



# LTD-535 585 SERIES

## 0.5" DUAL DIGIT NUMERIC DISPLAYS

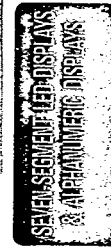
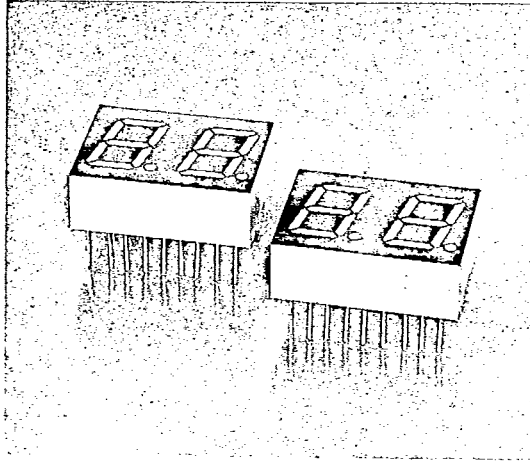
LITE-ON INC

31E D 5536367 0002412 T LTN

T-41-33

### FEATURES

- 0.5 INCH (12.7mm) 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.
- HIGH CONTRAST.
- HIGH BRIGHTNESS.
- WIDE VIEWING ANGLE.
- SOLID STATE RELIABILITY.
- COMMON ANODE OR COMMON CATHODE MODELS.
- TWO DIGIT PACKAGE SIMPLIFIES ALIGNMENTS & ASSEMBLY.
- CATEGORIZED FOR LUMINOUS INTENSITY.
- I.C. COMPATIBLE.
- EASY MOUNTING ON P.C. BOARD OR SOCKETS.



### DESCRIPTION

The LTD-535/585 series are 0.5 inch (12.7mm) height dual 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, bright red, green, yellow and orange displays have black face and white segment color. High efficiency red displays have red face and red segment color.

### DEVICES

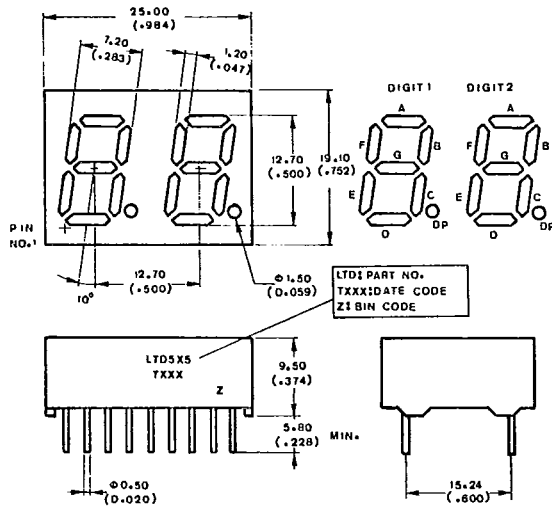
PART NO. LTD-						DESCRIPTION	INTERNAL CIRCUIT DIAGRAM
RED	BRIGHT RED	GREEN	YELLOW	ORANGE	HI.-EFF. RED		
535R	535P	535G	535Y	535E	535HR	Common Cathode, Rt. Hand Decimal	A
585R	585P	585G	585Y	585E	585HR	Common Anode, Rt. Hand Decimal	B

5-110

773

T-41-33

PACKAGE DIMENSIONS



NOTE: All dimensions are in millimeters (inches) tolerance are:

- Lead length (from seating plane): minimum value  $\frac{+1.00}{-0.00}$  mm ( $\frac{+0.040''}{-0.000''}$ )
- $\pm 0.25$  mm ( $0.010''$ ) unless otherwise noted.

