



# Crystal Clock Oscillator

## 3.3V & 5V, ACMOS, TTL, SMD

## Technical Data

### S1903 / S1950 Series



#### Description

The 5V S1950 and 3.3V S1903 are crystal-controlled, low-current oscillators providing precise rise and fall times to drive high performance applications. The sub-miniature, very low profile leadless ceramic package has gold-plated contact pads, ideal for today's pick-and-place SMT environments. The S1903 and the high output load S1950 are both available to 125 MHz.

#### **Applications & Features**

- Gigabit Ethernet 125.0000 MHz
- Perfect for notebook and palmtop computers; portable applications; PCMCIA cards. Anywhere small size, low power, surface mountability are a priority. 1.8mm high SMD ceramic package
- 3.3V or 5V
- Tri-State standard
- CMOS, ACMOS & TTL compatible
- Available on tape & reel; 16mm tape,
- 1000 pcs per reel
- See S16XX series for low jitter performance

$\begin{tabular}{ c c c c c } tolerance, operating temperature, rated input (supply) voltage change, *aging, load change, shock and vibration. *Aging: 1 year @ 25°C average ambient operating temperature Temperature Range: 0 to +70°C or -40 to +85°C Storage: -55 to +125°C $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$		
80+ MHz to 125 MHz (\$1950) as rated Up to 160MHz available, contact SaRonix for details           Frequency Stability:         ±20, ±32, ±32, ±50 or ±100ppm over all conditions; calibration tolerance, operating temperature; rated input (supply) voltage change, *aging, load change, shock and vibration.           *Aging:         1 year @ 25°C average ambient operating temperature           Temperature Range: Operating:         0 to +70°C or -40 to +85°C           Supply Voltage:         5V ±5% or 3.3V ±10% (+7V absolute max)           Supply Current:         35mA typ, 50mA max @ 5V 35mA max @ 3.3V           Output:         45/55% max @ 50% VpD or 1.5V, 0 to +70°C @ 5V 40/60% max @ 50% VpD or 1.5V, 0 to +70°C @ 5V 45/55% max @ 50% VpD or 1.5V, 0 to +70°C @ 5V 45/55% max @ 50% VpD or 1.5V, 0 to +85°C @ 5V 45/55% max @ 50% VpD or 1.5V, 0 to +70°C @ 5V 45/55% max @ 50% VpD max for \$1903 Logic 1:           Bow Areas Control Characteristics:         2100 max for \$1950 or 95Ω ACMOS @ 3.3V           Period Jitter RMS:         \$1950: 209m max 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C           Output Oscillation(V <sub>IN</sub> ):         2.2.V ro N/C 20utput High Impedance (V <sub>IN</sub> ):           Output Oscillation(V <sub>IN</sub> ):         2.2.V ro N/C 20ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C           Output Oscillation(V <sub>IN</sub> ):         2.2.V ro N/C 20utput High Impedance (V <sub>IN</sub> ):           Solderability:         MIL-STD-883, Method 2003, Condition A Solvent Resistance	Frequency Range	32 MHz to 125 MHz (\$1903) as roted
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Frequency Kange.	
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*aging, load change, shock and vibration. *Aging: 1 year @ 25°C average ambient operating temperature Temperature Range: Operating: 0 to +70°C or -40 to +85°C Storage: -55 to +125°C Supply Voltage: $5V \pm 5\%$ or $3.3V \pm 10\%$ (+7V absolute max) Supply Current: $35mA typ, 50mA max @ 5V$ 35mA max @ 3.3V Output: Symmetry: $45/55\%$ max $@ 50\%$ VpD or $1.5V$ , 0 to +70°C $@ 5V$ 40/60% max $@ 50%$ VpD or $1.5V$ , 40 to +85°C $@ 5V45/55%$ max $@ 50%$ VpD or $1.5V$ , 40 to +85°C $@ 5V45/55%$ max $20%$ to $80%$ VpD 1.5m max $0.5$ to $2.5V$ (\$1950 only) Logic 0: $10\%$ VpD max for \$1950 or $20\%$ VDD max for \$1903 Logic 1: $80\%$ VpD 1.5m max $0.5$ to $2.5V$ (\$1950 only) Logic 0: $10\%$ VpD max for $15V, 0$ to $+70°C$ $25p$ max, $20 to 75\Omega$ ACMOS $@ 3.3V$ Period Jitter RMS: $51950$ : $20p$ smax $0$ to $+70°C$ 25p max, $72 + to 125MHz, 0$ to $+70°C25p$ smax, $72 + to 125MHz, 0$ to $+70°C25p$ smax, $72 + to 125MHz, 0$ to $+70°C25p$ smax, $72 + to 125MHz, 0$ to $+85°CTri-State Control Characteristics:Output Oscillation(VIN): \geq 2.2V ro N/COutput High Impedance (VIN): \leq 2.2V ro N/C0.00000000000000000000000000000000000$	Frequency Stability:	
