

# SURFACE MOUNT HCMOS CLOCK OSCILLATORS

## FSO-2 SERIES

The FSO series is compatible with both TTL and HCMOS technologies. The J-led configuration and high resistance to soldering temperature make it ideal for surface mount production processes. The FSO offers the low power consumption of HCMOS, but will drive a full 10 TTL Gates when used in a TTL application. This part is built to withstand vapor phase and other high temperature soldering operations and to give long term outstanding performance and reliability.



Actual Size

OSCILLATORS

### FEATURES

- Extended Temperature Range
- Solderable @ 260° for 10 sec.
- Tape and Reel (1,000 pcs. STD)

**For Functional and Electrical Lower Cost Alternative See Page 50.**

### • ELECTRICAL CHARACTERISTICS (Ta = 25°C, VDD = 5.0V, CL = Max Load)

PARAMETERS	CONDITIONS	FSO-2		FSO-2T		FSO-2H		UNITS
		MIN	MAX	MIN	MAX	MIN	MAX	
Frequency Range		1.025	26.000	26.000+	66.667	26.000+	66.667	MHz
Frequency Stability *	-10°C ~ +70°C -40°C ~ +85°C	-100 -200	+100 +200	-100 -200	+100 +200	-100 ----	+100 ---	PPM
Temperature Range								
Operating (TOPR)		-10	+70	-10	+70	-10	+70	°C
Storage (TSTG)		-55	+125	-55	+125	-55	+125	
Supply Voltage (VDD)		+4.5	+5.5	+4.5	+5.5	+4.5	+5.5	V
Input Current (IDD)	No Load Output Disabled (Iz)		23 12		35 28		35 20	mA
Output Symmetry	2.5V 1.4V	40 45	60 55	---	---	40 ---	60 ---	%
Rise Time (Tr)	1.0V ~ 4.0V 0.4V ~ 2.4V		8 8		5 5		7 7	nS
Fall Time (Tf)	4.0V ~ 1.0V 2.4V ~ 0.4V		8 8		5 5		7 7	
Output Voltage (VOL) (VOH)	IOL = MAX IOH = MAX	4.6	0.4	2.4	0.4	4.6	0.4	V
Output Current (IOL) (IOH)	VOL = MAX VOH = MIN		16 -0.4		8 -0.4		4.0 -4.0	mA
Output Load	HCMOS TTL		50 10		5		50	pF TTL
Start-up Time (Ts)			4		10		10	mS
Output Enable/Disable Time			100		100		100	nS

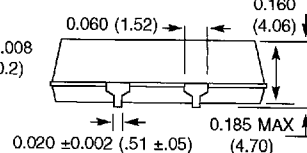
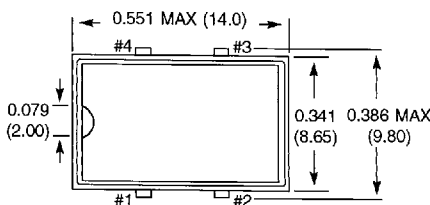
\* Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, aging, shock, and vibration.  
 \*\*\* An internal pullup resistor from pin 1 to pin 4 allows active output if pin 1 is left open.  
 See page 33 for environmental/mechanical specifications, test circuits, and output waveform.  
 Note: ±50PPM frequency stability at -10 to +70°C also available  
 Note: A 0.01µF bypass capacitor should be placed between VDD (Pin 4) and GND (Pin 2) to minimize power supply line noise.  
 All specifications subject to change without notice. Rev. 2/25/97

### • ENABLE / DISABLE FUNCTION \*\*

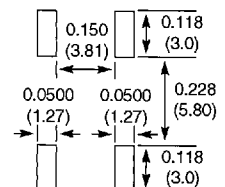
INH (Pin 1)	OUTPUT (Pin 3)
OPEN ***	ACTIVE
'1' Level VIH ≥ 2.0 V (FSO-2 / FSO-2H)	ACTIVE
'1' Level VIH ≥ 3.5 V (FSO-2 T)	ACTIVE
'0' Level VIL ≤ 0.8 V (FSO-2 / FSO-2H)	High Z
'0' Level VIL ≤ 1.5 V (FSO-2 T)	High Z

#### Pin Connections

- #1 E/D\*\*
- #2 GND
- #3 Output
- #4 +5VDC



#### Recommended Solder Pad Layout

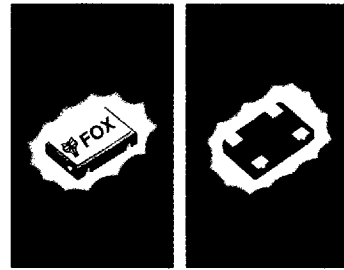


Inch dimensions shall govern.  
 All dimensions are in inches & parenthetically in millimeters.  
 See page 58 for tape and reel specifications.

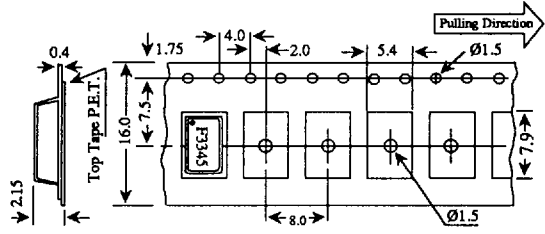
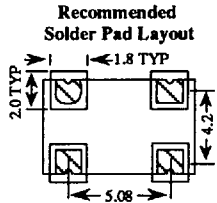
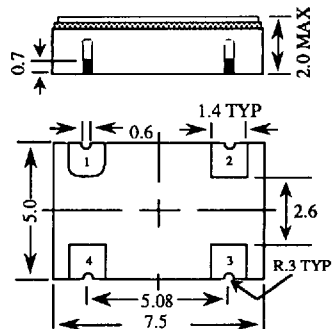
# SURFACE MOUNT OSCILLATORS

The F3345/F3340 & F3355/F3350 are ceramic oscillators, perfect for applications such as miniature computers and peripherals, telecommunication devices and instrumentation. Featuring tri-state enable/disable, high capacitive load option, and low EMI. (See pg. 60 - 61 for further information)

	F3345	F3355
Frequency Range	1.8432 ~ 67 MHz	1.8432 ~ 50 MHz
Frequency Stability	±100PPM (F3345) ±50PPM (F3340)	±100PPM (F3355) ±50PPM (F3350)
Operating Temperature	-10°C to +70°C	-10°C to +70°C
Input Current		
1.8432 ~ 25 MHz	25 mA MAX	20mA MAX
25 ~ 50 MHz	45 mA MAX	35mA MAX
50 ~ 67 MHz	60 mA MAX	-----
Symmetry @ 2.5 VDC	45/55% MAX	45/55% MAX
Rise/Fall Time	7 ns MAX	10 ns MAX
Output Load	10 TTL or 50 pF	10 LS-TTL or 15 pF

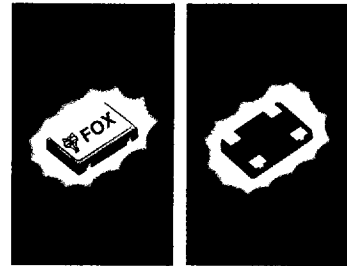


**Pin Connections**  
#1 E/D #3 OUTPUT  
#2 GND #4 5VDC

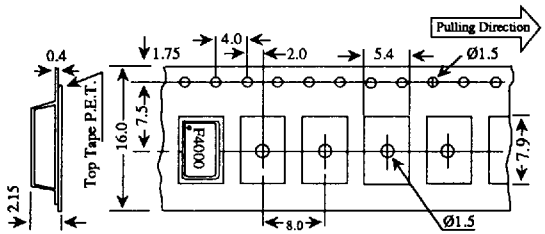
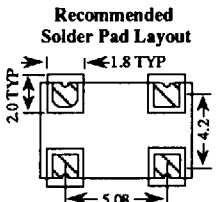
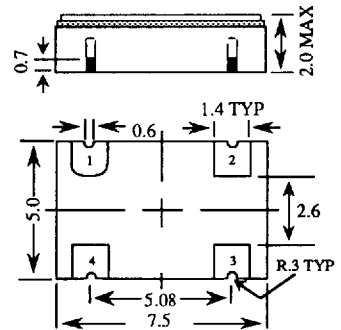


Fox supports the leading edge of technology with a new low-voltage oscillator, the F4000. Among the many benefits of a 3.3V system are an increase in battery life, reduced heat generation and improved EMI, packaged with the low profile necessary for today's advanced portable PC and instrumentation designs. (See pg. 62 - 63 for further information)

	F4000
Frequency Range	1.8432 ~ 50.000 MHz
Frequency Stability	±100PPM
Operating Temperature	-10°C to +70°C
Input Current	
1.8432 ~ 32.000 MHz	12.0 mA MAX
32.000+ ~ 50.000 MHz	16.5 mA MAX
Symmetry	45/55% MAX
Rise/Fall Time	7 ns MAX
Output Load - HCMOS	15 pF



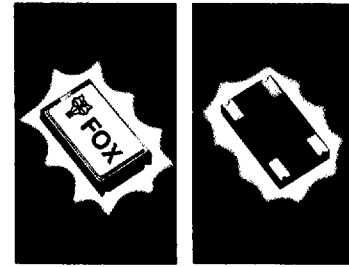
**Pin Connections**  
#1 E/D #3 OUTPUT  
#2 GND #4 3.3VDC



All dimensions in mm

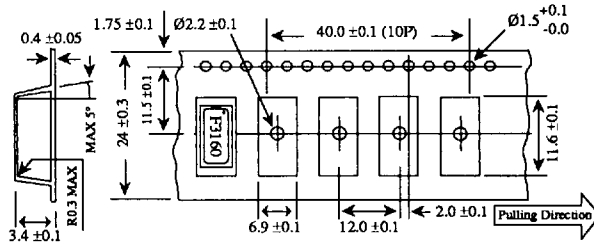
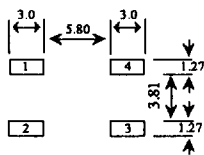
# SURFACE MOUNT OSCILLATORS

The F3160 / F3170 & F3165 / F3175 are ceramic oscillators which can drive both HCMOS and TTL loads in high density applications. Features include tri-state enable/disable, industry compatible pinout, and low noise. (See pg. 58 - 59 for further information)

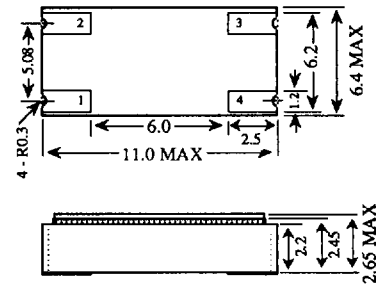


	<b>F3160</b>	<b>F3165</b>
Frequency Range	1.8432 - 100 MHz	1.8432 - 50 MHz
Frequency Stability	±100PPM ±50PPM (F3170)	±100PPM ±50PPM (F3175)
Operating Temperature	-10°C to +70°C	-10°C to +70°C
Input Current		
1.8432 ~ 25 MHz	25 mA MAX	20 mA MAX
25 ~ 50 MHz	45 mA MAX	35 mA MAX
50 ~ 70 MHz	70 mA MAX	-----
70 ~ 100 MHz	80 mA MAX	-----
Symmetry @ 2.5 VDC	40/60% MAX	45/55% MAX
Rise/Fall Time		
1.8432 ~ 70 MHz	7 ns MAX	10 ns MAX
70+ ~ 100 MHz	3ns MAX	-----
Output Load		
1.8432 ~ 70 MHz	10 TTL	10 LSTTL
1.8432 ~ 100 MHz	50 pF	15 pF

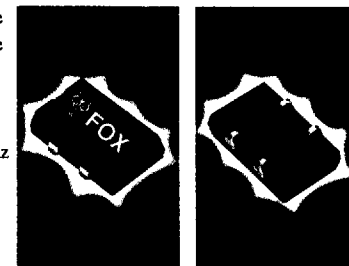
**Recommended Solder Pad Layout**



**Pin Connections**  
#1 E/D #3 Output  
#2 GND #4 +5 VDC

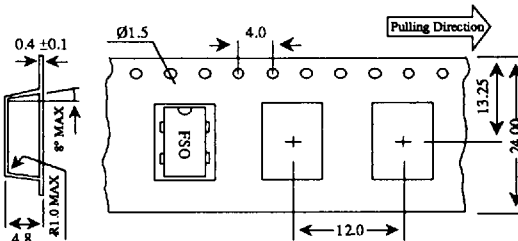
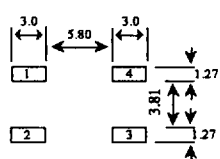


The FSO Series Oscillator is compatible with both TTL and HCMOS technologies. Features include extended temperature range, 5000 G shock resistance, and tri-state enable/disable option. Enable option FSO-2, FSO-2T, and FSO-2H. (See pg. 56 - 57 for further information)

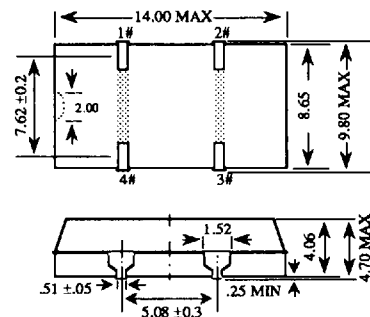


	<b>FSO / FSO-2</b>	<b>FSO-T/FSO-2T</b>	<b>FSO-H</b>	<b>FSO-2H</b>
Frequency Range	1.025 - 26 MHz	26 - 36 MHz	30 - 55 MHz	26 - 66.667 MHz
Frequency Stability				
-10°C to +70°C	±100PPM	±100PPM	±100PPM	±100PPM
-40°C to +85°C	±200PPM	±200PPM	-----	-----
Input Current				
No Load	23 mA MAX	35 mA MAX	35 mA MAX	35 mA MAX
Disabled (-2, -2T, -2H only)	12 mA MAX	20 mA MAX	-----	20 mA MAX
Symmetry	40/60% MAX	40/60% MAX	40/60% MAX	40/60% MAX
Rise/Fall Time	8 ns MAX	10 ns MAX	7 ns MAX	7 ns MAX
Output Load	10 TTL or 50 pF	10 TTL or 30 pF	10 LS-TTL or 50 pF	50 pF

**Recommended Solder Pad Layout**



**Pin Connections**  
#1 E/D or N.C. #3 Output  
#2 GND #4 +5 VDC



All dimensions in mm