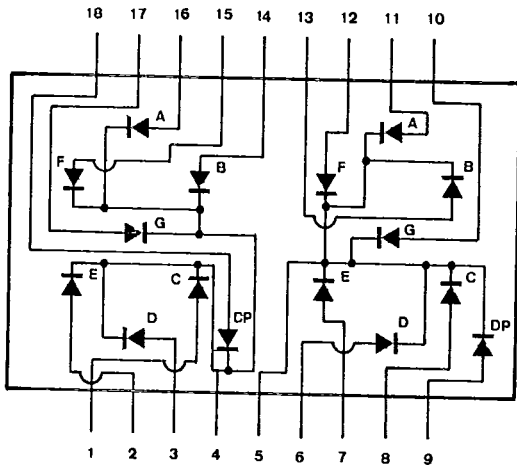
PIN CONNECTION

PIN NO.	CONNECTION	
	A. LTD-535	B. LTD-585
1	Anode C (Digit 1)	Cathode C (Digit 1)
2	Anode E (Digit 1)	Cathode E (Digit 1)
3	Anode D (Digit 1)	Cathode D (Digit 1)
4	Common Cathode (Digit 1)	Common Anode (Digit 1)
5	Common Cathode (Digit 2)	Common Anode (Digit 2)
6	Anode D (Digit 2)	Cathode D (Digit 2)
7	Anode E (Digit 2)	Cathode E (Digit 2)
8	Anode C (Digit 2)	Cathode C (Digit 2)
9	Anode D.P. (Digit 2)	Cathode D.P. (Digit 2)
10	Anode G (Digit 2)	Cathode G (Digit 2)
11	Anode A (Digit 2)	Cathode A (Digit 2)
12	Anode F (Digit 2)	Cathode F (Digit 2)
13	Anode B (Digit 2)	Cathode B (Digit 2)
14	Anode B (Digit 1)	Cathode B (Digit 1)
15	Anode F (Digit 1)	Cathode F (Digit 1)
16	Anode A (Digit 1)	Cathode A (Digit 1)
17	Anode G (Digit 1)	Cathode G (Digit 1)
18	Anode D.P. (Digit 1)	Cathode D.P. (Digit 1)

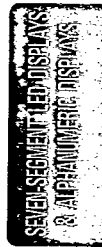
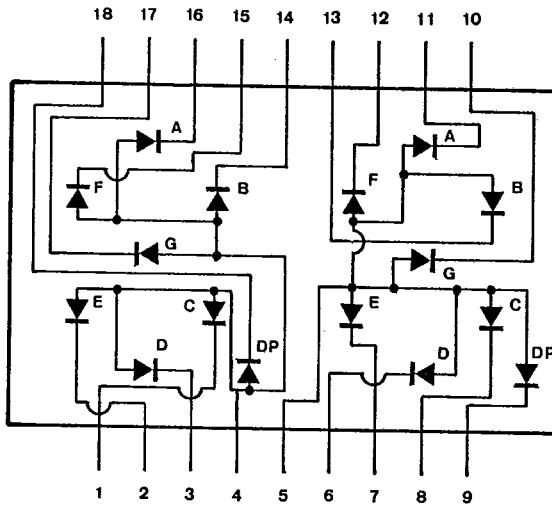
INTERNAL CIRCUIT DIAGRAM

T-41-33

A. LTD-535



B. LTD-585



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  $T_A = 25^\circ\text{C}$**   
**LTD-535R/585R**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	200	500		$\mu\text{cd}$	$I_F = 10\text{ mA}$
Peak Emission Wavelength	$\lambda_p$		655		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		24		nm	$I_F = 20\text{ mA}$
Forward Voltage 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	$\mu\text{A}$	$V_R = 5\text{ V}$
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)

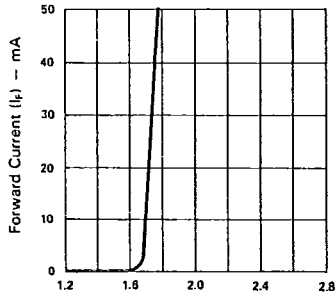


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

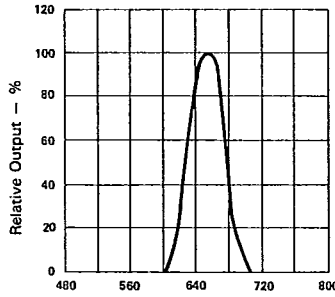


Fig. 2 SPECTRAL RESPONSE.

