

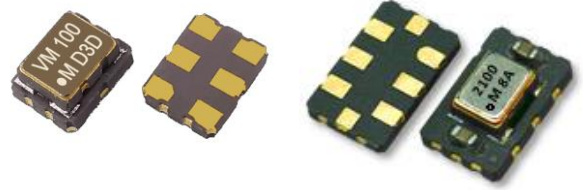
Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]



	TCXO	VCTCXO	SMD	1.8 V	2.5 V	3.3 V	Min.	Max.
	MJF_	VMJF_					15	2,100
							MHz	MHz

Features

- Wide frequency range : 15 ~ 2100 MHz
- RMS jitter (12kHz ~ 20MHz) : 250 fsec typ. (at 156.250MHz , 3.3V)
- Next-Day sample for Prototypes
- package size : 5.0 x 3.2mm and 3.2 x 2.5mm



General specifications , at Ta = +25°C

Model	(V)MJF326P , (V)MJF538P	(V)MJF326D , (V)MJF538D	(V)MJF326C , (V)MJF538C	(V)MJF326Q , (V)MJF538Q
Output Logic	PECL	LVDS	HCSL	CML
Supply Voltage V _{DD}	-- + 2.5 V ± 10% + 3.3 V ± 10%	+ 1.8 V ± 5% ^(*1) + 2.5 V ± 10% + 3.3 V ± 10%	+ 1.8 V ± 5% + 2.5 V ± 10% + 3.3 V ± 10%	+ 1.8 V ± 5% + 2.5 V ± 10% + 3.3 V ± 10%
Available Frequency Range	15 ~ 2,100 MHz	15 ~ 2,100 MHz	15 ~ 700 MHz	15 ~ 2,100 MHz
Output Load	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} - 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} - 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.)	620 mV (min.) 700 mV (typ.)	200 mV (min.) 600 mV (typ.)
Current Consumption (V _{DD} = + 3.3 V)	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	99 mA (typ.)	74 mA (typ.)	79 mA (typ.)	69 mA (typ.)
Rise Time / Fall Time (20% to 80% Waveform)	0.4 nsec. (max.)	0.4 nsec. (max.)	0.4 nsec.(max.)	0.4 nsec. (max.)
Initial Calibration Tolerance	± 1.0 ppm. (max.) at +25°C ± 2°C.			
Frequency Stability	Temperature (ref to +25°C)	± 2.5 ppm over -40°C to +85°C (default) ± 1.0 ppm over -40°C to +85°C (available)		
	Aging at Ta = +25°C	± 1.0 ppm (max.) , per year		
	Voltage Change	± 0.2 ppm (max.) , for a ± 5% input voltage change.		
	Load Change	± 0.2 ppm (max.) , for a ± 10% load condition change.		
	Reflow	± 1.0 ppm (max.) , 1 reflow and measured 24 hours afterwards.		
Duty Cycle	50 % ± 5%			
Start-up Time	5 msec (typ.) ; 10 msec. (max.)			
Storage Temperature	-55°C to + 150°C			
RMS Jitter (typ.) (12 KHz to 20 MHz)	15 MHz ~ 50 MHz : 500 fsec (typ.) , 51MHz ~ 1,200 MHz : 250 fsec (typ.)			
Control Voltage Function on Pad 1		Output Enable Function on pad 2		
Control Voltage Center and Range	+1.5V ± 1.0V for both V _{DD} = 2.5V and 3.3V		Output Enable / Disable Function	70% of V _{DD} (min.) to enable output.
	+ 0.9V ± 0.6V for both V _{DD} = 1.8V			30% of V _{DD} (max.) to disable output
Frequency Pulling Range	± 8 ppm min.		Output Enable Time	2.5 msec.(max.)
Linearity	1% (typ.) ; 10% (max.)			
Transfer Function	Positive Transfer		Output Disable Time	10 usec. (max.)
Input Impedance	5 MΩ (typ.)			

Note 1 : This needs AC coupling (100-nF series capacitor). Please check the test circuit.

