

SED1278

CMOS DOT MATRIX LCD CONTROLLER DRIVER

■ DESCRIPTION

The SED1278 is a character LCD controller-driver, capable of driving displays as large as 2 lines of 8 characters (5×8 pixels), with minimum external components.

The SED1278 has an internal CGROM consisting of 240 characters (5×7) plus the underline cursor, JIS, ASCII, and eight user-programmable characters in RAM.

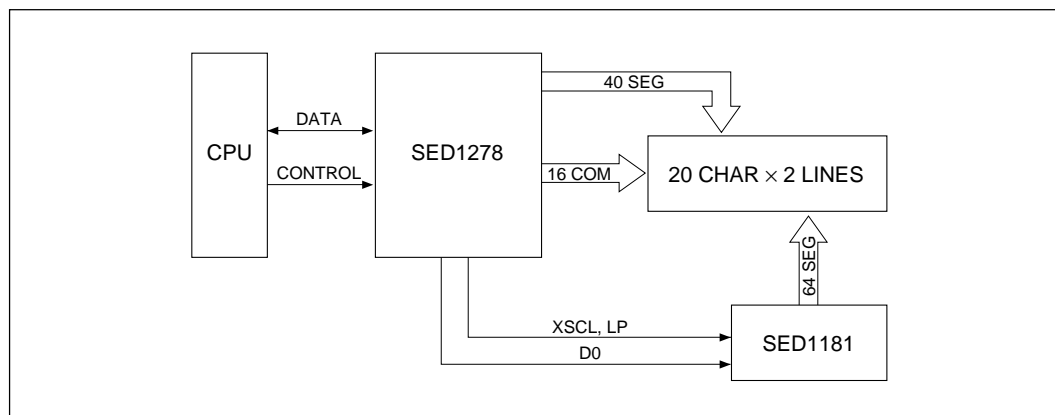
The SED1278 has 40 segment output and 16 common output built-in. Thus, one chip is capable of displaying up to 16 characters. The SED1278 can display one line of 48 characters using an SED1681F (80-bit output) as an expansion segment driver.

The SED1278 is fabricated using a silicon gate CMOS technology process and features very low power dissipation. This makes the device suitable for handheld and portable applications.

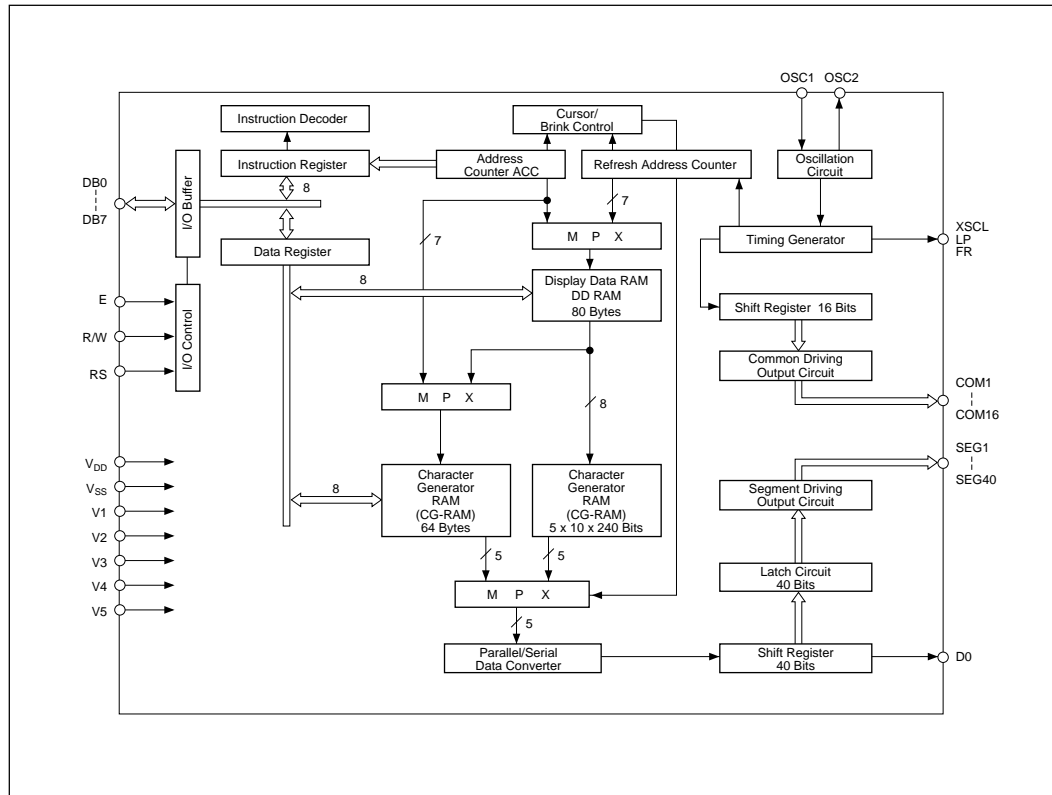
■ FEATURES

- Low-power CMOS technology
- 40 segment output
- 16 common output
- Duty: 1/8 or 1/16 (set by command)
- 4/8-bit CPU data interface, TTL compatible
- Two frame AC drive wave form
- CGROM: 240 characters
- CGRAM: 8 characters
- Display data RAM: ... 80×8 bits (80 characters)
- Recommended expansion segment driver:
SED1181FLA (64 output)
SED1681F (80 output)
- Built-in power on power-on reset
- Built-in RC oscillator
- Built-in LCD driver voltage-divider network
- TTL compatible CPU interface
- Supply voltage Logic: 4.5V to 5.5V
LCD: 3.5V to 5.5V
- Package:
QFP5-80 pins (F0A, F0B, F0C, F0D, F0G, F0H)
AI pad (D0A, D0B, D0C, D0D, D0G, D0H)

