

晶焱科技股份有限公司

AMAZING Microelectronic Corp.



ESD
Leading Provider



Presentation Agenda

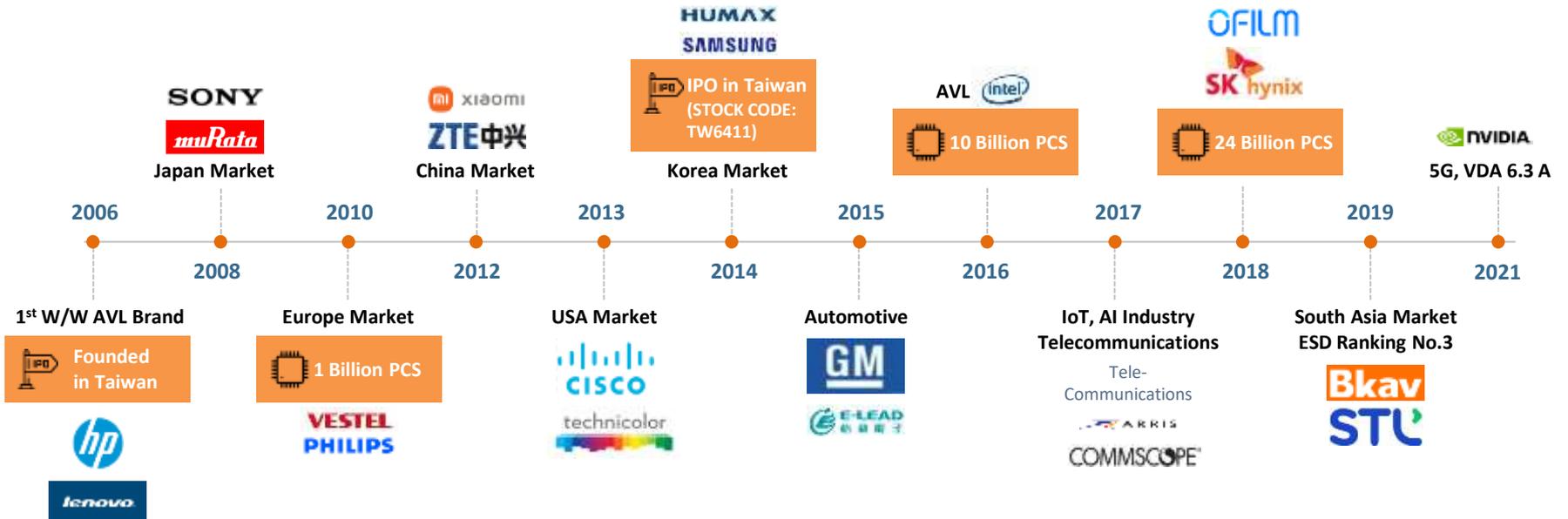
www.amazingIC.com

- 01 About AMAZING
- 02 AMAZING Outstanding
- 03 ESD/EOS Protection Suggestion
- 04 Product Family
- 05 Quality Management
- 06 Summary

