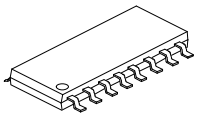
UCD45360B **Preliminary** ***CMOS IC***

CMOS OSCILLATOR WITH 14-STAGE DIVIDER AND ANALOG MULTIPLEXERS/ DEMULTIPLEXERS



SOP-16

■ DESCRIPTION

The **UCD45360B** consists of an oscillator section with 14 stage Divider, and digitally controlled analog switches.

The oscillator configuration allows design of either RC- or crystal-oscillator circuits. A high-to-low transition on the clock (C_{IN}) input increments the counter. A high level at the clear (RST) input disables the oscillator ($\overline{CO}$ goes high and CO goes low) and resets the counter to zero (all Q outputs low).

These analog multiplexers/demultiplexers control analog voltages that may vary across the voltage supply range (i.e. V_{CC} to V_{EE}). They are bidirectional switches thus allowing any analog input to be used as an output and vice-versa. The switches have low “on” resistance and low “off” leakages. In addition, all three devices have an enable control which, when high, disables all switches to their “off” state.

■ FEATURES

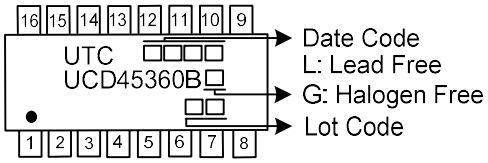
* Operation Control Voltage: V_{CC} – GND=3V to 18V
* Switch Voltage: V_{CC} - V_{EE}=0V to 18V
* RC or crystal oscillator configuration
* Low “On” Resistance
* Low Crosstalk between Switches
* Fast Switching and Propagation Speeds
* Wide Operating Temperature Range = -40°C to +125°C

■ ORDERING INFORMATION

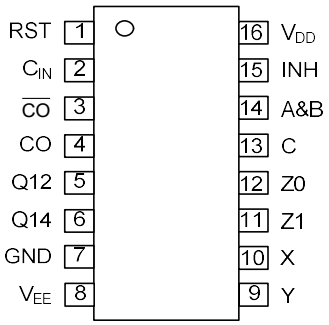
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UCD45360BL-S16-R	UCD45360BG-S16-R	SOP-16	Tape Reel

UCD45360BG-S16-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S16: SOP-16 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