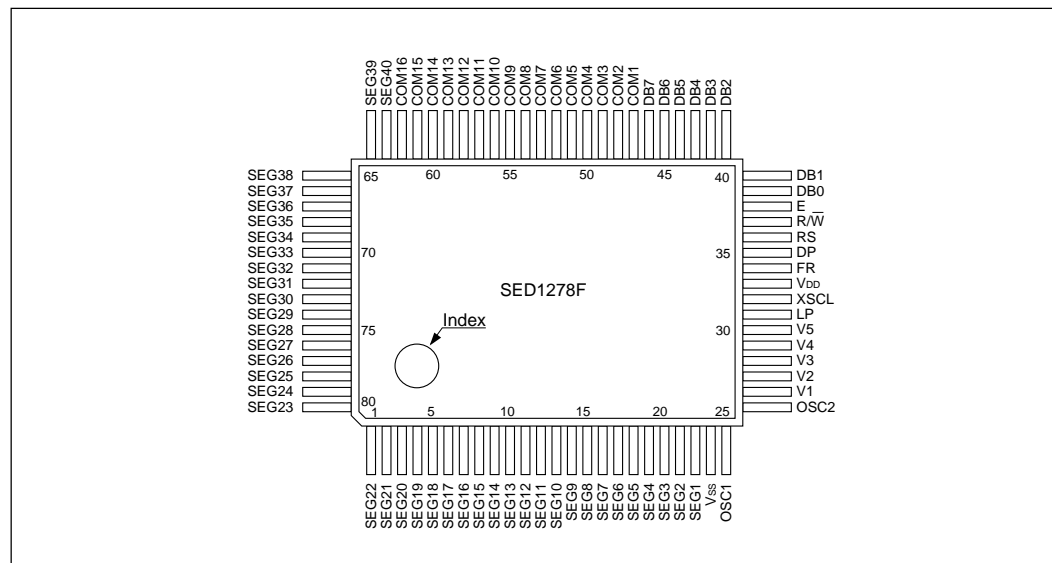
■ SYSTEM BLOCK DIAGRAM



■ BLOCK DIAGRAM





■ PIN CONFIGURATION



■ PIN DESCRIPTION

| Symbol | No. of signals | Functions | |
|-----------------|----------------|---|----|
| RS | 1 | Register select signal | *1 |
| R/W | 1 | Read/write select signal | |
| E | 1 | Read/write execute signal | |
| DB0 to DB7 | 8 | Data bus | |
| LP | 1 | Data latching pulse | |
| XSCL | 1 | Data transfer clock | |
| FR | 1 | LCD AC driving signal | |
| DO | 1 | Serial data | |
| COM1 to COM16 | 16 | Common outputs COM9 to COM16 : non-select for 1/8 duty COM12 to COM16: non-select for 1/11 duty | |
| SEG1 to SEG40 | 40 | Segment outputs | |
| V1 to V5 | 5 | LCD driving power ($V5 \geq V_{SS}$) | |
| V _{DD} | 1 | +5V | |
| V _{SS} | 1 | 0V (GND) | |
| OSC1 OSC2 | 2 | Used to connect resistor (typ. 91K Ω) for oscillation; OSC1 is for external clock input. | |

| | | | | |
|----|----|-----|---|--|
| *1 | RS | R/W | E | Operation |
| | 0 | 0 |  | Instruction write cycle |
| | 0 | 1 | 1 | Busy flag read cycle Address counter read cycle |
| | 1 | 0 |  | DD RAM or CG RAM data write cycle |
| | 1 | 1 | 1 | DD RAM or CG RAM data read cycle |

■ ELECTRICAL CHARACTERISTICS

● Absolute Maximum Ratings

(V_{SS} = 0V, T_a = 25°C)

| Parameter | Symbol | Rating | Unit |
|--------------------------------|------------------|------------------------------|------|
| Supply voltage (1) | V _{DD} | -0.3 to 7.0 | V |
| Supply voltage (2) | V1 to V5 | -0.3 to V _{DD} +0.3 | V |
| Input voltage | V _I | -0.3 to V _{DD} +0.3 | V |
| Output voltage | V _O | -0.3 to V _{DD} +0.3 | V |
| Power dissipation | P _D | 300 | mW |
| Operating temperature | T _{opr} | -20 to 75 | °C |
| Storage temperature | T _{stg} | -65 to 150 | °C |
| Soldering temperature and time | T _{sol} | 260°C•10s (at lead) | — |

Note: The following condition must always hold true: V_{DD} ≥ V1 ≥ V2 ≥ V3 ≥ V4 ≥ V5

