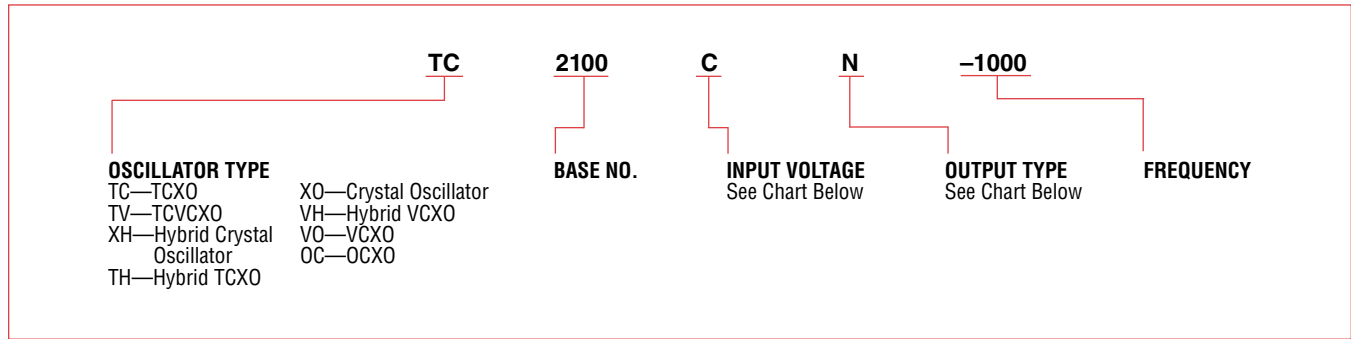


OSCILLATORS

CRYSTAL OSCILLATORS

INTRODUCTION AND STANDARDS

PART NUMBERING SYSTEM



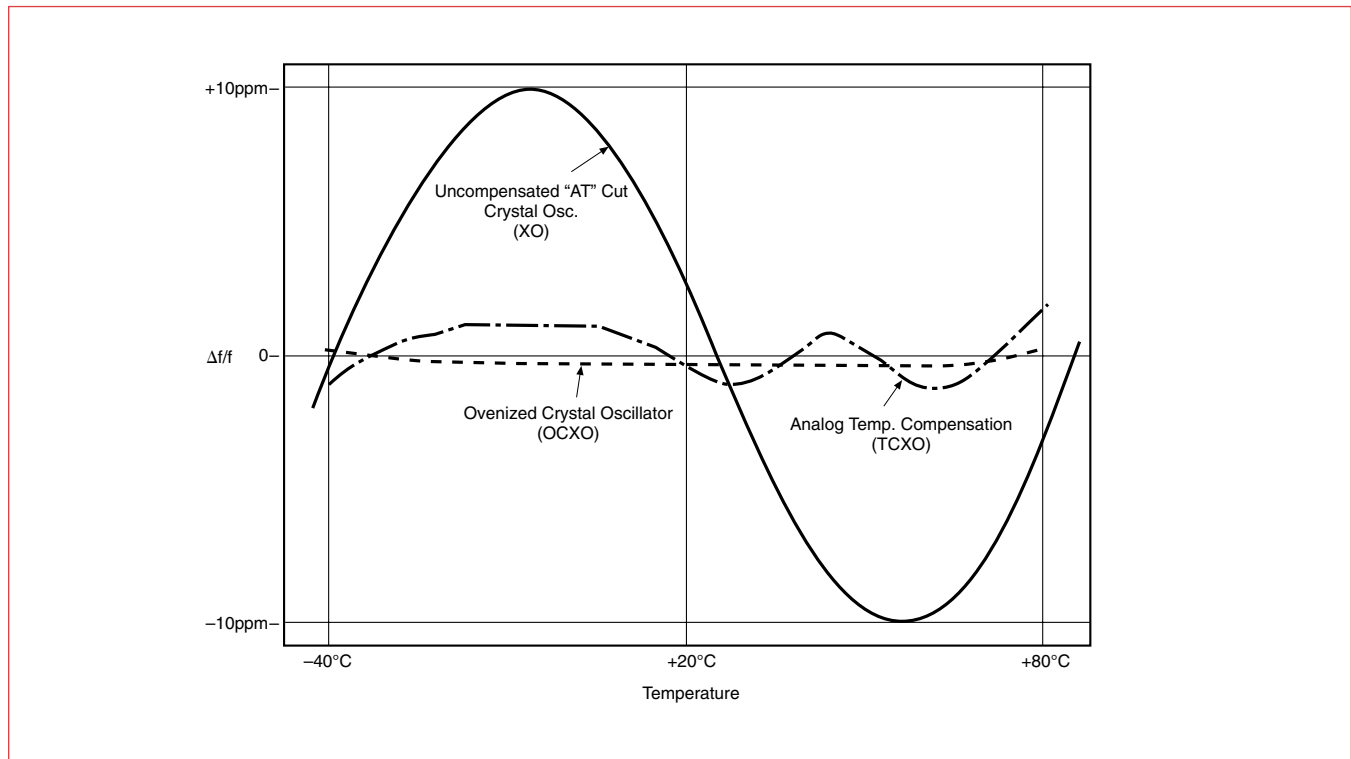
INPUT VOLTAGE (±5% TOLERANCE STANDARD)

