



## KD5083 4-DIGIT COUNTDOWN/UP TIMER

### 1. GENERAL DESCRIPTION

The KD5083 is an UP/DOWN timer IC. It can directly drive a standard 4 digit 1/4 duty cycle LCD. Maximum countdown time is 59:59 or 99:59. Count up cycle time is 60 or 100 minutes by bonding option. Also bonding option is for alarm time 32 or 64 seconds, 2kHz, and up/down or just down function. Feasible input options and universal functions give this chip many uses such as parking alarm timer, pillbox timer, kitchen timer, etc.

### 2. FUNCTIONS

- Special alarm trigger output for switch control or for driving another melody IC
- Internal voltage doubler
- 32,768Hz quartz crystal time base
- Single 1.5V battery operation
- Direct drive buzzer
- 4 digit LCD display
- Maximum count 59:59 min or 99:59 min (bonding option)
- Just count-down timer repeat function by bonding option
- Minutes and Seconds set independently
- Timer reset when depressing MSET and SSET simultaneously
- Alarm sound 2kHz, 32 or 64 second (bonding option)

### 3. PIN DESCRIPTION

#### 3.1 SSET - Second Setting Input

This pin sets the seconds time for countdown mode. The setting function will only be effective when the countdown mode has been stopped or reset. If this pin is pulled high with the MSET pin simultaneously, the Timer will be reset. This pin has been internally pulled low.

#### 3.2 MSET - Minute Setting Input

This pin sets minute time for the countdown mode. Like the SSET pin, the minute setting function can be carried out only when the countdown mode has been stopped or reset. This pin is used, with the SSET pin, to execute the reset function. It has been internally pulled low.

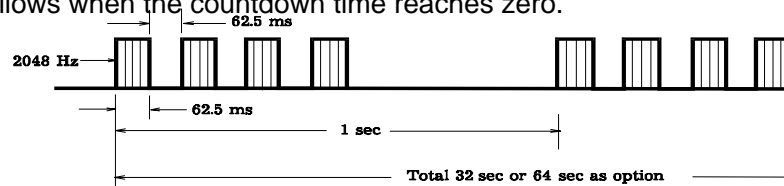
#### 3.3 START/STOP - Start or Stop Input

This pin acts as Start/Stop function for the Up/Down timer. After power-on or reset, the Timer will be in a stop state. When it is triggered, the Timer will be enable, and another trigger will stop the Timer. It has been internally pulled low.

NOTE: The short alarm signal, 62.5ms is sounded when any input beep will be pressed.

#### 3.4 BZ - Alarm Output

This pin (n-channel, open drain) is used to drive the buzzer or speaker. BZ output signal will be as follows when the countdown time reaches zero.



The above alarm signals will be stopped if any key is triggered during this time period.

- 3.5 TRIG - Trigger Output  
This output pin sends out a low level signal in normal condition, including countdown, count-up and standby. If countdown time reaches zero, a high level output appears in this 32 or 64 sec alarm interval; then goes back to low level while alarm stops or any key is pressed.
- 3.6 VDD, GND & VC  
VDD – power pins for positive power supply  
GND – ground  
VC – voltage doubler supply for LCD driving
- 3.7 VA & VB - Voltage Doubler Capacitor  
A capacitor should be connected between these pins.
- 3.8 OSCI & OSCO - Oscillator Input and Output  
A 32,768Hz quartz crystal oscillator is connected to these pins.
- 3.9 SEG1 – SEG8 (LCD Segments Driving Pins)
- 3.10 COM1 – COM4 (LCD Backplane Pins)
- 3.11 TEST (Test Input Pins)
- 3.12 OPT1 (Bonding option for alarm time)  
The alarm time will be 32 sec when this pin is disconnected and 64 sec when this pin is connected to GND.
- 3.13 OPT2 (Bonding option for up/down or input down)  
The up/down mode will be up when this pin is disconnected and down just mode when this pin is connected to GND.
- 3.14 OPT3 (Bonding option for maximum count)  
When it is disconnected the maximum MINUTE count is 99:59 and when it is connected to GND, the maximum MINUTE count is 59:59.