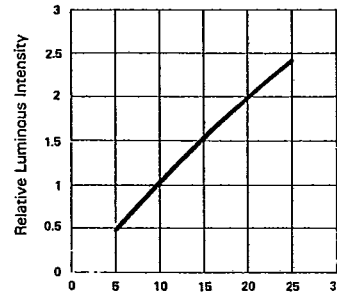


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

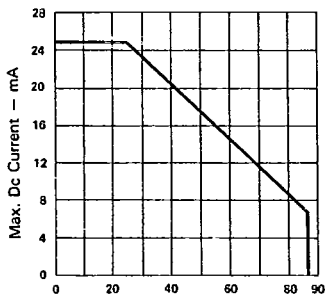


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

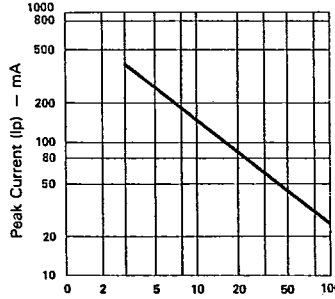


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

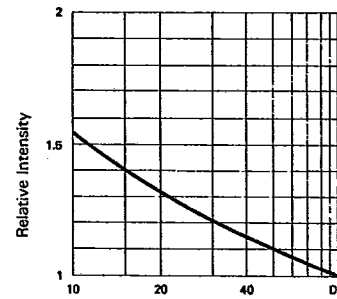


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE  $I_F = 10\text{mA}$  PER SEG.)

**ELECTRICAL/OPTICAL CHARACTERISTICS AT TA = 25°C**  
**LTD-535P/585P**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	300	750		$\mu\text{cd}$	$I_F = 10 \text{ mA}$
Peak Emission Wavelength	$\lambda_p$		697		nm	$I_F = 20 \text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		90		nm	$I_F = 20 \text{ mA}$
Forward Voltage 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	$\mu\text{A}$	$V_R = 5 \text{ V}$
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)

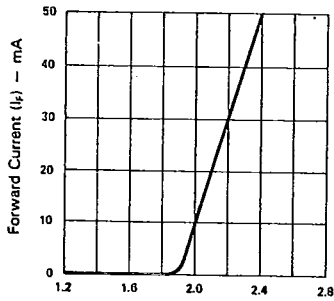


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

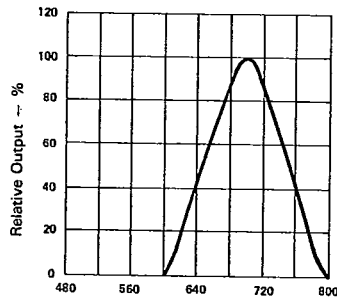


Fig. 2 SPECTRAL RESPONSE.

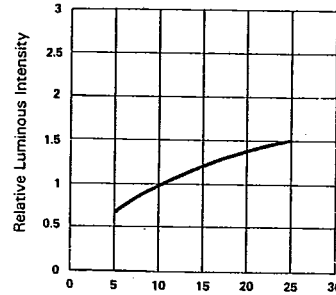


Fig. 3 RELATIVE, LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

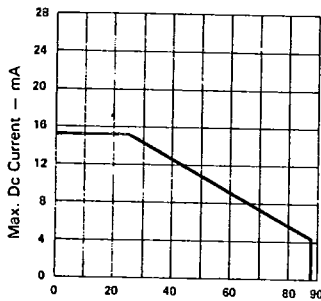


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

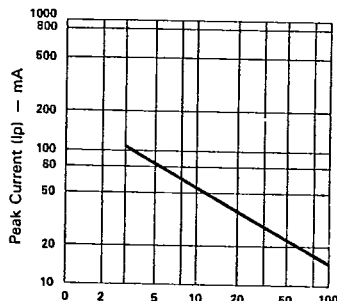


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)



