

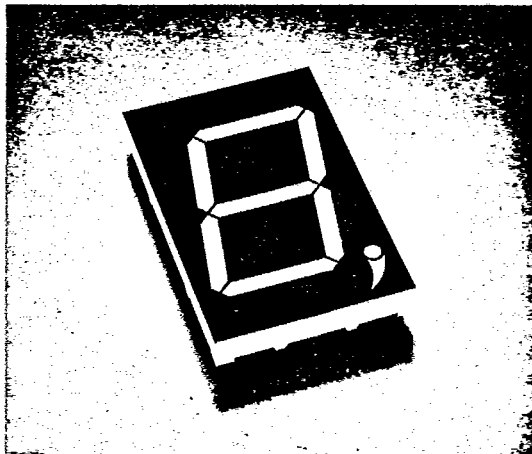


LTS- 30301/30801 30302A/30802A SERIES

3 INCH SINGLE COLOR & MULTICOLOR ULTRA LARGE
SINGLE DIGIT LED NUMERICAL DISPLAY

FEATURES

- 3 INCH (76.2mm) ULTRA LARGE DIGIT.
- CONTINUOUS UNIFORM SEGMENTS.
- LOW POWER REQUIREMENT.
- EXCELLENT CHARACTERS APPEARANCE HIGH CONTRAST.
- HIGH BRIGHTNESS.
- WIDE VIEWING ANGLE.
- SOLID STATE RELIABILITY.
- CATEGORIZED FOR LUMINOUS INTENSITY.
- I.C. COMPATIBLE.
- EASY MOUNTING ON P.C. BOARD.
- SINGLE COLOR DISPLAYS HAVE THE CHOICE OF TWO BRIGHT COLORS – GREEN/HIGH EFFICIENCY RED.
- MULTICOLOR DISPLAYS ARE APPLICABLE TO THREE BRIGHT COLORS – GREEN, ORANGE AND YELLOW (GREEN AND ORANGE MIXED).



DESCRIPTION

The LTS-30000 series are 3 inch (76.2mm) height ultra large single digit displays.

The LTS-30301/30801 series are single color displays. The green displays have black face and green segment color, the high efficiency red displays have black face and red segment color.

The LTS-30302A/30802A are multicolor displays. The multicolor displays have black face and white segment color.

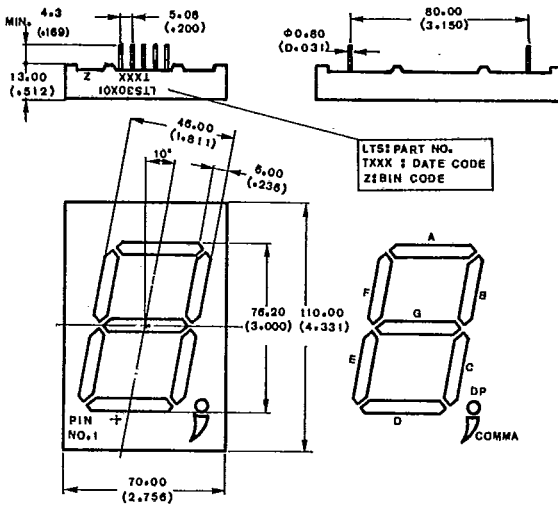
The green series utilize LED chips which are made from GaP on a transparent GaP substrate. The high efficiency red series devices utilize LED chips which are made from GaAsP on a transparent GaP substrate.

