

SAMSUNG PRODUCTS

1. SMD Quartz Crystal Units

- . 6035 Type**
- . 5032 Type**
- . 4729 Type**
- . Tuning Fork 5018 Type**

2. SMD Crystal Clock Oscillator

3. SMD Voltage controlled crystal oscillator

2001

SAMSUNG ELECTRO-MECHANICS CO., LTD

Electronic Devices Business

Function Devices Division

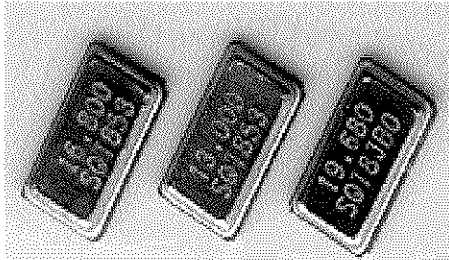
Crystal Team

1. SMD Quartz Crystal Units

PRODUCT LIST	TYPE	CL (pF)	R.T (±ppm)	T.C(±ppm) -10~60℃	C.I (Ohm)	D/L	Applications
10.368 MHz	6035	12,16	10	10	45	50 μ N	DECT
12.000 MHz	6035	20	20	20	45	50 μ N	MP-3
13.000 MHz	6035,5032	10,13	10	8	35	20 μ N	GSM
13.516 MHz	6035	20	20	15	45	50 μ N	MP-3
13.824 MHz	6035	20	20	20	40	50 μ N	DECT
14.725 MHz	6035	20	20	15	45	50 μ N	MP-3
14.7456 MHz	6035	20	20	15	45	50 μ N	MP-3
16.000 MHz	6035,5032	20	10	10	30	50 μ N	Bluetooth
16.800 MHz	6035	10	10	8	32	20 μ N	TDMA
19.680 MHz	6035,5032	10,13	10	8	30	20 μ N	PCS,CDMA
20.000 MHz	6035	18	20	20	30	100 μ N	Smart Card
26.000 MHz	6035,5032	9,13	10	8	35	100 μ N	GSM
32.000 MHz	6035	9	10	10	30	50 μ N	Bluetooth
44.000 MHz	6035	18	10	10	30	50 μ N	DECT
12.600 MHz	4729	10	10	10	40	20 μ N	TCXO
13.000 MHz	4729	10	10	10	40	20 μ N	TCXO
14.400 MHz	4729	10	10	10	40	20 μ N	TCXO
19.200 MHz	4729	10	10	10	30	20 μ N	TCXO
19.680 MHz	4729	10	10	10	30	20 μ N	TCXO
19.800 MHz	4729	10	10	10	30	20 μ N	TCXO
32.768 KHz	5018	9	30	-	80 k Ω	1.0 μ N	CDMA,GSM

SMD Quartz Crystal Units

SQ6U Series



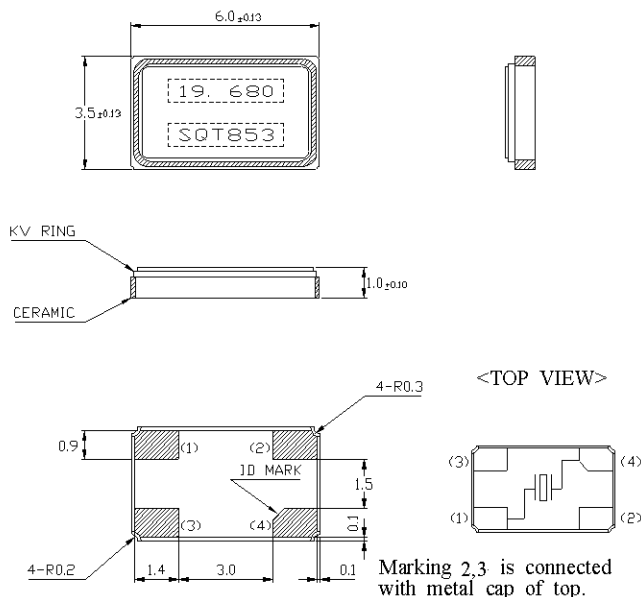
FEATURES

- High density surface mounting type with small and thin (Height:1.0mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Seam Sealing Type
- Reflow soldering

