LSI/CSI

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LS8106

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HOUR METER TIMER

FEATURES:

- Crystal based timer produces ultra-accurate timing pulses
- Selectable timing pulses at 0.01 hour or 0.001 hour intervals
- Geared to drive electro-mechanical hour meters
- Supply voltage 5V to 6.5V
- Internal Zener clamp allows any supply voltage using current limiting series resistor
- Sense input for over voltage shutdown
- Available in 8L DIP: part no. LS8106
- Available in 8L SOIC: part no. LS8106-S

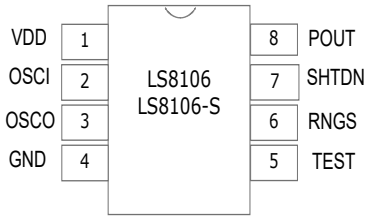

Fig 1

APPLICATIONS:

- DC or AC powered Electromechanical Hour Meters. Hour Meters can be integrated with machineries for logging their true depreciation by recording the run time accurately instead of recording the calendar days. This method of record keeping can also be used for scheduled maintenance, rental records, warranty etc.

GENERAL DESCRIPTION:

LS8106 is a monolithic CMOS integrated circuit designed for driving electro-mechanical hour meters. It produces output pulses at regular intervals to advance the hour meter display. The first output pulse occurs between 3 to 4 second after application of the supply voltage. Thereafter the pulses occur at time intervals of 3.6 seconds for 10,000 hours display range or 36 seconds for 100,000 hours display range. One of these two ranges can be selected with RNGS input

The chip can be powered by either a DC voltage source or an AC voltage source with the addition of a single rectifying diode in series with the AC source. With an appropriate current limiting resistor in series with the power supply a very wide range of DC and AC voltage sources can be used to power the chip. An over voltage protection input is provided to shut down the pulse output in the event of power supply over voltage condition.

INPUTS/OUTPUTS:

VDD (Pin 1). Supply voltage positive terminal. The VDD voltage is clamped at 6.5V to 7.5V with an internal Zener diode. When operating from a supply higher than 6.5V, VDD should be clamped to a maximum of 6.5V using a series resistor. For example, for an 80V supply a 510K series resistor will set VDD to around 6.5V.

OSCI, OSCO (Pin 2, Pin 3). Oscillator input and output terminals. A 32.768KHz crystal connected between these terminals generates the clock for the output pulse intervals.

GND (Pin 4). Supply voltage negative terminal.

TEST (Pin 5). This input pin is reserved for factory use only and must be tied to ground in all user applications.

RNGS (Pin 6). Range select input. When tied low RNGS input causes the circuit to be in 100,000hour mode. In this mode the output pulses are generated at 36 second intervals. When high 10,000hour mode is selected with the output pulses occurring at 3.6 second intervals. This input has an input pull-up.

SHTDN (Pin 7). Shutdown input. This input allows a means to shut down the output pulses at pin8 in a power supply over voltage condition. The output is disabled and held low when the SHTDN input voltage is above the shutdown threshold.

POUT (Pin 8). Pulse output. Nominal 70mS high going pulses occur at this output continually starting between 3 second and 4 second after powerup and every 3.6 seconds or 36 seconds thereafter depending on the logic state of the RNGS input. The output pulses are designed to drive an external NFET for driving the hour meter electromechanical relay.

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ABSOLUTE MAXIMUM RATINGS:
(All voltages are referenced to GND; T_A = +25°C unless otherwise specified)

Supply Voltage at VDD ……..-0.3V min, +7.5V max
Input voltage (all inputs)…… …… -0.3V min, VDD+0.3V max
Operating temperature……..-45°C to +90°C
Storage temperature……..-65°C to +150°C
Device power dissipation ……..250mW max

The information included herein is believed to be accurate and reliable. However, LSI Computer Systems, Inc. assumes no responsibilities for inaccuracies, or for any infringements of patent rights of others which may result from its use

