1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage ..... –0.3V to +4.0V
Input Voltage ..... –0.3V to V_{DD} + 0.3V
ESD Protection (HBM) ..... 4 kV
ESD Protection (MM) 400V
ESD Protection (CDM) ..... 1.5 kV

† Notice: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Specifications: V_{DD} = 3.3V; T_A = +25°C unless otherwise specified.

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Supply Voltage (Note 1)	V_{DD}	2.25	—	3.63	V	—
Supply Current	I_{DD}	—	—	0.095	mA	DSC1102, EN pin low, Output is disabled
		—	20	22		DSC1122, EN pin low, Output is disabled
Frequency Stability	Δf	—	—	±10	ppm	Includes frequency variation due to initial tolerance, temp., and power supply voltage.
		—	—	±20		
		—	—	±25		
		—	—	±50		
Aging - First Year	Δf_{Y1}	—	—	±5	ppm	One year at +25°C
Aging - After First Year	Δf_{Y2+}	—	—	<±1	ppm/yr	Year two and beyond at +25°C
Start-up Time (Note 2)	t_{SU}	—	—	5	ms	T = +25°C
Input Logic Levels	V_{IH}	0.75 x V_{DD}	—	—	V	Input logic high
	V_{IL}	—	—	0.25 x V_{DD}		Input logic low
Output Disable Time (Note 3)	t_{DA}	—	—	5	ns	—
Output Enable Time	t_{EN}	—	—	5	ms	DSC1102
		—	—	20	ns	DSC1122
Enable Pull-Up Resistor (Note 4)	R_{PU}	—	40	—	kΩ	Pull-up resistor exists
LVPECL Outputs						
Supply Current	I_{DD}	—	56.5	58	mA	Output Enabled, R_L = 50Ω
Output Logic Levels	V_{OH}	V_{DD} – 1.08	—	—	V	Output logic high, R_L = 50Ω
	V_{OL}	—	—	V_{DD} – 1.55		Output logic low
Peak-to-Peak Output Swing	—	—	800	—	mV	Single-Ended

Note 1: Pin 6 V_{DD} should be filtered with a 0.1 µF capacitor.
2: t_{SU} is time to 100 ppm stable output frequency after V_{DD} is applied and outputs are enabled.
3: Output Waveform and Test Circuit figures below define the parameters.
4: Output is enabled if pad is floated or not connected.

ELECTRICAL CHARACTERISTICS (CONTINUED)

Specifications: V_{DD} = 3.3V; T_A = +25°C unless otherwise specified.

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Output Transition Time (Note 3)	t_r	—	250	—	ps	Rise time, 20% to 80%
	t_f					Fall time, R_L = 50Ω, C_L = 0 pF
Frequency	f_0	2.3	—	460	MHz	—
Output Duty Cycle	SYM	48	—	52	%	Differential
Period Jitter	J_{PER}	—	2.5	—	ps_{RMS}	—
Integrated Phase Noise	J_{PH}	—	0.25	—	ps_{RMS}	200 kHz to 20 MHz @ 156.25 MHz
		—	0.38	—		100 kHz to 20 MHz @ 156.25 MHz
		—	1.7	2		12 kHz to 20 MHz @ 156.25 MHz

Note 1: Pin 6 V_{DD} should be filtered with a 0.1 µF capacitor.

2: t_{SU} is time to 100 ppm stable output frequency after V_{DD} is applied and outputs are enabled.

3: Output Waveform and Test Circuit figures below define the parameters.

4: Output is enabled if pad is floated or not connected.

TEMPERATURE SPECIFICATIONS (Note 1)

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range	T_A	–20	—	+70	°C	Ordering Option E
		–40	—	+85	°C	Ordering Option I
		–40	—	+105	°C	Ordering Option L
Junction Temperature	T_J	—	—	+150	°C	—
Storage Temperature Range	T_S	–55	—	+150	°C	—
Soldering Temperature	—	—	—	+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

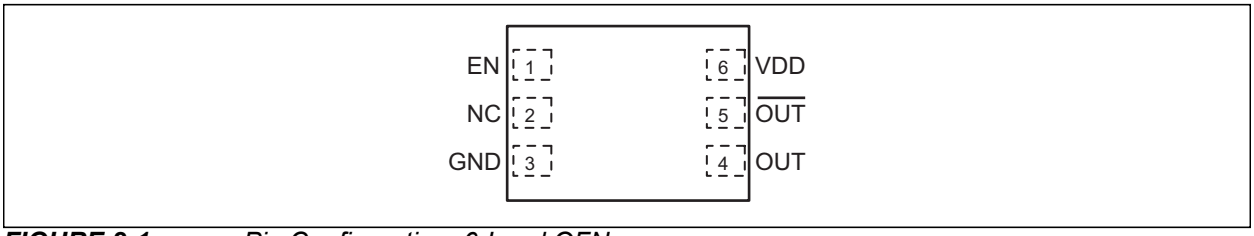


FIGURE 2-1: *Pin Configuration, 6-Lead QFN*

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1	EN	Enable or Standby.
2	NC	Leave unconnected or connect to ground.
3	GND	Ground.
4	OUT	Output.
5	$\overline{\text{OUT}}$	Complementary Output.
6	VDD	Supply Voltage.

3.0 NOMINAL PERFORMANCE PARAMETERS

Unless specified otherwise, T = +25°C, V_{DD} = 3.3V.

