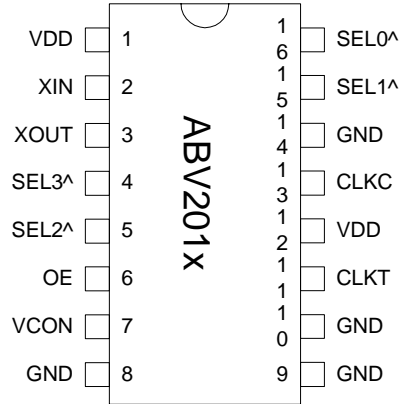


Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

FEATURES

- 65MHz to 130MHz Fundamental Mode Crystal.
- Output range: 65MHz – 800MHz (selectable 1x, 2x, 4x and 8x multipliers).
- Low Injection Power for crystal 50uW.
- Available outputs: PECL, LVDS, or CMOS.
- Integrated variable capacitors.
- Supports 3.3V-Power Supply.
- Available in 16 pin (TSSOP or SOIC)

PIN CONFIGURATION



DESCRIPTION

The ABV2017/18/19 family of VCXO IC's is specifically designed to pull high frequency fundamental crystals. They achieve very low current into the crystal resulting in better overall stability. Their internal varicaps allow an on chip frequency pulling, controlled by the VCON input.

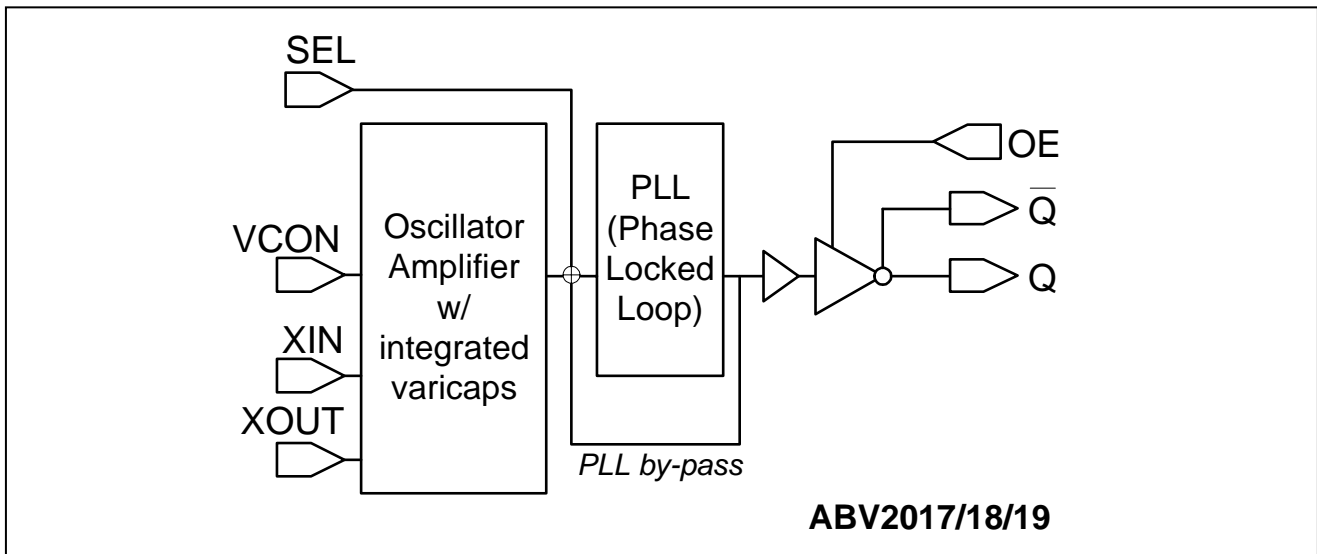
^: Internal pull-up

OUTPUT ENABLE LOGICAL LEVELS

| Part # | OE | State |
|--------------------|-------------|----------------|
| ABV2018 | 0 (Default) | Output enabled |
| | 1 | Tri-state |
| ABV2017 ABV2019 | 0 | Tri-state |
| | 1 (Default) | Output enabled |

OE input: Logical states defined by PECL levels for ABV2018
 Logical states defined by CMOS levels for ABV2017/-19

BLOCK DIAGRAM



Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

PIN DESCRIPTIONS

| Name | Number | Type | Description |
|------|-------------|------|---|
| XIN | 2 | I | Crystal input. See Crystal Specification on page 3. |
| XOUT | 3 | I | Crystal output. See Crystal Specification on page 3. |
| OE | 6 | I | Output enable. See Output Enable Logic Levels on page 1. |
| VCON | 7 | I | Voltage control input. |
| GND | 8,9, 10, 14 | P | Ground. |
| CLKT | 11 | O | True output PECL (ABV2018) or LVDS (ABV2019). No Connect for CMOS (ABV2017). |
| CLKC | 13 | O | Complementary output PECL (ABV2018) or LVDS (ABV2019). CMOS output for (ABV2017). |
| SEL | 4,5,15,16 | I | Multiplier selector pins. These pins have an internal pull-up that will default SEL to '1' when not connected to GND. |
| VDD | 1, 12 | P | +3.3V power supply. |

