

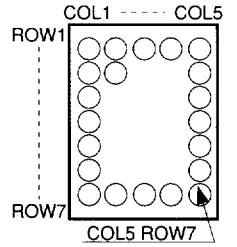
LED DOT MATRIX DISPLAY

The MD series of Stanley dot matrix displays can handle virtually any display application, including numbers, letters, special characters and graphics. To serve customers' needs, configurations with 5 x 7 dots, 8 x 8 dots and 16 x 16 dots in single color and bicolor are available.

▼DESCRIPTION OF PART NO.

MD 06 57 C 2 - R

Outer Dimensions: 06, 07 : 17~20mm 25 : 64mm 12 : 32mm 37 : 96mm 20 : 53mm
 No. of Dot: 57 : 5 × 7 08 : 8 × 8 16 : 16 × 16
 Type: C : Chip number M : Mold MK : Mold
 Additional Emitted Color: R : Red G : Green A : Orange RG : Red · Green



▼CHARACTERISTICS BY COLOR (EACH CHIP) / Ratings and specifications are for each segment.

Ta=25°C

Part No.	Emitted Color	Absolute Maximum Ratings					Electro-Optical Characteristics							
		Power Dissipation Pd	Forward Current If	Peak Forward Current I_{FM}	Operating Temp. Topr	Storage Temp. Tstg	Forward Voltage V _f		Reverse Current I _r		Peak Wavelength λ_p		Derating ΔI_{FM}	
				% I _{FM}	°C	°C	TYP.	MAX.	V _f	MAX.	V _r	TYP.	IF	
MD0657C2-R	Red	30	15	80	-20~+70	-20~+85	1.7	2.0	10	100	4	660	10	0.89
MD0657C2-A	Orange	36	15	80	-20~+70	-20~+85	2.0	2.4	10	100	4	605	10	0.89
MD0657C2-G	Green	36	15	80	-20~+70	-20~+85	2.0	2.4	10	100	4	570	10	0.89
MD0657C2-RG	Red	※ ₂ 30	※ ₂ 15	※ ₂ 60	-20~+70	-20~+85	1.7	2.0	10	100	4	660	10	0.89
	Green	※ ₂ 30	※ ₂ 15	※ ₂ 60			2.0	2.4	10	100	4	570	10	0.89
MD0657M-R	Red	30	15	60	-20~+70	-20~+85	1.7	2.0	10	100	4	660	10	0.89
MD0657M-A	Orange	36	15	60	-20~+70	-20~+85	2.0	2.4	10	100	4	605	10	0.89
MD0657M-G	Green	36	15	60	-20~+70	-20~+85	2.0	2.4	10	100	4	570	10	0.89

※₁ I_{FM} condition : tw ≤ 0.2msec. and Duty ≤ 1/5 where the lighting ratio is 50 % max.

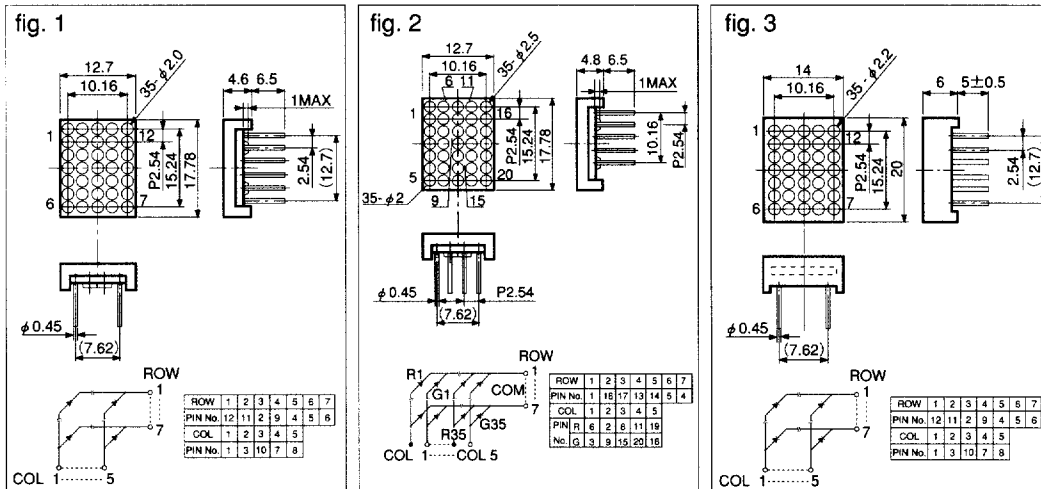
※₂ Items marked 2 are for single-color drive. For two driven colors, total values shall be within specified ratings.

