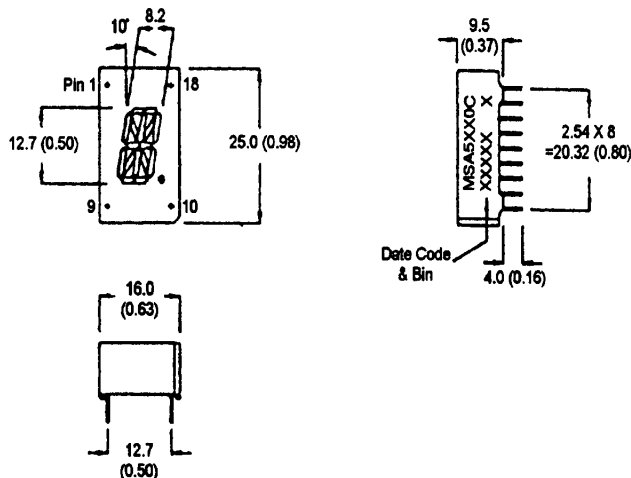


**BRIGHT RED MSA5160C, MSA5180C  
YELLOW MSA5360C, MSA5380C  
GREEN MSA5460C, MSA5480C  
HIGH EFF. RED MSA5960C, MSA5980C**

**PACKAGE DIMENSIONS**



**FEATURES**

- Easy to read digits.
- 1 digit common anode or cathode.
- Low power consumption.
- Bold segments that are highly visible.
- High brightness with high contrast
- White segments on a grey face.
- Directly compatible with integrated circuits.
- Rugged plastic/epoxy construction.

**APPLICATIONS**

- Digital readout displays.
- Instrument panels.

**NOTES: Dimensions are in mm (inch).  
All pins are 0.5 (0.02) diameter  
Tolerances are ± 0.25 (0.1) unless otherwise noted.**

**MODEL NUMBERS**

<u>Part number</u>	<u>Color</u>	<u>Description</u>
MSA5160C	Bright Red	2 Digit; Common Anode; Rt. Hand Decimal
MSA5180C	Bright Red	2 Digit; Common Cathode; Rt. Hand Decimal
MSA5360C	Yellow	2 Digit; Common Anode; Rt. Hand Decimal
MSA5380C	Yellow	2 Digit; Common Cathode; Rt. Hand Decimal
MSA5460C	Green	2 Digit; Common Anode; Rt. Hand Decimal
MSA5480C	Green	2 Digit; Common Cathode; Rt. Hand Decimal
MSA5960C	High Eff. Red	2 Digit; Common Anode; Rt. Hand Decimal
MSA5980C	High Eff. Red	2 Digit; Common Cathode; Rt. Hand Decimal

(For other colour options, contact your local area Sales Office)

**ABSOLUTE MAXIMUM RATING** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

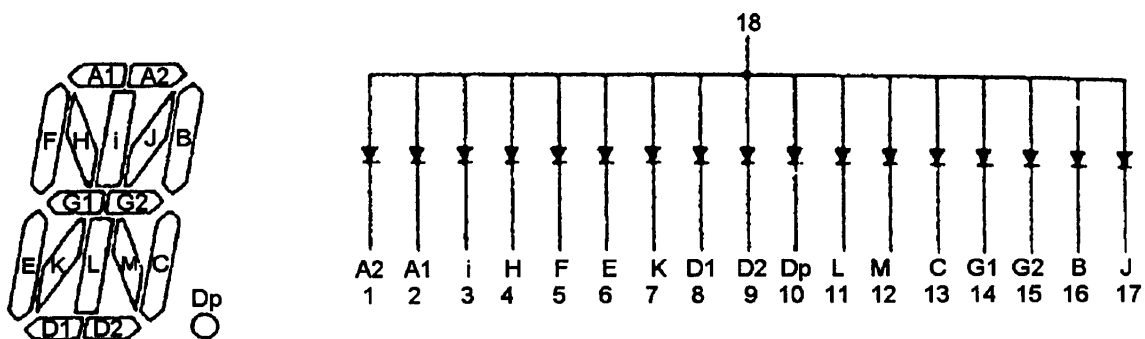
Part number	B.Red	Yellow	Green	High Eff. Red	Unit
	MSA	MSA	MSA	MSA	
	5160C	5360C	5460C	5960C	
	5180C	5380C	5480C	5980C	
Continuous forward current ( $I_f$ )					
Per Segment.....	15	20	25	25	mA
Peak forward current per die ( $I_f$ ) (at $f = 10.0$ KHz, Duty factor = 1/10)	50	90	90	90	mA
Power dissipation ( $P_D$ ).....	40*	70*	70*	70*	mW
*Derate Linearly From $25^{\circ}\text{C}$ .....	0.17	0.25	0.33	0.33	mW/ $^{\circ}\text{C}$
Reverse voltage per dice.....					5V
Operating and Storage temperature range.....					- $40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
Lead soldering time (at 1/16 inch from the bottom of lamp).....					5 seconds @ $230^{\circ}\text{C}$

