



STMicroelectronics Release to Market - Italy

November 2012

Agenda

- Power Conversion & Lighting
 - DC-DC Converters: LED5000 + *What's Next?*
 - HVLED Family Extension: HVLED807PF + *What's Next?*
 - PFC: L6564H & L4984
 - LED Array Drivers: *What's Next?*
- Motor Control
 - IPM: New Single Leg SLLIMM Modules
 - cSPIN
- Discretes
 - HV MOS: PowerFlat 3x3 Package Introduction
- Analog
 - LDO: New LDK Family
 - OpAmp: New TSX Family





LED5000

New 48-V DC-DC LED Driver
with Superior Dimming Capability

RtM, Q3 2012

LED5000 *LED Driver from DC bus able to drive long LED strings*

High V_{IN} (48 V)

Permits to drive several LEDs

PWM Pin

High Performance Dimming

Low Sensing Voltage

Low Dissipation

Also Buck-boost, Floating Boost Supported

Capability to drive more LEDs



LED5000: Product Overview

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$V_{IN} = 48\text{ V}$

$I_{OUT} = 3\text{ A}$

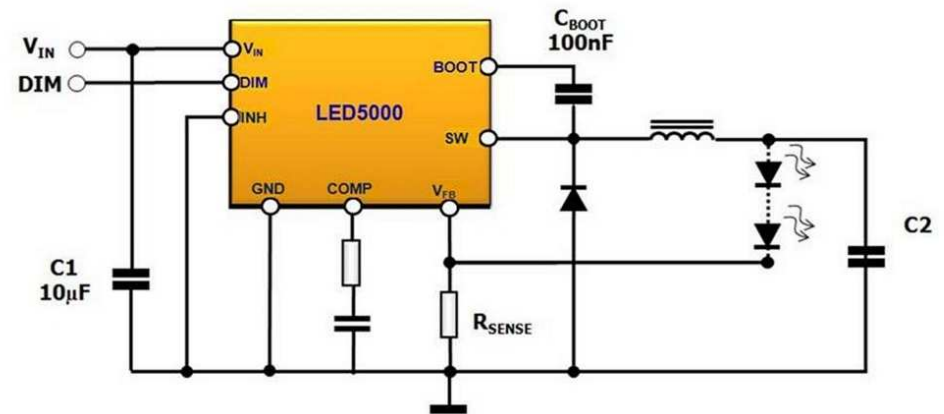
$F_{SW} = 850\text{ kHz}$

$V_{SENSE} = 200\text{ mV}$

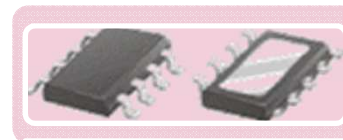
PWM Dimming

Inhibit

Internal Soft Start



Typical Application Circuit



HSOP-8L

LED5000: Positioning vs. Competition

Feature	LED5000	Comp. 1	Comp. 1	Comp. 2	Comp. 2
Supplier	ST	TI	TI	Diodes Inc.	Diodes Inc.
Input Voltage (V)	5.5 to 48	6 to 42	6 to 75	6 to 36	6.3-8 to 60
I_{LED} (A)	Up to 3A	Up to 1A	Up to 1A	Up to 1.5A	Up to 1.5A
Synchronous	No	No	No	No	No
Topology	Buck / Buck-boost / Boost	Buck	Buck	Buck	Buck / Buck-boost / Boost
R_{DS_ON} (Ω)	0.2	0.37	0.37	0.18	0.5
V_{SENSE} (mV)	200	200	200	100	350
Switching Frequency (kHz)	Fixed 850	Variable 10-20 to 1000	Variable 10-20 to 1000	Up to 1000	Variable 300 to 1000
PWM dimming	Yes	Yes	Yes	Yes	Yes
Package	HSOP-8L	SO-8L, PSOP-8L	SO-8L, PSOP-8L	MSOP-8EP	TSSOP-20EP
AEC-Q100	NO	NO	NO	NO	YES

LED5000: Key Messages

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Tailored to Drive Several LEDs

High V_{IN} (48 V) & also Step-up Topologies Supported
Particularly Suitable in Street-Lighting

High Performance PWM Dimming

Up to 20 kHz

Evaluation Boards

Available on Request

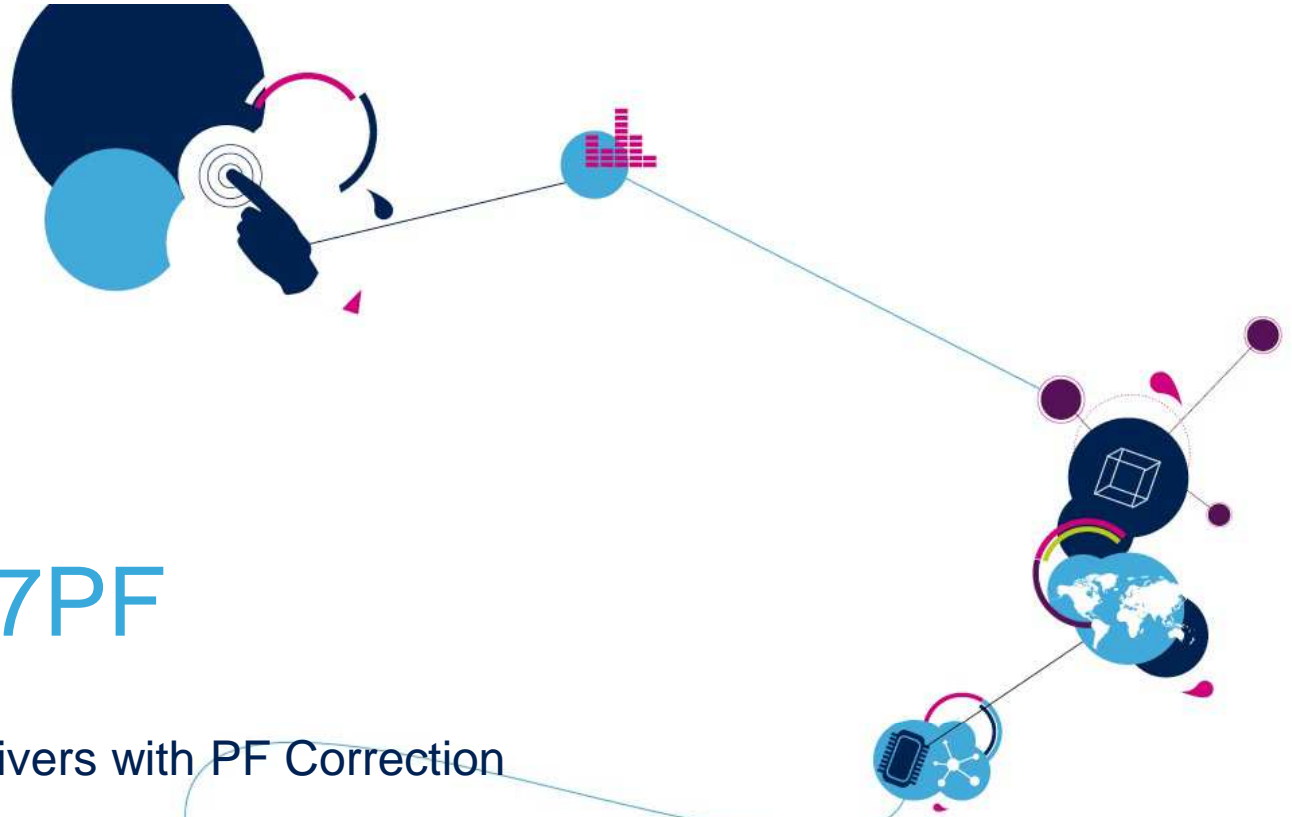
DC-DC: What's next?

High V_{IN}

- Up 61 V
- Also LED Version
- In roadmap Automotive Qualification

Low quiescent current

- $V_{IN} = 18\text{ V}; I_{OUT} = 4\text{ A}$
- $V_{IN} = 38\text{ V}; I_{OUT} = 2\text{ A}$



HVLED807PF

New Off-line LED Drivers with PF Correction

HVLED Family Extension

RtM, Q3 2012

HVLED Family Features

Dual-chip for Reliability and Flexibility:

800-V Avalanche Rugged MOS (Market Benchmark)

High Performance Controller

Offline LED Driver for Precise & Compact (low BOM) Solutions

Primary FB → No Opto-coupler needed

Current Regulation → No Current Controller needed

5% Current Precision → State of the Art LED Current Precision

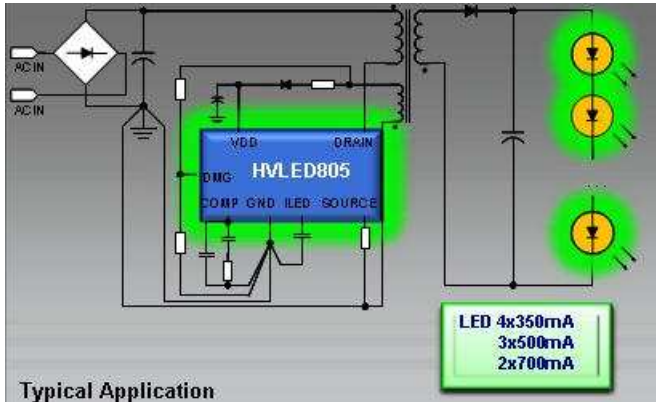
Additional Features

Adjustable Over Voltage Protection → Protection against LED String Open

Quasi-Resonant Mode of Operation → High Efficiency

Automatic Self Supply → Operation with variable number of LEDs

Helps in reducing the BOM list



**in wide V_{IN} range*

HVLED8xxPF: Power Factor Correction

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Power Factor Correction

Power Factor > 0.9

... compliant with



Extended Power

HVLED815PF: up to 15 W^(*)

Triac-Dimmable Boards in US V_{IN} Range



Mature Now

HVLED807PF: up to 7 W^(*)



HVLED Family: What's next?

