DSC63XX

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

Features

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

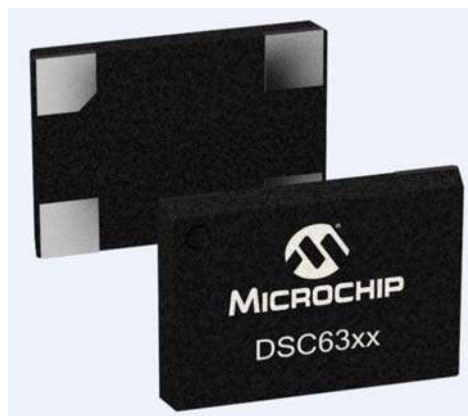
Applications

- 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 ±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.



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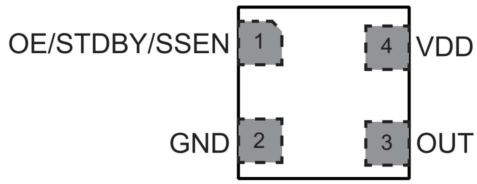
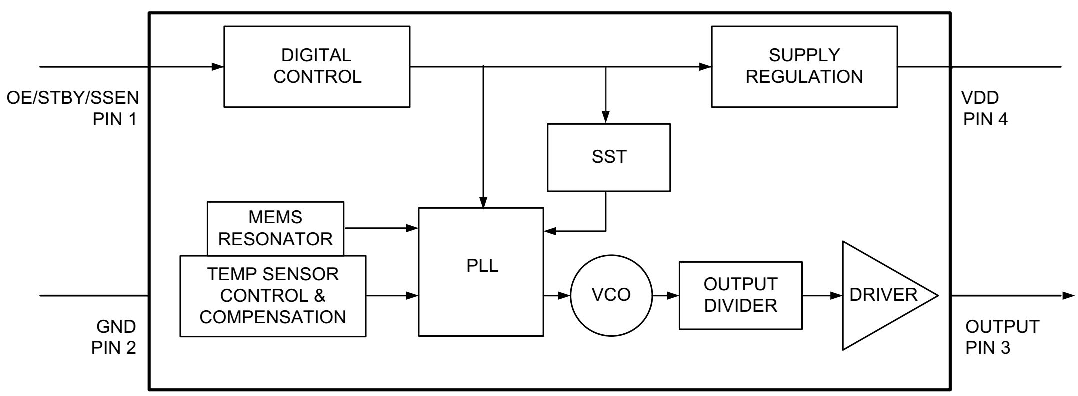
Package Types

DSC63xx
3.2 mm x 2.5 mm DFN
2.5 mm x 2.0 mm LGA
2.0 mm x 1.6 mm LGA
1.6 mm x 1.2 mm LGA
(Top View)



Block Diagram

DSC63xx



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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°C to 85°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°C
		—	—	±1		Per year after first year
Startup Time	t_{SU}	—	—	1.3	ms	From 90% V_{DD} to valid clock output, T = 25°C
Input Logic Levels Note 4	V_{IH}	0.7 x V_{DD}	—	—	V	Input Logic High
	V_{IL}	—	—	0.3 x 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	—	kΩ	If configured
Output Logic Levels	V_{OH}	0.8 x V_{DD}	—	—	V	Output Logic High, I = 3 mA, Std. Drive
						Output Logic High, I = 6 mA, High Drive
	V_{OL}	—	—	0.2 x 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°C to 85°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 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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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.

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 kΩ 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 µF 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.

