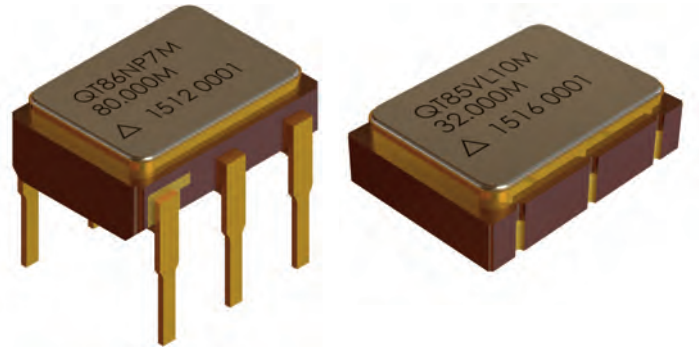
Description

Q-Tech's 5x7mm LVCMOS Voltage Controlled Crystal Oscillators consist of an IC operating at a supply voltage 3.3Vdc and a miniature strip quartz crystal that operates at the fundamental frequency. The series is offered in various ceramic package configurations from true Surface-Mount SMT to straight leads and formed leads. This is the smallest package offered with either a two-point crystal mount or a four-point for high shock and high reliability military applications.



(Sample part number)

Q T 85 V F L K M - 80.000MHz

Q	T	85	V	F	L	D	K	M	-	80.000MHz

Solder Dip Options
T = Standard
S = Sn60Pb40
G = SAC305

Package
86 = Leaded
87 = Formed Leads
80 = Formed Leads
85 = SMT

VCXO model

4-Point Mount
F = Four-point mount (High Shock)
Blank = Standard two-point mount

Logic
L = +3.3Vdc

Tristate
Blank = No T/S
D = Tristate options pin 2

Absolute Pull Range
Blank = ±30ppm
K = ±50ppm

Temperature code

1 =	0ºC	to	+70ºC
5 =	-20ºC	to	+70ºC
7 =	-40ºC	to	+85ºC
8 =	-40ºC	to	+105ºC

Screening Option:
Blank = No Screening
M = Screening per MIL-PRF-55310, Level B

Output Frequency

Features

- Made in the USA
- ECCN: EAR99
- Innovative Four Point Mount Strip Crystal Resonator option
- Broad Frequency Range, 16MHz to 125MHz
- Small Footprint
- LVCMOS output
- Operating Supply Voltage 3.3Vdc
- Wide Operating Temperature Range, -55°C to 105°C
- Option Enable/Disable (-D)
- Hermetically sealed package
- Fundamental Design allows low jitter performance
- Full or Partial Screening per MIL-PRF-55310, Level B
- High Shock Resistant Tested Up to 20,000g Mechanical Shock, Half-Sine, 0.3ms, All Axes with 4-point mount
- Low phase noise
- Optional Hot Solder Dip, Sn60Pb40 or SAC305
- RoHS Compliant

Applications

- ATM/SONET/SDH
- Missile Launch
- LAN/WAN data
- Test and Measurement
- Broadband access
- Ethernet, Gigabit Ethernet