DEVICES

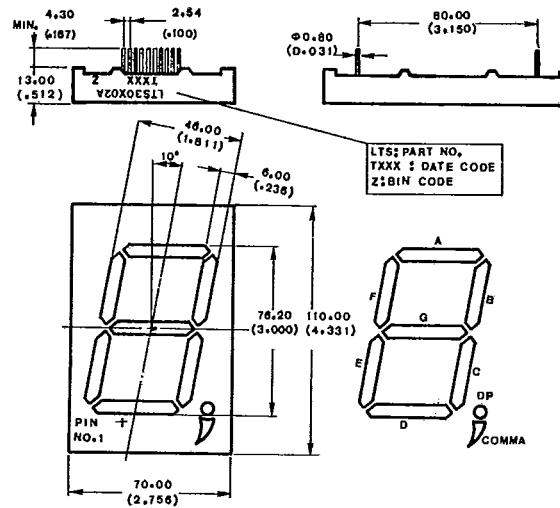
| PART NO. LTS- | | | DESCRIPTION | PACKAGE DIMENSION | INTERNAL CIRCUIT DIAGRAM |
|---------------|-------------|-------------|----------------|-------------------|--------------------------|
| GREEN | HI-EFF. RED | MULTI-COLOR | | | |
| 30301G | 30301HRB | — | Common Cathode | A | A |
| 30801G | 30801HRB | — | Common Anode | A | B |
| — | — | 30302A | Common Cathode | B | C |
| — | — | 30802A | Common Anode | B | D |

PACKAGE DIMENSIONS

A. LTS-30301/30801



B. LTS-30302A/30802A



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

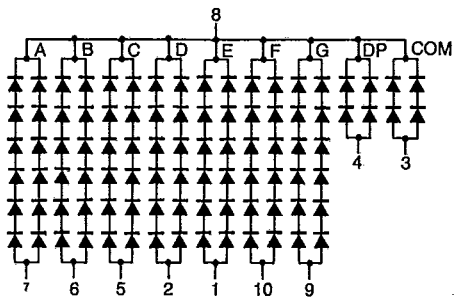
PIN CONNECTION

| PIN NO. | CONNECTION | | | |
|---------|-----------------|-------------------|------------------------|-----------------------|
| | LTS-30301 | LTS-30801 | LTS-30302A | LTS-30802A |
| 1 | Segment E Anode | Segment E Cathode | Anode E, Green | Cathode E, Green |
| 2 | Segment D Anode | Segment D Cathode | Anode E, Orange | Cathode E, Orange |
| 3 | Comma Anode | Comma Cathode | Anode D, Green | Cathode D, Green |
| 4 | D. P. Anode | D. P. Cathode | Anode D, Orange | Cathode D, Orange |
| 5 | Segment C Anode | Segment C Cathode | Anode Comma, Green | Cathode Comma, Green |
| 6 | Segment B Anode | Segment B Cathode | Anode Comma, Orange | Cathode Comma, Orange |
| 7 | Segment A Anode | Segment A Cathode | Anode DP, Green | Cathode DP, Green |
| 8 | Common Cathode | Common Anode | Anode DP, Orange | Cathode DP, Orange |
| 9 | Segment G Anode | Segment G Cathode | Anode C, Green | Cathode C, Green |
| 10 | Segment F Anode | Segment F Cathode | Anode C, Orange | Cathode C, Orange |
| 11 | | | Anode B, Green | Cathode B, Green |
| 12 | | | Anode B, Orange | Cathode B, Orange |
| 13 | | | Anode A, Green | Cathode A, Green |
| 14 | | | Anode A, Orange | Cathode A, Orange |
| 15 | | | Cathode Common, Green | Anode Common, Green |
| 16 | | | Cathode Common, Orange | Anode Common, Orange |
| 17 | | | Anode F, Green | Cathode F, Green |
| 18 | | | Anode F, Orange | Cathode F, Orange |
| 19 | | | Anode G, Green | Cathode G, Green |
| 20 | | | Anode G, Orange | Cathode G, Orange |

