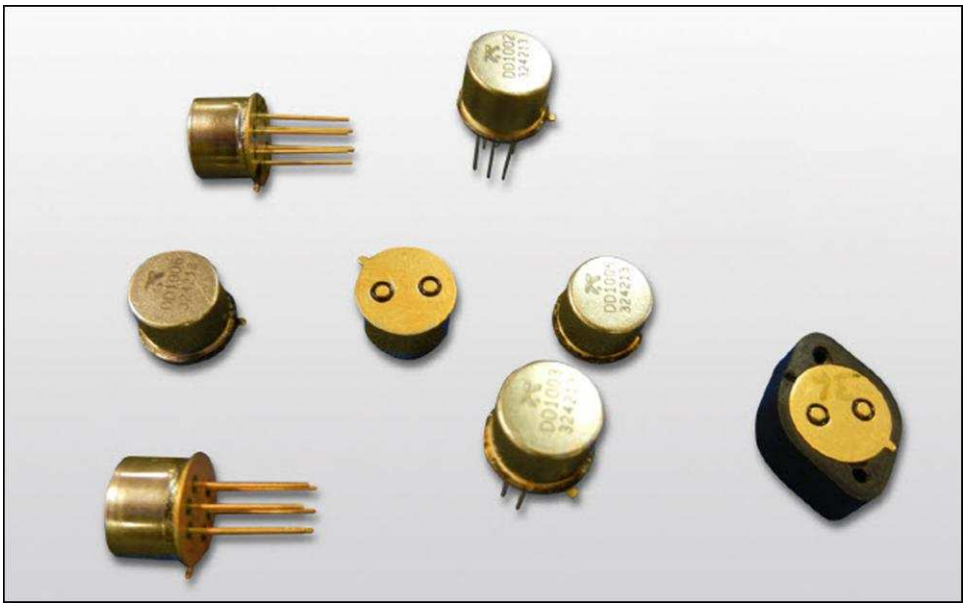
Blue Chip™ Detonator



The Blue Chip™ family of high voltage chip slapper detonators is designed for a wide variety of applications. Each type of detonator has been qualified to MIL-DTL-23659 Appendix A and is qualified for use in-line. The various versions of the detonator all have the same basic shape with variations in the explosive column.

The chip slapper consists of an exploding metal foil, covered by a Polyimide flying plate, deposited on a ceramic “chip” substrate. The assembly is laser welded to ensure the device is hermetic to a leak rate as low as 10-9 ATM-CC/SEC. Excelitas manufactures Blue Chip Detonators with either 2 or 6 pin TO-5 headers that can be utilized as surface mount, plugged into a connector, or attached to a flexible tape strip line.

All members of The Blue Chip Detonator family exceed the mechanical and thermal requirements of MIL-DTL 23659. They have been shown to be reliable at temperatures ranging from liquid Nitrogen (-196°C) to over 200°C. The devices are not degraded by high shocks (up to 100,000 g) generated during thick wall penetration. Aggressive long term aging studies have shown that they have a simulated reliability of hundreds of years.

The design of the Blue Chip Detonator provides easy control of the critical parameters, resulting in consistent performance from one device to the next.

Key Features

- Low cost, COTS device
- Low firing energy
- MIL-DTL 23659 Qualified
- MIL-STD-1316 compliant design
- Hermetic to 10-9 ATM-CC-SEC
- Demonstrated ability to initiate various booster and main charges
- Wide temperature operating range (-196° to 200° C)
- Multiple configurations
- Full lot and serialization control
- Manufactured in state-of-the-art ISO 9001 facility

Applications

- Safe and arm devices
- Warheads
- Rocket Motor initiation
- Payload launch vehicles
- Oil and gas exploration

EXCELITAS TECHNOLOGIES

Blue Chip™ Detonator

TABLE 1 Specifications

Part #	# Pins	Energy	Explosive Load	Description
324213	6 Pin	Standard	0.118 gms HNS IV	Standard 6-pin
327920	6 Pin	Low	0.118 gms HNS IV	Low Energy 6-pin
324500	6 Pin	Standard	0.011 gms HNS IV / 0.303 gms PBXN-5	Dual Load
327912	6 Pin	Low	0.011 gms HNS IV / 0.303 gms PBXN-5	Dual Load Low Energy
324337	6 Pin	Standard	0.267 gms HNS IV	Large Volume 6-pin Detonator
324490	6 Pin	Standard	0.169 gms HNS IV	Integral Sleeve Shock Hardened
324236	2 Pin	Standard	0.118 gms HNS IV	Standard 2-pin Detonator
332123	6 Pin	Low	0.034 gms HNS IV	Low Profile

TABLE 2 MIL-DTL-23659 Appendix A Qualification Matrix

Requirement	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Total
Number	30	30	30	30	5	10	30	30	50	50	50	50	50	50	5	500
Visual Inspection	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	500
Radiographic Examination	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	500
Resistance	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	500
Leakage	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	500
Threshold Ambient	x															30
Threshold Cold		x														30
Threshold Hot			x													30
Max No Damage Current				x												30
Thermal Cook-Off					x											5
Electrical Cook-Off						x										10
Max Allowed Sensitivity							x									30
1.5 meter drop								x	x	x	x					180
Electro Static Discharge												x				50
Temperature Shock/Humidity								x	x	x	x					180
Vibration								x	x	x	x					180
Shock								x	x	x	x					180
Visual Inspection								x	x	x	x					180
Radiographic Examination								x	x	x	x					180
Resistance								x	x	x	x					180
Leakage								x	x	x	x					180
All Fire Ambient									x			x				100
All Fire Cold										x			x			100
All Fire Hot											x			x		100
Threshold Ambient								x								30
High Voltage Fire															x	5

