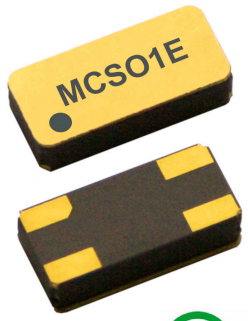
MICRO CRYSTAL SWITZERLAND

MCSO1E

High Temp Clock Oscillator 15 kHz – 100 MHz

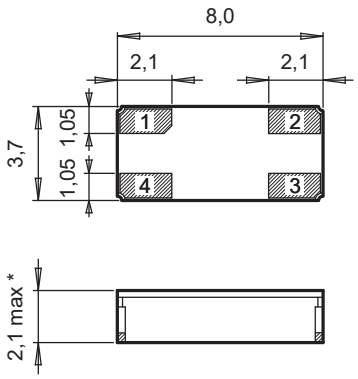


lead-free

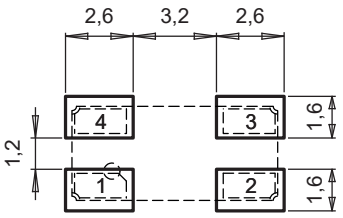
RoHS COMPLIANT

DIMENSIONS

Package:



Recommended Solder Pad:



pin 1 E/D
pin 2 GND
pin 3 F_{OUT}
pin 4 V_{DD}

* for ceramic lid 2.4 max

All dimensions in mm typical

APPLICATIONS

Security / Safety
Avionics / Aerospace
Radio Communication
Geothermal Equipment
Remote Control / Telemetry
Down Hole and Well Drilling

DESCRIPTION

The MCSO1E is a High Temperature, High Frequency SMD Oscillator that incorporates an integrated HCMOS circuit together with an XTAL. It operates under vacuum in a hermetically sealed ceramic package.

FEATURES

Outstanding hermetic sealing with gold-tin preform.
High stability and low aging guaranteed by hermetic sealing.
Frequency stability guaranteed for 1000 h at T_{MAX}.
Very fast start-up.
Operates in fundamental mode.
High shock and vibration resistant.
100% Pb-free, RoHS-compliant.

ELECTRICAL CHARACTERISTICS AT 25°C

Overall frequency stability over temperature range [1] C = –55 to +125°C E = –55 to +150°C D = –55 to +175°C G = –55 to +210°C [2]	ΔF/F	≤ ±100 ≤ ±150 ≤ ±300 ≤ ±400	ppm
Supply voltage ±5% [3]	V_{DD}	2.5 / 3.3 / 5.0	V
Input current	I_{DD}	See I_{DD} table	
Output signal		HCMOS compatible	
F_{OUT} duty cycle @ $V_{DD}/2$ (min./max.)	δ_{FOUT}	40 / 60	%
Rise & fall time, ≤ 20 MHz For L version, t_r / t_f ≤ 25 ns (C_L = 15 pF, 20% to 80% V_{DD})	t_r / t_f	≤ 7	ns
Rise & fall time, > 20 MHz (C_L = 15 pF, 10% to 90% V_{DD})	t_r / t_f	≤ 3	ns
Output level V_{OL} / V_{OH}		< 0.4 / > V_{DD} -0.5	V
Start-up time	t_{START}	< 5	ms
Capacitive load min. / max. For L version, C_L max. = 27 pF	C_L	3 / 47	pF

1) Including adjustment at +25°C, long term aging 1000 h at T_{MAX}, V_{DD} variations ±5% and C_L variations min. to max.
2) For the low consumption version (L), G version is only available as 5.0 V version and the G range is limited to +200°C
3) A 47 nF decoupling capacitor has to be connected between V_{DD} and GND

INPUT CURRENT: I_{DD} (no load)
(For L version, C_L = 10 pF)

Frequency	32.768 kHz (L)	≤ 10 MHz	≤ 20 MHz	> 20 to 100 MHz
V_{DD} = 2.5 V (W)	< 100 µA	< 2 mA	< 3 mA	< 15 mA
V_{DD} = 3.3 V (V)	< 110 µA	< 4 mA	< 5 mA	< 20 mA
V_{DD} = 5.0 V (Blank)	< 120 µA	< 6 mA	< 7 mA	< 30 mA

STANDARD FREQUENCIES

Frequencies				
32.768 kHz	3.6864 MHz	4.0000 MHz	8.0000 MHz	10.0000 MHz
12.0000 MHz	12.8000 MHz	14.7456 MHz	16.0000 MHz	20.0000 MHz
24.0000 MHz	40.0000 MHz	40.9600 MHz		
L version: Other frequencies from 15 kHz to 100 kHz on request Standard version: Other frequencies from 100 kHz to 100 MHz on request				

ENABLE/DISABLE E/D, OPTION 1

Input level V_{IL} / V_{IH}		< 0.3 V_{DD} / > 0.7 V_{DD}	V
Reaction time, Standard version	t	< 1	µs
Reaction time, L version	t	< 5	ms

Pin 1 E/D	Pin 3 F_{OUT}
V_{IH} or open	Output enabled
V_{IL}	Output disabled (Hi-Z)

No E/D function before V_{DD} is set.

ENVIRONMENTAL CHARACTERISTICS

	Conditions
Storage temperature range	–65 to +125°C
Shock resistance (survival)	10000 g, 0.3 ms, ½ sine
Vibration resistance (survival)	80 g / 10 – 2000 Hz

TERMINATIONS AND PROCESSING, OPTION 2

Reflow per IPC/JEDEC J-STD-020C	260°C / 20 - 40 s
Package	Ceramic
Lid	Ceramic lid (C)
	Kovar lid (Blank)
Terminations (Option 2) (T3 not available for G range)	SnAgCu solder dipped pads (T3)
	Au flashed pads (Blank)

ORDERING INFORMATION

MCSO1E C H V – D 24.000 MHz E/D T3 XXX

Frequency

L = Low power
Blank = Standard

Option 1
E/D = Enable/Disable
Blank = No function

C = Ceramic lid
Blank = Kovar lid

Frequency range
H > 20 MHz
Blank ≤ 20 MHz

Option 2
T3 = SnAgCu solder dipped pads **
Blank = Au flashed pads

Supply voltage
W = V_{DD} = 2.5 V
V = V_{DD} = 3.3 V
Blank = V_{DD} = 5.0 V

Customer specification N°

Temperature range
C = -55 to +125°C
E = -55 to +150°C
D = -55 to +175°C
G = -55 to +210°C *
X = Custom

* For the low consumption version (L), G version is only available as 5.0 V version and the G range is limited to +200°C. Kovar lid on G range version.
** T3 not available for G range version.

A unique part number will be generated for each product specification, i.e:	
20xxxx-ML00	≥250 pcs (in 16 mm tape on 7" reel)
20xxxx-EA00	yyy pcs (in ESD plastic tray)

All specifications subject to change without notice.

MICRO CRYSTAL SWITZERLAND
A COMPANY OF THE SWATCH GROUP

Micro Crystal AG
Muehlestrasse 14
CH-2540 Grenchen
Switzerland

Phone +41 32 655 82 82
sales@microcrystal.com
www.microcrystal.com

Version 14.0/08.2021