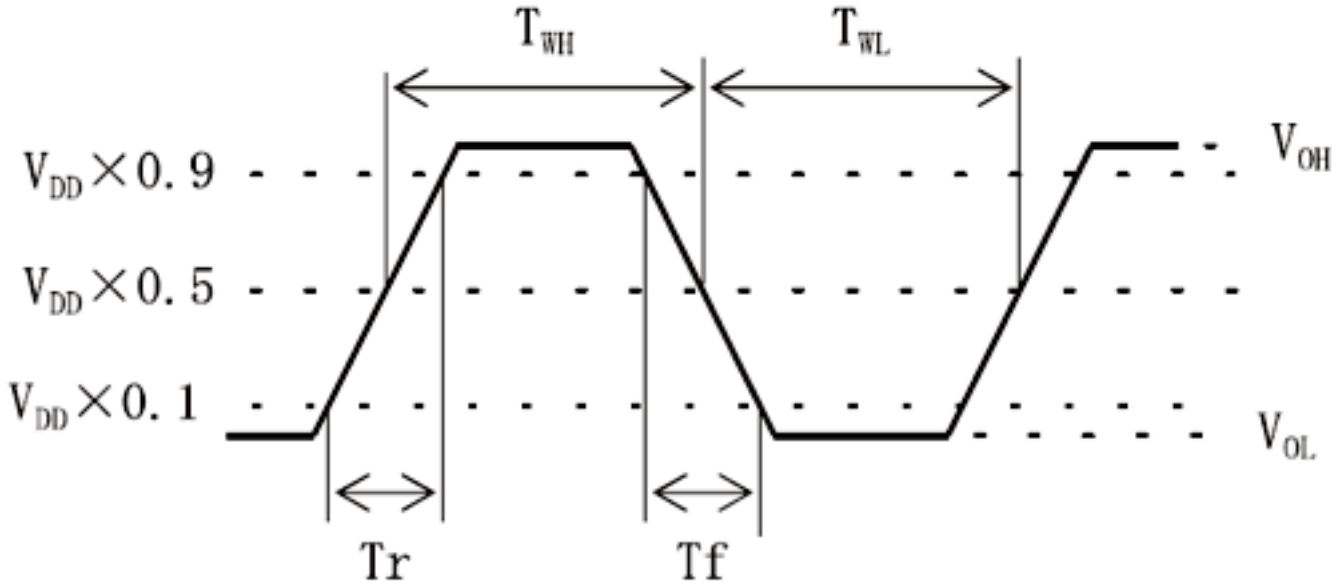
1/ Please contact Q-Tech for higher frequencies

Packaging Options

- Standard ESD packaging

TABLE I - ELECTRICAL CHARACTERISTICS

PARAMETERS	LIMITS	COMMENTS
Output Frequency Range (Fo)	16MHz – 125MHz	Consult Factory for Lower and Higher Frequencies
Supply Voltage (Vdd)	+3.3Vdc ± 5%	
Maximum Applied Voltage (Vdd max.)	+5Vdc	
Operating Temperature (Top)	See Ordering Information	
Storage temperature (Tsto)	-55°C to +125°C	
Supply current (Idd)	6mA Max. for 16MHz – <40MHz 10mA max. for 40MHz - <60MHz 15mA max. for 60MHz - <80MHz 20mA max. for 80MHz – 125MHz	No Load
Load	15pF	
Duty Cycle (Sym)	45/55% for 16MHz - <30MHz 40/60% for 30MHz – 125MHz	Measured at ½ waveform
Rise and Fall Times (Tr/Tf)	6ns max. for 16MHz – <40MHz 3ns max. for 40MHz – 125MHz	Measured Between 10% and 90% or 90% and 10% output waveform
Start-Up Time (Tstup)	10ms Max.	
Output Voltage High (VOH)	0.9*Vdd min.	
Output Voltage Low (VOL)	0.1*Vdd max.	
Enable/Disable	VIH ≥ 0.9Vcc Oscillation VIL ≤ 0.1Vcc Output Disabled	
Absolute Pull Range (APR)	±30ppm, ±50ppm	See ordering information
Linearity (Lin)	±10% max.	
Gain Transfer (Kv)	±60ppm/V to ±80ppm/V typ.	
Control Voltage Range (Vc)	0.3V to 3.0Vdc	
Modulation Bandwidth (BW)	10kHz min.	With Vc = 0.3V to 3.0V
Aging at +70°C ± 3°C	±5ppm First Year Max. ±2ppm Max. Each Year Thereafter	
Integrated Phase Jitter	1ps Max.	12kHz to 20MHz



