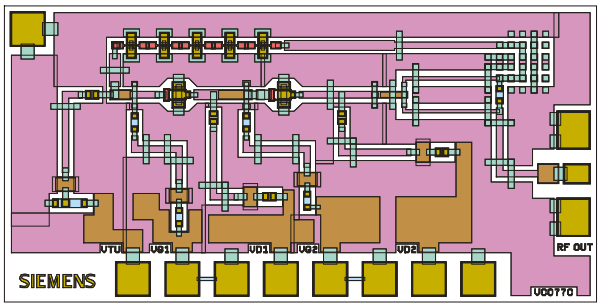
77 GHz GaAs Voltage Controlled Oscillator

- Operating Frequencies: 76,5 GHz
- Tuning Range > 1GHz
- Output matched to 50 Ω

ESD: **E**lectro**s**tatic **d**ischarge sensitive device, observe handling precautions!



Description:

The given description is based on preliminary test results at room temperature. This first design contains no buffer stage for the VCO. A VCO3 with buffer stage will be available till end of 1999. During test the MMIC was mounted on a metal chuck. The VCO was intended to be PLL-stabilized via a 5th harmonic mixer (HMIX-MMIC see data sheet) and a 15.1 GHz DRO (Pout > +8 dBm, phase noise < -105 dBc/Hz @ 100 kHz). Support on PLL- and DRO-design can be provided.

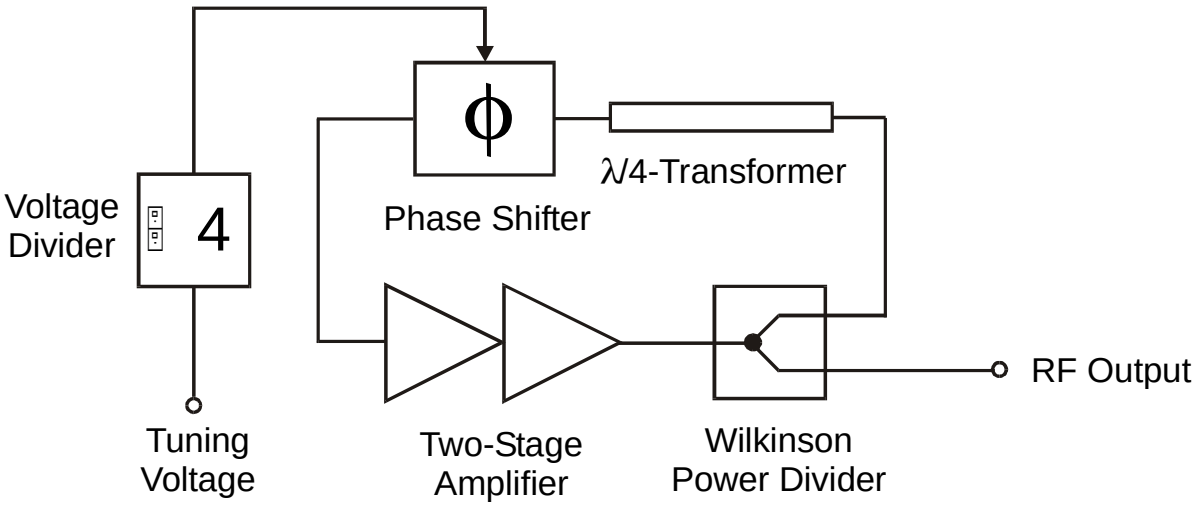
MMICs will be delivered with wirebond/flip-chip compatible pads. Custom-made bumps (Au- or AuSn-bumps) are optional. Layout can be provided in dxf- or gds2-format.

Type	Ordering Code	Package
Chip T602B_VCO_2	tbd	Chip

Electrical Specifications:

