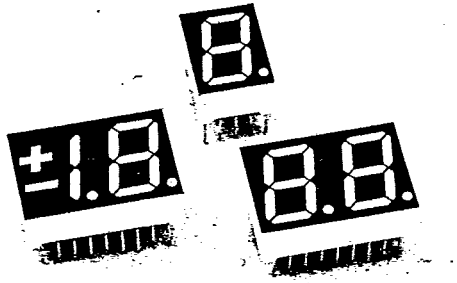
LITE-ON LED SPECIALIST

LTS-5000A LTD-5000A SERIES

0.56" SEVEN-SEGMENT NUMERIC DISPLAYS

FEATURES

- 0.56 INCH (14.2mm) DIGIT HEIGHT.
- CONTINUOUS UNIFORM SEGMENTS.
- CHOICE OF FIVE BRIGHT COLOR-RED/BRIGHT RED/GREEN/YELLOW/ORANGE.
- 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 OR SOCKETS.



DESCRIPTION

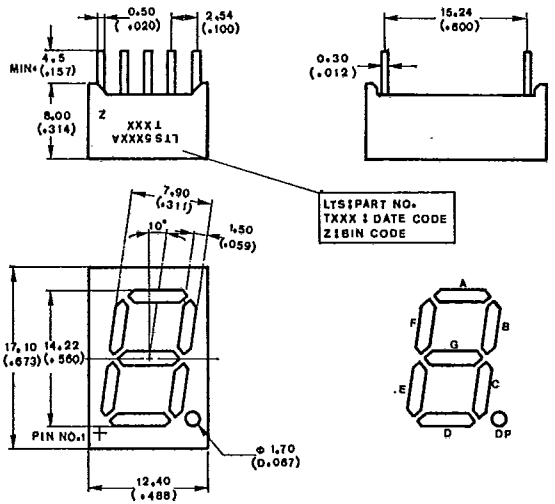
The LTS-5000A/LTD-5000A series are 0.56 inch (14.2mm) height single and dual digit displays.
The red series devices utilize LED chips which are made from GaAsP on GaAs substrate. The bright red and green series utilize LED chips which are made from GaP on a transparent GaP substrate. The yellow, orange series devices utilize LED chips which are made from GaAsp on a transparent GaP substrate. Red, bright red, yellow and orange displays have gray face and white segment color. Green displays have gray face and green segment color.

DEVICES

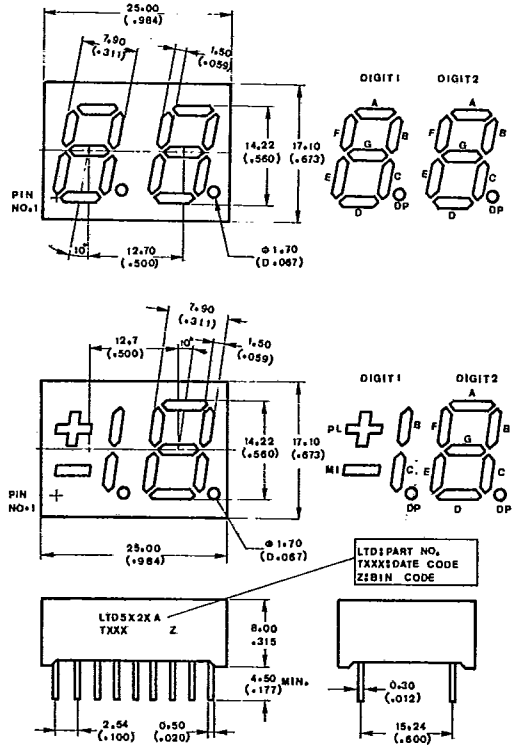
PART NO.					DESCRIPTION	PACKAGE DIMENSION	INTERNAL CIRCUIT DIAGRAM
RED	BRIGHT RED	GREEN	YELLOW	ORANGE			
LTS-5301AR	5301AP	5601AG	5701AY	5501AE	Common Anode, Rt. Hand Decimal	A	A
LTS-5303AR	5303AP	5603AG	5703AY	5503AE	Common Cathode, Rt. Hand Decimal	A	B
LTD-5321AR	5321AP	5621AG	5721AY	5521AE	Common Anode, R. H. Decimal	B	C
LTD-5323AR	5323AP	5623AG	5723AY	5523AE	Common Cathode, R. H. Decimal	B	D
LTD-5327AR	5327AP	5627AG	5727AG	5527AE	Common Anode, R. H. Decimal	B	E
LTD-5328AR	5328AP	5628AG	5728AY	5528AE	Common Cathode, R. H. Decimal	B	F

