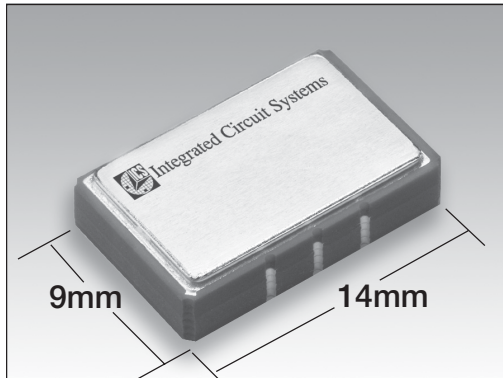




### M660-01 Voltage Controlled SAW Oscillator



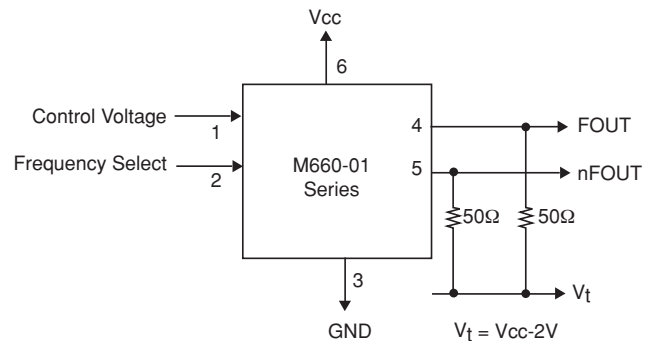
#### DESCRIPTION

The M660-01 is a dual output (selectable output) SAW based voltage controlled oscillator for telecom applications. An internal SAW provides jitter performance of less than 0.5psec (rms) over an operating temperature of -40 to +85°C. The dual oscillator is housed in a hermetically sealed leadless package (LCC). Pin 2 is used as frequency select using TTL Logic.

#### FEATURES

- Frequency Select Feature (dual frequency capability)
- Industry Standard Package, 14 x 9 x 3.5 mm
- Output Frequencies from 125-175MHz
- 3.3 V Operation
- Low Jitter < 1.5ps rms (50kHz to 80MHz offset range)
- LVPECL Logic Levels with Fast Transition Times
- Complementary Outputs

#### BLOCK DIAGRAM



#### APPLICATIONS

- Clock Smoothing for OC192/OC48/OC12/OC3
- Clock Smoothing for STS96/STS48/STS12/STS3/STS1
- Frequency Translation
- Clock and Data Retiming

#### ABSOLUTE MAX RATINGS

Operating Temp. Range (Case): ..... -40°C to +85°C  
 Storage Temp. Range (Ambient): ..... -55°C to +125°C  
 Control Voltage Range: ..... V<sub>EE</sub> to V<sub>CC</sub>  
 Output Current: ..... 20 mA  
 Power Supply Voltage (V<sub>cc</sub>): ..... 0 to +3.6 Vdc

**ISO 9001  
Registered**



### SPECIFICATIONS

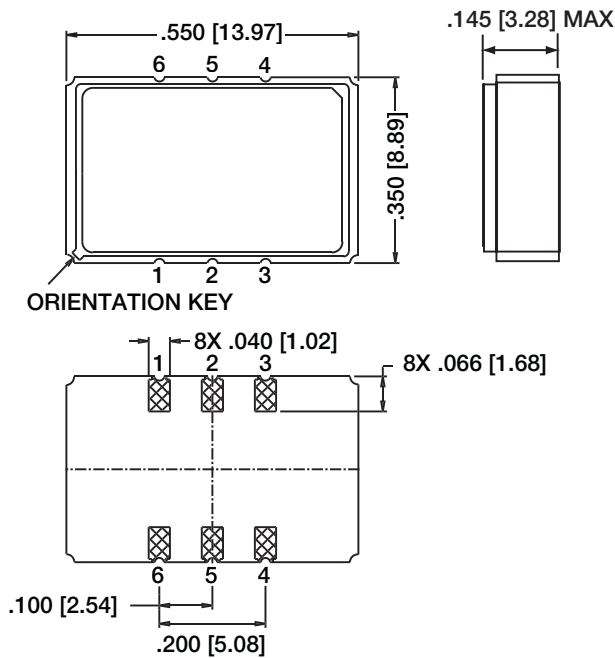
Specifications @  $V_{cc} = +3.3$  Volts,  $V_{ee} = 0$  Volts, and  $T_a = +25^\circ\text{C}$  unless otherwise specified

PARAMETER	Min	Typ	Max	Units
Output Frequency	125		175	MHz
VCO Gain KVC0		210		ppm/V
Absolute Pull Range	$\pm 50$			ppm
Duty Cycle	45		55	%
Spurious Suppression	-50	-70		dBc
Linearity <sup>3</sup>		8		%
Logic Levels $V_{ol}^1$	$V_{cc} - 2.0$		$V_{cc} - 1.7$	Volts
$V_{oh}^2$	$V_{cc} - 1.4$		$V_{cc} - 1.0$	Volts
$V_{OUT P-P}$		700		mV
Input Control Voltage (Vc) Range	0		$V_{cc}$	Volts
Vc Input Impedance		100		$k\Omega$
Vc Modulation BW		500		kHz
Frequency Select (Pin 2)	2.0		$V_{cc} + 0.3$	Volts
Frequency Select (Pin 2)	-0.3		0.8	Volts
Output Rise Time <sup>2</sup>		300	400	psec
Output Fall Time <sup>2</sup>		300	400	psec
Jitter @ 155.520MHz offset from carrier 12kHz to 20MHz		0.63		psec rms
Phase Noise (offset from carrier)				
100Hz		-58		dBc/Hz
1kHz		-85		dBc/Hz
10kHz		-110		dBc/Hz
100kHz		-134		dBc/Hz
Operating Temperature	-40	25	+85	$^\circ\text{C}$
Supply Current <sup>4</sup> $I_{cc}$		80	100	mA
Supply Voltage $V_{cc}$	3.135	3.3	3.465	V

- Notes: 1. Output levels are standard 100K ECL compatible.  
 2. Transition times are measured from 20% to 80%.  
 3.  $V_{in} = 0.3V$  to  $3.0V$ . Best fit straight line.  
 4. Includes  $150\Omega$  load resistors on both FOUT & nFOUT outputs.  
 5. Output terminated with  $50\Omega$  to  $V_{cc} - 2.0V$ .  
 6. Internally pulled down to logic "0" (Frequency 1) if left unconnected.



### PACKAGE DIMENSIONS



Pin	Symbol	Function
1	Vc	VCSO Control Voltage
2	FS	Frequency Select Frequency 1 = 0.0 to 0.5V Frequency 2 = 2.5 to 3.0V
3	GND	Case and electrical ground
4	FOUT	VCSO Output
5	nFOUT	VCSO Complementary Output
6	Vcc	Power supply voltage (3.3V ±5%)

Dimensions are in MM, dimensions in [ ] are in inches  
Tolerance is ±0.020 [0.001]

### ORDERING INFORMATION

Part Number M660-01 -BA -BH

Frequency 1 in MHz 155.5200 ————|

Frequency 2 in MHz 167.3317 ————|

### Available VCSO Frequencies

BA	155.5200	BG	167.3280
BB	156.2500	BH	167.3317
BC	156.8324	BI	168.0400
BD	161.1328	BJ	172.6423
BE	166.6286	BK	173.3708
BF	167.2828		

ICS reserves the right to make changes in the device data identified in this publication without further notice. ICS advises its customers to obtain the latest version of all device data to verify that any information being relied upon by the customer is current and accurate.

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