

ISSUE 14; December 2021

Description

- Sub 1ppm performance TCXO/VCTCXO, a single chip oscillator and analogue compensation circuit operating over an extended temperature range. Its ability to function down to a supply voltage of 2.4V and low power consumption make it particularly suitable for mobile applications.
- 1A No ref voltage, ageing adj option
- 1B No ref voltage, no freq adj option
- 2A Ref voltage = 2.2V, ageing adj option
- 3A Ref voltage = 2.7V, ageing adj option



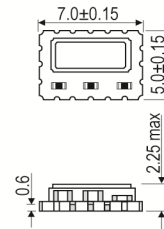
Frequency Parameters

- Frequency: 1.25MHz to 40.0MHz
- Frequency Tolerance: ± 1.00 ppm
- Tolerance Condition: @ 25°C
- Frequency Stability: ± 0.30 ppm to ± 2.50 ppm
- Acceleration sensitivity (Gamma vector, 3-axes, 30-1500Hz): <2 ppb/g typ
- Ageing:
 - ± 1 ppm max in 1st year, frequency ≤ 20 MHz
 - ± 3 ppm max for 10 years (including the 1st year), frequency ≤ 20 MHz
 - ± 2 ppm max in 1st year, frequency > 20 MHz
 - ± 5 ppm max for 10 years (including the 1st year), frequency > 20 MHz
- Supply Voltage Variation ($\pm 10\%$ change reference to frequency at nominal supply voltage): ± 0.2 ppm typ
- Load Variation (± 5 pF change reference to frequency at nominal load): ± 0.2 ppm typ
- After Reflow: ± 1 ppm max

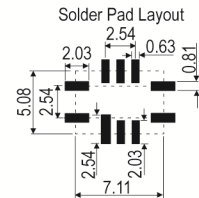
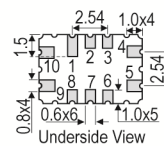
Electrical Parameters

- Supply Voltage: 3.3V $\pm 10\%$
- Supply Current (typical):
 - HCMOS: $1 + \text{Frequency(MHz)} * \text{Supply(V)} * \{\text{Load(pF)} + 15\} * 1E-3$ mA
 - i.e @ 20MHz, 3.3V, 15pF ≈ 3 mA
 - Calculation: $1 + (20 \times 3.3 \times (15 + 15) \times 0.001) = 2.98$ mA
- Note: Supply Voltages in the range 2.4V to 6.0V are available, please contact an IQD Sales Office

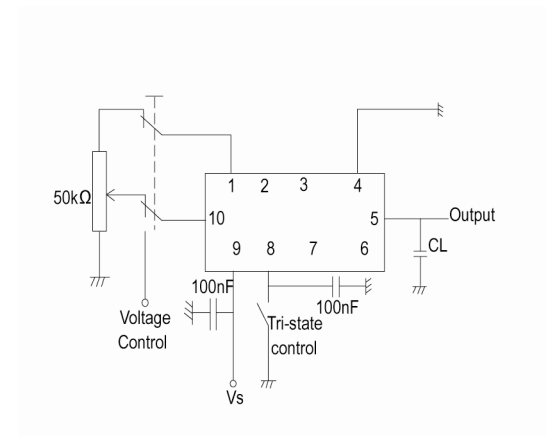
Outline (mm) -3A = Ref voltage = 2.7V, ageing adj option



- Pad Connections
- Vref (N/C if not required)
 - N/C
 - Do not connect
 - GND
 - Output
 - N/C
 - N/C
 - Tri-state Control (Enable)
 - +Vs
 - Voltage Control or N/C



