



LTS-4000A SERIES

0.4" SINGLE DIGIT NUMERIC DISPLAYS

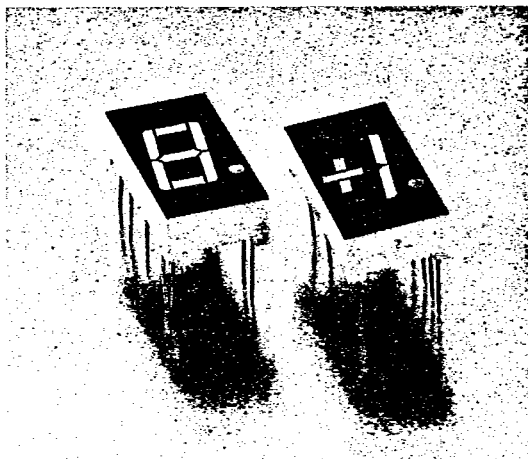
FEATURES

- 0.4 INCH (10.16mm) DIGIT HEIGHT.
- CONTINUOUS UNIFORM SEGMENTS.
- CHOICE OF SIX BRIGHT COLORS-RED/BRIGHT RED/GREEN/YELLOW/ORANGE/HIGH EFFICIENCY RED.
- LOW POWER REQUIREMENT.
- EXCELLENT CHARACTERS APPEARANCE.
- CATEGORIZED FOR LUMINOUS INTENSITY.
- I.C. COMPATIBLE.
- EASY MOUNTING ON P.C. BOARD OR SOCKETS.

DESCRIPTION

The LTS-4000A series are 0.4 inch (10.16mm) height single digit displays.

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. Red and bright red displays have black face and red segment color. Green and yellow displays have gray face and white segment color. Orange displays have orange face and orange segment color. High efficiency red displays have red face and red segment color.



DEVICES

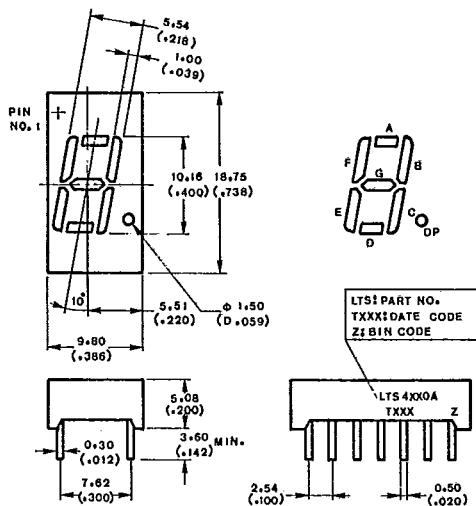
PART NO. LTS-						DESCRIPTION	PACKAGE DIMENSION	INTERNAL CIRCUIT DIAGRAM
RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED			
4705AR	4705AP	4505AG	4805AY	4605AE	4905AHR	Universal, ± 1 Overflow	B	A
4710AR	4710AP	4510AG	4810AY	4610AE	4910AHR	Common Anode, Rt. Hand Decimal	A	B
4730AR	4730AP	4530AG	4830AY	4630AE	4930AHR	Common Anode, ± 1 Overflow	B	C
4740AR	4740AP	4540AG	4840AY	4640AE	4940AHR	Common Cathode, Rt. Hand Decimal	A	D
4780AR	4780AP	4580AG	4880AY	4680AE	4980AHR	Common Cathode, Rt. Hand Decimal	A	E

