ADVANCED ANALOG

A Division of intech

3020

TRI-STAGE ALERT/ALARM

DESCRIPTION

The 3020 monolithic integrated circuit includes three LED/lamp drivers. Each of the three drivers has two TTL compatible inputs. When the first input is set low, the output is turned ON causing an LED or lamp to turn on. When the second input is set low (either alone or together with the first input), the LED or lamp will flash at an externally adjustable rate and duty cycle. A single oscillator operates all three drivers. The 3020 operates from a single 4.5 to 18 volts supply.

FEATURES

- **TTL Compatible Inputs**
- **Steady or Pulsating Output for Driving LED or Lamp**
- **Adjustable Flashing Rate**
- **Logic Included in Chip**
- **Parallel Connection Pin for Additional Circuits**
- **Single Power Supply**
- **Low Standby Current Drain**

APPLICATIONS

- **Process Control**
- **Warning Alarm Indication**
- **Central Detector for Multi-Channel Monitoring**

BLOCK DIAGRAM

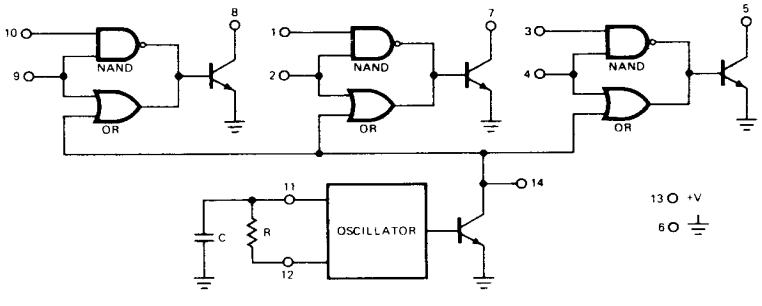
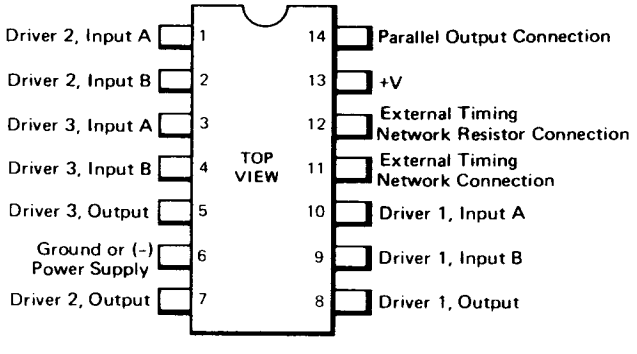


Figure 1: Block Diagram of 3020 Tri-Stage Alert/Alarm

PIN DESIGNATION

14 Pin Dual-In-Line



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SPECIFICATIONS

($T_A = 25\,°C$, $V_{CC} = +5$ to $+15V$)

PARAMETER	MIN	TYP	MAX	UNIT
Supply Voltage Range	4.5		18	V
Supply Current	4.5		18	V
$V_{CC} = 5V$, inputs high		1.5	3	mA
$V_{CC} = 15V$, inputs high		3	6	mA
$V_{CC} = 5V$, inputs low, no load		6	10	mA
$V_{CC} = 15V$, inputs low, no load		7.5	14	mA
Input Switching Threshold				
ON Voltage, each input			0.8	V
OFF Voltage, each input	2			V
Input Current				
Each input terminal at ground (sink) $V_{CC} = 5V$		0.2	0.5	mA
Each input terminal at 5V, $V_{CC} = 5V$		0.01	10	μA
Output				
ON voltage drop, each output at 100 mA sink		1.5	2	V
OFF leakage current, $V_{CC} = 15V$		0.05	100	μA
Oscillator Period Range**	0.1		10	Hz
Oscillator Range Duty Cycle*	10		80	%
Operating Temperature	−25		+85	°C
Storage Temperature	−55		+125	°C

Note: *Measured using Figure 10.