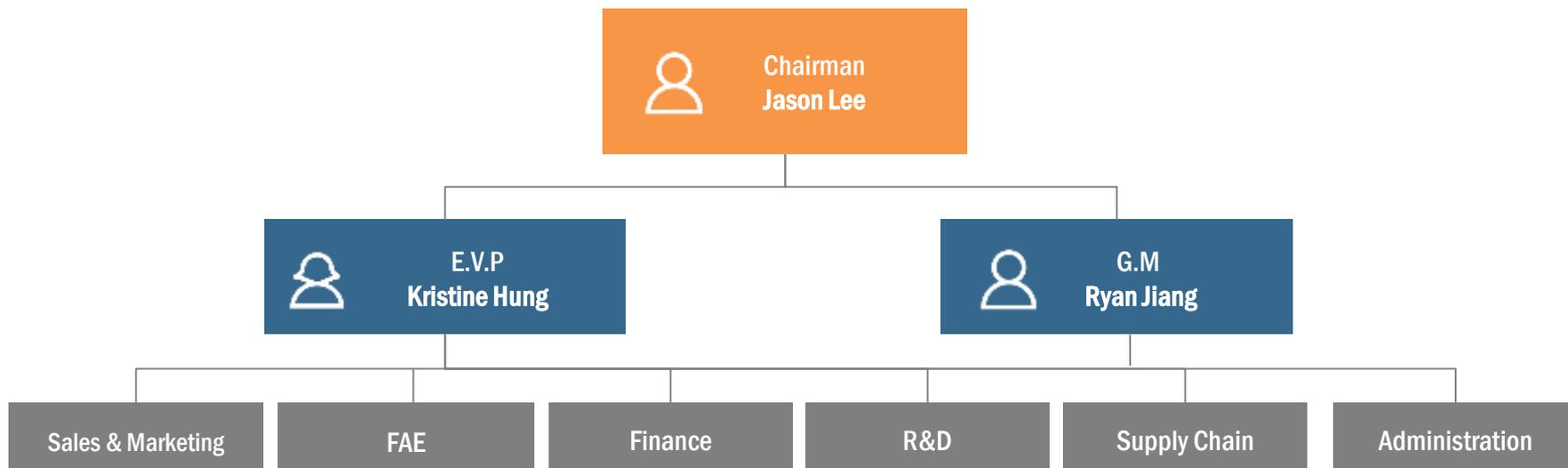
ESD
Leading Provider

About AMAZING

⚡ AMAZING History



AMAZING Organization Structure



⚡ Resources Distribution



47%
R&D Team



43%
Marketing Supply Chain

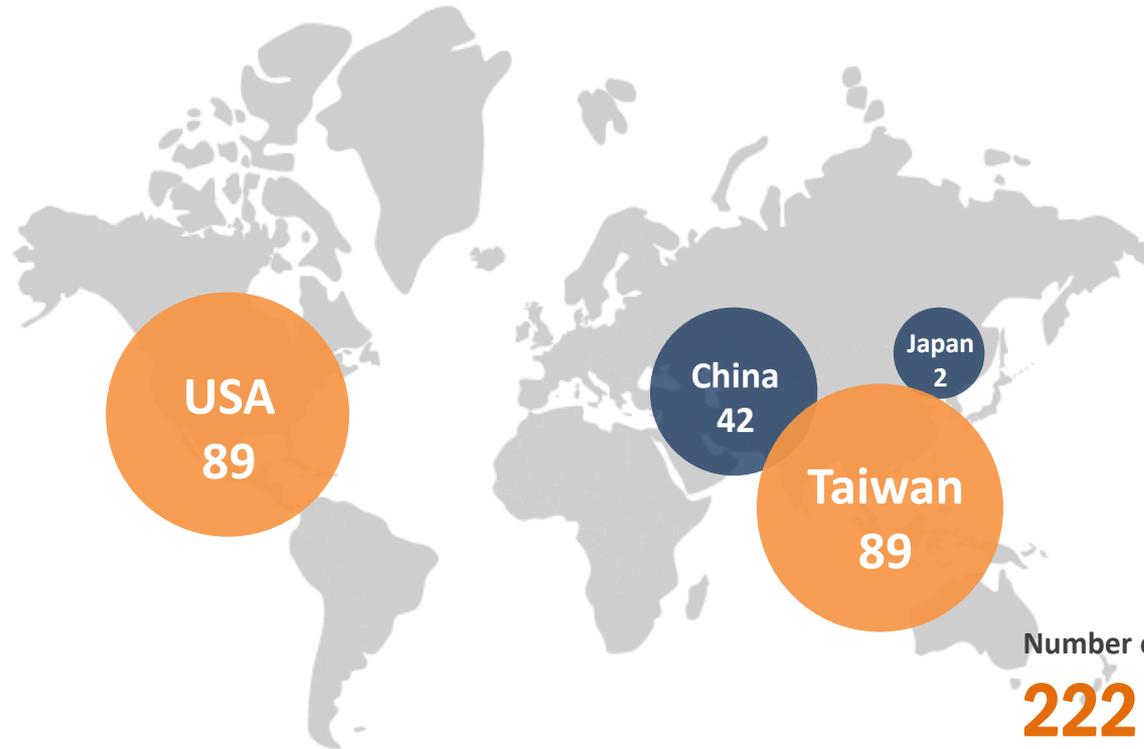


10%
Administration

⚡ Local Resource and Distribution



⚡ Own Number of Patents

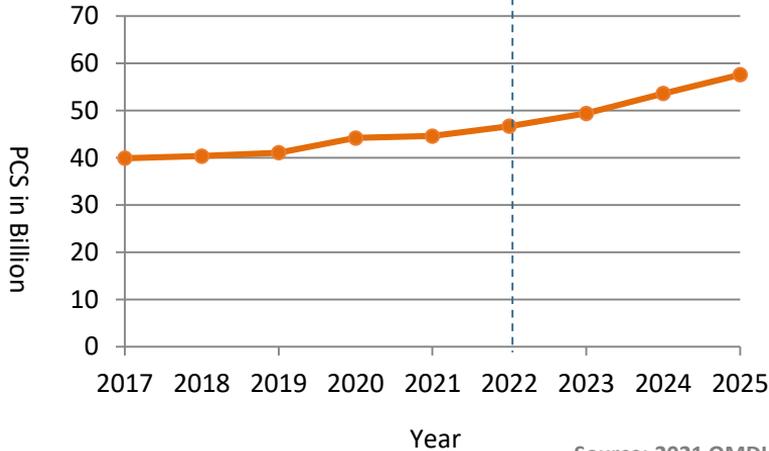


Number of Patent Registered Globally
222



Global ESD/EOS Protection Market

ESD Protection Devices Market Forecasts Predict Growth for 2022-2025



AMAZING in World No.3!

