


Revision Record

Revision	DCO	Description	Engineering Approval	Date	QA Approval	Date	Release Date
-	3984	Initial Release					4/22/2015



<p>UNLESS OTHERWISE SPECIFIED Dimensions are in Inches</p> <p><u>Tolerances</u></p> <table> <tr> <td>Decimal</td> <td>Fraction</td> <td>Angular</td> </tr> <tr> <td>.xxx ± .005</td> <td></td> <td></td> </tr> <tr> <td>.xx ± .02</td> <td></td> <td>x° ± 2°</td> </tr> <tr> <td>.x ± .1</td> <td></td> <td></td> </tr> </table>	Decimal	Fraction	Angular	.xxx ± .005			.xx ± .02		x° ± 2°	.x ± .1			<p>Proprietary Rights are involved in the subject matter of this material and all manufacturing, reproduction, use, and sales rights pertaining to such matter are expressly reserved. It is submitted in confidence for a specified purpose, and the recipient, by accepting this material, agrees that this material will not be used, copied, or reproduced in whole or in part, nor its contents revealed in any manner, or to any person, except for the purpose delivered.</p>
Decimal	Fraction	Angular											
.xxx ± .005													
.xx ± .02		x° ± 2°											
.x ± .1													

DETAIL PRODUCT SPECIFICATION CONTROL DRAWING

Initial Release			Q-Tech Corporation	
Prepared	Date		10150 West Jefferson Boulevard Culver City, CA 90232-3510 USA	
Richard Duong	4/21/2015		TITLE	
Checked	Date	QT86 5x7MM VCXO SERIES		
Charles Peot	4/20/2015	LVPECL VOLTAGE CONTROLLED CRYSTAL OSCILLATOR		
Engineering Approval	Date	3.3Vdc 120MHz TO 125MHz		
Richard Duong	4/21/2015	DRAWING NO.		REVISION
Quality Assurance Approval	Date	QPDS-0011		-
Charles Peot	4/20/2015	SCALE	SIZE	CAGE CODE
Released	Date	NONE	A	51774
Daniel Moline	4/22/2015			1 of 11

DESCRIPTION

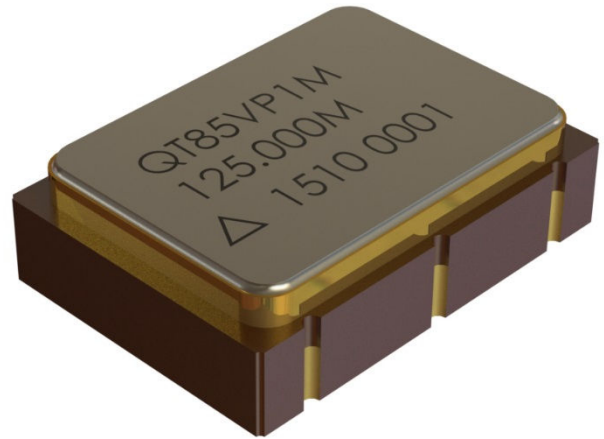
Q-Tech's 5x7mm LVPECL Voltage Controlled Crystal Oscillators consist of an IC operating at a supply voltage 3.3Vdc and a miniature strip quartz crystal that operates at the fundamental frequency. The series is offered in various ceramic package configurations from true Surface-Mount SMT to straight leads 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
	Solder Dip Options T = Standard S = Sn60Pb40 G = SAC305
T	
	Package 86 = Leaded 87 = Formed Leads 80 = Formed Leads 85 = SMT
85	
	V VCXO Model
F	4-Point Mount F = 4-Point Mount (High Shock) Blank = Standard 2-Point Mount
	Logic P = +3.3Vdc LVPECL
P	
	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
1	
	Screening Blank = No Screening M = Screening per MIL-PRF-55310, Level B
M	
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

