

LITEON**LTP- 537/587
3784/3785 SERIES**

T-41-35

0.5" & 0.54" ALPHANUMERIC DISPLAYS**FEATURES**

- LOW POWER REQUIREMENTS.
- EXCELLENT CHARACTER APPEARANCE.
- HIGH CONTRAST.
- HIGH BRIGHTNESS.
- WIDE VIEWING ANGLE.
- SOLID STATE RELIABILITY.
- COMMON ANODE OR COMMON CATHODE MODELS.
- CATEGORIZED FOR LUMINOUS INTENSITY.
- EASY MOUNTING ON P.C. BOARD.

DESCRIPTION

The LTP-537/587 series are 0.5 inch (12.7mm) height 16-segment single digit alphanumeric displays.

The red, bright red, green and orange displays have black face and white segment colors. The high efficiency red display has red face and red segment colors.

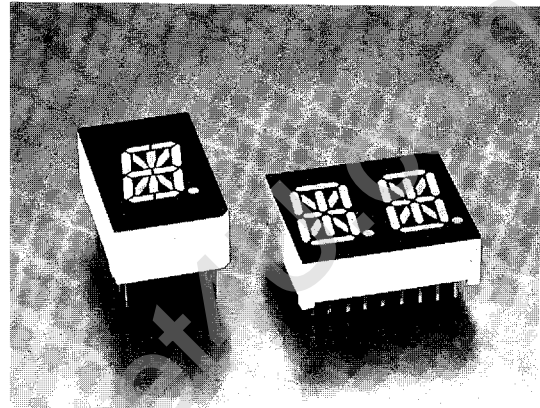
The LTP-3784/3785 series are 0.54 inch (13.8mm) height 14-segment dual digit alphanumeric displays.

The dual digit displays have gray face and white segment color.

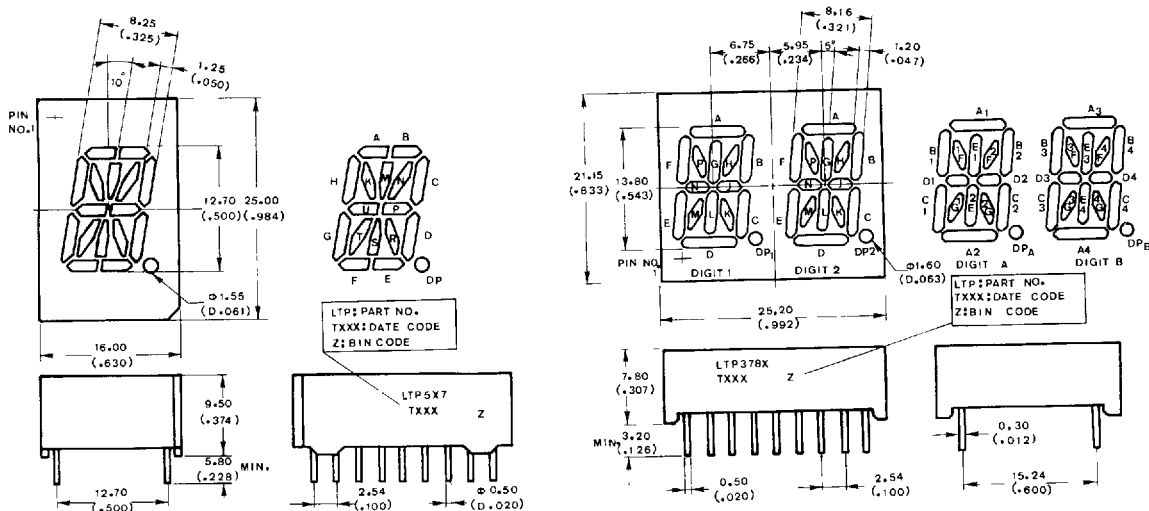
The red series devices utilize LED chips which are made from GaAsP on a GaAs substrate. The bright red and green series devices utilize LED chips which are made from GaP on a transparent GaP substrate. The yellow, orange and high efficiency red series devices utilize LED chips which are made from GaAsP on a transparent GaP substrate.