SEVEN-SEGMENT
LED DISPLAYS

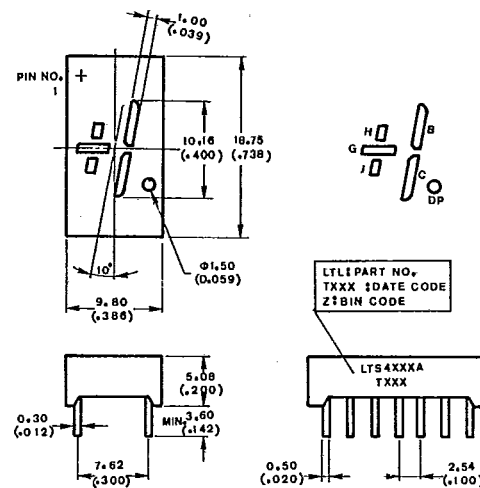
6-72
547

PACKAGE DIMENSIONS

A. LTS-4x10A/4x40A/4x80A



B. LTS-4x05A/4x30A



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				
	A. LTS-4x05A	B. LTS-4x10A	C. LTS-4x30A	D. LTS-4x40A	E. LTS-4x80A
1	Anode H	Cathode A	Anode G, H & J *2	Anode F	Common Cathode *4
2	No Pin	Cathode F	No Pin	Anode G	Anode F
3	Cathode H	Common Anode *1	Anode G, H & J *2	No Pin	Anode G
4	Cathode G	No Pin	No Pin	Common Cathode *3	Anode E
5	Cathode J	No Pin	No Pin	No Pin	Anode D
6	Anode J	No Pin	No connection	Anode E	Common Cathode *4
7	Anode G	Cathode E	Cathode H & J	Anode D	Anode D. P.
8	Anode D. P.	Cathode D	Cathode G	Anode C	Anode C
9	No Pin	Cathode D. P.	Cathode D. P.	Anode D. P.	Anode B
10	Cathode D. P.	Cathode C	Cathode C	No Pin	Anode A
11	Cathode C	Cathode G	Cathode B	No Pin	—
12	Cathode B	No Pin	No Pin	Common Cathode *3	—
13	Anode B	Cathode B	No Pin	Anode B	—
14	Anode C	Common Anode *1	Anode B, C & D. P.	Anode A	—

NOTES: 1. Pin 3 & 14 are internally connected.

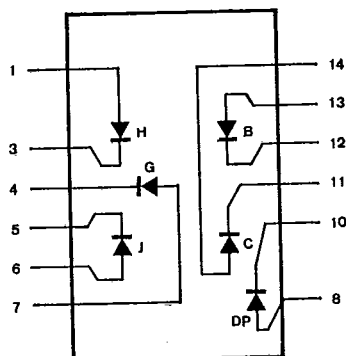
3. Pin 4 & 12 are internally connected.

2. Pin 1 & 3 are internally connected.

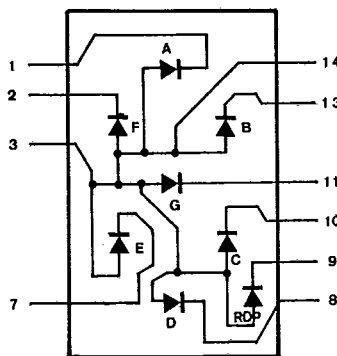
4. Pin 1 & 6 are internally connected.

