M54457P

1/256 HIGH-SPEED DIVIDER WITH ECL OUTPUT

DESCRIPTION

The M54457P is a semiconductor integrated circuit consisting of a built-in 1/256 high-speed frequency divider with an ECL circuit configuration.

FEATURES

- Extremely high-speed operation (f_{max} = 1.0GHz)
- Operation at low input amplitude (300mV_{P-P} minimum input amplitude)
- ECL 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 applications.

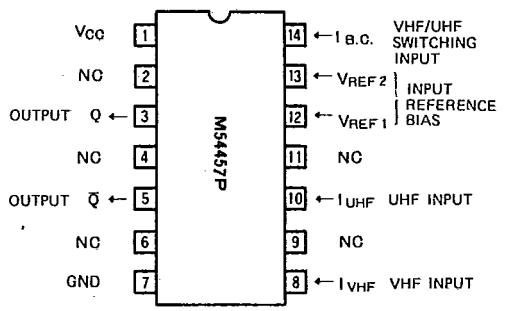
FUNCTION

This 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 outputs (Q, $\overline{Q}$) conform to the ECL 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 a 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.

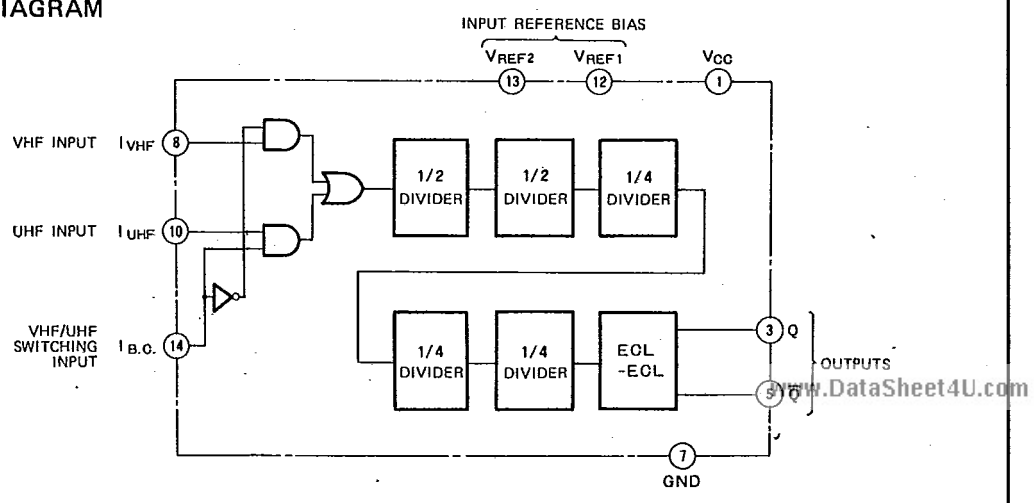
PIN CONFIGURATION (TOP VIEW)



NC: NO CONNECTION

Package Outline 14P4

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = −10 ~ +75°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
Topr	Operating temperature		−10 ~ +75	°C
Tstg	Storage temperature		−55 ~ +125	°C

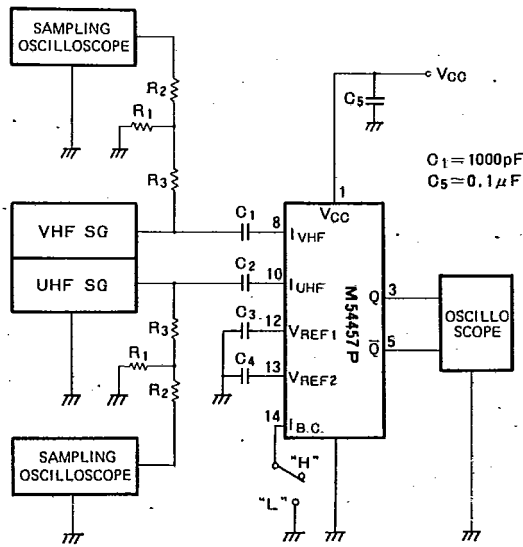
RECOMMENDED OPERATING CONDITIONS (Ta = −10 ~ +75°C, unless otherwise noted)