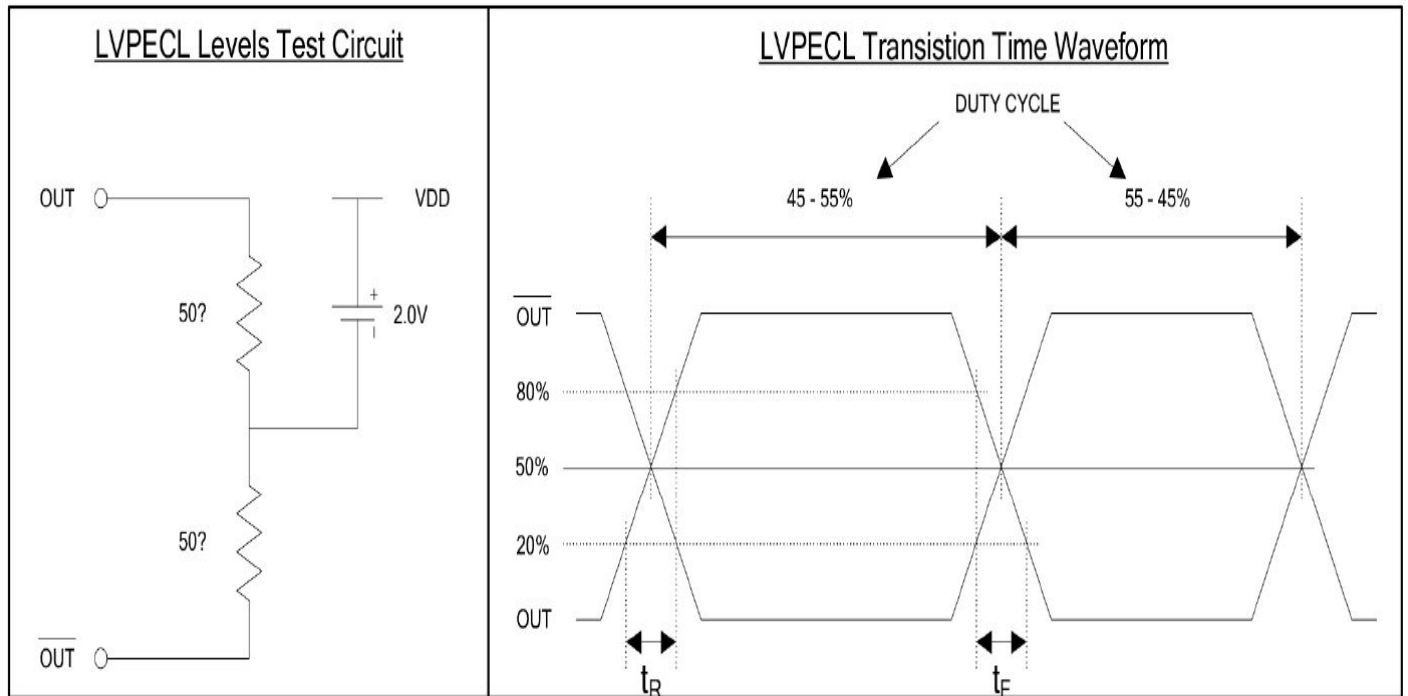
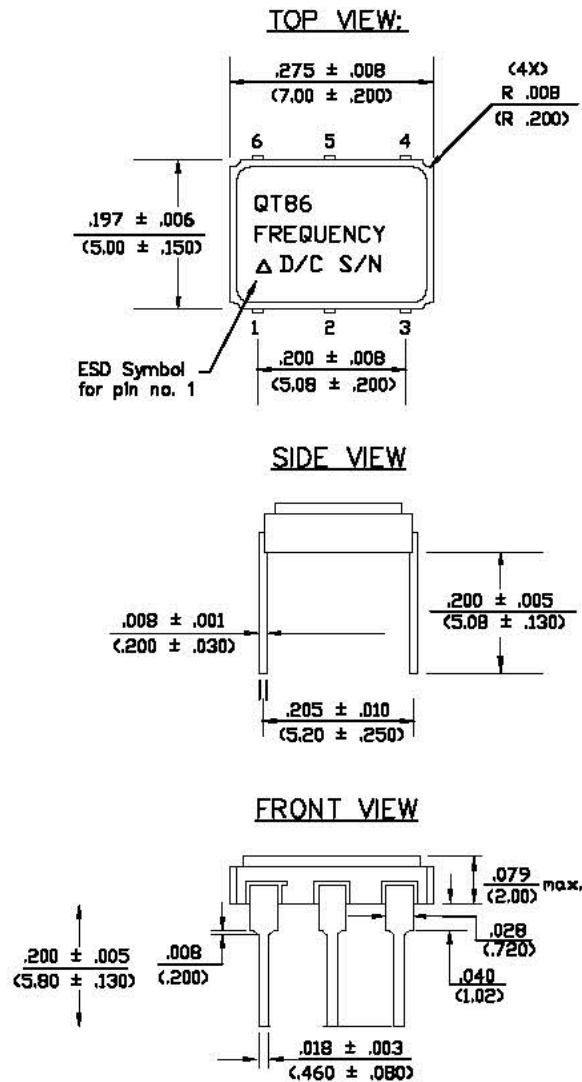
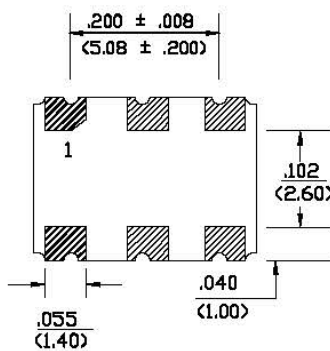
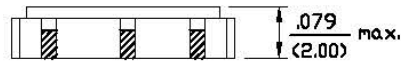
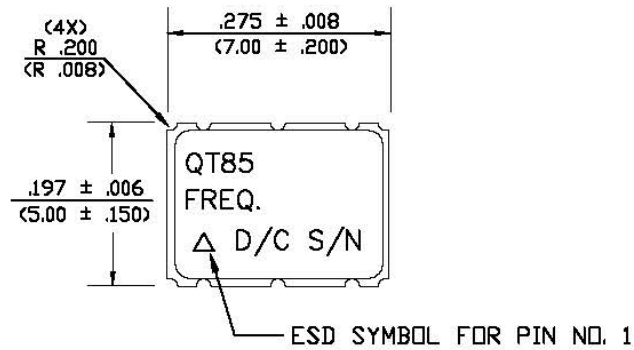


