Available Q2, 1995

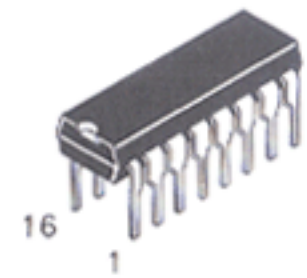
14-Bit Binary Counter and Oscillator with Schmitt Trigger Output

DV4060B

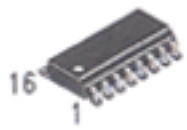
4060B

This device is a 14 stage binary ripple counter with an On-Chip Oscillator Buffer, which allows for either RC or Crystal Oscillator Circuits. A reset function forces all outputs to zero and disables the oscillator. The input line has Schmitt trigger action to accomodate slow rising and falling signals.

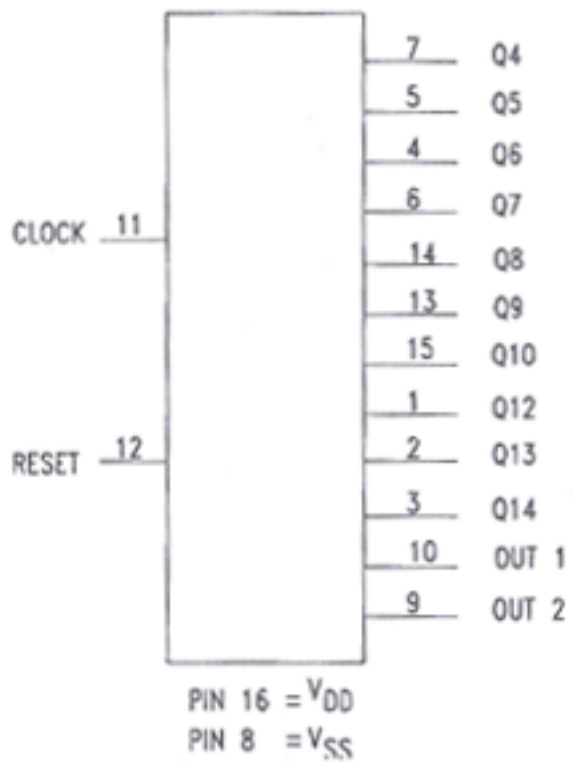
- **Supply voltage range = 3.0 Vdc to 18 Vdc**
- **All outputs buffered**
- **Capable of driving 4 Low Power TTL loads or one LS TTL load over the rated temperature range**
- **Diode protection on all Inputs**
- **Highest noise immunity at 12V supply**



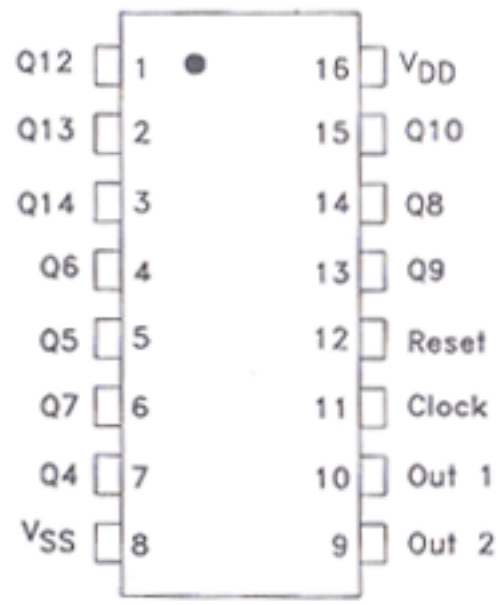
N Suffix
Plastic DIP
AVG-003 Case



D Suffix
Plastic SOP
AVG-004 Case



PIN ASSIGNMENT



TRUTH TABLE

Clock	Reset	Outputs
↑	L	No Change
↓	L	Count Up
X	H	Low

X = Don't Care
↓ = High to Low Transition
↑ = Low to High Transition
H = High Logic Level
L = Low Logic Level

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage (Referenced to V_{SS})	−0.5 to +18.0	V
V_{IN}, V_{OUT}	Input or Output Voltage	−0.5 to V_{DD}+0.5	V
I_{IN}, I_{OUT}	DC Current Into or Out of Any Pin	± 10	mA
P_D	Power Dissipation in Still Air, Derating:-12 mW/°C from 65° to 85°C	500	mW
T_{STG}	Storage Temperature Range	−65 to +150	°C
TL	Lead Temperature, (8 Second Soldering)	260	°C

