
Ultra-Small, Ultra-Low Power MEMS Oscillator with Spread Spectrum

Features

- Output Frequency: 1 MHz to 100 MHz LVCMOS
- Spread Spectrum Options:
 - Center Spread: $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1.0\%$, $\pm 1.5\%$, $\pm 2.0\%$, $\pm 2.5\%$
 - Down Spread: -0.5% , -1.0% , -1.5% , -2.0% , -2.5% , -3.0%
- Ultra-Low Power Consumption: 3 mA (Active), 12 μ A (Standby)
- Wide Supply Voltage Range: 1.71V ~ 3.63V V_{DD}
- Ultra-Small Package Sizes:
 - 1.6 mm \times 1.2 mm
 - 2.0 mm \times 1.6 mm
 - 2.5 mm \times 2.0 mm
 - 3.2 mm \times 2.5 mm
- Industrial Temperature Range: -40°C to 85°C
- Excellent Shock and Vibration Immunity
- High Reliability
- Lead Free and RoHS Compliant

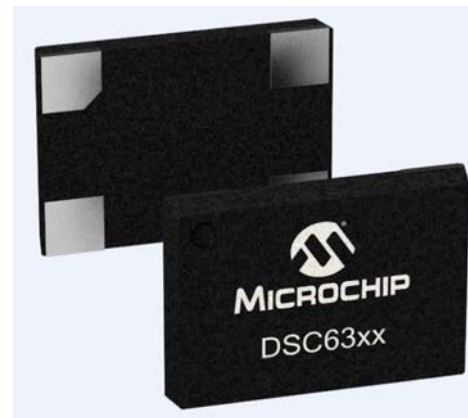
Applications

- Flat Panel Display/Monitor
- Multi-Function Printer
- Digital Signage
- Consumer Electronics

General Description

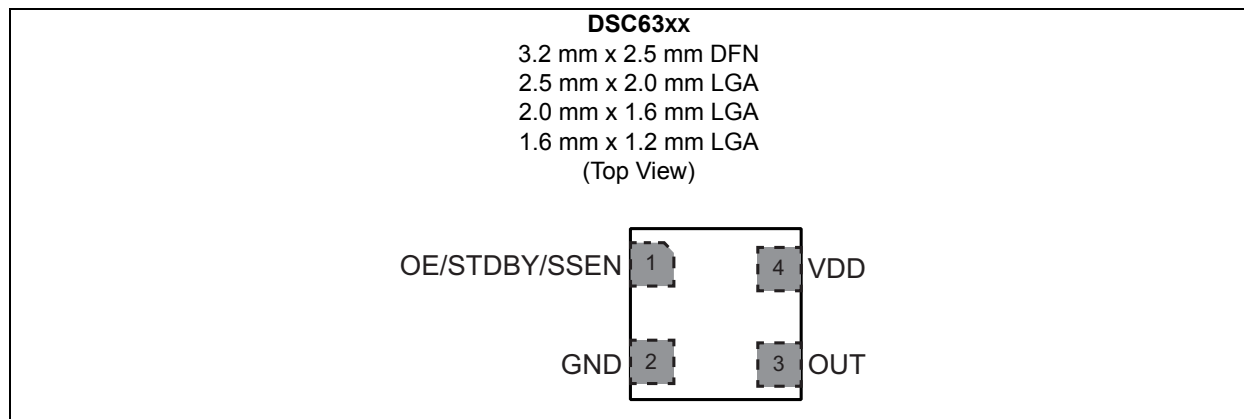
The DSC63xx family of devices is the industry's smallest and lowest-power spread-spectrum MEMS oscillators. Available in four different package sizes with operation as low as 3 mA, the smallest 4-pin package is a mere 1.6 mm x 1.2 mm in size. The devices support up to $\pm 2.5\%$ or -3% spread spectrum that can achieve up to 15 dB electromagnetic interference (EMI) reduction. Because of industry standard package and pin options, customers can solve last minute EMI problems simply by putting the new DSC63xx on their current board layout with no redesign required.

The DSC63xx family is available in ultra-small 1.6 mm x 1.2 mm and 2.0 mm x 1.6 mm packages. Other package sizes include: 2.5 mm x 2.0 mm and 3.2 mm x 2.5 mm. These packages are "drop-in" replacements for standard 4-pin CMOS quartz crystal oscillators.

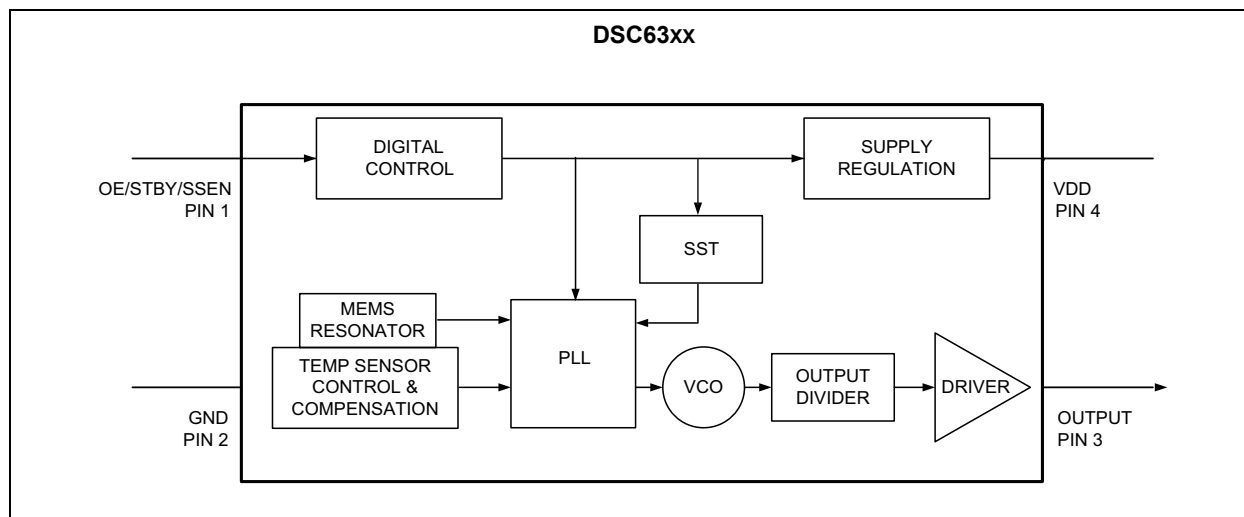


DSC63XX

Package Types



Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Supply Voltage	-0.3V to +4.0V
Input Voltage (V_{IN})	-0.3V to $V_{DD}+0.3V$
ESD Protection	4 kV HBM, 400V MM, 2 kV CDM