FREQUENCY SELECTION TABLE

| Pin #4 SEL3 | Pin #5 SEL2 | Pin #15 SEL1 | Pin #16 SEL0 | Selected Multiplier |
|----------------|----------------|-----------------|-----------------|---------------------|
| 0 | 0 | 1 | 1 | Fin x 8 |
| 1 | 0 | 1 | 1 | Fin x 4 |
| 1 | 1 | 1 | 0 | Fin x 2 |
| 1 | 1 | 1 | 1 | No multiplication |

All pins have internal pull-ups (default value is 1). Connect to GND to set to 0.

ELECTRICAL SPECIFICATIONS

1. Absolute Maximum Ratings

| PARAMETERS | SYMBOL | MIN. | MAX. | UNITS |
|-----------------------------------|----------|------|--------------|-------|
| Supply Voltage | V_{DD} | | 4.6 | V |
| Input Voltage, dc | V_i | -0.5 | $V_{DD}+0.5$ | V |
| Output Voltage, dc | V_o | -0.5 | $V_{DD}+0.5$ | V |
| Storage Temperature | T_s | -65 | 150 | °C |
| Ambient Operating Temperature* | T_A | -40 | 85 | °C |
| Junction Temperature | T_J | | 125 | °C |
| Lead Temperature (soldering, 10s) | | | 260 | °C |
| ESD Protection, Human Body Model | | | 2 | kV |

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

* Note: Operating Temperature is guaranteed by design for all parts (COMMERCIAL and INDUSTRIAL), but tested for COMMERCIAL grade only.

Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

2. Crystal Specifications

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP | MAX. | UNITS |
|-----------------------|----------------|------------|------|-----|------|-------|
| Clload | C _L | | | 6.5 | | pF |
| C0/C1 ratio (gamma) | γ | | | | 300 | - |
| Oscillation Frequency | OF | Fund. | 65 | | 130 | MHz |

3. Voltage Control Crystal Oscillator

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--------------------------------|----------------------|---|-------|---------|------|-------|
| VCXO Stabilization Time * | T _{VCXOSTB} | From power valid | | | 10 | ms |
| VCXO Tuning Range | | F _{XIN} = 100 – 200MHz; XTAL C ₀ /C ₁ < 250 0V ≤ VCON ≤ 3.3V | | 200* | | ppm |
| CLK output pullability | | VCON=1.65V, ±1.65V | ±100* | | | ppm |
| On-chip Varicaps control range | | VCON = 0 to 3.3V | | 4 – 18* | | pF |
| Linearity | | | | | 10* | % |
| VCXO Tuning Characteristic | | | | 65 | | ppm/V |
| VCON input impedance | | | | 60 | | kΩ |
| VCON modulation BW | | 0V ≤ VCON ≤ 3.3V, -3dB | 25 | | | kHz |

Note: Parameters denoted with an asterisk (*) represent nominal characterization data and are not production tested to any specific limits.

4. General Electrical Specifications

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---------------------------------|-----------------|--|----------------|----------------|----------------|-------|
| Supply Current (Loaded Outputs) | I _{DD} | PECL/LVDS/CMOS | | | 100/80/40 | mA |
| Operating Voltage | V _{DD} | | 2.97 | | 3.63 | V |
| Output Clock Duty Cycle | | @ 1.4V (CMOS) @ 1.25V (LVDS) @ V _{DD} – 1.3V (PECL) | 45 45 45 | 50 50 50 | 55 55 55 | % |
| Short Circuit Current | | | | ±50 | | mA |

Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

5. Jitter Specifications

| PARAMETERS | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|----------------------------|--|------|------|------|-------|
| Period jitter RMS | 77.76MHz | | 2.5 | | ps |
| | 155.52MHz | | 4 | | |
| | 622.08MHz | | 5 | | |
| Period jitter peak-to-peak | 77.76MHz | | 24 | | ps |
| | 155.52MHz | | 29 | | |
| | 622.08MHz | | 32 | | |
| Integrated jitter RMS | Integrated 12 kHz to 20 MHz at 77.76MHz | | 0.5 | | ps |
| | Integrated 12 kHz to 20 MHz at 155.52MHz | | 1.5 | | |
| | Integrated 12 kHz to 20 MHz at 622.08MHz | | 1.5 | | |

