Description

The IDT XL devices (XO and VCXO options) are ultra-precision crystal oscillators with 750 to 890fs typical phase jitter over 12kHz to 20MHz bandwidth. Available in a wide frequency range from 0.750MHz to 1350MHz, the XL series crystal oscillators utilize a family of proprietary ASICs, with a key focus on noise reduction technologies.

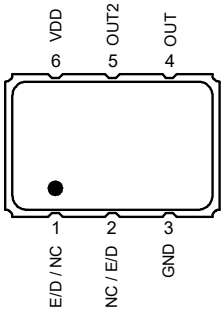
The 3rd order Delta Sigma Modulator reduces noise to the levels that are comparable to traditional Bulk Quartz and SAW oscillators. With short lead-time, low cost, low noise, wide frequency range, excellent ambient performance, the XL devices are an excellent choice over the conventional technologies. The XL (XO option) devices have stabilities as tight as ±20ppm and the XL (VCXO option) devices have ±50ppm APR. Either option provides extremely quick delivery for both standard and custom frequencies.

Features

- Output types: LVDS, LVPECL, LVCMOS
- Phase jitter (12kHz to 20MHz): 750fs to 890fs typical
- Supply voltage: 2.5V or 3.3V
- Package options:
  - 3.2 × 2.5 × 1.0 mm (not available for VCXO)
  - 5.0 × 3.2 × 1.2 mm
  - 7.0 × 5.0 × 1.3 mm
- Operating temperature: -20°C to +70°C
  - Frequency stability options: ±20, ±25, ±50, or ±100 ppm (XO only)
  - ±50ppm APR (VCXO only)
- Operating temperature: -40°C to +85°C
  - Frequency stability options: ±25, ±50, or ±100 ppm (XO only)
  - ±50ppm APR (VCXO only)
- Operating temperature: -40°C to +105°C (XO only)
  - Frequency stability options: ±50 or ±100 ppm
- kV of 85ppm/volt typical from 0.5VDC to VDD (VCXO only)
  - Better than ±10% linearity for Vc range

Pin Assignments (XO option)

NOTE: To minimize power supply line noise, a 0.01µF bypass capacitor should be placed between V_{DD} (Pin 6) and GND (Pin 3) on 6-pin devices, or V_{DD} (Pin 4) and GND (Pin 2) on 4-pin devices.



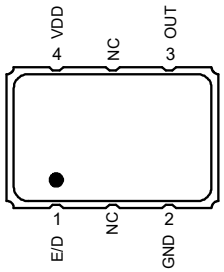


Table 1. XO 6-pin Package

Number	Name	Description
1	E/D NC	Enable/Disable [a][b] No connect
2	NC E/D	No connect Enable/Disable [a][b]
3	GND	Connect to ground
4	OUT	Output
5	OUT2	Complementary output
6	V_{DD}	Supply voltage

Table 2. XO 4-pin Package

Number	Name	Description
1	E/D	Enable/Disable [a][b]
2	GND	Connect to ground
3	OUT	Output
4	V_{DD}	Supply voltage

[a] Pulled high internally.

[b] Low = output disabled.

See Ordering Information (XO) for more details.

Pin Assignments (VCXO option)

NOTE: To minimize power supply line noise, a 0.01µF bypass capacitor should be placed between V_{DD} (Pin 6) and GND (Pin 3).

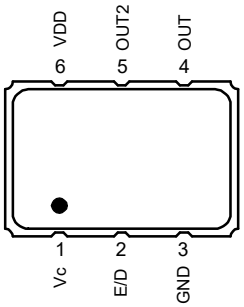


Table 3. VCXO 6-pin Package

Number	Name	Description
1	Vc	Voltage control
2	E/D	Enable/Disable [a][b]
3	GND	Connect to ground
4	OUT	Output
5	OUT2	Complementary output (NC LVCMOS)
6	V_{DD}	Supply voltage

[a] Pulled high internally.

[b] Low = output disabled.

See Ordering Information (VCXO) for more details.

Contents

Absolute Maximum Ratings

Stresses above the ratings listed below can cause permanent damage to the device. These ratings, which are standard values for IDT commercially rated parts, are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods can affect product reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

Table 4. Absolute Maximum Ratings

Item	Rating					
V_{DD}	-0.5 to +5.0V					
E/D	-0.5V to V_{DD} + 0.5V					
OUT	-0.5V to V_{DD} + 0.5V					
Storage Temperature	-55°C to 125°C					
Maximum Junction Temperature	125°C					
Core Current	65mA maximum					
Theta J_A	JU6	75.9 °C/W	JS6	89.6 °C/W	JX6	94.7 °C/W
Theta J_B	7.0 × 5.0 × 1.3 mm	48.6°C/W	5.0 × 3.2 × 1.2 mm	54.3 °C/W	3.2 × 2.5 × 1.0 mm	66.8 °C/W

ESD Compliance

Table 5. ESD Compliance

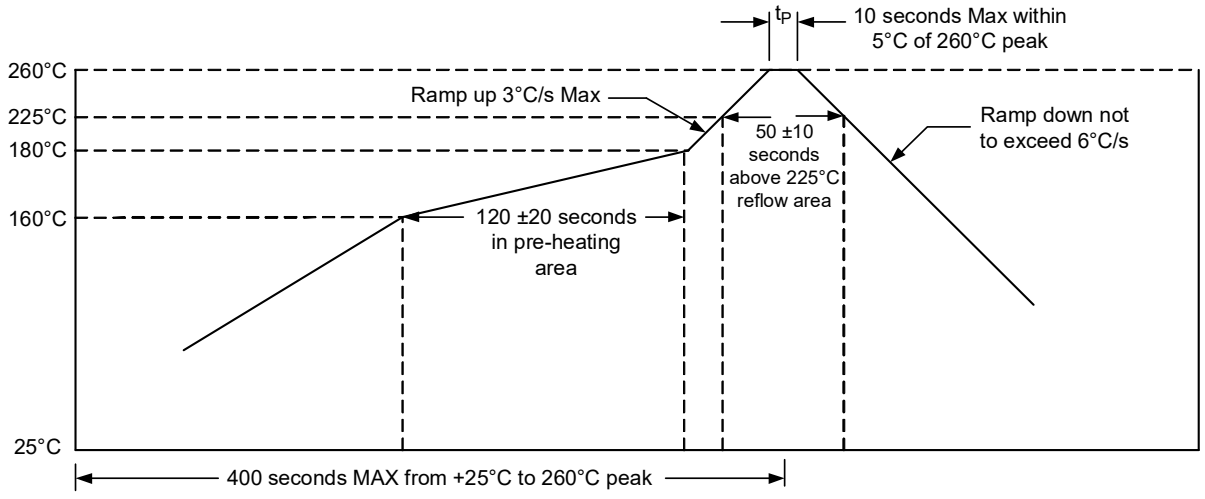
Human Body Model (HBM	1000V
Machine Model (MM)	150V

Mechanical Testing

Table 6. Mechanical Testing

Parameter	Test Method
Mechanical Shock	Drop from 75cm to hardwood surface–3 times.
Mechanical Vibration	10–55Hz, 1.5mm amplitude, 1 minute sweep; 2 hours each in 3 directions (X, Y, Z).
High Temperature Burn-in	Under power at 125°C for 2000 hours.
Hermetic Seal	He pressure: 4 ±1kgf/cm^2 2 hour soak.

Solder Reflow Profile



DC Electrical Characteristics

Table 7. 3.3V IDD DC Electrical Characteristics

V_{DD} = 3.3V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

Symbol	Parameter	Output Type	Conditions	Minimum	Typical	Maximum	Units
I_{DD}	Power Supply Current	LVDS	—	—	—	100	mA
		LVPECL	—	—	—	120	
		LVCMOS	0.75MHz to 20MHz.	—	—	32	
			20+MHz to 50MHz.	—	—	35	
			50+MHz to 130MHz.	—	—	47	
			130+MHz to 200MHz.	—	—	55	
			200+MHz to 250MHz.	—	—	60	

Table 8. 2.5V IDD DC Electrical Characteristics

V_{DD} = 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

Symbol	Parameter	Output Type	Conditions	Minimum	Typical	Maximum	Units
I_{DD}	Power Supply Current	LVDS	0.75MHz to 20MHz.	—	—	26	mA
			20+MHz to 220MHz.	—	—	34	
			220+MHz to 630MHz.	—	—	44	
			630+MHz to 1000MHz.	—	—	65	
		LVPECL	0.75MHz to 20MHz.	—	—	33	
			20+MHz to 220MHz.	—	—	41	
			220+MHz to 630MHz.	—	—	63	
			630+MHz to 1000MHz.	—	—	72	
		LVCMOS	0.75MHz to 20MHz.	—	—	22	
			20+MHz to 50MHz.	—	—	25	
			50+MHz to 100MHz.	—	—	29	
			100+MHz to 130MHz.	—	—	32	
			130+MHz to 160MHz.	—	—	35	
			160+MHz to 180MHz.	—	—	37	

Table 9. LVDS DC Electrical Characteristics

V_{DD} = 3.3V, 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C. Below are guaranteed for listed standard frequencies.