DSC63XX ELECTRICAL CHARACTERISTICS

Electrical Characteristics: Unless otherwise indicated, $V_{DD} = 1.8V -5\%$ to $3.3V +10\%$, $T_A = -40^{\circ}C$ to $85^{\circ}C$.							
Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions	
Supply Voltage, Note 1	V_{DD}	1.71	—	3.63	V	—	
Power Supply Ramp	t_{PU}	0.1	—	100	ms	Note 8	
Active Supply Current	I_{DD}	—	3.0	—	mA	$F_{OUT} = 27$ MHz, $V_{DD} = 1.8V$, No Load	
Standby Supply Current Note 2	I_{STBY}	—	12	—	μA	$V_{DD} = 1.8/2.5V$	
		—	80	—		$V_{DD} = 3.3V$	
Frequency Stability Note 3	Δf	—	—	± 25 ± 50	ppm	All temp ranges	
Aging	Δf	—	—	± 5	ppm	1st year @ $25^{\circ}C$	
		—	—	± 1		Per year after first year	
Startup Time	t_{SU}	—	—	1.3	ms	From 90% V_{DD} to valid clock output, $T = 25^{\circ}C$	
Input Logic Levels Note 4	V_{IH}	$0.7 \times V_{DD}$	—	—	V	Input Logic High	
	V_{IL}	—	—	$0.3 \times V_{DD}$	V	Input Logic Low	
Output Disable Time Note 5	t_{DA}	—	—	200+Period	ns	—	
Output Enable Time Note 6	t_{EN}	—	—	1	μs	—	
OE/STDBY/SSEN Pull-up Resistor Note 7	—	—	300	—	k Ω	If configured	
Output Logic Levels	V_{OH}	$0.8 \times V_{DD}$	—	—	V	Output Logic High, $I = 3$ mA, Std. Drive	
						Output Logic High, $I = 6$ mA, High Drive	
	V_{OL}	—	—	—	$0.2 \times V_{DD}$	V	Output Logic Low, $I = -3$ mA, Std. Drive
							Output Logic Low, $I = -6$ mA, High Drive

- Note 1:** Pin 4 V_{DD} should be filtered with 0.1 μf capacitor.
- 2:** Not including current through pull-up resistor on EN pin (if configured). Higher standby current seen at $>3.3V V_{DD}$.
- 3:** Includes frequency variations due to initial tolerance, temperature, and power supply voltage.
- 4:** Input waveform must be monotonic with rise/fall time < 10 ms
- 5:** Output Disable time takes up to one period of the output waveform + 200 ns.
- 6:** For parts configured with OE, not Standby.
- 7:** Output is enabled if pad is floated or not connected.
- 8:** Time to reach 90% of target V_{DD} . Power ramp rise must be monotonic.

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DSC63XX ELECTRICAL CHARACTERISTICS (CONTINUED)

Electrical Characteristics: Unless otherwise indicated, $V_{DD} = 1.8V -5\%$ to $3.3V +10\%$, $T_A = -40^{\circ}C$ to $85^{\circ}C$.								
Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions		
Output Transition Time Rise Time/Fall Time	t_{RX}/t_{FX}	—	1	1.5	ns	DSC63x2 High Drive, 20% to 80% $C_L = 15$ pF	$V_{DD} = 1.8V$	
		—	0.5	1.0	ns		$V_{DD} = 2.5V/3.3V$	
	t_{RY}/t_{FY}	—	1.2	2.0	ns	DSC63x1 Std Drive, 20% to 80% $C_L = 10$ pF	$V_{DD} = 1.8V$	
		—	1	1.6	ns		$V_{DD} = 2.5V/3.3V$	
Frequency	f_0	1	—	100	MHz	—		
Output Duty Cycle	SYM	45	—	55	%	—		
Period Jitter, RMS	J_{PER}	—	14	—	ps_{RMS}	$F_{OUT} = 27$ MHz	$V_{DD} = 1.8V$	
		—	11	—			$V_{DD} = 2.5V/3.3V$	
Cycle-to-Cycle Jitter (peak)	J_{Cy-Cy}	—	75	—	ps	$F_{OUT} = 27$ MHz	$V_{DD} = 1.8V$	
		—	53	—			$V_{DD} = 2.5V/3.3V$	
Spread Spectrum Modulation Frequency	f_{SS}	—	33	—	kHz	—		
Spread Spectrum Modulation and Type	—	—	± 0.25	—	%	Center Spread		
		—	± 0.5	—				
		—	± 1	—				
		—	± 1.5	—				
		—	± 2	—				
		—	± 2.5	—				
	—	—	—	-0.25	—	%	Down Spread	
			—	-0.5	—			
			—	-1	—			
			—	-1.5	—			
			—	-2	—			
			—	-3	—			

- Note 1:** Pin 4 V_{DD} should be filtered with 0.1 μ F capacitor.
- Note 2:** Not including current through pull-up resistor on EN pin (if configured). Higher standby current seen at $>3.3V V_{DD}$.
- Note 3:** Includes frequency variations due to initial tolerance, temperature, and power supply voltage.
- Note 4:** Input waveform must be monotonic with rise/fall time < 10 ms
- Note 5:** Output Disable time takes up to one period of the output waveform + 200 ns.
- Note 6:** For parts configured with OE, not Standby.
- Note 7:** Output is enabled if pad is floated or not connected.
- Note 8:** Time to reach 90% of target V_{DD} . Power ramp rise must be monotonic.

TEMPERATURE SPECIFICATIONS (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Junction Operating Temperature	T_J	—	—	+150	°C	—
Ambient Operating Temperature	T_A	-40	—	+85	°C	Industrial
Ambient Operating Temperature	T_A	-20	—	+70	°C	Extended Commercial
Storage Ambient Temperature Range	T_A	-55	—	+150	°C	—
Soldering Temperature	T_S	—	+260	—	°C	40 sec. max.

Note 1: The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction to air (i.e., T_A , T_J , θ_{JA}). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +150°C rating. Sustained junction temperatures above +150°C can impact the device reliability.

DSC63XX

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 2-1](#).

TABLE 2-1: DSC63XX PIN FUNCTION TABLE (OUTPUT FREQUENCY ≥ 1 MHZ)

Pin Number	Pin Name	Pin Type	Description
1	OE	I	Output Enable: H = Specified Frequency Output, Note 1 , Note 2 L = Output is high impedance
	STDBY		Standby: H = Specified Frequency Output, Note 1 , Note 2 L = Output is high impedance. Device is in low power mode, supply current is at I_{STBY}
	SSEN		Spread Spectrum Enable: H = Enabled L = Disabled, Note 1
2	GND	Power	Power supply ground
3	Output	O	Oscillator clock output
4	VDD	Power	Power supply, Note 3

Note 1: DSC630x/1x/3x has 300 k Ω internal pull-up resistor on pin 1. DSC634x/5x/7x has no internal pull-up resistor on pin 1 and needs an external pull-up or to be driven by other chip.

2: If pin 1 is configured as either OE or STDBY, then the Spread Spectrum is enabled by default.

