Revision Record							
Revision	**DCO**	**Description**	**Engineering Approval**	**Date**	**QA Approval**	**Date**	**Release Date**
-	3984	Initial Release					04/22/2015
A	11824	Add temperature stability code 6	R. Duong	06/12/2020	S. Dasgupta	06/15/2020	06/24/2020

UNLESS OTHERWISE SPECIFIED **Dimensions are in Inches** **Tolerances**		
Decimal	**Fraction**	**Angular**
.xxx ± .005 .xx ± .02 .x ± .1	$^{x}/_{x} \pm {}^{1}/_{16}$	x° ± 2°

DETAIL PRODUCT SPECIFICATION CONTROL DRAWING

Initial Release	
Prepared	**Date**
Richard Duong	4/21/2015
Checked	**Date**
Charles Peot	4/20/2015
Engineering Approval	**Date**
Richard Duong	4/21/2015
Quality Assurance Approval	**Date**
Charles Peot	4/20/2015
Released	**Date**
Daniel Moline	4/22/2015

Q-Tech Corporation
10150 West Jefferson Boulevard
Culver City, CA 90232-3510 USA

TITLE

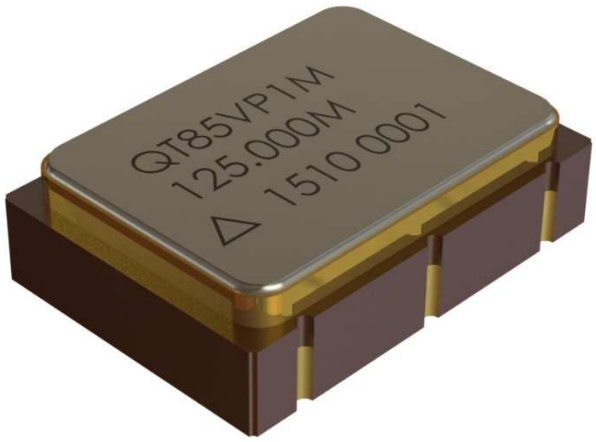
QT86 5x7MM VCXO SERIES
LVPECL VOLTAGE CONTROLLED CRYSTAL OSCILLATOR
3.3Vdc | 120MHz TO 125MHz

DRAWING NO.			REVISION
QPDS-0011			**A**
SCALE	SIZE	CAGE CODE	PAGE
NONE	**A**	**51774**	**1** of **11**

QT86VP VCXO SERIES
5x7mm LVPECL Voltage Controlled Crystal Oscillator
3.3Vdc | 120MHz to 125MHz

DESCRIPTION

Q-Tech's 5x7mm LVPECL 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.



FEATURES

- Made in the USA
- ECCN: EAR99
- Innovative Four Point Mount Strip Crystal Resonator option
- Frequency Range, 120MHz to 125MHz
- Small Footprint
- LVPECL 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 Mechanical Shock, Half-Sine, 0.3ms, all Axes with 4-point mount (-F)
- 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

ORDERING INFORMATION

Sample Part Number Construction

QT85VFP1M - 125.000MHz

Q	No Meaning
T	**Solder Dip Options** T = Standard S = Sn60Pb40 G = SAC305
85	**Package** 86 = Leaded 87 = Formed Leads 80 = Formed Leads 85 = SMT
V	VCXO Model
F	**4-Point Mount** F = 4-Point Mount (High Shock) Blank = Standard 2-Point Mount
P	**Logic** P = +3.3Vdc LVPECL
1	**Temperature Code** 1 = 0°C to +70°C 5 = -20°C to +70°C 7 = -40°C to +85°C 8 = -40°C to +105°C 6 = -55°C to +105°C
M	**Screening** Blank = No Screening M = Screening per MIL-PRF-55310, Level B
125.000MHz	**Frequency** Output Frequency in MHz