● DC Characteristics

(V_{DD} = 5.0V ± 10%, V_{SS} = 0V, T_a = -20 to 75°C)

| Parameter | Symbol | Condition | Applicable Pin | Min | Typ | Max | Unit |
|---|---------------------|---|------------------|----------------------|-----|--------------------|------|
| "H" level input voltage (1) | V _{IH1} | | DB0~DB7 | 2.0 | — | V _{DD} | V |
| "L" level input voltage (1) | V _{IL1} | | RS, R/W, E | V _{SS} | — | 0.8 | V |
| "H" level input voltage (2) | V _{IH2} | | OSC1 | V _{DD} -1.0 | — | V _{DD} | V |
| "L" level input voltage (2) | V _{IL2} | | | V _{SS} | — | 1.0 | V |
| "H" level output voltage (1) | V _{OH1} | I _{OH} =-0.205mA | DB0~DB7 | 2.4 | — | — | V |
| "L" level output voltage (1) | V _{OL1} | I _{OL} =1.6mA | | — | — | 0.4 | V |
| "H" level output voltage (2) | V _{OH2} | I _{OH} =-0.04mA | XSCL LP D0 | 0.9V _{DD} | — | — | V |
| "L" level output voltage (2) | V _{OL2} | I _{OL} =0.04mA | | — | — | 0.1V _{DD} | V |
| Driver-on resistor (COM) | R _{COM} | V _{COM} -V _n =0.5V | COM1~16 | — | 2 | 10 | kΩ |
| Driver-on resistor (SEG) | R _{SEG} | V _{SEG} -V _n =0.5V | SEG1~40 | — | 2.5 | 10 | kΩ |
| I/O leakage current | I _{IL} | V _I =0 to V _{DD} | | — | — | 1 | μA |
| Pull-up MOS current | -I _P | V _{DD} =5V | | 50 | 125 | 250 | μA |
| Supply current | I _{op} | R _f oscillation, from external clock V _{DD} =5V, f _{OSC} =f _{CP} =270kHz | V _{DD} | — | 0.5 | 0.8 | mA |
| External clock operation | | | | | | | |
| External clock operating frequency | f _{EXTCL} | | | 125 | 250 | 350 | kHz |
| External clock duty | Duty | | | 45 | 50 | 55 | % |
| External clock rise time | t _{rEXTCL} | | | — | — | 0.2 | μs |
| External clock fall time | t _{fEXTCL} | | | — | — | 0.2 | μs |
| Internal clock operation (R _f oscillation) | | | | | | | |
| Oscillation frequency | f _{OSC} | R _f =91kΩ±2% | | 190 | 270 | 350 | kHz |
| Internal clock operation (Ceramic filter oscillation) | | | | | | | |
| Oscillation frequency | f _{OSC} | Ceramic filter | | 245 | 250 | 255 | kHz |
| LCD driving voltage | V _{LCD} | V _{DD} -V ₅ | | 3.0 | — | V _{DD} | V |

● AC Characteristics

○ Read cycle

(V_{DD} = 5.0V ± 10%, V_{SS} = 0V, T_a = -20 to 75°C)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------|-----------------------------------|-----------------------|-----|-----|-----|------|
| Enable cycle time | t _{cycE} | | 500 | — | — | ns |
| Enable "H" level pulse width | t _{WEH} | | 220 | — | — | ns |
| Enable rise/fall time | t _{rE} , t _{fE} | | — | — | 25 | ns |
| RS, R/W setup time | t _{AS} | | 40 | — | — | ns |
| RS, R/W address hold time | t _{AH} | | 10 | — | — | ns |
| Read data output delay | t _{RD} | C _L =100pF | — | — | 120 | ns |
| Read data hold time | t _{DHR} | | 20 | — | — | ns |

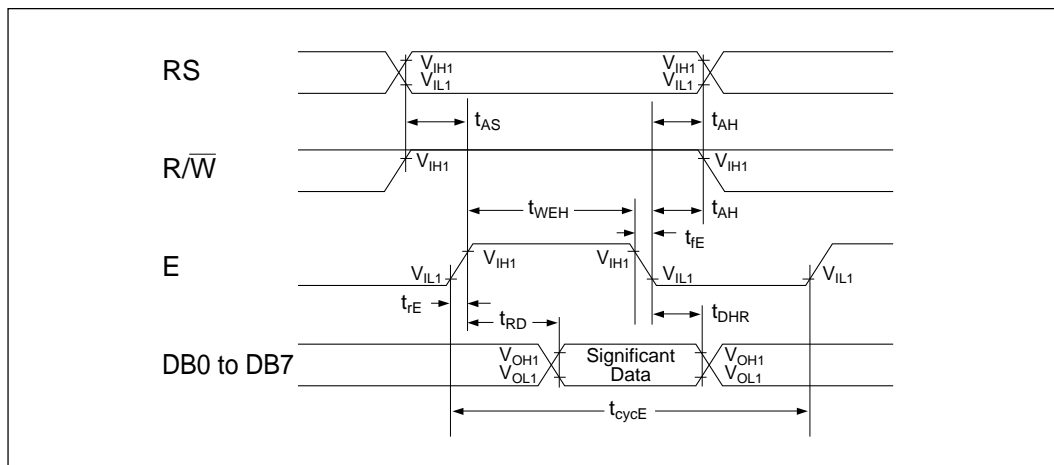
- Write cycle

($V_{DD} = 5.0V \pm 10\%$, $V_{SS} = 0V$, $T_a = -20$ to $75^\circ C$)