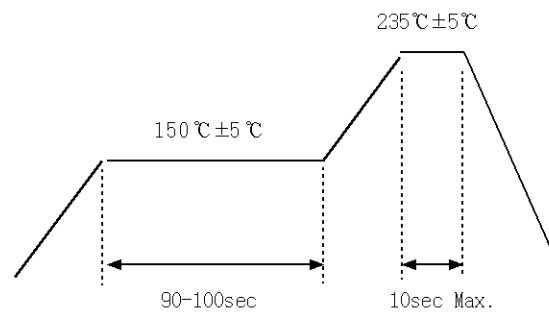
SPECIFICATIONS

ITEM	TYPE	SQ6U	
Frequency Range		10 ~ 45MHz	
Mode of Operation		Fundamental	
Load Capacitance		Series	
Drive Level		20 μ W(300 μ W max.)	
Frequency Tolerance		\pm 10ppm, \pm 20ppm, \pm 30ppm	
Equivalent Series Resistance		50 Ω max	50 Ω max
Frequency Temp. Stability		\pm 5ppm, \pm 10ppm, \pm 20ppm, \pm 30ppm	
Operating Temp. Range		-20 $^{\circ}$ C ~ +70 $^{\circ}$ C	
Storage Temp. Range		-40 $^{\circ}$ C ~ +85 $^{\circ}$ C	

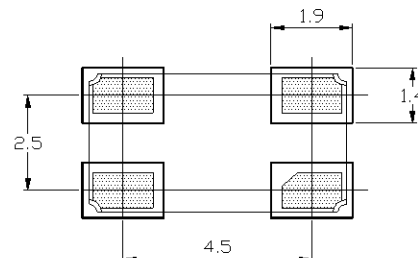
DIMENSIONS(mm)



REFLOW CONDITION(EXAMPLE)

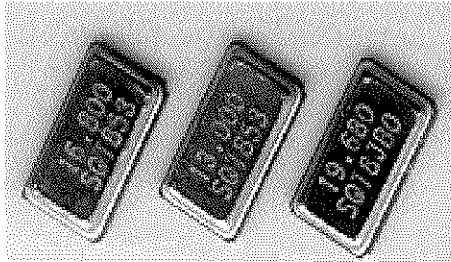


LAND PATTERN LAYOUT(EXAMPLE)



SMD Quartz Crystal Units

SQ5U Series



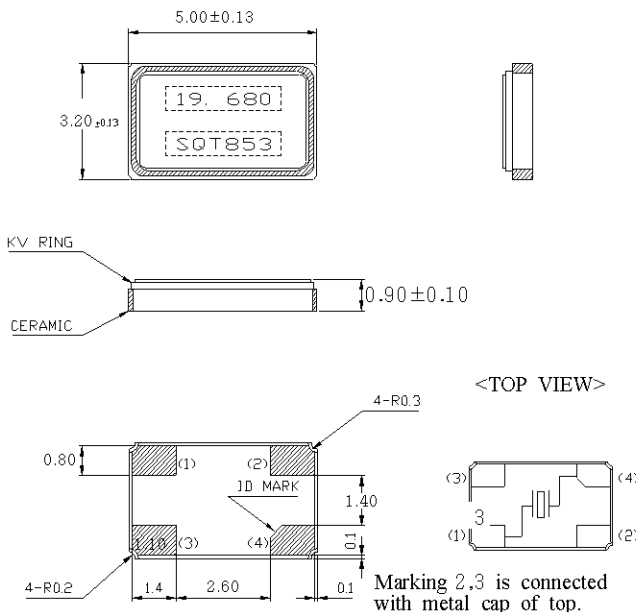
FEATURES

- High density surface mounting type with small and thin (Height:1.00mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Seam Sealing Type
- Reflow soldering