Test Circuit



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Frequency Adjustment

- Optional reference voltage output on pad 1, suitable for potentiometer supply or DAC reference:
 1. No output (standard option)
 2. 2.2V for min $V_s > 2.4V$
 3. 2.7V for min $V_s > 3.0V$Maximum load current (mA) = $V_{ref}/10$
- For manual frequency adjustment connect an external 50k Ω potentiometer between pad 1 (Reference Voltage) and pad 4 (GND) with wiper connected to pad 10 (Voltage Control). Please specify reference voltage as part of the ordering code.
- Standard Voltage Control Ranges:
Without Reference Voltage $V_s = 3.3V$ 1.65V \pm 1.0V
With Reference Voltage $V_s = 0V$ to V_{ref}
- Linearity: 1% max
- Slope: Positive
- Input Impedance: 100k Ω min
- Modulation Bandwidth: 2kHz min
- A. Standard Pulling Adjustment:
 $\pm 5ppm$ min, frequency $\leq 20MHz$
 $\pm 7ppm$ min, frequency $> 20MHz$
- B. No frequency adjustment initial calibration @ 25°C $\leq \pm 1.0ppm$
- C. High Pulling $\pm 10ppm$ to $\pm 20ppm$ can be available depending on frequency and stability options (please contact an IQD Sales Office)

Operating Temperature Ranges

- 0 to 50°C
- 0 to 70°C
- -20 to 70°C
- -30 to 75°C
- -40 to 85°C

Output Details

- Output Compatibility HCMOS
- Drive Capability 15pF
- VoL: $< 10\% V_s$
VoH: $> 90\% V_s$

Output Control

- Tri-state Operation:
Logic '1' ($> 60\% V_s$) or no connection to pad 8 enables output
Logic '0' ($< 20\% V_s$) to pad 8 disables output
The tristate control (enable) pin has a internal 100k Ω pull up resistor which allows the pin to be left unconnected if not required. When in tristate mode, the output stage is disabled, but the oscillator and compensation circuit are still active (current consumption typ. $\leq 1.0mA$).

Noise Parameters

- Phase Noise (typical @ 13.0MHz):
 - 65dBc/Hz @ 1Hz
 - 95dBc/Hz @ 10Hz
 - 120dBc/Hz @ 100Hz
 - 135dBc/Hz @ 1kHz
 - 140dBc/Hz @ 10kHz
 - 145dBc/Hz @ 100kHz

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Environmental Parameters

- Storage Temperature Range: -55 to 125°C
- Thermal Shock: IEC 60068-2-14, Test Nc Conditions: 15 cycles -55C to +125C
- Mechanical Shock: IEC 60068-2-27, Test Ea Conditions: 15 cycles 1500g 0.5ms 5 pulses/axis
- Vibration: IEC 60068-2-6, Test Fc, Conditions: 20g from 10 – 2000 Hz 12 hours total
- Solderability: MIL-STD-202, Method 208, Category 3

Manufacturing Details

- Pb-free Reflow Soldering: 260°C max for 30sec max
- RoHS Terminations NiCoAu
- RoHS Reflow 260degC 30s

Ordering Information

- Frequency*
Model*
Reference Voltage + Frequency Adjustment Options*
Output*
Frequency Stability (over operating temperature range)*
Operating Temperature Range*
Supply Voltage
(*minimum required)
- Example
10.0MHz CFPT-9006-1A
HCMOS ±1.0ppm -20 to 70C 3.3V
- Note: Certain frequency stability / temperature range combinations may not be available for all frequencies.

Compliance

- RoHS Status (2015/863/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): 1

Packaging Details

- Pack Style: Reel Tape & reel in accordance with EIA-481-D
Pack Size: 1,000
- Pack Style: Bulk Bulk pack
Pack Size: 10

Electrical Specification - maximum limiting values 3.3V ±10%

Frequency Min	Frequency Max	Temperature Range	Stability	Current Draw	Rise and Fall Time	Duty Cycle
		°C	ppm	mA	ns	%
1.25MHz	40.0MHz	0 to 70	±0.5	-	8	45/55%
		0 to 50	±0.3	-	8	45/55%
		-20 to 70	±0.5	-	8	45/55%
		-30 to 75	±1.0	-	8	45/55%
		-40 to 85	±1.0	-	8	45/55%

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Chipset Approval Table

IQD Model	Frequency	Chipset Type	IC Supplier
E2747LF	12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech
E2791LF	20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi
E2799LF	12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech
E2801LF	20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi
E2912LF	12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech
E3179LF	20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi
E3179LF	20MHz	BCM544841	Broadcom
E3198LF	12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech
E3199LF	20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi
E3394LF	12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech
E4940LF	25MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Broadcom
E5624LF	12.8MHz	82V32### WAN PLLs	IDT

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