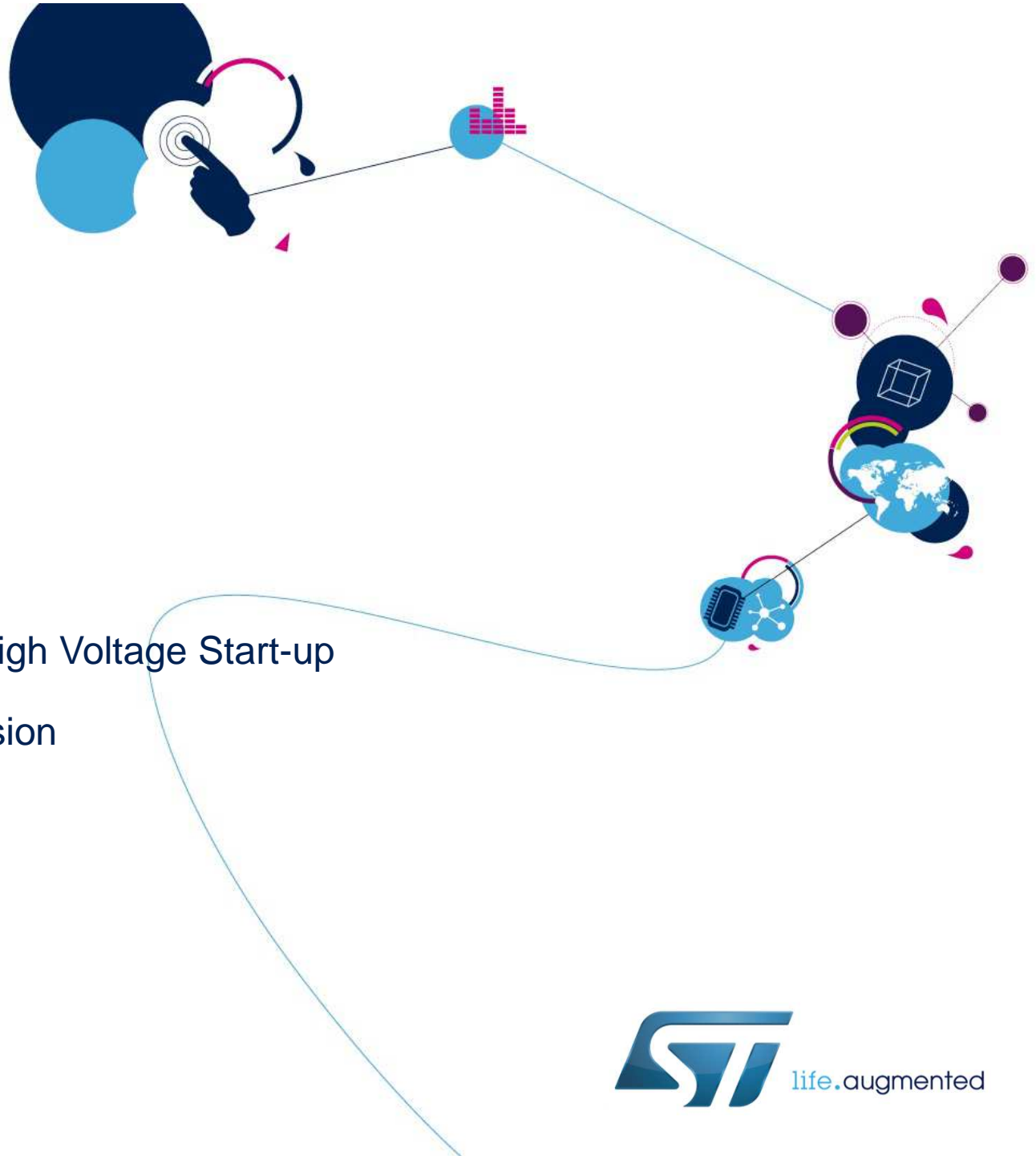
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HVLED815D

Up to 15 W

Power Factor Correction

Triac Dimmable also in EU range



L6564H

New TM PFC with High Voltage Start-up

L656x Family Extension

RtM, Q3 2012

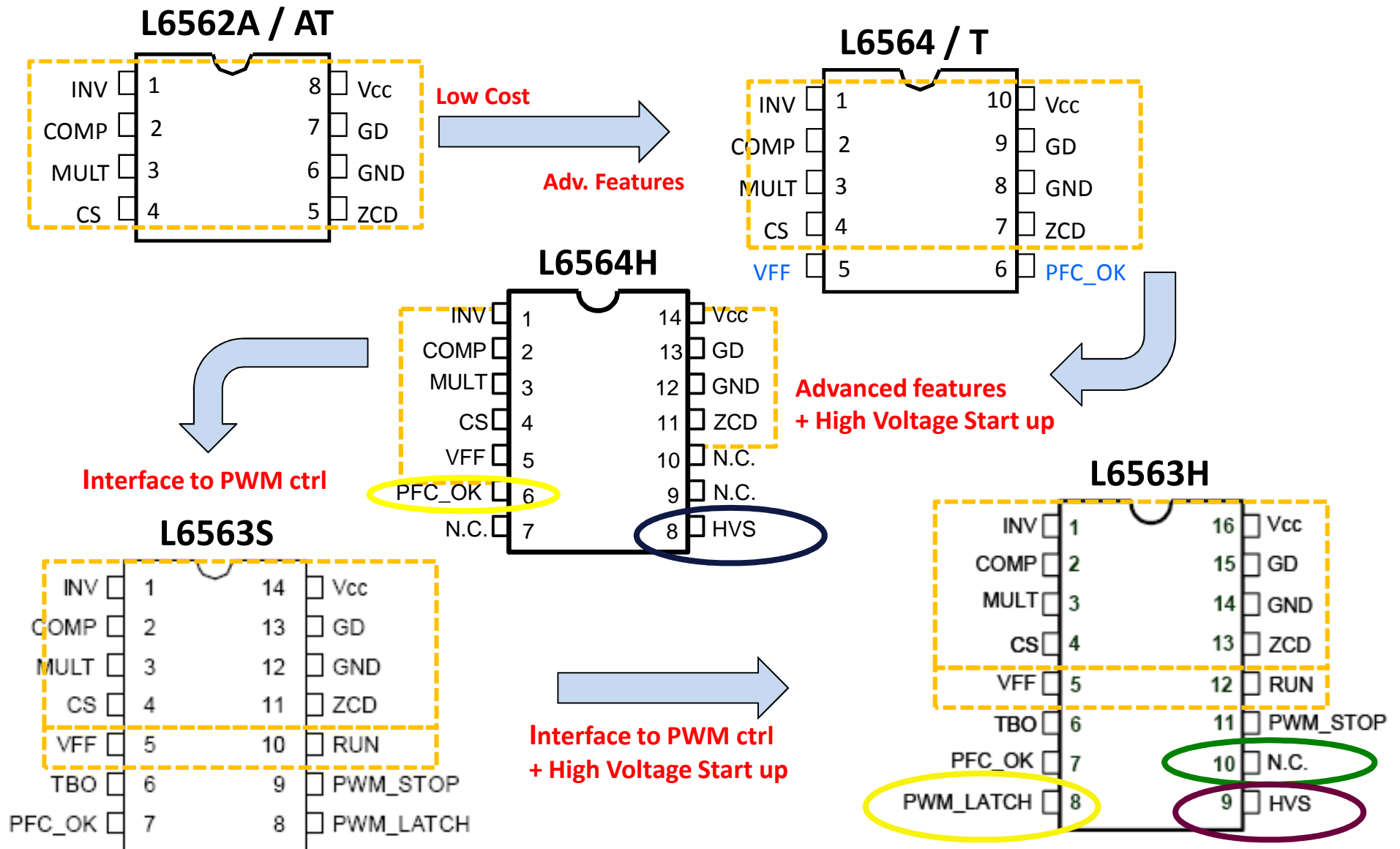
Power Factor Control in STM

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- Long term experience in transition mode (L656* family) is our starting point. Since 2010, more than 200Mio/y controller sold
- New value added
 - High voltage start-up
 - state-of-the-art for efficiency optimization and BOM optimization
 - Parameter temperature range extension → outdoor
 - New 10 pin controller for CCM
- Target applications
 - Standard PFC pre-regulator stage for SMPS and lighting
 - High power factor flyback for cost-effective single stage LED SMPS