A	+5.0VDC
B	+7.5VDC
C	+10.0VDC
D	+12.0VDC
E	+15.0VDC
F	+3.3VDC
G	-5.0VDC
H	-5.2VDC
J	-12.0VDC
K	-4.5VDC
L	+4.0VDC

OUTPUT TYPE

T	TTL
C	CMOS
H	CMOS/TTL Compatible
E	ECL "10KH"
F	ECL "100K"
G	SINE, 0dBm, 50Ω LOAD
J	SINE, +3dBm, 50Ω LOAD
K	SINE, +7dBm, 50Ω LOAD
L	SINE, +10dBm, 50Ω LOAD
M	SINE, +13dBm, 50Ω LOAD
N	SINE, 1V _{p-p} , 1kΩ LOAD
P	0dBm min., 50Ω LOAD
V	PECL
Z	CML

RELATIVE FREQUENCY STABILITY OF TYPICAL CRYSTAL OSCILLATOR TYPES



OSCILLATORS

CRYSTAL OSCILLATORS

OEXO MINIATURE OSCILLATORS



SPECIFICATIONS

MODEL	OC2545-DT
Features	Low cost High stability Low phase noise Small package
Frequency Range	5MHz to 20MHz
Input Voltage and Power	+12VDC @ 250mA max. (90mA Typ. after warm up)
Output Type	TTL 50/50 duty cycle
Electronic Freq. Control: Freq. vs. Voltage	±4ppm min., 0 to +6VDC
*Temperature Stability	±0.2ppm Typ., 0°C to +50°C
Aging	0.3ppm/Yr.
Package	35.30 x 26.93 x 25.40

*Other temperature ranges and stabilities available.

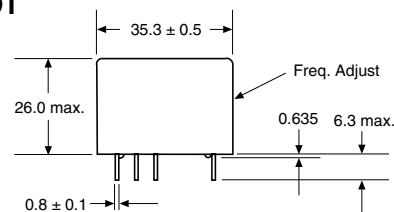


SPECIFICATIONS

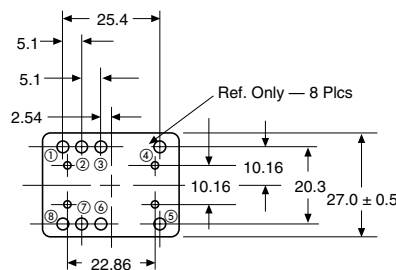
MODEL	OC2541-DT
Features	Very low cost for High stability "SC" cut osc. Low phase noise Small package
Frequency Range	5MHz to 20MHz
Input Voltage and Power	+12VDC @ 250mA max. (90mA Typ.)
Output Type	TTL 50/50 duty cycle
Electronic Freq. Control: Freq. vs. Voltage	±1ppm min., 0 to +10VDC
*Temperature Stability	±0.02ppm Typ., 0°C to +50°C
Aging	0.15ppm/Yr.
Package	35.30 x 26.93 x 25.40

*Other temperature ranges and stabilities available.

OC2545-DT

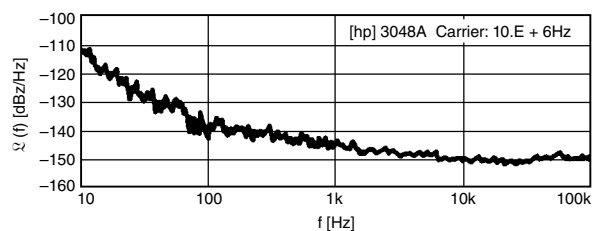


PIN	FUNCTION
1	Output
2	N/C
3	N/C
4	Ground
5	N/C
6	Freq. Control Voltage
7	N/C
8	+12V

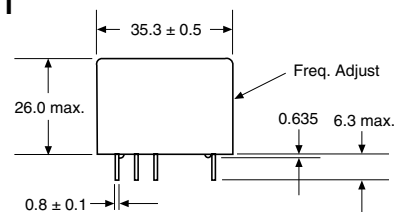


Dimensions: mm

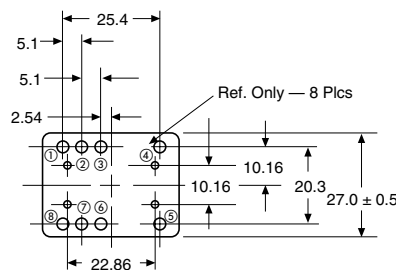
OC2545-DT



OC2541-DT

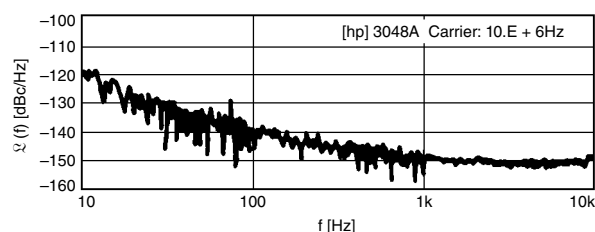


PIN	FUNCTION
1	Output
2	N/C
3	N/C
4	Ground
5	N/C
6	Freq. Control Voltage
7	N/C
8	+12V



Dimensions: mm

TYPICAL PHASE NOISE CHARACTERISTICS – OC2541-DT



OSCILLATORS

OVENIZED OSCILLATORS – EUROPEAN STANDARD PACKAGE

OCXO LOW PROFILE CRYSTAL OSCILLATORS

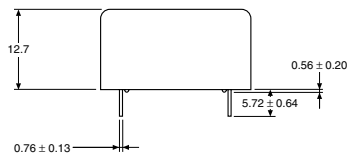


SPECIFICATIONS

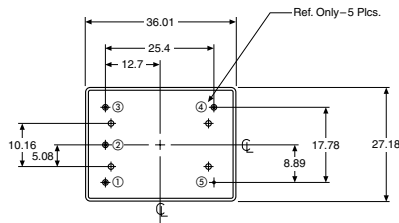
MODEL	OC2644	
Features	“AT” or “SC” cut crystal Low profile	
Frequency Range	5MHz to 25MHz	
Input Voltage	12 Volts/5 Volts	
Output Type	Sine Wave/CMOS	
Electronic Freq. Control	±2.0ppm	
*Temperature Stability	±20ppb @ -30 to 70°C	±15ppb @ 0° to 60°C
Aging	-.10ppm/Yr. -1ppb/Day	
Power Consumption	- Warm-up +5.0 Watts Max. - Stabilized +1.5 Watts Max.	

*Other temperature ranges and stabilities available.

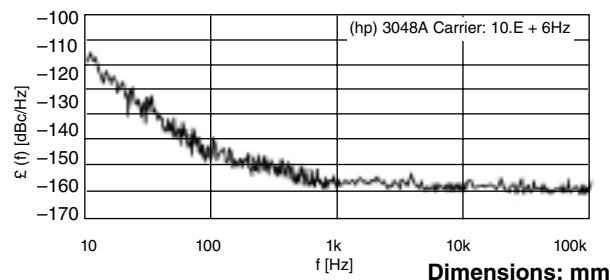
OC2644



PIN	FUNCTION
1	Control Voltage
2	Ref. Voltage
3	Supply Voltage
4	RF Output
5	Ground



TYPICAL PHASE NOISE (OC2644)



