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NTE2060 & NTE2061
Integrated Circuit
PMOS LSI Alarm Clock Circuit

Applications:

- Alarm Clock
- Clock Radio
- Timer for Home Appliances
- Display of Elapsed Time

Functions:

- Real Time Display
- Alarm With Snooze Function
- Sleep Timer (59 Minutes Max)

Features:

- Single Chip P–Channel ED MOS LSI
- Direct Drive Capable:
  LED (5mA or More, Red LED)
  Fluorescent Display Tube (Light–Up Voltage 16V or Less)
- Wide Operating Voltage Range: –8V to –16V
- Capable of 50Hz or 60Hz Reference Frequency
- Two Selections of Display Mode:
  AM/PM 12–Hour
  24–Hour
- 24–Hour Alarm Function
- Repeatable Snooze Function
- Presettable 59–Minute Down Counter (Sleep Timer)
- SNOOZE Pin can be used to Set the Sleep Timer with One Touch
- Clock Input Noise Eliminator
- Power Failure Indicating Function (All Digits Flashing):
  12H Display Mode $\rightarrow$ AM or OUTPUT of LSI
  24H Display Mode $\rightarrow$ AM, PM or b & c OUTPUT of LSI

Absolute Maximum Ratings: (T_A = +25°C, V_{SS} = 0V unless otherwise specified)

Maximum Supply Voltage, V_{DD}max . . . . . –18 to +0.3V
Input Voltage, V_{IN} . . . . . V_{DD} –0.3 to +0.3V
Output Voltage (Output Pin OFF), V_{OUT} . . . . . V_{DD} –0.3 to +0.3V
Allowable Power Dissipation (T_A = +70°C), $P_D$max 900mW
Operating Temperature Range, T_{opr} . . . . . –30° to +70°C
Storage Temperature Range, T_{stg} . . . . . –55° to +125°C

Recommended Operating Conditions: (T_A = +25°C, V_{SS} = 0V unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	–16	–12	–8	V
Input "H" Level Voltage	V_{IH}	–1	–	0	V
Input "L" Level Voltage	V_{IL}	V_{DD}	–	V_{DD} +2	V

Electrical Characteristics: (T_A = +25°C, V_{SS} = 0V, V_{DD} = 12V ±2V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output "H" Level Current						
ALARM OUT, SLEEP OUT	$I_{OH\ (1)}$	$V_{OH} = V_{SS} – 2V$	0.5	–	–	mA
b & c, a & d	$I_{OH\ (2)}$	$V_{OH} = V_{SS} – 2.5V$	10	–	–	mA
1Hz	$I_{OH\ (3)}$	$V_{OH} = V_{SS} – 2.5V$	13	–	–	mA
All Other Outputs	$I_{OH\ (4)}$	$V_{OH} = V_{SS} – 2.5V$	5	–	Note 1	mA
Output Leakage Current						
ALARM OUT, SLEEP OUT	$I_{OL\ (1)}$	$V_{OL} = V_{DD}$	–	–	5	µA
All Other Outputs	$I_{OL\ (2)}$	$V_{OL} = V_{DD} + 1.8V$	–	–	50	µA
Current Dissipation	I_{DD}	V_{DD} = –12V	–	3	–	mA

Note 1. 11mA Max is allowed in the range where the power dissipation is 900mW and 1.2W at T_A = +70°C and +25°C respectively.

Function Table A:

Alarm Display Input	Seconds Display Input	Sleep Display Input	Display Mode
L	L	L	Real Time Display
H	L	L	Alarm Display
L	H	L	Seconds Display
H	H	L	Alarm Display
L	L	H	Sleep Display
H	L	H	Sleep Display
L	H	H	Sleep Display
H	H	H	Sleep Display

Note 2. "H": Input Pin —— V_{SS} Level
"L": Input Pin —— V_{DD} Level (or Open)

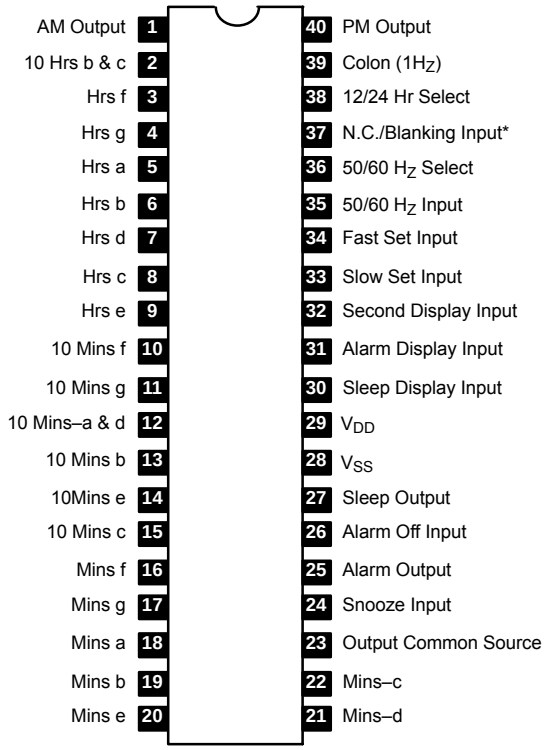
Function Table B:

Display Mode	Time Setting Input Pin	Function
Real Time Display	FAST	Minutes contents advance at a 60Hz (Note 3) rate.
	SLOW	Minutes contents advance at a 2Hz rate.
	BOTH	Minutes contents advance at a 60Hz (Note 3) rate.
Alarm Display	FAST	Minutes contents advance at a 60Hz (Note 3) rate.
	SLOW	Minutes contents advance at a 2Hz rate.
	BOTH	AM 12:00 is set when in the 12–hour display mode. 0:00 is set when in the 24–hour display mode.
Seconds Display	FAST	00 seconds is set. No carry to minutes is generated.
	SLOW	Seconds counting is stopped (Held).
	BOTH	(When in the 12–hour display mode) the real time counter is set to AM 12:00. (When in the 24–hour display mode) the real time counter is set to 0:00.
Sleep Display	FAST	Minutes contents advance at a 60Hz (Note 3) rate.
	SLOW	Minutes contents advance at a 2Hz rate.
	BOTH	Minutes contents advance at a 60Hz (Note 3) rate.

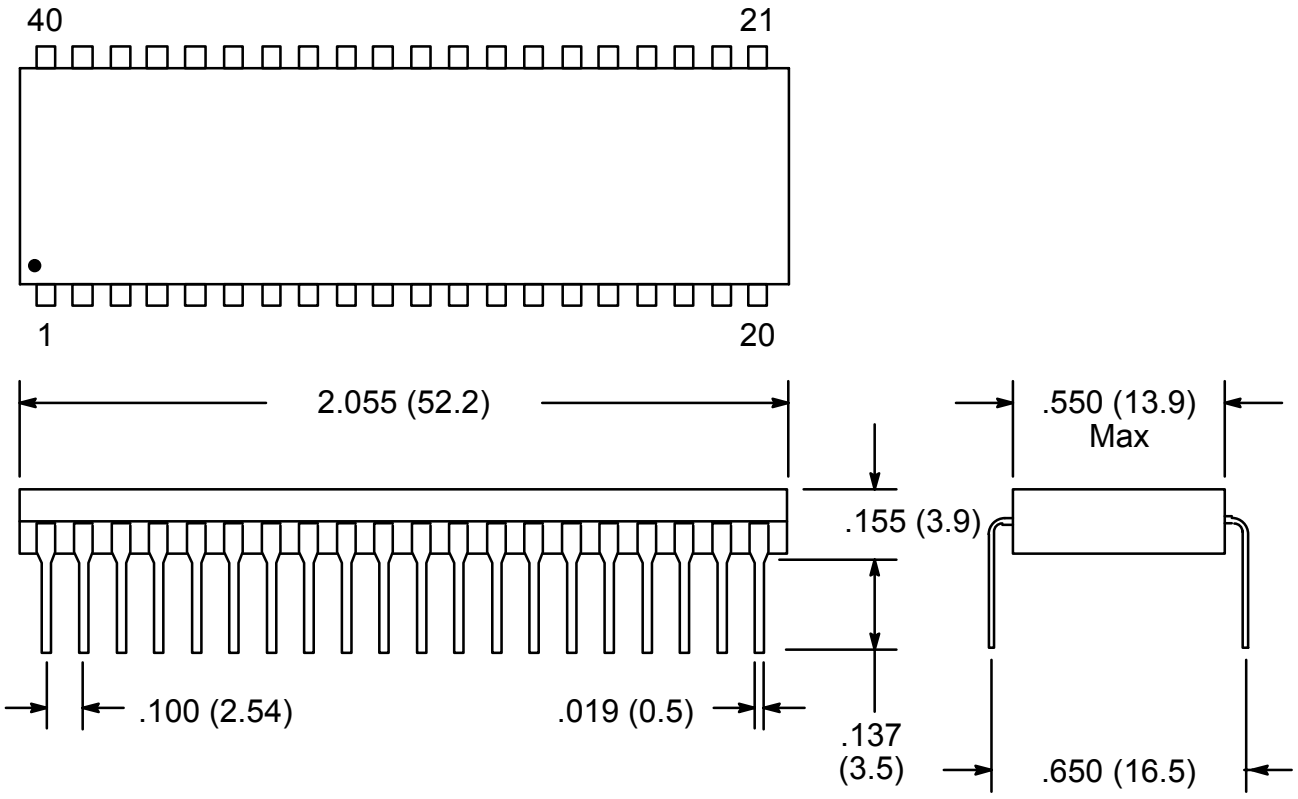
Note 3. For 50Hz use, 50Hz shall apply.

Note 4. Both means that 2 input pins of FAST and SLOW are set to “H”.

Pin Connection Diagram



Note: N.C. pin must not be used for external connection such as a relay point.
Pin 37 is Blanking Input on the NTE2061


40
21
1
20
2.055 (52.2)
.550 (13.9)
Max
.155 (3.9)
.100 (2.54)
.019 (0.5)
.137
(3.5)
.650 (16.5)