

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

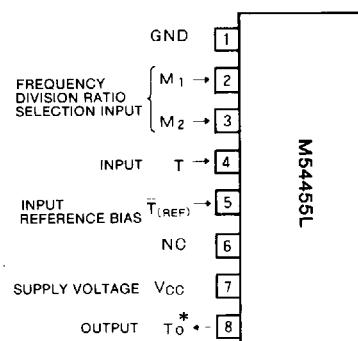
- High-speed operation ($f_{max} = 130$ MHz)
- Operation at low input amplitude (400mV_{P-P} minimum input amplitude)
- TTL level output

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)

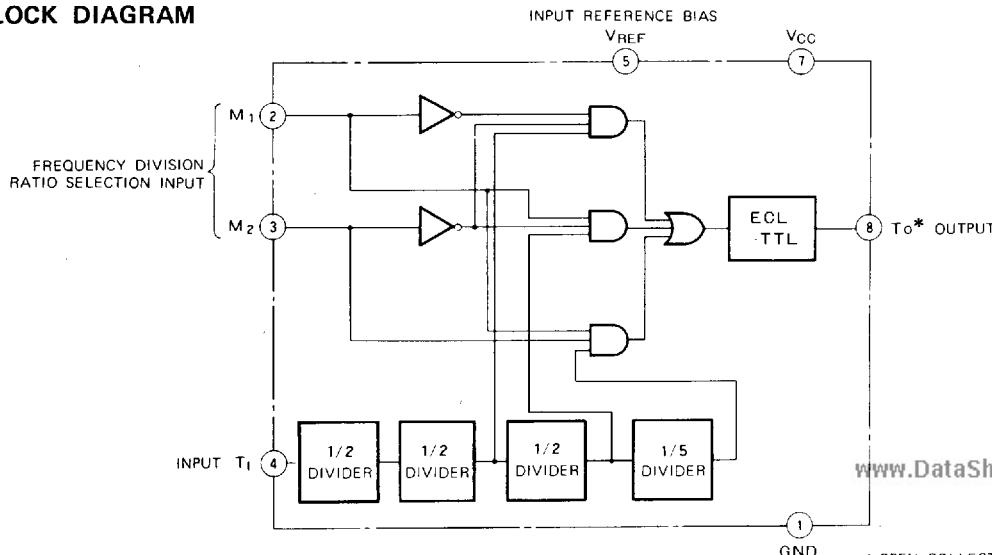
* : Open collector output
NC : No connection

Outline 8P5

FREQUENCY DIVISION RATIO SELECTION INPUTS (M₁, M₂) 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 M₁ low and M₂ high.

BLOCK DIAGRAM

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

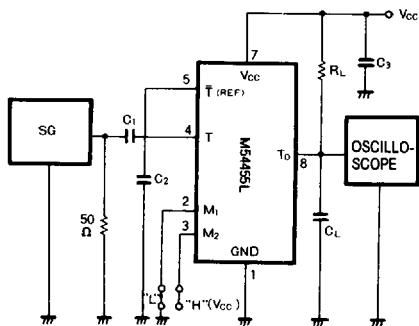
Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
V_I	Input voltage		2.5	V
V_{IM}	Input voltage (M input)		V_{CC}	V
V_O	Output applied voltage		5.5	V
P_d	Power dissipation	$T_a = 25^\circ\text{C}$	1.33	W
T_{opr}	Operating temperature		$-10 \sim +75$	$^\circ\text{C}$
T_{stg}	Storage 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	$V_{CC} = 5V, f_{IN} = 30 \sim 130\text{MHz}$	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	$V_{CC} = 5V$			13	mA
V_{IN}	Prescaler operating input	$V_{CC} = 5V, f_{IN} = 30 \sim 130\text{MHz}, T_a = 25^\circ\text{C}$			400	mV_{P-P}
$I_{IH(M)}$	High-level M input current	$V_{CC} = 5V, V_{OH} = 2.5V$			0	μA
$I_{IL(M)}$	Low-level M input current	$V_{CC} = 5V, V_{OL} = 0.4V$			30	μA
$I_{OL(\text{leak})}$	Output leak current	$V_{CC} = 5V, V_O = 5.5V$			100	μA
V_{OL}	Low-level output voltage	$V_{CC} = 5V, I_{OL} = 5\text{mA}$			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