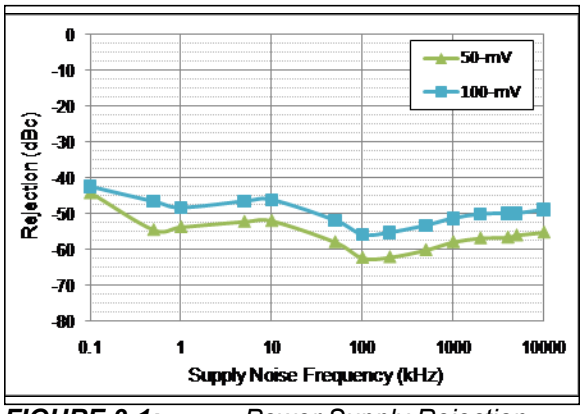


FIGURE 3-1: *Power Supply Rejection Ratio.*

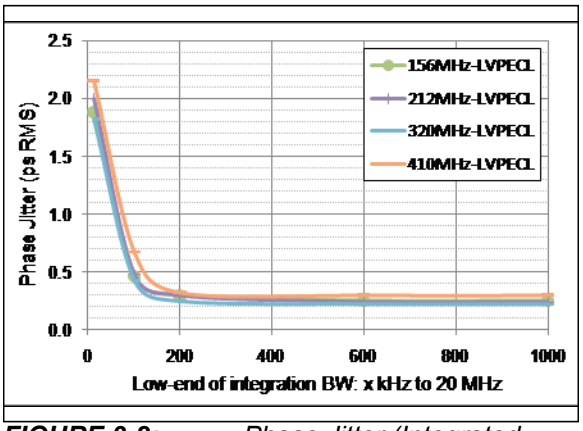


FIGURE 3-2: *Phase Jitter (Integrated Phase Noise).*

3.1 Output Waveform

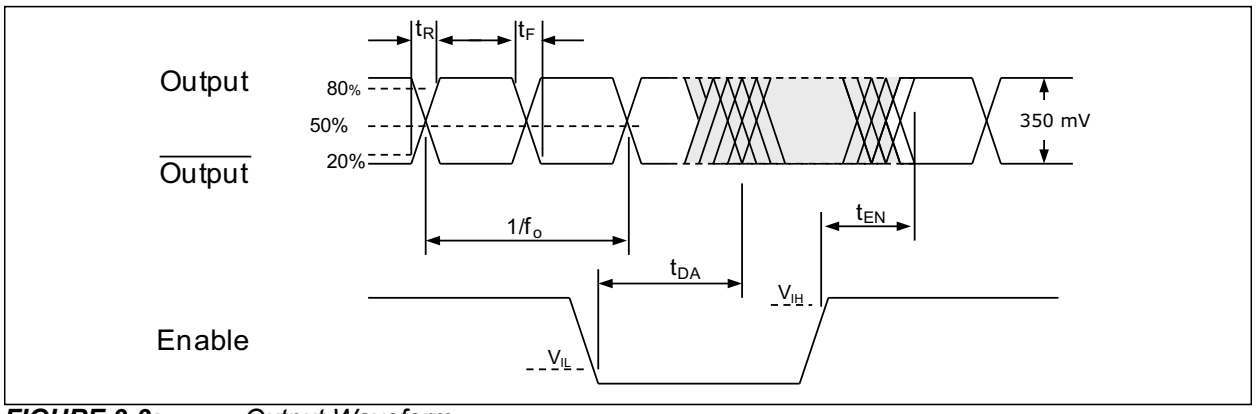


FIGURE 3-3: *Output Waveform.*

3.2 Typical Termination Scheme

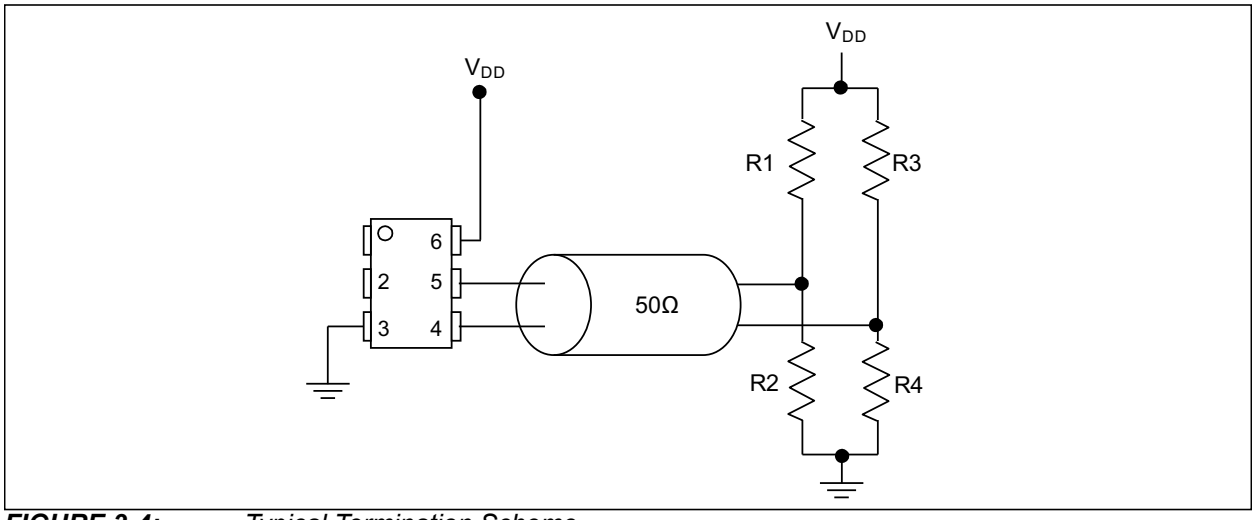


FIGURE 3-4: *Typical Termination Scheme.*

The values for R1, R2, R3, and R4 in the termination scheme depend on what V_{DD} is used. Table 3-1 lists the recommended values for each resistor depending on V_{DD}.