$$Duty=\frac{T_{WH}}{T_{WH}+T_{WL}}\times 100\%$$

FIGURE 1 – OUTPUT WAVEFORM

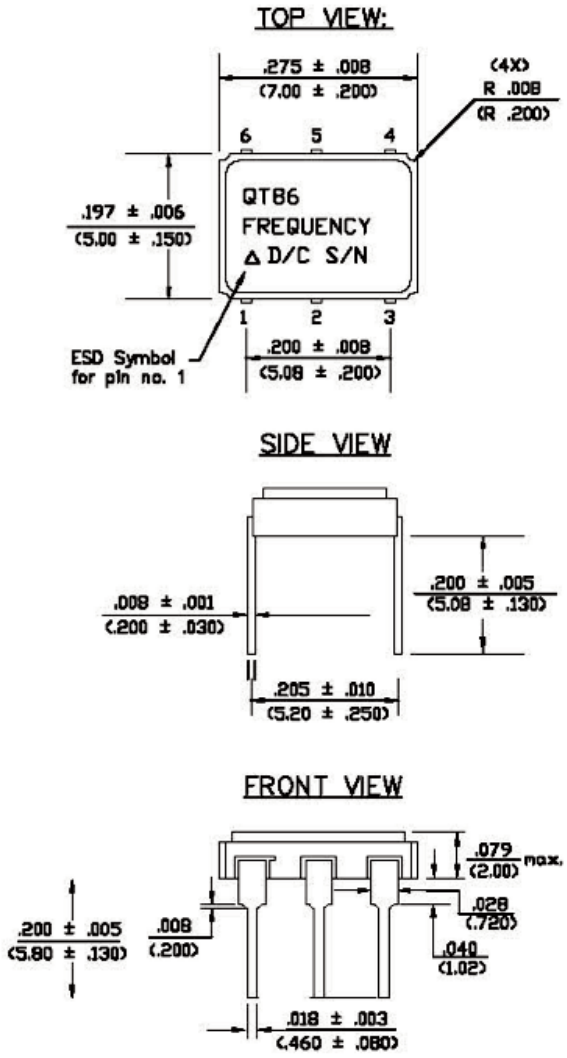


Figure 2 – QT86 DRAWING AND PIN OUTPUTS

QT86 (6 Leads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