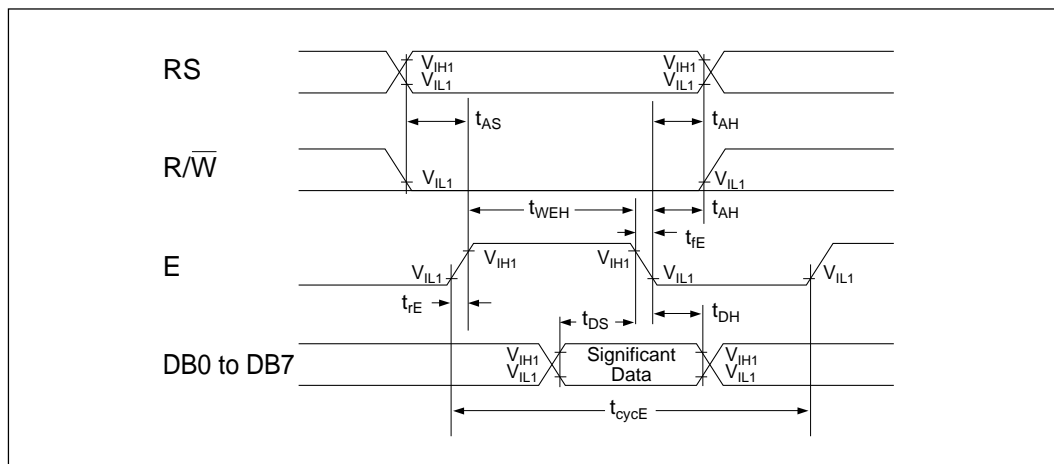
| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|------------------------------|---------------------|------------|-----|-----|-----|------|
| Enable cycle time | t_{cycE} | | 500 | — | — | ns |
| Enable "H" level pulse width | t_{WEH} | | 220 | — | — | ns |
| Enable rise/fall time | t_{rE} , t_{fE} | | — | — | 25 | ns |
| RS, R/W setup time | t_{AS} | | 40 | — | — | ns |
| RS, R/W address hold time | t_{AH} | | 10 | — | — | ns |
| Data setup time | t_{DS} | | 60 | — | — | ns |
| Write data hold time | t_{DH} | | 10 | — | — | ns |