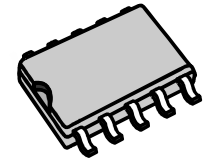
Product evolution for TM



From L6562A to L6564, more than just 2 pin

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- Inductor Saturation Detection
 - Choke optimization without risk of mosfet damaging
- Feedback Disconnection Protection and new OVP
 - Reliability increased
 - Easier PCB lay-out
 - Remote ON/OFF
- Voltage Feed Forward
 - Line Transient rejection
- Brown-out protection
 - Input undervoltage detection
- L6564T with Electrical Parameters guaranteed from -40C to +125C.
Ideal for OUTDOOR applications

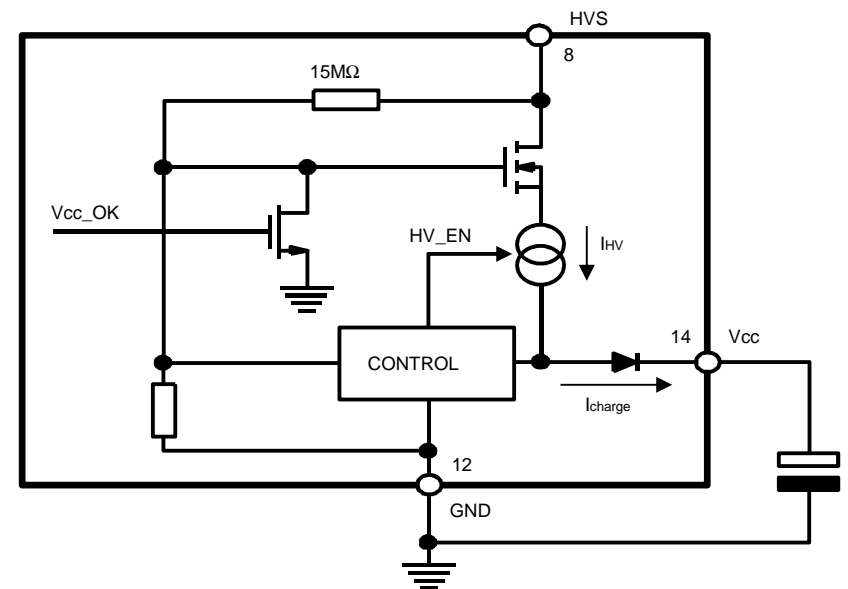


SSOP10 (SO8 body)
1mm pitch

Now with High-voltage Start-up

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- 700V rated
- Improves efficiency and restarts after faults
- 80V starting voltage



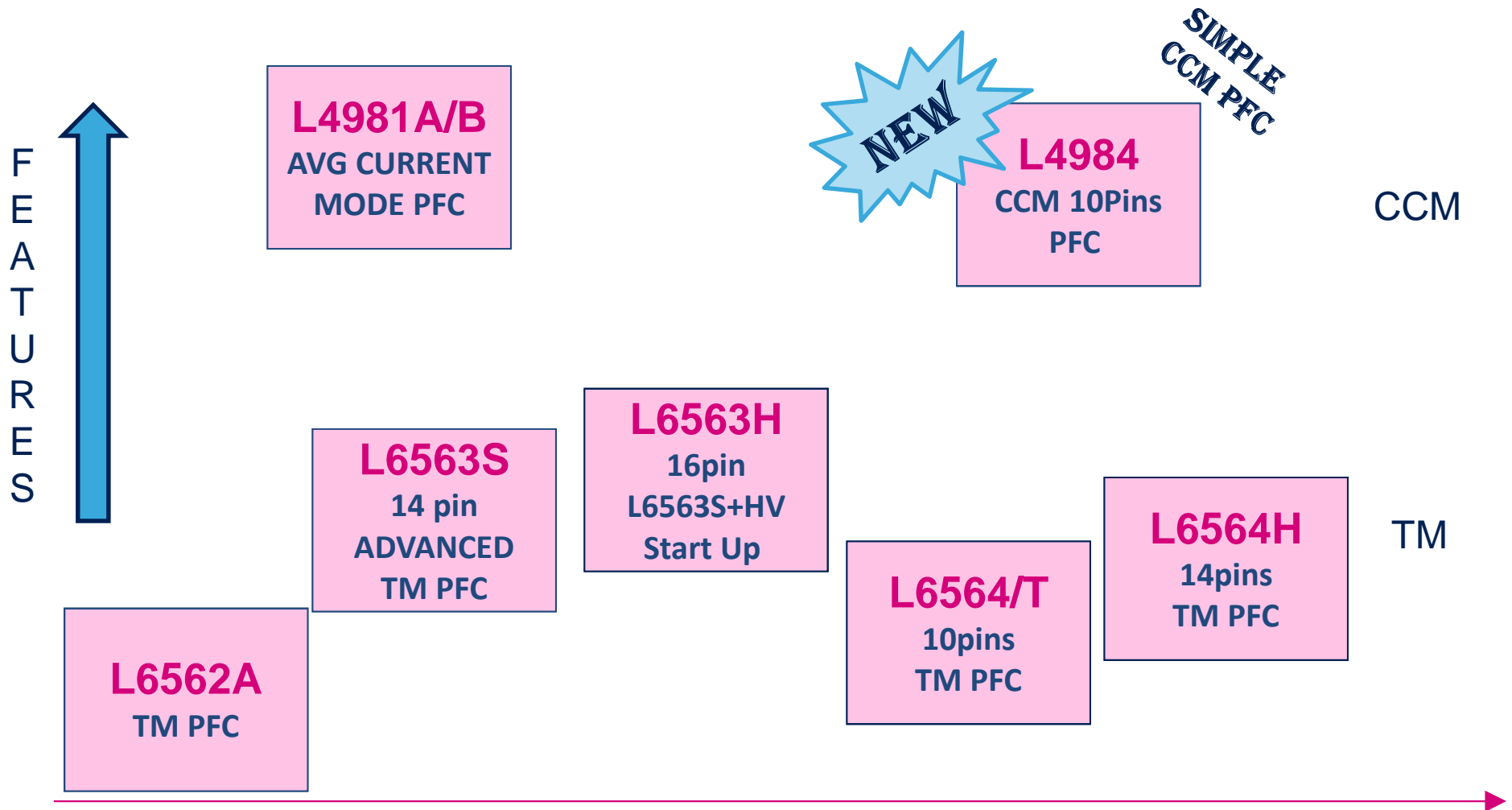
L4984D

New CCM PFC

RtM, Q3 2012

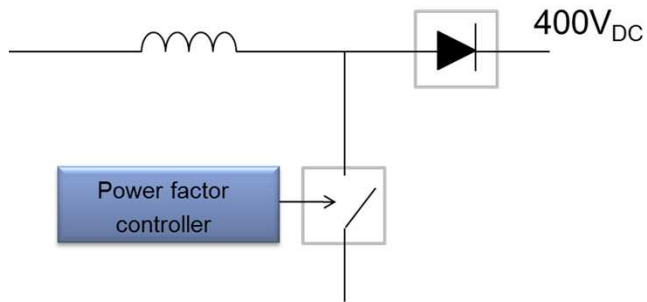


Power Factor Control Portfolio



L4984D Introduction

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- PF Controller for **CCM** Operation with **low THD**
- Designed to work in Fixed OFF Time (FOT)
- Set of Protections for complete Application **Reliability**
 - Adjustable OVP on Output Voltage (No Latched)
 - Inductor Saturation (No Latched)
 - Open Loop Protection
 - Input Mains Under-Voltage Detection

PFC pre-regulator stages
with power
from ~ 200 W to > 1 kW

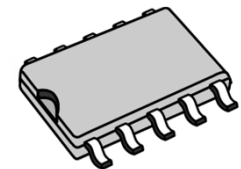
No output capacitor explosion
No MOSFET damaging
No MOSFET over-heating