3: Bypass with 0.1 μ F capacitor placed as close to V_{DD} pin as possible.

2.1 Output Buffer Options

The DSC63xx family is available in multiple output driver configurations.

The standard-drive (63x1) and high-drive (63x2) deliver respective output currents of greater than 3 mA and 6 mA at 20%/80% of the supply voltage. For heavy loads of 15 pF or higher, the high-drive option is recommended.

3.0 DIAGRAMS

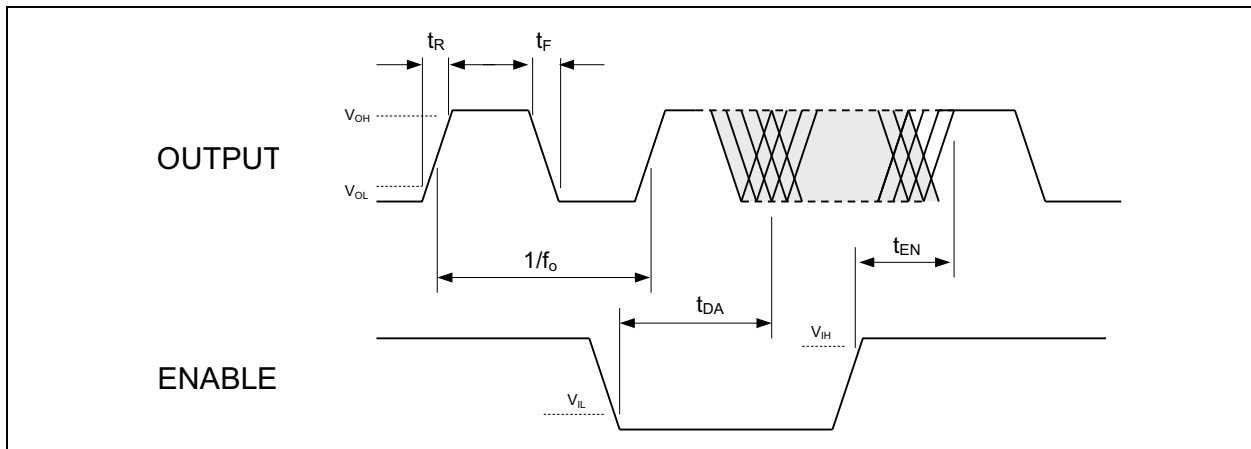


FIGURE 3-1: Output Waveform.

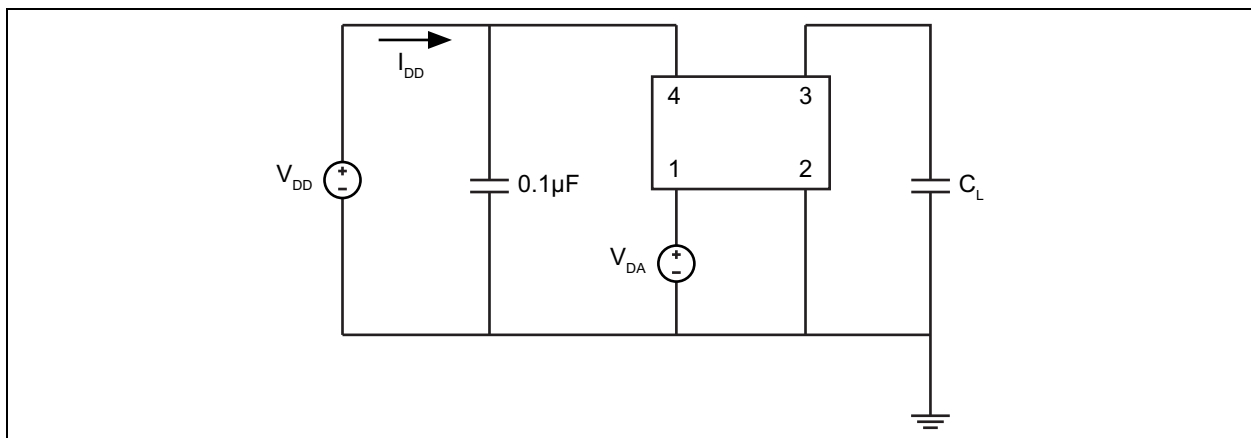


FIGURE 3-2: Test Circuit.

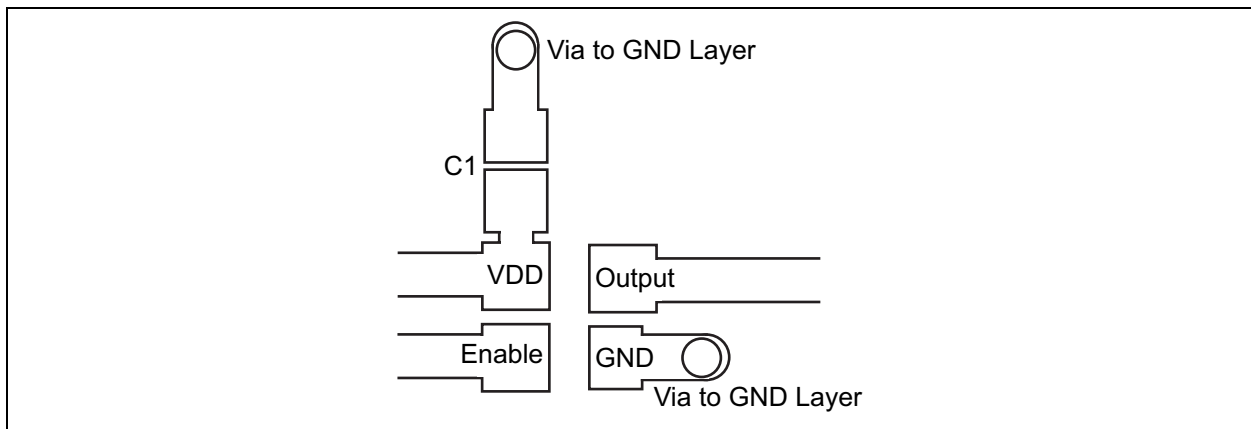


FIGURE 3-3: Recommended Board Layout.

DSC63XX

4.0 SPREAD SPECTRUM

Spread spectrum is a slow modulation of the clock frequency over time. The PLL inside the MEMS oscillator is modulated with a triangular wave at 33 kHz. With such a slow modulation, the peak spectral energy of both the fundamental and all the harmonics is spread over a wider frequency range and such an energy is significantly reduced, thus providing an EMI reduction. The triangular wave is chosen because of its flat spectral density.

The DSC63xx MEMS oscillator family offers several modulation options: the spreading is either center spread or down spread with respect to the clock frequency. Center spreading ranges from $\pm 0.25\%$ to $\pm 2.5\%$, while down spreading ranges from -0.25% to -3% .

