

Low-Power CMOS ALARM IC with Horn Driver

The MC14600 Alarm IC is designed to simplify the process of interfacing an alarm level voltage condition to a piezoelectric horn and/or LED. With an extremely low average current requirement and an integrated low battery detect feature, the part is ideally suited to battery operated applications. The MC14600 is easily configured with a minimum number of external components to serve a wide range of applications and circuit configurations. Typical applications include intrusion alarms, moisture or water ingress alarms, and personal safety devices.

- High Impedance, FET Input Comparator
- Comparator Outputs for Low Battery and Alarm Detect
- Alarm Detect Threshold Easily Established with 2 Resistor
- Integrated Oscillator and Piezoelectric Horn Driver
- Low Battery Trip Point Set Internally (Altered Externally)
- Horn "Chirp" During Low Battery Condition
- Pulsed LED Drive Output
- Reverse Battery Protection
- Input Protection Diodes on the Detect Input
- Average Supply Current: 9 μ A

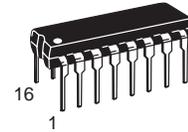
MAXIMUM RATINGS* (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +15	V
Input Voltage, All Inputs Except Pin 8	V_{in}	-0.25 to $V_{DD} + 0.25$	V
DC Current Drain per Input Pin, Except Pin 15 = 1 mA	I	10	mA
DC Current Drain per Output Pin	I	30	mA
Operating Temperature Range	T_A	-10 to +60°C	°C
Storage Temperature Range	T_{stg}	-55 to +125	°C
Reverse Battery Time	t_{RB}	5.0	s

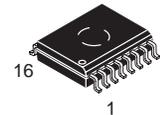
* Maximum Ratings are those values beyond which damage to the device may occur.

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$.

MC14600



**P SUFFIX
PLASTIC DIP
CASE 648-08**

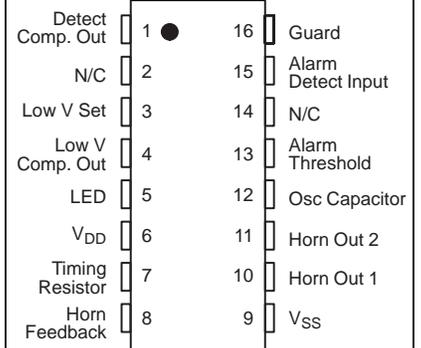


**DW SUFFIX
SOIC PACKAGE
CASE 751G-03**

ORDERING INFORMATION

MC14600P	PLASTIC DIP
MC14600DW	SOIC
MC14600DWR2	SOIC TAPE & REEL

PIN ASSIGNMENT (16 PIN DIP)



MC14600

RECOMMENDED OPERATING CONDITIONS (Voltages referenced to V_{SS})

Parameter	Symbol	Value	Unit
Supply Voltage	V_{DD}	9.0	V
LED (Pin 5) Load	—	10	mA

ELECTRICAL CHARACTERISTICS (Voltages referenced to V_{SS} , $T_A = 25^\circ\text{C}$)

