

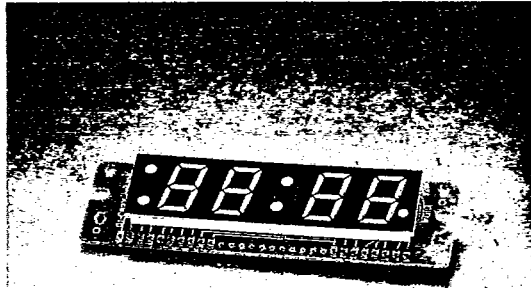


LTC-6000 SERIES

0.6" FOUR DIGIT LED CLOCK FREQUENCY DISPLAYS

FEATURES

- 0.6 INCH (15.24mm) 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 1/4 DUTY RATIO) FOR MULTIPLEX DRIVE.
- BRIGHT RED (GaP) 4 DIGIT LED COLOCK DISPLAY VERSION STANDARD [GREEN (GaP) DISPLAY SUFFIX G.].



DESCRIPTION

The LTC-6000 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

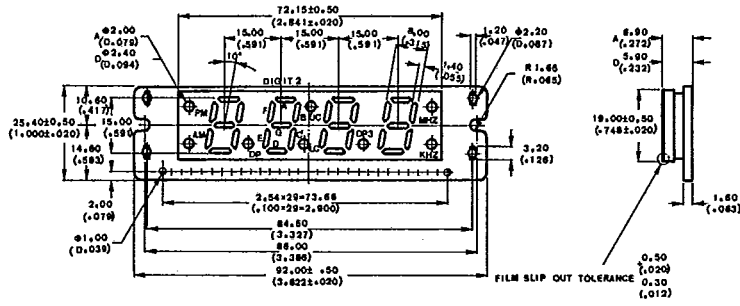
| PART NO. LTC- | DESCRIPTION | | | | PIN OUT | | | INTERNAL CIRCUIT DIAGRAM | PACKAGE DIMENSION | |
|------------------|-------------|---------|------------|-------|------------------------------------|-------|-----|--------------------------|-------------------|------------|
| | DRIVE | | COLOR | | SEG A.G.D. E.F. OF 1ST DIGIT | ALARM | | | | AM / PM |
| | FORM | CIRCUIT | BRIGHT RED | GREEN | | UP | LOW | | | |
| 612D1P | C.A. | MPX | V | | YES | V | V | V/V | A | A |
| 612D1G | C.A. | MPX | | V | YES | V | V | V/V | A | A |
| 612A1P | C.A. | MPX | V | | YES | V | V | V/V | A | A |
| 612A1G | C.A. | MPX | | V | YES | V | V | V/V | A | A |
| 617A1P | C.A. | MPX | V | | YES | | V | V/V | B | B |
| 617A1G | C.A. | MPX | | V | YES | | V | V/V | B | B |
| 617D1P | C.A. | MPX | V | | YES | | V | V/V | B | B |
| 617D1G | C.A. | MPX | | V | YES | | V | V/V | B | B |
| 627A1P | C.C. | MPX | V | | YES | | V | V/V | C | C |
| 627A1G | C.C. | MPX | | V | YES | | V | V/V | C | C |
| 627D1P | C.C. | MPX | V | | YES | | V | V/V | C | C |
| 627D1G | C.C. | MPX | | V | YES | | V | V/V | C | C |