If the clock frequency is 100 MHz and center spreading with $\pm 1\%$ is chosen, the output clock will range from 99 MHz to 101 MHz. If down spreading with -2% is chosen, the output clock will range from 98 MHz to 100 MHz.

Figure 4-1 and Figure 4-2 show a spectrum example of the DSC6331 with a 33.333 MHz clock, modulated with central spread of $\pm 1\%$.

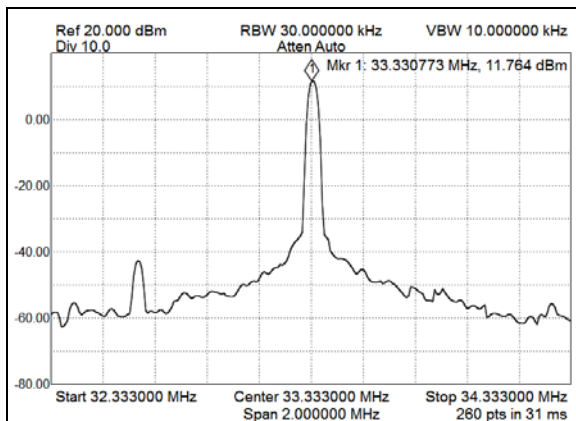


FIGURE 4-1: DSC6331 Spectrum at 33.333 MHz with Modulation Turned Off.

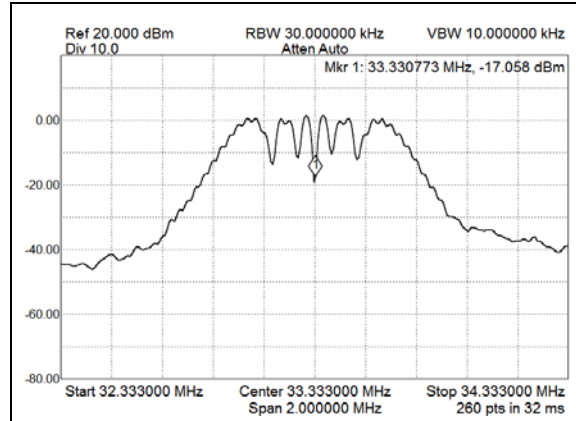


FIGURE 4-2: DSC6331 Spectrum at 33.333 MHz with Modulation Turned On.

It is noticeable that the spread spectrum provides a reduction of about 10 dB from the peak power. Such a reduction may also be estimated by the following equation:

EQUATION 4-1:

$$EMI \text{ Reduction} = 10 \times \text{Log}_{10}(|S| \times fc \div RBW)$$

Where:

- S Peak-to-peak spread percentage (0.01, this example).
- fc Carrier frequency (33.333 Mhz, this example).
- RBW Resolution bandwidth of the spectrum analyzer (30 kHz, this example).

The theoretical calculation for this example provides 10.45 dB, which is consistent with the measurement.

Similarly to the fundamental frequency, all the harmonics are spread and attenuated in similar fashion. Figure 4-3 shows how the DSC6331 fundamental at 33.333 MHz and its odd harmonics are attenuated when various types of modulations are selected. For picture clarity, only the center spread options are shown. However, down spread with corresponding percentage provides the same level of harmonic attenuation (e.g. central spread of $\pm 1\%$ provides the same harmonics attenuation of down spread with -2%).

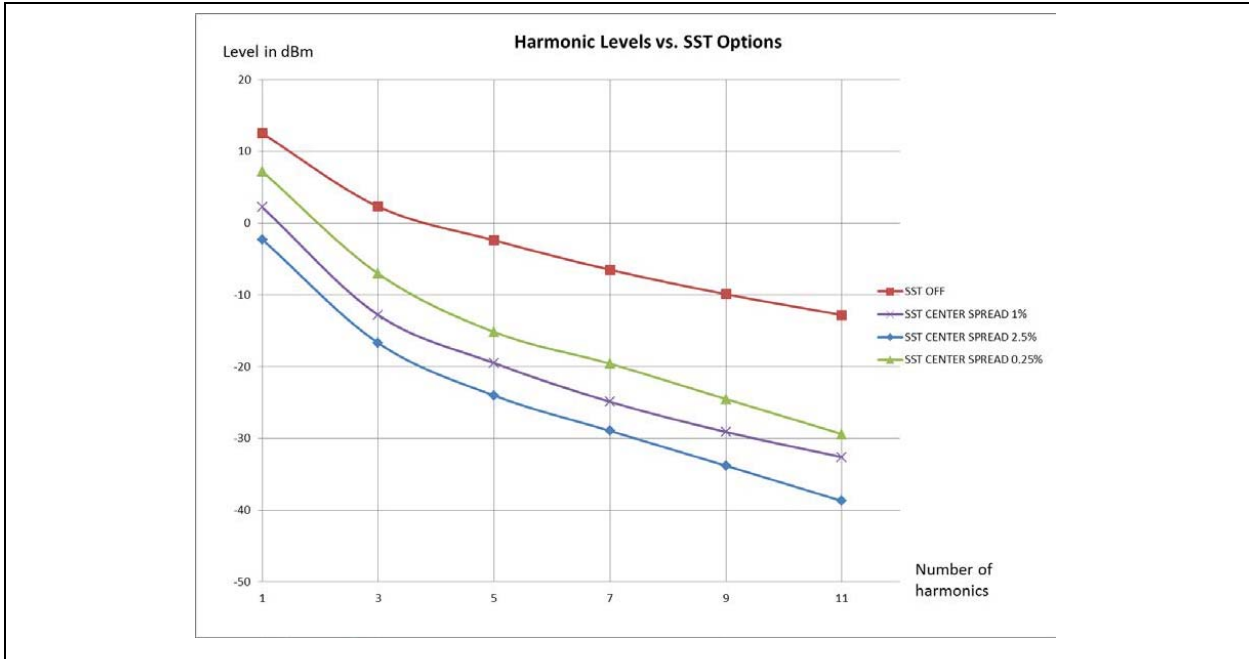


FIGURE 4-3: DSC6331 Harmonic Levels with Various Spread Spectrum Options.

