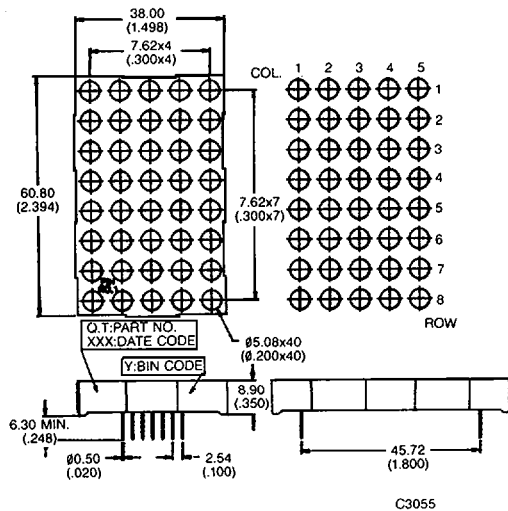


**ORANGE GMA 2185 GMC 2185  
 YELLOW GMA 2885 GMC 2885  
 HIGH EFFICIENCY RED GMA 2985 GMC 2985  
 HIGH EFFICIENCY GREEN GMA 2485 GMC 2485  
 BICOLOR RED/GREEN GMA 2685**

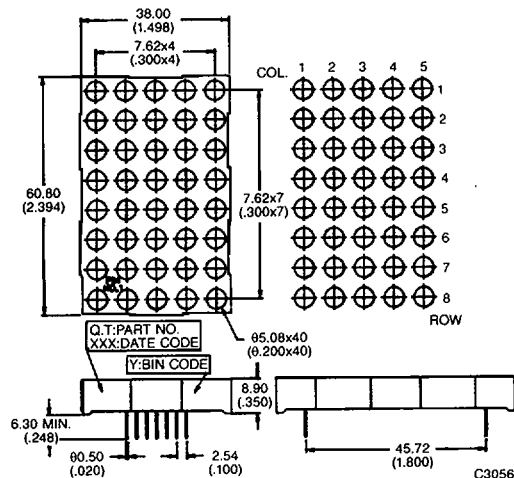
**PACKAGE DIMENSIONS**

**DESCRIPTION**

**A. GMA/GMC 2X85**



**B. GMA2685**



The GMX2685 are multicolor applicable displays. The multicolor displays have gray face and white dot color. The GMX2X85 series are single color displays. The green, yellow and orange displays have gray face and white dot color. The high efficiency red displays have red face and red dot color. The X in GMX denotes cathode row or anode row. The GMX2X85 family of displays are large emitting area ( $\phi 0.2''$ ) LED sources.

**FEATURES**

- 2.3" (58.42mm) character height
- Low power requirement
- High contrast & brightness
- Wide viewing angle 130°
- 5x8 array with X-Y select
- Compatible with USASCII and EBCDIC codes
- X-Y stackable
- Choice of two matrix orientation  
 anode row or cathode row
- Easy mounting on P.C. board
- Categorized for luminous intensity
- Single color displays have the choice of four bright colors—green/yellow/orange/high efficiency red.
- Multicolor displays are applicable to three bright colors: greens, orange (H.E.R.) and yellow (green and H.E.R. mixed)

Note: All dimensions are in millimeters, tolerance is 0.25mm unless otherwise noted.  
 (inches) (0.010")

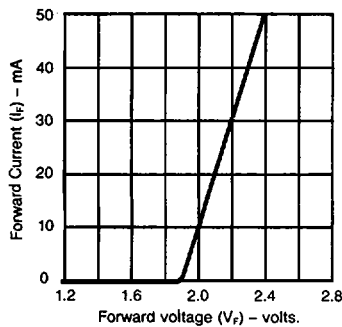
**MODEL NUMBERS**

PART NO. GMX			HI-EFE. RED	MULTI- COLOR	DESCRIPTION	PACKAGE DIMENSION	INTERNAL CIRCUIT DIAGRAM
GREEN	YELLOW	ORANGE					
2485C	2885C	2185C	2985	—	Anode column, cathode row	A	A
2485A	2885A	2185A	—	—	Anode row, cathode column	A	B
—	—	—	—	—	—	—	—
—	—	—	—	2685	Cathode row, anode column	B	C

