Technical Data
Data Sheet N1680 REV.C

eGuard0524P TVS Arrays

Description - eGuard™

The eGuard0524P* 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 eGuard0524P 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 eGuard0524P 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 eGuard0524P is designed to protect up to four data lines. It is packaged in a RoHS/WEEE compliant, 10 pin DFN that has a very low package profile of 0.5mm (nominal). The combination of ultra low capacitance, high surge capability, tight clamping ratio and low package profile make the eGuard0524P the ideal choice for today's ESD sensitive, space constrained applications.

Features

- ESD protection in accordance with:
  IEC 61000-4-2 (ESD) ±17kV (air), ±12kV (contact)
  IEC 61000-4-5 (lightning) 7A (8/20µs)
  IEC 61000-4-4 (EFT) 40A (5/50ns)
- Tight clamping ratio, VC/VRWM, ensures superior protection
- High reverse surge current, IPP, capability
- Low idle current minimizes standby power consumption
- Low profile DFN package
- Package design optimized for high speed lines
- Flow-Through design
- Protects four I/O lines
- Low capacitance: 0.35pF typical (I/O to I/O)
- Low operating voltage: 5V
- Solid-state silicon-avalanche technology

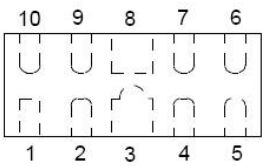
Mechanical Characteristics

- DFNWB2.5×1-10L 10-pin package
- RoHS/WEEE Compliant
- Lead Pitch: 0.5mm
- Lead finish: Pure Sn
- Marking: Marking Code
- Packaging: Tape and Reel

Applications

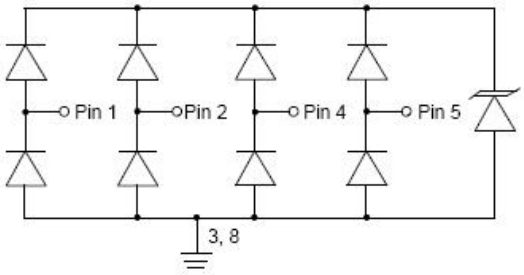
- High Definition Multi-Media Interface (HDMI)
- Digital Visual Interface (DVI)
- DisplayPort TM Interface
- MDDI(Mobile Display Digital Interface)Ports
- PCI(Peripheral Component Interconnect) Express
- eSATA(External Serial Advanced Technology Attachment)Interfaces

Pin Configuration



Pin	Identification
1, 2, 4, 5	Input Lines
6, 7, 9, 10	Output Lines (No Internal Connection)
3, 8	Ground

Circuit Diagram



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

Technical Data
Data Sheet N1680 REV.C

RoHS

Ordering Information

Device	Package	Shipping
eGuard0524P	DFNWB2.5×1-10L (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) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±17 ±12	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 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 ℃ Any I/O pin to ground	-	0.5	1	μA
Clamping Voltage	V_C	@I_{PP} = 1A, tp=8/20μs Any I/O pin to ground	-	9.5	10.5	V
Clamping Voltage	V_C	@I_{PP} = 7A, tp=8/20μs Any I/O pin to ground	-	-	17	V
Junction Capacitance	C_j	@V_R = 0V, f_{SIG} = 1MHz Between I/O pins	-	0.35	0.4	pF
Junction Capacitance	C_j	@V_R = 0V, f_{SIG} = 1MHz Any I/O pin to ground	-	0.65	0.8	pF