Temperature Compensated Crystal Oscillators [TCXO " M " and VCTCXO " VM "]



TCXO
MJF_

VCTCXO
VMJF_

SMD

1.8 V

2.5 V

3.3 V

Min.
15
MHz

Max.
2,100
MHz

Part Number Format and Example

● Wide frequency range

	[1]	[2]	[3]	[4]		[5]		[6]		[7]
	Holder Type	Package Code	Waveform Code	Supply Voltage	-	Center Frequency	-	Frequency Stability	/	Operating Temp. Range

Examples	(1)	MJF	326	D	33	-	156.250	-	1.0	/	-20+70
	(2)	VMJF	538	C	18	-	100.000	-	2.5	/	-40+85

Ex (1) : MJF326D33 - 156.250 - 1.0 / -20+70 [TCXO , MJF326 type , LVDS , +3.3V , 156.250MHz , ±1.0ppm from -20°C to 70°C]

Ex (2) : VMJF538C18 - 100.000 - 2.5 / -40+85 [VCTCXO , VMJF538 type , HCSSL , +1.8V , 100.000MHz , pulling : ±8ppm min. , ±2.5ppm from -40°C to 85°C]

[1]	Holder Type : " MJF " stands for TCXO ; " VMJF " stands for VCTCXO
[2]	Package Code : " 326 " stands for 3.2 x 2.5 x 1.6 mm 6pad ; " 538 " stands for 5.0 x 3.2 x 1.4 mm 8pad
[3]	Output Waveform Code : " P " stands for LVPECL ; " D " stands for LVDS ; " C " stands for HCSSL ; " Q " stands for CML
[4]	Supply Voltage : " 18 " stands for +1.8V ; " 25 " stands for +2.5V ; " 33 " stands for +3.3V
[5]	Center Frequency in MHz
[6]	Frequency Stability in ± ppm ; ex 1 : ± 2.5ppm --- 2.5 , ex 2 : ± 1.0ppm --- 1.0
[7]	Operating Temperature Range in °C ex 1 : -10 °C to 60°C ----- -10+60 ; ex 2 : -20 °C to 70°C ----- -20+70 ; ex 3 : -40 °C to 85°C ----- -40+85

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

<p>MJF538_ , VMJF538_</p> <p>Top View: 5.0 ± 0.1 mm width, 3.2 ± 0.1 mm height. Bottom View: 8 pins, 0.6 mm pitch. Land Pattern: 0.8 mm pin width, 2.1 mm pitch, 2.54 mm pad width. Side View: 1.4 ± 0.1 mm height, 2.5 ± 0.1 mm top width, 0.6 mm bottom width.</p> <p>Pad Connection : Pad 1 : Ground for TCXO VC for VCTCXO Pad 2 : Output Enable Pad 3 : Ground Pad 4 : Output</p> <p>Pad 5 : Complementary Pad 6 : Supply voltage Pad 7 : Do Not Connet Pad 8 : Do Not Connet</p>	<p>MJF326_ , VMJF326_</p> <p>Top View: 3.2 ± 0.1 mm width, 2.5 ± 0.1 mm height. Bottom View: 6 pins, 0.6 mm pitch. Land Pattern: 0.9 mm pin width, 1.9 mm pitch, 2.4 mm pad width. Side View: 1.6 ± 0.1 mm height, 2.5 ± 0.1 mm top width, 0.7 mm bottom width.</p> <p>Pad Connection : Pad 1 : Ground for TCXO VC for VCTCXO Pad 2 : Output Enable Pad 3 : Ground Pad 4 : Output Pad 5 : Complementary Pad 6 : Supply voltage</p>
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Test Circuits

<p>PECL Test Circuit</p> <p>VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>	<p>HCSSL Test Circuit</p> <p>VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>	
<p>CML Test Circuit</p> <p>VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>	<p>LVDS Test Circuit for 2.5V and 3.3V</p> <p>VDD = 3.3 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>	<p>LVDS Test Circuits for 1.8V only (*1)</p> <p>VDD = 1.8 V : R1 = R3 = 127Ω ; R2 = R4 = 82.5Ω VDD = 2.5 V : R1 = R3 = 250Ω ; R2 = R4 = 62.5Ω</p>

Note 1 : The 50-ohm termination resistors along with the bias voltage (Vocm) is required to be set at the destination circuit as shown in the figure.

