



十速

TM8793

DATA SHEET

Rev 1.2

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AMENDMENT HISTORY

| Version | Date | Description |
|---------|-----------|---|
| V1.0 | May, 2014 | New release |
| V1.1 | May, 2016 | 1. P.14 Sustain Voltage 1.1V Max. => 1.1V Min 2. P.4 appication => application 3. P.5 Instructon => Instruction 4. P.5 cpacity => capacity |
| V1.2 | Dec, 2016 | P.17 Correct the Static data in Segment Driver Output Characteristics: Voh1d, Voh1e 1.0V -> 2.2V |

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7. Input/output ports.

- Port IOA 4 pins (with internal pull-low, input signal chattering prevention circuitry), and can be defined as SEG24~27/CX, RR, RT, RH by option, or can be defined as CX, RFC0~2 by option.
- Port IOB 4 pins (with internal pull-low), and can be defined as SEG28~31/ELC, ELP. BZB. BZ by option.
- Port IOC 4 pins (with internal pull-low, low-level-hold, input signal chattering prevention circuitry), and can be defined as SEG32~35/KI1~4 by option.
- Port IOD 4 pins (with internal pull-low, input signal chattering prevention circuitry), and can be defined as SEG36~39 by option.
- Port IOE 4 pins (with internal pull-low), and can be defined as SEG40~43 by option, or can be defined as RFC3~5, CX2 by option.

8. Interrupt function.

- External factors 5 (INT pin, Port IOA, IOC, IOD & KI input).
- Internal factors 5 (Pre-Divider, Timer1, Timer2, Timer3 & RFC).

9. Built-in EL-light driver.

- ELC, ELP. Can be defined as SEG28, 29 by option, or can be defined as SEG44, 45 by option.

10. Built-in Alarm, clock or single tone melody generator.

- BZB, BZ. Can be defined as SEG30, 31 by option, or can be defined as SEG46, 47 by option.

11. Built-in resistance to frequency converter.

- CX, RR, RT, RH. Can be defined as SEG24~27/IOA1~4 by option.
- CX, RFC0~5, CX2. Can be defined as IOA1~4, IOE1~4 by option.

12. Built-in key matrix scanning function.

- KO1~KO16 (Shared with SEG1~16)
- KI1~KI4. Can be defined as SEG32~35/IOC1~4 by option.

13. Three 6-bit programmable timers with programmable clock source.

- Read out the content in anytime
- Merged 2 or 3 timers as 12-bit or 18-bit timer
- Used as counter for RFC

14. Watchdog timer.**15. Built-in voltage charge halver & pump circuit for Charge Pump type & $1/nV_{BAT} \sim (n-1)/nV_{BAT}$ (n=3, 4 for 1/3, 1/4Bias) for Capacitive Voltage Divider type**

16. Dual clock operation

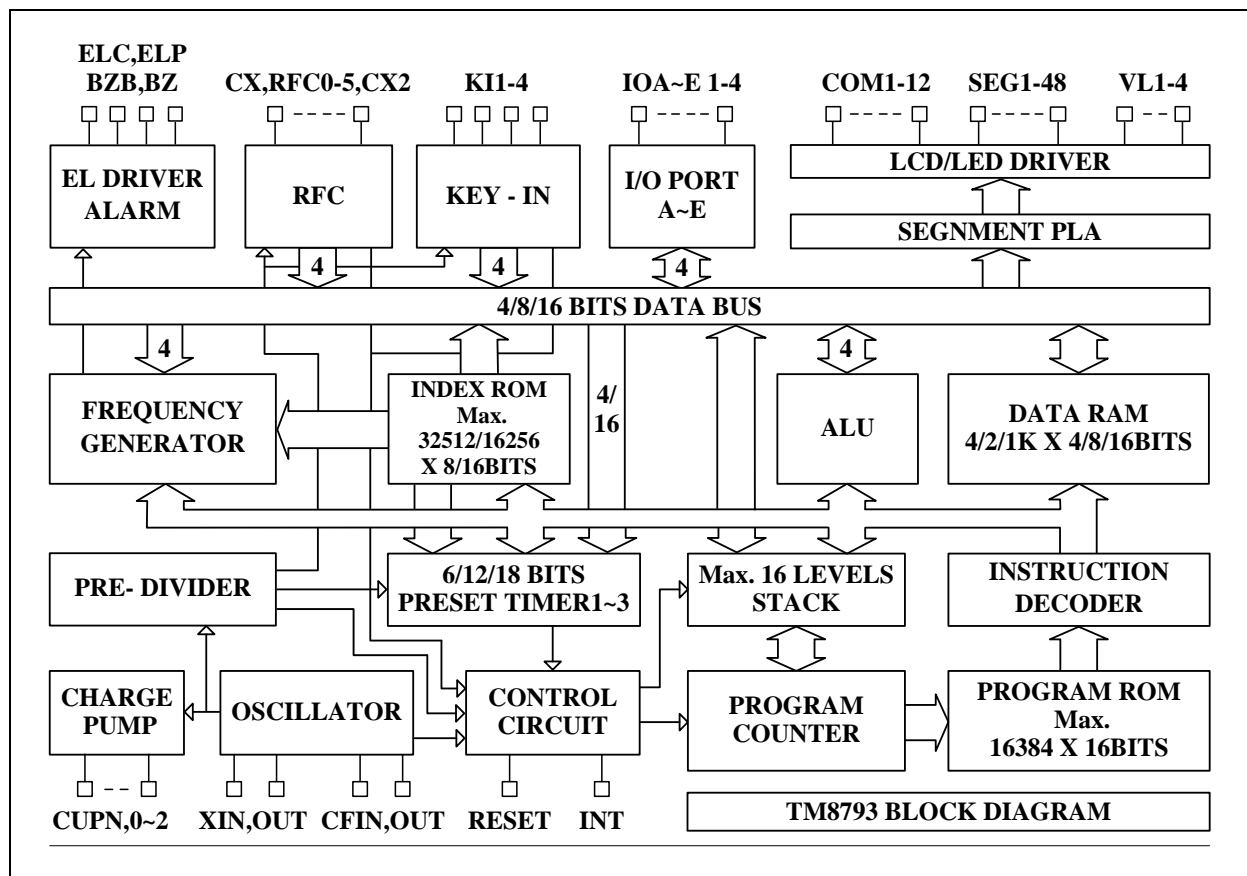
- slow clock oscillation can be defined as X'tal or external RC type oscillator by option.
- fast clock oscillation can be defined as 3.58 MHz ceramic resonator, internal R or external R type oscillator by option.

17. HALT function.**18. STOP function.**

APPLICATION

- Timer/Calendar/Calculator/Thermometer

BLOCK DIAGRAM



PAD ASSIGNMENT

| No | Name | No | Name |
|----|------------|----|----------------|
| 1 | BAK | 51 | SEG48 |
| 2 | XIN | 52 | SEG24/IOA1/CX |
| 3 | XOUT | 53 | SEG25/IOA2/RR |
| 4 | CFIN | 54 | SEG26/IOA3/RT |
| 5 | CFOUT | 55 | SEG27/IOA4/RH |
| 6 | GND | 56 | SEG28/IOB1/ELC |
| 7 | VL1 | 57 | SEG29/IOB2/ELP |
| 8 | VBAT | 58 | SEG30/IOB3/BZB |
| 9 | VL2 | 59 | SEG31/IOB4/BZ |
| 10 | VL3 | 60 | SEG32/IOC1/KI1 |
| 11 | VL4 | 61 | SEG33/IOC2/KI2 |
| 12 | CUPN | 62 | SEG34/IOC3/KI3 |
| 13 | CUP0 | 63 | SEG35/IOC4/KI4 |
| 14 | CUP1 | 64 | SEG36/IOD1 |
| 15 | CUP2 | 65 | SEG37/IOD2 |
| 16 | COM1 | 66 | SEG38/IOD3 |
| 17 | COM2 | 67 | SEG39/IOD4 |
| 18 | COM3 | 68 | SEG40/IOE1 |
| 19 | COM4 | 69 | SEG41/IOE2 |
| 20 | COM5/SEGH | 70 | SEG42/IOE3 |
| 21 | COM6/SEGG | 71 | SEG43/IOE4 |
| 22 | COM7/SEGF | 72 | SEG44/ELC/KI1 |
| 23 | COM8/SEGE | 73 | SEG45/ELP/KI2 |
| 24 | COM9/SEGD | 74 | SEG46/BZB/KI3 |
| 25 | COM10/SEGC | 75 | SEG47/BZ/KI4 |
| 26 | COM11/SEGB | 76 | IOA1/CX/ELC |
| 27 | COM12/SEGA | 77 | IOA2/RFC0/ELP |
| 28 | SEG1(K1) | 78 | IOA3/RFC1/BZB |
| 29 | SEG2(K2) | 79 | IOA4/RFC2/BZ |
| 30 | SEG3(K3) | 80 | IOE1/RFC3/ELC |
| 31 | SEG4(K4) | 81 | IOE2/RFC4/ELP |
| 32 | SEG5(K5) | 82 | IOE3/RFC5/BZB |
| 33 | SEG6(K6) | 83 | IOE4/CX2/BZ |
| 34 | SEG7(K7) | 84 | RESET |
| 35 | SEG8(K8) | 85 | INT |
| 36 | SEG9(K9) | 86 | VPP |
| 37 | SEG10(K10) | | |
| 38 | SEG11(K11) | | |
| 39 | SEG12(K12) | | |
| 40 | SEG13(K13) | | |
| 41 | SEG14(K14) | | |
| 42 | SEG15(K15) | | |
| 43 | SEG16(K16) | | |
| 44 | SEG17 | | |
| 45 | SEG18 | | |
| 46 | SEG19 | | |
| 47 | SEG20 | | |
| 48 | SEG21 | | |
| 49 | SEG22 | | |
| 50 | SEG23 | | |

SEGMENT NAME ASSIGNMENT:

| Option | SEGH | SEGG | SEGF | SEGE | SEGD | SEGC | SEGB | SEGA |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1 | SEG48 | SEG47 | SEG46 | SEG45 | SEG44 | SEG43 | SEG42 | SEG41 |
| 2 | SEG42 | SEG41 | SEG48 | SEG47 | SEG46 | SEG45 | SEG44 | SEG43 |
| 3 | SEG44 | SEG43 | SEG42 | SEG41 | SEG48 | SEG47 | SEG46 | SEG45 |
| 4 | SEG46 | SEG45 | SEG44 | SEG43 | SEG42 | SEG41 | SEG48 | SEG47 |

PIN DESCRIPTION

| Name | I/O | Description |
|---------------|--------|---|
| BAK | P | Positive Back-up voltage. At 3V power mode, connect a 0.1u capacitor to GND. Positive voltage is need to BAK for Serial Program/Read Mode. |
| VBAT | P | Positive supply voltage. Positive voltage is need to VBAT for Serial Program/Read Mode. |
| VL1~4 | P | LCD supply voltage. In 1.5V Power Mode or “External LCD Regulator for 3V Power Mode” option=“VL1”, connect positive power or regulator output to VL1. In 3V Power mode, if “External LCD Regulator for 3V Power Mode” option=“No Use” or “VL2”, connect positive power or regulator output to VL2. In 1.5V Power Mode, connect VL2 to VPP (but VL2 need >=2.1V). Positive voltage is need to VL4 for Serial Program/Read Mode. |
| RESET | I | Input pin for external reset request signal, built-in internal pull-down resistor. Signal for Serial Program/Read Mode. |
| INT | I | Input pin for external INT request signal. • Falling edge or rising edge triggered is defined by option. • Internal pull-down or pull-up resistor is defined by option. Signal for Serial Program/Read Mode. |
| VPP | | High voltage is need to VPP for Serial Program/Read Mode. In 1.5V Power Mode, connect VL2 to VPP. In 3.0V Power Mode, connect VBAT to VPP or Floating |
| CUPN,0,1,2 | O | Switching pins for supply the LCD driving voltage to the VDD1~4 pins. • Connect the CUP1 to CUP2 pins with non-polarized electrolytic capacitors when chip operated in 1/3 bias mode. • Connect the CUP0 to CUP2 & CUP1 to CUP2 pins with non-polarized electrolytic capacitors when chip operated in 1/4 bias mode. • Connect the CUPN to CUP0 & CUP1 to CUP2 pins with non-polarized electrolytic capacitors when chip operated in more efficient 1/3&1/4 bias mode. |
| XIN XOUT | I O | Low speed oscillator, generates clock for time base functions (clock specified. LCD alternating frequency. Alarm signal frequency) or system clock oscillation. • The usage of 32 KHz Crystal oscillator or external RC oscillator is defined by option. |
| CFIN CFOUT | I O | High speed oscillator, system clock oscillation for FAST clock only or DUAL clock operation. • The usage of 3.58MHz ceramic/resonator oscillator or external R type oscillator is defined by option |
| COM1~12 | O | Output pins for driving the common pins of the LCD panel. COM5~12 can be defined as COMS or Open Drain or SEG type output by option. |
| SEG1~48 | O | Output pins for driving the LCD panel segment. SEG24~27 can be defined as IOA1~4/CX, RR, RT, RH by option. SEG28~31 can be defined as IOB1~4/ELC, ELP, BZB, BZ by option. SEG32~35 can be defined as IOC1~4/KI1~4 by option. SEG36~39 can be defined as IOD1~4 by option. SEG40~43 can be defined as IOE1~4 by option. SEG44~47 can be defined as ELC, ELP, BZB, BZ by option. SEG1~48 can be defined as DC/Open Drain by option. |
| IOA1~4 | I/O | Input/Output port A, and can be defined as SEG24~27/CX, RR, RT, RH by option or can be defined as CX, RFC0~2 by option. |
| IOB1~4 | I/O | Input/Output port B, and can be defined as SEG28~31/ELC, ELP, BZB, BZ by option. |

| Name | I/O | Description |
|-----------------------------------|--------|---|
| IOC1~4 | I/O | Input/Output port C, and can be defined as SEG32~35/KI1~4 by option. |
| IOD1~4 | I/O | Input/Output port D, and can be defined as SEG36~39 by option. |
| IOE1~4 | I/O | Input/Output port E, and can be defined as SEG40~43 by option, or can be defined as RFC3~5, CX2 by option. |
| CX,RR,RT, RH CX,RFC0~5,C X2 | I O | 1 input pin and 3 output pins for RFC application, and can be defined as SEG24~27/ IOA1~4 by option. 2 input pin and 6 output pins for RFC application, and can be defined as IOA1~4, IOE 1~4 by option. |
| ELC/ELP | O | Output port for El panel driver, and can be defined as SEG28/29 or SEG44/45 or IOE1/2 by option. |
| BZB/BZ | O | Output port for alarm, clock or single tone melody generator, and can be defined as SEG30/31 or SEG46/47 or IOE3/4 by option. |
| KO1~KO16 | O | Output port for key matrix scanning, shared with SEG1~16. |
| KI1~4 | I | Input port for key matrix scanning, and can be defined as SEG32~35/IOC1~4 or SEG44~47/ELC, ELP, BZB, BZ by option. |
| GND | P | Negative supply voltage. Negative voltage is need to GND for Serial Program/Read Mode |

