

COMPACT DIGITAL FREQUENCY DIVIDERS

Description

Kamaten frequency dividers reduce input digital signal (clock) frequency and can be set to any integer division ratio from 1 to 8, 64, 512 or 4096. Input and output signals are differential CMOS. All input, output and control signals are CMOS. **Dividers have very compact footprint.** Inductors are not used, reducing silicon area and electromagnetic interference. Dividers are intended for use in frequency conversion or frequency synthesizing systems, requiring broad range of division ratios with inclusion of any value within the range. Dividers come as high frequency or low power versions, designed in TSMC 28HPC/HPC+ process. Designs may be ported to other process nodes by request.

Features

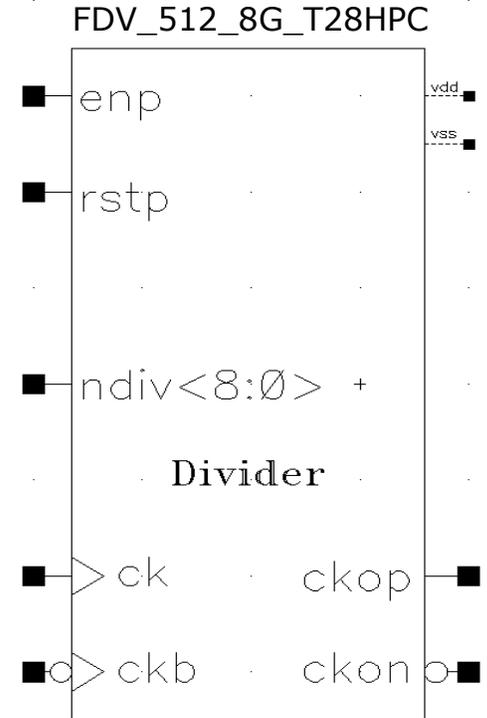
- Division ratio: any integer from 1 to 8/64/512/4096
- Maximum input frequency 2GHz – 10+GHz (A)
- Clock input and output signals are differential CMOS
- Control signals are single ended CMOS
- Typical consumption: 0.5 – 4mA at 1GHz, scales with frequency (A)
- Duty cycle at output 50±5%
- Power down and bypass mode
- Low leakage current
- Footprint: 52x30µm 1:1:512 high frequency version; 32x15µm 1:1:64 low power version
- Process: TSMC 28nm HPC/HPC+; can be ported to other nodes by request

(A) – depending on design version and division ratio

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Symbol View

Symbol view is exemplar for regular version of 1:1:512 divider. Other dividers have identical symbol views except name and bit count on “ndiv<N:0>” input. For instance, low power 1:1:64 divider will be FDV_64_2G_T28HPC with “ndiv<5:0>”.



Operating Conditions

For 1:1:512 high frequency version

Parameters	Units	Values		NOTES
		TYP	MAX	
Input clock frequency	GHz	8.00	6.0	max is at +110C/850mV/SlowSlow typ is at +40C/900mV/TypTyp
Power supply current, active	mA	0.8-3.0	0.9-4.0	At 1GHz, depending on design version
Power supply current, powerdown	µA	10.00	250.0	+110C/0.95V/FastFast
Clock transition time at iutput, 20/80	ps	6.00	8.0	
Clock duty cycle distortion at input	%		5.0	
Clock skew at input	%		5.0	
Input Capacitance, approximate	fF	30.00		

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Electrical Characteristics: * - preliminary

IP vs. Parameters	Division ratio, all integers included		Highest Frequency at Input, GHz		DCD at Output, %	Consumption, at 1GHz, mA		Consumption scaling, mA/GHz		Area, μ M	Status
	MIN	MAX	MIN	TYP	MAX	MAX	TYP	MAX	TYP		
HIGH FREQUENCY											
FDV_8_10G_T28HPC	1	8	10.0*	12.0*	5.0	1.5*	1.2*	1.6*	1.4*	30X30*	Coming soon
FDV_64_9G_T28HPC	1	64	9.0*	11.0*	5.0	2.0*	1.5*	2.1*	1.6*	40X30*	In development
FDV_512_8G_T28HPC	1	512	8.0	10.0	5.0	2.6	1.9	2.7	2.0	52X30	Available
FDV_4096_6G_T28HPC	1	4096	6.0*	8.0*	5.0	3.6*	3.0*	TBD	TBD	80X30*	In development
LOW POWER											
FDV_8_4G_T28HPC	1	8	4.0*	5.0*	5.0	TBD	TBD	TBD	TBD	TBD	Future plans
FDV_64_3G_T28HPC	1	64	3.0	4.0	5.0	0.9	0.7	0.9	0.75	32X15	Available
FDV_512_2G_T28HPC	1	512	2.0*	3.0*	5.0	TBD	TBD	TBD	TBD	TBD	Future plans
FDV_4096_1G_T28HPC	1	4096	1.0*	1.4*	5.0	TBD	TBD	TBD	TBD	TBD	Future plans

Operational Ratings

- Power Supply Voltage 850 – 950 mV
- Input Voltage 40mV – Vdd-50 mV
- Operating Temperature Range -40C/+110C
- Maximum Input Clock Frequency 2 – 10+GHz