DEVICES

PART NO. LTP-						DESCRIPTION	PACKAGE DIMENSION	INTERNAL CIRCUIT DIAGRAM
RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED			
537R	537P	537G	537Y	537E	537HR	Common Cathode, Rt. Hand Decimal	A	A
587R	587P	587G	587Y	587E	587HR	Common Anode, Rt. Hand Decimal	A	B
3784R	-	3784G	-	3784E	-	Multiplex Common Cathode, Rt. Hand Decimal	B	C
3785R	-	3785G	-	3785E	-	Multiplex Common Cathode, Rt. Hand Decimal	B	D

SEVEN-SEGMENT LED DISPLAYS
& ALPHANUMERIC DISPLAYS

PACKAGE DIMENSIONS



NOTE: All dimensions are in $\frac{\text{millimeters}}{(\text{inches})}$ tolerance are.

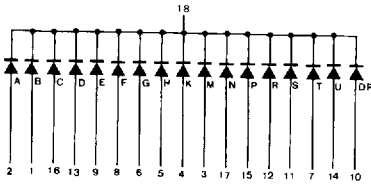
- Lead length (from seating plane) minimum value $\frac{+1.00}{-0.000}$ mm $\frac{+0.040''}{-0.000''}$
- ± 0.25 mm $(0.010'')$ unless otherwise noted.

PIN CONNECTION

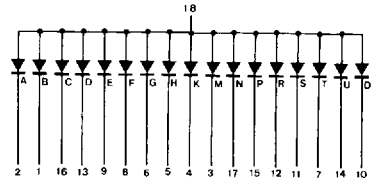
PIN NO.	CONNECTION			
	A. LTP-537	B. LTP-587	C. LTP-3784	D. LTP-3785
1	Anode B	Cathode B	Anode E	Anode D ₁ , D ₂ , D ₃ , D ₄
2	Anode A	Cathode A	Anode M	No connection
3	Anode M	Cathode M	No Connection	Anode G ₁ , G ₂ , G ₃ , G ₄
4	Anode K	Cathode K	Anode L	Anode C ₁ , C ₂ , C ₃ , C ₄
5	Anode H	Cathode H	Anode K	Cathode A ₂ , B ₂ , C ₂ , E ₂ , F ₂ , G ₂ , D.P.A.
6	Anode G	Cathode G	Anode J	Anode D.P.A.
7	Anode T	Cathode T	Anode D	No Connection
8	Anode F	Cathode F	Anode D.P	Cathode A ₃ , B ₃ , C ₃ , D ₃ , E ₃ , F ₃ , G ₃
9	Anode E	Cathode E	Anode C	Anode D.P.B.
10	Anode D.P.	Cathode D.P.	Anode B	Cathode A ₂ , B ₄ , C ₄ , D ₄ , E ₄ , F ₄ , G ₄ , D.P.B.
11	Anode S	Cathode S	Common Cathode, Character 2	No Connection
12	Anode R	Cathode R	Anode A	Anode A ₁ , A ₂ , A ₃ , A ₄
13	Anode D	Cathode D	Anode N	No Connection
14	Anode U	Cathode U	Anode H	Anode B ₁ , B ₂ , B ₃ , B ₄
15	Anode P	Cathode P	Anode G	Cathode A ₁ , B ₁ , C ₁ , D ₁ , E ₁ , F ₁ , G ₁
16	Anode C	Cathode C	Common Cathode, Character 1	No Connection
17	Anode N	Cathode N	Anode P	Anode E ₁ , E ₂ , E ₃ , E ₄
18	Common Cathode	Common Anode	Anode F	Anode F ₁ , F ₂ , F ₃ , F ₄

INTERNAL CIRCUIT DIAGRAM

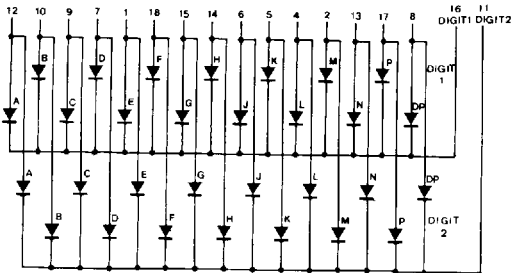
A. LTP-537



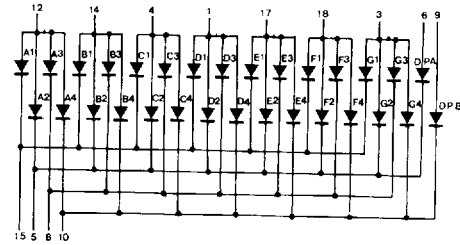
B. LTP-587



C. LTP-3784



D. LTP-3785



SEVEN-SEGMENT LED DISPLAYS
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ABSOLUTE MAXIMUM RATINGS AT $T_A = 25^\circ C$