▼CHARACTERISTICS BY SHAPE

Ta=25°C

(W×H)	Shape	Color	Part No.	Emitted Color	Dot Size	Dot Pitch	Dot Format	Electro-Optical Characteristics		fig.
								Luminous Intensity I _v /dot	MIN.	
12.7 X 17.7		Single Color	MD0657C2-R	Red	φ 2.0	2.54	5X7	1.0	10	1
			MD0657C2-A	Orange				0.5	10	
			MD0657C2-G	Green				1.0	10	
		Bicolor	MD0657C2-RG	Red				1.5	10	2
				Green				1.5	10	
14 X 20		Single Color	MD0657M-R	Red	φ 2.2	2.54	5X7	1.5	10	3
			MD0657M-A	Orange				1.0	10	
			MD0657M-G	Green				1.5	10	

▼DIMENSIONS Unit : mm



▼CHARACTERISTICS BY COLOR (EACH CHIP) /Ratings and specifications are for each segment.

Ta=25°C

Part No.	Emitted Color	Absolute Maximum Ratings					Electro-Optical Characteristics							
		Power Dissipation	Forward Current	Peak Forward Current	Operating Temp.	Storage Temp.	Forward Voltage V _f			Reverse Current I _r		Peak Wavelength λ _D		Derating
		P _d	I _f	I _{fM} ^{※1}	T _{opr}	T _{stg}	TYP.	MAX.	I _f	MAX.	V _r	TYP.	I _f	ΔI _{fM}
MD0657MK-R	Red	30	15	60	-20~+70	-20~+85	1.7	2.0	10	100	4	660	10	0.89
MD0657MK-A	Orange	36	15	60	-20~+70	-20~+85	2.0	2.4	10	100	4	605	10	0.89
MD0657MK-G	Green	36	15	60	-20~+70	-20~+85	2.0	2.4	10	100	4	570	10	0.89
MD0657MK-RG	Red	※2 30	※2 15	※2 60	-20~+70	-20~+85	1.7	2.0	10	100	4	660	10	0.89
	Green	※2 30	※2 15	※2 60			2.0	2.4	10	100	4	570	10	0.89
MD0708C-R	Red	10	—	80	-20~+60	-20~+80	1.7	2.0	20	20	6.5	660	20	1.45
MD0708C-A	Orange	10	—	65	-20~+60	-20~+80	2.2	2.5	20	20	6.5	605	20	1.16
MD0708C-G	Green	10	—	65	-20~+60	-20~+80	2.1	2.5	20	20	6.5	570	20	1.16
MD0708C-RG	Red	※2 10	—	※2 65	-20~+60	-20~+80	1.7	2.0	20	20	6.5	660	20	1.16
	Green	※2 10	—	※2 65			2.1	2.5	20	20	6.5	570	20	1.16

