

Compatible with Eu Directive  
 2002/EC - RoHS

## ACT9200SSCL

The ACT9200SSCL is housed in a miniature, low profile SMD package, with a ceramic base utilising a seam welded metal lid for high reliability and better long-term stability. Spread Spectrum Technology is employed to assist with EMI emission reductions. This 7x5mm device is available with CMOS output with a supply voltage of 3.3V. This version offers a lower jitter than the standard 9200SSC version. Taped and reeled packaging (1K reels) and loose quantities are available for purchase, to suit high and low volume production. Other Spread Spectrum devices available in DIL14 and 9.6x11.4x2.5 on request.



### SPECIFICATION

| Parameter  | Symbol            | Specification   | Condition   |
|--|-------------------|---|---|
| Supply Voltage   | VDD               | 3.3V <sub>DC</sub> ± 5%                               |   |
| Frequency Range  | f <sub>o</sub>    | 13.000 ~ 220.0 MHz                                    | Please specify  |
| Frequency Stability  | Δf/f <sub>o</sub> | ±25ppm, ±50ppm or ±100ppm                             | Please specify  |
| Temp Operating Range   | T <sub>opr</sub>  | 0 ~ +70°C or -40 ~ +85°C                              | Please specify  |
| Temp Storage Range   | T <sub>stg</sub>  | -65 to +150°C   | Freq Dependent  |
| Operating Current  | I <sub>op</sub>   | 25mA typical  |   |
| Spread Percentage  |                   | Total %      Down Spread %      Centre Spread %       |   |
| Down spread or   |                   | 0.50            -0.5                    ±0.25         |   |
|  |                   | 0.75            -0.75                    ±0.375       |   |
|  |                   | 1.30            -1.25                    ±0.625       |   |
|  |                   | 2.00            -2                        ±1.0        |   |
| Centre spread need to be specified when ordering. Tolerance ±30% of Total% |                   | 2.50            -2.5                    ±1.25         | ** For initial trial samples the centre spread ±1.5% is recommended |
|  |                   | 3.00            -3                        ±1.5**      |   |
|  |                   | 3.50            -3.5                    ±1.75         |   |
|  |                   | 3.80            -3.75                   ±1.875        |   |
| EMI Reduction  |                   | Equals 10Log(Total%x Frequency (MHz))xHarmonic / 0.12 | See examples  |
| Modulation Carrier Frequency   |                   | 25.3 KHz min, 58.6KHz max                             | Frequency dependant   |
| Duty Cycle   | T <sub>w</sub> /t | 45/55%  |   |
| Output Level '0'   | V <sub>OL</sub>   | 0.4V max (at 20% VDD)                                 |   |
| Output Level '1'   | V <sub>OH</sub>   | 2.4V min (at 80% VDD)                                 |   |
| Output Impedance   |                   | 40 ohms typical                                       |   |
| Rise & Fall Time (max)   | T <sub>rTf</sub>  | 1.2nS max (20%VDD to 80%VDD)                          |   |
| Output Load  | N/CL              | 15pF CMOS   |   |
| Start-up Time  | T <sub>osc</sub>  | 5mS max, 2mS Typ                                      |   |
| Tri-state  |                   | Not Available   | Pin 1 must be O/C   |
| Static discharge Voltage   |                   | >2000V  | MIL STD 883 Method 3015   |
| Ageing   | F <sub>a</sub>    | ±5ppm   | first year max @25°C  |
| Cycle to Cycle Jitter  | T <sub>j</sub>    | ±150pS max, ±100pS Typical                            | for 13 MHz Oscillator **  |

\*\* Refer to Page 3

- APPLICATIONS**
- Networking
  - Embedded Systems
  - GPS
  - LCD Displays
  - ADSL, PCMCIA
  - Digital Imaging
  - Instrumentation

