



LTC-9000 SERIES

0.9" FOUR DIGIT LED CLOCK FREQUENCY DISPLAYS

FEATURES

- 0.9 INCH (22.86mm) HEIGHT CHARACTER RED OR GREEN COLOR.
- COMMON CATHODE, COMMON ANODE; DIRECT, DUPLEX AND MULTIPLEX PIN OUT ARE AVAILABLE.
- FLEXIBLE TO SELECT BOTH 12/24 HOURS AND FULL FEATURE.
- CONTINUOUS UNIFORM SEGMENTS.
- WIDE ANGLE, LONG DISTANCE VIEWING.
- COLOR FILTER PROVIDES HIGH CONTRAST.
- LOW POWER REQUIREMENTS, HIGH RELIABILITY AND LONG LIFE.
- PRACTICAL BRIGHTNESS ARE OBTAINED AT ABOUT 8MA/SEGMENT DIRECT DRIVE; 20MA (WITH 1/2 DUTY RATIO) FOR DUPLEX DRIVE; 50MA (WITH 1/6 DUTY RATIO) FOR MULTIPLEX DRIVE.
- BRIGHT RED (GaP) 4 DIGIT LED COLOCK DISPLAY VERSION STANDARD SUFFIX P.



DESCRIPTION

The LTC-9000 Series devices are designed for viewing distance of up to two meters and for using in instrument, test equipment, communication equipment, business machines, computers, micro processor . . . etc.

DEVICES

PART NO. LTC--	DESCRIPTION				PIN OUT				INTERNAL CIRCUIT DIAGRAM	PACKAGE DIMENSION
	DRIVE		COLOR		SEG A.G.D. E.F. OF 1ST DIGIT	ALARM		AM PM		
	FORM	CIRCUIT	BRIGHT RED	GREEN		UP	LOW			
917A1P	C.A.	MPX	V		YES		V	V/V	A	A
917A1G	C.A.	MPX		V	YES		V	V/V	A	A
927A1P	C.C.	MPX	V		YES		V	V/V	B	B
927A1G	C.C.	MPX		V	YES		V	V/V	B	B
937S1P-12	C.C.	DPX	V		NO		V	V/V	C	C
937S1G-12	C.C.	DPX		V	NO		V	V/V	C	C
937S1P	C.C.	DPX	V		A.G.D.E.		V	V/V	C	C
937S1G	C.C.	DPX		V	A.G.D.E.		V	V/V	C	C
967S1P	C.C.	D.D.	V		YES		V	V/V	D	D
967S1G	C.C.	D.D.		V	YES		V	V/V	D	D

NOTES: 1. C.A.: common anode C.C.: common cathode 2. MPX: multiplex DPX: duplex D.D.: direct drive.

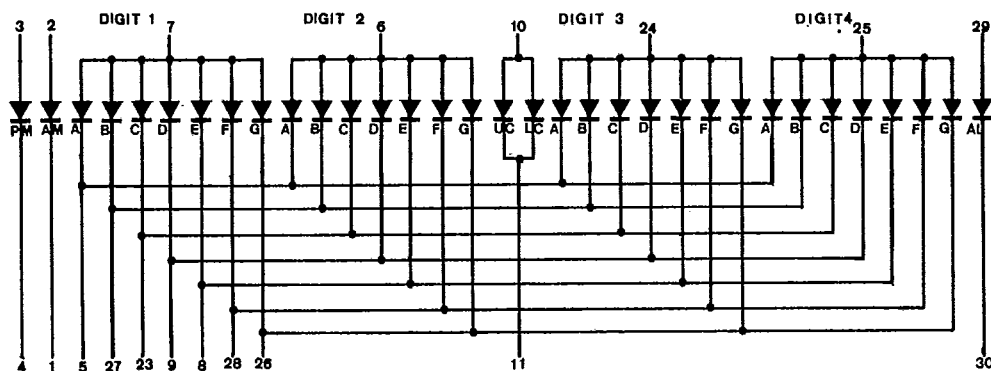
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LED CLOCK &
FREQUENCY DISPLAYS