MAXIMUM RATINGS

Supply Voltage	+18 V
OFF Input Voltage	Maximum voltage tracks supply voltage
Output Current*	100 mA (sink)
Parallel Output Current	40 mA (sink)
Operating Temperature Range	−25 °C to +85 °C
Storage Temperature Range	−55 °C to +125 °C

*Each stage

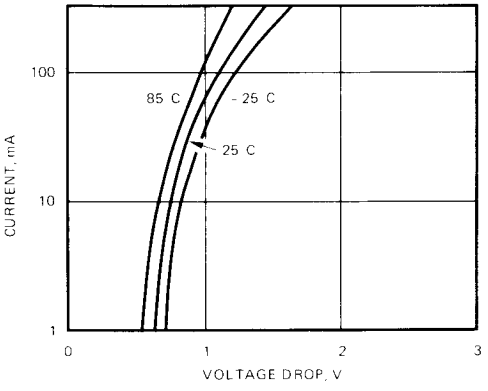


Figure 2: Voltage Drop, Terminals 7 and 8.

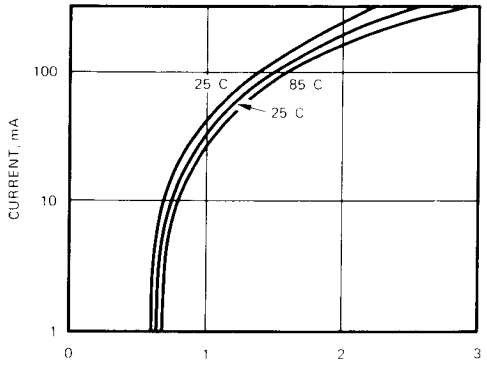


Figure 3: Voltage Drop, Terminal 5.

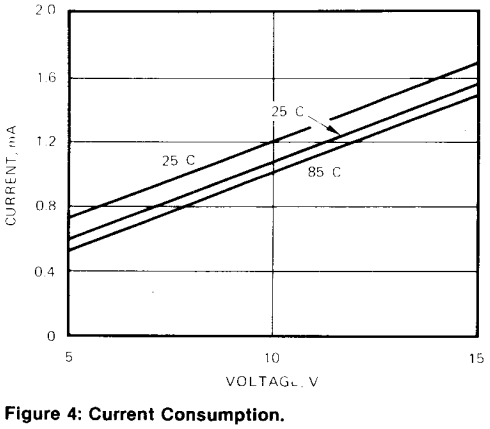


Figure 4: Current Consumption.

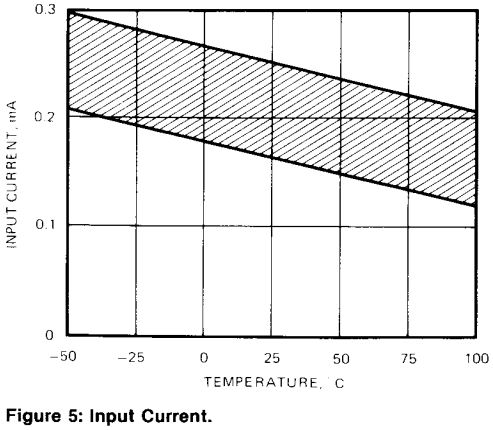


Figure 5: Input Current.

APPLICATION NOTES

This monolithic integrated circuit can drive up to three LEDs or lamps in either a steady or pulsating mode. It contains a built-in oscillator for the pulsating mode.

The block diagram of this circuit is shown in Figure 1. Each lamp driver consists of a Nand gate, an Or gate, and a power transistor. The upper terminal is a TTL compatible input for the steady mode. Moving it to ground causes the output of the Nand gate to go high and turn on the output transistor. If the second input is moved low the output of the Nand gate is high but is periodically disabled by the output of the Or gate. This output moves to ground when both of its inputs are at ground level. The second input for all Or gates is created by a saturated NPN transistor connected to the oscillator.

Both the on and off duration of the oscillator can be selected by an external resistor and capacitor.

