

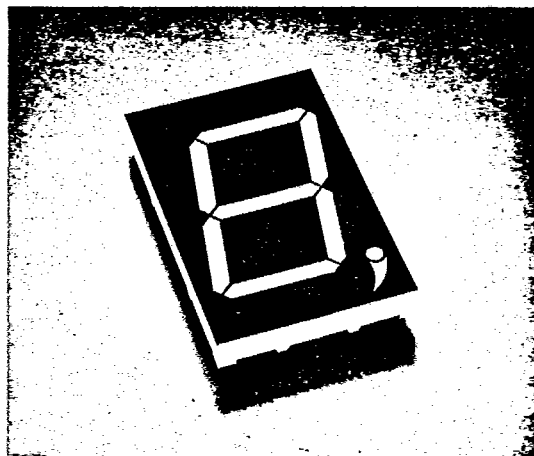


# LTS- 30301/30801 30302A/30802A SERIES

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.

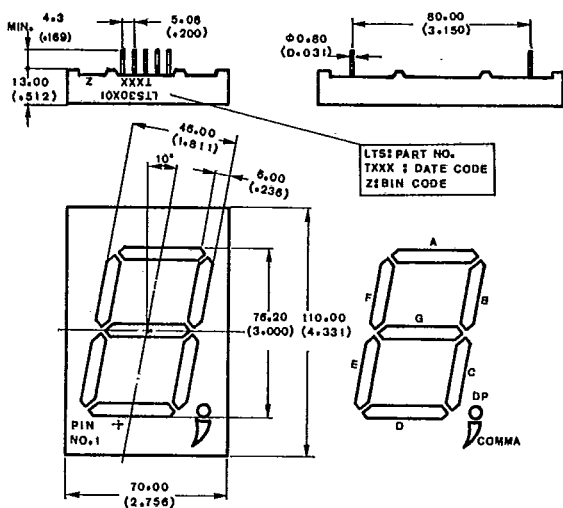
The green series utilize LED chips which are made from GaP on a transparent GaP substrate. The high efficiency red series devices utilize LED chips which are made from GaAsP on a transparent GaP substrate.

## DEVICES

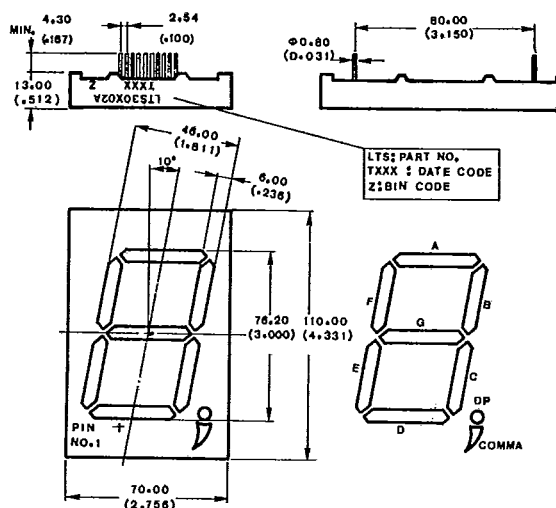
PART NO. LTS—			DESCRIPTION	PACKAGE DIMENSION	INTERNAL CIRCUIT DIAGRAM
GREEN	HI-EFF. RED	MULTI-COLOR			
30301G	30301HRB	—	Common Cathode	A	A
30801G	30801HRB	—	Common Anode	A	B
—	—	30302A	Common Cathode	B	C
—	—	30802A	Common Anode	B	D