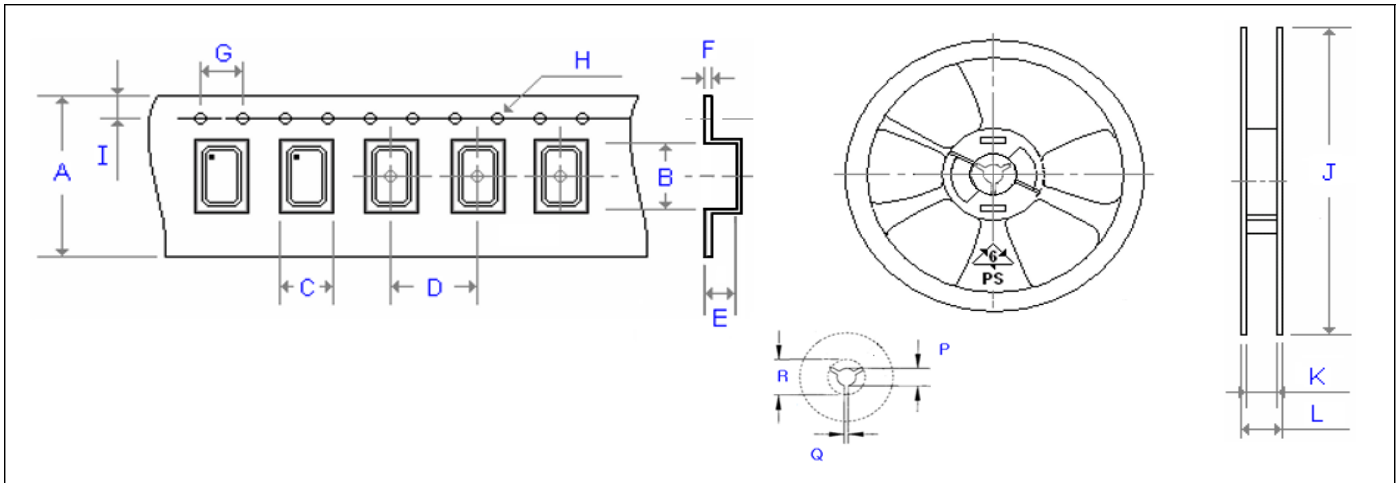
Mercury www.mercury-crystal.com ■ Taiwan : Tel: (+886)-2-2406-2779 / sales-tw@mercury-crystal.com

■ USA : Tel: (+1)-909-466-0427 / sales-us@mercury-crystal.com ■ China : Tel: (+86)-512-5763-8100 / sales-cn@mercury-crystal.com

Emboss Taping and Reel Specifications

[VCXO]

[(VC)TCXO]



Carrier Type Dimensions (unit : mm) ±0.3mm

	A	B	C	D	E	F	G	H	I	pcs / reel
G_226	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
G_326	8.00	3.40	2.70	4.00	1.40	0.25	4.00	∅ 1.50	1.75	3000
G_536	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
G_576	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
G_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	∅ 1.50	1.75	1000
G_578	16.00	7.30	5.30	8.00	1.90	0.32	4.00	∅ 1.50	1.75	1000
(V)M21	8.00	2.30	1.90	4.00	0.90	0.25	4.00	∅ 1.50	1.75	3000
ME21	8.00	2.30	1.50	4.00	1.35	0.25	4.00	∅ 1.50	1.75	3000
(V)M22	8.00	2.80	2.25	4.00	1.10	0.30	4.00	∅ 1.50	1.75	3000
(V)M_32	8.00	3.71	2.80	4.00	1.75	0.25	4.00	∅ 1.50	1.75	3000
(V)M_326	12.00	3.60	2.90	4.00	1.70	0.30	4.00	∅ 1.50	1.75	1000
(V)M_53	12.00	5.30	3.60	8.00	1.40	0.30	4.00	∅ 1.50	1.75	1000
(V)M_538	12.00	5.40	3.60	8.00	1.70	0.30	4.00	∅ 1.50	1.75	1000
(V)M_57(2)	16.00	7.40	5.50	8.00	2.80	0.35	4.00	∅ 1.50	1.75	500
(V)M_43 (63)	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	P	Q	R	pcs / reel
G_226	180.00	8.40	11.40	13.00	2.50	20.20	3000
G_326	180.00	9.00	12.00	13.00	2.50	20.20	3000
G_536	180.00	13.00	16.00	13.00	2.50	20.20	1000
G_576	180.00	17.20	19.30	13.00	2.50	20.20	1000
G_538	180.00	13.00	16.00	13.00	2.50	20.20	1000
G_578	180.00	17.20	19.30	13.00	2.50	20.20	1000
(V)M21	180.00	8.40	11.40	13.00	2.50	20.20	3000
ME21	180.00	9.00	12.00	13.00	2.50	20.20	3000
(V)M22	180.00	8.40	11.40	13.00	2.50	20.20	3000
(V)M_32	180.00	9.00	11.40	13.00	2.50	20.20	3000
(V)M_326	180.00	13.00	16.00	13.00	2.50	20.20	1000
(V)M_53	180.00	13.00	16.00	13.00	2.50	20.20	1000
(V)M_538	180.00	13.00	16.00	13.00	2.50	20.20	1000
(V)M_57(2)	180.00	17.20	19.30	13.00	2.50	20.20	500
(V)M_43 (63)	330.00	24.50	29.10	13.00	2.50	20.20	500

Mercury www.mercury-crystal.com ■Taiwan : Tel: (+886)-2-2406-2779 / sales-tw@mercury-crystal.com

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