

# Monsanto

GREEN ORANGE MAN50A  
 RED YELLOW MAN3600A  
 0.300-INCH SEVEN MAN70A  
 SEGMENT DISPLAY MAN80A

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## FEATURES

- Common anode or common cathode models
- Red, yellow, green and orange
- Fast switching—excellent for multiplexing
- Low power consumption
- Bold solid segments that are highly legible
- Solid state reliability—long operation life
- Impact resistant plastic construction
- Directly compatible with integrated circuits
- High brightness with high contrast
- Standard 14 pin dual in-line package configuration
- Wide angle viewing . . . 150°

For industrial and consumer applications such as:

- Digital readout displays
- Instrument panels
- Point of sale equipment
- Calculators
- Digital clocks

## DESCRIPTION

The MAN50A, MAN3600A, MAN70A and MAN80A Series provides a choice of color of LED displays. Standard units are available in red, green, orange and yellow, with common anode right hand decimal, common anode left hand decimal, common cathode right hand decimal, and common anode overflow ( $\pm 1$ ) with right hand decimal. They can be mounted in arrays with 0.400-inch (10.16 mm) center-to-center spacing.

## MODEL NUMBERS

PART NO.	COLOR	DESCRIPTION
MAN51A	Green	Common Anode; Right Hand Decimal
MAN52A	Green	Common Anode; Left Hand Decimal
MAN53A	Green	Common Anode; Overflow $\pm 1$
MAN54A	Green	Common Cathode; Right Hand Decimal
MAN3610A	Orange	Common Anode; Right Hand Decimal
MAN3620A	Orange	Common Anode; Left Hand Decimal
MAN3630A	Orange	Common Anode; Overflow $\pm 1$
MAN3640A	Orange	Common Cathode; Right Hand Decimal
MAN71A	Red	Common Anode; Right Hand Decimal
MAN72A	Red	Common Anode; Left Hand Decimal
MAN73A	Red	Common Anode; Overflow $\pm 1$
MAN74A	Red	Common Cathode; Right Hand Decimal
MAN81A	Yellow	Common Anode; Right Hand Decimal
MAN82A	Yellow	Common Anode; Left Hand Decimal
MAN83A	Yellow	Common Anode; Overflow $\pm 1$
MAN84A	Yellow	Common Cathode; Right Hand Decimal

**ELECTRO-OPTICAL CHARACTERISTICS** (25°C Free Air Temperature Unless Otherwise Specified)

		MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
MAN51A, 52A, 53A, 54A	Luminous intensity, Digit Average (See Note 1)	125			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Decimal point (See Note 3)	60			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Segment "C" or "D" of MAN53A	60			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Peak emission wavelength		565		nm	
	Spectral line half width		40		nm	
	Forward voltage					
	Segment			3.5	V	$I_F = 20\text{ mA}$
	Decimal point			3.5	V	$I_F = 20\text{ mA}$
	Dynamic resistance					
	Segment		17		$\Omega$	$I_F = 20\text{ mA}$
	Decimal point		17		$\Omega$	$I_F = 20\text{ mA}$
	Capacitance					
	Segment		35		pF	$V = 0$
	Decimal point		35		pF	$V = 0$
MAN3610A, 3620A, 3630A, 3640A	Luminous intensity, Digit Average (See Note 1)	510			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Decimal point (See Note 3)	265			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Segment "C" or "D" of MAN3630A	265			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Peak emission wavelength		630		nm	
	Spectral line half width		40		nm	
	Forward voltage					
	Segment			2.5	V	$I_F = 20\text{ mA}$
	Decimal point			2.5	V	$I_F = 20\text{ mA}$
	Dynamic resistance					
	Segment		26		$\Omega$	$I_F = 20\text{ mA}$
	Decimal point		26		$\Omega$	$I_F = 20\text{ mA}$
	Capacitance					
	Segment		35		pF	$V = 0$
	Decimal point		35		pF	$V = 0$
MAN71A, 72A, 73A, 74A	Luminous intensity, Digit Average (See Note 1)	125			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Decimal point (See Note 3)	60			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Segment "C" or "D" of MAN73A	60			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Peak emission wavelength		660		nm	
	Spectral line half width		20		nm	
	Forward voltage					
	Segment			2.0	V	$I_F = 20\text{ mA}$
	Decimal point			2.0	V	$I_F = 20\text{ mA}$
	Dynamic resistance					
	Segment		2		$\Omega$	$I_{PK} = 100\text{ mA}$
	Decimal point		2		$\Omega$	$I_{PK} = 100\text{ mA}$
	Capacitance					
	Segment		35	80		$V = 0$
	Decimal point		35	80		$V = 0$
MAN81A, 82A, 83A, 84A	Luminous intensity, Digit Average (See Note 1)	320			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Decimal point (See Note 3)	160			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Segment "C" or "D" of MAN83A	160			$\mu\text{cd}$	$I_F = 10\text{ mA}$
	Peak emission wavelength		585		nm	
	Spectral line half width		40		nm	
	Forward voltage					
	Segment			3.5	V	$I_F = 20\text{ mA}$
	Decimal point			3.5	V	$I_F = 20\text{ mA}$
	Dynamic resistance					
	Segment		26		$\Omega$	$I_F = 20\text{ mA}$
	Decimal point		26		$\Omega$	$I_F = 20\text{ mA}$
	Capacitance					
	Segment		35		pF	$V = 0$
	Decimal point		35		pF	$V = 0$
	Reverse current					
	Segment			100	$\mu\text{A}$	$V_R = 3.0\text{ V}$
	Decimal point			100	$\mu\text{A}$	$V_R = 3.0\text{ V}$

