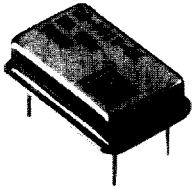


# TTL/CMOS/HCMOS/ACMOS Voltage Controlled Crystal Oscillators

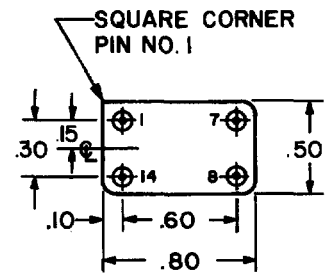
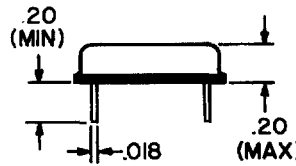
CO-401V  
CO-441V



**Features**

- 32 kHz to 75 MHz Frequency Range
- Low Profile 4 Pin DIP
- TTL/HCMOS/ACMOS Compatible
- 3 Point Mount Crystal

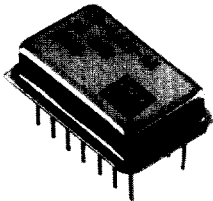
CO-401V  
CO-441V



Available with insulated standoffs:  
increases height to 0.23 maximum

Note: dimensions in inches

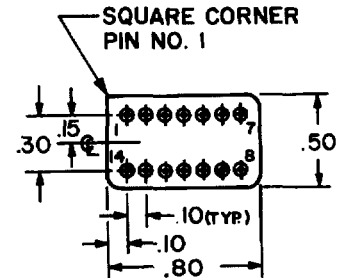
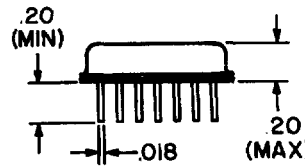
CO-402V  
CO-442V



**Features**

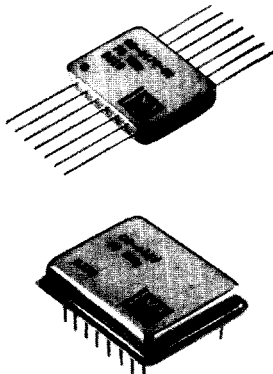
- 32 kHz to 75 MHz Frequency Range
- Low Profile 14 Pin DIP
- TTL/HCMOS/ACMOS Compatible
- 3 Point Mount Crystal

CO-402V  
CO-442V



Note: dimensions in inches

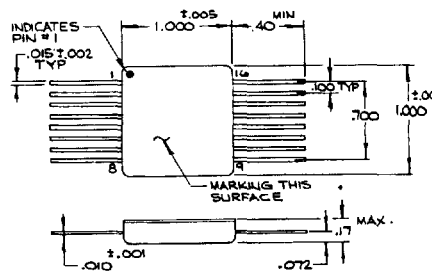
CO-464V  
CO-467V



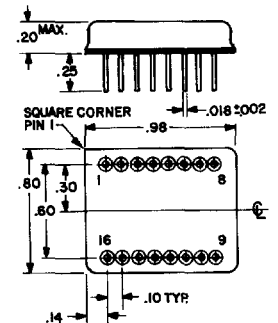
**Features**

- 8 MHz to 200 MHz
- -3.3 V operation
- Low Profile 16 Pin DIP or 16 pin flatpack
- PECL available
- 3 Point Mount Crystal

CO-467V



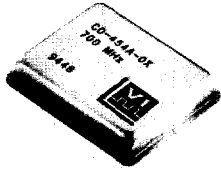
CO-464V



Note: dimensions in inches

# TTL/CMOS/HCMOS/ACMOS Voltage Controlled Crystal Oscillators

## CO-434V/454V CO-434VH/454VH

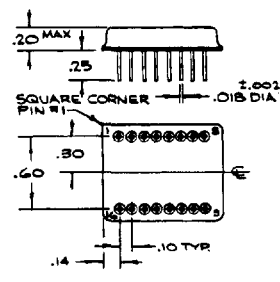
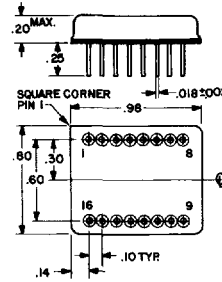


### Features

- Frequencies from 8 MHz to 640 MHz
- Low Profile 16 Pin and 24 Pin Double DIP
- 10K, 10 KH, 100K, ECLinPS, 10K/EL and 100E/EL Logic

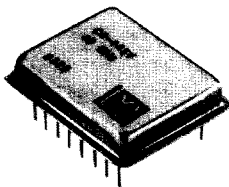
## CO-434V/454V (8 MHz to 200 MHz)

