Technical Data
Data Sheet N1683, REV. F

# eGuard0522P TVS Arrays

## Description - eGuard™

The eGuard0522P* is an ultra low capacitance TVS (Transient Voltage Suppressor) array designed to protect sensitive semiconductor components from electrical overstress when interfaced to high-speed data lines. The ultra low capacitance (0.35pF typical I/O to I/O) of the eGuard0522P ensures negligible signal attenuation at data rates up to 3.5GHz. The solid-state construction ensures fast clamping of electrical overstress transients resulting from ESD (electrostatic discharge), EFT (Electrical Fast Transients) or CDE (Cable Discharge Events).

In addition to ultra low capacitance, the eGuard0522P provides superior surge current capability and excellent voltage clamping performance. The surge current capability (8x20µs) is rated at 7A; approximately 33% higher than industry norms. Furthermore, the tight clamping ratio (VC/VRWM) of 1.9 (typical at 1A) ensures harmful transients are clamped quickly and close to the normal working voltage of the circuit. The super tight clamping ratio is 30% better than industry norms and ensures superior protection of sensitive integrated circuits.

The eGuard0522P is designed to protect up to two data lines. It is packaged in a RoHS/WEEE compliant, 6 pin DFN that has a very low package profile of 0.55mm (nominal). The combination of ultra low capacitance, high surge capability, tight clamping ratio and low package profile make the eGuard0522P the ideal choice for today's ESD sensitive, space constrained applications.

## Features

- ESD protection in accordance with:
  IEC 61000-4-2, ±18kV contact, ±30kV air
  IEC 61000-4-5 (lightning) 7A (8/20µs)
  IEC 61000-4-4 (EFT) 40A (5/50ns)
- Tight clamping ratio, $V_C/V_{RWM}$, ensures superior protection
- High reverse surge current, $I_{PP}$, capability
- Low idle current minimizes standby power consumption
- Low profile DFN package
- Package design optimized for high speed lines
- Flow-Through design
- Protects two I/O lines
- Low capacitance: 0.35pF typical (I/O to I/O)
- Low operating voltage: 5V
- Solid-state silicon-avalanche technology

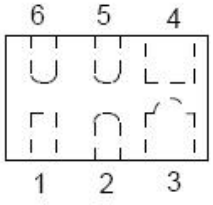
## Mechanical Characteristics

- DFNWB1.6×1-6L 6-pin package(1.6×1.0×0.5mm)
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Lead Pitch: 0.5mm
- Lead finish: NiPdAu
- Marking: Marking Code
- Packaging: Tape and Reel

## Applications

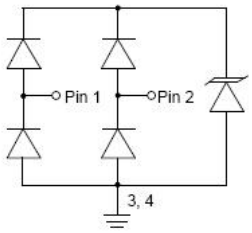
- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interface (DVI)
- DisplayPort TM Interface
- MDDI(Mobile Display Digital Interface)Ports
- PCI(Peripheral Component Interconnect ) Express
- eSATA(External Serial Advanced Technology Attachment)Interfaces

## Pin Configuration




| Pin | Identification |
|---|---|
| 1, 2 | Input Lines |
| 5, 6 | Output Lines (No Internal Connection) |
| 3, 4 | Ground |

## Circuit Diagram




* The e***Guard*** logo is a trademark of SMC Diode Solutions - Sangdest Microelectronics (Nanjing) Co.

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## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| eGuard0522P | DFNWB1.6×1-6L<br>(Pb-Free) | 3000pcs / reel |

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

## Maximum Ratings @$T_A$=25°C unless otherwise specified

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Peak Pulse Current (tp=8/20μs) | $I_{PP}$ | 7 | A |
| ESD per IEC 61000-4-2 (Air)<br>ESD per IEC 61000-4-2 (Contact) | $V_{ESD}$ | ±30<br>±18 | kV |
| Operating Junction Temperature Range | $T_J$ | -55 to + 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to + 150 | °C |