*Aging: 1 year @ 25°C average ambient operating temperature Temperature Range: Operating: 0 to $+70^{\circ}$ C or $-40$ to $+85^{\circ}$ C -55 to $+125^{\circ}$ C Supply Voltage: $5V \pm 5\%$ or $3.3V \pm 10\%$ ( $+7V$ absolute max) Supply Current: $35mA$ typ, $50mA$ max @ $5V$ 35mA max @ $3.3VOutput:Symmetry: 45/55\% max @ 50\% VDD or 1.5V, 0 to +70^{\circ}C @ 5V40/60\% max @ 50\% VDD or 1.5V, 40 to +85^{\circ}C @ 5V40/60\% max @ 50\% VDD or 1.5V, 40 to +85^{\circ}C @ 5V40/60%$ max @ $50%$ V <sub>DD</sub> @ $3.3VRise & Fall Times: 2ns max 20\% to 80\% VDD1.5ns$ max $0.5$ to $2.5V$ (S1950 only) Logic 0: $10\%$ V <sub>DD</sub> max for S1950 or $20\%$ VDD max for S1903 Logic 1: $80\%$ V <sub>DD</sub> max for S1950 or $20\%$ VDD max for S1903 Logic 1: $80\%$ V <sub>DD</sub> max $32$ to $725\Omega$ ACMOS @ $3.3V$ Period Jitter RMS: $51950$ : $20ps$ max $0$ to $+70^{\circ}$ C $25ps$ max, $72 +$ to $125MHz$ , $0$ to $+70^{\circ}$ C $25ps$ max, $72 +$ to $125MHz$ , $0$ to $+70^{\circ}$ C $25ps$ max, $72 +$ to $125MHz$ , $0$ to $+70^{\circ}$ C $25ps$ max, $72 +$ to $125MHz$ , $-40$ to $+85^{\circ}$ C Tri-State Control Characteristics: Output Oscillation(V <sub>IN</sub> ): $\geq 2.2V$ ro N/C Output High Impedance (V <sub>IN</sub> ): $\leq 0.8W$ or GND Disable Output Delay: $\leq 100ns$ Internal Pullup Resistance: $\geq 50k\Omega$ Mcchanical: MIL-STD-883, Method 2002, Condition B MIL-STD-883, Method 2003, Condition A Solvent Resistance: MIL-STD-883, Method 2004, Condition A Solvent Resistance: MIL-STD-883, Method 2004, Condition A MIL-STD-883, Method 2004, Condition A MIL-STD-883, Method 2004, Condition A Fine Leak Test: MIL-STD-883, Method 1014, Condition A Fine Leak Test: MIL-STD-883, Method 1014, Condition A		
Operating: Storage: $0 \text{ to } +70^{\circ}\text{C or } -40 \text{ to } +85^{\circ}\text{C}$ $-55 \text{ to } +125^{\circ}\text{C}$ Supply Voltage: $5V \pm 5\% \text{ or } 3.3V \pm 10\% (+7V \text{ absolute max})$ Supply Current: $35\text{mA typ, }50\text{mA max }@ 5V$ $35\text{mA max }@ 3.3V$ Output: $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, 0 \text{ to } +70^{\circ}\text{C} @ 5V$ $40/60\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 3.3V$ Rise & Fall Times: $2\text{ ns max } 20\% \text{ to } 80\% \text{ V}_{\text{DD}}$ $1.5\text{ som ax } 0.5 \text{ to } 2.5V (S1950 \text{ only})$ $1.\text{ Logic } 1:10\% \text{ V}_{\text{DD}} \text{ max } fo \text{ S1950 or } 20\% \text{ VDD max for S1903}1.\text{ Logic } 1:20\% \text{ ACMOS }@ 3.3VPeriod Jitter RMS:S1950: 20ps max /0 to +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +85^{\circ}\text{C}Tri-State Control Characteristics:Output Oscillation(V_{N}):20.8V \text{ or GND}20.8V \text{ or GND}10\text{ sable Output Delay: \leq 100\text{ ns}10\text{ rternal Pullup Resistance: \geq 50\text{ k\Omega}MiL-STD-883, Method 2002, Condition BSolderability:MIL-STD-883, Method 2003, Condition A11\text{ condition C}11 Scherket: MIL-STD-883, Method 2004, Condition D DMiLexResistance to Soldering Heat:MIL-STD-883, M$	*Aging:	