- **Remote ON/OFF** Control Input Pin

Application flexibility

- **Small Package**

Small PCB



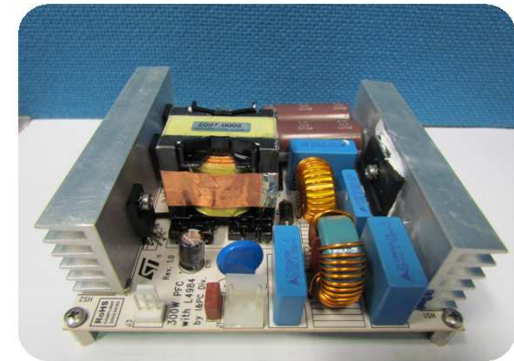
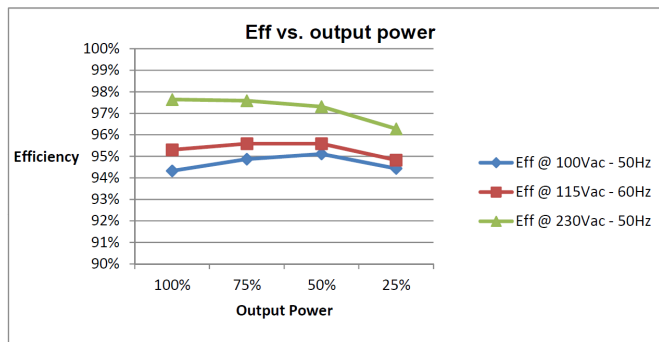
SSOP10 (SO8 body)
1mm pitch

L4984D Performances

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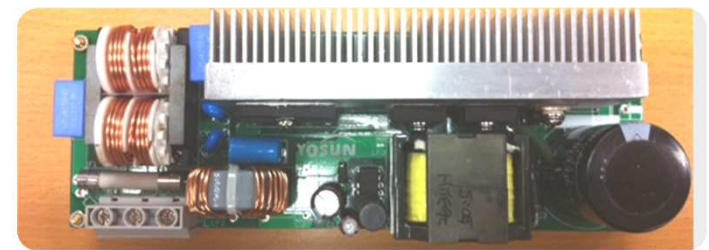
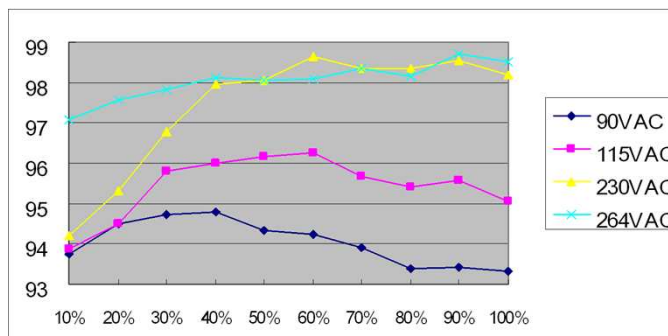
- **350W reference design (EVL4984-350W)**

- Efficiency > 94% on 85V_{AC} – 264V_{AC} input range
- THD < 10% at full load on 85V_{AC} – 264V_{AC} input range



- **600W reference design (EVL4984-600WBL)**

- Efficiency > 93% on 85V_{AC} – 264V_{AC} input range



L4984D - Summary

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- L4984D is the right solution for middle-high power SMPS and is the **best trade-off** between full set features, performance and price, form factor.

- L4984D is able to address a wide range of applications:

- Industrial, e.g. lighting & home appliances
- EV battery chargers
- Solar Inverters
- Servers SMPS for Data centers
- high end game consoles, desktop, and workstation

- *Suitable also for modified buck for LED applications from e.g 120VDC bus*



life.augmented



LED Array Drivers

What's next?

STPxx Family: Applications

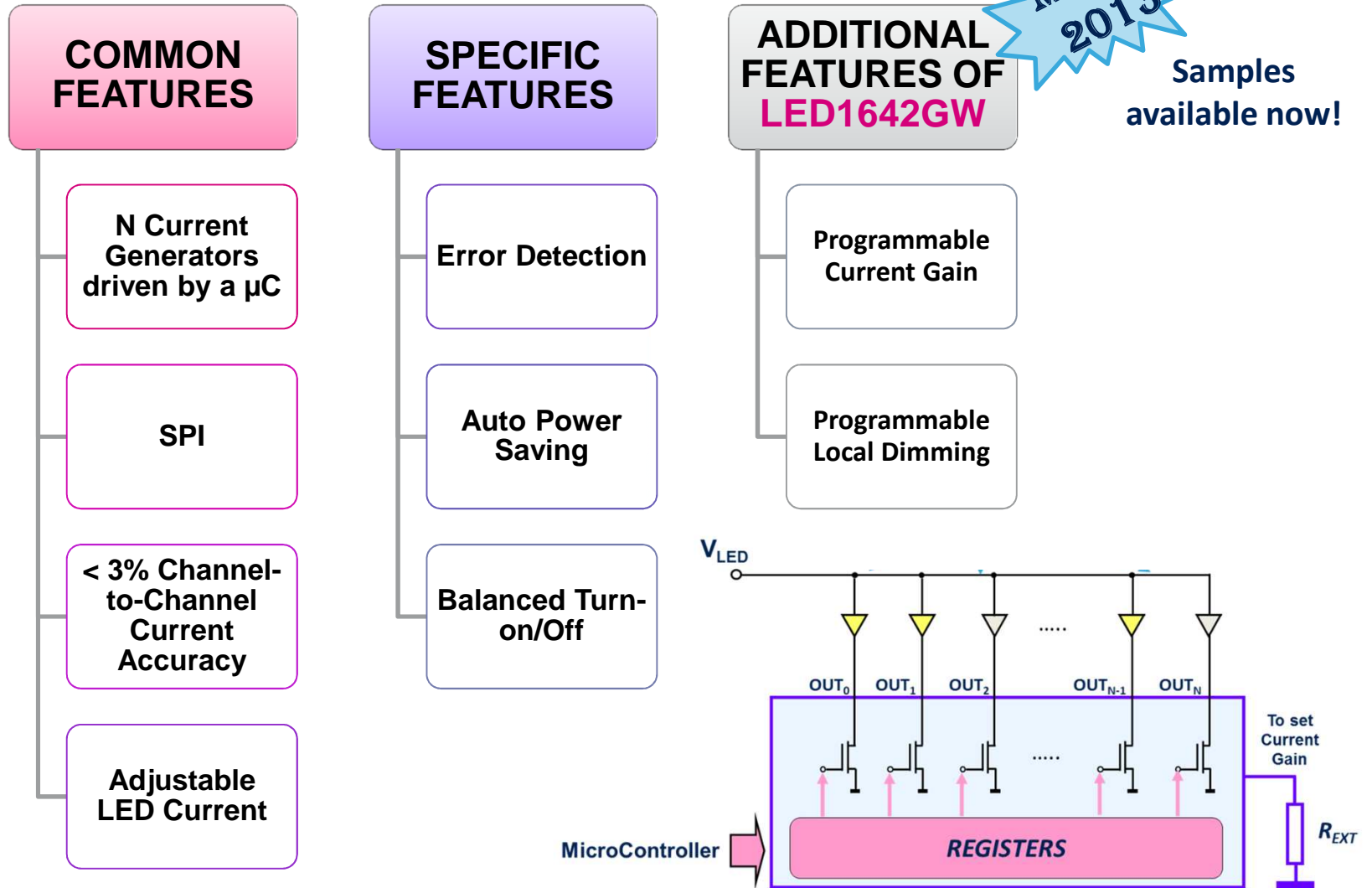
- Traffic / Advertising Panels
- Special Lighting
- User Interface (e.g. White Goods)

