

4 Frequencies Switchable Crystal Oscillators [15 ~ 2,100 MHz]

HC_JFN

CMOS / Differential

**4 Frequencies
Switchable**

**Quick - Turn
Clock Oscillators**

SMD

1.8 V

2.5 V

3.3 V

Min.

**15
MHz**

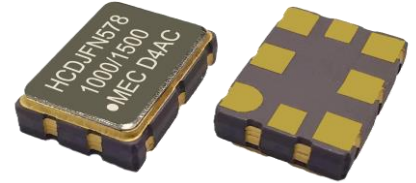
Max.

**2,100
MHz**

Features

150 fs Phase Jitter (typ.)

Mercury's 4 Frequencies switchable crystal oscillators that can be delivered in days
An integrated phase jitter performance of 150 fs RMS.
Supports all popular formats: CMOS, LVPECL, LVDS, HCSL and CML
Gaining its precision frequency control market position by providing engineers with
next-day samples for prototypes.



General specifications , at Ta = + 25°C

Model	HCTJFN	HCPJFN	HCDJFN	HCCJFN	HCQJFN
Output Logic	CMOS	LVPECL	LVDS	HCSL	CML
Supply Voltage V _{DD} (code)	+ 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	15 ~ 250 MHz	15 ~ 2,100 MHz	15 ~ 2,100 MHz	15 ~ 700 MHz	15 ~ 2,100 MHz
Output Load	15 pF (max.)	50 Ω into V _{DD} - 2V or Thevenin equivalent	100 Ω between output and complimentary output	50 Ω to GND	50 Ω to V _{DD}
Output Logic " High " , " 1 "	V _{DD} - 0.4 V (min.)	V _{DD} - 1.03 V (min.) V _{DD} - 0.6 V (max.)	1.4 V (typ.) 1.6 V (max.)	V _{DD} : 0.66V (min.) V _{DD} : 1.15V (max.)	V _{DD} - 0.085V (min.) V _{DD} = (max.)
Output Logic " Low " , " 0 "	V _{DD} x 0.1 V (max.) 0.3V (max.) for 1.8V only	V _{DD} - 1.85 V (min.) V _{DD} - 1.6 V (max.)	1.1 V (typ.) 0.9 V (min.)	V _{DD} : - 0.15V (min.) V _{DD} : 0.15V (max.)	V _{DD} - 0.6V (min.) V _{DD} - 0.32V (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.) 90 mA (max.)	100 mA (typ.) 120 mA (max.)	75 mA (typ.) 90 mA (max.)	80 mA (typ.) 100 mA (max.)	70 mA (typ.) 85 mA (max.)
Current with Output Disabie	62 mA (typ.)	99 mA (typ.)	74 mA (typ.)	79 mA (typ.)	69 mA (typ.)
Rise Time / Fall Time	5.0 nsec (max.) (10% to 90% Waveform)	0.4 nsec (max.) (20% to 80% Waveform)	0.4 nsec (max.) (20% to 80% Waveform)	0.4 nsec (max.) (20% to 80% Waveform)	0.4 nsec (max.) (20% to 80% Waveform)
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 [12 kHz ~ 20 MHz]	156.250 MHz : 148 fsec (typ.) ; 312.500 MHz : 147 fsec (typ.) ; 644.530 MHz : 141 fsec (typ.) ; 2,000 MHz : 155 fsec (typ.)				
Aging at Ta = +25°C	± 3 ppm (max.) for first year at 25°C				
Storage Temperature	-55°C to +150°C				
Frequency Selection Function					
FS0 Control on Pad 1	70% V _{DD} min. to logic Level " 1 "				
	30% V _{DD} max. to logic Level " 0 "				
FS1 Control on Pad 2	70% V _{DD} min. to logic Level " 1 "				
	30% V _{DD} max. to logic Level " 0 "				
Frequency Select Timing ; t _{FS}	10.0 msec. (max.)				
Frequency Configurations	The frequency output 1 ~ 4 setting is done based on the logic levels in the Table 1.				

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

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Min.
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Max.
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Part Number Format and Example

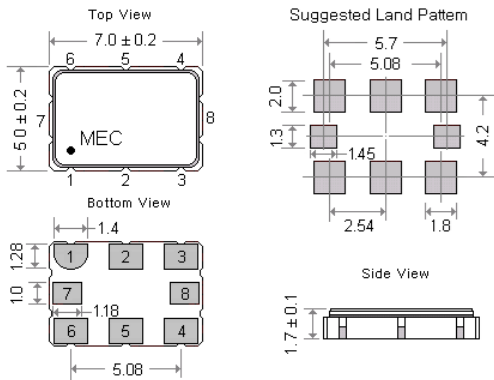
150 fs Phase Jitter (typ.)

Example : 3HCTJFN578 - E - 156 / 250 / 622 / 1024

3	HCTJFN	578	-	E	-	156	/	250	/	622	/	1024
Supply Voltage " 3 " for 3.3V " 25 " for 2.5V " 18 " for 1.8V	HCTJFN : CMOS HCPJFN : LVPECL HCDJFN : LVDS HCCJFN : HCSL HCQJFN : CML	Package Size " 578 " (7.0 * 5.0 mm) 8pad	-	Freq. Stability Code E : ± 50 ppm over -40 to +85°C Other temperature stabilities are available.	-	156.250 Freq. 1 (MHz)	/	250.000 Freq. 2 (MHz)	/	622.080 Freq. 3 (MHz)	/	1024.00 Freq. 4 (MHz)

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

HC_JFN578



Pad Connection :