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TABLE 3 Blue Chip® Detonator Parameters

Typical Parameter (at ambient temperature)	Value
Mean Threshold Voltage Standard Energy (0.1 µF capacitor)*	1250 V
Mean Threshold Voltage Standard Energy (0.2 µF capacitor)*	800 V
Mean Threshold Voltage Low Energy (0.1 µF capacitor)*	940 V
Mean Threshold Voltage Low Energy (0.2 µF capacitor)*	730 V
Standard Deviation (relative to mean)	1%
Temperature at variation of mean (-54° C to 71° C)	±2%
.99999 All Fire @ 95% confidence Standard Energy (0.1 µF capacitor)*	1400 V
.99999 All Fire @ 95% confidence Standard Energy (0.2 µF capacitor)*	1000 V
.99999 All Fire @ 95% confidence Low Energy (0.1 µF capacitor)*	1030 V
.99999 All Fire @ 95% confidence Low Energy (0.2 µF capacitor)*	790 V
No-Fire (1e-6 @95%, 0.2 µF capacitor)*	700 V
Dent Depth (low profile)	10 mils
Dent Depth (standard output)	19 mils
Dent Depth (large volume output)	19 mils
Dent Depth (dual load output)	33 V
Proven Temperature Operating Range	-196° to 200° C
Proven Long Term Temperature Storage	111° C
Maximum No Damage Current (1 minute)	8 Amps
Component Resistance (depends on configurations)	15-50 mΩ
Resistance variation within type	±1 mΩ
Diameter (not including flange)	0.322 ± 0.002 in
Diameter (including flange)	0.360 ± 0.003 in
Height (Top to base, excluding pins)	0.247 ± 0.001 cm
Weight	1.3 – 1.9 g
* Strongly dependent on firing system parameters	

FIGURE 1 All-Fire Probability (0.1 µF)

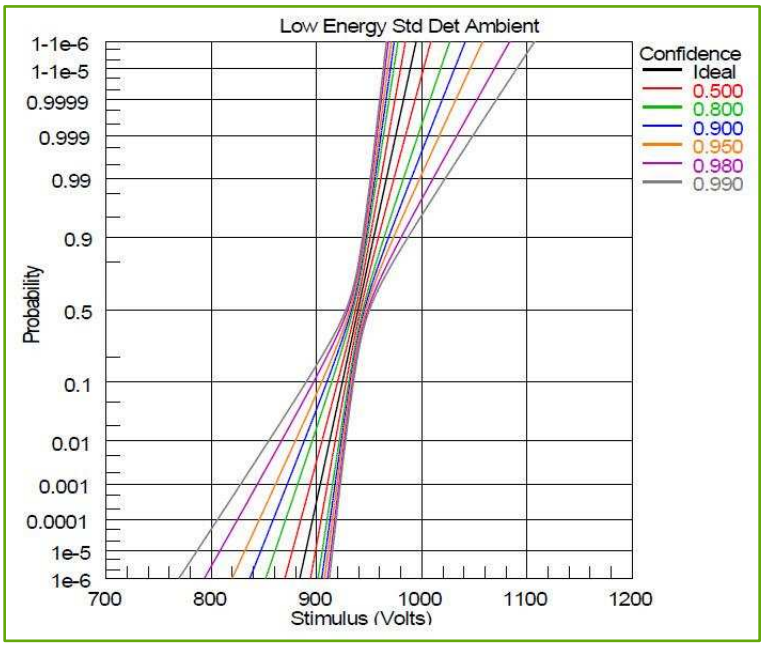

FIGURE 2 Packaging Dimensions

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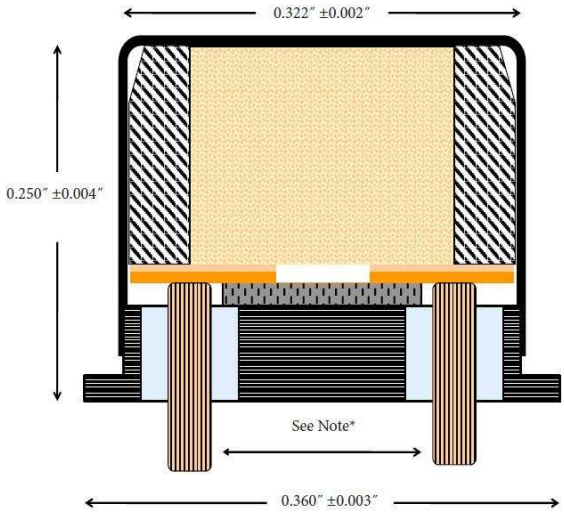

Note:
2 pin spacing is 0.170”
6 pins are a 0.200” circle.
Pin spacing is center to center

About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection, energetic, frequency standards and high-reliability power needs of OEM customers.

From aerospace and defense applications to industrial, safety and security, medical lighting, analytical instrumentation, and clinical diagnostics, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has approximately 3,000 employees in North America, Europe and Asia, serving customers across the world.

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