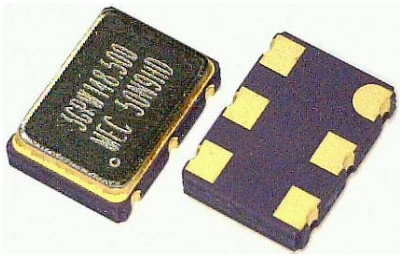
Differential HCSL Crystal Clock Oscillators
HCK5761 Series 200 fsec Jitter +2.5V +3.3V "K" Family

MERCURY
Since 1973

- ◆ **Femto** second integrated phase jitter (200 fs typical, 12 KHz to 20 MHz)
- ◆ Superior phase noise (-138 dBc/Hz at 10 KHz and -144 dBc/Hz at 100 KHz offset).
- ◆ High performance with surprisingly low price.
- ◆ 2.5V or 3.3V supply voltage.

RoHS Compliant Product by Mercury



General Specifications

Product Series		**HCK5761**; "**K**" family characteristics. Tri-State on pad 1						
Frequency Range		40 MHz ~ 200 MHz.						
Output Logic		Differential HCSL square wave						
Frequency Stability vs Operating Temperature Range		Stability Code	**Commercial " C ":**: -10°C to +70°C		**Industrial " I ":** -40°C to +85°C			
		±25 ppm	**A**		**D**			
		±50 ppm	**B**		**E**			
		±100 ppm	**C**		**F**			
		Custom ±xx ppm	**C**xx		**I**xx			
		If custom, use "temperature range code + desired stability in ppm" for the stability code. Example: "**C20**" (±20 ppm over -10 to +70°C).						
Supply Voltage V_{CC}		+2.5 V ± 5 % (Voltage code is "**25**"); or +3.3 V ± 5 % (Voltage code is "**3**")						
Output Voltage HIGH "1", V_{OH}		660 mV min.; 740 mV typical; 850 mV max.						
Output Voltage LOW "0", V_{OL}		-150 mV min.; 0 mV typical; 150 mV max.						
Output Swing		620 mV min; 700 mV typical; 780 mV max.						
Current Consumption		f<90 MHz: 17 mA typical; 27 mA max. 90≥f<125 MHz: 18 mA typical; 28 mA max. 125≥f<160 MHz: 19 mA typical; 29 mA max. ≥160 MHz: 20 mA typical; 30 mA max.						
Load		50 ohms to ground on each output						
Rise Time (Tr)		0.15 n sec. typ; 0.4 n sec. max. 20%→80% of waveform						
Fall Time (Tf)		0.15 n sec. typ; 0.4 n sec. max. 80%→20% of waveform						
Duty Cycle		50% ± 5% max. measured at Q and complimentary Q cross point						
Tri-state Function on pad No. 1		If not connected or 2.4V min (referenced to ground) is applied: Output. Internal pull-up. Oscillation disable time is 0.2 u sec max.						
		If 0.6V max (referenced to ground) is applied: High impedance. Current consumption is 10 uA max. Oscillation enable time is 2 m sec. max.						
Phase Jitter (RMS)		200 fs typical (12 KHz to 20 MHz integrated)						
SSB Phase Noise (dBc/Hz). Typical	Offset	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz
	125 MHz	-50	-82	-116	-138	-144	-149	-155
Start-up Time		3 ms typical; 10 ms max.						
Aging		±3 ppm / year max.						
Packaging		180 mm reel; 16 mm tape, 8.0 mm pitch. 1000 pcs per reel.						

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

MERCURY www.mercury-crystal.com
Taiwan: TEL (886)-2-2406-2779, FAX (886)-2-2496-0769, e-mail: sales-tw@mercury-crystal.com
U.S.A.: TEL (1)-909-466-0427, FAX (1)-909-466-0762, e-mail: sales-us@mercury-crystal.com

Absolute Maximum Rating Permanent damage may be created if operate beyond limits specified **Ta=25**°C, Vss=0V

Parameters	Rating	
	Min.	Max.
Supply Voltage	Vss-0.5V	5.0V
Input Voltage	Vss-0.5V	V_{DD}+0.5V
Output Voltage	Vss-0.5V	V_{DD}+0.5V