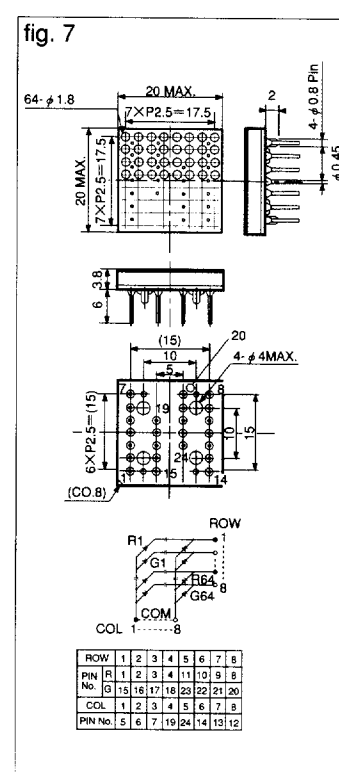
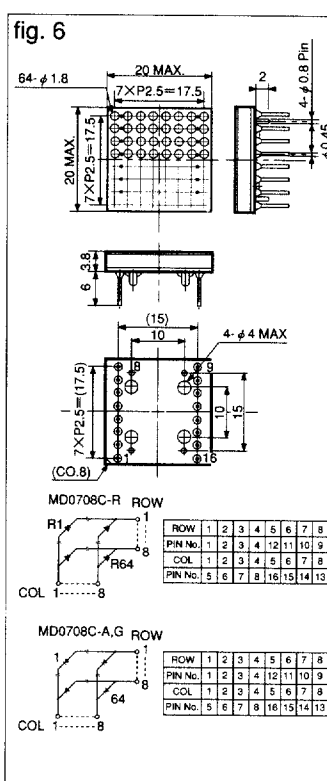
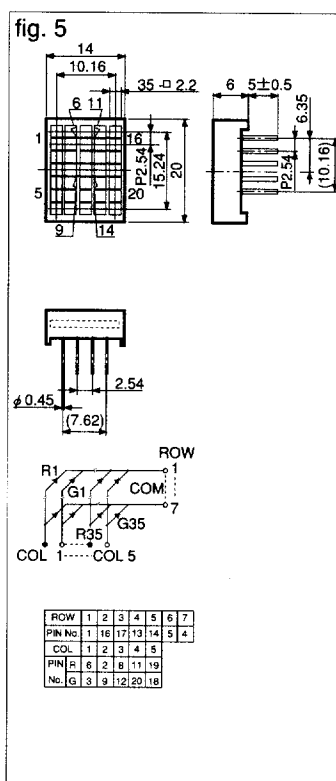
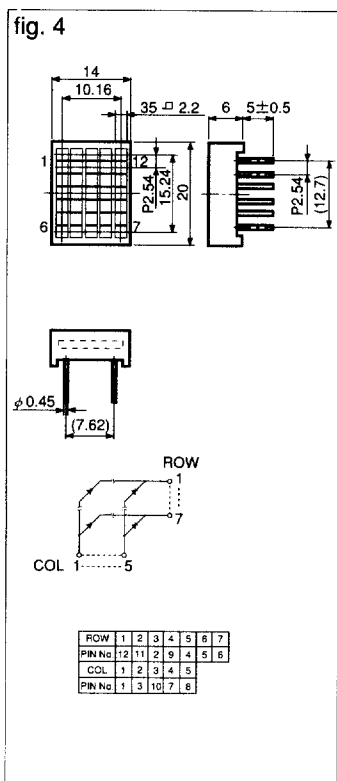
※1 I_{fM} condition: t_w ≤ 1 msec. and duty ≤ 1/16 where the lighting ratio is 50% max. (I_{fM} values for the MD0657MK-R, A, G, and RG: t_w ≤ 0.2 msec and duty cycle ≤ 1/5)
 ※2 Items marked 2 are for single-color drive. For two driven colors, total values shall be within specified ratings.

▼CHARACTERISTICS BY SHAPE

Ta=25°C

(W×H)	Shape	Color	Part No.	Emitted Color	Dot Size	Dot Pitch	Dot Format	Electro-Optical Characteristics		fig.
								Luminous Intensity I _v /dot		
								MIN.	I _f	
14×20		Single Color	MD0657MK-R	Red	□ 2.2	2.54	5X7	1.5	10	4
			MD0657MK-A	Orange				1.0	10	
			MD0657MK-G	Green				1.5	10	
		Bicolor	MD0657MK-RG	Red				1.5	10	5
				Green				1.5	10	
□20		Single Color	MD0708C-R	Red	φ 1.8	2.5	8X8	2.0	20	6
			MD0708C-A	Orange				1.0	20	
			MD0708C-G	Green				2.0	20	
		Bicolor	MD0708C-RG	Red				1.0	20	7
				Green				1.0	20	

▼DIMENSIONS Unit:mm



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▼ CHARACTERISTICS BY COLOR (EACH CHIP) / Ratings and specifications are for each segment.


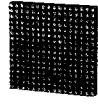
Ta=25°C

Part No.	Emitted Color	Absolute Maximum Ratings					Electro-Optical Characteristics							
		Power Dissipation Pd	Forward Current If	Peak Forward Current I_{FM}	Operating Temp. Topr	Storage Temp. Tstg	Forward Voltage V _f		Reverse Current I _r		Peak Wavelength λ_p		Derating ΔI_{FM}	
MD1208C-R	Red	22	—	70	-20~+70	-30~+80	1.7	2.0	20	20	4	660	20	0.5
MD1208C-A	Orange	22	—	70	-20~+70	-30~+80	2.2	2.5	20	20	4	605	20	0.5
MD1208C-G	Green	22	—	70	-20~+70	-30~+80	2.1	2.5	20	20	4	570	20	0.5
MD1208C-KRG-ARG	Red	*2 22	—	*2 70	-20~+70	-30~+80	1.7	2.0	20	20	6.5	660	20	0.5
	Green	*2 22	—	*2 70			2.1	2.5	20	20	6.5	570	20	0.5
MD1216C-R	Red	6.5	—	50	-20~+60	-20~+80	1.7	2.0	20	20	6.5	660	20	0.89
MD1216C-A	Orange	6.5	—	40	-20~+60	-20~+80	2.2	2.5	20	20	6.5	605	20	0.71
MD1216C-G	Green	6.5	—	40	-20~+60	-20~+80	2.1	2.5	20	20	6.5	570	20	0.71
MD1216C-RG	Red	6.25	—	50	-30~+70	-30~+80	1.7	2.0	20	20	4	660	20	1.3
	Green	6.25	—	40			2.1	2.5	20	20	4	570	20	1.0