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

Ratings and Characteristics Curves

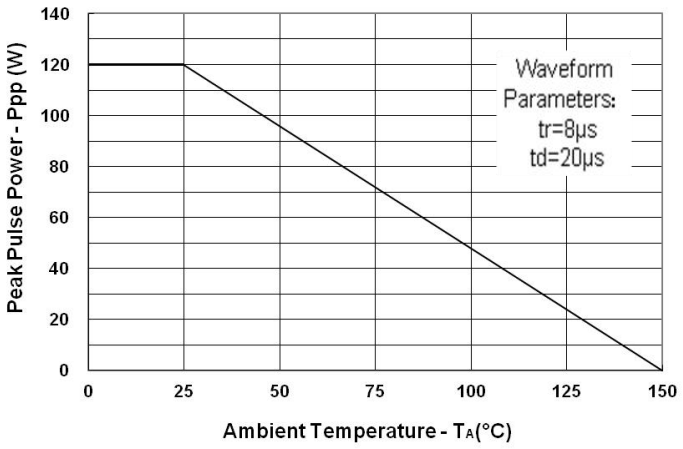


Fig.1 Power Derating Curve

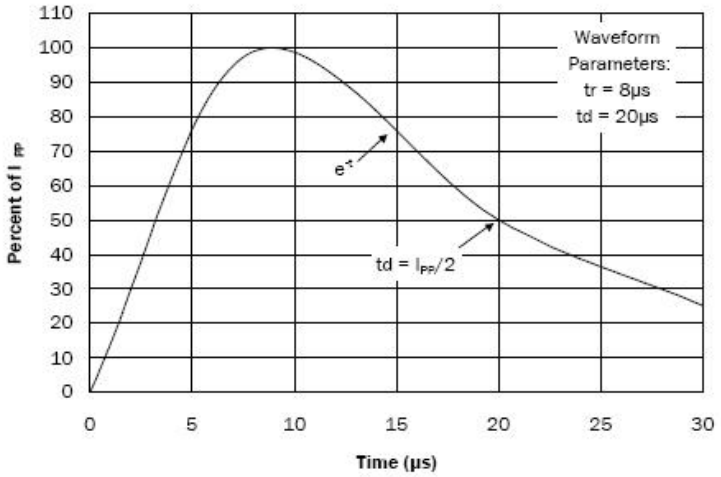


Fig.2 Pulse Waveform

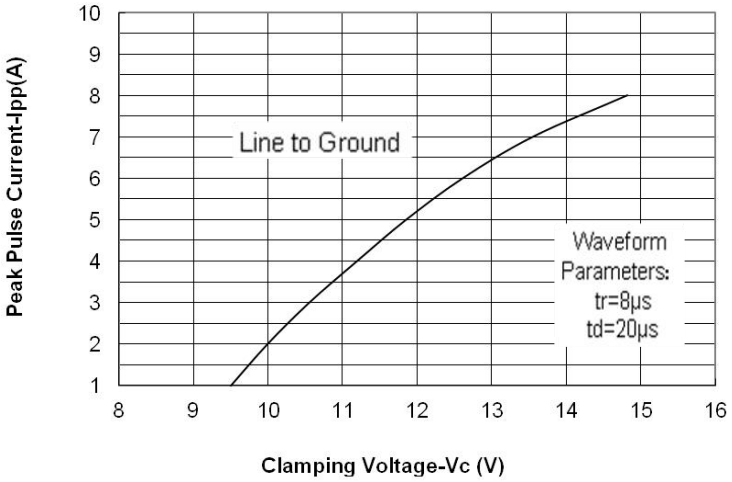


Fig. 3 Clamping Voltage vs. Peak Pulse Current

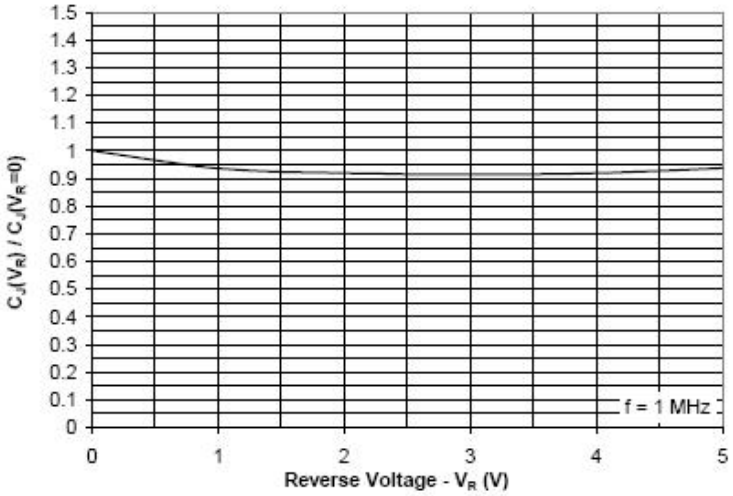


Fig. 4 Normalized Capacitance vs. Reverse Voltage