Figures 2 through 9 show the typical performance of this circuit. The outputs of terminals 7 and 8 have a slightly lower voltage drop than that of terminal 5. Thus the heaviest loads should be connected to those two terminals.

Figure 10 shows the basic connection of the 3020. The flash rate and duty cycle are controlled at terminals 11 and 12. Pins 1, 10, and 3 are the steady TTL inputs whereas, 2, 9, and 4 are the flashing TTL inputs. Instead of a TTL level, any of the inputs may be activated by connecting a switch to ground.

The corresponding lamps or LEDs are connected to terminals 7, 8, and 5. In this configuration the circuit can be powered from any voltage between 4.5 and 18 volts. If additional lamps or LEDs are to be driven at exactly the same rate, the connection shown in Figure 11 may be used. The upper row of additional 3020's are all connected to terminal 14 of the master unit. Up to three of these circuits may be driven in this way. These circuits will flash at the same rate and the lights will be on at the same time. The lower row of additional units will have the same rate but the opposite duty cycle. Thus when the lights of the master unit or those of the upper row are on, the lower row will have its lights off.

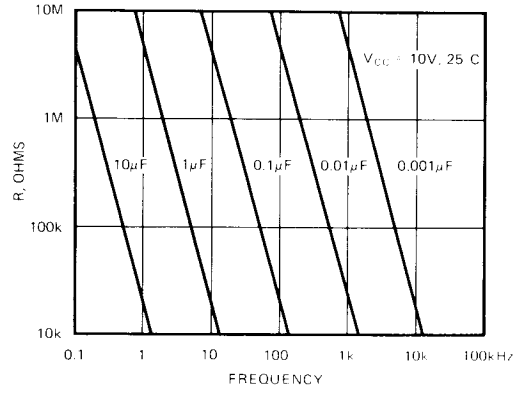


Figure 6: Frequency of Oscillator vs. R and C.

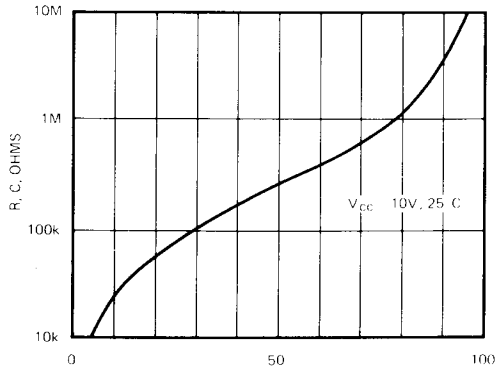


Figure 7: Duty Cycle of Oscillator vs. R and C.

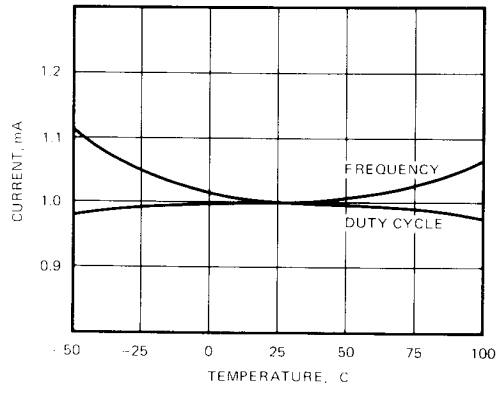


Figure 8: Frequency and Duty Cycle vs. Supply Voltage.

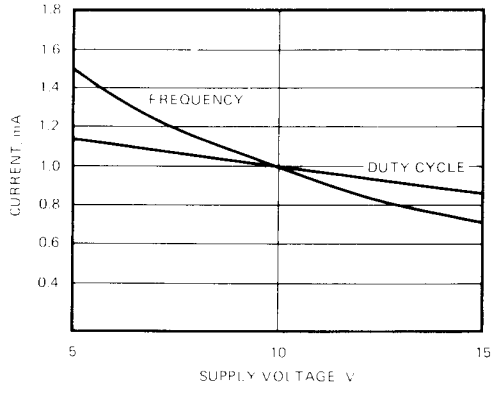


Figure 9: Frequency and Duty Cycle Temperature.