## Electrical Characteristics

| Characteristics | Symbol | Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Reverse Stand-Off Voltage | $V_{RWM}$ | Any I/O pin to ground | - | - | 5 | V |
| Reverse Breakdown Voltage | $V_{BR}$ | @ $I_t$=1mA<br>Any I/O pin to ground | 6 | - | - | V |
| Forward Voltage Drop | $V_F$ | @ $I_F$=1mA, T = 25 ℃ | - | - | 0.9 | V |
| Reverse Leakage Current | $I_R$ | @$V_{RWM}$ = 5V, T = 25 ℃<br>Any I/O pin to ground | - | 0.5 | 1 | μA |
| Clamping Voltage | $V_C$ | @$I_{PP}$ = 1A, tp=8/20μs<br>Any I/O pin to ground | - | 9.5 | 10.5 | V |
| Clamping Voltage | $V_C$ | @$I_{PP}$ = 7A, tp=8/20μs<br>Any I/O pin to ground | - | - | 17 | V |
| Junction Capacitance | $C_j$ | @$V_R$ = 0V, $f_{SIG}$ = 1MHz<br>Between I/O pins | - | 0.35 | 0.4 | pF |
| Junction Capacitance | $C_j$ | @$V_R$ = 0V, $f_{SIG}$ = 1MHz<br>Any I/O pin to ground | - | 0.65 | 0.8 | pF |