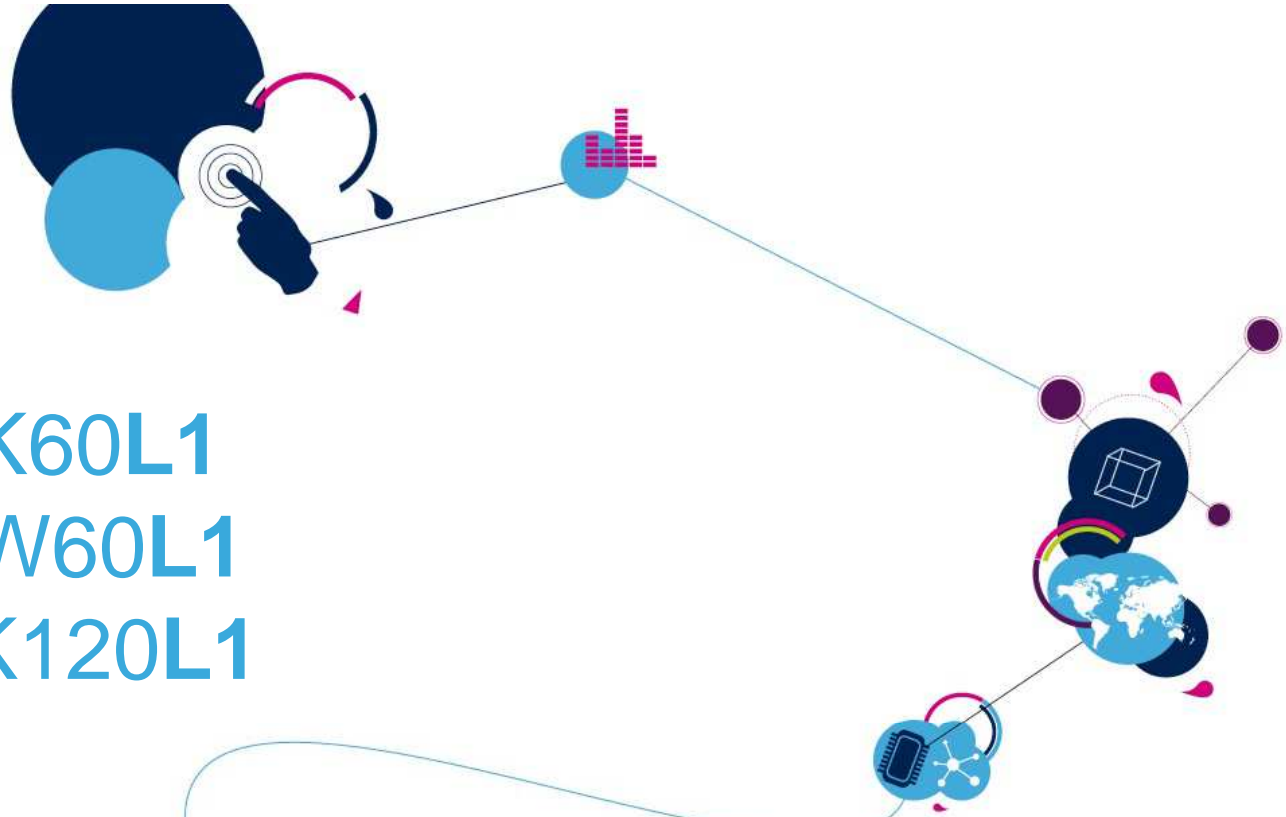


STPxx Family

**MP Q1
2013**

Samples available now!





STGIPS35K60L1
STGIPS40W60L1
STGIPL35K120L1

New 1-phase, single-leg SLLIMM™ IPMs of ST

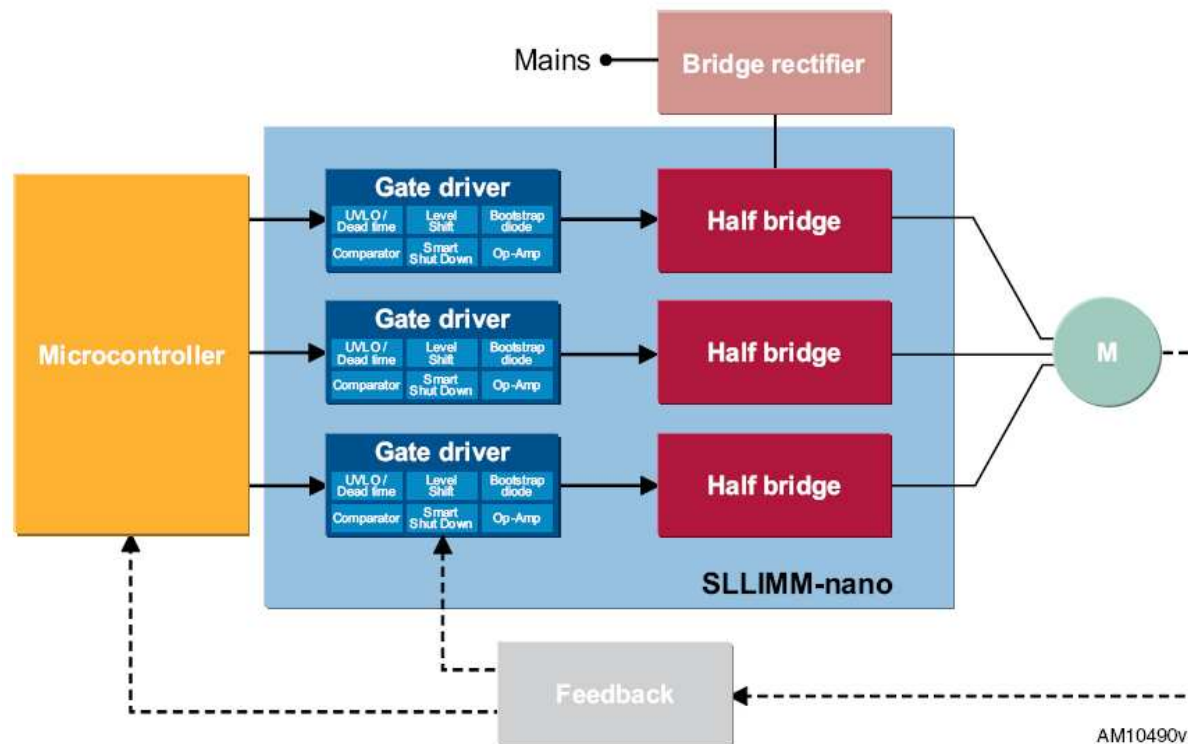
SLLIMM™ Portfolio Extension

RtM, Q3 2012

Refresh of SLLIMM™

Small, Low-Losses, Intelligent Molded Module

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What's inside

Ratings: 600 V, 3 20 A

3-phase IGBT inverter bridge:
– 6 low-losses and short-circuit protected IGBTs

– 6 low V_F and soft recovery freewheeling diodes

3 control ICs for gate driving and protection

NTC for temperature monitoring

For 3-ph driving architectures, the industry is moving progressively from a **discrete** towards a **module solution** !!

Key Benefits and Target Applications

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SLLIMM Key Benefits

High Reliability

Advanced protection functions

Reduced EMI and noise

Reduced total system cost

Easy Layout

SLLIMM Target Applications

Low-power motor drives

Washing machine

Dish washers

Compressor drives

Refrigerators

Sewing machines

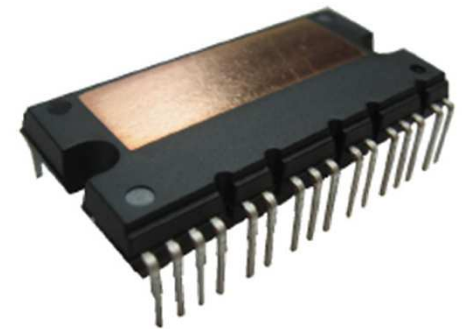
Pumps

Power Tools

Fans

Rehabilitation and fitness applications

The SLLIMM™ represents a Compact, Easy-to-use and Reliable Solution for motor drives up to 2 kW

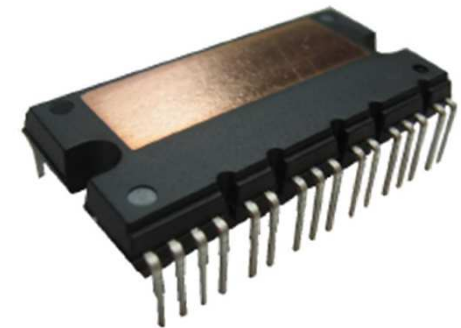


SLLIMM™: Marketing Guidelines

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- State-of-the-art in **functional integration**. ST embeds:
 - operational amplifier
 - comparator
 - smart shut-down
 - temperature sensor

→ Today only ST integrates so much functions in the module.
- Outstanding **thermal performances**
 - BDC layer instead of low-cost ceramic layer
- Extended **temperature range** (-40 150 C) for the whole family



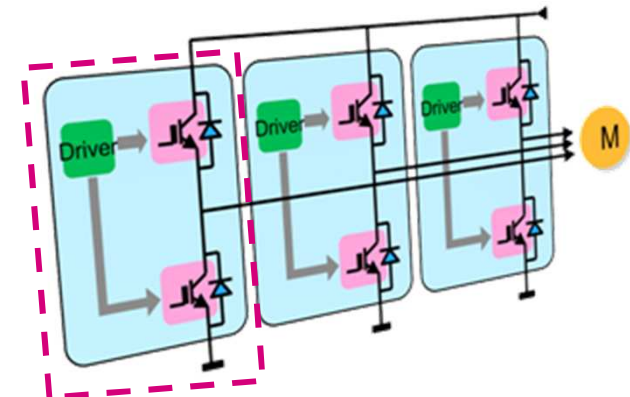
Modular Half-Bridge SLLIMM

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SLLIMM-Single Leg for a modular inverter approach

Features

- Modular solution
- Flexibility: 1-ph, 2-ph, 3-ph topologies can be realized
- Several “smart” functions embedded
 - Internal bootstrap diode
 - Internal OP-AMP
 - Embedded Comparator
 - Interlocking function
 - Smart shutdown function
 - Undervoltage lockout
 - DBC substrate → very low thermal resistance
 - 5 kΩ NTC for temperature control



