
EM65168

**80 COM/SEG
LCD Driver**

**Product
Specification**

DOC. VERSION 1.0

ELAN MICROELECTRONICS CORP.


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Specification Revision History

Doc. Version	Revision Description	Date
0.1	Initial version	2002/12/23
0.2	<ol style="list-style-type: none"> 1. Added Pin Configuration 2. Added COB bonding diagram 	2003/03/28
0.3	Added BF, DON, HPM, and RES control registers	2003/03/31
0.4	<ol style="list-style-type: none"> 1. Modified the DC characteristics 2. Modified the RF registers 	2003/04/29
0.5	<ol style="list-style-type: none"> 1. Modified EM65168 to EM65168/EM65168A. 2. Added compatibility feature of EM65168A and EM83040A on Section 2. 3. Added a Note about EM65168A control registers on the BF Register section. 4. Added the resistor value level limitation of Ra and Rb when using external resistor. 5. Added a Note on adding a capacitor across V1 and Vreg, and its recommended value. 	2003/05/28
0.6	<ol style="list-style-type: none"> 1. Modified the LCD waveform (Fig. 7-7). 2. Added a description for all COM/SEG voltage state when EN=1 on Section 6 Pin Description. 3. Added a Note about RAMW and RAMR after the DC Characteristics table on Section 9. 	2003/09/17
0.7	Modified the IOH1 and IOL1 DC Characteristics values	2003/11/05
0.8	<ol style="list-style-type: none"> 1. Modified the VEV values of REG [5:0] vs VEV table. 2. Modified the VEV and REG [5:0] setting values on Section 9, DC Characteristics. 	2003/12/18
0.9	Added a Note about High Power Mode for large LCD panel, on the HPM Section	2004/04/29
1.0	<ol style="list-style-type: none"> 1. Added C64 S256 Application Circuit 2. Added package 	2006/04/26



1 General Description

The EM65168/EM65168A is a dot matrix, RAM mapping and multi-function LCD driver, implemented with low power, high speed CMOS technology. This device integrates an 80-bit shift register, 80-bit data latch and 80-bit level driver. An on-chip LCD RAM can be mapped to an LCD signal, converts RAM data to parallel data and output a waveform to an LCD.

2 Features

- Operating voltage: 2.5V~5.5V
- LCD driver voltage: 3.6V to 15V
- Internal RAM: 6,400 bits
- RAM can be controlled by eight signals including 4/8 bits bus
- Duty: 1/32, 1/48, 1/64, 1/80
- Built-in DC/DC converter: double, triple, quad and five times
- Modularized function: connect to another EM65168/EM65168A to extent LCD matrix
- One DC converter enabled and other EM65168/EM65168A can share with this
- Internal regulator output for DC/DC converter
- Bias Selectable: 1/5, 1/6, 1/7, 1/8, 1/9
- Internal RC clock: 24kHz
- CMOS process (P-type silicon substrate)
- EM65168A is compatible with EM83040A
- Package (Ordering information):

Part Number	Versions	Description	Package information
EM65168H	Bare chip	NA	Page 31
EM65168AH	Bare chip	NA	Page 31

Note: The EM65168 series has the following sub-codes, depending on their shapes.

H: Bare chip (Aluminum pad without bump)