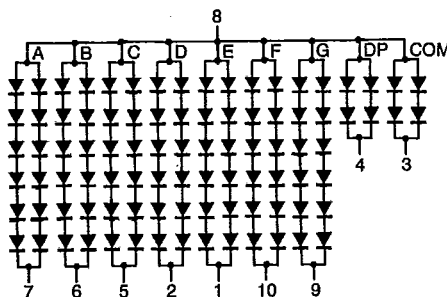
SEVEN-SEGMENT
LED DISPLAYS

INTERNAL CIRCUIT DIAGRAM

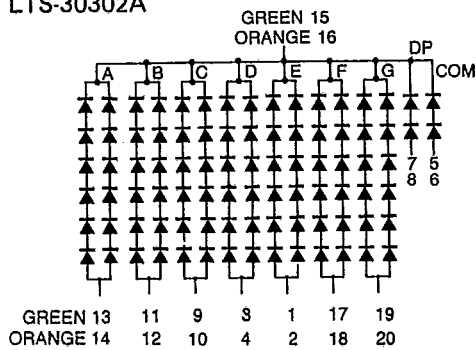
A. LTS-30301



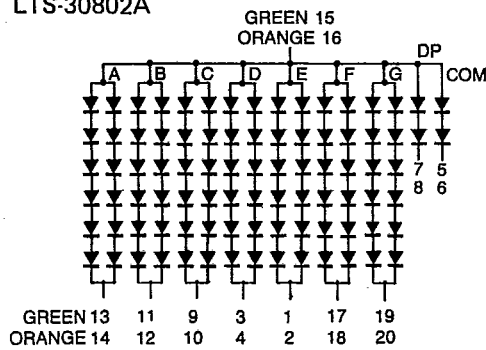
B. LTS-30801



C. LTS-30302A



D. LTS-30802A



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

| PARAMETER | 30x01 | | 30x02A | | UNIT |
|--|------------------|--------------|--------|--------|-------|
| | GREEN | HI..EFF. RED | GREEN | ORANGE | |
| Power Dissipation Per Segment | 650 | 650 | 330 | 330 | mW |
| Peak Forward Current Per Segment (1/10 Duty Cycle, 0.1ms Pulse Width) | 160 | 160 | 80 | 80 | mA |
| Continuous Forward Current Per Segment | 40 | 40 | 20 | 20 | mA |
| Derating Linear From 25°C Per Segment | 0.48 | 0.48 | 0.24 | 0.24 | mA/°C |
| Reverse Voltage Per Segment | 30 | 30 | 30 | 30 | V |
| Operating Temperature Range | - 25°C to + 85°C | | | | |
| Storage Temperature Range | - 25°C to + 85°C | | | | |
| Soler Temperature 1/16 inch Below Seating Plane for 3 Seconds at 260°C | | | | | |

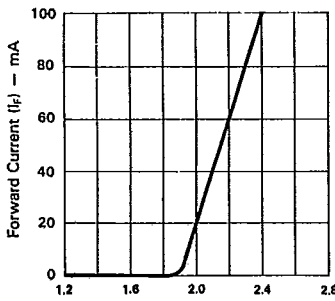
ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTS-30301G/30801G

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|-------------------------------------|-----------------|------|---------------|---------------|---------------|----------------------|
| Average Luminous Intensity | I_v | 12 | 30 | | mcd | $I_F = 20\text{ mA}$ |
| Peak Emission Wavelength | λ_p | | 565 | | nm | $I_F = 40\text{ mA}$ |
| Spectral Line Half-Width | $\Delta\lambda$ | | 30 | | nm | $I_F = 40\text{ mA}$ |
| Forward Voltage, any Segment (D.P.) | V_F | | 12.6 (4.2) | 16.8 (5.6) | V | $I_F = 40\text{ mA}$ |
| Reverse Current, any Segment | I_R | | | 200 | μA | $V_R = 30\text{V}$ |
| Luminous Intensity Matching Ratio | $I_v\text{-m}$ | | | 2:1 | | $I_F = 40\text{ mA}$ |

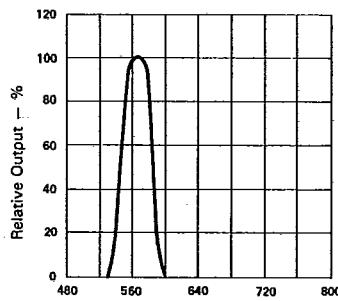
Note: The BIN brightness classification see page 6-161, category G