PACKAGE DIMENSION

A. LTS-5x01A/5x03A



B. LTD-5x21A/5x23A/5x27A/5x28A



NOTE: All dimensions are in millimeters (inches), tolerance is 0.25mm (0.010") unless otherwise noted.

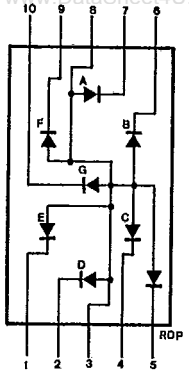
PIN CONNECTION

PIN NO.	CONNECTION			
	A. LTS-5x01A	B. LTS-5x03A	LTD-5x21A/5x23A	LTD-5x27A/5x28A
1	Cathode E	Anode E	Seg. E (Digit 1)	Seg. MI (Digit 1)
2	Cathode D	Anode D	Seg. D (Digit 1)	Seg. PI (Digit 1)
3	Common Anode*1	Common Cathode*1	Seg. C (Digit 1)	Seg. C (Digit 1)
4	Cathode C	Anode C	D. P. (Digit 1)	D. P. (Digit 1)
5	Cathode D.P.	Anode D.P.	Seg. E (Digit 2)	Seg. E (Digit 2)
6	Cathode B	Anode B	Seg. D (Digit 2)	Seg. D (Digit 2)
7	Cathode A	Anode A	Seg. G (Digit 2)	Seg. G (Digit 2)
8	Common Anode*1	Common Cathode *1	Seg. C (Digit 2)	Seg. C (Digit 2)
9	Cathode F	Anode F	D. P. (Digit 2)	D. P. (Digit 2)
10	Cathode G	Anode G	Seg. B (Digit 2)	Seg. B (Digit 2)
11	—	—	Seg. A (Digit 2)	Seg. A (Digit 2)
12	—	—	Seg. F (Digit 2)	Seg. F (Digit 2)
13	—	—	Common (Digit 2)	Common (Digit 2)
14	—	—	Common (Digit 1)	Common (Digit 1)
15	—	—	Seg. B (Digit 1)	Seg. B (Digit 1)
16	—	—	Seg. A (Digit 1)	No Connection
17	—	—	Seg. G (Digit 1)	No Connection
18	—	—	Seg. F (Digit 1)	No Connection

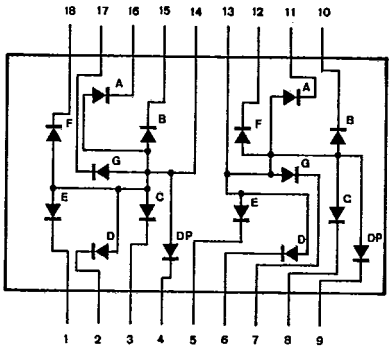
Notes: Pin 3 & 8 are internally connected.