Operating: Storage: $0 \text{ to } +70^{\circ}\text{C or } -40 \text{ to } +85^{\circ}\text{C}$ $-55 \text{ to } +125^{\circ}\text{C}$ Supply Voltage: $5V \pm 5\% \text{ or } 3.3V \pm 10\% (+7V \text{ absolute max})$ Supply Current: $35\text{mA typ, }50\text{mA max }@ 5V$ $35\text{mA max }@ 3.3V$ Output: $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, 0 \text{ to } +70^{\circ}\text{C} @ 5V$ $40/60\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5V, -40 \text{ to } +85^{\circ}\text{C} @ 5V$ $45/55\% \text{ max }@ 50\% \text{ V}_{\text{DD}} \text{ or } 3.3V$ Rise & Fall Times: $2\text{ ns max } 20\% \text{ to } 80\% \text{ V}_{\text{DD}}$ $1.5\text{ som ax } 0.5 \text{ to } 2.5V (S1950 \text{ only})$ $1.\text{ Logic } 1:10\% \text{ V}_{\text{DD}} \text{ max } fo \text{ S1950 or } 20\% \text{ VDD max for S1903}1.\text{ Logic } 1:20\% \text{ ACMOS }@ 3.3VPeriod Jitter RMS:S1950: 20ps max /0 to +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +70^{\circ}\text{C}25ps max, 72+ \text{ to } 125\text{ MHz}, 0 \text{ to } +85^{\circ}\text{C}Tri-State Control Characteristics:Output Oscillation(V_{N}):20.8V \text{ or GND}20.8V \text{ or GND}10\text{ sable Output Delay: \leq 100\text{ ns}10\text{ rternal Pullup Resistance: \geq 50\text{ k\Omega}MiL-STD-883, Method 2002, Condition BSolderability:MIL-STD-883, Method 2003, Condition A11\text{ condition C}11 Scherket: MIL-STD-883, Method 2004, Condition D DMiLexResistance to Soldering Heat:MIL-STD-883, M$	Temnerature Range	
Storage: $-55$ to $+125^{\circ}$ CSupply Voltage: $5V \pm 5\%$ or $3.3V \pm 10\%$ ( $+7V$ absolute max)Supply Current: $35mA$ max $@ 3.3V$ Output: $35mA$ max $@ 50\%$ V <sub>DD</sub> or $1.5V$ , 0 to $+70^{\circ}$ C $@ 5V$ $40/60\%$ max $@ 50\%$ V <sub>DD</sub> or $1.5V$ , 40 to $+85^{\circ}$ C $@ 5V$ $40/60\%$ max $@ 50\%$ V <sub>DD</sub> or $1.5V$ , 40 to $+85^{\circ}$ C $@ 5V$ $45/55\%$ max $@ 50\%$ V <sub>DD</sub> or $1.5V$ , 40 to $+85^{\circ}$ C $@ 5V$ $45/55\%$ max $@ 50\%$ V <sub>DD</sub> or $0.5V$ , 40 to $+85^{\circ}$ C $@ 5V$ $45/55\%$ max $@ 50\%$ V <sub>DD</sub> or $0.5V$ , 40 to $+85^{\circ}$ C $@ 5V$ $45/55\%$ max $@ 50\%$ V <sub>DD</sub> or $0.5V$ , 40 to $+85^{\circ}$ C $0.5V$ max $0.5 to 2.5V (Sl (950 only))Logic 0:Logic 0:10\% VDD max for Sl 950 or 20% VDD max for Sl 903Logic 1:Bogic 1:80\% VDD max for Sl 950 a ACMOS @ 3.3VPeriod Jitter RMS:S1950: 20ps max 0 to +70^{\circ}C25ps max, 72 to 125MHz, 0 to +70^{\circ}C25ps max, 72 to 125MHz, 0 to +70^{\circ}C25ps max, 72 to 125MHz, -40 to +85^{\circ}CTri-State Control Characteristics:Output Oscillation(VIN):20.8V or GNDDisable Output Delay:\leq 100msInternal Pullup Resistance:\geq 00K\OmegaMechanical:MIL-STD-883, Method 2002, Condition BSolderability:MIL-STD-883, Method 2003, Condition ASolvent Resistance:MIL-STD-883, Method 2004, Condition ASolvent Resistance:MIL-STD-883, Method 2004, Condition A IMIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1011, Condition A$	1 0	$0 \text{ to } +70^{\circ}\text{C} \text{ or } -40 \text{ to } +85^{\circ}\text{C}$
Supply Current:       35mA typ, 50mA max @ 5V 35mA max @ 3.3V         Output:       45/55% max @ 50% V <sub>DD</sub> or 1.5V, 0 to +70°C @ 5V 40/60% max @ 50% V <sub>DD</sub> or 1.5V, -40 to +85°C @ 5V 45/55% max @ 50% V <sub>DD</sub> @ 3.3V         Rise & Fall Times:       2ns max 20% to 80% V <sub>DD</sub> (2000)         1.5ns max 0.5 to 2.5V (\$1950 or 20% VDD max for \$1903)         Logic 1:       80% V <sub>DD</sub> min         Load:       500 ACMOS @ 5V or 95Ω ACMOS @ 3.3V         Period Jitter RMS:       \$1950: 20ps max 0 to +70°C 25ps max -40 to +85°C         S1903:       14ps max, 32 to 72 MHz 20ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, -40 to +85°C         Tri-State Control Characteristics:       0utput Oscillation(V <sub>IN</sub> ):         Output Disable Output Delay:       ≤0.8V or GND         Disable Output Delay:       ≤100ns         Internal Pullup Resistance:       ≥50kΩ         Mechanical:       MIL-STD-883, Method 2003, Condition B Solderability:         Solvent Resistance:       MIL-STD-883, Method 2003, Condition A Solvent Resistance:         MIL-STD-202, Method 215       Terminal Strength:         Resitance to Soldering Heat:       MIL-STD-883, Method 2004, Condition T or J         Environmental:       MIL-STD-883, Method 1014, Condition C Fine Leak Test:         MIL-STD-883, Method 1014, Condition A Thermal Shock:       MIL-STD-883, Method 1014, Condition A		