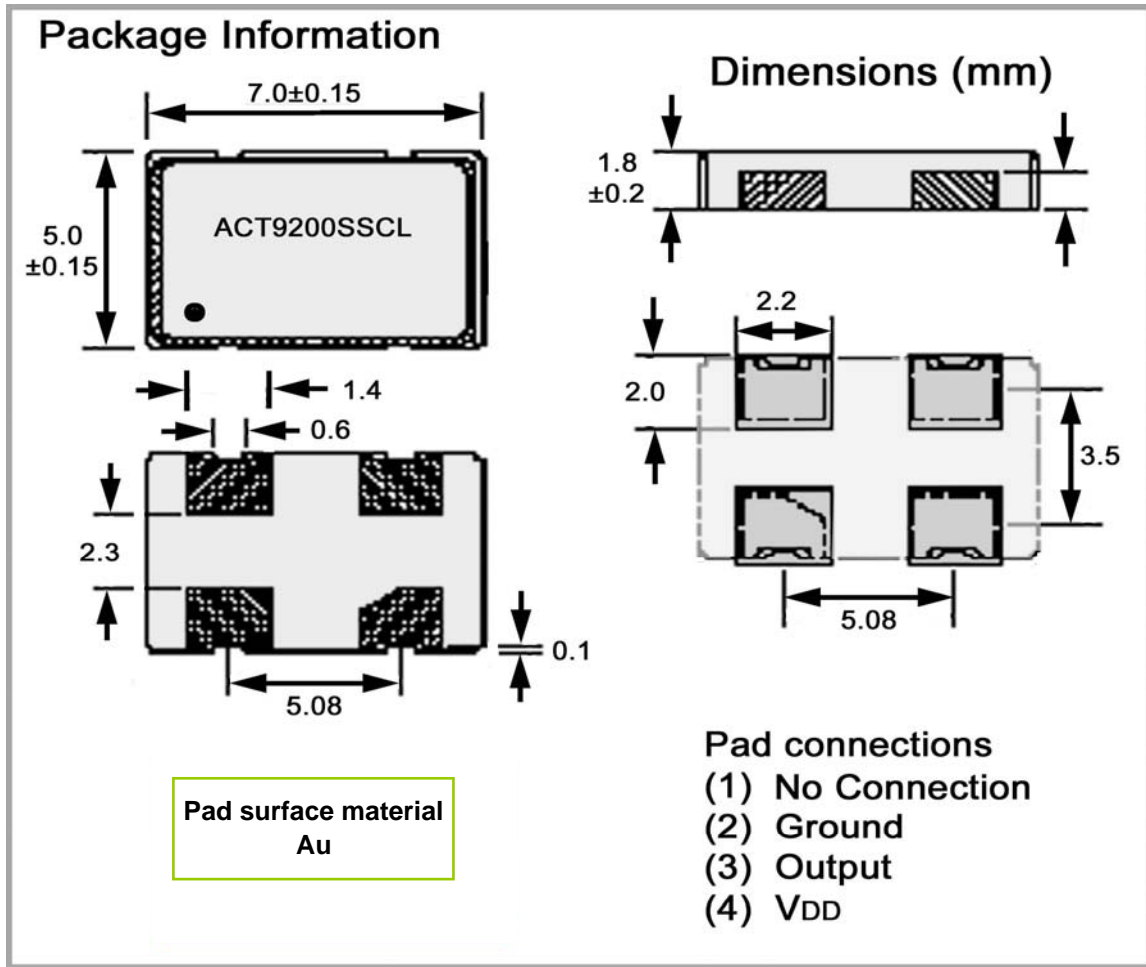
Please note that all parameters can not necessarily be specified in the same device

Customer to Specify : Frequency, Frequency Stability, Operating Temperature Range, Centre or down Spread, Spread Percentage  
 In line with our ongoing policy of product evolution and improvement, the above specification is subject to change without notice.