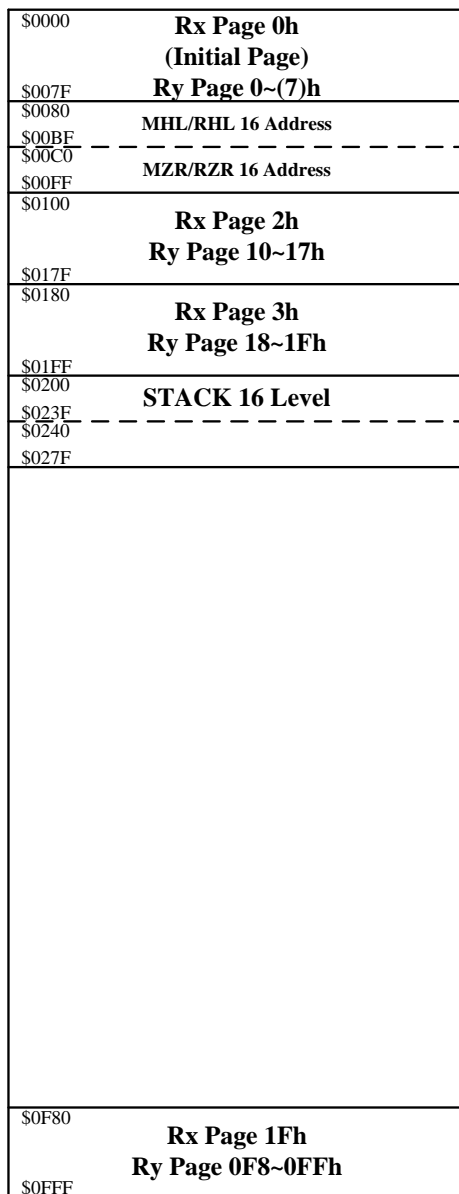
SERIAL PROGRAM/READ CONNECT PINS :

VPP, VBAT, GND, RESET, INT, BAK, VL4

RAM & INITIAL PAGE ASSIGNMENT

| Mode | Initial Page | Page Number | Instruction inserted for set other Page by Compiler |
|-----------------|----------------|-------------|---|
| Rx (0000~0FFFh) | 0000~007Fh (0) | 32 (x128) | SRX X (X: 1~1Fh) |
| Ry (0000~0FFFh) | 0070~007Fh (7) | 256 (x16) | SRY X (X: 0~6, 8~0FFh) |
| Lz (000~7Fh) | 0~1Fh (0) | 2 (x32) | SLZ X (X: 0~1h) |

4K x 4bits RAM



\$0,0000, 10XX, XX00b <= IDBF3-0
 \$0,0000, 10XX, XX01b <= IDBF7-4
 \$0,0000, 10XX, XX10b <= IDBF11-8
 \$0,0000, 10XX, XX11b <= IDBF15-12

 \$0,0000, 11XX, XX00b <= ZRBF3-0
 \$0,0000, 11XX, XX01b <= ZRBF7-4
 \$0,0000, 11XX, XX10b <= ZRBF11-8
 \$0,0000, 11XX, XX11b <= ZRBF15-12

16 level x 16bits STACK(if share)

| level | PC15~12 | PC11~8 | PC7~4 | PC3~0 |
|-------|---------|--------|--------|--------|
| 1 | \$0203 | \$0202 | \$0201 | \$0200 |
| 2 | \$0207 | \$0206 | \$0205 | \$0204 |
| 3 | \$020B | \$020A | \$0209 | \$0208 |
| 4 | \$020F | \$020E | \$020D | \$020C |
| 5 | \$0213 | \$0212 | \$0211 | \$0210 |
| 6 | \$0217 | \$0216 | \$0215 | \$0214 |
| 7 | \$021B | \$021A | \$0219 | \$0218 |
| 8 | \$021F | \$021E | \$021D | \$021C |
| 9 | \$0223 | \$0222 | \$0221 | \$0220 |
| 10 | \$0227 | \$0226 | \$0225 | \$0224 |
| 11 | \$022B | \$022A | \$0229 | \$0228 |
| 12 | \$022F | \$022E | \$022D | \$022C |
| 13 | \$0233 | \$0232 | \$0231 | \$0230 |
| 14 | \$0237 | \$0236 | \$0235 | \$0234 |
| 15 | \$023B | \$023A | \$0239 | \$0238 |
| 16 | \$023F | \$023E | \$023D | \$023C |

ABSOLUTE MAXIMUM RATINGS

GND=0V

| Name | Symbol | Range | Unit |
|-------------------------------|--------|-------------------|------|
| Maximum Supply Voltage | VBAT | -0.3 to 5.5 | V |
| | VL1 | | |
| | VL2 | | |
| | VL3 | -0.3 to 8.5 | |
| | VL4 | | |
| Maximum Input Voltage | Vin1 | -0.3 to VBAT+0.3 | |
| | Vin2 | -0.3 to VL1/2+0.3 | |
| Maximum output Voltage | Vout1 | -0.3 to VBAT+0.3 | |
| | Vout2 | -0.3 to VL1/2+0.3 | |
| | Vout3 | -0.3 to VL3+0.3 | |
| | Vout4 | -0.3 to VL4+0.3 | |
| Maximum Operating Temperature | Topg | -40 to +80 | °C |
| Maximum Storage Temperature | Tstg | -40 to +125 | |

POWER CONSUMPTION

at Ta= -40°C to 80°C, GND=0V

Halt Conduction: BCF=0, 1/3Bias, 1/12Duty, LCD Alternating Frequency=PH6, Charge Pump Cycle =PH5, Only 32.768 KHz Crystal oscillator operating, without loading.

| Name | Sym. | Power Mode | Min. | Typ. | Max. | Unit |
|-----------|--------|--------------------------------------|------|------|------|------|
| HALT mode | IHALT1 | 1.5V Mode, VBAT=1.5V | | 5 | | uA |
| | IHALT2 | 3V Mode (BCF=0=>BAK=VL1), VBAT=3.0V | | 2 | | |
| | IHALT2 | 3V Mode (BCF=0=>BAK=VBAT), VBAT=3.0V | | 10 | | |
| STOP mode | ISTOP | | | | 1 | |

Note: When RC oscillator function is operating, the current consumption will depend on the frequency of oscillation.

ALLOWABLE OPERATING CONDITIONS

at#1: 1.5V Power Mode

at#2: 3/5V Power Mode

at#3: BAK=1.2V

at#4: BAK=2.2V

at Ta= -40°C to 80°C, GND=0V; X'tal No Matched Capacitance (BAK>4V need Matched Capacitance)

| Name | Symb. | Condition | Min. | Max. | Unit |
|-----------------------------|-------------|---|----------|----------|------|
| Supply LCD Voltage | VL1 | #1 | 1.2 | 1.8 | V |
| | | #2 | 0.95 | 1.8 | |
| | VL2 | #1 | 2.2 | 5.25 | |
| | | #2 | 2.0 | 5.25 | |
| | VL3 | | 2.2 | 8.0 | |
| VL4 | | 2.2 | 8.0 | | |
| Oscillator Start-Up Voltage | VDDB | Crystal Mode BCF=1, #1 | 1.4 | | |
| | | Crystal Mode BCF=1, #2 | 1.8 | | |
| Oscillator Sustain Voltage | VDDB | Crystal Mode BCF=0 | 1.1 | | |
| Supply Voltage | VBAT | 1.5V Power Mode | 1.2 | 1.8 | |
| | | 3V Power Mode BAK=VBAT for BCF=0 | 2.2 | 5.25 | |
| | | 3V Power Mode BAK=VL1 for BCF=0 | 2.4 | 5.25 | |
| | | 3V Power Mode VL1=1/3 x VBAT for 1/3Bias | 2.85 | 5.25 | |
| | | 3V Power Mode VL1=1/4 x VBAT for 1/4 Bias | 3.8 | 5.25 | |
| Input "H" Voltage | Vih1 | I/O | 0.8xVBAT | VBAT+0.6 | |
| Input "L" Voltage | Vil1 | | -0.6 | 0.2xVBAT | |
| Input "H" Voltage | Vih2 | CX/2, INT, RESET | 0.8xVBAT | VBAT+0.6 | |
| Input "L" Voltage | Vil2 | | -0.6 | 0.2xVBAT | |
| Input "H" Voltage | Vih3 | XIN,CFIN | 0.8xBAK | BAK+0.6 | |
| Input "L" Voltage | Vil3 | | -0.6 | 0.2xBAK | |
| Operating Freq | Fopg1 | Crystal Mode | 32 | | KHz |
| | Fopg2 | RC Mode, #3 | 10 | 250 | |
| | | RC Mode, #4 | 10 | 4096 | |
| Fopg3 | CF Mode, #4 | 1000 | 4096 | | |

ALLOWABLE OPERATING FREQUENCY

at Ta= -40°C to 80°C, GND=0V

| Condition | Max, Operating Frequency |
|-----------|--------------------------|
| BAK=1.2V | 250 KHz |
| BAK=2.2V | 4 MHz |

INTERNAL RC FREQUENCY RANGE

at Ta=-40°C to 80°C, GND=0V

| Option Mode | BAK | Min. | Typ. | Max. |
|-------------|------|---------|---------|---------|
| 250 KHz | 1.5V | 100 KHz | 180 KHz | 300 KHz |
| | 3.0V | 200 KHz | 250 KHz | 300 KHz |
| 500 KHz | 1.5V | 200 KHz | 360 KHz | 600 KHz |
| | 3.0V | 400 KHz | 500 KHz | 600 KHz |

ELECTRICAL CHARACTERISTICS

at#1: VBAT=1.5V (1.5V Power Mode)

at#2: VBAT=3.0V (3V Power Mode)

at#3: VBAT=5.0V (5V Power Mode)

at Ta=-40°C to 80°C, GND=0V

Input Resistance

| Name | Symb. | Condition | Min. | Typ. | Max. | Unit |
|-------------------------|--------|--------------------------|------|------|------|------|
| “L” Level Hold Tr (IOC) | Rllh1 | Vi=0.2xVBAT, #1 | 10 | 40 | 100 | KΩ |
| | Rllh2 | Vi=0.2xVBAT, #2 | 10 | 40 | 100 | |
| | Rllh3 | Vi=0.2xVBAT, #3 | 10 | 20 | 100 | |
| IOC Pull-Down Tr | Rmad1 | Vi=VBAT, #1 | 200 | 500 | 1000 | |
| | Rmad2 | Vi=VBAT, #2 | 200 | 500 | 1000 | |
| | Rmad3 | Vi=VBAT, #3 | 100 | 250 | 500 | |
| INT Pull-up Tr | Rintu1 | Vi=VBAT, #1 | 50 | 200 | 1000 | |
| | Rintu2 | Vi=VBAT, #2 | 50 | 350 | 1000 | |
| | Rintu3 | Vi=VBAT, #3 | 100 | 250 | 500 | |
| INT Pull-Down Tr | Rintd1 | Vi=GND, #1 | 200 | 500 | 1000 | |
| | Rintd2 | Vi=GND, #2 | 200 | 500 | 1000 | |
| | Rintd3 | Vi=GND, #3 | 100 | 250 | 500 | |
| RES Pull-Down R | Rres1 | Vi=GND or VBAT, #1, 2, 3 | 10 | 40 | 100 | |

DC OUTPUT CHARACTERISTICS

at#1: VBAT=1.2V

at#2: VBAT=2.4V

at#3: VBAT=4.0V

at Ta=-40°C to 80°C, GND=0V

| Name | Symb. | Condition | Port | Min. | Typ. | Max. | Unit |
|--------------------|-------|----------------|--|------|------|------|------|
| Output "H" Voltage | Voh1a | Ioh=-100uA, #1 | COM1~16, SEG1~23, 48, *1 | 1.0 | | | V |
| | Voh2a | Ioh=-1mA, #2 | | 2.0 | | | |
| | Voh3a | Ioh=-3mA, #3 | | 3.2 | | | |
| Output "L" Voltage | Vol1a | Iol=200uA, #1 | | | | 0.2 | |
| | Vol2a | Iol=2mA, #2 | | | | 0.4 | |
| | Vol3a | Iol=6mA, #3 | | | | 0.8 | |
| Output "H" Voltage | Voh1b | Ioh=-200uA, #1 | RFC0~5, INT/CX/CX2 (Vol only), *2 | 1.0 | | | |
| | Voh2b | Ioh=-3mA, #2 | | 2.0 | | | |
| | Voh2c | Ioh=-5mA, #3 | | 3.2 | | | |
| Output "L" Voltage | Vol1b | Iol=400uA, #1 | | | | 0.2 | |
| | Vol2b | Iol=5mA, #2 | | | | 0.4 | |
| | Vol3b | Iol=10mA, #3 | | | | 0.8 | |