- Timing Chart

- Read cycle



- Write cycle

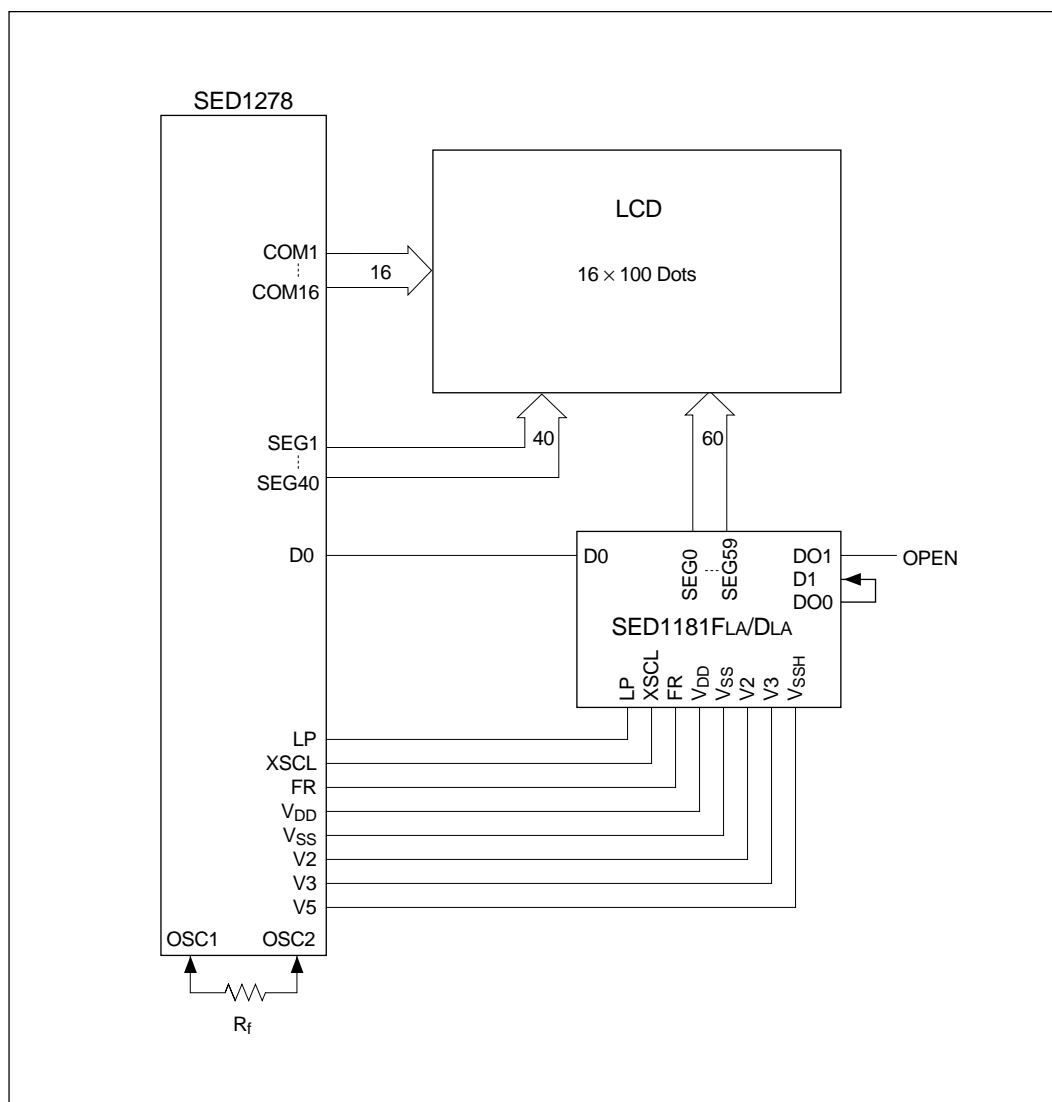


■ DISPLAY COMMAND

| Parameter | RS | R/W | DB7 | DB6 | DB5 | DB4 | DB3 | DB2 | DB1 | DB0 | Note |
|------------------------------------|----|-----|------------|-----|-----|-----|-----|-----|-----|---|---|
| CLEAR DISPLAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| CURSOR HOME | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | * | |
| ENTRY MODE SET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | I/D | S | DB1=1 : Increment, DB1=0 : Decrement DB0=1 : The display is shifted. DB0=0 : The display is not shifted. |
| DISPLAY ON/OFF | 0 | 0 | 0 | 0 | 0 | 0 | 1 | D | C | B | DB2=1 : Display on DB2=0 : Display off DB1=1 : Cursor on DB1=0 : Cursor off DB0=1 : Brinking on DB0=0 : Brinking off |
| CURSOR/DISPLAY SHIFT | 0 | 0 | 0 | 0 | 0 | 1 | S/C | R/L | * | * | DB3=1 : Shifts display one character DB2=1 : Right shift, DB2=0 : Left shift |
| SYSTEM SET | 0 | 0 | 0 | 0 | 1 | DL | N | F | * | * | DB4=1 : 8 bits, DB4=0 : 4 bits DB3=1 : 2 lines display (1/16 duty), DB3=0 : 1 line display (DB2=1 : 5x10 dots, 1/11 duty) (DB2=0 : 5x7dots, 1/8 duty) |
| SET CGRAM ADDRESS | 0 | 0 | 0 | 1 | ACG | | | | | | The address length that can be set is 64 addresses. |
| SET DDRAM ADDRESS | 0 | 0 | 1 | ADD | | | | | | The address length that can be set is 80 addresses. | |
| READ BUSY FLAG/ ADDRESS COUNTER | 0 | 1 | BF | AC | | | | | | DB7=1 : Busy (instruction not accepted) DB7=0 : Ready (instruction accepted) | |
| WRITE DATA | 1 | 0 | Write Data | | | | | | | | |
| READ DATA | 1 | 1 | Read Data | | | | | | | | |

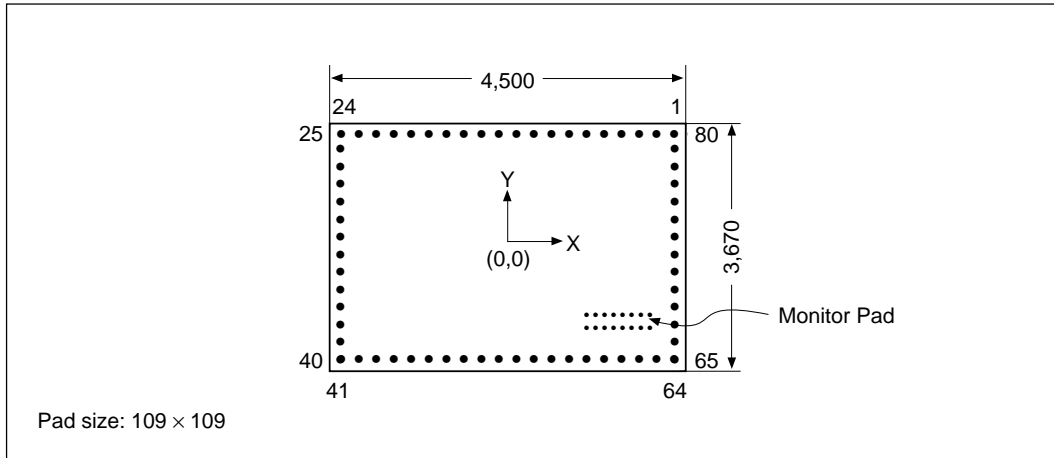
* Don't care

■ EXAMPLE OF APPLICATION (2 lines × 20 characters)



SED1278 is usually connected to 8-bit MPU via I/O ports.