INTERNAL CIRCUIT DIAGRAM

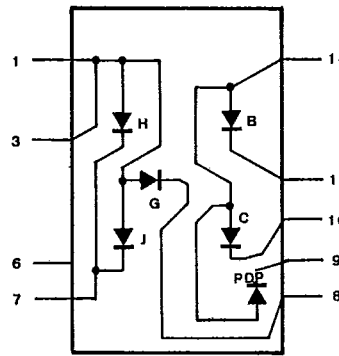
A. LTS-4x05A



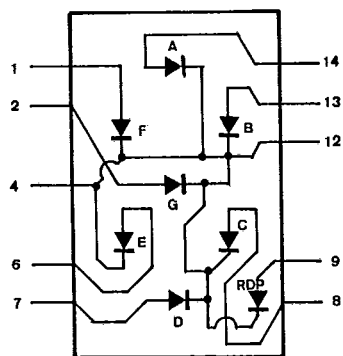
B. LTS-4x10A



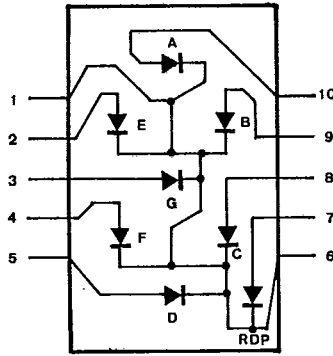
C. LTS-4x30A



D. LTS-4x40A



E. LTS-4x80A

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

PARAMETER	RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED	UNIT
Power Dissipation Per Segment	55	40	75	60	75	75	mW
Peak Forward Current Per Segment (1/10 Duty Cycle, 0.1ms Pulse Width)	160	60	100	80	100	100	mA
Continuous Forward Current Per Segment	25	15	25	20	25	25	mA
Derating Linear From 25°C Per Segment	0.3	0.18	0.3	0.24	0.3	0.3	mA/°C
Reverse Voltage Per Segment	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							

SEVEN-SEGMENT
LED DISPLAYS

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-4700AR SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	200	550		μcd	$I_F = 10\text{ mA}$
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 Segment or D.P.	V_F		1.7	2.0	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	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 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

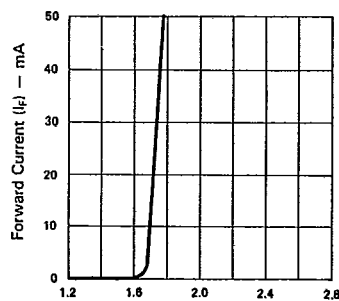


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

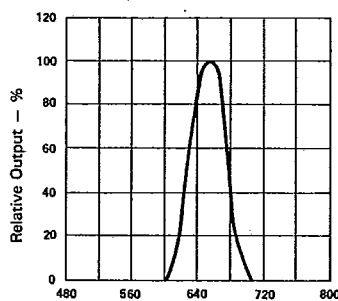


Fig. 2 SPECTRAL RESPONSE.

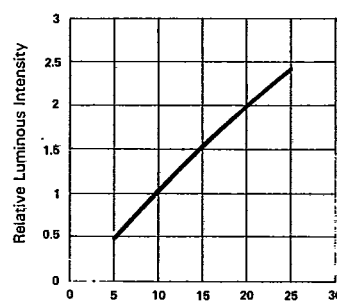


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

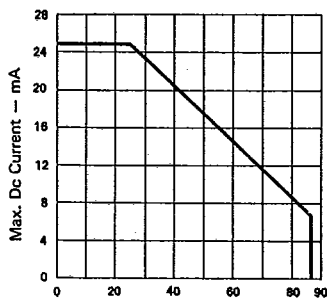


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

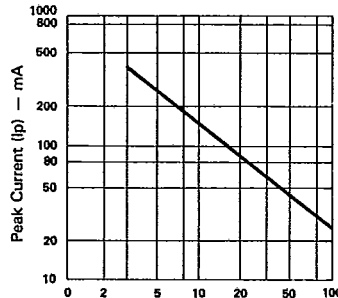


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. (REFRESH RATE - $F = 1\text{ KHz}$)

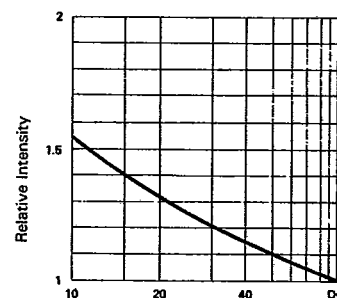


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE. (AVERAGE $I_F = 10\text{ mA}$ PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-4700AP SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	400	850		μcd	$I_F = 10\text{ mA}$
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 Segment or D.P.	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	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 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

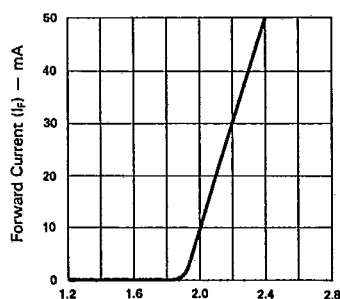


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

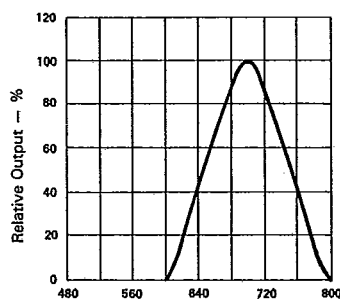


Fig. 2 SPECTRAL RESPONSE.