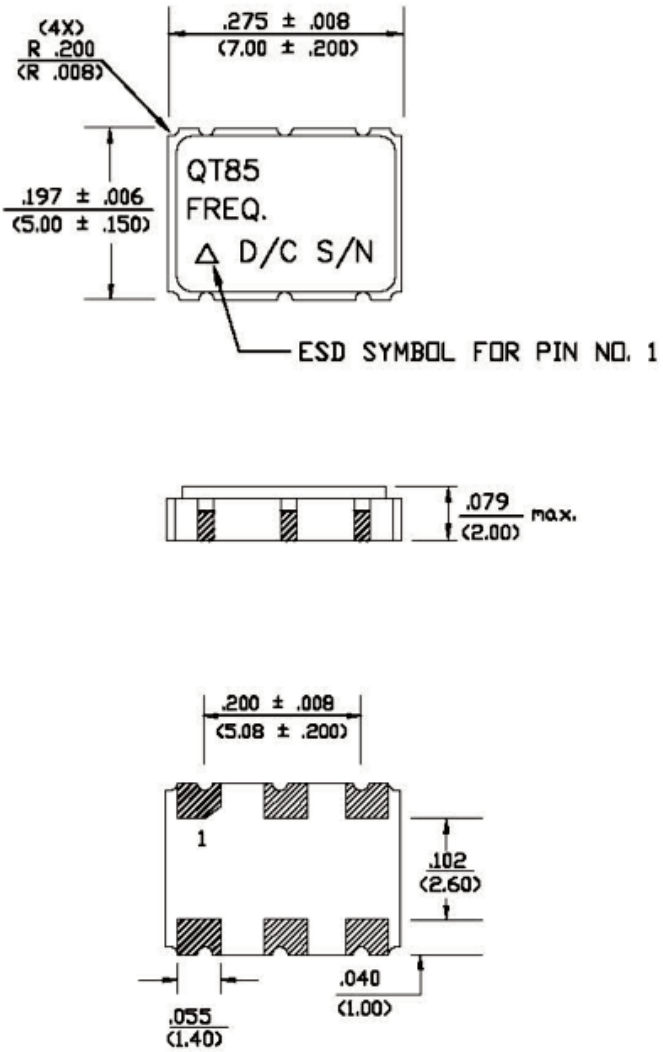


Figure 3 – QT85 DRAWING AND PIN OUTPUTS

QT85 (6 pads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

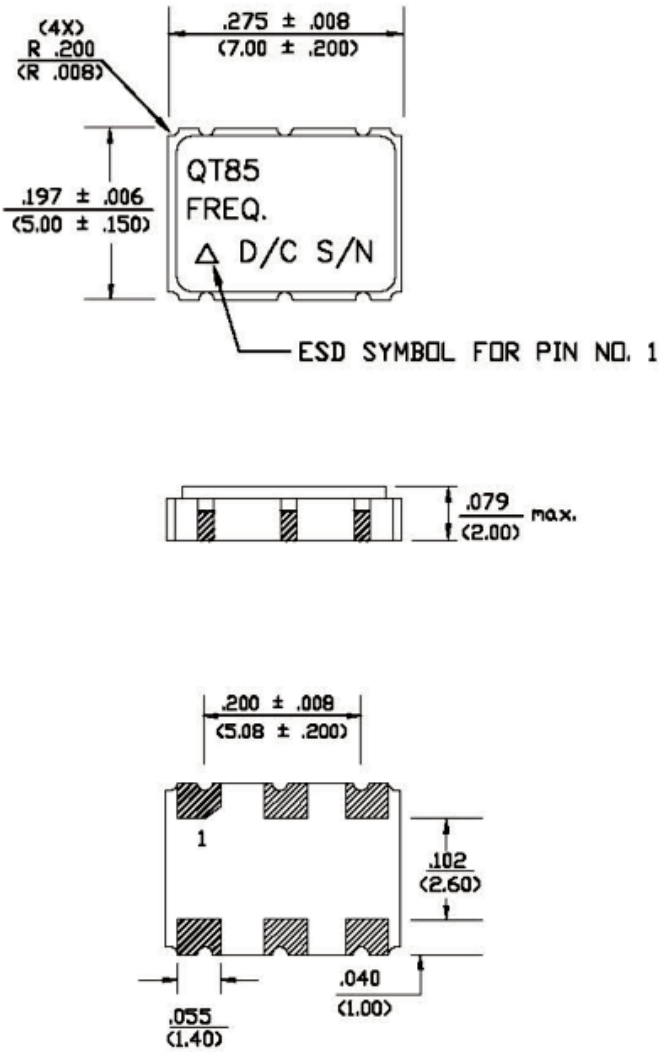