**ELECTRICAL/OPTICAL CHARACTERISTICS AT TA = 25°C**  
**LTD-535G/585G**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	750	2000		$\mu\text{cd}$	$I_F = 10 \text{ mA}$
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 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	$\mu\text{A}$	$V_R = 5 \text{ V}$
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)

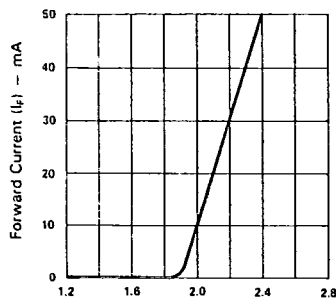


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

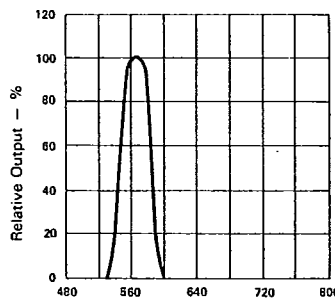


Fig. 2 SPECTRAL RESPONSE.

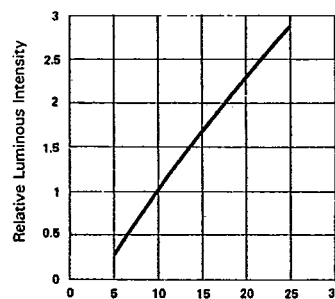


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

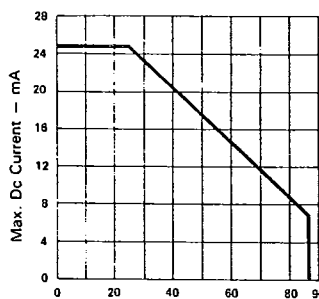


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

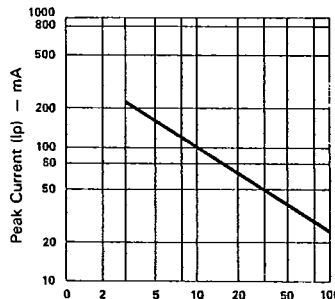


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

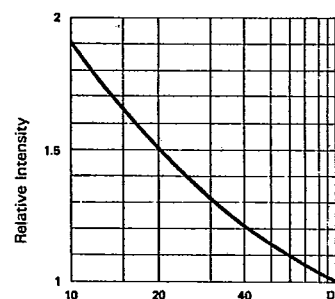


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE  $I_f = 10\text{mA}$  PER SEG.)

ELECTRICAL/OPTICAL CHARACTERISTICS AT TA = 25°C  
LTD-535Y/585Y

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	Iv	600	2000		μcd	IF = 10 mA
Peak Emission Wavelength	λp		585		nm	IF = 20 mA
Spectral Line Half-Width	Δλ		35		nm	IF = 20 mA
Forward Voltage Segment or D.P.	VF		2.1	2.8	V	IF = 20 mA
Reverse Current any Segment or D.P.	IR			100	μA	VR = 5V.
Luminous Intensity Matching Ratio	Iv-m			2:1		IF = 20 mA

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

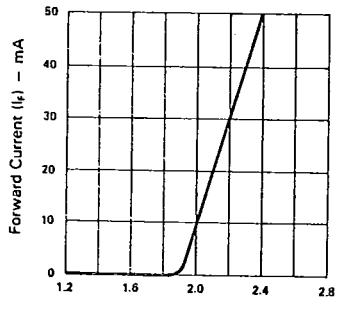


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

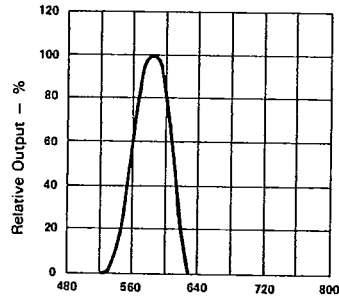


Fig. 2 SPECTRAL RESPONSE.

