

ES52C5E25V-13.000M



ITEM DESCRIPTION

Temperature Compensated Quartz Crystal Clock Oscillators TCXO TC(VC)XO Clipped Sinewave 3.0Vdc 4 Pad 3.2mm x 5.0mm Ceramic Surface Mount (SMD) 13.000MHz ± 2.5 ppm Maximum -30°C to +75°C

ELECTRICAL SPECIFICATIONS

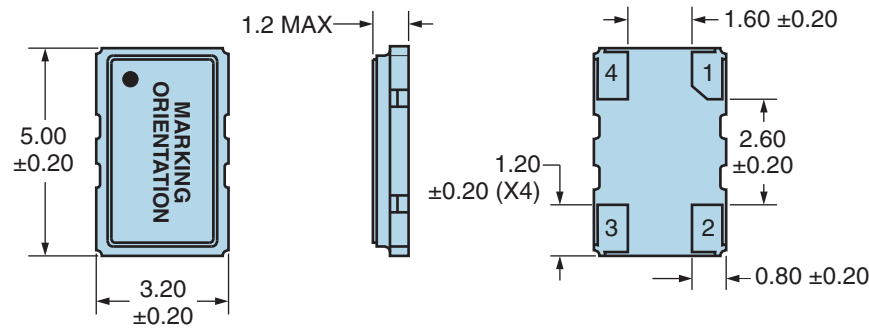
Nominal Frequency	13.000MHz
Frequency Tolerance	± 1.0 ppm Maximum (at 25°C $\pm 2^\circ\text{C}$, at Vdd=3.0Vdc, and Vc=1.5Vdc)
Frequency Stability	± 2.5 ppm Maximum (Inclusive of Operating Temperature Range, at Vdd=3.0Vdc)
Frequency Stability vs. Supply Voltage	± 0.3 ppm Maximum (Vdd $\pm 5\%$)
Frequency Stability vs. Load	± 0.2 ppm Maximum ($\pm 1\text{k}\Omega$ / $\pm 1\text{pF}$)
Frequency Stability vs. Aging	± 1 ppm/year Maximum (at 25°C)
Operating Temperature Range	-30°C to +75°C
Supply Voltage	3.0Vdc $\pm 5\%$
Input Current	2.0mA Maximum
Output Voltage	0.7Vp-p Clipped Sinewave Minimum (External DC-Cut capacitor required, 1000pF recommended)
Load Drive Capability	10kOhms//10pF
Output Logic Type	Clipped Sinewave
Control Voltage	1.5Vdc ± 1.0 Vdc
Control Voltage Range	0.0Vdc to Vdd
Frequency Deviation	± 8 ppm Minimum
Linearity	10% Maximum
Transfer Function	Positive Transfer Characteristic
Modulation Bandwidth	3kHz Minimum (Measured at -3dB with a Control Voltage of 1.5Vdc)
Input Impedance	100kOhms Minimum
Phase Noise	-80dBc/Hz at 10Hz Offset, -115dBc/Hz at 100Hz Offset, -135dBc/Hz at 1kHz Offset, and -148dBc/Hz at 10kHz Offset (All Values are Typical)
Start Up Time	5mSec Maximum
Storage Temperature Range	-40°C to +85°C

ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM: 1500V
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Flammability	UL94-V0
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity	J-STD-020, MSL 1
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A

ES52C5E25V-13.000M

MECHANICAL DIMENSIONS (all dimensions in millimeters)

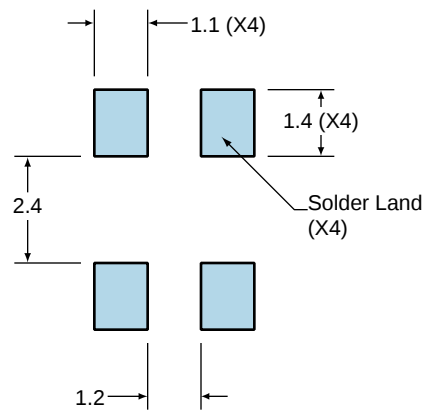


PIN	CONNECTION
1	Control Voltage
2	Ground
3	Output
4	Supply Voltage

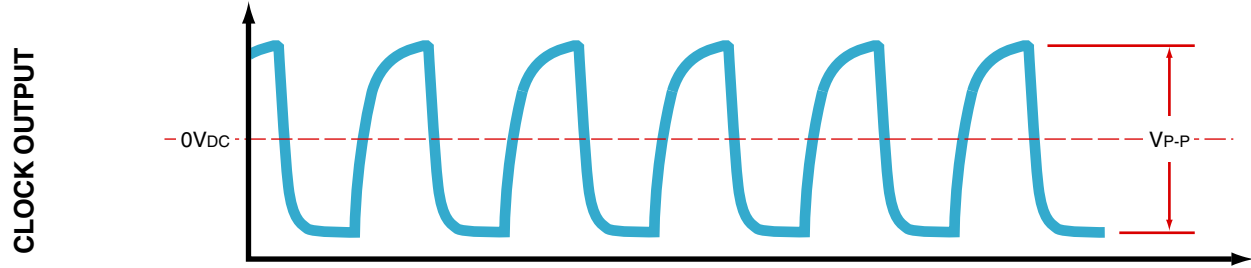
LINE	MARKING
1	E13.000 <i>E=Ecliptek Designator</i>
2	XXXXXX <i>XXXXXX=Ecliptek Manufacturing Identifier</i>