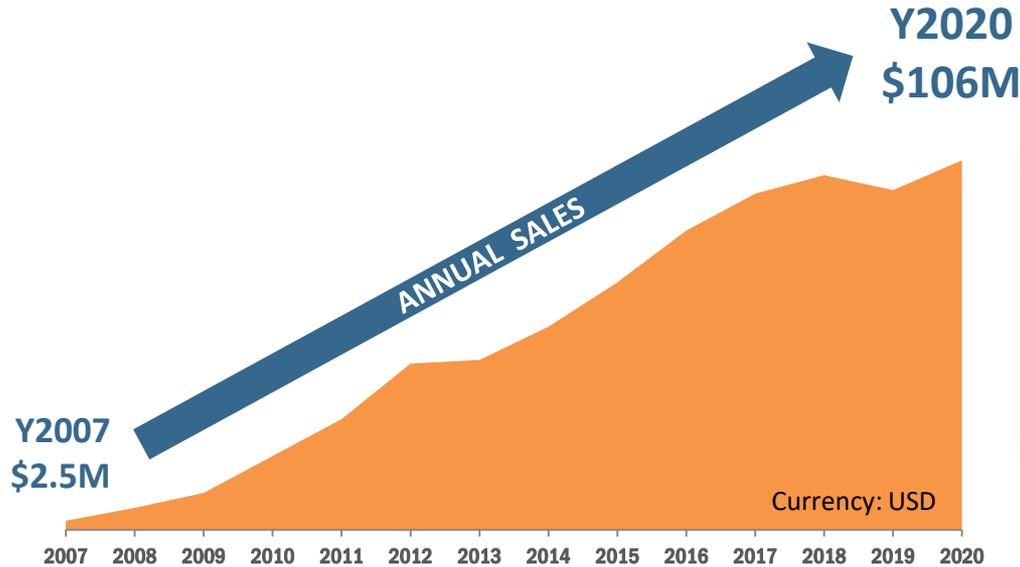
Table 3.3
World Market Shares - Pure ESD Protection Devices
Revenues (\$M)

| | Company Name | 2019 Sales (\$M) | 2019 Share (%) | 2020 Sales (\$M) | 2020 Share (%) |
|---|---------------------|------------------|----------------|------------------|----------------|
| 1 | Nexperia | 189.3 | 24.9% | 192.0 | 24.6% |
| 2 | ON Semiconductor | 104.6 | 13.8% | 105.1 | 13.5% |
| 3 | Amazing | 86.3 | 11.4% | 98.6 | 12.6% |
| 4 | Semtech | 58.6 | 7.7% | 60.3 | 7.7% |
| 5 | ST Microelectronic: | 55.0 | 7.2% | 53.5 | 6.9% |
| 6 | Infineon | 42.4 | 5.6% | 45.6 | 5.9% |
| 7 | ROHM | 43.3 | 5.7% | 39.4 | 5.1% |
| 8 | Littelfuse | 39.1 | 5.1% | 37.1 | 4.8% |
| | Others | 141.4 | 18.6% | 148.0 | 19.0% |
| | Total | 760.0 | | 779.6 | |