## TYPICAL CURVES

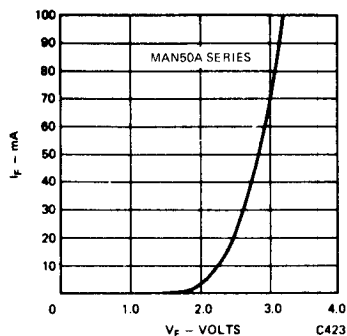


Fig. 1. Forward Current vs. Forward Voltage

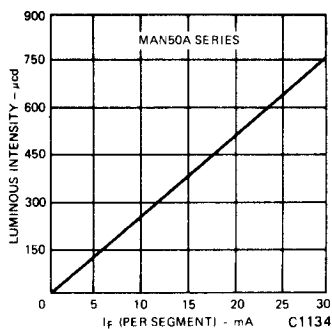


Fig. 2. Luminous Intensity vs. Forward Current

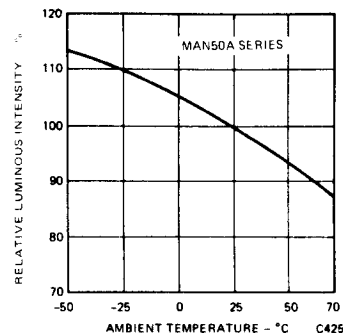


Fig. 3. Luminous Intensity vs. Temperature

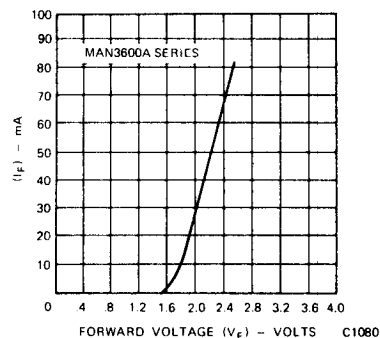


Fig. 4. Forward Current vs. Forward Voltage

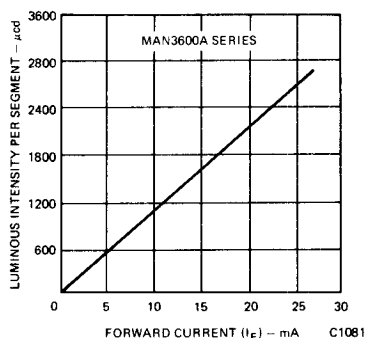


Fig. 5. Luminous Intensity vs. Forward Current

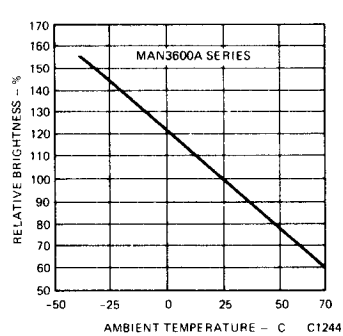


Fig. 6. Luminous Intensity vs. Temperature

