DALLAS SEMICONDUCTOR

DS1284
Watchdog Timekeeper Chip

FEATURES

- Keeps track of hundredths of seconds, seconds, minutes, hours, days, date of the month, months, and years; valid leap year compensation up to 2100
- Watchdog timer restarts an out-of-control processor
- Alarm function schedules real-time related activities
- Programmable interrupts and square wave outputs maintain 28-pin JEDEC footprint
- All registers are individually addressable via the address and data bus
- Accuracy is better than ±2 minute/month at 25°C
- 50 bytes of user NV RAM
- Optional 28-pin PLCC surface mount package
- Low-power CMOS circuitry is maintained on less than 0.5 µA when power is supplied from battery input
- Optional industrial temperature range available on 28-pin PLCC (-40°C to +85°C)

PIN ASSIGNMENT

DS1284
28-Pin DIP (600-mil)

DS1284
28-Pin PLCC
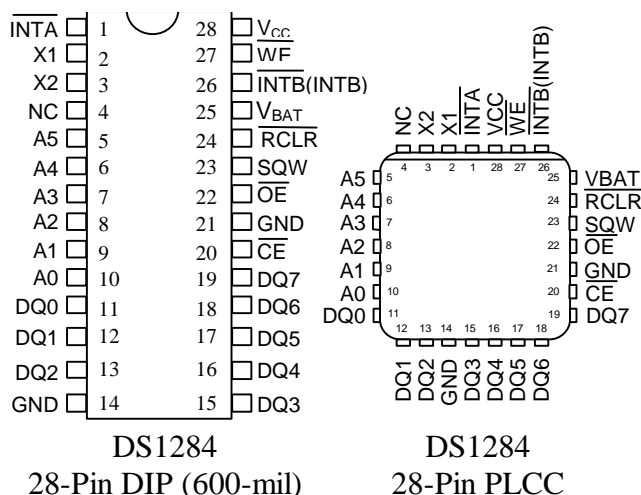
PIN DESCRIPTION

$\overline{\text{INTA}}$	- Interrupt Output A (open drain)
$\overline{\text{INTB}}$ (INTB)	- Interrupt Output B (open drain)
A0-A5	- Address Inputs
DQ0-DQ7	- Data Input/Output
$\overline{\text{CE}}$	- Chip Enable
$\overline{\text{OE}}$	- Output Enable
$\overline{\text{WE}}$	- Write Enable
V_{CC}	- +5 Volts
GND	- Ground
NC	- No Connection
SQW	- Square Wave Output
X1,X2	- 32.768 kHz Crystal Connections
V_{BAT}	- +3 Volt Battery Input
$\overline{\text{RCLR}}$	- RAM Clear

DESCRIPTION

The DS1284 Watchdog Timekeeper Chip is a self-contained real-time clock, alarm, watchdog timer, and interval timer in a 28-pin JEDEC DIP package or a 28-pin PLCC surface mount package. An external crystal and battery are the only components required to maintain time-of-day and memory status in the absence of power. For a complete description of operating conditions, electrical characteristics, bus timing, and pin descriptions other than X1, X2, V_{BAT}, and $\overline{\text{RCLR}}$, see the DS1286 Watchdog Timekeeper data sheet.

PIN DESCRIPTION

X1, X2 - Connections for a standard 32.768 kHz quartz crystal. The internal oscillator circuitry is designed for operation with a crystal having a specified load capacitance (C_L) of 6 pF. The crystal is connected directly to the X1 and X2 pins. There is no need for external capacitors or resistors. For more information on crystal selection and crystal layout considerations, please consult Application Note 58, "Crystal Considerations with Dallas Real Time Clocks."

V_{BAT} - Battery input for any standard 3-volt lithium cell or other energy source. Battery voltage must be held between 2.4 and 3.7 volts for proper operation. The nominal write-protect trip point voltage at which access to registers containing time, watchdog, alarm, and RAM information is denied is set by internal circuitry as 1.26 x V_{BAT}. A maximum load of 0.5 μA at 25°C in the absence of power should be used to size the external energy source. The battery should be connected directly to the V_{BAT} pin. A diode must not be placed in series with the battery to the V_{BAT} pin. Furthermore, a diode is not necessary because reverse charging current protection circuitry is provided internal to the device and has passed the requirements of Underwriters Laboratories for UL listing. An optional ground pin is provided for connection to battery negative. This pin should be grounded but can be left floating.