Figure 1 – Output Waveform and Test Set-Up



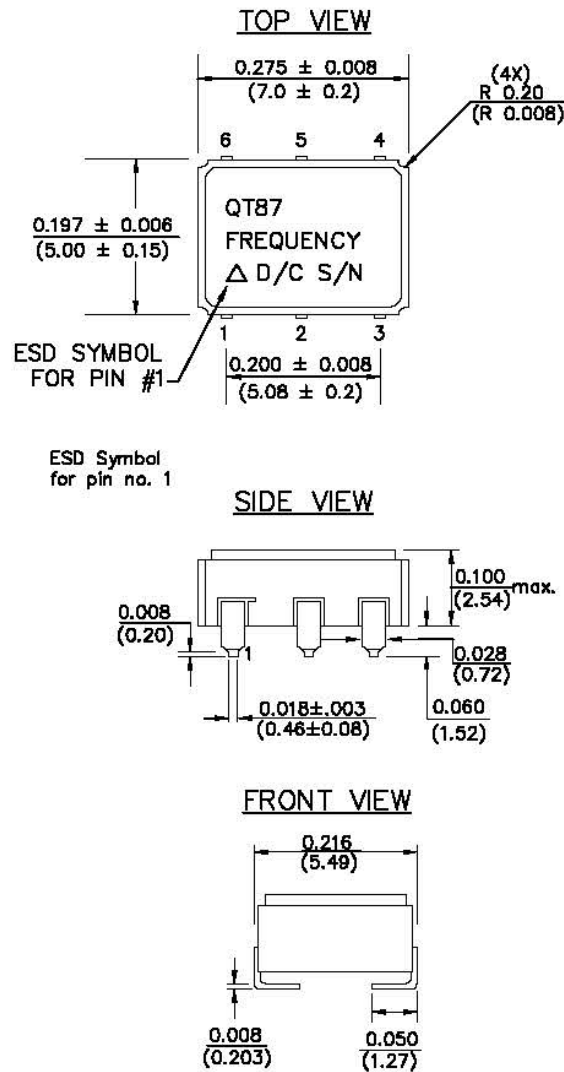
QT86 (6 Leads)		
Pin No.	Symbol	Function
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option -D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