DSC63XX

5.0 SOLDER REFLOW

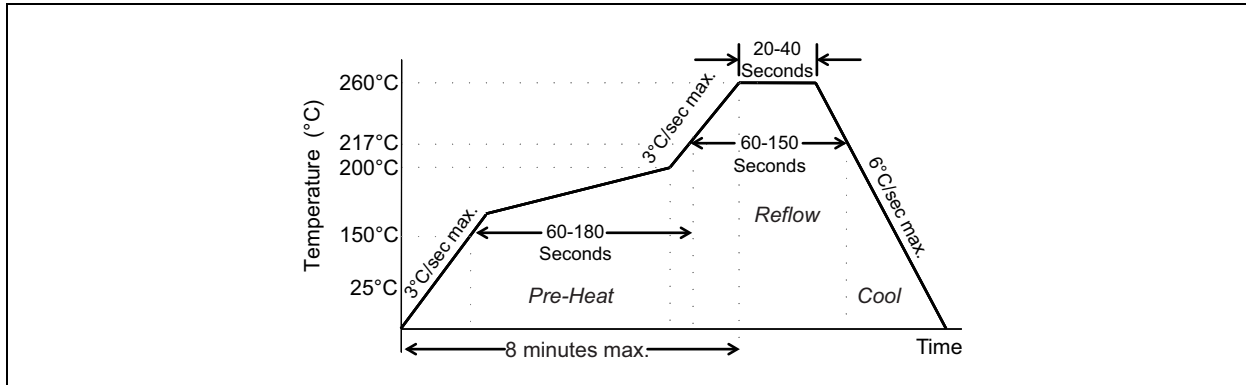


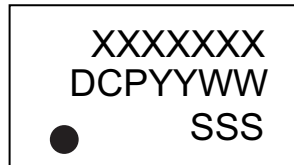
FIGURE 5-1: Solder Reflow Profile.

MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/sec max.
Pre-heat Time 150°C to 200°C	60 to 180 sec.
Time maintained above 217°C	60 to 150 sec.
Peak Temperature	255°C to 260°C
Time within 5°C of actual Peak	20 to 40 sec.
Ramp-Down Rate	6°C/sec. max.
Time 25°C to Peak Temperature	8 minutes max.

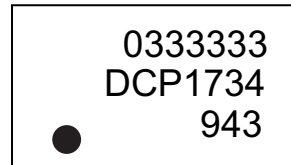
6.0 PACKAGING INFORMATION

6.1 Package Marking Information

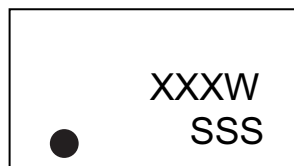
4-Lead DFN*



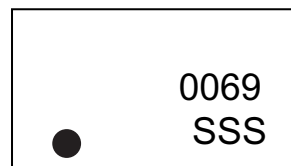
Example



4-Lead VFLGA*



Example



Legend:	XX...X	Product code, customer-specific information, or frequency in MHz without printed decimal point
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	(e3)N	Alphanumeric traceability code
	*	Pb-free JEDEC® designator for Matte Tin (Sn) (e3)
		This package is Pb-free. The Pb-free JEDEC designator () can be found on the outer packaging for this package.
	•, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

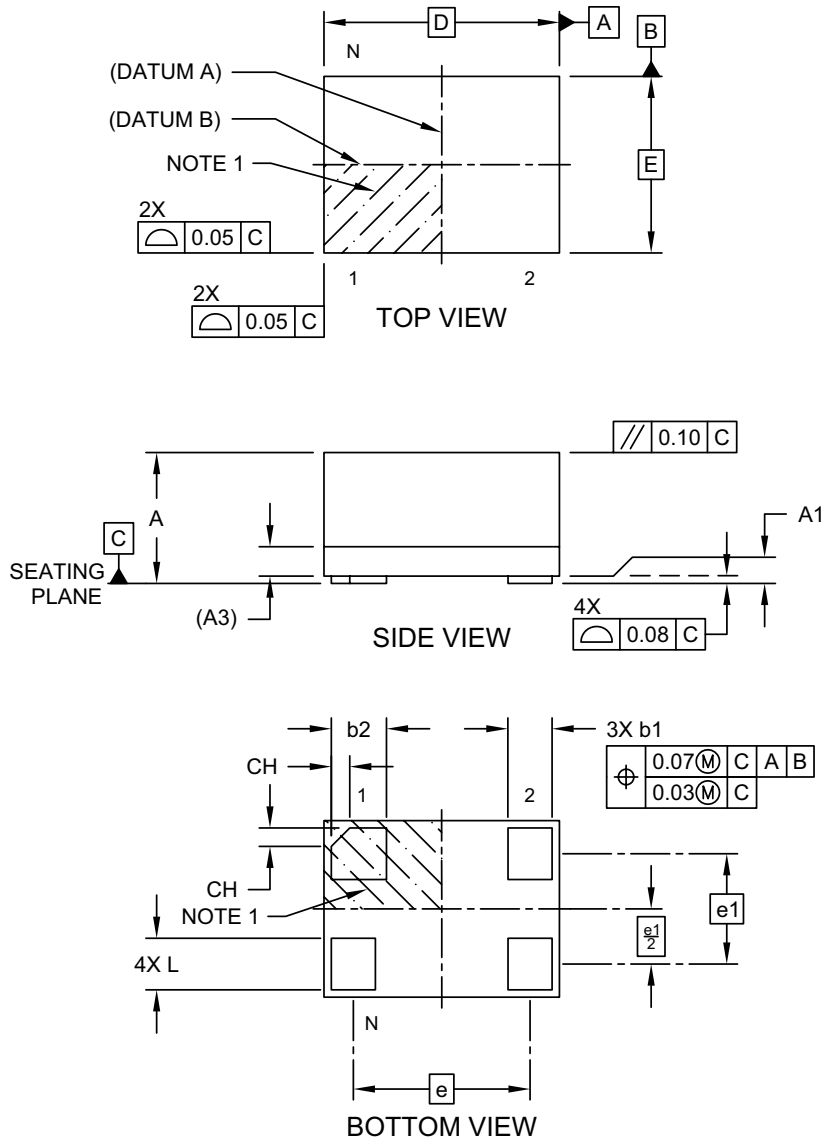
Underbar () and/or Overbar () symbol may not be to scale.

DSC63XX

4-Lead VFLGA 1.6 mm x 1.2 mm Package Outline

4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

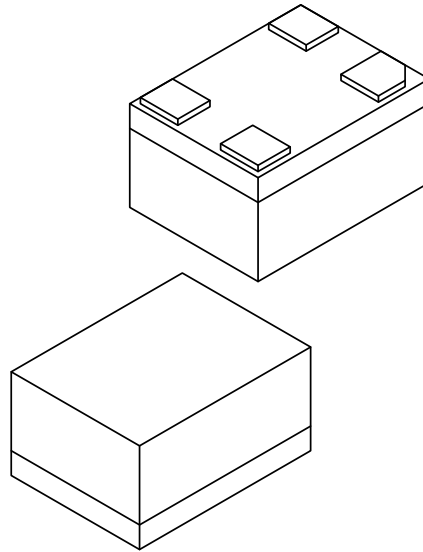


Microchip Technology Drawing C04-1199A Sheet 1 of 2

4-Lead VFLGA 1.6 mm x 1.2 mm Package Outline

4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N	4		
Terminal Pitch	e	1.20 BSC		
Terminal Pitch	e1	0.75 BSC		
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3	0.20 REF		
Overall Length	D	1.60 BSC		
Overall Width	E	1.20 BSC		
Terminal Width	b1	0.25	0.30	0.35
Terminal Width	b2	0.325	0.375	0.425
Terminal Length	L	0.30	0.35	0.40
Terminal 1 Index Chamfer	CH	-	0.125	-