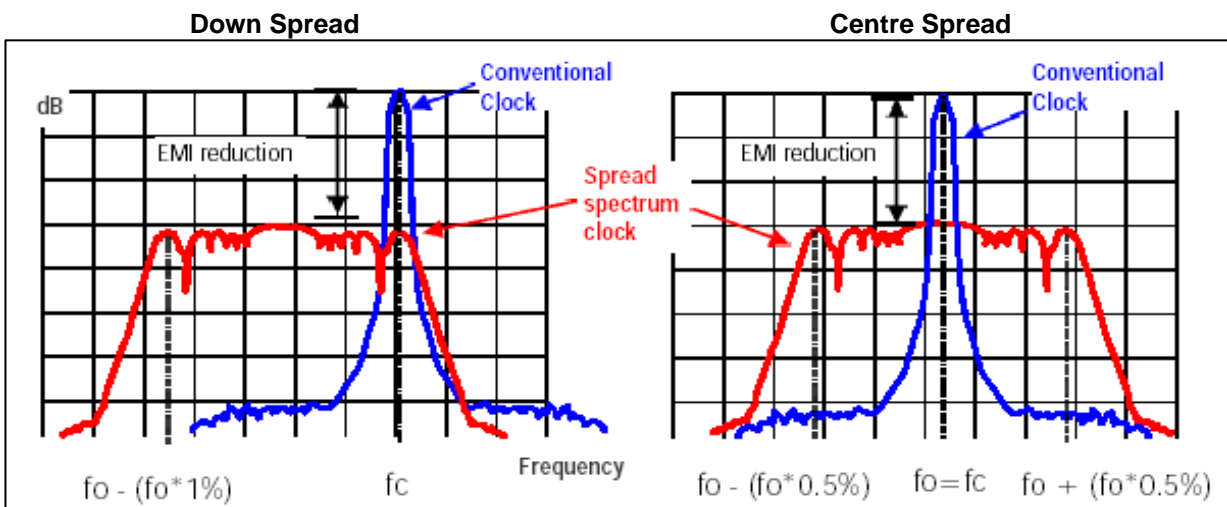
ISO9001: 2000 Registered

For quotations or further information please contact us at:  
 3 The Business Centre, Molly Millars Lane, Wokingham, Berks, RG41 2EY, UK  
<http://www.actcrystals.com>

## ACT9200SSCL



### Principle of Spread Spectrum



In line with our ongoing policy of product evolution and improvement, the above specification is subject to change without notice.

ISO9001: 2000 Registered

For quotations or further information please contact us at:  
 3 The Business Centre, Molly Millars Lane, Wokingham, Berks, RG41 2EY, UK  
<http://www.actcrystals.com>

## ACT9200SSCL

### Principle of Spread Spectrum (continued from page 2)

**Spread Spectrum Clock (SSC)**, the mode energy of a spread spectrum clock is spread over a wider bandwidth, resulting from the frequency modulation technique. The modulation carrier frequency is in the KHz range which makes the modulation process transparent to the oscillator frequency. The controlled modulation process can be on all of one side of the nominal frequency (**DOWN SPREAD**) or equally spread either side of the nominal frequency (**CENTRE SPREAD**). If **OVER-CLOCKING** is a problem to the system then the down spread is preferred.

#### Instantaneous Frequencies (100MHz Nominal Frequency)

| Total Spread % | Down Spread      |                   | Centre Spread     |                   |
|----------------|------------------|-------------------|-------------------|-------------------|
|                | Min              | Max               | Min               | Max               |
|                | Down Range       | Up Range          | Down Range        | Up Range          |
| 0.5            | -0.5%            | 0%                | -0.25%            | +0.25%            |
|                | -5000ppm         | 0ppm              | -2500ppm          | +2500ppm          |
|                | <b>99.500000</b> | <b>100.000000</b> | <b>99.750000</b>  | <b>100.250000</b> |
| 0.75           | -0.75%           | 0%                | -0.375            | +0.375            |
|                | -7500            | 0ppm              | -3750             | -3750             |
|                | <b>99.250000</b> | <b>100.000000</b> | <b>99.625000</b>  | <b>100.375000</b> |
| 1.25           | -1.25%           | 0%                | -0.625%           | +0.625            |
|                | -12500           | 0ppm              | -6250             | +12650            |
|                | <b>98.750000</b> | <b>100.000000</b> | <b>99.375000</b>  | <b>100.625000</b> |
| 2.0            | -2.0%            | 0%                | -1.0%             | +1.0%             |
|                | -20000           | 0ppm              | -10000            | +10000            |
|                | <b>98.000000</b> | <b>100.000000</b> | <b>-99.000000</b> | <b>101.000000</b> |
| 2.5            | -2.5%            | 0%                | -1.25%            | +1.25%            |
|                | -25000           | 0ppm              | -12500            | +12500            |
|                | <b>99.000000</b> | <b>100.000000</b> | <b>99.500000</b>  | <b>100.500000</b> |
| 3.0**          | -3.0%            | 0%                | -1.5%             | +1.5%             |
|                | -30000ppm        | 0ppm              | -15000ppm         | +15000ppm         |
|                | <b>97.500000</b> | <b>100.000000</b> | <b>98.750000</b>  | <b>101.250000</b> |
| 3.5            | -3.5%            | 0%                | -1.75%            | +1.75%            |
|                | -35000ppm        | 0ppm              | -17500            | +17500            |
|                | <b>96.500000</b> | <b>100.000000</b> | <b>98.250000</b>  | <b>101.750000</b> |
| 3.75           | -3.75%           | 0%                | -1.875%           | +1.875%           |
|                | -30000ppm        | 0ppm              | -15000ppm         | +15000ppm         |
|                | <b>96.250000</b> | <b>100.000000</b> | <b>98.125000</b>  | <b>101.875000</b> |