ELECTRICAL CHARACTERISTICS

PARAMETERS	LIMITS	COMMENTS
Output Frequency Range (Fo)	**120MHz – 125MHz**	
Supply Voltage (Vdd)	+3.3Vdc ± 5%	
Maximum Applied Voltage (Vdd max.)	+5Vdc	
Operating Temperature (Top)	See Ordering Information	
Storage Temperature (Tsto)	-62°C to +125°C	
Supply Current (Idd)	50mA max.	No Load
Load	15pF	
Duty Cycle (Sym)	40/60% max. 45/55% typ.	Measured at ½ waveform
Rise and Fall Times (Tr/Tf)	600ps max., 400ps typ.	Measured Between 20% and 80% or 80% and 20% output waveform
Start-Up Time (Tstup)	10ms Max.	
Output Voltage High (VOH)	Vdd-1.025V min., Vdd-0.880V max.	RL=50Ω into Vdd-2Vdc
Output Voltage Low (VOL)	Vdd-1.810V min., Vdd-1.620V max.	
Enable/Disable (Option D)	VIH ≥ 0.9Vcc Oscillation VIL ≤ 0.1Vcc Output Disabled	
Absolute Pull Range (APR)	±30ppm min.	
Linearity (Lin)	±10% max., ±5% typ.	
Gain Transfer (Kv)	±60ppm/V to ±80ppm/V typ.	
Control Voltage Range (Vc)	0V to 3.3Vdc	
Modulation Bandwidth (BW)	10kHz min., 30kHz typ.	With Vc = 0V to 3.3V, -3dB
Aging at +70°C ± 3°C	±5ppm First Year Max. ±2ppm Max. Each Year Thereafter	
Integrated Phase Jitter	1ps Max., 200fs typ.	12kHz to 20MHz
Period Jitter RMS	5ps max. , 2.5ps typ.	
Phase Noise, relative to carrier (typ.)	10Hz -70dBc/Hz 100Hz -98dBc/Hz 1kHz -125dBc/Hz 10kHz -145dBc/Hz 100kHz -150dBc/Hz 1MHz -150dBc/Hz	Measured at Vc = 0.3V to 3.0Vdc