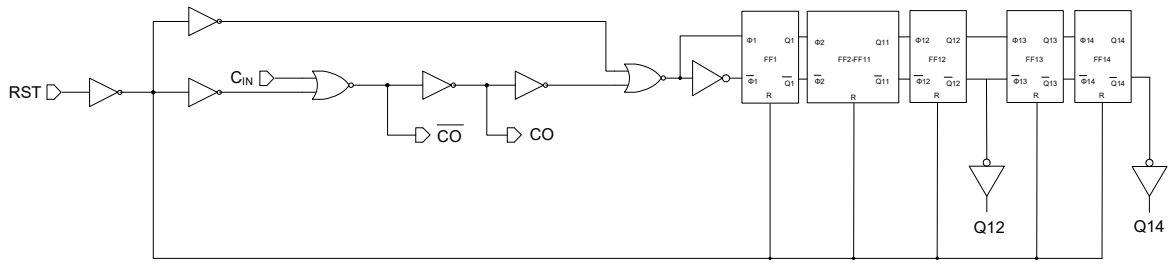
■ PIN CONFIGURATION

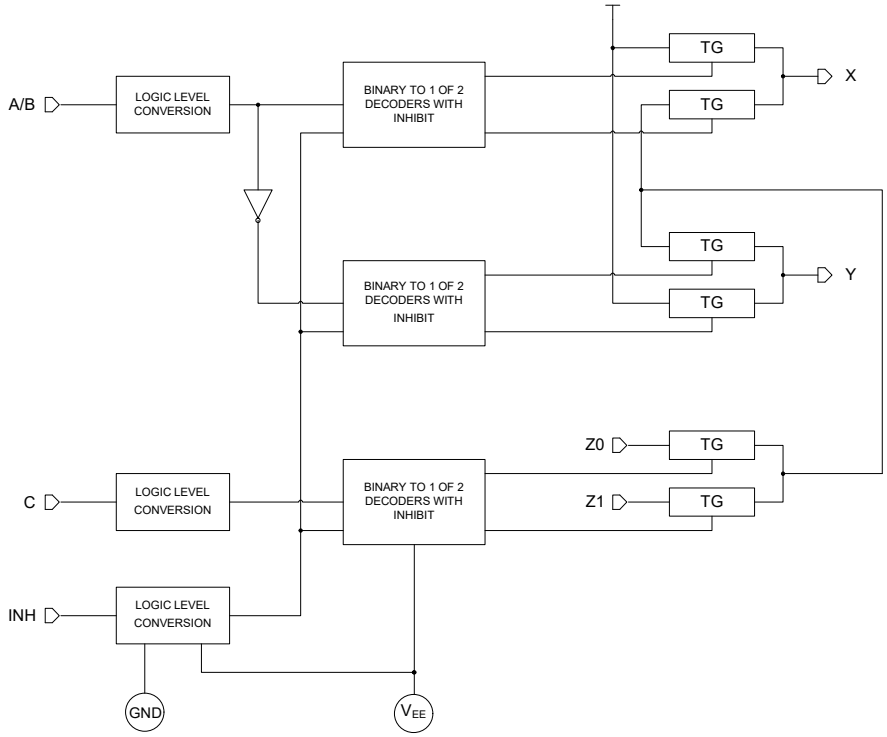


■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	RST	Master reset input (active HIGH)
2	C_{IN}	Clock input /oscillator pin
3	$\overline{CO}$	External resistor connection
4	CO	External capacitor connection
5	Q12	Counter output
6	Q14	Counter output
7	GND	Ground (0V)
8	V_{EE}	Negative supply voltage
9	Y	Common output
10	X	Common output
11	Z1	Independent input
12	Z0	Independent input
13	C	Select input
14	A&B	Select input
15	INH	Enable input (active LOW)
16	V_{DD}	Positive supply power

■ BLOCK DIAGRAM





■ ABSOLUTE MAXIMUM RATING (T_A = 25°C, unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Range	V_{CC} - GND	-0.5 ~ 20	V
	V_{CC} - V_{EE}	-0.5 ~ 20	V
Input Voltage Range (Note 2)	V_{IN} - GND	-0.5 ~ 20	V
	V_{IN} - V_{EE}	-0.5 ~ 20	V
Input Current	I_I	±10	mA
DC switch Current	I_O	±25	mA
Total Power Dissipation	P_D	500	mW
Storage Temperature	T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W

■ RECOMMENDED OPERATING CONDITIONS (NOTE)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}		3		18	V
Input-Pulse Width	t_W	V_{DD}=5V	100			ns
		V_{DD}=10V	40			ns
		V_{DD}=15V	30			ns
Reset Pulse Width	t_W	V_{DD}=5V	120			ns
		V_{DD}=10V	60			ns
		V_{DD}=15V	40			ns
Input-Pulse Frequency	F_{CIN}	V_{DD}=5V			3.5	MHz
		V_{DD}=10V			8	MHz
		V_{DD}=15V			12	MHz
Operating Temperature	T_A		-40		+125	°C

Note: All unused control inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

■ STATIC ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Quiescent Device Current	I_{DD}	V_{DD}=5V			5	μA
		V_{DD}=10V			10	μA
		V_{DD}=15V			20	μA
		V_{DD}=20V			100	μA
Low Level Input Voltage	V_{IL}	V_{DD}=5V			1.5	V
		V_{DD}=10V			3	V
		V_{DD}=15V			4	V
High Level Input Voltage	V_{IH}	V_{DD}=5V	3.5			V
		V_{DD}=10V	7			V
		V_{DD}=15V	11			V
Low Level Output Voltage (Q12/Q14)	V_{OL}	V_{DD}=5V			0.05	V
		V_{DD}=10V			0.05	V
		V_{DD}=15V			0.05	V
High Level Output Voltage (Q12/Q14)	V_{OH}	V_{DD}=5V	4.95			V
		V_{DD}=10V	9.95			V
		V_{DD}=15V	14.95			V
Low Level Output Current (Q12/Q14)	I_{OL}	V_{DD}=5V, V_{OL}=0.4V	0.51			mA
		V_{DD}=10V, V_{OL}=0.5V	1.3			mA
		V_{DD}=15V, V_{OL}=1.5V	3.4			mA
High Level Output Current (Q12/Q14)	I_{OH}	V_{DD}=5V, V_{OH}=2.5V	-1.6			mA
		V_{DD}=5V, V_{OH}=4.6V	-0.51			mA
		V_{DD}=10V, V_{OH}=9.5V	-1.3			mA
		V_{DD}=15V, V_{OH}=13.5V	-3.4			mA
Input Current	I_{IN}	V_{DD}=18V , V_{IN}=0 or 18V			±0.1	μA
OFF Channel Leakage Current	I_{LEAK}	V_{DD}=18V			±100	nA
Drain to Source ON Resistance	$R_{DS(ON)}$	V_{DD}=5V			1050	Ω
		V_{DD}=10V			400	Ω
		V_{DD}=15V			240	Ω
Low Level Output Current (CO)	I_{OL}	V_{DD}=5V, V_{OL}=0.4V	0.16			mA
		V_{DD}=10V, V_{OL}=0.5V	0.42			mA
		V_{DD}=15V, V_{OL}=1.5V	1			mA
High Level Output Current (CO)	I_{OH}	V_{DD}=5V, V_{OH}=4.6V	-0.16			mA
		V_{DD}=10V, V_{OH}=9.5V	-0.42			mA
		V_{DD}=15V, V_{OH}=13.5V	-1			mA

