NEC®

LOW POWER DUAL MODULUS PRESCALER

UPB555C

The UPB555C is a general purpose dual modulus prescaler. It can be operated up to 150 MHz and it utilizes a low power advanced bipolar process technology.

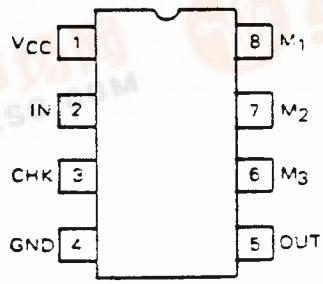
FEATURES

- Low supply current: I_{CC} = 7.0 mA (TYP.)
- Variable division ratio: ÷8, ÷9, ÷16, ÷17, ÷32 and ÷33
- Pulse swallowing operation: ÷8/÷9, ÷16/÷17, ÷32/÷33
- Small input amplitude: V_{in} = 150 mV_{P-P} (MIN.)
- Incorporated buffer amplifier: V_O = 1.2 V_{P-P} (TYP.)
- 150 MHz operation is guaranteed: −35 to +75 °C
- Single supply voltage: V_{CC} = 5 ±0.5 volts
- Low Cost

ORDERING INFORMATION

Order Code	Package
UPB555C	8 pin plastic DIP (300 mil)

CONNECTION DIAGRAM (Top View)



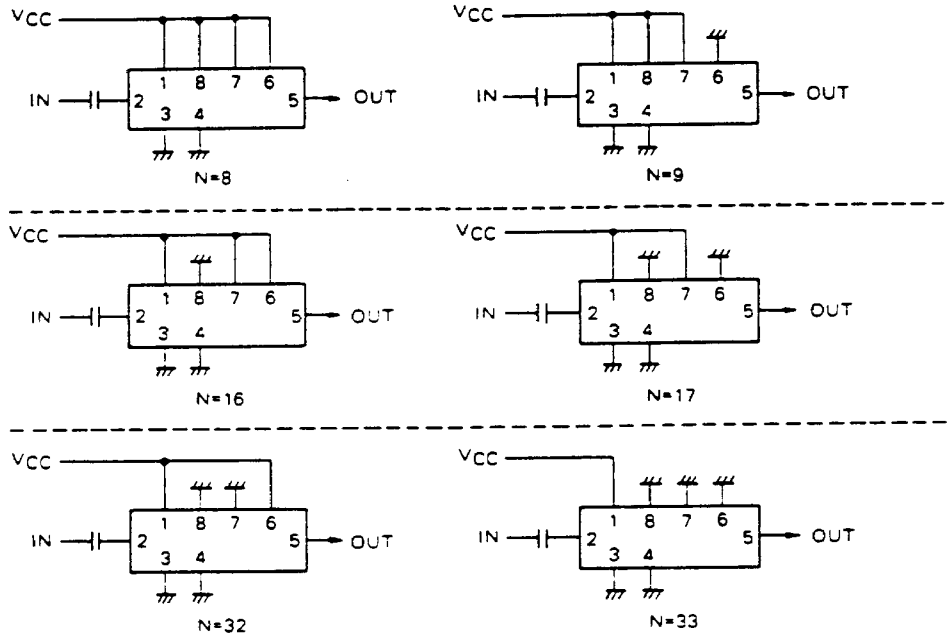
1. V_{CC} : Power Supply (+5 V)
2. IN : Signal Input
3. CHK : Check (Connect to GND)
4. GND : Ground
5. OUT : Signal Output
6. M_3 : } Division Ratio Control
7. M_2 : }
8. M_1 : }

DIVISION RATIO CONTROL

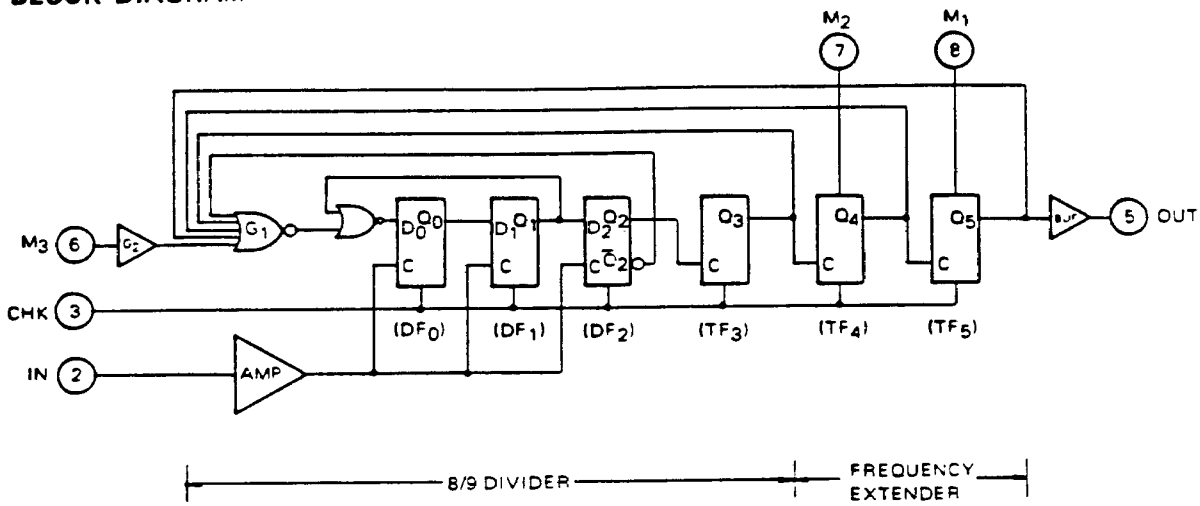
M_1	M_2	M_3	DIVISION RATIO
V_{CC}	V_{CC}	High	÷ 8
V_{CC}	V_{CC}	Low	÷ 9
GND	V_{CC}	High	÷16
GND	V_{CC}	Low	÷17
GND	GND	High	÷32
GND	GND	Low	÷33

