

M54454P

MITSUBISHI (DGTL LOGIC)

3LE D ■ 6249827 0014418 3 ■ MIT3

1/256 HIGH-SPEED DIVIDER WITH TTL OUTPUT

IT-45-19-13

DESCRIPTION

The M54454P is a semiconductor integrated circuit consisting of a built-in 1/256 high-speed frequency divider in an ECL circuit configuration.

FEATURES

- Ultra-high-speed operation ($f_{max} = 1.2\text{GHz}$)
- Operation at low input amplitude (300mV_{P-P} minimum input amplitude)
- TTL level output
- Two inputs (UHF and VHF)
- TTL level compatible bandswitching input

APPLICATIONS

Prescalers for PLL synthesizer TV tuners; digital equipment for consumer and industrial application

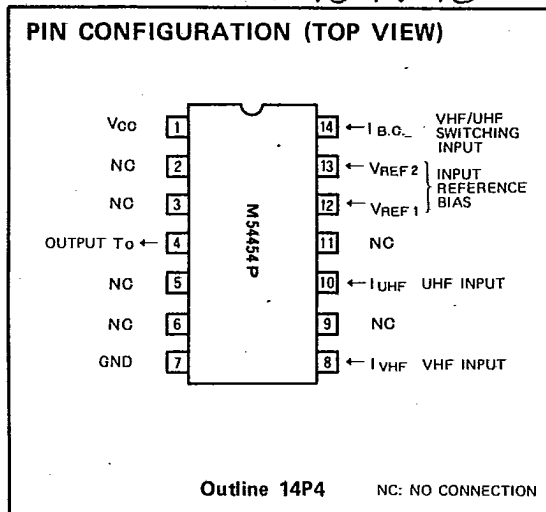
FUNCTION

This 1/256 frequency divider is based on an ECL circuit configuration. When a frequency between 450MHz and 950MHz is applied to the UHF input (I_{UHF}) pin, a 1/256-divided frequency output is obtained. The same output is obtained when a frequency between 80MHz and 350MHz is applied to the VHF input (I_{VHF}) pin. The output (T_0) conforms to the TTL level.

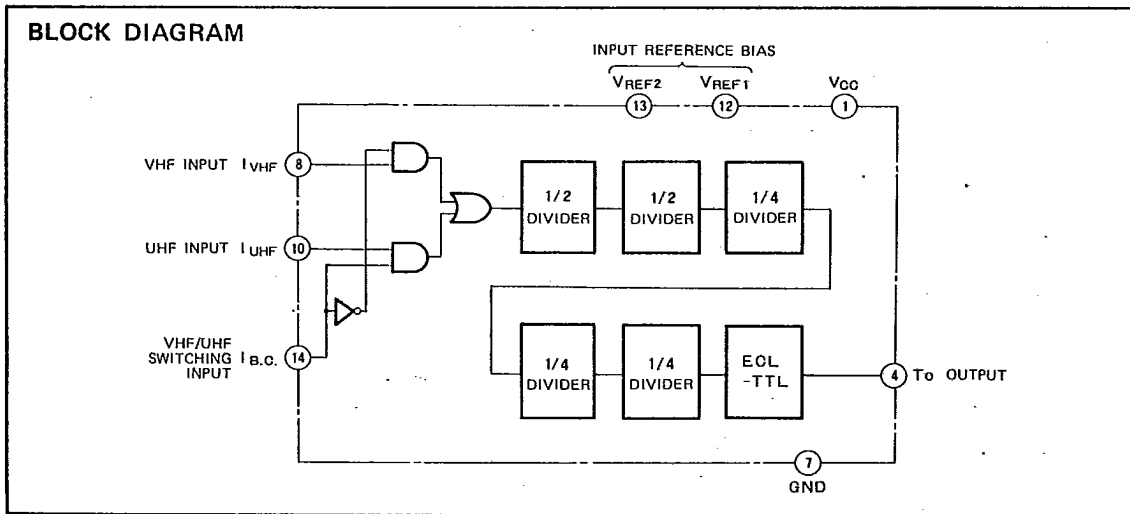
A wideband operating system should be used when the UHF input pin is supplied with frequencies ranging from 80MHz to 950MHz.

When the bandswitching input ($I_{B.C.}$) pin is high or open, the UHF input (I_{UHF}) pin can be used and when it is low, the VHF input (I_{VHF}) pin can be used. Do not supply signals simultaneously to the UHF input (I_{UHF}) and VHF input (I_{VHF}) pins.

PIN CONFIGURATION (TOP VIEW)



BLOCK DIAGRAM



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

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		9	V
V_I	Input voltage		2.5	V _{P-P}
$V_{B,C}$	Band switching input voltage		-0.5 ~ +7.2	V
I_O	Output current		-30 ~ +30	mA
T_{opr}	Operating temperature		-10 ~ +75	°C
T_{stg}	Storage temperature		-55 ~ +125	°C