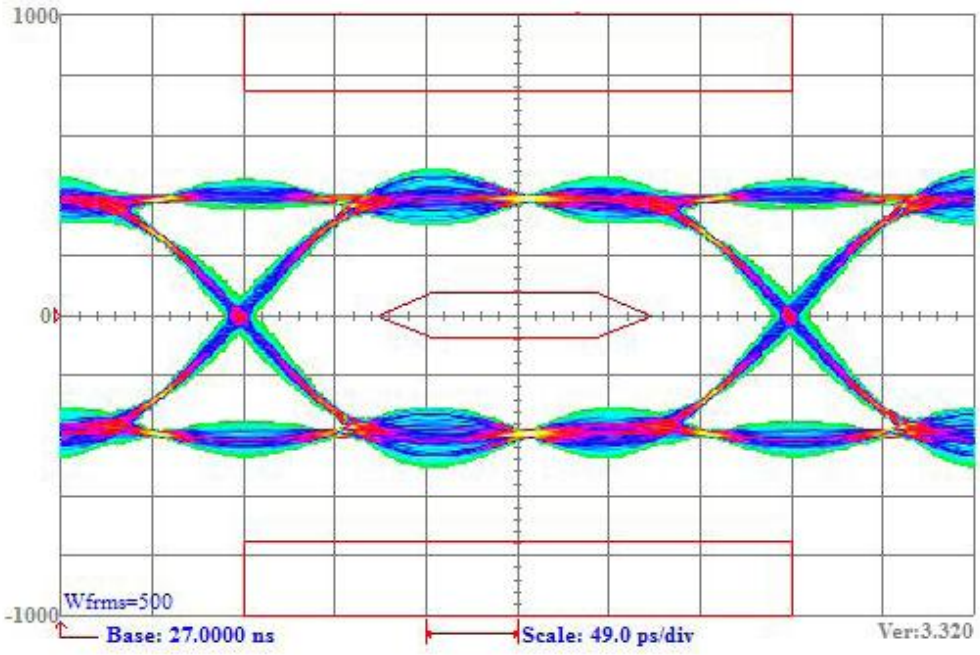


Fig. 5 HDMI 1.4 Eye Diagram

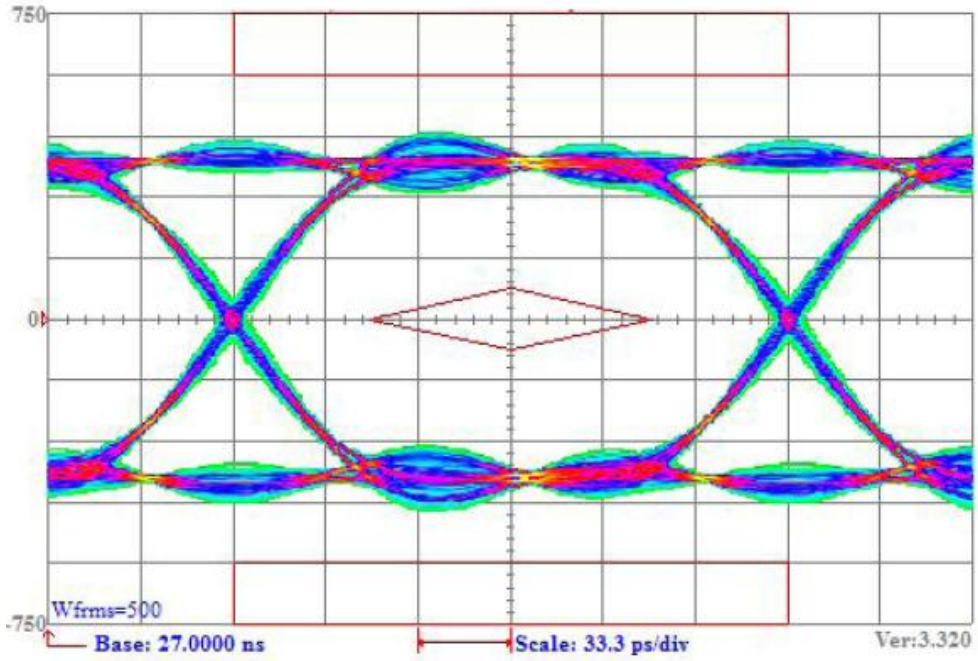


Fig. 6 USB3.0 Eye Diagram

Technical Data
Data Sheet N1680 REV.C

RoHS

Part Name Information

eGuard 05 24 P

- Suffix: P = Ultra-low Capacitance
- Number of lines: 24=2Ground/4Data Lines
- Max Stand-off Voltage: 05=5V_{RWM} (Volts)
- TVS Arrays Product