## 4. FUNCTIONAL DESCRIPTION

### 4.1 Countdown Timer Mode

1. After power-on, LCD will display 00:00.
2. Time is set by the SSET and MSET pins. Time setting is only effective in this mode and the timer must be in the stop or reset state. Each depression of these pins will make the timer count advance one digit and if it is depressed more than one second, the timer will count one digit for every 1/8 second. The second and minute setting are independent. Colon will be on but not flash during the setting.
3. The timer will reset to 00:00, if SSET and MSET are depressed simultaneously.
4. After the time has been set, triggering the START/STOP pin will start the timer and colon will begin to flash (0.5 sec on, 0.5 sec off).
5. When the timer is counting, it will be stopped by triggering off any key pin. When the timer is stopped by pressing MSET or SSET key, the preset time will be the time of last pressing one of this keys. In this stop state, the colon will be on, but not flash. The timer can also be set during this state. An additional trigger to START/STOP will terminate this state and start to count from the time which it displays.

6. When countdown time is reached, the LCD displays 00:00 and the colon will be on but not flash. At this moment, BD will send out a 2048 x 8 x 1Hz signal for 32 second (or 64 sec by bonding option). During this alarm period, depress any pin will stop the output.
7. When the countdown timer reaches zero and the alarm signal ends (32 or 64 sec), the LCD will be returned to preset time. If alarm signal is stopped by depressing START/STOP, the LCD will be returned to preset time. If alarm is stopped by the SSET or MSET pin, the LCD displays 00:00 and then depressing START/STOP pin will be returned the LCD to preset time.

#### 4.2 Countup Timer Mode

1. The count-up timer will be triggering START/STOP start only when the chip has been reset and powered on without a set time. The countup timer will start by triggering Start/Stop after reset.
2. The countup timer has a cyclical count of 59 minutes (or 99 minutes by bonding option) after being started.
3. While the countup timer is counting, depressing the any key will stop it. Another trigger of START/STOP will start the timer continuously counting.
4. When the chip is in count up timer mode, the chip can change to count down timer mode after the countup timer is stopped by any key and then preset by MSET and SSET.

#### 5. ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^{\circ}\text{C}$ )

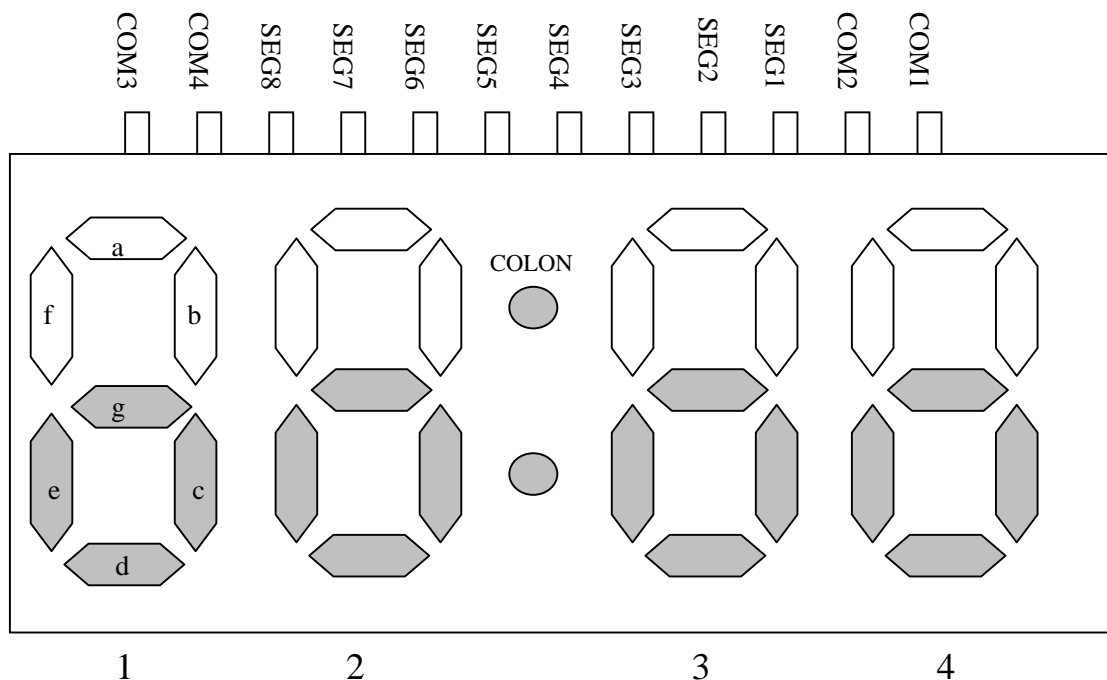
Characteristic	Symbol	Value	Unit
Supply Voltage	VDD - GND	-0.3 ~ 5.0	V
Input Voltage	$V_{IN}$	GND -0.2 to VDD +0.3	V
Operating Temperature	$T_A$	- 20 ~ + 60	$^{\circ}\text{C}$
Storage Temperature	$T_{stg}$	- 55 ~ + 125	$^{\circ}\text{C}$