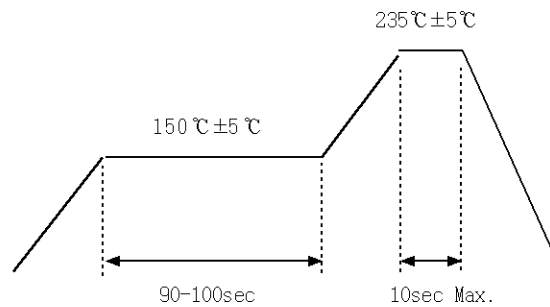
SPECIFICATIONS

ITEM	TYPE	SQ5U
Frequency Range		12.800 ~ 45.000MHz
Mode of Operation		Fundamental
Load Capacitance		Series, 10pF, 13pF
Drive Level		20 μ W(300 μ W max.)
Frequency Tolerance		\pm 10ppm, \pm 20ppm, \pm 30ppm
Equivalent Series Resistance		50 Ω max
Frequency Temp. Stability		\pm 5ppm, \pm 10ppm, \pm 20ppm, \pm 30ppm
Operating Temp. Range		-10 $^{\circ}$ C ~ +60 $^{\circ}$ C
Storage Temp. Range		-30 $^{\circ}$ C ~ +85 $^{\circ}$ C

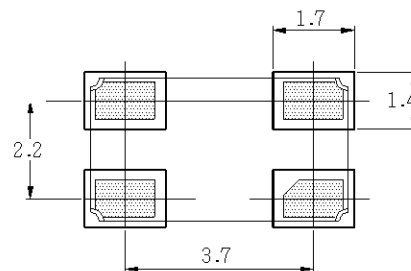
DIMENSIONS(mm)



REFLOW CONDITION(EXAMPLE)

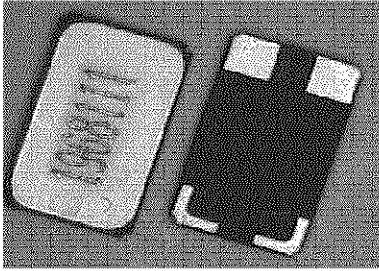


LAND PATTERN LAYOUT(EXAMPLE)



SMD Quartz Crystal Units

SQ4U Series



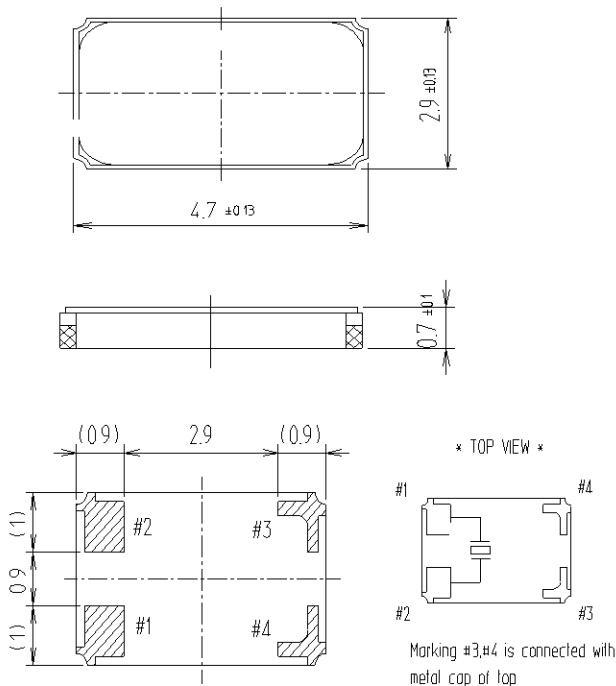
FEATURES

- High density surface mounting type with small and thin (Height:0.70mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Au-Sn Sealing Type
- Reflow soldering

