2024

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AMS & P&D
Growth Products
*introductions as @**Q1**'24*

EMEA Product Marketing

Analog & Sensors

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Q1

VL53**L4ED** extended temperature capability

Time-of-Flight high accuracy proximity sensor with extended temperature capability

Highlights

- **VL53L4ED**
  - Single-zone ToF
  - High performance proximity sensor
  - Short distance linearity down to 1mm
  - From 0 to 1300mm with full field-of-view
  - 18° diagonal FoV
  - Extended effective temperature range of **-40°C to 105°C**
  - Up to 800 mm ranging under 5 kLux
  - Fast ranging frequency up to 100 Hz
  - 4.4 x 2.4 x 1 mm size
  - Pin-to-pin compatible with VL53L4CD

Extended Temperature range

Tools

Evaluation Kits:

X-NUCLEO-53L4A3
P-NUCLEO-53L4A3
SATEL-VL53L4ED

Software:

Ultra-Light Driver
GUI for X-Nucleo board
Linux Driver
X-Cube example

Documentation

Datasheet
User manual & AN

Applications

- **Typical use-cases**
  - Industrial automation & Security systems
  - Touchless button for Industrial tools
  - Industrial manufacture assistance
  - Liquid level monitoring (container, tanks, etc).
- **Applications**

Tank

Industrial tools

Smart storage

Logistics & Industrial

Q1

What is your VL53L4 product?

Which ToF sensors should you choose from our VL53L4 family?

Close distance Linearity

Ultra-low Power Mode

1 Time-of-flight high accuracy proximity sensor with excellent short distance linearity

VL53L4CD

Single-zone

Package size :

4.4 x 2.4 x 1 mm

FoV : 18°

Distance measurement : up to 1.3 meters

Ranging under ambient light (5 klux): 80cm

Close distance linearity : >0.1cm

Typical power Consumption: 22mA

down to 55 µA with ultra-low power mode

Histo

Histogram Multi-object Detection

Long ranging distance

2 Time-of-Flight sensor with extended range measurement

VL53L4CX

Single-zone

Package size :

4.4 x 2.4 x 1 mm

FoV : 18°

Distance measurement : up to 6 meters

Ranging under ambient light (5 klux): 180cm

Close distance linearity : >1cm

Typical power Consumption: 19mA

Extended Temperature range
-40°C to 105°C

3 Time-of-Flight high accuracy proximity sensor with extended temperature capability

VL53L4ED

Single-zone

Package size :

4.4 x 2.4 x 1 mm

FoV : 18°

Distance measurement : up to 1.3 meters

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TSC2020

100V precision bidirectional current sense amplifier

Flexibility

- **Bidirectional current measurement**
- High side or low side configuration possible
- Supply voltage range: 2.7V. to 5.5 V

High Performance

- Offset voltage: ± 150µV max.
- Offset drift: 0.5 µV/°C max.
- High common-mode rejection: 100dB min.
- **Internal fixed gain 20 V/V**
  - Gain error: 0.3% max.
  - Gain drift: 3.5 ppm/°C max.
  - **Gain x50 and x100 in coming quarters**
- Bandwidth: typ. 700 kHz

Robustness

- **-4 to 100 V operating voltage on inputs**
- Enhanced PWM rejection
- 2 kV HBM ESD tolerance
- Extended temperature range : -40 °C to +125 °C
- **AEC-Q101 qualified**: TSC2020I**Y**
- SO8 and MiniSO8 packages

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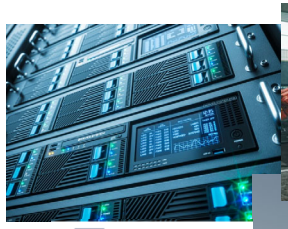
SO8

Mini SO8

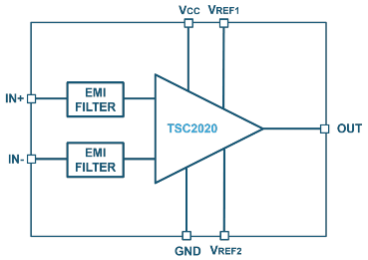
Applications

- *48V systems*
- *Motor control*
- *Lighting*
- *Data Centres*
- *Automotive*



ST Competitive Edge

- Wide common mode voltage
- Bidirectional sensing
- Integrated solution
- Embedded EMI filters
- High accuracy



