

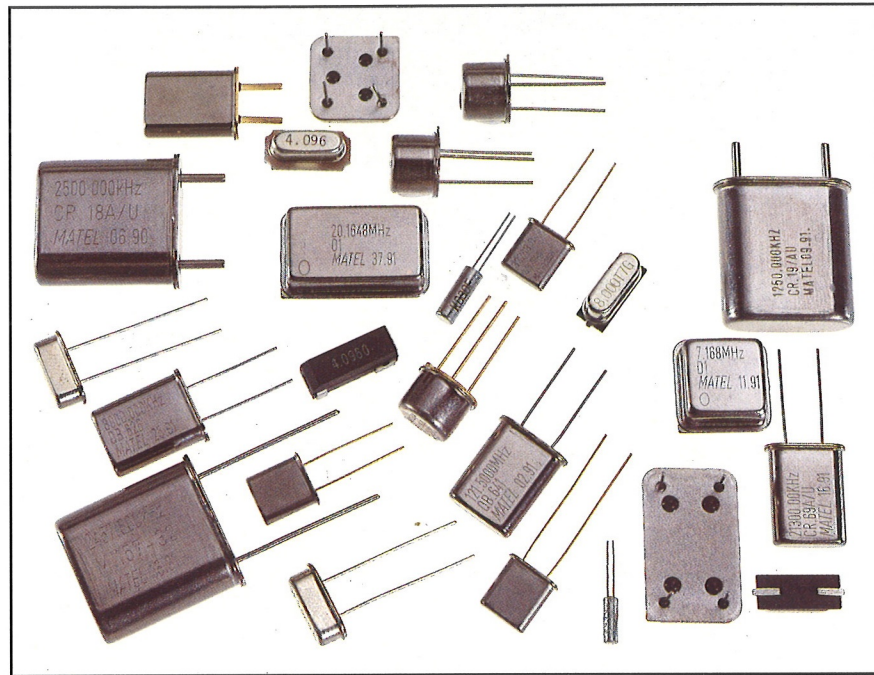
Résonateurs et Oscillateurs à Quartz





CRÉTEIL PARC
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Depuis plus de trente ans, la société **Matel** produit des résonateurs et oscillateurs à Quartz pour applications professionnelles. Nos produits sont utilisés dans les matériels téléphoniques, la radio, l'avionique, les équipements militaires, etc...

Ils ont reçus l'agrément des administrations nationales et figurent en liste LNZ 44-04 et GAM T1.

Matel distribue également des produits à faible coût pour le marché industriel.

*For more than 30 years **Matel** have produced Quartz crystals resonators and oscillators.*

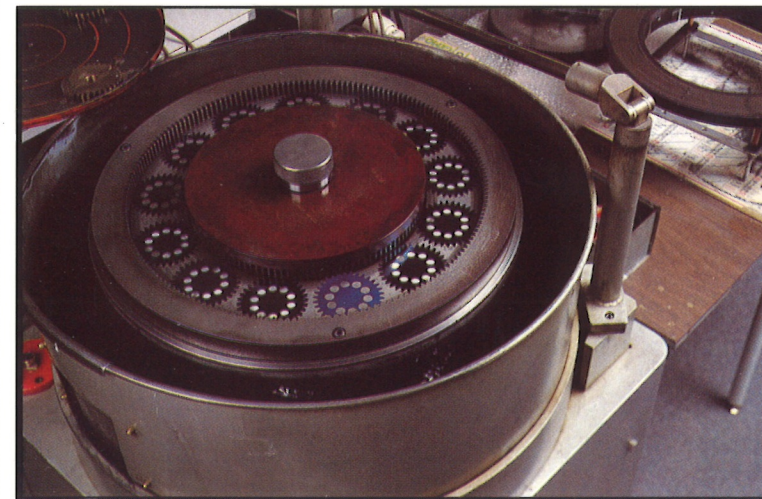
Our products are used in the main market sectors such as telecommunications, avionics, military equipment, etc...

Our crystals are approved to LNZ and GAM T1.

*In addition **Matel** distributes low cost products for the industrial market.*

Du cristal au blank

From crystal to blank

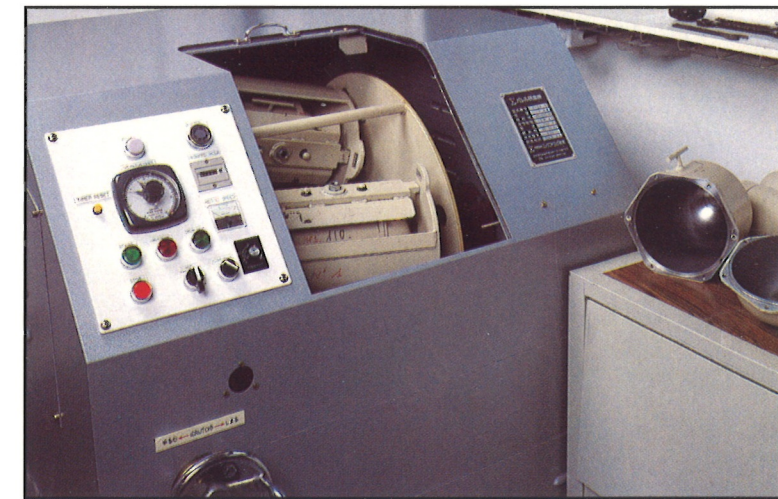
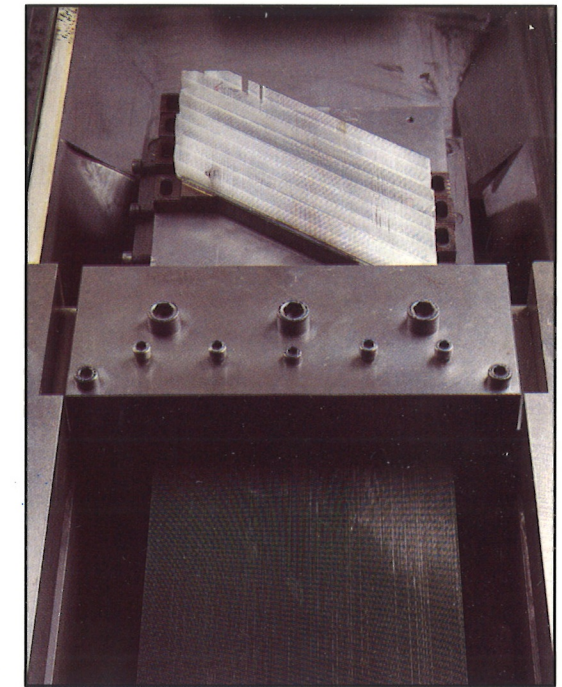


Rodage des blanks

Planetary lapping

Sciage des blanks

High precision wafering saw



Machine à biseaux

Blank bevelling machine

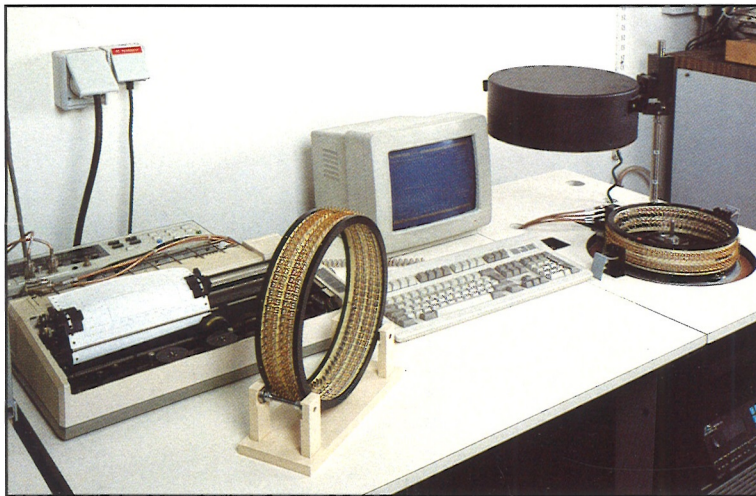
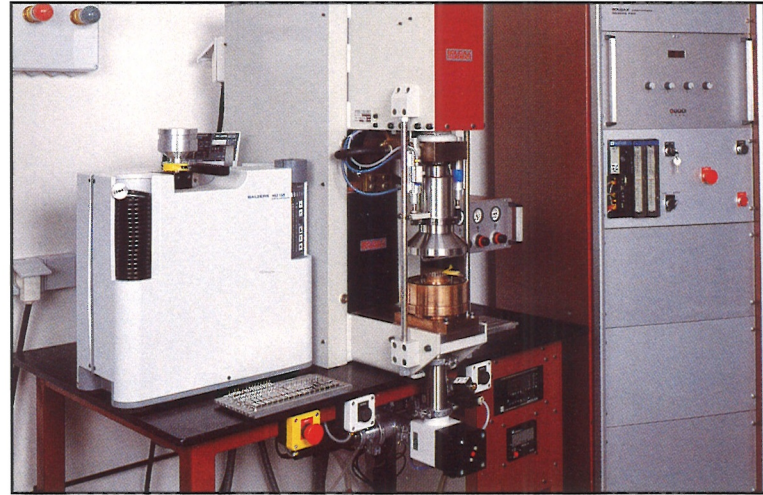
Mise à Fréquence (1 à 250 MHz)

Plating system (1 to 250 MHz)



Fermeture électrique et contrôle d'étanchéité

Resistance weld sealing equipment and helium leak detector



Banc de contrôle en température (1 à 250 MHz)

Temperature test system (1 to 250 MHz)



