Voltage Controlled Oscillators

How To Order

* Single-Band VCO

1	2	3	4	5	6	7	8	9	10	11
VCX			2 3 8 8				M			
Product Code			Center Frequency				Package		Vcc	Code

Example	
2388	Frequency Range: 2290-2485 (High Band+Low Band)/2 (2290+2485)/2= 2388

Package:
- S = 8x6x1.9mm
- T = 7.6x7.6x1.9mm
- ST = 6x6x1.9mm
- U = 9x7x1.9mm
- Q = 12.7x12.7x2.54mm
- UT = 5.5x4.8x1.85mm
- N = 9.8x9.3x1.9mm
- US = 5x4x1.7mm

Voltage:
- 0 = 2.7V
- 1 = 2.85V
- 2 = 3V
- 3 = 3.3V
- 4 = 4.2V
- 5 = 5V
- 6 = Customer Design
- 7 = 2.8V
- 8 = 8V
- 9 = 2.6V

- A = 12V
- B = 3.5V
- C = 2.75V
- D = 3.6V
- E = 10V
- F = 2.5V
- G = TBD
- :
- Z = TBD

* Dual-Band VCO

1	2	3	4	5	6	7	8	9	10	11
DDV			17		11		M			
Product Code			First 2 digits of high band frequency		First 2 digits of low band frequency		Package		Vcc	Code

Package:
- S = 8x6x1.9mm
- U = 9x7x1.9mm
- UP = 9.8x8x1.9mm
- V = 10.2x7.5x1.9mm
- UT = 9.8x7.2x2.0mm
- SP = 8.8x6.7x1.9mm
- QS = 12.0x9.6x1.9mm

Voltage:
- 0 = 2.7V
- 1 = 2.85V
- 2 = 3V
- 3 = 3.3V
- 4 = 4.2V
- 5 = 5V
- 6 = Customer Design
- 7 = 2.8V
- 8 = 8V
- 9 = 2.6V

- A = 12V
- B = 3.5V
- C = 2.75V
- D = 3.6V
- E = 10V
- F = 2.5V
- G = TBD
- :
- Z = TBD

Introduction *Of* Voltage Controlled Oscillators

Overview

The wireless telecommunications industry is undergoing a high growth rate and technological innovations. It requires products of low profile, miniature size, lightweight, higher frequency and featured performance.

Delta's broad spectrum of technical expertise includes low and high frequency, analog and digital electronic components design, high density and miniature surface mount package design, hybrid circuit design which enable Delta to follow the trend toward cost-effective, outstanding performance, ultimate small size VCO to fulfill the demands of wireless communication market. Delta has long term relationship with the world leading telecommunication companies, such as Nortel, Alcatel, Siemens, Nokia, Ericsson, NEC, Philips and many others. Our product quality, reliability and service are well recognized.

VCO Applications

* *Cellular/Cordless Phone System : GSM, CDMA, DCS , PDC, D-AMPS, PHS, DECT*
* *2-WAY PAGER*
* *Wireless LAN*
* *Wireless Local Loop*
* *Basestation*
* *Satellite Communication*
* *Military Communication*
* *Radar*
* *VSAT*
* *GPS*

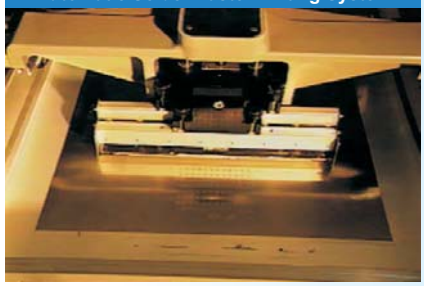
Technology & Manufacture

With full understanding of customer's application requirements, our design engineers are capable of developing reliable and cost effective products. To further ensure product quality and performance, different testing instrument and equipment, such as Spectrum Analyzer, Vector Network Analyzer, Noise Figure and Gain Test Set, VCO/PLL Test Set, Synthesized Signal Generator, and Circuit Simulator have been used.

Noise Figure and Gain Test Set

Furthermore, our strong capability in factory automation, automated equipment developed in-house, enable us to provide customers with high volume manufacturing and consistent quality. These automated equipment such as Surface Mount System, Solder Paste Printing System, Laser Trimming System, Automatic Functional Test System, and Electronic Optical Inspection System are used in our highly automated manufacturing facility.

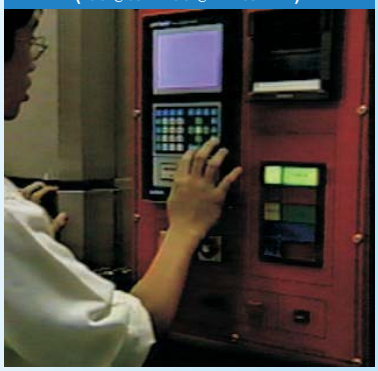
Automatic Solder Paste Printing System



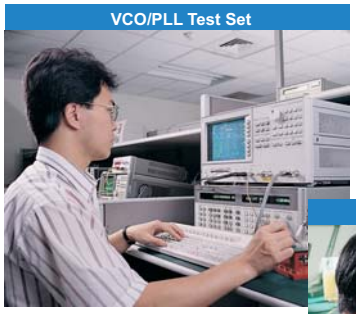
Quality Assurance

Excellence in quality and reliability has been our primary goal and the "Do it right the first time" is our ultimate philosophy in quality assurance. We believe it is more economical and efficient to prevent defects from occurring in advance than correcting them afterwards. Therefore, our quality control is emphasized both at design and production stages to meet customers full satisfication. At design stage, our quality engineers and manufacturing engineers are highly involved in evaluating the quality, reliability and manufacturing feasibility. Reliability tests are strictly conducted to ensure satisfactory performance in the product life. We also implement strict Statistical Process Control (SPC) and Total Quality Control (TQC) techniques to achieve our ultimate goal of zero defect and total customer satisfaction.

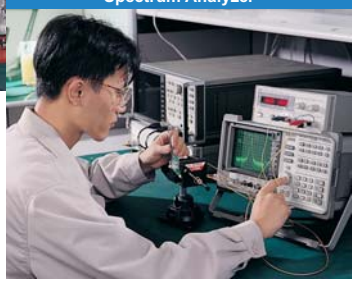
Thermal Shock Chamber
(-55℃to +155℃Air to Air)



VCO/PLL Test Set



Spectrum Analyzer



Dual-Band VCO

Part Number: DDV1413S00
Application: Dual RX GSM /DCS
Electrical Specification

Parameter	Unit	GSM900	DCS1800
Frequency	MHz	1274~1360	1352~1480
Output Power	dBm	-3~3	
Control Voltage	V	0.5~3	
Control Voltage Sensitivity	MHz/V	75±15	85±15
C/N	dBc/Hz	-124@600KHz	
Pushing (±0.1V)	KHz	±1500	
Pulling VSWR=2:1	KHz	±3000	
Harmonics	dBc	-10max	
Supply Voltage	V	2.7±0.1	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦15	
Switch Voltage	V	0~0.5	2.3~Vcc

* The above specifications are subject to change without notice.

Part Number: DDV1512UCO
Application: Dual RX GSM /DCS
Electrical Specification

Parameter	Unit	GSM900	DCS1800
Frequency	MHz	1162-1242	1520-1598
Output Power	dBm	-2±3	
Control Voltage	V	0.8 ~ 2.2	
Control Voltage Sensitivity	MHz/V	80±15 typ	88±15 typ
C/N	dBc/Hz	-85@10KHz -140@3.0MHz	-85@10KHz -135@3.0MHz
Pushing (±0.1V)	KHz	±800	
Pulling VSWR=2:1	KHz	±4000	
Harmonics	dBc	-15max	
Supply Voltage	V	2.8±0.1	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦9	
Switch Voltage	V	0~0.8	2.3~Vcc

* The above specifications are subject to change without notice.

Dual-Band VCO

Part Number: DDV1611U10
Application: Dual RX GSM /PCS
Electrical Specification

Parameter	Unit	GSM900	PCS
Frequency	MHz	1150-1185	1575-1655
Output Power	dBm	0 ±3	
Control Voltage	V	0.5 ~ 2.5	
Control Voltage Sensitivity	MHz/V	42±5	65±10
C/N	dBc/Hz	-85@10KHz -125@600KHz -140@3.0MHz	-85@10KHz -125@600KHz -138@3.0MHz
Pushing (±0.1V)	KHz	±1000	
Pulling VSWR=2:1	KHz	±4000	
Harmonics	dBc	-10max	
Supply Voltage	V	2.85±0.1	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦10	
Switch Voltage	V	0~0.5	2.6~Vcc

* The above specifications are subject to change without notice.

Part Number: DDV1790UT00
Application: Dual TX GSM /DCS
Electrical Specification

Parameter	Unit	GSM900	DCS1800
Frequency	MHz	880~915	1710~1785
Output Power	dBm	7±2	8-1/+2
Control Voltage	V	0.8~3.0	
Control Voltage Sensitivity	MHz/V	20~40	45~60
C/N	dBc/Hz	-133@600KHz	-126@600KHz
Pushing (±0.1V)	KHz	±1500	
Pulling VSWR=2:1	KHz	±1500	±2500
Harmonics	dBc	-15max	
Supply Voltage	V	2.7±0.2	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦25	≦35
Switch Voltage	V	0~0.5	2.3~Vcc

* The above specifications are subject to change without notice.

Dual-Band VCO

Part Number: DDV1790UP03
Application: Dual TX GSM /DCS
Electrical Specification

Parameter	Unit	GSM900	DCS1800
Frequency	MHz	880~915	1710~1785
Output Power	dBm	9~12	
Control Voltage	V	0.5~2.8	
Control Voltage Sensitivity	MHz/V	36±5	40±6
C/N	dBc/Hz	-114@200KHz -120@400KHz -148@10MHz	-114@200KHz -120@400KHz -148@10MHz
Pushing (±0.12V)	KHz	±800	±1000
Pulling VSWR=2:1	KHz	±1500	±2000
Harmonics	dBc	-15max	
Supply Voltage	V	2.70±0.12	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦40	
Switch Voltage	V	0~0.3SW1	0~0.3SW2

* The above specifications are subject to change without notice.

Part Number: DDV-1790UT73
Application: Dual TX GSM /DCS
Electrical Specification

Parameter	Unit	GSM900	PCS
Frequency	MHz	880~915	1710~1785
Output Power	dBm	12±3	10±3
Control Voltage	V	0.5~2.3	
Control Voltage Sensitivity	MHz/V	24~40	55~85
C/N	dBc/Hz	-100@10KHz -120@100KHz	-90@10KHz -110@100KHz
Pushing (±0.1V)	KHz	±1000	±1000
Pulling VSWR=2:1	KHz	±1500	±3000
Harmonics	dBc	-15max	
Supply Voltage	V	2.8±0.1	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦35	
Switch Voltage	V	0~0.4	2.0~Vcc

* The above specifications are subject to change without notice.

Dual-Band VCO

Part Number: DDV1121V21
Application: DECT Phone
Electrical Specification

Parameter	Unit	RX	TX
Frequency	MHz	1144~1185	1200~1242
Output Power	dBm	-8±3	
Control Voltage	V	0.5~2.7	0.5~2.5
Control Voltage Sensitivity	MHz/V	65±5	
C/N	dBc/Hz	-97@25KHz	
Pushing (±0.1V)	KHz	±1000	
Pulling VSWR=2:1	KHz	±2000	
Harmonics	dBc	-10max	
Supply Voltage	V	3.0±0.2	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦10	
Switch Voltage	V	0~0.8	2.3~3.0

* The above specifications are subject to change without notice.