GH: Gold bumped chip

F: COF package

T: TAB (TCP) package

3 Application

- Data Bank
- LCD leisure products
- Educational computer

4 Pin Configuration

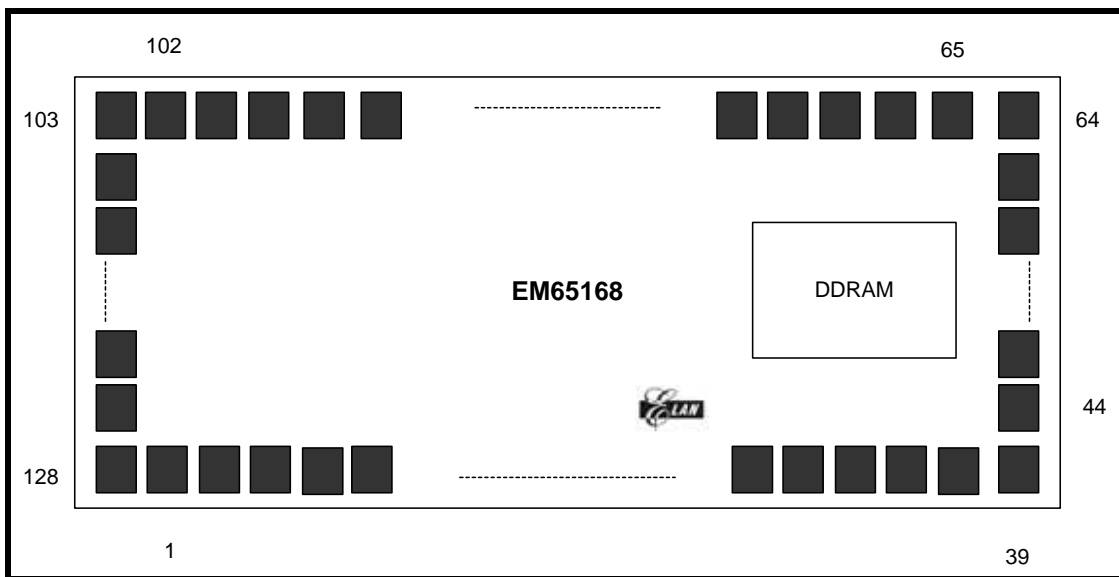


Figure 4-1 Pin Configuration

NOTE

With the Elan logo in the center (as shown figure) and DDRAM (black color) on the right side the pin 1 is in the down left corner.

Pin Dimensions

Item	Pad No.	Size		Unit
		X	Y	
Chip size	-	4260	2150	μm
Pad size (min.)	-	85	90	
Pad pitch (min.)	100			
Coordinate Origin	Chip center			



Pad Coordinates (Total of 114 pins)

Pin No	Pad Name	Coordinate (X, Y)	Pin No	Pad Name	Coordinate (X, Y)
1	GND	-1880.0 , -948.8	36	O18	1660.0 , -948.8
2	CA	-1770.0 , -948.8	37	O19	1770.0 , -948.8
3	VSS2+	-1660.0 , -948.8	38	O20	1880.0 , -948.8
4	VSS2-	-1555.0 , -948.8	39	O21	2003.8 , -948.8
5	V2	-1450.0 , -948.8	40	-	-
6	V3	-1350.0 , -948.8	41	-	-
7	VREG	-1250.0 , -948.8	42	-	-
8	V1	-1150.0 , -948.8	43	-	-
9	V4	-1050.0 , -948.8	44	O26	2003.8 , -825.0
10	V5	-950.0 , -948.8	45	O27	2003.8 , -715.0
11	O1	-850.0 , -948.8	46	O28	2003.8 , -605.0
12	VOUT	-750.0 , -948.8	47	O29	2003.8 , -500.0
13	O2	-650.0 , -948.8	48	O30	2003.8 , -400.0
14	VSS4	-550.0 , -948.8	49	O31	2003.8 , -300.0
15	O3	-450.0 , -948.8	50	O32	2003.8 , -200.0
16	VSS3	-350.0 , -948.8	51	O33	2003.8 , -100.0
17	O4	-250.0 , -948.8	52	O34	2003.8 , 00.0
18	CB	-150.0 , -948.8	53	O35	2003.8 , 100.0
19	O5	-50.0 , -948.8	54	O36	2003.8 , 200.0
20	O6	50.0 , -948.8	55	O37	2003.8 , 300.0
21	O25	150.0 , -948.8	56	O38	2003.8 , 400.0
22	O7	250.0 , -948.8	57	O39	2003.8 , 500.0
23	O24	350.0 , -948.8	58	O40	2003.8 , 605.0
24	O8	450.0 , -948.8	59	O41	2003.8 , 715.0
25	O23	550.0 , -948.8	60	O42	2003.8 , 825.0
26	O9	650.0 , -948.8	61	-	-
27	O22	750.0 , -948.8	62	-	-
28	O10	850.0 , -948.8	63	-	-
29	O11	950.0 , -948.8	64	O47	2003.8 , 948.8
30	O12	1050.0 , -948.8	65	O48	1880.0 , 948.8
31	O13	1150.0 , -948.8	66	O49	1770.0 , 948.8
32	O14	1250.0 , -948.8	67	O50	1660.0 , 948.8
33	O15	1350.0 , -948.8	68	O51	1555.0 , 948.8
34	O16	1450.0 , -948.8	69	O52	1450.0 , 948.8
35	O17	1555.0 , -948.8	70	O53	1350.0 , 948.8