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 (Ta = −10 ~ +75°C unlews otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	V_{CC} = 6.8V		68		mA
V_O	Output voltage	V_{CC} = 6.8V		0.8		V
V_{BCH}	High-level bandswitching input voltage		2.5			V
V_{BCL}	Low level bandswitching input voltage				0.4	V
V_S	VHF input sensitivity	V_{CC} = 6.8V, Ta = 25°C f_{IN} = 80 ~ 350MHz			300	mV_{P-P}
U_{S1}	UHF input sensitivity 1	V_{CC} = 6.8V, Ta = 25°C f_{IN} = 450 ~ 950MHz			300	mV_{P-P}
U_{S2}	UHF input sensitivity 2	V_{CC} = 6.8V, Ta = 25°C f_{IN} = 80 ~ 350MHz			300	mV_{P-P}
Vmax	VHF maximum input level	f_{IN} = 80 ~ 350MHz	1			V_{P-P}
Umax	UHF maximum input level	f_{IN} = 450 ~ 950MHz	1			V_{P-P}

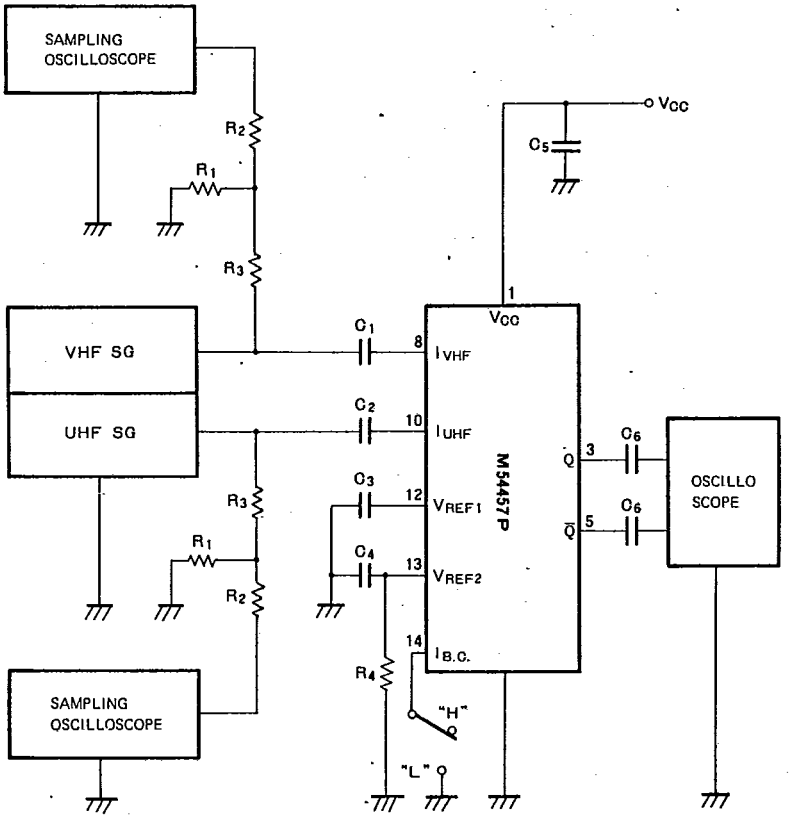
f_{max} TEST CIRCUIT



C_1 = 1000pF, C_2 = 1000pF, C_3 = 1000pF, C_4 = 1000pF
C_5 = 0.1μF, R_1 = 20Ω, R_2 = 33Ω, R_3 = 33Ω

APPLICATION EXAMPLE

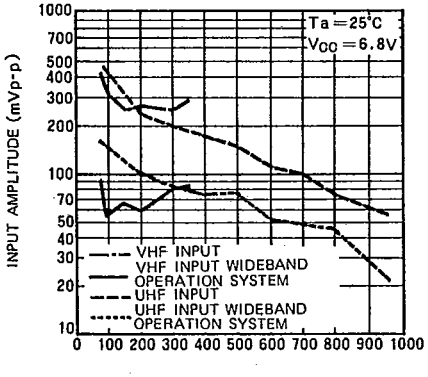
For wide-band operation



Operation across an even wider frequency range is enabled for the UHF input by setting R_4 between V_{REF2} and GND with $C_1 = 1000pF$, $C_2 = 1000pF$, $C_3 = 1000pF$, $C_4 = 1000pF$, $C_5 = 0.1\mu F$, $R_1 = 20\Omega$, $R_2 = 33\Omega$, $R_3 = 33\Omega$, $R_4 = 36k\Omega$, $R_5 = 1k\Omega$

TYPICAL CHARACTERISTICS

MINIMUM INPUT AMPLITUDE VS INPUT FREQUENCY



MINIMUM INPUT AMPLITUDE VS SUPPLY VOLTAGE