**ELECTRICAL/OPTICAL CHARACTERISTICS AT T<sub>A</sub> = 25°C  
GMX2985 (H.E. RED)**

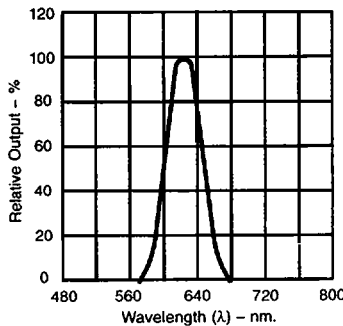
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Average luminous intensity	I <sub>v</sub>	900	4000		μcd	I <sub>D</sub> = 48 mA 1/8 DUTY
Peak emission wavelength	λ <sub>p</sub>		635		nm	I <sub>F</sub> = 20 mA
Spectral line half-width	Δλ		40		nm	I <sub>F</sub> = 20 mA
Forward voltage, any dot	V <sub>F</sub>		2.1	2.8	V	I <sub>F</sub> = 20 mA
Reverse current, any dot	I <sub>R</sub>			100	μA	V <sub>R</sub> = 5V
Luminous intensity Matching ratio	I <sub>v</sub> - m			2:1		I <sub>F</sub> = 20 mA

**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES**  
(25°C Ambient Temperature Unless Otherwise Noted)



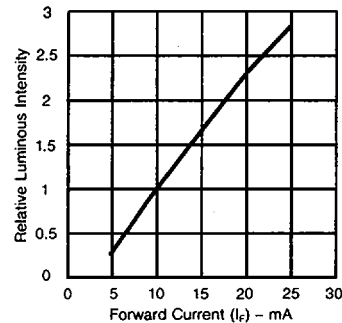
C3049

Fig. 1. Forward Current vs. Forward Voltage



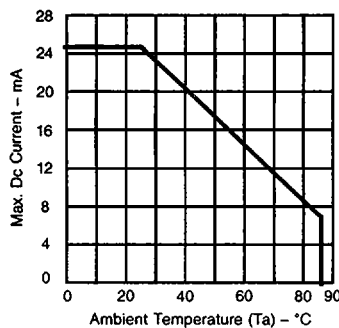
C3050

Fig. 2. Spectral Response



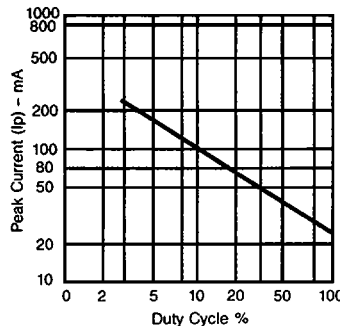
C3051

Fig. 3. Relative Luminous Intensity vs. Forward Current (Per Segment)



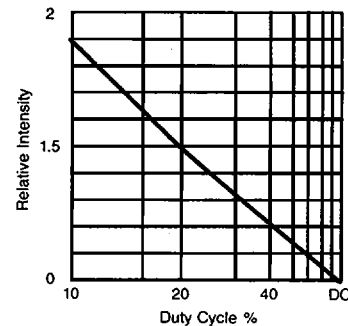
C3052

Fig. 4. Max. Forward Allowable DC Current Per Seg. vs. Ambient Temperature



C3053

Fig. 5. Max. Peak Current vs. Duty Cycle % (Refresh Rate - F = 1 KHz)

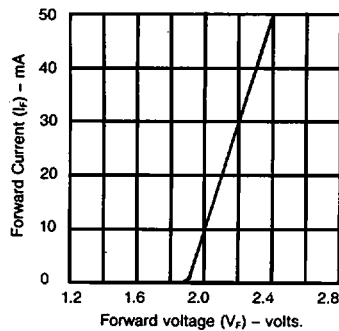


C3054

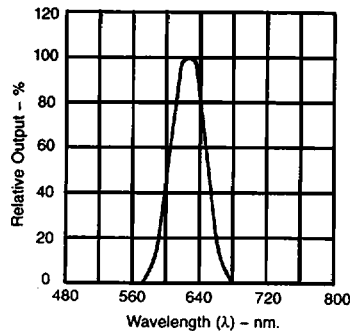
Fig. 6. Luminous Intensity vs. Duty Cycle % (Average I = 10 mA Per Seg.)