Part Number: DDV9488V20
Application: DECT Phone
Electrical Specification

Parameter	Unit	RX	TX
Frequency	MHz	884~895	939~950
Output Power	dBm	-8±3	
Control Voltage	V	0.5~2.7	0.5~2.5
Control Voltage Sensitivity	MHz/V	13~20	
C/N	dBc/Hz	-100@25KHz	
Pushing (±0.1V)	KHz	±1000	
Pulling VSWR=2:1	KHz	±2000	
Harmonics	dBc	-10max	
Supply Voltage	V	3.0±0.2	
Operation Temp. Range	°C	-20~+75	
Current	mA	≦10	
Switch Voltage	V	0~0.8	2.3~3.0

* The above specifications are subject to change without notice.

Dual-Band VCO

Part Number: DDV1890U11
Application: Dual TX GSM/PCS/DCS
Electrical Specification

Parameter	Unit	GSM TX	DCS/PCS TX
Frequency	MHz	880~915	1710~1910
Output Power	dBm	8±3	8±3
Control Voltage	V	0.5~2.5	0.5~2.5
Control Voltage Sensitivity	MHz/V	66±10	132±20
C/N	dBc/Hz	≦-92@10KHz ≦-121@400KHz ≦-153@10MHz	≦-88@10KHz ≦-119@400KHz ≦-150@10MHz
Pushing (±0.1V)	KHz	±1000	±1500
Pulling VSWR=2:1	KHz	±1000	±3000
Harmonics	dBc	-10max	-10max
Supply Voltage	V	2.80	2.80
Operation Temp. Range	°C	-20~+75	-20~+75
Current	mA	≦20	≦25
Switch Voltage	V	0.3max	2.65min

* The above specifications are subject to change without notice.

Part Number: DDV1796U11
Application: CDMA/PCS
Electrical Specification

Parameter	Unit	CDMA	PCS
Frequency	MHz	954~980	1720~1788
Output Power	dBm	-2±3	
Control Voltage	V	0.3~2.35	0.3~2.35
Control Voltage Sensitivity	MHz/V	22 typ	40 typ
C/N	dBc/Hz	≦-120@60KHz	≦-139@1.25MHz
Pushing (±0.1V)	KHz	±1000	±1000
Pulling VSWR=2:1	KHz	±1000	±1000
Harmonics	dBc	< -10max	< -10max
Supply Voltage	V	2.85±0.15	2.85±0.15
Operation Temp. Range	°C	-30~+80	-30~+80
Current	mA	≦10	≦10
Switch Voltage	V	2.7~Vcc	0~0.15

* The above specifications are subject to change without notice.

Tri-Band VCO

Part Number: DMP-TDV1789U70
Application: GPRS
Electrical Specification

Parameter	Unit	GSM	DCS	PCS
Frequency	MHz	880~915	1710~1785	1850~1910
Output Power	dBm	8±2	8±2	8±2
Control Voltage	V	0.1~2.4	0.4~2.4	0.4~2.4
Control Voltage Sensitivity	MHz/V	30±5	60±10	60±10
C/N	dBc/Hz	< -163@20MHz	< -154@20MHz	< -154@20MHz
Pushing (±0.1V)	KHz	±1000	±1000	±1000
Pulling VSWR=2:1	Khz	±1000	±2000	±2000
Harmonics	dBc	-15max	-15max	-15max
Supply Voltage	V	2.8±0.15	2.8±0.15	2.8±0.15
Operation Temp. Range	°C	-20~+75	-20~+75	-20~+75
Current	mA	≦35	≦35	≦35
Switch Voltage	V	VS1=L,VS2=X	VS1=H, VS2=L	VS1=H, VS2=H

* The above specifications are subject to change without notice.

VS1	VS2	E-GSM	DCS 1800	PCS 1900
0	X	ON	OFF	OFF
1	0	OFF	ON	OFF
1	1	OFF	OFF	ON

X=Don't Care

Quad-Band VCO

Part Number: QDV1316QTCO
Application: GSM
Electrical Specification

Parameter	Unit	TXL01	RX Band	GSM	DCS
Frequency	MHz	1286~1361	1805~1920	880~915	1710~1785
Output Power	dBm	-3±3	-3±3	12±3	10±3
Control Voltage	V	0.5~2.2			
Control Voltage Sensitivity	MHz/V	80±10	80±10	30±10	60±10
C/N	dBc/Hz	-115@400KHz			
Pushing (±0.1V)	KHz	±1500			
Pulling VSWR=2:1	KHz	±2000			
Harmonics	dBc	-13max			
Supply Voltage	V	2.75±0.1			
Operation Temp. Range	°C	-20~+75			
Current	mA	≦20		≦50	
Switch Voltage	V	0~0.3		2.0~3.0	

* The above specifications are subject to change without notice.

Power Down	Band SW	Power SW	TXL01	RX Band	GSM	DCS
1	X	X	OFF	OFF	OFF	OFF
0	0	0	ON	OFF	OFF	OFF
0	0	1	OFF	OFF	ON	OFF
0	1	0	OFF	ON	OFF	OFF
0	1	1	OFF	OFF	OFF	ON

X=Don't Care

Single-Band VCO Selection Guide

APPLICATIONs	Part Number	Frequency Range Min. (MHz)	Frequency Range Max. (MHz)	Tuning Voltage (Vdc)	Phase Noise @10KHz (dBc/Hz)	Output Power (dBm)	Pushing (MHz, max)	Pulling 2.0:1 VSWR (MHz, max)	Input Capacitance (pF, max)	Supply Voltage (Vdc)	Supply Current (mA)	Harmonic Suppression (dBc)	Operating Temperature (°C)
Cable Modem	DMP-VCX205T50	204	206	1~4	≦-100	3±3	1	1	≦47	5±0.25	≦15	≦-10	-20 to 75
	DMP-VCX380R50	350	410	0.8~5.2	≦-97	7.5±2.5	±1.0	5	≦47	5.0±0.25	≦20	≦-14	-20 to 75
2-WAY PAGER	DMP-VCX411S20	410	412	0.7~3.0	≦-95	0±2	±0.5	1.5	≦47	3.0±0.1	≦20	≦-10	-20 to 75
2-WAY PAGER	DMP-VCX411S21	405	417	0.7~2.5	≦-94	0±3	±0.5	2	≦47	3.0±0.2	≦8	≦-20	-20 to 75
	DMP-VCX430U60	430	430	0~3	≦-110	0±3	±0.5	0.5	≦47	2.525±0.125	≦9	≦-20	-20 to 75
	DMP-VCX460S50	450	470	1.0~4.0	≦-100	6±3	±1	2	≦47	5.0±0.2	≦15	≦-15	-20 to 75
	DMP-VCX540R10	538	542	0.5~2.85	≦-100	1±3	±1.0	2.0	≦47	2.85±0.15	≦10	≦-13	-20 to 75
Cable Modem	DMP-VCX550S50	540	560	1~4	≦-100	0~5	±0.5	1	≦47	5±0.25	≦15	≦-10	-20 to 75
	DMP-VCX560S20	555	565	0.5~2.5	≦-110@100KHz	-1±3	±1.0	1.6	≦47	3.0±0.15	≦12	≦-15	-20 to 75
	DMP-VCX652S50	634	669	1.0~4.0	≦-98	7±2	±0.5	2	≦47	5.0±0.2	≦20	≦-20	-20 to 75
PDC	DMP-VCX686S50	668.2	703.2	1.0~4.0	≦-96	7±2	±0.5	2	≦47	5.0±0.2	≦20	≦-20	-20 to 75
Wireless LAN	DMP-VCX704S60	702	706	0.5~2.5	≦-115@100KHz	≧-12	±0.5	2	≦47	3.15±0.3	≦5	≦-10	-20 to 75
PDC	DMP-VCX723S50	710	735	1.0~4.0	≦-98	7±2	±0.5	1	≦47	5.0±0.2	≦20	≦-20	-20 to 75
2-WAY PAGER,PDC	DMP-VCX734S50	723	746	1.0~4.0	≦-98	7±2	±0.5	2	≦47	5.0±0.2	≦20	≦-20	-20 to 75
Wireless LAN	DMP-VCX748S60	741	755	0.5~2.2	≦-93	-8±3	±2	2	≦47	2.84±0.20	≦5	≦-18	-20 to 75
2-WAY PAGER, GSM	DMP-VCX792S20	785	800	0.5~2.5	≦-100	7±2	±1.0	4	≦47	3.0±0.2	≦25	≦-18	-20 to 75
2-WAY PAGER, GSM	DMP-VCX815S20	805	825	0.5~2.5	≦-95	9±2	±1.0	4	≦47	3.0±0.1	≦20	≦-15	-20 to 75
2-WAY PAGER, GSM	DMP-VCX815S21	806	825	0.5~2.5	≦-100	7±2	±1	2	≦47	3.0±0.2	≦25	≦-20	-20 to 75
2-WAY PAGER, GSM	DMP-VCX815S22	805	825	0.5~2.5	≦-100	7±2	±0.5	4	≦47	3.0±0.2	≦25	≦-20	-20 to 75
CT2, CDMA, AMPS	DMP-VCX837S20	830	845	0.5~2.5	≦-100	7±2	±1.0	4	≦47	3.0±0.2	≦25	≦-20	-20 to 75
	DMP-VCX896S20	889	903	0.5~3.0	≦-60@12.5KHz	0±3	1.0	2	≦47	3.0±0.15	≦8	≦-10	-20 to 75
	DMP-VCX896UT60	889.5	902.5	0.5~2.8	≦-60@12.5KHz	0±3	±1.0	2	≦47	2.8±0.2	≦8	≦-10	-20 to 75
2-WAY PAGER, CT2, AMPS, GSH	DMP-VCX902S20	890	915	0.5~2.5	≦-100	3±2	±1.0	1	≦47	3.0±0.2	≦9	≦-10	-20 to 75
2-WAY PAGER, CT2, AMPS, GSH	DMP-VCX902S21	890	915	0.5~2.5	≦-95	1±3	±2.0	2	≦47	3.0±0.2	≦10	≦-20	-20 to 75
2-WAY PAGER, GSM	DMP-VCX902UT60	890	915	0.5~2.5	≦-96	0±3	±1.0	1	≦47	2.8±0.2	≦10	≦-15	-20 to 75
	DMP-VCX905U10	880	930	0.5~2.5	≦-98@12.5KHz	3±3	±1.2	1.5	≦47	2.85±0.15	≦8	≦-10	-20 to 75
GSM	DMP-VCX917U20	884	949	0.5~2.9	≦-95@25KHz	2±3	1.0	2	≦47	3.0±0.15	≦9.0	≦-10	-20 to 75
GSM	DMP-VCX917U60	884	949	0.6~3.0	≦-98@25KHz	0±3	0.8	2	≦47	2.5±0.15	≦8.5	≦-10	-20 to 75
CDMA	DMP-VCX966UT30	951	981	0.2~2.8	≦-95	1±3	±2	2	≦47	3.3±0.2	≦10	≦-20	-20 to 75
2-WAY PAGER, CDMA	DMP-VCX966S30	951	981	0.2~2.8	≦-95	1±3	±2.0	2	≦47	3.3±0.2	≦10	≦-20	-20 to 75
2-WAY PAGER, CDMA	DMP-VCX967UT20	954	980	0.5~3.25	≦-100	-2.5±3.5	±0.8	2	≦47	3.0±0.25	≦6.4	≦-10	-20 to 75
2-WAY PAGER, CDMA	DMP-VCX967ST10	954	980	0.2~2.8	≦-95	0±3	±1.0	1.2	≦47	2.85±0.2	≦9	≦-20	-20 to 75
WLAN	DMP-VCX980S11	974	987	0.4~2.4	≦-110@50KHz	-3±2.5	±1	1	≦47	2.85±0.15	≦4	≦-10	-20 to 75
E-TACS, GSM	DMP-VCX1018S40	1006	1031	1.0~4.0	≦-94	-3±3	±1.0	2	≦47	4.2±0.2	≦10	≦-20	-20 to 75
GSM	DMP-VCX1080UT60	1075	1085	0.5~2.2	≦-93	-5±2	±0.85	2	≦47	2.8±0.1	≦8	≦-10	-20 to 75
GSM	DMP-VCX1166UT20	1126	1206	0.5~2.5	≦-93	-5±3	±1.0	1	≦47	3.0±0.15	≦8	≦-10	-20 to 75
GSM	DMP-VCX1172S20	1160	1185	0.5~2.5	≦-90	0±3	±1	2	≦47	3.0±0.2	≦10	≦-20	-20 to 75
GSM	DMP-VCX1172S21	1160	1185	0.5~2.5	≦-90	0±3	±1.0	2	≦47	3.0±0.2	≦10	≦-20	-20 to 75
GSM	DMP-VCX1190UT20	1150	1230	0.7~2.0	≦-91	-2±2	±1.0	4	≦47	3.0±0.1	≦9	≦-15	-20 to 75
WLAN	DMP-VCX1197UT30	1095	1300	0.5~4.5	≦-142@3MHz	≧-5	±3	8	≦47	3.3±0.3	≦10	≦-10	-20 to 75
	DMP-VCX1207ST60	1172	1242	0.5~2.2	≦-97@20KHz	-2±3	±1.0	4	≦47	2.8±0.1	≦8	≦-15	-20 to 75
	DMP-VCX1288Q60	925	1650	3~17	≦-86	8±3	±1	3	≦47	1.2±0.2	≦30	≦-5	-20 to 75
	DMP-VCX1342R80	1250	1435	0.5~6.5	≦-92	7.5±2.5	±1.4	7	≦47	8.0±0.4	≦20	≦-15	-20 to 75
GSM	DMP-VCX1361ST70	1280	1440	0.5~2.2	≦-90	>-3	±0.8	3	≦47	2.8±0.1	≦8	≦-15	-20 to 75
GSM	DMP-VCX1377ST70	1274	1480	0.5~2.2	≦-93	0±3	±2	3	≦47	2.8±0.1	≦15	≦-25	-20 to 75
GSM	DMP-VCX1388ST71	1280	1495	0.4~2.4	≦-85	0±3	±1.5	4	≦47	2.8±0.1	≦10	≦-10	-20 to 75
GSM	DMP-VCX1501S50	1464	1539	1.0~4.0	≦-92	7±2	±0.5	3	≦47	5.0±0.2	≦20	≦-20	-20 to 75
GSM	DMP-VCX1507S20	1463	1551	0.5~2.5	≦-92	0±3	±1.0	2	≦47	3.0±0.15	≦16	≦-15	-20 to 75
	DMP-VCX1560ST60	1521	1598	0.5~2.2	≦-137@3MHz	-2±3	±2.0	4	≦47	2.8±0.1	≦9	≦-15	-20 to 75
GSM	DMP-VCX1570UT20	1530	1610	0.7~2.0	≦-87	-2±2	±1.0	4.0	≦47	3.0±0.1	≦9	≦-15	-20 to 75
	DMP-VCX1586S50	1548	1623	1.0~4.0	≦-94	7±2	±0.5	3	≦47	5.0±0.2	≦20	≦-20	-20 to 75
	DMP-VCX1590S20	1540	1640	0.5~2.5	≦-86	-3±3	±2.0	4	≦47	3.0±0.25	≦7	≦-20	-20 to 75
	DMP-VCX1607S40	1567	1647	1.0~4.0	≦-94	7±2	±0.5	3	≦47	4.2±0.25	≦20	≦-20	-20 to 75
WLAN	DMP-VCX1620S60	1576	1664	0.5~2.2	≦-80	-6±3	±2	0.4	≦20	2.84±0.2	≦10	≦-20	-20 to 75
	DMP-VCX1624S50	1548	1700	1.0~4.0	≦-94	7±2	±0.5	3	≦47	5.0±0.2	≦20	≦-20	-20 to 75
PDC, DCS	DMP-VCX1635UT60	1620	1650	0.5~2.5	≦-93	0±3	±1	1.5	≦47	2.7±0.1	≦8	≦-15	-20 to 75
PDC, DCS	DMP-VCX1635ST20	1620	1650	0.5~2.5	≦-90	0±3	±2.0	2	≦47	3.0±0.15	≦15	≦-20	-20 to 75
	DMP-VCX1636S20	1594	1784	0.5~2.5	≦-90	0±3	±2.0	2	≦47	3.0±0.3	≦10	≦-20	-20 to 75
PDS, DCS	DMP-VCX1638S20	1600	1675	0.7~4.3	≦-90	2±2	±1	2	≦47	3.0±0.1	≦15	≦-20	-20 to 75
DCS	DMP-VCX1652ST60	1632	1673	0.4~2.1	≦-100	≧-6	±1.2	2.5	≦47	2.7±0.1	≦5.5	≦-15	-20 to 75
PDS, DCS	DMP-VCX1656S20	1614	1698	0.5~2.5	≦-90	0±3	±2	2	≦47	3.0±0.3	≦10	≦-20	-20 to 75