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

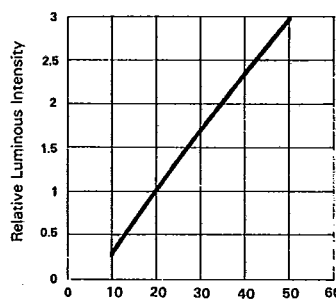
(25°C Ambient Temperature Unless Otherwise Noted)



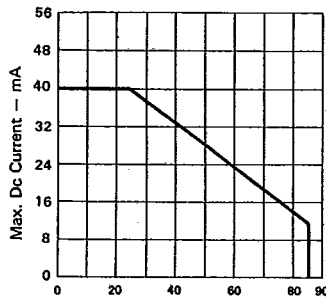
Forward Voltage (V_F) - Volts
 Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.



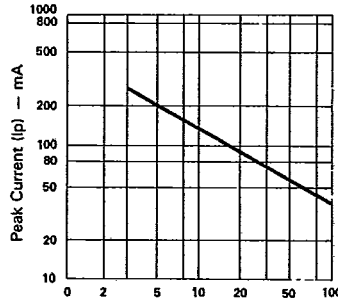
Wavelength (λ) - nm.
 Fig. 2 SPECTRAL RESPONSE.



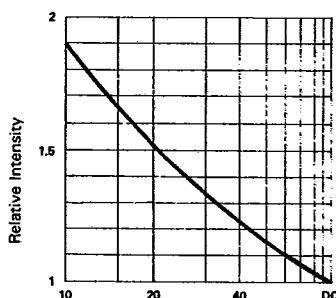
Forward Current (I_F) - mA
 Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).



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.)

SEVEN-SEGMENT LED DISPLAYS

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTS-30301 HRB/30801 HRB

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|-------------------------------------|-----------------|------|---------------|---------------|---------------|----------------------|
| Average Luminous Intensity | I_v | 12 | 30 | | mcd | $I_f = 20\text{ mA}$ |
| Peak Emission Wavelength | λ_p | | 635 | | nm | $I_f = 40\text{ mA}$ |
| Spectral Line Half-Width | $\Delta\lambda$ | | 40 | | nm | $I_f = 40\text{ mA}$ |
| Forward Voltage, any Segment (D.P.) | V_f | | 12.6 (4.2) | 16.8 (5.6) | V | $I_f = 40\text{ mA}$ |
| Reverse Current, any Segment | I_R | | | 100 | μA | $V_R = 30\text{V}$ |
| Luminous Intensity Matching Ratio | $I_v\text{-m}$ | | | 2:1 | | $I_f = 40\text{ mA}$ |

Note: The BIN brightness classification see page 6-161, category H

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

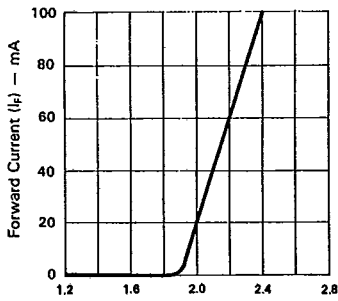


Fig. 1 FORWARD CURRENT VS. FORWARD VOLTAGE.

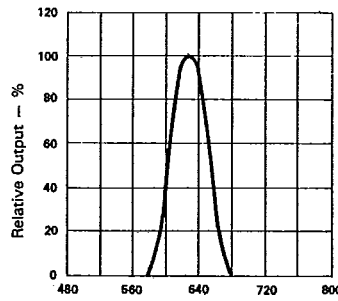


Fig. 2 SPECTRAL RESPONSE.