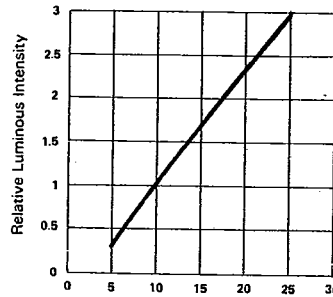


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

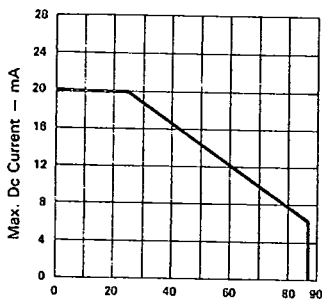


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

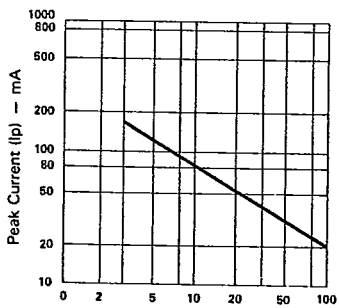


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

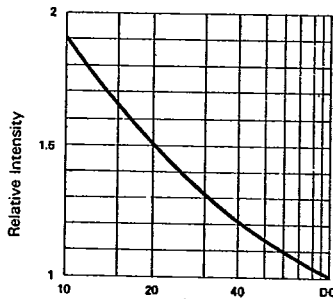


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE.% (AVERAGE If = 10mA PER SEG.)



T-41-33

**ELECTRICAL/OPTICAL CHARACTERISTICS AT  $T_A = 25^\circ\text{C}$**   
**LTD-535E/585E**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	750	2000		$\mu\text{cd}$	$I_F = 10\text{ mA}$
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 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	$\mu\text{A}$	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES**

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

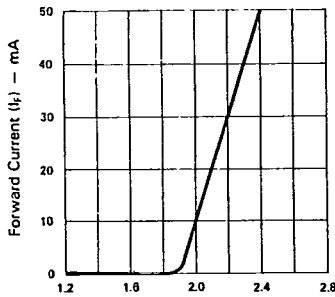


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

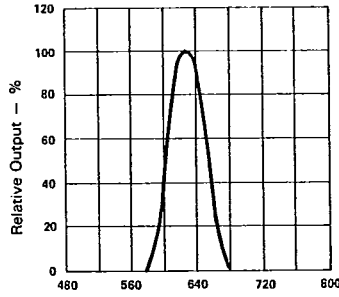


Fig. 2 SPECTRAL RESPONSE.

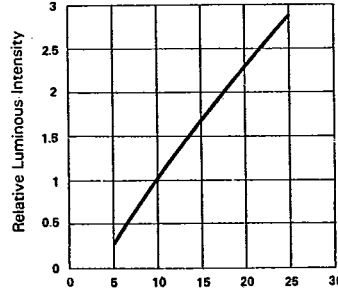


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

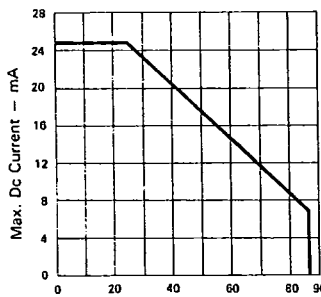


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

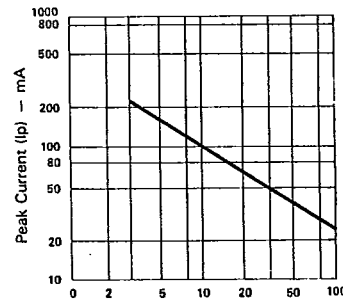


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

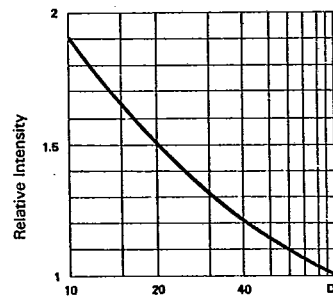


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE%. (AVERAGE  $I_F = 10\text{mA}$  PER SEG.)