* The above specifications are subject to change without notice.

Single-Band VCO Selection Guide

APPLICATIONs	Part Number	Frequency Range Min. (MHz)	Frequency Range Max. (MHz)	Tuning Voltage (Vdc)	Phase Noise @10KHz (dBc/Hz)	Output Power (dBm)	Pushing (MHz, max)	Pulling 2.0:1 VSWR (MHz, max)	Input Capacitance (pF, max)	Supply Voltage (Vdc)	Supply Current (mA)	Harmonic Suppression (dBc)	Operating Temperature (°C)
PHS	DMP-VCX1668US21	1649	1687	0.5~2.5	≦-125@600KHz	-2±2.5	±0.5	1	≦47	3.0±0.06	≦6	≦-10	-20 to 75
	DMP-VCX1679T00	1659	1699	0~3	≦-86	-6±2	±5	12	≦47	2.7±0.5	≦6	≦-7	-20 to 75
	DMP-VCX1679S60	1638	1720	0.5~4.5	≦-99@60KHz	≧-3	±1.0	6	≦47	3.5±0.1	≦10	≦-10	-20 to 75
PDC, DCS	DMP-VCX1690S20	1640	1740	0.5~2.5	≦-85@200KHz	0±3	±0.8	2	≦47	3.0±0.1	≦20	≦-20	-20 to 75
PDC, DCS	DMP-VCX1690S21	1640	1740	0.5~2.5	≦-90	0±3	±0.8	2	≦47	3.0±0.1	≦20	≦-20	-20 to 75
	DMP-VCX1695S50	1680	1710	1~4	≦-94	7±3	±1	3	≦47	5.0±0.2	≦20	≦-20	-20 to 75
PHS	DMP-VCX1702S40	1662	1742	1~4	≦-104@25KHz	7±3	±2	3	≦47	4.2±0.25	≦20	≦-20	-20 to 75
CDMA	DMP-VCX1711ST70	1635	1788	0.4~2.3	≦-143@2MHz	-3±3	±1.5	3	≦47	2.8±0.2	≦8	≦-20	-20 to 75
	DMP-VCX1716S20	1674	1758	0.5~2.5	≦-90	0±3	±2	2	≦47	3.0±0.3	≦10	≦-20	-20 to 75
	DMP-VCX1740ST60	1705	1775	0.5~2.2	≦-85@200KHz	0±3	±1.5	4	≦47	2.7±0.1	≦10	≦-15	-20 to 75
DCS, DECT, PCS, CDMA	DMP-VCX1748S60	1705	1790	0.5~2.2	≦-86	±3	±2.0	4	≦47	2.8±0.15	≦10	≦-10	-20 to 75
DECT, PCS, CDMA	DMP-VCX1750UT10	1720	1780	0.5~2.5	≦-92	0±3	±1.0	1.5	≦47	2.85±0.1	≦9	≦-10	-20 to 75
DCS, DECT, PCS	DMP-VCX1785S50	1770	1800	1~4	≦-94	7±3	±1	2	≦47	5.0±0.2	≦20	≦-20	-20 to 75
	DMP-VCX1800QA0	1400	2200	0.5~1.7	≦-84	8±4	±5	25	≦47	12±1	≦40	≦-12	-20 to 75
PCS, PHS, DECT, DCS	DMP-VCX1840S20	1780	1900	0.3~2.5	≦-90	0±3	±1.5	3	≦47	3.0±0.1	≦10	≦-15	-20 to 75
DCS	DMP-VCX1861W60	1801	1921	0.8~2.8	≦-141@3MHz	-3±3	±1.5	4	≦47	2.7±0.2	≦8	≦-15	-20 to 75
DCS	DMP-VCX1880S20	1850	1910	0.5~2.5	≦-90	-3±3	±1.0	4	≦47	3.0±0.1	≦10	≦-20	-20 to 75
PHS, DECT, PCS	DMP-VCX1880ST60	1850	1910	0.5~2.2	≦-85@200KHz	-4±3	≦±1.5	4	≦47	2.7±0.1	≦15	≦-15	-20 to 75
PHS, DECT, PCS	DMP-VCX1880ST20	1850	1910	0.5~2.5	≦-90	-3±3	±1.0	4	≦47	3.0±0.1	≦10	≦-20	-20 to 75
	DMP-VCX1950S50	1800	2100	0.7~3.0	≦-90	9±2	±1.0	4	≦47	5.0±0.2	≦25	≦-15	-20 to 75
	DMP-VCX1965M50	1865	2065	0.7~4.0	≦-90	9±2	±1.5	6	≦47	5.0±0.2	≦25	≦-15	-20 to 75
	DMP-VCX1977R50	1825	2130	1.0~6.5	≦-85	8±2	±4	7	≦47	5.0±0.25	≦25	≦-12	-20 to 75
MMDS	DMP-VCX1980S50	1930	2030	0.5~4.5	≦-90	9±2	±3	8	≦47	5±0.25	≦20	≦-10	-20 to 75
TDMA	DMP-VCX2040S20	1965	2115	0.4~2.7	≦-100@25KHz	0±3	±2	2	≦47	3±0.15	≦9	≦-15	-20 to 75
	DMP-VCX2071SBO	2028	2113	0.5~4.5	≦-98	≧-3	±1.5	6.6	≦47	3.5±0.1	≦10	≦-10	-20 to 75
Wireless LAN	DMP-VCX2074S60	2023	2125	0.5~2.2	≦-85	0±3	±2	6	≦47	2.84±0.1	≦15	≦-15	-20 to 75
	DMP-VCX2080T20	1980	2180	0.5~2.5	≦-90	3±3	±1	4	≦47	3.0±0.1	≦20	≦-15	-20 to 75
2-WAY PAGER	DMP-VCX2080T21	1980	2180	0.5~2.5	≦-90	3±3	±1.0	4	≦47	3.0±0.1	≦20	≦-18	-20 to 75
	DMP-VCX2100TBO	2050	2150	0.5~3	≦-85	8±2	±1.5	15	≦47	3.5±0.1	≦20	≦-15	-20 to 75
Wireless LAN	DMP-VCX2165SBO	2100	2230	0.5~3.0	≦-90	8±3	±2	15	≦47	3.5±0.1	≦20	≦-18	-20 to 75
CDMA	DMP-VCX2139S10	2105	2174	0.3~2.3	≦-139@2MHz	-2.5±2	±0.6	2	≦47	2.85±0.15	≦10	≦-10	-20 to 75
Wireless LAN	DMP-VCX2162S20	2112	2212	0.5~2.5	≦-85	-1±3	±2	8	≦47	3.0±0.15	≦12	≦15	-20 to 75
Wireless LAN	DMP-VCX2162S21	2112	2212	0.5~2.5	≦-85	-1±3	±2	8	≦47	3.0±0.1	≦12	≦-15	-20 to 75
Wireless LAN	DMP-VCX2165SBO	2100	2230	0.5~3.0	≦-90	8±3	±3.0	15	≦47	3.5±0.1	≦20	≦-15	-20 to 75
Wireless LAN	DMP-VCX2168T20	2132	2204	0.5~3.0	≦-90	7±3	±3	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
Wireless LAN	DMP-VCX2175M20	2160	2190	0.5~3.0	≦-92	9±3	±2	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
Wireless LAN	DMP-VCX2179T20	2132	2225	0.5~3.0	≦-92	9±3	±2	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
	DMP-VCX2188T20	2100	2275	0.5~3.0	≦-92	9±3	±2.0	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
	DMP-VCX2208S20	2162	2255	0.3~2.7	≦-90	9±3	±2.0	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
	DMP-VCX2208S20	2162	2255	0.3~2.7	≦-92	9±3	±2.0	15	≦47	3.0±0.1	≦20	≦-18	-20 to 75
WLAN	DMP-VCX2210T20	2120	2300	0.5~2.5	≦-92	9±3	±2	15	≦47	3±0.1	≦20	≦-18	-20 to 75
WLAN	DMP-VCX2240S20	2190	2290	0.3~2.7	≦-90	9±3	±2	6	≦47	3±0.1	≦20	≦-15	-20 to 75
	DMP-VCX2245M20	2230	2260	0.7~3.0	≦-94	8±2	±1.0	3	≦47	3.0±0.1	≦20	≦-20	-20 to 75
	DMP-VCX2250T50	2200	2300	0.3~4.6	≦-90	0±3	±1.0	5	≦47	5.0±0.1	≦20	≦-18	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2305M60	2295	2315	1.0~4.0	≦-94	-2±3	±1	10	≦47	4.3±0.1	≦25	≦-10	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2348M50	2248	2448	0.7~3.5	≦-90	9±2	±1.5	15	≦47	5.0±0.1	≦25	≦-10	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2375S50	2200	2550	0.7~3.5	≦-90	9±2	±1.5	15	≦47	5.0±0.1	≦25	≦-10	-20 to 75
Wireless LAN	DMP-VCX2388T20	2290	2485	0.~3.3	≦-88	10±2	±2	20	≦47	3.0±0.1	≦18	≦-15	-20 to 75
Wireless LAN	DMP-VCX2388T21	2290	2485	0~3.3	≦-88	7±3	±3.0	15	≦47	3.0±0.1	≦18	≦-18	-20 to 75
	DMP-VCX2395T20	2290	2500	0.~3	≦-90	8±2	±2	20	≦47	3.0±0.1	≦20	≦-15	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2400S50	2300	2500	0.5~4.5	≦-93	3±2	±2.0	10	≦47	5.0±0.1	≦15	≦-15	-20 to 75
	DMP-VCX2435T20	2435	2675	0.4~2.9	≦-90	7±2	±20	20	≦47	3±0.1	≦25	≦-15	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2445T60	2400	2484	0.5~3.0	≦-90	3±3	±2	10	≦47	3.5±0.1	≦15	≦-20	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2450S20	2400	2500	0.5~2.5	≦-93	3±3	±1.5	10	≦47	3.0±0.1	≦20	≦-15	-20 to 75
2-WAY PAGER, Wireless LAN	DMP-VCX2450S50	2400	2500	1.0~4.0	≦-90	3±3	±2.0	10	≦47	5.0±0.1	≦20	≦-15	-20 to 75
WLAN	DMP-VCX4440S20	4350	4530	0.5~2.2	≦-80	-3±3	±2	10	≦20	3.0±0.2	≦15	≦-20	-20 to 75
WLAN	DMP-VCX4895S60	4780	5010	0.5~2.2	≦-85	-3±3	±10	20	≦47	2.8±0.1	≦20	≦-20	-20 to 75