$\overline{RCLR}$ - The $\overline{RCLR}$ pin is used to clear (set to logic 1) all 50 bytes of user NV RAM but does not affect the registers involved with time, alarm, and watchdog functions. In order to clear the RAM, $\overline{RCLR}$ must be forced to an input logic 0 (-0. 3 to +0.8 volts) during battery back-up mode when V_{CC} is not applied. The $\overline{RCLR}$ function is designed to be used via human interface (shorting to ground or by switch) and not be driven with external buffers. This pin is internally pulled up and should be left floating when not in use.

DS1284Q 28-PIN PLCC WATCHDOG TIMEKEEPER
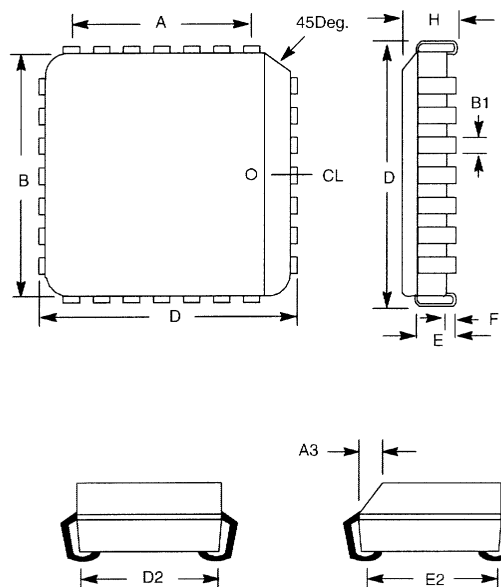
PKG	28-PIN	
DIM	MIN	MAX
A IN.	0.300 BSC	
MM	7.62	
B IN.	0.442	0.462
MM	17.68	11.73
D IN.	0.480	0.500
MM	12.2	12.7
D2 IN.	0.390	0.430
MM	9.91	10.92
E IN.	0.090	0.120
MM	2.29	3.05
E2 IN.	0.390	0.430
MM	9.91	10.92
F IN.	0.015	0.020
MM	0.38	0.518
H IN.	0.100	0.020
MM	2.54	0.518

DS1284 28-PIN DIP WATCHDOG TIMEKEEPER
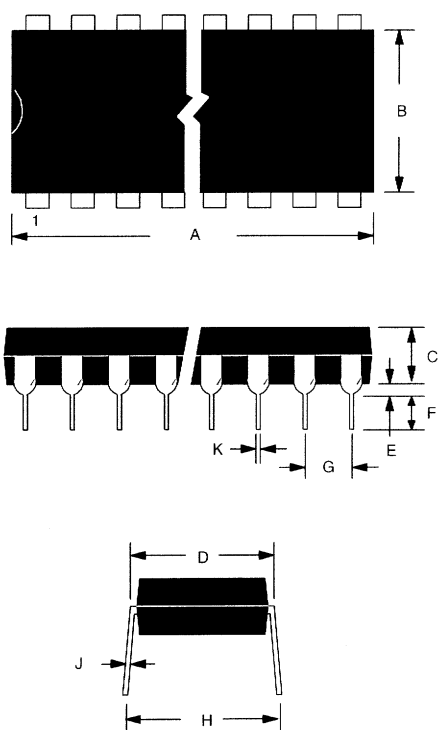
PKG	28-PIN	
DIM	MIN	MAX
A IN. MM	1.445	1.470
B IN. MM	0.530	0.550
C IN. MM	0.140	0.160
D IN. MM	0.600	0.625
E IN. MM	0.015	0.040
F IN. MM	0.120	0.145
G IN. MM	0.090	0.110
H IN. MM	0.625	0.675
J IN. MM	0.008	0.012
K IN. MM	0.015	0.022