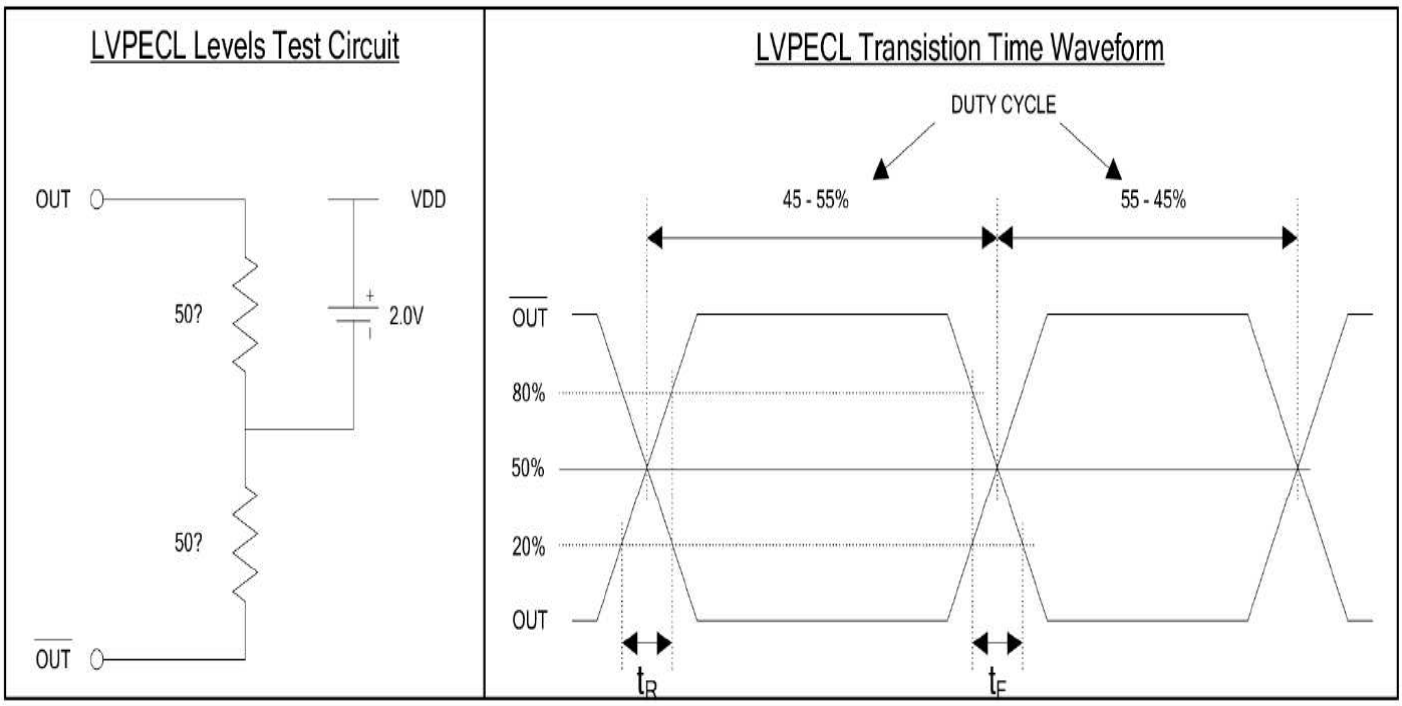
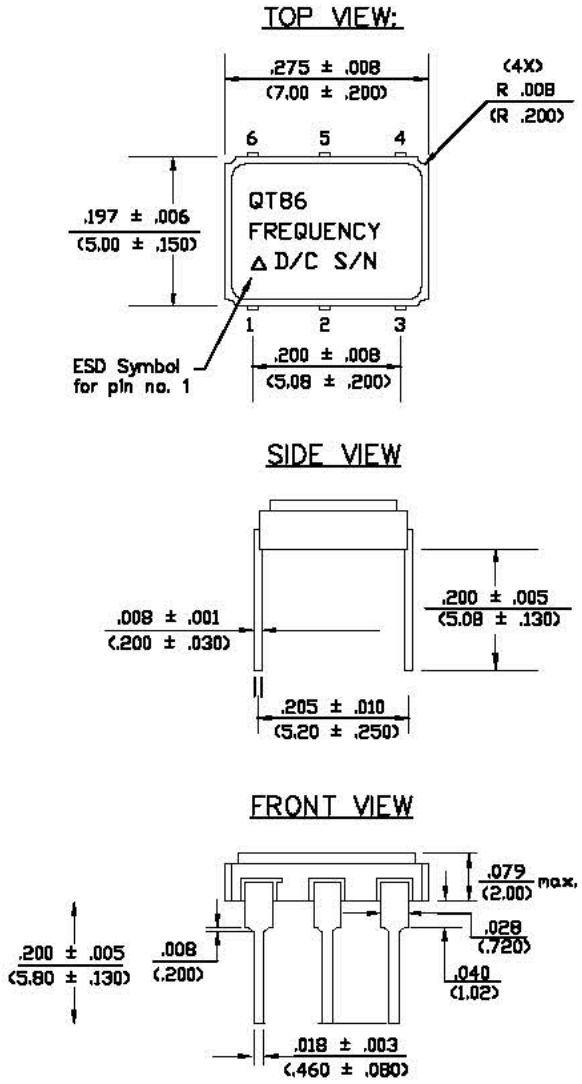
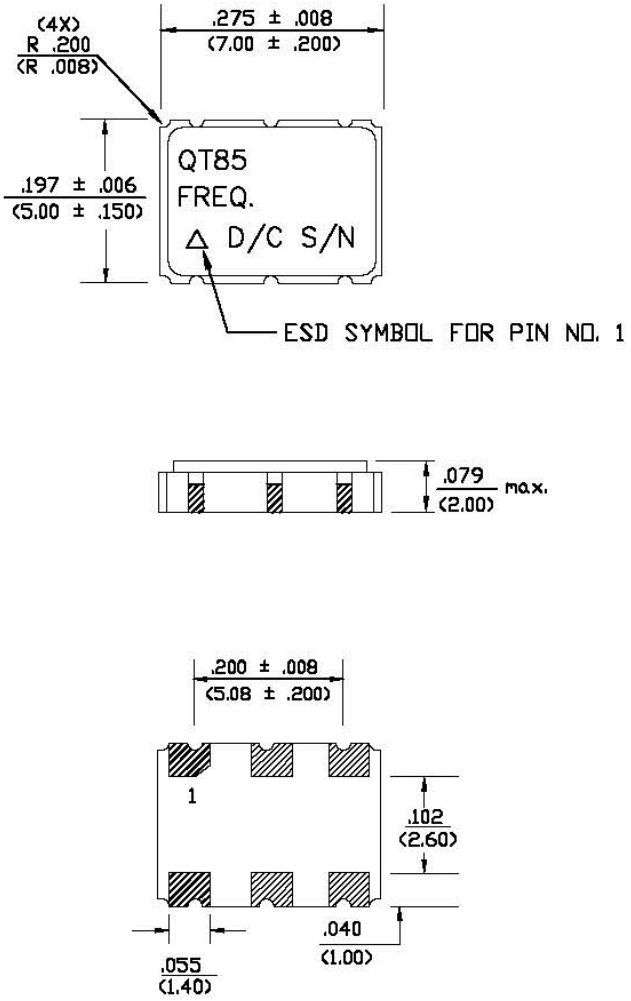