* The above specifications are subject to change without notice.

Part Number: DMP-VCX2074S6/DMP-VCX2074UT60

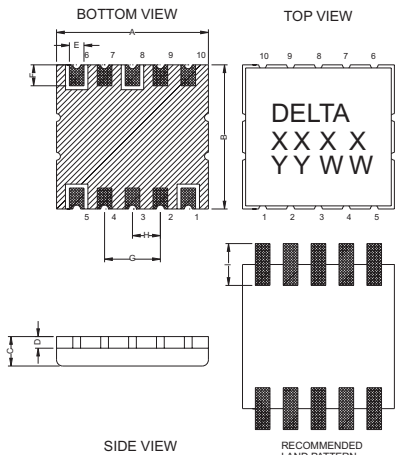
Parameter	Unit	
Frequency	MHz	2023~2125
Output Power	dBm	0±3
Tuning Voltage	V	0.5~2.2
Phase Noise@10KHz	dBc/Hz	≦-85
Input Capacitance	pF	≦47
Pushing (±0.1V)	KHz	±2000
Pulling VSWR=2:1	KHz	±3000
Harmonics	dBc	≦-15
Supply Voltage	V	2.84±0.1
Operation Temp. Range	^{0}C	-20~+75
Current	mA	≦15

Part Number: DMP-VCX748S6/DMP-VCX748UT60

Parameter	Unit	
Frequency	MHz	741~755
Output Power	dBm	-8±3
Tuning Voltage	V	0.5~2.2
Phase Noise@10KHz	dBc/Hz	≦-93
Input Capacitance	pF	≦47
Pushing (±0.1V)	KHz	±2000
Pulling VSWR=2:1	KHz	±2000
Harmonics	dBc	≦-18
Supply Voltage	V	2.84±0.20
Operation Temp. Range	^{0}C	-20~+75
Current	mA	≦5

Package Style

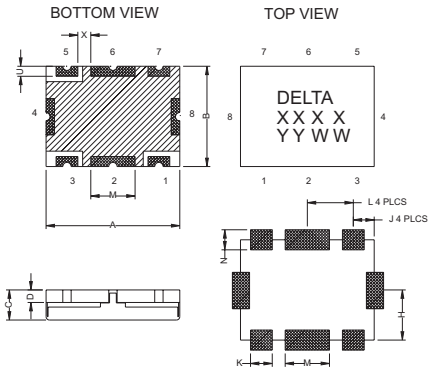
Package Style "N"



PIN OUT FOR VCO	
	PIN
VT	1
VCC	5
Vsw	8
RF OUT	6
GND	2,3,4,7,9,10

SYMBOL	DIMENSION MILLIMETERS
A	9.80±0.3
B	9.30±0.3
C	1.9 MAX
D	0.75
E	0.94
F	1.35
G	3.60
H	1.80
I	2.70

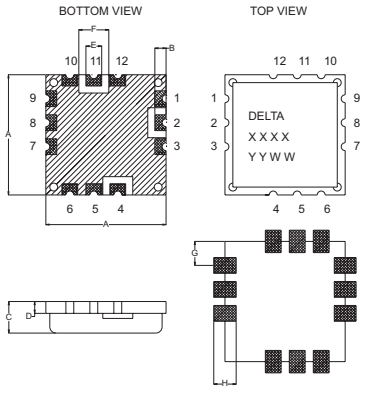
Package Style "S"



PIN OUT FOR VCO	
	PIN
VT	1
VCC	3
RF OUTPUT	5
GND	2,4,6,7,8

SYMBOL	DIMENSION MILLIMETERS
A	8.0±0.2
B	6.0±0.2
C	1.9MAX
D	0.75
H	3.0
J	1.26
K	1.30±0.08
L	2.65±0.08
M	2.65±0.08
N	1.20±0.08
P	1.27±0.08
U	0.6
X	1.00

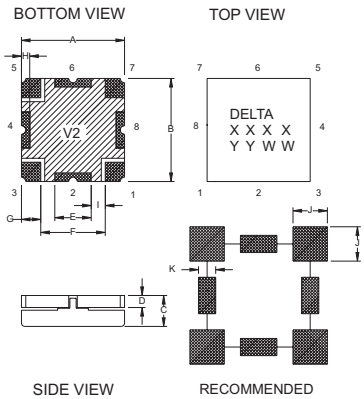
Package Style "T"



PIN OUT FOR VCO	
	PIN
VT	4
RF OUTPUT	11
VCC	2
GND	OTHERS

SYMBOL	DIMENSION MILLIMETERS
A	7.62±0.2
B	0.7
C	2.0 MAX
D	0.75
E	1.0
F	1.9
G	1.52
H	1.4

Package Style "ST"



PIN OUT FOR VCO	
	PIN
Vt	1
VCC	3
OUT	5
GND	2,4,6,7,8

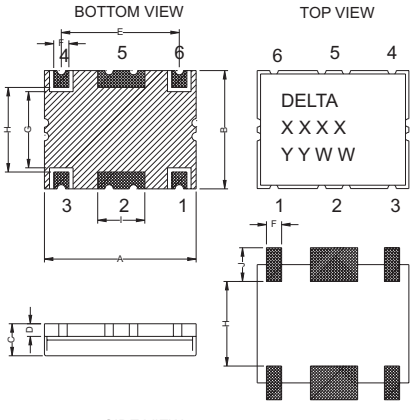
SYMBOL	DIMENSION MILLIMETERS
A	6.0±0.2
B	6.0±0.2
C	1.9 MAX
D	0.75
E	2.125
F	3.75
G	1.125
H	0.5
I	0.8125
J	2.0
K	1.0

Note:
1. Inside radius of all half holes on perimeter of the board are solder plated for attachment.
2. Shield material is tin plated brass and solderable.
3. YYWW is the date code.

tolerances are .XX ±0.2

Package Style

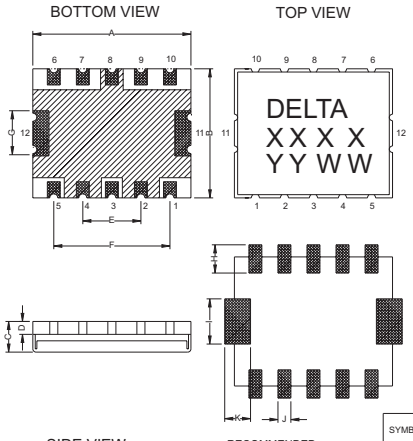
"U" Size



PIN OUT FOR VCO	
	PIN
VT	1
VCC	3
RF OUTPUT	4
SWITCH	6
GND	2,5

SYMBOL	DIMENSION
	MILLIMETERS
A	9.0±0.2
B	7.0±0.2
C	1.9 MAX
D	0.75
E	7.0±0.1
F	0.9±0.1
G	4.5±0.1
H	5.0±0.1
I	2.8±0.1
J	2.0±0.1