**ELECTRO - OPTICAL CHARACTERISTICS** ( $T_A = 25^{\circ}\text{C}$  unless otherwise specified)

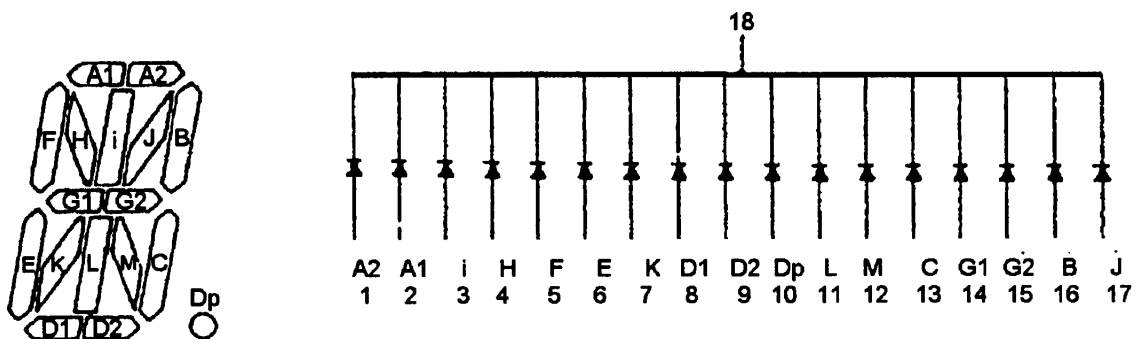
Part number	B. Red	Yellow	Green	High Eff. Red	Test Condition
	MSA	MSA	MSA	MSA	
	6110C	6310C	6410C	6910C	$I_f = 20$ mA
	6140C	6340C	6440C	6940C	
Luminous intensity (ucd)					
minimum	320	800	800	800	
typical	750	2200	2000	2000	
Forward voltage ( $V_f$ )					$I_f = 20$ mA
typical	2.1	2.1	2.1	2.0	
maximum	2.6	2.8	2.8	2.8	
Peak wavelength (nm)	697	590	570	635	$I_f = 20$ mA
Spectral line half width (nm)	90	35	30	45	$I_f = 20$ mA
Reverse breakdown voltage ( $V_R$ )	5	5	5	5	$I_R = 100$ uA