Figure 2 – QT86 Drawing and Pin Outputs



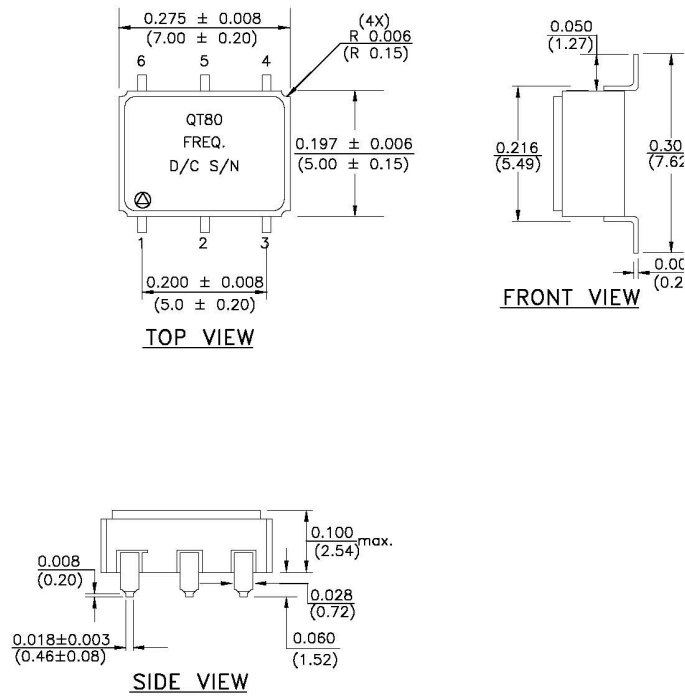
QT85 (6 pads)		
Pin No.	Symbol	Function
1	Vc	VCXO Control Voltage
2	E/D	N/C or Enable/Disable (Option -D)
3	GND	GND/CASE
4	Output	Output
5	N/C	No Connect
6	VDD	VDD (+3.3Vdc)