Single-Leg

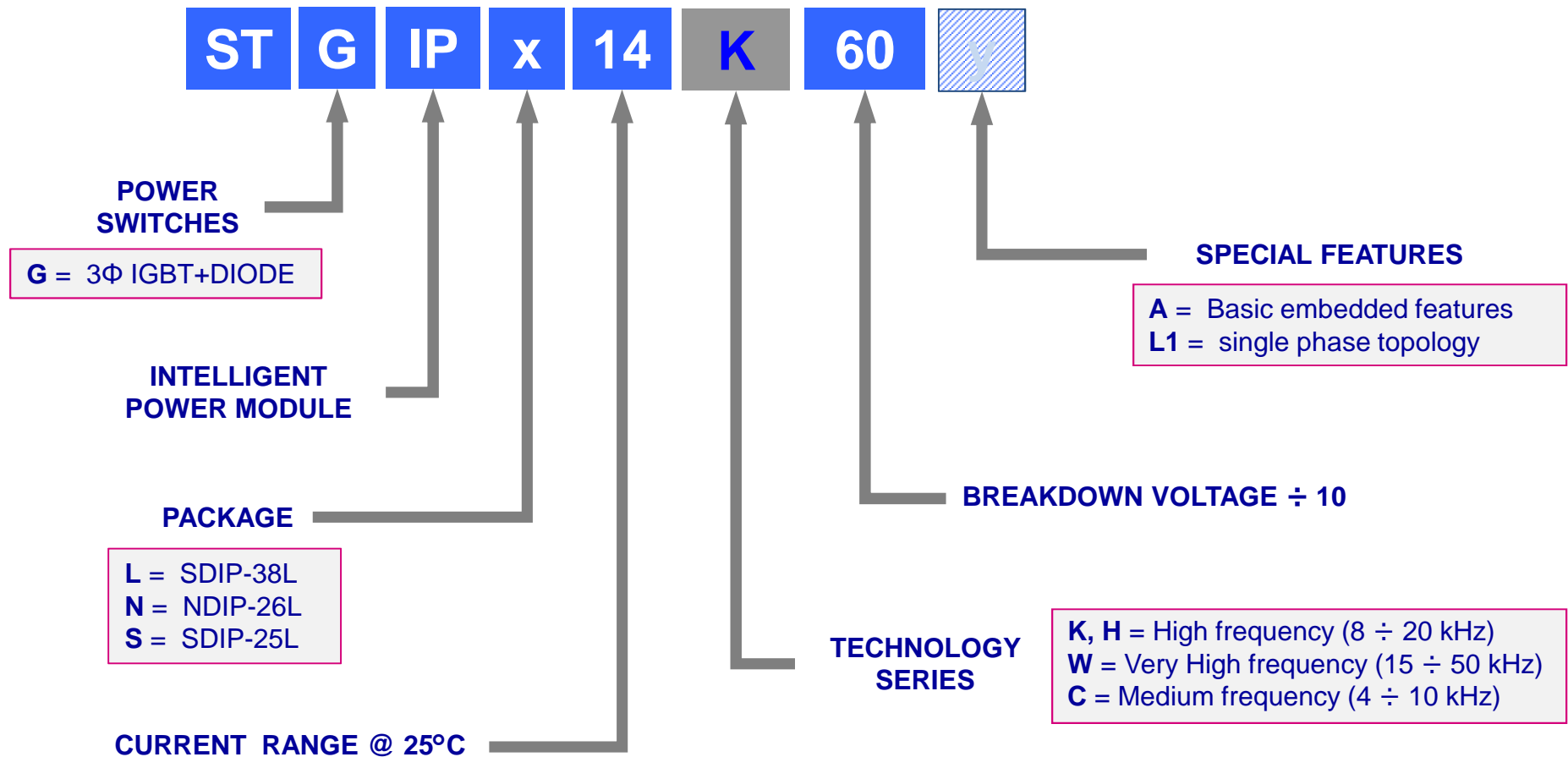
Silicon Options:
W-Series: High. Freq.
K-Series: Medium Freq. + Short-circuit rugged

Part Number	BVCES	IC @ 25 C	Features	Package	Application
STGIPS35K60L1	600 V	35 A	L6390 based	SDIP 22L	MC
STGIPS40W60L1	600 V	40 A	L6390 based	SDIP 22L	PFC
STGIPL35K120L1	1200V	35 A	TD350 based	SDIP 18L	MC



Nomenclature

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SLLIMM Family

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Basic

Fully featured

Part Number	STGIPS10K60A	STGIPS10K60T	STGIPS14K60T	STGIPS14K60	STGIPL14K60	STGIPS20K60	STGIPL20K60
Feature							
Pin Count	25	25	25	25	38	25	38
Pkg Size [mm]	44.4*22.0*5.4	44.4*22.0*5.4	44.4*22.0*5.4	44.4*22.0*5.4	49.6*24.5*5.4	44.4*22.0*5.4	49.6*24.5*5.4
DBC substrate	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Voltage [V]	600	600	600	600	600	600	600
Current @ Tc=25 C [A]	10	10	14	14	15	18	20
R _{th(J-C)} (max) [°C/W]	3.8	3.8	3	3	2.8	2.4	2.2
NTC	Yes	Yes	Yes	No	Yes	No	Yes
Integrated Bootstrap diode	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Smart shutdown function	No	No	No	Yes	Yes	Yes	Yes
SD function	No	Yes	Yes	Yes	Yes	Yes	Yes
Op-amps for Advanced current sensing	No	No	No	No	Yes	No	Yes
Comparator for fault protection	No	No	No	Yes (1 pin)	Yes (3 pins)	Yes (1 pin)	Yes (3 pins)

SLLIMM-nano Family

	Basic	Fully featured
Part Number	STGIPN3H60A	STGIPN3H60
Feature		
Pin Count	26	26
Package Size [mm]	29.5x12.5X3.1	29.5x12.5X3.1
Voltage [V]	600	600
Current @ Tc=25 C [A]	3	3
R _{th(J-A)} [C/W]	50	50
Integrated bootstrap diode	Yes	Yes
Smart shutdown function	No	Yes
SD function	No	Yes
Op-amps for advanced current sensing	No	Yes
Comparator for fault protection	No	Yes
3.3/5V input interface compatibility	Yes	Yes
Interlocking function	Yes	Yes
Under Voltage Lockout	Yes	Yes

SLLIMM: What's next?

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Today...

Up to 2 kW

...in development

... up to 2.5KW



STL3NM60N

High Voltage Power MOSFET in tiny PowerFLAT™ 3.3 x 3.3

New Package Introduction for HV MOSFETs

RtM, Q3 2012

PowerFLAT™ HV Package Innovation

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PowerFLAT™ HV: THE SMART PACKAGE SOLUTION FOR SPACE SAVING



- NEW smallest Surface Mounting HV Packages
- Suitable to house HV Super-Junction Power MOSFETs
- Providing Efficient, Very Compact, Cost effective Solutions
- For the most Innovative Applications in the Semiconductor Arena

PowerFLAT™ 3.3 x 3.3 HV

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Innovative High Voltage, 1 mm high, leadless SMD package

→ increasing power density

→ reducing thickness and weight

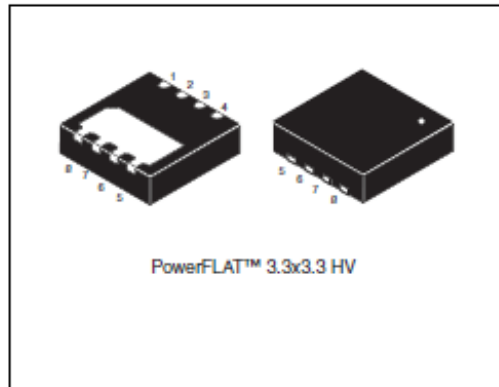
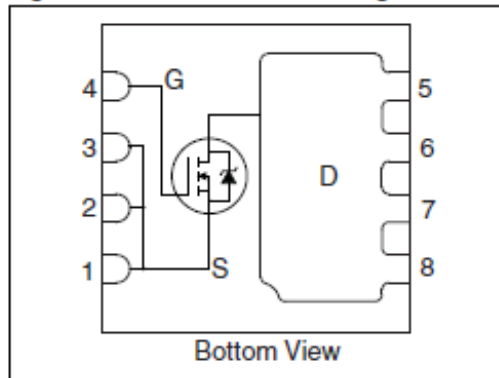