Competition:

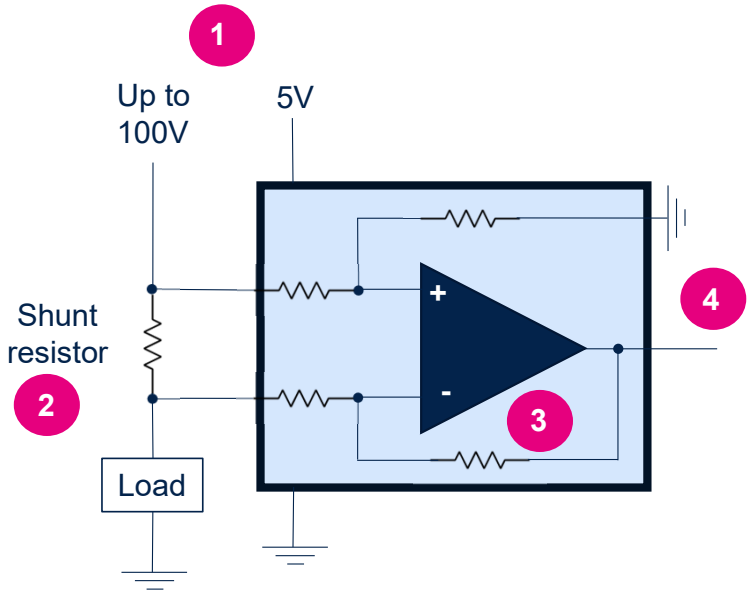
- TI: INA240
- ADI: AD8418

Product Saletype

- **TSC2020IDT/IST**, DCPL 0.9756 Euros
- **TSC2020IYDT/YIST**, DCPL 1.1707 Euros

TSC2020 vs discrete

Discrete solution versus a dedicated current sense amplifier



1. Independent voltages
   Power rail voltage can be higher vs. supply voltage
2. Precision current sense with low offset allows smaller shunt resistor and less power dissipation

   TSC2020 is a bidirectional current sense amplifier, replacing 2 discrete op amps (for 2 directions) + all resistors
3. High accuracy and matched resistors for superior gain performance
4. OUT can be connected to a low voltage ADC or MCU

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TSC2020

100V precision bidirectional current sense amplifier

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High Performance

- Offset voltage: ± 150µV max.
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- High common-mode rejection: 100dB min.
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SO8

Mini SO8

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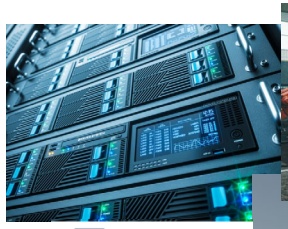
- *Motor control*
- *Lighting*
- *Data Centres*
- *Automotive*



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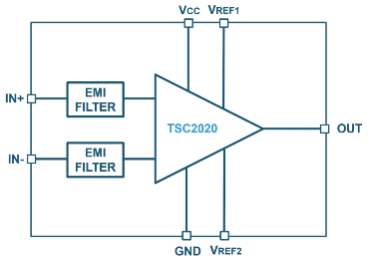

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Power & Discrete

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RF IPD

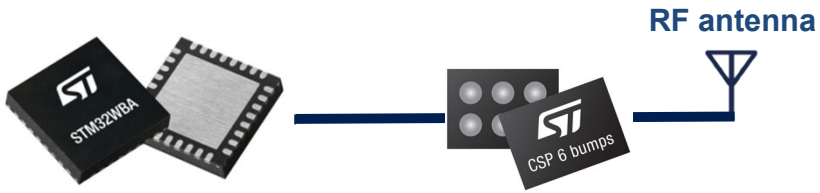
LONGEVITY 10 YEARS COMMITMENT

MLPF-WB-04D3

Matched Low-Pass Filter for STM32WBA series

High RF performance in low PCB footprint

- **Simpler integration**
  - Impedance matching, harmonics filtering and antenna protection
- **Cost effective**
  - BOM reduction and reliability improvement
- **Efficiency**
  - Optimizes wireless performance