Supply Current:       35mA typ, 50mA max @ 5V 35mA max @ 3.3V         Output:       Symmetry:       45/55% max @ 50% V <sub>DD</sub> or 1.5V, 0 to +70°C @ 5V 40/60% max @ 50% V <sub>DD</sub> or 1.5V, -40 to +85°C @ 5V 45/55% max @ 50% V <sub>DD</sub> @ 3.3V         Rise & Fall Times:       2ns max 20% to 80% V <sub>DD</sub> 1.5ns max 0.5 to 2.5V (\$1950 or 10% V <sub>DD</sub> max for \$1903 Logic 1:       80% V <sub>DD</sub> min Load:       500 ACMOS @ 5V or 95Ω ACMOS @ 3.3V         Period Jitter RMS:       \$1950: 20ps max 0 to +70°C 25ps max -40 to +85°C       \$1903: 14ps max, 32 to 72 MHz 20ps max, 72+ to 125MHz, 0 to +70°C 25ps max, 72+ to 125MHz, 0 to +70°C         Tri-State Control Characteristics:       Output Oscillation(V <sub>IN</sub> ):       ≥2.2V ro N/C         Output Disable Output Delay:       ≤100ns         Internal Pullup Resistance:       ≥50kΩ         Mechanical:       MIL-STD-883, Method 2002, Condition B Solderability:         MIL-STD-883, Method 2003, Condition A Solvent Resistance:       MIL-STD-883, Method 2003, Condition A Solvent Resistance:         MIL-STD-202, Method 215       Terminal Strength:       MIL-STD-883, Method 2004, Condition A Solvent Resistance:         MIL-STD-202, Method 210, Condition I or J       Environmental:       MIL-STD-883, Method 1014, Condition C Fine Leak Test:         MIL-STD-883, Method 1014, Condition A Thermal Shock:       MIL-STD-883, Method 1014, Condition A MIL-STD-883, Method 1014, Condition A	Supply Voltage:	$5V \pm 5\%$ or 3 $3V \pm 10\%$ (+7V absolute max)
$\begin{array}{c} 35\text{mA max } @ 3.3 \text{V} \\ \hline & 35\text{mA max } @ 3.3 \text{V} \\ \hline & 35\text{mA max } @ 3.3 \text{V} \\ \hline & 35\text{mA max } @ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5 \text{V}, 0 \text{ to } +70^{\circ}\text{C} @ 5 \text{V} \\ 40/60\% \text{ max } @ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5 \text{V}, 40 \text{ to } +85^{\circ}\text{C} @ 5 \text{V} \\ 45/55\% \text{ max } @ 50\% \text{ V}_{\text{DD}} \text{ or } 1.5 \text{V}, 40 \text{ to } +85^{\circ}\text{C} @ 5 \text{V} \\ 45/55\% \text{ max } @ 50\% \text{ V}_{\text{DD}} \text{ or } 3.3 \text{V} \\ \hline & \text{Rise & Fall Times:} & 2\text{ns max } 20\% \text{ to } 80\% \text{ V}_{\text{DD}} \text{ m} \\ 1.5\text{ ns max } 0.5 \text{ to } 2.5 \text{V} \text{ (S1950 only)} \\ \hline & \text{Logic 0:} & 10\% \text{ V}_{\text{DD}} \text{ max for $1950 \text{ or } 20\% \text{ VDD max for $1903} \\ \hline & \text{Logic 1:} & 80\% \text{ V}_{\text{DD}} \text{ min} \\ \hline & \text{Load:} & 50\Omega \text{ ACMOS } @ 5 \text{ V or } 95\Omega \text{ ACMOS } @ 3.3 \text{V} \\ \hline \text{Period Jitter RMS:} & $1950: \text{ cops max } 0 \text{ to } +70^{\circ}\text{C} \\ 25\text{ps max } -40 \text{ to } +85^{\circ}\text{C} \\ \hline \text{S1903:} 14\text{ps max}, 32 \text{ to } 72 \text{ MHz} \\ 20\text{ps max}, 72 + \text{ to } 125\text{MHz}, 0 \text{ to } +85^{\circ}\text{C} \\ \hline \hline \text{Tri-State Control Characteristics:} \\ \hline \text{Output Oscillation}(V_{\text{IN}): & $22.9 \text{ vo } \text{N/C} \\ \hline \text{Output Oscillation}(V_{\text{IN}}): & $22.9 \text{ vo } \text{N/C} \\ \hline \text{Output Delay:} & $\leq 100\text{ns} \\ \hline \text{Internal Pullup Resistance:} & $\geq 50\text{ k\Omega} \\ \hline \hline \hline \ \text{MiL-STD-883}, \text{Method } 2002, \text{ Condition B} \\ \hline \text{Solderability:} & \text{MIL-STD-883}, \text{Method } 2003, \\ \hline \text{Vibration:} & \text{MIL-STD-883}, \text{Method } 2004, \text{ Condition A} \\ \hline \text{Solvent Resistance:} & \text{MIL-STD-202}, \text{ Method } 210, \text{ Condition S D} \\ \hline \ \text{Resitance to Soldering Heat:} & \text{MIL-STD-883}, \text{Method } 1014, \text{ Condition C} \\ \hline \text{Fine Leak Test:} & \text{MIL-STD-883}, \text{Method } 1014, \text{ Condition A} \\ \hline \ \text{Fine Leak Test:} & \text{MIL-STD-883}, \text{Method } 1014, \text{ Condition A} \\ \hline \ \text{MIL-STD-883}, \text{Method } 1014, \text{ Condition A} \\ \hline \ \ \end{tabular} \text{ Solvek} & \text{MIL-STD-883}, \text{Method } 1014, \text{ Condition A} \\ \hline \ \ \ \end{tabular} \text{ Solveh} \text{ MIL-STD-883}, \text{Method } 1014, \text{ Condition A} \\ \hline \ \ \ \ \ \end{tabular} \text{ Solveh} \text{ Solveh} \text{ Solveh} \text{ Solveh} \text{ Solveh} \text{ Solveh}  So$		· · · · ·
Output:       Symmetry:       45/55% max @ 50% V <sub>DD</sub> or 1.5V, 0 to +70°C @ 5V 40/60% max @ 50% V <sub>DD</sub> or 1.5V, -40 to +85°C @ 5V 45/55% max @ 50% V <sub>DD</sub> @ 3.3V         Rise & Fall Times:       2ns max 20% to 80% V <sub>DD</sub> @ 3.3V         Rise & Fall Times:       2ns max 20% to 80% V <sub>DD</sub> @ 3.3V         Logic 0:       1.5ns max 0.5 to 2.5V (S1950 only)         Logic 1:       80% V <sub>DD</sub> max for S1950 or 20% VDD max for S1903         Logic 1:       80% V <sub>DD</sub> min         Load:       50Ω ACMOS @ 5V or 95Ω ACMOS @ 3.3V         Period Jitter RMS:       S1950: 20ps max 0 to +70°C         25ps max -40 to +85°C       S1903: 14ps max, 32 to 72 MHz         20ps max, 72+ to 125MHz, 0 to +70°C       25ps max, 72+ to 125MHz, -40 to +85°C         Tri-State Control Characteristics:         Output Oscillation(V <sub>IN</sub> ):       ≥2.2V ro N/C         Output Disable Output Delay:       ≤100ns         Internal Pullup Resistance:       ≥50kΩ         MIL-STD-883, Method 2002, Condition B         Solvert Resistance:       MIL-STD-883, Method 2003, Condition A         Vibration:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak	Supply Current:	
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$\begin{array}{rcl} & 40/60\% \max \left( \widehat{w} \ 50\% \ V_{DD} \ or \ 1.5 \ V, \ 40 \ to \ +85^\circ \ C \ (\widehat{w} \ 5 \ V \\ & 45/55\% \ max \ (\widehat{w} \ 50\% \ V_{DD} \ (\widehat{w} \ 3.3 \ V \\ & 2ns \ max \ 20\% \ to \ 80\% \ V_{DD} \ (\widehat{w} \ 3.3 \ V \\ & 1.5ns \ max \ 0.5 \ to \ 2.5 \ V \ (S1950 \ only) \\ & Logic \ 1 \\ & Logic \ 1 \\ & 10\% \ V_{DD} \ max \ for \ S1950 \ or \ 20\% \ VDD \ max \ for \ S1903 \\ & Logic \ 1 \\ & 80\% \ V_{DD} \ min \\ & Load: \\ & 50\Omega \ ACMOS \ (\widehat{w} \ 5V \ or \ 95\Omega \ ACMOS \ (\widehat{w} \ 3.3 \ V \\ & Period \ Jitter \ RMS: \\ & S1950: \ 20ps \ max \ 40 \ to \ +85^\circ \ C \\ & S1903: \ 14ps \ max, \ 32 \ to \ 72 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 20ps \ max, \ 72 + \ to \ 125 \ MHz \\ & 30.8 \ V \ or \ GND \\ & Disable \ Output \ Delay: \ \leq 0.8 \ V \ or \ GND \\ & Disable \ Output \ Delay: \ \leq 0.8 \ V \ or \ GND \\ & Disable \ Output \ Delay: \ \ \leq 0.8 \ V \ or \ GND \\ & Solderability: \ MIL-STD-883, \ Method \ 2002, \ Condition \ B \\ & Solderability: \ MIL-STD-883, \ Method \ 2003, \ Condition \ A \\ & Solvent \ Resistance: \ MIL-STD-883, \ Method \ 2004, \ Condition \ A \\ & Solvent \ Resistance: \ MIL-STD-883, \ Method \ 2004, \ Condition \ A \\ & Solvent \ Resistance: \ MIL-STD-883, \ Method \ 2004, \ Condition \ D \\ & Resitance \ to \ Soldering \ Heat: \ MIL-STD-883, \ Method \ 2004, \ Condition \ A \\ & Solvent \ Resistance: \ MIL-STD-883, \ Method \ 2004, \ Condition \ A \\ & Fine \ Leak \ Test: \ MIL-STD-883, \ Method \ 1014, \ Condition \ C \\ & Fine \ Leak \ Test: \ MIL-STD-883, \ Method \ 1014, \ Condition \ A \\ & MIL-STD-883, \ Method \ 1014, \ Condition \ A \\ & MIL-STD-883, \ Method \ 1014, \ Condition \ A \\ & MIL-STD-883, \ Method \ 1014, \ Condition \ A \\ & MIL-S$	•	45/550/ mm @ 500/ XI = == 1.5X 0.4 17000 @ 5X
$\begin{array}{rcl} & 45/55\% \mbox{ max } @ 50\% \ V_{DD} \ @ 3.3V\\ Rise \& Fall Times: 2ns max 20\% to 80\% \ V_{DD} \\ & 1.5ns max 0.5 to 2.5V \ (S1950 only)\\ & Logic 0: 10\% \ V_{DD} \mbox{ max for S1903} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1903} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1904} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1905} \ or 20\% \ VDD \mbox{ max for S1903} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1950} \ or 20\% \ VDD \mbox{ max for S1903} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1950} \ or 20\% \ VDD \mbox{ max for S1903} \ \\ & Logic 1: 80\% \ V_{DD} \mbox{ max for S1905} \ @ 3.3V\\ \mbox{Period Jitter RMS: S1950: 20ps max 0 to +70°C} \ & 25ps \mbox{ max -40 to +85°C} \ \\ & S1903: 14ps \mbox{ max, 72+ to 125MHz, 0 to +70°C} \ & 25ps \mbox{ max, 72+ to 125MHz, -40 to +85°C} \ \\ \hline \mbox{Tri-State Control Characteristics:} \ & Output Oscillation(V_{IN}): & $\geq 2.2V$ ro \ N/C \ & 20ps \mbox{ max, 72+ to 125MHz, -40 to +85°C} \ \\ \hline \mbox{Output High Impedance (V_{IN}): } & $\leq 0.8V$ or GND \ & Disable Output Delay: & $\leq 100ns \ \\ & Internal Pullup Resistance: & $\geq 50k\Omega \ \\ \hline \mbox{Mechanical:} & MIL-STD-883, Method 2002, Condition B \ & Solderability: \ & MIL-STD-883, Method 2003, \ & Vibration: \ & MIL-STD-883, Method 2004, Condition A \ & Solvent Resistance: \ & MIL-STD-202, Method 215 \ \\ & Terminal Strength: \ & MIL-STD-202, Method 215 \ \\ \hline \mbox{Terminal Strength: } MIL-STD-883, Method 2004, Conditions D \ \\ \hline \mbox{Resistance to Soldering Heat: } MIL-STD-883, Method 2004, Condition I or J \ \\ \hline \end{tabular}$	Symmetry:	
Rise & Fall Times: $2ns max 20\%$ to $80\% V_{DD}$ Logic 0: $1.5ns max 0.5$ to $2.5V$ (S1950 only)Logic 0: $10\% V_{DD}$ max for S1950 or $20\% VDD$ max for S1903Logic 1: $80\% V_{DD}$ minLoad: $50\Omega ACMOS @ 5V$ or $95\Omega ACMOS @ 3.3V$ Period Jitter RMS:S1950: $20ps max 0$ to $+70^{\circ}C$ $25ps max -40$ to $+85^{\circ}C$ S1903: $14ps max, 32$ to $72$ MHz $20ps max, 72+$ to $125MHz, 0$ to $+70^{\circ}C$ $25ps max, 72+$ to $125MHz, 0$ to $+70^{\circ}C$ $25ps max, 72+$ to $125MHz, -40$ to $+85^{\circ}C$ Tri-State Control Characteristics:Output Oscillation( $V_{IN}$ ): $\geq 2.2V$ ro N/COutput Delay: $\leq 0.8V$ or GNDDisable Output Delay: $\leq 100ns$ Internal Pullup Resistance: $\geq 50k\Omega$ Mechanical:Solvent Resistance:MIL-STD-883, Method 2002, Condition BSolvent Resistance:MIL-STD-883, Method 2004, Condition ASolvent Resistance:MIL-STD-202, Method 215Terminal Strength:MIL-STD-883, Method 2004, Condition S DResitance to Soldering Heat:MIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1014, Condition A		
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	Rise & Fall Times:	
$\begin{array}{llllllllllllllllllllllllllllllllllll$		
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Logic 0:	
