

# Displays

Monsanto offers a variety of standard solid state digital display devices with choices of font style, size, package type, and color. This table is representative of the many types available.

Applications include . . .

- calculators
- instruments
- consumer products
- automobiles
- clocks
- communications equipment
- computers
- POS terminals

## QUICK REFERENCE CHART

PRODUCT	DIGIT HEIGHT	COLOR	PEAK WAVE-LENGTH	BRIGHTNESS (ft.-L) OR LUMINOUS INTENSITY ( $\mu\text{cd}$ ) (per SEG. MIN.)	VOLTS-MAX. ( $V_F$ /SEG.)	TEST CONDITION ( $I_F$ )	PRODUCT FEATURES	PACKAGE
MAN1A	.270 in.	Red	660 nm	100 ft.-L	4.0 V	20 mA	Low Brightness 7 Segment	A
MAN10A	.270 in.	Red	660 nm	100 ft.-L	4.0 V	10 mA	High Brightness Low Current	A
MAN1001A	.270 in.	Red	660 nm	100 ft.-L	4.0 V	20 mA	Polarity/Overflow for MAN1A	B
MAN101A	.270 in.	Red	660 nm	100 ft.-L	4.0 V	10 mA	Polarity/Overflow for MAN10A	B
MAN2A	.320 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	35 Diode Alpha-Numeric	G
MAN3610	.300 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Anode; RHDP	C,N
MAN3620	.300 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Anode; LHDP	D,N
MAN3630	.294 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Anode; RHDP Overflow ( $\pm 1$ )	E,N
MAN3640	.300 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Cathode; RHDP	F,N
MAN51	.300 in.	Green	565 nm	125 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; RHDP	C,N
MAN52	.300 in.	Green	565 nm	125 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; LHDP	D,N
MAN53	.294 in.	Green	565 nm	125 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; RHDP Overflow ( $\pm 1$ )	E,N
MAN54	.300 in.	Green	565 nm	125 $\mu\text{cd}$	3.5 V	10 mA	Common Cathode; RHDP	F,N
MAN71	.300 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	Common Anode; RHDP	C,N
MAN72	.300 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	Common Anode; LHDP	D,N
MAN73	.294 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	Common Anode; RHDP Overflow ( $\pm 1$ )	E,N
MAN74	.300 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	Common Cathode; RHDP	F,N
MAN81	.300 in.	Yellow	590 nm	320 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; RHDP	C,N
MAN82	.300 in.	Yellow	590 nm	320 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; LHDP	D,N
MAN83	.294 in.	Yellow	590 nm	320 $\mu\text{cd}$	3.5 V	10 mA	Common Anode; RHDP (Overflow $\pm 1$ )	E,N
MAN84	.300 in.	Yellow	590 nm	320 $\mu\text{cd}$	3.5 V	10 mA	Common Cathode; RHDP	F,N
MAN4610	.400 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Anode; RHDP	H,N
MAN4630	.400 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Anode; RHDP Overflow ( $\pm 1$ )	I,N
MAN4640	.400 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Common Cathode; RHDP	J,N
MAN6610	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	2 Digit; Common Anode; RHDP	K
MAN6630	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	1½ Digit; Common Anode; Overflow ( $\pm 1.8$ ); RHDP	L
MAN6640	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	2 Digit; Common Cathode; RHDP	K
MAN6650	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	1½ Digit; Common Cathode; Overflow ( $\pm 1.8$ ); RHDP	L
MAN6660	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Single digit; Common Anode; RHDP	M
MAN6680	.560 in.	Orange	630 nm	510 $\mu\text{cd}$	2.5 V	10 mA	Single digit; Common Cathode; RHDP	M
MAN6710	.560 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	2 Digit; Common Anode; RHDP	K
MAN6730	.560 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	1½ Digit; Common Anode; Overflow ( $\pm 1.8$ ); RHDP	L
MAN6740	.560 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	2 Digit; Common Cathode; RHDP	K
MAN6750	.560 in.	Red	650 nm	125 $\mu\text{cd}$	2.0 V	10 mA	1½ Digit; Common Cathode; Overflow ( $\pm 1.8$ ); RHDP	L

Models shown in bold type are industry standard products.

# Monsanto

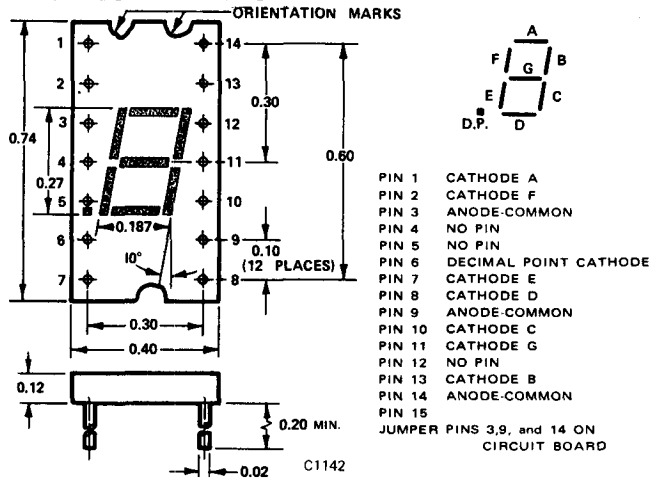
## .27" ALPHA-NUMERIC DISPLAY

## MAN10 MAN10A

### PRODUCT DESCRIPTION

The MAN10 is a seven segment diffused planar GaAsP light emitting diode array. It is mounted on a dual in-line 14 pin substrate and then encapsulated in clear epoxy for protection. It is capable of displaying all digits and nine distinct letters. The MAN-10A has identical specifications but is encapsulated in high contrast red epoxy.