Figure 1. Internal schematic diagram



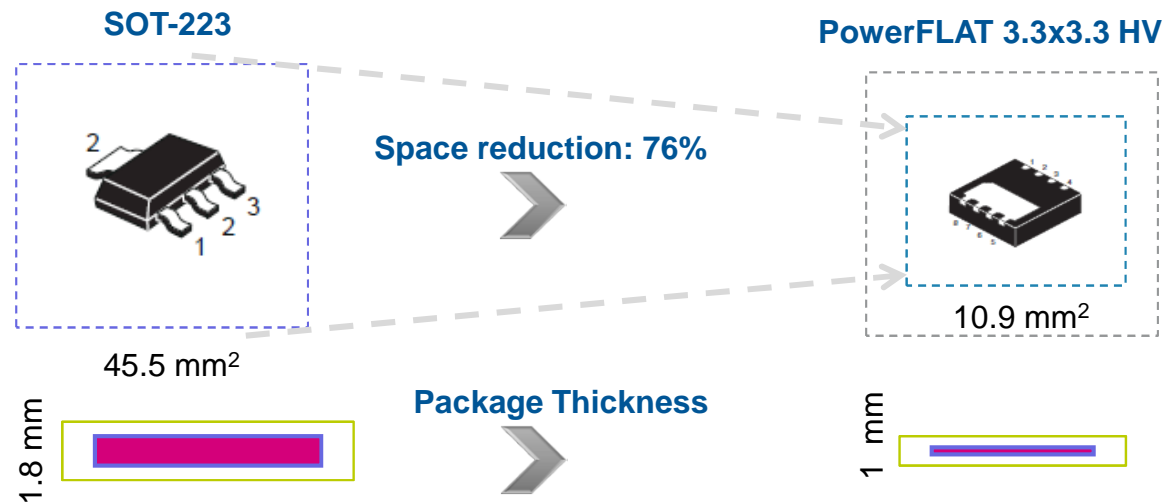
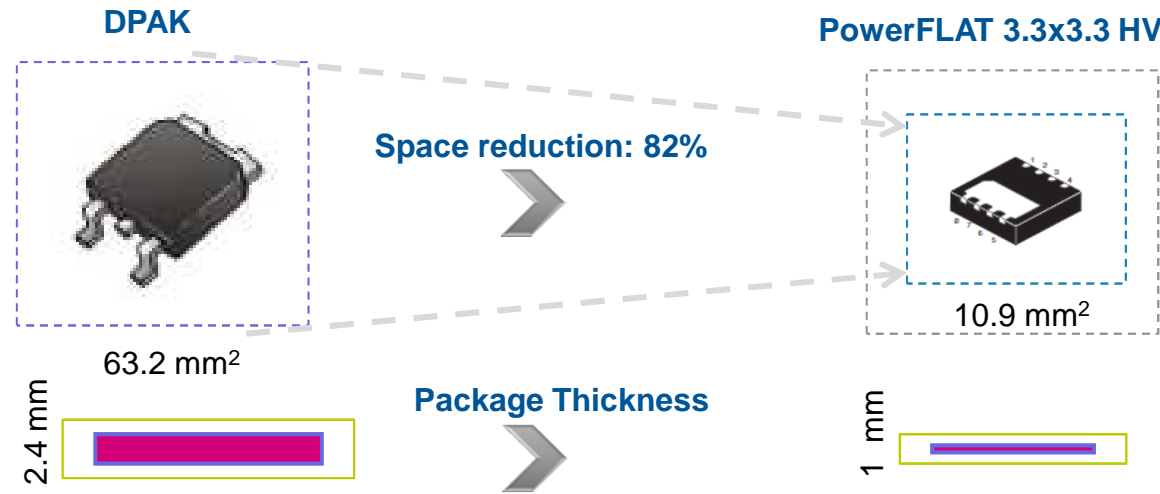
Features

- Dimensions: 3.3 x 3.3 x 1 mm³
- Clearance / Creepage distance: 1.4mm
- Footprint: 10.9 mm²
- Strong reduction in Parasitic Inductance

Benefits

- Developed for High Voltage Power Devices
- Compactness
- Electric signals are much cleaner

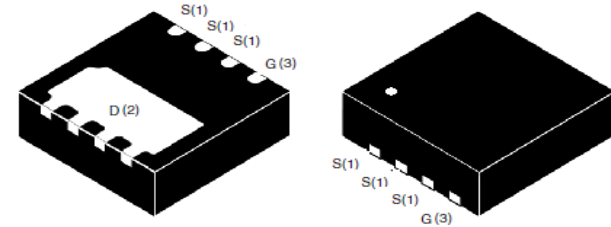
PowerFLAT™ 3.3 x 3.3 HV vs DPAK & SOT-223



Part-numbers in PowerFLAT™ 3.3 x 3.3 HV

NEW best in class HV Power MOSFETs for high efficiency applications

- Small Power Adapters & Battery Chargers
- Lighting Applications like LED
- Telecom Power Equipment



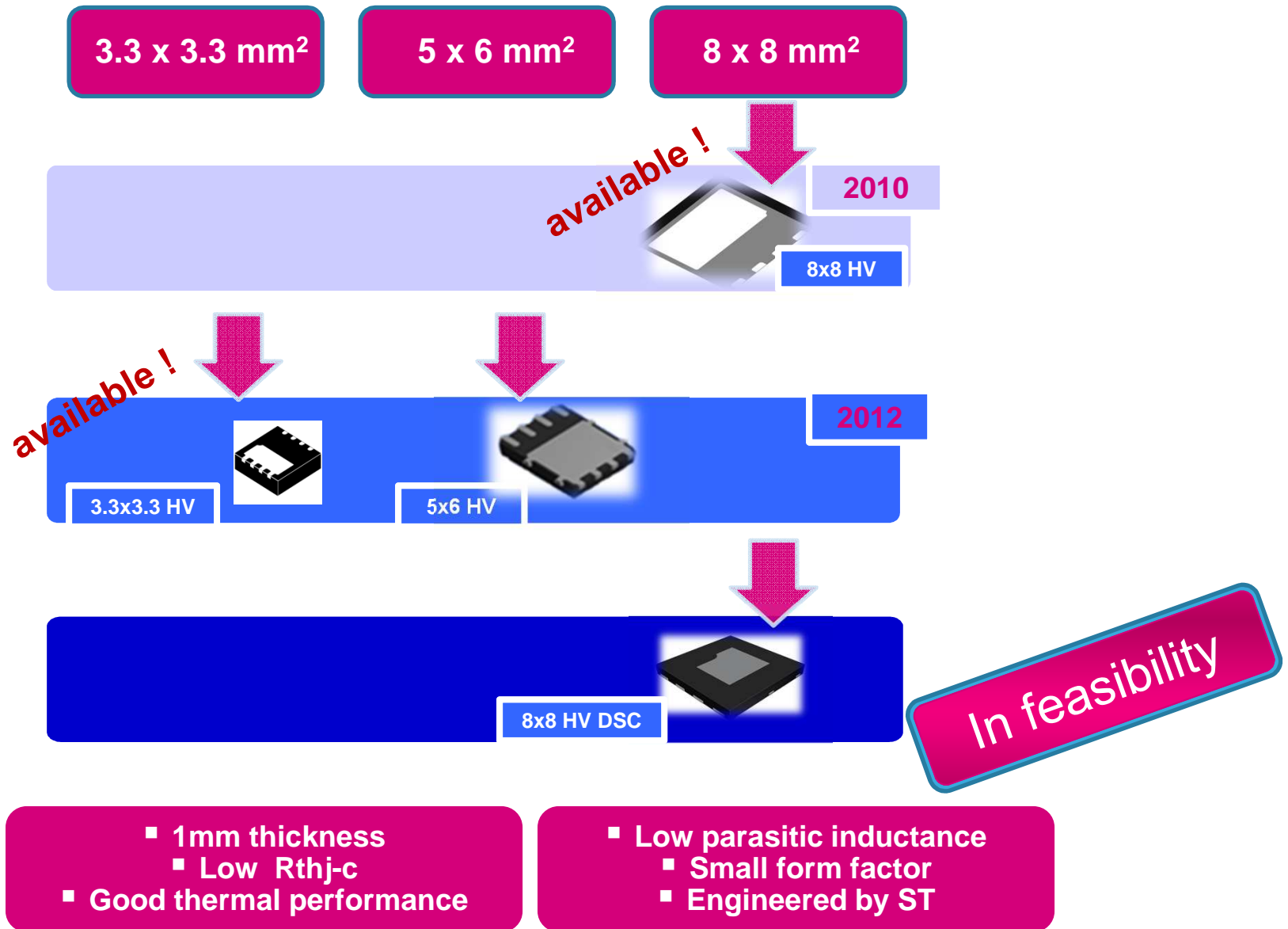
V _{DS} [V]	Part number	R _{DS(on)} (max) [Ω]	P _{TOT} (W)	Technology	Status
600	STL3NM60N	1.8	2 (*) 22 (**)	MDmesh II	Production
650	STL3N65M5	1.1	2 (*) 22 (**)	MDmesh V	Samples by Q4 – Q1 2013