■ DYNAMIC ELECTRICAL CHARACTERISTICS (T_A = 25°C, t_R ,t_F=20ns ,unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation Delay Time Address-to-Signal OUT (Channels ON or OFF)	t_{PLH} , t_{PHL}	C_L=50pF R_L=10kΩ	V_{DD}=5V			720	ns
			V_{DD}=10V			320	ns
			V_{DD}=15V			240	ns
Propagation Delay Time (Signal Input to Output)	t_{PLH} , t_{PHL}	C_L=50pF R_L=200kΩ	V_{DD}=5V			60	ns
			V_{DD}=10V			30	ns
			V_{DD}=15V			20	ns

■ SWITCHING CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Oscillator Frequency	f_{OSC}	C_X=150pF R_S=10MΩ R_X=3.3MΩ	V_{DD}=2V		560		Hz
			V_{DD}=7V		610		Hz
Variation of Frequency (Unit to Unit)		C_X=200pF R_S=560kΩ R_X=50kΩ	V_{DD}=5V		23±10%		kHz
			V_{DD}=10V		24±10%		kHz
			V_{DD}=15V		25±10%		kHz
Variation of Frequency with voltage change (Same Unit)		C_X=200pF R_S=560kΩ R_X=50kΩ	V_{DD}=5V to 10V		1.5		kHz
			V_{DD}=10V to 15V		0.5		kHz
Rx Max.		V_{DD}=5V, Cx=10μF				20	MΩ
		V_{DD}=10V, Cx=50μF				20	MΩ
		V_{DD}=15V, Cx=10μF				10	MΩ
Cx Max.	.	V_{DD}=5V, Rx=500kΩ				1000	μF
		V_{DD}=10V, Rx=300kΩ				50	μF
		V_{DD}=15V, Rx=300kΩ				50	μF
Max. C_{IN} Input Pulse Frequency		V_{DD}=5V		3.5			MHz
		V_{DD}=10V		8			MHz
		V_{DD}=15V		12			MHz
Min. C_{IN} Input Pulse Width	t_W	V_{DD}=5V				100	ns
		V_{DD}=10V				40	ns
		V_{DD}=15V				30	ns
Min. Reset Pulse Width	t_W	V_{DD}=5V				120	ns
		V_{DD}=10V				60	ns
		V_{DD}=15V				40	ns
RST Propagation Delay Time	t_{PHL}	V_{DD}=5V				360	ns
		V_{DD}=10V				160	ns
		V_{DD}=15V				100	ns