**PINOUT**

**MSA6X10C - Common Anode**



**MSA6X40C - Common Cathode**



**GRAPHICAL DETAIL: Bright Red** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

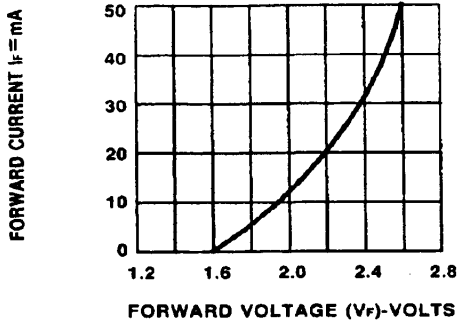


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

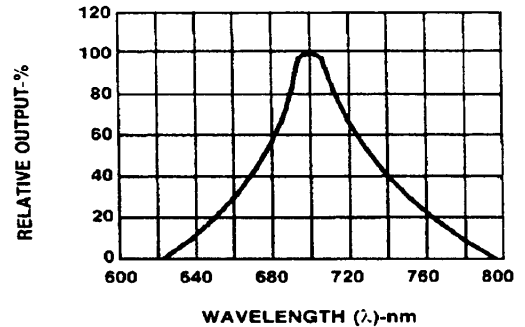


Fig.2 SPECTRAL RESPONSE

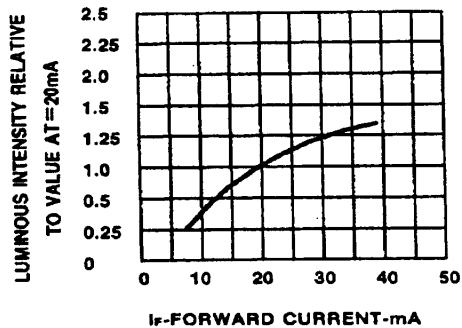


Fig.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

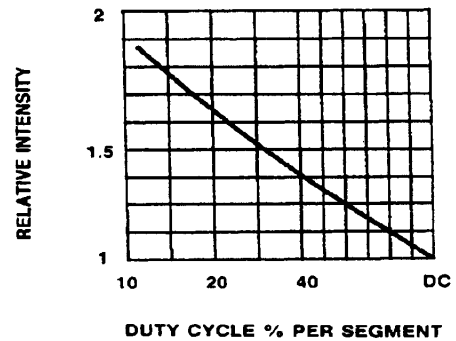


Fig.5 LUMINOUS INTENSITY VS. DUTY CYCLE

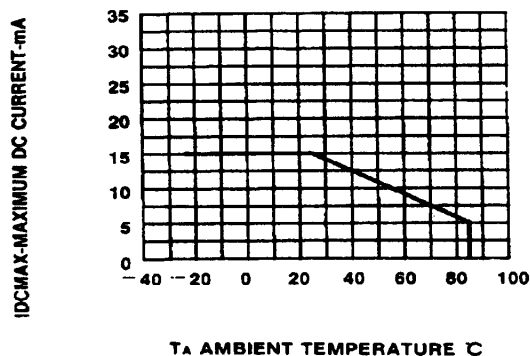


Fig.4 MAXIMUM ALLOWABLE DC CURRENT PER SEGMENT VS. A FUNCTION OF AMBIENT TEMPERATURE.

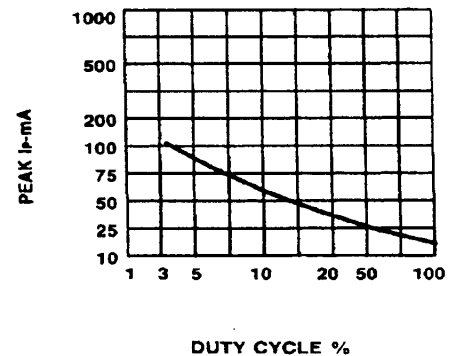


Fig.6 MAX PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE f = 1 KHz)

**GRAPHICAL DETAIL: Green** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

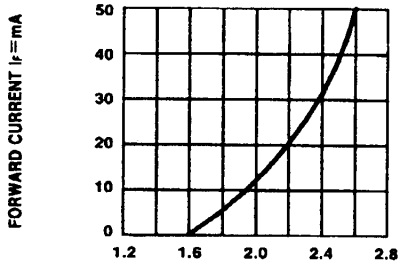


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

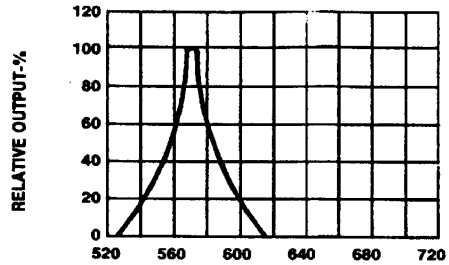


Fig.2 SPECTRAL RESPONSE

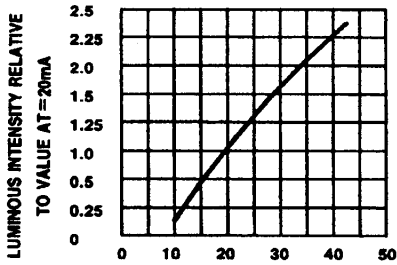


Fig.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

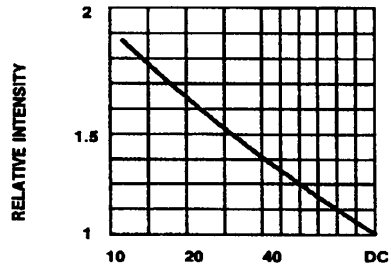


Fig.5 LUMINOUS INTENSITY VS. DUTY CYCLE

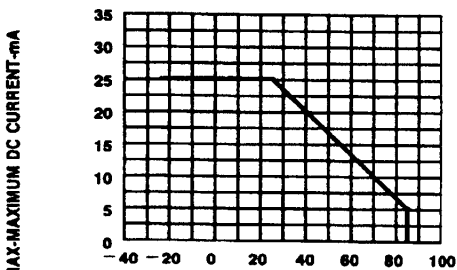


Fig.4 MAXIMUM ALLOWABLE DC CURRENT PER SEGMENT CS. A FUNCTION OF AMBIENT TEMPERATURE.