Notes:

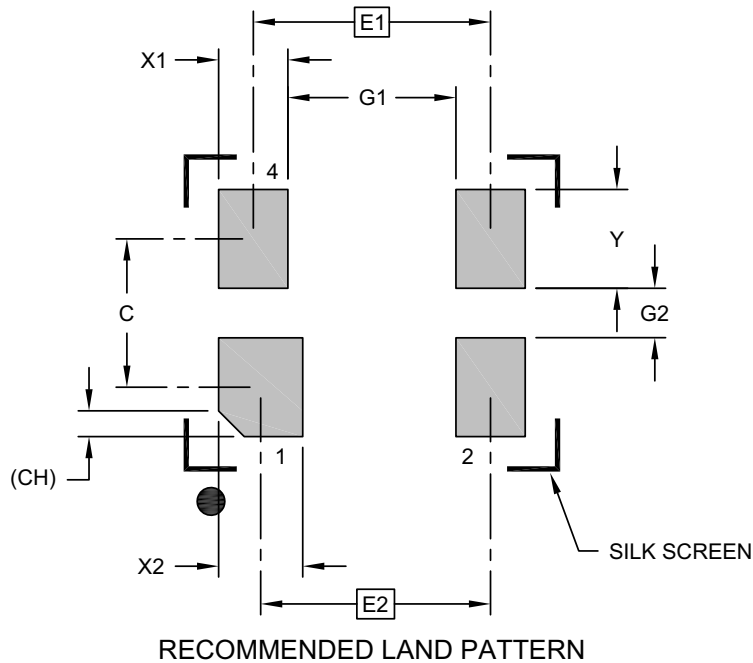
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Package is saw singulated
- Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1199A Sheet 2 of 2

4-Lead VFLGA 1.6 mm x 1.2 mm Recommended Land Pattern

4-Lead Very Thin Fine Pitch Land Grid Array (ARA) - 1.6x1.2 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E1	1.20 BSC		
Contact Pitch	E2	1.16 BSC		
Contact Spacing	C	0.75		
Contact Width (X3)	X1			0.35
Contact Width	X2			0.43
Contact Pad Length (X6)	Y			0.50
Space Between Contacts (X4)	G1	0.85		
Space Between Contacts (X3)	G2	0.25		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

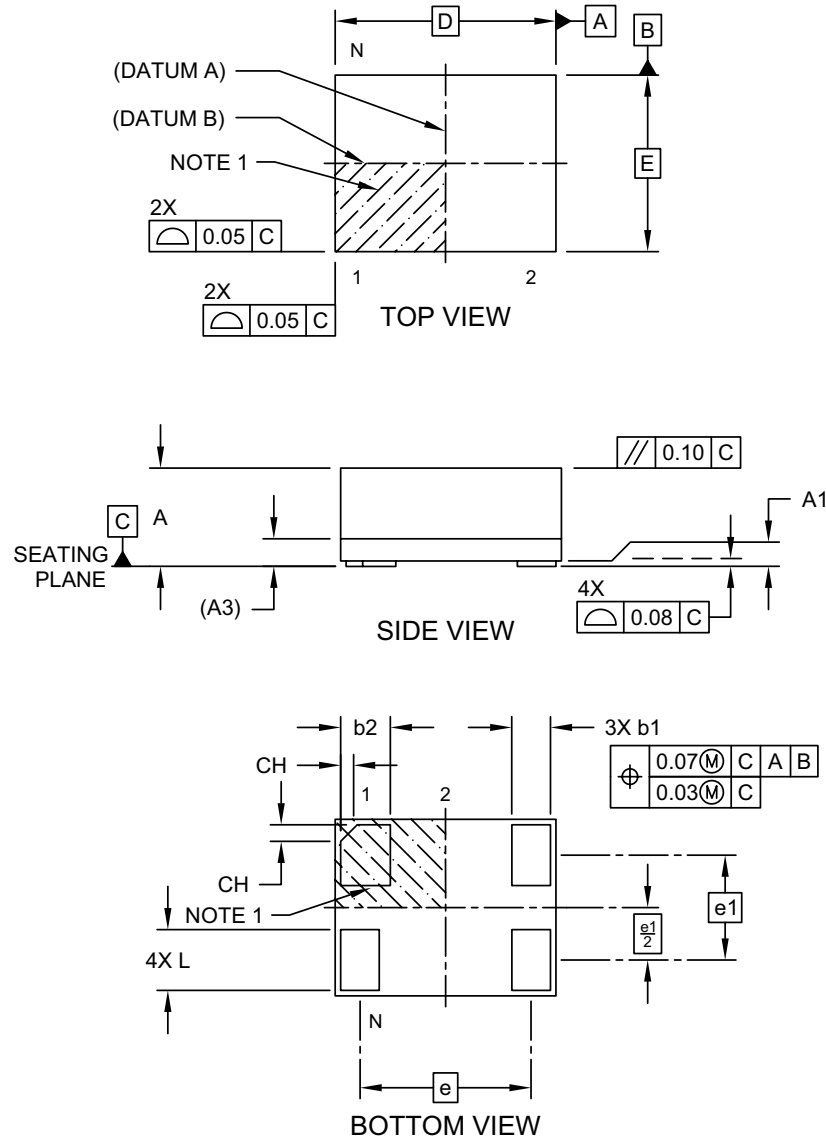
1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3199A

4-Lead VLGA 2.0 mm x 1.6 mm Package Outline

4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



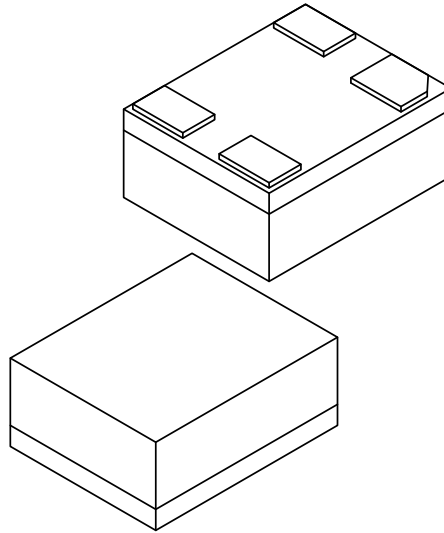
Microchip Technology Drawing C04-1200A Sheet 1 of 2

DSC63XX

4-Lead VLGA 2.0 mm x 1.6 mm Package Outline (Continued)

4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N	6		
Terminal Pitch	e	1.55 BSC		
Terminal Pitch	e1	0.95 BSC		
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3	0.20 REF		
Overall Length	D	2.00 BSC		
Overall Width	E	1.60 BSC		
Terminal Width	b1	0.30	0.35	0.40
Terminal Width	b2	0.40	0.45	0.50
Terminal Length	L	0.50	0.55	0.60
Terminal 1 Index Chamfer	CH	-	0.15	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