Marquage par gravure

Computer controlled engraving system

QUARTZ SELON NORMES NF 93 611 C

CRYSTAL UNITS ACCORDING TO NF 93 611 C

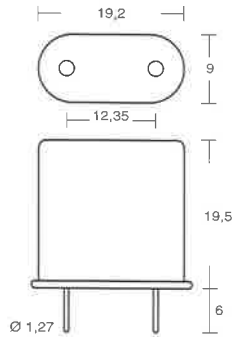
Type	Gamme de température	Variation de fréquence	Tolérance à 27°C	Gamme de fréquence	Mode de fonctionnement
Type	Temperature range	Temperature stability ppm	Adjustment tolerance ppm	Frequency range	Mode
Boitier / Enclosure • 5 • BC • DP • HC 18/U • HC 43/U • HC49/U •					
QM 02	-10°C ... + 70°C	± 50	± 30	3 ... 35 MHz	F 30 pF
QA 60A	-55°C ... +105°C	± 50*		5 ... 20 MHz	F série
QA 64	-55°C ... +105°C	± 50*		4 ... 20 MHz	F 30 pF
QB 504	-55°C ... +105°C	± 25	± 10	3.7 ... 30 MHz	F 30 pF
QB 620	+ 5°C ... + 55°C	± 4	± 10	5 ... 30 MHz	F 30 pF
QB 621	-10°C ... + 70°C	± 5	± 10	5 ... 30 MHz	F 30 pF
QB 622	-40°C ... + 85°C	± 25	± 10	5 ... 30 MHz	F 30 pF
QB 623	-55°C ... +100°C	± 30	± 10	5 ... 30 MHz	F 30 pF
QB 624	+ 5°C ... + 55°C	± 5	± 10	3 ... 30 MHz	F 30 pF
QB 625	-10°C ... + 70°C	± 10	± 10	3 ... 30 MHz	F 30 pF
QB 626	-40°C ... + 85°C	± 30	± 10	3 ... 30 MHz	F 30 pF
QB 627	-55°C ... +100°C	± 40	± 10	3 ... 30 MHz	F 30 pF
QA 55	-55°C ... +105°C	± 50*		17 ... 61 MHz	3 série
QA 61	85°C ... ± 5°C	± 20*		17 ... 61 MHz	3 série
QB 628	+ 5°C ... + 55°C	± 4	± 10	30 ... 90 MHz	3 série
QB 629	-10°C ... + 70°C	± 4	± 10	30 ... 90 MHz	3 série
QB 630	-40°C ... + 85°C	± 25	± 10	30 ... 90 MHz	3 série
QB 631	-55°C ... +100°C	± 30	± 10	30 ... 90 MHz	3 série
QB 632	+ 5°C ... + 55°C	± 5	± 10	30 ... 90 MHz	3 série
QB 633	-10°C ... + 70°C	± 10	± 10	30 ... 90 MHz	3 série
QB 634	-40°C ... + 85°C	± 30	± 10	30 ... 90 MHz	3 série
QB 635	-55°C ... +100°C	± 40	± 10	30 ... 90 MHz	3 série
QA 56A	-55°C ... +105°C	± 50*		50 ... 125 MHz	5 série
QA 59A	85°C ... ± 5°C	± 20*		50 ... 125 MHz	5 série
QB 503	-55°C ... +105°C	± 25	± 10	50 ... 125 MHz	5 série
QB 636	+ 5°C ... + 55°C	± 4	± 10	60 ... 130 MHz	5 série
QB 637	-10°C ... + 70°C	± 4	± 10	60 ... 130 MHz	5 série
QB 638	-40°C ... + 85°C	± 25	± 10	60 ... 130 MHz	5 série
QB 639	-55°C ... +100°C	± 30	± 10	60 ... 130 MHz	5 série
QB 640	+ 5°C ... + 55°C	± 5	± 10	60 ... 130 MHz	5 série
QB 641	-10°C ... + 70°C	± 10	± 10	60 ... 130 MHz	5 série
QB 642	-40°C ... + 85°C	± 30	± 10	60 ... 130 MHz	5 série
QB 643	-55°C ... +100°C	± 40	± 10	60 ... 130 MHz	5 série

* Tolérance globale de fréquence * Global temperature stability

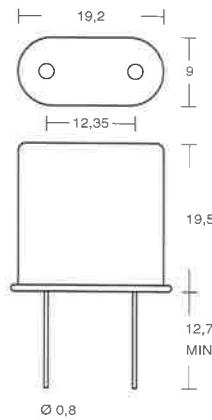
BOITIERS SELON NF 93601, CEI 122 ET MIL 10056

ENCLOSURES ACCORDING TO NF 93601, IEC 122 AND MIL 10056

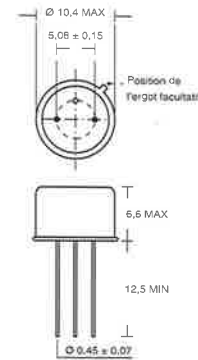
3A • DN • HC 48/U
0.9 ... 125 MHz



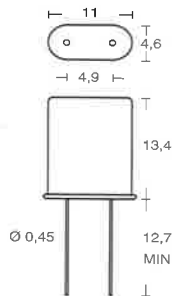
2A • DZ • HC 51/U
0.9 ... 125 MHz



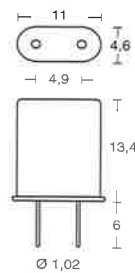
12A • CK • HC 35/U
10 ... 250 MHz



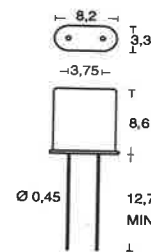
5 • DP • HC 49/U
1.7 ... 250 MHz



9 • DQ • HC 50/U
1.7 ... 250 MHz



17 • EB • HC 45/U
7 ... 250 MHz



Nous produisons des résonateurs coupe AT de 900 kHz à 230 MHz selon différentes normes (CEI, MIL, NF).
Nous pouvons également fabriquer les produits selon vos spécifications particulières.

We produce AT cut quartz crystals from 900 kHz to 250 MHz according to standards (IEC, MIL, NF).
We can also make crystals according to your special requirements.

Stabilité en température
Temperature range and stability

- 5°C ... 55°C	±10	± 5	ppm		
- 10°C ... 70°C	±50	±20	±10	±5	ppm
- 40°C ... 85°C	±30	±25	±15	ppm	
- 55°C ... 105°C	±40	±30	ppm		

Calage
Tolerance

25°C	± 20	± 10	ppm
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QUARTZ SELON SPECIFICATION PARTICULIERE

DATA SHEET FOR CRYSTAL UNITS

Client **Référence**
Customer *Reference*

Fréquence nominale **Fn** **kHz ou MHz**
Nominal frequency *Fn* *kHz or MHz*

Mode de Fonctionnement*
*Mode**

Boitier
Enclosure

Résistance maximum **Ohms**
E.S.R. max. *Ohms*

Capacité de charge **CL** **± 0.5 pF**
Load capacitance *CL* *± 0.5 pF*

TOLERANCE DE FREQUENCE
FREQUENCY TOLERANCE

Calage ±	.10⁻⁶ à	°C	
<i>Tolerance</i> ±	<i>.10⁻⁶ at</i>	<i>°C</i>	
Dérive ±	.10⁻⁶ de	°C à	°C
<i>Stability</i> ±	<i>.10⁻⁶ from</i>	<i>°C to</i>	<i>°C</i>

Niveau d'excitation **mW**
Drive level *mW*

Résonance indésirable **Rp/R1 > =** **de Fn à Fn +** **KHz**
Unwanted mode *Rp/R1 > =* *from Fn to Fn +* *KHz*

Vieillessement < = **.10⁻⁶ par an**
Aging < = *.10⁻⁶ per year*

Paramètres électriques **C0 =** **pF**
Equivalent parameters **C1 =** **fF**

L1 = **mH**

Q =

Autres caractéristiques
Additional data

*Fondamental, partiel 3, 5, 7 ou 9 *Fundamental, 3, 5th, 7th or 9th overtone

Boitier / Enclosure • 9 • CX • DQ • HC 25/U • HC 42/U • HC 50/U •

QA 81	-55°C ... +105°C	± 50*		17 ...	61 MHz	3	série
QA 81Z	-55°C ... +105°C	± 50*		17 ...	61 MHz	3	série

Boitier / Enclosure • 17 • EB • HC 45/U •

QM 03	-10°C ... + 70°C	± 50	± 30	12 ...	35 MHz	F	30 pF
QB 644	+ 5°C ... + 55°C	± 4	± 10	16 ...	35 MHz	F	30 pF
QB 645	-10°C ... + 70°C	± 4	± 10	16 ...	35 MHz	F	30 pF
QB 646	-40°C ... + 85°C	± 25	± 10	16 ...	35 MHz	F	30 pF
QB 647	-55°C ... +100°C	± 30	± 10	16 ...	35 MHz	F	30 pF
QB 648	+ 5°C ... + 55°C	± 5	± 10	12 ...	35 MHz	F	30 pF
QB 649	-10°C ... + 70°C	± 10	± 10	12 ...	35 MHz	F	30 pF
QB 650	-40°C ... + 85°C	± 30	± 10	12 ...	35 MHz	F	30 pF
QB 651	-55°C ... +100°C	± 40	± 10	12 ...	35 MHz	F	30 pF
QB 652	+ 5°C ... + 55°C	± 4	± 10	30 ...	90 MHz	3	série
QB 653	-10°C ... + 70°C	± 4	± 10	30 ...	90 MHz	3	série
QB 654	-40°C ... + 85°C	± 25	± 10	30 ...	90 MHz	3	série
QB 655	-55°C ... +100°C	± 30	± 10	30 ...	90 MHz	3	série
QB 656	+ 5°C ... + 55°C	± 5	± 10	30 ...	90 MHz	3	série
QB 657	-10°C ... + 70°C	± 10	± 10	30 ...	90 MHz	3	série
QB 658	-40°C ... + 85°C	± 30	± 10	30 ...	90 MHz	3	série
QB 659	-55°C ... +100°C	± 40	± 10	30 ...	90 MHz	3	série
QB 660	+ 5°C ... + 55°C	± 4	± 10	60 ...	130 MHz	5	série
QB 661	-10°C ... + 70°C	± 4	± 10	60 ...	130 MHz	5	série
QB 662	-40°C ... + 85°C	± 25	± 10	60 ...	130 MHz	5	série
QB 663	-55°C ... +100°C	± 30	± 10	60 ...	130 MHz	5	série
QB 664	+ 5°C ... + 55°C	± 5	± 10	60 ...	130 MHz	5	série
QB 665	-10°C ... + 70°C	± 10	± 10	60 ...	130 MHz	5	série
QB 666	-40°C ... + 85°C	± 30	± 10	60 ...	130 MHz	5	série
QB 667	-55°C ... +100°C	± 40	± 10	60 ...	130 MHz	5	série

Boitier / Enclosure • 2A • BF • DZ • HC 33/U • HC 47/U • HC 51/U •

QM 01	-10°C ... + 70°C	± 50	± 30	1 ...	6 MHz	F	30 pF
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Boitier / Enclosure • 3A • AA • DN • HC 6/U • HC 36/U • HC 48/U •