#### 6. ELECTRICAL CHARACTERISTICS

( $T_a = 25^{\circ}\text{C}$ , GND = 0V, VDD = 1.5V,  $F_{OSC} = 32768\text{ Hz}$  ; unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Operating Voltage	VDD		1.25	1.5	1.70	V
Display Voltage	VC		2.4	3.0	3.4	V
Supply Current	$I_{CC}$	Without Load		3.0	5.0	$\mu\text{A}$
Output Drive Current (BZ, TRIG Output)	$I_{OH}$	$V_{OH} = 1.35\text{V}$ (TRIG Output)	-500			$\mu\text{A}$
	$I_{OL}$	$V_{OL} = 0.15\text{V}$ (TRIG Output)	500			
		$V_{OL} = 0.5\text{V}$ (BZ Output)	5	10		$\text{mA}$
Frequency Stability	$\Delta f/f$	$V_{CC} = 1.25\text{V}$ to $1.70\text{V}$			10	ppm
Oscillator Built-in Capacitor	CD			10		pF
Alarm Output Frequency	$F_{BZ}$		2048 x 4 x 1			Hz
Oscillator Start up Time	$T_{OS}$	$V_{CC} = 1.30\text{V}$			2	sec

四位数字 LCD 格式:



IC pin	COM1	COM2	COM3	COM4
S8	a1	f1	e1	--
S7	b1	g1	c1	d1
S6	a2	f2	e2	--
S5	b2	g2	c2	d2
S4	a3	f3	e3	colon
S3	b3	g3	c3	d3
S2	a4	f4	e4	--
S1	b4	g4	c4	d4

0 1 2 3 4 5 6 7 8 9

管脚说明:

NO.	PADNAME	X	Y
1	VA	-694	389
2	VB	-694	204
3	TEST	-733	-112
4	OPT3	-733	-270
5	VC	-733	-410
6	COM1	-726	-723
7	COM2	-586	-723
8	SEG1	-427	-723
9	SEG2	-289	-723
10	SEG3	-129	-723
11	SEG4	11	-723
12	SEG5	170	-723
13	SEG6	310	-723
14	SEG7	468	-723

NO.	PADNAME	X	Y
15	SEG8	733	-723
16	COM4	733	-565
17	COM3	733	-425
18	OSCO	733	-235
19	OSCI	733	-95
20	TRIG	695	58
21	OPT2	733	296
22	GND	733	445
23	BZ1	738	720
24	VDD	-130	723
25	OPT1	-289	723
26	START	-429	723
27	SSET	-587	723
28	MSET	-727	723

应用线路图:

