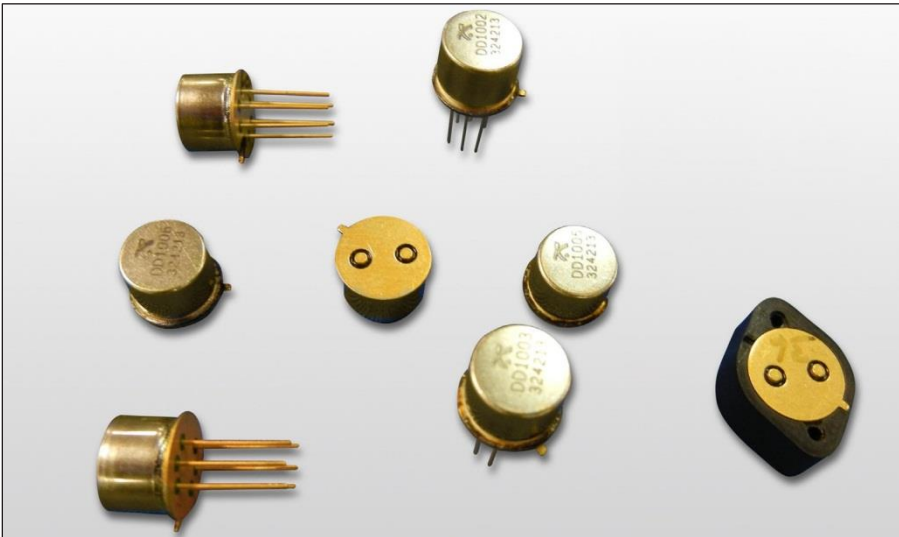


## Blue Chip® Detonator



The Blue Chip® family of high voltage chip slapper detonators is designed for a wide variety of applications. The detonators have been qualified to MIL-DTL-23659 Appendix A and are 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 ( $-196^{\circ}\text{C}$ ) to over  $200^{\circ}\text{C}$ . The devices are not degraded by high shocks (up to 100,000g) 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.

### Features

- Low Cost, Commercial device
- Low firing energy
- MIL-DTL-23659 Qualified
- MIL-STD-1316 compliant design
- MIL-STD-1901 compliant design
- Hermetic to  $10^{-9}$  ATM-CC/SEC
- Demonstrated ability to initiate various booster and main charges
- Wide temperature operating range ( $-196^{\circ}$  to  $200^{\circ}\text{C}$ )
- 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

# Blue Chip® Detonator

**TABLE 1 Specifications**

| Drawing # | # Pins | Firing Energy | Maximum Explosive Load | Description                    |
|-----------|--------|---------------|------------------------|--------------------------------|
| 327920    | 6 Pin  | Low           | 0.12 g HNS IV          | Standard Profile               |
| 327912    | 6 Pin  | Low           | 0.30 g PBXN-5          | Dual Load (HNS IV / PBXN-5)    |
| 324490    | 6 Pin  | Low           | 0.17 g HNS IV          | Integral Sleeve Shock Hardened |
| 324236    | 2 Pin  | Low           | 0.12 g HNS IV          | Standard Profile               |
| 332123    | 6 Pin  | Low           | 0.03 g HNS IV          | Low Profile                    |
| 324337    | 6 Pin  | Low           | 0.27 g HNS IV          | Large Volume                   |
| 324638    | 6 Pin  | Low           | 0.12 g HNS IV          | High Temperature               |

**TABLE 2 MIL-DTL-23659 Appendix A Qualification**

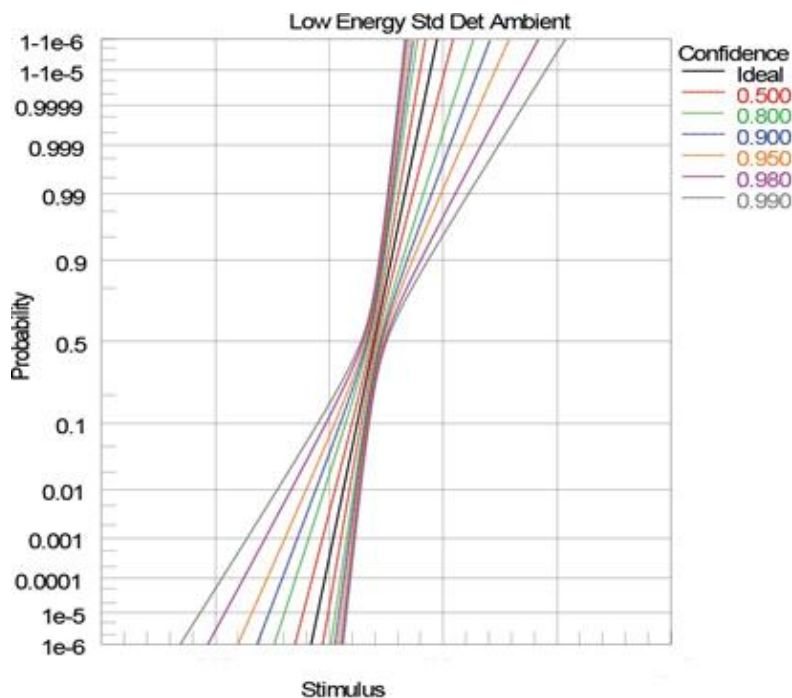
| Requirement                | A  | B  | C  | D  | E | F  | G  | H  | I  | J  | K  | L  | M  | N  | O | Total |
|----------------------------|----|----|----|----|---|----|----|----|----|----|----|----|----|----|---|-------|
| Number                     | 30 | 30 | 30 | 30 | 5 | 30 | 30 | 30 | 50 | 30 | 30 | 30 | 30 | 30 | 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     |