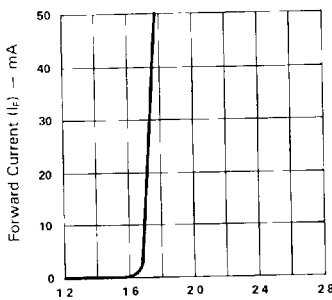
PARAMETER	RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED	UNIT
Power Dissipation Per Segment	55	40	75	60	75	75	mW
Peak Forward Current Per Segment (1/10 Duty Cycle, 0.1ms Pulse Width)	160	60	100	80	100	100	mA
Continuous Forward Current Per Segment	25	15	25	20	25	25	mA
Derating Linear From $25^\circ C$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

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTP-537R/587R & LTP-3784R/3785R

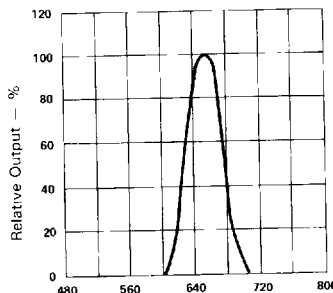
PARAMETER	LTP-	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	537R/587R	I_v	200	500		μcd	$I_F = 10\text{ mA}$
	3784R/3785R	I_v	200	400		μcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength		λ_p		655		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width		$\Delta\lambda$		24		nm	$I_F = 20\text{ mA}$
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		$I_F = 20\text{ mA}$

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

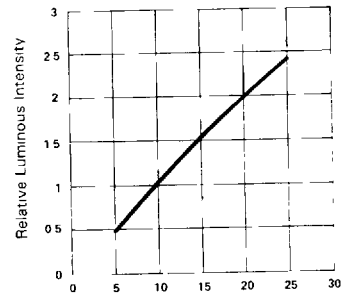
(25°C Ambient Temperature Unless Otherwise Noted)



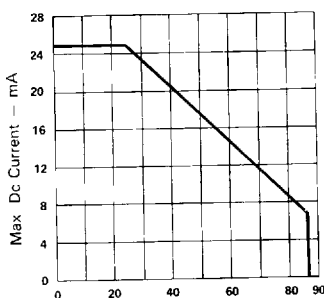
Forward Voltage (V_F) — Volts
 Fig 1 FORWARD CURRENT Vs FORWARD VOLTAGE



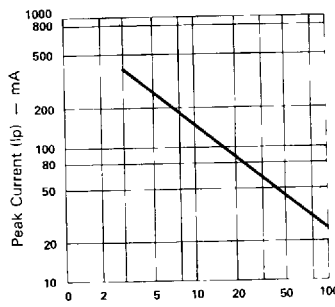
Wavelength (λ) — nm
 Fig 2 SPECTRAL RESPONSE



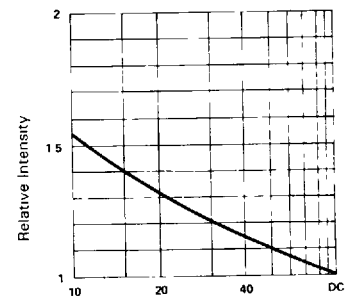
Forward Current (I_F) — mA
 Fig 3 RELATIVE LUMINOUS INTENSITY Vs FORWARD CURRENT (PER SEGMENT)



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 $I_F = 10\text{ mA PER SEG}$)

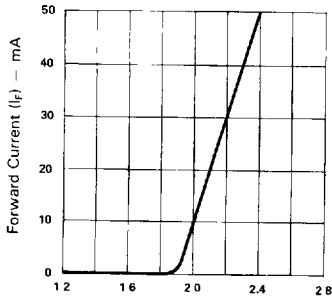
ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTP-537P/587P

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	300	750		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		$I_F = 20\text{ mA}$

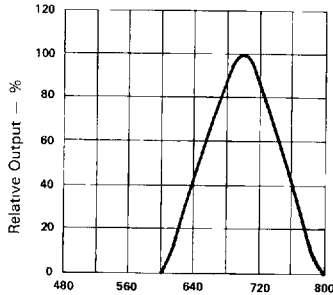
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 & ALPHANUMERIC DISPLAYS