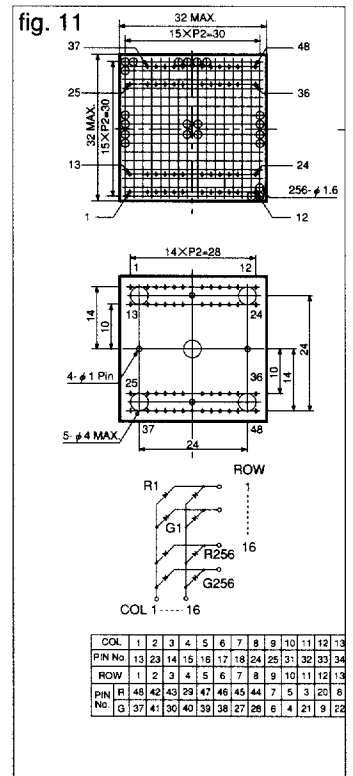
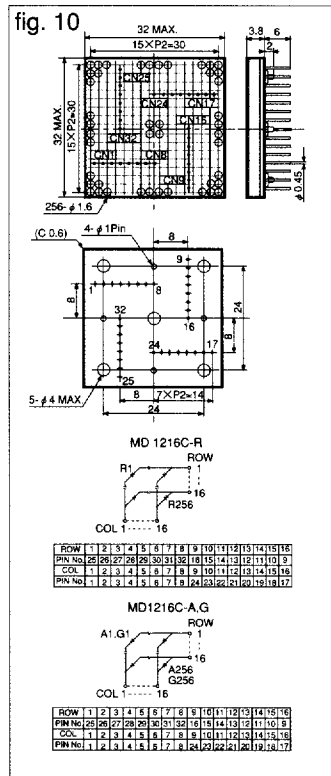
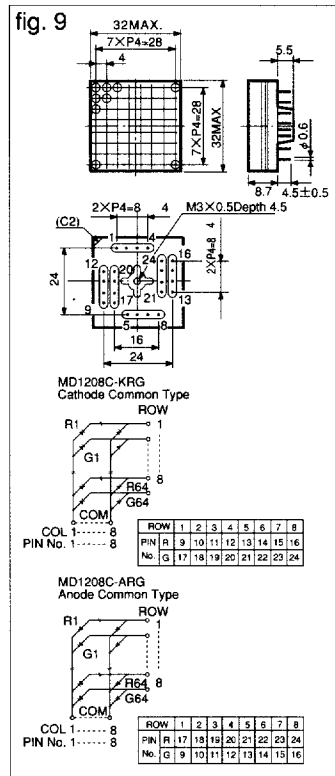
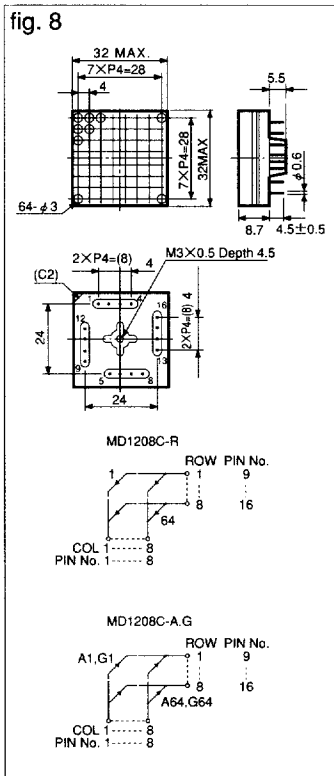
*1 IFM condition: $t_w \leq 1$ msec. and duty $\leq 1/16$ where the lighting ratio is 50% max.
 *2 Items marked 2 are for single-color drive. For two driven colors, total values shall be within specified ratings.

