

High Frequency Ultra-low Jitter Crystal Oscillators [Quick - Turn Oscillators , 50 ~ 2,100 MHz]

H_JFN

CMOS / Differential

**Quick - Turn
Clock Oscillators**

**150 fsec
RMS Jitter**

SMD

1.8 V

2.5 V

3.3 V

Min.

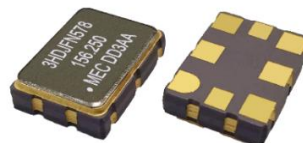
50 MHz

Max.

2,100 MHz

Features

- High Frequency Range : 50 ~ 2,100 MHz
- Ultra-low RMS Jitter : 150 fsec (typ.) @ 3.3V , 156.250 MHz
- Package Size : 3.2 x 2.5mm and 5.0 x 3.2mm and 7.0 x 5.0mm
- Next-Day sample for Prototypes



General specifications , at Ta = +25°C

Model	HTJFN	HPJFN	HDJFN	HCJFN	HQJFN
Output Logic	CMOS (*1)	LVPECL	LVDS	HCSL	CML
Supply Voltage (V _{DD})	+ 1.8 V ± 5%	--	+ 1.8 V ± 5% (*2)	+ 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	50 ~ 250 MHz	50 ~ 2,100 MHz	50 ~ 2,100 MHz	50 ~ 700 MHz	50 ~ 2,100 MHz
Output Load	15 pF (max.)	50 Ω into V _{DD} - 2V or Thevenin equivalent	100 Ω	50 Ω to GND	50 Ω to V _{DD}
Output Logic " High " , " 1 "	V _{DD} - 0.4 V (min.)	V _{DD} - 1.165 V (min.) V _{DD} - 0.8 V (max.)	V _{DD} : 1.4 V (typ.) V _{DD} : 1.6 V (max.)	V _{DD} : 0.66 V (min.) V _{DD} : 1.15 V (max.)	V _{DD} - 0.085 V (min.) V _{DD} = (max.)
Output Logic " Low " , " 0 "	V _{DD} × 0.1 V (max.) 0.3V (max.) for 1.8V only	V _{DD} - 2.0 V (min.) V _{DD} - 1.55 V (max.)	V _{DD} : 1.1 V (typ.) V _{DD} : 0.9 V (min.)	V _{DD} : - 0.15 V (min.) V _{DD} : 0.15 V (max.)	V _{DD} - 0.6 V (min.) V _{DD} - 0.32 V (max.)
Output Voltage Swing	---	595 mV (min.) 930 mV (max.)	250 mV (min.) 450 mV (max.)	450 mV (min.) 700 mV (typ.)	200 mV (min.) 600 mV (max.)
Current Consumption (V _{DD} = + 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 (-20°C to +70°C)		A	B	C
	Industrial (-40°C to +85°C)		D	E	F
	Extended Industrial (-40°C to +105°C)		---	H	J
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 _{DD} (min.) to enable output.				
	20% of V _{DD} (max.) to disable output.				
Enable / Disable Time	2.5 msec (max.) / 10 usec (max.)				

Note * 1 : For CMOS output , only 7.0x5.0mm and 5.0x3.2mm packages are available.

Note * 2 : This needs AC coupling (100-nF series capacitor). Please check the test circuit.

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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
Example	(1) 3	H	P	JFN	328	1	-	D	-	250.000
	(2) 3	H	D	JFN	578	1	-	E	-	644.530

EX (1) : **3HPJFN3281 - D - 250.000** [+3.3V , HPJFN type , PECL output , 3.2x2.5mm 8pad , OE on pad1 , ±25ppm from -40 to +85°C , 250.000 MHz]

EX (2) : **3HDJFN5781 - E - 644.530** [+3.3V , HDJFN 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 " : LVPECL ; " D " : LVDS ; " C " : HCSL ; " Q " : CML		
[4]	JFN 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]	-20°C ~ 70 °C	" A " ± 25ppm ; " B " ± 50ppm ; " C " ± 100ppm	
	-40°C ~ 85 °C	" D " ± 25ppm ; " E " ± 50ppm ; " F " ± 100ppm	
	-40°C ~ 105 °C	" H " ± 50ppm ; " J " ± 100ppm	
[8]	Frequency in MHz		

