

# High Frequency Ultra-low Jitter Crystal Oscillators [ Quick - turn Oscillators , 150 ~ 2,100 MHz ]

## H<sub>JF</sub>

CMOS / Differential

**150 fsec typical Phase Jitter**

SMD

1.8 V

2.5 V

3.3 V

Min.

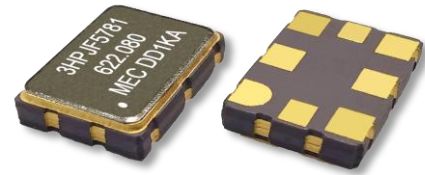
150 MHz

Max.

2,100 MHz

### Features

- High Frequency Range : 150 ~ 2,100 MHz
- Ultra-low RMS Jitter : 150 fsec ( typ. ) @ 3.3V , 156.250 MHz
- 3.2 x 2.5mm or 5.0 x 3.2mm or 7.0 x 5.0mm Package Size
- Next-Day sample for Prototypes



### General specifications , at Ta = +25°C

Model	HTJF	HPJF	HDJF	HCJF	HQJF
Output Logic	CMOS	PECL	LVDS	HCSL	CML
Supply Voltage ( V <sub>DD</sub> )	+ 1.8 V ± 5%	--	+ 1.8 V ± 5% (*)	+ 1.8 V ± 5%	+ 1.8 V ± 5%
	+ 2.5 V ± 10%	+ 2.5 V ± 10%	+ 2.5 V ± 10%	+ 2.5 V ± 10%	+ 2.5 V ± 10%
	+ 3.3 V ± 10%	+ 3.3 V ± 10%	+ 3.3 V ± 10%	+ 3.3 V ± 10%	+ 3.3 V ± 10%
Available Frequency Range	150 ~ 250 MHz	150 ~ 2,100 MHz	150 ~ 2,100 MHz	150 ~ 700 MHz	150 ~ 2,100 MHz
Output Load	15pF	50 Ω into V <sub>DD</sub> - 2V or Thevenin equivalent	100 Ω	50 Ω to GND	50 Ω to V <sub>DD</sub>
Output Logic " High " , " 1 "	90% V <sub>DD</sub> ( min. )	V <sub>DD</sub> - 1.165 V ( min. ) V <sub>DD</sub> - 0.8 V ( max. )	V <sub>DD</sub> : 1.4V ( typ. ) V <sub>DD</sub> : 1.6 V ( max. )	V <sub>DD</sub> : 0.66V ( min. ) V <sub>DD</sub> : 1.15 V ( max. )	V <sub>DD</sub> - 0.085V ( min. ) V <sub>DD</sub> = max.
Output Logic " Low " , " 0 "	10% V <sub>DD</sub> ( max. )	V <sub>DD</sub> - 2.0 V ( min. ) V <sub>DD</sub> - 1.55 V ( max. )	V <sub>DD</sub> : 1.1 V ( typ. ) V <sub>DD</sub> : 0.9 V ( min. )	V <sub>DD</sub> : 0.0V ( min. ) V <sub>DD</sub> : 0.15V ( max. )	V <sub>DD</sub> - 0.6V ( min. ) V <sub>DD</sub> - 0.32V ( max. )
Output Voltage Swing	---	595 mV ( min. ) 930 mV ( max. )	250 mV ( min. ) 450 mV ( max. )	620 mV ( min. ) 780 mV ( max. )	200 mV ( min. ) 600 mV ( typ. )
Current Consumption ( V <sub>DD</sub> = + 3.3 V )	75 mA ( typ. )	100 mA ( typ. )	75 mA ( typ. )	94 mA ( typ. )	70 mA ( typ. )
	90 mA ( max. )	120 mA ( max. )	90 mA ( max. )	115 mA ( max. )	85 mA ( max. )
Disable Current	62 mA ( typ. )	99 mA ( typ. )	74 mA ( typ. )	93 mA ( typ. )	69 mA ( typ. )
Rise Time / Fall Time ( 20% to 80% Waveform )	5.0 nsec. ( max. ) ( 10% to 90% )	0.4 nsec. ( max. )	0.4 nsec. ( max. )	0.4 nsec. ( max. )	0.4 nsec. ( max. )
Frequency Stability Codes	Frequency Stability Over Operating Temperature Range		± 25 ppm	± 50 ppm	± 100 ppm
	Commercial ( -10°C to +70°C )		A	B	C
	Industrial ( -40°C to +85°C )		D	E	F
Duty Cycle	50 % ± 5%				
Start-up Time	5 msec ( typ. ) ; 10 msec. ( max. )				
RMS Jitter ( typ. ) ( 12 KHz to 20 MHz )	156.250 MHz : 159 fsec. ; 491.520 MHz : 155 fsec. ; 644.530 MHz : 151 fsec. ; 2,000 MHz : 163 fsec.				
Storage Temperature	-55°C to + 150°C				
Aging at Ta = +25°C	+ 3 ppm ( max. ) for first year ; ± 2 ppm ( max. ) per year thereafter				
Enable / Disable Function on Pad1	80% of V <sub>DD</sub> ( min. ) to enable output.				
	20% of V <sub>DD</sub> ( max. ) to disable output.				
Enable / Disable Time	2.5 msec. ( max. ) / 10 usec. ( max. )				