ELECTRICAL CHARASTERISTICS; VDD =6. 5V, T_A = 27°C unless specified otherwise						
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Supply Voltage	VDD	4.5	-	6.5	Volt	
Supply Current	Idd	-	-	800	uA	Vdd = 6.5V, no current limiting resistor between Vsupply and Vdd
Power dissipation	P_D	-	-	200	mW	P_D = Vdd x Idd
RNGS input logic low	V_{RL}	2.0	2.5	-	Volt	Vdd = 6.5V
RNGS input logic high	V_{RH}	-	3.5	4.0	Volt	Vdd = 6.5V
SHTDN input switching threshold	V_{SD}	-	0.42xVdd	-	Volt	
SHTDN input hysteresis	V_{SHYS}	-	160	-	mV	Vdd = 6.5V
Input current: RNGS input low	I_{RL}	-	-3	-	uA	Vin = 0, Vdd = 6.5V
Input current: RNGS input high	I_{RH}	-	100	-	nA	Vin = VDD
Input current: SHTDN input low/high	I_S	-	50	-	nA	Vin = 0 to Vdd
Output current: POUT source	I_{PSRC}	-1.6	-2.0	-	mA	Vout = VDD – 0.5V, Vdd = 6.5V
Output current: POUT sink	I_{PSRC}	0.8	1.0	-	mA	Vout = 0.5V, Vdd = 6.5V
SWITCHING CHARASTERISTICS; VDD = 6.5V, T_A = 27°C, output load = 15pF						
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Oscillator frequency	Fosc	-	32768	-	Hz	Using 32.768KHz crystal
Output pulse width, POUT	Pw	-	70	-	mS	Using 32.768KHz crystal
Start-up delay, POUT	Tps	3	-	4.3	S	Delay after power-up
Pulse interval, POUT	Tt	-	3.6	-	S	RNGS = high, 10,000hour mode
		-	36	-	S	RNGS = low, 100,000hour mode

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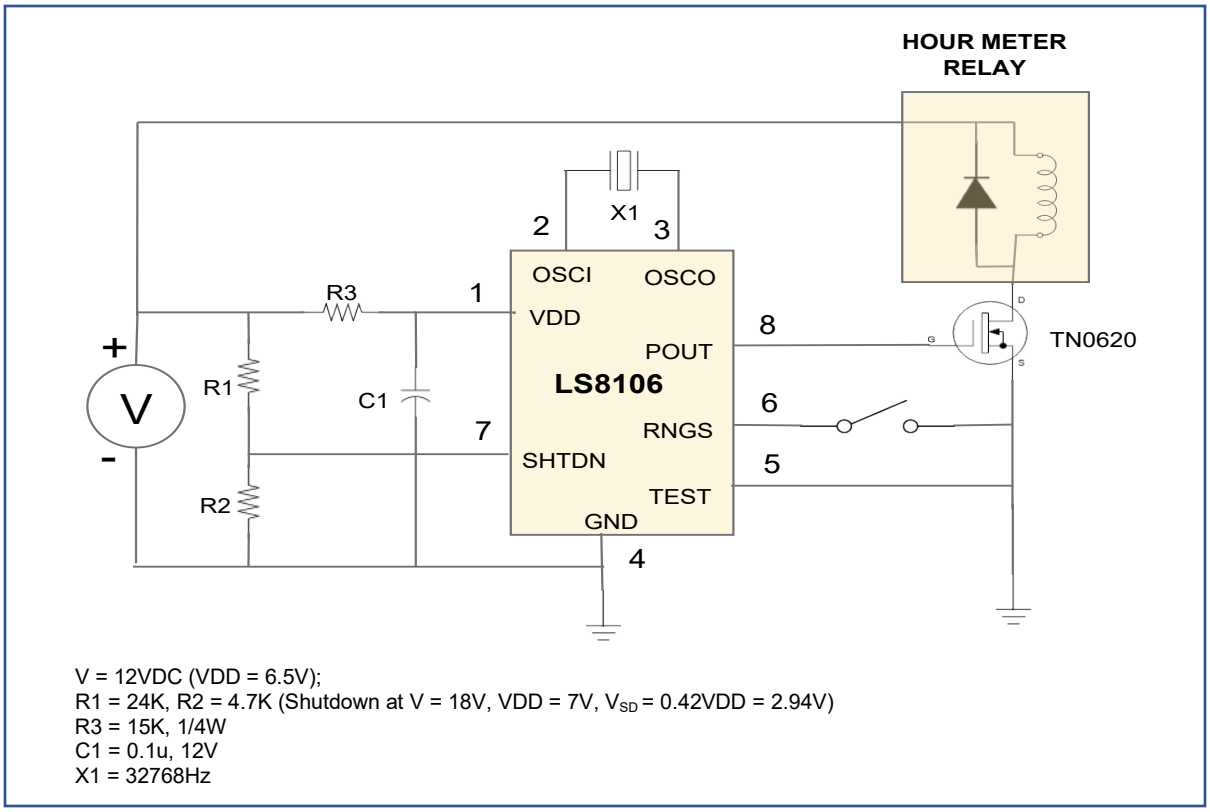


V = 12VDC (VDD = 6.5V);
R1 = 24K, R2 = 4.7K (Shutdown at V = 18V, VDD = 7V, V_{SD} = 0.42VDD = 2.94V)
R3 = 15K, 1/4W
C1 = 0.1u, 12V
X1 = 32768Hz