OSCILLATORS

OVENIZED OSCILLATORS – 4-PIN DIP OCXO

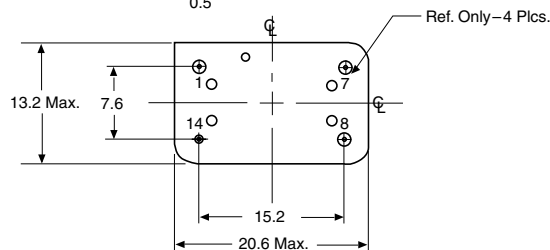
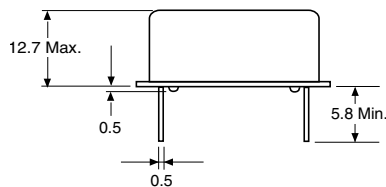
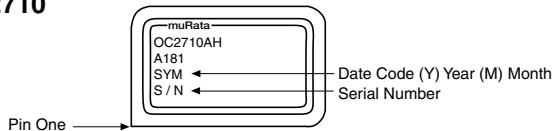
NEW



SPECIFICATIONS

MODEL	OC2710	
Features	“AT” or “SC” cut crystal Low profile/Low power	
Frequency Range	5MHz to 50MHz	
Input Voltage	12 Volts/5 Volts/3.3	
Output Type	Sine Wave/CMOS	
Electronic Freq. Control	±5.0ppm min.	
*Temperature Stability	±300ppb @ -30 to 70°C	±100ppb @ 0° to 60°C
Aging	4×10^{-6} for 10 years	

OC2710



PIN	CONNECTIONS
1	Vc
7	+5V
8	RF Output
14	Case Ground

Dimensions: mm

NEW

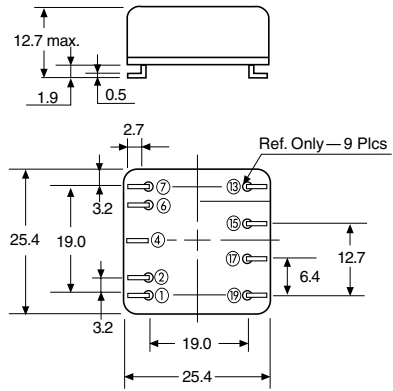
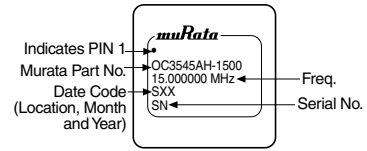


SPECIFICATIONS

MODEL	OC3545	
Features	"AT" or "SC cut crystal Low profile, surface mount	
Frequency Range	4.8MHz to 40MHz	
Input Voltage	12 Volts/5 Volts/3.3	
Output Type	Sine Wave/CMOS	
Electronic Freq. Control	±1.0ppm	
*Temperature Stability	20ppb@ -30°C to +70°C	10ppb @ 0°C to 50°C
Aging	.15ppm/Yr.	

*Other temperature ranges and stabilities available.

OC3545



PIN	CONNECTIONS
1	RF Output
2	N/C
4	GND
6	N/C
7	EFC
13	Rev. Volt Output
15	N/C
17	N/C
19	+5 Volt Supply