#### EMI Reduction Data

Main mode: EMI reduction:

$$10\text{Log} \left( \frac{\text{Total spread \% x frequency}(f_0)}{0.12} \right) \text{ dB}$$

3rd Harmonic: EMI reduction:

$$10\text{Log} \left( \frac{\text{Total spread \% x frequency}(f_0) \times 3}{0.12} \right) \text{ dB}$$

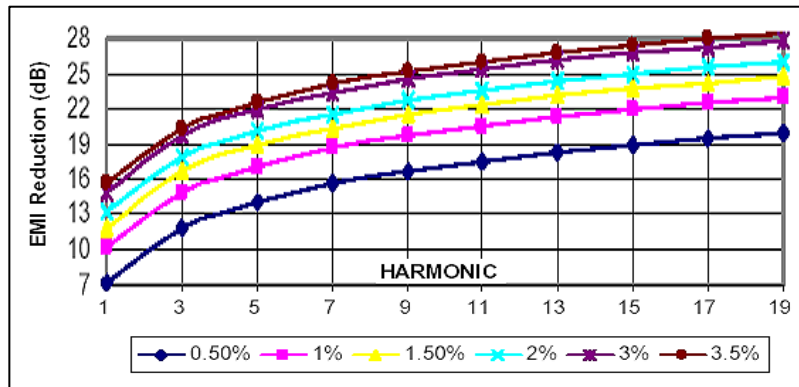
5th Harmonic: EMI reduction:

$$10\text{Log} \left( \frac{\text{Total spread \% x frequency}(f_0) \times 5}{0.12} \right) \text{ dB}$$

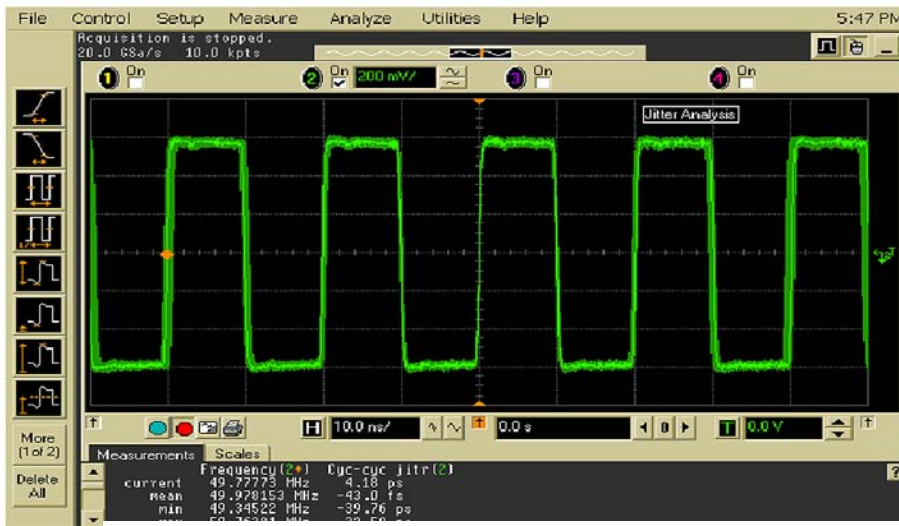
ISO9001: 2000 Registered

For quotations or further information please contact us at:  
 3 The Business Centre, Molly Millars Lane, Wokingham, Berks, RG41 2EY, UK  
<http://www.actcrystals.com>