M_3 { Low : Less than 0.2 V_{CC}
High : More than 0.8 V_{CC}

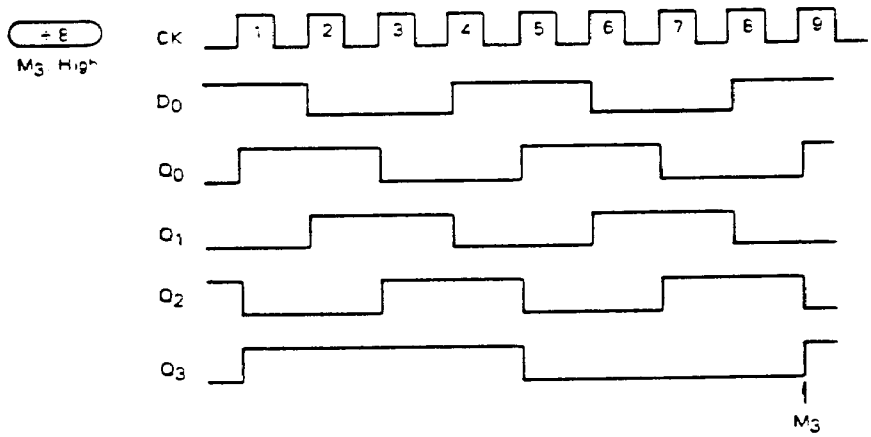
APPLICATION

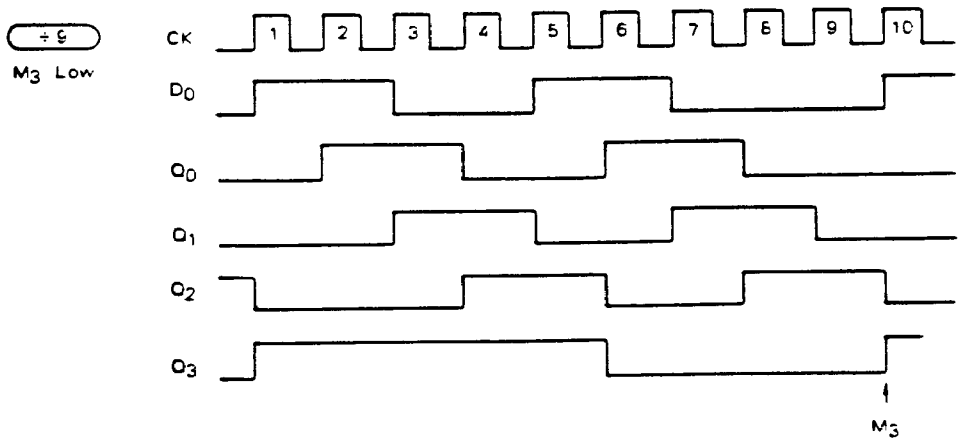


BLOCK DIAGRAM



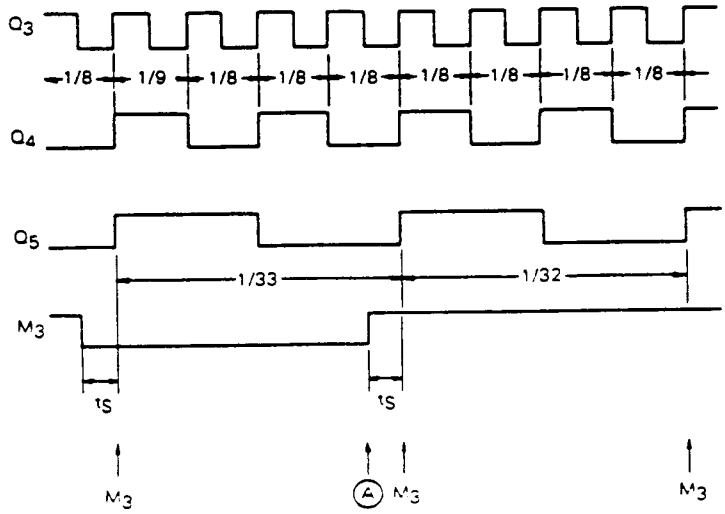
TIMING CHART 1





TIMING CHART 2

Frequency Extender (M_1=M_2=GND)



When both Q_4 and Q_5 are low level, the M_3 pin is active. If the M_3 pin is low at (A) point, the division ratio is 1/9, otherwise the division ratio is 1/8. So 1/33 division ratio means N = 9 x 1 + 8 x 3.