Dimensions: mm

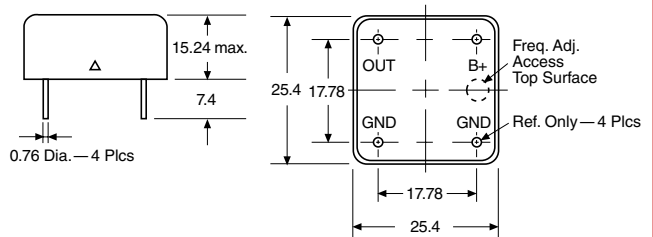
HIGH STABILITY CRYSTAL OSCILLATORS



SPECIFICATIONS

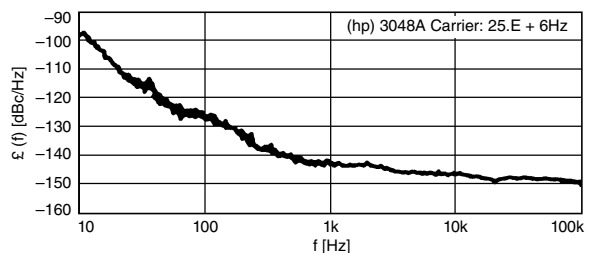
MODEL	TC2110	
Features	High stability	
Frequency Range	5MHz to 30MHz	
Frequency Stability vs. Temperature Range	±1ppm -40°C to +85°C	
Input Voltage and Current	+5VDC @ 20mA max.	
Output Types	Clipped Sine Wave, Sine Wave, CMOS	
Aging Rate	±1ppm/Yr.	
Frequency Adjustment	Mechanical; 10 Yr. Range min.	
Package	25.40 X 25.40 X 15.24mm	

TC2110



Dimensions: mm

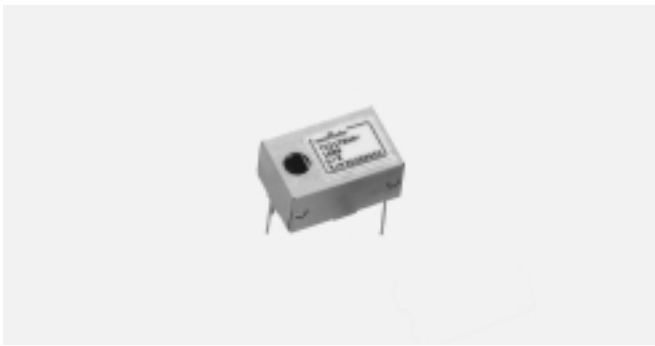
TYPICAL PHASE NOISE (TC2110)



OSCILLATORS

CRYSTAL OSCILLATORS

HIGH STABILITY CRYSTAL OSCILLATORS



SPECIFICATIONS

MODEL	TC2178 AN
Features	High stability
Frequency Range	5MHz to 155MHz
*Frequency Stability vs. Temperature Range	±1ppm -40°C to +85°C
Input Voltage and Current	+5VDC, ±5% @ 2mA max.
Output Types	Clipped Sine Wave, Sine Wave, CMOS
Load	1kΩ//10pF
Aging Rate	±1ppm/Yr., ±5ppm/10Yrs.
Frequency Adjustment	TC2178 Mech.; 5 Yr. Range Min.
Package	TC2178AN – 11.71 x 18.30 x 9.00

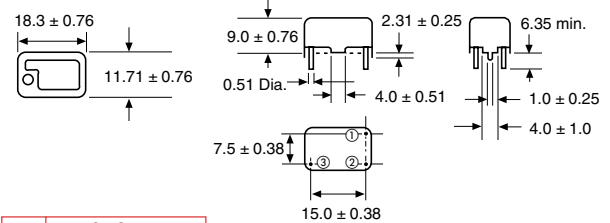
*Other temperature ranges and stabilities available.



SPECIFICATIONS

MODEL	TV2178
Features	High Stability
Frequency Range	5.0MHz to 155MHz
Input Voltage and Current	+5.0VDC, ±5% @ 2mA max.
Output Types	Clipped Sine Wave, Sine Wave, CMOS
Load	1kΩ // 10pF
Frequency Adj.	Mechanical; 5 Yr. Range min.
Electronic Freq. Control: Control Voltage and Deviation	2.5V ±2V, ±6ppm min.
Frequency Stability	vs. Temperature ±1ppm, -40°C to +85°C vs. Supply Voltage ±0.08ppm, (+5.0VDC, ±5%)
Aging	±1.0ppm/1 Yr., ±5ppm/10 Yr.
Package	11.71 x 18.30 x 9.00

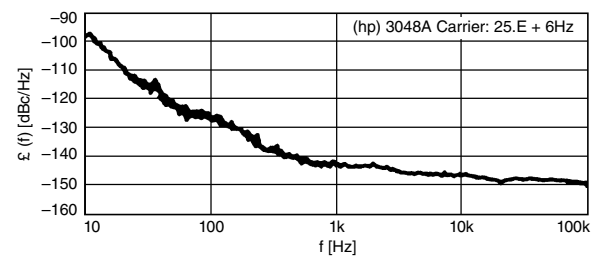
TC2178



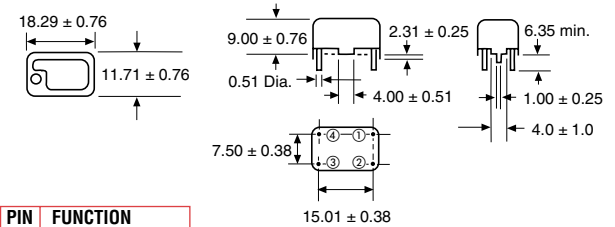
PIN	FUNCTION
1	Common and Case
2	Output
3	+Vcc

