ABS06W

2.0 x 1.2 x 0.6 mm

RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

FEATURES

- Exceptionally low plating load of 3.0pF, ideal for wearables, wireless, and IoT applications
- Simultaneously optimized for ESR over extended operating temperature range
- Miniature 2.0x1.2x0.6 mm SMD package, ideally suited for space constrained designs
- Available with ±10 ppm set tolerance
- Seam sealed package for long term reliability

APPLICATIONS

- Wearables
- Wireless Modules
- Internet of Things (IoT)
- Bluetooth/Bluetooth Low Energy (BLE)
- Machine-to-Machine (M2M) Connectivity
- Ultra Low Power MCU
- Near Field Communication (NFC)
- ISM Band Applications
- Ultra low power, energy saving MCU

STANDARD SPECIFICATIONS

PARAMETERS	MINIMUM	TYPICAL	MAXIMUM	UNITS	NOTES
Frequency		32.768		kHz	
Operation Mode		Flexural Mode (Tuning Fork)			
Operating Temperature	-40		+125	ºC	See options
Storage Temperature	-55		+125	ºC	
Frequency Tolerance @ +25°C	-10		+10	ppm	Refer to Note #1, ±20 ppm is also available
Shift through standard RoHS Reflow, (2) reflow cycles maximum	-2.00		+2.00	ppm	260°C peak maximum reflow temperature, relative to stand-alone set-tolerance frequency
Temperature Coefficient:	-0.04	-0.03	-0.02	ppm/T²	
Turn-over temperature:	+20	+25	+30	ºC	
Frequency Stability Over Operating Temperature, relative to in-circuit measured frequency post reflow	-200		-100	ppm	Over -40°C to +85°C
	-275		-100	ppm	Over -40°C to +105°C
	-450		-100	ppm	Over -40°C to +125°C
Load capacitance (CL)		3		pF	Refer to Note #2
Equivalent Series Resistance (ESR)		<55	65	kΩ	@ +25±3°C
		<75	95	kΩ	Over -40°C to +85°C
		<90	110	kΩ	Over -40°C to +105°C
		<100	120	kΩ	Over -40°C to +125°C
Shunt capacitance (C0)		1.0	2.0	pF	Combined Electrode & Package Capacitance
Motional Capacitance (C1)		5.0		fF	C1 also referred as Cm
Motional Inductance (L1)		5,549,000		mH	L1 also referred as Lm
Drive Level		0.1	0.5	µW	
Crystal sensitivity to closed-loop oscillator loading (Ts)	125	140	165	ppm/pF	Refer to Note #3
Q value	10000				Quality Factor
Aging @ +25°C±3°C [First Year]	-3		+3	ppm	Relative to post reflow measured frequency
Aging @ +25°C±3°C [Over 10-years]	-10		+10	ppm	Relative to post reflow measured frequency
Insulation Resistance	500			MΩ	@ 100Vdc

Note #1: With an effective loop capacitance of 3.0pF, the oscillator circuit will be within set-tolerance specification; less any frequency shift due to the reflow process.

Note #2: The oscillator loop needs to present an effective loop capacitance of 3.0 pF to track the stand-alone crystal frequency. This loop capacitance is essential to ensure highest possible Closed-Loop Safety Factor for the entire population of crystals.

Note #3: $Ts = - (C1) / [2*(C0 + CL)^2]$ ……. Where CL = 3pF

ABS06W

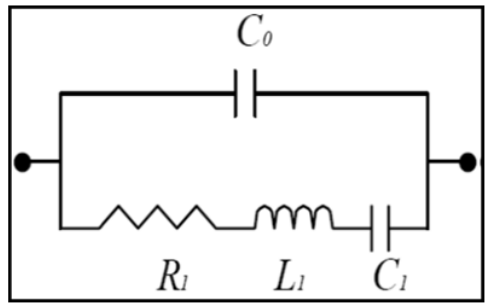
2.0 x 1.2 x 0.6 mm

RoHS/RoHS II Compliant

MSL = N/A: NOT APPLICABLE

SPICE MODEL (BASED ON TYPICAL VALUES AT 25ºC ± 3ºC):

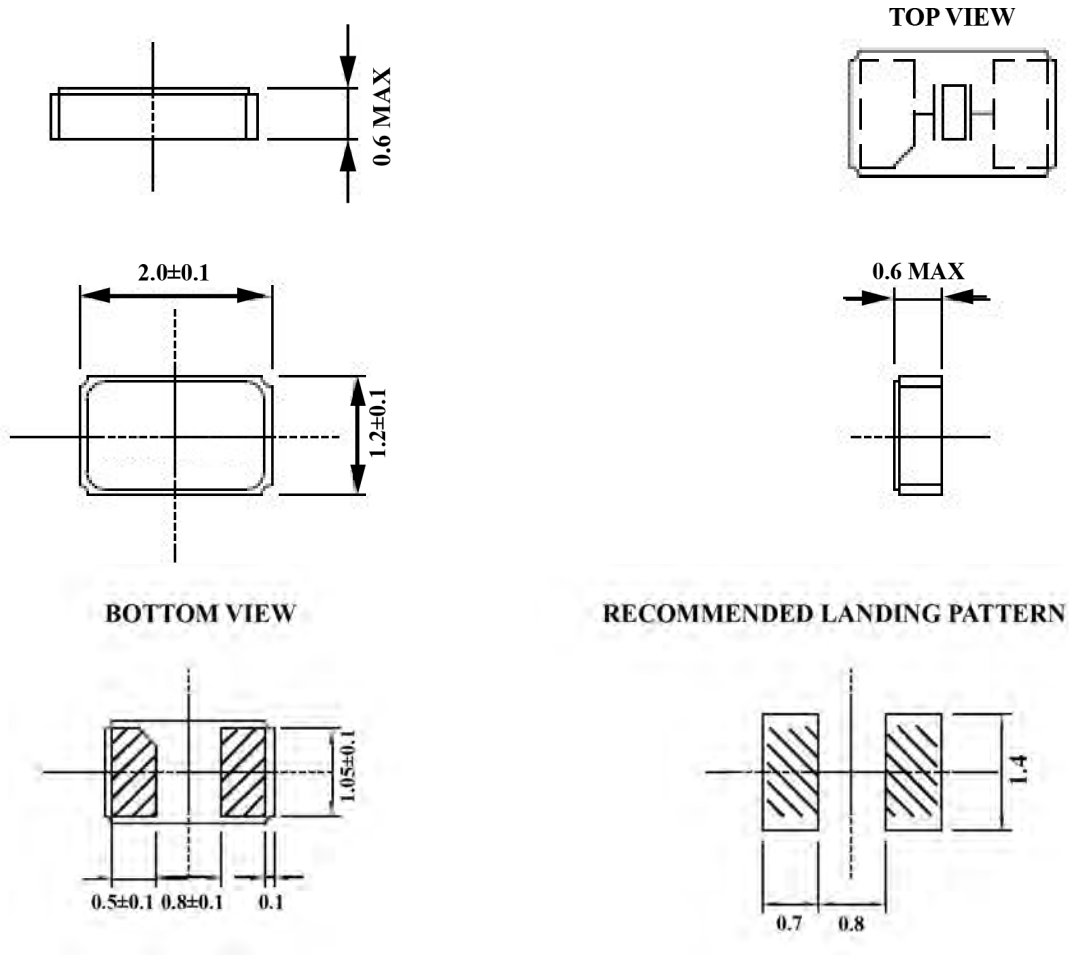
Quartz Crystal Equivalent Circuit



Frequency: 32.78kHz

Plating Load (CL) = 3pF
C0 = 0.90 pF
R1 = 47,594 Ω
L1 = 5,549,000 mH
C1 = 4.26 fF

MECHANICAL DIMENSIONS



DIMENSIONS: mm