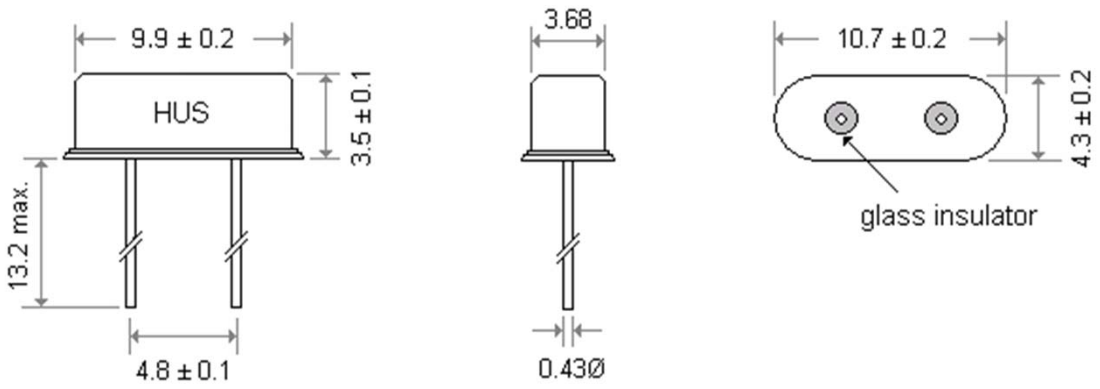
Serial No. : E190701 - 11

Date : 2019/7/1

Electronical Specification

| | Paramenters | SYM. | Electrical Spec. | | | | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typical | Max. | Unit | |
| 1 | Mercury Part No. | | | - | | | HUSG - 24.000 - 20 |
| 2 | Nominal Frequency | FL | | 24.000000 | | MHz | |
| 3 | Holder Type | | | - | | | HUS series ( 10.7 * 4.3 * 3.5mm ) |
| 4 | Crystal Cut | | | - | | | AT-Cut |
| 5 | Mode of Oscillation | | | - | | | Fundamental Mode |
| 6 | Frequency Tolerance | F_tol | -30 | ~ | 30 | ppm | at 25°C ± 3°C |
| 7 | Frequency Stability | F_tem | -30 | ~ | 30 | ppm | Over Operating Temperature |
| 8 | Spurious Attenuation | SpdB | | | -4 | dB | |
| 9 | Equivalent Series Resistance | Rr | | | 40 | Ω | |
| 10 | Shunt Capacitance | CO | | | 7.0 | pF | |
| 11 | Load Capacitance | CL | | 20 | | pF | |
| 12 | Drive Level | DL | | 100 | 500 | uW | |
| 13 | MaxR/MinR | DLD2 | | | 10 | Ω | 0.1 uw ~ 100 uW , 5 points |
| 14 | MaxFR-MinFR | FDLD | | | 10 | ppm | 0.1 uw ~ 100 uW , 5 points |
| 15 | MaxR | RLD2 | | | 40 | Ω | 0.1 uw ~ 100 uW , 10 points |
| 16 | Operating Temperature | T_use | -10 | ~ | 60 | °C | |
| 17 | Storage Temperature | T_stg | -50 | ~ | 105 | °C | |
| 18 | Aging | F_aging | -3 | | 3 | ppm | first year |
| 19 | Lead Free Approved Report | SGS Taiwan Ltd. Report No. : CE / 2019 / 22245 | | | | | |

Package Dimension ( Unit : mm )



## Marking

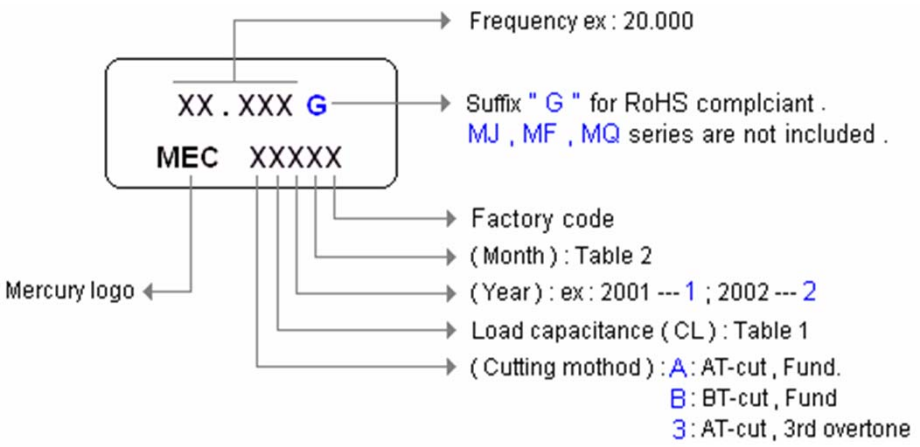



Table 1

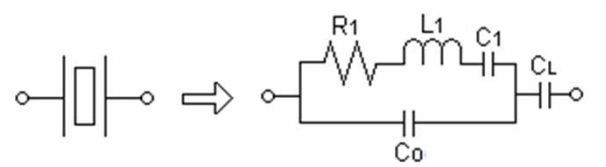
| CL | <10 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | A | B | C | D | E | F | G | H | I | J | K | L |