Figure 1 – Output Waveform and Test Set-Up



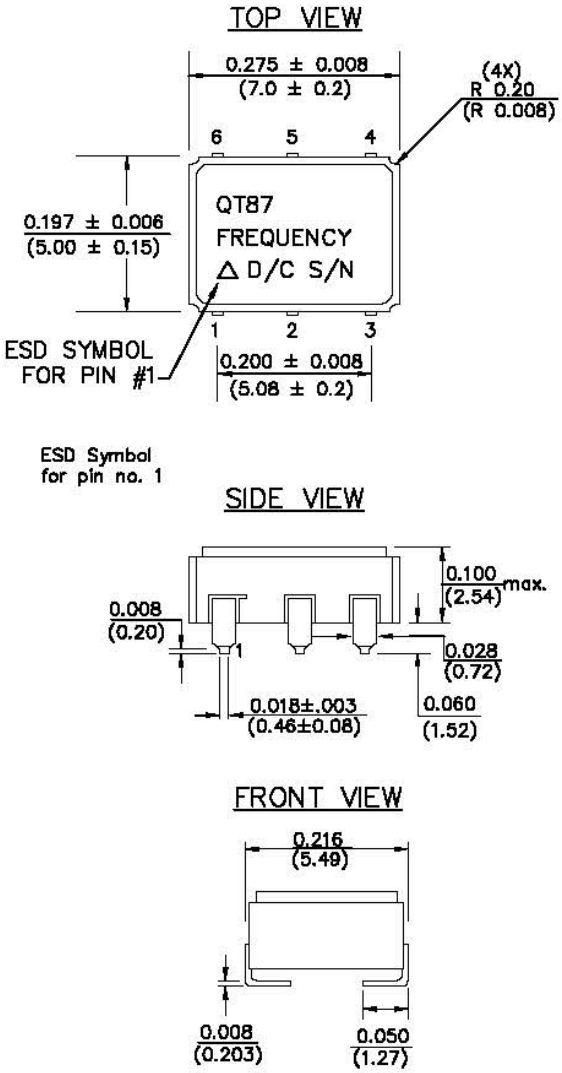
QT86 (6 Leads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

Figure 2 – QT86 Drawing and Pin Outputs



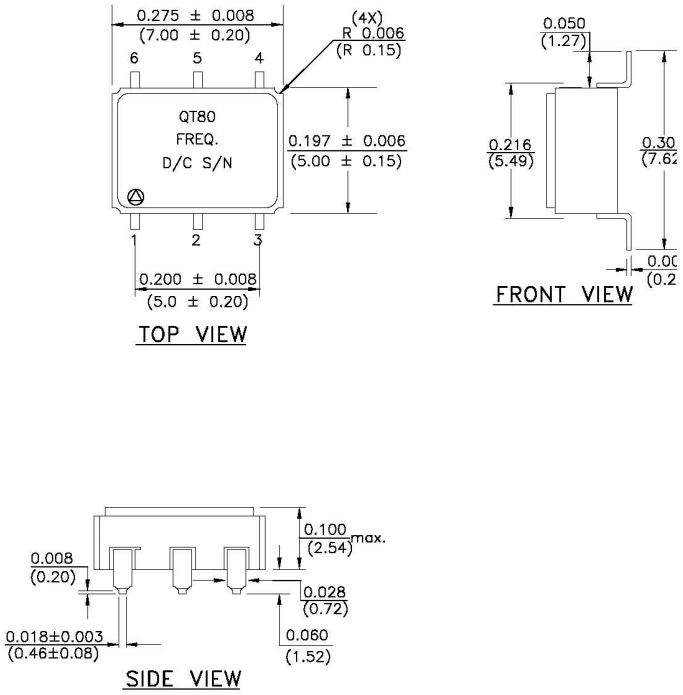
QT85 (6 pads)		
Pin No.	**Symbol**	**Function**
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option –D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

