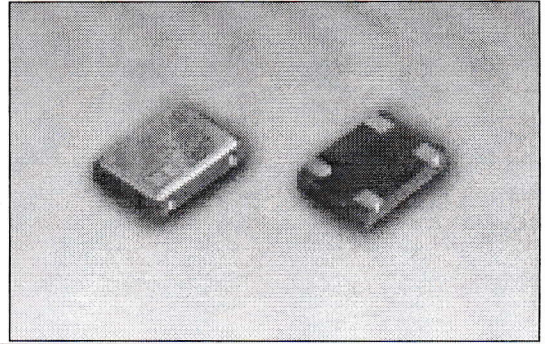


# HE-SMO-170 / 180 / 190 / 200 SURFACE MOUNT OSCILLATOR



The HE-SMO-170/180/190/200 series is the ceramic base SMD clock oscillator with the ability to drive both HCMOS and TTL loads in high density applications. These oscillators have industry standard pin out spacing and feature a height of only 1.6mm. The HE-SMO-190 product line features the low voltage operation of 3.3V, helping to increase battery life, reduce heat generation, and improve EMI. **Now available with stabilities as low as +/- 10 PPM.**



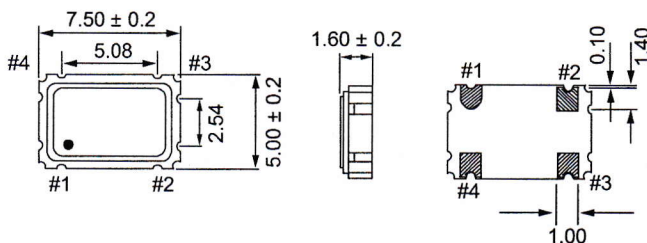
## FEATURES:

- Industry standard pin-out spacing
- Tri-State Enable/Disable
- Optional extended temperature range -40+85°C

## ELECTRICAL SPECIFICATIONS

PARAMETERS	CONDITIONS	SPECIFICATIONS			
		HE-SMO-170	HE-SMO-180	HE-SMO-190	HE-SMO-200
HEC PN					
SUPPLY VOLTAGE	DC $V_{DD}$	+5.0V ± 10%	+5.0V ± 10%	+3.3V ± 10%	+3.3V / +5.0V Compatible
FREQUENCY RANGE		1.544-100.00 MHz	1.544-100.00 MHz	1.544-100.00 MHz	1.544-32.00 MHz
FREQUENCY STABILITY	All	±25 PPM: A ±50 PPM: B ±100 PPM: C OTHER : S	±25 PPM: A ±50 PPM: B ±100 PPM: C OTHER : S	±25 PPM: A ±50 PPM: B ±100 PPM: C OTHER : S	±150 PPM $V_{DD} = 5V, \pm 100 PPM$
OPERATING TEMPERATURE		-10 °C to +70 °C / -40 °C to +85 °C Optional (-E designation)			
STORAGE TEMPERATURE		-55 °C to +125 °C			
OUTPUT SYMMETRY		45% min. 55% max. 50% ± 2% typical			
DRIVING ABILITY	TTL Load (Max) CMOS Load (Max)	10 LS TTL 30 pF	10N TTL 50 pF	10LS TTL 15pF	10LS TTL 30pF
RISE AND FALL TIME	$0.1 V_{DD} - 0.9 V_{DD}$ $C_L = \text{Max.}$	15ns (max.)	7ns (max.)	5ns (max.)	10ns (max.)
START UP TIME		1.8 - 32 MHz: 5ms max. // 32 MHz and up: 10 ms max.			
OUTPUT VOLTAGE	VOH (Min.) VOL (Max.)	4.5V 0.5V	4.5V 0.5V	2.97V 0.33V	$0.9 * V_{DD}$ $0.1 * V_{DD}$
CURRENT CONSUMPTION	#1 Open $C_L = \text{Max.}$	1.8-32 MHz: 20mA 32.1-50 MHz: 40mA 50.1-70 MHz: 60mA	1.8-32 MHz: 27mA 32.1-50 MHz: 45mA 50.1-70 MHz: 70mA	1.8-32 MHz: 10mA 32.1-50 MHz: 18mA 50.1-70 MHz: 20mA	15mA / 3.3V 10mA / 5.0V
OUTPUT CURRENT	"0" Level (Min.) "1" Level (Min.)	4mA 4mA	16mA 16mA	10mA 10mA	10mA/16mA 10mA/16mA
STAND BY CURRENT	At "0" Level at #1	N/A	N/A	10uA (max.)	10uA/15uA (max)
E/D FUNCTION		#1 Open - #3 Active #1 >= 2.2V - #3 Active #1 <= 0.8V - #3 High Z			
JITTER		<5pS Max. RMS (<40 Peak to Peak)			
PART NUMBERING GUIDE	HEC PART NUMBER	STABILITY (A, B, C, OR S)	OP TEMP OPTION (E = -40+85°C)	- FREQUENCY	- SPECIAL OPTIONS
PART NUMBER EXAMPLE	HE-SMO-190BE-25.00M or HE-SMO-180S-20.00M-20PPM				

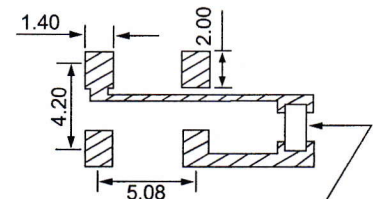
## MECHANICAL DRAWING



Pin Connections:  
#1: E/D or NC  
#2: GND  
#3: Output  
#4: VDD

Unit: mm

Recommended Solder Pad Layout



24 Note: A 0.01 µF bypass capacitor is recommended between VDD (pin 4) and GND (pin 2) to minimize power supply line noise. 0.01 µF