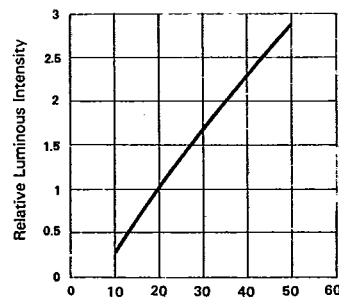


Fig. 3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT (PER SEGMENT).

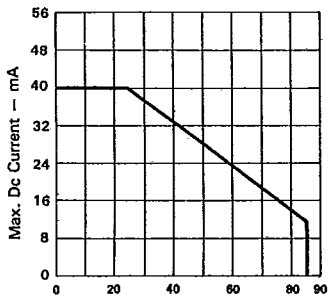


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. VS AMBIENT TEMPERATURE.

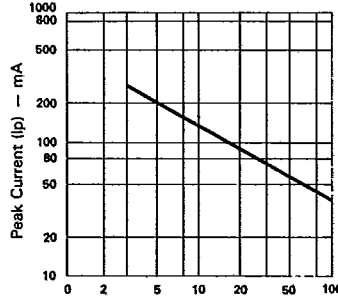


Fig. 5 MAX. PEAK CURRENT VS. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

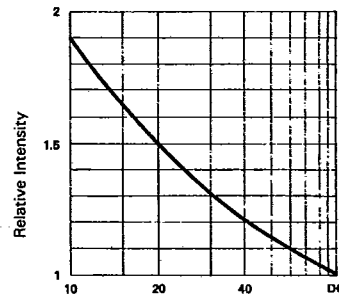


Fig. 6 LUMINOUS INTENSITY VS. DUTY CYCLE% (AVERAGE $I_f = 10\text{mA}$ PER SEG.)

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

LTS-30302A/30802A (GREEN)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|-------------------------------------|-----------------|------|---------------|---------------|---------|-----------------------|
| Average Luminous Intensity | I_v | 6 | 15 | | 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 Segment (D.P.) | V_F | | 12.6 (4.2) | 16.8 (5.6) | V | $I_F = 20 \text{ mA}$ |
| Reverse Current, any Segment | I_R | | | 100 | μA | $V_R = 30V$ |
| Luminous Intensity Matching Ratio | $I_v\text{-m}$ | | | 2:1 | | $I_F = 20 \text{ mA}$ |

Note: The BIN brightness classification see page 6-161, category G

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

($25^\circ C$ Ambient Temperature Unless Otherwise Noted)

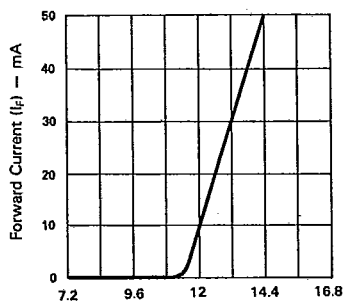


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

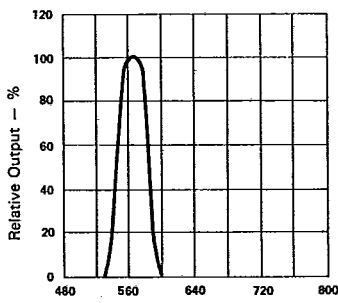


Fig. 2 SPECTRAL RESPONSE.