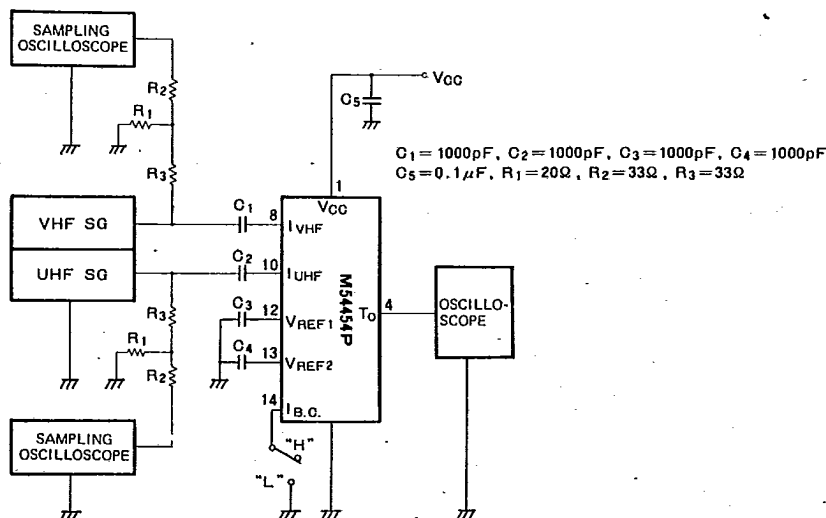
RECOMMENDED OPERATING CONDITIONS ($T_a = -10 \sim +75^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Limits			Unit
		Min	Typ	Max	
V_{CC}	Supply voltage	6.1	6.8	7.5	V
I_{OL}	Low-level output current			5	mA

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	$V_{CC} = 6.8\text{V}$		68		mA
V_{OH}	High-level output voltage	$V_{CC} = 6.8\text{V}$, $I_{OH} = -0.2\text{mA}$	2.5	3.5		V
V_{OL}	Low-level output voltage	$V_{CC} = 6.8\text{V}$, $I_{OL} = 5\text{mA}$			0.4	V
V_{BOH}	High-level bandswitching input voltage		2.5			V
V_{BOL}	Low-level bandswitching input voltage				0.4	V
V_S	VHF input sensitivity	$V_{CC} = 6.8\text{V}$, $T_a = 25^\circ\text{C}$ $f_{IN} = 80 \sim 350\text{MHz}$			300	mV _{P-P}
U_{S1}	UHF input sensitivity 1	$V_{CC} = 6.8\text{V}$, $T_a = 25^\circ\text{C}$ $f_{IN} = 450 \sim 950\text{MHz}$			300	mV _{P-P}
U_{S2}	UHF input sensitivity 2	$V_{CC} = 6.8\text{V}$, $T_a = 25^\circ\text{C}$ $f_{IN} = 80 \sim 350\text{MHz}$			300	mV _{P-P}
V_{max}	VHF maximum input level	$f_{IN} = 80 \sim 350\text{MHz}$	1			V _{P-P}
U_{max}	UHF maximum input level	$f_{IN} = 450 \sim 950\text{MHz}$	1			V _{P-P}

f_{max} TEST CIRCUIT



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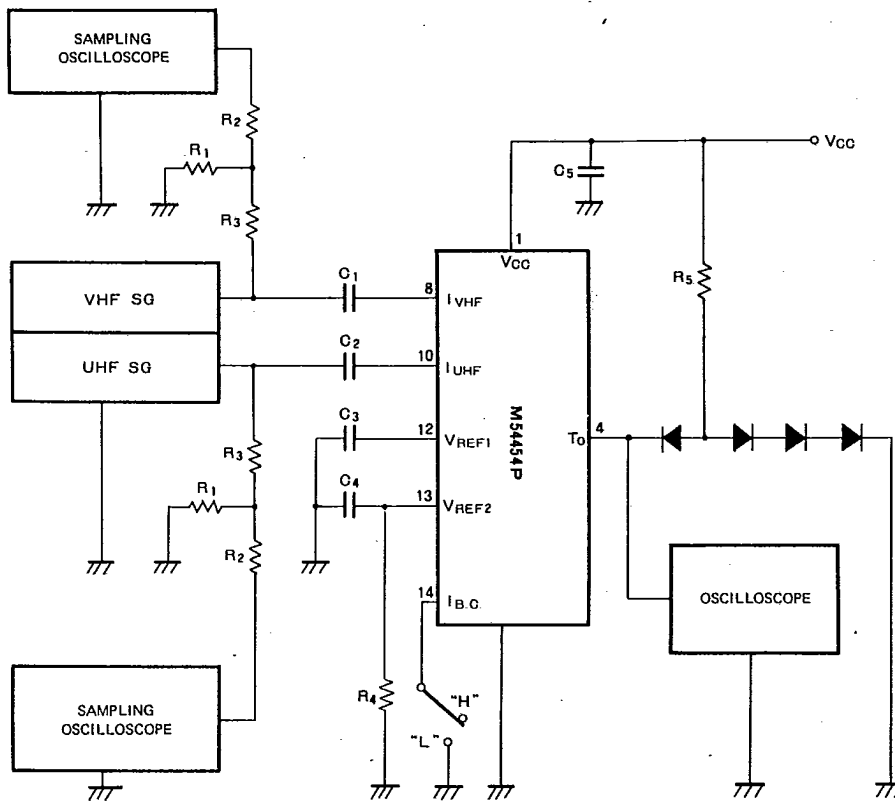
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APPLICATION EXAMPLE

For wide-band operation



Operation across an even wider frequency range is enabled for the UHF input by setting R_4 between V_{REF2} and GND with $C_1 = 1000\text{pF}$, $C_2 = 1000\text{pF}$, $C_3 = 1000\text{pF}$, $C_4 = 1000\text{pF}$, $C_5 = 0.1\mu\text{F}$, $C_6 = 0.1\mu\text{F}$, $R_1 = 20\Omega$, $R_2 = 33\Omega$, $R_3 = 33\Omega$, $R_4 = 36\text{k}\Omega$

TYPICAL CHARACTERISTICS