▼ CHARACTERISTICS BY SHAPE

Ta=25°C

(WXH)	Shape	Color	Part No.	Emitted Color	Dot Size	Dot Pitch	Dot Format	Electro-Optical Characteristics		fig.
								Luminous Intensity Mcd	If	
□32		Single Color	MD1208C-R	Red	$\phi 3$	4.0	8X8	3	20	8
			MD1208C-A	Orange				2	20	
			MD1208C-G	Green				2	20	
		Bicolor	MD1208C-KRG-ARG	Red				3	20	9
				Green				2	20	
		Single Color	MD1216C-R	Red	$\phi 1.6$	2.0	16X16	1.0	20	10
			MD1216C-A	Orange				0.5	20	
			MD1216C-G	Green				1.0	20	
		Bicolor	MD1216C-RG	Red				1.0	20	11
				Green				0.5	20	

▼ DIMENSIONS Unit:mm



▼CHARACTERISTICS BY COLOR (EACH CHIP) /Ratings and specifications are for each segment.

Ta=25°C

Part No.	Emitted Color	Absolute Maximum Ratings					Electro-Optical Characteristics							
		Power Dissipation Pd	Forward Current If	Peak Forward Current Ifm	Operating Temp. Topr	Storage Temp. Tstg	Forward Voltage Vf			Reverse Current Ir		Peak Wavelength λp		Display
						TYP.	MAX.	Ir	MAX.	Vr	TYP.	Ir	Ånm	
MD1516C2-R	Red	10	—	80	-20~+60	-20~+80	1.7	2.0	20	20	6.5	660	20	1.45
MD1516C2-A	Orange	10	—	65	-20~+60	-20~+80	2.2	2.5	20	20	6.5	605	20	1.16
MD1516C2-G	Green	10	—	65	-20~+60	-20~+80	2.1	2.5	20	20	6.5	570	20	1.16
MD1516C2-RG	Red	※2 10	—	※2 80	-20~+60	-30~+80	1.7	2.0	20	20	6.5	660	20	1.45
	Green	※2 10	—	※2 65			2.1	2.5	20	20	6.5	570	20	1.16
MD2516C-R	Red	22	—	70	-20~+70	-30~+80	1.7	2.0	20	20	6.5	660	20	0.5
MD2516C-A	Orange	22	—	70	-20~+70	-30~+80	2.2	2.5	20	20	6.5	605	20	0.5
MD2516C-G	Green	22	—	70	-20~+70	-30~+80	2.1	2.5	20	20	6.5	570	20	0.5
MD2516C-KRG	Red	※2 22	—	※2 70	-20~+70	-30~+80	1.7	2.0	20	20	6.5	660	20	0.5
	Green	※2 22	—	※2 70			2.1	2.5	20	20	6.5	570	20	0.5

※1 1fM condition: tw ≤ 1 msec. and duty ≤ 1/16 where the lighting ratio is 50% max.