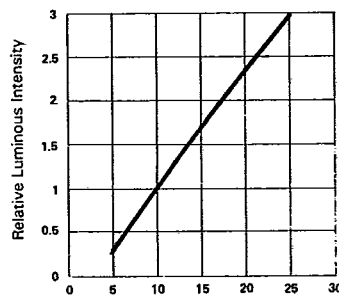


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

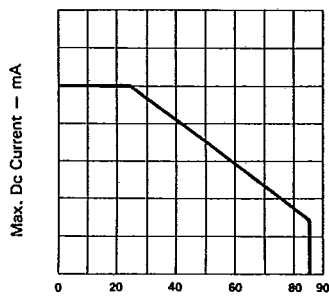


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

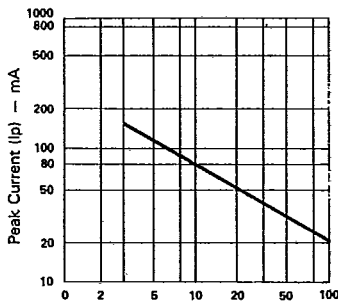


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

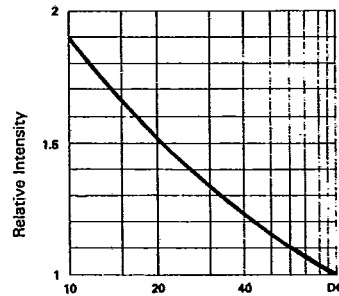


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE.% (AVERAGE $I_F = 10 \text{ mA}$ PER SEG.)

SEVEN-SEGMENT LED DISPLAYS

ELECTRICAL/OPTICAL CHARACTERISTICS AT TA = 25°C
LTS-30302A/30802A (ORANGE)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|-------------------------------------|-----------------|------|---------------|---------------|---------------|-----------------------|
| Average Luminous Intensity | I_v | 6 | 15 | | mcd | $I_F = 10 \text{ mA}$ |
| 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 Segment (D.P.) | V_F | | 12.6 (4.2) | 16.8 (5.6) | V | $I_F = 20 \text{ mA}$ |
| Reverse Current, any Segment | I_R | | | 100 | μA | $V_R = 30\text{V}$ |
| Luminous Intensity Matching Ratio | $I_v\text{-m}$ | | | 2:1 | | $I_F = 20 \text{ mA}$ |

Note: The BIN brightness classification see page 6-161, category G

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

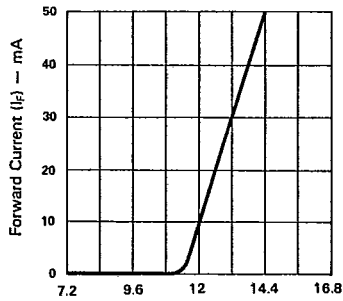


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

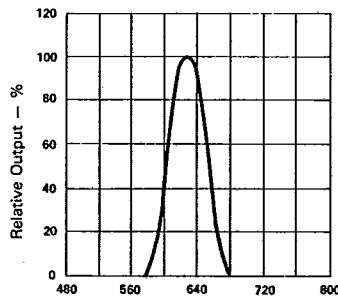


Fig. 2 SPECTRAL RESPONSE.

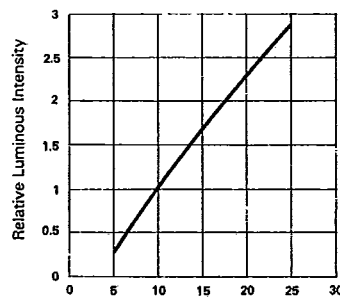


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

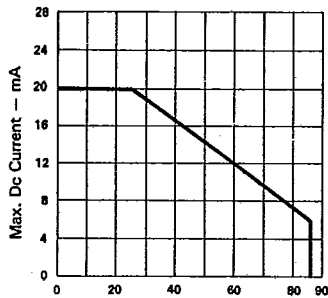


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

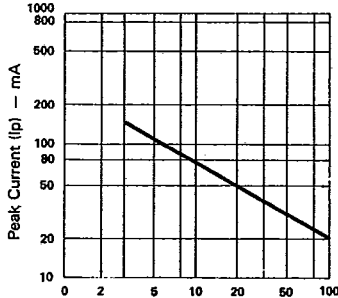


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

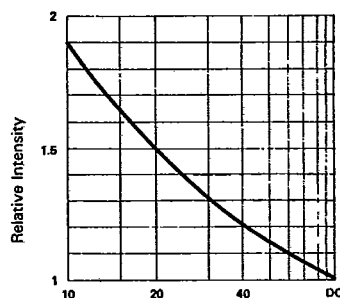


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{mA}$ PER SEG.)