Characteristic	Pin #	Symbol	V_{DD} V_{dc}	Min	Typ	Max	Unit
Operating Voltage	6	V_{DD}	—	6.0	—	12	V
Output Voltage		V_{OH}					V
Piezoelectric Horn Drivers ($I_{OH} = +16\text{ mA}$)	10,11		7.4	6.5	—	—	
Comparators ($I_{OH} = +30\ \mu\text{A}$)	4		9.0	8.5	8.8	—	
Piezoelectric Horn Drivers ($I_{OL} = -16\text{ mA}$)	10,11	V_{OL}	7.4	—	—	0.9	V
Comparators ($I_{OL} = -30\ \mu\text{A}$)	4		9.0	—	0.1	0.5	
($I_{OL} = -200\ \mu\text{A}$)	1		—	—	—	0.5	
Output Voltage — LED Driver, $I_{OL} = 10\text{ mA}$	5	V_{OL}	7.2	—	—	2.0	V
Output Impedance, Active Guard	16	Hi-Z	9.0	—	—	1000	k Ω
Standby Current ($R_{bias} = 8.2\text{ M}\Omega$)	—	I_{DD}	9.0 12.0	— —	5.0 —	9.0 12.0	μA
Input Leakage Current	1 8 13	— I_{in} —	9.0 9.0 9.0	— — —	— — —	± 30 ± 0.1 ± 30	nA μA nA
Detect Comp. Out	1	— —	— —	2.50 —	— —	— 8.00	mA mA
Low Battery Threshold Voltage (Pin 3 open)	6	V_{low}	9.0	7.2	—	7.8	V
Offset Voltage (measured at $V_{in} = V_{DD}/2$)		V_{OS}					mV
Active Guard	16		9.0	—	—	± 100	
Detect Comparator	13,15		9.0	—	—	± 50	
Input Voltage Range	8	V_{in}	—	$V_{SS} - 10$	—	$V_{DD} + 10$	V
Input Capacitance (to V_{SS} @ 1 kHz)	15	C_{in}	—	—	5.0	—	pF
Common Mode Voltage Range	13,15	V_{cm}	—	1.5	—	$V_{DD} - 2$	V
Breakdown Voltage	All pins except 15	—	—	± 500	—	—	V
Human Body Models per MIL-STD-883 Method 3015	15	—	—	± 400	—	—	

Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

TIMING PARAMETERS ($C_{osc} = 0.1 \mu F$, $R_{bias} = 8.2 M\Omega$, $V_{DD} = 9.0 V$, $T_A = 25^\circ C$, See Figure 2)

Characteristics		Pin #	Symbol	Min	Max	Units
Oscillator Period (1 Clock Cycle = 1 Oscillator Period)	No Alarm	12	t_{Cl}	1.25	2.25	s
	Alarm		—	30	52	ms
Oscillator Pulse Width (No Alarm and Alarm Condition)		3,4,5,13	t_r	7.0	13	ms
LED Output Period	No Alarm	5	t_{LED}	30	52	s
	Alarm		—	.71	1.25	ms
Alarm Horn Output	Hi Time	10,11	t_{on}	120	208	ms
	Low Time		t_{off}	60	104	ms
Low Battery Horn Output	Hi Time	10,11	t_{on}	7.0	13	ms
	Between Pulses		t_{off}	30	52	s