TABLE 3-1: RECOMMENDED RESISTOR VALUES

V_{DD}	R1, R3	R2, R4
3.3V	130Ω	82Ω
2.5V	249Ω	62Ω

3.3 Test Circuit

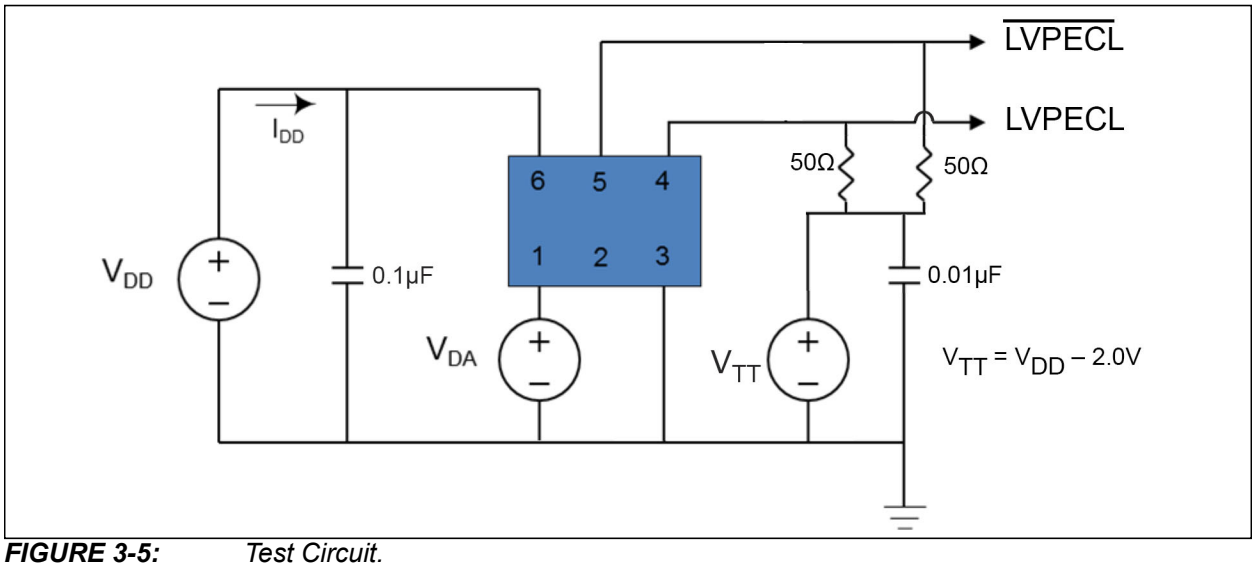


FIGURE 3-5: *Test Circuit.*

3.4 Recommended Board Layout

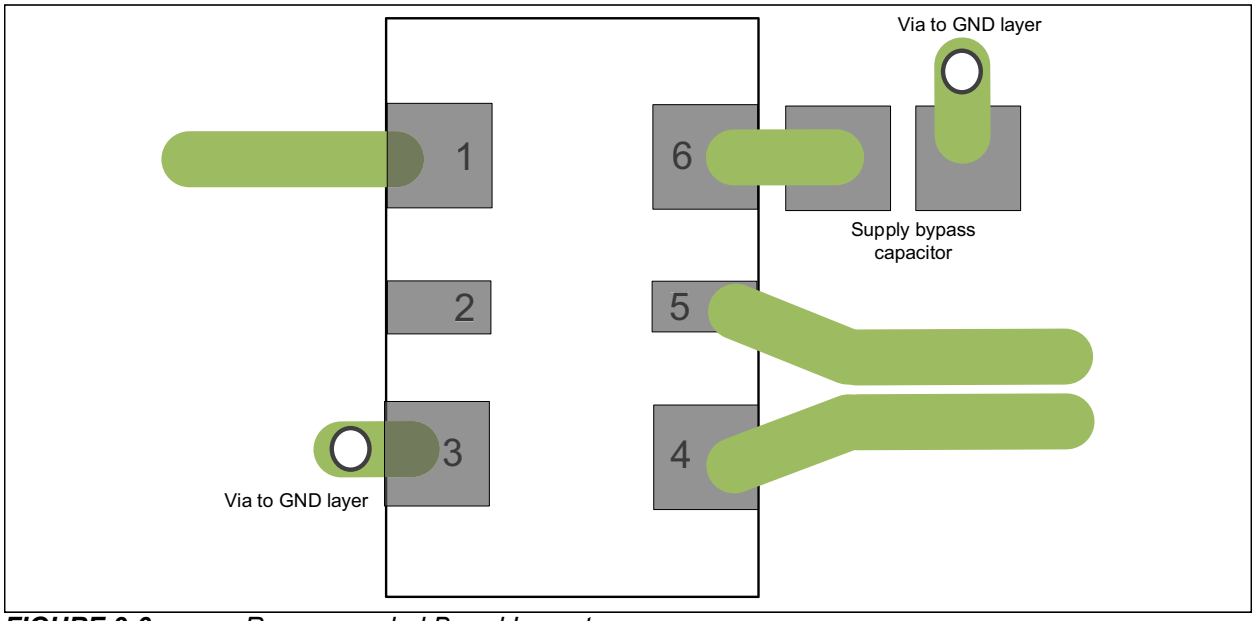
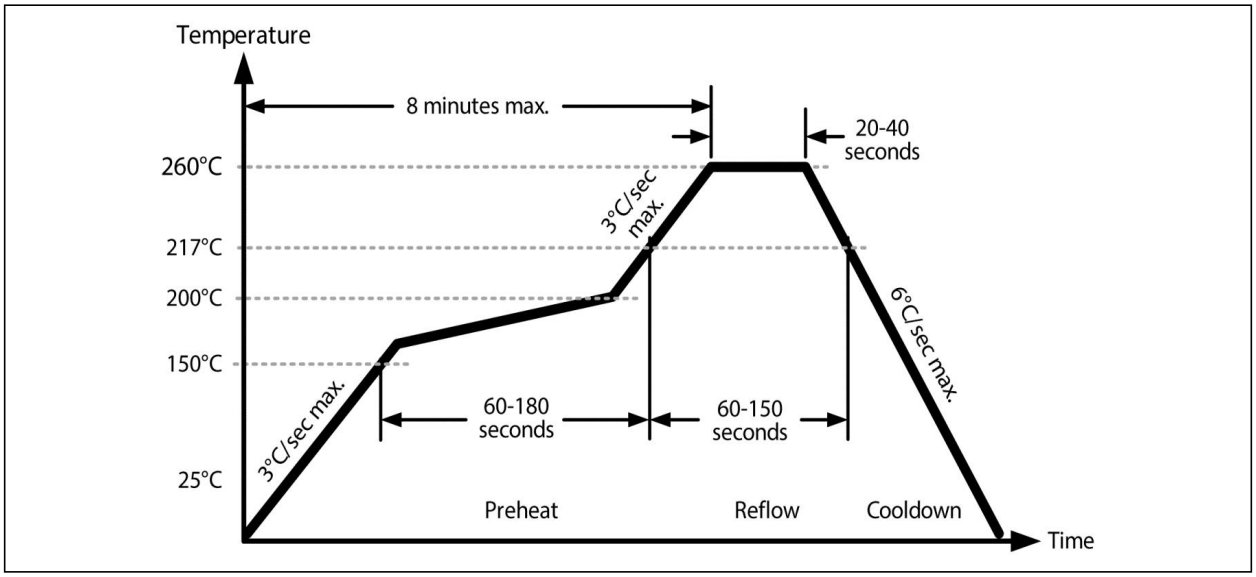