### PACKAGE DIMENSIONS



### FEATURES

- High brightness . . . Typically 350 ft-L @ 10 mA
- Single plane, wide angle viewing . . . 150°
- Unobstructed emitting surface
- Standard 14 pin dual-in-line package configuration
- Long operating life . . . solid state reliability
- Shock resistant
- Operates with IC voltage requirements
- Small size; offering unique styling advantages
- All numbers plus 9 distinct letters
- Usable for high ambient applications
- Usable in vibrating environment, impervious to vibration

The MAN10 is for industrial and military applications such as:

- Digital readout displays
- Cockpit readout displays
- Battery operated equipment

### ABSOLUTE MAXIMUM RATINGS

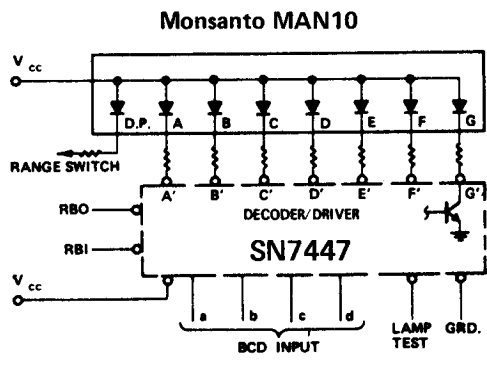
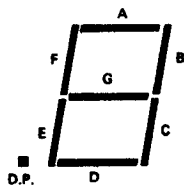
Power dissipation @ 25°C ambient	750 mW
Derate linearly from 25°C	10 mW/°C
Storage and operating temp	-55°C to 100°C
Continuous forward current	
Total	240 mA
Per segment	30 mA
Decimal point	30 mA
Reverse Voltage	
Per segment	6.0 volts
Decimal point	3.0 volts

### ELECTRO-OPTICAL CHARACTERISTICS

(25°C Ambient Temperature Unless Otherwise Specified)

CHARACTERISTICS	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
Brightness (note 1)					
Segment	100	350		ft-L	I <sub>F</sub> =10 mA, λ=660 nm
Decimal point	100	350		ft-L	I <sub>F</sub> =10 mA, λ=660 nm
Peak emission wave length	630		700	nm	
Spectral line half width		20		nm	
Forward voltage					
Segment		3.4	4.0	V	I <sub>F</sub> = 10 mA
Decimal point		1.6	2.0	V	I <sub>F</sub> = 10 mA
Dynamic resistance					
Segment		11		Ω	I <sub>F</sub> =20 mA
Decimal point		5.5		Ω	I <sub>F</sub> =20 mA
Capacitance					
Segment		80		pF	V=0
Decimal point		135		pF	V=0
Reverse Current					
Segment			100	μA	V <sub>R</sub> =6.0 volts
Decimal point			100	μA	V <sub>R</sub> =3.0 volts

## DECODER/DRIVER FUNCTIONAL DIAGRAM

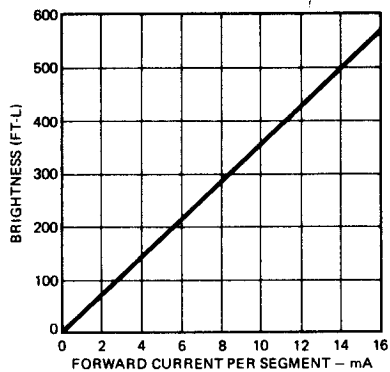


C1143

## TYPICAL TRUTH TABLE

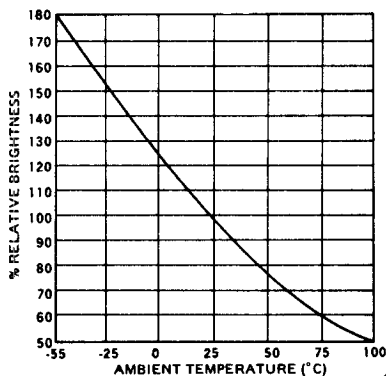
INPUT CODE				OUTPUT STATE							DISPLAY
d	c	b	a	A'	B'	C'	D'	E'	F'	G'	
0	0	0	0	0	0	0	0	0	0	1	0
0	0	0	1	1	0	0	1	1	1	1	1
0	0	1	0	0	0	1	0	0	1	0	2
0	0	1	1	0	0	0	0	1	1	0	3
0	1	0	0	1	0	0	1	1	0	0	4
0	1	0	1	0	1	0	0	1	0	0	5
0	1	1	0	1	1	0	0	0	0	0	6
0	1	1	1	0	0	0	1	1	1	1	7
1	0	0	0	0	0	0	0	0	0	0	8
1	0	0	1	0	0	0	1	1	0	0	9

## TYPICAL CURVES



C1144

Figure 1 Brightness vs. Forward Current



C1145

Figure 2 Brightness vs. Temperature

## TYPICAL THERMAL CHARACTERISTICS

Thermal Resistance (note 4) Junction to free air $\theta_{JA}$	.....	.440°C/W
Wavelength Temperature Coefficient (case temp)	.....	3.0 Å/°C
Forward Voltage Temperature Coefficient	.....	-3.0 mV/°C

## NOTES

- As measured with a Photo Research Corp. Spot Brightness Meter with "SPECTAR" L175 lens in the brightest region of the emitting surface. Brightness cannot vary more than  $\pm 50\%$  between all segments.
- The curve in Figure 2 is normalized to the brightness at 25°C to indicate the relative efficiency over the operating temperature range.
- For contrast improvement Polaroid HRC7 circular polarizer filter can be used. Non-glare circular polarizer filter will provide further enhancement in display visibility.
- Thermal resistance (junction to ambient) value of any one segment with all segments in operation.