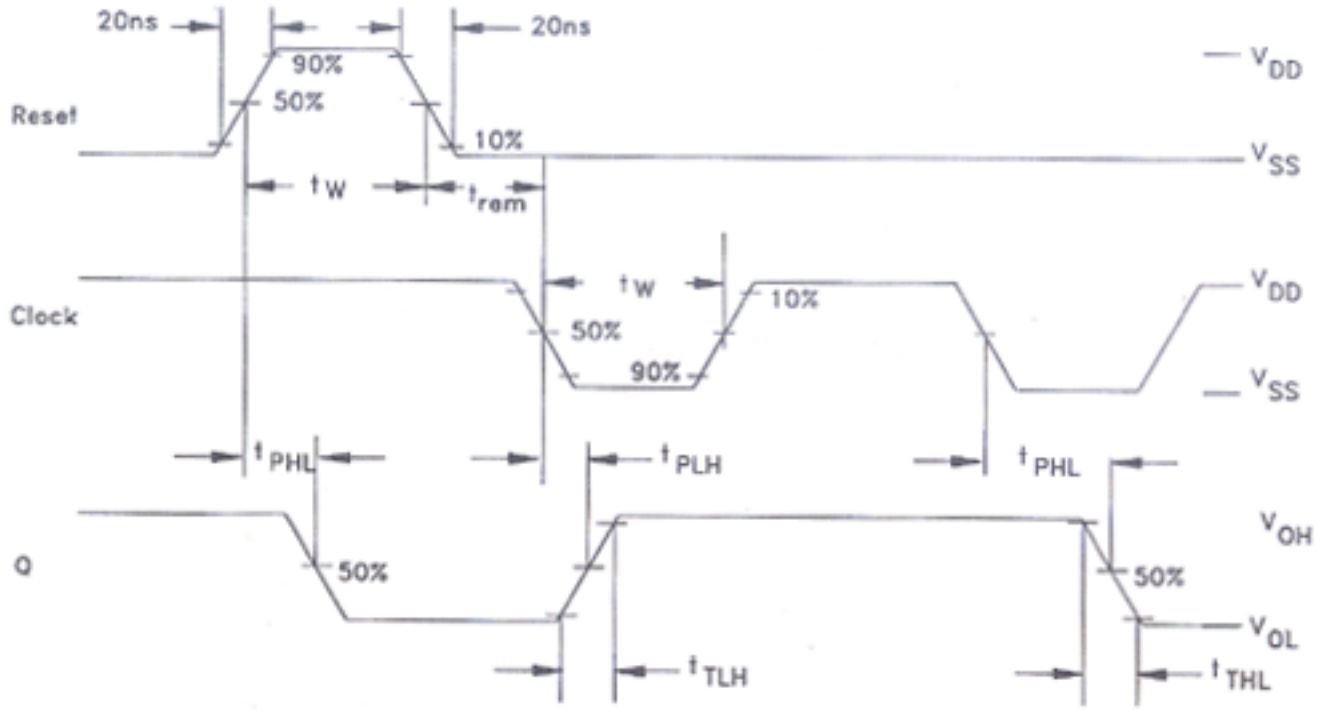
ELECTRICAL CHARACTERISTICS (Voltages Referenced to V_{SS})