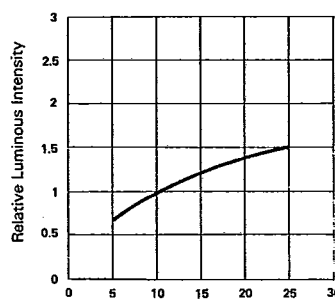


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

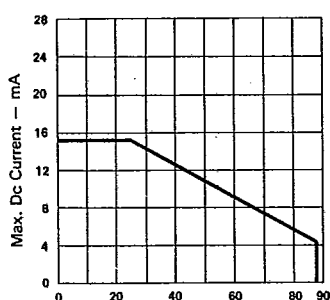


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

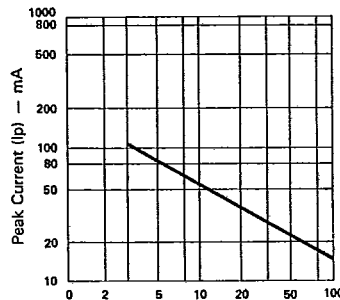


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

SEVEN-SEGMENT
LED DISPLAYS

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-4500AG SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	850	2200		μcd	$I_F = 10\text{ mA}$
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 or D.P.	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	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 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

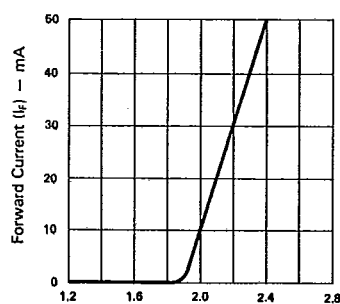


Fig. 1 FORWARD CURRENT VS. FORWARD VOLTAGE.

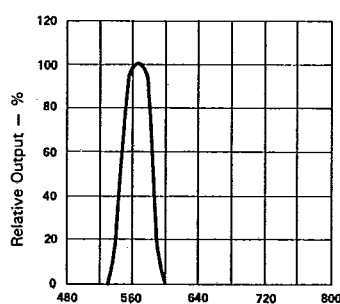


Fig. 2 SPECTRAL RESPONSE.

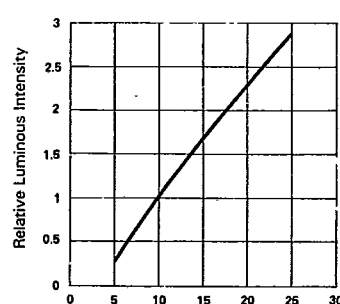


Fig. 3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT (PER SEGMENT).

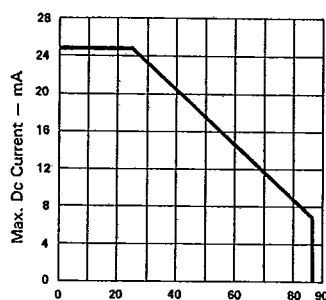


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. VS AMBIENT TEMPERATURE.

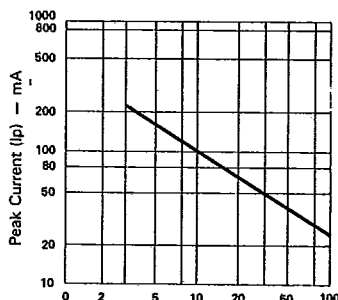


Fig. 5 MAX. PEAK CURRENT VS. DUTY-CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

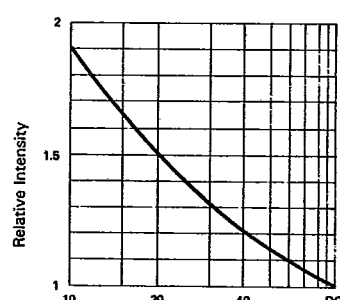


Fig. 6 LUMINOUS INTENSITY VS. DUTY CYCLE% (AVERAGE $I_F = 10\text{ mA PER SEG.}$)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-4800AY SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	800	2200		μcd	$I_F = 10\text{ mA}$
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 Segment or D.P.	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	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 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