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Units
V_{OD}	Differential Output Voltage	V_{DD} = 3.3V ±5%.	—	—	0.6	V
		V_{DD} = 2.5V ±5%.	—	—	0.4	
V_{OS}	Output Offset Voltage	V_{DD} = 3.3V ±5%.	—	—	1.3	
		V_{DD} = 2.5V ±5%.	—	—	1.25	
V_{IH}	Enable/Disable Input High Voltage (Output enabled)	—	70% V_{DD}	—	—	
V_{IL}	Enable/Disable Input Low Voltage (Output disabled)	—	—	—	30% V_{DD}	

Table 10. LVPECL DC Electrical Characteristics

V_{DD} = 3.3V, 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C. Below are guaranteed for listed standard frequencies.

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Units
V_{OD}	Differential Output Voltage	V_{DD} = 3.3V ±5%.	2.055		2.405	V
		V_{DD} = 2.5V ±5%.	—	1.4	—	
V_{OS}	Output Offset Voltage	V_{DD} = 3.3V ±5%.	1.305		1.65	
		V_{DD} = 2.5V ±5%.	—	0.68	—	
V_{IH}	Enable/Disable Input High Voltage (Output enabled)	—	70% V_{DD}	—	—	
V_{IL}	Enable/Disable Input Low Voltage (Output disabled)	—	—	—	30% V_{DD}	

Table 11. LVCMOS DC Electrical Characteristics

V_{DD} = 3.3V, 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C. Below are guaranteed for listed standard frequencies.

Symbol	Parameter	Conditions		Minimum	Typical	Maximum	Units
V_{OH}	Output High Voltage	V_{DD} = 3.3V ±5%.	0.75MHz to 150MHz.	90% V_{DD}	—	—	V
			150+MHz to 250MHz.	80% V_{DD}	—	—	
		V_{DD} = 2.5V ±5%.	0.75MHz to 160MHz.	90% V_{DD}	—	—	
			160+MHz to 180MHz.	80% V_{DD}	—	—	
V_{OL}	Output Low Voltage	V_{DD} = 3.3V ±5%.	0.75MHz to 150MHz.	—	—	10% V_{DD}	
			150+MHz to 250MHz.	—	—	20% V_{DD}	
		V_{DD} = 2.5V ±5%.	0.75MHz to 160MHz.	—	—	10% V_{DD}	
			160+MHz to 180MHz.	—	—	20% V_{DD}	
V_{IH}	Enable/Disable Input High Voltage (Output enabled)	—	—	70% V_{DD}	—	—	
V_{IL}	Enable/Disable Input Low Voltage (Output disabled)	—	—	—	—	30% V_{DD}	

AC Electrical Characteristics

Table 12. 3.3V AC Electrical Characteristics

V_{DD} = 3.3V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

Symbol	Parameter	Test Condition		Minimum	Typical	Maximum	Units
F	Output Frequency Range	LVDS.		0.75	—	1350	MHz
		LVPECL.		0.75	—	1350	
		LVCMOS.		0.75	—	250	
	Frequency Stability	Temperature = -20°C to +70°C.		±20	—	±100	ppm
		Temperature = -40°C to +85°C.		±25	—	±100	ppm
		Temperature = -40°C to +105°C.		±50	—	±100	ppm
	Aging (1st year)	T_A = 25°C.		—	—	±3	ppm
	Aging (10 years)	T_A = 25°C.		—	—	±10	ppm
	Output Load	LVDS.	Differential.	—	100	—	Ω
		LVPECL.	V_{DD} - 2.0V.	—	50	—	
		LVCMOS.	To GND.	—	15	—	pF
T_{ST}	Start-up Time	Output valid time after V_{DD} meets minimum specified level.		—	—	10	ms
t_R	Output Rise Time	LVDS.	20% to 80% Vpp.	—	—	400	ps
		LVPECL.		—	—	400	
		LVCMOS.	10% to 90% V_{DD}.	—	—	3	ns
t_F	Output Fall Time	LVDS.	80% to 20% Vpp.	—	—	400	ps
		LVPECL.		—	—	400	
		LVCMOS.	90% to 10% V_{DD}.	—	—	3	ns
O_{DC}	Output Clock Duty Cycle	LVDS.		45	—	55	%
		LVPECL.		45	—	55	
		LVCMOS.	$F_{OUT} \leq$ 62.5MHz.	45	—	55	
			F_{OUT} > 62.5MHz.	40	—	60	
T_{OE}	Output Enable/ Disable Time	—		—	—	100	ns
J_{PER}	Period Jitter, RMS	LVDS.		—	3	—	ps
		LVPECL.		—	5.8	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	5	—	
R_J	Random Jitter	LVDS.		—	1.3	—	ps
		LVPECL.		—	1.29	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	0.6	—	
D_J	Deterministic Jitter	LVDS.		—	5.8	—	ps
		LVPECL.		—	9.3	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	10	—	

Table 12. 3.3V AC Electrical Characteristics (Cont.)

V_{DD} = 3.3V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

Symbol	Parameter	Test Condition		Minimum	Typical	Maximum	Units
T_J	Total Jitter	LVDS.		—	23.6	—	ps
		LVPECL.		—	27.7	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	19	—	
f_{JITTER}	Phase Jitter (12kHz–20MHz)	LVDS.		—	890	—	fs
		LVPECL.		—	860	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	750	—	

Table 13. 2.5V AC Electrical Characteristics

V_{DD} = 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

Symbol	Parameter	Test Condition		Minimum	Typical	Maximum	Units
F	Output Frequency Range	LVDS.		0.75	—	1000	MHz
		LVPECL.		0.75	—	1000	
		LVCMOS.		0.75	—	180	
	Frequency Stability	Temperature = -20°C to +70°C.		±20	—	±100	ppm
		Temperature = -40°C to +85°C.		±25	—	±100	ppm
		Temperature = -40°C to +105°C.		±50	—	±100	ppm
	Aging (1st year)	T_A = 25°C.		—	—	±3	ppm
	Aging (10 years)	T_A = 25°C.		—	—	±10	ppm
	Output Load	LVDS.	Differential.	—	100	—	Ω
		LVPECL.	V_{DD} - 2.0V.	—	50	—	
		LVCMOS.	To GND.	—	15	—	pF
T_{ST}	Start-up Time	Output valid time after V_{DD} meets minimum specified level.		—	—	10	ms
t_R	Output Rise Time	LVDS.	20% to 80% Vpp.	—	—	400	ps
		LVPECL.		—	—	400	
		LVCMOS.	10% to 90% V_{DD}.	—	—	3.5	ns
t_F	Output Fall Time	LVDS.	80% to 20% Vpp.	—	—	400	ps
		LVPECL.		—	—	400	
		LVCMOS.	90% to 10% V_{DD}.	—	—	3	ns
O_{DC}	Output Clock Duty Cycle	LVDS.		45	—	55	%
		LVPECL.		45	—	55	
		LVCMOS.		45	—	55	
T_{OE}	Output Enable/ Disable Time	—		—	—	100	ns

Table 13. 2.5V AC Electrical Characteristics (Cont.)

V_{DD} = 2.5V ±5%, T_A = -20°C to +70°C; -40°C to +85°C, -40°C to +105°C.

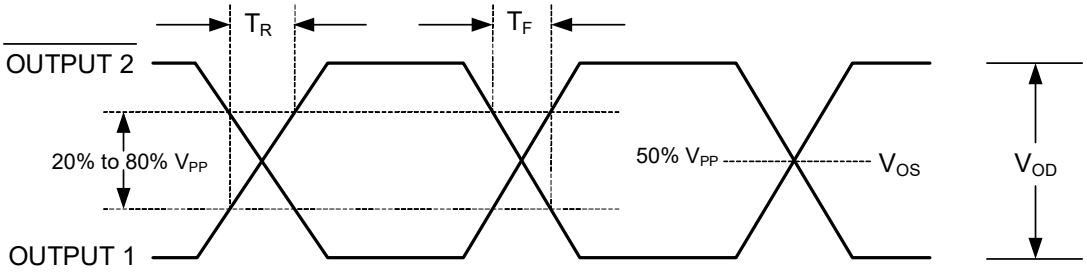
Symbol	Parameter	Test Condition		Minimum	Typical	Maximum	Units
J_{PER}	Period Jitter, RMS	LVDS.		—	4	—	ps
		LVPECL.		—	5.12	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	3.3	—	
R_J	Random Jitter	LVDS.		—	1.4	—	ps
		LVPECL.		—	1.36	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	1.3	—	
D_J	Deterministic Jitter	LVDS.		—	9.2	—	ps
		LVPECL.		—	10	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	6.7	—	
T_J	Total Jitter	LVDS.		—	29.2	—	ps
		LVPECL.		—	29.3	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	25.6	—	
f_{JITTER}	Phase Jitter (12kHz–20MHz)	LVDS.		—	1040	—	fs
		LVPECL.		—	1200	—	
		LVCMOS.	F_{OUT} = 125MHz.	—	850	—	

Notes for all AC Electrical Characteristics tables:

[1] All jitter values provided at 156.25MHz, unless noted otherwise.

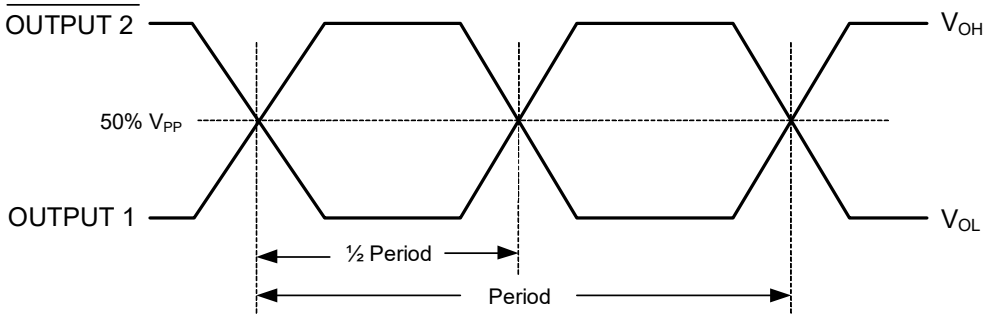
Output Waveforms – LVDS

Output Levels/Rise Time/Fall Time Measurements



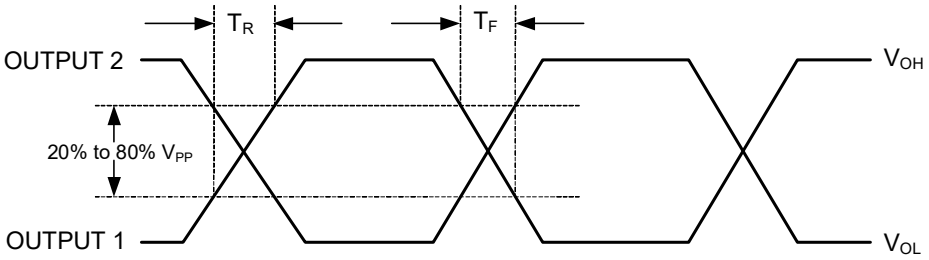
Oscillator Symmetry

Ideally, Symmetry should be 50/50 for ½ period –Other expressions are 45/55 or 55/45

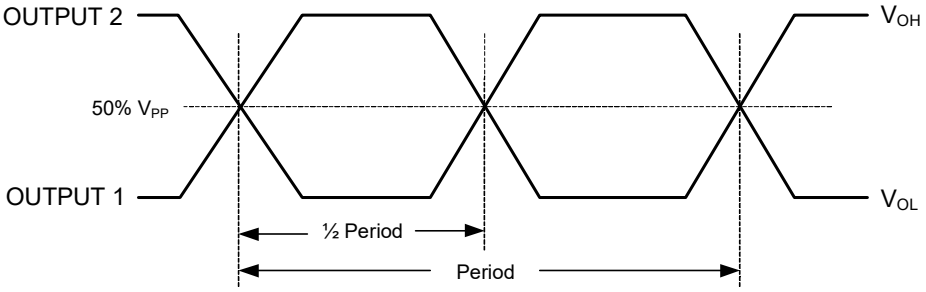


Output Waveforms – LVPECL

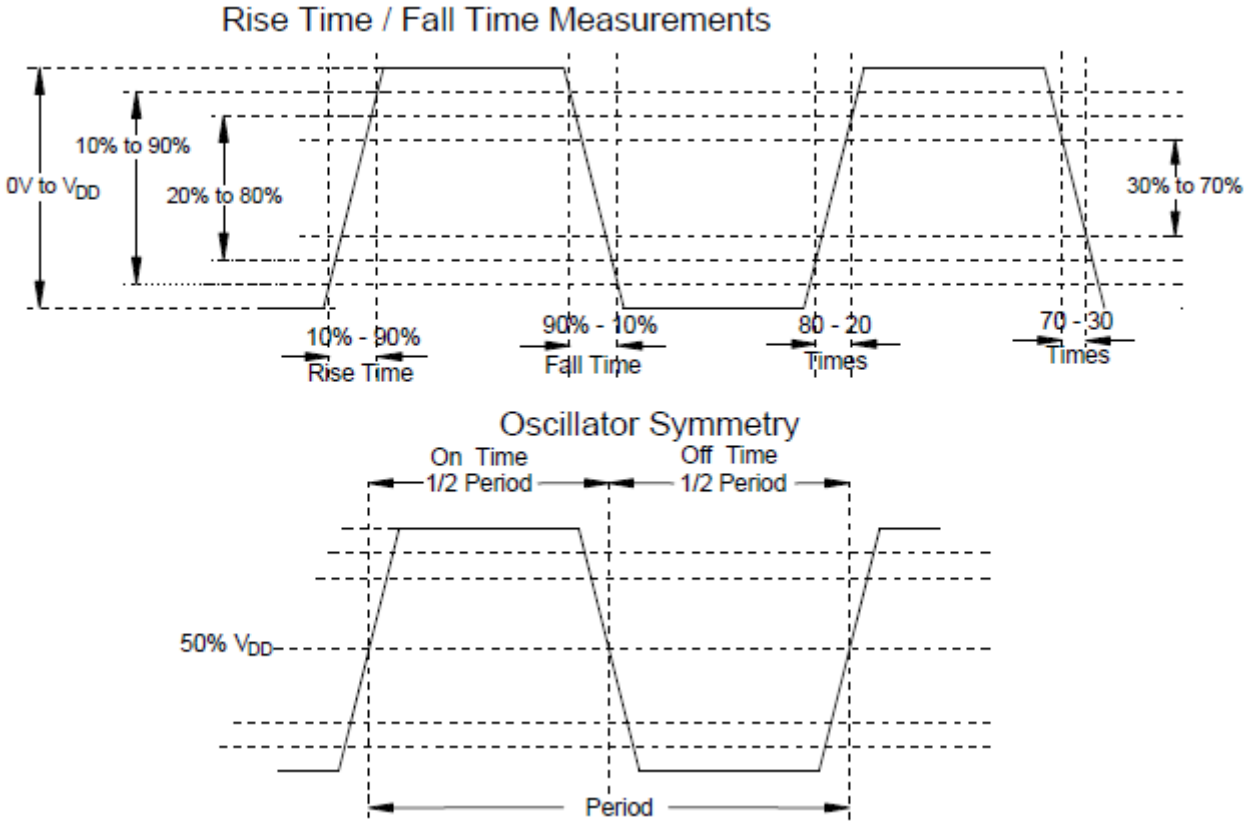
Rise Time/Fall Time Measurements



Oscillator Symmetry



Output Waveforms – LVCMOS



Package Outline Drawings

The package outline drawings are appended at the end of this document and are accessible from the links below. The package information is the most current data available.

www.idt.com/document/psc/js6-package-outline-50-x-32-mm-body-11-mm-thick

www.idt.com/document/psc/jx6-package-outline-32-x-25-mm-body-09-mm-thick

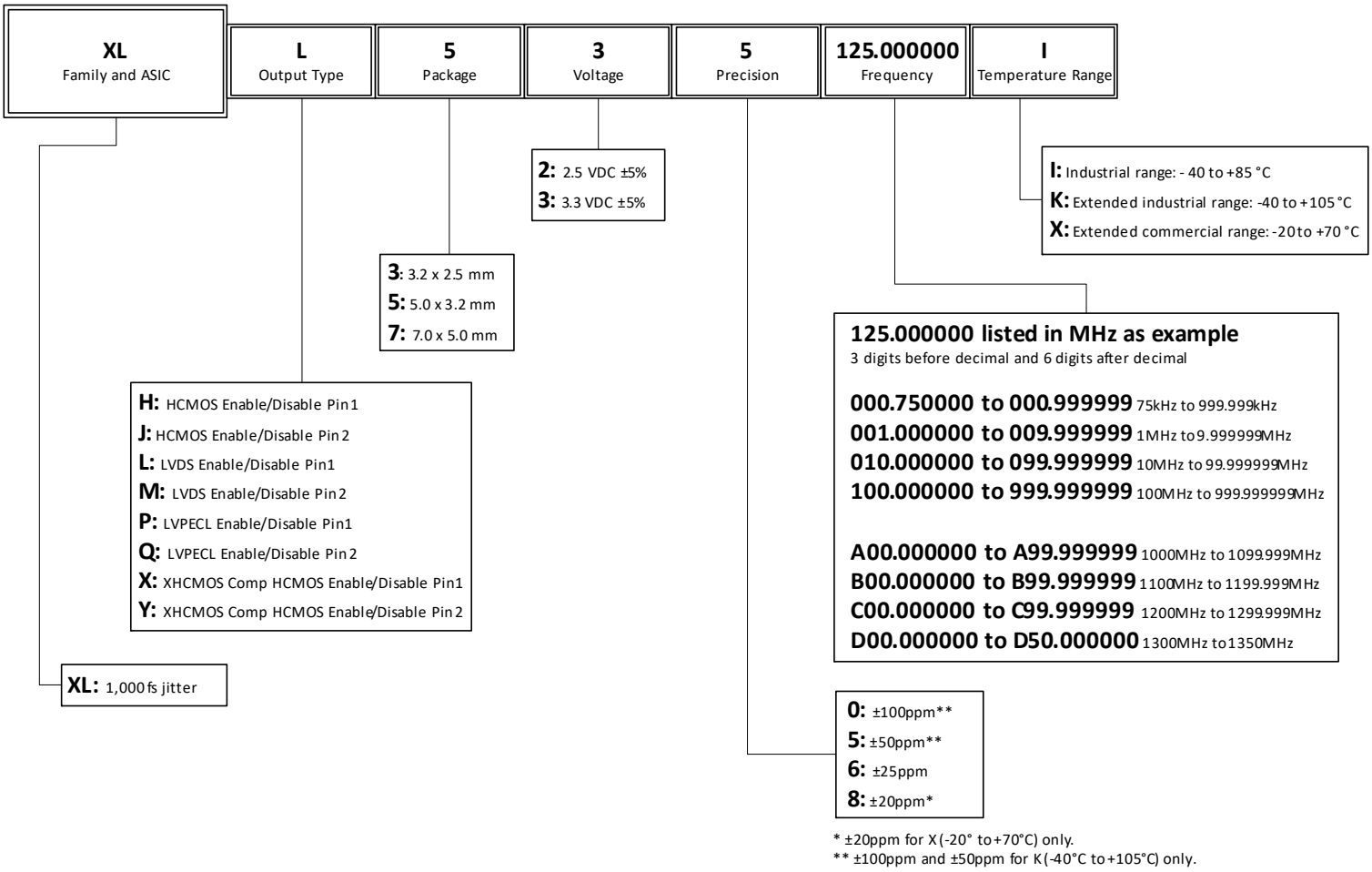
www.idt.com/document/psc/ju6-package-outline-70-x-50-mm-body-13-mm-thick

www.idt.com/document/psc/js4-package-outline-50-x-32-mm-body-11-mm-thick

www.idt.com/document/psc/ju4-package-outline-70-x-50-mm-body-13-mm-thick

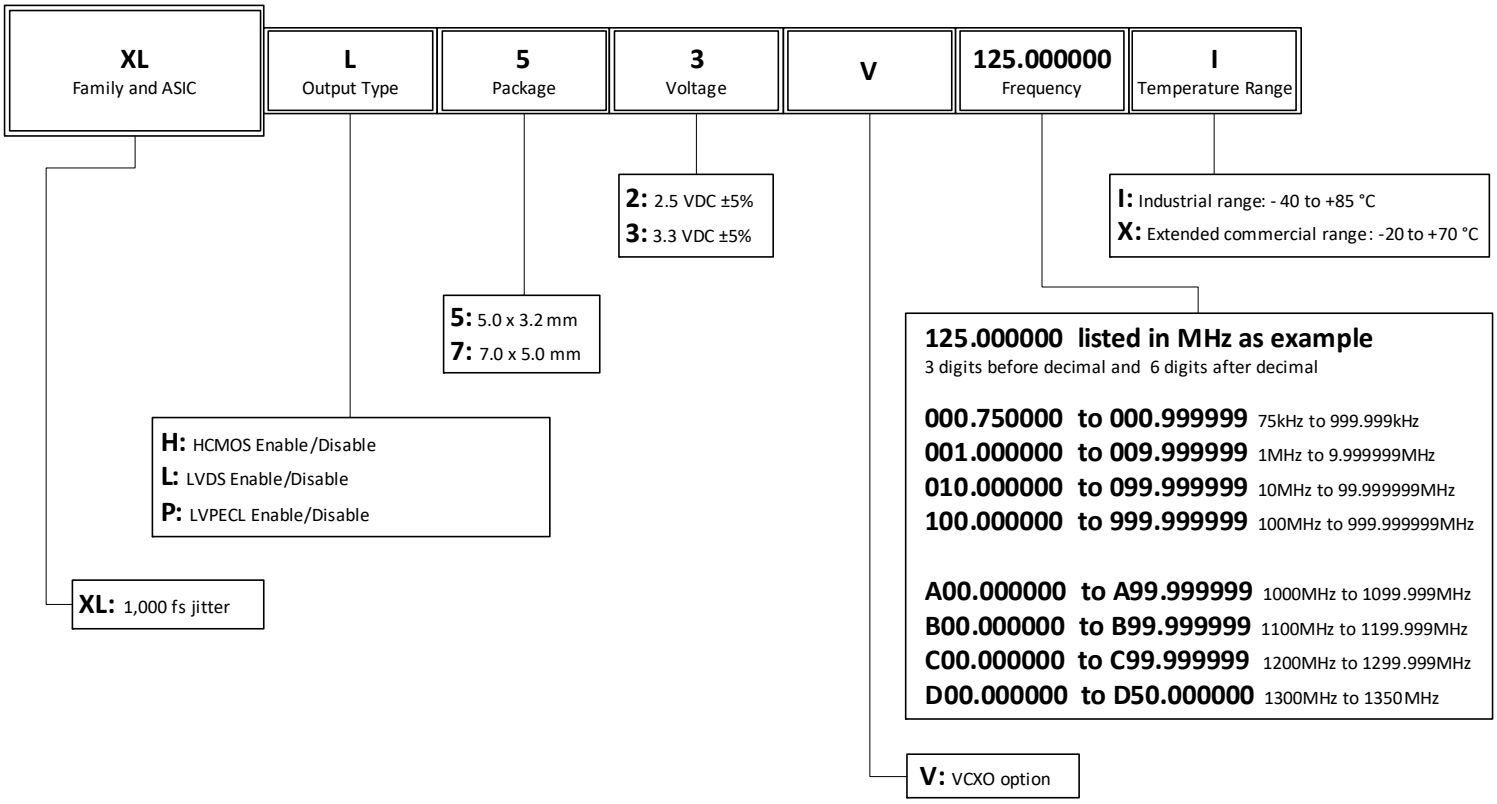
www.idt.com/document/psc/jx4-package-outline-32-x-25-mm-body-09-mm-thick

Ordering Information (XO)



* ±20ppm for X (-20° to +70°C) only.
** ±100ppm and ±50ppm for K (-40°C to +105°C) only.

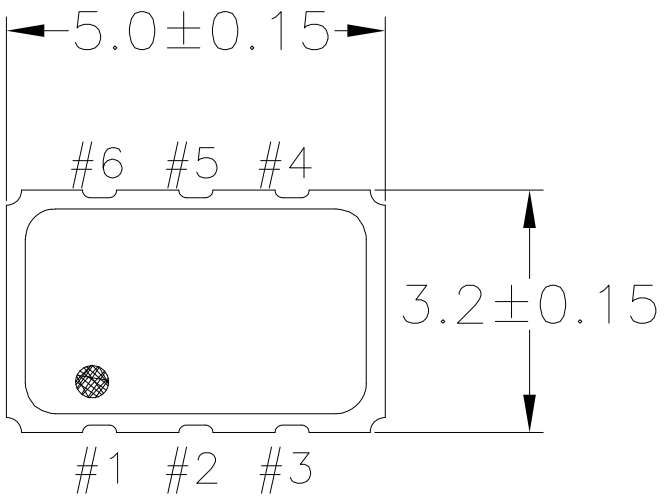
Ordering Information (VCXO)



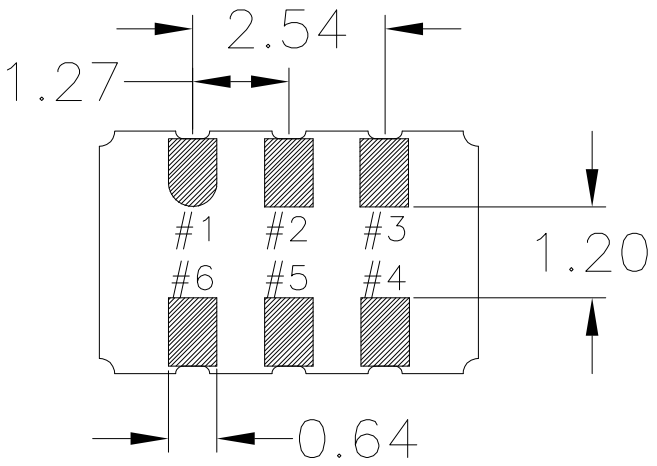
Revision History

Revision Date	Description of Change
April 27, 2020	Updated ODC parameter. 2nd LVCMOS row to be changed from <= to > 62.5 MHz.
September 7, 2018	Updated frequency stability options value from ±20ppm to ±25ppm for -40°C to +85°C XO only.
June 25, 2018	▪ Updated Package Outline Drawings section.
May 4, 2018	▪ Added XO and VCXO options. ▪ Updated description and Features sections. ▪ Updated Package Outline Drawings section. ▪ Added VCXO Ordering Information decoder diagram.
January 12, 2018	Initial release.

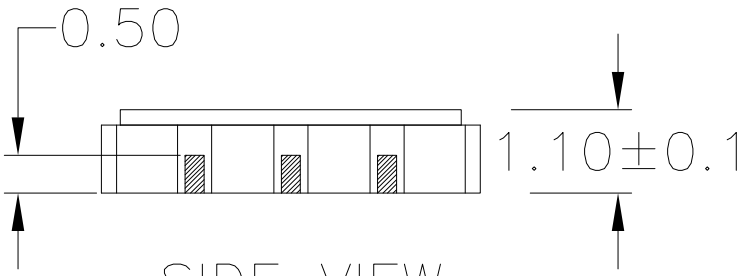
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	04/2/12	DP
01	ADDED LID IN TOP VIEW	07/12/12	KS
02	UPDATED LID TOLERANCES	12/03/12	KS
03	UPDATE PACKAGE DRAWING	8/8/14	J.HUA



TOP VIEW



BOTTOM VIEW



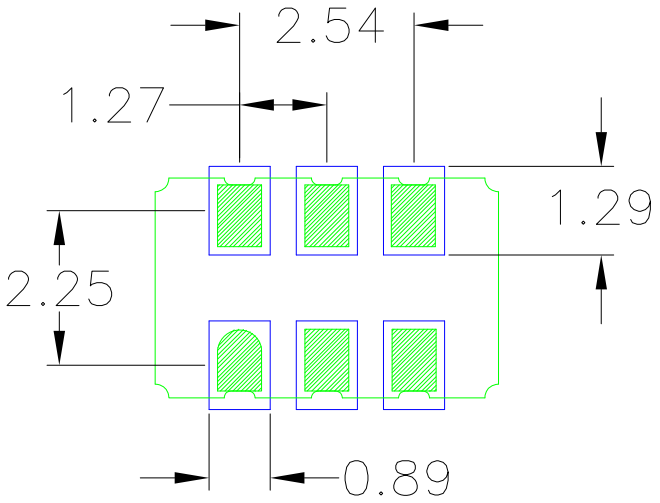
SIDE VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JS6 PACKAGE OUTLINE 5.0 x 3.2 mm BODY 1.1 mm Thick
DRAWN RAC	04/2/12		
CHECKED			
		SIZE C	DRAWING No. PSC-4411 REV 03
		DO NOT SCALE DRAWING	SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	04/2/12	DP
01	ADDED LID IN TOP VIEW	07/12/12	KS
02	UPDATED LID TOLERANCES	12/03/12	KS
03	UPDATE PACKAGE DRAWING	8/8/14	J.HUA



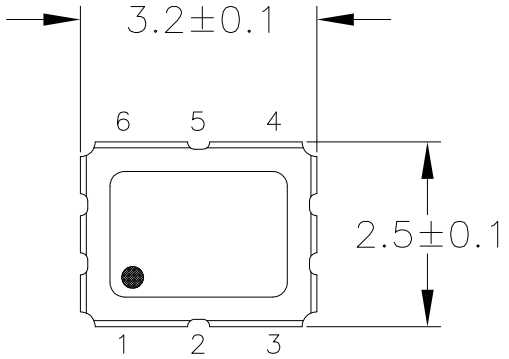
RECOMMENDED LAND PATTERN

NOTES:

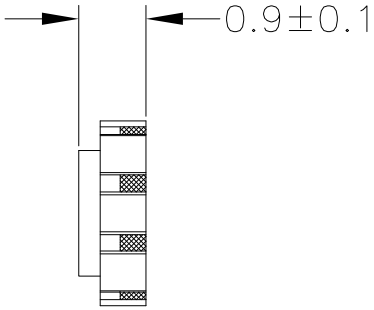
1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JS6 PACKAGE OUTLINE 5.0 x 3.2 mm BODY 1.1 mm Thick
DRAWN PEAC	04/2/12		
CHECKED			
		SIZE C	DRAWING No. PSC-4411 REV 03
		DO NOT SCALE DRAWING	SHEET 2 OF 2

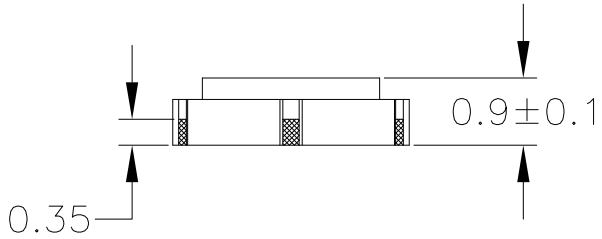
REVISIONS			
REV	DESCRIPTION	DATE CREATED	AUTHOR
00	INITIAL RELEASE	8/11/14	J.HUA
01	ADD PITCH	11/17/16	J.HUA
REFER TO DCP FOR OFFICIAL RELEASE DATE			



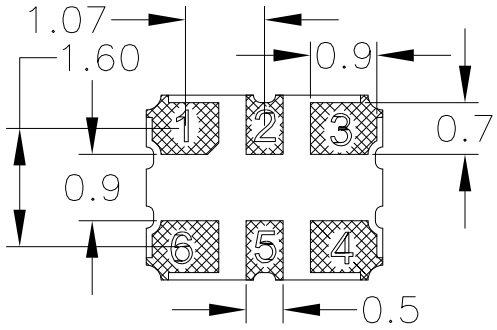
TOP VIEW



END VIEW



SIDE VIEW



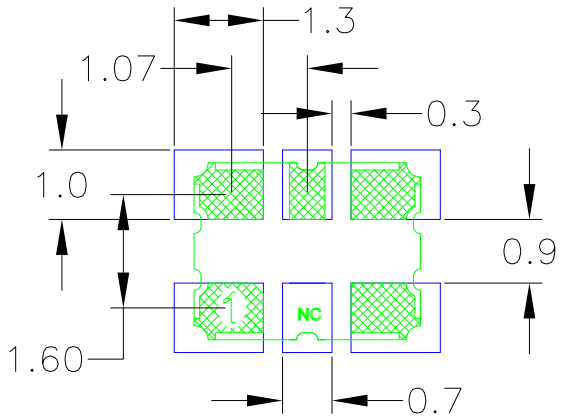
BOTTOM VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL XX± XXX± XXXX± ANGULAR ±	IDT™ www.IDT.com 6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
	TITLE JX6 PACKAGE OUTLINE 3.2 x 2.5 mm BODY 0.9 mm Thick
	SIZE C | DRAWING No. PSC-4412 | REV 01
	DO NOT SCALE DRAWING | SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE CREATED	AUTHOR
00	INITIAL RELEASE	8/11/14	J.HUA
01	ADD PITCH	11/17/16	J.HUA
REFER TO DCP FOR OFFICIAL RELEASE DATE			



RECOMMENDED LAND PATTERN DIMENSION

NOTES:

1. ALL DIMENSIONS ARE IN MM. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOWS FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED
DECIMAL ANGULAR
XX± ±
XXX±
XXXX±

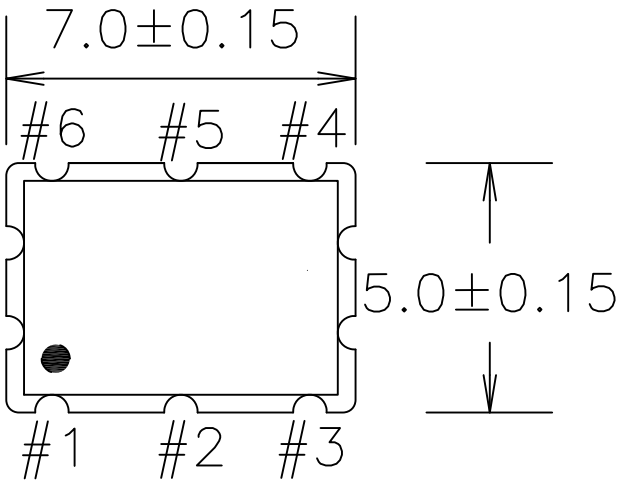
IDT™ www.IDT.com
6024 Silver Creek Valley Rd
San Jose, CA 95138
PHONE: (408) 727-6116
FAX: (408) 492-8674

TITLE JX6 PACKAGE OUTLINE
3.2 x 2.5 mm BODY
0.9 mm Thick

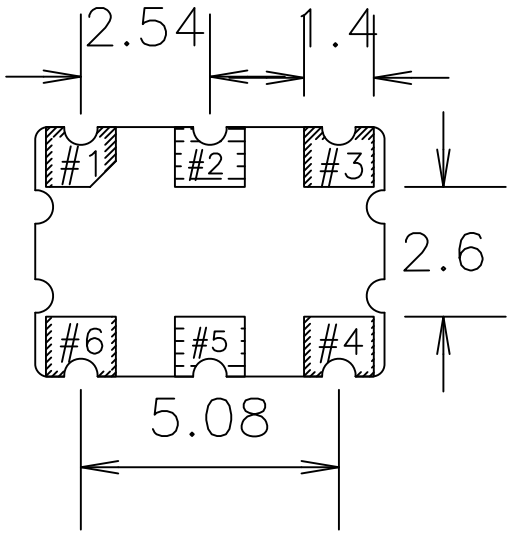
SIZE C | DRAWING No. PSC-4412 | REV 01

DO NOT SCALE DRAWING | SHEET 2 OF 2

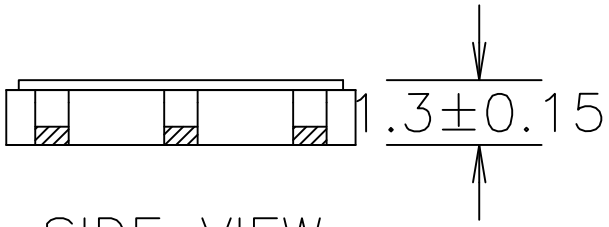
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	10/5/12	KS
01	UPDATE PACKAGE DRWING	8/12/14	J.HUA



TOP VIEW



BOTTOM VIEW



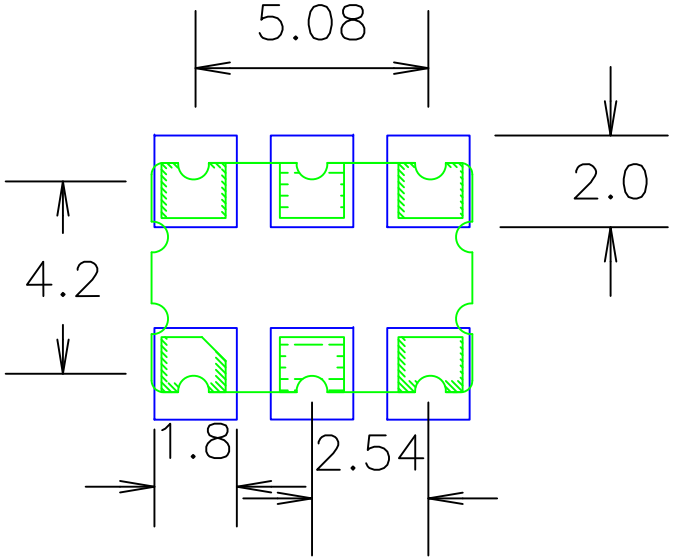
SIDE VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JU6 PACKAGE OUTLINE 7.0 x 5.0 mm BODY 1.3 mm Thick
DRAWN KB	10/03/12		
CHECKED		SIZE C	DRAWING No. PSC-4430 REV 01
		DO NOT SCALE DRAWING	SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	10/5/12	KS
01	UPDATE PACKAGE DRWING	8/12/14	J.HUA



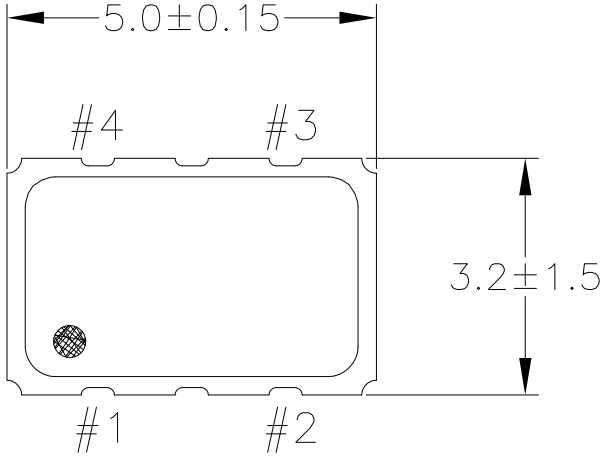
RECOMMENDED LAND PATTERN

NOTES:

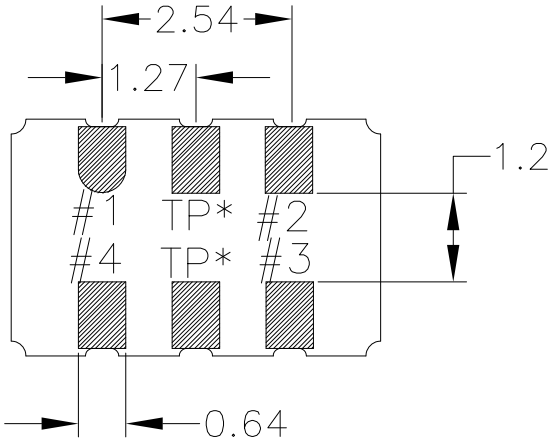
1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE JU6 PACKAGE OUTLINE 7.0 x 5.0 mm BODY 1.3 mm Thick	
DRAWN JCB	10/03/12		
CHECKED			
		SIZE C / DRAWING No. PSC-4430	REV 01
		DO NOT SCALE DRAWING	SHEET 2 OF 2

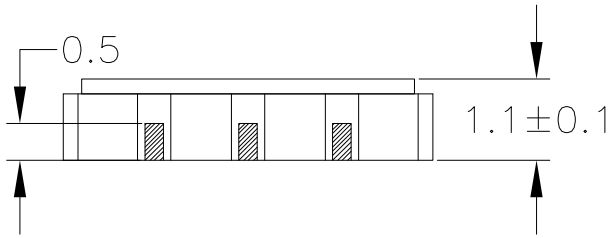
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	08/21/12	K. Stahn
01	UPDATED LID TOLERANCES	12/03/12	K. Stahn
02	UPDATE PACKAGE DRAWING	8/8/14	J.HUA



TOP VIEW



BOTTOM VIEW



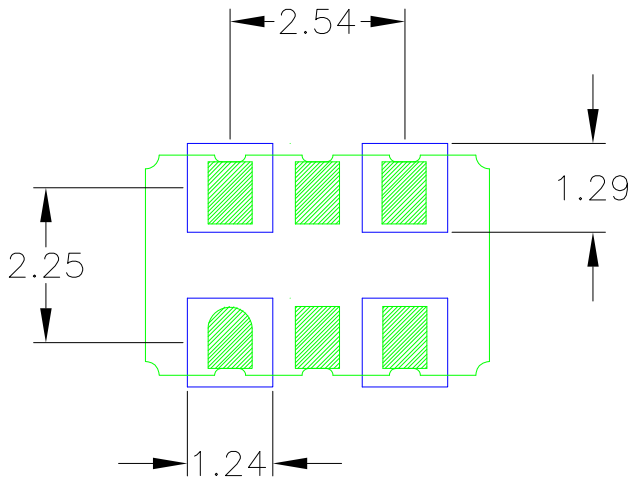
SIDE VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE JS4 PACKAGE OUTLINE 5.0 x 3.2 mm BODY 1.1 mm Thick	
DRAWN KB	07/16/12		
CHECKED			
		SIZE C / DRAWING No. PSC-4429	REV 02
		DO NOT SCALE DRAWING	SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	08/21/12	K. Stahn
01	UPDATED LID TOLERANCES	12/03/12	K. Stahn
02	UPDATE PACKAGE DRAWING	8/8/14	J.HUA



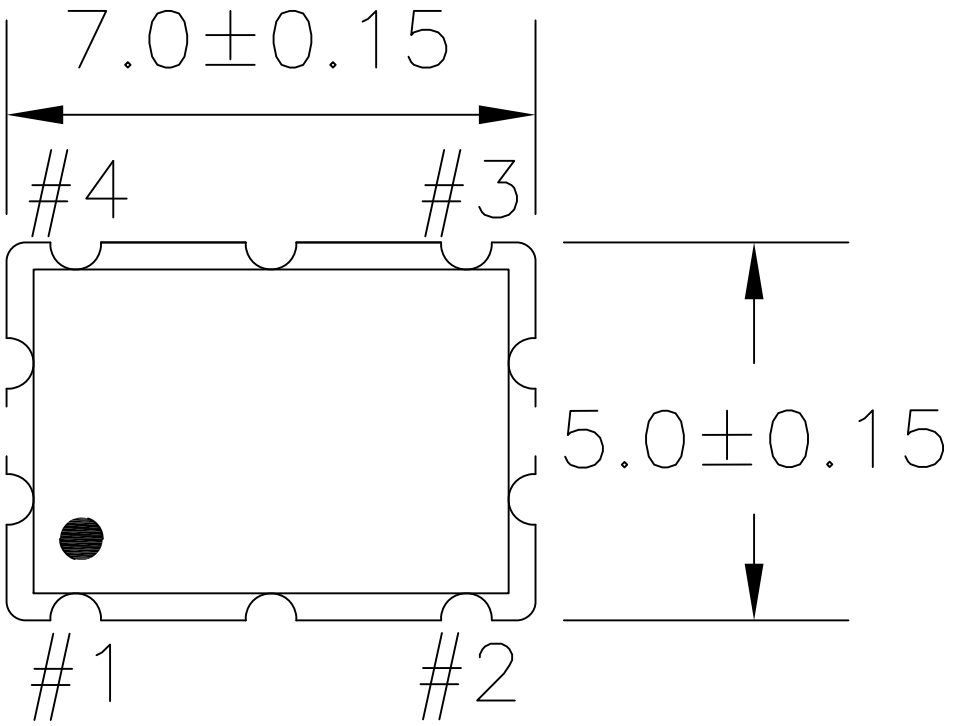
RECOMMENDED LAND PATTERN

NOTES:

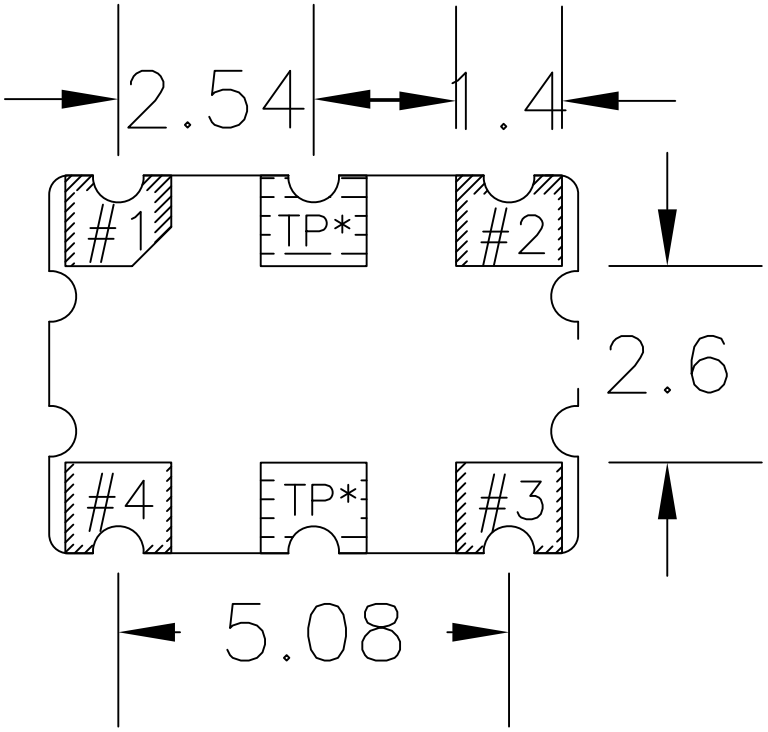
1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JS4 PACKAGE OUTLINE 5.0 x 3.2 mm BODY 1.1 mm Thick
DRAWN JCS	07/16/12		
CHECKED			
		SIZE C	DRAWING No. PSC-4429 REV 02
		DO NOT SCALE DRAWING	SHEET 2 OF 2

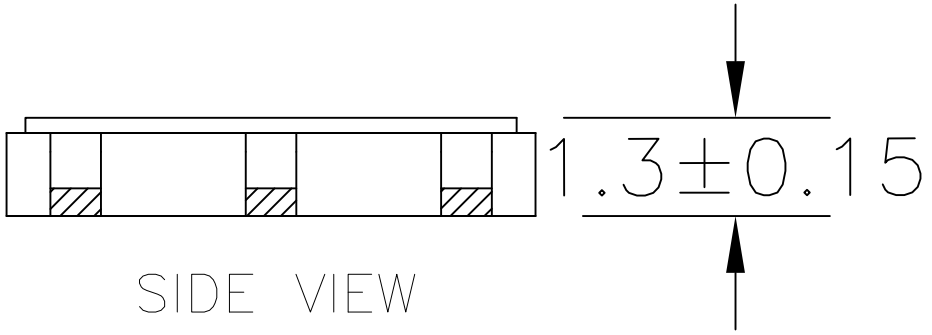
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	10/09/12	KS
01	UPDATE PACKAGE DRWING	8/11/14	J.HUA



TOP VIEW



BOTTOM VIEW



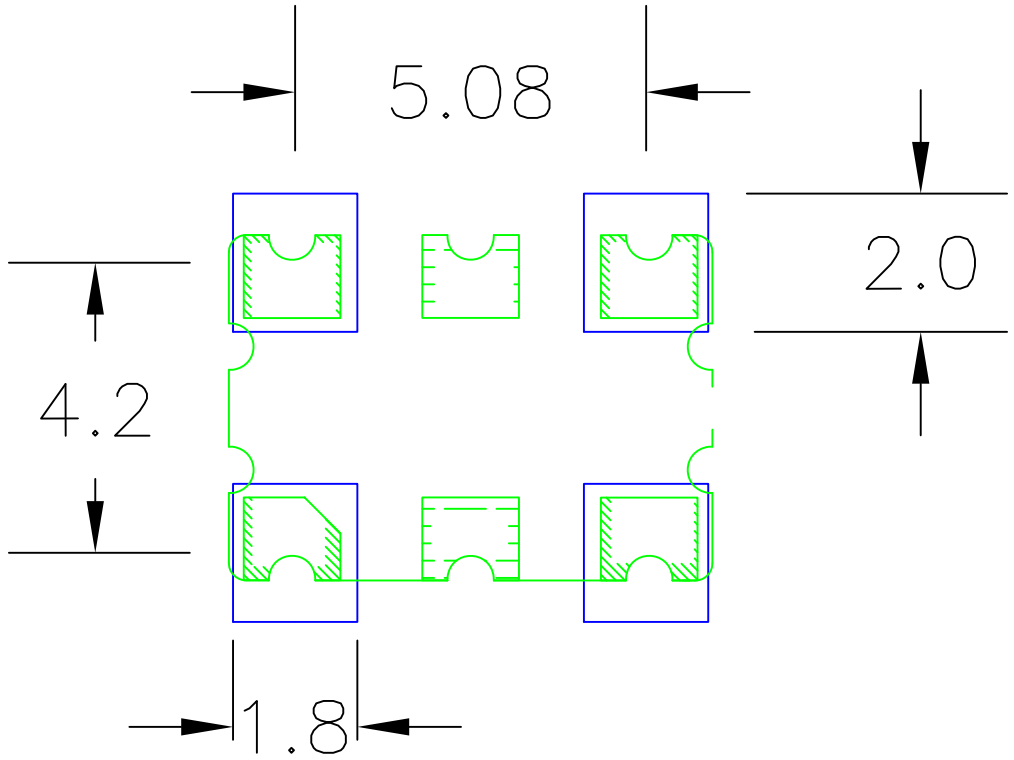
SIDE VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JU4 PACKAGE OUTLINE 7.0 x 5.0 mm BODY 1.3 mm Thick
DRAWN KS	10/05/12		
CHECKED			
		SIZE C	DRAWING No. PSC-4431 REV 01
		DO NOT SCALE DRAWING	SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	10/09/12	KS
01	UPDATE PACKAGE DRWING	8/11/14	J.HUA



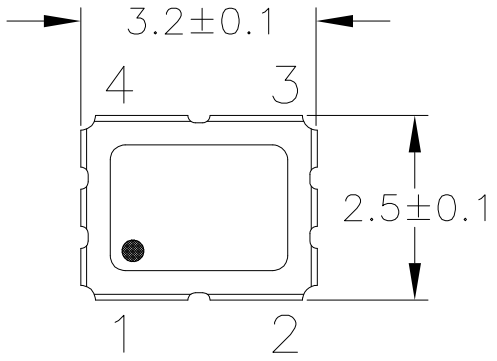
RECOMMENDED LAND PATTERN

NOTES:

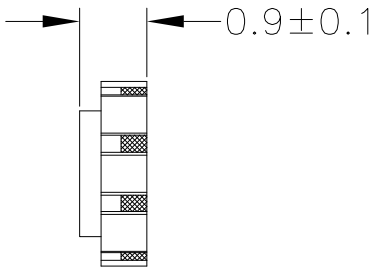
1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JU4 PACKAGE OUTLINE 7.0 x 5.0 mm BODY 1.3 mm Thick
DRAWN KS	10/05/12		
CHECKED			
		SIZE C	DRAWING No. PSC-4431 REV 01
		DO NOT SCALE DRAWING	SHEET 2 OF 2

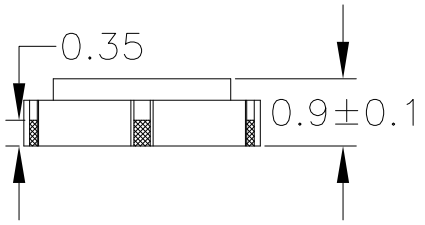
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	8/8/14	J.HUA
01	ADD OPTION 1 & 2	4/2/15	J.HUA



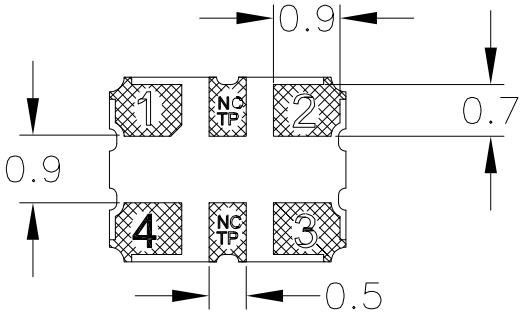
TOP VIEW



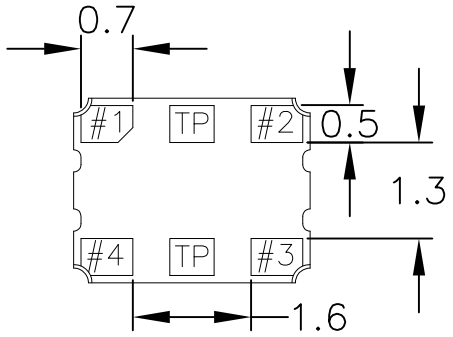
END VIEW



SIDE VIEW



OPTION 1
BOTTOM VIEW



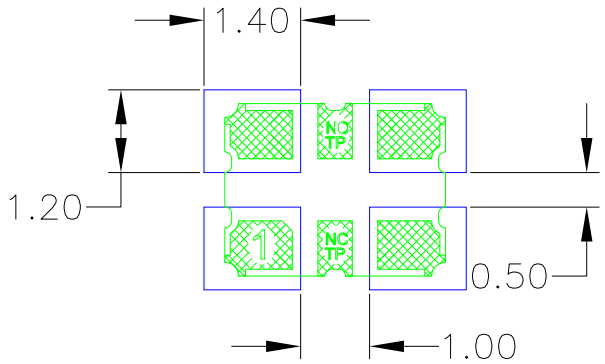
OPTION 2
BOTTOM VIEW

NOTES:

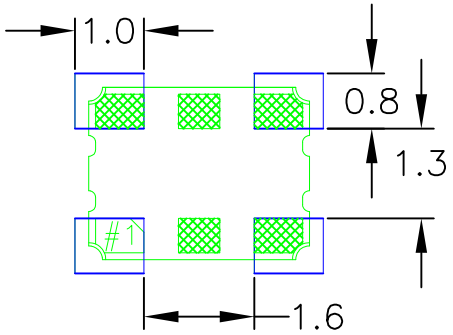
1. ALL DIMENSIONS IN MM.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±		IDT™ www.IDT.com	6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674
APPROVALS	DATE	TITLE	JX4 PACKAGE OUTLINE 3.2 x 2.5 mm BODY 0.9 mm Thick
DRAWN RAC	8/8/14		
CHECKED			
		SIZE C	DRAWING No. PSC-4489 REV 01
		DO NOT SCALE DRAWING	SHEET 1 OF 2

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
00	INITIAL RELEASE	8/8/14	J.HUA
01	ADD OPTION 1 & 2	4/2/15	J.HUA



OPTION 1



OPTION 2

RECOMMENDED LAND PATTERN

NOTES:

1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOWN FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

TOLERANCES UNLESS SPECIFIED DECIMAL ANGULAR XX± ± XXX± XXXX±	IDT™ 6024 Silver Creek Valley Rd San Jose, CA 95138 PHONE: (408) 727-6116 FAX: (408) 492-8674 www.IDT.com
APPROVALS DATE DRAWN RAC 8/8/14 CHECKED	TITLE JX4 PACKAGE OUTLINE 3.2 x 2.5 mm BODY 0.9 mm Thick
SIZE C	DRAWING No. PSC-4489 REV 01
DO NOT SCALE DRAWING	SHEET 2 OF 2

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(Rev.1.0 Mar 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

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