Dimensions: mm

TYPICAL PHASE NOISE (TC2178)



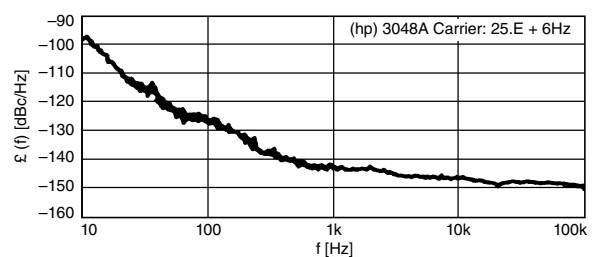
TV2178



PIN	FUNCTION
1	Common and Case
2	Output
3	+Vcc
4	+Vc Input

Dimensions: mm

TYPICAL PHASE NOISE (TV2178)



OSCILLATORS

CRYSTAL OSCILLATORS—SURFACE MOUNT

TCXO HIGH STABILITY CRYSTAL OSCILLATORS

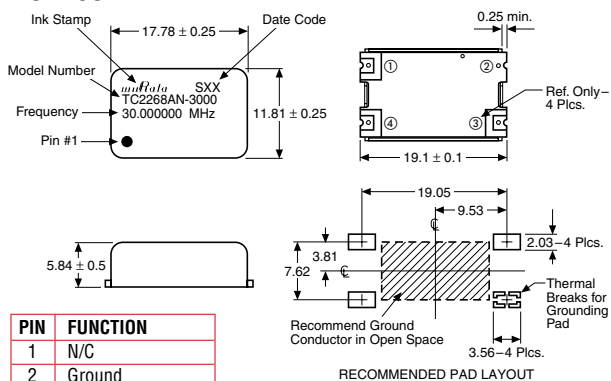


SPECIFICATIONS

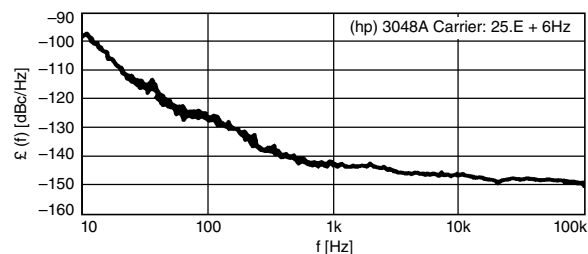
MODEL	TC2268
Features	High stability
Frequency Range	5MHz to 155MHz
*Frequency Stability vs. Temperature Range	±1ppm -40°C to +85°C
Input Voltages and Current	+3.3VDC/+5VDC, ±5% @ 2mA max.
Output Types	Sine Wave, CMOS
Aging Rate	4ppm for 10 years
Environmental	IR reflow capable

*Other temperature ranges and stabilities available.

