PETERMANN TECHNIK
your clocking experts

PETERMANN-TECHNIK GmbH
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HIGH FREQUENCY ULTRA PERFORMANCE OSCILLATOR

SERIES „HFUPO“ 80.0-220.0MHz

FEATURES

+ Ultra Performance Oscillator for Low Cost
+ Low power consumption / Ultra low phase Jitter
+ Excellent long time reliability
+ Very tight frequency stability as low as ±10 ppm
+ Outstanding long term aging of ±5ppm after 10 years
+ LVCMOS/LVTTL compatible output
+ Standard housings: 2.5x2.0; 3.2x2.5; 5.0x3.2; 7.0x5.0mm
+ Express samples within 1 day ex works PETERMANN-TECHNIK
+ Pb-free, RoHS and REACH compliant / MSL1@260°C

APPLICATIONS

+ SATA, SAS, Ethernet, 10-Gigabit Ethernet, SONET, PCI Express, video, Wireles
+ Computing, storage, networking, telecom, industrial control,
+ etc.

GENERAL DATA[1]

PARAMETER AND CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
FREQUENCY RANGE						
Output Frequency Range	f	80.000001	–	220	MHz	
FREQUENCY STABILITY AND AGING						
Frequency Stability	F_stab	-10	–	+10	PPM	Inclusive of initial tolerance at 25 °C, and variations over
		-20	–	+20	PPM	operating temperature, rated power supply voltage and load
		-25	–	+25	PPM	
		-50	–	+50	PPM	
First year Aging	F_aging	-1.5	–	+1.5	PPM	25°C
10-year Aging		-5	–	+5	PPM	25°C
OPERATING TEMPERATURE RANGE						
Operating Temperature Range	T_use	-20	–	+70	°C	Extended Commercial
		-40	–	+85	°C	Industrial
Storage Temperature Range	T_stor	-55	–	+125	°C	Storage
SUPPLY VOLTAGE AND CURRENT CONSUMPTION						
Supply Voltage	V_{DD}	1.71	1.8	1.89	V	Supply voltages between 2.5V and 3.3V can be supported.
		2.25	2.5	2.75	V	Contact PETERMANN-TECHNIK for guaranteed performance
		2.52	2.8	3.08	V	specs for supply voltages not specified in this table
		2.97	3.3	3.63	V	
Current Consumption	I_{DD}	–	34	36	mA	No load condition, f = 100 MHz, V_{DD} = 2.5V, 2.8V or 3.3V
		–	30	33	mA	No load condition, f = 100 MHz, V_{DD} = 1.8V
OE Disable Current	I_OD	–	–	31	mA	V_{DD} = 2.5V, 2.8V or 3.3V, OE = GND, output is pulled down
				30	mA	V_{DD} = 1.8 V. OE = GND, output is pulled down
Standby Current	I_std	–	–	70	µA	V_{DD} = 2.5V, 2.8V or 3.3V, ST = GND, output is pulled down
		–	–	10	µA	V_{DD} = 1.8 V. ST = GND, output is pulled down

Note:
1. All electrical specifications in the above table are specified with 15 pF±10% output load at default drive strength and for all V_{DD}(s) unless otherwise stated.

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GENERAL DATA[1] (continued)

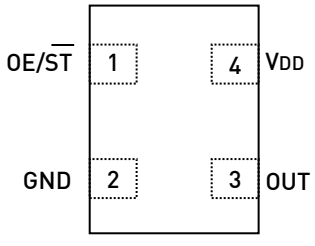
PARAMETER AND CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
LVCMOS OUTPUT CHARACTERISTICS						
Duty Cycle	DC	45	–	55	%	f <= 165 MHz, all VDDs.
		40	–	60	%	f > 165 MHz, all VDDs.
Rise/Fall Time	Tr, Tf	–	1.2	2	ns	15 pF load, 10% - 90% VDD
Output Voltage High	VOH	90%	–	–	VDD	IOH = -6 mA, IOL = 6 mA, (VDD = 3.3V, 2.8V, 2.5V), IOL = 3 mA, (VDD = 1.8V)
Output Voltage Low	VOL	–	–	10%	VDD	
INPUT CHARACTERISTICS						
Input Voltage High	VIH	70%	–	–	VDD	Pin 1, OE or ST
Input Voltage Low	VIL	–	–	30%	VDD	Pin 1, OE or ST
Input Pull-up Impedance	Z_in	–	100	250	kΩ	Pin 1, OE logic high or logic low, or ST logic high
		2	–	–	MΩ	Pin 1, ST logic low
STARTUP AND RESUME TIMING						
Startup Time	T_start	–	7	10	ms	Measured from the time VDD reaches its rated minimum value
OE Enable/Disable Time	T_oe	–	–	115	ns	f = 80 MHz, For other frequencies, T_oe = 100 ns + 3 cycles
Resume Time	T_resume	–	–	10	ms	In standby mode, measured from the time ST pin crosses 50% threshold. Refer to Figure 4.
JITTER						
RMS Period Jitter	T_jitt	–	1.5	2	ps	f = 156.25 MHz, VDD = 2.5V, 2.8V or 3.3V
		–	2	3	ps	f = 156.25 MHz, VDD = 1.8V
RMS Phase Jitter (random)	T_phj	–	0.5	1	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz
EXCELLENT RELIABILITY DATA						
MTBF				500 million hours		
Shock Resistance:				10.000 g		
Vibration Resistance:				70 g		