Chip Scale Package on glass 6 bumps
1.00 x 1.60 x 0.63 mm

Applications

- *BTLE 5.4, IEEE 802.15.4, Zigbee, Thread, Matter*
- *Alarms, appliances, lighting, Door locks*
- *Smoke detectors, Heating/Cooling systems*
- *Wearable and medical equipment,*

Competition

- Discrete RF passives

ST Competitive Edge

- Co-designed and optimized in ST by STM32 and RF IPDs design teams
- Glass substrate is less sensitive to process and temperature variation
- PCB space reduction with higher RF performance vs discrete solution

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BALUN

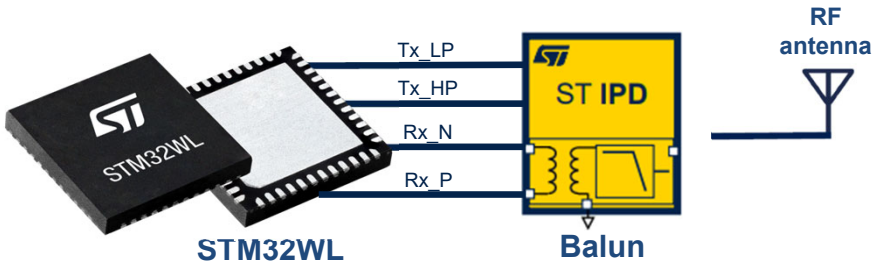
LONGEVITY 10 YEARS COMMITMENT

BALF-WL-00D3

868-928 MHz RF balun and filter with 2 power modes for STM32WL

Simplifying the RF complexity

- **Two RF transmission paths enabling adjustable output power:**
  - Low power (up to 22 dBm)
  - High power (up to 27 dBm)
- **Simplify matching and filtering network complexity**
  - Single chip integrates: Rx and two Tx matching networks (low power, high power), balun, harmonic filter, and ESD shunt inductor
- **Bill of material reduction and 85% PCB space saving on PCB**
  - Alternative to discrete solution



Chip Scale Package on glass 15 bumps
2.40 x 2.70 x 0.63 mm

Reference design

life.augmented **B-WL5M-SUBG1** : Connectivity expansion board with STM32WL5MOC module

Applications

- *Multiprotocol LPWAN, LoRa networks,*
- *Smart metering* LoRaWAN®
- *Asset tracking* sigfox verified
- *Alarm systems*
- *Industrial IoT, smart cities and buildings*

Competition

- Discrete RF passives

ST Competitive Edge

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STPOWER SiC MOSFET Gen 3

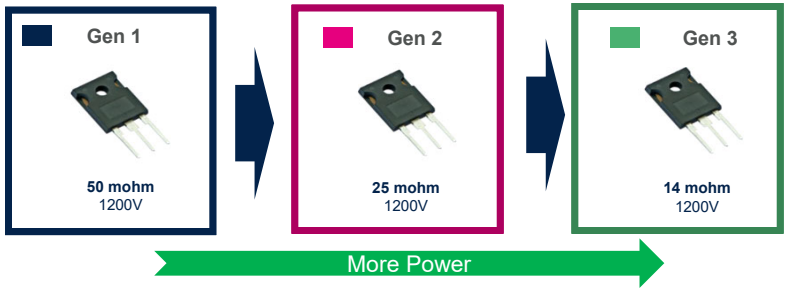
GROWTH DRIVERS

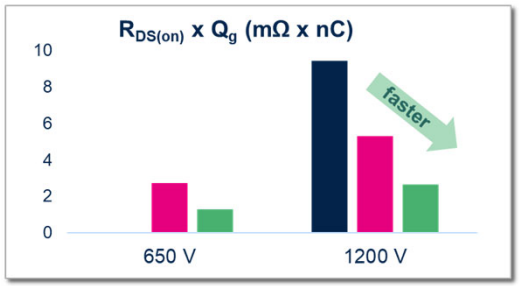
- Better efficiency
- Smaller form factor
- Lower Total Costs Ownership vs. silicon technologies
- **The Energy Transition:**
  - **Silicon Carbide is the key enabling technology**