INTERNAL CIRCUIT DIAGRAM

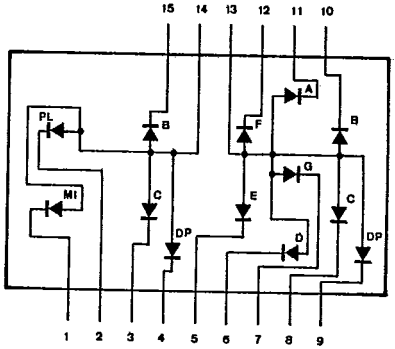
LTS-5x01A



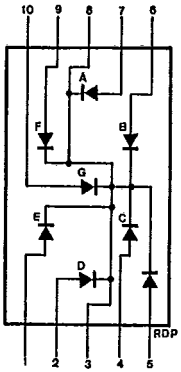
LTD-5x21A



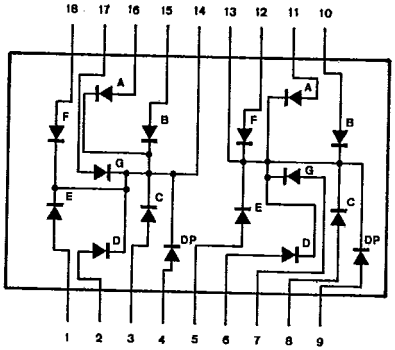
LTD-5x27A



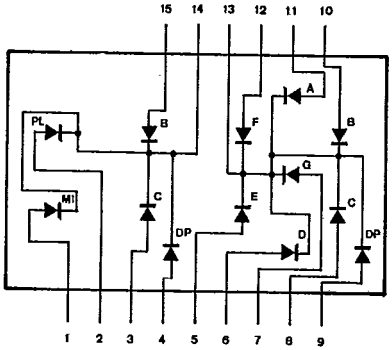
LTS-5x03A



LTD-5x23A



LTD-5x28A



ABSOLUTE MAXIMUM RATINGS AT $T_A = 25°C$

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

LTS-5301AR/5303AR/LTD-5321AR/5323AR/5327AR/5328AR

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	Iv	200	600		μcd	I_F = 10 mA
Peak Emission Wavelength	λp		655		nm	I_F = 20 mA
Spectral Line Half-Width	Δλ		24		nm	I_F = 20 mA
Forward Voltage, any Segment or D.P.	V_F		1.7	2.0	V	I_F = 20 mA
Reverse Current, any Segment or D.P.	I_R			100	μA	V_R = 5 V
Luminous Intensity Matching Ratio	Iv-m			2:1		I_F = 20 mA

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

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

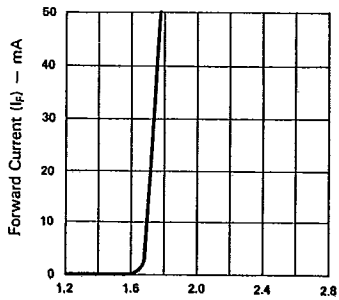


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

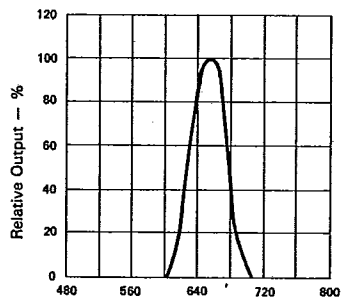


Fig. 2 SPECTRAL RESPONSE.

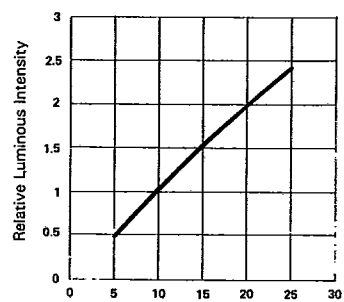


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

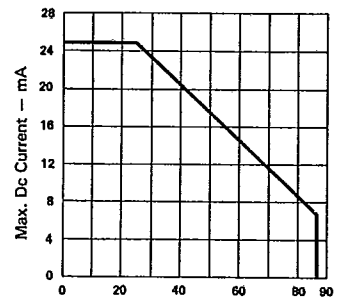


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

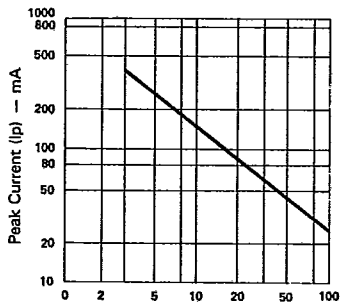


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE – F = 1 KHz)