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

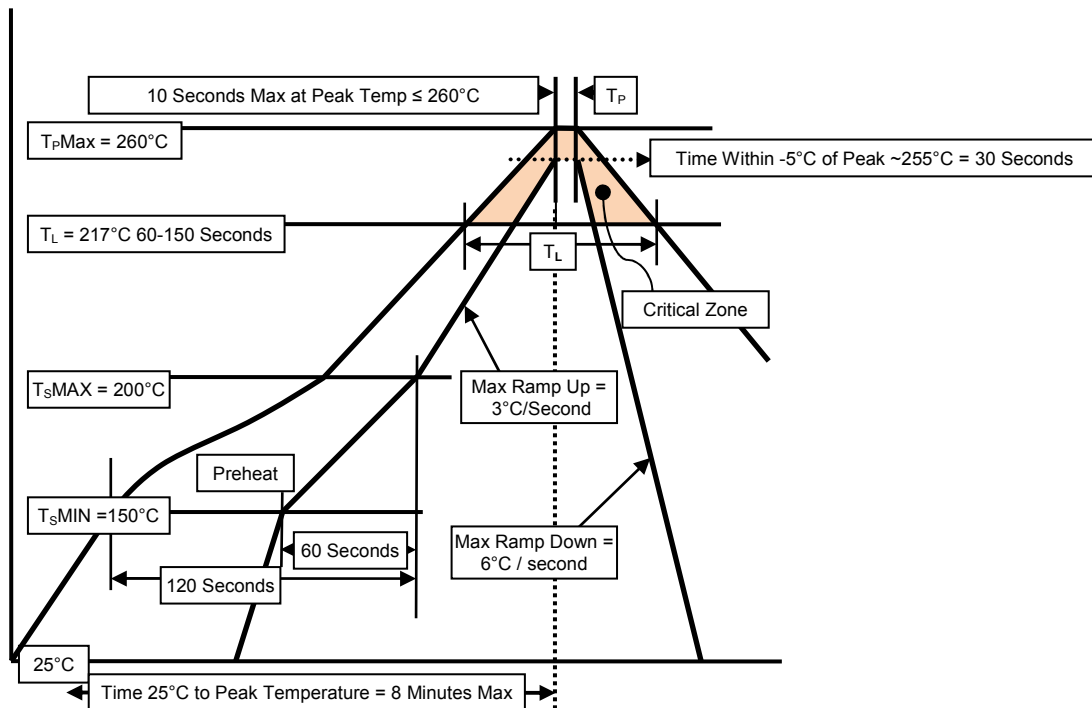


Figure 6 – Solder Reflow Profile

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



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

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

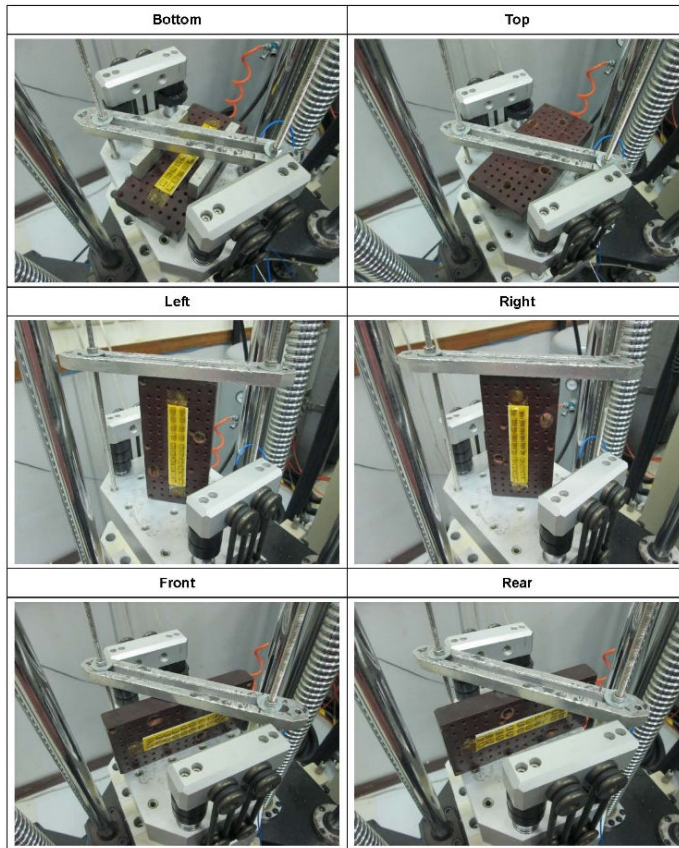


Figure 8 – Mechanical Shock Test Set Up

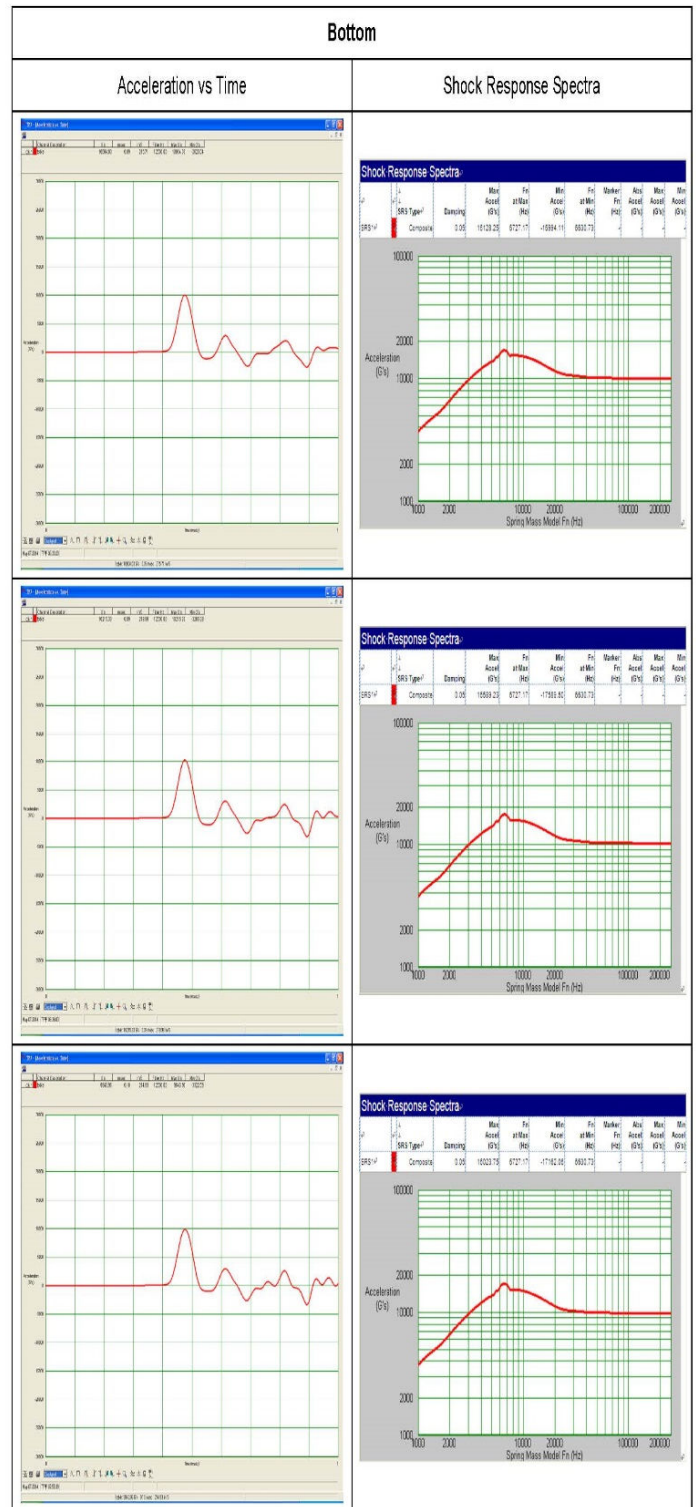


Figure 9 – Graph of Mechanical Shock Test