

ESD SOLUTIONS AT YOUR FINGERTIPS

SOFICS IP & SERVICES
H1 2018

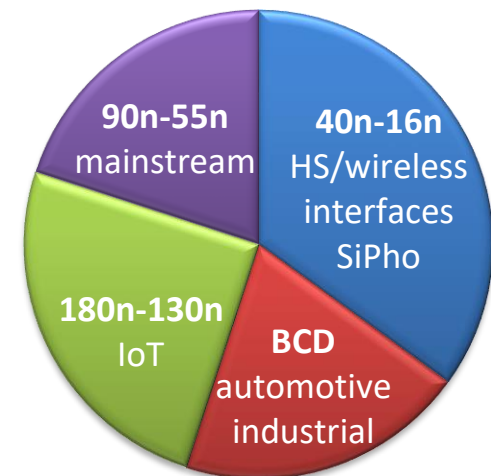
The logo for SOFICS is contained within a large white oval on a blue background. The word "SOFICS" is written in a bold, dark red serif font, with a registered trademark symbol (®) to its upper right. Below "SOFICS" is the tagline "SOLUTIONS FOR ICS" in a smaller, blue, sans-serif font. To the right of the text is a blue graphic element consisting of two curved lines that form a partial circle or swoosh.

SOFICS[®]
SOLUTIONS FOR ICS

Sofics in the market place

ESD/EOS/EMC/Latch-up solutions for ICs

- Sofics aspires to be the 1st partner for on-chip ESD solutions to:
 - enable specialty/advanced IO performance leak, PWR, speed, noise, OVT...
 - enhance robustness for harsher specs EOS, EMC, IEC/System
 - reduce cost of design, silicon and time-to-market masks, re-spins, area, IP, down to 16n
- Sofics is a foundry-independent IP provider
 - 60+ fabless – repeat business
 - 15+ IDM – repeat business
 - 10+ foundries
 - 50+ processes
 - 1 new volume production release per day



Process coverage

- Mature to advanced CMOS
 - 180nm: TSMC, UMC, Silterra
 - 130nm: TSMC, UMC, TowerJazz, Altis/Xfab, HHGrace
 - 110nm: HHGrace, Lfoundry
 - 90nm: TSMC, SMIC
 - 65nm: TSMC, UMC
 - 55nm (optical shrink): TSMC, GF
 - 40nm: TSMC, SMIC, UMC
 - 28nm: TSMC, UMC
 - 16nm: TSMC
 - 12nm: TSMC – on-going
 - 7nm: Development to start in H2-2017



Process coverage

- High voltage and BCD processes
 - TSMC 0.35um HV CMOS – 15V
 - TSMC 0.35um BCD
 - TowerJazz 0.35um BCD
 - TSMC 0.25um BCD
 - Generation I, II
 - ESD solutions available for free
 - Royalty paid for by TSMC
 - TSMC 180nm LDMOS – 32V
 - TSMC 180nm BCD
 - Generation I, II
 - UMC 180nm BCD
 - TowerJazz 180nm BCD
- SOI and specialty
 - Xfab 1um HV SOI
 - STmicroelectronics 130nm (PD)
 - GlobalFoundries 130nm SOI
 - Proprietary technology 90nm (BST)
 - Proprietary technology 65nm (PD)
 - GlobalFoundries 9HP BiCMOS

3 reasons why companies use Sofics solutions

1. Enable specialty or advanced I/O performance

- Y Leakage/Power
- Y Speed/Noise
- Y Over/under-voltage

2. Enhanced robustness for harsher specs

- Y System level/IEC
- Y EMC
- Y EOS

3. Reduce design and silicon cost

- Y Process/masks
- Y Silicon/area
- Y Time to market/IP-proven



Track record: Severe reliability requirements

- **Severe component level ESD or system level ESD**
 - 8kV HBM, 800V MM
 - Applications: HDMI, timing controllers
 - 8kV IEC 61000-4-2
 - Applications: USB 2.0, analog switches, HDMI
- **EOS compatibility**
 - IEC 61000-4-5: System level EMC requirement (switching / lightning events)
 - Applications: timing controllers in flat panel displays
 - High voltage tolerance: 2x to 10x Vdd in CMOS
 - Applications: Analog sensor inputs, Non-volatile memory program/erase
- **Latch-up and transient latch-up**
 - ESD stress during functional operation

Track record: enable specialty IO performance

- ESD clamps with **low parasitic capacitance**
 - 100fF capacitance or lower
 - Protection of wireless applications, high speed digital interfaces, Silicon Photonics
- **High voltage tolerance ESD solutions**
 - 12V in 28nm CMOS
 - Applications: Analog sensor inputs, Non-volatile memory program/erase
 - Tolerance for negative voltage swings
- **Low leakage ESD solutions**
 - 10pA leakage
 - Analog sensor applications
 - Enhance battery life
 - IoT – cyclic power-up / power-down

Track record: reduce cost

- Reduce design cost
 - Save \$50k to \$100k
 - Silicon proven solutions, no need for new developments
 - Reduce time to market by months
- Reduce mask cost
 - Remove ESD-specific masks with Sofics solutions
 - Example: 50\$ lower cost per wafer
- Reduce manufacturing cost
 - Reduce chip area
 - Example: 10% die size reduction for Display Driver chip
 - Example: \$1M higher margin thanks to more dies on a wafer

Contact us

- Sofics contact

Bart Keppens

SOFICS bvba

bkeppens@sofics.com

new engineering office address

Sint-Godelievestraat 32

9880 Aalter, Belgium

(tel) +32-9-21-68-333

(fax) +32-9-3-746-846

www.sofics.com



PowerQubic, TakeCharge, Sofics are registered trademarks of Sofics bvba