**ELECTRICAL/OPTICAL CHARACTERISTICS AT  $T_A=25^\circ\text{C}$   
GMX2185 & GMA2685 (ORANGE)**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Average luminous intensity	$I_v$	900	4000		$\mu\text{cd}$	$I_p=48\text{ mA}$ 1/8 DUTY
Peak emission wavelength	$\lambda_p$		630		nm	$I_f=20\text{ mA}$
Spectral line half-width	$\Delta\lambda$		40		nm	$I_f=20\text{ mA}$
Forward voltage, any dot	$V_f$		2.1	2.8	V	$I_f=20\text{ mA}$
Reverse current, any dot	$I_R$			100	$\mu\text{A}$	$V_R=5\text{V}$
Luminous intensity Matching ratio	$I_v-m$			2:1		$I_f=20\text{ mA}$

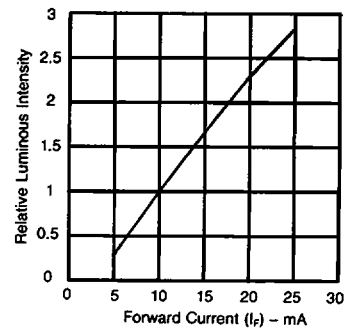
**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES**  
(25°C Ambient Temperature Unless Otherwise Noted)


C3031

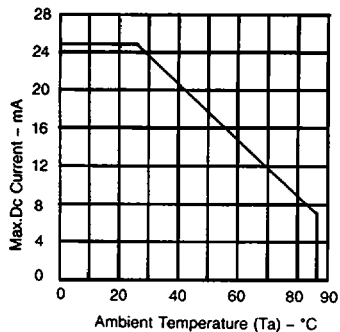
 Fig. 1. Forward Current vs.  
Forward Voltage


C3032

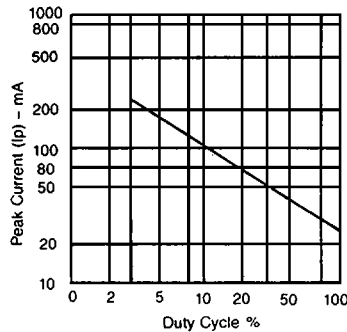
Fig. 2. Spectral Response



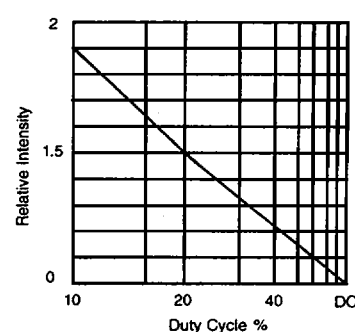
C3033

 Fig. 3. Relative Luminous Intensity vs.  
Forward Current (Per Segment)


C3034

 Fig. 4. Max. Forward Allowable  
DC Current Per Seg. vs.  
Ambient Temperature


C3035

 Fig. 5. Max. Peak Current vs.  
Duty Circle %  
(Refresh Rate -  $F=1\text{ KHz}$ )


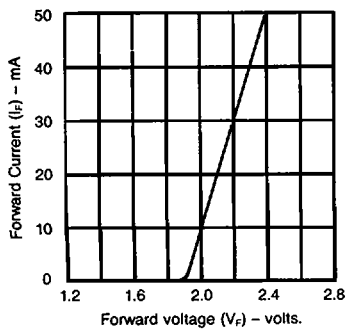
C3036

 Fig. 6. Luminous Intensity vs.  
Duty Cycle %  
(Average  $I=10\text{ mA}$  Per Seg.)