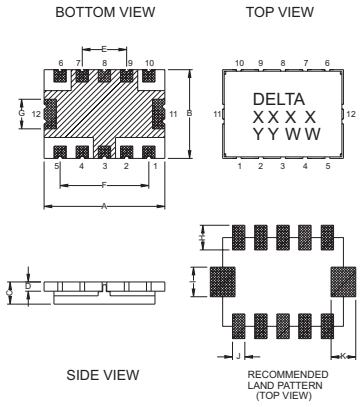
"UP" Size



PIN OUT FOR VCO	
	PIN
VCC	1,5
VT	3
GSM OUT	6
BAND SW1	7
BAND SW2	9
DCS OUT	10
GND	2,4,8,11,12

SYMBOL	DIMENSION
	MILLIMETERS
A	9.80 ± 0.2
B	8.00 ± 0.2
C	1.8 MAX
D	0.65
E	3.6
F	7.2
G	2.4
H	2.0
I	2.8
J	1.0
K	2.0

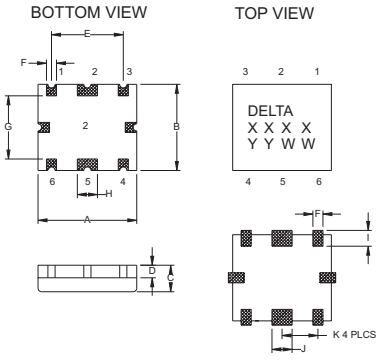
Dual-Band "UT" Size



PIN OUT FOR VCO	
	PIN
BAND select(SW2)	1
VC	2
Frequency Tuning	4
BAND select(SW1)	5
GSM BAND output	6
DCS BAND output	10
GND	3,7,8,9,11,12

SYMBOL	DIMENSION
	MILLIMETERS
A	9.80±0.2
B	7.20±0.2
C	2.0 MAX
D	0.75
E	3.6
F	7.2
G	2.4
H	2.0
I	2.4
J	1.0
K	2.0

Single-Band "UT" Size



PIN OUT FOR VCO	
	PIN
OUT	1
Vt	4
VCC	6
GND	2,3,5

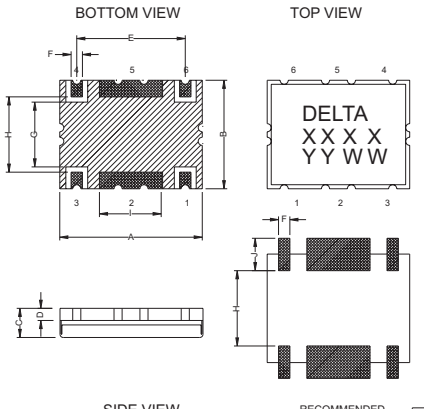
SYMBOL	DIMENSION
	MILLIMETERS
A	5.5 ± 0.2
B	4.8 ± 0.2
C	1.85 MAX
D	0.75
E	4.0 ± 0.1
F	0.7 ± 0.1
G	3.2 ± 0.1
H	1.4 ± 0.1
I	1.1 ± 0.1
J	1.4 ± 0.1
K	2.0 ± 0.1

Note:
1. Inside radius of all half holes on perimeter of the board are solder plated for attachment.
2. Shield material is tin plated brass and is solderable.
3. YYWW is the date code.

tolerances are .XX ±0.2

Package Style

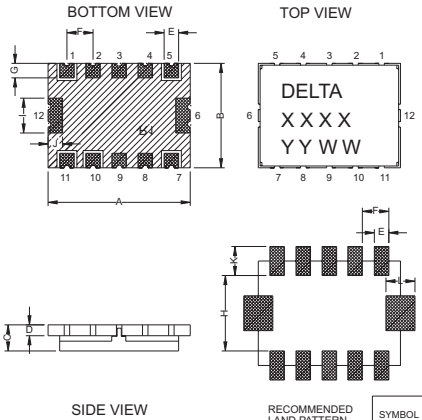
"SP" Size



PIN OUT FOR VCO	
	PIN
VT	1
VCC	3
RF OUTPUT	4
SWITCH	6
GND	2,5

SYMBOL	DIMENSION MILLIMETERS
A	8.80 ± 0.2
B	6.70 ± 0.2
C	1.9MAX
D	0.75
E	6.70
F	0.70
G	4.00
H	4.65
I	3.90
J	2.00

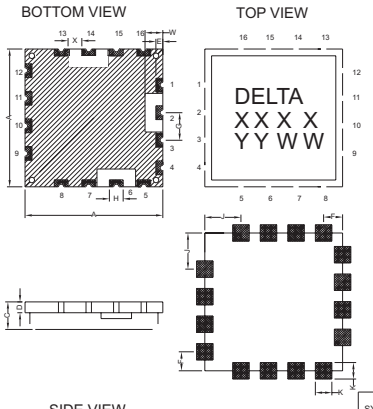
"V" Size



PIN OUT FOR VCO	
	PIN
VT	1
VCC	5
RF OUTPUT	7
SWITCH	10
MODULATION	11
GND	2,3,4,6,8,9,12

SYMBOL	DIMENSION MILLIMETERS
A	10.2 ± 0.2
B	7.50 ± 0.2
C	2.0 MAX
D	0.75
E	1.0 ± 0.1
F	1.8 ± 0.1
G	0.9 ± 0.1
H	5.7
I	2.0
J	0.85
K	1.8
L	1.7

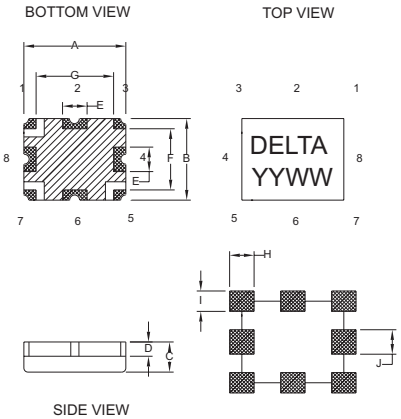
"Q" Size



PIN OUT FOR VCO	
	PIN
VCC	2
VT	6
RF OUTPUT	14
GND	OTHERS

SYMBOL	DIMENSION MILLIMETERS
A	12.7 ± 0.2
C	2.54MAX
D	1.0
E	0.76
F	1.75
G	2.54
H	1.27
J	2.92
K	1.52
W	1.65
X	1.02

"US" Size



PIN OUT FOR VCO	
	PIN
OUT	1
VT	5
VCC	7
GND	2,3,4,6,8

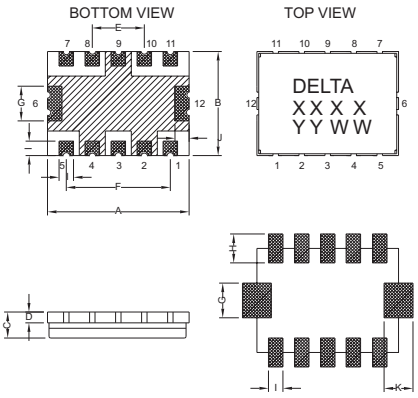
SYMBOL	DIMENSION MILLIMETERS
A	5.0 ± 0.2
B	4.0 ± 0.2
C	1.70 MAX
D	0.7
E	1.2 ± 0.1
F	3.0 ± 0.1
G	3.8 ± 0.1
H	1.2 ± 0.1
I	1.0 ± 0.1
J	1.2 ± 0.1

Note:
1. Inside radius of all half holes on perimeter of the board are solder plated for attachment.
2. Shield material is tin plated brass and is solderable.
3. YYWW is the date code.

tolerances are .XX ±0.2

Package Style

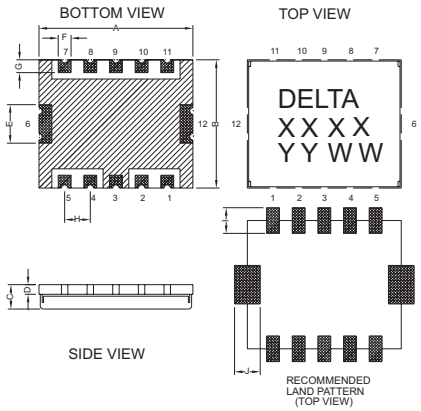
Tri-Band "UP" Size



PIN OUT FOR VCO	
	PIN
VCC	5
VT	3
VCC2	5
O/P1 GSM	6
VSW1	7
VSW2	9
O/P2 DCS/PCS	10
GND	1,2,4,8,11,12

SYMBOL	DIMENSION MILLIMETERS
A	9.80 ± 0.2
B	7.80 ± 0.2
C	1.7 MAX
D	0.65
E	3.25
F	6.5
G	2.54
H	1.72
I	0.86
J	0.76
K	1.52

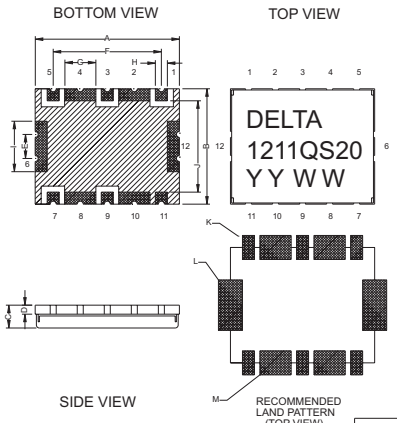
Quad-Band "QT" Size



PIN OUT FOR VCO	
	PIN
VT	1
Vcc	2
O/P RX VCO TX LO1 VCO	4
O/P LOW BAND TX VCO	5
O/P HIGH BAND TX VCO	8
BAND SWITCH	9
POWER SWITCH	10
POWER ON/OFF	11
GND	3,6,7,12

SYMBOL	DIMENSION MILLIMETERS
A	12.0 ± 0.2
B	10.0 ± 0.2
C	1.9 MAX
D	0.75
E	3.0
F	1.0
G	1.0
H	2.0
I	2.0
J	2.0

"QS"-Type



PIN OUT FOR VCO	
	PIN
RF OUTPUT	1
VCC	3
VT	5
MOD	7
VSW	9
GND	2,4,6,8 10,11,12

SYMBOL	DIMENSION MILLIMETERS
A	12.0 ± 0.2
B	9.60 ± 0.2
C	1.9 MAX
D	0.75
E	2.0
F	9.0
G	2.6X4
H	1.0X6
I	4.2
J	7.6
K	1.0X2.0X6
L	4.2X2.0X2
M	2.6X2.0X4

Note:
1. Inside radius of all half holes on perimeter of the board are solder plated for attachment.
2. Shield material is tin plated brass and is solderable.
3. YYWW is the date code.