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

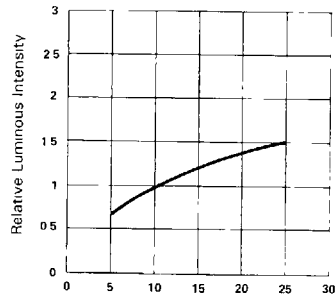
(25°C Ambient Temperature Unless Otherwise Noted)



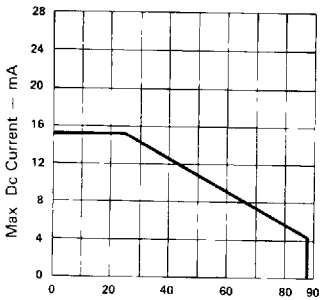
Forward Voltage (V_F) — Volts
 Fig 1 FORWARD CURRENT VS. FORWARD VOLTAGE



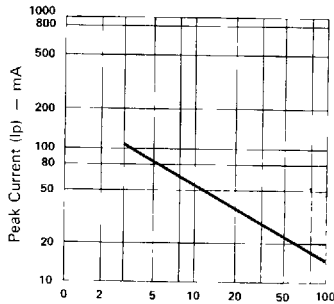
Wavelength (λ) — nm
 Fig 2 SPECTRAL RESPONSE.



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



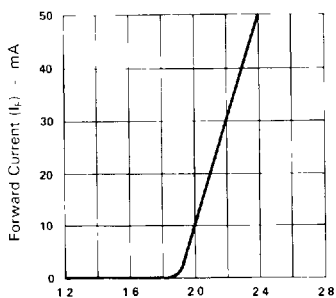
Duty Cycle %
 Fig 5 MAX PEAK CURRENT VS DUTY CYCLE % (REFRESH RATE $F = 1\text{ KHz}$)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTP-537G/587G & LTP-3784G/3785G

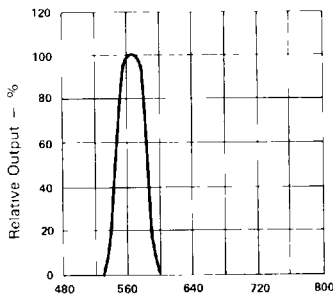
PARAMETER	LTP-	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	537G/587G	I_v	750	2000		μcd	$I_F = 10\text{ mA}$
	3784G/3785G	I_v	600	1800		μcd	$I_F = 10\text{ mA}$
Peak Emission Wavelength		λ_p		565		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width		$\Delta\lambda$		30		nm	$I_F = 20\text{ mA}$
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		$I_F = 20\text{ mA}$

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

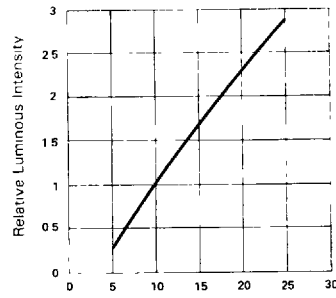
(25°C Ambient Temperature Unless Otherwise Noted)



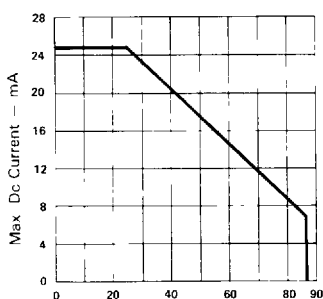
Forward Voltage (V_F) — Volts
 Fig 1 FORWARD CURRENT VS FORWARD VOLTAGE



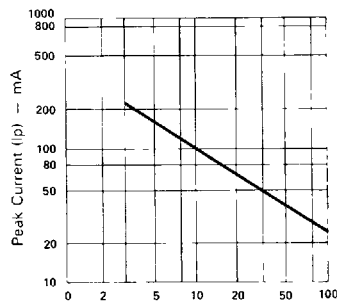
Wavelength (λ) — nm
 Fig 2 SPECTRAL RESPONSE



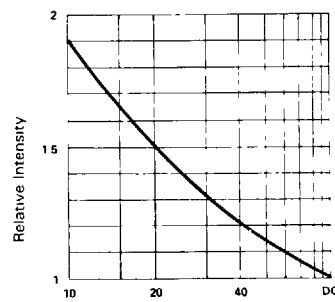
Forward Current (I_F) — mA
 Fig 3 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT (PER SEGMENT)