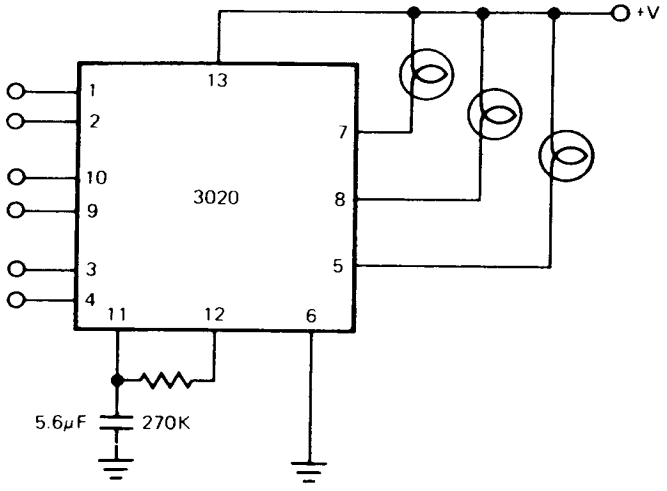


Figure 10: Lamp-flasher with a Flash Rate of 1 Hz and a Duty Cycle of 50%.

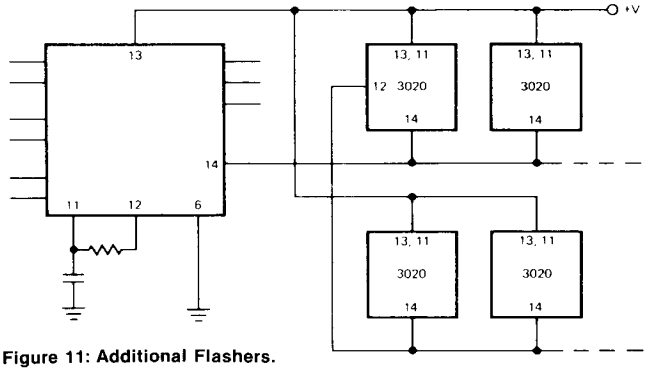
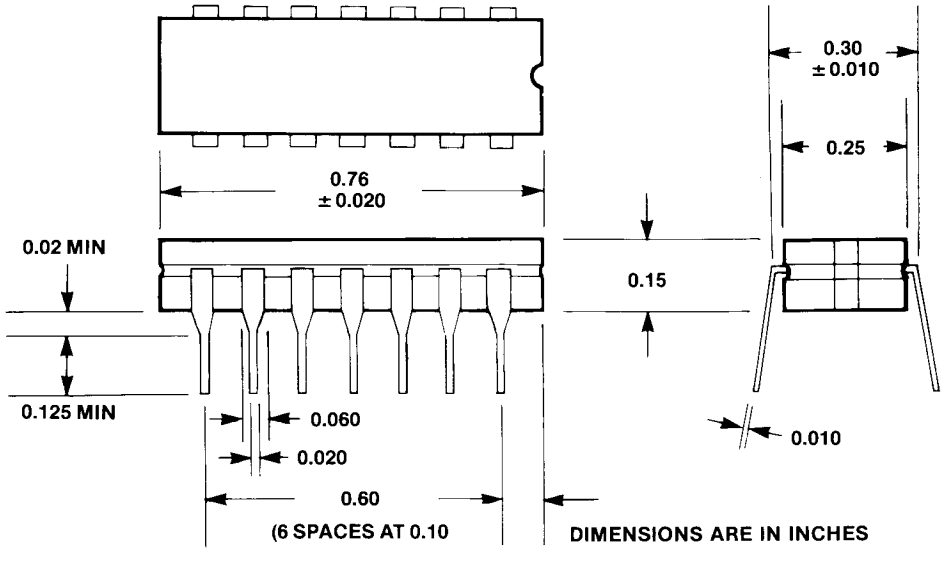


Figure 11: Additional Flashers.

MECHANICAL OUTLINE



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