LED CLOCK & FREQUENCY DISPLAYS

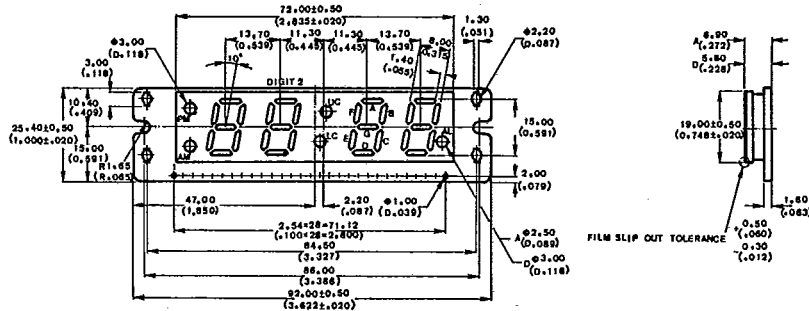
| PART NO. LTC- | DESCRIPTION | | | | PIN OUT | | | INTERNAL CIRCUIT DIAGRAM | PACKAGE DIMENSION | |
|------------------|-------------|---------|---------------|-------|------------------------------------|-------|-----|--------------------------|-------------------|----------|
| | DRIVE | | COLOR | | SEG A.G.D. E.F. OF 1ST DIGIT | ALARM | | | | AM PM |
| | FORM | CIRCUIT | BRIGHT RED | GREEN | | UP | LOW | | | |
| 637C1P | C.C. | DPX | V | | A.G.D.E. | | V | V/V | D | D |
| 637C1P-12 | C.C. | DPX | V | | NO | | V | V/V | D | D |
| 637C1G-12 | C.C. | DPX | | V | NO | | V | V/V | D | D |
| 637C1G | C.C. | DPX | | V | A.G.D.E. | | V | V/V | D | D |
| 637A1P-12 | C.C. | DPX | V | | NO | | V | V/V | D | E |
| 637A1G-12 | C.C. | DPX | | V | NO | | V | V/V | D | E |
| 637A1P | C.C. | DPX | V | | A.G.D.E. | | V | V/V | D | E |
| 637A1G | C.C. | DPX | | V | A.G.D.E. | | V | V/V | D | E |
| 637D1P-12 | C.C. | DPX | V | | NO | | V | V/V | D | E |
| 637D1G-12 | C.C. | DPX | | V | NO | | V | V/V | D | E |
| 637D1G | C.C. | DPX | | V | A.G.D.E. | | V | V/V | D | E |
| 637D1G-12S | C.C. | DPX | | V | NO | | V | V/V | D | E |
| 637D1P | C.C. | DPX | V | | A.G.D.E. | | V | V/V | D | E |
| 637D1P-12S | C.C. | DPX | V | | NO | | V | V/V | D | E |
| 656TP | C.C. | D.D. | V | | YES | | V | V/V | E | F |
| 656TG | C.C. | D.D. | | V | YES | | | V/V | E | F |
| 667A1P-12 | C.C. | D.D. | V | | NO | | | V/V | F | H |
| 667A1G-12 | C.C. | D.D. | | V | NO | | | V/V | F | H |
| 667A1P | C.C. | D.D. | V | | YES | | | V/V | F | H |
| 667A1G | C.C. | D.D. | | V | YES | | | V/V | F | H |
| 667D1P-12 | C.C. | D.D. | V | | NO | | | V/V | F | H |
| 667D1G-12 | C.C. | D.D. | | V | NO | | | V/V | F | H |
| 667D1P | C.C. | D.D. | V | | YES | | | V/V | F | H |
| 667D1G | C.C. | D.D. | | V | YES | | | V/V | F | H |
| 667C1P-12 | C.C. | D.D. | V | | NO | | | V/V | F | G |
| 667C1G-12 | C.C. | D.D. | | V | NO | | | V/V | F | G |
| 667C1P | C.C. | D.D. | V | | YES | | | V/V | F | G |
| 667C1G | C.C. | D.D. | | V | YES | | | V/V | F | G |
| 6703A1P | C.C. | MPX | V | | YES | V | V | V/V | G | I |
| 6703A1G | C.C. | MPX | | V | YES | V | V | V/V | G | I |
| 6703D1P | C.C. | MPX | V | | YES | V | V | V/V | G | I |
| 6703D1G | C.C. | MPX | | V | YES | V | V | V/V | G | I |
| 672A1G | C.A. | D.D. | | V | YES | V | V | V/V | H | J |
| 672A1P | C.A. | D.D. | V | | YES | V | V | V/V | H | J |
| 672D1G | C.A. | D.D. | | V | YES | V | V | V/V | H | J |
| 672D1P | C.A. | D.D. | V | | YES | V | V | V/V | H | J |
| 672D1G-12 | C.A. | D.D. | | V | NO | V | V | V/V | H | J |
| 672D1P-12 | C.A. | D.D. | V | | NO | V | V | V/V | H | J |
| 674A1G | C.A. | D.D. | | V | YES | V | | V/V | I | K |
| 674A1P | C.A. | D.D. | V | | YES | V | | V/V | I | K |
| 674D1G-12 | C.A. | D.D. | | V | NO | V | | V/V | I | K |
| 674D1P-12 | C.A. | D.D. | V | | NO | V | | V/V | I | K |
| 674D1G | C.A. | D.D. | | V | YES | V | | V/V | I | K |
| 674D1P | C.A. | D.D. | V | | YES | V | | V/V | I | K |
| 677A1P | C.C. | D.D. | V | | YES | | | V/V | J | L |
| 677A1G | C.C. | D.D. | | V | YES | | | V/V | J | L |
| 677D1P | C.C. | D.D. | V | | YES | | | V/V | J | L |
| 677D1G | C.C. | D.D. | | V | YES | | | V/V | J | L |
| 687A1P | C.A. | DPX | V | | YES | | V | V/V | K | M |
| 687A1G | C.A. | DPX | | V | YES | | V | V/V | K | M |
| 687S1P | C.A. | MPX | V | | YES | | V | V/V | L | M |
| 687S1G | C.A. | MPX | | V | YES | | V | V/V | L | M |