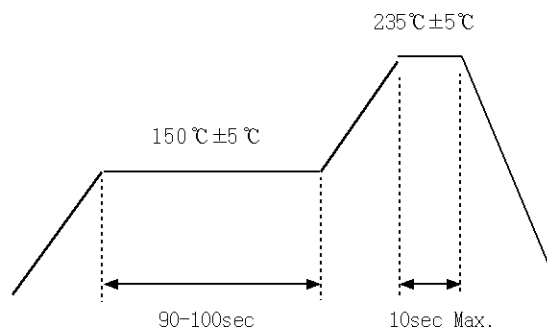
SPECIFICATIONS

ITEM	TYPE	SQ4U
Frequency Range		16.000 ~ 40.000MHz
Mode of Operation		Fundamental
Load Capacitance		Series
Drive Level		20 μ W(300 μ W max.)
Frequency Tolerance		\pm 10ppm, \pm 20ppm, \pm 30ppm
Equivalent Series Resistance		50 Ω max
Frequency Temp. Stability		\pm 5ppm, \pm 10ppm, \pm 20ppm, \pm 30ppm
Operating Temp. Range		-10 $^{\circ}$ C ~ +60 $^{\circ}$ C
Storage Temp. Range		-30 $^{\circ}$ C ~ +85 $^{\circ}$ C

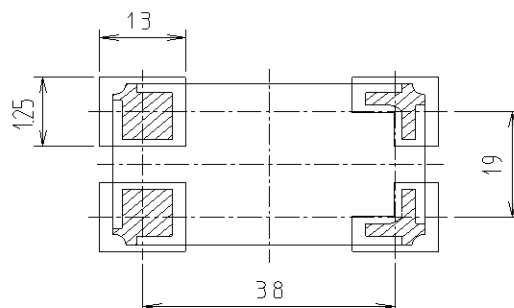
DIMENSIONS(mm)



REFLOW CONDITION(EXAMPLE)

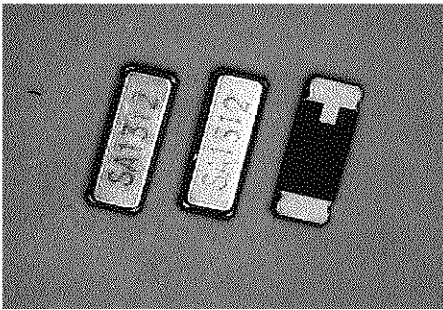


LAND PATTERN LAYOUT(EXAMPLE)



SMD Quartz Crystal Units

SQ2F Series



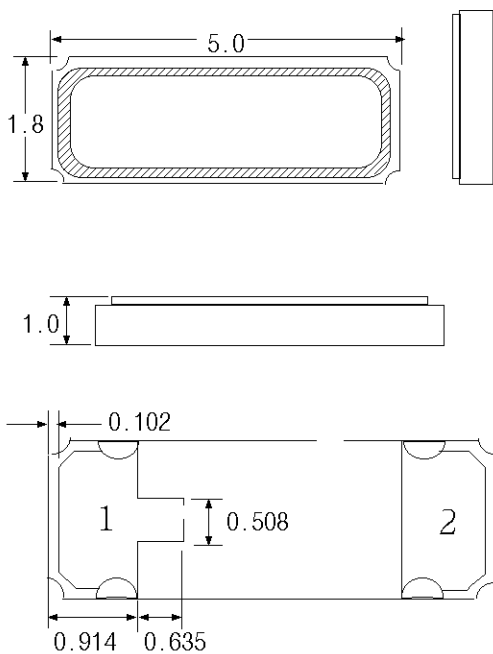
FEATURES

- High density surface mounting type with small and thin (Height:1.00mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Au-Sn Sealing Type
- Reflow soldering