## CO-434VH/454VH (200 MHz to 640 MHz)



Note: dimensions in inches

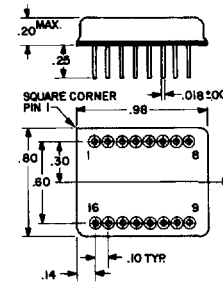
## CO-445V



### Features

- 100 kHz to 50 MHz Frequency Range
- Low Profile 16 Pin Double DIP
- HCMOS Compatible
- Deviation to  $\pm 500$  ppm

## CO-445V



Note: dimensions in inches

## SPECIFICATIONS

	HCMOS	TTL/HCMOS/ACMOS	ECL																																																																																																												
<b>Series</b>	CO-445V 16 pin Double DIP <i>Very wide deviation</i>	(a) CO-401V 4 Pin Dip (a) CO-402V 14 Pin Dip (b) CO-441V: 4 Pin Dip (b) CO-442V: 14 Pin Dip	(a) CO-434V: 16 pin DDIP (b) CO-434VH: 24 pin DDIP (a) CO-437V: 16 pin Flatpack	(a) CO-454V: 16 pin DDIP (b) CO-454VH: 24 pin DDIP (a) CO-464V: 16 pin DDIP (a) CO-467V: 16 pin flatpack																																																																																																											
<b>Center Frequency</b>	100 kHz to 50 MHz	(a) 32 kHz-75 MHz (b) 64 kHz-75 MHz	(a) 8-200 MHz (b) 200.1-640 MHz	(a) 8-200 MHz (b) 200.1-640 MHz																																																																																																											
<b>Output Level</b>	HCMOS, drives 3 TTL loads	(a) TTL (b) HCMOS/ACMOS	10K, 10KH, MECLIII, ECLinPS 10E or 10EL Complementary output is standard in CO-434VH and CO-454VH, optional in other models	100K ECLinPS, 100E or 100 EL																																																																																																											
<b>Supply (<math>\pm 5\%</math>)</b>	+5 Vdc, <25 mA	+5 Vdc at 20-60 mA, depending on frequency	-5.2 Vdc	-4.5 Vdc -3.3 Vdc																																																																																																											
<b>Deviation/ Stability/ Alternatives</b>	<table border="1"> <thead> <tr> <th>Code</th> <th>Range</th> <th>Temperature Stab. at fo</th> <th>Deviation Range</th> </tr> </thead> <tbody> <tr><td>EB35</td><td>0/+50°C</td><td><math>\pm 30</math> ppm</td><td><math>\pm 250</math> ppm</td></tr> <tr><td>FB55</td><td>0/+50°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 500</math> ppm</td></tr> <tr><td>EC45</td><td>0/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 250</math> ppm</td></tr> <tr><td>FC65</td><td>0/+70°C</td><td><math>\pm 60</math> ppm</td><td><math>\pm 500</math> ppm</td></tr> <tr><td>ED45</td><td>-20/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 250</math> ppm</td></tr> <tr><td>FD65</td><td>-20/+70°C</td><td><math>\pm 60</math> ppm</td><td><math>\pm 500</math> ppm</td></tr> <tr><td>EE55</td><td>-40/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 250</math> ppm</td></tr> <tr><td>FE75</td><td>-40/+85°C</td><td><math>\pm 70</math> ppm</td><td><math>\pm 500</math> ppm</td></tr> <tr><td>EF55</td><td>-55/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 250</math> ppm</td></tr> <tr><td>FF85</td><td>-55/+85°C</td><td><math>\pm 80</math> ppm</td><td><math>\pm 500</math> ppm</td></tr> </tbody> </table> <p>Aging rate: 3-5 ppm per year Size: 0.8" x 1.0" x 0.38". 16 pin double DIP NOTE: When internal multiplication is used (generally above 25 MHz) sub-harmonic suppression is &gt;-30 dBc.</p>	Code	Range	Temperature Stab. at fo	Deviation Range	EB35	0/+50°C	$\pm 30$ ppm	$\pm 250$ ppm	FB55	0/+50°C	$\pm 50$ ppm	$\pm 500$ ppm	EC45	0/+70°C	$\pm 40$ ppm	$\pm 250$ ppm	FC65	0/+70°C	$\pm 60$ ppm	$\pm 500$ ppm	ED45	-20/+70°C	$\pm 40$ ppm	$\pm 250$ ppm	FD65	-20/+70°C	$\pm 60$ ppm	$\pm 500$ ppm	EE55	-40/+85°C	$\pm 50$ ppm	$\pm 250$ ppm	FE75	-40/+85°C	$\pm 70$ ppm	$\pm 500$ ppm	EF55	-55/+85°C	$\pm 50$ ppm	$\pm 250$ ppm	FF85	-55/+85°C	$\pm 80$ ppm	$\pm 500$ ppm	<table border="1"> <thead> <tr> <th>Code</th> <th>Temperature Range</th> <th>Temperature Stability</th> <th>*Minimum Deviation</th> </tr> </thead> <tbody> <tr><td>O</td><td>0/+50°C</td><td><math>\pm 10</math> ppm</td><td><math>\pm 30</math> ppm</td></tr> <tr><td>A</td><td>0/+50°C</td><td><math>\pm 20</math> ppm</td><td><math>\pm 50</math> ppm</td></tr> <tr><td>B</td><td>0/+50°C</td><td><math>\pm 