

CLOCK OSCILLATORS – Ultra Low Current “HK57 Series”
Logic: HCMOS 5x7 mm Wave Form: Square wave



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Since 1973

HK57 (5x7x1.4 mm) is specifically designed for battery operated portable or hand-held consumer electronic devices where small size and low current consumption are mandatory. HK57 27 MHz consumes less than 1.7 mA at operation mode of +1.8 V and less than 2 uA at disabled mode. Phase noise is -130 dBc / Hz at 10 KHz offset. HK57 can operate at voltage as low as 1.8 V.



General Specifications

$T_A = +25^\circ\text{C}$, V_{DD} at specified voltage, $CL = 15 \text{ pF}$

Product Series		HK57				
Frequency Range		10 MHz ~50 MHz				
Output Logic		HCMOS				
Input Voltage Range (V_{DD})		+1.8 V $\pm 10\%$ (voltage code is “18”)		+2.5 V $\pm 10\%$ (voltage code is “25”)		+3.3 V $\pm 10\%$ (voltage code is “3”)
Output Voltage HIGH “1”; V_{OH}		+1.40 V min.		+2.00 V min.		+2.40 V min.
Output Voltage LOW “0”; V_{OL}		+0.20 V max.		+0.30 V max.		+0.40 V max.
Current Consumption. mA, typical	10 MHz	0.66 mA		0.96 mA		1.42 mA
	13.5 MHz	0.88 mA		1.28 mA		1.82 mA
	16.000 MHz	1.05 mA		1.51 mA		2.12 mA
	20.945 MHz	1.34 mA		1.86 mA		2.58 mA
	25.000 MHz	1.54 mA		2.17 mA		3.00 mA
	27.000 MHz	1.69 mA		2.35 mA		3.25 mA
	30.0 MHz	1.93 mA		2.74 mA		3.77 mA
	38.0 MHz	2.27 mA		3.26 mA		4.48 mA
	50.0 MHz	2.60 mA		3.90 mA		4.95 mA
Tri-state mode (when pad 1 is grounded): 2 uA typical; 4 uA max. (oscillator is off).						
Rise Time / Fall Time		4 n sec. typical when measured from 10% $V_{DD} \leftrightarrow 90\% V_{DD}$.				
Fanout (Drive Capability)		12 mA typical; as TTL output (+3.3 V)				
Duty Cycle (Symmetry)		45% min; 55% max. measured at +1.4 V D.C.				
Start-up Time (T_s)		10 m sec. typical; V_{DD} reaches 1.62 V				
Load		15 pF				
Voltage Sensitivity		± 0.8 ppm typical with 10% variation of V_{DD}				
Frequency Stability⁽¹⁾	Commercial (0°C to +70°C) Temperature code is ‘C’	Stability code “A”: ± 25 ppm over 0°C to +70°C Stability code “B”: ± 50 ppm over 0°C to +70°C Stability code “C”: ± 100 ppm over 0°C to +70°C If non-standard please enter the desired stability after the “C”. For example “C20” represents ± 20 ppm over 0 to +70°C				
	Industrial (-40°C to +85°C) Temperature code is ‘I’	Stability code “D”: ± 25 ppm over -40°C to +85°C Stability code “E”: ± 50 ppm over -40°C to +85°C Stability code “F”: ± 100 ppm over -40°C to +85°C If non-standard please enter the desired stability after the “I”. For example “I20” represents ± 20 ppm over -40 to +85°C				
Period Jitter RMS		2.1 ps typical with capacitive decoupling between V_{DD} and ground				
Phase Noise (+3.3V 27 MHz)	Offset	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz
	dBc / Hz	-80	-110	-130	-138	-145

MERCURY www.mercury-crystal.com

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Pad 1 Options	When connected to ground: Output is disabled (oscillator is off). When no connection or connected to logic high: Clock output. Disable time is 10 m sec. typical. Enable time (when ground is removed from pad 1) is 10 m sec. typical.
Aging	±5 ppm per year max.
ESD Protection	2000 V max.; Human body model
Packaging	16 mm tape; 8 mm pitch; 1000 pcs per reel

⁽¹⁾Inclusive of 25°C tolerance, operating temperature range, ±10% input voltage variation, load change, aging, shock and vibration.