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SMD

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Min.

150 MHz

Max.

2,100 MHz

### Part Number Format and Example

[ 1 ]	[ 2 ]	[ 3 ]	[ 4 ]	[ 5 ]	[ 6 ]	[ 7 ]	[ 8 ]
Supply Voltage	OSC Type	Output Waveform	Series	Package Size	OE Function	Frequency Stability	Center Frequency
3	H	D	JF	578	1	E	644.530

EX : 3HDJF5781 - E - 644.530 [ +3.3V, HDJF type, LVDS output, 7.0x5.0mm 8pad, OE on pad1, ±50ppm from -40 to +85°C, 644.530 MHz ]

[ 1 ]	Supply voltage, " 18 " for +1.8V ; " 25 " for +2.5V ; " 3 " for +3.3V
[ 2 ]	OSC Type, " H " : XO
[ 3 ]	Output Waveform, " T " : CMOS ; " P " : PECL ; " D " : LVDS ; " C " : HCSL ; " Q " : CML
[ 4 ]	JF Series
[ 5 ]	Package Size, " 328 " : 3.2 x 2.5 mm 8pad ; " 538 " : 5.0 x 3.2 mm 8pad ; " 578 " : 7.0 x 5.0 mm 8pad
[ 6 ]	" 1 " : OE function on pad # 1
[ 7 ]	-10°C ~ 70 °C " A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm -40°C ~ 85 °C " D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm
[ 8 ]	Frequency in MHz

### Outline Dimensions ( Unit : mm ) , Suggested pad Layout for SMDs

H_JF328	H_JF538	H_JF578

### Pad Connections :

**Pad 1** : Output Enable ; **Pad 2** : No Connection ; **Pad 3** : Ground ; **Pad 4** : CMOS : Output , Differential : Output

**Pad 5** : CMOS : No Connection , Differential : Complementary ; **Pad 6** : Supply Voltage ; **Pad 7 , Pad 8** : Do Not Connect