Note: 1. All electrical specifications in the above table are specified with 15 pF ±10% output load and for all VDD(s) unless otherwise stated.

PIN DESCRIPTION

PIN	SYMBOL		FUNCTIONALITY
1	OE/ ST	Output Enable	H or Open[2]: specified frequency output L: output is high impedance. Only output driver is disabled.
		Standby	H or Open[2]: specified frequency output L: output is low (weak pull down). Device goes to sleep mode. Supply current reduces to I_std.
2	GND	Power	Electrical ground[3]
3	OUT	Output	Oscillator output
4	VDD	Power	Power supply voltage[3]

TOP VIEW



Notes:
2. A pull-up resistor of <10 kΩ between OE/ ST pin and VDD is recommended in high noise environment.
3. A capacitor value of 0.1 µF between VDD and GND is recommended.

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TEST CIRCUIT AND WAVEFORM [4, 5]

FIGURE 1. TEST CIRCUIT

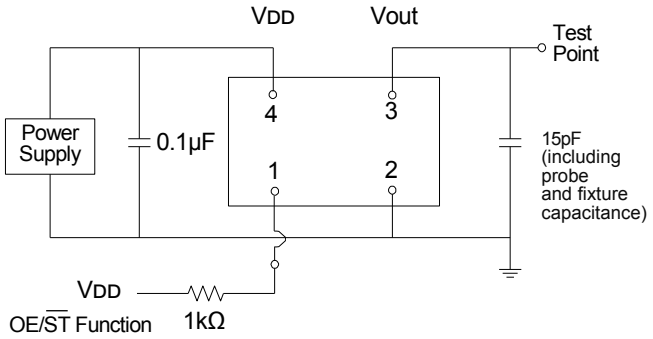
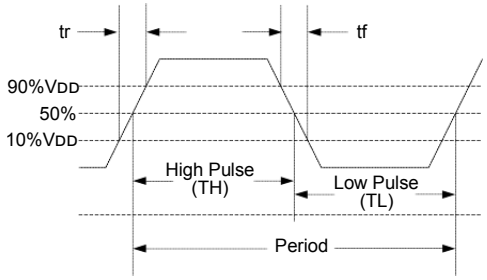
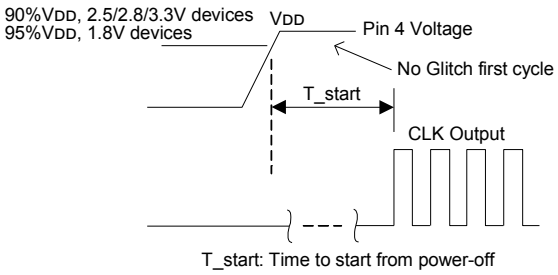


FIGURE 2. WAVEFORM



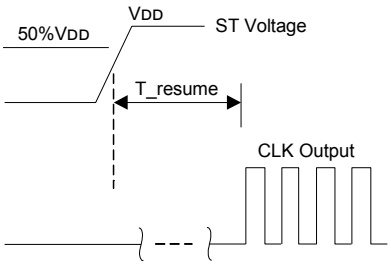
TIMING DIAGRAMS [6, 7]

FIGURE 3. STARTUP TIMING (OE/ST MODE)



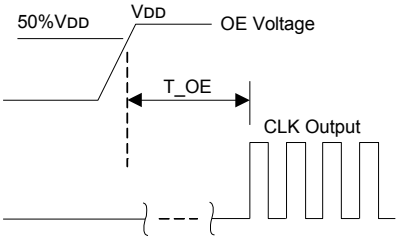
T_start: Time to start from power-off

FIGURE 4. STANDBY RESUME TIMING (ST MODE ONLY)