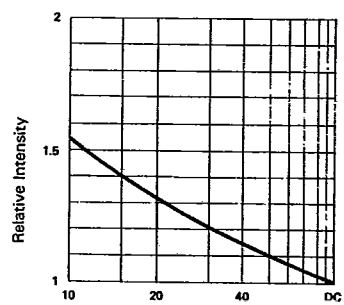


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE I_F = 10mA PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25°C$

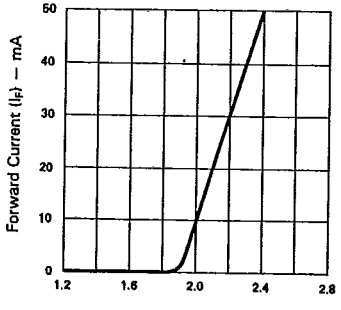
LTS-5301AP/5303AP/LTD-5321AP/5323AP/5327AP/5328AP

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	Iv	350	950		μcd	I_F = 10 mA
Peak Emission Wavelength	λp		697		nm	I_F = 20 mA
Spectral Line Half-Width	Δλ		90		nm	I_F = 20 mA
Forward Voltage, any Segment or D.P.	V_F		2.1	2.8	V	I_F = 20 mA
Reverse Current, any Segment or D.P.	I_R			100	μA	V_R = 5 V
Luminous Intensity Matching Ratio	Iv-m			2:1		I_F = 20 mA

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

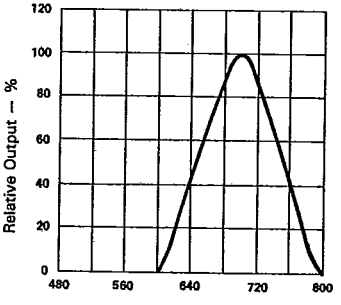
TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)



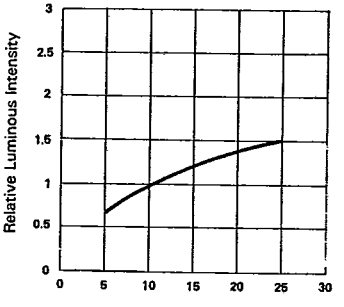
Forward Voltage (V_F) — Volts

Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.



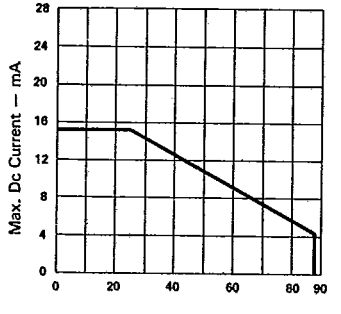
Wavelength (λ) — nm.

Fig. 2 SPECTRAL RESPONSE.



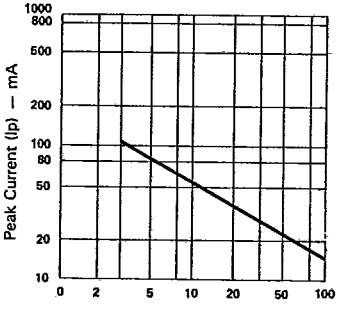
Forward Current (I_F) — mA

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



Ambient Temperature (Ta) — °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 KHz)

ELECTRICAL/OPTICAL CHARACTERISTICS AT T_A = 25°C
LTS-5601AG/5603AG/LTD-5621AG/5623AG/5627AG/5628AG

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	Iv	900	2400		μcd	I_F = 10 mA
Peak Emission Wavelength	λp		565		nm	I_F = 20 mA
Spectral Line Half-Width	Δλ		30		nm	I_F = 20 mA
Forward Voltage, any Segment or D.P.	V_F		2.1	2.8	V	I_F = 20 mA
Reverse Current, any Segment or D.P.	I_R			100	μA	V_R = 5 V
Luminous Intensity Matching Ratio	Iv-m			2:1		I_F = 20 mA

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

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

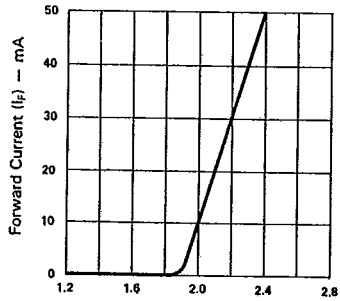


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

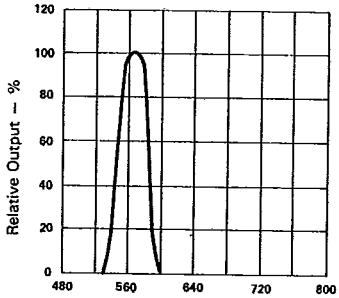


Fig. 2 SPECTRAL RESPONSE.