High End Industrial

KEY APPLICATIONS

- **Solar Inverter**
- **Energy Storage**
- **Data centers**
- **Power Supply**
- **Charging Station**
- **Welding**
- **Drives**
- **Avionics**





Wide Voltage Range **650V, 750V, 900V, 1200V**

RDs (on) Range from **55 mΩ to 11 mΩ**

18 V driving voltage but it is suitable to be driven at Vgs 15 V

Ultrafast series optimizing Ron and Qg for very high frequency applications

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H2PAK 7L

TOLL

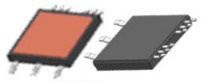
HiP247, rated at 200°C

TO247-4L HC
High Creepage**
** 1100 V_{RMS} insulation - coming soon

TO-247 3LL

TO-247 4L

New top side cooling solutions



SMIT

HU3PAK

Die business

SiC MOSFET Available for Mass Market

Commercial Product	Package	DCPL
SCT012H90G3AG	H2PAK-7	24.0000
SCT015W120G3-4AG	TO247-4	28.0000
SCT018H65G3AG	H2PAK-7	11.1000
SCT018W65G3-4AG	TO247-4	11.5000
SCT025W120G3-4AG	TO247-4	11.8000
SCT027W65G3-4AG	TO247-4	8.5000
SCT040H120G3AG	H2PAK-7	8.5000
SCT040H65G3AG	H2PAK-7	6.3500
SCT040HU65G3AG	HU3PAK - MIXED BE PLANT	7.5000
SCT040W120G3-4AG	TO247-4	8.6000
SCT040W120G3AG	HiP-247 IN LINE HEAT SINK 2MM	8.5500
SCT055HU65G3AG	HU3PAK - MIXED BE PLANT	6.2409
SCT055W65G3-4AG	TO247-4	6.0500
SCT060HU75G3AG	HU3PAK	6.3500
SCT070H120G3AG	H2PAK-7	5.7000
SCT070HU120G3AG	HU3PAK - MIXED BE PLANT	6.5000
SCT070W120G3-4AG	TO247-4	6.3000
SCT1000N170	HiP-247 IN LINE HEAT SINK 2MM	4.0000
SCT10N120	HiP-247 IN LINE HEAT SINK 2MM	4.5309
SCT10N120AG	HiP-247 IN LINE HEAT SINK 2MM	5.1118
SCT20N120	HiP-247 IN LINE HEAT SINK 2MM	7.7440
SCT20N120AG	HiP-247 IN LINE HEAT SINK 2MM	8.5970
SCT20N120H	H2PAK HC 2-3 Leads	7.3810
SCT30N120	HiP-247 IN LINE HEAT SINK 2MM	12.1000
SCT30N120H	H2PAK HC 2-3 Leads	11.9790
SCT50N120	HiP-247 IN LINE HEAT SINK 2MM	18.8206
SCTH100N65G2-7AG	H2PAK-7	17.6660
SCTH35N65G2V-7	H2PAK-7	7.2600
SCTH35N65G2V-7AG	H2PAK-7	7.5600
SCTH40N120G2V-7	H2PAK-7	9.1960
SCTH40N120G2V7AG	H2PAK-7	10.1073
SCTH60N120G2-7	H2PAK-7	14.6410
SCTH70N120G2V-7	H2PAK-7	23.4000
SCTH90N65G2V-7	H2PAK-7	17.3030
SCTL35N65G2V	Power FLAT MLPD 8x8 4L	8.4000
SCTL90N65G2V	Power FLAT MLPD 8x8 4L	18.0290
SCTW100N65G2AG	HiP-247 IN LINE HEAT SINK 2MM	18.0000
SCTW35N65G2V	HiP-247 IN LINE HEAT SINK 2MM	8.0000
SCTW35N65G2VAG	HiP-247 IN LINE HEAT SINK 2MM	8.3000
SCTW40N120G2V	HiP-247 IN LINE HEAT SINK 2MM	9.8010
SCTW40N120G2VAG	HiP-247 IN LINE HEAT SINK 2MM	10.8900
SCTW60N120G2	HiP-247 IN LINE HEAT SINK 2MM	15.6090
SCTW70N120G2V	HiP-247 IN LINE HEAT SINK 2MM	24.2000
SCTW90N65G2V	HiP-247 IN LINE HEAT SINK 2MM	17.9080
SCTWA20N120	TO-247 LONG LEADS	8.2280
SCTWA30N120	TO-247 LONG LEADS	15.4880
SCTWA35N65G2V	TO-247 LONG LEADS	8.1000
SCTWA35N65G2V-4	TO247-4	8.2000
SCTWA40N120G2V	TO-247 LONG LEADS	9.8900
SCTWA40N120G2V-4	TO247-4	9.9912
SCTWA40N12G24AG	TO247-4	11.0000
SCTWA50N120	TO-247 LONG LEADS	19.1691
SCTWA60N120G2-4	TO247-4	16.2100
SCTWA70N120G2V-4	TO247-4	24.6600
SCTWA90N65G2V	TO-247 LONG LEADS	18.5130
SCTWA90N65G2V-4	TO247-4	18.6000