## 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.

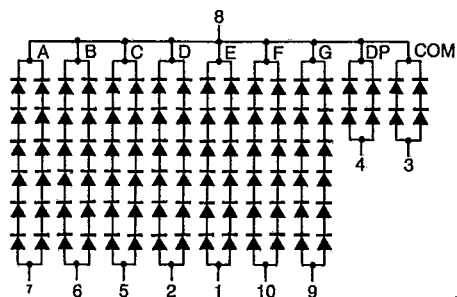
## PIN CONNECTION

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

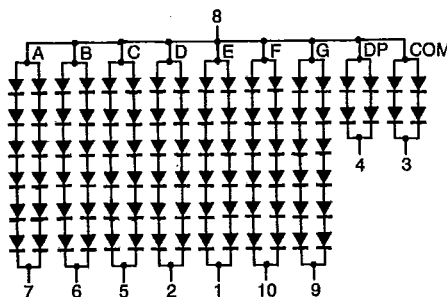
SEVEN-SEGMENT  
LED DISPLAYS

## INTERNAL CIRCUIT DIAGRAM

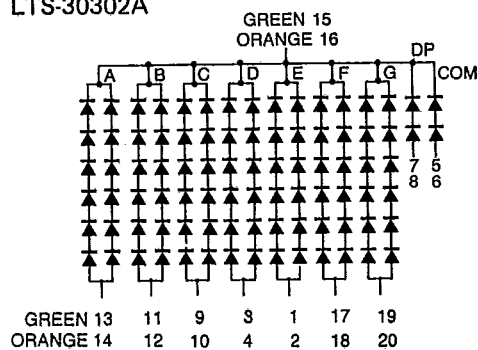
A. LTS-30301



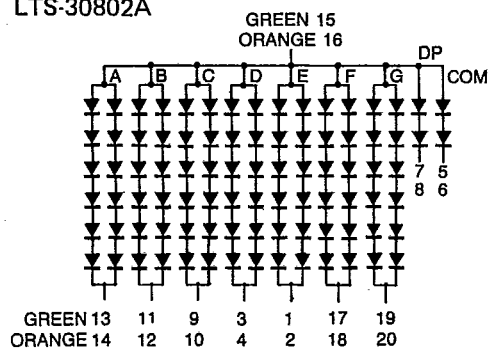
B. LTS-30801



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				
Solder Temperature 1/16 inch Below Seating Plane for 3 Seconds at 260°C					

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

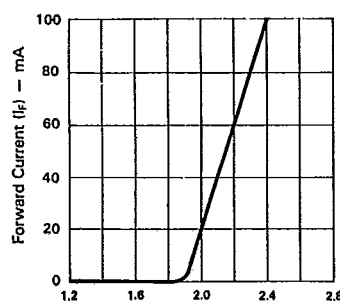
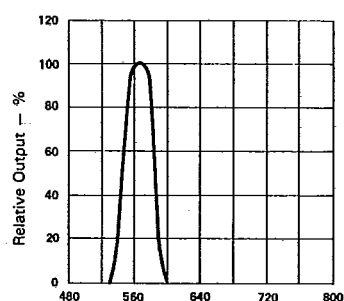
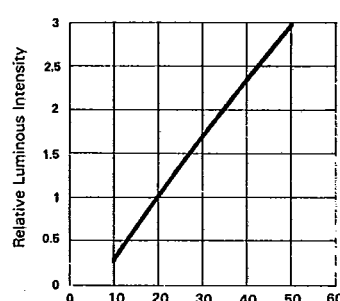
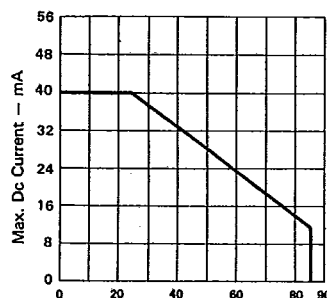
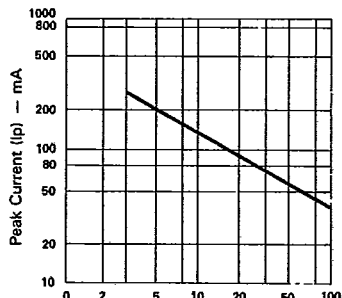
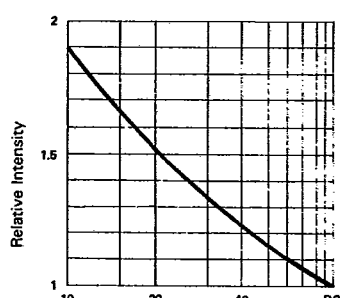
LTS-30301G/30801G