PACKAGE DIMENSIONS

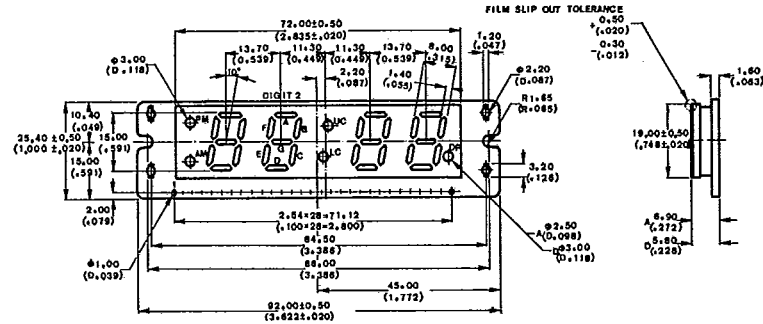
A. LTC-612A1 x / D1 x Series



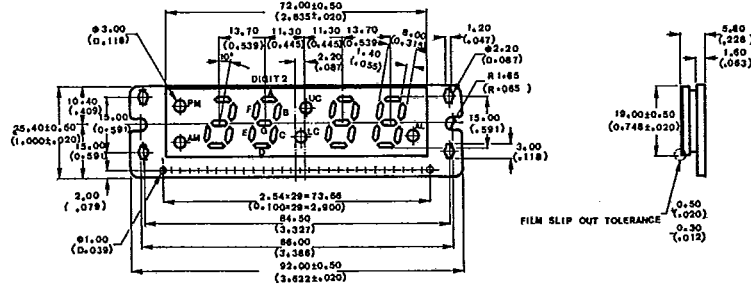
B. LTC-617A1 x / D1 x Series



C. LTC-627A1 x / D1 x Series

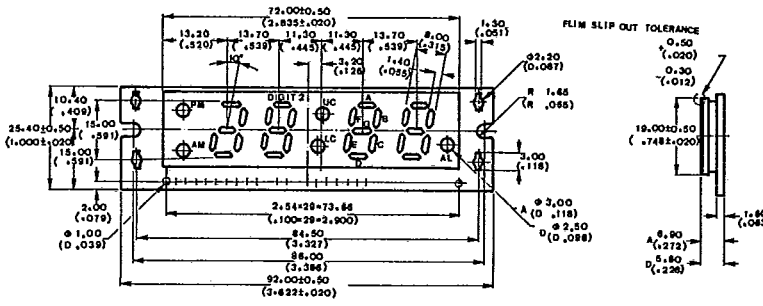


D. LTC-637C1 x Series

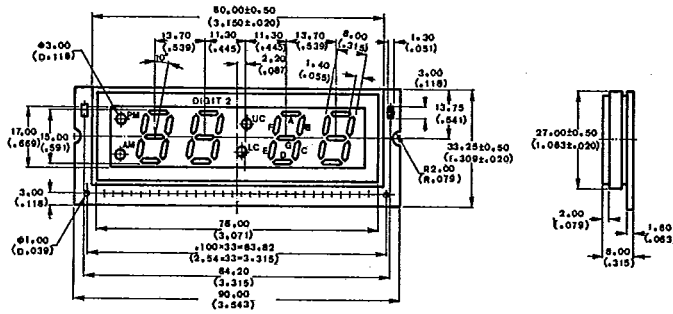


LED CLOCK & FREQUENCY DISPLAYS

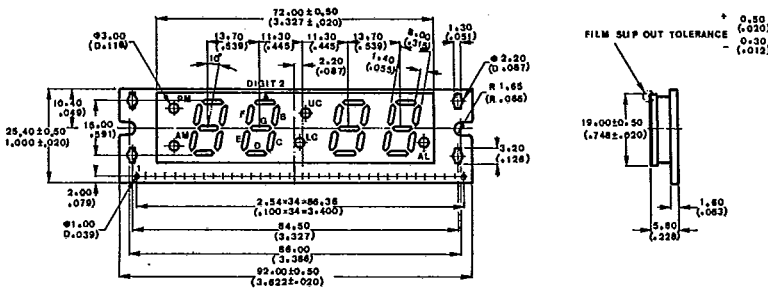
