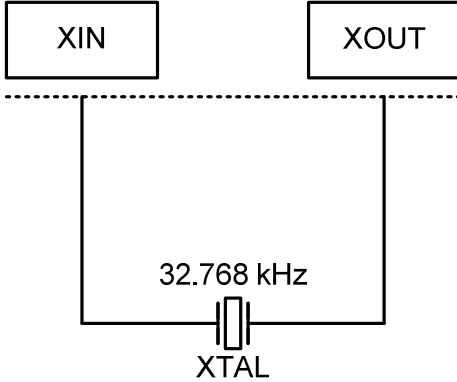


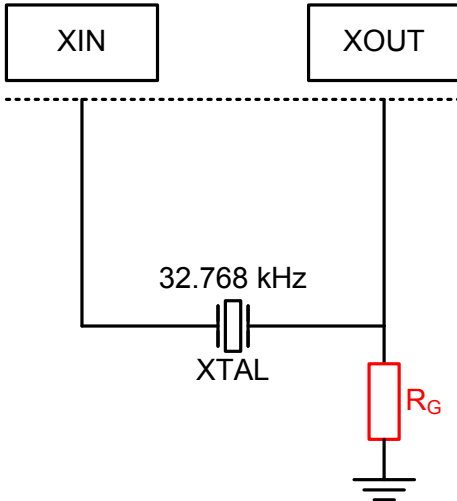
Pierce Oscillator

Design and Crystal Recommendations MSP430x1xx & x3xx Families Texas Instruments

MSP430x1xx & x3xx Families



MSP430x1xx & x3xx Families



Remarks

- All load capacitors are integrated.
- The 32.768 kHz crystal must be connected to XIN and XOUT pins and the crystal's ESR constraints have to be respected.
- The PCB traces should be designed as short as possible to avoid additional load capacitance and to minimize external interferences.
- If V_{DD} is <3.0 V, the 5.1 M Ω (R_G) option allows the use of SMD crystals with an ESR up to 60 k Ω typ.**

Oscillator Design Check

Test Conditions		
Power Supply Voltage V_{DD}	≥ 3.0	V
Load Capacitors	Integrated	pF
Results		
Effective Load Capacitance	10.2	pF
Oscillation Allowance	300	k Ω
Oscillator Output Voltage AC	400	mV _{RMS}
Drive Level	0.220	μ W
Startup Time	1000	ms
Overtone Mode Suppression	Safe	---

Oscillator Design Check

Test Conditions		
Power Supply Voltage V_{DD}	<3.0	V
Load Capacitors	Integrated	pF
R_G	5.1	M Ω
Results		
Effective Load Capacitance	10.2	pF
Oscillation Allowance	300	k Ω
Oscillator Output Voltage AC	350	mV _{RMS}
Drive Level	0.220	μ W
Startup Time	1000	ms
Overtone Mode Suppression	Safe	---

Recommendation

Crystal		
Crystal Type Metal-can	MS3V-T1R	
Crystal Type Ceramic	CC7V-T1A	
Frequency	32.768	kHz
Tolerance	+/-20	ppm
Load Capacitance C_L	9.0 or 12.5	pF

In accordance with our policy of continuous development and improvement, Micro Crystal reserves the right to modify specifications or design-recommendations without prior notice. The recommendations stated above are based on measured-results, respecting the "oscillator design rules". Micro Crystal makes no representation or warranty for information in this "Design and Crystal Recommendations".