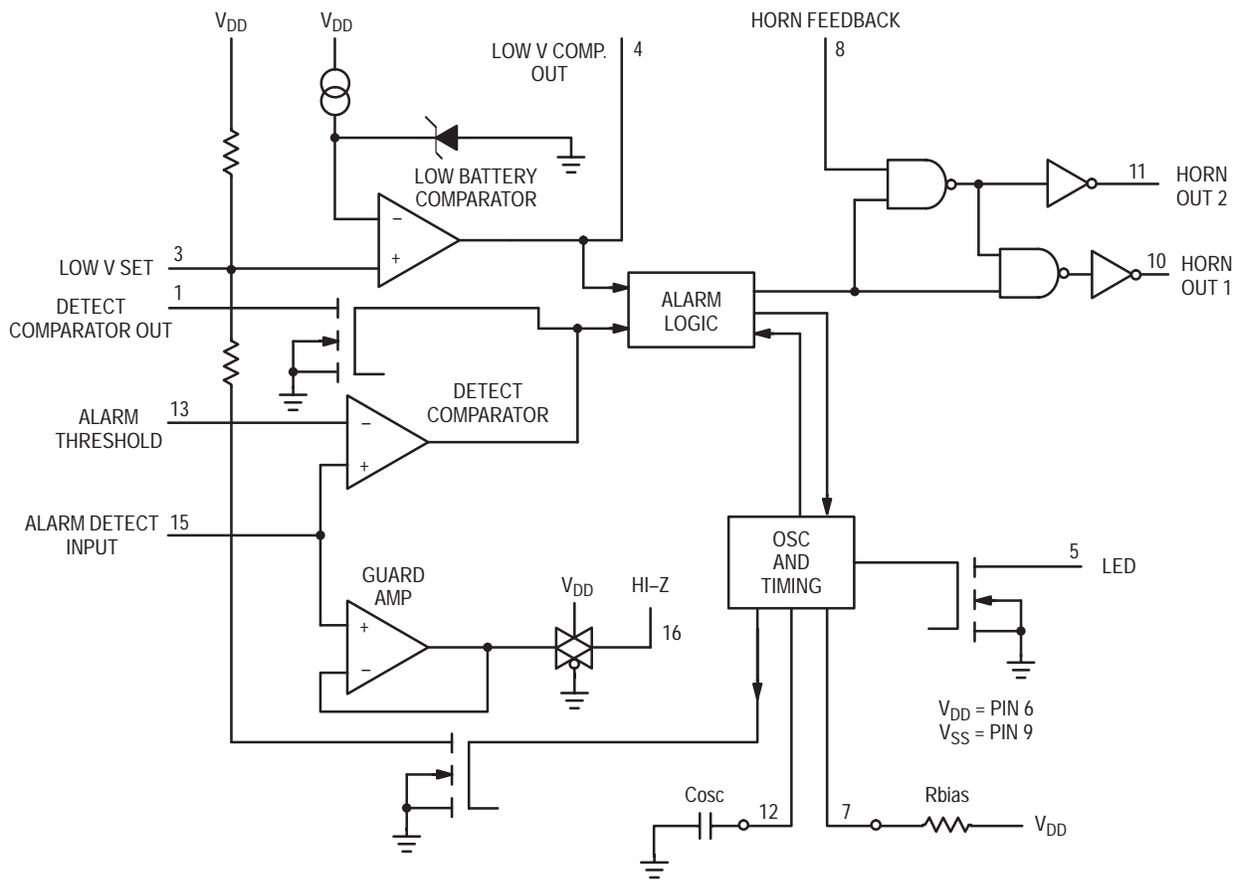


Figure 1. Block Diagram

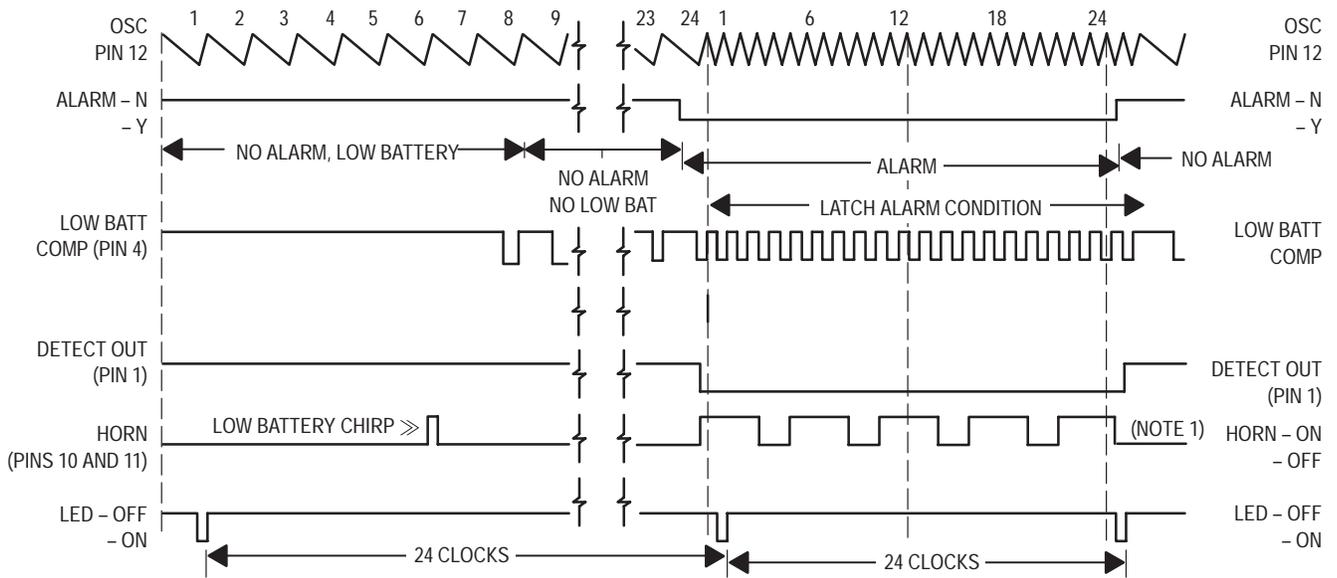


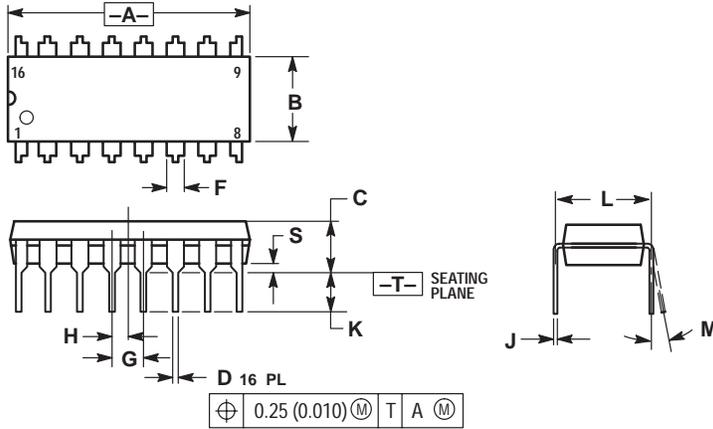
Figure 3. MC14600 Timing Diagram

NOTES:

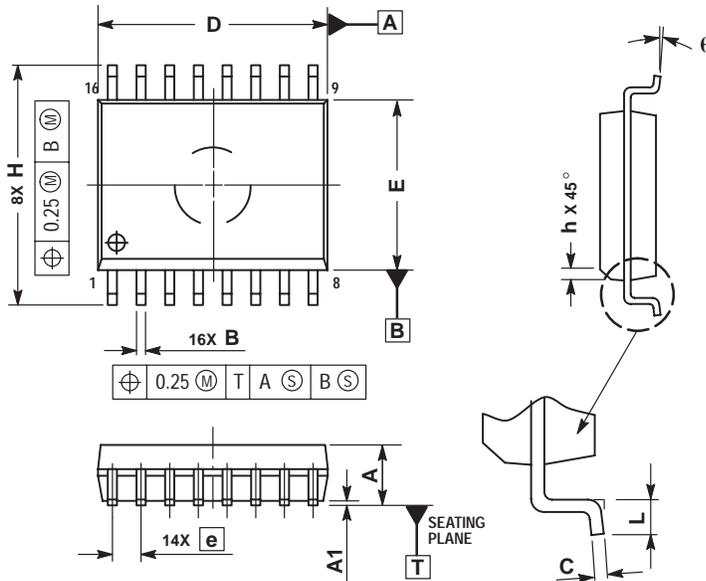
1. Horn modulation is self-completing. When going from Alarm to No Alarm, the alarm condition will terminate only when horn is off.
2. Comparators are strobed once per cycle.
3. Low battery comparator information is latched only during LED pulse.
4. Current source required into Pin 1.
5. Alarm Condition can initiate on any clock pulse except 1 and 7.

PACKAGE DIMENSIONS

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
 4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
 5. ROUNDED CORNERS OPTIONAL.



CASE 648-08
ISSUE R



- NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
 2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
 3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
 5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	10.15	10.45
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

CASE 751G-03
ISSUE B

NOTES

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