Figure 3 – QT85 DRAWING AND PIN OUTPUTS)

QT85 (6 pads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

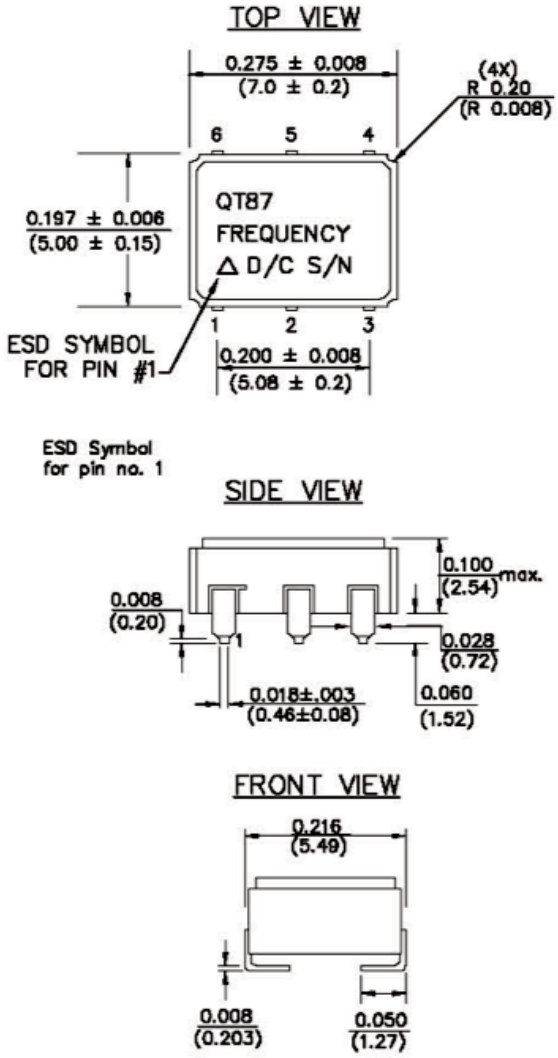
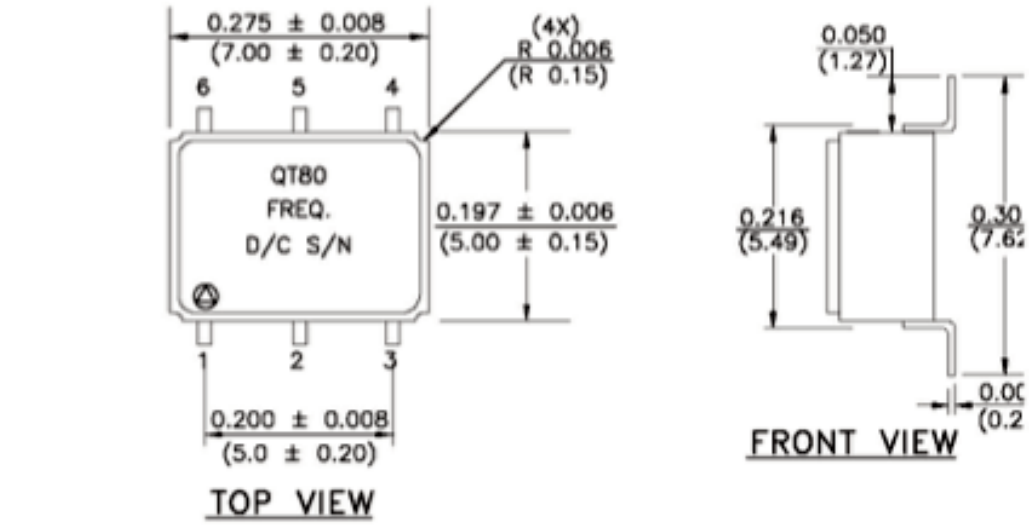