E. LTC-637A1 x / D1 x Series



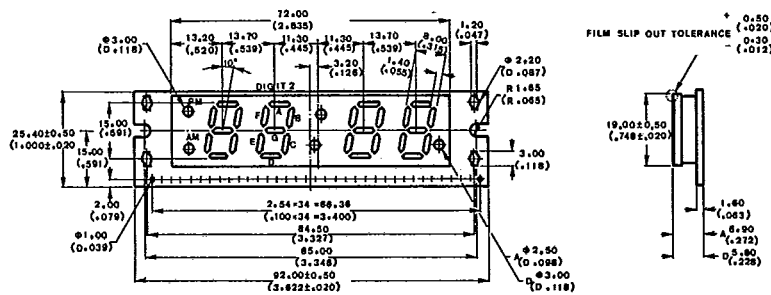
F. LTC-656T x Series



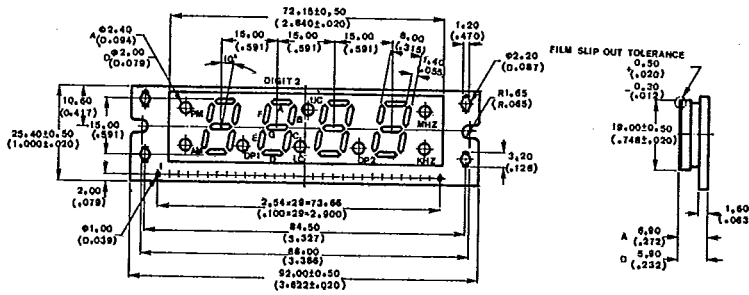
G. LTC-667C1 x Series



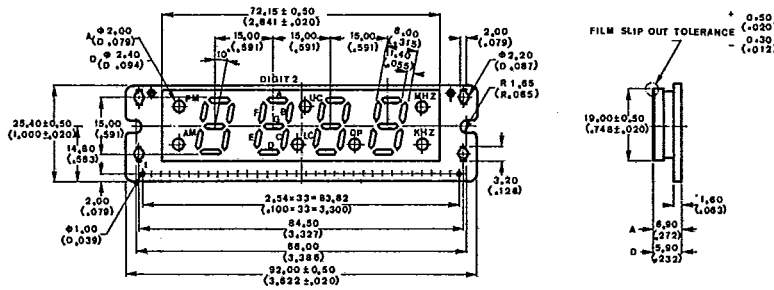
H. LTC-667A1 x / D1 x Series



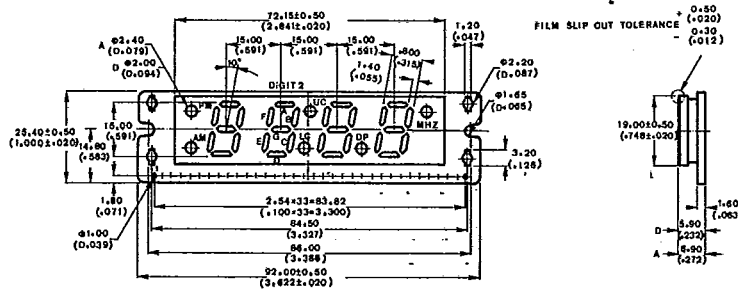
I. LTC-6703A1 x / D1 x Series



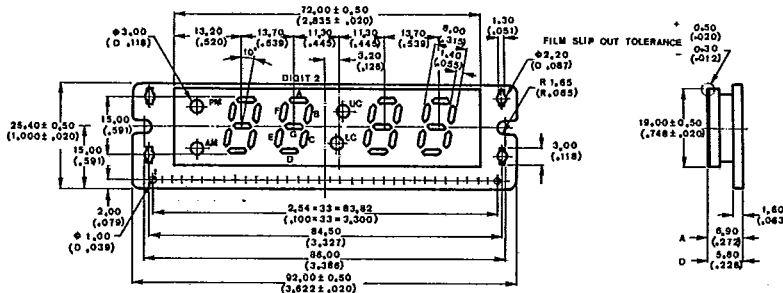
J. LTC-672A1 x / D1 x Series



K. LTC-674A1 x / D1 x Series

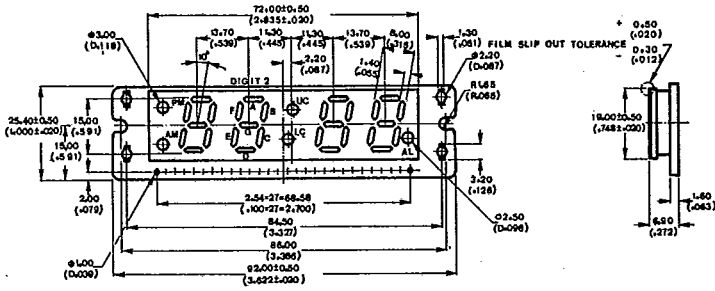


L. LTC-677A1 x / D1 x Series



LED CLOCK & FREQUENCY DISPLAYS

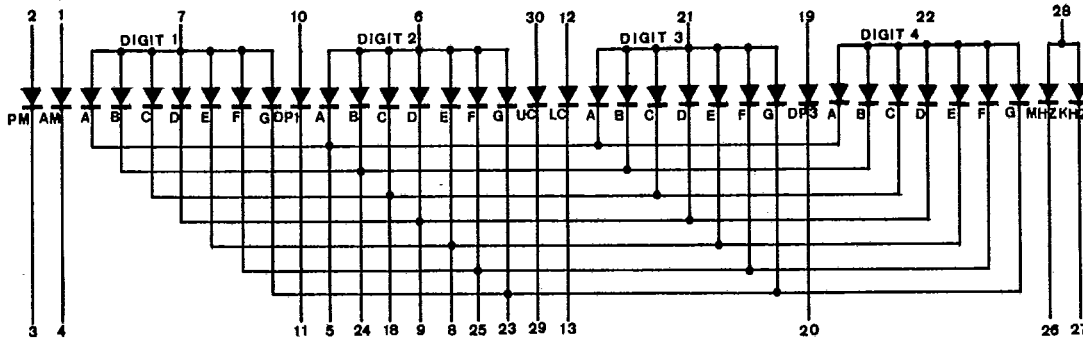
M. LTC-687A1 x / S1 x Series



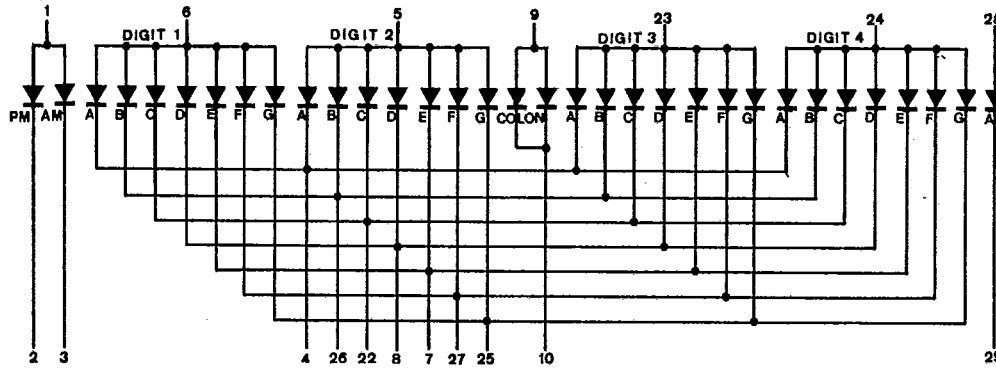
NOTE: All dimensions are in $\frac{\text{millimeters}}{\text{(inches)}}$, tolerance is $\frac{0.25\text{mm}}{(0.010'')}$ unless otherwise noted.