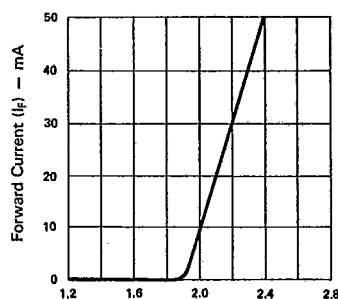


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

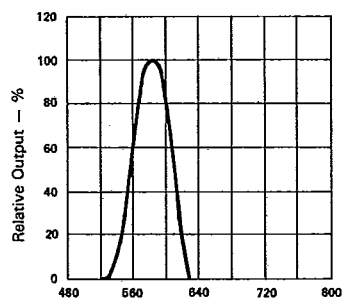


Fig. 2 SPECTRAL RESPONSE.

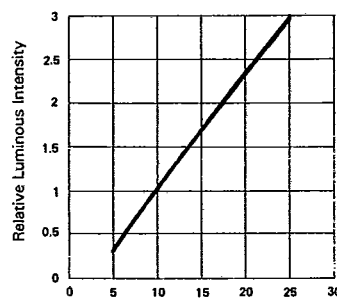


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

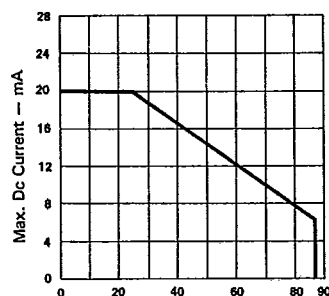


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

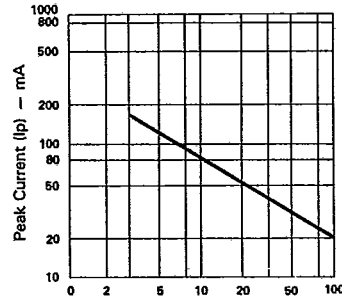


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - $F = 1\text{ KHz}$)

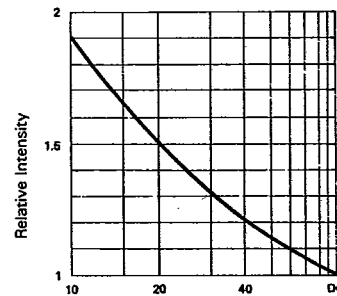


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE $I_F = 10\text{ mA}$ PER SEG.)

SEVEN-SEGMENT
LED DISPLAYS

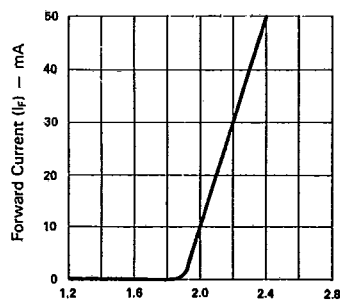
ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$ LTS-4600AE SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	850	2200		μcd	$I_F = 10\text{ mA}$
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 or D.P.	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	I_R			100	μA	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

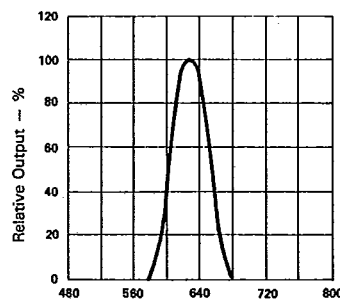
Note: The BIN brightness classification see page 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

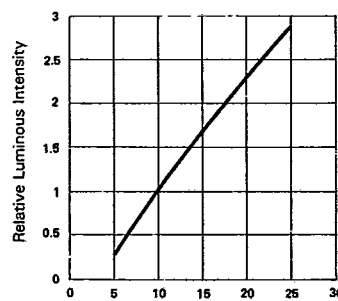
(25°C Ambient Temperature Unless Otherwise Noted)



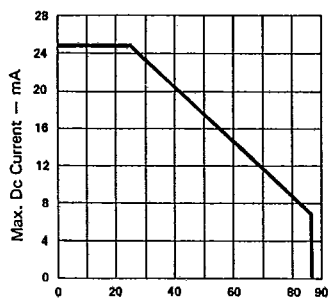
Forward Voltage (V_F) — Volts
Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.