6. Phase Noise Specifications

| PARAMETERS | FREQUENCY | @10Hz | @100Hz | @1kHz | @10kHz | @100kHz | UNITS |
|---------------------------------|-----------|-------|--------|-------|--------|---------|--------|
| Phase Noise relative to carrier | 77.76MHz | -75 | -95 | -125 | -145 | -155 | dBc/Hz |
| | 155.52MHz | -75 | -95 | -120 | -125 | -123 | |
| | 622.08MHz | -75 | -95 | -115 | -118 | -115 | |

Note: Phase Noise measured at VCON = 0V

7. CMOS Output Electrical Specifications

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|--|-----------------|--|------|------|------|-------|
| Output drive current (High Drive) | I _{OH} | V _{OH} = V _{DD} -0.4V, V _{DD} =3.3V | 30 | | | mA |
| | I _{OL} | V _{OL} = 0.4V, V _{DD} = 3.3V | 30 | | | mA |
| Output drive current (Standard Drive) | I _{OH} | V _{OH} = V _{DD} -0.4V, V _{DD} =3.3V | 10 | | | mA |
| | I _{OL} | V _{OL} = 0.4V, V _{DD} = 3.3V | 10 | | | mA |
| Output Clock Rise/Fall Time (Standard Drive) | | 0.3V ~ 3.0V with 15 pF load | | 2.4 | | ns |
| Output Clock Rise/Fall Time (High Drive) | | 0.3V ~ 3.0V with 15 pF load | | 1.2 | | |

Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

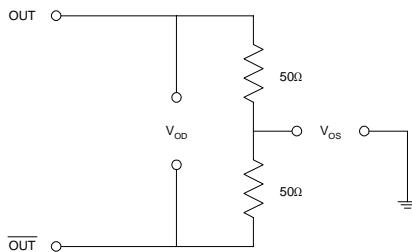
8. LVDS Electrical Characteristics

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|------------------------------|-----------------|--|-------|---------|----------|---------|
| Output Differential Voltage | V_{OD} | $R_L = 100 \Omega$ (see figure) | 247 | 355 | 454 | mV |
| V_{DD} Magnitude Change | ΔV_{OD} | | -50 | | 50 | mV |
| Output High Voltage | V_{OH} | | | 1.4 | 1.6 | V |
| Output Low Voltage | V_{OL} | | 0.9 | 1.1 | | V |
| Offset Voltage | V_{OS} | | 1.125 | 1.2 | 1.375 | V |
| Offset Magnitude Change | ΔV_{OS} | | 0 | 3 | 25 | mV |
| Power-off Leakage | I_{OXD} | $V_{out} = V_{DD}$ or GND $V_{DD} = 0V$ | | ± 1 | ± 10 | μA |
| Output Short Circuit Current | I_{OSD} | | | -5.7 | -8 | mA |

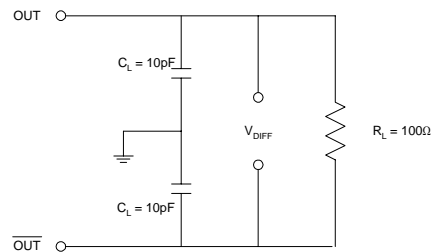
9. LVDS Switching Characteristics

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|------------------------------|--------|---|------|------|------|-------|
| Differential Clock Rise Time | t_r | $R_L = 100 \Omega$ $C_L = 10 \text{ pF}$ (see figure) | 0.2 | 0.7 | 1.0 | ns |
| Differential Clock Fall Time | t_f | | 0.2 | 0.7 | 1.0 | ns |

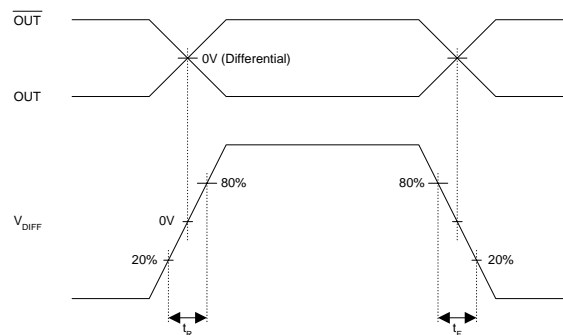
LVDS Levels Test Circuit



LVDS Switching Test Circuit



LVDS Transistion Time Waveform



Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

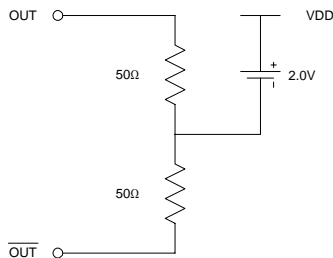
10. PECL Electrical Characteristics

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | MAX. | UNITS |
|---------------------|----------|--|------------------|------------------|-------|
| Output High Voltage | V_{OH} | $R_L = 50 \Omega$ to $(V_{DD} - 2V)$ (see figure) | $V_{DD} - 1.025$ | | V |
| Output Low Voltage | V_{OL} | | | $V_{DD} - 1.620$ | V |