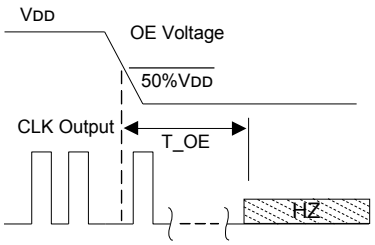
T_resume: Time to resume from ST

FIGURE 5. OE ENABLE TIMING (OE MODE ONLY)



T_OE: Time to re-enable the clock output

FIGURE 6. OE DISABLE TIMING (OE MODE ONLY)



T_OE: Time to put the output drive in High Z mode

Notes:
4. Duty Cycle is computed as Duty Cycle = TH/Period.
5. HFUPO supports the configurable duty cycle feature. For custom duty cycle at any given frequency, contact PETERMANN-TECHNIK.
6. HFUPO supports no runt pulses and no glitches during startup or resume.
7. HFUPO supports gated output which is accurate within rated frequency stability from the first cycle.

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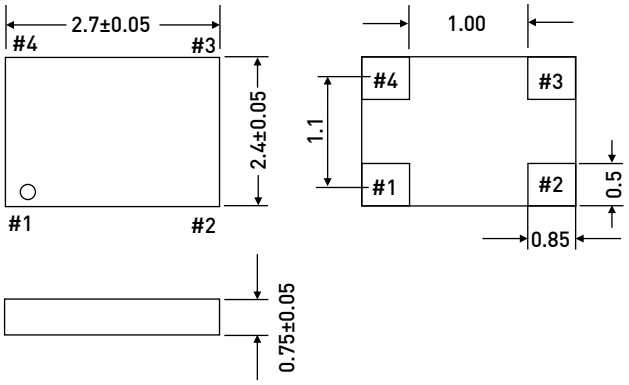
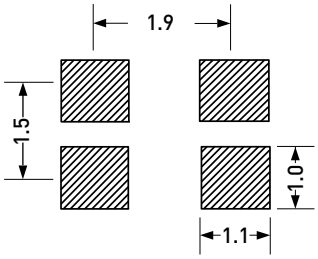
DIMENSIONS AND PATTERNS

PACKAGE SIZE – DIMENSIONS (UNIT:MM)

2.7X 2.4 X 0.75 MM (100% COMPATIBLE WITH 2.5X2.0MM FOOTPRINT)

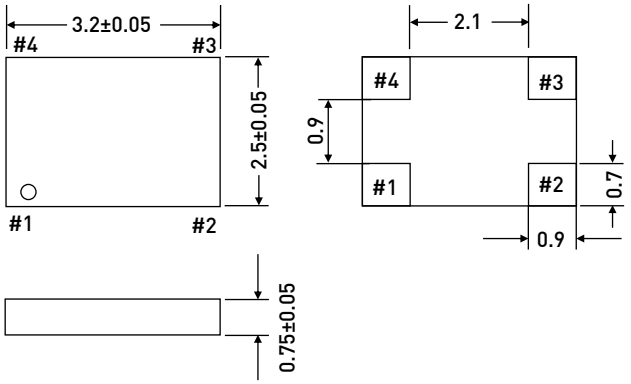


RECOMMENDED LAND PATTERN (UNIT:MM) [9]

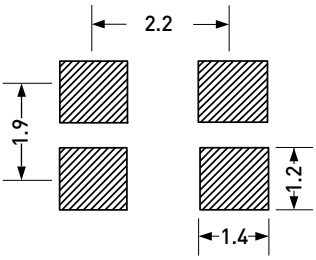


PACKAGE SIZE – DIMENSIONS (UNIT:MM)

3.2 X 2.5 X 0.75 MM

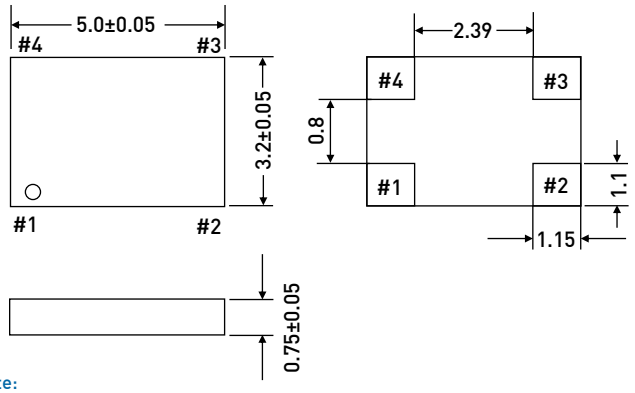


RECOMMENDED LAND PATTERN (UNIT:MM) [9]