QA 18A	-55°C ... +105°C	± 50*		0.9 ...	20 MHz	F	32 pF
QA 19A	-55°C ... +105°C	± 50*		0.9 ...	20 MHz	F	série
QA 27A	75°C ... ± 5°C	± 20*		0.9 ...	20 MHz	F	32 pF
QA 28A	75°C ... ± 5°C	± 20*		0.9 ...	20 MHz	F	série
QA 35A	85°C ... ± 5°C	± 20*		0.9 ...	20 MHz	F	série
QA 36A	85°C ... ± 5°C	± 20*		0.9 ...	20 MHz	F	32 pF
QB 501	-55°C ... +105°C	± 35	± 15	0.9 ...	30 MHz	F	30 pF
QB 502	-20°C ... + 70°C	± 10	± 10	0.9 ...	30 MHz	F	30 pF
QB 612	+ 5°C ... + 55°C	± 5	± 10	2 ...	20 MHz	F	30 pF
QB 613	-10°C ... + 70°C	± 7.5	± 10	2 ...	20 MHz	F	30 pF

* Tolérance globale de fréquence * Global temperature stability

QUARTZ PROFESSIONNELS
PROFESSIONAL QUARTZ CRYSTALS

QB 614	-40°C ... + 85°C	± 25	± 10	2 ...	20 MHz	F	30 pF
QB 615	-55°C ... +100°C	± 30	± 10	2 ...	20 MHz	F	30 pF
QB 616	+ 5°C ... + 55°C	± 5	± 10	1 ...	20 MHz	F	30 pF
QB 617	-10°C ... + 70°C	± 10	± 10	1 ...	20 MHz	F	30 pF
QB 618	-40°C ... + 85°C	± 30	± 10	1 ...	20 MHz	F	30 pF
QB 619	-55°C ... +100°C	± 40	± 10	1 ...	20 MHz	F	30 pF
QA 32A	75 ... ± 5°C	± 20*		10 ...	75 MHz	3/5	série
QA 52A	-55°C ... +105°C	± 50*		10 ...	61 MHz	3	série
QA 54A	-55°C ... +105°C	± 50*		50 ...	125 MHz	5	série
Boitier / Enclosure • 12 A • CK • HC 35/U •							
QB 684	+ 5°C ... + 55°C	± 4	± 10	16 ...	35 MHz	F	30 pF
QB 685	-10°C ... + 70°C	± 4	± 10	16 ...	35 MHz	F	30 pF
QB 686	-40°C ... + 85°C	± 25	± 10	16 ...	35 MHz	F	30 pF
QB 687	-55°C ... +100°C	± 30	± 10	16 ...	35 MHz	F	30 pF
QB 688	+ 5°C ... + 55°C	± 5	± 10	10 ...	35 MHz	F	30 pF
QB 689	-10°C ... + 70°C	± 10	± 10	10 ...	35 MHz	F	30 pF
QB 690	-40°C ... + 85°C	± 30	± 10	10 ...	35 MHz	F	30 pF
QB 691	-55°C ... +100°C	± 40	± 10	10 ...	35 MHz	F	30 pF
QB 722	-40°C ... + 85°C	± 30	± 10	12 ...	35 MHz	F	série
QB 723	-55°C ... +100°C	± 40	± 10	12 ...	35 MHz	F	série
QB 724	-40°C ... + 85°C	± 30	± 10	12 ...	35 MHz	F	30 pF
QB 725	-55°C ... +100°C	± 40	± 10	12 ...	35 MHz	F	30 pF
QB 700	+ 5°C ... + 55°C	± 4	± 10	30 ...	90 MHz	3	série
QB 701	-10°C ... + 70°C	± 4	± 10	30 ...	90 MHz	3	série
QB 702	-40°C ... + 85°C	± 25	± 10	30 ...	90 MHz	3	série
QB 703	-55°C ... +100°C	± 30	± 10	30 ...	90 MHz	3	série
QB 704	+ 5°C ... + 55°C	± 5	± 10	30 ...	90 MHz	3	série
QB 705	-10°C ... + 70°C	± 10	± 10	30 ...	90 MHz	3	série
QB 706	-40°C ... + 85°C	± 30	± 10	30 ...	90 MHz	3	série
QB 707	-55°C ... +100°C	± 40	± 10	30 ...	90 MHz	3	série
QB 726	-40°C ... + 85°C	± 25	± 10	30 ...	90 MHz	3	série
QB 727	-55°C ... +100°C	± 30	± 10	30 ...	90 MHz	3	série
QB 708	+ 5°C ... + 55°C	± 4	± 10	60 ...	130 MHz	5	série
QB 709	-10°C ... + 70°C	± 4	± 10	60 ...	130 MHz	5	série
QB 710	-40°C ... + 85°C	± 25	± 10	60 ...	130 MHz	5	série
QB 711	-55°C ... +100°C	± 30	± 10	60 ...	130 MHz	5	série
QB 712	+ 5°C ... + 55°C	± 5	± 10	60 ...	130 MHz	5	série
QB 713	-10°C ... + 70°C	± 10	± 10	60 ...	130 MHz	5	série
QB 714	-40°C ... + 85°C	± 30	± 10	60 ...	130 MHz	5	série
QB 715	-55°C ... +100°C	± 40	± 10	60 ...	130 MHz	5	série
QB 728	-40°C ... + 85°C	± 25	± 10	60 ...	130 MHz	5	série
QB 729	-55°C ... +100°C	± 30	± 10	60 ...	130 MHz	5	série

* Tolérance globale de fréquence * Global temperature stability

MATEL

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QUARTZ SELON NORMES MIL C 3098

CRYSTAL UNITS ACCORDING TO MIL C 3098

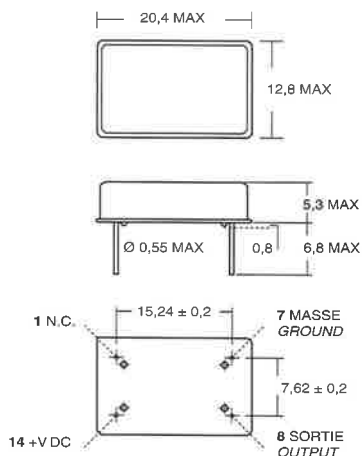
Type	Boitier NF 93601	Boitier MIL 10056	fréquence MHz	Mode	Tolérance 10 ⁻⁶	Niveau mW	Gamme de température	Capacité de charge
Type	Enclosure NF 93601	Enclosure MIL 10056	Frequency MHz	Mode	Tolerance 10 ⁻⁶	Drive level	Temperature range	Load capacitance
CR -18 A/U	3 A	HC - 6/U	0.9 - 20	F	± 50	10	- 55 +105	32 pF
CR -19 A/U	3 A	HC - 6/U	0.9 - 20	F	± 50	5	- 55 +105	série
CR -23 /U	3 A	HC - 6/U	10 - 125	P3 - P5	± 50	4	- 55 +105	série
CR -27 A/U	3 A	HC - 6/U	0.9 - 20	F	± 20	2.5	+75 ± 5	32 pF
CR -28 A/U	3 A	HC - 6/U	0.9 - 20	F	± 20	2.5	+75 ± 5	série
CR -32 A/U	3 A	HC - 6/U	10 - 75	P3 - P5	± 20	1	+75 ± 5	série
CR -33 A/U	3 A	HC - 6/U	10 - 25	P3	± 50	2.5	- 55 +105	32 pF
CR -35 A/U	3 A	HC - 6/U	0.9 - 20	F	± 20	5	+85 ± 5	série
CR -36 A/U	3 A	HC - 6/U	0.9 - 20	F	± 20	2.5	+85 ± 5	32 pF
CR -44 /U	3 A	HC - 6/U	15 - 20	F	± 20	5	+85 ± 5	32 pF
CR -48 /U	3 A	HC - 6/U	0.9 - 3	F	± 75	2	- 55 + 90	32 pF
CR -52 A/U	3 A	HC - 6/U	10 - 61	P3	± 50	2	- 55 +105	série
CR -53 A/U	3 A	HC - 6/U	50 - 87	P5	± 50	2	- 55 +105	série
CR -54 A/U	3 A	HC - 6/U	50 - 125	P5	± 50	2	- 55 +105	série
CR -55 A/U	5	HC - 18/U	17 - 62	P3	± 50	2	- 55 +105	série
CR -56 A/U	5	HC - 18/U	50 - 125	P5	± 50	2	- 55 +105	série
CR -59 A/U	5	HC - 18/U	50 - 125	P5	± 20	1	+85 ± 5	série
CR -60 A/U	5	HC - 18/U	5 - 20	F	± 50	5	- 55 +105	série
CR -61 /U	5	HC - 18/U	17 - 61	P3	± 20	2	+85 ± 5	série
CR -62 /U	3 A	HC - 6/U	0.9 - 20	F	± 10	2	+75 ± 5	32 pF
CR -64 /U	5	HC - 18/U	4 - 20	F	± 50	2	- 55 +105	30 pF
CR -65 /U	3 A	HC - 6/U	10 - 61	P3	± 25	2	+75 ± 5	série
CR -66 /U	3 A	HC - 6/U	3 - 20	F	± 30	10	- 55 +105	30 pF
CR -67 A/U	5	HC - 18/U	17 - 62	P3	± 25	2	- 55 +105	série
CR -68 /U	3 A	HC - 6/U	3 - 20	F	± 20	10	+75 ± 5	32 pF
CR -69 A/U	5	HC - 18/U	2.9 - 25	F	± 30	5	- 55 +105	30 pF
CR -72 /U	9	HC - 25/U	17 - 61	P3	± 50	2	- 55 +105	série
CR -73 /U	9	HC - 25/U	17 - 61	P3	± 30	2	- 55 +105	série
CR -74 /U	5	HC - 18/U	45 - 125	P5	± 10	1	+85 ± 5	série
CR -75 /U	3 A	HC - 6/U	50 - 125	P5	± 10	1	+75 + 5	série
CR -76 A/U	5	HC - 18/U	17 - 61	P3	± 30	2	- 55 ±105	série
CR -77 /U	9	HC - 25/U	17 - 62	P3	± 30	2	- 55 +105	série
CR -78 A/U	9	HC - 25/U	2.9 - 20	F	± 50	2	- 55 +105	30pF
CR -79 /U	9	HC - 25/U	2.9 - 20	F	± 50	5	- 55 +105	série
CR -80 /U	5	HC - 18/U	50 - 125	P5	± 30	2	- 55 +105	série
CR -81 /U	9	HC - 25/U	17 - 61	P3	± 50	2	- 55 +105	série
CR -82 /U	9	HC - 25/U	50 - 125	P5	± 50	2	- 55 +105	série
CR -83 /U	9	HC - 25/U	50 - 125	P5	± 30	2	- 55 +105	série
CR -84 /U	9	HC - 25/U	17 - 61	P3	± 20	1	+85 ± 5	série
CR -85 /U	3 A	HC - 6/U	0.9 - 20	F	± 30	5	- 55 +105	série
CR -97 /U	5	HC - 18/U	8 - 10	F	± 50	2	- 40 + 85	32 pF
CR -98 /U	9	HC - 25/U	50 - 134	P5	± 15	2	- 30 + 70	série