Symbol	Parameter		V_{DD}	Guaranteed Limits							Unit
				-40°C		25°C			85°C		
				Min	Max	Min	Typ	Max	Min	Max	
V_{OL}	Output Voltage $V_{IN}=V_{DD}$ or 0	"0" Level	5.0 10 15	- - -	0.05 0.05 0.05	- - -	0 0 0	0.05 0.05 0.05	- - -	0.05 0.05 0.05	Vdc
V_{OH}	V_{IN}= 0 or V_{DD}	"1" Level	5.0 10 15	4.95 9.95 14.95	- - -	4.95 9.95 14.95	5.0 10 15	- - -	4.95 9.95 14.95	- - -	Vdc
V_{IL}	Input Voltage (V_O=4.5 or 0.5 Vdc) (V_O=9.0 or 1.0 Vdc) (V_O=13.5 or 1.5 Vdc)	"0" Level	5.0 10 15	- - -	1.5 3.0 4.0	- - -	2.25 4.50 6.75	1.5 3.0 4.0	- - -	1.5 3.0 4.0	Vdc
V_{IH}	(V_O=0.5 or 0.5 Vdc) (V_O=4.5 or 0.5 Vdc) (V_O=4.5 or 0.5 Vdc)	"1" Level	5.0 10 15	3.5 7.0 11	- - -	3.5 7.0 11	2.75 5.50 8.25	- - -	3.5 7.0 11	- - -	Vdc
I_{OH}	Output Drive Current (V_{OH} = 2.5 Vdc) (V_{OH} = 4.6 Vdc) (V_{OH} = 9.5 Vdc) (V_{OH} = 13.5 Vdc)	Source	5.0 5.0 10 15	 −2.5 −0.52 −1.3 −3.6	 - - - -	 −2.1 −0.44 −1.1 −3.0	 −4.2 −0.88 −2.25 −8.8	 - - - -	 −1.7 −0.36 −0.9 −2.4	 - - - -	mAdc
I_{OL}	(V_{OL} = 0.4 Vdc) (V_{OL} = 0.5 Vdc) (V_{OL} = 1.5 Vdc)	Sink	5.0 10 15	0.52 1.3 3.6	- - -	0.44 1.1 3.0	0.88 2.25 8.8	- - -	0.36 0.9 2.4	- - -	mAdc
I_{IN}	Input Current		15	-	±0.3	-	±0.00001	±0.3	-	±1.0	µAdc
C_{IN}	Input Capacitance	V_{IN}=0	-	-	-	-	5.0	7.5	-	-	pF
I_{DD}	Quiescent Current (Per Package)		5.0 10 15	- - -	20 40 80	- - -	0.005 0.010 0.015	20 40 80	- - -	150 300 600	µAdc

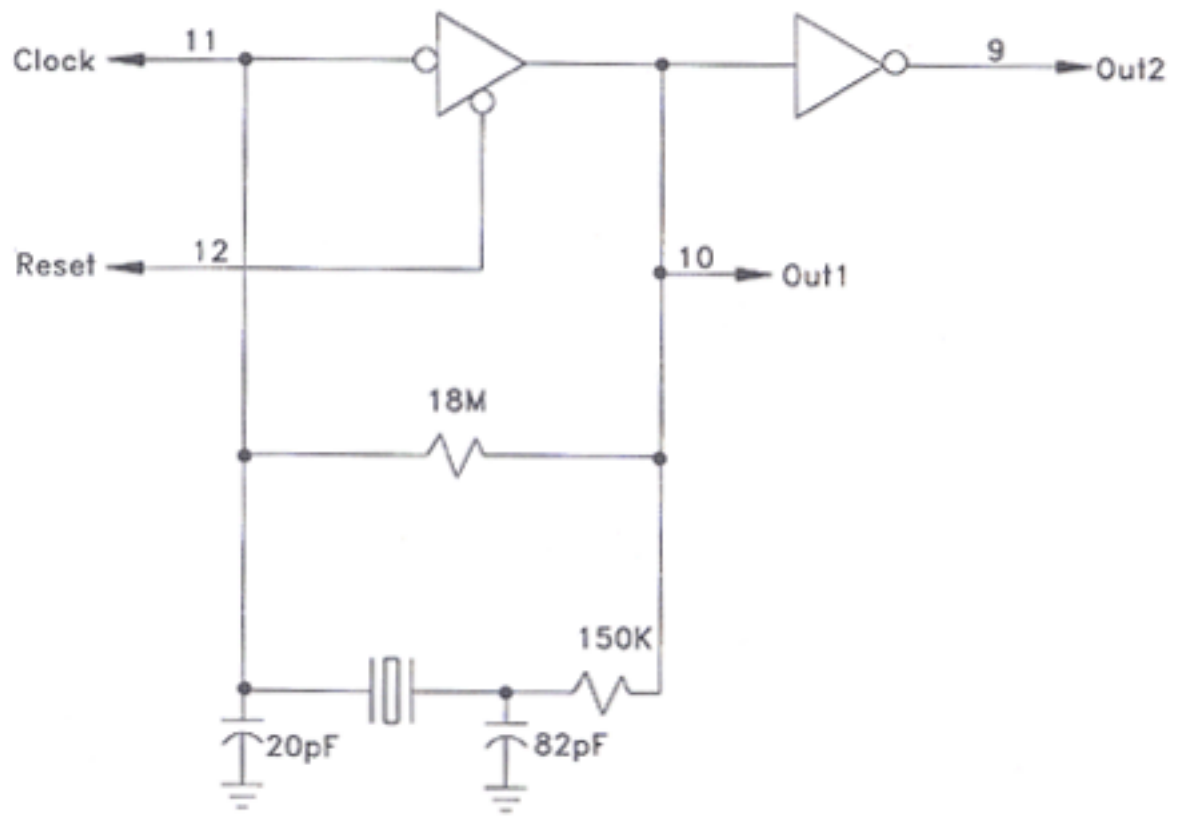
SWITCHING CHARACTERISTICS (C_L=50 pF, T_A=25°C)