When the M_1 pin is V_{CC} level, the TF_5 is through mode (Q_4 = Q_5). The two-modulus division ratio are 1/16 and 1/17. When both the M_1, M_2 pins are V_{CC} level, both TF_4, TF_5 are through mode. The two-modulus division ratio are 1/8 and 1/9.

COUNT	D_0	Q_0	Q_1	Q_2	Q_3
1	1	0	0	0	1
2	1	1	0	0	1
3	0	1	1	0	1
4	0	0	1	1	1
5	1	0	0	1	1
6	1	1	0	0	0
7	0	1	1	0	0
8	0	0	1	1	0
9	0 (1)*	0	0	1	0

M_3="0" (1/9)

M_3="1" (1/8)

* division ratio is 1/8

M_1=M_2=V_{CC} (both TF_4, TF_5 are through mode)

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	V_{CC}	−0.5 to +6.0	V
Input Voltage	V_i	−0.5 to V_{CC}	V
Output Current	I_o	−10	mA
Storage Temperature	T_{stg}	−55 to +125	°C

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Supply Voltage	V_{CC}	4.5	5.0	5.5	V	
Output Load Capacitance	C_L			10	pF	OUT Pin
Ambient Temperature	T_a	−35		+75	°C	
Input Rise Time	t_r			100	ns	M_3 Pin (20 to 8
Input Fall Time	t_f			100	ns	M_3 Pin (20 to 8

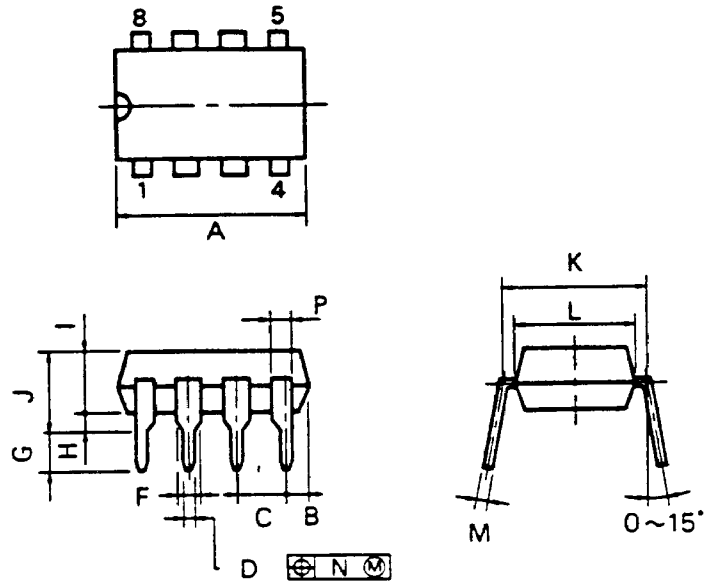
ELECTRIC CHARACTERISTICS (V_{CC} = 5 V ±10 %, T_a = −35 to +75 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Operating Frequency	f_{in}	1		150	MHz	IN Pin, $V_{in} \geq$ 150 mV_{p-p} sine wave
Input Voltage	V_{in}	150		2000	mV_{p-p}	IN Pin
High Level Input Voltage	V_{IH}	0.8 V_{CC}			V	M_3 Pin
Low Level Input Voltage	V_{IL}			0.2 V_{CC}	V	M_3 Pin
Output Voltage	V_o	0.9	1.2		V_{p-p}	OUT Pin
Supply Current	I_{CC}		7.0	11	mA	V_{CC} Pin
Set Up Time	t_s			30	ns	M_3 – OUT
Output Rise Time	t_r	5		20	ns	OUT Pin, C_L=10 pF (20 to 80 %)

Note: M_1, M_2 and CHK input terminals should be connected to either GND or V_{CC}.

PACKAGE DIMENSION

8 PIN PLASTIC DIP (300 mil)



P8C-100-300A

NOTES

1) Each lead centerline is located within 0.25 mm (0.01 inch) of its true position (T.P.) at maximum material condition.

2) Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS	INCHES
A	10.16 MAX.	0.400 MAX.
B	1.27 MAX.	0.050 MAX.
C	2.54 (T.P.)	0.100 (T.P.)
D	$0.50^{+0.10}_{-0.08}$	$0.020^{+0.004}_{-0.003}$
F	1.4 MIN.	0.055 MIN.
G	$2.9^{+0.3}$	0.114
H	0.51 MIN.	0.020 MIN.
I	4.31 MAX.	0.170 MAX.
J	5.08 MAX.	0.200 MAX.
K	7.62 (T.P.)	0.300 (T.P.)
L	6.4	0.252
M	$0.25^{+0.10}_{-0.05}$	$0.010^{+0.004}_{-0.003}$
N	0.25	0.01
P	0.9 MIN.	0.035 MIN.