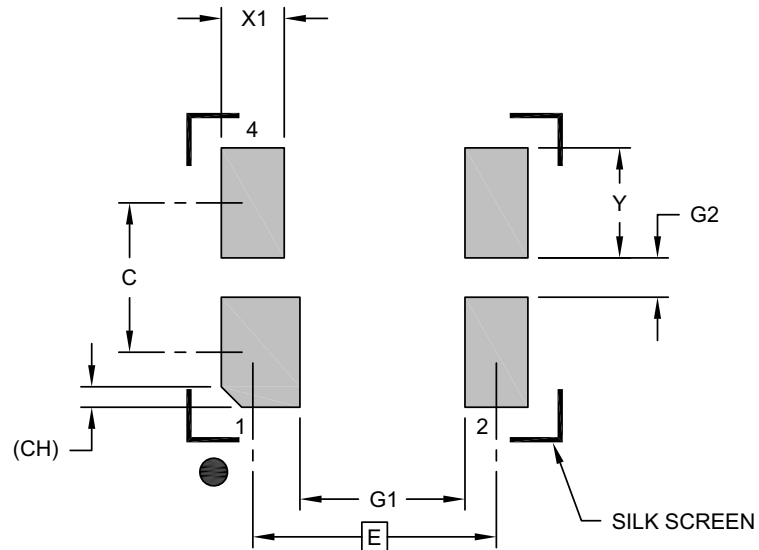
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1200A Sheet 2 of 2

4-Lead VFLGA 2.0 mm x 1.6 mm Package Outline

4-Lead Very Thin Fine Pitch Land Grid Array (ASA) - 2.0x1.6 mm Body [VFLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.55 BSC		
Contact Spacing	C	0.95		
Contact Width (X4)	X1	0.50		
Contact Width (X2)	X2	0.40		
Contact Pad Length (X6)	Y	0.70		
Space Between Contacts (X4)	G1	1.05		
Space Between Contacts (X3)	G2	0.25		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

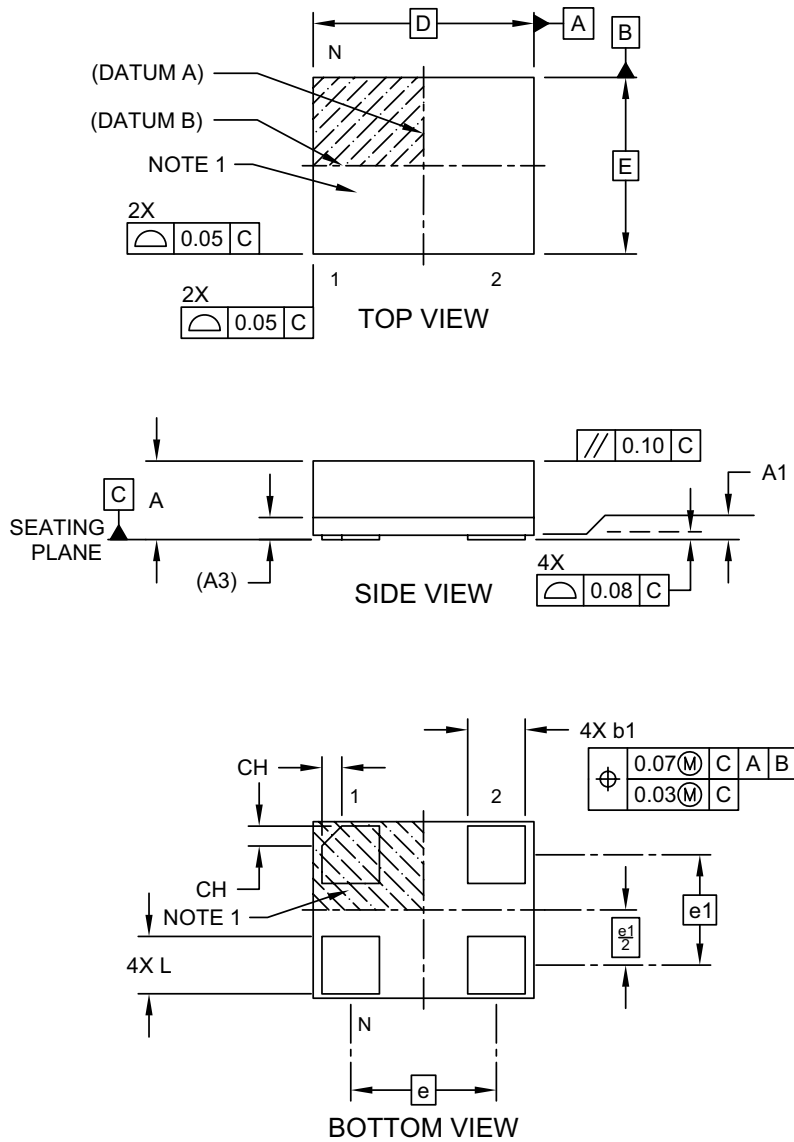
Microchip Technology Drawing C04-3200A

DSC63XX

4-Lead VLGA 2.5 mm x 2.0 mm Package Outline

4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

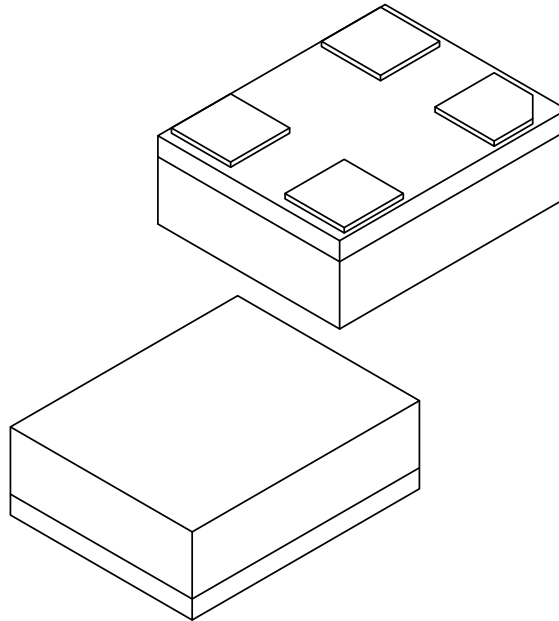


Microchip Technology Drawing C04-1202A Sheet 1 of 2

4-Lead VLGA 2.5 mm x 2.0 mm Package Outline (Continued)

4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Terminals	N	4		
Terminal Pitch	e	1.65 BSC		
Terminal Pitch	e1	1.25 BSC		
Overall Height	A	0.79	0.84	0.89
Standoff	A1	0.00	0.02	0.05
Substrate Thickness (with Terminals)	A3	0.20 REF		
Overall Length	D	2.50 BSC		
Overall Width	E	2.00 BSC		
Terminal Width	b1	0.60	0.65	0.70
Terminal Length	L	0.60	0.65	0.70
Terminal 1 Index Chamfer	CH	-	0.225	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M
 - BSC: Basic Dimension. Theoretically exact value shown without tolerances.
 - REF: Reference Dimension, usually without tolerance, for information purposes only.