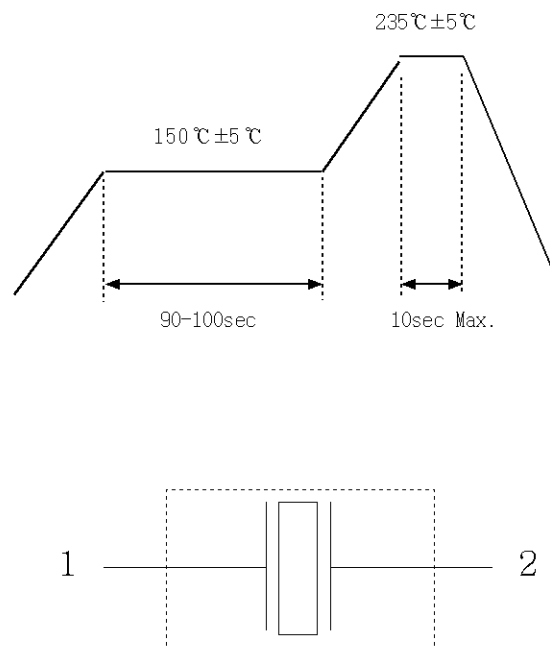
SPECIFICATIONS

ITEM	TYPE	SQ2F
Nominal Frequency		32.768KHz
Mode		Fundamental
Load Capacitance		9pF
Drive Level		1.0μW Max
Frequency Tolerance		±50ppm, ±100ppm
Series resistance		Typ.50kΩ/Max.80 kΩ
Frequency temp. characteristics		-0.04ppm/°C ² max.
Operating Temp. Range		-40°C ~ +85°C
Storage Temp. Range		-50°C ~ +125°C

DIMENSIONS(mm)



REFLOW CONDITION(EXAMPLE)



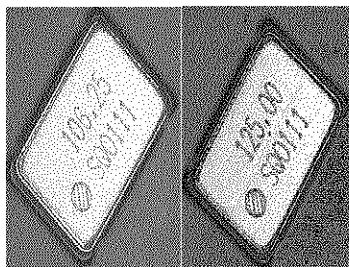
2. SMD Crystal Clock Oscillator



PRODUCT LIST	TYPE	VDD	OUTPUT LEVEL	R.T/TC (ppm)	SYMMETRY (%)	Remarks
14.318 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
20.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
24.704 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
25.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
28.704 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
32.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
33.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
40.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
44.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
50.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
60.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
80.000 MHz	7050	3.3V,5V	H CMOS	± 100	60/40	
106.25 MHz	7050	3.3V	H CMOS	± 100	60/40	
125.00 MHz	7050	3.3V	H CMOS	± 100	60/40	
133.00 MHz	7050	3.3V	H CMOS	± 100	60/40	
155.52 MHz	7050	3.3V	H CMOS	± 100	60/40	

SMD CRYSTAL OSCILLATORS

SQ70 Series



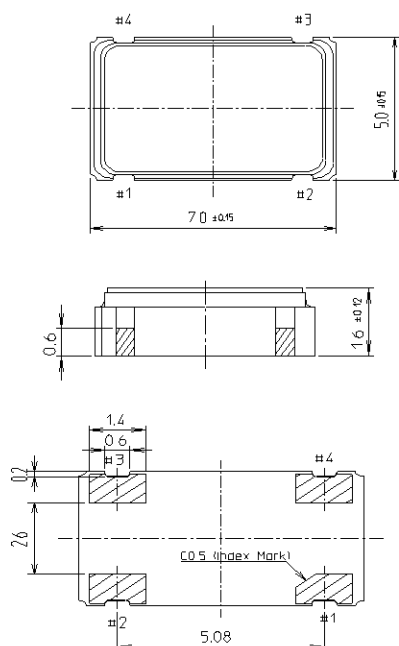
FEATURES

- High density surface mounting type with small and thin (Height:1.60mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Low current consumption
- Reflow soldering