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	12	30		mcd	$I_F = 20\text{ mA}$
Peak Emission Wavelength	$\lambda_p$		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	$\mu\text{A}$	$V_R = 30\text{V}$
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 ( $\lambda$ ) — nm.  
Fig. 2 SPECTRAL RESPONSE.Forward Current ( $I_F$ ) — mA  
Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).Ambient Temperature ( $T_A$ ) — °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	$\lambda_P$		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	$\mu\text{A}$	$V_R = 30\text{V}$
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

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

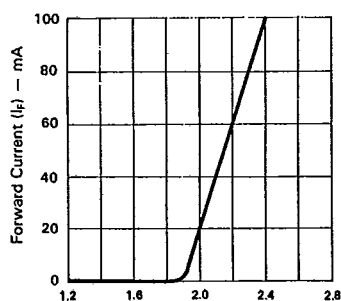


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

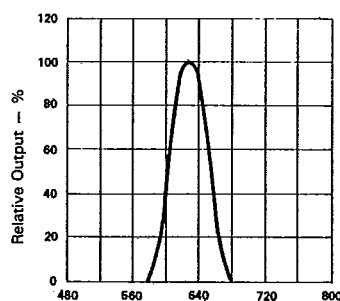


Fig. 2 SPECTRAL RESPONSE.

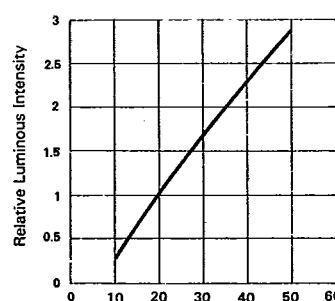
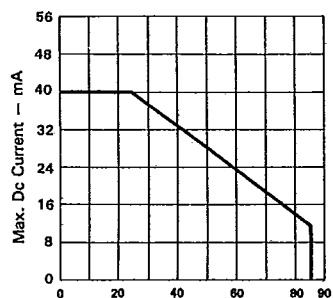


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).



6-25  
500

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

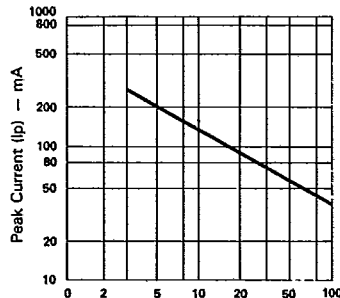


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. (REFRESH RATE -  $F = 1\text{ KHz}$ )

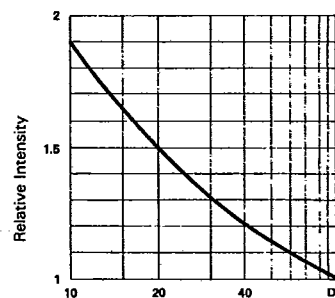


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE. (AVERAGE  $I_F = 10\text{ mA}$  PER SEG.)

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

## 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	$\lambda_p$		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	$\mu\text{A}$	$V_R = 30\text{ V}$
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

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

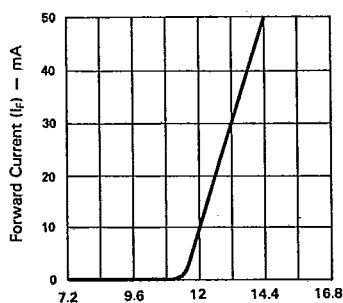


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

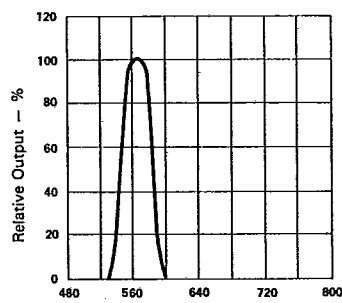


Fig. 2 SPECTRAL RESPONSE.