Source: OMDIA

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Annual Sales Revenue Growth

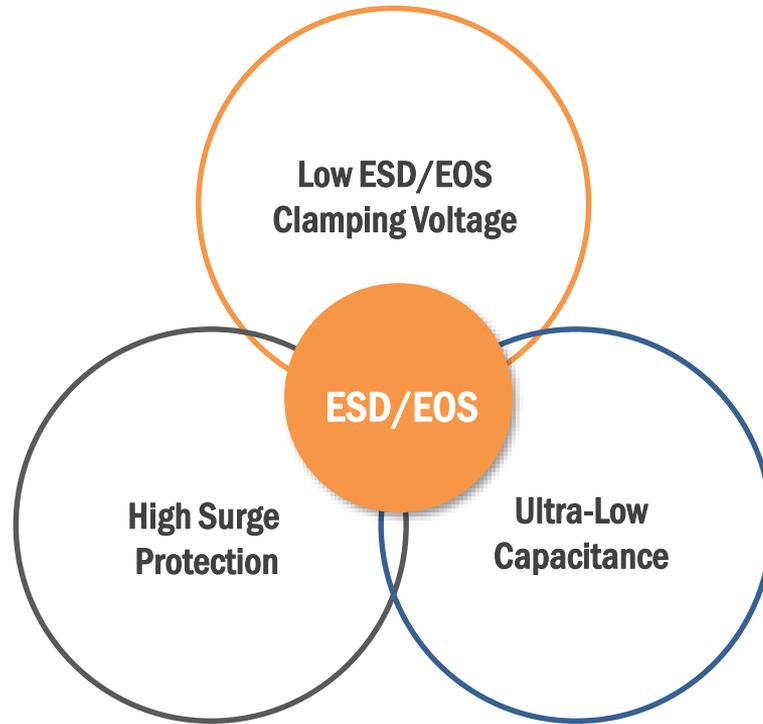


Record High of 2020
106 Millions

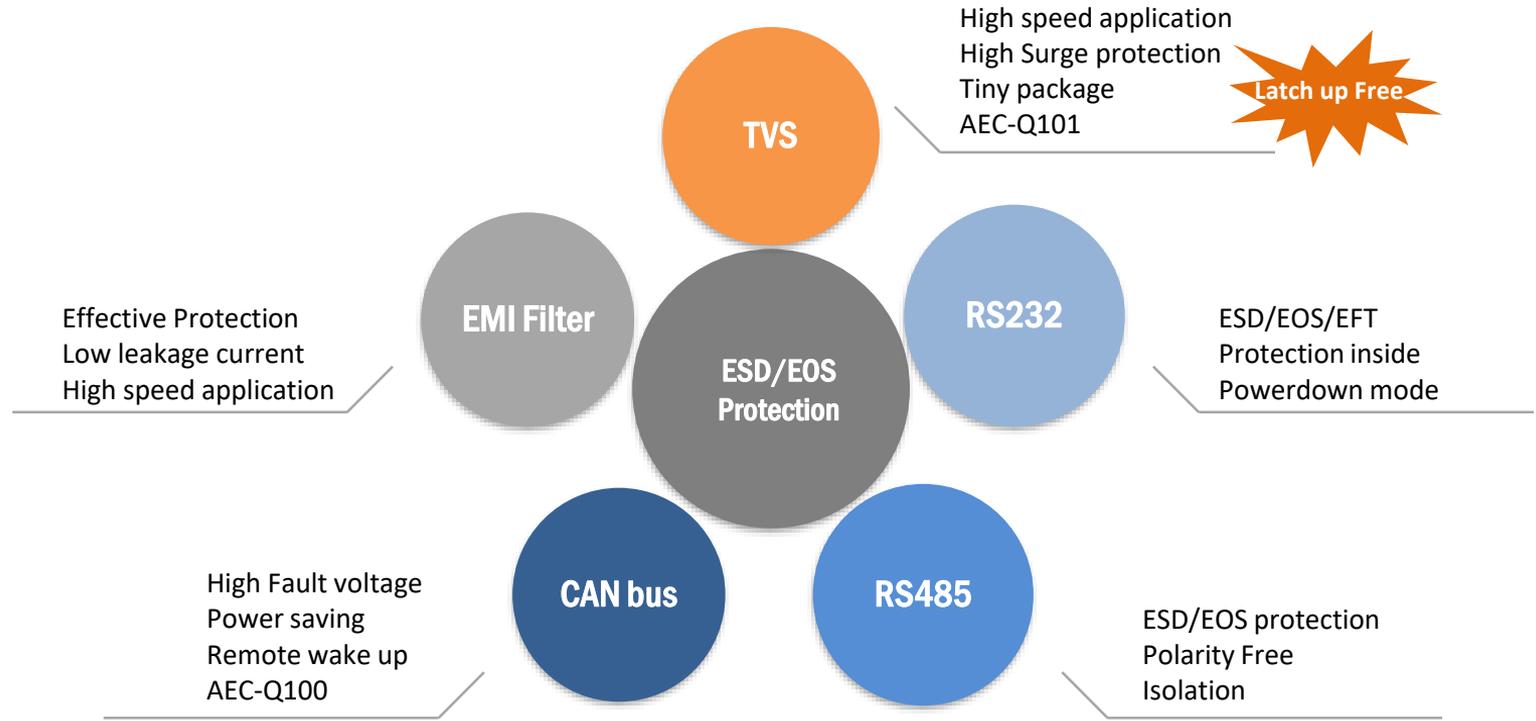
STOCK CODE: TW6411

AMAZING Outstanding

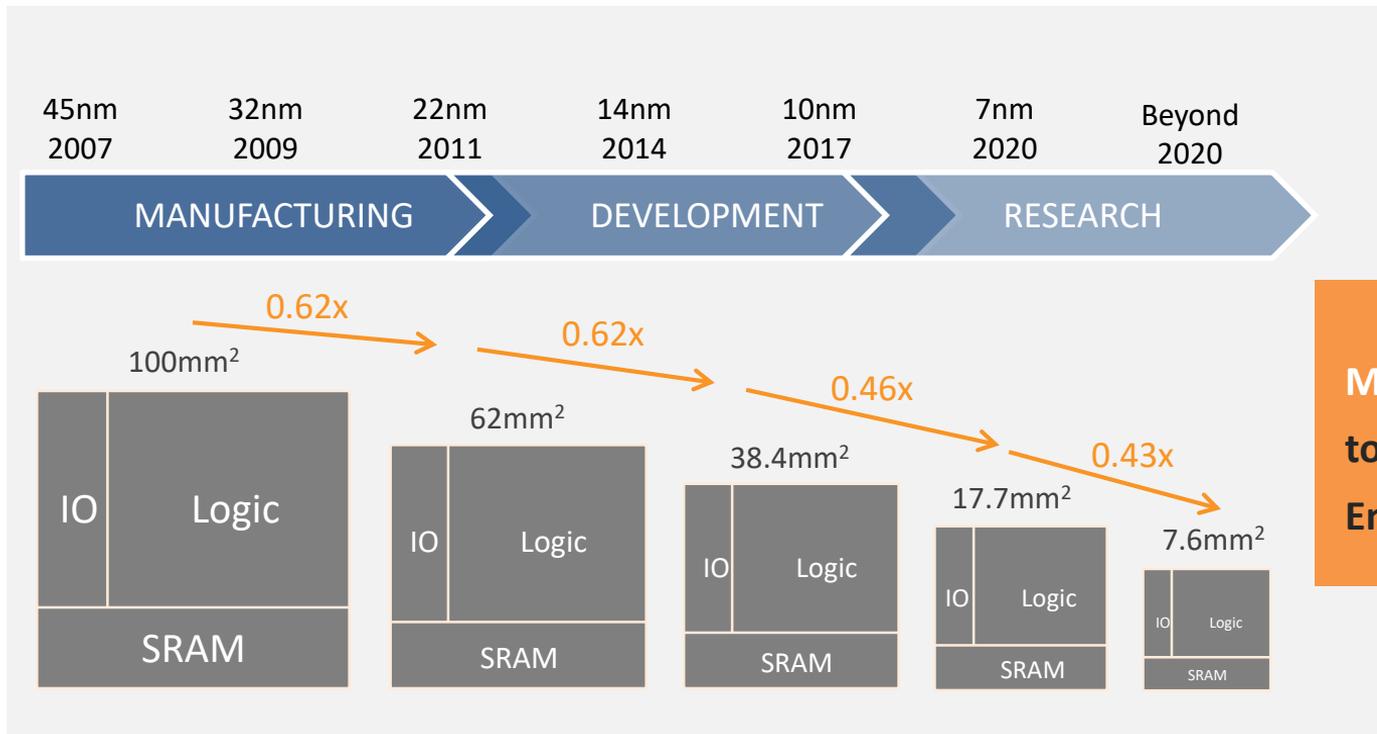
AMAZING Core Technology



AMAZING Product Family

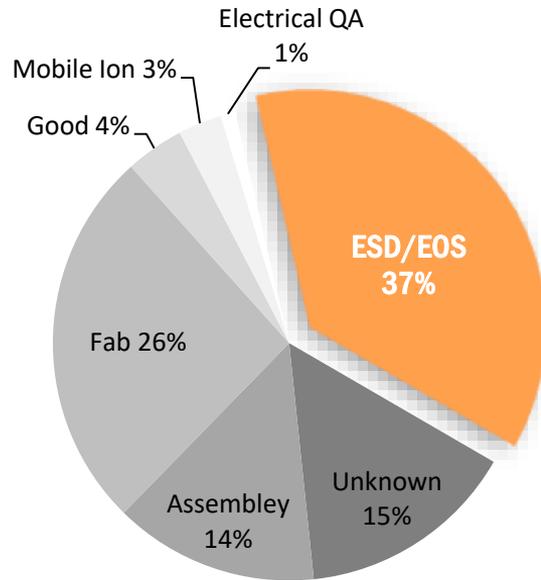


⚡ ESD Robustness of Main-Chip Decrease Dramatically



Main-chip will be Weaker to Withstand ESD/EOS Energy Transient Events.

All Electronics Have High Risk of ESD/EOS



Source: National Semiconductor & American EOS/ESD Association

**IC Failure rate due to ESD/EOS is
Up To 37%**

- Extra Cost for Mass Production
- High Expense to Re-work
- EOS RMA Damages Reputation

ESD/EOS Protection Suggestion

⚡ How to Test the ESD Completely



Hot Plugging often causes

- Serious Damage to the System
- High Risk Field Return



Cable Discharge Event



To Improve the Product ESD/EOS Robustness- Direct Pin Injection Test



- Guarantee the Robustness of product if pass
- Reduce the Damage Risk from Hot Plug Energy
- Improve product Quality and Robustness