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3.0 DIAGRAMS

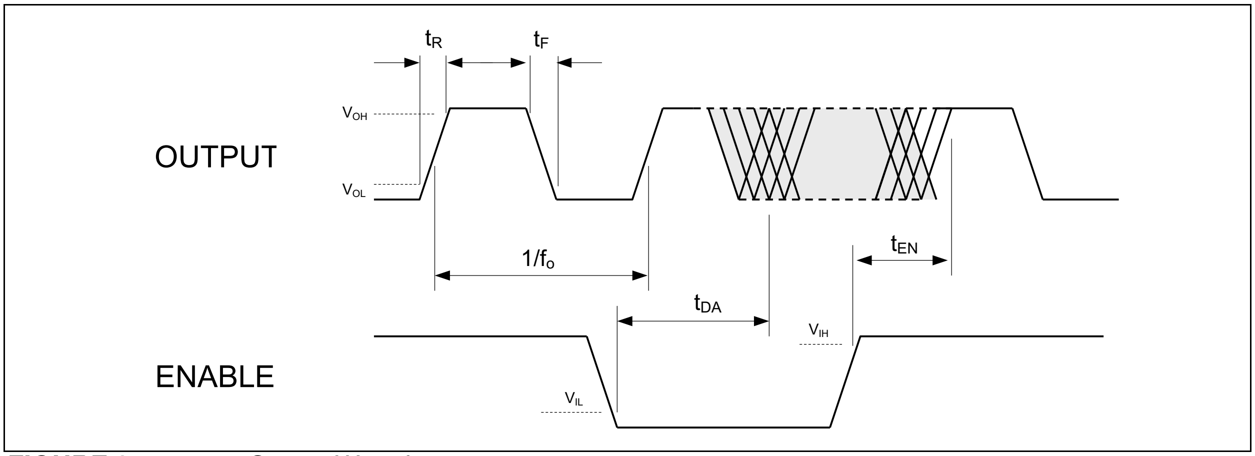

FIGURE 3-1: *Output Waveform.*

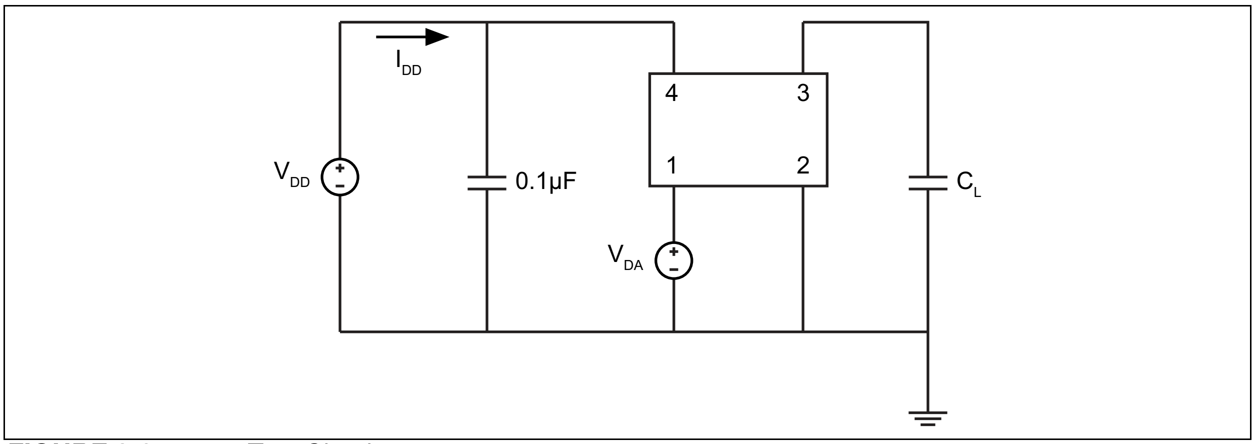

FIGURE 3-2: *Test Circuit.*

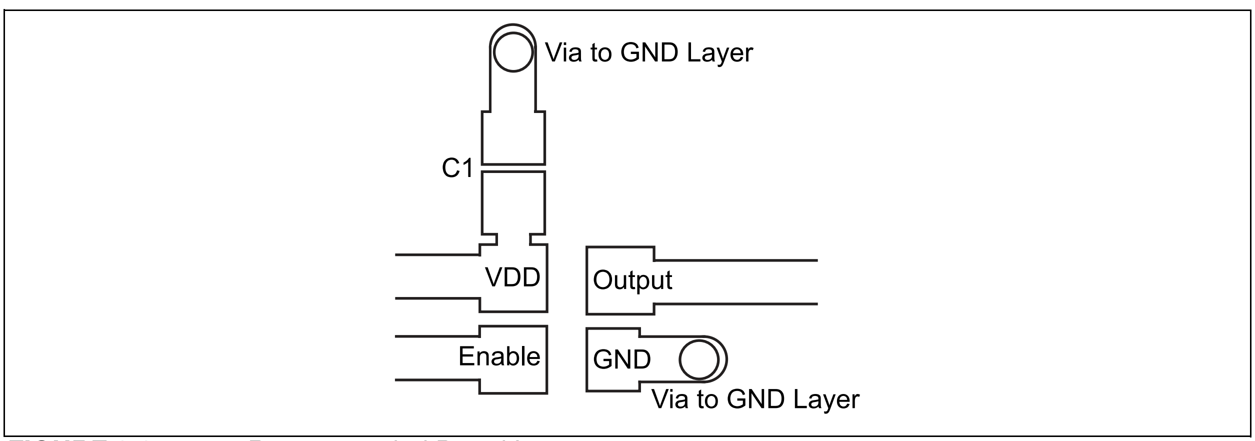

FIGURE 3-3: *Recommended Board Layout.*

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 ±0.25% to ±2.5%, while down spreading ranges from –0.25% to –3%.