# Blue Chip® Detonator

TABLE 3 Blue Chip® Detonator Parameters

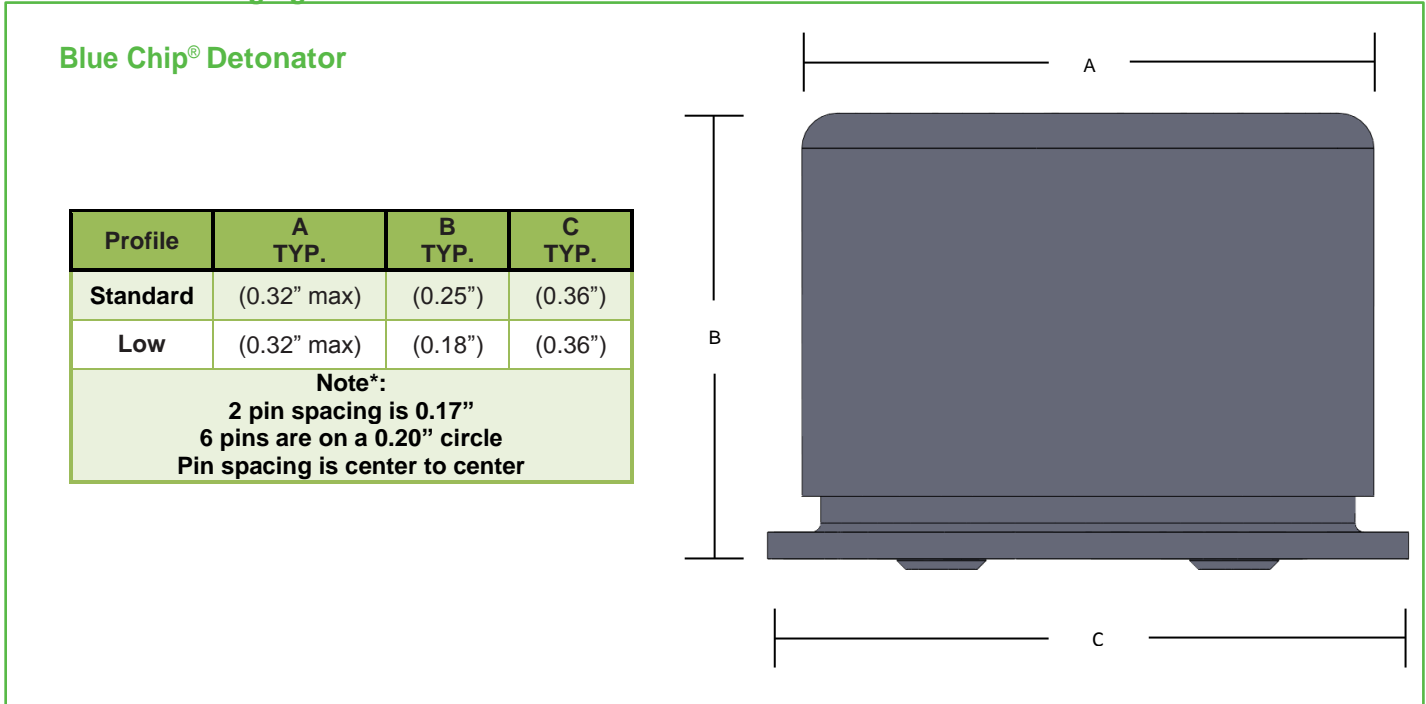
| Typical Parameter (at ambient temp)               | Typical Value* |
|---|----------------|
| Mean Threshold Voltage Low Energy*                | 920 V          |
| Standard Deviation (relative to mean)             | 1.5%           |
| Variation of mean at Temperature (-54 C to +71 C) | ±3%            |
| .99999 All Fire @ 95% confidence Low Energy*      | 1030 V         |
| No-Fire (1e <sup>-6</sup> @ 95%)*                 | 670 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 mils        |
| Proven Temperature Operating Range                | -196 to +200°C |
| Proven Long Term Temperature Storage              | 111°C          |
| Maximum No Damage Current (1 minute)              | 8 Amps         |
| Diameter (not including flange)                   | 0.324 in max   |
| Diameter (including flange)                       | 0.36           |
| Height (Top to base, excluding pins)              | 0.25           |
| Weight  | 1.3 - 1.9 g    |
| Pin Length (6 Pin Detonator)                      | 0.35           |
| *Strongly dependent on firing system parameters.  |                |

FIGURE 1 All-Fire Probability



# Blue Chip® Detonator

FIGURE 2 Packaging Dimensions



## About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection and other high-performance technology needs of OEM customers.

From analytical instrumentation to clinical diagnostics, medical, industrial, safety and security, and aerospace and defense applications, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has over 5,000 employees in North America, Europe and Asia, serving customers across the world.

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