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

H_JFN538	H_JFN328
Top View: 5.0 ± 0.2, 3.2 ± 0.2, MEC Bottom View: 0.64, 2.1, 0.64, 2.7, 0.7, 2.54, 1.0, 0.8, 1.2, 2.2, 4.1, 2.54 Land pattern: 0.84, 0.8, 1.2, 2.54, 4.1, 2.2 Side View: 1.4 ± 0.1	Top View: 3.2 ± 0.1, 2.5 ± 0.1, MEC Bottom View: 0.5, 1.65, 0.65, 2.5, 0.7, 2.85, 1.95, 0.95, 0.85 Land pattern: 0.85, 0.95, 2.85, 1.95 Side View: 1.10 ± 0.1
H_JFN578	Pad Connections :
Top View: 7.0 ± 0.2, 5.0 ± 0.2, MEC Bottom View: 1.4, 1.0, 3.7, 1.2, 5.08, 1.3, 1.4, 2.0, 5.08, 5.7, 4.2, 1.3 Land pattern: 1.8, 1.4, 2.0, 5.08, 5.7, 4.2, 1.3 Side View: 1.7 ± 0.1	Pad 1 : Output Enable Pad 2 : No Connection Pad 3 : Ground Pad 4 : CMOS : Output , Differential : Output Pad 5 : CMOS : No Connection , Differential : Complementary Output Pad 6 : Supply Voltage Pad 7 : Do Not Connect Pad 8 : Do Not Connect

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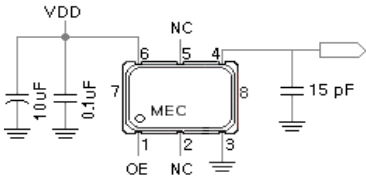
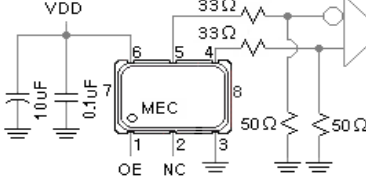
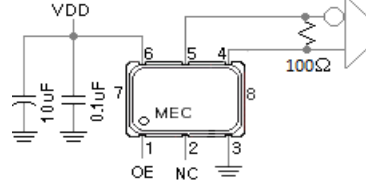
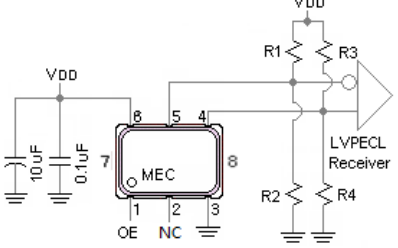
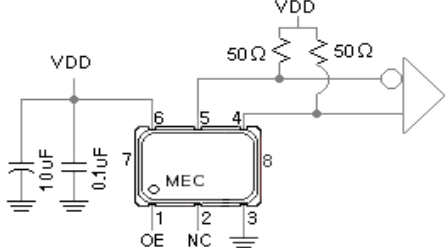
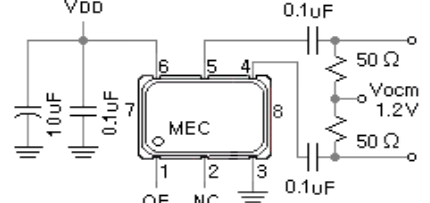
Min.

50 MHz

Max.