tolerances are .XX ±0.2

Customer Design Requirements

Tel: 886-3-4526107
Fax: 886-3-4527314
E-mail: Richard.Meng@delta.com.tw

Company: _____ Contact Person: _____

Address: _____

Phone: _____

E-Mail: _____ FAX: _____

_____

* Single-Band VCO

Frequency Range: _____MHz to _____MHz

Tuning Voltage: _____V to _____V

Supply Voltage (Vcc): _____V±_____V Tuning Sensitivity _____MHz/V

Power Output: _____dBm ±_____

Load Impedance: _____ OHM

Pushing: _____± MHz

Pulling: _____± MHz (VSWR 2.0 for all phase, ref. 50 OHM)

Phase Noise @ _____ KHz _____ (typ.) dBc/Hz

@ _____ KHz _____ (typ.) dBc/Hz

@ _____ KHz _____ (typ.) dBc/Hz

@ _____ KHz _____ (typ.) dBc/Hz

@ _____ KHz _____ (typ.) dBc/Hz

@ _____ KHz _____ (typ.) dBc/Hz

Harmonic Suppression: _____

Operation Temp.: _____

Supply Current: _____ Max

Package (SMD): ☐ S = 8x6x1.9mm ☐ Q = 12.7x12.7x5.00mm ☐ U = 9x7x1.9mm

☐ T = 7.6x7.6x1.9mm ☐ UT = 5.5x4.8x1.85mm ☐ US = 5x4x1.7mm

☐ ST = 6x6x1.9mm ☐ N = 9.8x9.3x1.9mm

☐ Customed design size:_____mm

Remarks: _____

Dual-Band VCO

Tel: 886-3-4526107
Fax: 886-3-4527314
E-mail: Richard.Meng@delta.com.tw

Frequency Range - High Band: _____MHz to _____MHz

Frequency Range - Low Band: _____MHz to _____MHz

Supply Voltage (Vcc): _____V±_____V

VCO Parameters	Unit	_____(High) Band	_____(Low) Band
1. Power Output	dBm		
2. Load Impedance	OHM		
3. Control Voltage	V		
4. Control Sensitivity	MHz/V		
5. Pushing	±MHz/V		
6. Pulling (VSWR=2:1) for all phase, ref. 50 OHM)	±MHz		
7. Phase Noise			
@_____KHz	dBc/Hz		
@_____KHz	dBc/Hz		
@_____KHz	dBc/Hz		
@_____KHz	dBc/Hz		
@_____KHz	dBc/Hz		
8. Harmonic Suppression	dBc		
9. Operation Temp.	°C		
10. Supply Current	mA		

Package: ☐ U = 9x7x1.9mm ☐ UT = 9.8x7.2x2.0mm ☐ V = 10.2x7.5x1.9mm

☐ UP = 9.8x8x1.9mm ☐ S = 8x6x1.9mm ☐ SP = 8.8x6.7x1.9mm

☐ Custom Design size: _____ ☐ QS = 12.0x9.6x1.9mm

Remarks: _____

Introduction *Of*
Voltage Controlled Temperature Compensated Crystal Oscillators

Overview

The wireless telecommunications industry is undergoing a high growth rate and technological innovations. It requires products of low profile, miniature size, lightweight, higher frequency and featured performance.

Delta's broad spectrum of technical expertise includes low and high frequency, analog and digital electronic components design, high density and miniature surface mount package design, which enable Delta to follow the trend toward cost-effective, outstanding performance, ultimate small size (VC)TCXO to fulfill the demands of wireless communication market. Our product quality, reliability and service are well recognized.

VCO Applications

** Wireless Base Station & Cell Phone*
** GPS & Navigation*
** Instrument*
** LAN/WAN*
** Telecom*
** Satellite Communication*
** Military*

Quality Assurance

Excellence in quality and reliability has been our primary goal and to "Do the right things right the first time is our ultimate philosophy in quality assurance. We believe it is more economical to and efficient to prevent defects from occurring in advance than correcting them afterwards. Therefore, our quality control is emphasized both at design and production stages to meet customers full satisfaction. At design stage, our quality engineers and manufacturing engineers are heavily involved in evaluating the quality, reliability and manufacturability . Reliability tests are strictly conducted to ensure satisfactory performance in the product life. We also implement strict Statistical Process Control (SPC) and Total Quality Management (TQM) system to achieve our ultimate goal of zero defect and customer satisfaction.

Definition of Terminology

- ***Temperature Compensated Crystal Oscillator (TCXO)***
  TCXO is a precision crystal oscillator with an internal temperature compensation circuit. The oscillating frequency drift caused by temperature change can be compensated to within a specified value (±2.5PPM or less) for the entire working temperature range.
- ***Voltage Controlled Temperature Compensated Crystal Oscillator (VCTCXO)***
  It's a TCXO designed so the output frequency of which can be changed slightly by applying a voltage to its control port or tuning port.

Voltage Controlled Oscillators

How To Order

(Part Number(P/N)Definition)

V 13.000 A 1 S

Output waveform	S = True Sine Wave C = Clipping Sine Wave T = Square Wave
Voltage	1 = 2.8 V 2 = 3.0 V 3 = 3.3 V 4 = 5.0 V
Package	A = DIP 14 with base B = DIP14 without base C = SMD 18.3□11.7 (Have Pin) D =SMD 18.3□11.7 E = DIP 8 H = SMD 11.4□9.6□2.5 mm U = SMD 9 □7 □2 mm V = SMD 7 □5 □2 mm W = SMD 5 □3.2 □1.7 mm
Frequency	13.000 = 13.000 MHz 12.800 = 12.800 MHz
Product Code	V = (VC)TCXO T = TCXO G = TCXO Have Mechanical Adjustment M =(VC)TCXO Have Mechanical Adjustment X = VCXO O =Crystal Oscillator

Customer Design Requirement

Company: _____ Contact Person: _____
Address: _____
Phone: _____ Fax: _____
E-mail: _____

1. P/N: _____
2. Operation Temperature: From _____ ºC To _____ ºC
3. Control Sensitivity _____ ppm/V
4. Quantity: _____
5. Customer Design Size: _____

Remarks: _____
Please send to: - E-mail: Desales@deltatj.com.cn
- Fax: 86-22-25760380

ULTRA MINIATURE SIZE SMD (VC)TCXO 5X3.2 TYPE

FEATURES

- Ultra miniature size (0.03cc).
- High reliability with IC circuits.
- Reflow soldering (2 reflows allowable).

APPLICATIONS

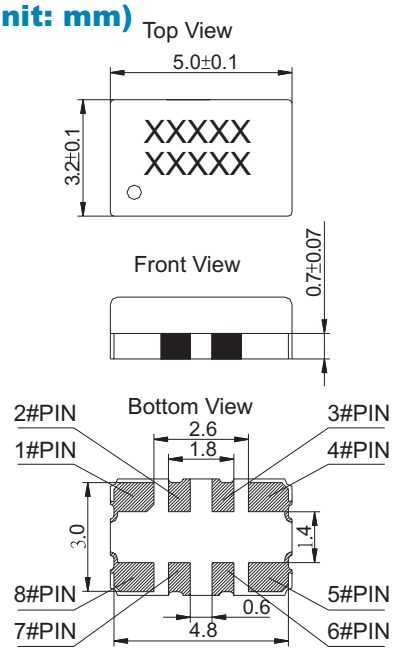
- Cellular phones (PDC, PCN,GSM, PCS, CDMA, etc.)
- GPS
- Other systems

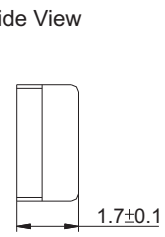
GENERIC SPECIFICATION

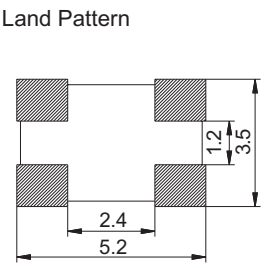
TYPE		VCTCXO	TCXO
NOMINAL FREQUENCY		10.000~20.000 MHz (optional)	
FREQUENCY STABILITY	vs. Temperature	+/- 2.5 ppm /-30 °C~+80 °C	
	vs. Supply Voltage	+/- 0.2 ppm/Vdd+/-5%	
	vs. Load	+/- 0.2 ppm/10K // 10 pF +/-10%	
	vs. Aging	+/- 2.0 ppm/yr.	
FREQUENCY TOLERANCE		+/- 2.0 ppm/Ta = 25 °C; Vcon =1.5V	
SUPPLY VOLTAGE (Vdd)		2.8~5.0 V (optional)	
POWER SUPPLY CURRENT	2.0 mA max.		
VOLTAGE CONTROL RANGE (Vcon)	+0.5V~+2.5V	5~16 ppm/V (optional)	-
	Control Slope	Positive	-
START UP TIME		2 ms (typical)	
OUTPUT WAVEFORM		Clipping Sine	
OUTPUT VOLTAGE		0.8 Vp-p min.	
2nd HARMONICS		-5.0 dBc max.	
SSB PHASE NOISE		-125 dBc/Hz (offset 1kHz)	
OPERATING TEMPERATURE RANGE		-30 °C~+80 °C or Per Customer Requirement	

Please contact your DELTA sales representative to discuss particular spec. requirements or E-mail: sales@deltatj.com.cn

DIMENSIONS (Unit: mm)







PIN OUT FOR VCTCXO	
Pin	Pin Connect
1	Vcon
2	Floating
3	Floating
4	Gnd/case Gnd
5	Fout
6	Floating
7	Floating
8	Vdd

ULTRA MINIATURE SIZE SMD (VC)TCXO 7X5 TYPE

FEATURES

- Ultra miniature size (0.07cc).
- High reliability with IC circuits.
- Reflow soldering (2 reflows allowable).

APPLICATIONS

- Cellular phones (PDC, PCN,GSM, PCS, CDMA, etc.)
- GPS
- Other systems

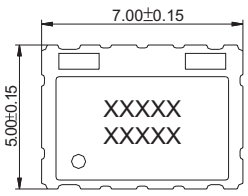
GENERIC SPECIFICATION

TYPE		VCTCXO	TCXO
NOMINAL FREQUENCY		10.000~20.000 MHz (optional)	
FREQUENCY STABILITY	Vs. Temperature	+/- 2.5 ppm /-30 °C~+80 °C	
	Vs. Supply Voltage	+/- 0.2 ppm/Vdd+/-5%	
	Vs. Load	+/- 0.2 ppm/10K // 10 pF +/-10%	
	Vs. Aging	+/-2.0 ppm/yr.	
FREQUENCY TOLERANCE		+/-2.0 ppm/Ta = 25 °C; Vcon =1.5V	
SUPPLY VOLTAGE (Vdd)		2.8~ 5.0 V (optional)	
POWER SUPPLY CURRENT	2.0 mA max.		
VOLTAGE CONTROL RANGE (Vcon)	+0.5V~ +2 .5V	5~16 ppm/V (optional)	-
	Control Slope	Positive	-
START UP TIME		2 ms (typical)	
OUTPUT WAVEFORM		Clipping Sine	
OUTPUT VOLTAGE		0.8 Vp-p min.	
2nd HARMONICS		-5.0 dBc max./for Clipping Sine Wave	
SSB PHASE NOISE		-125 dBc/Hz (offset 1kHz)	
OPERATING TEMPERATURE RANGE		-30 °C~+80 °C or Per Customer Requirement	

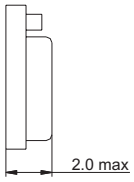
Please contact your DELTA sales representative to discuss particular spec. requirements or E-mail: sales@deltatj.com.cn

DIMENSIONS (Unit: mm)

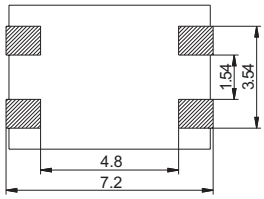
Top View



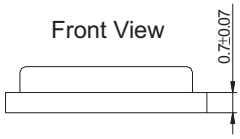
Side View



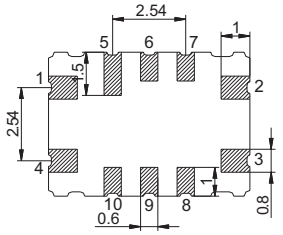
Land Pattern



Front View



Bottom View



PIN OUT FOR VCTCXO	
PIN	PIN CONNECT
1	Vcon
2	GND/CASE GND
3	Fout
4	Vdd
5	Floating
6	Floating
7	Floating
8	Floating
9	Floating
10	Floating

MINIATURE SIZE SMD (VC)TCXO

9X7 TYPE

FEATURES

- Miniature size (0.13cc).
- True sine wave output.
- High reliability with IC circuits.
- Reflow soldering (2 reflows allowable).