OSCILLATEURS A QUARTZ TTL BOITIER DIP 14

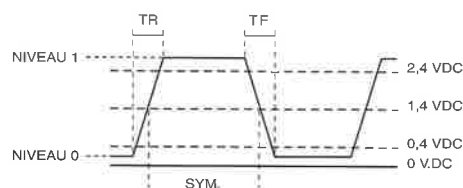
CLOCK OSCILLATOR TTL OUTPUT DIP 14

Catégorie Part number	01	02	03
Gamme de fréquence Frequency range	0.250 MHz ... 70 MHz	0.250 MHz ... 70 MHz	0.250 MHz ... 70 MHz
Température de fonctionnement Operating temperature	- 20C° ... + 70C°	- 20C° ... + 70C°	- 40C° ... + 85C°
Stabilité de fréquence Frequency stability	50 ppm	25 ppm	50 ppm
Tension d'alimentation Input voltage (VDC)	5 V ± 5%	5 V ± 5%	5 V ± 5%
Consommation Input current	40 mA max (< 40 MHz) 50 mA max (> 40 MHz)	40 mA max (< 40 MHz) 50 mA max (> 40 MHz)	40 mA max (< 40 MHz) 50 mA max (> 40 MHz)
Température de stockage Storage temperature	- 55C° ... + 125C°	- 55C° ... + 125C°	- 55C° ... + 125C°
Sortance Output load	10 TTL	10 TTL	10 TTL
Symétrie Symetry	60/40%	60/40%	60/40%
Temps de montée et descente Rise and fall time	≤ 15 ns	≤ 15 ns	≤ 15 ns

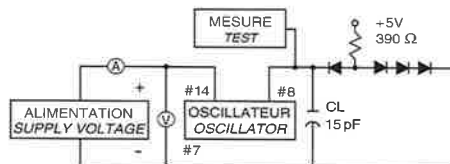
Dimensions
Outline dimensions



Signal de sortie
Output wave form



Circuit de test
Test circuit

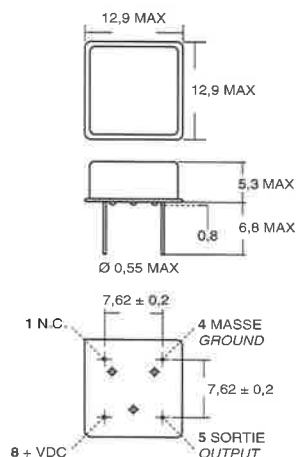


OSCILLATEURS A QUARTZ HCMOS BOITIER DIP 8

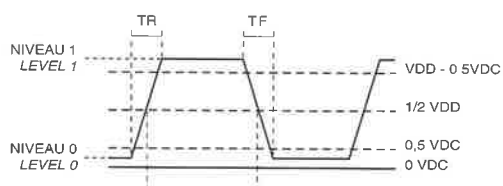
CLOCK OSCILLATOR HCMOS OUTPUT DIP 8

Catégorie <i>Part number</i>	D1	D2	D3
Gamme de fréquence <i>Frequency range</i>	3.5 MHz ... 70 MHz	3.5 MHz ... 70 MHz	3.5 MHz ... 70 MHz
Température de fonctionnement <i>Operating temperature</i>	- 20C° ... + 70C°	- 20C° ... + 70C°	- 40C° ... + 85C°
Stabilité de fréquence <i>Frequency stability</i>	50 ppm	25 ppm	50 ppm
Tension d'alimentation <i>Input voltage(VDD)</i>	5 V ± 5%	5 V ± 5%	5 V ± 5%
Consommation <i>Input current</i>	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)
Température de stockage <i>Storage temperature</i>	- 55C° ... + 125C°	- 55C° ... + 125C°	- 55C° ... + 125C°
Sortance <i>Output load</i>	15 pF	15 pF	15 pF
Symétrie <i>Symetry</i>	60/40%	60/40%	60/40%
Temps de montée et descente <i>Rise and fall time</i>	≤ 10 ns	≤ 10 ns	≤ 10 ns

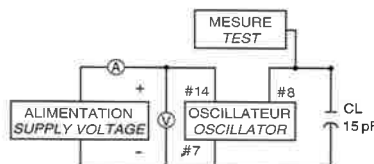
Dimensions
Outline dimensions



Signal de sortie
Output wave form



Circuit de test
Test circuit

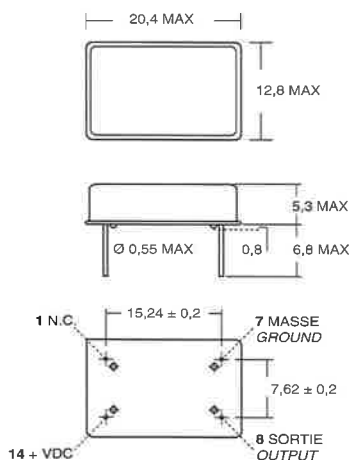


OSCILLATEURS A QUARTZ HCMOS BOITIER DIP 14

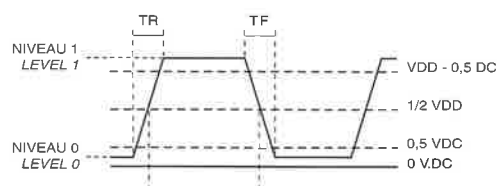
CLOCK OSCILLATOR HCMOS OUTPUT DIP 14

Catégorie <i>Part number</i>	M1	M2	M3
Gamme de fréquence <i>Frequency range</i>	3,5 MHz ... 70 MHz	3,5 MHz ... 70 MHz	3,5 MHz ... 70 MHz
Température de fonctionnement <i>Operating temperature</i>	- 20C° ... + 70C°	- 20C° ... + 70C°	- 40C° ... + 85C°
Stabilité de fréquence <i>Frequency stability</i>	50 ppm	25 ppm	50 ppm
Tension d'alimentation <i>Input voltage (VDD)</i>	5 V ± 5%	5 V ± 5%	5 V ± 5%
Consommation <i>Input current</i>	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)	15 mA max (< 30 MHz) 30 mA max (> 30 MHz)
Température de stockage <i>Storage temperature</i>	- 55C° ... + 125C°	- 55C° ... + 125C°	- 55C° ... + 125C°
Sortance <i>Output load</i>	15 pF	15 pF	15 pF
Symétrie <i>Symetry</i>	60/40%	60/40%	60/40%
Temps de montée et descente <i>Rise and fall time</i>	≤ 10 ns	≤ 10 ns	≤ 10 ns

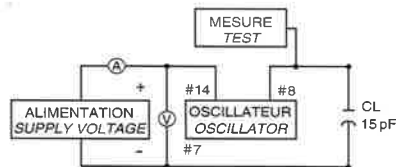
Dimensions
Outline dimensions



Signal de sortie
Output wave form



Circuit de test
Test circuit



MONTAGE TRADITIONNEL

CONVENTIONAL MOUNTING

CARACTÉRISTIQUES GÉNÉRALES
GENERAL CHARACTERISTICS

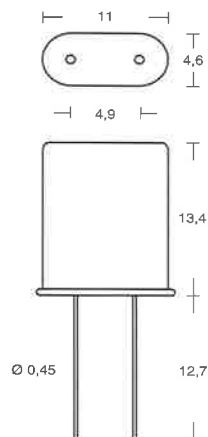
Tolérance
Calibration

25°C	± 30	ppm
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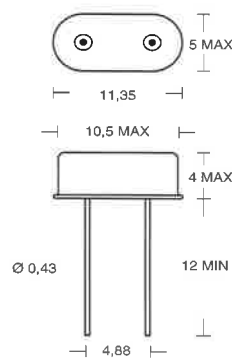
Stabilité en température
Temperature stability

- 20°C ... 70°C	± 50	ppm
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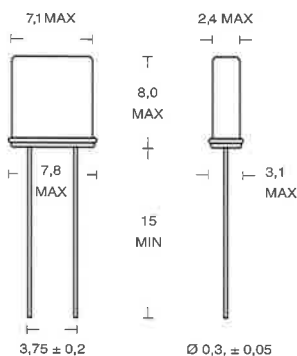
HC 49/U
1.8432 ... 100 MHz
(hauteur 13.5mm)



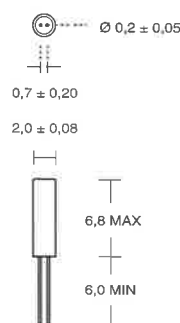
HC 49/S-4H
3.2 ... 66.6 MHz
(hauteur 4 mm)



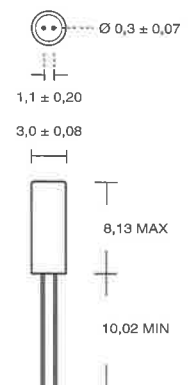
UM1
3.6 ... 150 MHz



TC 26
10 ... 150 kHz



TC 38
10 ... 150 kHz



MONTAGE EN SURFACE

SURFACE MOUNTING

CARACTÉRISTIQUES GÉNÉRALES
GENERAL CHARACTERISTICS

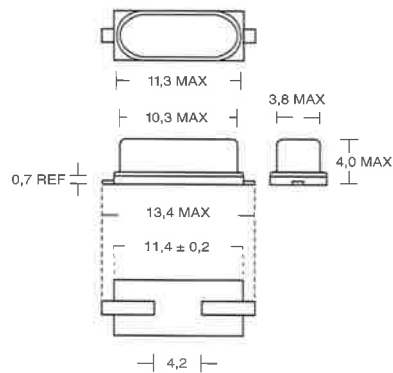
Tolérance
Calibration

25°C	± 30	ppm
------	------	-----

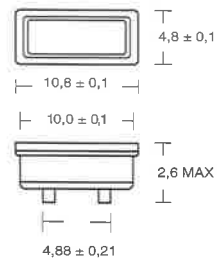
Stabilité en température
Temperature stability

