5	5	5	5	V
Operating Temperature Range	-25°C to +85°C						
Storage Temperature Range	-25°C to +85°C						
Solder Temperature 1/16 inch Below Seating Plane for 3 Seconds at 260°C							

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTA-1000R

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous intensity	I_v	0.2	0.5		mcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		655		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		24		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		1.7	2.0	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

LED LIGHT BARS &
BAR GRAPH ARRAYS

Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

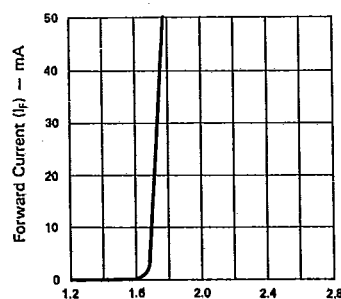


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

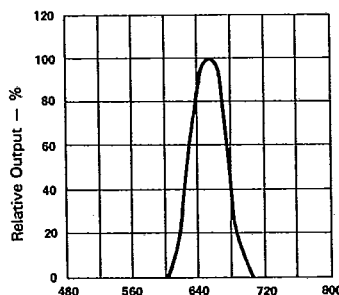


Fig. 2 SPECTRAL RESPONSE.

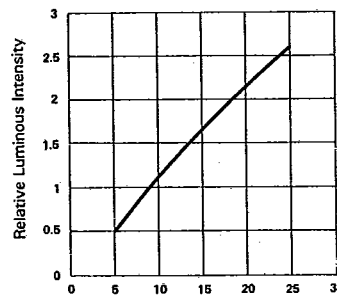


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

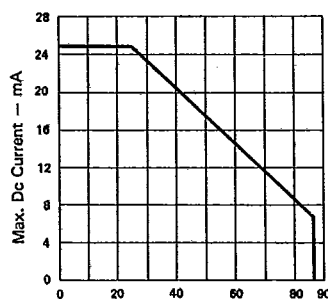


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

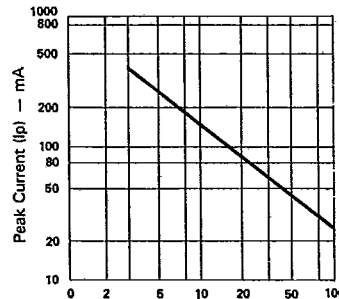


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

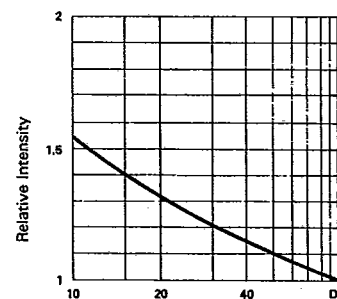


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{mA PER SEG.}$)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTA-1000P

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	0.3	0.7		mcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		697		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		90		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

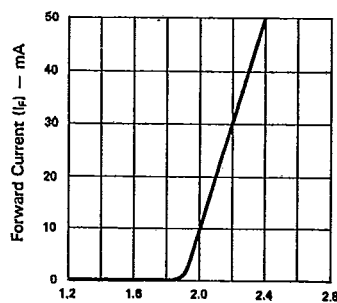


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

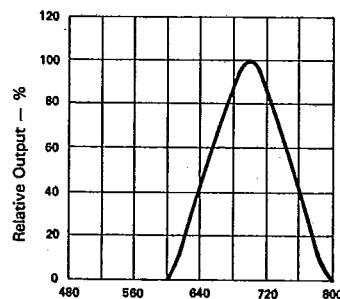


Fig. 2 SPECTRAL RESPONSE.