If the clock frequency is 100 MHz and center spreading with ±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 ±1%.

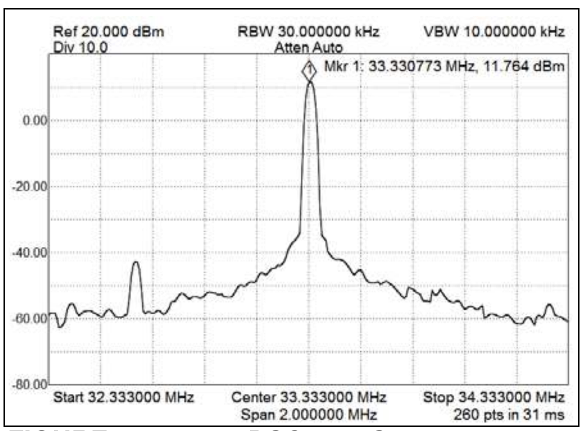

FIGURE 4-1: *DSC6331 Spectrum at 33.333 MHz with Modulation Turned Off.*

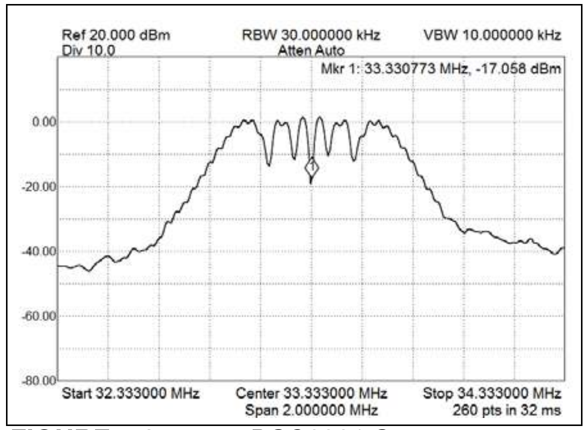

FIGURE 4-2: *DSC6331 Spectrum at 33.333 MHz with Modulation Turned On.*

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:

$$EMI \text{ Reduction} = 10 \times Log10(|S| \times fc \div RBW)$$

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 ±1% provides the same harmonics attenuation of down spread with –2%).

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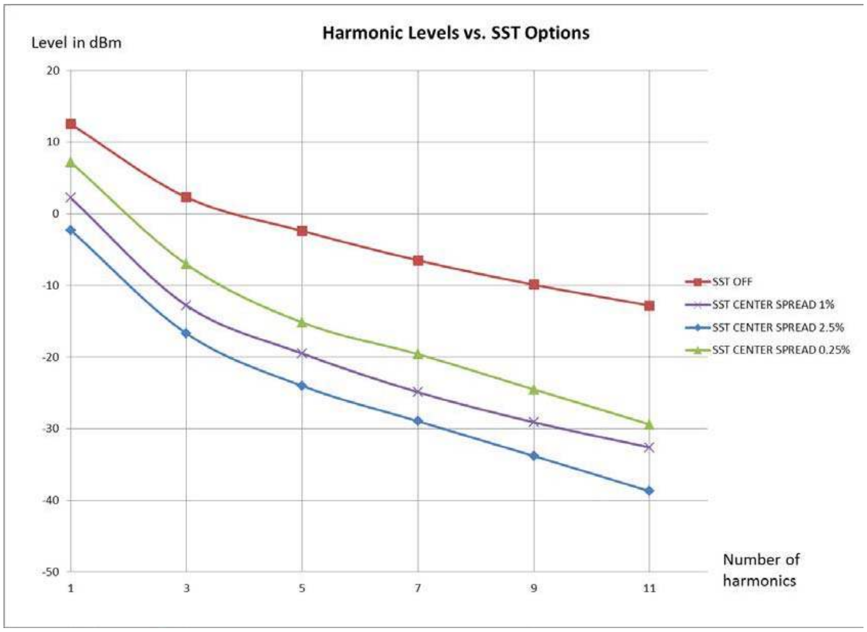