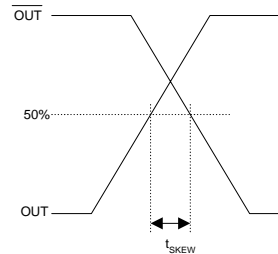
11. PECL Switching Characteristics

| PARAMETERS | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|-----------------|--------|----------------|------|------|------|-------|
| Clock Rise Time | t_r | @20/80% - PECL | | 0.6 | 1.5 | ns |
| Clock Fall Time | t_f | @80/20% - PECL | | 0.5 | 1.5 | ns |

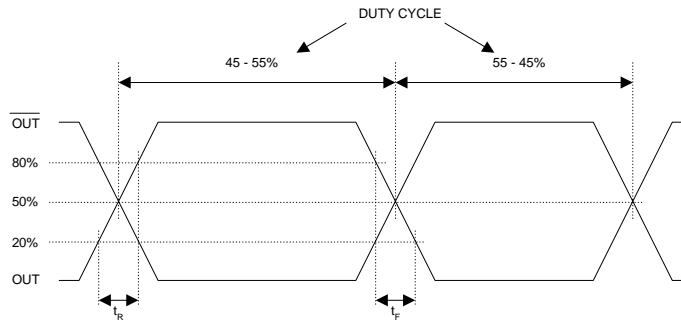
PECL Levels Test Circuit



PECL Output Skew



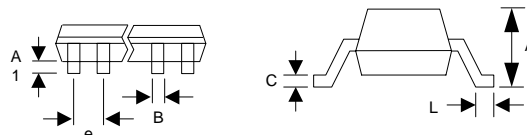
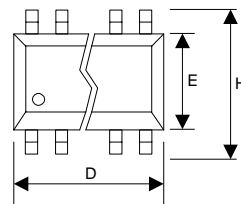
PECL Transition Time Waveform



PACKAGE INFORMATION

16 PIN Narrow SOIC, TSSOP (mm)

| Symbol | SOIC | | TSSOP | |
|--------|----------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 1.35 | 1.75 | - | 1.20 |
| A1 | 0.10 | 0.25 | 0.05 | 0.15 |
| B | 0.33 | 0.51 | 0.19 | 0.30 |
| C | 0.19 | 0.25 | 0.09 | 0.20 |
| D | 9.80 | 10.00 | 4.90 | 5.10 |
| E | 3.80 | 4.00 | 4.30 | 4.50 |
| H | 5.80 | 6.20 | 6.40 BSC | |
| L | 0.40 | 1.27 | 0.45 | 0.75 |
| e | 1.27 BSC | | 0.65 BSC | |



Low Phase Noise VCXO with multipliers (for 65-130MHz Fund Xtal)

ORDERING INFORMATION

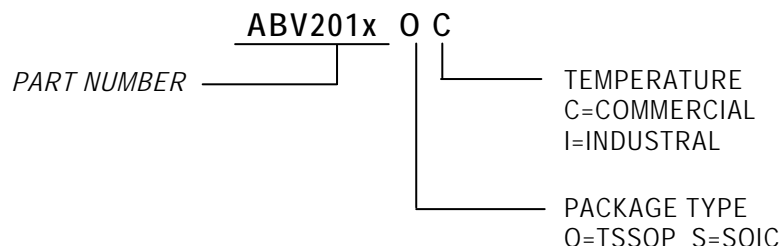
For part ordering, please contact our Sales Department:

30332 Esperanza., Rancho Santa Margarita, Ca 92688

Ph: 949-546-8000 Fax: 949-546-8001

PART NUMBER

The order number for this device is a combination of the following:
 Device number, Package type and Operating temperature range



| <u>Order Number</u> | <u>Marking</u> | <u>Package Option</u> |
|---------------------|----------------|-----------------------|
| ABV2017OC | ABV2017OC | TSSOP – Tube |
| ABV2017OC-T | ABV2017OC | TSSOP – Tape & Reel |
| ABV2017SC | ABV2017SC | SOIC – Tube |
| ABV2017SC-T | ABV2017SC | SOIC – Tape & Reel |
| ABV2018OC | ABV2018OC | TSSOP – Tube |
| ABV2018OC-T | ABV2018OC | TSSOP – Tape & Reel |
| ABV2018SC | ABV2018SC | SOIC – Tube |
| ABV2018SC-T | ABV2018SC | SOIC – Tape & Reel |
| ABV2019OC | ABV2019OC | TSSOP – Tube |
| ABV2019OC-T | ABV2019OC | TSSOP – Tape & Reel |
| ABV2019SC | ABV2019SC | SOIC – Tube |
| ABV2019SC-T | ABV2019SC | SOIC – Tape & Reel |

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