APPLICATIONS

- Cellular phones (PDC, PCN, GSM, PCS, CDMA, etc.)
- GPS
- Other systems

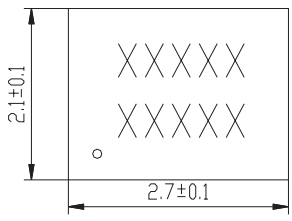
GENERIC SPECIFICATION

TYPE		VCTCXO	TCXO
NOMINAL FREQUENCY		10.000~20.000 MHz (optional)	
FREQUENCY STABILITY	Vs. Temperature	+/- 2.5 ppm /-30°C~+80°C	
	Vs. Supply Voltage	+/- 0.3 ppm/Vdd+/-5%	
	Vs. Load	+/- 0.3 ppm/10K // 10 pF +/-10%	
	Vs. Aging	+/-2.0 ppm/yr.	
FREQUENCY TOLERANCE		+/-2.5 ppm/Ta = 25°C; Vcon =Vdd/2	
SUPPLY VOLTAGE (Vdd)		2.8~ 5.0 V (optional)	
POWER SUPPLY CURRENT		2.0 mA max.	
VOLTAGE CONTROL RANGE (Vcon)	+0.5V~Vdd - 0.5V	5~16 ppm/V (optional)	-
	Control Slope	Positive	-
START UP TIME		2 ms (typical)	
OUTPUT WAVEFORM		True Sine	
OUTPUT VOLTAGE		0.8 Vp-p min.	
2nd HARMONICS		-15.0 dBc max.	
SSB PHASE NOISE		-125 dBc/Hz (offset 1kHz)	
OPERATING TEMPERATURE RANGE		-30°C~+80°C or Per Customer Requirement	

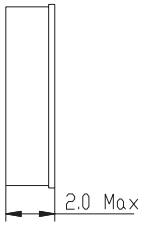
Please contact your DELTA sales representative to discuss particular spec. requirements or E-mail: sales@deltatj.com.cn

DIMENSIONS (Unit: mm)

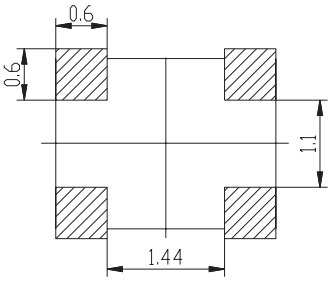
Top View



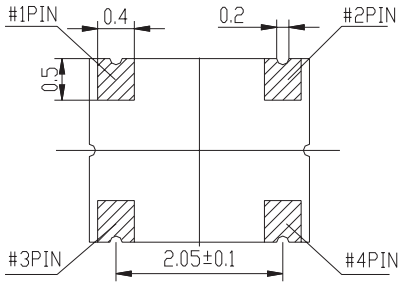
Side View



Land Pattern



Bottom View



PIN OUT FOR VCTCXO	
PIN	PIN CONNECT
1	Vcon
2	GND/CASE GND
3	Fout
4	Vdd

MINIATURE SIZE SMD (VC)TCXO

11.4X9.6 TYPE

FEATURES

- Miniature size (0.13cc).
- True sine wave output.
- High reliability with IC circuits.
- Reflow soldering (2 reflows allowable).

APPLICATIONS

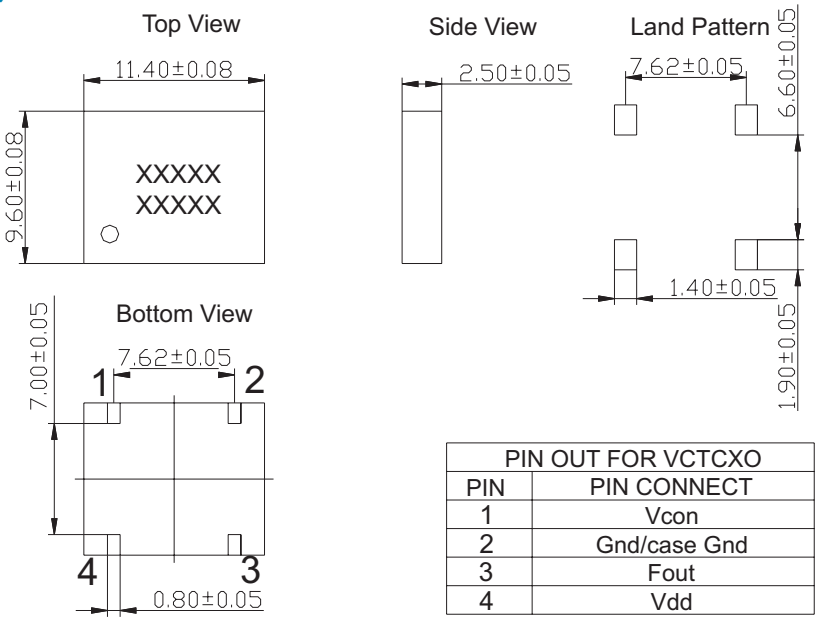
- Cellular phones (PDC, PCN, GSM, PCS, CDMA, etc.)
- GPS
- Other systems

GENERIC SPECIFICATION

TYPE		VCTCXO	TCXO
NOMINAL FREQUENCY		10.000~20.000 MHz (optional)	
FREQUENCY STABILITY	Vs. Temperature	+/- 2.5 ppm /-30°C~+80°C	
	Vs. Supply Voltage	+/- 0.3 ppm/Vdd+/-5%	
	Vs. Load	+/- 0.3 ppm/10K // 10 pF +/-10%	
	Vs. Aging	+/-2.0 ppm/yr.	
FREQUENCY TOLERANCE		+/-2.5 ppm/Ta = 25°C; Vcon =Vdd/2	
SUPPLY VOLTAGE (Vdd)		2.8~ 5.0 V (optional)	
POWER SUPPLY CURRENT		2.0 mA max.	
VOLTAGE CONTROL RANGE (Vcon)	+0.5V~Vdd - 0.5V	5~16 ppm/V (optional)	-
	Control Slope	Positive	-
START UP TIME		2 ms (typical)	
OUTPUT WAVEFORM		True Sine	
OUTPUT VOLTAGE		0.8 Vp-p min.	
2nd HARMONICS		-15.0 dBc max.	
SSB PHASE NOISE		-125 dBc/Hz (offset 1kHz)	
OPERATING TEMPERATURE RANGE		-30°C~+80°C or Per Customer Requirement	

Please contact your DELTA sales representative to discuss particular spec. requirements or E-mail: sales@deltatj.com.cn

DIMENSIONS (Unit: mm)



PIN OUT FOR VCTCXO	
PIN	PIN CONNECT
1	Vcon
2	Gnd/case Gnd
3	Fout
4	Vdd

COMPATIBLE WITH 14 PIN DIP (VC)TCXO DIP14 TYPE

FEATURES

- Compatible with 14 pin DIP.
- True sine wave output.
- High reliability with IC circuits.
- Reflow soldering (2 reflows allowable).

APPLICATIONS

- Test instrument
- Other systems

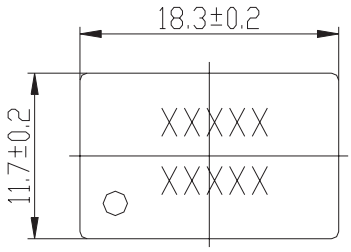
GENERIC SPECIFICATION

TYPE		VCTCXO	TCXO
NOMINAL FREQUENCY		10.000~20.000 MHz (optional)	
FREQUENCY STABILITY	Vs. Temperature	+/- 2.5 ppm /-30°C~+80°C	
	Vs. Supply Voltage	+/- 0.3 ppm/Vdd+/-5%	
	Vs. Load	+/- 0.3 ppm/10K // 10 pF +/-10%	
	Vs. Aging	+/-2.0 ppm/yr.	
FREQUENCY TOLERANCE		+/-2.5 ppm/Ta = 25°C; Vcon =Vdd/2	
SUPPLY VOLTAGE (Vdd)		2.8~ 5.0 V (optional)	
POWER SUPPLY CURRENT		2.0 mA max.	
VOLTAGE CONTROL RANGE (Vcon)	+0.5V~Vdd - 0.5V	5~16 ppm/V (optional)	-
	Control Slope	Positive	-
START UP TIME		2 ms (typical)	
OUTPUT WAVEFORM		True Sine	
OUTPUT VOLTAGE		0.8 Vp-p min.	
2nd HARMONICS		-15.0 dBc max.	
SSB PHASE NOISE		-125 dBc/Hz (offset 1kHz)	
OPERATING TEMPERATURE RANGE		-30°C~+80°C or Per Customer Requirement	

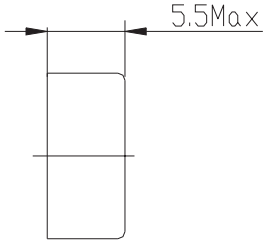
Please contact your DELTA sales representative to discuss particular spec. requirements or E-mail: sales@deltatj.com.cn

DIMENSIONS (Unit: mm)

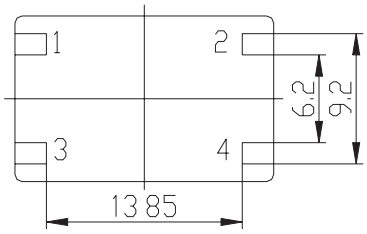
Top View



Side View



Bottom View



PIN OUT FOR VCTCXO	
PIN	PIN CONNECT
1	Vcon
2	GND/CASE GND
3	Fout
4	Vdd

3.5V Triple-Band Power Amplifier Module for GSM900 and DCS1800/PCS1900 Applications

DESCRIPTIONS

The DLT3201 is a triple-band Power Amplifier Module (PAM) designed for used as the final RF amplifier in GSM900 and DCS1800/PCS1900 cellular handset. The PAM consists of two separate Gallium Arsenide (GaAs) dies, which being manufactured on an advanced InGaP Heterojunction Bipolar Transistor (HBT) process and containing also internal components for input and output 50Ω matching.