### Test Circuits

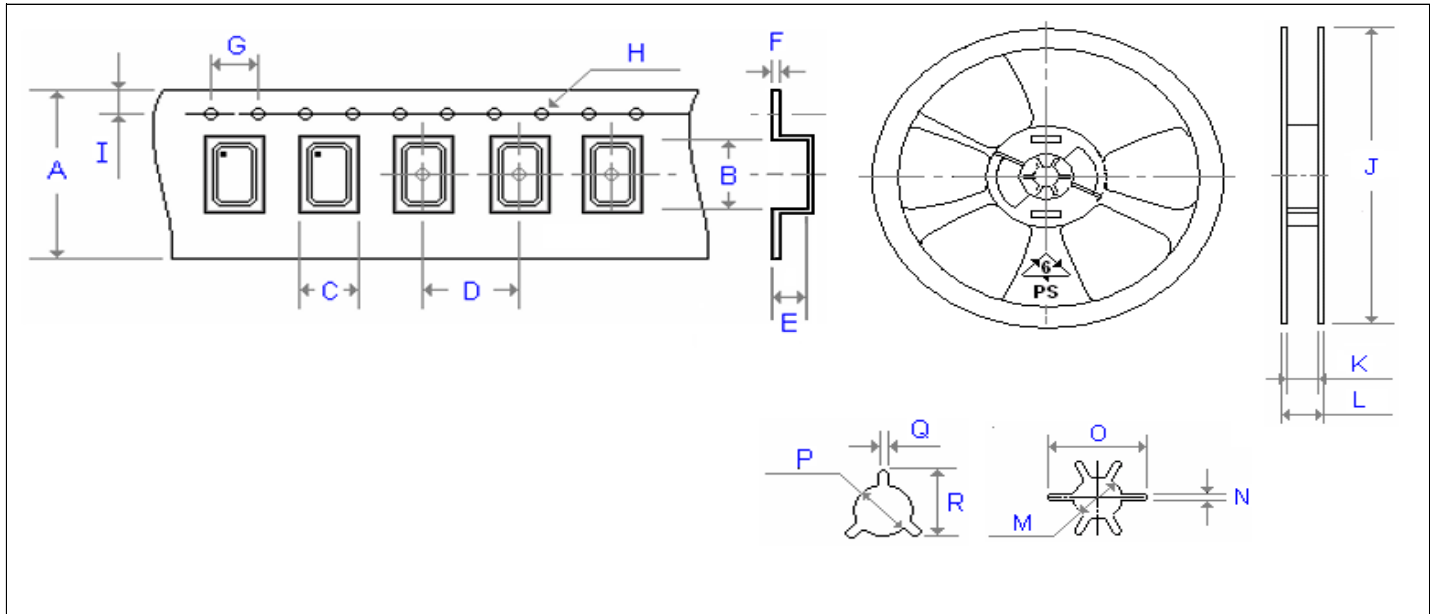
CMOS	HCSL	LVDS
PECL	CML	LVDS Test Circuits for 1.8V only (*)
<p><math>V_{DD} = 3.3V ; R_1 = R_3 = 127 \Omega ; R_2 = R_4 = 82.5 \Omega</math> <math>V_{DD} = 2.5V ; R_1 = R_3 = 250 \Omega ; R_2 = R_4 = 62.5 \Omega</math></p>		<p>Vocm 1.2V</p>

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# Emboss Taping and Reel Specifications

[ Crystal Oscillator Units ]



Carrier Type Dimensions ( unit : mm ) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.55	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.55	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.32	4.00	∅ 1.55	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.55	1.75	1000
HP_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.55	1.75	1000
HD_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.55	1.75	1000
H_42	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	∅ 1.50	1.75	500

Reel Dimensions ( unit : mm ) ±2mm

	J	K	L	M	N	O	P	Q	R	pcs / reel
H_22	178.00	8.40	11.400	-	-	-	13.00	2.50	20.50	3000
H_32	180.00	9.00	12.000	-	-	-	13.20	2.10	-	3000
H_53	180.00	13.00	16.000	-	-	-	13.20	2.50	-	1000
H_57	180.00	17.20	19.300	-	-	-	13.30	2.20	22.00	1000
SWO	180.00	17.20	19.300	-	-	-	13.30	2.20	22.00	1000
H_576	180.00	17.20	19.300	-	-	-	13.30	2.20	22.00	1000
HP_576	180.00	17.20	19.300	-	-	-	13.30	2.20	22.00	1000
HD_576	180.00	17.20	19.300	-	-	-	13.30	2.20	22.00	1000
H_42	330.00	24.50	29.100	-	-	-	13.00	2.20	17.30	500
H_43	330.00	24.50	29.100	-	-	-	13.00	2.20	17.30	500

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