Environmental Performance Specifications

Green Requirement	RoHS 6/6 (2002/95/EC) and WEEE (2002/96/EC) compliant
MSL Level	Level 1 per IPC/JEDEC J-STD-020D.1
Storage temp. range	-55°C 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 max.. 2 times max.
Vibration	MIL-STD-202F method 204, 35G, 50 to 2000 Hz
Shock	MIL-STD-202F method 213B, test condi. E, 1000GG ½ sine wave
ESD Protection	2KV max. Human body model.
Contact pad surface finish	Gold (0.3~1.0 um) on nickel (1.27~8.89 um)
Weight per unit	180 mg typical

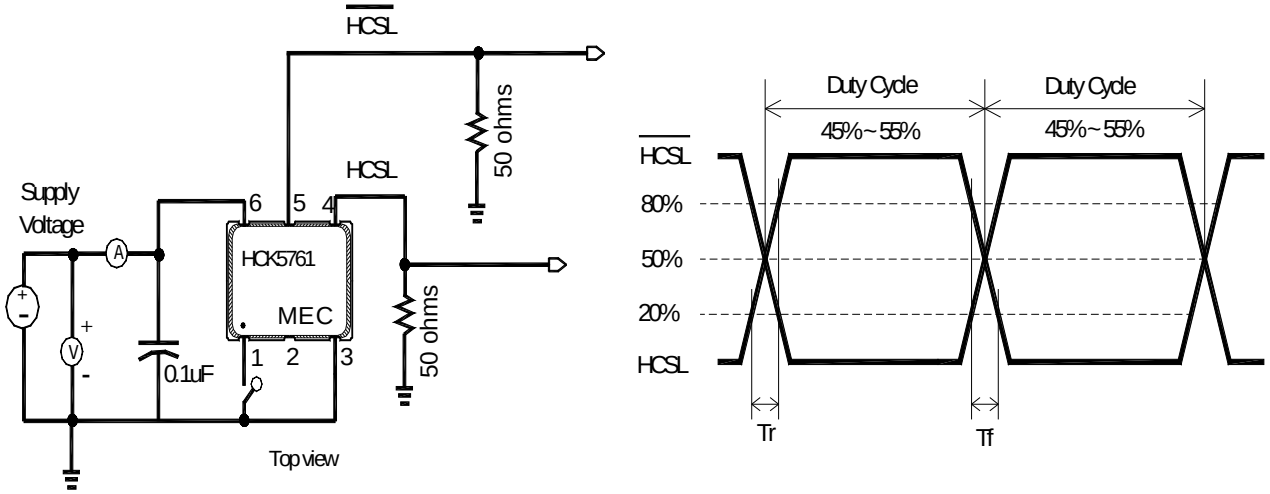
Part Number Format and Examples:

Example: **3HCK5761-A-155.520; 25HCK5761-A-155.520**
Explanation: +3.3V HCK5761 series HCSL output clock oscillator, frequency stability is ±25 ppm over -10°C to +70°C, 155.520 MHz

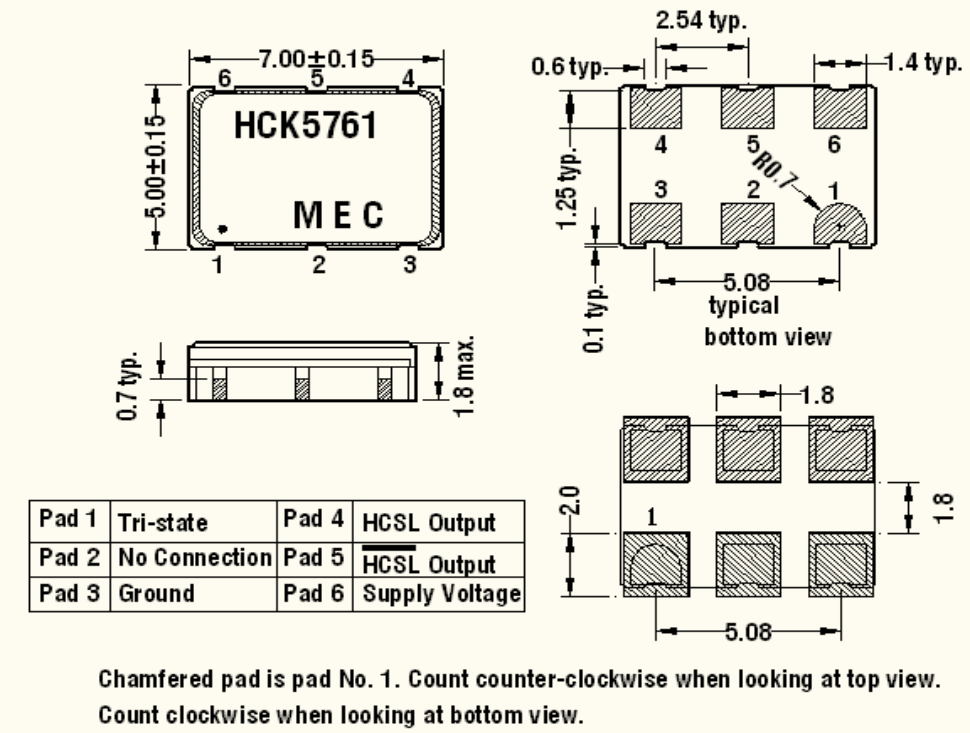
			✍		✍	✍: customer to specify
3	HCK5761	—	A	—	155.520	
①	②		③		④	