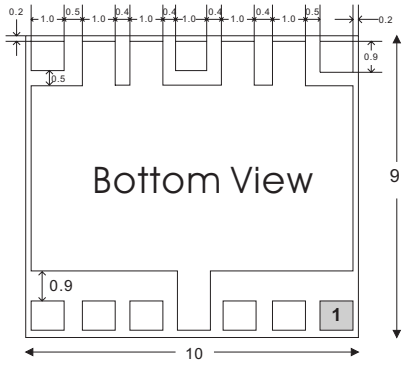
FEATURES

- Supports dual/triple-band GSM handsets
- Small footprint (9mm' 10mm) and low Profile (1.5mm max.)
- InGaP HBT technology
- High efficiency : 50% (min.) for GSM900; 45%(min.) for DCS1800/PCS1900
- Lead free contact

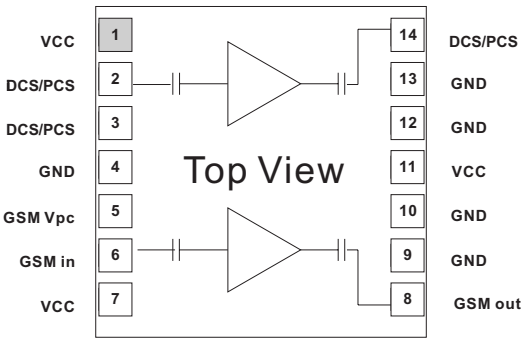
Absolute Minimum and Maximum Ratings

	Minimum	Maximum	Units
Supply Voltage		+6	V
Input RF Power		+12	dBm
Control Voltage		+3.5	V
Storage Temperature	-55	+150	oC
Operating Temperature	-25	+85	oC
Duty Cycle at Max. Power		50	%
Output Load VSWR		8:1	

DLT3201 PACKAGE LAYOUT DIMENSION

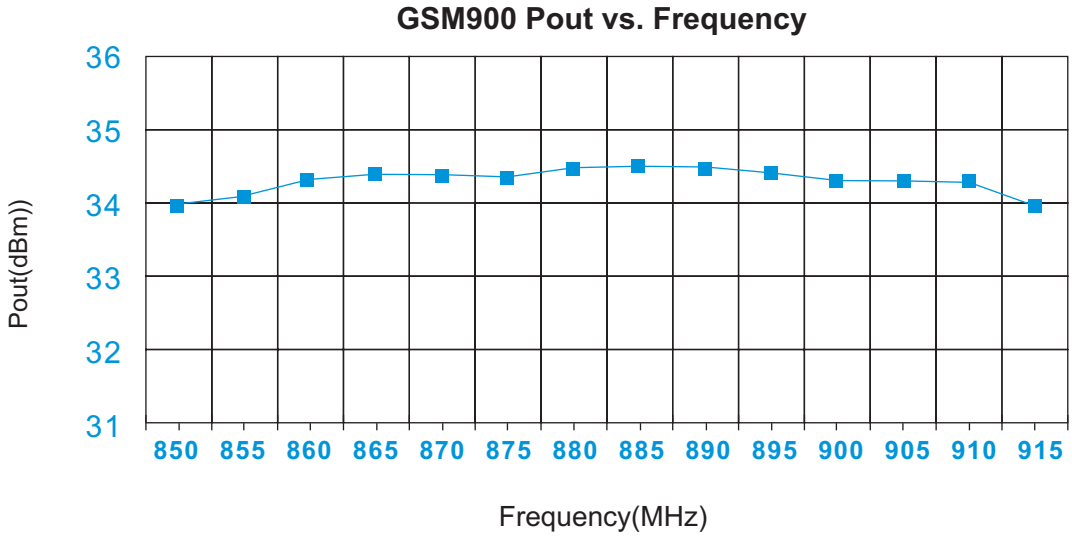


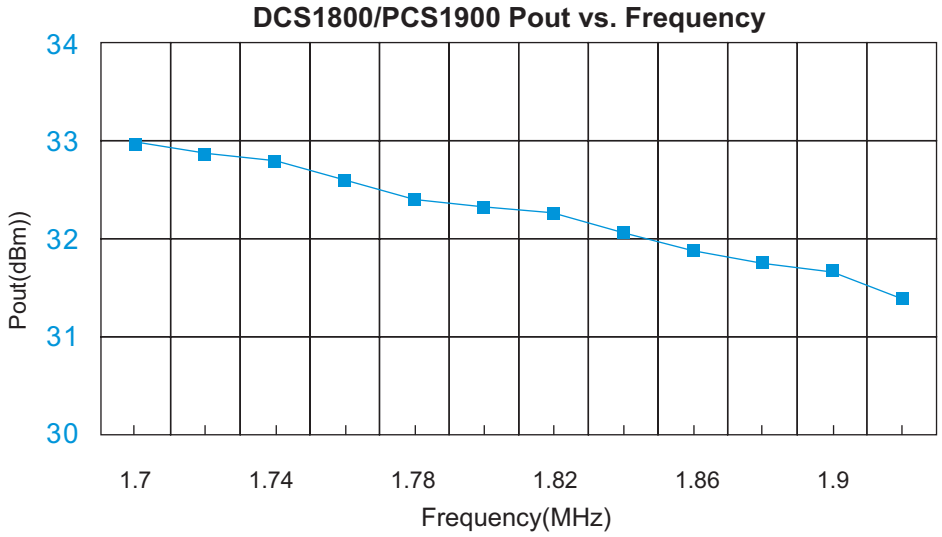
DLT3201 PIN-OUT CONFIGURATION

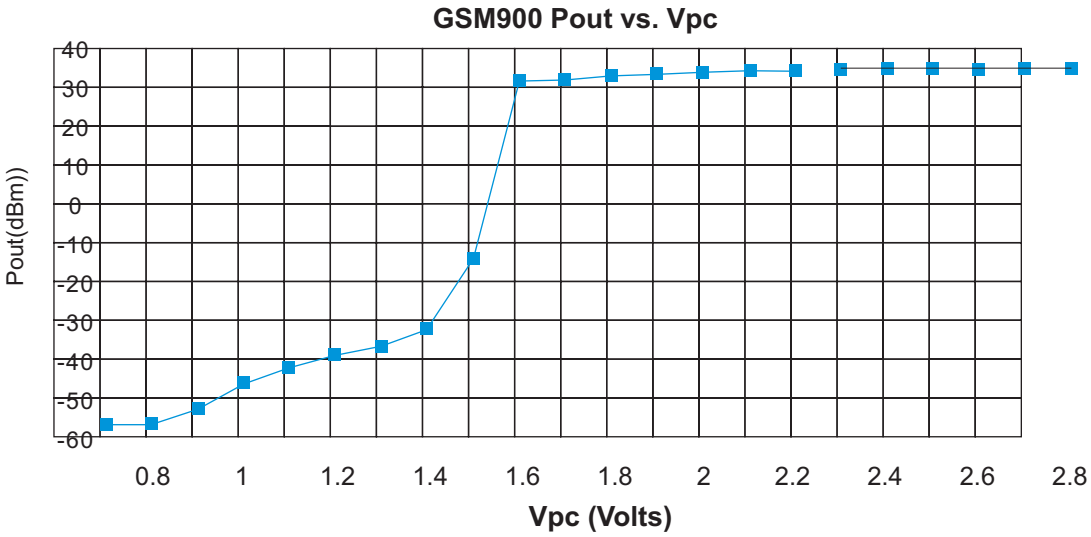


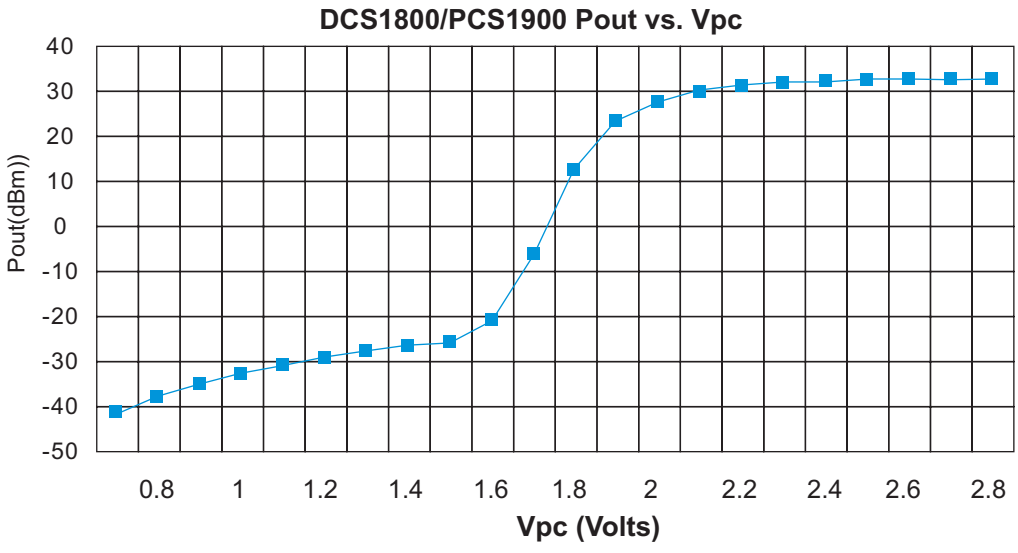
Pin	Function	Description
1	Vcc	Power supply for the driver stage of the DCS/PCS band
2	DCS/PCS RF in	50 ohm RF input of DCS/PCS band
3	DCS/PCS Vpc	Power control for the DCS/PCS band
4	GND	Package Grounding
5	GSM Vpc	Power control of GSM band
6	GSM RF in	50 ohm RF input of GSM band
7	Vcc	Power supply for the driver stage of the GSM band
8	GSM RF out	50 ohm RF output of GSM band
9	GND	Package Grounding
10	GND	Package Grounding
11	Vcc	Power supply for the power stages of GSM and DCS/PCS Band
12	GND	Package Grounding
13	GND	Package Grounding
14	DCS/PCS RF out	50 ohm Therefore output of DCS/PCS band

Parameter			Specification			Condition
GSM Mode			Min.	Typical	Max.	(Temp=+25oC, Vcc=3.5V, 4-slot)
	Output Power (3.5V)		34.5dBm			880MHz to 915MHz
						@ saturated output power
	Power Added Efficiency		50%			
	Input Power Range			6dBm		Pout=34.5dBm
	2nd harmonic				-40dBc	
	3rd harmonic				-50dBc	
	Isolation				-30dBm	Vpc=0.2V, Pin=8dBm
	Input VSWR				2.5	Pout < 34.5dBm
DCS AND PCS	Output Power	DCS	33dBm			DCS : 1710MHz to 1785MHz,
		PCS	32dBm			PCS : 1850MHz to 1910MHz
	Power Added Efficiency		45%			@ saturated output power
	Input Power Range			6dBm		
	2nd harmonic				-40dBc	Pout=33dBm (DCS) ; 32dBm(PCS)
	3rd harmonic				-50dBc	
	Isolation				-30dBm	Vpc=0.2V, Pin=8dBm
	Input VSWR			2.5		Pout < 33dBm
Power Control "ON"				2.8V		
Module Size				9x10mm2		
Input current for Power control				<5mA		




DCS1800/PCS1900 Pout vs. Frequency
34
33
32
31
30
Pout(dBm))
1.7
1.74
1.78
1.82
1.86
1.9
Frequency(MHz)


GSM900 Pout vs. Vpc
40
30
20
10
0
-10
-20
-30
-40
-50
-60
Pout(dBm))
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
Vpc (Volts)


DCS1800/PCS1900 Pout vs. Vpc
40
30
20
10
0
-10
-20
-30
-40
-50
Pout(dBm))
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
Vpc (Volts)

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