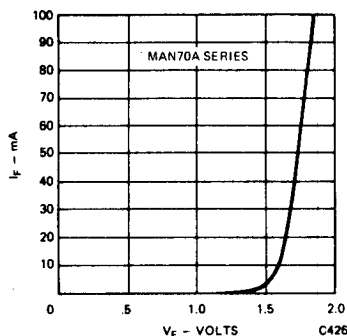


Fig. 7. Forward Current vs. Forward Voltage

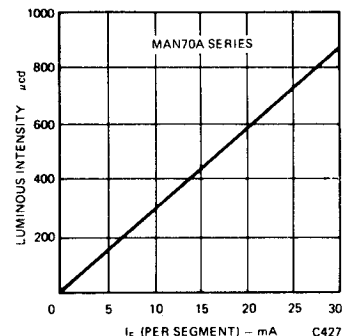


Fig. 8. Luminous Intensity vs. Forward Current

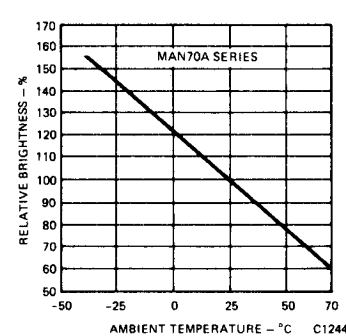


Fig. 9. Luminous Intensity vs. Temperature

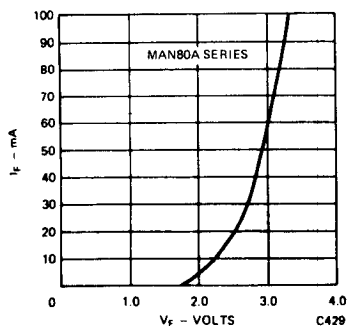


Fig. 10. Forward Current vs. Forward Voltage

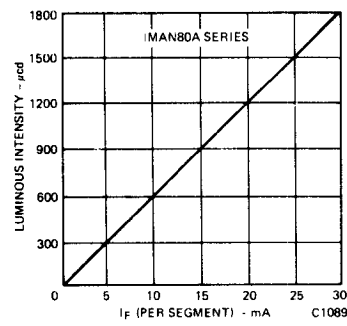


Fig. 11. Luminous Intensity vs. Forward Current

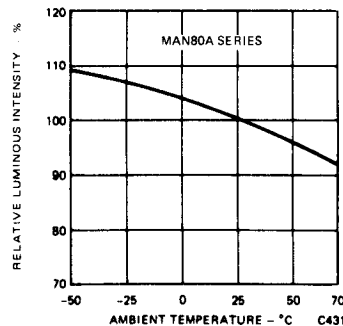
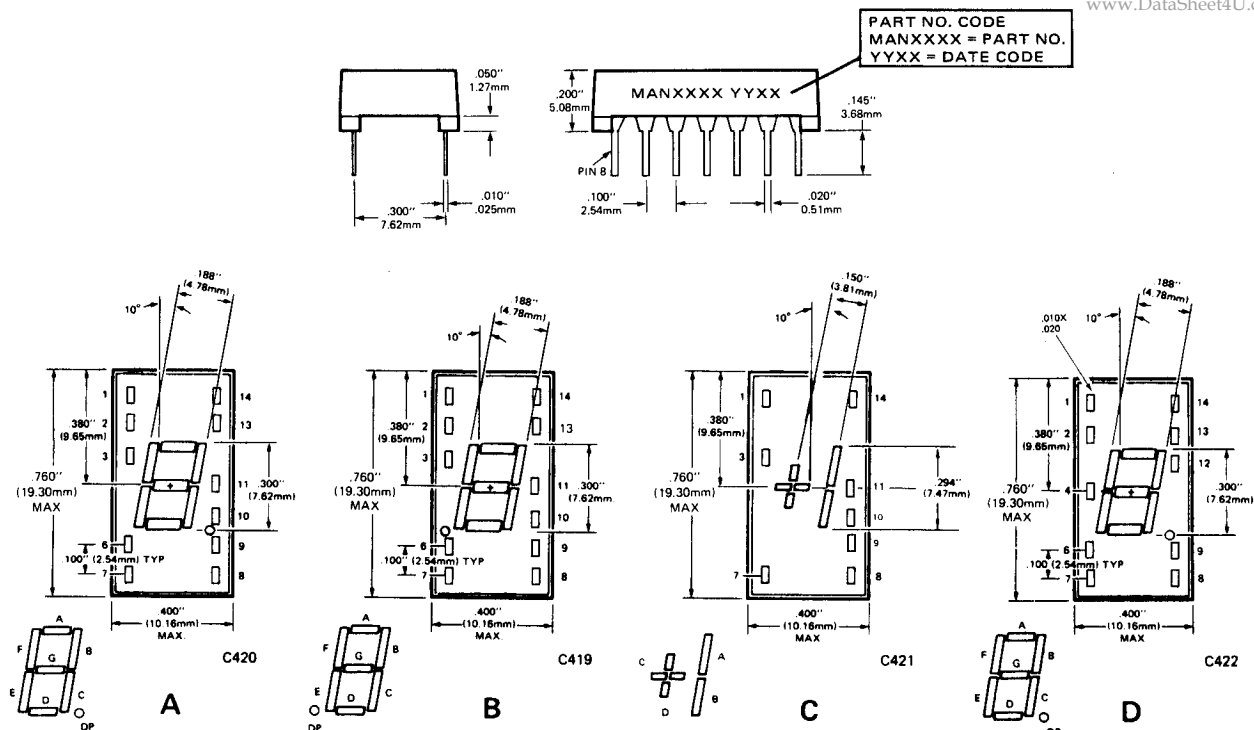