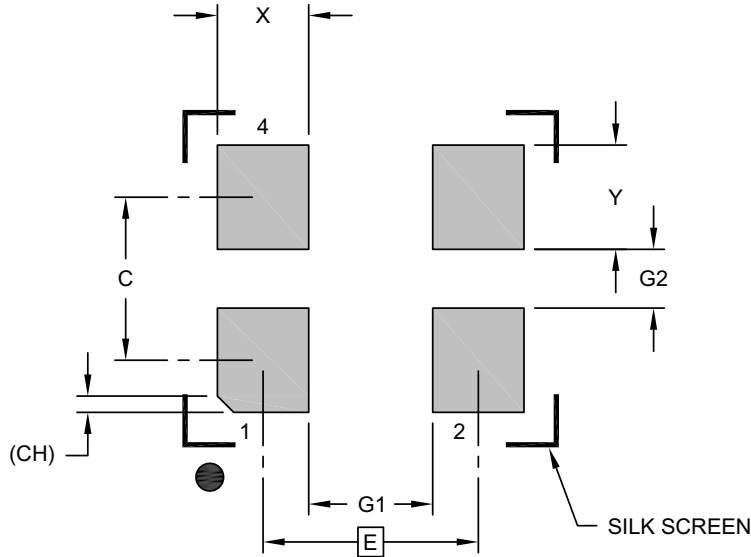
Microchip Technology Drawing C04-1202A Sheet 2 of 2

DSC63XX

4-Lead VLGA 2.5 mm x 2.0 mm Recommended Land Pattern

4-Lead Very Thin Land Grid Array (AUA) - 2.5x2.0 mm Body [VLGA]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Contact Pitch	E	1.65 BSC		
Contact Spacing	C		1.25	
Contact Width (X4)	X			0.70
Contact Pad Length (X6)	Y			0.80
Space Between Contacts (X4)	G1	0.95		
Space Between Contacts (X3)	G2	0.45		
Contact 1 Index Chamfer	CH	0.13 X 45° REF		

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3202A

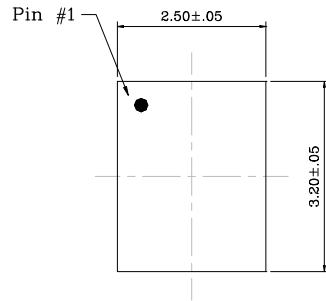
4-Lead CDFN 3.2 mm x 2.5 mm Package Outline and Recommended Land Pattern

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

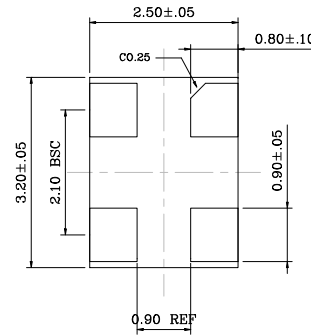
TITLE

4 LEAD CDFN 3.2x2.5mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

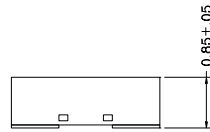
DRAWING #	UNIT
CDFN3225-4LD-PL-1	MM



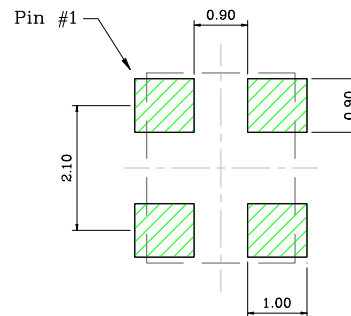
Top View



Bottom View



Side View



Recommended Land Pattern

NOTE:

- Green shaded rectangles in Recommended Land Pattern are solder stencil opening.

DSC63XX

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (September 2017)

- Initial release of DSC63xx Microchip data sheet DS20005808A.

DSC63XX

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART NO.	X	X	X	X	X	X	X	X	X - XXX.XXXX	X
Device	Pin 1 Definition	Output Drive Strength	Package	Temp. Range	Freq. Stability	Spread Spectrum	Revision	Frequency	Tape and Reel	
Device:	DSC63xx: Ultra-Low Power MEMS Oscillator									
Pin Definition:	Selection	Pin 1	Internal Pull Register							
	0	OE	Pull-up							
	1	STDBY	Pull-up							
	3	SSEN	Pull-up							
	4	OE	None							
	5	STDBY	None							
	7	SSEN	None							
Output Drive Strength:	1	Standard								
	2	High								
Packages:	C	= 4-Lead 3.2 mm x 2.5 mm DFN								
	J	= 4-Lead 2.5 mm x 2.0 mm VFLGA								
	M	= 4-Lead 2.0 mm x 1.6 mm VFLGA								
	H	= 4-Lead 1.6 mm x 1.2 mm VFLGA								
Temperature Range:	E	= -20°C to +70°C (Extended Commercial)								
	I	= -40°C to +85°C (Industrial)								
Frequency Stability:	1	= ± 50 ppm								
	2	= ± 25 ppm								
Spread Spectrum:	A	= ±0.25%								
	B	= ±0.5%								
	C	= ±1.0%								
	D	= ±1.5%								
	E	= ±2.0%								
	F	= ±2.5%								
	G	= -0.25%								
	H	= -0.5%								
	I	= -1.0%								
	J	= -1.5%								
	K	= -2.0%								
	L	= -3.0%								
	M	= Custom								
Revision:	A	= Revision A								
Frequency:	xxx.xxxx	= User-Defined Frequency between 001.0000 MHz and 100.0000 MHz								
Tape and Reel:	<blank>	= 110/Tube								
	T	= 1,000/Reel								

Examples:

a) DSC6332JI2AA-100.0000:

Ultra-Low Power MEMS Oscillator, Pin1 = Spread Spectrum Enable with Internal Pull-Up, High Drive Strength, 4-Lead 2.5 mm x 2.0 mm VFLGA, Industrial Temperature, ±25 ppm Stability, ±0.25% Spread Spectrum, Revision A, 100 MHz Frequency, 110/Tube

b) DSC6301HE1HA-016.0000T:

Ultra-Low Power MEMS Oscillator, Pin1 = OE with Internal Pull-Up, Standard Drive Strength, 4-Lead 1.6 mm x 1.2 mm VFLGA, Extended Commercial Temp., ±50 ppm Stability, -0.5% Spread Spectrum Revision A, 16 MHz Frequency, 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

Note 1: Please visit Microchip ClockWorks® Configurator Website to configure the part number for customized frequency. <http://clockworks.microchip.com/timing/>.

DSC63XX

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
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- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

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Corporate Office
2355 West Chandler Blvd.
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