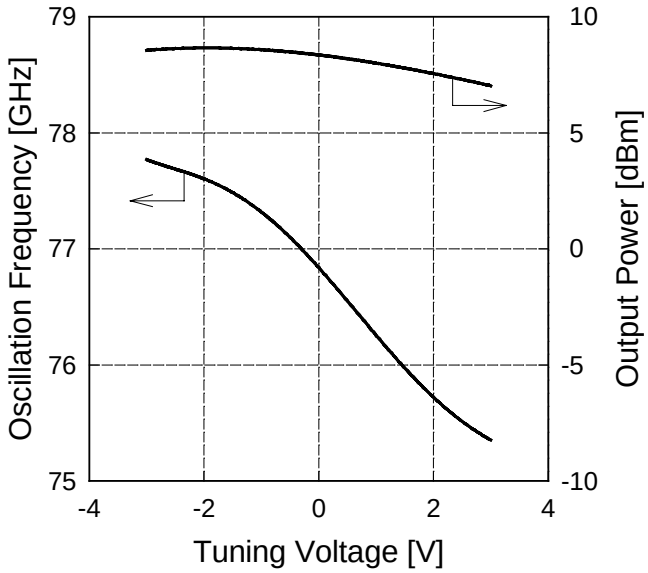
Characteristics	Symbol	Typ. Value	Unit
Drain Supply Voltage, VCO, 1st Stage	V_{D1}	3.5	V
Gate Supply Voltage, VCO, 1st Stage	V_{G1}	0.5	V
Drain Supply Current, VCO, 1st Stage	I_{D1}	16	mA
Drain Supply Voltage, VCO, 2nd Stage	V_{D2}	3.5	V
Gate Supply Voltage, VCO, 2nd Stage	V_{G2}	0.5	V
Drain Supply Current, VCO, 2nd Stage	I_{D2}	16	mA
Output Power	P_{out}	> 6.5	dBm
Phase noise free running		-75	dBc/Hz @ 1MHz
Phase noise PLL stabilized		< -90	dBc/Hz @ 100kHz
Tuning Voltage (Gate), VCO	V_{tune}	-3 to +3	V
Tuning Slope	s	-0.7 to -0.5	GHz/V
Tuning Port Input Impedance	Z_{tune}	200	Ω

Block diagram of the voltage-controlled oscillator with feedback topology



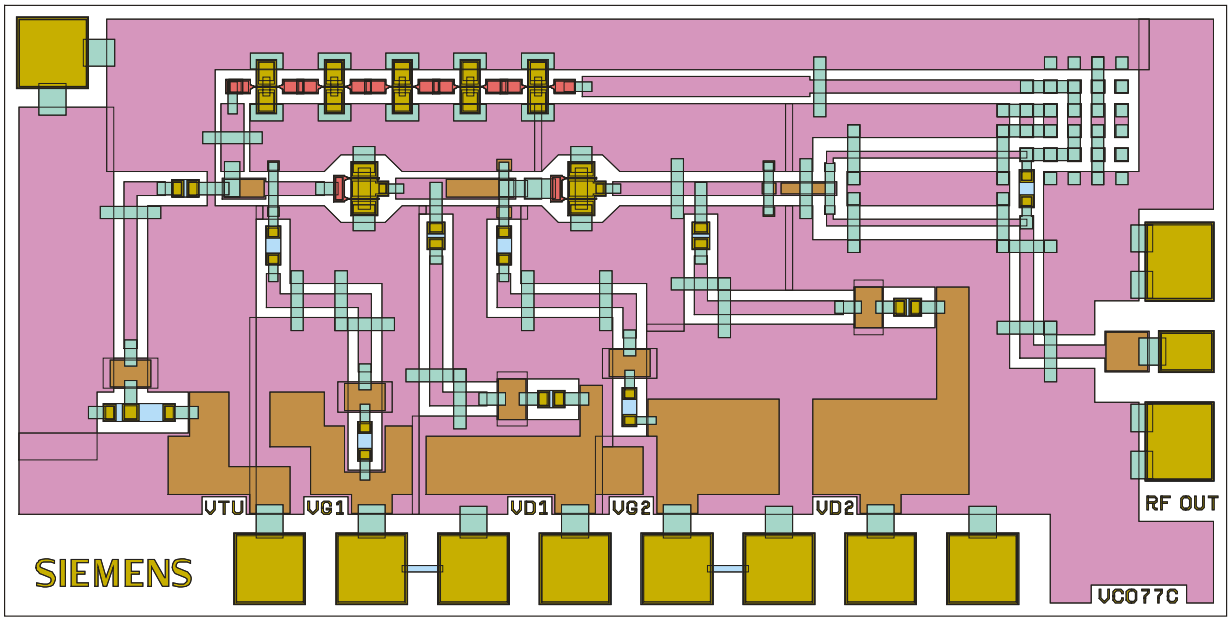
Measured data:

Measured oscillation frequency and output power of the monolithic VCO as a function of the external tuning voltage



Technology data:

Chip Thickness	100 µm
Chip Size	2 x 1 mm²
Bond Pad Size, DC / HF	100x100 / 50x50 µm²
Bond Pad Pitch, DC, RF (G-S-G)	150µm



Recommendation of Bonding Conditions:

	Thermocompression Nailhead, without ultrasonic	Wedge Bonding	Bond Pull Test Mil 883, >2 g
Table Temp.	250°C	250°C	1: 2,5 g 2: 3,1 g 3: 3,2 g 4: 3,0 g 5: 2,8 g
Tool Temp.	180°C	150°C	
Scrub	100 Hz		
Bond Force	50 g	25 g	
Wire Diameter	25 µm	17 µm	

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