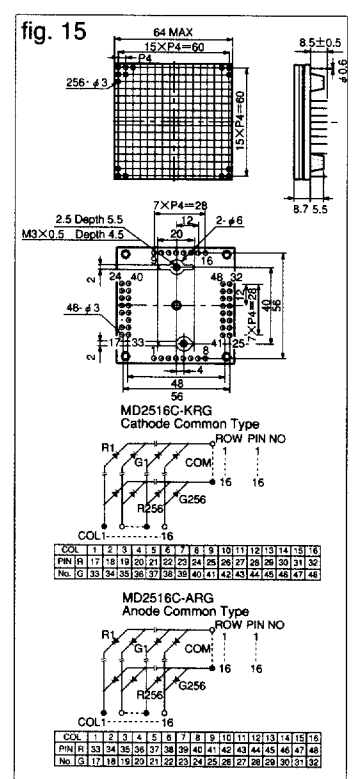
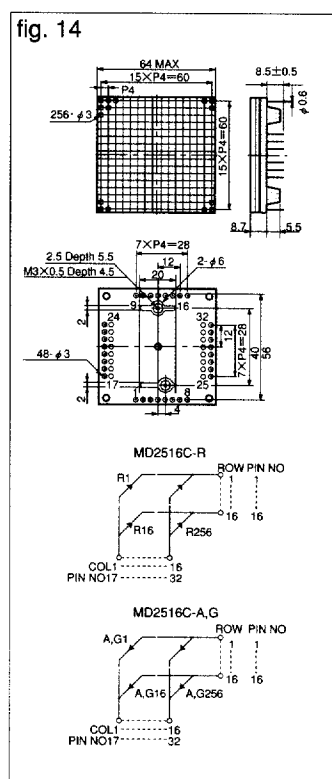
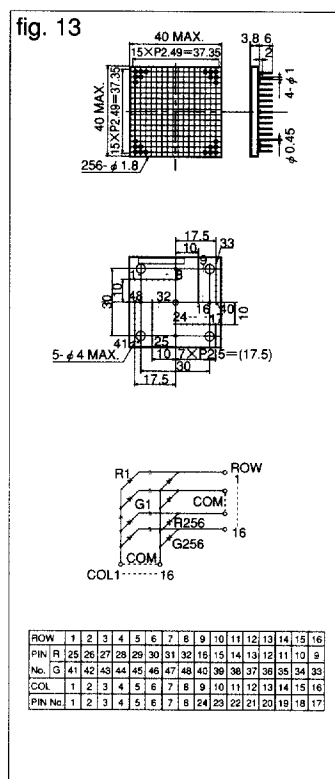
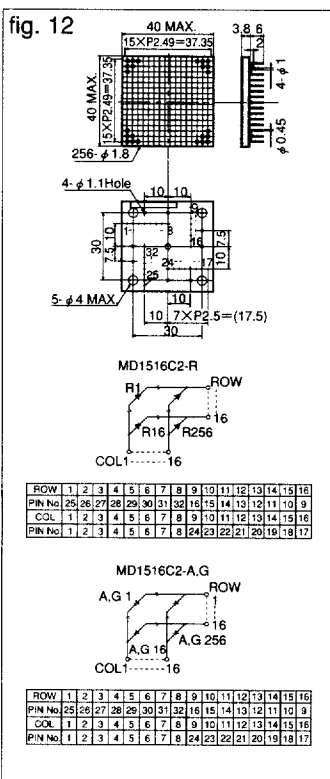
※2 Items marked 2 are for single-color drive. For two driven colors, total values shall be within specified ratings.

▼CHARACTERISTICS BY SHAPE

Ta=25°C

(WXH)	Shape	Color	Part No.	Emitted Color	Dot Size	Dot Pitch	Dot Format	Electro-Optical Characteristics		Fig.
								Luminous Intensity Im	Ir	
□40		Single Color	MD1516C2-R	Red	φ 1.8	2.49	16X16	2.0	20	12
			MD1516C2-A	Orange				1.0	20	
			MD1516C2-G	Green				2.0	20	
		Bicolor	MD1516C2-RG	Red	2.0	20	13			
Green	2.0	20								
□64		Single Color	MD2516C-R	Red	φ 3	4.0	16X16	3.0	20	14
			MD2516C-A	Orange				2.0	20	
			MD2516C-G	Green				2.0	20	
		Bicolor	MD2516C-KRG	Red	3.0	20	15			
			Green	2.0	20					

▼DIMENSIONS Unit:mm



LED DOT MATRIX DISPLAY

▼CHARACTERISTICS BY COLOR (EACH CHIP) /Ratings and specifications are for each segment.

Ta=25°C

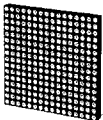
Part No.	Emitted Color	Absolute Maximum Ratings					Electro-Optical Characteristics							
		Power Dissipation Pd	Forward Current If	Peak Forward Current *1 Ifm	Operating Temp. Topr	Storage Temp. Tstg	Forward Voltage Vf		Reverse Current Ir		Peak Wavelength λp		Densiting ΔIfm	
							TYP.	MAX.	MAX.	Vr	TYP.	Ir		
MD3716M2-RG	Red	*2 11	—	*2 70	-20~+70	-30~+80	1.7	2.0	20	20	6.5	660	20	0.5
	Green	*2 11	—	*2 70	-20~+70	-30~+80	2.1	2.5	20	20	6.5	570	20	0.5
		Units	mW	mA	mA	°C	°C	V	V	mA	mA	nm	nm	%

*1 Ifm condition: tw ≤ 1 msec. and duty ≤ 1/16 where the lighting ratio is 50% max.

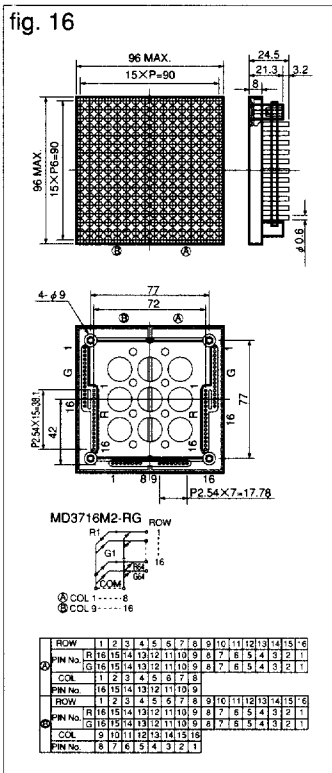
*2 Items marked 2 are for single-color drive. For two driven colors, total values shall be within specified ratings.