* Pulse width < 300 μs, duty cycle < 2%

## Ratings and Characteristics Curves

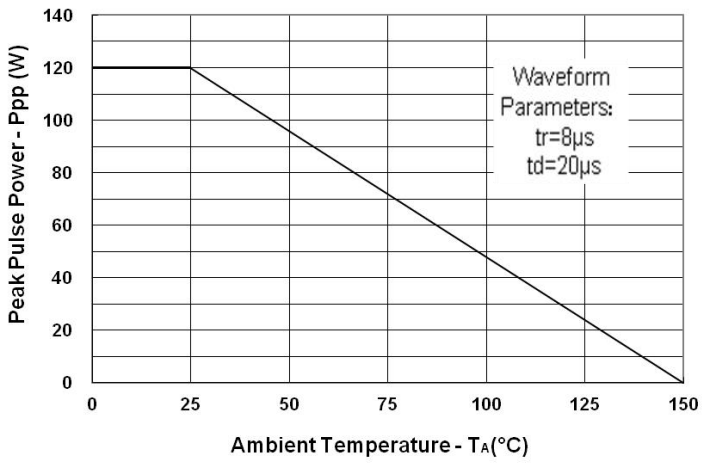


Fig.1 Power Derating Curve

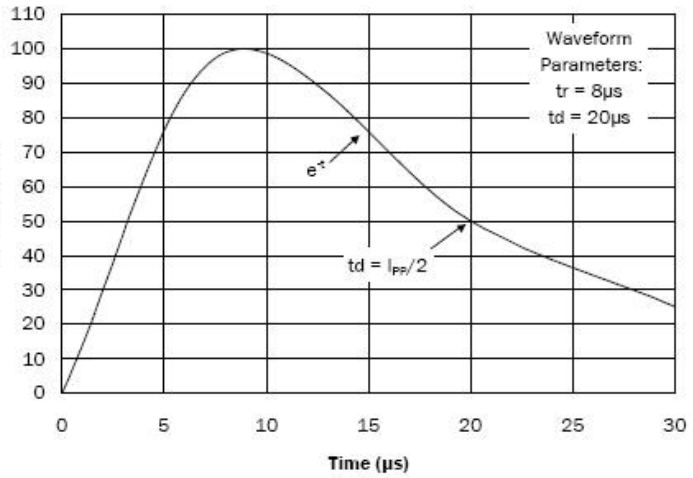


Fig.2 Pulse Waveform

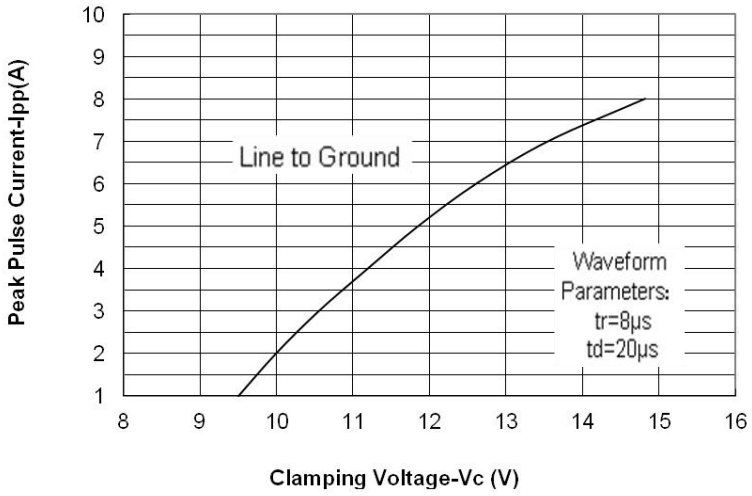


Fig. 3 Clamping Voltage vs. Peak Pulse Current

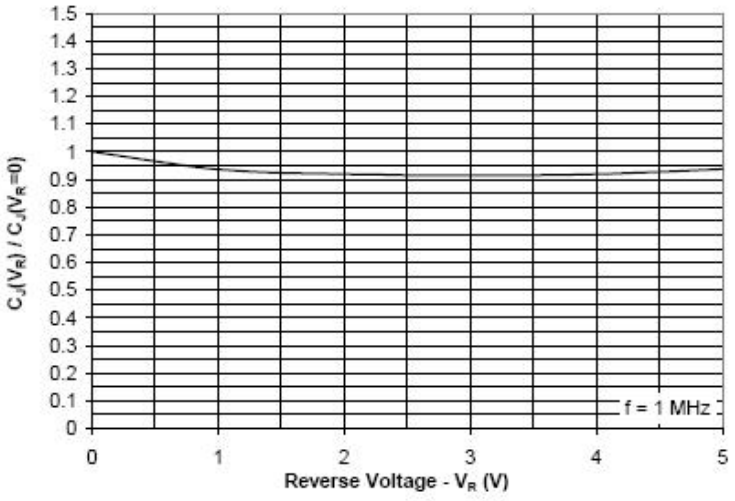


Fig. 4 Normalized Capacitance vs. Reverse Voltage

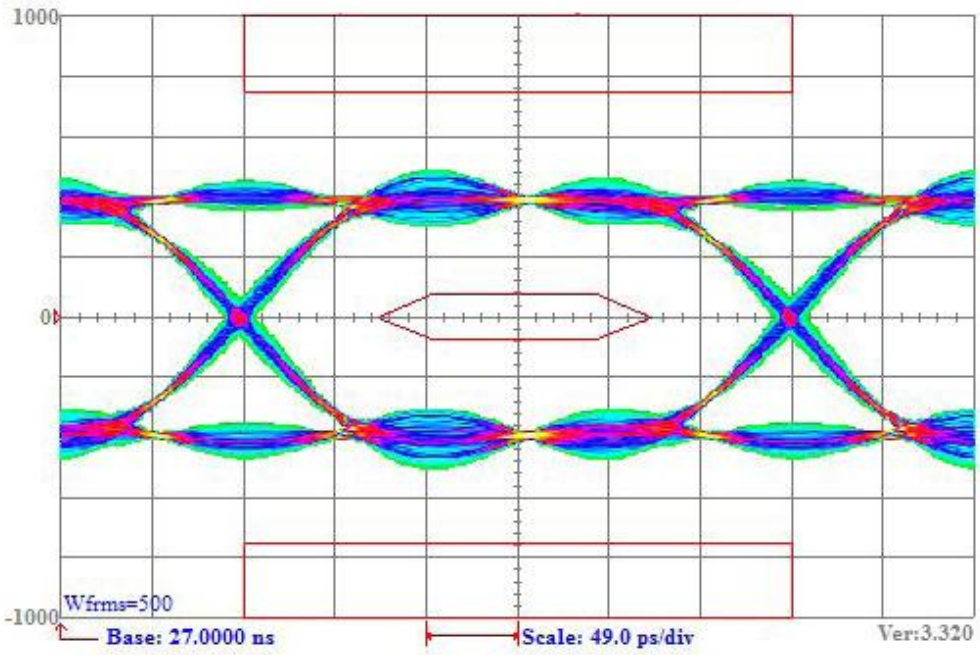


**Fig. 5 HDMI 1.4 Eye Diagram**

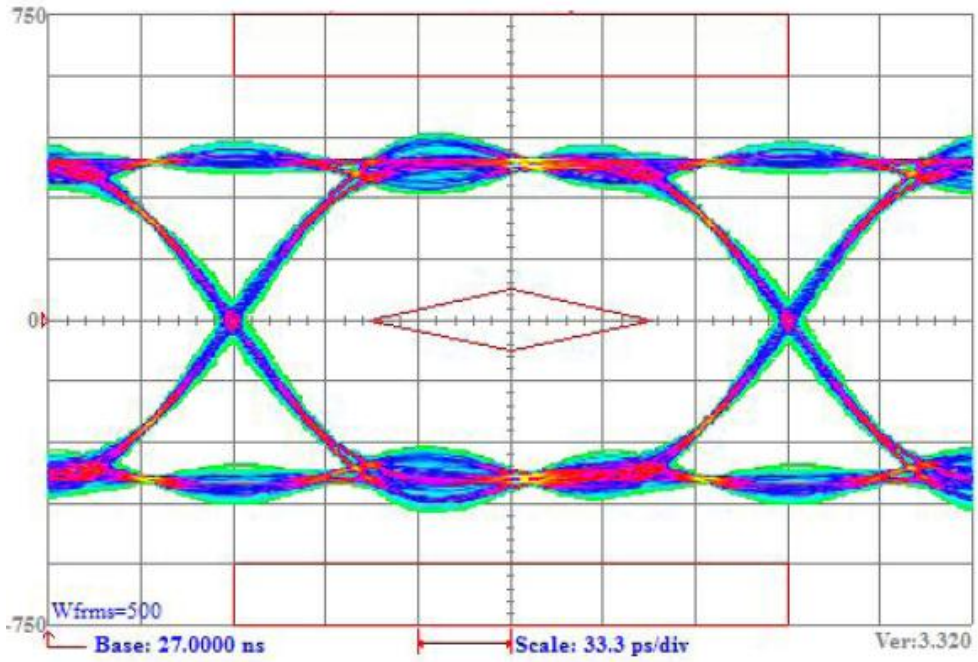


**Fig. 6 USB3.0 Eye Diagram**

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RoHS

## Part Name Information

eGuard 05 22 P

- Suffix: P = Ultra-low Capacitance
- Number of lines: 22=2Ground/2Data Lines
- Max Stand-off Voltage: 05=5$V_{RWM}$ (Volts)
- TVS Arrays Product

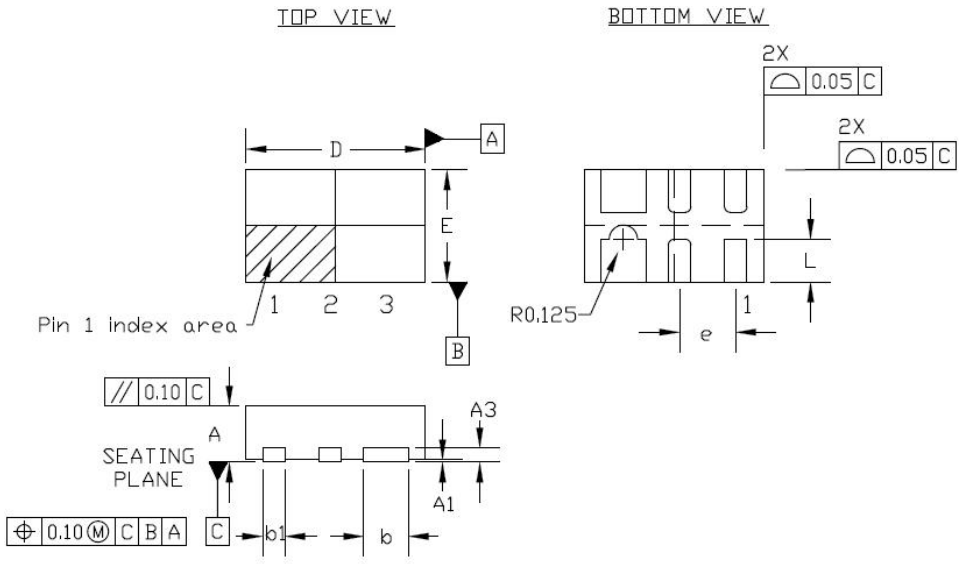
## Marking Diagram


Where 522P is eGuard0522P

522P = Part name
X = Marking code for date code

**Cautions:** Molding resin
Epoxy resin UL:94V-0

## Mechanical Dimensions DFNWB1.6×1-6L




| SYMBOL | COMMON | | | | | |
|---|---|---|---|---|---|---|
| | DIMENSIONS MILLIMETER | | | DIMENSIONS INCH | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| A1 | 0.00 | 0.02 | 0.05 | 0.000 | 0.001 | 0.002 |
| A3 | 0.125 REF | | | 0.005 REF | | |
| b | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| b1 | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 1.55 | 1.60 | 1.65 | 0.062 | 0.063 | 0.065 |
| D2 | – | – | – | – | – | – |
| E | 0.95 | 1.00 | 1.05 | 0.038 | 0.040 | 0.042 |
| E2 | – | – | – | – | – | – |
| e | 0.50 REF | | | 0.020 REF | | |
| L | 0.33 | 0.38 | 0.43 | 0.013 | 0.015 | 0.017 |

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