■ PAD LAYOUT



● PAD COORDINATES

| Pad No. | Pad Name | X | Y | Pad No. | Pad Name | X | Y |
|---------|----------|-------|-------|---------|----------|-------|-------|
| 1 | SEG22 | 2087 | 1671 | 41 | DB2 | -2087 | -1671 |
| 2 | SEG21 | 1905 | 1671 | 42 | DB3 | -1905 | -1671 |
| 3 | SEG20 | 1723 | 1671 | 43 | DB4 | -1723 | -1671 |
| 4 | SEG19 | 1541 | 1671 | 44 | DB5 | -1541 | -1671 |
| 5 | SEG18 | 1359 | 1671 | 45 | DB6 | -1359 | -1671 |
| 6 | SEG17 | 1177 | 1671 | 46 | DB7 | -1177 | -1671 |
| 7 | SEG16 | 995 | 1671 | 47 | COM1 | -995 | -1671 |
| 8 | SEG15 | 814 | 1671 | 48 | COM2 | -814 | -1671 |
| 9 | SEG14 | 633 | 1671 | 49 | COM3 | -633 | -1671 |
| 10 | SEG13 | 452 | 1671 | 50 | COM4 | -452 | -1671 |
| 11 | SEG12 | 272 | 1671 | 51 | COM5 | -272 | -1671 |
| 12 | SEG11 | 91 | 1671 | 52 | COM6 | -91 | -1671 |
| 13 | SEG10 | -91 | 1671 | 53 | COM7 | 91 | -1671 |
| 14 | SEG9 | -272 | 1671 | 54 | COM8 | 272 | -1671 |
| 15 | SEG8 | -452 | 1671 | 55 | COM9 | 452 | -1671 |
| 16 | SEG7 | -633 | 1671 | 56 | COM10 | 633 | -1671 |
| 17 | SEG6 | -814 | 1671 | 57 | COM11 | 814 | -1671 |
| 18 | SEG5 | -995 | 1671 | 58 | COM12 | 995 | -1671 |
| 19 | SEG4 | -1177 | 1671 | 59 | COM13 | 1177 | -1671 |
| 20 | SEG3 | -1359 | 1671 | 60 | COM14 | 1359 | -1671 |
| 21 | SEG2 | -1541 | 1671 | 61 | COM15 | 1541 | -1671 |
| 22 | SEG1 | -1723 | 1671 | 62 | COM16 | 1723 | -1671 |
| 23 | GND | -1905 | 1671 | 63 | SEG40 | 1905 | -1671 |
| 24 | OSC1 | -2087 | 1671 | 64 | SEG39 | 2087 | -1671 |
| 25 | OSC2 | -2087 | 1365 | 65 | SEG38 | 2087 | -1365 |
| 26 | V1 | -2087 | 1183 | 66 | SEG37 | 2087 | -1183 |
| 27 | V2 | -2087 | 1001 | 67 | SEG36 | 2087 | -1001 |
| 28 | V3 | -2087 | 819 | 68 | SEG35 | 2087 | -819 |
| 29 | V4 | -2087 | 637 | 69 | SEG34 | 2087 | -637 |
| 30 | V5 | -2087 | 455 | 70 | SEG33 | 2087 | -455 |
| 31 | LP | -2087 | 273 | 71 | SEG32 | 2087 | -273 |
| 32 | XSCL | -2087 | 91 | 72 | SEG31 | 2087 | -91 |
| 33 | VCC | -2087 | -91 | 73 | SEG30 | 2087 | 91 |
| 34 | FR | -2087 | -273 | 74 | SEG29 | 2087 | 273 |
| 35 | DO | -2087 | -455 | 75 | SEG28 | 2087 | 455 |
| 36 | RS | -2087 | -637 | 76 | SEG27 | 2087 | 637 |
| 37 | R/W | -2087 | -819 | 77 | SEG26 | 2087 | 819 |
| 38 | E | -2087 | -1001 | 78 | SEG25 | 2087 | 1001 |
| 39 | DB0 | -2087 | -1183 | 79 | SEG24 | 2087 | 1183 |
| 40 | DB1 | -2087 | -1365 | 80 | SEG23 | 2087 | 1365 |

■ SED1278F0A/D0A CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|-------|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | | | 00P`P | | | | | | | | — | 3 | 3 | 3 | 3 |
| | 1 | CG RAM (2) | | ! | 1A0a4 | | | | | | | | 7 | 7 | 4 | ä | q |
| | 2 | CG RAM (3) | | " | 2BRbr | | | | | | | | " | " | × | p | 0 |
| | 3 | CG RAM (4) | | # | 3CScs | | | | | | | | „ | „ | £ | £ | £ |
| | 4 | CG RAM (5) | | \$ | 4DTdt | | | | | | | | „ | „ | „ | „ | „ |
| | 5 | CG RAM (6) | | % | 5Eueu | | | | | | | | „ | „ | „ | „ | „ |
| | 6 | CG RAM (7) | | & | 6Fufv | | | | | | | | „ | „ | „ | „ | „ |
| | 7 | CG RAM (8) | | ' | 7Gw9w | | | | | | | | „ | „ | „ | „ | „ |
| | 8 | CG RAM (1) | | (| 8HXhx | | | | | | | | „ | „ | „ | „ | „ |
| | 9 | CG RAM (2) | |) | 9IYiy | | | | | | | | „ | „ | „ | „ | „ |
| | A | CG RAM (3) | | * | :JZjz | | | | | | | | „ | „ | „ | „ | „ |
| | B | CG RAM (4) | | + | :Kck< | | | | | | | | „ | „ | „ | „ | „ |
| | C | CG RAM (5) | | , | <L*ll | | | | | | | | „ | „ | „ | „ | „ |
| | D | CG RAM (6) | | — | =M]m> | | | | | | | | „ | „ | „ | „ | „ |
| | E | CG RAM (7) | | . | >N^nn | | | | | | | | „ | „ | „ | „ | „ |
| | F | CG RAM (8) | | / | ?0Lo+ | | | | | | | | „ | „ | „ | „ | „ |