Figure 3 – QT85 Drawing and Pin Outputs



QT87 (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 4 – QT87 Drawing and Pin Outputs



QT80 (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 5 – QT80 Drawing and Pin Outputs

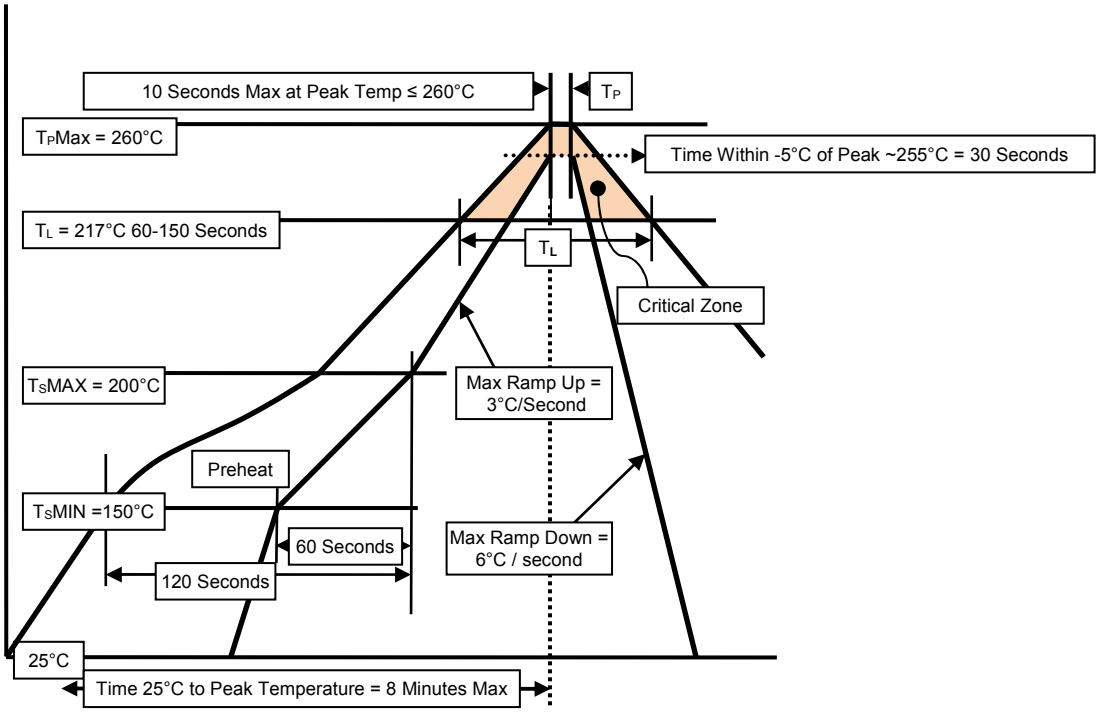