■ TYPICAL APPLICATION CIRCUIT

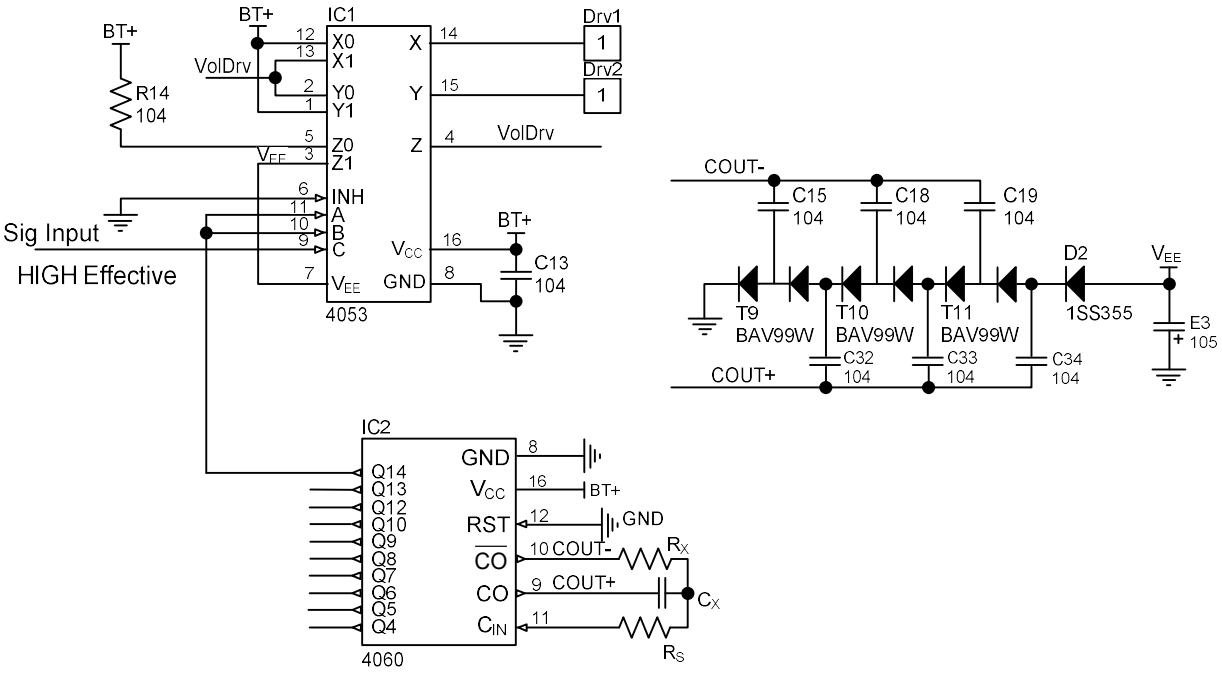


Figure 1. Basic Working Circuit Principle

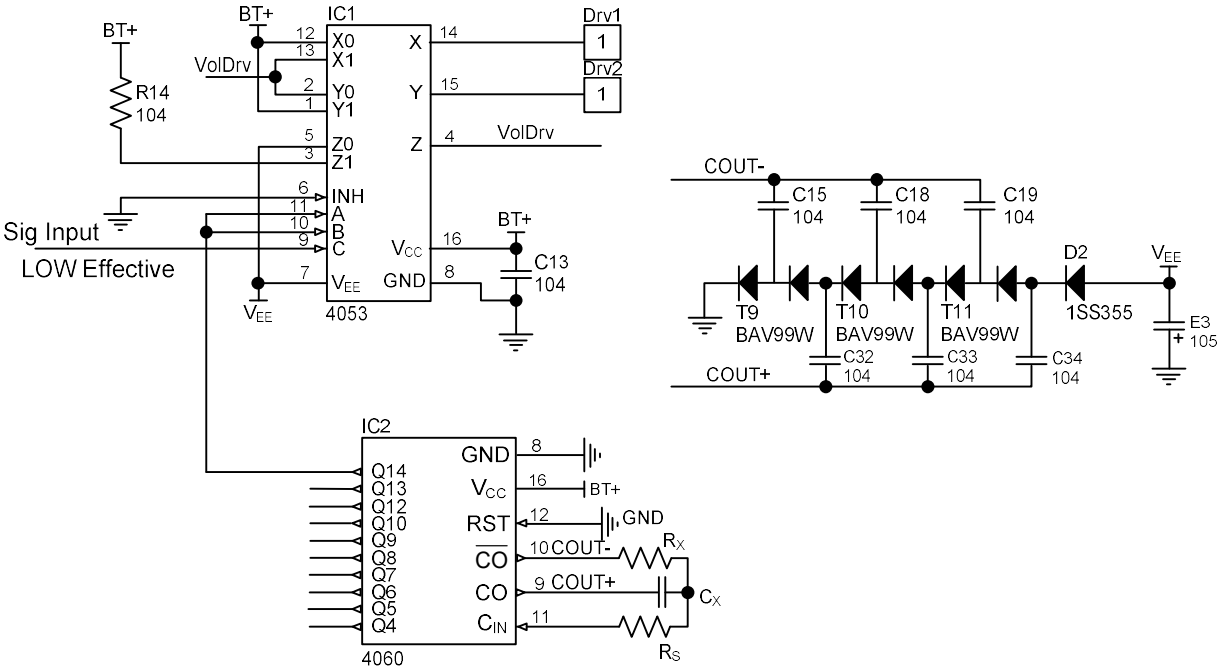


Figure 2. Basic Working Circuit Principle