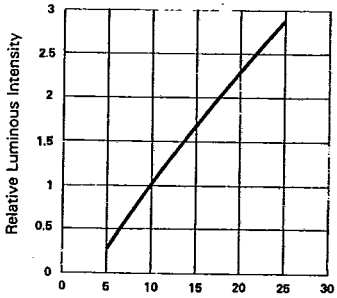


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

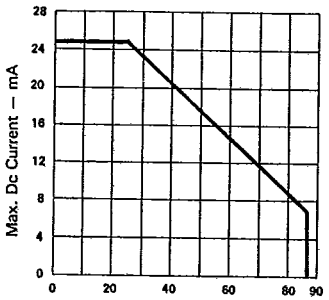


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

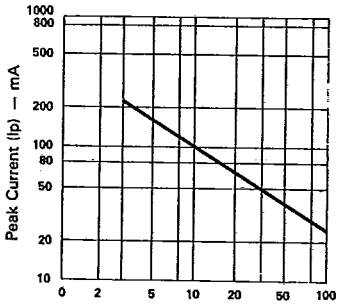


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE — F = 1 KHz)

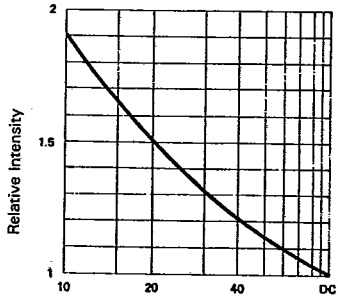


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE I_F = 10mA PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25°C$

LTS-5701AY/5703AY/LTD-5721AY/5723AY/5727AY/5728AY

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	750	2400		μcd	I_F = 10 mA
Peak Emission Wavelength	λ_p		585		nm	I_F = 20 mA
Spectral Line Half-Width	$\Delta\lambda$		35		nm	I_F = 20 mA
Forward Voltage, any Segment or D.P.	V_F		2.1	2.8	V	I_F = 20 mA
Reverse Current, any Segment or D.P.	I_R			100	μA	V_R = 5 V
Luminous Intensity Matching Ratio	I_{V-m}			2:1		I_F = 20 mA

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

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

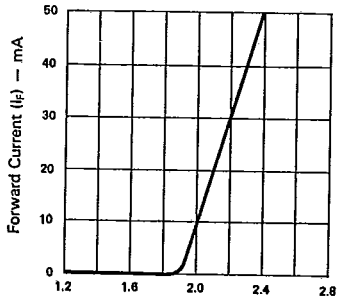


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

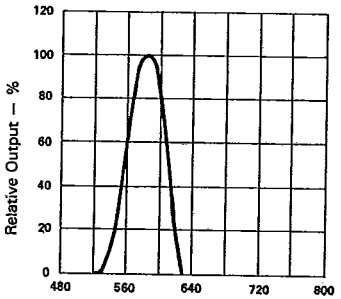


Fig. 2 SPECTRAL RESPONSE.