Load: $50\Omega ACMOS @ 5V or 95\Omega ACMOS @ 3.3V$ Period Jitter RMS: $$1950: 20ps max 0 to +70^{\circ}C$ $25ps max -40 to +85^{\circ}C$ S1903: $14ps max, 32 to 72 MHz$ $20ps max, 72+ to 125MHz, 0 to +70^{\circ}C$ $25ps max, 72+ to 125MHz, -40 to +85^{\circ}C$ Tri-State Control Characteristics:Output Oscillation(V <sub>IN</sub> ): $\geq 2.2V$ ro N/COutput High Impedance (V <sub>IN</sub> ): $\leq 0.8V$ or GND $Disable Output Delay:Internal Pullup Resistance:\geq 50k\OmegaMechanical:MIL-STD-883, Method 2002, Condition BSolderability:Stock:MIL-STD-883, Method 2003, Condition ASolvent Resistance:MIL-STD-883, Method 2004, Condition ASolvent Resistance:MIL-STD-883, Method 2004, Conditions DResitance to Soldering Heat:MIL-STD-202, Method 210, Condition I or JEnvironmental:Gross Leak Test:MIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1014, Condition A$	•	
$\begin{array}{rl} 25 \text{ps} \mbox{ max} -40 \ \text{to} +85^\circ\text{C} \\ \text{S1903: 14 ps} \mbox{ max}, 32 \ \text{to} 72 \ \text{MHz} \\ 20 \text{ps} \mbox{ max}, 72 + \ \text{to} 125 \ \text{MHz}, 0 \ \text{to} +70^\circ\text{C} \\ 25 \text{ps} \mbox{ max}, 72 + \ \text{to} 125 \ \text{MHz}, -40 \ \text{to} +85^\circ\text{C} \end{array}$ $\begin{array}{rl} \textbf{Tri-State Control Characteristics:} \\ \text{Output Oscillation}(V_{\text{IN}}): & \geq 2.2 \ \text{V} \ \text{ro} \ \text{N/C} \\ \text{Output High Impedance} (V_{\text{IN}}): & \leq 0.8 \ \text{V} \ \text{or} \ \text{GND} \\ \text{Disable Output Delay:} & \leq 100 \ \text{ns} \\ \text{Internal Pullup Resistance:} & \geq 50 \ \text{k\Omega} \end{array}$ $\begin{array}{rl} \textbf{MiL-STD-883, \ \text{Method} 2002, \ \text{Condition B} \\ \text{Solderability:} & \ \text{MIL-STD-883, \ \text{Method} 2003} \\ \text{Vibration:} & \ \text{MIL-STD-883, \ \text{Method} 2007, \ \text{Condition A} \\ \text{Solvent Resistance:} & \ \text{MIL-STD-202, \ \text{Method} 215} \\ \text{Terminal Strength:} & \ \text{MIL-STD-202, \ \text{Method} 210, \ \text{Condition SD} \\ \text{Resitance to Soldering Heat:} & \ \text{MIL-STD-202, \ \text{Method} 210, \ \text{Condition I or J} \end{array}$ $\begin{array}{r} \textbf{Environmental:} \\ \hline \textbf{Gross Leak Test:} & \ \text{MIL-STD-883, \ \text{Method} 1014, \ \text{Condition A2} \\ \text{Thermal Shock:} & \ \text{MIL-STD-883, \ \text{Method} 1014, \ \text{Condition A} \end{array}$		$50\Omega \text{ ACMOS } @ 5V \text{ or } 95\Omega \text{ ACMOS } @ 3.3V$
$S1903: 14\text{ ys max, } 32 \text{ to } 72 \text{ MHz}$ $20\text{ ys max, } 72+\text{ to } 125\text{ MHz, } 0 \text{ to } +70^{\circ}\text{C}$ $25\text{ ys max, } 72+\text{ to } 125\text{ MHz, } -40 \text{ to } +85^{\circ}\text{C}$ $Tri-State Control Characteristics:$ $Output Oscillation(V_{IN}): \geq 2.2\text{ V ro N/C}$ $Output High Impedance (V_{IN}): \leq 0.8\text{ V or GND}$ $Disable Output Delay: \leq 100\text{ ns}$ $Internal Pullup Resistance: \geq 50\text{ k}\Omega$ $Mechanical:$ $Shock: MIL-STD-883, Method 2002, Condition B$ $Solderability: MIL-STD-883, Method 2003$ $Vibration: MIL-STD-883, Method 2007, Condition A$ $Solvent Resistance: MIL-STD-883, Method 2004, Conditions D$ $Resitance  to Soldering Heat: MIL-STD-202, Method 210, Condition I or J$ $Environmental:$ $Gross Leak Test: MIL-STD-883, Method 1014, Condition C$ $Fine Leak Test: MIL-STD-883, Method 1014, Condition A2$ $Thermal Shock: MIL-STD-883, Method 1011, Condition A$	Period Jitter RMS:	
$\begin{array}{rl} & 20 \text{ps max}, 72 + \text{to } 125 \text{MHz}, 0 \text{ to } +70^{\circ}\text{C} \\ & 25 \text{ps max}, 72 + \text{to } 125 \text{MHz}, -40 \text{ to } +85^{\circ}\text{C} \end{array}$		*
$25 \text{ps max}, 72 + \text{to } 125 \text{MHz}, -40 \text{ to } +85^{\circ}\text{C}$ <b>Tri-State Control Characteristics:</b> Output Oscillation(V <sub>IN</sub> ): $\geq 2.2 \text{V ro N/C}$ Output High Impedance (V <sub>IN</sub> ): $\leq 0.8 \text{V or GND}$ Disable Output Delay: $\leq 100 \text{ns}$ Internal Pullup Resistance: $\geq 50 \text{k}\Omega$ <b>Mechanical:</b> Solderability: MIL-STD-883, Method 2002, Condition B   Solderability: MIL-STD-883, Method 2003   Vibration: MIL-STD-202, Method 215   Terminal Strength: MIL-STD-202, Method 210, Conditions D   Resitance to Soldering Heat: MIL-STD-202, Method 210, Condition I or J <b>Environmental:</b> Gross Leak Test: MIL-STD-883, Method 1014, Condition C   Fine Leak Test: MIL-STD-883, Method 1014, Condition A2   Thermal Shock: MIL-STD-883, Method 1011, Condition A		