Pad 1 : FS0 Control

Pad 2 : FS1 Control

Pad 3 : Ground

Pad 4 : CMOS : Output

Differential : Output

Pad 5 : CMOS : No Used For CMOS

Differential : Complementary Output

Pad 6 : Supply Voltage

Pad 7 : Do Not Connect

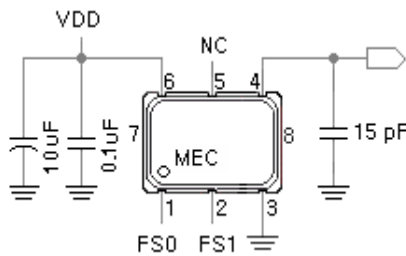
Pad 8 : Do Not Connect

Frequency selection configurations

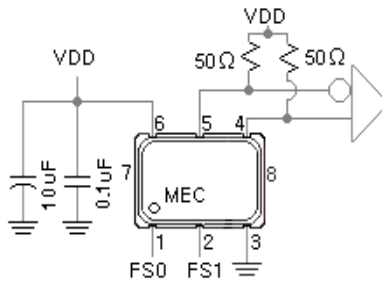
FS1	FS0	Freq. output
0	0	Freq. 1
0	1	Freq. 2
1	0	Freq. 3
1	1	Freq. 4

Table 1

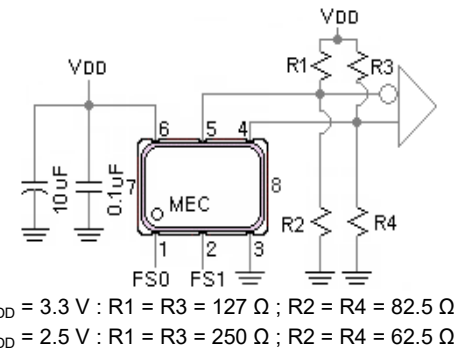
CMOS Test Circuits



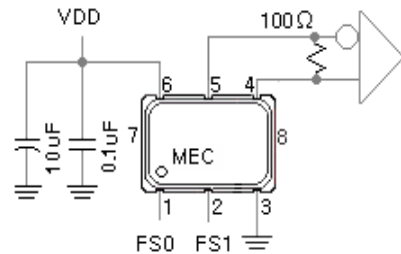
CML Test Circuits



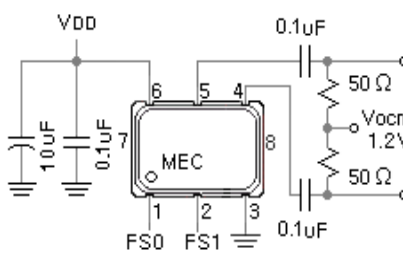
LVPECL Test Circuits



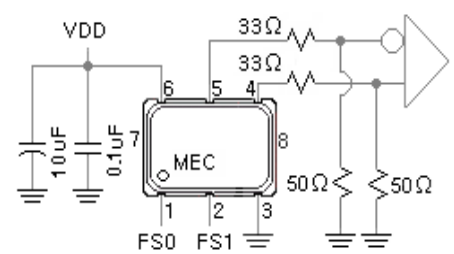
LVDS Test Circuits for 2.5V and 3.3V



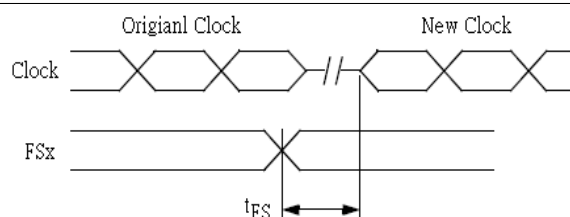
LVDS Test Circuits for 1.8V only(*)



HCSL Test Circuits

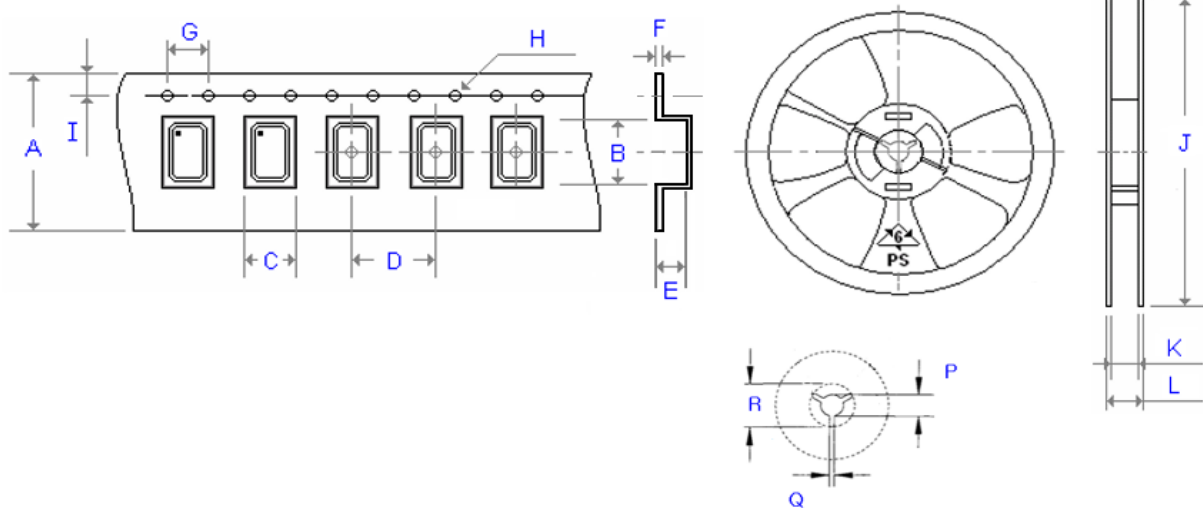


Frequency Select Timing



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