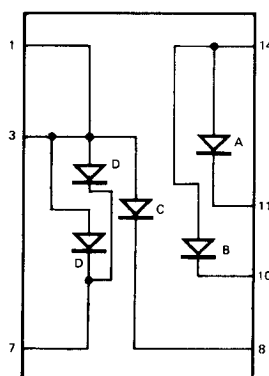
Fig. 12. Luminous Intensity vs. Temperature



## PIN CONNECTIONS

PIN NO.	ELECTRICAL CONNECTIONS			
	A	B	C	D
	MAN51A, 3610A, 71A, 81A	MAN52A, 72A, 3620A, 82A	MAN53A, 3630A, 73A, 83A	MAN54A, 3640A, 74A, 84A
1	Cathode A	Cathode A	Anode C, D	Anode F
2	Cathode F	Cathode F	No pin	Anode G
3	Common anode	Common anode	Anode C, D	No pin
4	No pin	No pin	No pin	Common cathode
5	No pin	No pin	No pin	No pin
6	N.C.	Cathode D.P.	No pin	Anode E
7	Cathode E	Cathode E	Cathode D	Anode D
8	Cathode D	Cathode D	Cathode C	Anode C
9	Cathode D.P.	N.C.	N.C.	Anode D.P.
10	Cathode C	Cathode C	Cathode B	No pin
11	Cathode G	Cathode G	Cathode A	No pin
12	No pin	No pin	No pin	Common cathode
13	Cathode B	Cathode B	No pin	Anode B
14	Common anode	Common anode	Anode A, B	Anode A

## ELECTRICAL SCHEMATIC



MAN53A, 3630A, 73A, 83A

## ABSOLUTE MAXIMUM RATINGS

	MAN51A, 52A, 54A, 3610A, 3620A, 3640A, 81A, 82A, 84A	MAN53A, 3630A, 83A	MAN71A, 72A, 74A	MAN73A
Power dissipation @ 25°C ambient . . .	400 mW	250 mW	700 mW	350 mW
Derate linearly from 25°C . . . . .	-6.7 mW/°C	-4.2 mW/°C	-11.7 mW/°C	-5.8 mW/°C
Storage and operating temperature . . .	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Continuous forward current				
Total . . . . .	160 mA	100 mA	240 mA	150 mA
Per segment . . . . .	20 mA	20 mA	30 mA	30 mA
Decimal point . . . . .	20 mA	20 mA	30 mA	30 mA
Reverse voltage				
Per segment . . . . .	3.0 V	3.0 V	5.0 V	5.0 V
Decimal point . . . . .	3.0 V	3.0 V	5.0 V	5.0 V
Solder time @ 260°C (Note 4) . . . .	5 sec	5 sec	5 sec	5 sec

## RECOMMENDED FILTERS

For optimum on and off contrast, one of the following filters or equivalents should be used over the display:

DEVICE TYPE	FILTER
MAN51A } MAN52A } MAN53A } MAN54A }	Panelgraphic Green 48
MAN3610A } MAN3620A } MAN3630A } MAN3640A }	Panelgraphic Scarlet 65 Homalite 100-1670
MAN71A } MAN72A } MAN73A } MAN74A }	Panelgraphic Red 60 Homalite 100-1605
MAN81A } MAN82A } MAN83A } MAN84A }	Panelgraphic Yellow 25 or Amber 23 Homalite 100-1720 or 100-1726

## TYPICAL THERMAL CHARACTERISTICS

## GREEN/YELLOW

Thermal resistance junction to free air $\Phi_{JA}$ . . . . .	160°C/W
Wavelength temperature coefficient (case temp) . . . . .	1.0 Å/°C
Forward voltage temperature coefficient . . . . .	-1.5 mV/°C

## RED/ORANGE

Thermal resistance junction to free air $\Phi_{JA}$ . . . . .	160°C/W
Wavelength temperature coefficient (case temp) . . . . .	1.0 Å/°C
Forward voltage temperature coefficient . . . . .	-2.0 mV/°C

## NOTES:

1. The digit average Luminous Intensity is obtained by summing the Luminous Intensity of each segment and dividing by the total number of segments. The standard of measurement is the Photo Research Spectra Microcandela Meter corrected for wavelength. Intensity will not vary more than  $\pm 33.3\%$  between all segments within a digit.
2. The curve in Fig. 3, 6, 9, and 12 is normalized to the brightness at 25°C to indicate the relative luminous intensity over the operating temperature range.
3. The decimal point is designed to have the same surface brightness as the segments; therefore, the luminous intensity of the decimal point is .3 times the luminous intensity of the segments, since the area of the decimal point is .3 times the area of the average segment.
4. Leads of the device immersed to 1/16-inches from the body. Maximum device surface temperature is 140°C.
5. For flux removal, Freon TF, Freon TE, isopropanol or water may be used up to their boiling points.