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$\begin{array}{llllllllllllllllllllllllllllllllllll$		<b>1</b>
Output High Impedance (V <sub>IN</sub> ):       ≤0.8V or GND         Disable Output Delay:       ≤100ns         Internal Pullup Resistance:       ≥50kΩ         Mechanical:       MIL-STD-883, Method 2002, Condition B         Solderability:       MIL-STD-883, Method 2003         Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-202, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Disable Output Delay:       ≤100ns         Internal Pullup Resistance:       ≥50kΩ         Mechanical:       MIL-STD-883, Method 2002, Condition B         Solderability:       MIL-STD-883, Method 2003         Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-202, Method 210, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		—
Internal Pullup Resistance:       ≥50kΩ         Mechanical:       Shock:       MIL-STD-883, Method 2002, Condition B         Solderability:       MIL-STD-883, Method 2003         Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-202, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		—
Mechanical:       Shock:       MIL-STD-883, Method 2002, Condition B         Solderability:       MIL-STD-883, Method 2003         Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         MIL-STD-883, Method 1014, Condition C       Fine Leak Test:         MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Shock:MIL-STD-883, Method 2002, Condition BSolderability:MIL-STD-883, Method 2003Vibration:MIL-STD-883, Method 2007, Condition ASolvent Resistance:MIL-STD-202, Method 215Terminal Strength:MIL-STD-883, Method 2004, Conditions DResitance to Soldering Heat:MIL-STD-202, Method 210, Condition I or JEnvironmental:Gross Leak Test:MIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1011, Condition A	-	
Solderability:       MIL-STD-883, Method 2003         Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		MIL STD 882 Method 2002 Condition D
Vibration:       MIL-STD-883, Method 2007, Condition A         Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Solvent Resistance:       MIL-STD-202, Method 215         Terminal Strength:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Terminal Strength:       MIL-STD-883, Method 2004, Conditions D         Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       Gross Leak Test:         Gross Leak Test:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Resitance to Soldering Heat:       MIL-STD-202, Method 210, Condition I or J         Environmental:       MIL-STD-883, Method 1014, Condition C         Fine Leak Test:       MIL-STD-883, Method 1014, Condition A2         Thermal Shock:       MIL-STD-883, Method 1011, Condition A		
Gross Leak Test:MIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1011, Condition A		
Gross Leak Test:MIL-STD-883, Method 1014, Condition CFine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1011, Condition A	Environmental:	
Fine Leak Test:MIL-STD-883, Method 1014, Condition A2Thermal Shock:MIL-STD-883, Method 1011, Condition A		MIL-STD-883, Method 1014, Condition C
Thermal Shock: MIL-STD-883, Method 1011, Condition A		
Moisture Resistance: MIL-STD-883, Method 1004		
	Moisture Resistance:	







# Crystal Clock Oscillator

## 3.3V & 5V, ACMOS, TTL, SMD

## Technical Data

## S1903 / S1950 Series