Fig 2. Hour Meter application with output shutdown

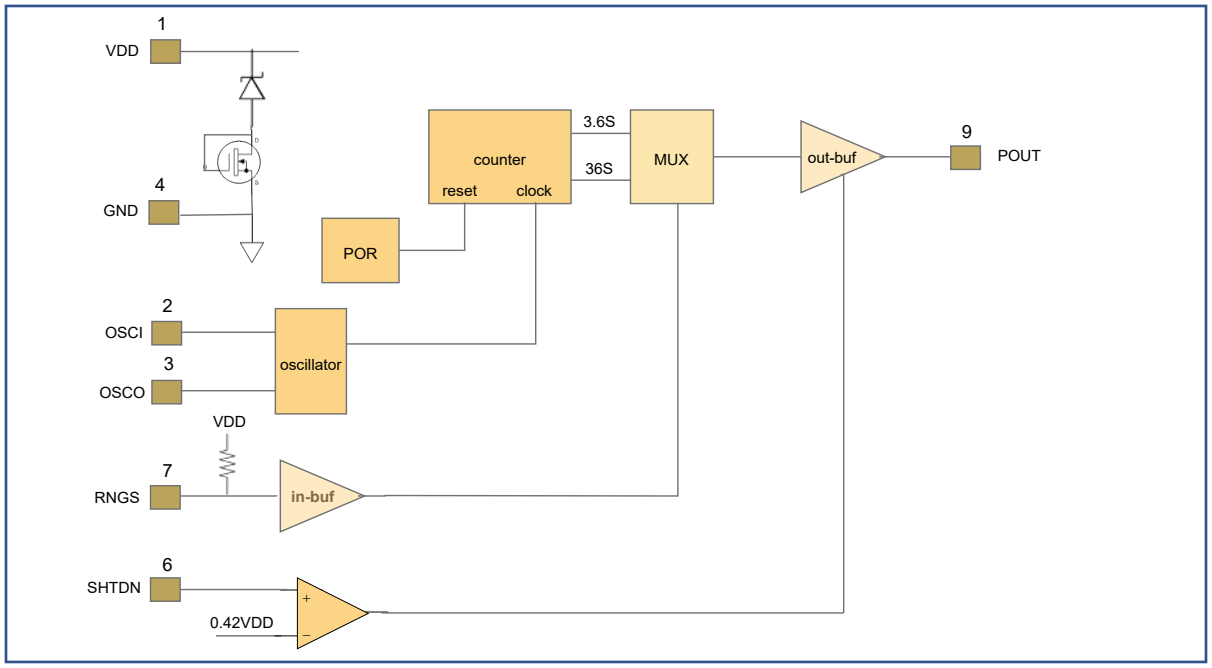
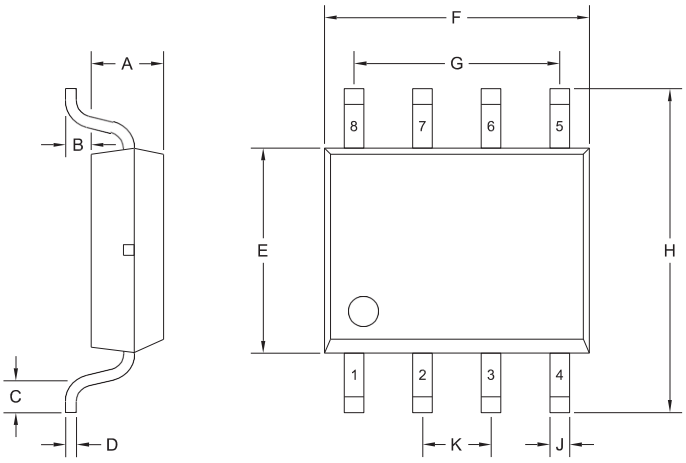


Fig 3. Block Diagram

Package Details
SOIC-8 Case

Mechanical Drawing



DIMENSIONS				
	INCHES		MILLIMETERS	
SYMBOL	MIN	MAX	MIN	MAX
A	0.049	0.057	1.24	1.44
B	0.000	0.011	0.00	0.27
C	0.018	-	0.46	-
D	0.006	0.011	0.16	0.27
E	0.145	0.154	3.70	3.90
F	0.189	0.198	4.81	5.01
G	0.150		3.81	
H	0.231	0.244	5.88	6.18
J	0.013	0.021	0.35	0.52
K	0.050		1.27	

SOIC-8

Mounting Pad Geometry (Dimensions in mm)