**ELECTRICAL/OPTICAL CHARACTERISTICS AT  $T_A = 25^\circ\text{C}$   
GMX2885 (YELLOW)**

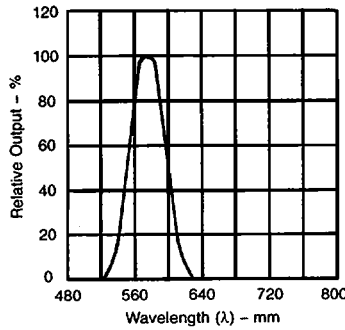
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Average luminous intensity	$I_v$	250	4000		$\mu\text{cd}$	$I_F = 48 \text{ mA}$ 1/8 DUTY
Peak emission wavelength	$\lambda_p$		585		nm	$I_F = 20 \text{ mA}$
Spectral line half-width	$\Delta\lambda$		35		nm	$I_F = 20 \text{ mA}$
Forward voltage, any dot	$V_F$		2.1	2.8	V	$I_F = 20 \text{ mA}$
Reverse current, any dot	$I_R$			100	$\mu\text{A}$	$V_R = 5\text{V}$
Luminous intensity Matching ratio	$I_v - m$			2.1		$I_F = 20 \text{ mA}$

**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES**  
( $25^\circ\text{C}$  Ambient Temperature Unless Otherwise Noted)



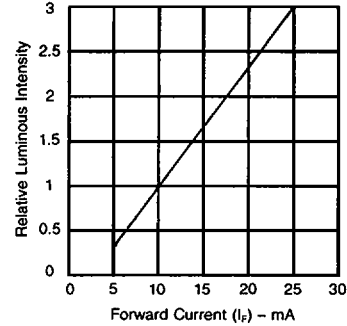
C3037

Fig. 1. Forward Current vs. Forward Voltage



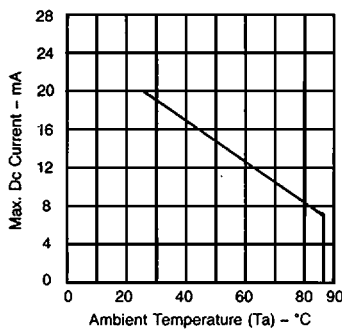
C3038

Fig. 2. Spectral Response



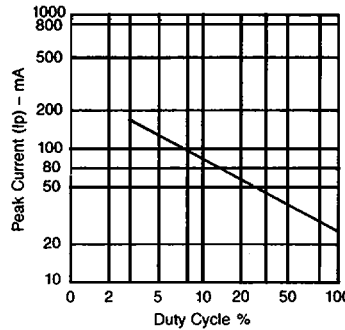
C3039

Fig. 3. Relative Luminous Intensity vs. Forward Current (Per Segment)



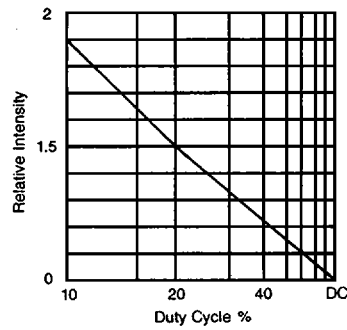
C3040

Fig. 4. Max. Forward Allowable DC Current Per Seg. vs. Ambient Temperature



C3041

Fig. 5. Max. Peak Current vs. Duty Cycle % (Refresh Rate -  $F = 1 \text{ KHz}$ )



C3042

Fig. 6. Luminous Intensity vs. Duty Cycle % (Average  $I = 10 \text{ mA}$  Per Seg.)