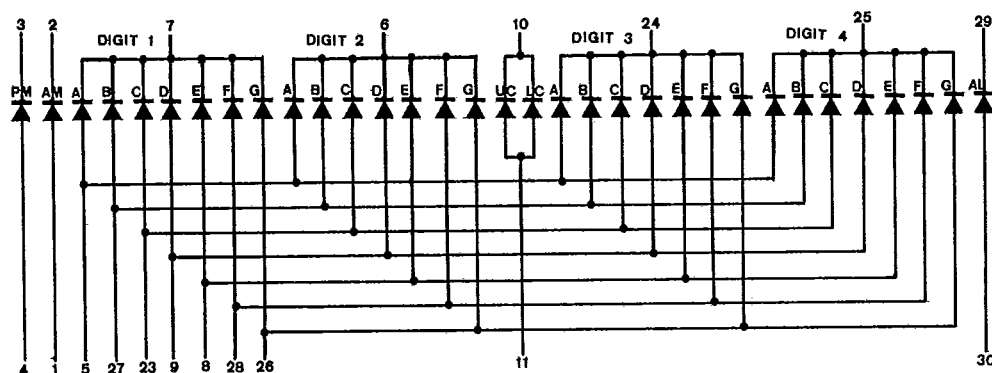
NOTE: All dimensions are in $\frac{\text{millimeters}}{(\text{inches})}$ tolerance is $\frac{0.25\text{mm}}{(0.010")}$ unless otherwise noted.

INTERNAL CIRCUIT DIAGRAM

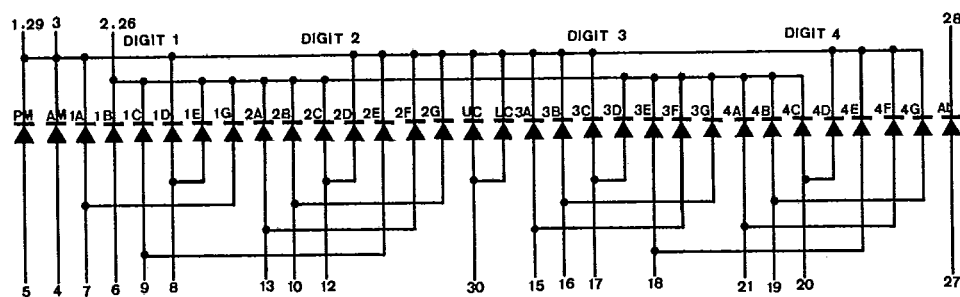
A. LTC-917A



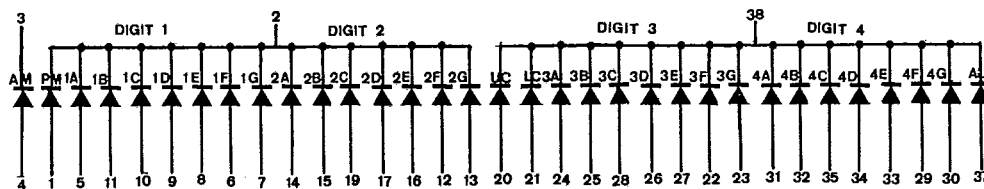
B. LTC-927A



C. LTC-937S



D. LTC-967S

LED CLOCK &
FREQUENCY DISPLAYS7-58
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ABSOLUTE MAXIMUM RATINGS AT $T_A = 25^\circ\text{C}$

PARAMETER	SYMBOL	MAXIMUM RATING	UNIT
Average Forward Current Per Segment/D.P. Direct Drive Current	I_{CP}	20	mA
Peak Forward Current Per Segment/D.P. (Duty 1/10 1 KHz)	I_{PF}	150	mA
Continuous Forward Current Duplex Circuit (Duty 1/2)	I_F /pulse	30	mA
Reverse Voltage (Segment of Decimal Point)	V_R	5	V
Operating Temperature Range	T_{opr}	-25°C to 60°C	
Storage Temperature Range	T_{stg}	-25°C to 70°C	
Derating Linear From 25°C	P_D	2.4	mW
Derating Linear From 25°C		0.42	$\text{mA}/^\circ\text{C}$
Max. Solder Temperature 260°C For 3 Seconds at 2 mm From The Case Or Reflector Edge			

NOTE: Caution

Please be careful of the following.

- 1) Avoid washing the LED DISPLAY in water.
- 2) Except for the printed wiring board, Avoid heating the LED DISPLAY over MAXIMUM RATING.
- 3) Avoid using chemicals except for the following, when washing off flux and wiping off stain on surface of the LED DISPLAY

Freon TE or TF

Methyl or Ethyl Alcohol

Dai-From Solvent S3 or S3-E

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

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Luminous Intensity	I_v	135	340		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	V_F		2.1	2.8	V	$I_F = 20 \text{ mA}$
Reverse Current	I_R			100	μA	$V_R = 5\text{V}$
Luminous Intensity Matching Ratio	I_{vm}			2:1		$I_F = 10 \text{ mA}$

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

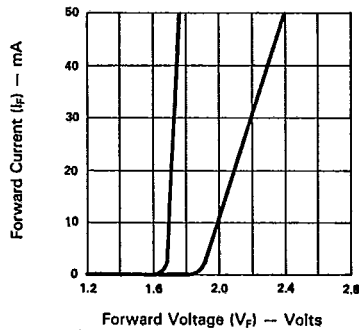


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

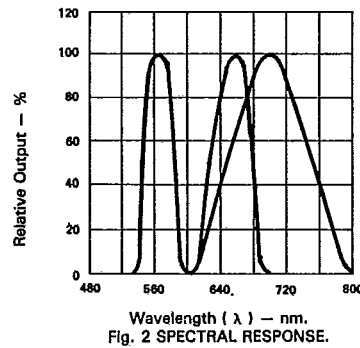


Fig. 2 SPECTRAL RESPONSE.

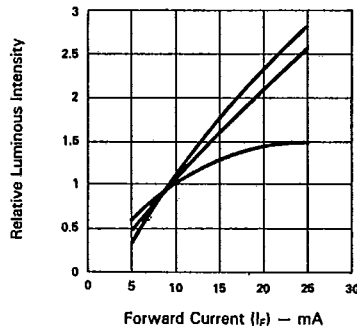


Fig. 3 RELATIVE, LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

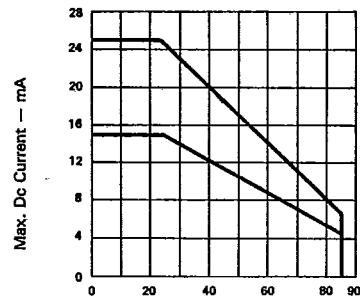


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

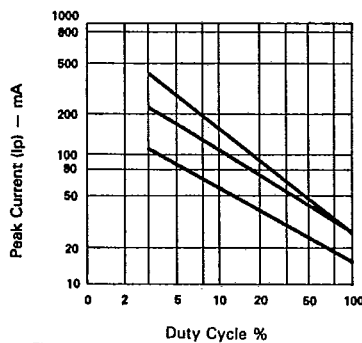
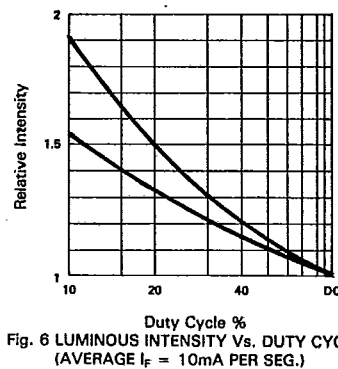


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE. % (REFRESH RATE - F = 1 KHz)

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