**ELECTRICAL/OPTICAL CHARACTERISTICS AT  $T_A = 25^\circ\text{C}$**   
**LTD-535HR/585HR**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	$I_v$	750	2000		$\mu\text{cd}$	$I_F = 10\text{ mA}$
Peak Emission Wavelength	$\lambda_p$		635		nm	$I_F = 20\text{ mA}$
Spectral Line Half-Width	$\Delta\lambda$		40		nm	$I_F = 20\text{ mA}$
Forward Voltage 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	$\mu\text{A}$	$V_R = 5\text{ V}$
Luminous Intensity Matching Ratio	$I_v\text{-m}$			2:1		$I_F = 20\text{ mA}$

**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES**

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

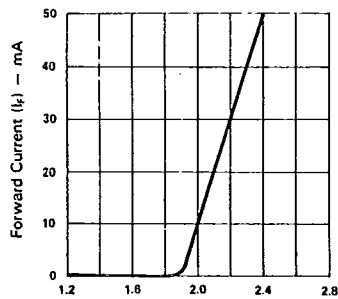


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

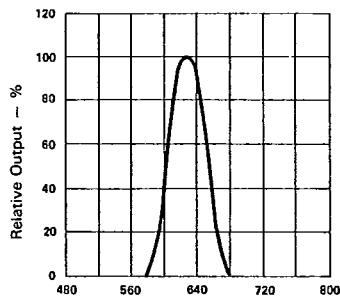


Fig. 2 SPECTRAL RESPONSE.

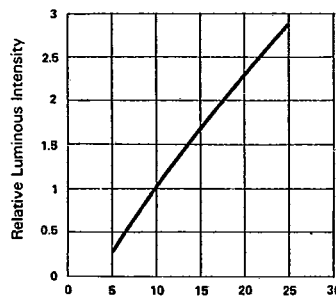


Fig. 3 RELATIVE LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

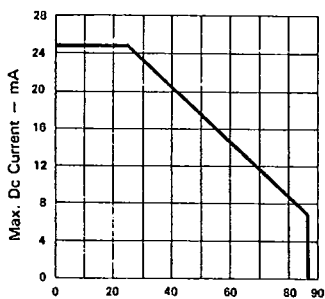


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

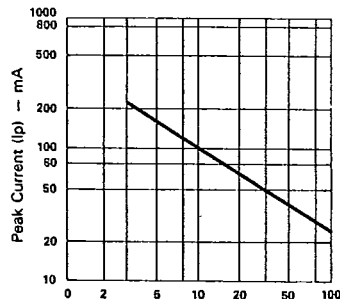


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

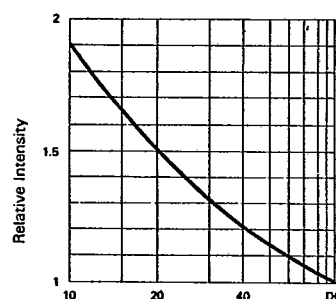


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE% (AVERAGE  $I_F = 10\text{mA}$  PER SEG.)