35</math> ppm</td><td><math>\pm 100</math> ppm</td></tr> <tr><td>C**</td><td>0/+50°C</td><td><math>\pm 35</math> ppm</td><td><math>\pm 200</math> ppm</td></tr> <tr><td>D</td><td>0/+70°C</td><td><math>\pm 20</math> ppm</td><td><math>\pm 40</math> ppm</td></tr> <tr><td>E</td><td>0/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 100</math> ppm</td></tr> <tr><td>F**</td><td>0/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 200</math> ppm</td></tr> <tr><td>G</td><td>-20/+70°C</td><td><math>\pm 30</math> ppm</td><td><math>\pm 60</math> ppm</td></tr> <tr><td>H</td><td>-20/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 100</math> ppm</td></tr> <tr><td>I**</td><td>-20/+70°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 200</math> ppm</td></tr> <tr><td>J</td><td>-40/+85°C</td><td><math>\pm 40</math> ppm</td><td><math>\pm 60</math> ppm</td></tr> <tr><td>K</td><td>-40/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 100</math> ppm</td></tr> <tr><td>L**</td><td>-40/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 200</math> ppm</td></tr> <tr><td>M</td><td>-55/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 100</math> ppm</td></tr> <tr><td>N**</td><td>-55/+85°C</td><td><math>\pm 50</math> ppm</td><td><math>\pm 200</math> ppm</td></tr> </tbody> </table>	Code	Temperature Range	Temperature Stability	*Minimum Deviation	O	0/+50°C	$\pm 10$ ppm	$\pm 30$ ppm	A	0/+50°C	$\pm 20$ ppm	$\pm 50$ ppm	B	0/+50°C	$\pm 35$ ppm	$\pm 100$ ppm	C**	0/+50°C	$\pm 35$ ppm	$\pm 200$ ppm	D	0/+70°C	$\pm 20$ ppm	$\pm 40$ ppm	E	0/+70°C	$\pm 40$ ppm	$\pm 100$ ppm	F**	0/+70°C	$\pm 40$ ppm	$\pm 200$ ppm	G	-20/+70°C	$\pm 30$ ppm	$\pm 60$ ppm	H	-20/+70°C	$\pm 40$ ppm	$\pm 100$ ppm	I**	-20/+70°C	$\pm 40$ ppm	$\pm 200$ ppm	J	-40/+85°C	$\pm 40$ ppm	$\pm 60$ ppm	K	-40/+85°C	$\pm 50$ ppm	$\pm 100$ ppm	L**	-40/+85°C	$\pm 50$ ppm	$\pm 200$ ppm	M	-55/+85°C	$\pm 50$ ppm	$\pm 100$ ppm	N**	-55/+85°C	$\pm 50$ ppm	$\pm 200$ ppm	<p>* Deviation is referenced to the specified output frequency. For example, in Model CO-441V-BX at 10 MHz, at 25°C and 0V control the frequency is at least 100 ppm below 10 MHz and at -5V the frequency is at least 100 ppm above 10 MHz.</p> <p>** The following notes apply to options C, F, I, L, and N (<math>\pm 200</math> ppm deviation) They are only available at frequencies up to 25 MHz for HCMOS/ACMOS and 75 MHz for ECL. Linearity of <math>\pm 10\%</math> is standard. (<math>\pm 5\%</math> and <math>\pm 2\%</math> optional for HCMOS and ACMOS models) CO-464V and CO-467V not available on all codes. Contact factory for availability.</p>
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<b>Control Voltage and Linearity</b>	0 to +5 Vdc Positive transfer (lowest frequency at 0V) $\pm 20\%$ linearity smooth monotonic characteristic ( $\pm 10\%$ linearity available)	CO-40 and 44 series 0 to +5V; positive transfer function; CO-43 and 45 series: 0 to -5V negative transfer; CO-46 series: 0 to -3.3V negative transfer (lowest frequency at 0V) $\pm 20\%$ linearity is standard, ( $\pm 10\%$ optionally available standard for C, F, I, L, and N deviation codes). $\pm 5V$ bipolar control voltage is optional ( $\pm 3V$ to $\pm 10V$ available) With Bipolar, transfer function is negative, standard linearity is $\pm 10\%$																																																																																																													
<b>Modulation Rate</b>	0 to 1 kHz (Higher modulation rates available)	dc to 1 kHz; higher modulation rates optional																																																																																																													
<b>Modulation Input Z</b>	Greater than 50 k $\Omega$	Greater than 50 k $\Omega$																																																																																																													
<b>Aging Rate</b>	3-5 ppm first year, then 2 ppm/year thereafter—less than 20 ppm total over 10 years.																																																																																																														