SPECIFICATIONS

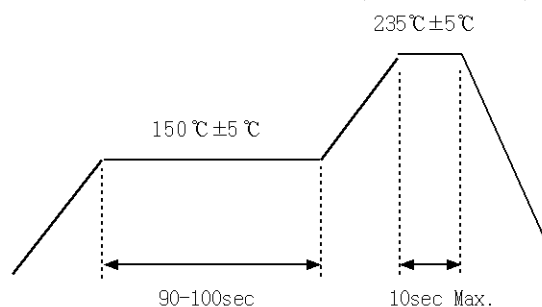
ITEM	TYPE	SQ70			
Frequency Range		1.0 ~ 40.0MHz		30.0 ~ 156.0MHz	
Output Level		CMOS		CMOS	
Supply Voltage		3.3V ± 10%	5.0V ± 10%	3.3V ± 10%	5.0V ± 10%
Frequency Stability (Inc)		±25ppm, ±50ppm, ±100ppm		±25ppm, ±50ppm, ±100ppm	
Current Consumption		50mA Max		100mA Max	
Tr / Tf Max		10ns Max		10ns Max	
Duty Cycle		50 ± 10%		50 ± 10%	
Standby Function		Tri-state		Tri-state	
Output Load		15pF		15pF	
Operating Temp. Range		-20°C ~ +70°C		-20°C ~ +70°C	
Storage Temp. Range		-40°C ~ +85°C		-40°C ~ +85°C	

DIMENSIONS(mm)

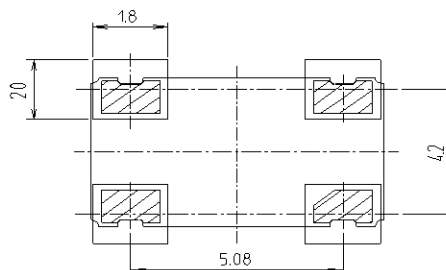


#1 : CONT
#2 : Vss
#3 : OUT
#4 : Vdd

REFLOW CONDITION(EXAMPLE)



LAND PATTERN LAYOUT(EXAMPLE)



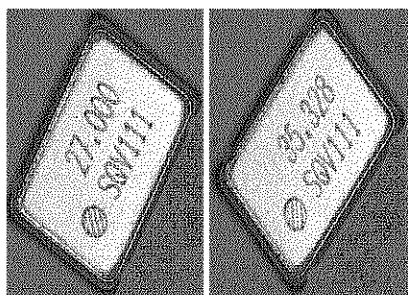
3. SMD Quartz Crystal Vcxo



PRODUCT LIST	TYPE	VDD	OUTPUT LEVEL	R.T/TC Pull(ppm)	SYMMETRY (%)	Remarks
27.000 MHz	7050	3.3V,5V	H CMOS	50/100	60/40	
35.328 MHz	7050	3.3V,5V	H CMOS	50/100	60/40	

SMD CRYSTAL VCXO

SQ7V Series



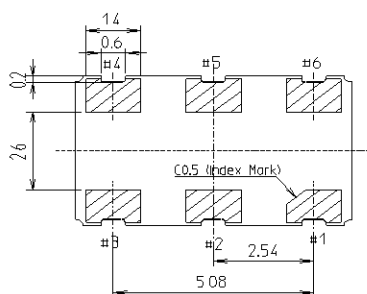
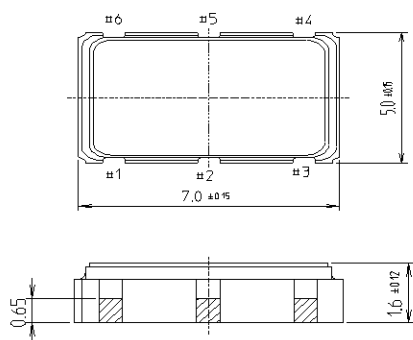
FEATURES