Suggested Solder Pad Layout

All Dimensions in Millimeters

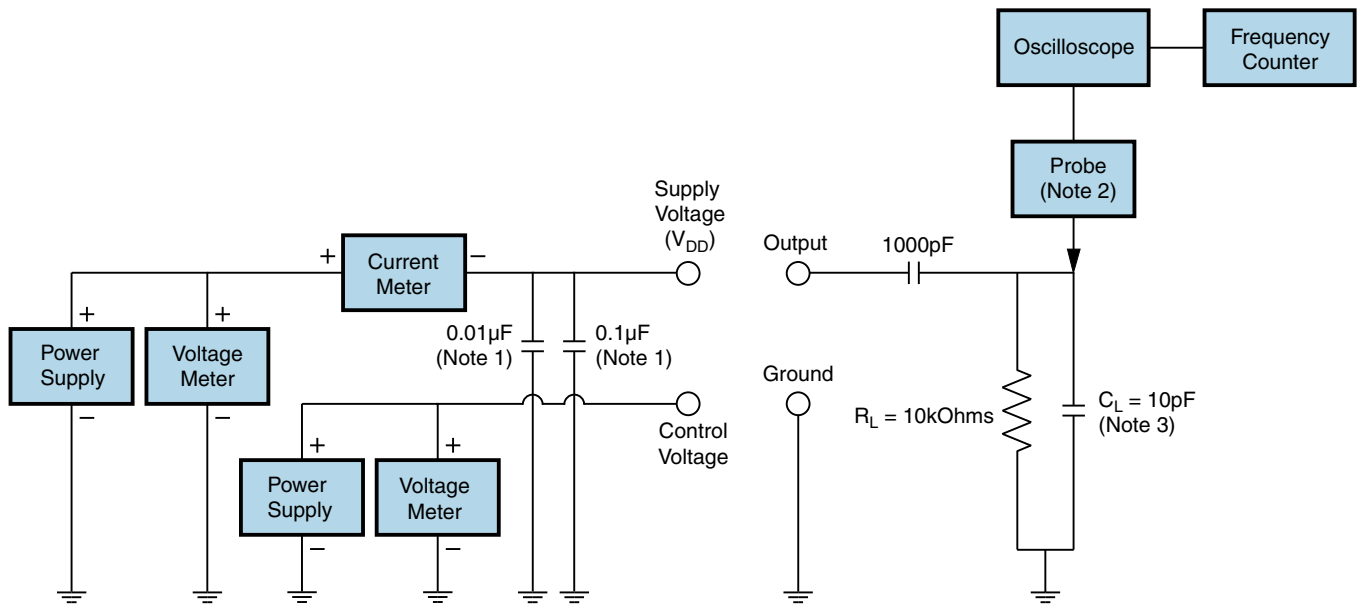


All Tolerances are ±0.1

ES52C5E25V-13.000M **OUTPUT WAVEFORM**

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Test Circuit for Control Voltage Option



Note 1: An external $0.01\mu\text{F}$ bypass capacitor in parallel with a $0.1\mu\text{F}$ high frequency ceramic bypass capacitor close (less than 2mm) to the package ground and supply voltage pin is required.

Note 2: A low input capacitance ($<12\text{pF}$), 10X attenuation factor, high impedance ($>10\text{M}\Omega$), and high bandwidth ($>300\text{MHz}$) passive probe is recommended.

Note 3: Capacitance value C_L includes sum of all probe and fixture capacitance.

ES52C5E25V-13.000M [↗](#)

Recommended Solder Reflow Methods



High Temperature Infrared/Convection

Ts MAX to Tl (Ramp-up Rate)	3°C/Second Maximum
Preheat	
- Temperature Minimum (Ts MIN)	150°C
- Temperature Typical (Ts TYP)	175°C
- Temperature Maximum (Ts MAX)	200°C
- Time (ts MIN)	60 - 180 Seconds
Ramp-up Rate (Tl to Tp)	3°C/Second Maximum
Time Maintained Above:	
- Temperature (Tl)	217°C
- Time (tL)	60 - 150 Seconds
Peak Temperature (Tp)	260°C Maximum for 10 Seconds Maximum
Target Peak Temperature (Tp Target)	250°C +0/-5°C
Time within 5°C of actual peak (tp)	20 - 40 Seconds
Ramp-down Rate	6°C/Second Maximum
Time 25°C to Peak Temperature (t)	8 Minutes Maximum
Moisture Sensitivity Level	Level 1
Additional Notes	Temperatures shown are applied to body of device.

ES52C5E25V-13.000M [↗](#)

Recommended Solder Reflow Methods



Low Temperature Infrared/Convection 240°C

T_S MAX to T_L (Ramp-up Rate) 5°C/Second Maximum

Preheat

- Temperature Minimum (T_S MIN) N/A
 - Temperature Typical (T_S TYP) 150°C
 - Temperature Maximum (T_S MAX) N/A
 - Time (t_s MIN) 60 - 120 Seconds

Ramp-up Rate (T_L to T_P) 5°C/Second Maximum

Time Maintained Above:

- Temperature (T_L) 150°C
 - Time (t_L) 200 Seconds Maximum

Peak Temperature (T_P) 240°C Maximum

Target Peak Temperature (T_P Target) 240°C Maximum 2 Times / 230°C Maximum 1 Time

Time within 5°C of actual peak (t_p) 10 Seconds Maximum 2 Times / 80 Seconds Maximum 1 Time

Ramp-down Rate 5°C/Second Maximum

Time 25°C to Peak Temperature (t) N/A

Moisture Sensitivity Level Level 1

Additional Notes Temperatures shown are applied to body of device.

Low Temperature Manual Soldering

185°C Maximum for 10 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)

High Temperature Manual Soldering

260°C Maximum for 5 Seconds Maximum, 2 times Maximum. (Temperatures shown are applied to body of device.)