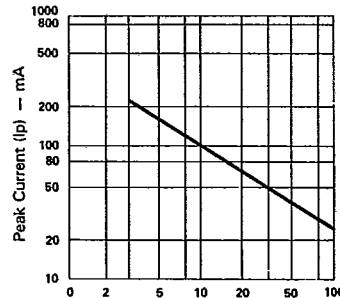
Wavelength (λ) — nm.
Fig. 2 SPECTRAL RESPONSE.



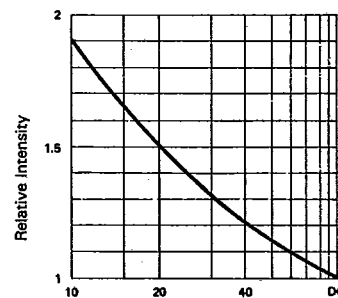
Forward Current (I_F) — mA
Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).



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 $T_A = 25^\circ\text{C}$ LTS-4900AHR SERIES

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	850	2200		μcd	$I_F = 10\text{ mA}$
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 Segment or D.P.	V_F		2.1	2.8	V	$I_F = 20\text{ mA}$
Reverse Current, any Segment or D.P.	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 6-160, category A

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

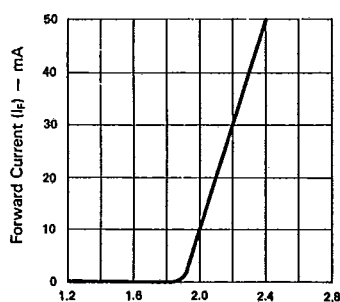


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

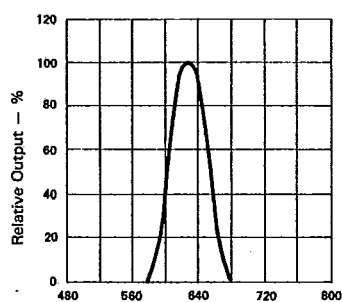


Fig. 2 SPECTRAL RESPONSE.

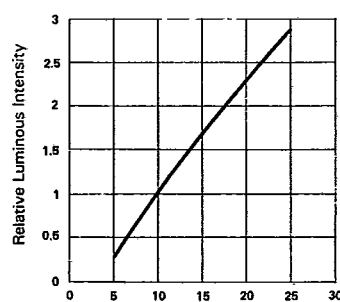


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

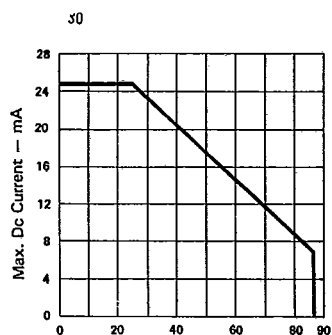


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

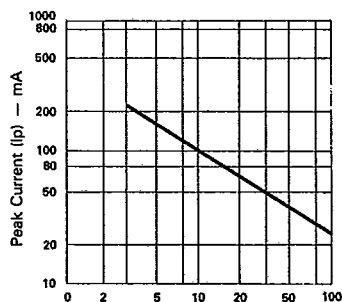


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. % (REFRESH RATE - $F = 1\text{ KHz}$)

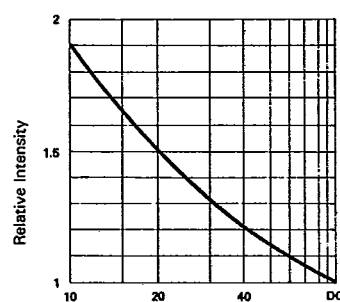


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE. % (AVERAGE $I_F = 10\text{ mA}$ PER SEG.)

SEVEN-SEGMENT
LED DISPLAYS