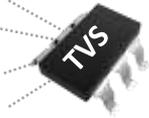


⚡ How to Select the TVS Solution

The Factors of TVS Selection

Various Low Voltage TVS

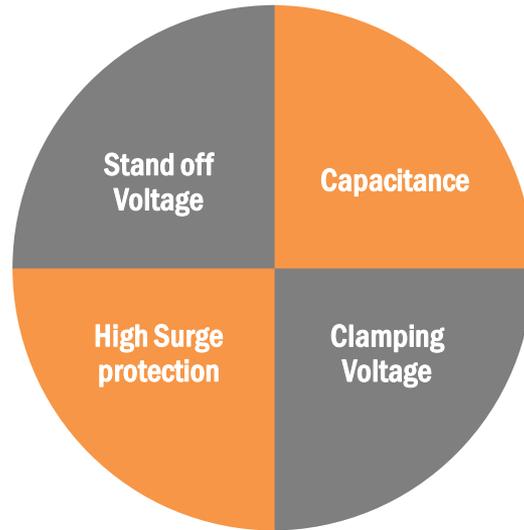
1.2V
1.8V
2.5V
3.3V



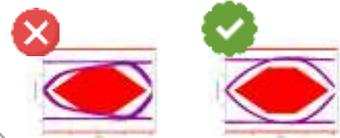
High Surge Level for Reducing EOS



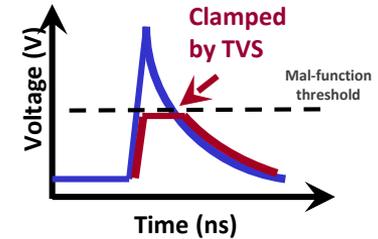
Surge robustness



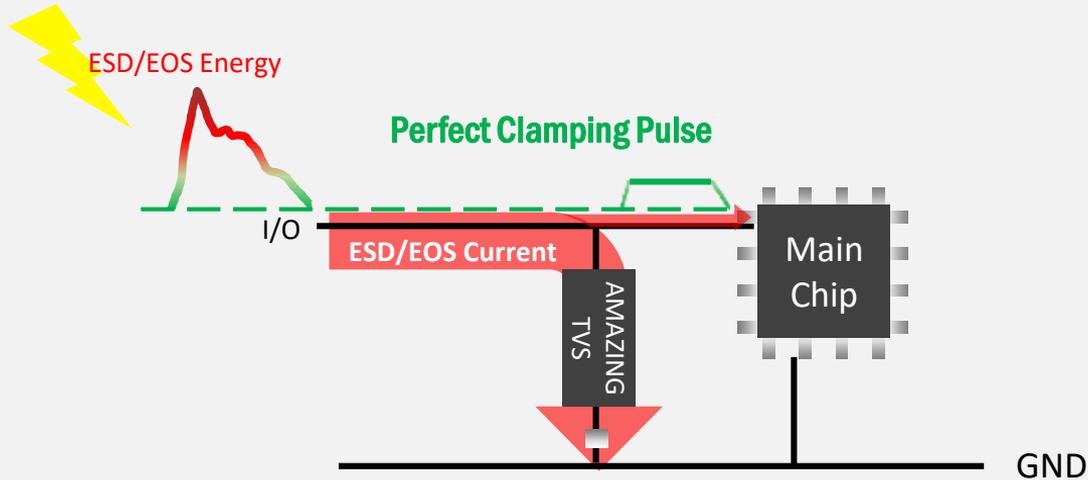
Ultra Low Capacitance



Low Clamping Voltage



⚡ The Most Important Parameter: Clamping Voltage

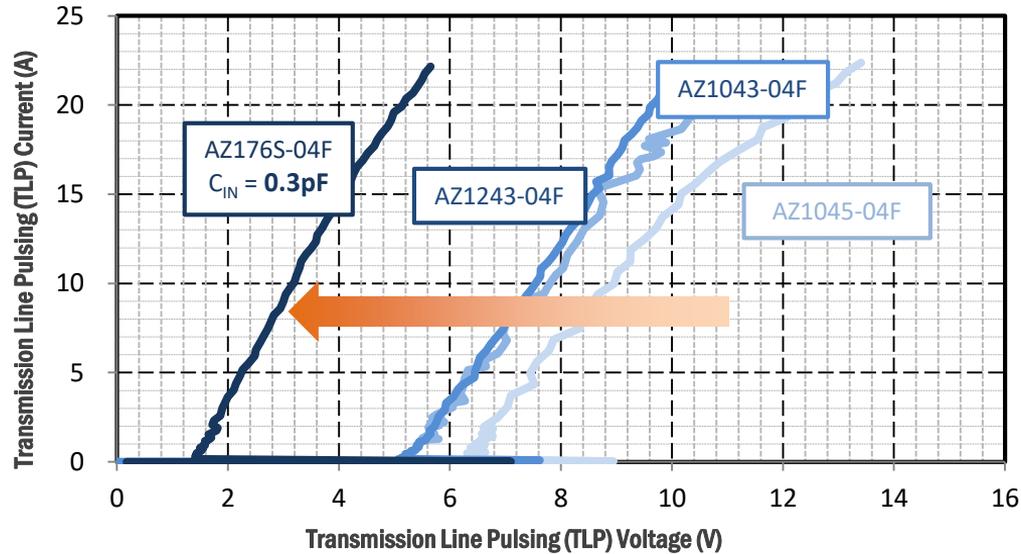


- Bypass the ESD/EOS Current
- Clamp the Voltage at Low Value
- Improve System Robustness



Outstanding Spec.

Transmission Line Pulsing (TLP) Measurements



AMAZING Keeps Offering

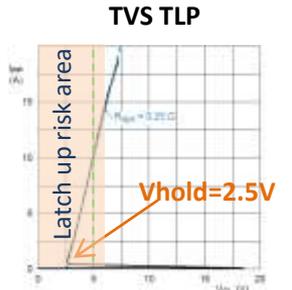
- Low clamping voltage
- Ultra-low Capacitance
- High Surge Performance

to Enhance System ESD/EOS Robustness.

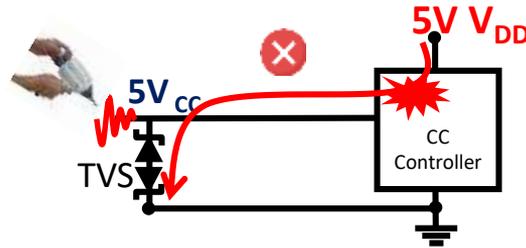
But...

⚡ TVS Selection Issue - Latch Up

The Holding Voltage (V_{hold}) must be Bigger than Working Voltage (V_{RWM}) to Avoid the Latch Up Risk.



5V TVS with $V_{hold} = 2.5V$



Serious Issues Caused by Latch Up

System Signal Abnormal



Latch up issue effect the system signal.

Serious Burn Out Risk



High Current through the IC will has the risk to burn out.

Business Reputation Loss



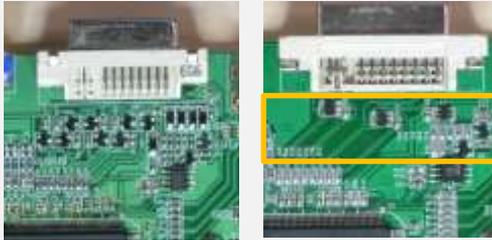
Pay huge indemnity and loss for the company credibility

⚡ TVS Benefit for Customer



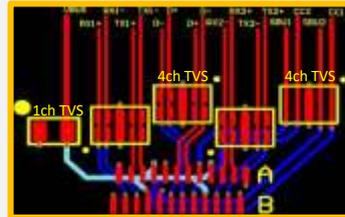
TVS Array

Traditional Diodes **AMAZING TVS Array**



**Save PCB Area
Save Cost**

Feed Through Design



Easy to Design

Pin Compatible for Same Package



**Multiple ESD and EOS Protection
Solution**

EMI Filter, RS232, RS485, CAN bus Series

Robust Design

Provides ESD, EFT
and Surge protection



Patents

Over 21 worldwide patents



Customized

Enhance specific parameters



⚡ Traditional One Channel vs TVS Array

| | Single Channel TVS | TVS Array |
|--------------------|---|---|
| |  |  |
| Cost | Normal | Save Money 🏆 |
| PCB Occupied Area | Large Area | Save Area 🏆 |
| Function | Normal | Better 🏆 |
| Environment Effect | Normal | Eco-Friendly 🏆 🌿 |
| Application | Power Line, Control Signal | Differential Pair 🏆 |