Figure 4 – QT87 DRAWING AND PIN OUTPUTS

QT85 (6 pads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)



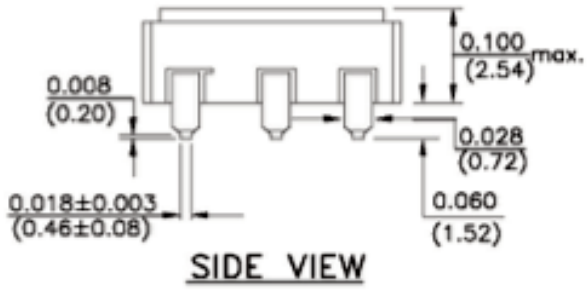


Figure 5 – QT80 DRAWING AND PIN OUTPUTS

QT85 (6 pads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

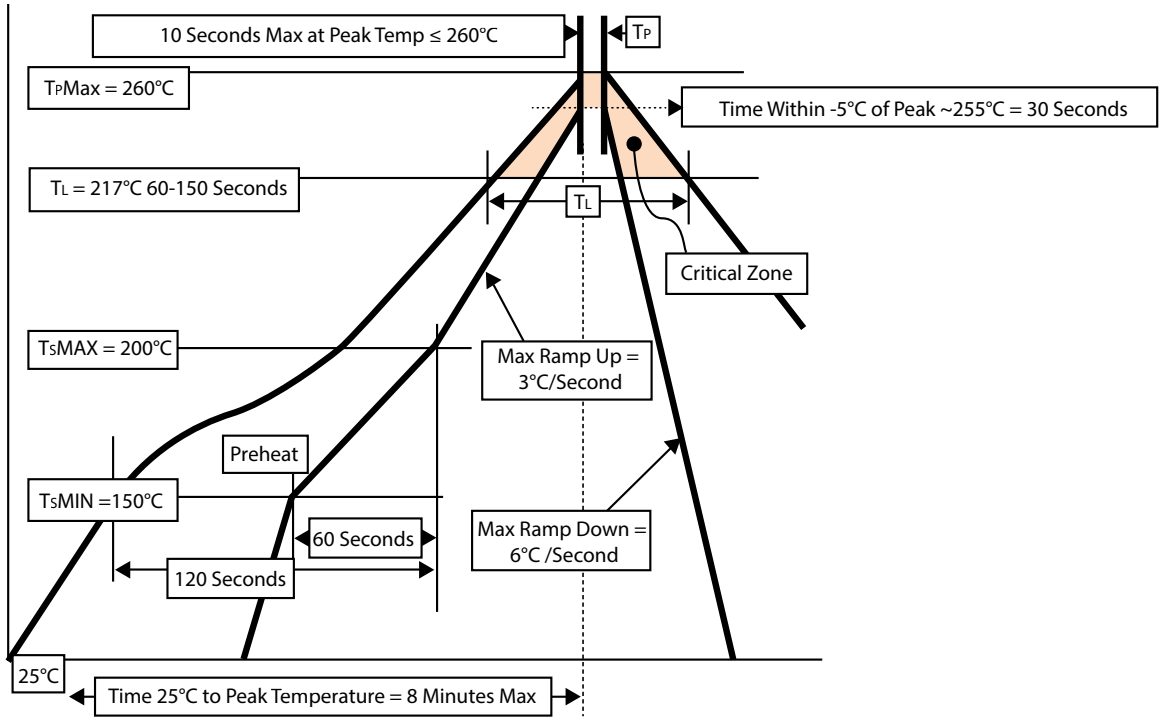


Figure 6 – Solder Reflow Profile Reflow Profile per IPC/JEDEC J-STD-020D.1, 240°C Reflow Profile Also Acceptable

ENVIRONMENTAL AND MECHANICAL TEST SPECIFICATIONS

TEST	SPECIFICATION
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Thermal Shock	MIL-STD-883, Method 1011, Condition A
Moisture Resistance	MIL-STD-883, Method 1004
Terminal Strength	MIL-STD-883, Method 2004, Test Condition D
Solderability	MIL-STD-883, Method 2003
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition B
Mechanical Shock	MIL-STD-883, Method 2002, Condition B
Mechanical Vibration	MIL-STD-883, Method 2007, Condition A
Gross Leak	MIL-STD-883, Method 1014, Condition C
Fine Leak	MIL-STD-883, Method 1014, Condition A1
Solvent Resistance	MIL-STD-202, Method 215
Moisture Sensitivity Level	MSL = 1
Contact Pads	Gold (Au 60µin) Over Nickel (Ni 100-250µin) or Solder Dip Sn60Pb40/SAC305 Lead Free
ESD	Proper ESD Precautions Should be Taken When Handling and Mounting Crystal Oscillators. Built in ESD Protection Circuitry Ratings are as Follows: HBM Class 1C 1,999V per MIL-STD-883, Method 3015.7