FIGURE 4-3: *DSC6331 Harmonic Levels with Various Spread Spectrum Options.*

5.0 SOLDER REFLOW

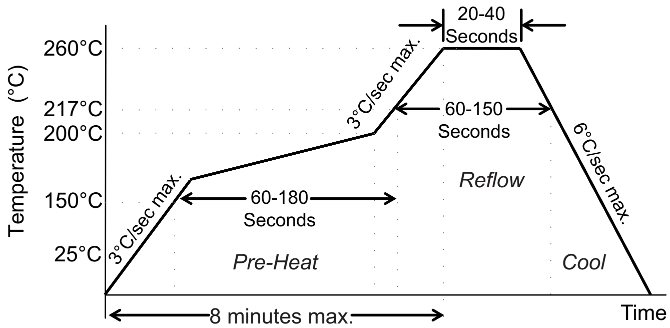

FIGURE 5-1: Solder Reflow Profile.

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.

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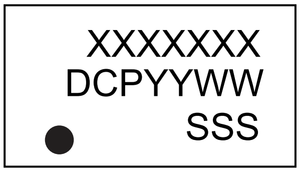
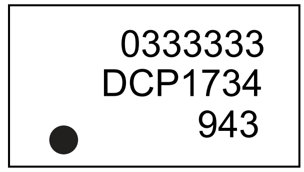
6.0 PACKAGING INFORMATION

6.1 Package Marking Information

4-Lead DFN*

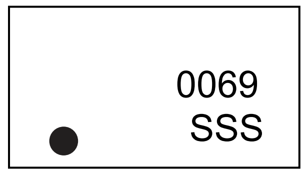


Example



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 ((e3)) 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.

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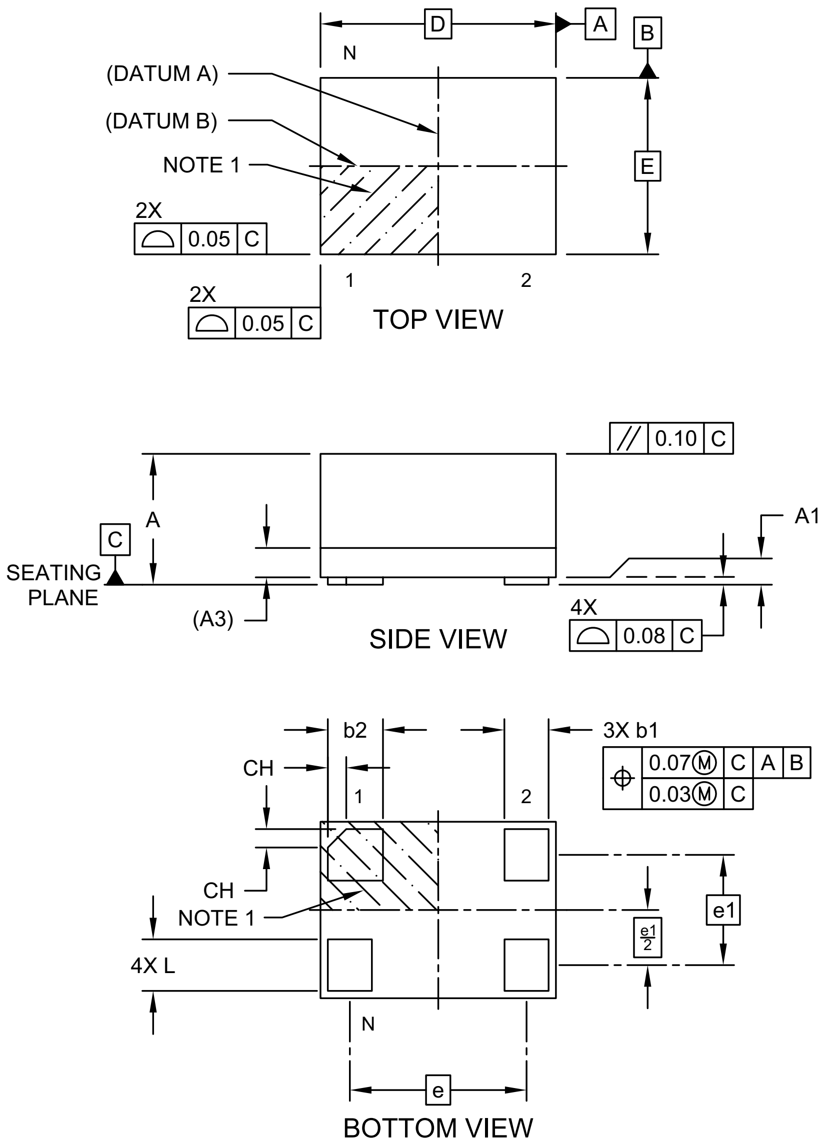
4-Lead VFLGA 1.6 mm x 1.2 mm Package Outline

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



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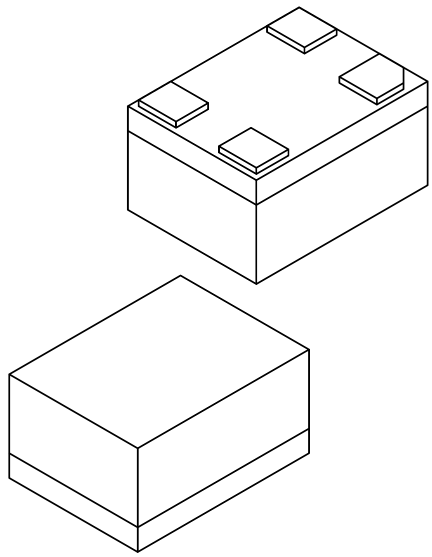
4-Lead VFLGA 1.6 mm x 1.2 mm Package Outline

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



	Units	MILLIMETERS		
	Dimension Limits	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:

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.

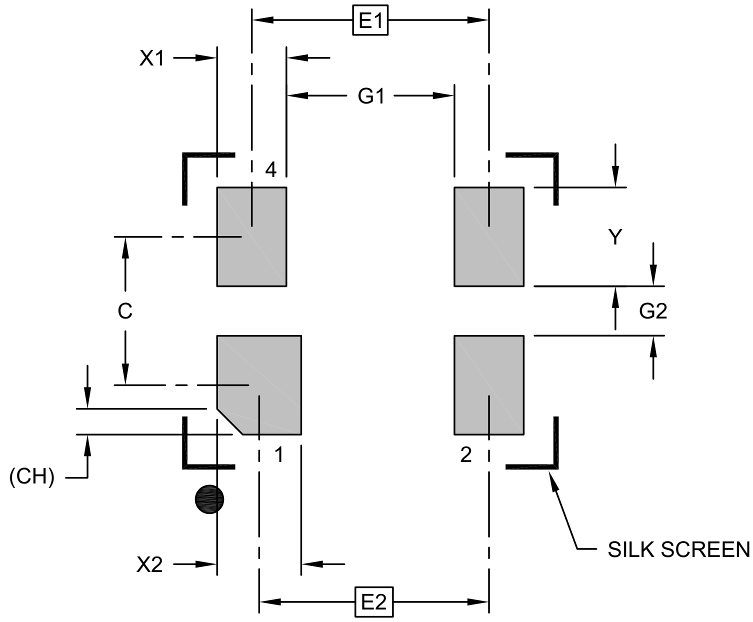
   REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1199A 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



RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		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.

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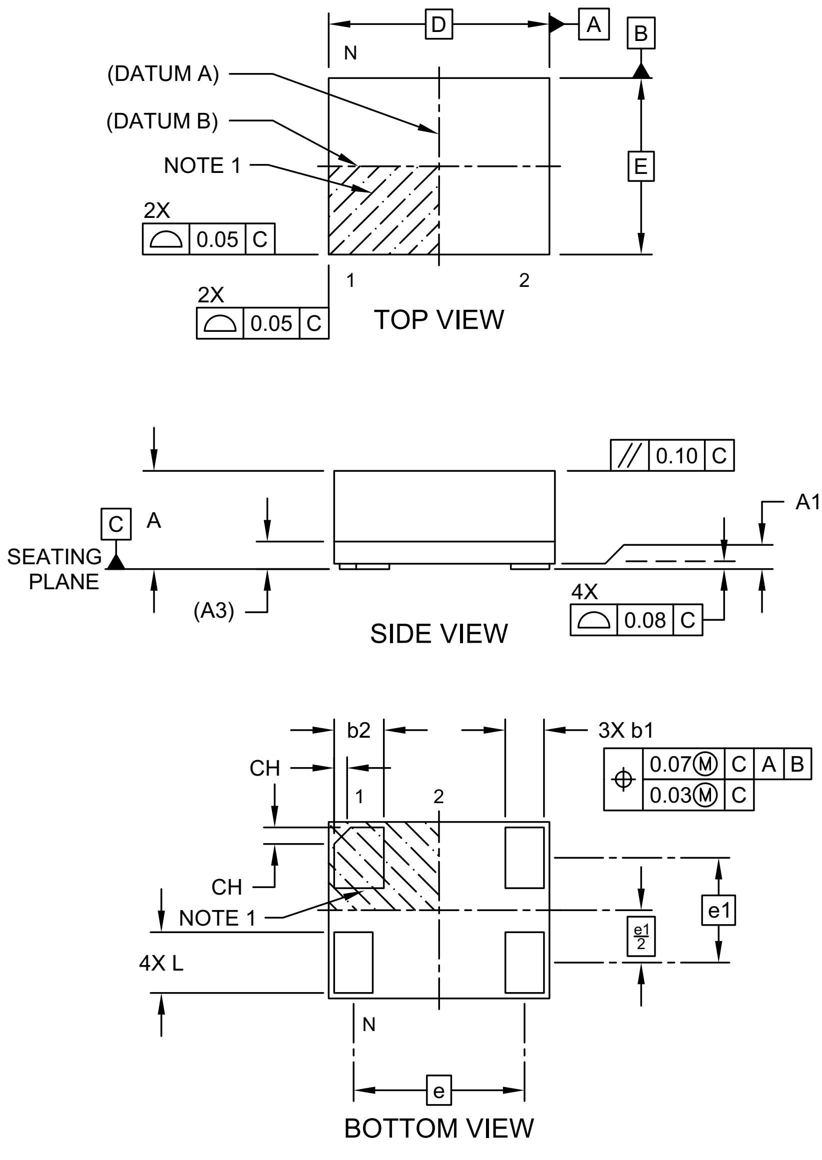
4-Lead VLGA 2.0 mm x 1.6 mm Package Outline

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



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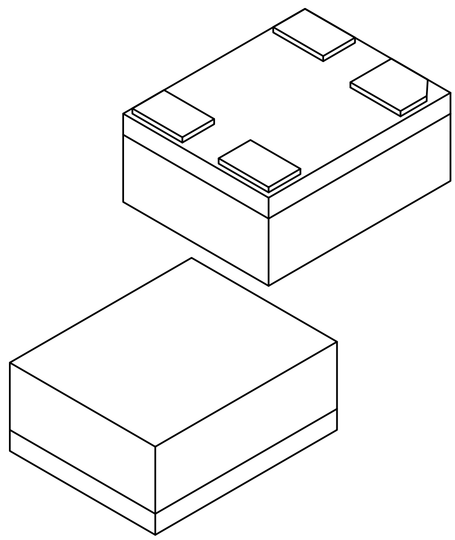
4-Lead VLGA 2.0 mm x 1.6 mm Package Outline (Continued)

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



Units		MILLIMETERS		
Dimension Limits		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.

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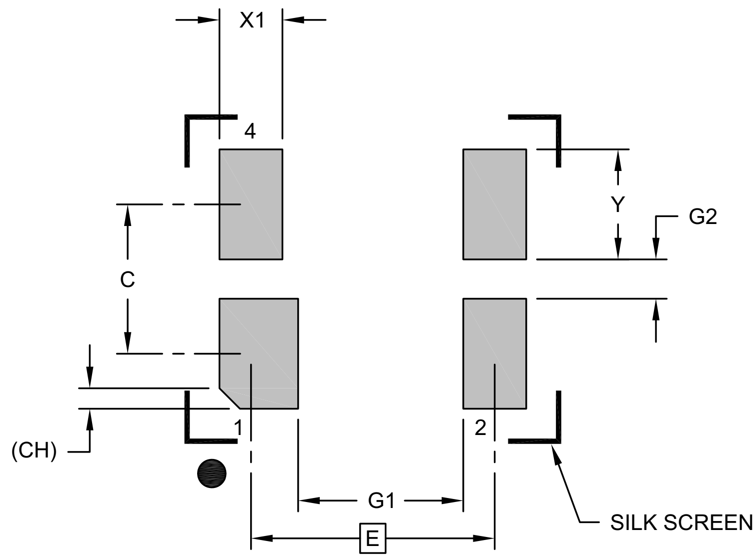
4-Lead VFLGA 2.0 mm x 1.6 mm Package Outline

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

		Units	MILLIMETERS		
		Dimension Limits	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.

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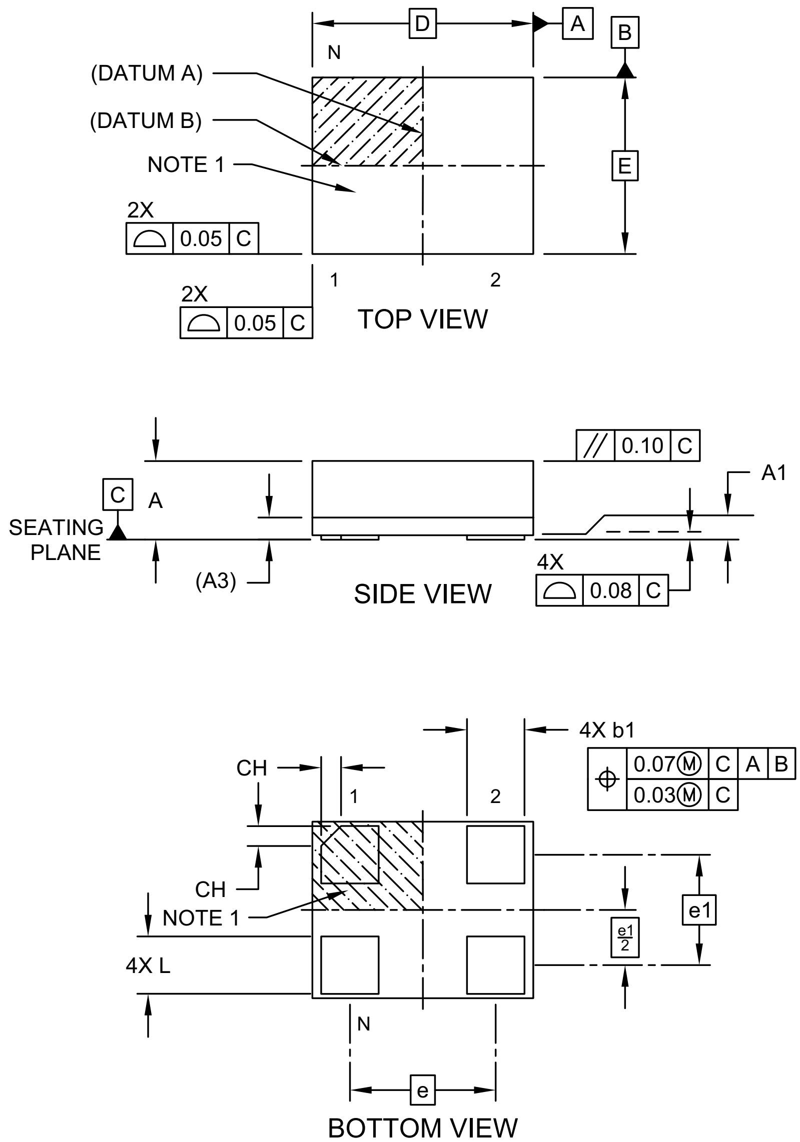
4-Lead VLGA 2.5 mm x 2.0 mm Package Outline

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



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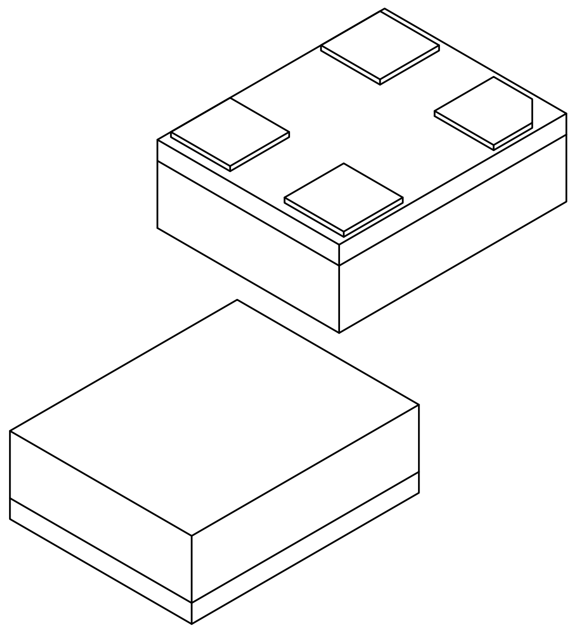
4-Lead VLGA 2.5 mm x 2.0 mm Package Outline (Continued)

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



Units		MILLIMETERS		
Dimension Limits		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

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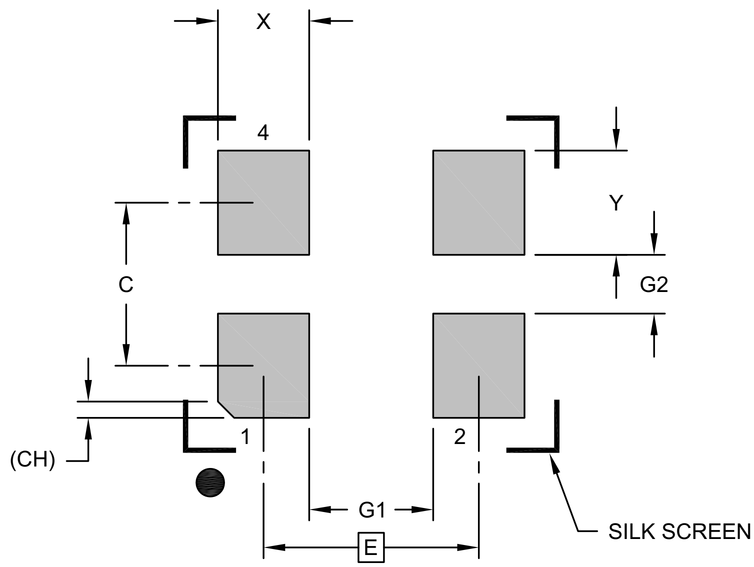
4-Lead VLGA 2.5 mm x 2.0 mm Recommended Land Pattern

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

Units		MILLIMETERS		
Dimension Limits		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

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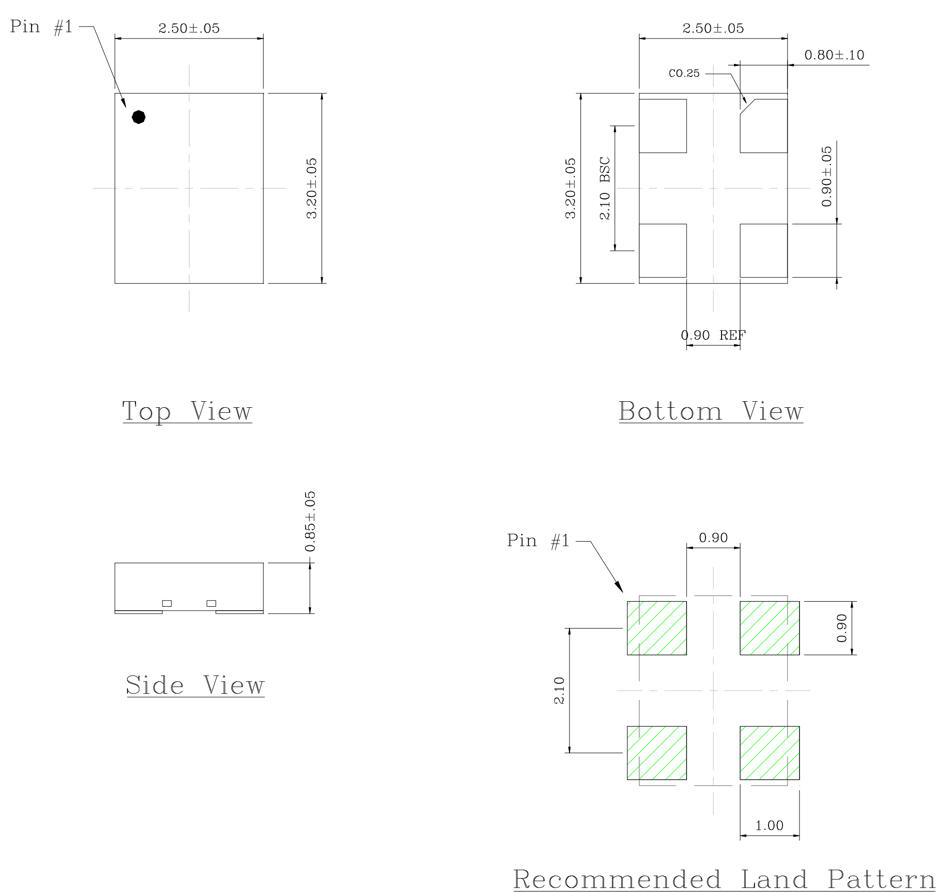
4-Lead CDFN 3.2 mm x 2.5 mm Package Outline and Recommended Land Pattern

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



NOTE:

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

NOTES:

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APPENDIX A: REVISION HISTORY

Revision A (September 2017)

- Initial release of DSC63xx Microchip data sheet DS20005808A.

NOTES:

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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 –	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/.

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NOTES:

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- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
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- 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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