①: V_{DD} voltage codes: "**3**" for +3.3 V; "**25**" for +2.5 V ②: HCK5761 product series. '**H**" for clock; "**C**" for HCSL; "**K**": for "K" family characteristics."**576**" for 5x7 mm SMD with 6 pads. '**1**" for Tri-State on pad 1.
③: Frequency stability code: "**A**" ~ "**F**" or custom. See table above. ④: Frequency in MHz

25HCK5761 and 3HCK5761 Test Circuit and Waveform:



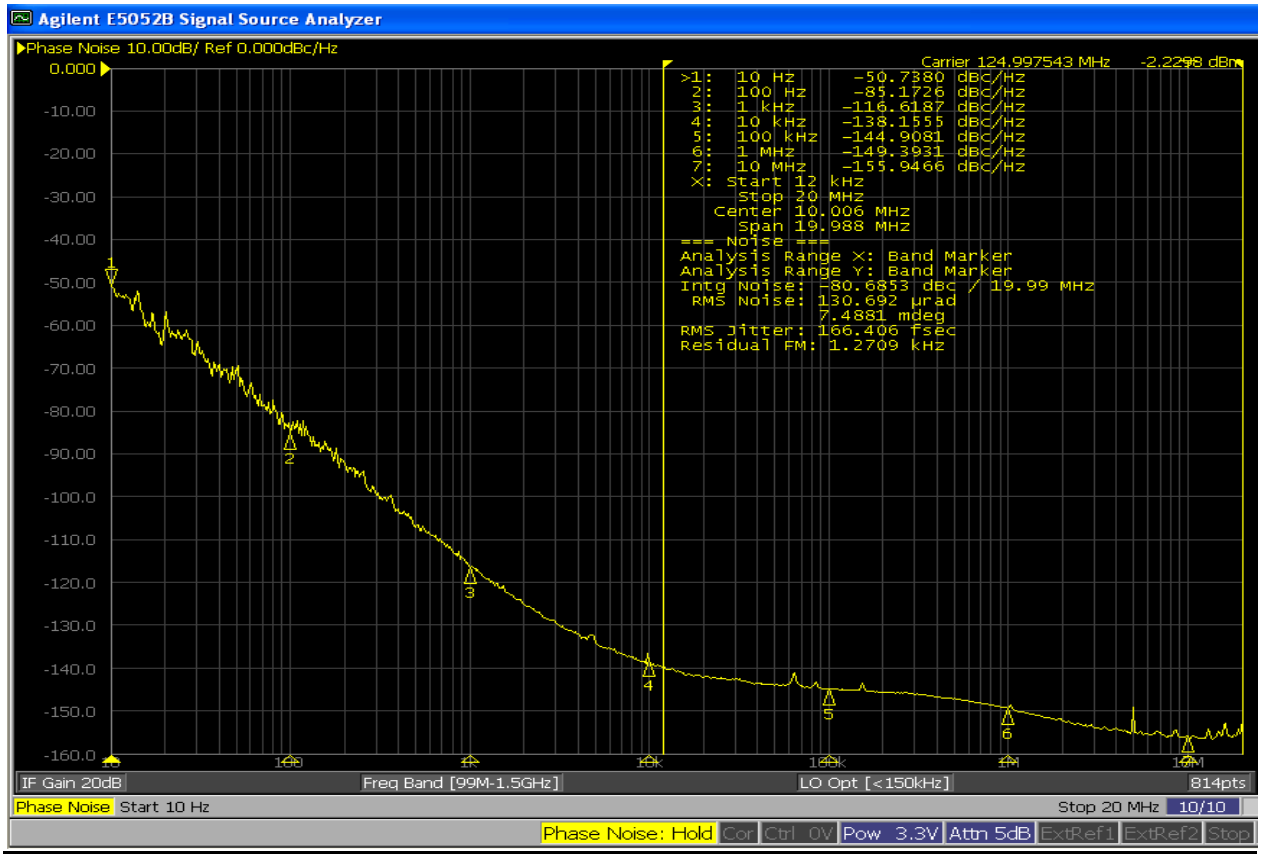
HCK5761 Package Dimensions and Recommended Solder Pad Layout: unit mm[inches]