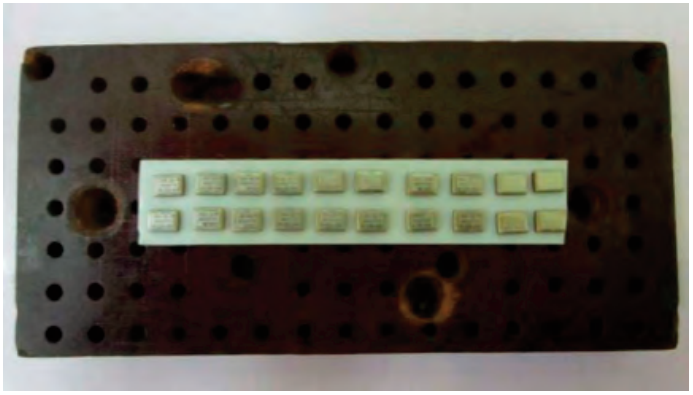


Figure 7 – UNITS TO BE TESTED

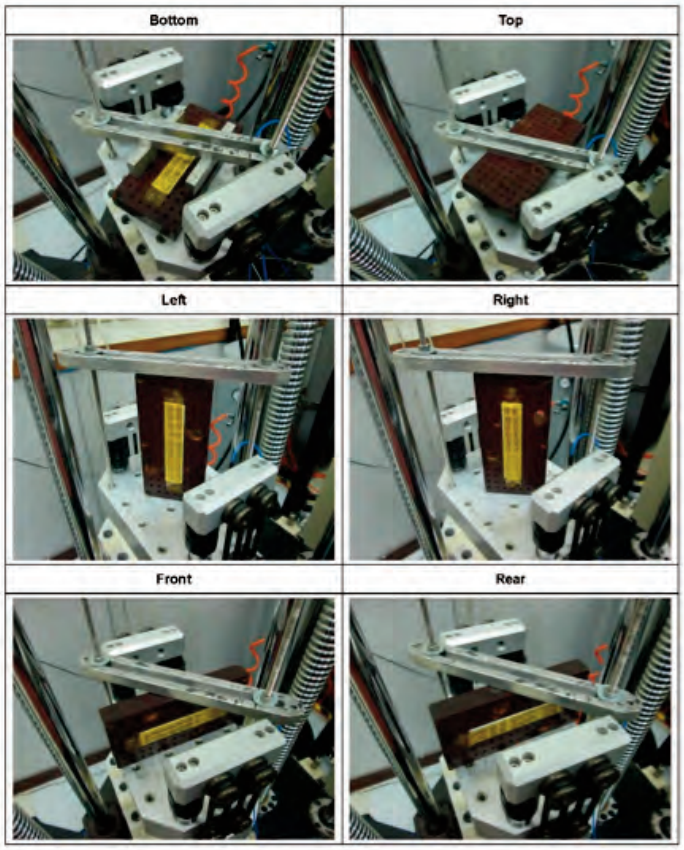


Figure 8 – MECHANICAL SHOCK TEST SET UP

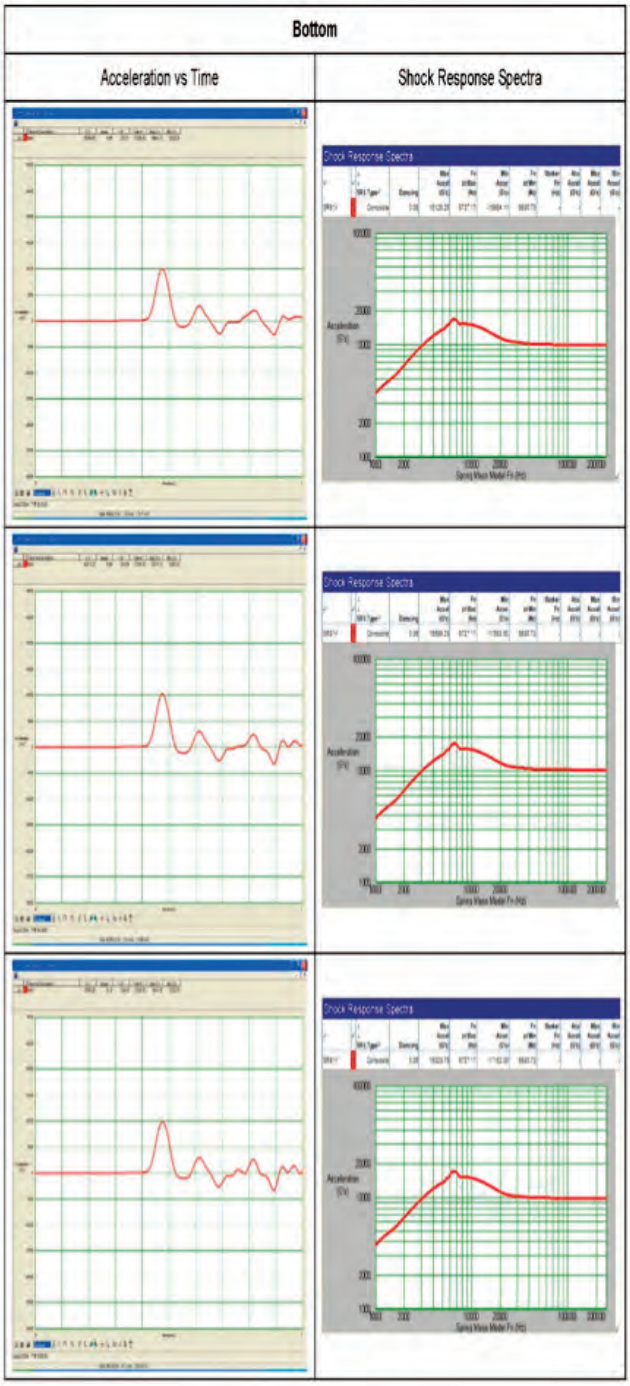


Figure 9 – GRAPH OF MECHANICAL SHOCK TEST