- 20°C ... 70°C	± 50	ppm
-----------------	------	-----

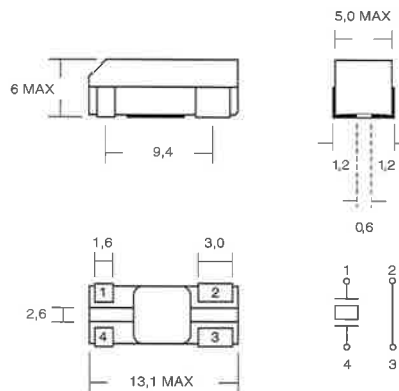
SL-L/4H(HC 49/SMD)
3.2 ... 66.6 MHz



SL-MC
3.2 ... 66.6 MHz



AG 3A
3.579 ... 70 MHz



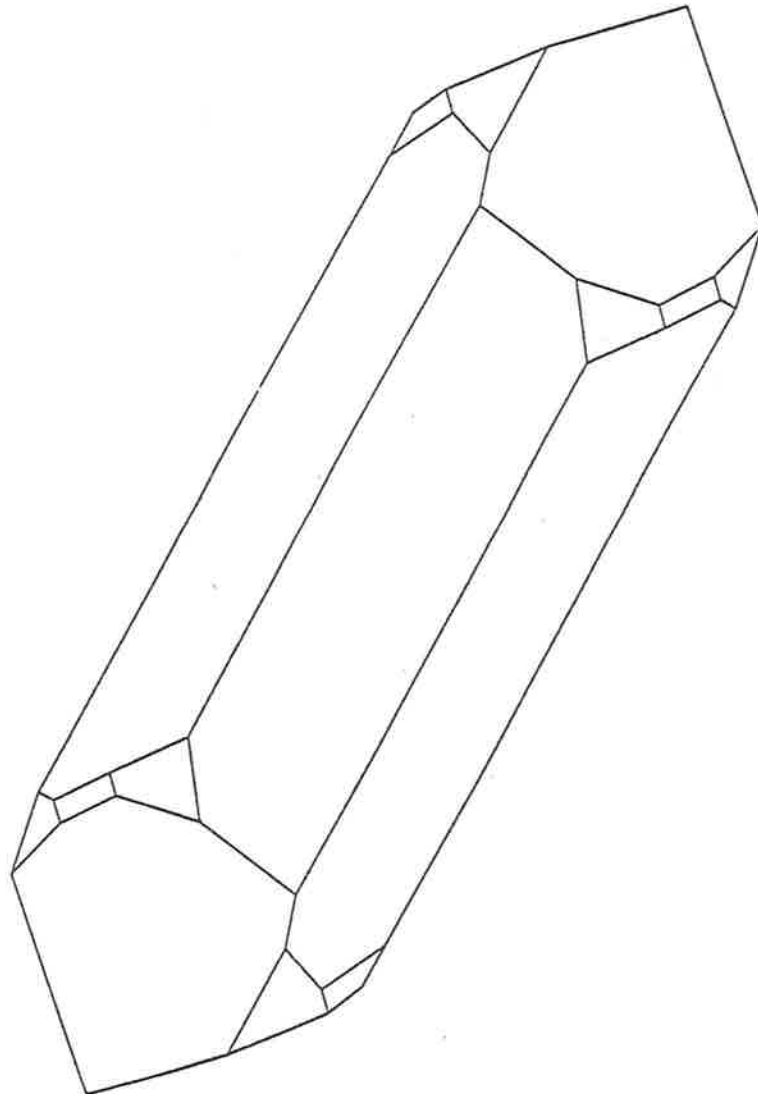
MATEL
Résonateurs et Oscillateurs à quartz
18 Rue Séjourné
94044 CRETEIL CEDEX

fordahl
FREQUENCY CONTROL PRODUCTS

Tél. (33.1) 49 80 49 85
Fax (33.1) 49 80 49 63

EXTRAIT DU CATALOGUE GENERAL

**QUARTZ CRYSTAL
OSCILLATORS**



1992 Edition



OSCILLATOR TYPES

FORDAHL supplies a wide range of quartz crystal oscillators meeting most of the market needs. Our policy is to offer products achieving the best possible size to performance ratio, at economical cost, particularly illustrated by our DFO 114-SH DFN 4-SH models. Our range is divided into six different main types :

- Clock oscillators (CXO)
- Precision oscillators (PXO)
- Temperature compensated oscillators (TCXO)
- Oven controlled oscillators (OCXO)
- Voltage controlled oscillators (VCXO)
- Surface mount oscillators (SXO)

1. CLOCK OSCILLATORS

They use a hybrid circuit containing the oscillator and buffer electronics, and a crystal either mounted directly on top of the hybrid, or packaged into its own holder. Their stability is generally around ± 100 or ± 50 ppm overall. The wide use of these products by the computer industry strongly decreased their price over the last years.

2. PRECISION OSCILLATORS

Their crystal is always packaged into its own holder, and their electronic circuit is improved compared to clock oscillators. They are usually delivered with the same package size and pin-out than clock oscillators, but their performances approach those from temperature compensated oscillators, and they are suitable for military and harsh environment applications.

3. TEMPERATURE COMPENSATED OSCILLATORS

The temperature stability of these oscillators is improved by mean of an electronic circuit that compensates the frequency change versus temperature of the crystal. This allows to reach tight temperature stabilities with reasonable sizes and low power consumptions, but in practice, the best achievable accuracy is around ± 0.5 ppm, and wide temperature ranges may lead to high prices. These oscillators are mostly suitable for commercial temperature ranges.

4. OVEN CONTROLLED OSCILLATORS

This is the other alternative to reach high frequency stabilities. The crystal is heated at its turnover point, above the operating temperature range of the device. This leads to the best possible frequency stability available with a crystal oscillator, but takes more power than electronic compensation. However, these products may offer a very economical solution for wide temperature ranges and **FORDAHL** specializes into miniature OCXO's that bring an interesting alternative to TCXO's, size-wise and cost-wise. The DFO 114-SH is the **WORLD'S FIRST DIL 14 OCXO** in regular production.

5. VOLTAGE CONTROLLED OSCILLATORS

The frequency of VCXO's can be pulled by as much as ± 1000 ppm by mean of an external voltage. The stability is similar to precision oscillators, but can be degraded by very large pulling ranges. A tight linearity of the pulling can be achieved on certain models.

OSCILLATOR TYPES

With the expansion of surface mount technologies, appeared an increased demand for surface mountable devices of all kinds. Over a long period of time were crystal oscillators within the last components not available as surface mount devices.

The reason of this late reaction is mainly due to technological difficulties and the lack of standardization of packages.

Crystals are components needing hermetically sealed packages in order to perform properly, and this explains the difficulty to produce such packages for surface mount applications.

6. SURFACE MOUNT CRYSTAL OSCILLATORS

Taking into account the need of hermetic packages, it was not easy to find suitable solutions to the surface mounting of quartz crystal oscillators.

The first solution still in use by several suppliers is to use a hermetic ceramic package, like a chip-carrier. In this case, the crystal is mounted directly on top of the hybrid electronics, exactly like into a clock oscillator. It means that the crystal blank is not protected against eventual degazings of the electronic circuit. Such oscillators often exhibit poor ageing figures and temperature stabilities are limited.

Recently, several suppliers proposed oscillators where the crystal is encapsulated within a cylindrical holder, and the whole oscillator is then molded into a plastic package, using the same technology as standard integrated circuits. The advantage is to offer a simple solution for mass production oscillators, but no flexibility for special specifications is possible. Also, the manufacturing process of cylindrical crystals is limited in terms of frequencies and the package technology do not allow wide temperature ranges.

Surface mount being not only needed for mass production, **FORDAHL** tried to find a suitable solution to answer special requests, with wider temperature ranges and tighter specifications, without the disadvantages of the ceramic packages.

This led to a new concept: The crystal being the most sensitive element of the oscillator, it should be protected against external influences. Therefore, we decided to use a hermetic package for the crystal (UM-1 or UM-5) that offer a full flexibility on the specifications. The oscillator is packed into a non-hermetic epoxy package that allows an easy design and a low cost. The product can also withstand the full military temperature range. This concept is today applied to our **DFN S1-KH**, but should be still considered as experimental, as it can be improved further, particularly on the soldering technology.

APPLICATION NOTES

Crystal oscillators request some precautions from their users. High frequencies create difficult measurement problems, and calibrations as well as test conditions are of primary importance.

Interferences with other frequency sources are possible, and board designs should be treated carefully, preventing also from power supply noises.

This page gives a certain number of advises to designers and oscillator users, and should prevent them from certain basic problems encountered with these products. It also informs about our standard calibration and test conditions.

1. BOARD DESIGN CONSIDERATIONS

Crystal oscillators are sensitive to their environment, and particularly to power supply noises and stray capacitances. A few rules should be kept in mind when designing board layouts:

- Avoid lines (except ground lines) below the oscillator
- Decoupling capacitors should be located as close as possible to the oscillator.
- When several frequency sources are connected to the same power supply, RF chokes should be placed in series on the supply line of each oscillator.
- Avoid long lines between the oscillator and its loads, they will damage the output signal, due to the high stray capacitances involved.
- In case an external frequency adjustment is used, the adjustment device should be located directly on the oscillator external adjustment input.

As a general rule, stray capacitances should be avoided as much as possible, and high frequency sources or lines should be kept away from each other.

2. POWER SUPPLY DECOUPLING

Modern high speed technologies make decoupling even more important than former standard TTL devices. Each oscillator must be decoupled individually, even if a decoupling capacitor already exists on the power supply rails. HCMOS and FAST TTL devices exhibit high switching currents that can cause troubles if the decoupling is not sufficient. For all types of oscillators, FORDAHL recommends the use of a 100 nF capacitor, in parallel with a 10 pF ceramic one preventing from spikes, mounted as close as possible to the oscillator.

