

Helping Customers Innovate, Improve & Grow

Features

- Any frequency between 220 MHz and 625 MHz accurate to 6 decimal places
- LVPECL and LVDS output signaling types
- 0.75ps RMS phase jitter (random) over 12 kHz to 20 MHz bandwidth
- Industrial and extended commercial temperature ranges
- Industry-standard packages: 3.2mm x 2.5mm, 5.0 mm x 3.2 mm and 7.0 mm x 5.0 mm

Applications

- SONET, Synchronous Ethernet, SATA, SAS, 10GB Ethernet, Fibre Channel, PCI-Express
- Telecom, networking, broadband, instrumentation

Performance Specifications

Parameter and Conditions	Symbol	Min.	Typ.	Max.	Unit	Condition
LVPECL and LVDS, Common AC Characteristics						
Output Frequency Range	f	220	–	625	MHz	For frequency coverage see last page
Frequency Stability		-20	–	+20	PPM	Inclusive of Initial tolerance at 25 °C, and variations over operating temperature, aging, supply voltage and load
		-50	–	+50	PPM	
1-year Aging		-1	–	+1	PPM	First year @ 25°C
10-year Aging		-5	–	+5	PPM	@ 85°C
Operating Temperature Range	T _{use}	-40	–	+85	°C	Industrial
		-20	–	+70	°C	Extended Commercial
Start-up Time	T _{start}	–	–	10	ms	
Duty Cycle	DC	45	–	55	%	f = 220 to 312.5 MHz and f = 525 to 625 MHz
		40	–	60	%	f = 420 to 500 MHz
LVPECL, DC and AC Characteristics						
Supply Voltage	V _{dd}	2.97	3.3	3.63	V	
		2.25	2.5	2.75	V	
Current Consumption	I _{dd}	–	61	69	mA	Excluding Load Termination Current, V _{dd} = 3.3V or 2.5V
OE Disable Supply Current	I _{OE}	–	–	35	mA	OE = GND
Output Disable Leakage Current	I _{leak}	–	–	1	µA	OE = GND
Maximum Output Current	I _{driver}	–	–	30	mA	Maximum average current drawn from OUT+ or OUT-
Output High Voltage	VOH	V _{dd} -1.1	–	V _{dd} -0.7	V	See Figure 1
Output Low Voltage	VOL	V _{dd} -1.9	–	V _{dd} -1.5	V	See Figure 1
Output differential Voltage Swing	V _{Swing}	1.2	1.6	2.0	V	See Figure 1
Rise/Fall Time	T _r , T _f	100	300	500	ps	20% to 80%
OE Enable/Disable Time	T _{oe}	–	–	102	ns	f = 625 MHz - For other frequencies, T _{oe} = 100ns + 3 period
RMS Period Jitter	T _{jitt}	–	1.2	1.7	ps	f = 266 MHz, V _{DD} = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 312.5 MHz, V _{DD} = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 622.08 MHz, V _{DD} = 3.3V or 2.5V
RMS Phase Jitter (random)	T _{phj}	–	0.5	0.75	ps	f = 312.5 MHz, Integration bandwidth = 12 kHz to 20 MHz, all V _{dds}
LVDS, DC and AC Characteristics						
Supply Voltage	V _{dd}	2.97	3.3	3.63	V	
		2.25	2.5	2.75	V	
Current Consumption	I _{dd}	–	47	55	mA	Excluding Load Termination Current, V _{dd} = 3.3V or 2.5V
OE Disable Current	I _{OE}	–	–	35	mA	OE = V _{dd}
Output Disable Leakage Current	I _{leak}	–	–	1	µA	OE = V _{dd}
Differential Output Voltage	V _{OD}	200	350	500	mV	See Figure 4
V _{OD} Magnitude Change	ΔV _{OD}	–	–	50	mV	See Figure 4
Offset Voltage	V _{OS}	1.125	1.2	1.375	V	See Figure 4
V _{OS} Magnitude Change	ΔV _{OS}	–	–	50	mV	See Figure 4
Rise/Fall Time	T _r , T _f	360	495	600	ps	20% to 80%
OE Enable/Disable Time	T _{oe}	–	–	102	ns	f = 625 MHz - For other frequencies, T _{oe} = 100ns + 3 period
RMS Period Jitter	T _{jitt}	–	1.4	1.7	ps	f = 266 MHz, V _{DD} = 3.3V or 2.5V
		–	1.4	1.7	ps	f = 312.5 MHz, V _{DD} = 3.3V or 2.5V
		–	1.2	1.7	ps	f = 622.08 MHz, V _{DD} = 3.3V or 2.5V
RMS Phase Jitter (random)	T _{phj}	–	0.6	1.0	ps	f = 312.5 MHz, Integration bandwidth = 12 kHz to 20 MHz, all V _{dds}