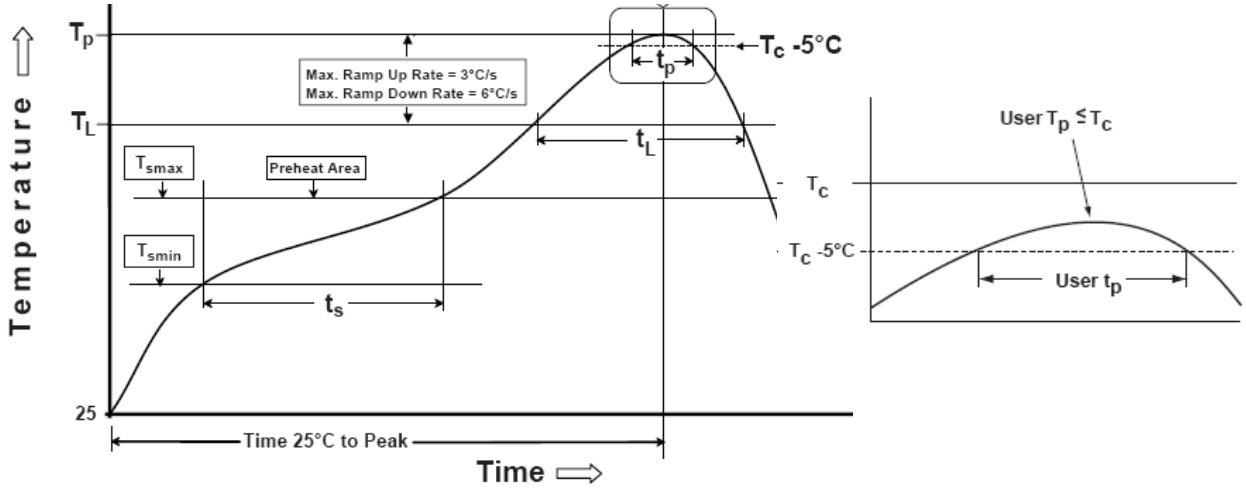
Pad 1	Tri-state	Pad 4	HCSL Output
Pad 2	No Connection	Pad 5	$\overline{\text{HCSL Output}}$
Pad 3	Ground	Pad 6	Supply Voltage

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

Typical Phase Noise Plot **3HCK5761-A-125.000**



HCK5761 Recommended Solder Reflow Profile (from IPC/JEDEC J-STD-020D.1)



Profile Feature	Sn-Pb Eutectic Assembly	Pb-free Assembly
Preheat/Soak		
- Temperature min. (Ts min.)	100ºC	150ºC
- Temperature max. (Ts max.)	150ºC	200ºC
- Time (ts) (Ts min. to Ts max.)	60 to 120 seconds	60 to 180 seconds
Ramp-up rate (T_L to Tp)	3ºC / sec. max.	3ºC / sec. max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	183ºC 60 to 150 seconds	217ºC 60 to 150 seconds
Peak package body temperature (Tp)	235ºC	260ºC
Time (Tp) within 5ºC of the classification temperature Tc	10 to 30 seconds	20 to 40 seconds
Ramp-down rate (Tp to T_L)	6ºC / second max.	6ºC / second max.
Time 25ºC to peak temperature	6 minutes max.	8 minutes max.

All temperatures refer to topside of the package, measured on the package body surface.