3. TEST JIGS AND MESURAMENT

Test jigs should be manufactured using the same design considerations as the main boards. The use of multipurpose test plates or breadboards is not recommended, particularly for frequencies above 1 MHz. The measuring instruments should be carefully calibrated, and the use of low capacitance value (10 pF) oscilloscope probes is a main condition for testing. Never use coaxial cables directly at the oscillator output.

4. CALIBRATION CONDITIONS

FORDAHL calibrates its oscillators at 25°C ± 5°C ambient when not otherwise stated, the barometric pressure is within 650 and 800 mm Hg and RH 45 to 75 %. When not specified, supply voltage is nominal and load is 1/2 of full load.

ORDERING CODE

EXAMPLE : DFN 114-KHT 10.000 MHz XH100SB

DFN	Type	Non compensated oscillator (CXO or PXO)
1	Version	version no 1
14	Package	DIL 14 package
K	Internal use code	Not for customer use, defined by data-sheet
H	Output code	HCMOS output
T	Option code	External trimming possibility
10.000 MHz	Frequency	10.000 MHz
X	Indication code	Overall stability, all effects included
H	Temperature range	-55 to 125°C
100	Frequency stability	± 100 ppm, for VCXO, see also "Pulling code"
SB	Test level	Screening level B to MIL-STD-883

PACKAGE CODE		
FORDAHL	DESCRIPTION	SEAL
14	DIL 14	RW
4	DIL 8	RW
8	TO-8	RW
18	18,5 x 12 mm	SS
20	20 x 20 mm	SS
25	25 x 15 mm	SS
30	30 x 30 mm	SS
36	36 x 27 mm	SS
40	40 x 40 mm	SS
67	67 x 60 mm	SS
S1	14 x 9 mm, SMD	EP
S4	28 pin PLCC, SMD	PM

RW = resistance welding
 SS = solder seal
 EP = epoxy package, SMD
 PM = plastic molded, SMD

TYPE CODE	
DFN	CXO/PXO
DFA	TCXO
DFO	OCXO
DFV	VCXO

OUTPUT CODE	
T	TTL
F	FAST TTL
C	CMOS
H	HCMOS
OC	CPEN COL.
E	ECL
O	Clip sine
SW	Sine wave

TEMPERATURE RANGE CODE	
RANGES	CODES
0 to 50°C	A
0 to 60°C	L
0 to 70°C	B
-10 to 50°C	M
-10 to 60°C	D
-10 to 70°C	I
-20 to 70°C	C
-25 to 75°C	P
-30 to 60°C	K
-30 to 75°C	N
-40 to 70°C	F
-40 to 85°C	E
-55 to 105°C	G
-55 to 125°C	H

PULLING CODE (VCXO only)
This code defines the pulling range of a VCXO and is placed in front of the indication code or the temperature range code. It is the frequency pulling value expressed in ppm. EXAMPLE : ± 100 ppm = code 100

OPTION CODE (Void = no option)			
I	Enable/disable	Z	Tri-state
T	External trimmer	A	Internal trimmer
V	Voltage control	R	Tight symmetry

L	Low power model
P	2nd phase shifted output
O	2nd independant output
N	Negative pulling function (VCXO)
G	Inverted pin-out (ECL)
C	Positive supply voltage (ECL)

INDICATION CODE	
Z	Non standard specification
X	Overall frequency stability
-	Temperature stability only

TEST LEVEL CODE (Void = standard)	
BI	Burn-in (168 H @ 125°C)
SC	MIL-STD-883/MIL-O-55310 screening C
SB	MIL-STD-883/MIL-O-55310 screening B

When non-standard specifications, or additional parameters are requested, a special FORDAHL specification number will be issued.
 25.01.92

1ST SECTION

**CRYSTAL CLOCK OSCILLATORS
 (CXO)
 SALES PROGRAM OVERVIEW**

MODEL	OUTPUT TYPE	FREQUENCY RANGE (MHz)	SUPPLY	TEMPERATURE AND STABILITY (°C) (ppm)	PACKAGE
DFN 14-T	TTL	0.25 - 120	5 V 50-90 mA	0 - 70 ± 25 to 100 -40 - 85 ± 50 to 100	DIL 14 4 pins
DFN 14-H	HCMOS	0.50- 100	5 V 20-40 mA	0 - 70 ± 25 to 100 -40 - 85 ± 50 to 100 -55 - 125 ± 75 to 100	DIL 14 4 pins
DFN 4-H	HCMOS	0.50 - 80	5 V 20-40 mA		DIL 8 4 pins
DFN 14-B	HCMOS/TTL TRI STATE option	1 - 70	5 V 15-40 mA	0 - 70 ± 50 to 100	DIL 14 4 pins
DFN 4-B	HCMOS/TTL TRI STATE option	1 - 70	5 V 15-40 mA		DIL 8 4 pins
DFN 114-E	ECL	30 - 200 DUAL OUTPUT option	-5.2 V or 5 V 50 mA	0 - 70 ± 50 to 100	DIL 14 4 pins
DFN 14-0	CLIPPED SINE WAVE	30 - 200 DUAL OUTPUT option	5 V 40 mA		DIL 14 4 pins

Frequency stability includes 25°C calibration, temperature, Vcc, load and 1st year ageing at 25°C.

Frequencies above 70 MHz (TTL) and 80 MHz (HCMOS) are only available over the 0 to 70°C temperature range.

OPTIONS on most of the models :
 -tighter duty cycle up to 25 MHz
 -enable/disable
 -screening to MIL-STD-883/MIL-O-55310

2ND SECTION

**PRECISION CRYSTAL OSCILLATORS
 (PXO)**

SALES PROGRAM OVERVIEW

MODEL	OUTPUT TYPE	FREQUENCY RANGE (MHz)	SUPPLY	TEMPERATURE AND STABILITY (°C), (ppm)	PACKAGE
DFN 14-KH DFN 114-KH	HCMOS	1 - 100	5 V 10-40 mA	0 - 70 ± 15 to 50 -40 - 85 ± 25 to 75 -55 - 125 ± 50 to 100	DIL 14 4 pins or DIL 14 14 pins
DFN 14-KT DFN 114-KT	TTL	1 - 70	5 V 30-70 mA		DIL 8 4 pins
DFN 4-KH	HCMOS	1 - 80	5 V 10-40 mA		24x18x12 mm 4 pins
DFN 24-H Ex NMC21,000	HCMOS	1 - 60	5 V 10-40 mA		36x27x10 mm 5 pins
DFN 36-H	HCMOS	1 - 100	5 V 10-40 mA		TO-8 8 pins
DFN 8 DFN 8-D	FTTL ENABLE/ DISABLE	0.75 - 40 DUAL OUTPUT option	5 V 30-50 mA	0 - 70 ± 25 to 50 -40 - 85 ± 50 to 100 -55 - 125 ± 75 to 100	TO-8 8 pins
DFN 14-KE DFN 114-KE	ECL	30 - 175	-5.2/5 V 40 mA	0 - 70 ± 15 to 25 -40 - 85 ± 50 to 100 (optional dual output)	DIL 14 4 pins or DIL 14 14 pins
DFN 14-KO DFN 114-KO	CLIPPED SINE WAVE	30 - 200	5 V 40 mA		36x27x10 mm 5 pins
DFN 36-E DFN 36-O	ECL CLIPPED SINE WAVE	15 - 250 DUAL OUTPUT option	-5.2/5 V 5 V 50 mA	0 - 70 ± 15 to 50	36x27x10 mm 5 pins
DFN 14-SH DFN 4-SH	HCMOS	1 - 70	5 V 10-30 mA	-10 - 60 ± 3 0 - 70 ± 4 -20 - 70 ± 5	DIL 14 DIL 8 4 pins

Frequency stability : 25°C calibration, temperature, Vcc, load and 1st year ageing at 25°C, except DFN 14-SH and DFN 4-SH, temperature stability only.
 F > 80 MHz (HCMOS) only available over 0 to 70°C range
 OPTIONS on most of the models : -tighter duty cycle up to 25 MHz
 -internal, external trimming or enable/disable
 -screening to MIL-STD-883/MIL-O-55310

HCMOS PRECISION CRYSTAL OSCILLATOR

TYPE : DFN 14-KH & DFN 114-KH 1 - 100 MHz

-HIGH FREQUENCIES AVAILABLE

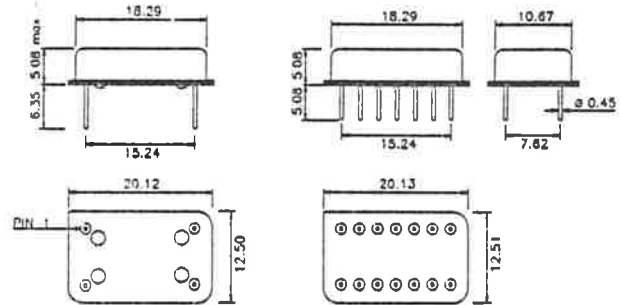
-GUARANTEED LONG TERM AGEING AND RELIABILITY THANKS TO A CRYSTAL PACKED INTO ITS OWN HERMETIC HOLDER.