⚡ IC Integration Comparison

| | Traditional | AMAZING |
|-----------------------|--|--|
| |  <p>Interface IC + ESD Protector</p> |  <p>Interface IC + ESD In a Single Device</p> |
| Device No. | Many | Only One  |
| Integrated Efficiency | Low | High  |
| Cost | Cost High | Low  |
| PCB Space | More | Less  |
| ESD Protection | Weak | Good  |
| Environment Effect | Normal | Eco-Friendly   |

AMAZING Product Family

ESD Protection Device Product Families

Cover the widest range of ESD protection device spec in the market with more than **400 items** !

| Family | Functions |
|--------|---|
| AZ1 | High Speed , ESD/EFT/Lightning/EOS Protector |
| AZ2 | Low Speed , ESD/EFT/Lightning Protector |
| AZ3 | Lightning Protector |
| AZ4 | High Voltage (> 5V) , ESD/EFT/Lightning/EOS Protector |
| AZ5 | Tiny Package , ESD Protector |
| AZ6 | Low Voltage (<3.3V) , ESD Protector |
| AZ9 | Automotive Application, ESD Protector, AEC-Q101 |
| AZC | Customization , High Speed, ESD Protector |

Transceiver IC Product Families

RS232 Transceiver Series for Industry Application

| Family | Functions |
|--------|-----------|
| RS232 | 4T/5R |
| RS232 | 2T/2R |
| RS232 | 3T/5R |

RS485 Transceiver Series for Industry Application

| Family | Functions |
|------------------------|--|
| Surge RS485 | 30A Surge Protection RS485 with H/L Speed |
| ESD RS485 | System 15kV ESD Protection RS485 |
| Polarity Free RS485 | Transceiver with Bus Polarity Free Function |
| Low Power RS485 | 3.3V RS485 with H/L Speed |
| Ultra High Speed RS485 | 60Mbps Ultra High Speed RS485 |
| Profi-Bus RS485 | RS485 Transceiver for Profi-Bus Application |
| RS232 Series | Multi-Channel RS232 Transceiver |

CAN bus Transceiver Series for Automotive Application (AEC-Q100)

| Family | Functions |
|------------|--|
| Automotive | 5Mbps CAN-FD Bus Transceiver with Standby mode for Automotive application |
| Industrial | 5Mbps CAN-FD Bus Transceiver with Standby mode for Industrial application |



AMAZING's Products Apply on All The Applications



3C Peripheral



NB, TV, Monitor



Industrial



Medical Electronic



Networking



Automotive



Aerospace



LCM(Panel)

⚡ Global Partnerships

Reference Design



ALI
ASMEDIA
AMBARELLA
EETI
ELAN
FRESCO LOGIC
FOCALTEK
GENESYS logic

HISILICON
MEDIATEK
NOVATEK
REALTEK
RICHTEK
SPREADTRUM
WELTREND

Contract Manufactories



ALTEK
ACCTON
ARCADYAN
AUO
AMTRAN
ASTEELFLASH
BENCHMARK
BOE
CORETRONIC
CVTE
CHICONY
E-LEAD
FABRINET
FAURECIA CLARION ELECTRONICS

FLEX
INVENTEK
INNOLUX
INTEGRATED MICRO-ELECTRONICS
JABIL
KEYTRONIC
LACROIX ELECTRONICS
LUXSHARE
MITRASTAR
MOXA
MURATA
PLEXUS
PRIME
QISDA

RAKEN
SANMINA
SANDMARTIN
SERCOM
SFO TECHNOLOGIES
TERRATEK
TPV
VENTURE
VVDN TECHNOLOGIES
WINGTEK
WNC
ZINWELL
ZOLLNER

⚡ Global Partnerships – Brand Company

Automotive



Cellular Handsets



Medical + Industrial



Computer & Office



Consumer



Telecoms & Other Communications



Quality Management

AMAZING Quality Policy



- To Furnish Competitive Grade Product Quality
- To Provide Satisfactory Level Customer Service
- To Carry Out Hazardous Substance Prevention Activities
- To Implement Hazardous Substance Free Management Task



ISO 9001



ISO 14001



ISO 45001

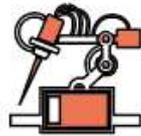


IECQ QC080000

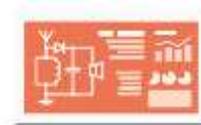


VDA 6.3 A Class

Production Management



Specified Production Line for AMAZING Only



Key Parameter On-line monitor



Specified Operator for AMAZING Only



AMAZING Quality Staff On-Site Audit

Green material / Product management



Regulation request



Customer request



Others
(ex: Phthalates)

PCN/EOL Rule

PCN

- Inform customer **6 months** before change
- PCN items including Design, Processing, Logistic, Manufacturing location, Quality/Reliability, Material change, add or update