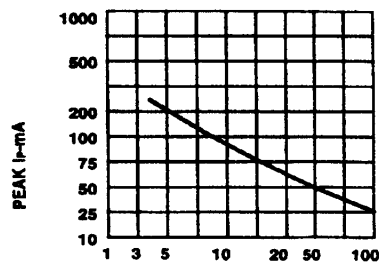


Fig. 6 MAX PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE  $f = 1 \text{ KHz}$ )

**GRAPHICAL DETAIL: High Efficiency Red ( $T_A = 25^\circ\text{C}$  unless otherwise specified)**

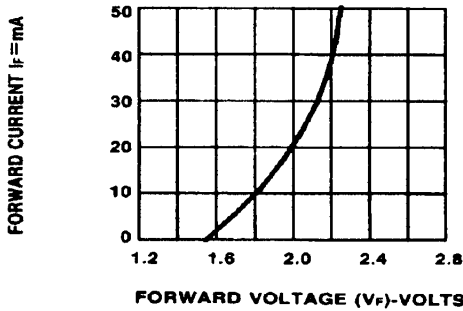


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

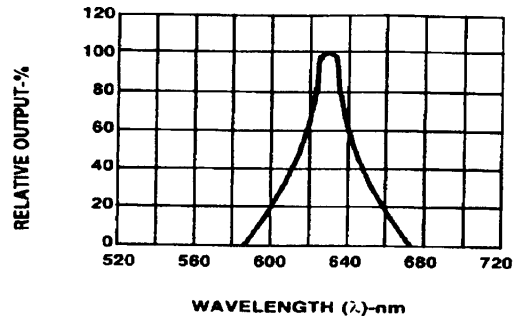


Fig.2 SPECTRAL RESPONSE

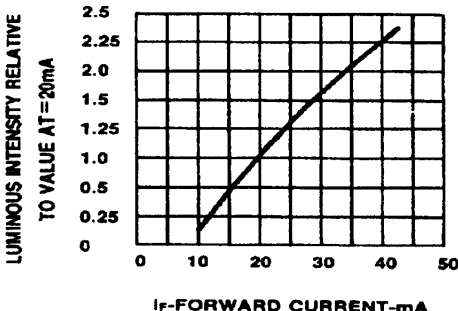


Fig.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

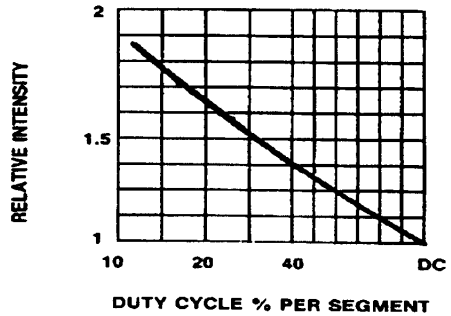


Fig.5 LUMINOUS INTENSITY VS. DUTY CYCLE

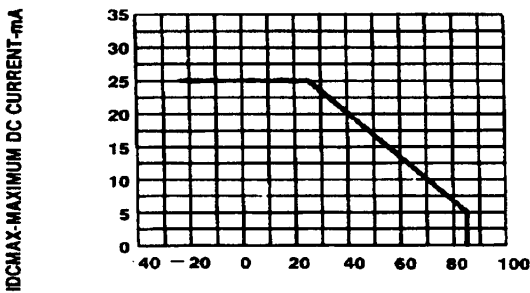


Fig.4 MAXIMUM ALLOWABLE DC CURRENT PER SEGMENT VS. A FUNCTION OF AMBIENT TEMPERATURE.

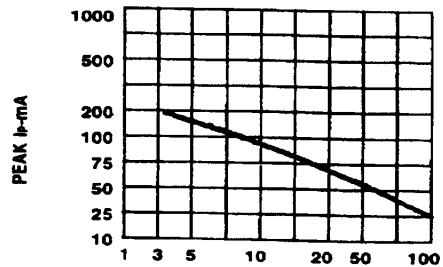


Fig. 6 MAX PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE  $f=1\text{ KHz}$ )

GRAPHICAL DETAIL: Yellow ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

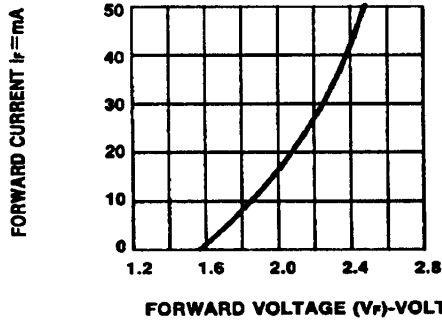


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

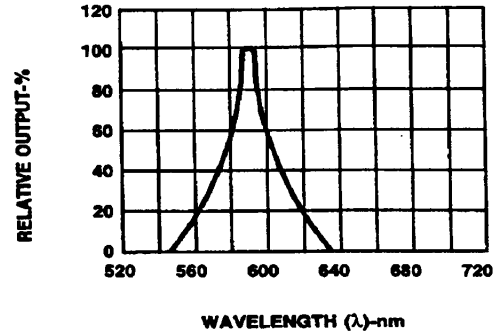


Fig.2 SPECTRAL RESPONSE

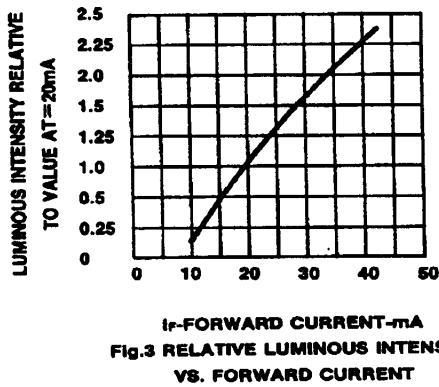


Fig.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

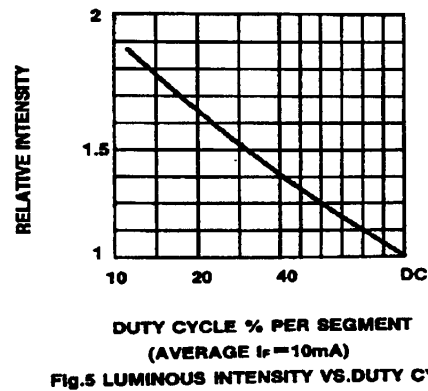


Fig.5 LUMINOUS INTENSITY VS. DUTY CYCLE

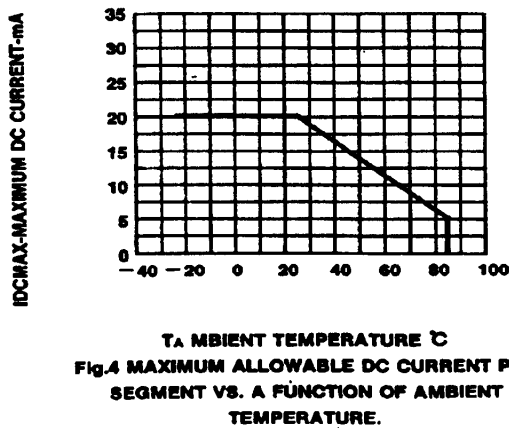


Fig.4 MAXIMUM ALLOWABLE DC CURRENT PER SEGMENT VS. A FUNCTION OF AMBIENT TEMPERATURE.

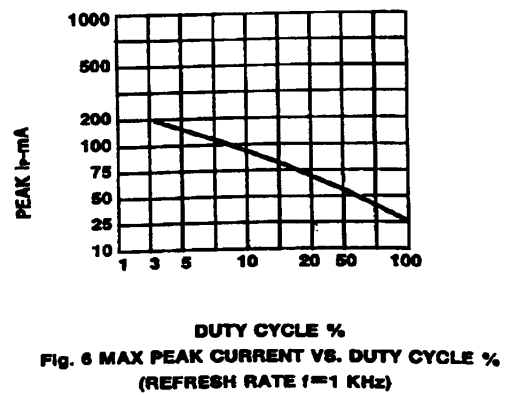


Fig. 6 MAX PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE  $f = 1\text{ KHz}$ )

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.