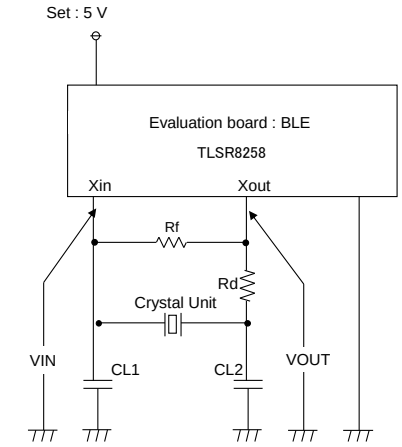
Evaluation Data of Oscillation Circuit for Crystal Unit

muRata

■ Murata's recommendation 推奨回路定数

Item			Condition
IC name		IC名	TLSR8258
Parts Number of Crystal Unit		品番	XRCGB24M000F1H23R0
Circuit Parameter	External load capacitance	負荷容量 CL1	8.2pF
		負荷容量 CL2	8.2pF
	Feedback resistance	帰還抵抗 Rf	No mount
	Damping resistance	制限抵抗 Rd	0ohm
Supply Voltage Range		電源電圧範囲	5V
Temp. Range		温度範囲	-40 to 85deg.C

Test Circuit



Murata standard Measurement equipment

Oscilloscope	DSO6052(K)
Current probe	CT-6(T)
Passive probe	P5100A(T) (40Mohm/2.5pF)
DC supply	E3631A(K)
Sepectrum analyzer	N9010A(K)

(K) Keysight
(T) Tektronix

■ Characteristics of oscillation circuit on above condition 推奨定数での発振回路特性

Circuit Characteristics 特性	Value 測定値			Remarks 備考
Center Frequency and Difference 発振回路における発振周波数とそのずれ量 (*1) (Typical sample at Set=5V,+25deg.C)	24.000028		[MHz]	Oscillating frequency and its shift against nominal frequency 発振回路における発振周波数と振動子の公称周波数に対するずれ量
	1		[ppm]	
Load Capacitance on your PCB 負荷容量値 (Typical sample at Set=5V,+25deg.C)	5.9		[pF]	This value shows load capacitance the evaluated circuit has 発振回路において振動子の両端に仮想的に接続される容量
Negative Resistance and Oscillation margin 負性抵抗／発振余裕度 (at Set=5V,+25deg.C)	|-R|	871	[Ω]	The details is explained in page 2 詳細につきましては、次頁をご参照下さい。
	Ratio	10.9	[Times]	
Drive Level ドライブレベル (Typical sample at Set=5V,+25deg.C)	19		[uW]	Drive power of crystal under circuit condition 発振回路が動作している状態において振動子で消費される電力
Oscillating Voltage 発振電圧 (Typical sample at Set=5V,+25deg.C)	VINp-p	0.9	[V]	Swing level at input side 発振入力振幅 (VIN_H - VIN_L)
	VOUTp-p	1.0	[V]	Swing level at output side 発振出力振幅 (VOUT_H - VOUT_L)

*1 Frequency difference means the oscillating frequency difference between your PCB and Murata's frequency sorting circuit.
貴社基板と当社検査回路では、同一振動子を使用した場合でも発振周波数の差が生じます。これを発振周波数相関と呼びます。
*2 The measurement results is affected by the rise-up characteristics of supplied voltage on your PCB.
測定結果は実装基板の電源立ち上がり特性の影響を受けます。

Notes
The characteristics of the crystal oscillation circuit is affected by the circuit constants and actual mounting conditions and so on.
Therefore, it is possible to get the different results from above one due to the production variation of the crystal oscillator circuitry.
In your company, please use this results after confirmation of the matching between our crystal unit and oscillator circuit.
And furthermore, since the above-mentioned evaluation results evaluate only an oscillating circuit block, please confirm the checking of operations of a set in your company.

注意事項
発振回路の特性は回路定数や実装状態により影響を受けるため、回路や基板のパラツキ等によっては上記の結果と異なる可能性があります。
貴社におかれましても弊社水晶振動子と発振回路とのマッチングをご確認の上、ご使用下さるようお願い致します。
また上記評価結果は発振回路ブロックのみを評価したものですので、セットの動作確認は貴社にてご確認下さるようお願い致します。

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■ Test Data : Characteristics of recommended conditions

Center frequency **24.000028 MHz**

Center frequency difference 1 ppm from 24MHz

This frequency difference causes imbalance of initial frequency tolerance on your PCB, because of load capacitance difference.

Load capacitance of the circuit **5.9 pF**

This value shows load capacitance the evaluated circuit has.

Our crystal proposed in this report is sorted with 6pF as load capacitance

Negative resistance

Ratio of negative resistance |-R| to R1spec.

Ratio 10.9 times

Ratio = |-R| / R1spec.

|-R| 871 ohm

Negative resistance |-R| = Rs_max + Re

Rs_max: 820 ohm

Maximum series resistance for Crystal Unit to keep oscillation

Re: 50.9 ohm

Effective resistance of Crystal Unit at actual oscillation frequency

R1spec. 80 ohm

Equivalent series resistance

Drive level

Drive power of crystal under circuit condition shown in page 1

Drive level 19 uW

Drive level = I^2 x R1

I: 0.68 mA (RMS)

Current through Crystal Unit measured by current probe

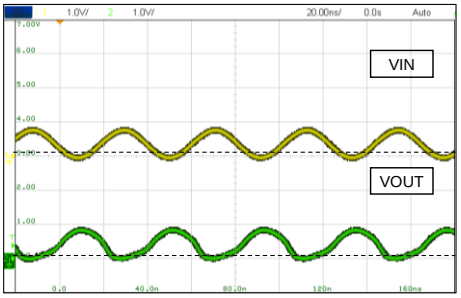
R1: 41.4 ohm

Evaluation Data of Oscillation Circuit for Crystal Unit

■ Test Data : Characteristics of recommended conditions

Oscillation waveform

MODEL : XRCGB24M000F1H23R0 with TLSR8258



VIN [V]			VOUT [V]		
High	Low	p-p	High	Low	p-p
0.8	-0.1	0.9	0.9	-0.1	1.0

Typical sample at Set=5V, +25deg.C

[VIN] Vertical: 1V/div., Horizontal: 20ns/div.
Broken line: GND

[VOUT] Vertical: 1V/div., Horizontal: 20ns/div.
Broken line: GND