- High density surface mounting type with small and thin (Height:1.60mm) features.
- High accuracy characteristics can be maintained to meet wide frequency range.
- Used with highly reliable ceramic package to provide superior environmental characteristics.
- Low current consumption
- Reflow soldering

SPECIFICATIONS

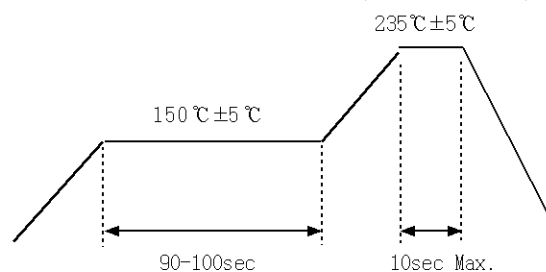
ITEM	TYPE	SQ7V
Standard Frequency	27.000MHz	35.328MHz
Output Level	CMOS / 15pF Load	CMOS / 15pF Load
Supply Voltage Range	3.3V ± 10%	3.3V ± 10%
Control Voltage Range	+1.65 ± 1.65Vdc	+1.65 ± 1.65Vdc
Frequency Stability	±25ppm, ±50ppm, ±100ppm	±25ppm, ±50ppm, ±100ppm
Current Consumption	50mA Max	50mA Max
Tr / Tf Max	10ns Max	10ns Max
Duty Cycle	50 ± 10%	50 ± 10%
Standby Function	Tri-state	Tri-state
Pullability (Positive Slope)	± 50ppm, ± 100ppm, ± 150ppm	± 50ppm, ± 100ppm, ± 150ppm
Operating Temp. Range	-20°C ~ +70°C	-20°C ~ +70°C
Storage Temp. Range	-40°C ~ +85°C	-40°C ~ +85°C

DIMENSIONS(mm)

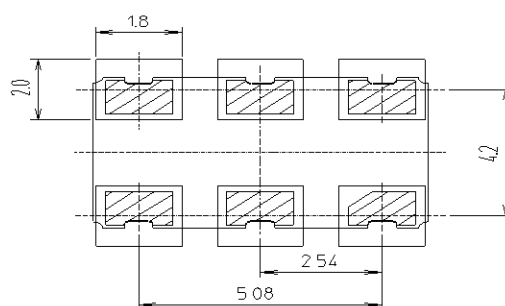


- #1 : Control Voltage
- #2 : Enable/Disable
- #3 : Ground
- #4 : Output
- #5 : No Connect
- #6 : Vcc

REFLOW CONDITION(EXAMPLE)



LAND PATTERN LAYOUT(EXAMPLE)



4. R&D Road Map

2001

ITEM	2001				2002
	1/4	2/4	3/4	4/4	
XTAL 6035	 TCXO, B/T, MP3		 3 rd OVER TONE		
XTAL 5032	 TCXO : 13.0, 19.68, 19.2M B/T, : 16.0, ., 32M				
XTAL 4729	 TCXO : 12.6, 14.4, 19.8, 19.2M				
XTAL L/C 5032	 M.P CLOCK : 24.576, 27.000, 28.636, 36.000M NOTE P.C : 14.318 MHz BLUE TOOTH : 16.0, 13.0, 32.0MHz				
XTAL 5018 T/FORK	 TIME CLOCK : 32.768 KHz				
OSC 7050	 LAN : 44.000MHz NOTE P.C : 14.318MHz		 HIGH FREQ. 100MHz OVER (106.25, 125.0, 135, 150MHz)		
VCXO 7050	 27.000 MHz 32.328 MHz		 HIGH FREQ. VCXO (50.0MHz OVER)		
OSC 5032	 B/T: 12.0, 13.0, 16.0, 26.0, 32.0MHz NOTE P.C : 14.318, 27.0.MHz				
XTAL 4025	 TCXO : 19.20, 19.68, 26.0, 32.0, 39.0 MHz				