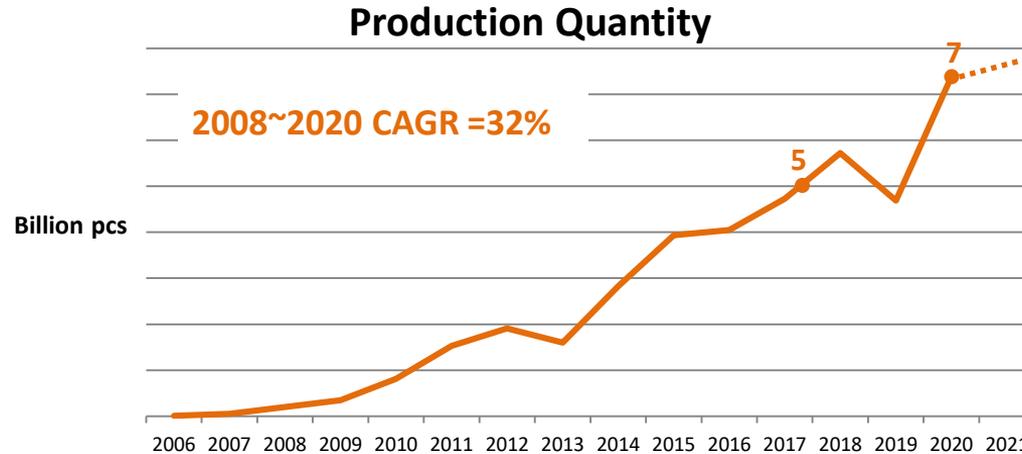
EOL

- Inform customer **12 months** before EOL
- There will be no shipment after EOL activated (indicated in EOL letter “last ship date”)



Capacity Management

- Sign Off **Long Term Agreement(LTA)** with Foundry for Secure Wafer Capacity
- **Specific Line Investment** for Secure Assembly & FT Capacity
- Partnership with Worldwide **Top 3 Small Package Suppliers**
- Actual Production Q'ty CAGR = 32% in Last 13 Years



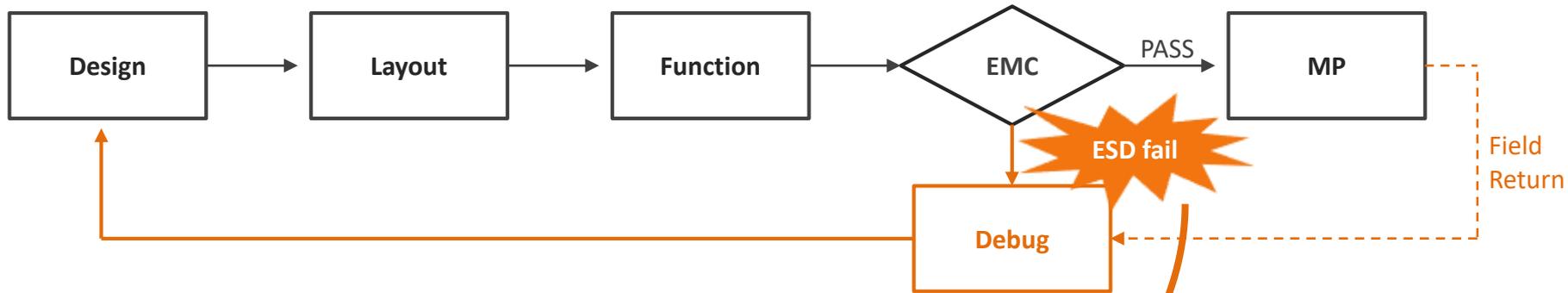
AMAZING - A Virtual IDM

| Item | IDM | AMC (Virtual) |
|------------------------------|--|---|
| Flexible Capacity Adjustment | At least 1 year | Within 6 Months  |
| Good Risk Management | Single Production Side | Multiple Production Sides  |
| Short Delivery Time | >16 Weeks | 8 ~ 12 Weeks  |
| Stable Supply | Share Capacity with Different Product, such as MOSFET, Diode, Transistor, etc. | 100% Capacity for TVS  |
| Product Types | Less | More  |
| Wafer Process Variety | Less | More  |
| Package Variety | Less | More  |

Summary

⚡ AMAZING Can Help!!!

> Product design flow



AMAZING Can Help!!!

1. Provide proper **TVS Solution**
2. Robustness **ESD/EOS Protection**
3. Reduce **Field Return Rate**
4. Save **Product Design Cost and Time**

What can Amazing offer?

The Best Specification

- Lower Clamping Voltage
- Ultra Low Capacitance for Signal Quality
- Array Solution Saving PCB Area and Part Counts

Debug Service

- Provide Pre-Test Support by Own ESD Lab
- Provide Debug Service



Develop New Solution

- Amazing is Willing to Cooperate with Customer to Develop New Product if the Advance Solution is Preferred by Customer

Design Consult

- Provide ESD/EOS Prevention Consult
- System Design and Technique Support

ESG is the Next Big Thing



Ready to Get More ESD?

Technical Article

<https://www.amazingic.com/en/application/Technical-Share>

It's AMAZING

<https://www.amazingic.com/en/video/AMAZING>

Why Did Dinosaurs Disappear?

<https://www.amazingic.com/en/video/dinosaurs>