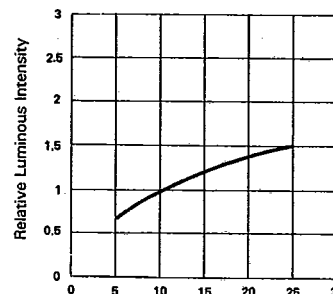


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

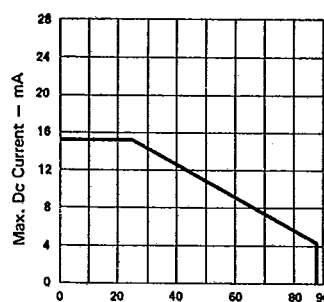


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

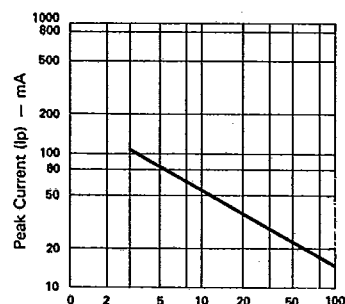


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. (REFRESH RATE - $F = 1\text{ KHz}$)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$

LTA-1000G

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous intensity	I_v	0.8	2.0		mcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		565		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		30		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

LED LIGHT BARS &
BAR GRAPH ARRAYS

Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

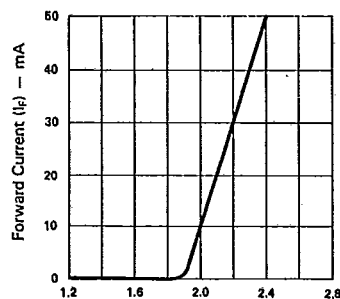


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

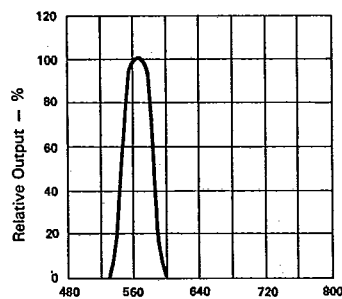


Fig. 2 SPECTRAL RESPONSE.

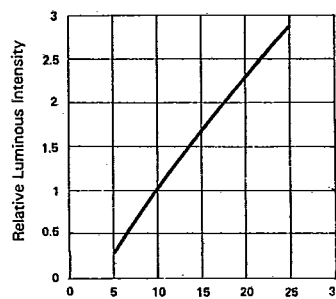


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

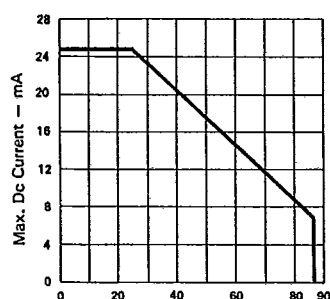


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

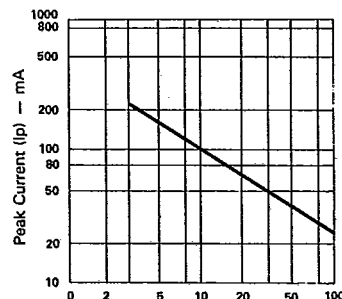


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

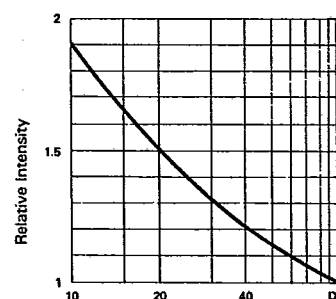


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{mA}$ PER SEG.)

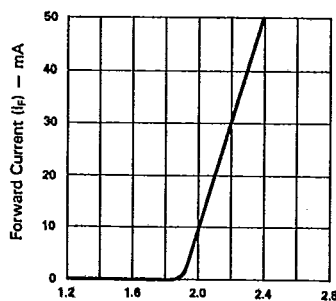
ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTA-1000Y

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	0.8	2.0		mcđ	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		585		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		35		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

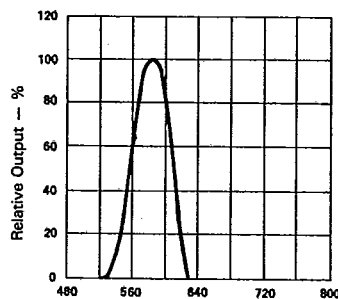
Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

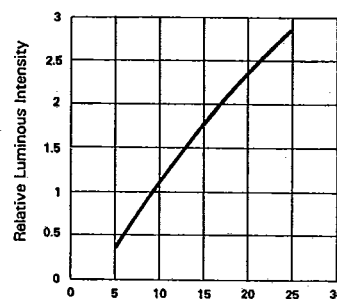
(25°C Ambient Temperature Unless Otherwise Noted)



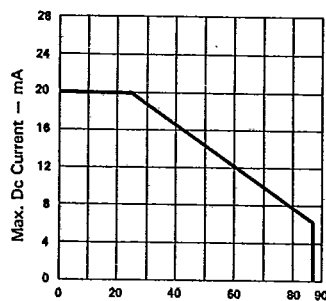
Forward Voltage (V_F) — Volts
Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.



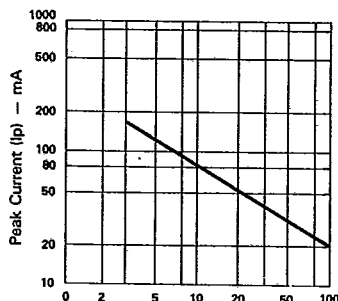
Wavelength (λ) — nm.
Fig. 2 SPECTRAL RESPONSE.



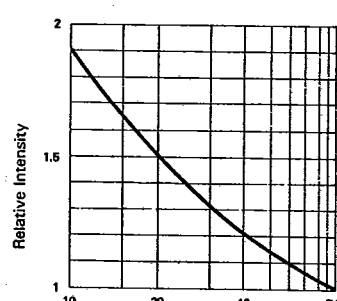
Forward Current (I_F) — mA
Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).



Ambient Temperature (T_A) — $^\circ\text{C}$
Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.



Duty Cycle %
Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE, % (REFRESH RATE — $F = 1\text{ KHz}$)



Duty Cycle %
Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{ mA PER SEG.}$)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTA-1000E

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	0.8	2.0		mcđ	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		630		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		40		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

LED LIGHT BARS &
BAR GRAPH ARRAYS

Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES (25°C Ambient Temperature Unless Otherwise Noted)

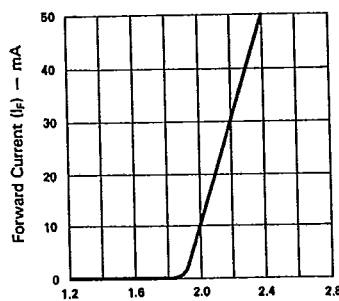


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

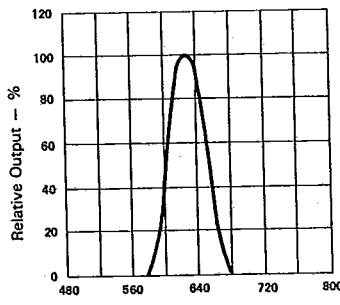


Fig. 2 SPECTRAL RESPONSE.

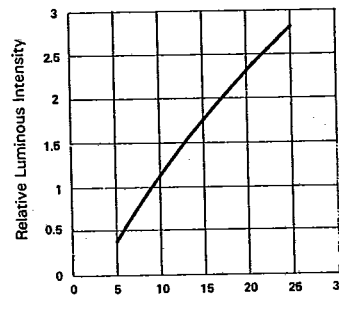


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

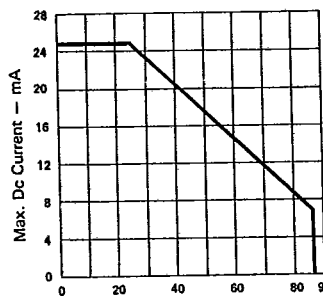


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

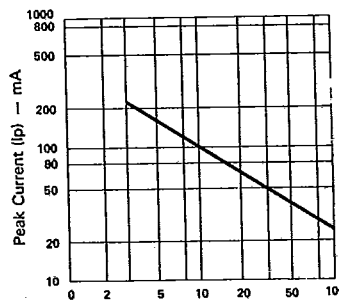


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

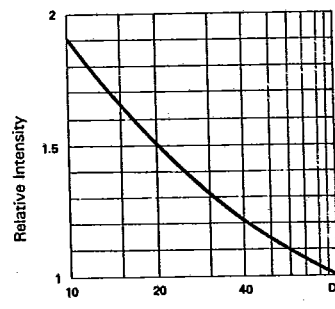


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{ mA}$ PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTA-1000HR