-MIL-STD-883 SCREENING

-LOW PROFILE PACKAGE

-MANY OPTIONS

Function	pin
NC/Trim/Enable	1
GND	7
Output	8
Vcc	14
NC	other



ELECTRICAL SPECIFICATIONS

supply voltage	5 V \pm 10%
supply current (no load), up to 25 MHz/100 MHz	\leq 10 mA/ \leq 40 mA
output load, up to 25 MHz/100 MHz	50 pF or 2 TTL/15 pF or 8 TTL
symmetry @ 2.5 V	\leq 40/60...60/40 %
rise/fall times up to 25 MHz/100 MHz	\leq 10 ns/ \leq 5 ns
high/low levels	\geq 4.5 V/ \leq 0.5 V
start up	\leq 10 ms @ 4.5 V

FREQUENCY STABILITY

including 25°C calibration, temperature, ageing 1st year, Vcc and load change.
 80.1 to 100 MHz range only available as XB models.

temperature range	stability	code	stability	code	stability	code
0 to 70°C	\pm 15 ppm	XB15	\pm 25 ppm	XB25	\pm 50 ppm	XB50
-40 to 85°C	\pm 25 ppm	XE25	\pm 50 ppm	XE50	\pm 75 ppm	XE75
-55 to 125°C	\pm 50 ppm	XH50	\pm 75 ppm	XH75	\pm 100 ppm	XH100

ENVIRONMENTAL SPECIFICATIONS

storage temperature	-62 to 150°C
shocks (6 directions)	1000g, 0.2 ms, 1/2 sine
vibrations (3 axes)	20-2000 Hz, 20g

OPTIONS

14 pins package (type DFN 114-KH)	all gold plated base and pins
tighter symmetry (code R), for F \leq 25 MHz	45/55...55/45%
external trimmer (code T), for F \leq 50 MHz	\geq \pm 5 ppm (3 to 15 pF)
internal trimmer (code A), for F \leq 50 MHz	\geq \pm 5 ppm, PACKAGE HEIGHT \leq 7 mm
enable/disable (code I)	low = disable
screening (code SC)	MIL-STD-883C/MIL-O-55310 level C
screening (code SB)	MIL-STD-883C/MIL-O-55310 level B
low power option (code L)	Icc \leq 5 mA for F \leq 20 MHz

ORDERING CODE

type + option code + frequency + temperature code + stability + screening code
 EXAMPLE : DFN 14-KH 24.576 MHz XE25
 09.01.92



HCMOS MINIATUR PRECISION OSCILLATOR

TYPE : DFN 4-KH 1 - 80 MHz

-HIGH FREQUENCIES AVAILABLE

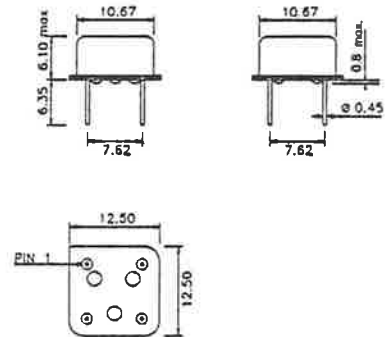
-GUARANTEED LONG TERM AGEING AND RELIABILITY THANKS TO A CRYSTAL PACKED INTO ITS OWN HERMETIC HOLDER.

-MIL-STD-883 SCREENING

-LOW PROFILE PACKAGE

-MANY OPTIONS

Function	pin
NC/Trim/Enable	1
GND	4
Output	5
Vcc	8



ELECTRICAL SPECIFICATIONS

supply voltage	5 V ± 10%
supply current (no load), up to 25 MHz/80 MHz	≤ 10 mA/≤ 40 mA
output load, up to 25 MHz/80 MHz	50 pF or 2 TTL/15 pF or 8 TTL
symmetry @ 2.5 V	≤ 40/60...60/40 %
rise/fall times up to 25 MHz/80 MHz	≤ 10 ns/≤ 5 ns
high/low levels	≥ 4.5 V/≤ 0.5 V
start up	≤ 10 ms @ 4.5 V

FREQUENCY STABILITY

including 25°C calibration, temperature, ageing 1st year, Vcc and load change.

temperature range	stability	code	stability	code	stability	code
0 to 70°C	± 15 ppm	XB15	± 25 ppm	XB25	± 50 ppm	XB50
-40 to 85°C	± 25 ppm	XE25	± 50 ppm	XE50	± 75 ppm	XE75
-55 to 125°C	± 50 ppm	XH50	± 75 ppm	XH75	±100 ppm	XH100

ENVIRONMENTAL SPECIFICATIONS

storage temperature	-62 to 150°C
shocks (6 directions)	1000g, 0.2 ms, 1/2 sine
vibrations (3 axes)	20-2000 Hz, 20g

OPTIONS

tighter symmetry (code R), for F ≤ 25 MHz	45/55...55/45%
external trimmer (code T), for F ≤ 50 MHz	≥ ± 5 ppm (3 to 15 pF)
enable/disable (code I)	low = disable
screening (code SC)	MIL-STD-883C/MIL-O-55310 level C
screening (code SB)	MIL-STD-883C/MIL-O-55310 level B
low power option (code L)	Icc ≤ 5 mA for F ≤ 20 MHz

ORDERING CODE

type + option code + frequency + temperature code + stability + screening code

EXAMPLE : DFN 4-KH 68.736 MHz XH50



DIL 14 ECL PRECISION CRYSTAL OSCILLATOR
TYPE : DFN 14-KE & DFN 114-KE 30 - 175 MHz

-FAST ECL 10KH LOGIC

-HIGH FREQUENCIES AVAILABLE

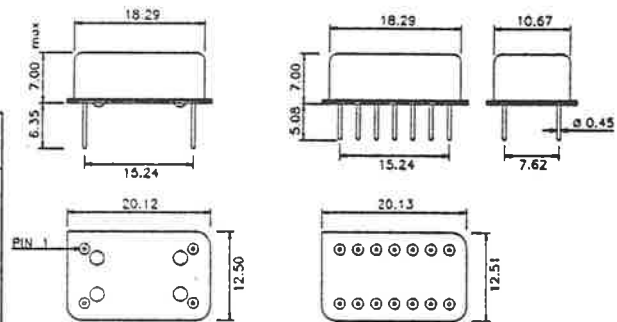
-STANDARD DIL 14 MINIATURE PACKAGE

-HIGH STABILITY

-NEGATIVE OR POSITIVE
 SUPPLY VOLTAGE

-INVERTED OUTPUT OPTIONAL

Function	pin
NC/Trim/ Output B	1
Vee	7
Output A	8
GND	14
NC	other



ELECTRICAL SPECIFICATIONS

supply voltage	-5.2 V \pm 5% (+5 V optional)
supply current (no load)	\leq 40 mA (lower on request)
output load	ECL 10KH (50 ohms to -2V)
symmetry at 50 % level	40/60...60/40 % max
rise/fall times (20 to 80%), up to 170 MHz	\leq 2 ns
up to 200 MHz	\leq 1.5 ns
high/low levels	\geq -1.0 V / \leq -1.6 V
start up	\leq 10 ms @ -5.2 V

FREQUENCY STABILITY

including 25°C calibration, temperature, ageing 1st year, Vcc and load change.

temperature range	stability	code	stability	code
0 to 70°C	\pm 15 ppm	XB15	\pm 25 ppm	XB25
-40 to 85°C	\pm 50 ppm	XE50	\pm 100 ppm	XE100

ENVIRONMENTAL SPECIFICATIONS

storage temperature	-55 to 125°C
shocks (6 directions)	1000g, 0.2 ms, 1/2 sine
vibrations (3 axes)	10-55 Hz, 1.5 mm D.A., 2 hours

OPTIONS

14 pins package (type DFN 114-KE)	all gold plated base and pins
positive supply voltage (code C)	pin 14 : Vcc, pin 7 : GND
second output on pin 1 (code P)	180° inverted
external trimmer on pin 1 (code T)	3-15 pF \pm 5 ppm min
inverted pin-out (code G)	pin 14 : Vee, pin 7 : GND

ORDERING CODE

type + option code + frequency + temperature code + stability + screening code

EXAMPLE : DFN 14-KET 139.264 MHz XB15

3RD SECTION

**TEMPERATURE COMPENSATED OSCILLATORS
 (TCXO)
 SALES PROGRAM OVERVIEW**

MODEL	OUTPUT TYPE	FREQUENCY RANGE (MHz)	SUPPLY	TEMPERATURE AND STABILITY (°C) (ppm)	PACKAGE
DFA 14-O DFA 14-T	CLIP SINE TTL	5 - 70	5 V 8-15 mA	-10 - 60 ± 2 ≤ 15 MHz 0 - 70 ± 10 * *incl. calibration	DIL 14 4 pins
DFA 18-O DFA 18-T	CLIP SINE TTL	5 - 20	5 V 3-15 mA	-10 - 50 ± 3 -30 - 60 ± 3 to 5 -30 - 75 ± 2.5	DIL 14 compatible 18x12x10 mm
DFA 25-O DFA 25-T	CLIP SINE TTL	5 - 70	5 V 10-20 mA	0 - 60 ± 1 ≤ 15 MHz -30 - 60 ± 3 ≤ 15 MHz 0 - 70 ± 5 ≤ 70 MHz	DIL 14 compatible 25x15x10 mm
DFA 20-O DFA 20-H	CLIP SINE HCMOS	5 - 25	5 V 5-15 mA	-20 - 70 ± 1.5 to 2 -25 - 75 ± 2.5	20x20x10 mm 5 pins
DFA 30-O DFA 30-SW	CLIP SINE SINE WAVE	1 - 20 1 - 150	5 - 12 V 15-20 mA	0 - 50 ± 0.5 to 1 -10 - 60 ± 0.5 to 2 -20 - 70 ± 2	30x30x15 mm 4 pins
DFA 30-T DFA 30-C	TTL CMOS	1 - 20	5 - 12 V 15 mA		
DFA 36-O DFA 36-SW	CLIP SINE SINE WAVE	1 - 20	5 - 12 V 15 mA	0 - 50 ± 0.5 to 1 -10 - 60 ± 0.5 to 2 -20 - 70 ± 1 to 2 -40 - 85 ± 2 to 5	36x27x10 mm 5 pins
DFA 36-T DFA 36-H	TTL HCMOS	1 - 20	5 - 12 V 15 mA		

Frequency stability is including the temperature stability only, and all of these oscillators have internal or external calibration possibilities

4TH SECTION

**OVEN CONTROLLED OSCILLATORS
(OCXO)**

SALES PROGRAM OVERVIEW

MODEL	OUTPUT TYPE	FREQUENCY RANGE (MHz)	SUPPLY	TEMPERATURE AND STABILITY (°C) (ppm)	PACKAGE
DFO 14-SH	HCMOS	1 - 35	10-20 V 400 to 700 mW	-10 - 60 $\leq \pm 0.2 - 0.5$ -20 - 70 $\leq \pm 0.5 - 1$ -40 - 70 $\leq \pm 1 - 2$	DIL 14 4 pins
DFO 36-SH	HCMOS	1 - 35	10-20 V 360 to 700 mW	-20 - 70 $\leq \pm 0.2 - 0.5$ -40 - 70 $\leq \pm 0.5 - 1$	36x27x20 mm 5 pins
DFO 236-SH	HCMOS	1 - 25	5-24 V ≤ 2 W	-20 - 70 $\leq \pm 1 \times 10E-7$ -40 - 70 $\leq \pm 2 \times 10E-7$	36x27x20 mm 5 pins
DFO 237-SH Ex Newmarket NMC25,000	HCMOS	1 - 25	5-24 V ≤ 2 W	-10 - 70 $\leq \pm 0.1 - 0.2$ -40 - 70 $\leq \pm 0.2 - 0.5$	36x27x26 mm 5 pins
DFO 67-ASW	SINE WAVE	4 - 12.5	12-24 V ≤ 2 W	-20 - 60 $\leq 5 \times 10E-8$ 1 x 10E-9/day ageing 1 x 10E-10/1 sec	67x60x40 mm 5 pins
DFO 67-SSW	SINE WAVE	5 or 10	12-24 V ≤ 2 W	-20 - 70 $\leq 1 \times 10E-8$ -20 - 70 $\leq 5 \times 10E-9$ daily ageing 5 or 2 x 10E-10 1 x 10E-11/1 sec	67x60x40 mm 5 pins
DFO 76-OSW	SINE WAVE	4 - 10	12-24 V ≤ 2 W	-40 - 60 $\leq 8 \times 10E-9$ 5 x 10E -10/day ageing 1 x 10E-11/1 sec	76x50x50 mm connector