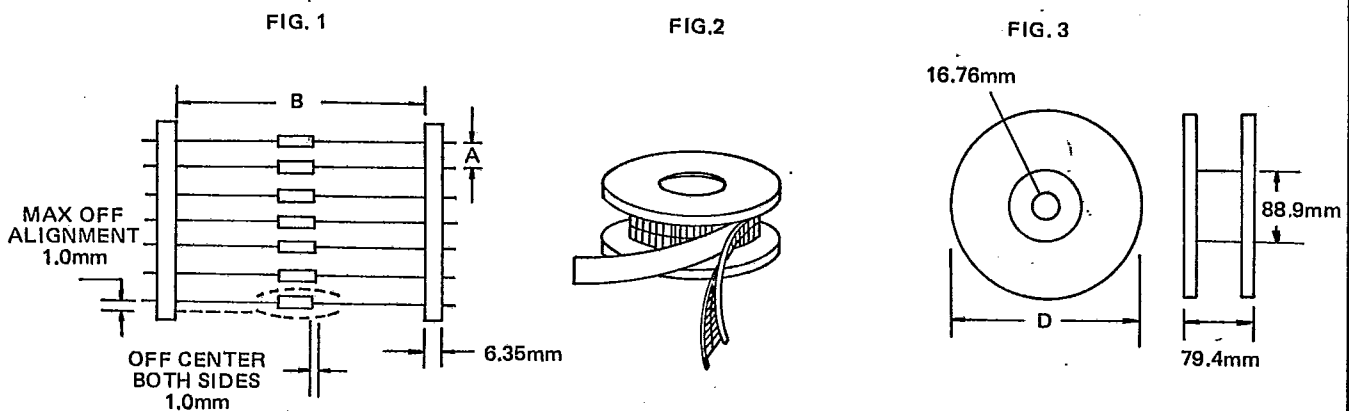
**PACKAGING**

T-90-20

## Reel Packaging (Axial Lead Units)

DEVICE TYPE	COMPONENT SPACE (MM) "A"	TAPE SPACE (MM) "B"	REEL DIA (MM) "D"	QUANTITY (EA)		CARTON	
				REEL	CARTON	SIZE (MM)	WEIGHT (KG)
DO-41 DO-41L	5±0.5	52.4±1.5	326~336	5000	20K	355 x 355 x 355	10.5
DO-201AD	10±0.5	52.4±1.5	326~336	1200	4.8K	355 x 355 x 355	9.0
P6(Aleg)	10±0.5	52.4±1.5	326~336	700	2.8K	355 x 355 x 355	8.8

The C dimension of Fig. 3 is between 3.17m.m. and 635mm greater than the length of the component involved.

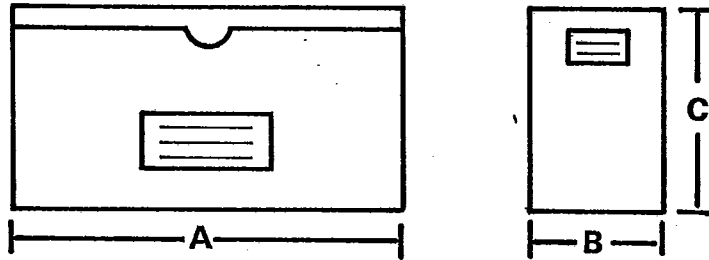


## Bulk Packaging (Axial Lead Devices and Bridge Rectifiers)

DEVICE TYPE	PACKAGING SIZE (MM)		QUANTITY (EA)		APPROX GROSS WEIGHT (KG)	
	BOX	CARTON	BOX	CARTON	BOX	CARTON
DO-41 DO-41L	196 x 84 x 20	450 x 210 x 250	1000	50K	0.38	20
DO-201AD	305 x 93 x 59	355 x 355 x 355	1000	20K	1.35	28
P6(Aleg)	305 x 93 x 59	355 x 355 x 355	500	10K	1.2	24.5
PBM	357 x 125 x 60	530 x 360 x 340	1000	20K	1.5	32.3
PBDF	495 x 155 x 145	500 x 325 x 305	5000	20K	5.1	21.5
PBP	357 x 125 x 60	530 x 360 x 340	500	10K	1.5	31.5
PBL	375 x 220 x 155	470 x 385 x 455	1000	5K	5.7	30.5
PBPC-6	357 x 125 x 60	560 x 360 x 340	250	5K	1.1	22
PBPC-8	357 x 125 x 60	560 x 360 x 340	250	5K	1.7	35
KBPC	375 x 220 x 365	470 x 390 x 385	500	1K	15.1	31.5
KBPC-W	375 x 220 x 365	470 x 390 x 385	500	1K	14.5	30.0

**AMMO BOX PACKAGING**

**BOX SIZE**



Unit:m. m.

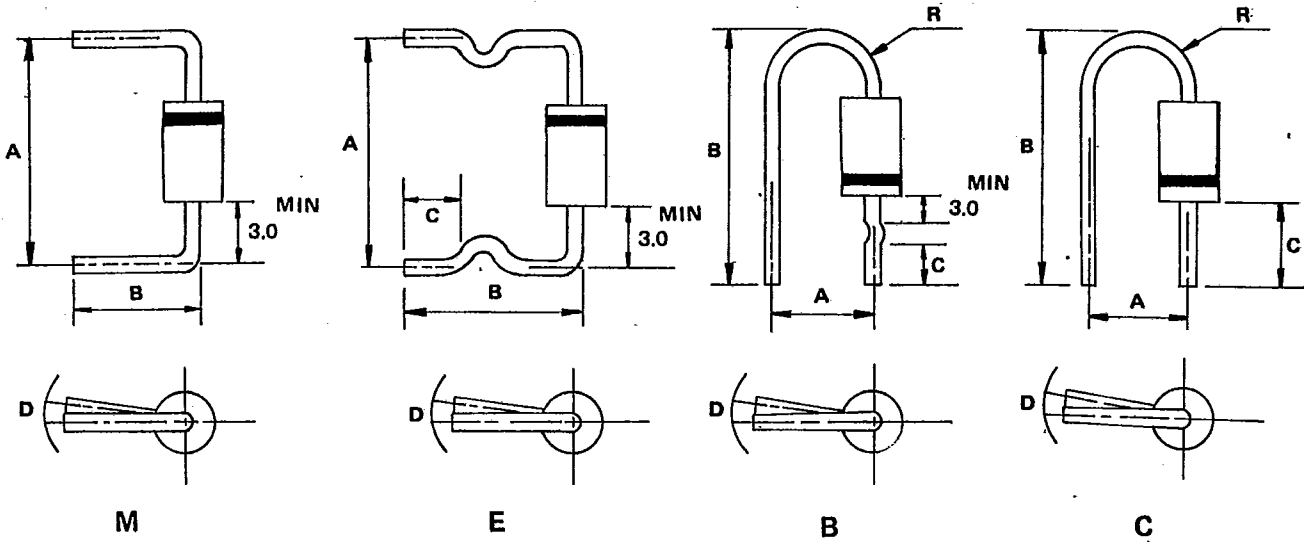
Packaging	Products Outline	Dimension *A*	Dimension *B*	Dimension *C*	Q'ty per BOX
26MM Horizontal Ammo Pack	DO-41 DO-41L(0.6mm Lead)	255	50	95	3K
					3K
52MM Horizontal Ammo Pack	DO-41and DO-41L DO 201AD	250	75	92	3K
					0.8K

**CARTON SIZE**

Unit:m. m.

Packaging	Products Outline	length	Width	High	Q'ty Per Carton
26MM Horizontal Ammo Pack	DO-41 DO-41L(0.6mm Lead)	330	310	268	42K
					48K
52MM Horizontal Ammo Pack	DO-41and DO-41L DO 201AD	355	355	340	12K

# PREFORMED LEAD DRAWING



Case type	Preformed type	A (mm)		B (mm)		C (mm)		D (mm)		R (mm)	
		range	tolerance	range	tolerance	range	tolerance	range	tolerance	range	tolerance
D041	M	9.0-20.0	1.0	8.0-22.0	±0.5	-	-	1.5	max	-	-
	E	11.0-20.0	±1.0	11.0-16.0	±1.0	4.0-5.0	±0.5	1.5	max	-	-
	B	7.5	±0.5	19.0-22.0	±0.5	7.5	±0.5	1.5	max	2.5-4.0	Typ
	C	4.5	±0.8	18.0-19.0	±0.5	9.0	±0.5	1.5	max	2.5-4.0	Typ
D0201AD	M	15.0-20.0	±1.0	8.0-22.0	±1.0	-	-	2.0	max	-	-
	E	15.0-20.0	±1.0	10.0-22.0	±1.0	3.0-15.0	±0.5	2.0	max	-	-
P6(Aleg)	M	15.0-20.0	±1.0	8.0-22.0	±1.0	-	-	2.0	max	-	-