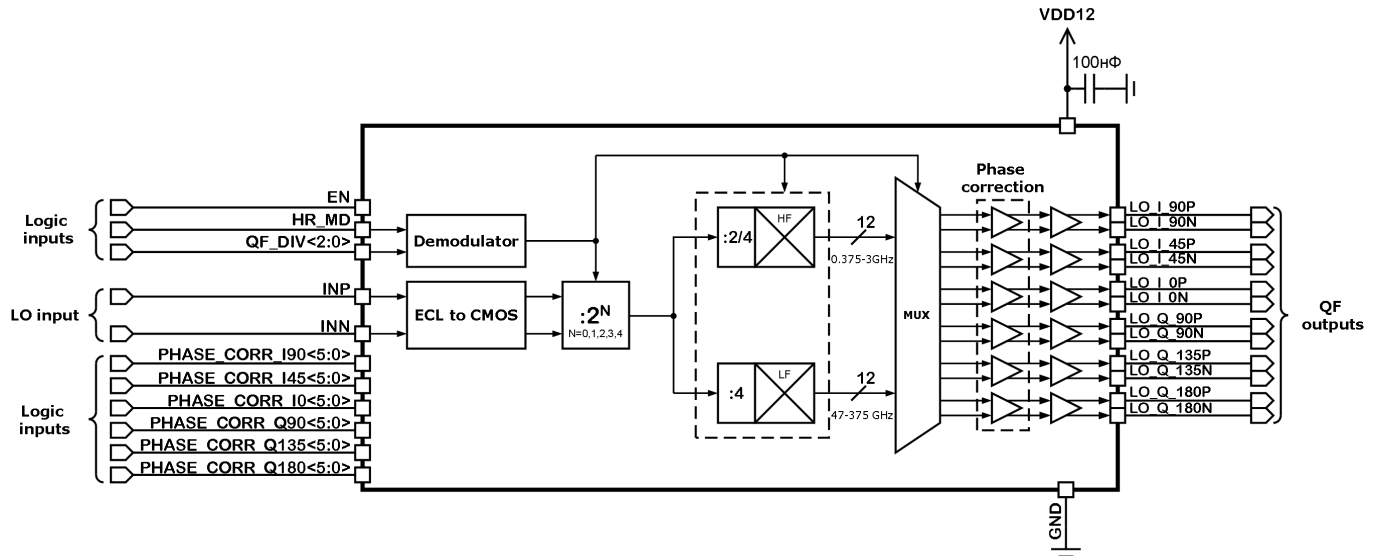


3-6 GHz to 0.075-3 GHz Quadrature former

OVERVIEW



055TSMC_QF_02 is a quadrature former generating a differential quadrature signal in frequency range from 0.075 GHz to 3GHz. Input frequency range from 3 GHz to 6 GHz. Output frequency is formed using the built-in divider by 2, 4, 8, 16, 32, 64.

The QF has two modes output signals:

- Mode 1: differential quadrature signal (LO_I_45* and LO_Q_135*)
- Mode 2: differential quadrature signal with signals offset by ±45 degrees (LO_I_0*, LO_I_45*, LO_I_90*, LO_Q_90*, LO_Q_135* and LO_Q_180*)

The quadrature outputs have phase accuracy adjustment for each differential signal.

IP technology: TSMC EF CMOS 55nm technology.

IP status: pre-silicon verification.

Area: 172.2×450um².

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units	
			min	typ.	max		
Input supply voltage	V _{DD}	-	1.14	1.2	1.26	V	
Operating temperature range	T _j	-	-40	+27	+85	°C	
Current consumption	I _{DD}	Mode 1	F _{OUT} =3GHz	-	15.0	-	mA
			F _{OUT} =1.5GHz	-	13.0	-	
			F _{OUT} =0.075GHz	-	10.0	-	
		Mode 2	F _{OUT} =1.5GHz	-	18.0	-	
			F _{OUT} =0.075GHz	-	13.0	-	
			F _{OUT} =0.047GHz	-	6.0	-	
Input frequency range	F _{IN}	-	3	-	6	GHz	
Input duty cycle	DC	-	49.5	50	50.5	%	
Output frequency range	F _{OUT}	-	0.075	-	3	GHz	
Input differential signal amplitude	A _{in p-p}	For input INP and INN	0.5	-	-	V	
Output amplitude	V _{OUT p-p}	CMOS	-	1.2	-	V	
IQ phase error	φ _{err}	Without adj.	F _{OUT} =3GHz	-	-	±15	degree
			F _{OUT} =1.5GHz	-	-	±4	
Phase adjustment range	φ _{corr.}	F _{OUT} =3GHz	0	-	28.6	degree	
		F _{OUT} =1.5GHz	0	-	7.0		
		F _{OUT} =0.075GHz	0	-	2.4		
		F _{OUT} =0.047GHz	0	-	0.05		