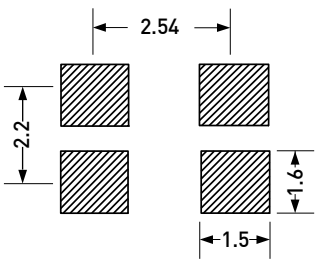


PACKAGE SIZE – DIMENSIONS (UNIT:MM)

5.0 X 3.2 X 0.75 MM



RECOMMENDED LAND PATTERN (UNIT:MM) [9]



Note:

8. A capacitor value of 0.1 µF between V_{DD} and GND is recommended.

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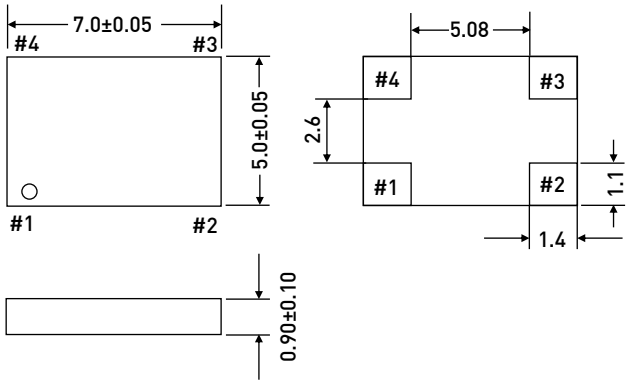
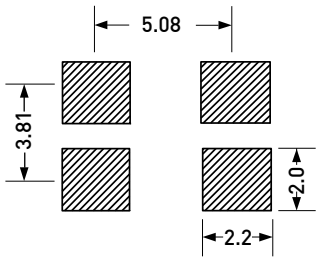
DIMENSIONS AND PATTERNS

PACKAGE SIZE – DIMENSIONS (UNIT:MM)

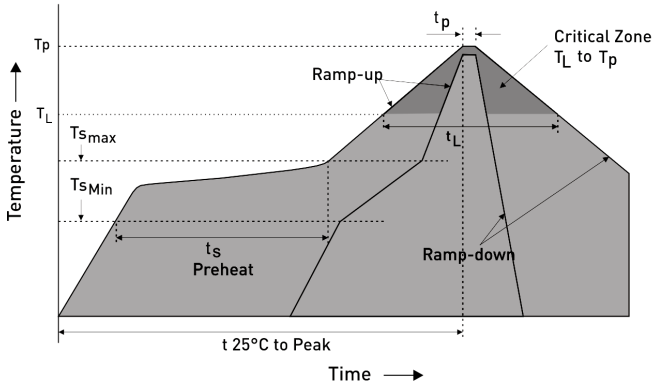
7.0 X 5.0 X 0.90 MM



RECOMMENDED LAND PATTERN (UNIT:MM)



REFLOW SOLDER PROFILE



IPC/JEDEC Standard	IPC/JEDEC J-STD-020
Moisture Sensitivity Level	Level 1
TS MAX to TL (Ramp-up Rate)	3°C/second Maximum
Preheat	
- Temperature Minimum (TS MIN)	150°C
- Temperature Typical (TS TYP)	175°C
- Temperature Typical (TS MAX)	200°C
- Time (tS)	60 - 180 Seconds
Ramp-up Rate (TL to TP)	3°C/second Maximum
Time Maintained Above:	
- Temperature (TL)	217°C
- Time (TL)	60 - 150 Seconds
Peak Temperature (TP)	260°C Maximum
Target Peak Temperature (TP Target)	255°C
Time within 5°C of actual peak (tP)	20 -40 Seconds
Max. Number of Reflow Cycles	3
Ramp-down Rate	6°C/second Maximum
Time 25°C to Peak Temperature (t)	8 minutes Maximum

Note:

8. A capacitor value of 0.1 µF between V_{DD} and GND is recommended.

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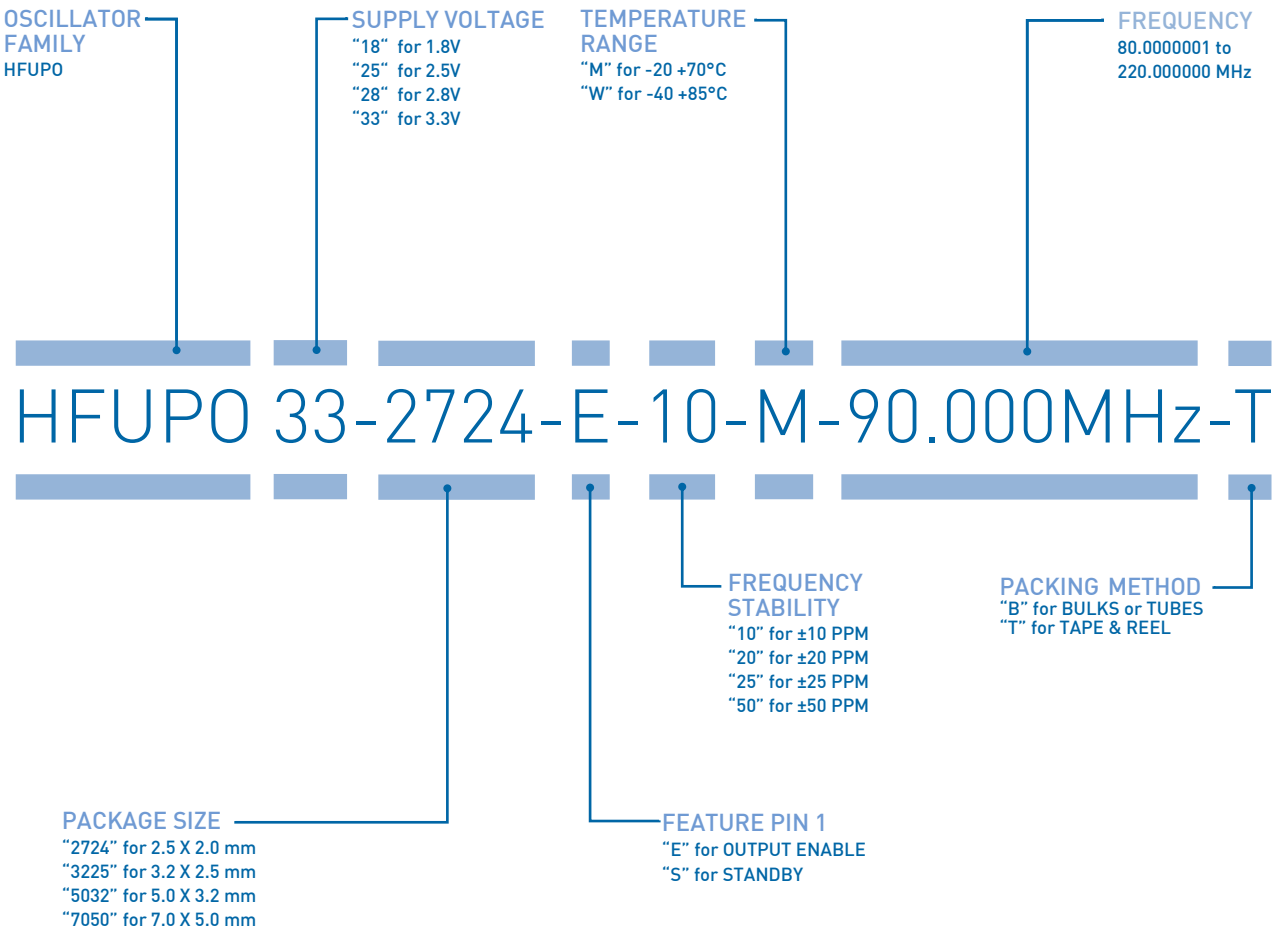
ORDERING INFORMATION



Note:

9. Contact PETERMANN-TECHNIK for custom drive strength to drive higher or multiple load, or for EMI reduction.

EXAMPLE: HFUPO33-2724-E-10-M-90.000MHz-T

PLEASE CLICK HERE TO CREATE YOUR OWN ORDERING CODE

EXPRESS SAMPLES ARE DELIVERABLE ON THE SAME DAY IF ORDERED UNTIL 02:00 PM!

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PREMIUM QUALITY BY PETERMANN-TECHNIK

DMSZ certified according to ISO 9001 QM 00886

OUR COMPANY IS CERTIFIED ACCORDING TO ISO 9001:2015 IN OCTOBER 2016 BY THE DMSZ CERTIFIKATION GMBH.

THIS IS FOR YOU TO ENSURE THAT THE PRINCIPLES OF QUALITY MANAGEMENT ARE FULLY IMPLEMENTED IN OUR QUALITY MANAGEMENT SYSTEM AND QUALITY CONTROL METHODS ALSO DOMINATE OUR QUALITY STANDARDS.