TC2268



TYPICAL PHASE NOISE



VCXO HIGH STABILITY CRYSTAL OSCILLATORS

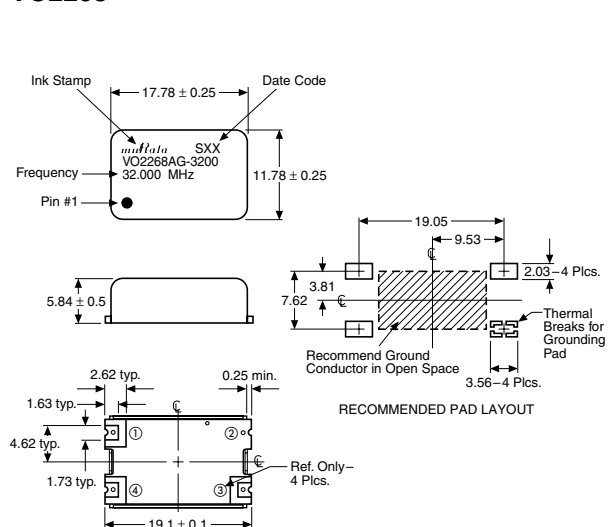


SPECIFICATIONS

MODEL	VO2268
Features	Surface mount
Frequency Range	5MHz to 155MHz
*Temperature Stability	±30ppm @ -40°C to +85°C
Output Types	Clipped Sine/Sine Wave/CMOS
Electronic Frequency Range	±40ppm
Aging Rate	±1ppm/Yr., ±5ppm/10Yrs.
Environmental	IR reflow capable

*Other temperature ranges and stabilities available.

VO2268



PIN	FUNCTION
1	EFC
2	Ground
3	Output Signal
4	Supply Voltage

Dimensions: mm

OSCILLATORS

CRYSTAL OSCILLATORS

SONET CRYSTAL OSCILLATORS



SPECIFICATIONS

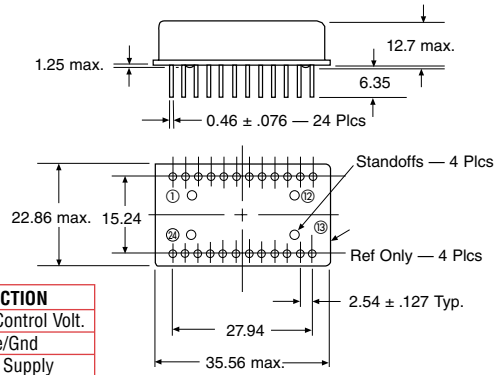
MODEL	TV2363-1
Features	Designed for Sonet Standard STS/OC-3
Frequency Range	155.52MHz
Input Voltage & Current	-4.5VDC @50mA Nominal +12VDC @20mA max.
Output Type	100K ECL- Complementary Outputs; Phase Jitter: 64pS p-p Output Skew: 100pS max.
Control Voltage and Freq. vs. Voltage Slope	0 ± 8V Negative
AFC Input Impedance	10kΩ min.
Linearity	±20%
Deviation	±40 to ±60ppm
Temp. Stability	±5ppm
Temp. Range	-40°C/+85°C



SPECIFICATIONS

MODEL	VH2359
Features	Designed for Sonet Standard STS/OC-3
Frequency Range	155.52MHz
Input Voltage & Current	5V @ 60mA Nominal
Output Type	ECL in PS Lite Complementary Outputs; Phase Jitter: 64pS p-p Output Skew: 100pS max.
Control Voltage and Freq. vs. Voltage Slope	0 to 5V Positive
AFC Input Impedance	50kΩ min.
Linearity	±20%
Deviation	±70 to ±140ppm
Temp. Stability	±20ppm
Temp. Range	0°C to +70°C

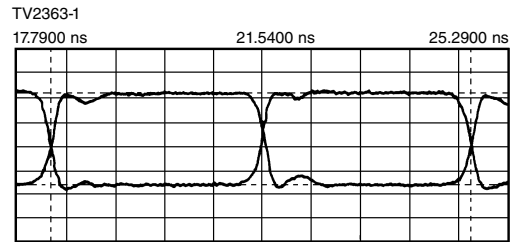
TV2363-1



PIN	FUNCTION
1	VC Control Volt.
2,8,10,12	Case/Gnd
9	VS2 Supply Volt. (+12V)
11	VS1 Supply Volt. (-4.5V)
14	Output Signal
16	Complementary Output Signal
13,15,17	Case/Gnd
Others	N/C

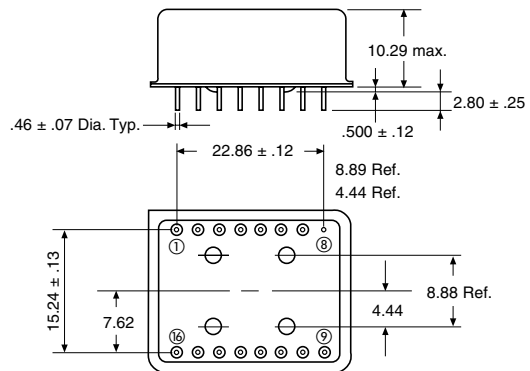
Dimensions: mm

100K ECL COMPLEMENTARY OUTPUT CHARACTERISTICS



Ch. 1 = 200.0 mVolts/div
Delta V = 768.75 mVolts
Timebase = 750 ps/div

VH2359



PIN	CONNECTION
6	Vin Control
8	Case/Gnd
9	Output 1
10	Output 2
16	+Vcc

Dimensions: mm

OSCILLATORS

CRYSTAL OSCILLATORS

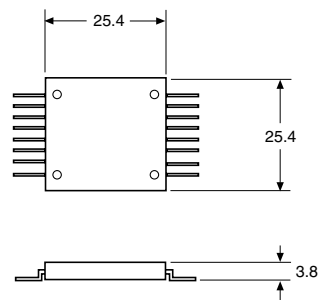
SONET CRYSTAL OSCILLATORS



SPECIFICATIONS

MODEL	VH1011
Center Frequency	150MHz to 650MHz
Deviation	±40 ppm min.
Control Voltage (AFC)	0 to -5v Negative Slope
AFC Input Impedance	10kΩ min.
Tuning Voltage Sensitivity (Kv)	20 ppm/volt to 30 ppm/volt
Stability	±15 ppm
Aging	Less than 1ppm/year
Output Level	Complementary ECL
Power Requirement	-5.0 volts @ 60 mA
Operating Temperature	0°C to +85°C

VH1011



PIN	FUNCTION
1	Tuning Voltage
2-7	Ground
8, 9	V _{EE}
10, 11	Ground
12	ECL Output
13	Ground
14	ECL Output Complement
15	Ground
16	Ground

Dimensions: mm

OSCILLATORS

CRYSTAL OSCILLATORS

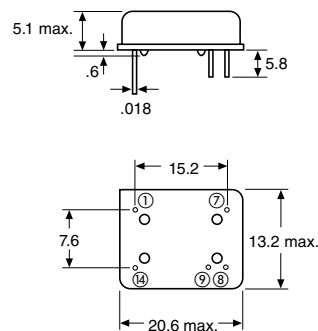
VCXO



SPECIFICATIONS

MODEL	V02386AV
Features	Designed for Sonet Standard STS/OC-3
Frequency Range	10MHz to 155.52MHz
Input Voltage & Current	5V @ 64mA Nominal
Output Type	PECL Complementary Outputs: Output Skew: 100pS max.
Control Voltage and Freq. vs. Voltage Slope	0 to 5V Positive
AFC Input Impedance	50kΩ min.
Linearity	±25 to 50ppm/volt
Deviation	±60 to ±115ppm
Temperature Stability	±20ppm
Temperature Range	0°C to +85°C

V02386



PIN	FUNCTION
1	V _c , Control Voltage
7	Ground, Case/Ground
8	Q ₁ Output Signal
9	Q ₂ Complementary Output Signal
14	V _{cc}

Dimensions: mm

OSCILLATORS

CRYSTAL OSCILLATORS

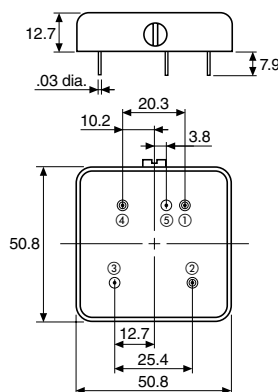
DIGITALLY COMPENSATED OSCILLATORS



SPECIFICATIONS

MODEL	DC2301
Features	High Stability/Low Power Consumption
Frequency Range	5MHz to 20MHz
Frequency Stability	±.2ppm
Frequency Adjustment	Electrical or Mechanical
Supply Voltage	5.0 volts ±5%
Supply Current	35mA max.
Output Types	Sine Wave or CMOS
Spurious	-80dBc max.
Phase Noise	-70dBc @ 10Hz
	-100dBc @ 100Hz
	-120dBc @ 1kHz
	-140dBc @ 10kHz to 100MHz
Aging	Less than 1ppm/year

DC2301



PINS	CONNECTIONS
1	Output
2	Serial I/O
3	GND
4	+5
5	GND

Dimensions: mm

TEMPERATURE CHARACTERISTIC (DC2301DT-1000)