▼CHARACTERISTICS BY SHAPE

Ta=25°C

(WXH)	Shape	Color	Part No.	Emitted Color	Dot Size	Dot Pitch	Dot Format	Electro-Optical Characteristics		fig.
								Luminous Intensity MIN.	Ir	
□96		Bicolor	MD3716M2-RG	Red	φ4.8	6.0	16X16	9	20	16
				Green				9	20	

▼DIMENSIONS Unit:mm



The following conditions should be met when the MD series of LED dot matrix displays are used.

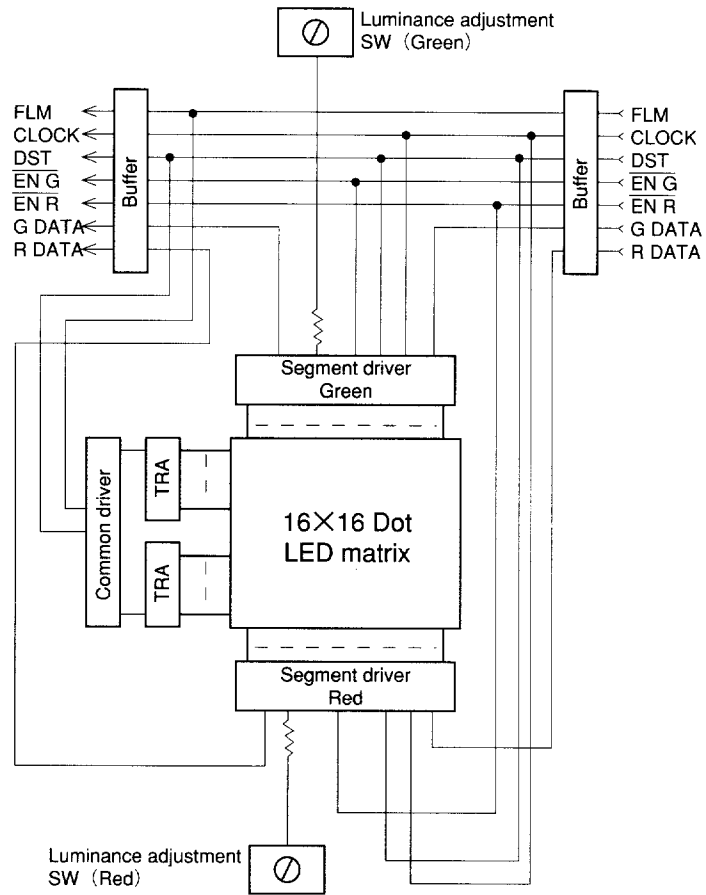
▼ Recommended operating conditions

- 1) **Recommended drive conditions** 1/16 Duty
LED on time: 1 msec.

Lighting frequency: 62.5 Hz

* Since the recommended value of the peak forward current (IFM) may vary depending on product configurations or operating conditions, please consult us first. When the lighting frequency goes below 50 Hz, a flicker may appear on the display screen.