**ELECTRICAL/OPTICAL CHARACTERISTICS AT T<sub>a</sub> = 25°C  
GMX2485 & GMX2685 (GREEN)**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Average luminous intensity	I <sub>v</sub>	900	4000		μcd	I <sub>p</sub> = 48 mA 1/8 DUTY
Peak emission wavelength	λ <sub>p</sub>		565		nm	I <sub>f</sub> = 20 mA
Spectral line half-width	Δλ		30		nm	I <sub>f</sub> = 20 mA
Forward voltage, any dot	V <sub>f</sub>		2.1	2.8	V	I <sub>f</sub> = 20 mA
Reverse current, any dot	I <sub>R</sub>			100	μA	V <sub>R</sub> = 5V
Luminous intensity Matching ratio	I <sub>v</sub> - m			2:1		I <sub>f</sub> = 20 mA

**TYPICAL ELECTRICAL/OPTICAL CHARACTERISTIC CURVES  
(25°C Ambient Temperature Unless Otherwise Noted)**

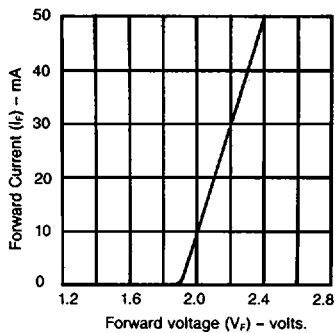


Fig. 1. Forward Current vs. Forward Voltage

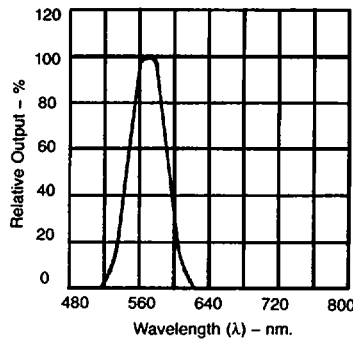


Fig. 2. Spectral Response

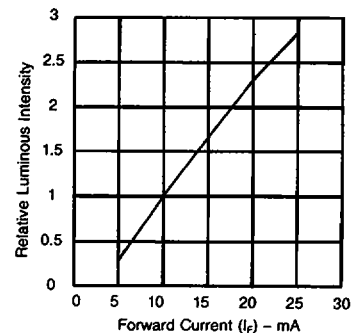


Fig. 3. Relative Luminous Intensity vs. Forward Current (Per Segment)

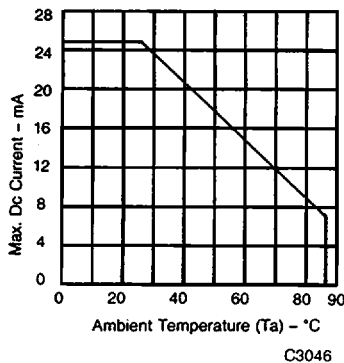


Fig. 4. Max. Forward Allowable DC Current Per Seg. vs. Ambient Temperature

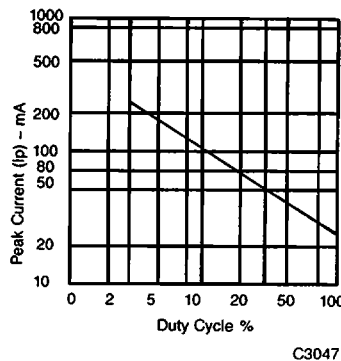


Fig. 5. Max. Peak Current vs. Duty Cycle %  
(Refresh Rate - F = 1 KHz)

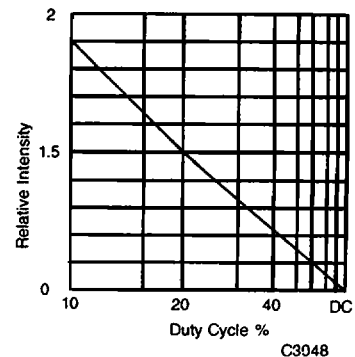
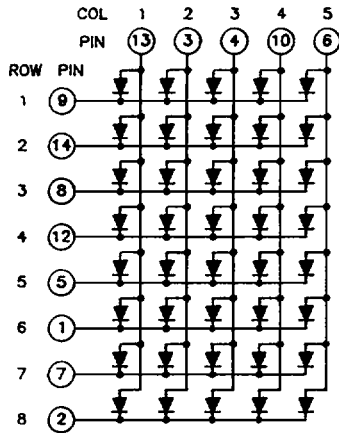


Fig. 6. Luminous Intensity vs. Duty Cycle %  
(Average I = 10 mA Per Seg.)