***1: SEG24~47, IOA~E, EL, BZ normal driver/sink follow Body**

***2: SEG24~27, IOA~E, EL, BZ, big driver/sink follow Body**

SEGMENT DRIVER OUTPUT CHARACTERISTICS

at#1: VL1=1.2V

at#2: VL2=2.4V

at#3: VL2=4.0V

at#4: VL1=1.05V

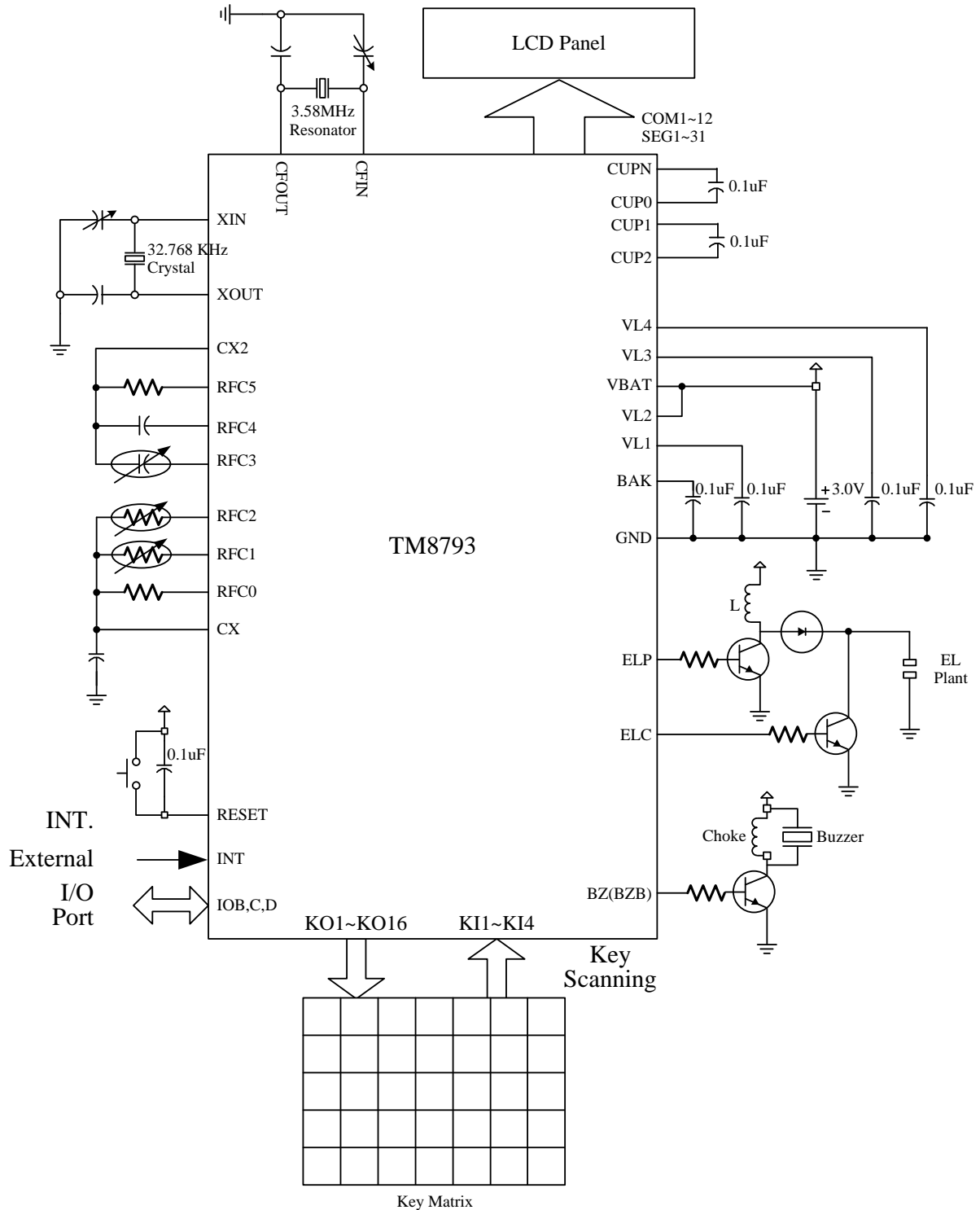
at#5: VL2=2.10V

| Name | Symb. | Condition | For | Min. | Typ. | Max. | Unit. | |
|-----------------------|---------|-----------------------|-------|------|------|------|-------|--|
| Static display Mode | | | | | | | | |
| Output "H" Voltage | Voh1d | Ioh=-1uA, #1 | SEG-n | 2.2 | | | V | |
| | Voh2d | Ioh=-1uA, #2 | | 2.2 | | | | |
| | Voh3d | Ioh=-1uA, #3 | | 3.8 | | | | |
| | Voh4d | Ioh=-1uA, #4 | | 0.85 | | | | |
| | Voh5d | Ioh=-1uA, #5 | | 1.90 | | | | |
| Output "L" Voltage | Vol1d | Iol=1uA, #1 | | | | 0.2 | | |
| | Vol2d | Iol=1uA, #2 | | | | 0.2 | | |
| | Vol3d | Iol=1uA, #3 | | | | 0.2 | | |
| | Vol4d | Iol=1uA, #4 | | | | 0.2 | | |
| | Vol5d | Iol=1uA, #5 | | | | 0.2 | | |
| Output "H" Voltage | Voh1e | Ioh=-10uA, #1 | COM-n | 2.2 | | | V | |
| | Voh2e | Ioh=-10uA, #2 | | 2.2 | | | | |
| | Voh3e | Ioh=-10uA, #3 | | 3.8 | | | | |
| | Voh4e | Ioh=-10uA, #4 | | 0.85 | | | | |
| | Voh5e | Ioh=-10uA, #5 | | 1.90 | | | | |
| Output "L" Voltage | Vol1e | Iol=10uA, #1 | | | | 0.2 | | |
| | Vol2e | Iol=10uA, #2 | | | | 0.2 | | |
| | Vol3e | Iol=10uA, #3 | | | | 0.2 | | |
| | Vol4e | Iol=10uA, #4 | | | | 0.2 | | |
| | Vol5e | Iol=10uA, #5 | | | | 0.2 | | |
| 1/2 Bias display Mode | | | | | | | | |
| Output "H" Voltage | Voh12f | Ioh=-1uA, #1, #2 | SEG-n | 2.2 | | | V | |
| | Voh3f | Ioh=-1uA, #3 | | 3.8 | | | | |
| | Voh45f | Ioh=-1uA, #4, #5 | | 1.95 | | | | |
| Output "M1" Voltage | Vom112f | Iol/h=+/-1uA, #1, #2 | | 1.0 | | 1.4 | | |
| | Vom13f | Iol/h=+/-1uA, #3 | | 1.8 | | 2.2 | | |
| | Vom145f | Iol/h=+/-1uA, #4, #5 | | 0.85 | | 1.25 | | |
| Output "L" Voltage | Vol12f | Iol=1uA, #1, #2 | | | | 0.2 | | |
| | Vol3f | Iol=1uA, #3 | | | | 0.2 | | |
| | Vol45f | Iol=1uA, #4, #5 | | | | 0.2 | | |
| Output "H" Voltage | Voh12g | Ioh=-10uA, #1, #2 | COM-n | 2.2 | | | V | |
| | Voh3g | Ioh=-10uA, #3 | | 3.8 | | | | |
| | Voh45g | Ioh=-10uA, #4, #5 | | 1.95 | | | | |
| Output "M1" Voltage | Vom112g | Iol/h=+/-10uA, #1, #2 | | 1.0 | | 1.4 | | |
| | Vom13g | Iol/h=+/-10uA, #3 | | 1.8 | | 2.2 | | |
| | Vom145g | Iol/h=+/-10uA, #4, #5 | | 0.85 | | 1.25 | | |
| Output "L" Voltage | Vol12g | Iol=10uA, #1, #2 | | | | 0.2 | | |