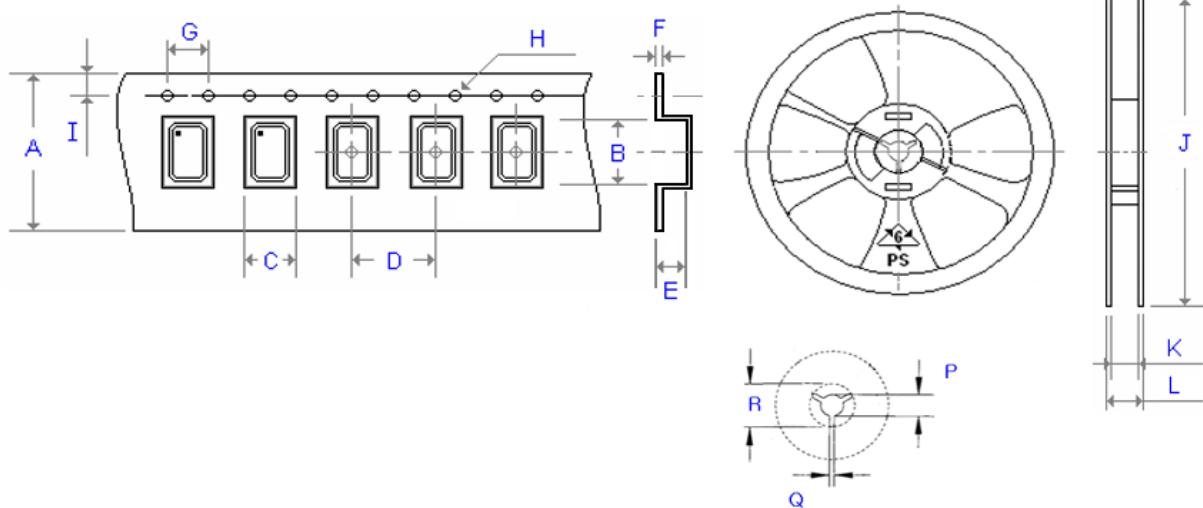
2,100 MHz

Test Circuits

CMOS	HCSL	LVDS Test Circuits for 2.5V and 3.3V
		
LVPECL	CML	LVDS Test Circuits for 1.8V only (*2)
 $V_{DD} = 3.3V$; $R1 = R3 = 127\ \Omega$; $R2 = R4 = 82.5\ \Omega$ $V_{DD} = 2.5V$; $R1 = R3 = 250\ \Omega$; $R2 = R4 = 62.5\ \Omega$		

Emboss Taping and Reel Specifications

[Crystal Oscillator Units]



Carrier Type Dimensions (unit : mm) $\pm 0.3\text{mm}$

	A	B	C	D	E	F	G	H	I	pcs / reel
H21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
H_22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_32	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_57	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000
SWO	16.00	7.20	5.40	8.00	1.80	0.30	4.00	Ø 1.50	1.75	1000
H_216	8.00	2.30	1.90	4.00	0.90	0.25	4.00	Ø 1.50	1.75	3000
H_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	Ø 1.50	1.75	3000
H_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	Ø 1.50	1.75	1000
H_576	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000
H_328	8.00	3.40	2.70	4.00	1.40	0.25	4.00	Ø 1.50	1.75	3000
H_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	Ø 1.50	1.75	1000
H_578	16.00	7.30	5.30	8.00	1.90	0.30	4.00	Ø 1.50	1.75	1000
H_43	24.00	11.80	10.00	16.00	5.00	0.30	4.00	Ø 1.50	1.75	500

Reel Dimensions (unit : mm) $+2.0 / -0.0\text{mm}$

	J	K	L	P	Q	R	pcs / reel
H21	180.00	9.00	12.00	13.20	2.10	-	3000
H_22	180.00	9.00	12.00	13.20	2.10	-	3000
H_32	180.00	9.00	12.00	13.20	2.10	-	3000
H_53	180.00	13.00	16.00	13.20	2.50	-	1000
H_57	180.00	17.20	19.30	13.30	2.20	22.00	1000
SWO	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_216	178.00	8.40	11.40	13.30	2.50	20.50	3000
H_226	180.00	8.40	11.40	13.20	2.10	-	3000
H_326	180.00	9.00	12.00	13.20	2.10	-	3000
H_536	180.00	13.00	16.00	13.20	2.50	-	1000
H_576	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_328	180.00	8.00	12.00	13.20	2.10	-	3000
H_538	180.00	13.00	16.00	13.20	2.50	-	1000
H_578	180.00	17.20	19.30	13.30	2.20	22.00	1000
H_43	330.00	24.50	29.10	13.00	2.20	17.30	500