<b>PIN CONNECTION</b>			
<b>PIN NO.</b>	<b>CONNECTION</b>		
	<b>A. GMC2X85</b>	<b>B. GMA2X85</b>	<b>C. GMA2685</b>
1	Cathode Row 6	Anode Row 6	Cathode Column 1 Green
2	Cathode Row 8	Anode Row 8	Cathode Column 2 Green
3	Anode Column 2	Cathode Column 2	Cathode Column 2 Orange
4	Anode Column 3	Cathode Column 3	Cathode Column 3 Orange
5	Cathode Row 5	Anode Row 5	Anode Row 6
6	Anode Column 5	Cathode Column 5	Anode Row 7
7	Cathode Row 7	Anode Row 7	Cathode Column 4 Orange
8	Cathode Row 3	Anode Row 3	Anode Row 5
9	Cathode Row 1	Anode Row 1	Anode Row 8
10	Anode Column 4	Cathode Column 4	Cathode Column 5 Green
11	Anode Column 3	Cathode Column 3	Cathode Column 5 Orange
12	Cathode Row 4	Anode Row 4	Cathode Column 4 Green
13	Anode Column 1	Cathode Column 1	Anode Column 3 Green
14	Cathode Row 2	Anode Row 2	Anode Row 4
15	—	—	Anode Row 2
16	—	—	Anode Row 1
17	—	—	Anode Row 3
18	—	—	Cathode Column 1 Orange

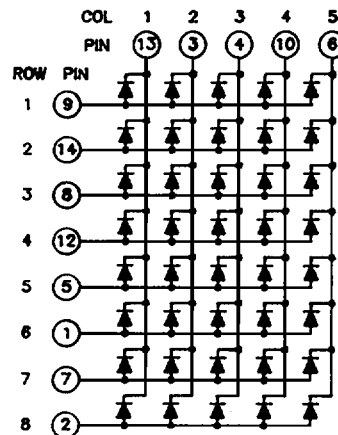
**INTERNAL CIRCUIT DIAGRAM**

**A. GMC2X85**



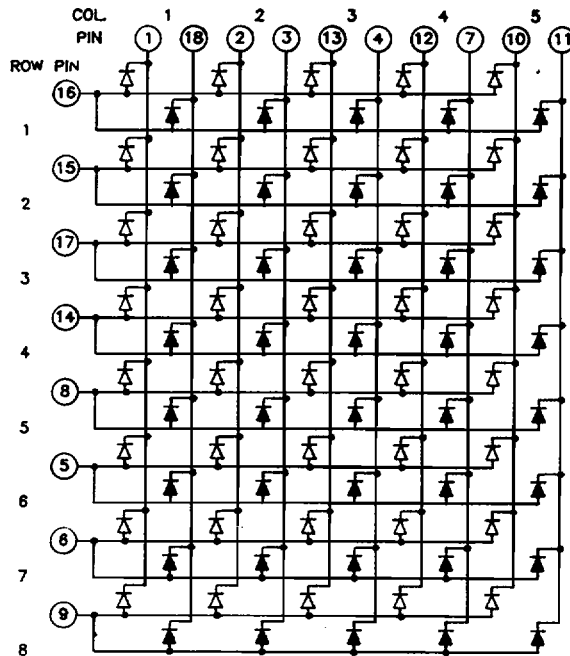
C3057

**B. GMA2X85**



C3058

**C. GMA2685**



C3059

**NOTES :**

1. THE SIGN STANDS FOR GREEN COLOR CHIPS.
2. THE SIGN STANDS FOR ORANGE COLOR CHIPS.