

DMF Series

DMF633

MECHANICAL DATA

Item	Standard Value	Unit
Module Dimensions	180(W) × 75(H) × 15max.(D)	mm
Viewing Area	132(W) × 39(H)	mm
Dot Pixels	240(W) × 64(H)	dots
Dot Size	0.48(W) × 0.48(H)	mm
Dot Pitch	0.53(W) × 0.53(H)	mm

ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Condition	min.	typ.	max.	Unit
Supply Voltage (Logic)	$V_{CC}-V_{SS}$	—	-0.3	—	7	V
Supply Voltage (LCD Drive)	$V_{CC}-V_{EE}$	—	-0.3	—	19.0	V
Input Voltage	V_I	—	-0.3	—	$V_{CC}+0.3$	V
Operating Temperature	T_{opr}	—	0	—	+50	°C
Storage Temperature	T_{stg}	—	-20	—	+60	°C

ELECTRICAL CHARACTERISTICS • OPTICAL DATA $T_a=25^\circ\text{C}$

Item	Symbol	Condition	Standard Value			Unit
			min.	typ.	max.	
Supply Voltage (Logic)	$V_{CC}-V_{SS}$	—	4.75	5	5.25	V
Supply Voltage (LCD Drive)	$V_{CC}-V_{EE}$	—	5.5	—	17.0	V
Supply Current	I_{CC}	—	—	—	7.6	mA
	I_{EE}	—	—	—	+5.6	mA
Input Voltage "H" Level	V_{IH}	—	$0.7V_{CC}$	—	V_{CC}	V
Input Voltage "L" Level	V_{IL}	—	0	—	$0.3V_{CC}$	V
Supply Voltage for LCD Drive 1/32duty	$V_{ADJ}-V_{EE}$	$T_a=0^\circ\text{C}$	—	—	10.9	V
		$T_a=25^\circ\text{C}$	—	9.3	—	V
		$T_a=50^\circ\text{C}$	8.1	—	—	V
Contrast Ratio	CR	$\theta=0^\circ \phi=90^\circ$	2	—	—	—
Response Time (rise)	τ_r	Note 1 $T_a=25^\circ\text{C}$	—	130	200	ms
Response Time (decay)	τ_d	Note 2 $T_a=25^\circ\text{C}$	—	150	230	ms

Note 1: Required time for blackening ratio of segment goes up from 0% to 90% when wave form is switched from non-selected one to selected one. ($\theta=0^\circ, \phi=90^\circ$)

Note 2: Required time for blackening ratio of segment goes down from 100% to 10% when wave form is switched from selected one to non-selected one. ($\theta=0^\circ, \phi=90^\circ$)

PIN ASSIGNMENT

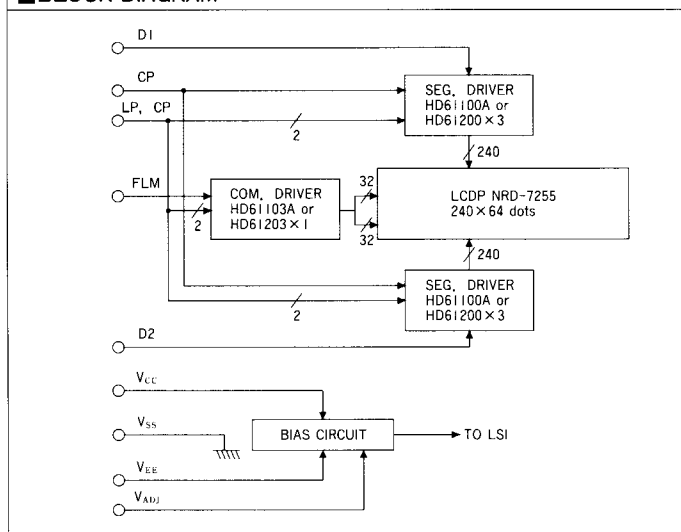
Pin No.	Symbol	Level	Function
1	DI	H/L	Display Data 1 (Upper)
2	FLM	H→L	Frame Signal
3	M	H/L	Alternate Signal for LCD Drive
4	LP	H→L	Data Latch Signal
5	CP	H/L	Clock Signal for Shifting Serial Data
6	D2	H/L	Display Data 2 (Lower)
7	V_{CC}	—	Power Supply for Logic (+5V)
8	V_{SS}	—	Power Supply (0V, GND)
9	V_{EE}	—	Power Supply for LCD Drive (-5V)
10	V_{ADJ}	—	Voltage Level for LCD Control Adjustment