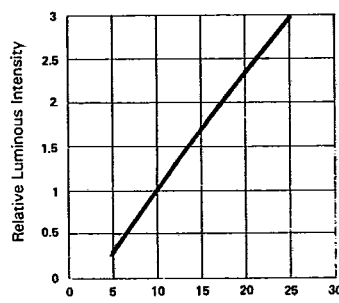


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

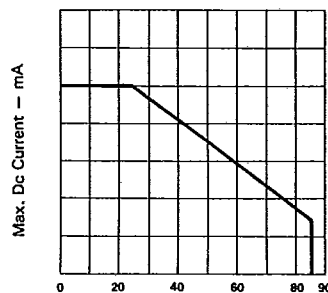


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

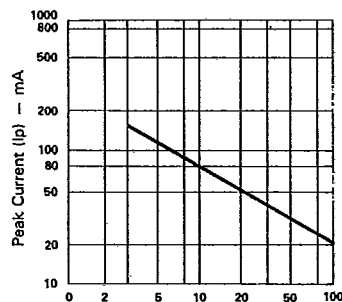


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE -  $F = 1\text{ KHz}$ )

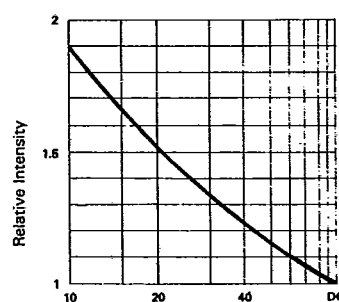


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE.% (AVERAGE  $I_F = 10\text{ mA PER SEG.}$ )

SEVEN-SEGMENT  
LED DISPLAYS

# ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-30302A/30802A (ORANGE)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	6	15		mcđ	$I_F = 10\text{ mA}$
Peak Emission Wavelength	$\lambda_p$		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	$\mu\text{A}$	$V_R = 30\text{V}$
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

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

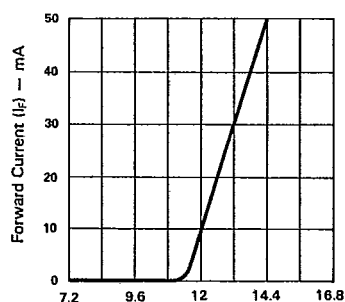


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

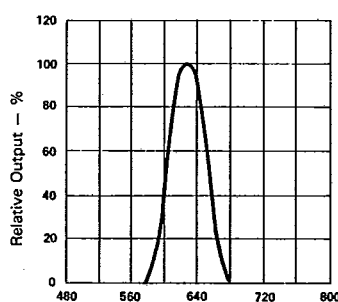


Fig. 2 SPECTRAL RESPONSE.

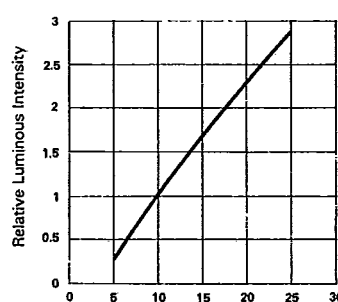


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

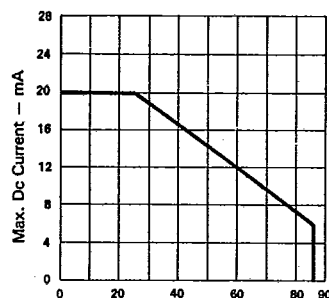


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

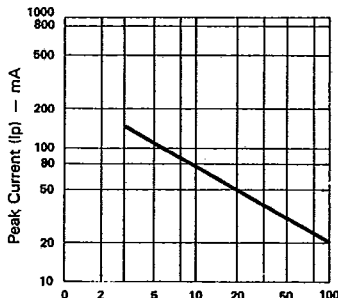


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. % (REFRESH RATE -  $F = 1\text{ KHz}$ )

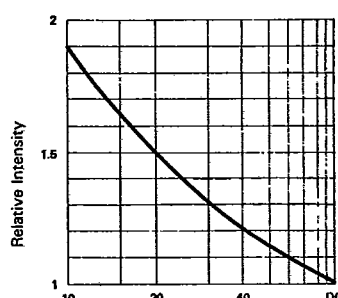


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE. % (AVERAGE  $I_F = 10\text{mA}$  PER SEG.)