Frequency stability is including the temperature stability only, and all of these oscillators have external calibration possibilities

5TH SECTION

**VOLTAGE CONTROLLED OSCILLATORS
 (VCXO)**

SALES PROGRAM OVERVIEW

MODEL + FREQUENCY	OUTPUT TYPE	SUPPLY	PULLING AND TEMPERATURE STABILITY (ppm, °C, ppm) (DFV 14-H : all effects included) (other : temperature only)	PACKAGE
DFV 14-H 2 - 45 MHz	HCMOS	5 V 10-30 mA	± 100 or 150 for (2.5 ± 2 V) 0 - 70 ± 50 to 100	DIL 14 4 pins
DFV 14-KH 1 - 50 MHz	HCMOS	5 V 10-30 mA	± 100 for 0 - 70 ± 10 to 25 (0.5 - 5 V) -40 - 85 ± 25 to 50 ± 350 for 0 - 70 ± 25 to 50 (0.5 - 10 V)	DIL 14 4 pins
DFV 114-KH 1 - 40 MHz	HCMOS	5 V 10-20 mA	± 100 for 0 - 70 ± 10 to 25 (0 - 5 V) -40 - 85 ± 25 to 50 linear model ± 10%, 33 - 54 ppm/V	DIL 14 4 pins (H= 8.3 mm)
DFV 214-KH 1 - 50 MHz	HCMOS	5 V 10-30 mA	± 130 - 160 for 0 - 70 ± 20 (0 ± 5 V, -15 to -60 ppm/V)	DIL 14 4 pins
DFV 25-H 2 - 80 MHz	HCMOS	5 V 10-35 mA	± 100 for 0 - 70 ± 10 to 25 ± 150 for 0 - 70 ± 15 to 25 (0.5 - 5V or 0 ± 5V)	DIL 14 compatible 25x15x10 mm
DFV 30-H 1 - 80 MHz	HCMOS	5 - 12 V 50-100 mA	± 100 for 0 - 70 ± 20 ± 500 for 0 - 70 ± 50 (2.5 ± 2 V or 0 ± 2 V or 0 ± 5 V)	30x30x15 mm 4 pins
DFV 36-0 15-160 MHz	SINE WAVE 0 dBm/50Ω	5 V 50 mA	± 100 - 150 for 0 - 70 ± 15 to 25 (0 - 5 V)	36x27x10 mm 5 pins
DFV 36-E 15-160 MHz	ECL 10KH	-5.2 V 50 mA	± 100 - 150 for 0 - 70 ± 15 to 25 (0 to -5 V)	36x27x10 mm 5 pins
DFV 40-E DFV 140-E 70-200 MHz	ECL 10K ECL 100K	-5.2 V -4.5 V 100 mA	± 100 for 0 - 70 ± 20 ± 250 for 0 - 70 ± 40 (-2.5 ± 2 V, other on request)	40x40x13 mm 5 pins
DFV 40-SW 70-200 MHz	SINE WAVE 0 dBm/50Ω	12 V 50 mA	± 100 for 0 - 70 ± 20 ± 250 for 0 - 70 ± 40 (2.5 ± 2V, other on request)	40x40x13 mm 5 pins

DIL 14 HCMOS VCXO PRECISION OSCILLATOR
TYPE : DFV 14-KH 1 - 50 MHz

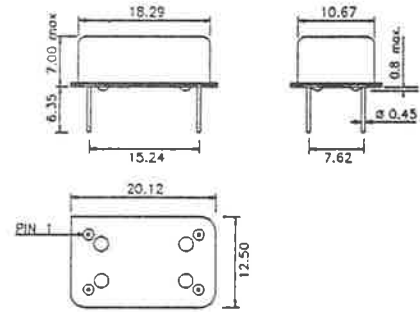
-STANDARD DIL 14 DESIGN

-LOW POWER

-GUARANTEED LONG TERM AGEING AND RELIABILITY THANKS TO A CRYSTAL PACKED INTO ITS OWN HERMETIC HOLDER

-WIDE TEMPERATURE RANGE

Function	pin
V control	1
GND	7
Output	8
Vcc	14



ELECTRICAL SPECIFICATIONS

supply voltage	5 V \pm 5%
supply current (no load), up to 25 MHz	\leq 10 mA
up to 50 MHz	\leq 30 mA
output load, up to 25/50 MHz	50/15 pF or 10 LSTTL
symmetry at 2.5 V	40/60...60/40 % max
rise/fall times (10 to 90%)	\leq 10 ns
high/low levels	\geq 4.5 V/ \leq 0.5 V
start up	\leq 10 ms @ 4.75 V

FREQUENCY STABILITY AND PULLING

model code	frequency stability (ppm) versus				pulling range (ppm)	control voltage (V)
	temperature range	@ 25°C	Vcc	load		
100B10	0 to 70°C \pm 10	\pm 10	\pm 2	\pm 1	$\geq \pm$ 100	0.5 to 5 center @ 2.5
100B15	0 to 70°C \pm 15					
100B25	0 to 70°C \pm 25					
100E25	-40 to 85°C \pm 25					
100E35	-40 to 85°C \pm 35					
100E50	-40 to 85°C \pm 50					
350B25	0 to 70°C \pm 25	\pm 20	\pm 5	\pm 1	$\geq \pm$ 350	0.5 to 10 center @ 4.25 F \geq 2 MHz
350B50	0 to 70°C \pm 50					
350E75	-40 to 85°C \pm 75					

input impedance : \geq 10 k Ω

pulling function : positive

ENVIRONMENTAL SPECIFICATIONS

storage temperature	-40 to 85°C
shocks (6 directions)	1000g, 0.2 ms, 1/2 sine
vibrations (3 axes)	20-2000 Hz, 20g

ORDERING CODE

type + frequency + model code

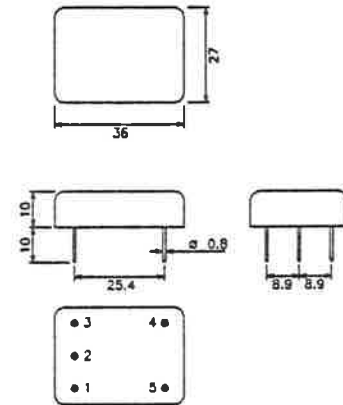
EXAMPLE : DFV 14-KH 34.368 MHz 100E25
 25.01.92

HIGH FREQUENCY VCXO CRYSTAL OSCILLATOR

TYPES : DFV 36-E 15 - 160 MHz

- GOOD STABILITY
- HIGH FREQUENCIES
- WIDE PULLING RANGES
- 10KH ECL OUTPUT
- GOOD PHASE NOISE
- LOW COST

Function	pin
V control	1
N.C.	2
GND	3
Output	4
Vee	5



ELECTRICAL SPECIFICATIONS

supply voltage	-5.2 V \pm 5 %
supply current (no load)	\leq 50 mA
output load	ECL 10KH (50 Ω to -2 V)
symmetry @ 50 % level	\leq 40/60...60/40 %
rise/fall times (20 to 80%)	\leq 2 ns
high/low levels	\geq -1.0 V / \leq -1.6 V
start up	\leq 10 ms @ 4.75 V
subharmonics and spurious	-35 dB below main mode
phase noise (1 Hz bandwidth)	- 55 dBc/Hz @ 10 Hz - 85 dBc/Hz @ 100 Hz -115 dBc/Hz @ 1 kHz

FREQUENCY STABILITY AND PULLING

model code	frequency stability (ppm) versus				pulling range (ppm)	control voltage (V)
	temperature range	@ 25°C	Vcc	load		
100B15	0 to 70°C \pm 15	\pm 10	\pm 2	\pm 1	\geq \pm 100	0 to -5 V
150B25	0 to 70°C \pm 25	\pm 10	\pm 2	\pm 1	\geq \pm 150	0 to -5 V
linearity or slope : \pm 20 %				pulling function : negative		
input impedance : \geq 10 k Ω				center voltage : -2.5 V		
modulation freq. : \geq 1 kHz @ -3 dB						

ENVIRONMENTAL SPECIFICATIONS

storage temperature	-40 to 85°C
shocks (6 directions)	100g, 6 ms, 1/2 sine
vibrations (3 axes)	10-55 Hz, 1.5 mm D.A., 2 hours

ORDERING CODE

type + frequency + model code

EXAMPLE : DFV 36-E 155.52 MHz 100B15

6TH SECTION

**SURFACE MOUNT CRYSTAL OSCILLATORS
 (SXO)
 SALES PROGRAM OVERVIEW**

MODEL	OUTPUT TYPE	FREQUENCY RANGE (MHz)	SUPPLY	TEMPERATURE AND STABILITY (°C) (ppm)	PACKAGE
DFN S1-KH	HCMOS	1 - 100	5 V 20-40 mA	0 - 70 ± 15 to 100 -40 - 85 ± 25 to 100 -55 - 125 ± 50 to 150	14.2x9.1x5 mm epoxy

Frequency stability includes 25°C calibration, temperature, Vcc, load and 1st year ageing at 25°C.

F ≥ 80 MHz (HCMOS) only available over 0 to 70°C range.

OPTIONS : -tighter duty cycle up to 35 MHz
 -enable/disable
 -screening to MIL-STD-883/MIL-O-55310