■ SED1278F0B/D0B CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | ± | | 0 | 0 | P | ' | P | 5 | e | á | ' | i | M | B | v |
| | 1 | CG RAM (2) | ≡ | ! | 1 | A | O | a | 9 | U | æ | i | ' | J | t | y | u |
| | 2 | CG RAM (3) | 7 | " | 2 | B | R | b | r | e | E | ó | ' | o | 3 | 8 | x |
| | 3 | CG RAM (4) | ¿ | # | 3 | C | S | c | s | á | á | á | ' | P | 7 | e | w |
| | 4 | CG RAM (5) | / | \$ | 4 | D | T | d | t | ä | ä | ä | ' | 4 | T | Z | o |
| | 5 | CG RAM (6) | \ | % | 5 | E | U | e | u | ä | ä | ä | ' | 2 | t | a | n |
| | 6 | CG RAM (7) | ¡ | & | 6 | F | U | f | u | ä | ä | ä | ' | 4 | B | B | » |
| | 7 | CG RAM (8) | ¿ | ' | 7 | G | W | w | w | ä | ä | ä | ' | x | ÷ | h | « |
| | 8 | CG RAM (1) | / | (| 8 | H | X | h | x | e | g | ' | ' | ÷ | ÷ | E | K |
| | 9 | CG RAM (2) | \ |) | 9 | I | Y | i | y | e | ä | ä | ' | 1 | T | T | h |
| | A | CG RAM (3) | * | * | * | J | Z | j | z | e | ä | ä | ' | 2 | T | Z | µ |
| | B | CG RAM (4) | J | + | * | K | C | k | c | i | ä | ä | ' | L | t | v | ÷ |
| | C | CG RAM (5) | = | , | < | L | \ | l | l | i | ä | ä | ' | » | » | » | » |
| | D | CG RAM (6) | ~ | - | = | M | I | m | i | ä | ä | ä | ' | » | » | » | » |
| | E | CG RAM (7) | » | . | > | N | ^ | n | ^ | ä | ä | ä | ' | » | » | » | » |
| | F | CG RAM (8) | » | / | ? | O | _ | o | _ | ä | ä | ä | ' | » | » | » | » |

■ SED1278Foc/D0c CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | | | 0 | 0 | P | ` | P | | | | é | á | é | í | é |
| | 1 | CG RAM (2) | | ! | 1 | A | 0 | a | 9 | | | 0 | a | 1 | é | 0 | 9 |
| | 2 | CG RAM (3) | | " | 2 | B | R | b | r | | | é | R | ó | i | 9 | 9 |
| | 3 | CG RAM (4) | | # | 3 | C | S | c | s | | | á | ó | ú | í | , | R |
| | 4 | CG RAM (5) | | \$ | 4 | D | T | d | t | | | á | ó | K | i | 4 | # |
| | 5 | CG RAM (6) | | % | 5 | E | U | e | u | | | á | ó | R | | ó | t |
| | 6 | CG RAM (7) | | & | 6 | F | V | f | v | | | ' | 0 | a | " | 0 | 9 |
| | 7 | CG RAM (8) | | ' | 7 | B | W | w | | | | 9 | 0 | 0 | 0 | é | 9 |
| | 8 | CG RAM (1) | | (| 8 | H | X | h | x | | | é | 9 | 0 | W | 0 | R |
| | 9 | CG RAM (2) | |) | 9 | I | Y | i | y | | | é | 4 | 0 | Y | 0 | 0 |
| | A | CG RAM (3) | | * | * | J | Z | j | z | | | é | 0 | 0 | A | 0 | é |
| | B | CG RAM (4) | | + | * | K | C | k | < | | | í | é | 4 | i | 0 | R |
| | C | CG RAM (5) | | , | < | L | \ | l | ~ | | | í | 0 | 4 | A | 0 | R |
| | D | CG RAM (6) | | - | = | M | J | m | > | | | í | A | i | 0 | é | ÷ |
| | E | CG RAM (7) | | . | > | N | ^ | n | ÷ | | | Á | é | ↑ | 9 | 2 | |
| | F | CG RAM (8) | | / | ? | O | _ | o | ÷ | | | 9 | 0 | 0 | 0 | 3 | 0 |

■ SED1278F0D/D0D CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|--------|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | | | 00P`P | | | | | | | Æ | Ä | Å | Ä | Å | Å |
| | 1 | CG RAM (2) | | ! | 1A0a9 | | | | | | | Ü | ä | 1 | ✓ | Ä | Å |
| | 2 | CG RAM (3) | | " | 2BRbr | | | | | | | é | É | ó | É | ç | Å |
| | 3 | CG RAM (4) | | # | 3CScs | | | | | | | ä | ö | ü | ° | Ä | Å |
| | 4 | CG RAM (5) | | \$ | 4DTdt | | | | | | | ä | ö | Ä | Ä | Ä | # |
| | 5 | CG RAM (6) | | % | 5Eueu | | | | | | | ä | ö | Ä | ° | ö | Ä |
| | 6 | CG RAM (7) | | & | 6Fufv | | | | | | | ' | ö | ä | ° | Ä | Å |
| | 7 | CG RAM (8) | | ' | 7Bwsw | | | | | | | Ä | ö | Ä | Ä | Ä | Ä |
| | 8 | CG RAM (1) | | (| 8HXhx | | | | | | | é | é | Ä | Ä | Ä | Ä |
| | 9 | CG RAM (2) | |) | 9IYiy | | | | | | | é | é | Ä | Ä | Ä | Ä |
| | A | CG RAM (3) | | * | :JZjz | | | | | | | é | ö | Ä | Ä | Ä | Ä |
| | B | CG RAM (4) | | + | :Kck< | | | | | | | é | ö | Ä | Ä | Ä | Ä |
| | C | CG RAM (5) | | , | <L\l~ | | | | | | | é | ö | Ä | Ä | Ä | Ä |
| | D | CG RAM (6) | | - | =M]m> | | | | | | | é | ö | Ä | Ä | Ä | Ä |
| | E | CG RAM (7) | | . | >N^nn~ | | | | | | | Ä | é | Ä | Ä | Ä | Ä |
| | F | CG RAM (8) | | / | ?O_oe | | | | | | | Ä | é | Ä | Ä | Ä | Ä |

■ SED1278F0G/D0G CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|--------|---|---|---|---|---|---|----|----|----|----|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | | | 00P`P | | | | | | | 7E | 8A | 9C | 01 | | |
| | 1 | CG RAM (2) | | ! | 1A0a9 | | | | | | | 0a | 1a | 2c | 1 | | |
| | 2 | CG RAM (3) | | " | 2BRbr | | | | | | | eE | 6x | 9f | | | |
| | 3 | CG RAM (4) | | # | 3CScs | | | | | | | 8c | 00 | 7 | 4 | | |
| | 4 | CG RAM (5) | | \$ | 4DTdt | | | | | | | 8c | 00 | 7 | 4 | | |
| | 5 | CG RAM (6) | | % | 5Eueu | | | | | | | 8c | 00 | 7 | 4 | | |
| | 6 | CG RAM (7) | | & | 6Fufv | | | | | | | ' | 0a | ° | 0 | | |
| | 7 | CG RAM (8) | | ' | 7Bwsw | | | | | | | 90 | 00 | 7 | 4 | | |
| | 8 | CG RAM (1) | | (| 8HXhx | | | | | | | e9 | c | u | 0 | | |
| | 9 | CG RAM (2) | |) | 9IYiy | | | | | | | e4 | 7 | 4 | 0 | | |
| | A | CG RAM (3) | | * | : JZjz | | | | | | | e0 | 4 | L | . | e | |
| | B | CG RAM (4) | | + | : Kck< | | | | | | | i | u | 9 | I | 0 | |
| | C | CG RAM (5) | | , | < L\l~ | | | | | | | i | 0 | 4 | - | 0 | |
| | D | CG RAM (6) | | - | = Mln> | | | | | | | i | . | i | 0 | e | |
| | E | CG RAM (7) | | . | > N^n~ | | | | | | | 8e | 7 | 1 | 2 | 1 | |
| | F | CG RAM (8) | | / | ? O_oe | | | | | | | 8e | 7 | 1 | 2 | 1 | |

■ SED1278F_{0H}/D_{0H} CHARACTER FONT

| | | Higher 4-bit (D4 to D7) of Character Code (Hexadecimal) | | | | | | | | | | | | | | | |
|--|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| Lower 4-bit (D0 to D3) of Character Code (Hexadecimal) | 0 | CG RAM (1) | | | 0 | a | P | ' | P | | | B | 0 | 4 | . | 2 | K |
| | 1 | CG RAM (2) | | ! | 1 | A | 0 | a | a | | | Γ | 9 | w | . | U | P |
| | 2 | CG RAM (3) | | " | 2 | B | R | b | r | | | E | 6 | u | u | W | P |
| | 3 | CG RAM (4) | | # | 3 | C | S | c | s | | | W | e | u | u | a | P |
| | 4 | CG RAM (5) | | \$ | 4 | D | T | t | t | | | 3 | r | u | u | u | P |
| | 5 | CG RAM (6) | | % | 5 | E | U | e | u | | | N | e | a | u | u | P |
| | 6 | CG RAM (7) | | & | 6 | F | V | v | v | | | N | w | u | u | u | P |
| | 7 | CG RAM (8) | | ' | 7 | G | W | w | w | | | J | 3 | a | I | ' | P |
| | 8 | CG RAM (1) | | (| 8 | H | X | x | x | | | n | w | u | u | ' | P |
| | 9 | CG RAM (2) | |) | 9 | I | V | v | v | | | Y | 3 | a | u | ' | P |
| | A | CG RAM (3) | | * | * | J | Z | j | z | | | 0 | k | u | u | e | P |
| | B | CG RAM (4) | | + | ; | K | L | k | w | | | 4 | a | ' | w | u | P |
| | C | CG RAM (5) | | , | < | L | u | l | e | | | w | w | u | u | u | P |
| | D | CG RAM (6) | | - | = | M | I | m | e | | | b | w | u | u | u | P |
| | E | CG RAM (7) | | . | > | N | ^ | n | e | | | W | n | u | u | u | P |
| | F | CG RAM (8) | | / | ? | O | _ | o | e | | | 3 | r | u | u | u | P |

* Character codes (00H-0FH) of SED1278F are assigned to the area of character generator RAM (CG RAM). The CG ROM of the SED1278F is masked; if you wish to have your own CG ROM, consult S-MOS Marketing Department for conversion of the masked ROM.

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