

1/4, 1/8, 1/40 HIGH SPEED DIVIDER

DESCRIPTION

The M54455L is a semiconductor integrated circuit consisting of a 1/4, 1/8, 1/40 high speed frequency divider with an ECL circuit configuration.

FEATURES

- High-speed operation ($f_{max} = 130$ MHz)
- Operation at low input amplitude (400mV_{p-p} minimum input amplitude)
- TTL level output

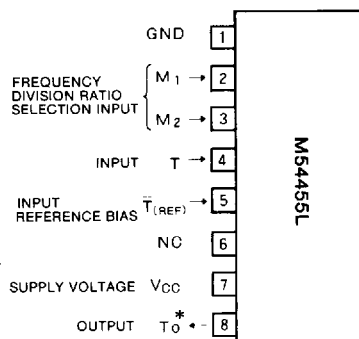
APPLICATION

FM radio prescalers; digital equipment for consumer and industrial applications.

FUNCTION

This divider is based on an ECL circuit configuration. If a frequency up to a maximum of 150MHz is applied to the input (T_1) pin, a 1/4-divided output can be obtained when the frequency division ratio selection input (M_1 and M_2) pins are both low. When pins M_1 and M_2 are at high and low a 1/8-divided output is obtained and both pins are high, a 1/40-divided output is obtained. The output (T_0) conforms to the TTL level open collector format. The table right side gives the relationship between the input conditions and the frequency division ratio.

PIN CONFIGURATION (TOP VIEW)



* : Open collector output
NC : No connection

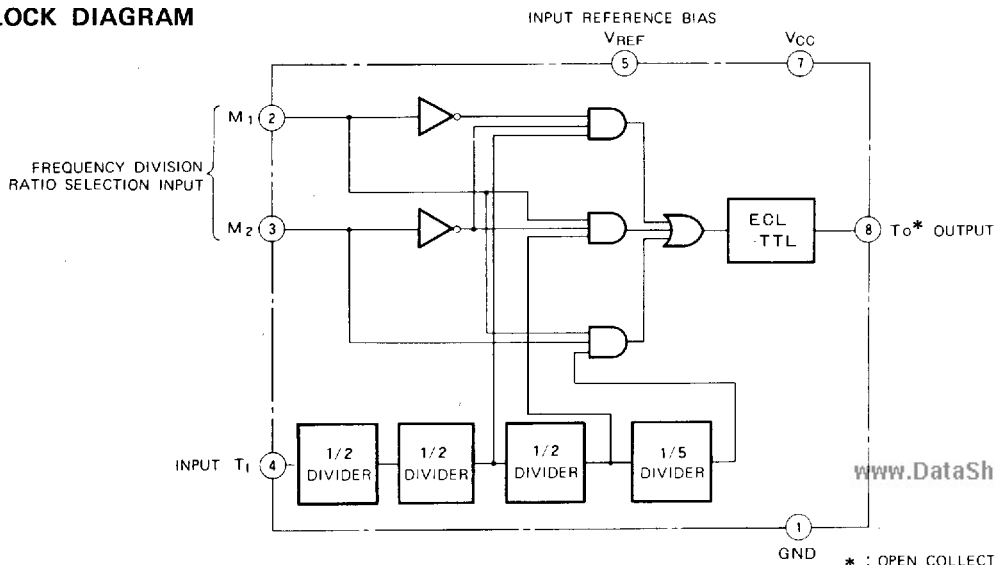
Outline 8P5

FREQUENCY DIVISION RATIO SELECTION INPUTS (M_1, M_2) AND FREQUENCY DIVISION RATIOS

M_1	L	H	H
M_2	L	L	H
Frequency division ratio	1/4	1/8	1/40

Note: Do not use the divider with M_1 low and M_2 high.

BLOCK DIAGRAM



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* : OPEN COLLECTOR OUTPUT

ABSOLUTE MAXIMUM RATINGS ($T_a = -10 \sim +75^\circ\text{C}$, unless otherwise noted)

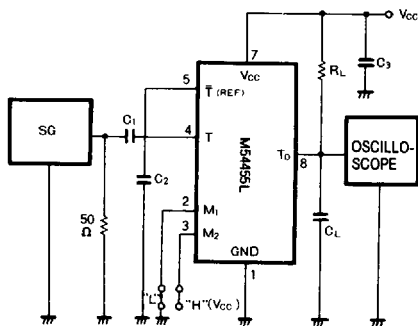
Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
V_I	Input voltage		2.5	V
V_{IM}	Input voltage (M input)		V_{CC}	V
V_O	Output applied voltage		5.5	V
P_d	Power dissipation	$T_a = 25^\circ\text{C}$	1.33	W
T_{opr}	Operating temperature		$-10 \sim +75$	$^\circ\text{C}$
T_{stg}	Storage temperature		$-55 \sim +125$	$^\circ\text{C}$

RECOMMENDED OPERATING CONDITIONS ($T_a = -10 \sim +75^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4.5	5	5.5	V
f_{IN}	Input frequency		30		130	MHz
V_{IN}	Input amplitude	$V_{CC} = 5\text{V}$, $f_{IN} = 30 \sim 130\text{MHz}$	400		800	mV _{p-p}
$V_{IH(M)}$	High-level M input voltage		2.5		V_{CC}	V
$V_{IL(M)}$	Low-level M input voltage		0		0.4	V

ELECTRICAL CHARACTERISTICS ($T_a = -10 \sim +75^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Supply current	$V_{CC} = 5\text{V}$			13	mA
V_{IN}	Prescaler operating input	$V_{CC} = 5\text{V}$, $f_{IN} = 30 \sim 130\text{MHz}$, $T_a = 25^\circ\text{C}$			400	mV _{p-p}
$I_{IH(M)}$	High-level M input current	$V_{CC} = 5\text{V}$, $V_{OH} = 2.5\text{V}$		0		μA
$I_{IL(M)}$	Low-level M input current	$V_{CC} = 5\text{V}$, $V_{OL} = 0.4\text{V}$		30		μA
$I_{O(leak)}$	Output leak current	$V_{CC} = 5\text{V}$, $V_O = 5.5\text{V}$			100	μA
V_{OL}	Low-level output voltage	$V_{CC} = 5\text{V}$, $I_{OL} = 5\text{mA}$			0.5	V

 f_{max} TEST CIRCUIT

$C_1 \approx 1000\text{pF}$, $C_2 \approx 1000\text{pF}$, $C_L \approx 5\text{pF}$; $R_L = 3 \sim 5\text{k}\Omega$,
 $C_3 \approx 0.1\mu\text{F}$

TYPICAL CHARACTERISTICS**INPUT AMPLITUDE VS
INPUT FREQUENCY**