- 2) **Recommended drive circuit**
Block diagram

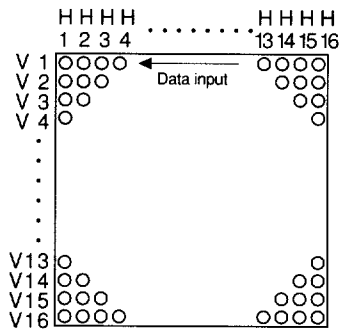


Buffer circuit detailed diagram



LED DOT MATRIX DISPLAY

3) Signal input method



Input Specification for Segment

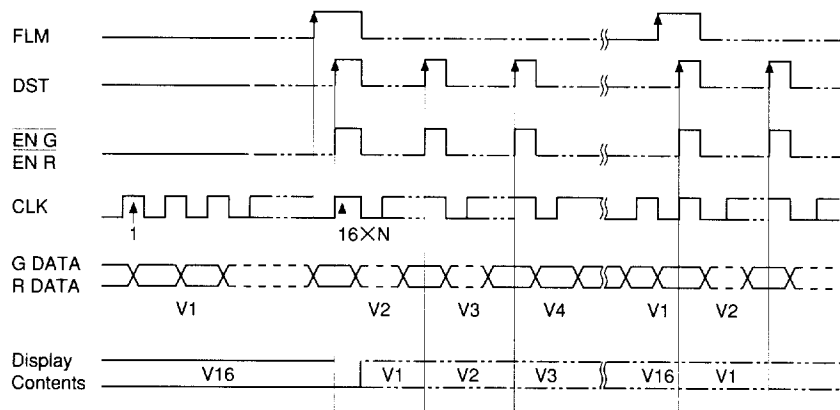
- ① Synchronize the display data (R Data, G Data) that corresponds to the dot patterns on the display screen with shift clock (CLK). Then, input data of all 16 dots serially from the position of (H1, V1) to (H16, V1) on the screen (16 dots). When combining display screens, input the same number of combinations (16 dots x number of combinations).
- ② Input the strobe signal (DST). Also, at the same time, the enable signal ($\overline{\text{ENG}}$, $\overline{\text{ENR}}$) is set to "high" and the display turns off.
- ③ Perform the same procedures mentioned in ① and ② for V2(V10) to V8(V16) lines to display on a screen panel.

Input Specification for Common

- ④ Input data of 16 dots x number of combinations and then input the FLM signal.
- ⑤ The common line can be selected by the strobe signal of the segment.
- ⑥ Perform the same procedures mentioned in ⑤ for V2 to V16 lines. The process mentioned in ④ should be done after inputting data of V1 line.
- ⑦ Details about the display data and clocks are in compliance with timing charts.

4) Description of each signal (all are positive logic.)

Input Signal	Function
FLM	Frame synchronizing signal (Input after V1 line)
CLK	When leading clock pulse ("L" to "H") for data transmitting of shift register, serial data is shifted.
DST	When setting "H" the signal is transmitted to the latch register from shift register, it is latched at setting "L".
$\overline{\text{ENG}}$	Switching to turn on or off the green LED. When setting "L", LED is turned on.
$\overline{\text{ENR}}$	Switching signal to turn on or off the red LED. When setting "L", LED is turned on.
G DATA	Serial data to display the green color (H=on, L=off)
R DATA	Serial data to display the red color (H=on, L=off)



- (※1) The FLM signal should be set to "H" when transferring V1 data.
- (※2) N : Connections

5) Operating temperature range

The operating temperature range specified in this catalog is where the dot lighting ratio is not greater than 50%. When the dot lighting ratio is more than 50%, the upper limit of the operating ambient temperature is considered to be 50°C.

Dot lighting ratio and operating ambient temperature

Dot lighting ratio	Operating ambient temperature range [°C]
50% or lower	-20 to +70
More than 50%	-20 to +50

▼Regarding brightness

1) Emitted luminous intensity standard

The emitted luminous intensity standard (lv) in this catalog is obtained by measuring the brightness of one dot under static lighting with a photometer. As far as the variation of luminous intensity, no dot is 2.5 times brighter than any other dot in one unit.

2) Brightness of emitting surface

When the brightness of the emitting surface is evaluated, the brightness should be measured during dynamic lighting with a photometer. 16 x 16 dot type classified, special units are available for delivery. The classification (ranks) are made according to the brightness of the emitting surface. Customized specifications will be considered separately.

3) Correlation between luminous intensity and brightness

Stanley defines the unit of luminous intensity as [mcd] and the unit of brightness as [cd/m²]. Generally speaking, it is quite possible to find a correlation between the two. However, actual correlation may be difficult to find due to the differences in the type of measuring equipment and methods.

▼Upon unit installation

1) Configuration for installation

A material with high thermal conductivity should be used for a securing board when installing a unit with studs. All studs should be tightened to enhance flat diffusion of the radiating characteristics and the emitting surface.

2) Temperature control after installation

When installing multiple units on one panel, the surface temperature should be controlled so as not to exceed 70°C under maximum thermal radiation in actual use. If used at a surface temperature of more than 70°C, degradation of brightness may be accelerated.

3) Cooling method

It is strongly recommended that a forced air cooling system with fans be used to send air to lead pins and cooling boards which are attached to the rear sides of the units. In addition, it is also recommended that fans be placed at the upper and lower part of the boards to promote air flow across the surface.

4) Front panel installation

Install a front panel which has been treated with non-glare treatment to protect the emitting surface of the unit from dust and to improve the contrast ratio.