Figure 6 – Solder Reflow Profile

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

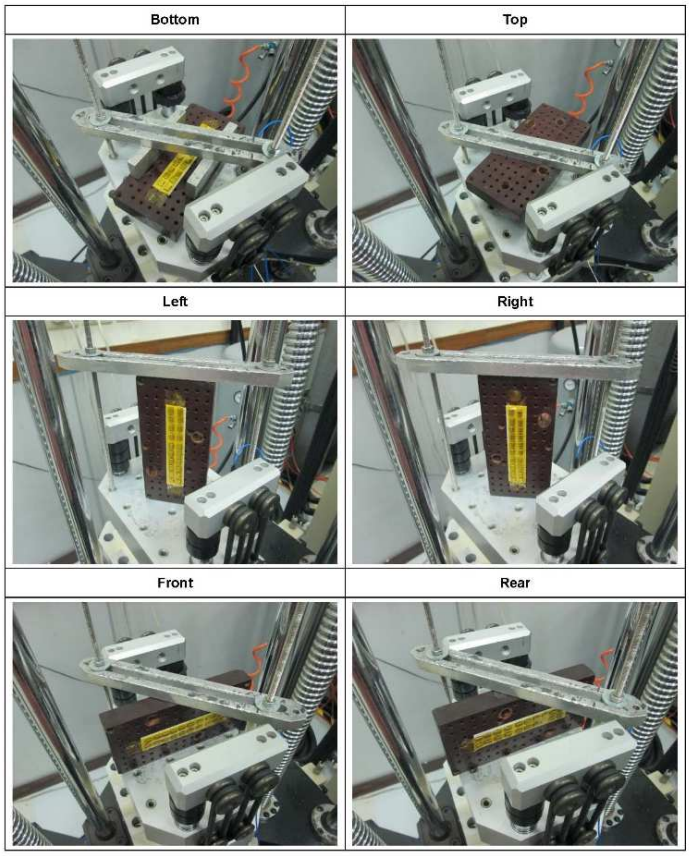


Figure 8 – Mechanical Shock Test Set Up

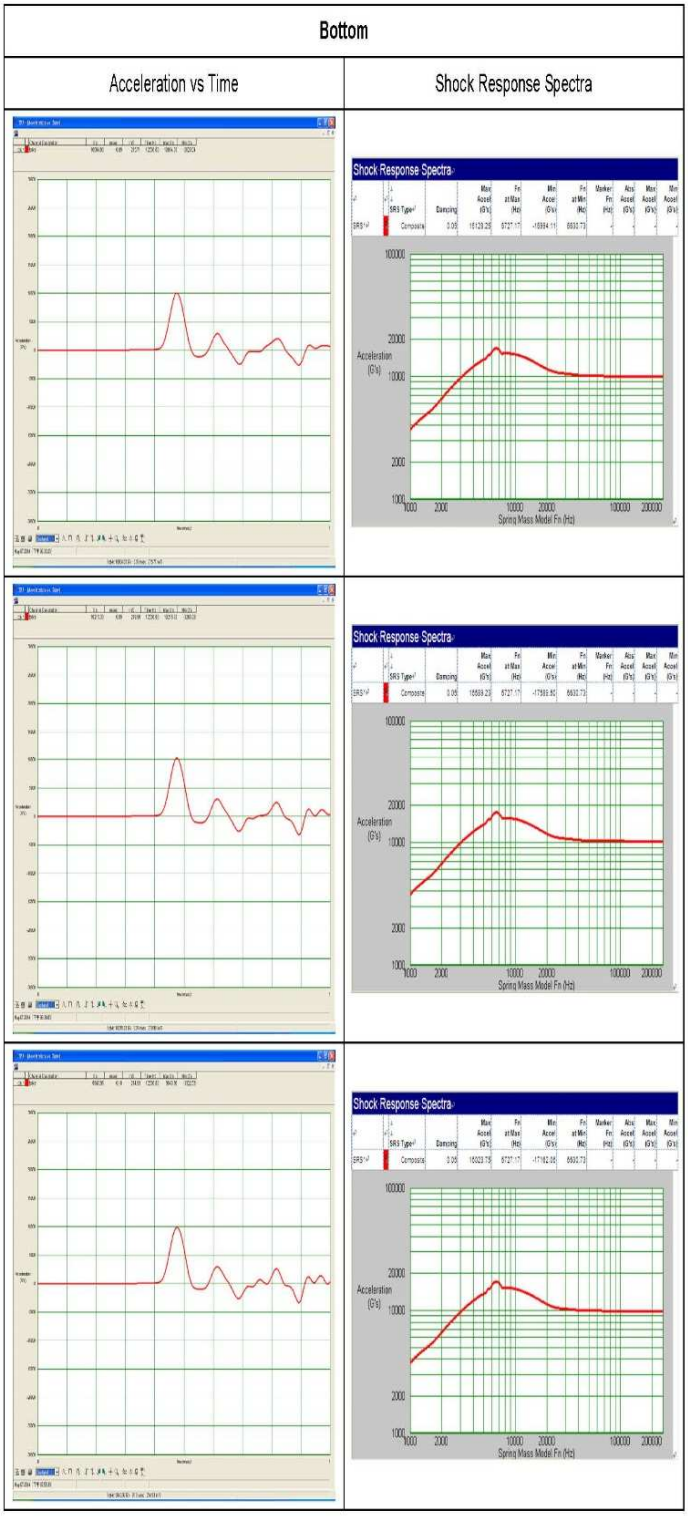


Figure 9 – Graph of Mechanical Shock Test