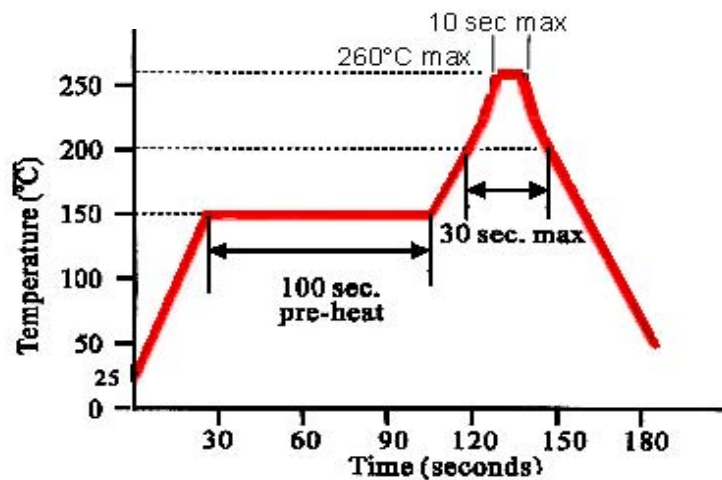
## ACT9200SSCL



**Example Jitter Measurement for 125MHz 9200SSCL**  
 Cycle to Cycle Jitter 32ps min 39.76ps max for 10000 samples



## Reflow Data



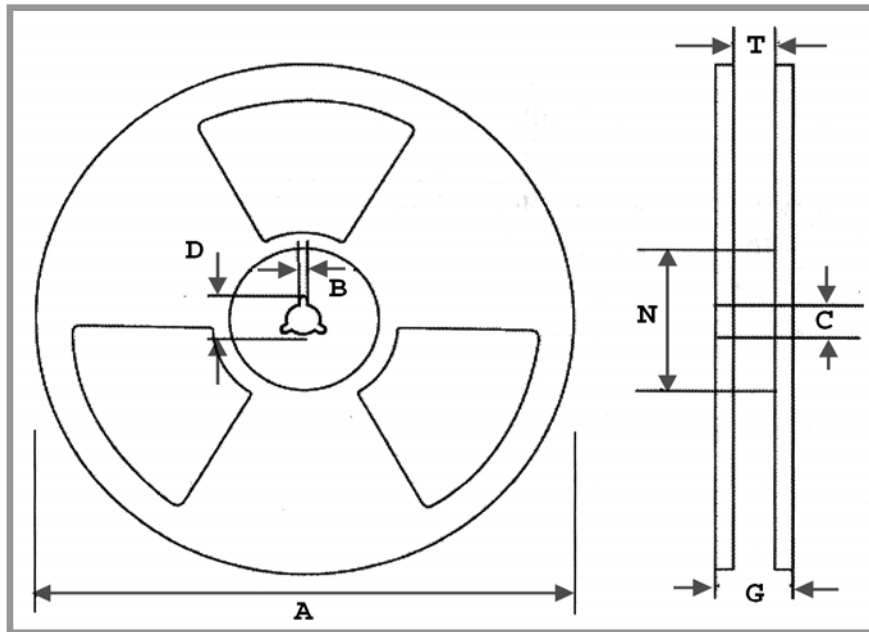
In line with our ongoing policy of product evolution and improvement, the above specification is subject to change without notice.

ISO9001: 2000 Registered

For quotations or further information please contact us at:  
 3 The Business Centre, Molly Millars Lane, Wokingham, Berks, RG41 2EY, UK  
<http://www.actcrystals.com>

## ACT9200SSCL TAPE & REEL SPECIFICATIONS

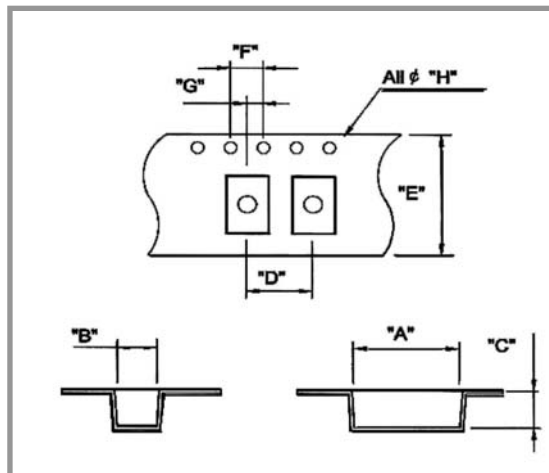
REEL



| A   | B±0.5 | D±1.0 | C±0.2 | N±1.0 | T±0.1 | G±2.0 | mm |
|-----|-------|-------|-------|-------|-------|-------|----|
| 180 | 2.2   | 20.2  | 13    | 62    | 16.5  | 20.5  |    |

## ACT9200SSCL REFLOW SPECIFICATION

TAPE



| A±0.1 | B±0.1 | C±0.1 | D±1.0 | E±0.1 | F±0.1 | G±0.05 | H+0.1-0 | mm |
|-------|-------|-------|-------|-------|-------|--------|---------|----|
| 7.7   | 5.3   | 1.8   | 8.0   | 16.0  | 4.0   | 2.0    | 1.5     |    |

In line with our ongoing policy of product evolution and improvement, the above specification is subject to change without notice.

ISO9001: 2000 Registered

For quotations or further information please contact us at:  
 3 The Business Centre, Molly Millars Lane, Wokingham, Berks, RG41 2EY, UK  
<http://www.actcrystals.com>

Issue:4 M6  
 Date:26/10/05