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous intensity	I_v	0.8	2.0		mcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength	λ_p		635		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		40		nm	$I_F = 20\text{ mA}$
Forward Voltage any Bar	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Bar	I_R			100	μA	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

Note: The BIN brightness classification see page 3-24, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

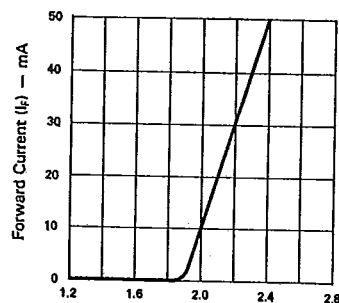


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

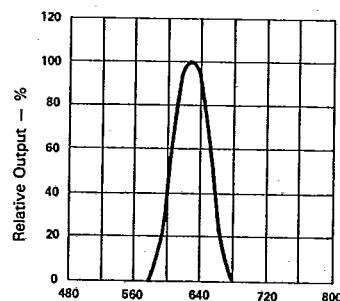


Fig. 2 SPECTRAL RESPONSE.

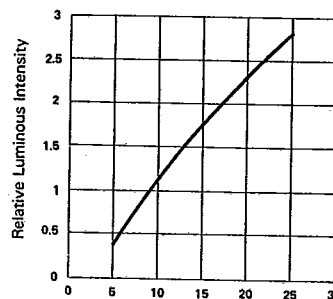


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

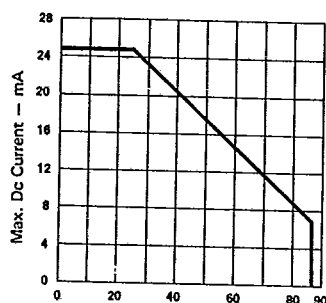


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

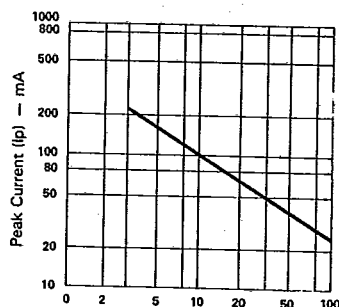


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. (REFRESH RATE - $F = 1\text{ KHz}$)

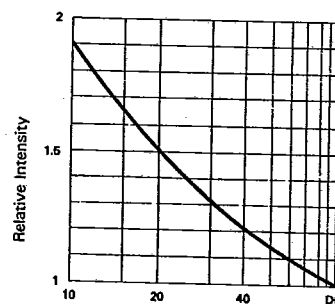


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE (AVERAGE $I_F = 10\text{ mA PER SEG.}$)

NOTES: 1. Clean only in water, isopropanol, ethanol, freon TF (or equivalent).

2. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commission Internationale De L'Eclairage) eye-response curve.

3. The average luminous intensity is obtained by summing the luminous intensity of each segment and dividing by the total number of segments. The displays are categorized for luminous intensity with the intensity category designated by a letter located on the side of the package. The BIN brightness classification is as follows:

CATEGORY A:

BIN CODE	A	B	C	D	E	F	G	H	J	K	L
RANGE (μcd)	68~ 156	104~ 252	168~ 408	272~ 648	432~ 1044	696~ 1668	1112~ 2832	1888~ 4524	3016~ 7236	4820~ 11568	7712~ 16325

CATEGORY E:

BIN CODE	3	2	2	A	B	C	D
RANGE (μcd)	1.2~ 2.28	1.6~ 3	2.08~ 4.2	2.88~ 6	4.08~ 8.4	5.68~ 12	8.08~ 16.8

BIN CODE	E	F	G	H	J	K
RANGE (μcd)	11.28~ 24	16.08~ 33.6	22.48~ 46.8	31.28~ 64.8	43.28~ 91.2	60.8~ 128.04

LED LIGHT BARS &
BAR GRAPH ARRAYS