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TM8793

DATA SHEET

Rev 1.2

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

CONTENTS

GENERAL DESCRIPTION

TM8793 is a One Time PROM embedded high-performance 4-bit microcomputer with LCD/LED driver. It contains all the necessary functions in TM87-series for 1.5V/3V/5V application.

FEATURES

1. Low power dissipation.

- 1.5V/3V/5V operating voltage range.

2. Powerful instruction set.

- Binary addition, subtraction, BCD adjustment. BCD can be executed directly in addition, subtraction operation.
- 4 bits x 4 bits Multiplier
- Single-bit manipulation (set, reset, decision for branch).
- Various conditional branches.
- 16 initial working registers and manipulators. (can be extended to all RAM by Page Mode)
- Table look-up.
- LCD driver data transfer.

3. ROM capacity. 16K x 16 bits.

- Instruction ROM Max. capacity 16K x 16 bits.
- Table ROM Max. capacity 32512/16256 x 8/16 bits.

4. RAM capacity. 4K/2K/1K x 4/8/16 bits.

- STACK Max. capacity 16 x 16 bits.
- HL/ZR store Max. capacity 16/16 x 16 bits.

5. With direct/index addressing mode in data RAM access.

6. LCD driver output.

- Over 512 LCD dots by 12 common outputs and 48 segment outputs.
- COM7~12 can be defined as SEG48~43 by option.
- SEG24~47 can be defined as IO, EL, BZ, KI ports by option.
- 1/1~1/12 Duty can be selected by option.
- 1/2 ~1/4 Bias can be selected by option.
- Single instruction to turn off all segments.
- COM5~12 can be defined as CMOS or P_open drain type output by option.

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/nVBAT ~ (n-1) /nVBAT (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.

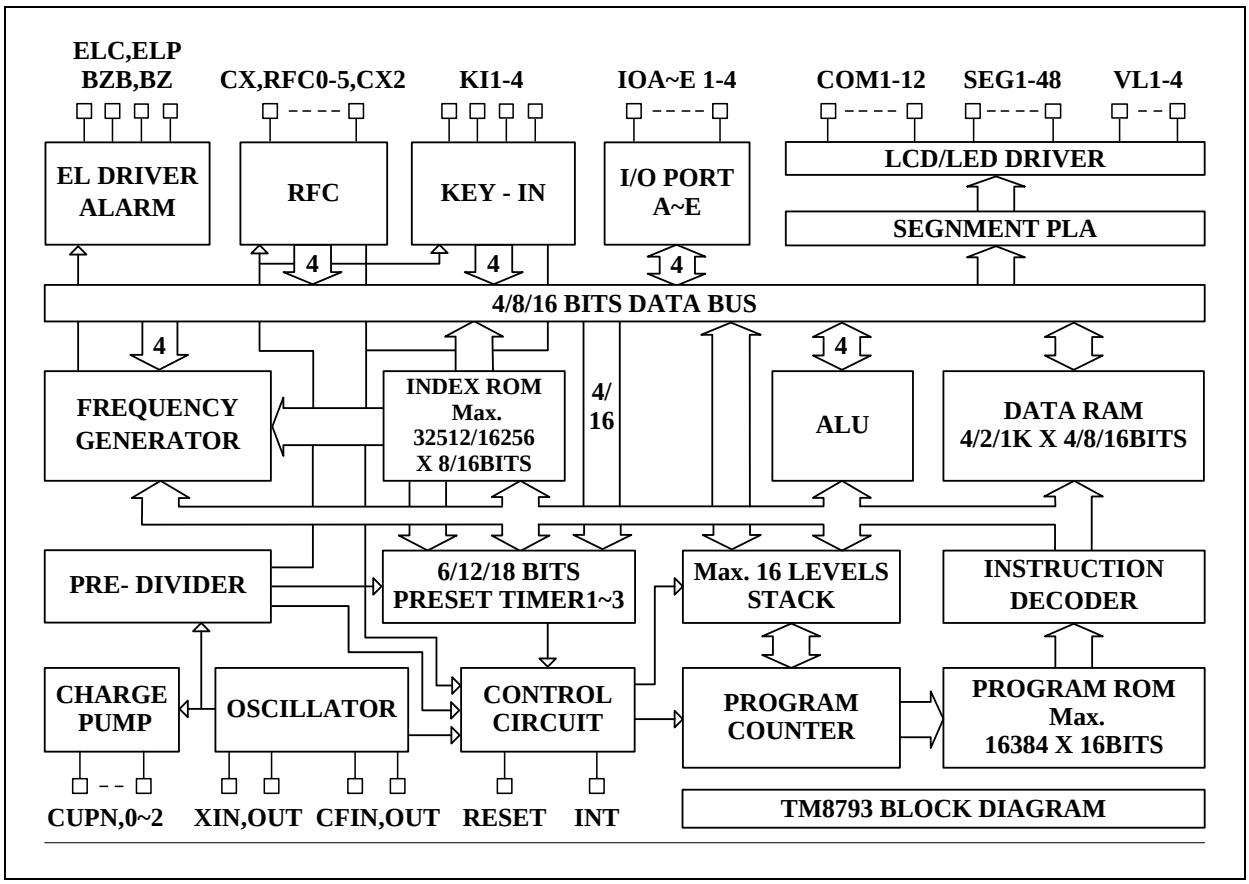
17. HALT function.