EL ELECTRICAL DATA (at 25°C)

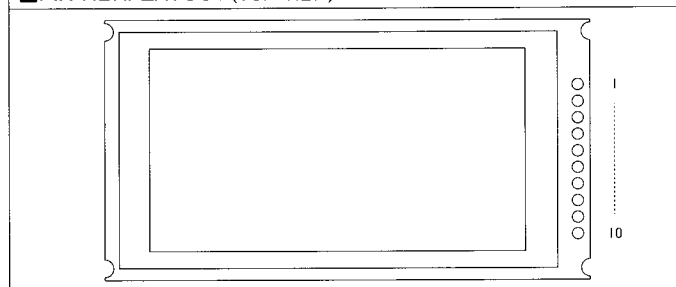
Item	Unit	Test Condition	Limit		
			min.	typ.	max.
Brightness*1)	cd/m ²	AC100Vrms, 400Hz (In Dark Room)	40	50	—
Operating Current	mA	AC100Vrms, 400Hz (In Dark Room)	—	13.5	18
Electrostatic Capacitance	nF	AC150mV 1KHz (In Dark Room)	—	32	—

*1) Measured at the bare EL unit.

BLOCK DIAGRAM



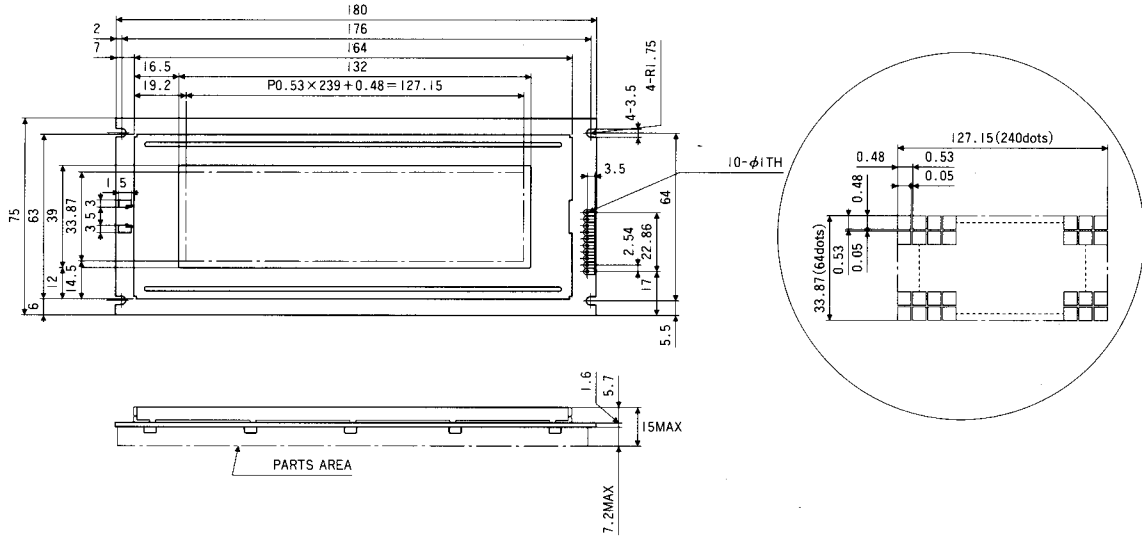
PIN NBR. LAYOUT (TOP VIEW)