| Name | Symb. | Condition | For | Min. | Typ. | Max. | Unit. | |
|-----------------------|---------|-----------------------|-------|-------|------|------|-------|---|
| | Vol3g | Iol=10uA, #3 | | | | 0.2 | | |
| | Vol45g | Iol=10uA, #4, #5 | | | | 0.2 | | |
| 1/3 Bias display Mode | | | | | | | | |
| Output "H" Voltage | Voh12h | Ioh=-1uA, #1, #2 | SEG-n | 3.4 | | | V | |
| | Voh3h | Ioh=-1uA, #3 | | 5.8 | | | | |
| | Voh45h | Ioh=-1uA, #4, #5 | | 2.95 | | | | |
| Output "M1" Voltage | Vom112h | Iol/h=+/-1uA, #1, #2 | | 1.0 | | 1.4 | | |
| | Vom13h | Iol/h=+/-1uA, #3 | | 1.8 | | 2.2 | | |
| | Vom145h | Iol/h=+/-1uA, #4, #5 | | 0.85 | | 1.25 | | |
| Output "M2" Voltage | Vom212h | Iol/h=+/-1uA, #1, #2 | | 2.2 | | 2.6 | | |
| | Vom23h | Iol/h=+/-1uA, #3 | | 3.8 | | 4.2 | | |
| | Vom245h | Iol/h=+/-1uA, #4, #5 | | 1.95 | | 2.30 | | |
| Output "L" Voltage | Vol12h | Iol=1uA, #1, #2 | | | | 0.2 | | |
| | Vol3h | Iol=1uA, #3 | | | | 0.2 | | |
| | Vol45h | Iol=1uA, #4, #5 | | | | 0.2 | | |
| Output "H" Voltage | Voh12i | Ioh=-10uA, #1, #2 | | COM-n | 3.4 | | | |
| | Voh3i | Ioh=-10uA, #3 | | | 5.8 | | | |
| | Voh45i | Ioh=-10uA, #4, #5 | | | 2.95 | | | |
| Output "M1" Voltage | Vom112i | Iol/h=+/-10uA, #1, #2 | 1.0 | | | 1.4 | | |
| | Vom13i | Iol/h=+/-10uA, #3 | 1.8 | | | 2.2 | | |
| | Vom145i | Iol/h=+/-10uA, #4, #5 | 0.85 | | | 1.25 | | |
| Output "M2" Voltage | Vom212i | Iol/h=+/-10uA, #1, #2 | 2.2 | | | 2.6 | | |
| | Vom23i | Iol/h=+/-10uA, #3 | 3.8 | | | 4.2 | | |
| | Vom245i | Iol/h=+/-10uA, #4, #5 | 1.90 | | | 2.30 | | |
| Output "L" Voltage | Vol12i | Iol=10uA, #1, #2 | | | | 0.2 | | |
| | Vol3i | Iol=10uA, #3 | | | | 0.2 | | |
| | Vol45i | Iol=10uA, #4, #5 | | | | 0.2 | | |
| 1/4 Bias display Mode | | | | | | | | |
| Output "H" Voltage | Voh12j | Ioh=-1uA, #1, #2 | SEG-n | | 4.6 | | | V |
| | Voh45j | Ioh=-1uA, #4, #5 | | | 4.00 | | | |
| Output "M2" Voltage | Vom212j | Iol/h=+/-1uA, #1, #2 | | 2.2 | | 2.6 | | |
| | Vom245j | Iol/h=+/-1uA, #4, #5 | | 1.90 | | 2.30 | | |
| Output "L" Voltage | Vol12j | Iol=1uA, #1, #2 | | | | 0.2 | | |
| | Vol45j | Iol=1uA, #4, #5 | | | | 0.2 | | |
| Output "H" Voltage | Voh12k | Ioh=-10uA, #1, #2 | COM-n | 4.6 | | | | |
| | Voh45k | Ioh=-10uA, #4, #5 | | 4.00 | | | | |
| Output "M1" Voltage | Vom112k | Iol/h=+/-10uA, #1, #2 | | 1.0 | | 1.4 | | |
| | Vom145k | Iol/h=+/-10uA, #4, #5 | | 0.85 | | 1.25 | | |
| Output "M3" Voltage | Vom312k | Iol/h=+/-10uA, #1, #2 | | 3.4 | | 3.8 | | |
| | Vom345k | Iol/h=+/-10uA, #4, #5 | | 2.95 | | 3.35 | | |
| Output "L" Voltage | Vol12k | Iol=10uA, #1, #2 | | | 0.2 | | | |
| | Vol45k | Iol=10uA, #4, #5 | | | 0.2 | | | |

TYPICAL APPLICATION CIRCUIT

This application circuit is simply an example, and is not guaranteed to work.



3V power mode (BAK=VL1 for BCF=0), 1/4 Bias, 1/12 Duty