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		

SEGNMENT 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.

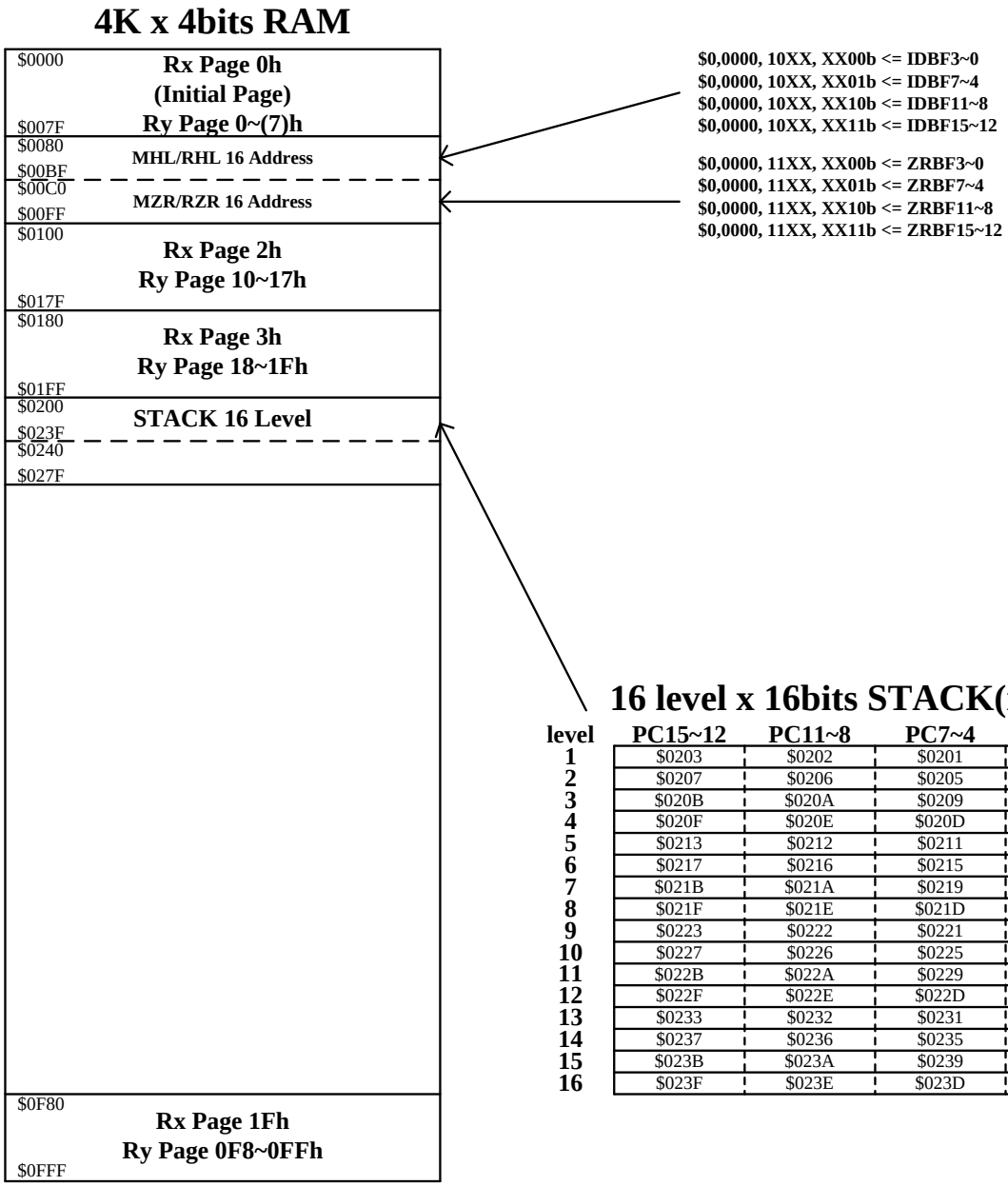
Name	I/O	Description
IOC1~4	I/O	Input/Output port C, and can be defined as SEG32~35/KI1~4 by option.
IOD1~4	I/O	Input/Output port D, and can be defined as SEG36~39 by option.
IOE1~4	I/O	Input/Output port E, and can be defined as SEG40~43 by option, or can be defined as RFC3~5, CX2 by option.
CX,RR,RT, RHCX,RFC0~5,CX2	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, IOE1~4 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)