INTERNAL CIRCUIT DIAGRAM

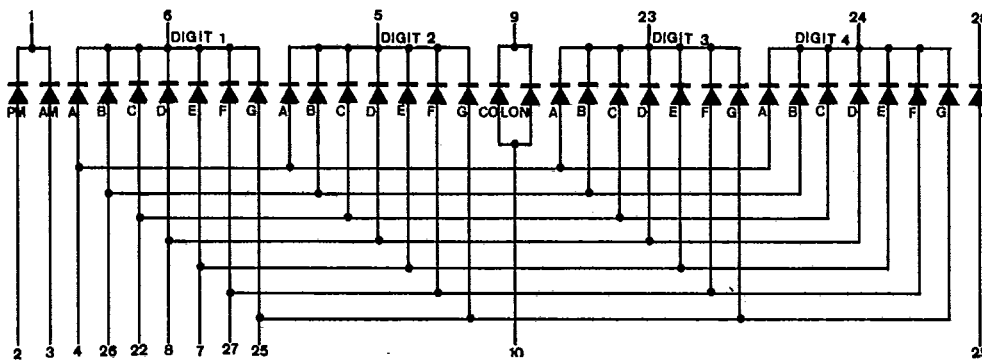
A. LTC-612



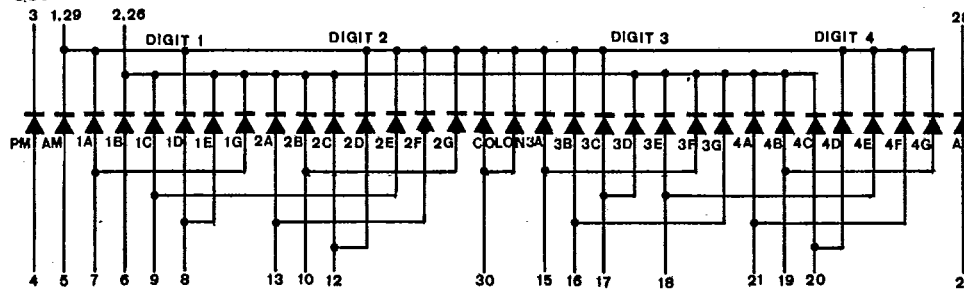
B. LTC-617



C. LTC-627

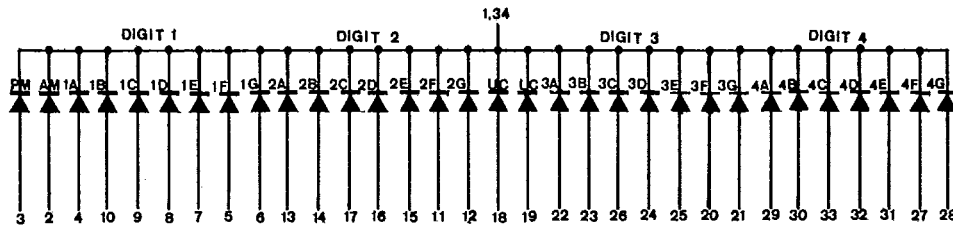


D. LTC-637

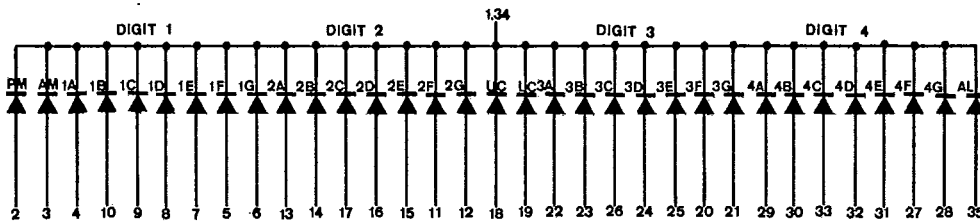


LED CLOCK & FREQUENCY DISPLAYS

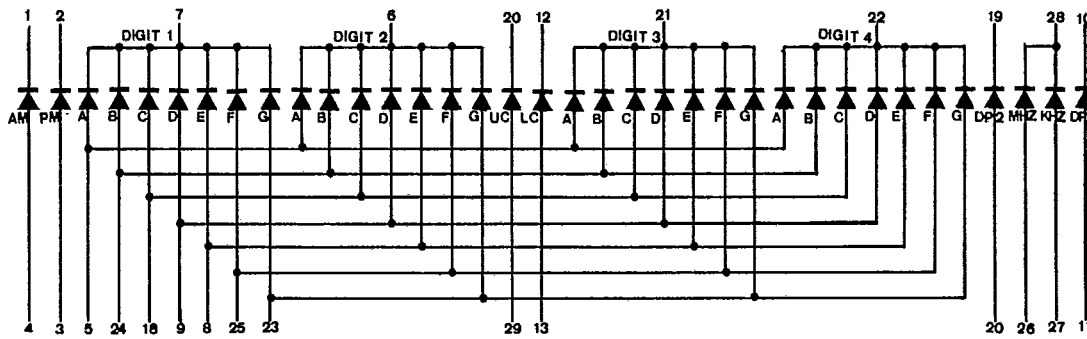
E. LTC-656



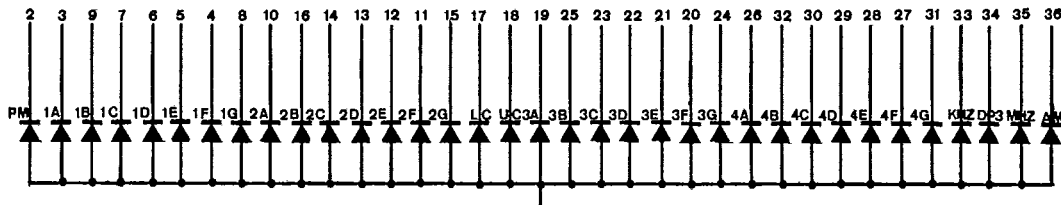
F. LTC-667



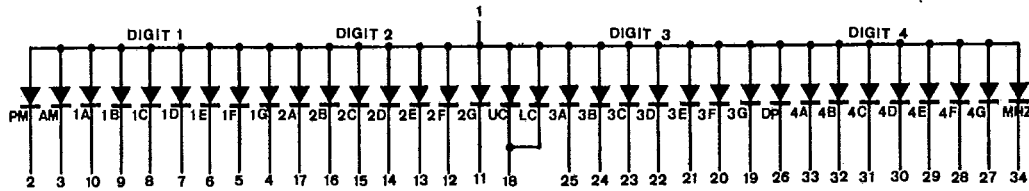
G. LTC-6703



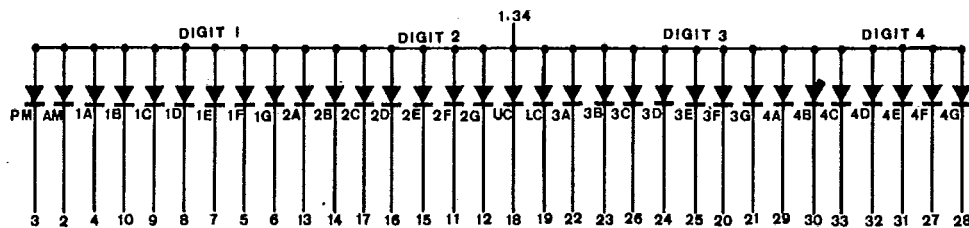
H. LTC-672



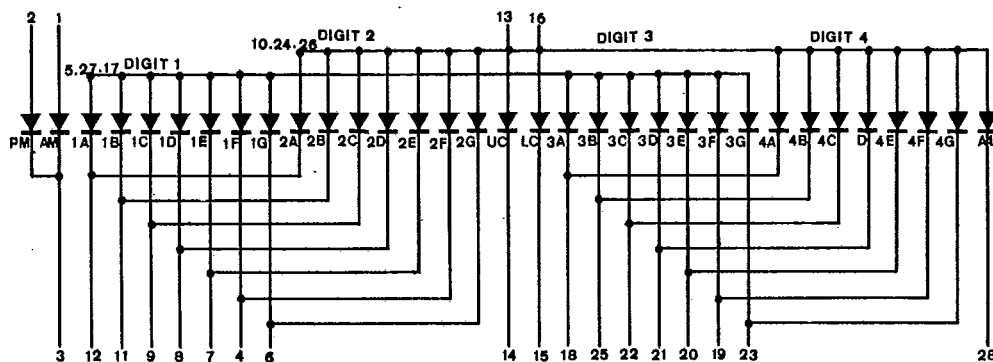
I. LTC-674



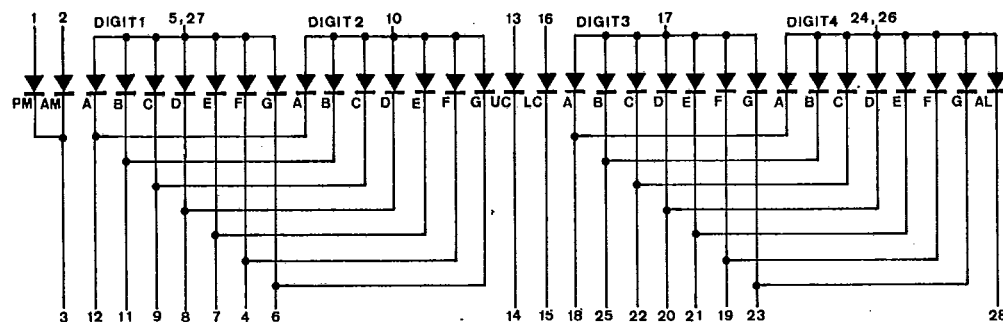
J. LTC-677



K. LTC-687A



L. LTC-687S



LED CLOCK &
FREQUENCY DISPLAYS

ABSOLUTE MAXIMUM RATINGS AT TA = 25°C

| PARAMETER | SYMBOL | BRIGHT RED | GREEN | UNIT |
|---|----------|---------------|-------|-------|
| Average Forward Current Per Segment/D.P. Direct Drive Current | ICF | 20 | 20 | mA |
| Peak Forward Current Per Segment/D.P. (Duty 1/10.1 KHz) | IPF | 150 | 150 | mA |
| Continuous Forward Current Duplex Circuit (Duty 1/2) | IF/pulse | 30 | 30 | mA |
| Reverse Voltage (Segment or Decimal Point) | VR | 5 | 5 | V |
| Operating Temperature Range | Topr | -25°C to 60°C | | |
| Storage Temperature Range | Tstg | -25°C to 70°C | | |
| Derating Linear From 25°C | Pd | 2.4 | 2.4 | mW |
| Derating Linear From 25°C | | 0.42 | 0.42 | mA/°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 TA = 25°C

| PARAMETER | SYMBOL | DEVICES | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|-----------------------------------|--------|------------|------|------|------|------|----------------|
| Luminous Intersity | IV | BRIGHT RED | 140 | 350 | | μcd | IF = 10 mA |
| | | GREEN | 245 | 600 | | | |
| Edge Peak Emission Wavelength | λp | BRIGHT RED | | 697 | | nm | IF = 20 mA |
| | | GREEN | | 565 | | | |
| Spectral Line Half-Width | Δλ | BRIGHT RED | | 90 | | nm | IF = 20 mA |
| | | GREEN | | 30 | | | |
| Forward Voltage | VF | BRIGHT RED | | 2.1 | 2.8 | V | IF = 20 mA |
| | | GREEN | | 2.1 | 2.8 | | |
| Reverse Current | IR | BRIGHT RED | | | 100 | μA | VR = 5V |
| | | GREEN | | | 100 | | |
| Luminous Intensity Matching Ratio | Ivm | All Model | | | 2.1 | | IF = 10 mA |

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

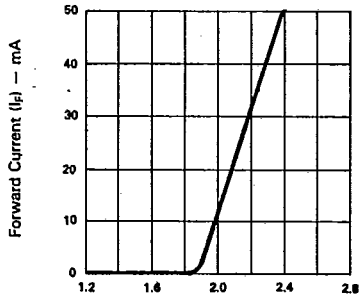


Fig. 1 FORWARD CURRENT Vs. FORWARD VOLTAGE.

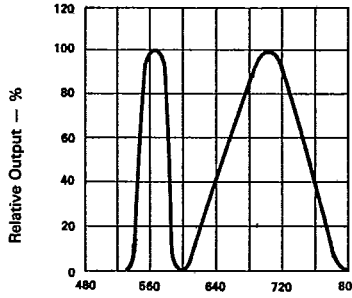


Fig. 2 SPECTRAL RESPONSE.

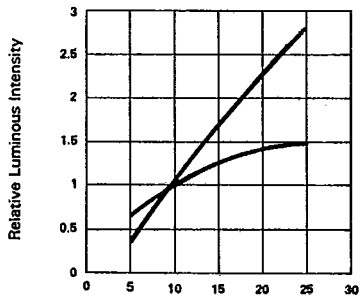


Fig. 3 RELATIVE, LUMINOUS INTENSITY Vs. FORWARD CURRENT (PER SEGMENT).

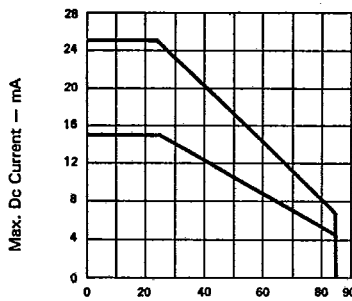


Fig. 4 MAX. ALLOWABLE DC CURRENT PER SEG. Vs AMBIENT TEMPERATURE.

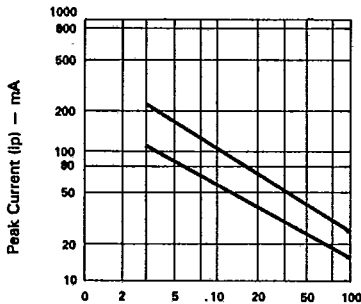


Fig. 5 MAX. PEAK CURRENT Vs. DUTY CYCLE.% (REFRESH RATE - F = 1 KHz)

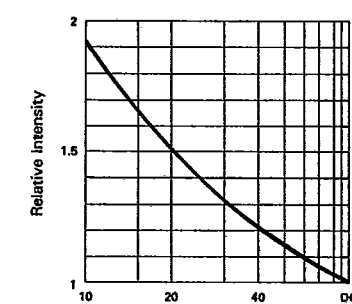


Fig. 6 LUMINOUS INTENSITY Vs. DUTY CYCLE % (AVERAGE If = 10mA PER SEG.)

LED CLOCK & FREQUENCY DISPLAYS