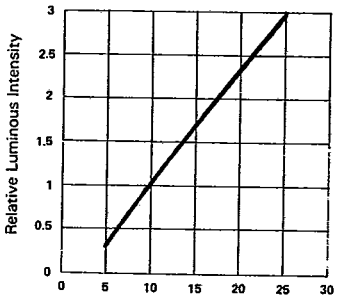


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

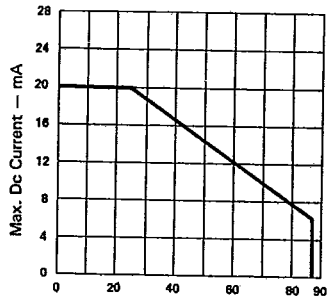


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

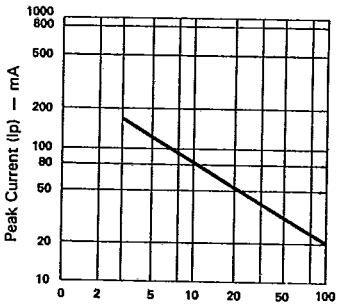


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE – F = 1 KHz)

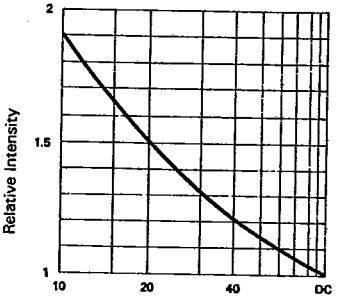


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE I_F = 10mA PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT T_A = 25°C

LTC5501AE/5503AE/LTD-5521AE/5523AE/5527AE/5528AE

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	Iv	900	2400		μcd	I_F = 10 mA
Peak Emission Wavelength	λp		630		nm	I_F = 20 mA
Spectral Line Half-Width	Δλ		40		nm	I_F = 20 mA
Forward Voltage, any Segment or D.P.	V_F		2.1	2.8	V	I_F = 20 mA
Reverse Current, any Segment or D.P.	I_R			100	μA	V_R = 5 V
Luminous Intensity Matching Ratio	Iv-m			2:1		I_F = 20 mA

Note: The BIN brightness classification see page 6-160, category B-1

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

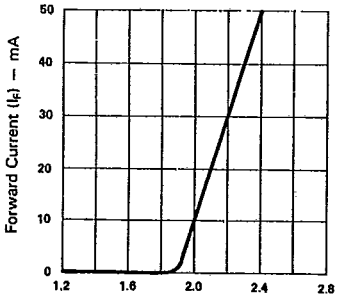


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

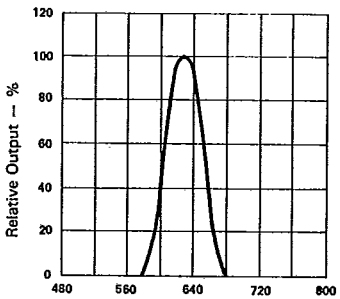


Fig. 2 SPECTRAL RESPONSE.

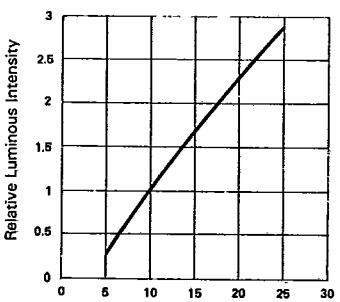


Fig. 3 RELATIVE, LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

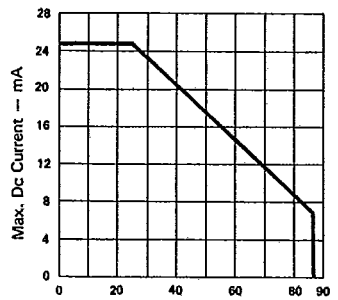


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

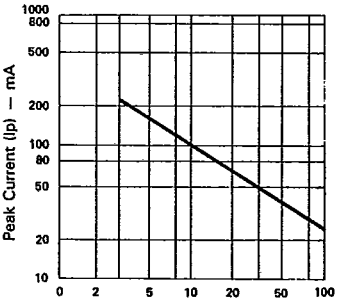


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE — F = 1 KHz)

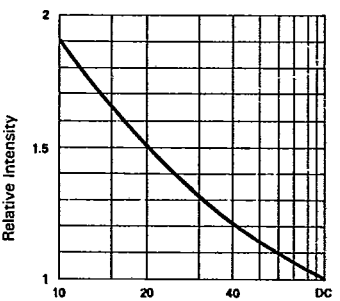


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE I_F = 10mA PER SEG.)