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

ABSOLOUTE 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

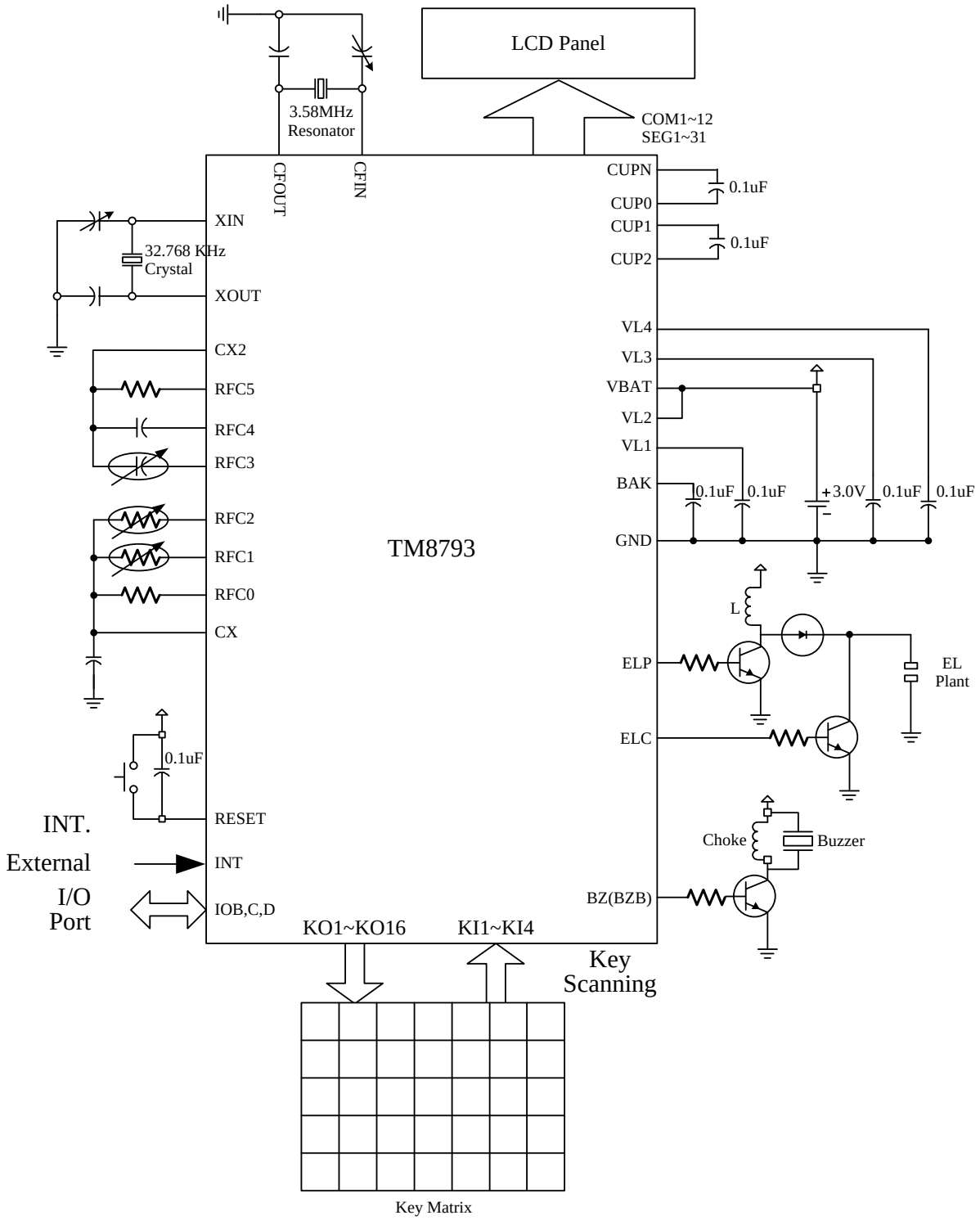
at#5: VL2=2.10V

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			
	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			
	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