- 56 Total Devices in Available in DCPL
- 17 Devices introduced in Q1 24 from latest Gen 3 Silicon Carbide MOSFET
- Wide Portfolio of Rds (on) and Packages….
- EPL Design Registration

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Accelerating expansion of Silicon Carbide device manufacturing capacity

In volume production with SiC devices since 2017

- 1B$ SiC MOSFET Revenue 2023 achieved
- Automotive & Industrial Market Segment

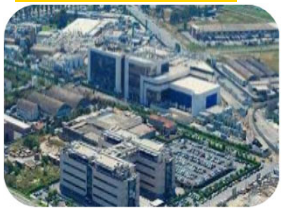
Acquisition of Norstel AB in Q4'19 (*)

- *to establish internal manufacturing **capacity** and **know-how***

- First prototypes of 200mm wafers achieved
- Extended Supply Chain capability thanks to Multi-Year agreement with Cree and SiCrystal on Silicon Carbide 150mm wafers
- Assy & Testing at two sites: Shenzhen & Bouskoura

Vertical Integration for a strategic balance:
Internal & Suppliers capabilities (Sanan)

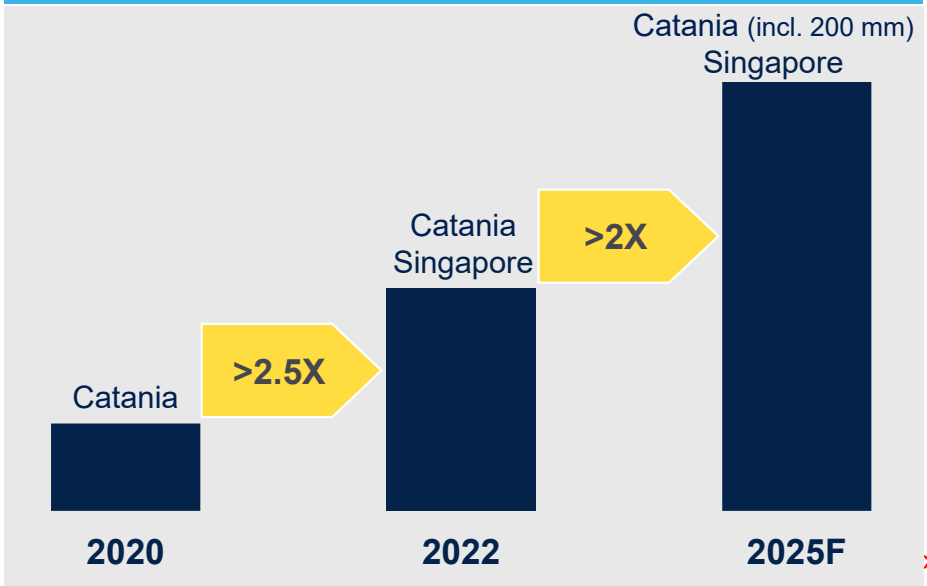
Catania



CT WSiC 8

Singapore

SiC capacity growth



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(*) Norstel AB renamed as ST SiC since 2020

Thank you

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