Environmental Performance Specifications

RoHS Compliance	Pb (lead) free
Storage temp. range	-55 to +125°C
Humidity	85% RH, 85°C, 48 hours
Hermetic seal	Leak rate 2x10 ⁻⁸ ATM-cm ³ /sec max.
Solderability	MIL-STD-202F method 208E
Reflow	260°C for 10 sec.
Vibration	MIL-STD-202F method 204, 35G, 50 to 2000 Hz
Shock	MIL-STD-202F method 213B, test condi. E, 1000GG ½ sine wave

Part Number Format and Example:

Example: 18HK57-BT-27.000

Explanation: HK57 ultra low current clock oscillator, +1.8 V supply voltage, ±50 ppm frequency stability over 0 to +70°C, 27.000 MHz

18	HK57	—	B	T	—	27.000	
❶	❷		❸	❹		❺	

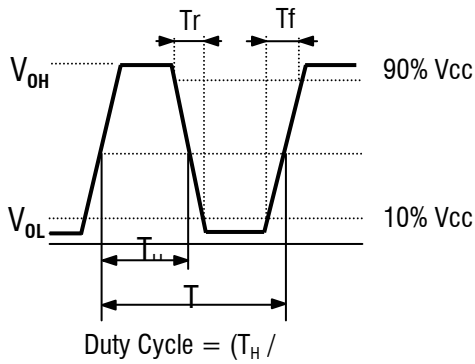
- ❶: Voltage codes: “18” for +1.8 V; “25” for +2.5 V; “3” for +3.3 V
- ❷: Product series ❸: Frequency stability code: “A” ~ “F” or custom. See table above.
- ❹: “T”: Tri-state option on pad 1 (Tri-state is standard if not specified), leave blank if tri-state is not required.
- ❺: Frequency in MHz

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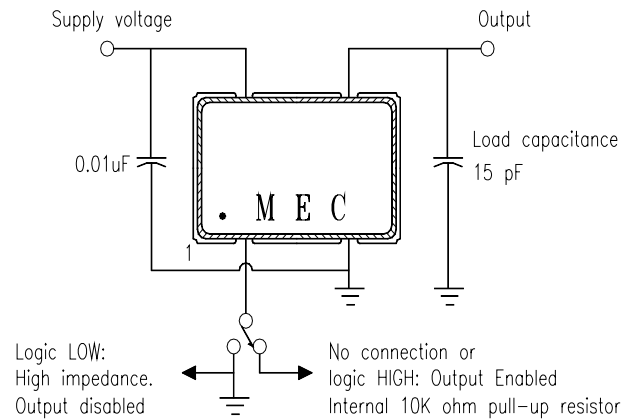


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HK57 OUTPUT WAVEFORM:

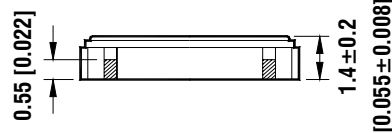
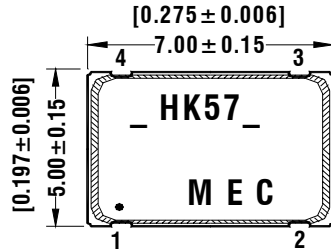


HK57 Test Circuit:

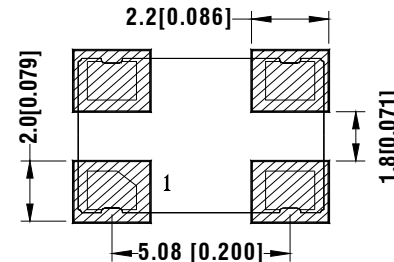
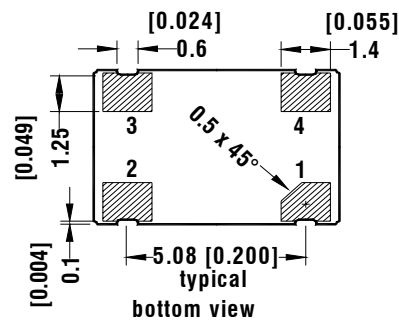


HK57 Package Dimensions and Recommended Pad Layout:

unit mm[inches]



Pad 1	Tri-State or No Connection
Pad 2	Ground
Pad 3	Output
Pad 4	Supply voltage



Chamfered pad is pad No. 1. Count counter-clockwise when looking at top view. Count clockwise when looking at bottom view.

RECOMMENDED REFLOW SOLDERING PROFILE