Marking Diagram

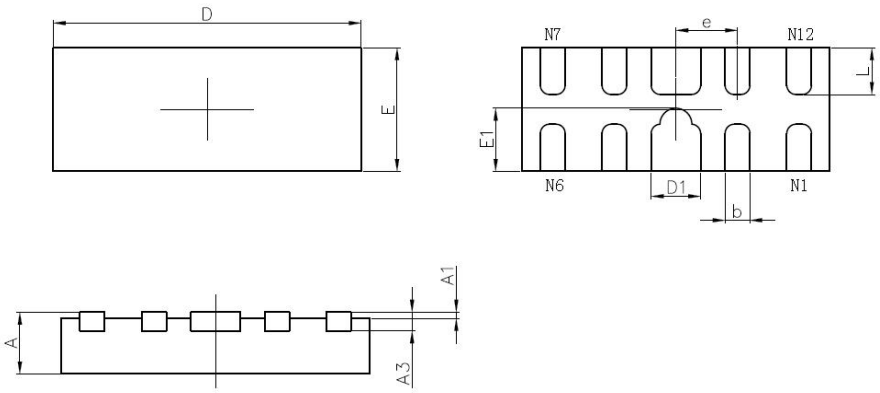


Where 524P is eGuard0524P

524P = Part name
X = Marking code for date code

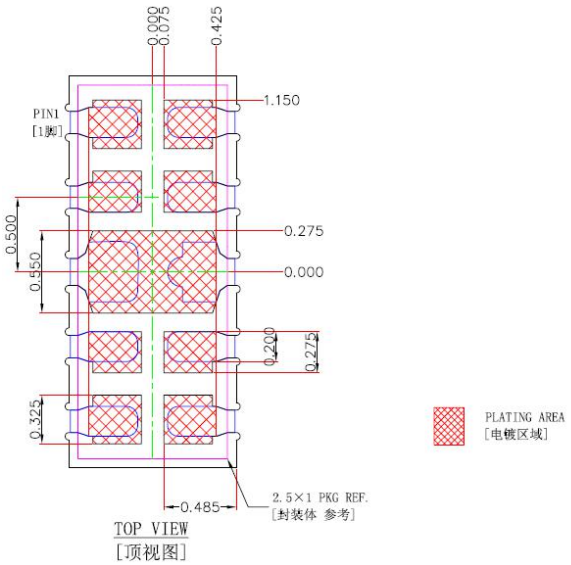
Cautions: Molding resin
Epoxy resin UL:94V-0

Mechanical Dimensions DFNWB2.5×1-10L



SYMBOL	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
A3	0.150 REF.		0.006 REF.	
D	2.424	2.576	0.095	0.101
E	0.924	1.076	0.036	0.042
D1	0.300	0.500	0.012	0.020
E1	0.410	0.610	0.016	0.024
k	-	-	-	-
b	0.150	0.250	0.006	0.010
e	0.500 TYP.		0.020 TYP.	
L	0.304	0.456	0.012	0.018

Soldering Pad Layout (Millimeters)



Technical Data
Data Sheet N1680 REV.C

DISCLAIMER:
1- The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact the SMC - Sangdest Microelectronics (Nanjing) Co., Ltd sales department for the latest version of the datasheet(s).
2- In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, medical equipment , and safety equipment) , safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement .
3- In no event shall SMC - Sangdest Microelectronics (Nanjing) Co., Ltd be liable for any damages that may result from an accident or any other cause during operation of the user's units according to the datasheet(s). SMC - Sangdest Microelectronics (Nanjing) Co., Ltd assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in the datasheets.
4- In no event shall SMC - Sangdest Microelectronics (Nanjing) Co., Ltd be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.
5- No license is granted by the datasheet(s) under any patents or other rights of any third party or SMC - Sangdest Microelectronics (Nanjing) Co., Ltd.
6- The datasheet(s) may not be reproduced or duplicated, in any form, in whole or part, without the expressed written permission of SMC - Sangdest Microelectronics (Nanjing) Co., Ltd.
7- The products (technologies) described in the datasheet(s) are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety nor are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations..