

ISSUE 14; March 2018

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



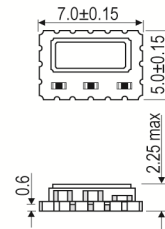
Frequency Parameters

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

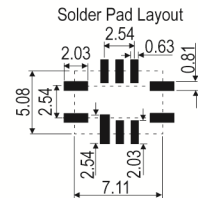
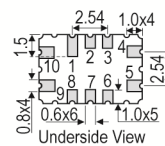
Electrical Parameters

- Supply Voltage: 3.3V $\pm 10\%$
- Current Draw:
 - $1 + \text{Frequency}(\text{MHz}) * \text{Supply}(\text{V}) * \{\text{Load}(\text{pF}) + 15\} * 10^{-3}$ mA
 - e.g. 20MHz, 3.3V, 15pF $\approx 2\text{mA}$
- Note: Supply Voltages in the range 2.4V to 6.0V are available, please contact an IQD Sales Office

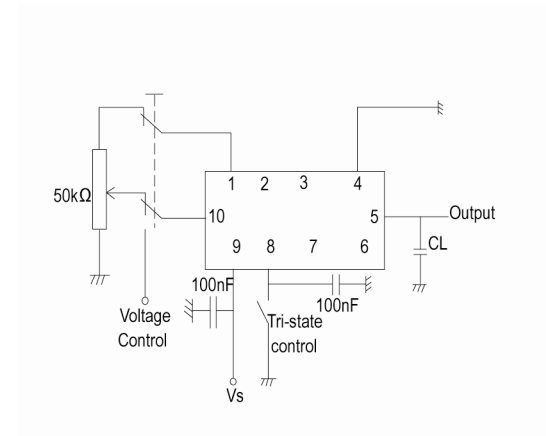
Outline (mm) -3A = Ref voltage = 2.7V, ageing adj option



- 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

- Shock: IEC 60068-2-27, Test Ea: 1500g acceleration for 0.5ms, 1/2 sine pulse, 3 shocks in each of 3 mutually perpendicular axes.
- Vibration: IEC 60068-2-6, Test Fc, 10Hz-60Hz at 10g 30mins in 3 mutually perpendicular axes at 1 octave per minute.
- Solderability: MIL-STD-202, Method 208, Category 3
- Storage Temperature Range: -55 to 125°C

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 (2011/65/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): 1

Packaging Details

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

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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