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 TA = 25°C
LTP-537Y/587Y

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_v	750	2000		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	I_R			100	μA	$V_R = 5 \text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20 \text{ mA}$

SEVEN-SEGMENT LED DISPLAYS & ALPHANUMERIC DISPLAYS

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

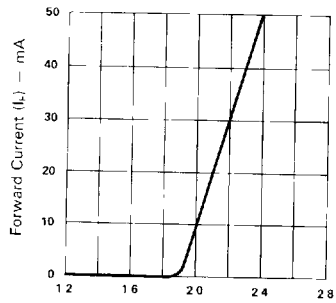


Fig 1 FORWARD CURRENT VS FORWARD VOLTAGE

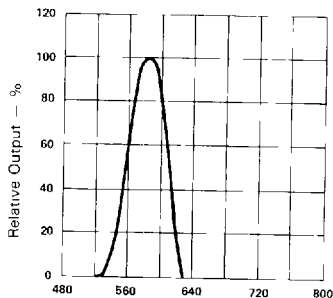


Fig 2 SPECTRAL RESPONSE

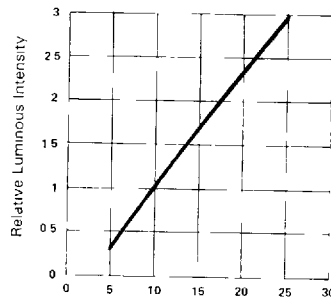


Fig 3 RELATIVE, LUMINOUS INTENSITY VS FORWARD CURRENT (PER SEGMENT)

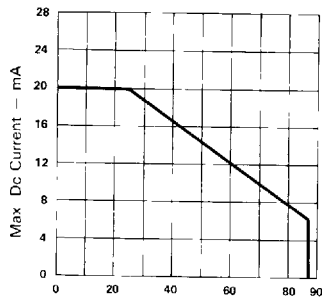


Fig 4 MAX ALLOWABLE DC CURRENT PER SEG VS AMBIENT TEMPERATURE

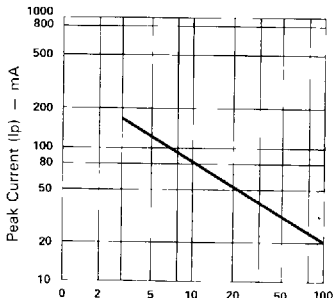


Fig 5 MAX PEAK CURRENT VS DUTY CYCLE % (REFRESH RATE F = 1 KHz)

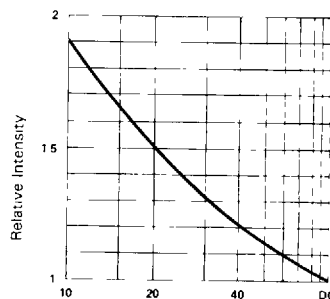


Fig 6 LUMINOUS INTENSITY VS DUTY CYCLE % (AVERAGE $I_f = 10\text{mA}$ PER SEG)

ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTP-537E/587E & LTP-3784E/3785E

PARAMETER	LTP-	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	537E/587E	I_v	750	2000		μcd	$I_F = 10\text{ mA}$
	3784E/3785E	I_v	600	1800		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		$I_F = 20\text{ mA}$

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

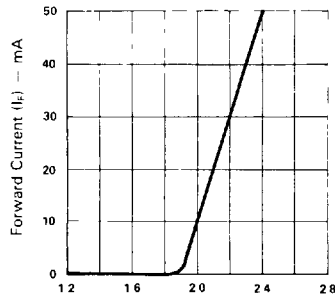


Fig 1 FORWARD CURRENT VS FORWARD VOLTAGE

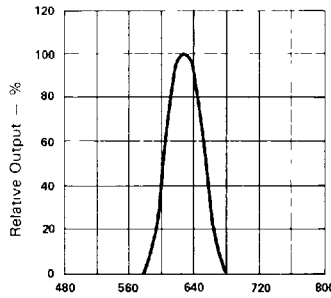


Fig 2 SPECTRAL RESPONSE

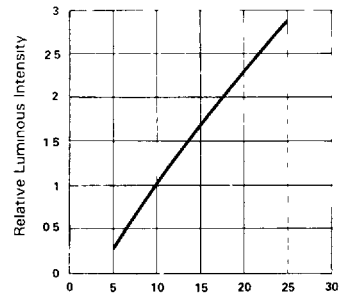


Fig 3 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT (PER SEGMENT)