Symbol	Characteristics	V_{DD}	Min	Typ	Max	Unit
t_{TLH}	Output Rise Time (Counter Outputs)	5.0 10 15	- - -	40 25 20	200 100 80	ns
t_{THL}	Output Fall Time, All B-Series Gates	5.0 10 15	- - -	50 30 20	200 100 80	ns
t_{PLH} t_{PHL}	Propagation Delay Time Clock to Q4	5.0 10 15	- - -	415 175 125	740 300 200	ns
	Clock to Q14	5.0 10 15	- - -	1.5 0.7 0.4	2.7 1.3 1.0	µs
t_{WH}	Clock Pulse Width	5.0 10 15	100 40 30	65 30 20	- - -	ns
f_{cl}	Clock Pulse Frequency	5.0 10 15	- - -	5 14 17	3.5 8 12	MHz
t_{TLH} t_{THL}	Clock Rise and Fall Time	5.0 10 15	No Limit			-
t_W	Reset Pulse Width	5.0 10 15	120 60 40	40 15 10	- - -	ns
t_{PHL}	Propagation Delay Time Reset to Qn	5.0 10 15	- - -	170 80 60	360 160 100	ns

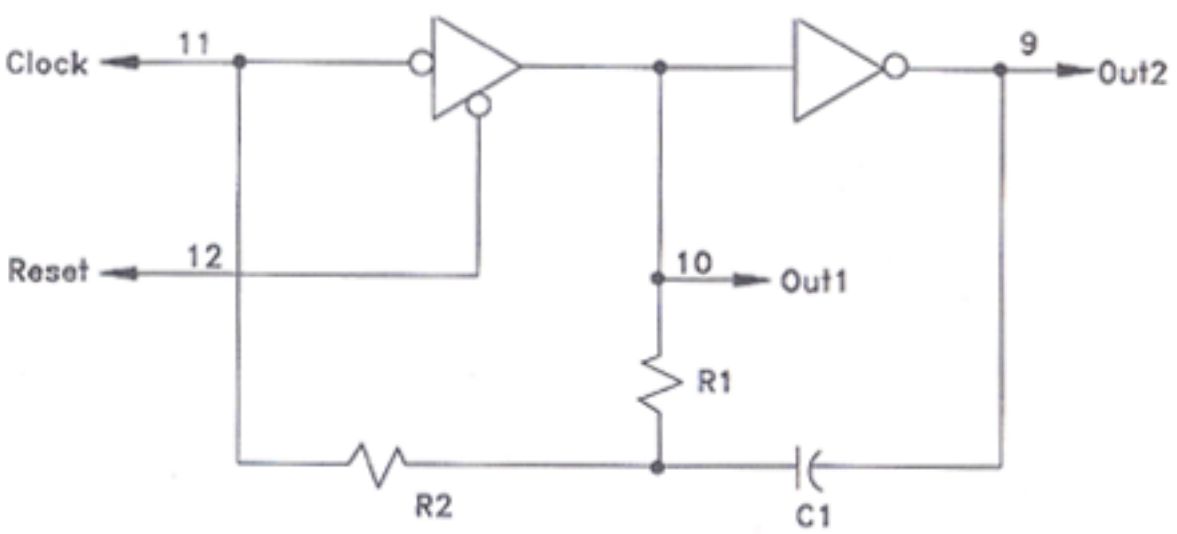
SWITCHING WAVEFORMS



Typical Crystal Oscillator Circuit



Typical RC Oscillator Circuit



$$f \approx \frac{1}{2.25\ R_1\ C_1}$$

$$1m\Omega \geq R_2 \geq 2\ R_1$$