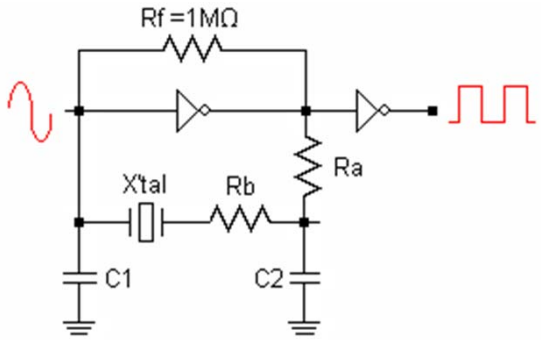
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M | N | O | P | Q | R | S | T | U | V | W | X |

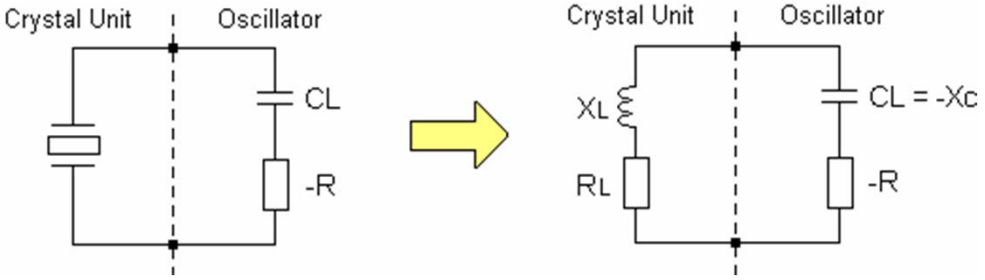
| 33 | 34 | >34 | Series |
|---|---|---|---|
| Y | Z | a | b |

Table 2

| Month | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | A | B | C | D | E | F | G | H | I | J | K | L |




The condition of starting oscillate :

RL ≦ |-R| Mosc=|-R| / R ≧ 5

The balance condition after oscillation :

RL ≦ |-R|

The balance condition of exact frequency :

XL = Xc ; XL - Xc = 0

CL : Load capacitance
-R : Negative resistance
XL : Reactance of a quartz crystal unit
-Xc : Reactance of an oscillator unit
XL : Load resonance resistance

Environmental Specification

| | | | |
|---|---|---|---|
| 1.Temperature Test | | | |
| *Temperature Cycling Test | | | |
| Conditions: | Steps of cycle | (1)At-55°C , 30minutes | (3)At+85°C , 30minutes |
| | | (2)At+25°C , 10~15minutes | (4)At+25℃,10~15minutes |
| | Number of | 3 times | |
| Results: | Performance form of tested products must remain within specifications. | | |
| *Thermal Shock Test | | | |
| Conditions: | Temperature T(H)+125°C ,T(L)-55°C | | Duration of cycle 3 times |
| | Exposure time at temperature extremes 5minutes | | |
| Results: | Performance form of tested products must remain within specifications. | | |
| *Low Temperature Test | | | |
| Conditions: | Exposure time at temperature extremes 5minutes | | Duration of test 96hours |
| Results: | There Should be no stain on surface of products | | |
| | Frequency and wave form of tested products must remain within specifications. | | |
| | | | |
| 2.Aging Test | | | |
| Conditions: | Temperature +85°C±2°C | | Duration of test 96 hours |
| Results: | Deviation of frequency must be less than±3ppm | | (+/-0.0003%) |
| | | | |
| 3.Salt Spray Test | | | |
| Conditions | Temperature 35°C±2°C | | Duration of test 48 hours |
| | NaCl 5% | | |
| | | | |
| 4.Humidity Test | | | |
| Conditions: | Temperature:+40°C+/-2°C | Relative humidity:90~95% | Duration of test:96 hours |
| Results: | Insulation resistance must be 500Mohm/100 minimum Vdc. | | |
| | Resistance and wave form must remain within specification | | |
| | | | |
| 5.Fine Leak Test | | | |
| Conditions: | Helium | | |
| Results: | Less than 2×10-8 Atm cc/sec | | |

Mechanical Specification Sheet

| | | |
|---|---|---|
| 1.Lead Solderability Test | | |
| Conditions: | Dipping in solder(230°C+/-5°C) for 5 seconds | |
| Results: | More than 95% of surface being tested should be coated uniformly with solder. | |
| | | |
| 2.Vibration Test | | |
| Conditions: | Frequency | 10-55 Hz |
| | Amplitude | 0.762 mm |
| | Sweep | 1.0 minute |
| | Duration | 2 hours |
| Results: | Performance form of tested products must remain within specifications. | |
| | | |
| 3.Drop Test | | |
| Conditions: | Method of drop | Free drop |
| | Dropping floor | Hard wood board |
| | Height | 75 cm |
| | Number of drops | 3 times |
| Results: | Frequency and wave form of tested products must remain within specifications. | |
| | | |
| 4.Terminal Strength | | |
| *lead Pulling Test | | |
| Conditions: | Load | 907.2gram |
| | Direction | To the downward |
| | Duration of | 5 seconds |
| Results: | There should be no distortion in appearance | |
| *Lead Bending Test | | |
| Conditions: | Load | 453.6 gram |
| | Direction | 90 ℃ to normal position |
| | Duration of | 3 seconds in each cycle |
| Results: | There should be no distortion in appearance | |

Notice :

1 Upon approval , please return a copy of this document with your signature to Mercury .

2 . Any change to these specifications have to be agreed by both parties and new revision of the specification sheets will be issued .