FIGURE 3-6: *Recommended Board Layout.*

3.5 Solder Reflow Profile

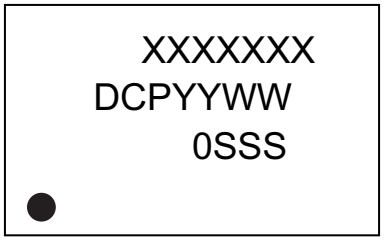


MSL 1 @ 260°C refer to JSTD-020C	
Ramp-Up Rate (200°C to Peak Temp)	3°C/sec. max.
Preheat Time 150°C to 200°C	60-180 sec.
Time Maintained above 217°C	60-150 sec.
Peak Temperature	255°C to 260°C
Time within 5°C of Actual Peak	20-40 sec.
Ramp-Down Rate	6°C/sec. max.
Time 25°C to Peak Temperature	8 minutes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

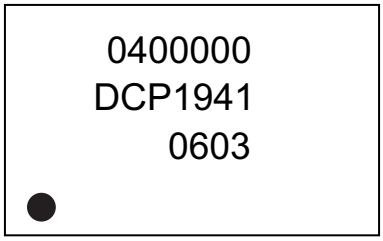
4.0 PACKAGE MARKING INFORMATION

4.1 Package Marking Information

6-Lead CDFN/VDFN*



Example



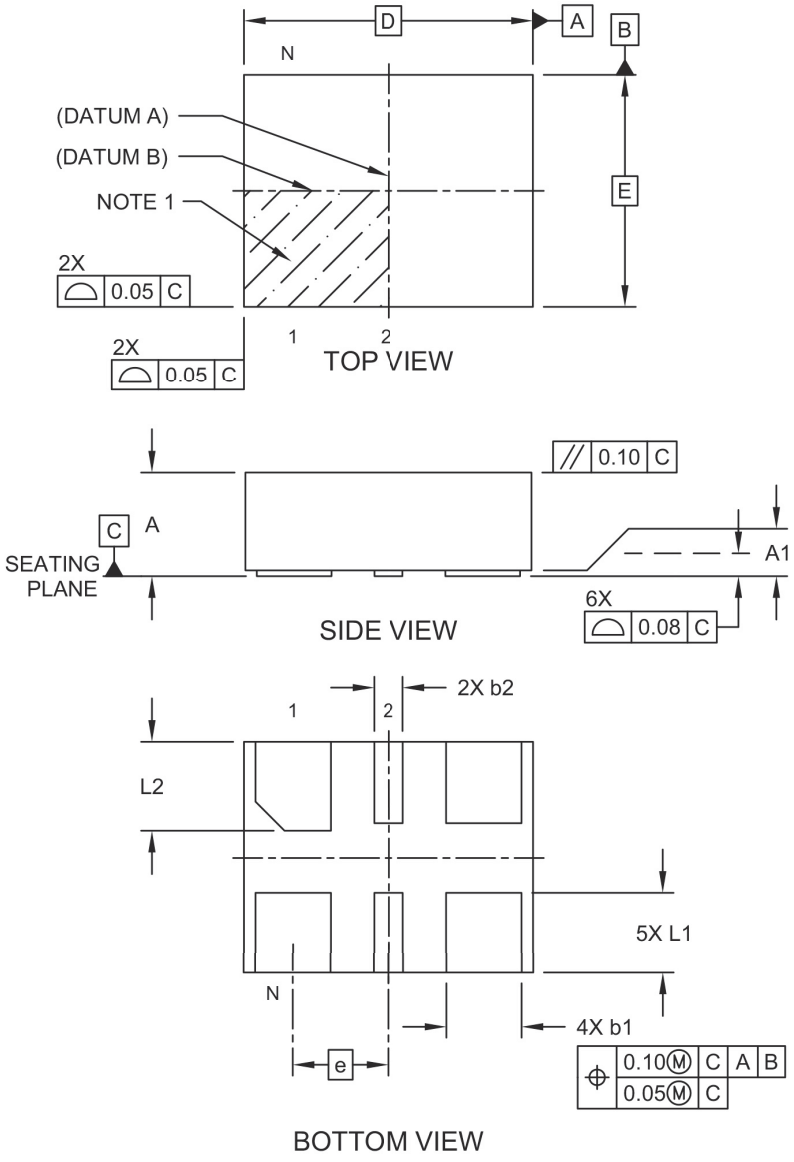
Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	SSS	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package 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.

6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

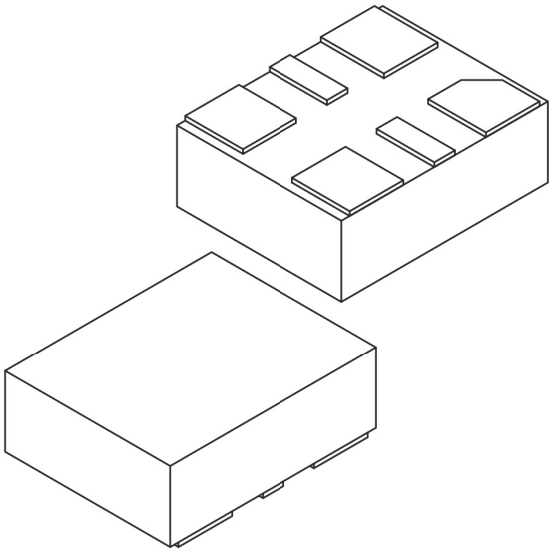
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-1005 Rev C Sheet 1 of 2

6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

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	
Pitch	e		0.825 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		2.50 BSC	
Overall Width	E		2.00 BSC	
Terminal Width	b1	0.60	0.65	0.70
Terminal Width	b2	0.20	0.25	0.30
Terminal Length	L1	0.60	0.70	0.80
Terminal Length	L2	0.665	0.765	0.865

Notes:

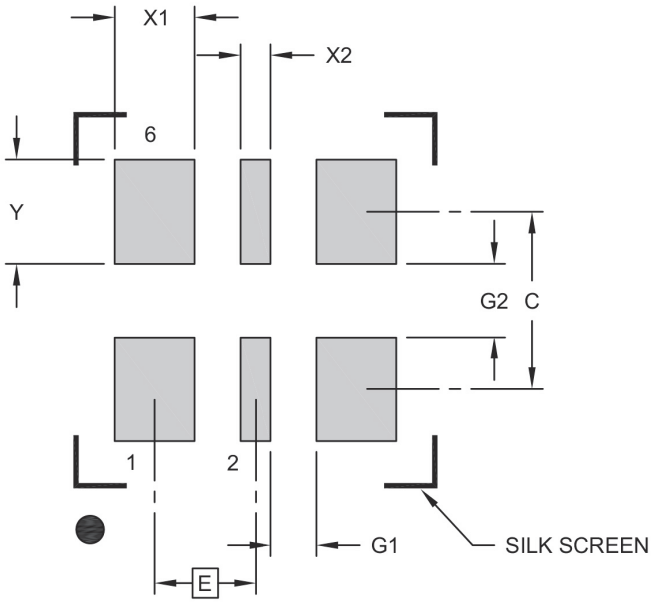
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1005 Rev C Sheet 2 of 2

6-Lead Very Thin Dual Flatpack No-Leads (J7A) - 2.5x2.0 mm Body [VDFN]

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	0.825 BSC		
Contact Pad Width (X4)	X1			0.65
Contact Pad Width (X2)	X2			0.25
Contact Pad Length (X6)	Y			0.85
Contact Pad Spacing	C		1.45	
Space Between Contacts (X4)	G1	0.38		
Space Between Contacts (X3)	G2	0.60		

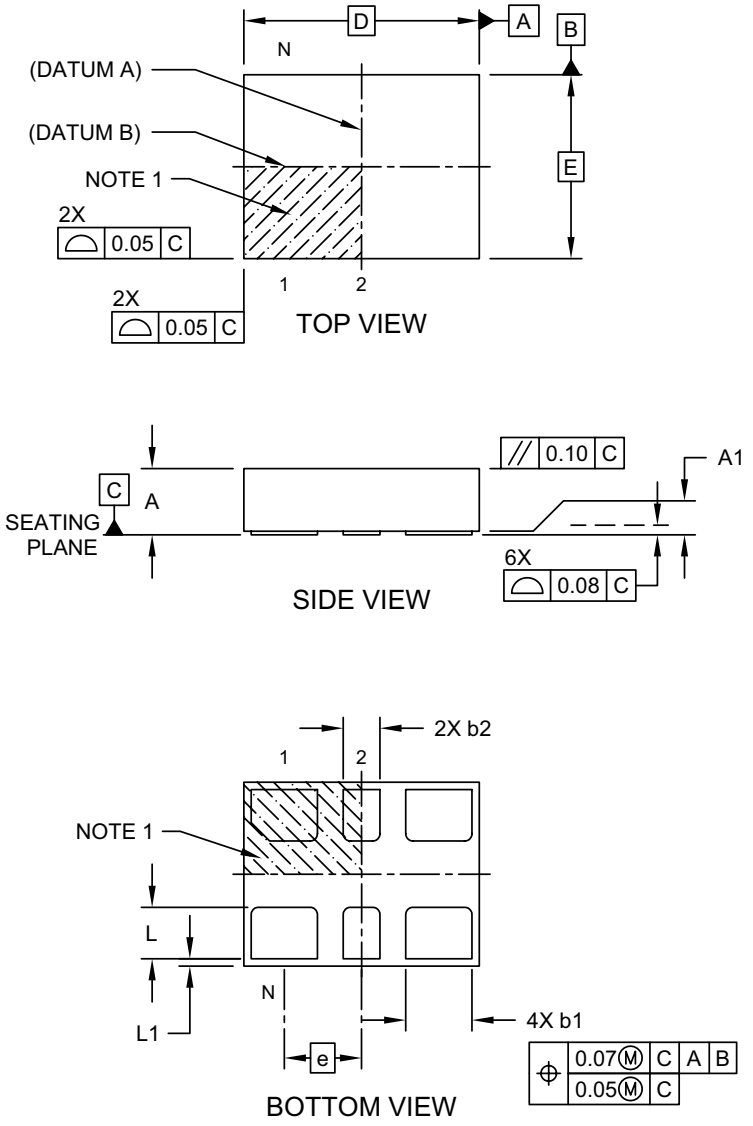
Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3005 Rev C

6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

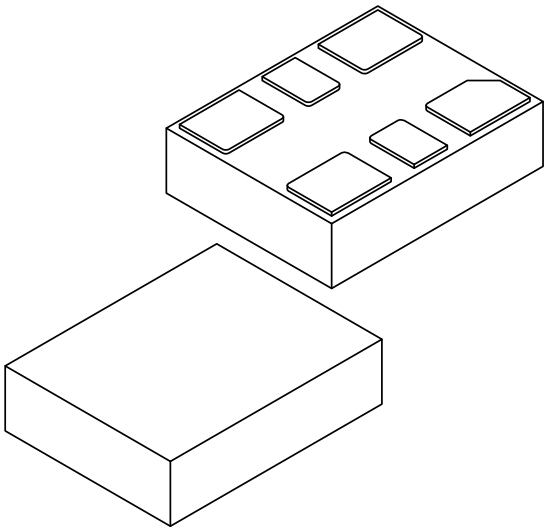
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-1007A Sheet 1 of 2

6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

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	
Pitch	e		1.05 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		3.20 BSC	
Overall Width	E		2.50 BSC	
Terminal Width	b1	0.85	0.90	0.95
Terminal Width	b2	0.45	0.50	0.55
Terminal Length	L	0.65	0.70	0.75
Terminal Pullback	L1		0.10 REF	

Notes:

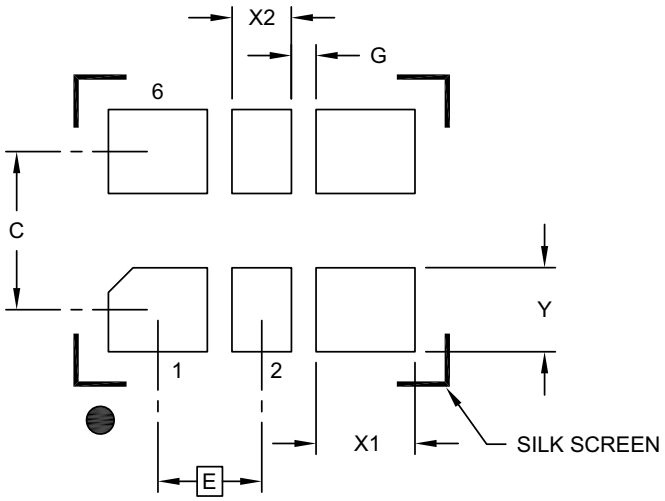
1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1007A Sheet 2 of 2

6-Lead Very Thin Plastic Dual Flatpack No-Lead (H5A) - 3.2x2.5 mm Body [VDFN]

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		1.05 BSC	
Contact Pad Spacing	C		1.60	
Contact Pad Width (X4)	X1			1.00
Contact Pad Width (X2)	X2			0.60
Contact Pad Length (X6)	Y			0.85
Space Between Contacts (X4)	G1	0.25		

Notes:

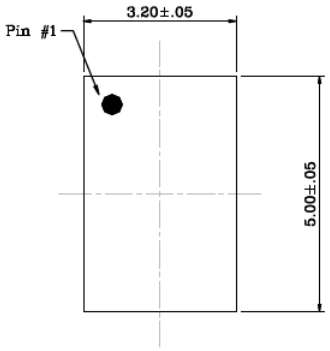
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-3007A

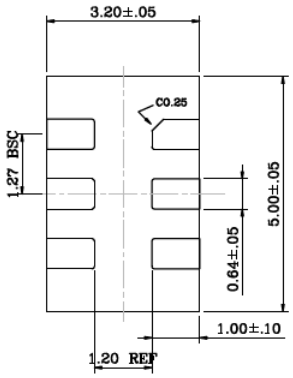
TITLE

6 LEAD CDFN 5.0x3.2mm COL PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

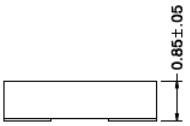
DRAWING #	CDFN5032-6LD-PL-1	UNIT	MM



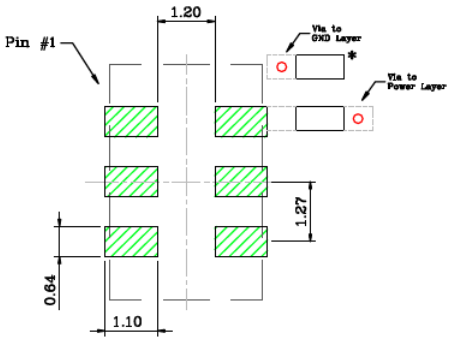
Top View



Bottom View



Side View



Recommended Land Pattern

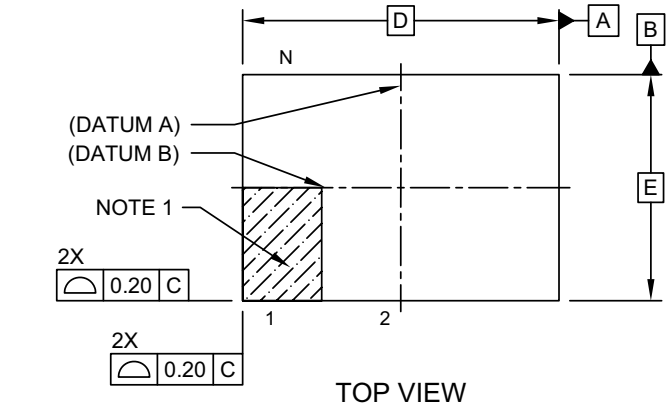
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

NOTE:

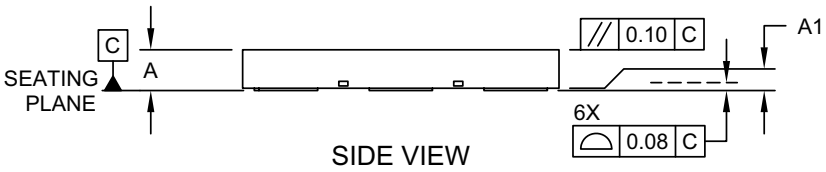
1. * Power Supply Decoupling Capacitor is required in Recommended Land Pattern.
2. Green shaded rectangles in Recommended Land Pattern are solder stencil opening.
3. Red circles in Recommended Land Pattern are thermal VIA.

6-Lead Very Thin Plastic Quad Flat, No Lead Package (H8A) - 7x5 mm Body [VDFN] With 2.8x1.8 mm Exposed Pad

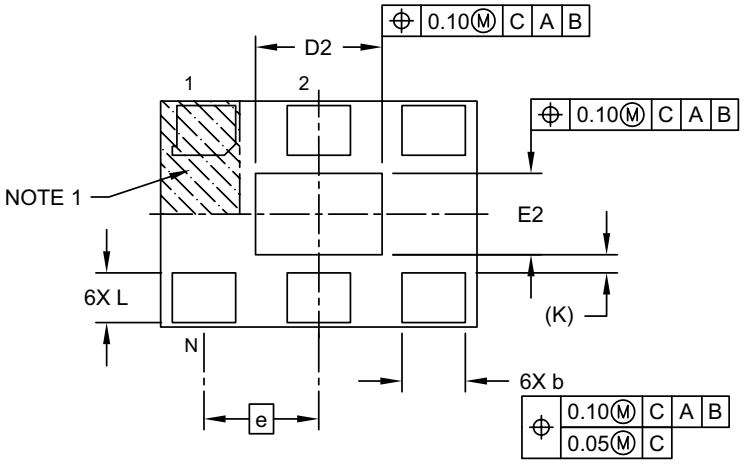
Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



TOP VIEW



SIDE VIEW

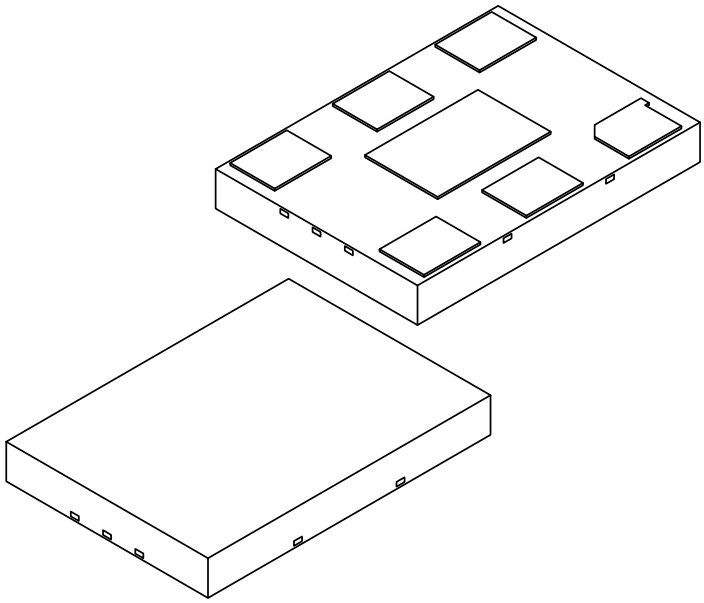


BOTTOM VIEW

Microchip Technology Drawing C04-1010A Sheet 1 of 2

6-Lead Very Thin Plastic Quad Flat, No Lead Package (H8A) - 7x5 mm Body [VDFN] With 2.8x1.8 mm Exposed Pad

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	
Pitch	e		2.54	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		7.00 BSC	
Exposed Pad Length	D2	2.70	2.80	2.90
Overall Width	E		5.00 BSC	
Exposed Pad Width	E2	1.70	1.80	1.90
Terminal Width	b	1.35	1.40	1.45
Terminal Length	L	1.00	1.10	1.20
Terminal-to-Exposed-Pad	K		0.20 REF	

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

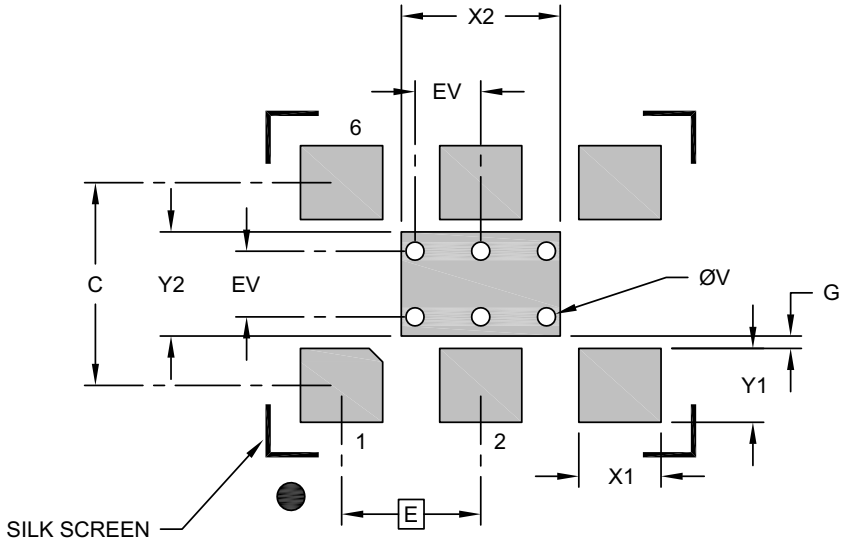
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

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

Microchip Technology Drawing C04-1010A Sheet 2 of 2

6-Lead Very Thin Plastic Quad Flat, No Lead Package (H8A) - 7x5 mm Body [VDFN] With 2.8x1.8 mm Exposed Pad

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	2.54 BSC		
Optional Center Pad Width	X2			2.90
Optional Center Pad Length	Y2			1.90
Contact Pad Spacing	C		3.70	
Contact Pad Width (X6)	X1			1.50
Contact Pad Length (X6)	Y1			1.35
Contact Pad to Center Pad (X2)	G	0.20		
Thermal Via Diameter (X6)	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

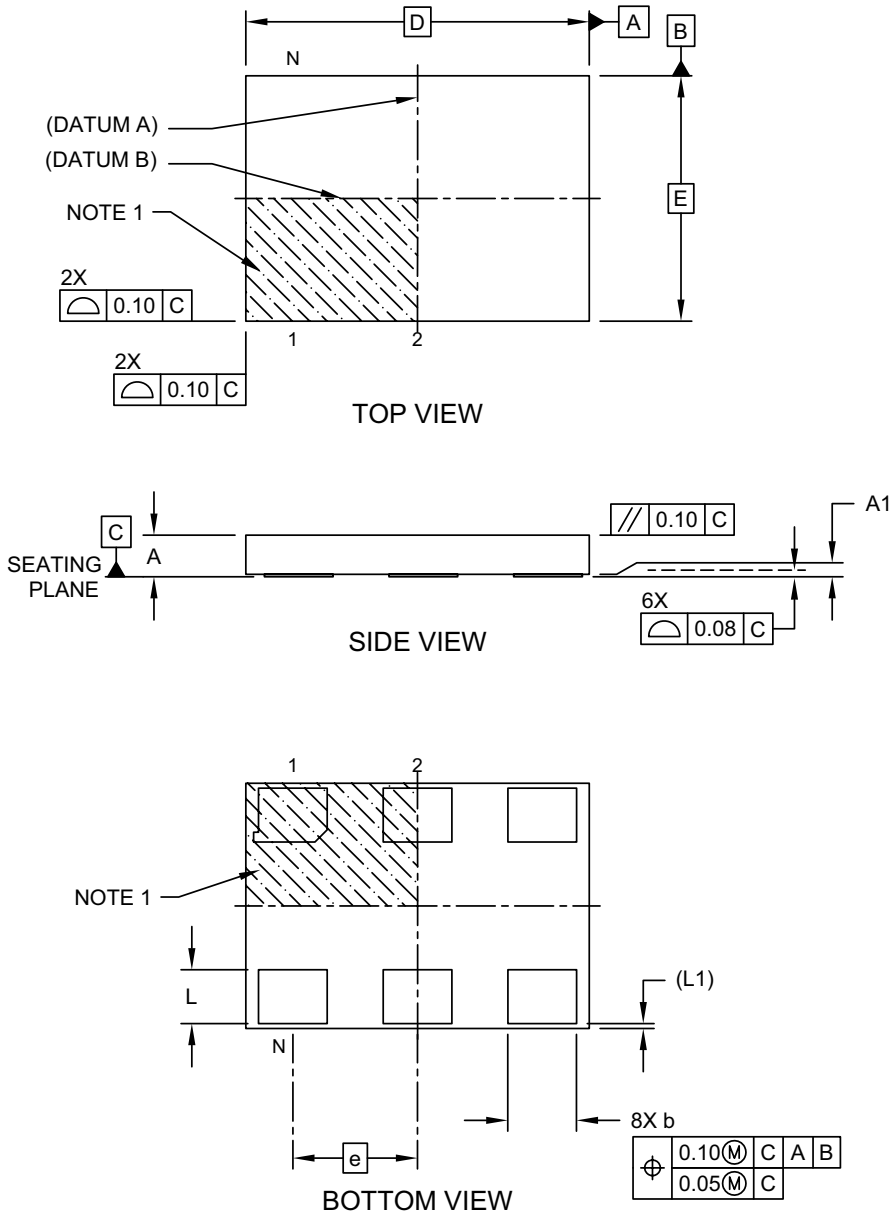
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3010A

6-Lead Very Thin Dual Flatpack, No Lead Package (HPA) - 7x5 mm Body [VDFN]

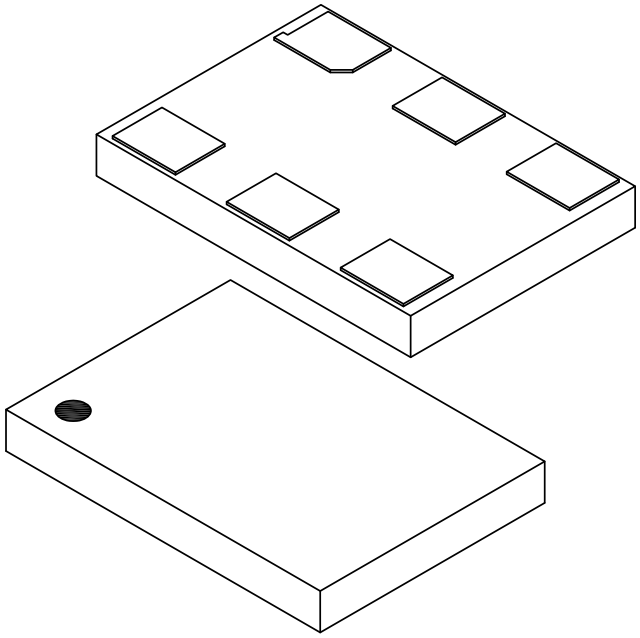
Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



Microchip Technology Drawing C04-1227 Rev A Sheet 1 of 2

6-Lead Very Thin Dual Flatpack, No Lead Package (HPA) - 7x5 mm Body [VDFN]

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	
Pitch	e		2.54 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.02	0.05
Overall Length	D		7.00 BSC	
Overall Width	E		5.00 BSC	
Terminal Width	b	1.30	1.40	1.50
Terminal Length	L	1.00	1.10	1.20
Pullback	L1		0.10 REF	

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

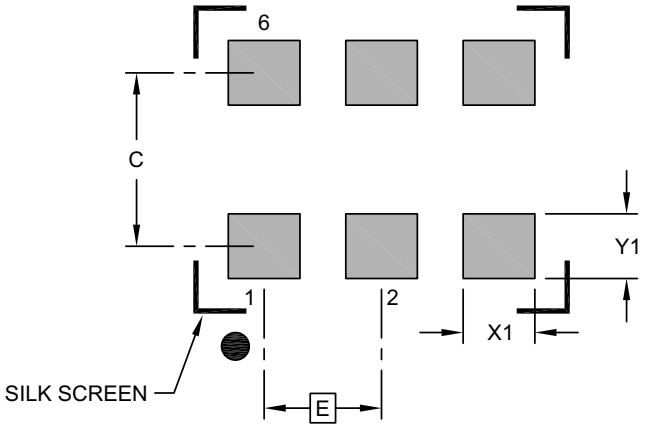
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

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

Microchip Technology Drawing C04-1227 Rev A Sheet 2 of 2

6-Lead Very Thin Dual Flatpack, No Lead Package (HPA) - 7x5 mm Body [VDFN]

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		2.54 BSC	
Contact Pad Spacing	C		3.90	
Contact Pad Width (X6)	X1			1.55
Contact Pad Length (X6)	Y1			1.40

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-3227 Rev A

APPENDIX A: REVISION HISTORY

Revision A (October 2019)

- Initial creation of document DSC1102/22 to Microchip data sheet template DS20006254A.
- •Minor text changes throughout.

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	-XXX.XXXX	X
Device	Package	Temperature Range	Stability	Frequency	Packaging Option

Device:	DSC1102:		Low-Jitter Precision LVPECL Oscillator with Standby Pin
	DSC1122:		Low-Jitter Precision LVPECL Oscillator with Output Enable
Package:	A	=	6-Lead 7.0 mm x 5.0 mm VDFN
	B	=	6-Lead 5.0 mm x 3.2 mm CDFN
	C	=	6-Lead 3.2 mm x 2.5 mm VDFN
	D	=	6-Lead 2.5 mm x 2.0 mm VDFN
	N	=	6-Lead 7.0 mm x 5.0 mm VDFN w/o center pad
Temperature Range:	E	=	–20°C to +70°C (Extended Commercial)
	I	=	–40°C to +85°C (Industrial)
	L	=	–40°C to +105°C (Extended Industrial)
Stability:	1	=	±50 ppm
	2	=	±25 ppm
	3	=	±20 ppm
	5	=	±10 ppm
Frequency:	xxx.xxxx	=	2.3 MHz to 460 MHz (User Defined)
Packing Option:	<blank>=		Tube
	T	=	1000/Reel

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

Examples:

a) DSC1102AE1-053.5000: DSC1102, 6-Lead 7x5 VDFN, Ext. Commercial Temp. Range, ±50 ppm Stability, 53.5 MHz Frequency, Tube

b) DSC1122BI2-246.8100T: DSC1122, 6-Lead 5x3.2 CDFN, Industrial Temp. Range, ±25 ppm Stability, 246.81 MHz Frequency, 1000/Reel

c) DSC1102CL5-156.2500: DSC1102, 6-Lead 3.2x2.5 VDFN, Ext. Industrial Temp. Range, ±10 ppm Stability, 156.25 MHz Frequency, Tube

d) DSC1122DE3-094.5500T: DSC1122, 6-Lead 2.5x2.0 VDFN, Industrial Temp. Range, ±20 ppm Stability, 94.55 MHz Frequency, 1000/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.

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.
- 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.
- 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."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

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