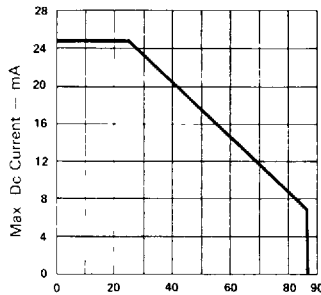


Fig 4 MAX ALLOWABLE DC CURRENT PER SEG VS AMBIENT TEMPERATURE

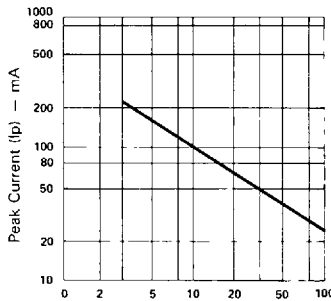


Fig 5 MAX PEAK CURRENT VS DUTY CYCLE % (REFRESH RATE - F = 1 KHz)

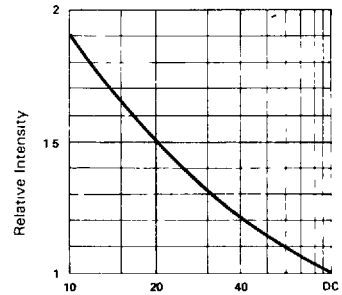


Fig 6 LUMINOUS INTENSITY VS DUTY CYCLE % (AVERAGE $I_v = 10\text{mA}$ PER SEG)

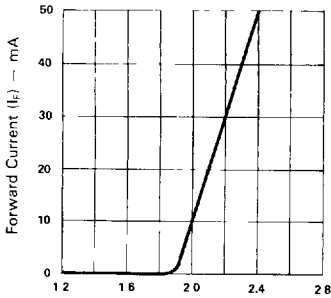
ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$
LTP-537HR/587HR

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	750	2000		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		$I_F = 20\text{ mA}$

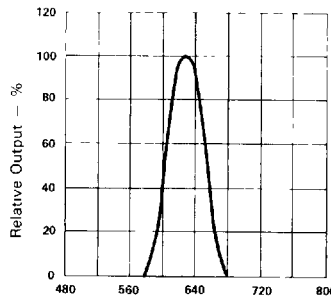
SEVEN SEGMENT LED DISPLAYS
 & ALPHANUMERIC DISPLAYS

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

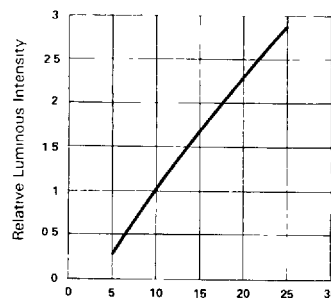
(25°C Ambient Temperature Unless Otherwise Noted)



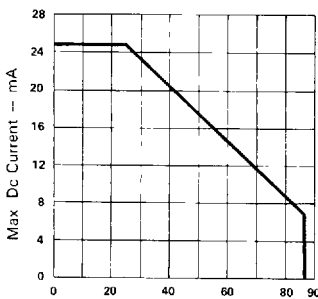
Forward Voltage (V_F) - Volts
 Fig 1 FORWARD CURRENT VS FORWARD VOLTAGE



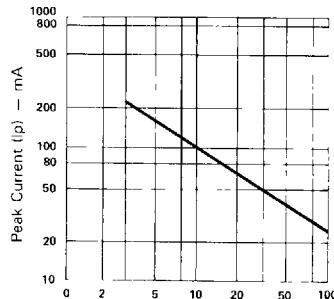
Wavelength (λ) - nm
 Fig 2 SPECTRAL RESPONSE



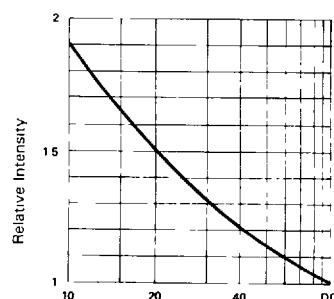
Forward Current (I_F) - mA
 Fig 3 RELATIVE LUMINOUS INTENSITY VS FORWARD CURRENT (PER SEGMENT)



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 $I_F = 10\text{ mA PER SEG}$)