Typical Phase Noise

Agilent E5052A Signal Source Analyzer

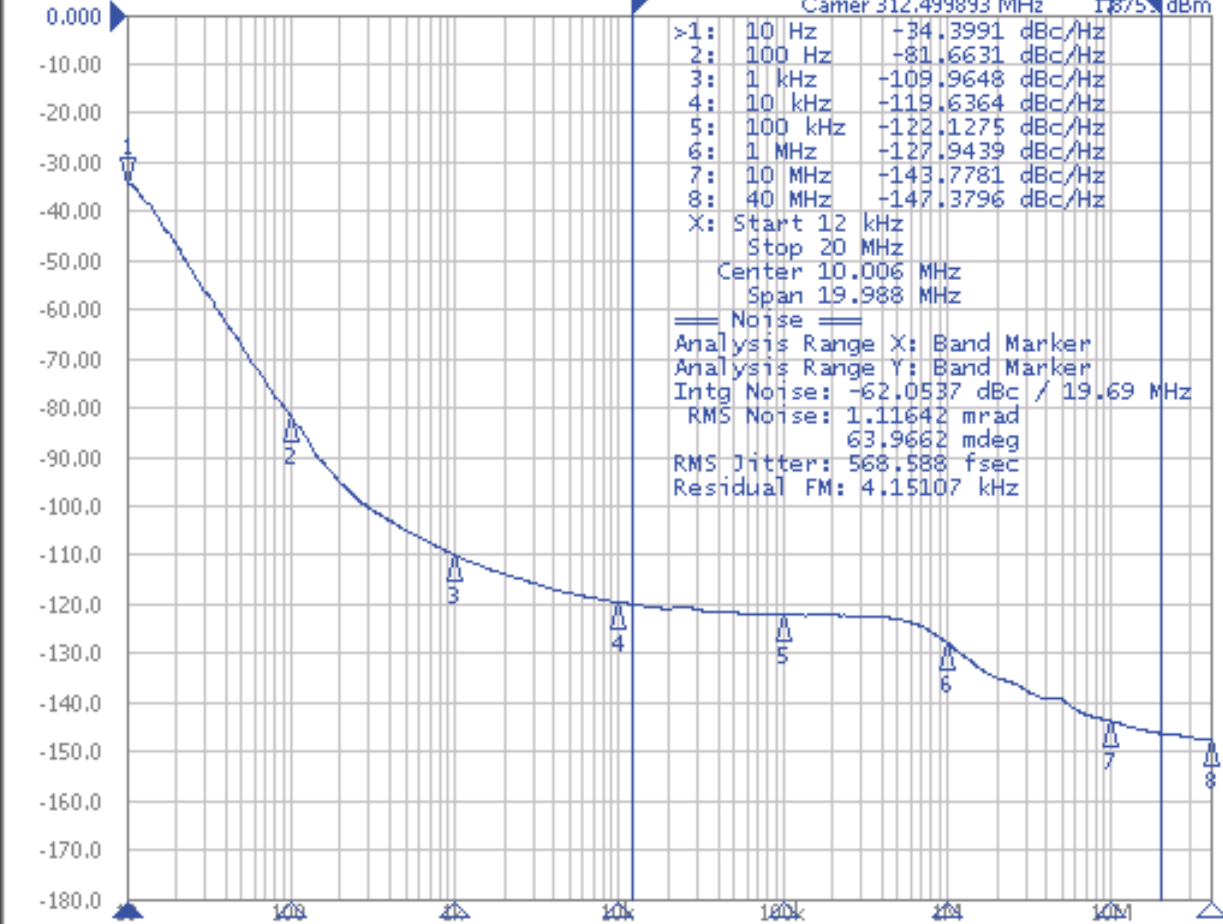
Phase Noise 10.00dB/ Ref 0.000dBc/Hz [Smo]

Carrier 312.499893 MHz 1875 dBm

>1:	10 Hz	+34.3991 dBc/Hz
2:	100 Hz	-81.6631 dBc/Hz
3:	1 kHz	-109.9648 dBc/Hz
4:	10 kHz	-119.6364 dBc/Hz
5:	100 kHz	-122.1275 dBc/Hz
6:	1 MHz	-127.9439 dBc/Hz
7:	10 MHz	-143.7781 dBc/Hz
8:	40 MHz	-147.3796 dBc/Hz

X: Start 12 kHz
Stop 20 MHz
Center 10.006 MHz
Span 19.988 MHz

== Noise ==
Analysis Range X: Band Marker
Analysis Range Y: Band Marker
Intg Noise: -62.0537 dBc / 19.69 MHz
RMS Noise: 1.11642 mrad
63.9662 mdeg
RMS Jitter: 568.588 fsec
Residual FM: 4.15107 kHz



IF Gain 20dB Freq Band [99M-1.5GHz] Omit LO Opt [<150kHz] 853pts

Phase Noise Start 10 Hz Stop 40 MHz 8/8

Phase Noise: Hold Cor Ctrl 1.65V Pow 3.3V Attn 0dB ExtRef Stop Svc 2012-12-20 11:11

Save/Recall

Save State

Recall State

Recall by

File Name

Save

Data Trace ...

Save

Memory Trace ...

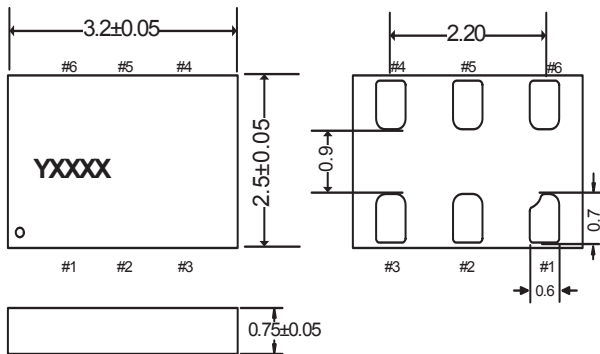
Explorer

Return

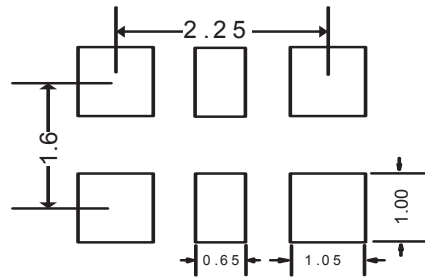
Outline Drawing / Packaging

Package Outline & Dimensions (Unit: mm)

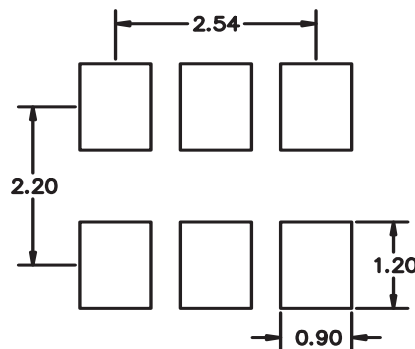
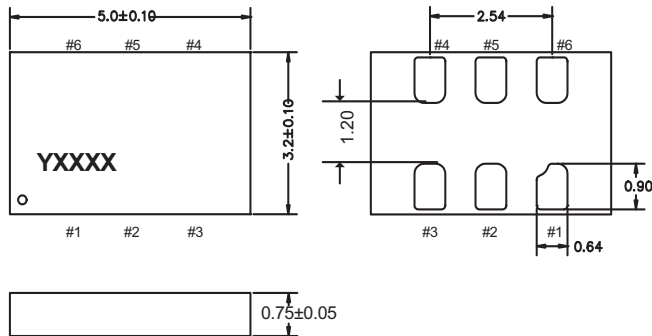
3.2 x 2.5 x 0.75 mm



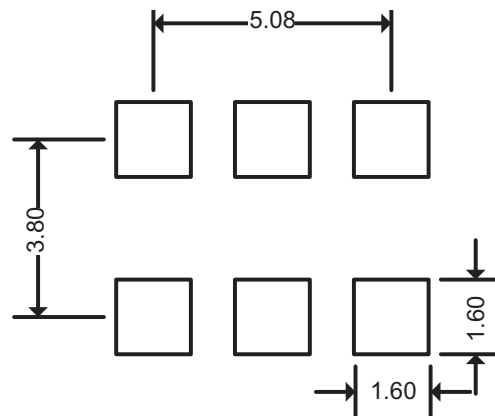
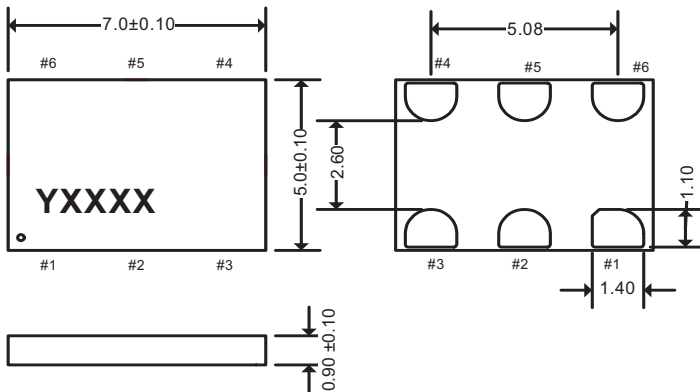
Recommended Land Pattern (Unit: mm)



5.0 x 3.2 x 0.75 mm



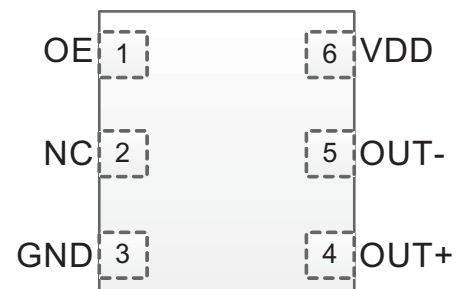
7.0 x 5.0 x 0.90 mm



Pin Connections

Pin	Symbol		Functionality
1	OE	Input	H or Open: specified frequency output L: output is high impedance
2	NC	NA	Do Not Connect; Leave it floating
3	GND	Power	VDD Power Supply Ground
4	OUT+	Output	Oscillator output
5	OUT-	Output	Complementary oscillator output
6	VDD	Power	Power supply voltage

Top View



Termination Circuit Examples

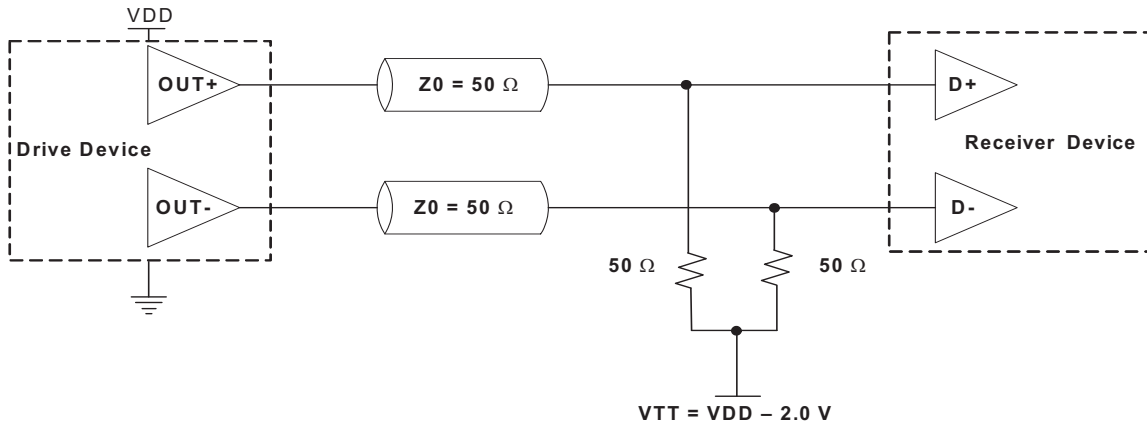


Figure 1. LVPECL Typical Termination

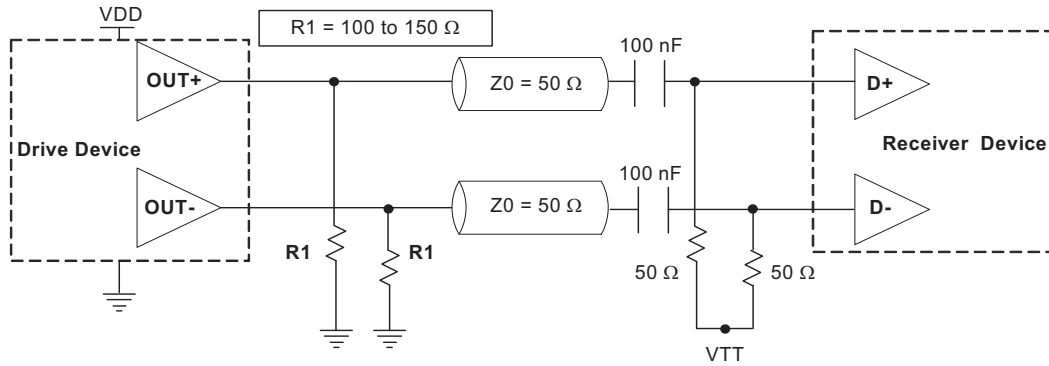


Figure 2. LVPECL AC Coupled Termination

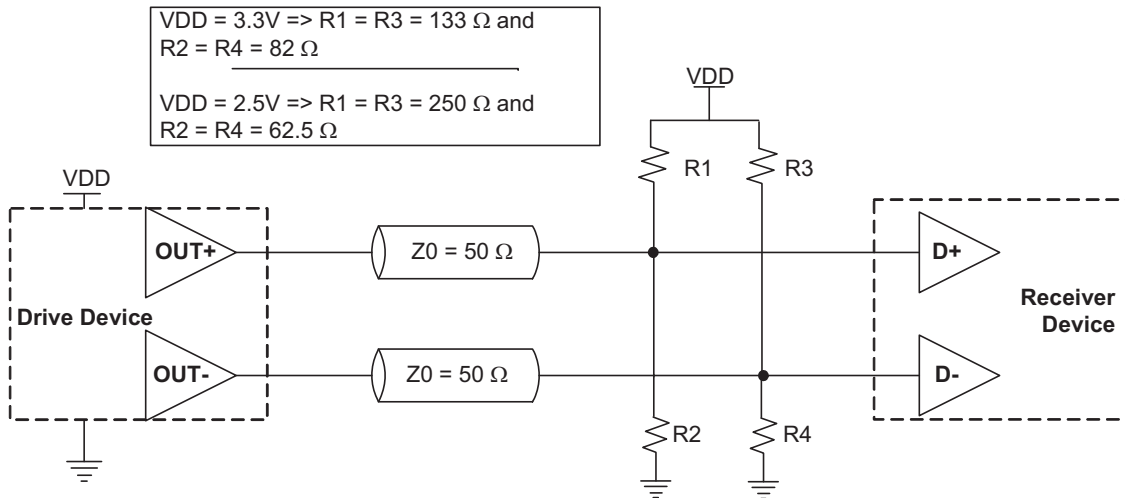


Figure 3. LVPECL with Thevenin Typical Termination

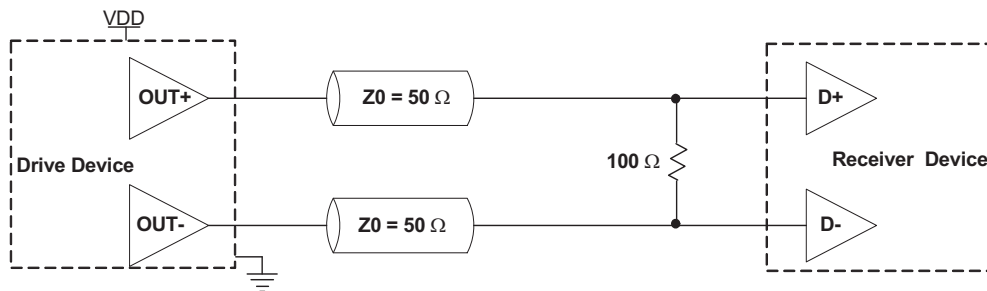


Figure 4. LVDS Single Termination (Load Terminated)

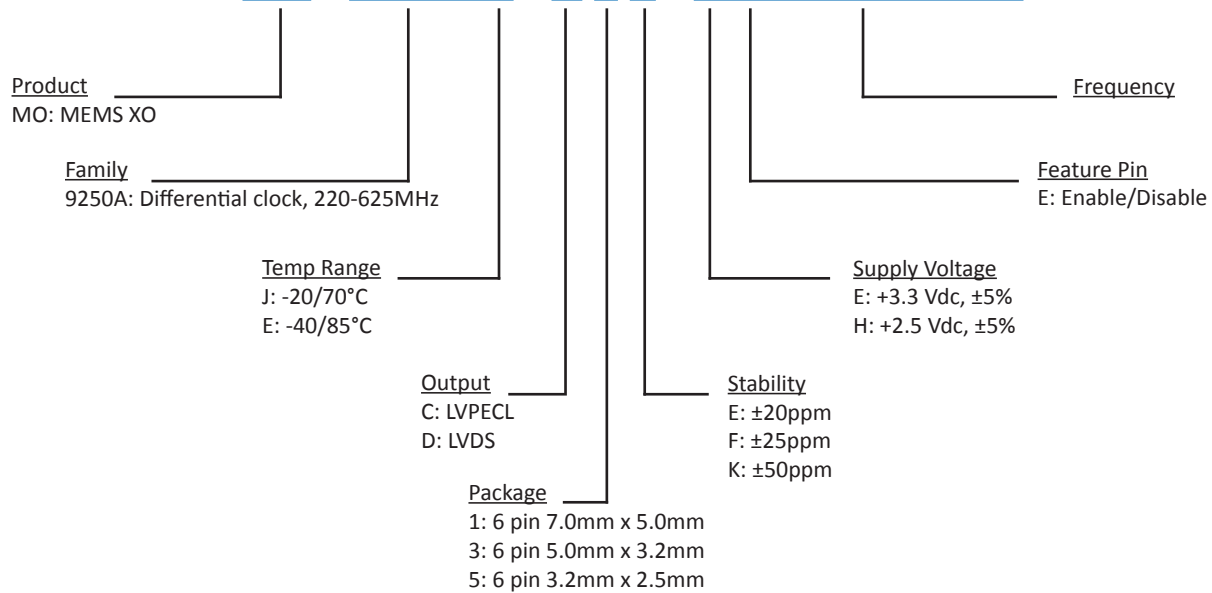
Absolute Maximum Ratings and Test Compliance

Maximum Ratings			
Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	°C
VDD	-0.5	4	V
Electrostatic Discharge	–	2000	V
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	°C

Environmental Compliance	
Parameter	Condition/Test Method
Mechanical Shock	MIL-STD-883F, Method 2002
Mechanical Vibration	MIL-STD-883F, Method 2007
Temperature Cycle	JESD22, Method A104
Solderability	MIL-STD-883F, Method 2003
Moisture Sensitivity Level	MSL1 @ 260°C

Ordering Information

MO - 9250A E - C 3 F - E E 312M500000



Notes:

- Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- Unless otherwise stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
- Subject to technical modification.
- Contact factory for availability.

Frequency Ranges Not Supported

Range 1	209.000001 MHz to 210.999999 MHz
Range 2	251.000001 MHz to 263.999999 MHz
Range 3	314.00001 to 422.999999 MHz
Range 4	502.000001 to 527.999999 MHz

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Revision History

Revision	Change Summary	Date
1.0	Product Release	June 2013
1.1	Knowles logo and address change	Feb 2014
1.2	Add ± 20 ppm temperature stability	Aug 2014

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