240×64dots

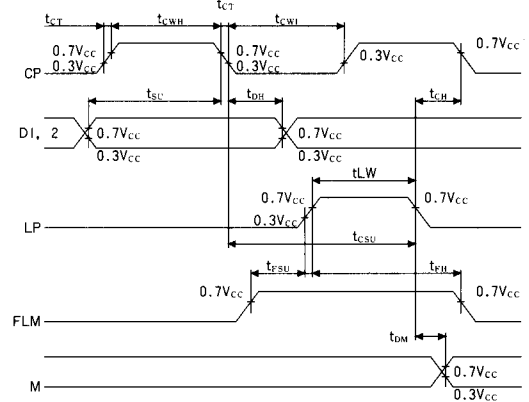
1/32Duty Drive

EXTERNAL DIMENSIONS

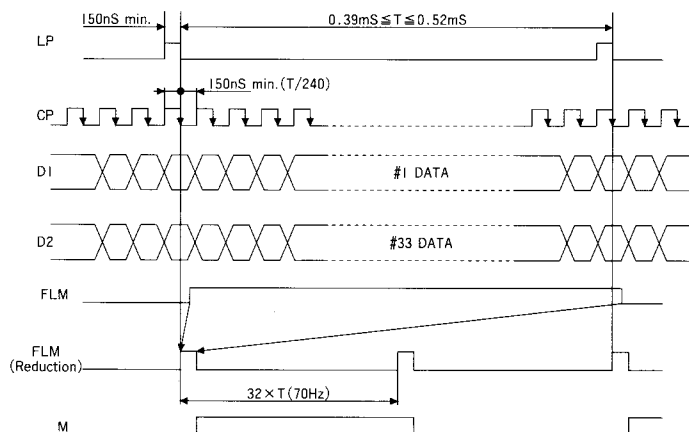


TIMING CHARACTERISTICS

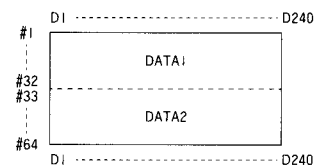
Item	Symbol	min.	typ.	max.	Unit
Clock Pulse Width (H Level)	t_{CWH}	150	—	—	ns
Clock Pulse Width (L Level)	t_{CWL}	150	—	—	ns
Clock Set Up Time	t_{CSU}	100	—	—	ns
Clock Hold Time	t_{CH}	100	—	—	ns
Data Set Up Time	t_{SU}	80	—	—	ns
Data Hold Time	t_{DH}	100	—	—	ns
Frame Data Set Up Time	t_{FSU}	100	—	—	ns
Frame Data Hold Time	t_{FH}	100	—	—	ns
M Delay Time	t_{DM}	—	0	300	ns
Clock Rise/Fall Time	t_{CT}	—	—	30	ns
Load Pulse Width	t_{LW}	450	—	—	ns



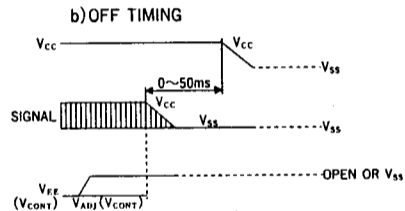
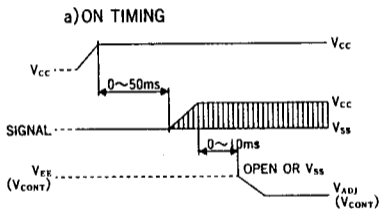
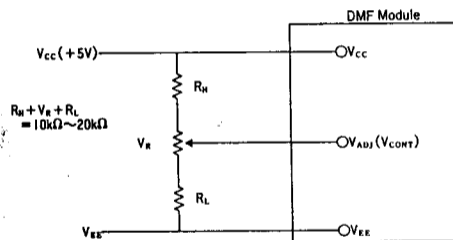
INTERFACE TIMING



Comparison between Display and Data (Top View)



EXAMPLE OF POWER SUPPLY (applied to all DMF series)



Important Instructions

Please be sure to proceed with the sequence as above when turn on/off the module.
 While alternate signal for LCD drive (M) is unstable, if power supply for LCD drive (V_{EE}) is supplied to the module, DC component will be applied to the LCD panel, which will get inferior LC molecule to cause display error.