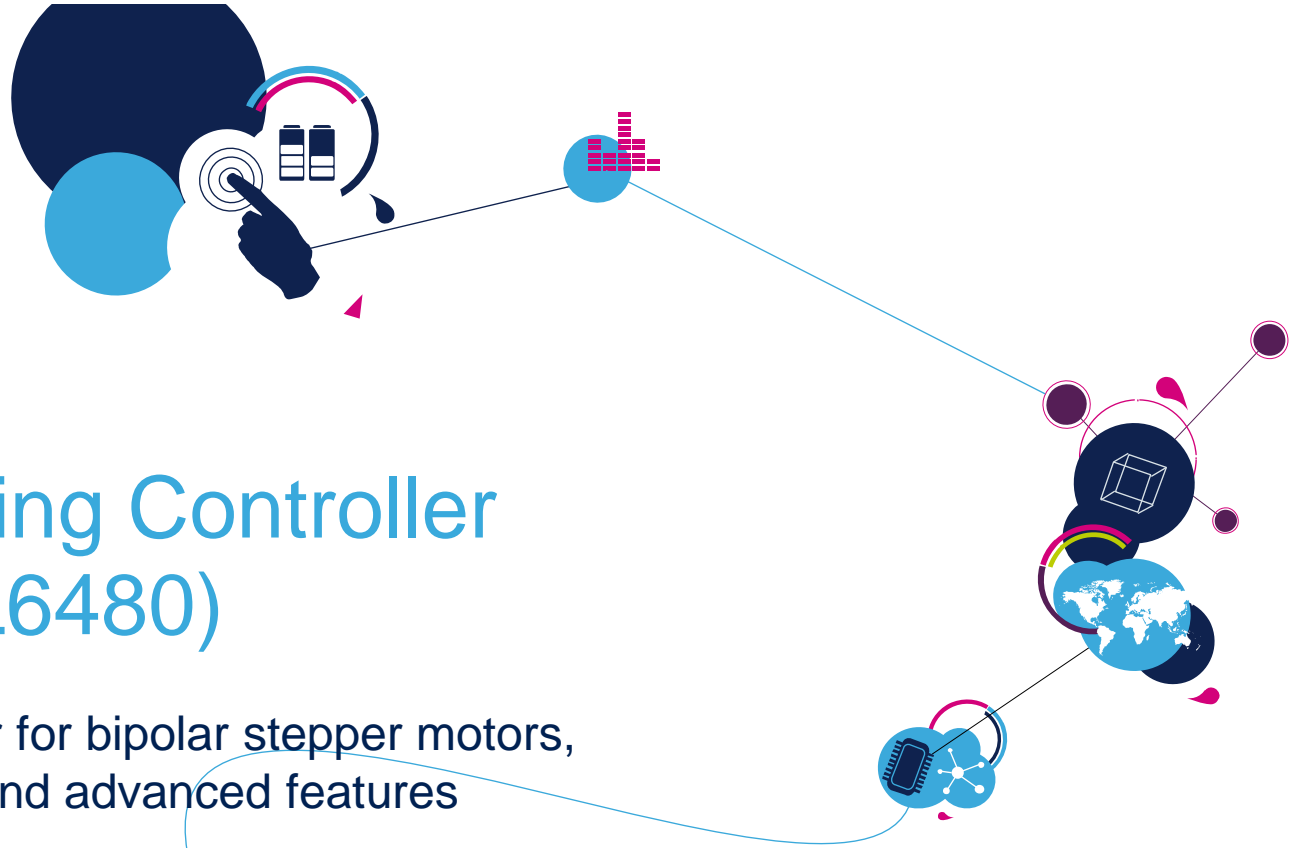
* When mounted on FR-4 board with a drain pad of 1inch², 2oz Cu, t < 10 sec

** The value is rated according Rthj-case.

PowerFLAT™ HV Roadmap

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Microstepping Controller cSPIN™ (L6480)

Innovative controller for bipolar stepper motors,
with high flexibility and advanced features



Applications addressed

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Industrial

- X-Y Position and Rotation systems
- PCB assembly (Pick & Place)
- Robotics & NC machines
- Textile industry (Sewing / Spinning machines)
- Professional printers
- Stage lighting

Point Of Sale

- ATM systems
- Vending machines

Gaming

- Casino machine
- Toys

Medical

- Diagnostic Equipment
- Pumps



Office equipment

- Shredders

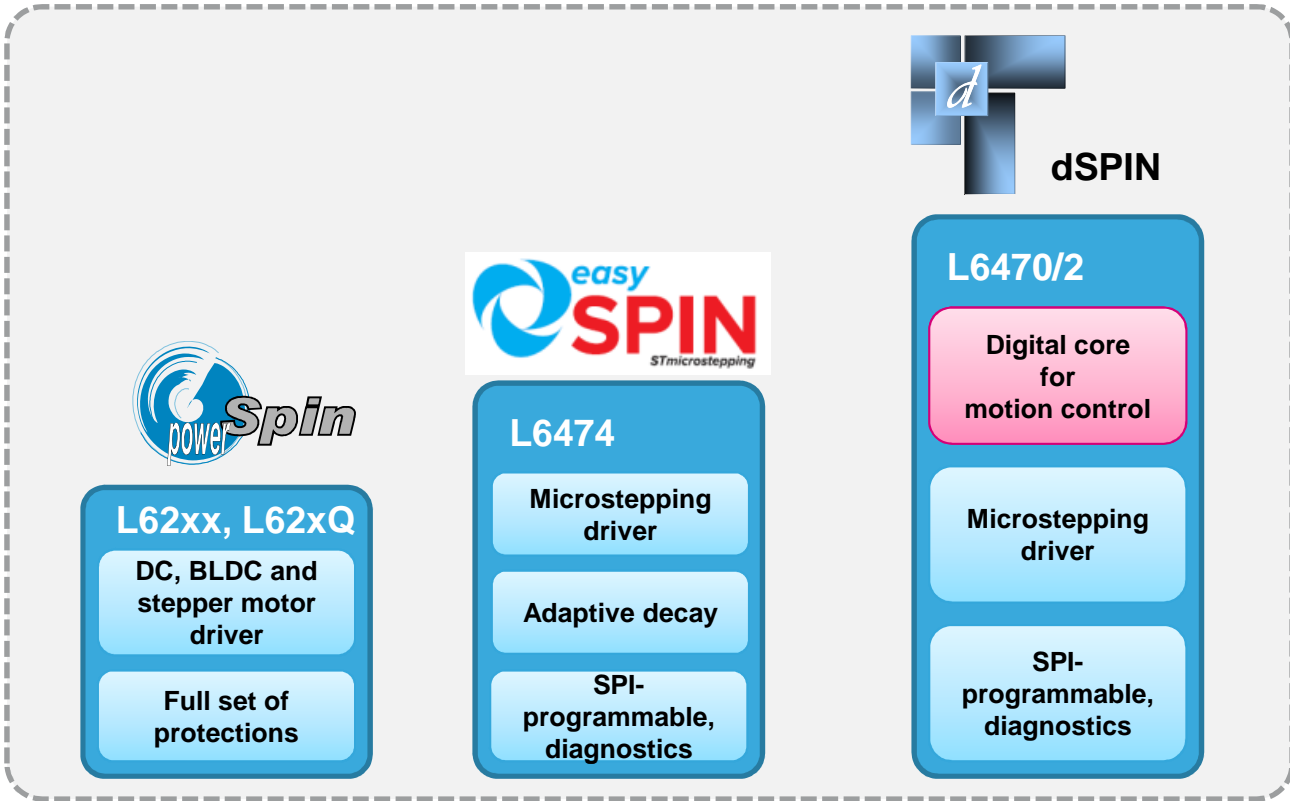
Intelligent buildings

- Security systems
- Antenna / satellite positioning

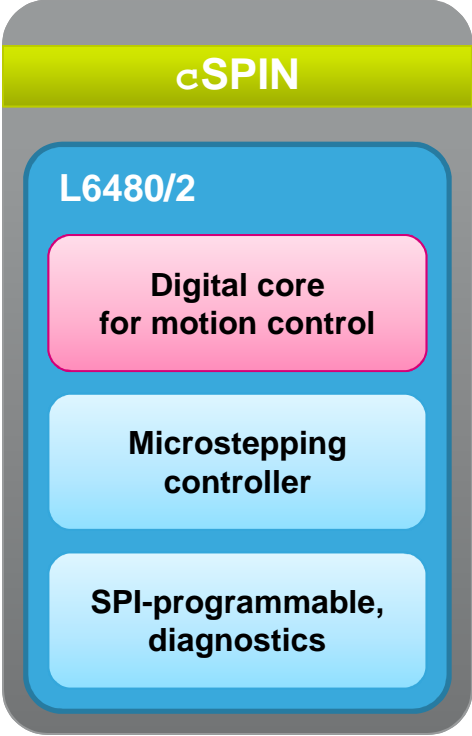
Wherever stepper motors are used!

xSPIN Product Family Overview

Fully integrated drivers with DMOS power stage



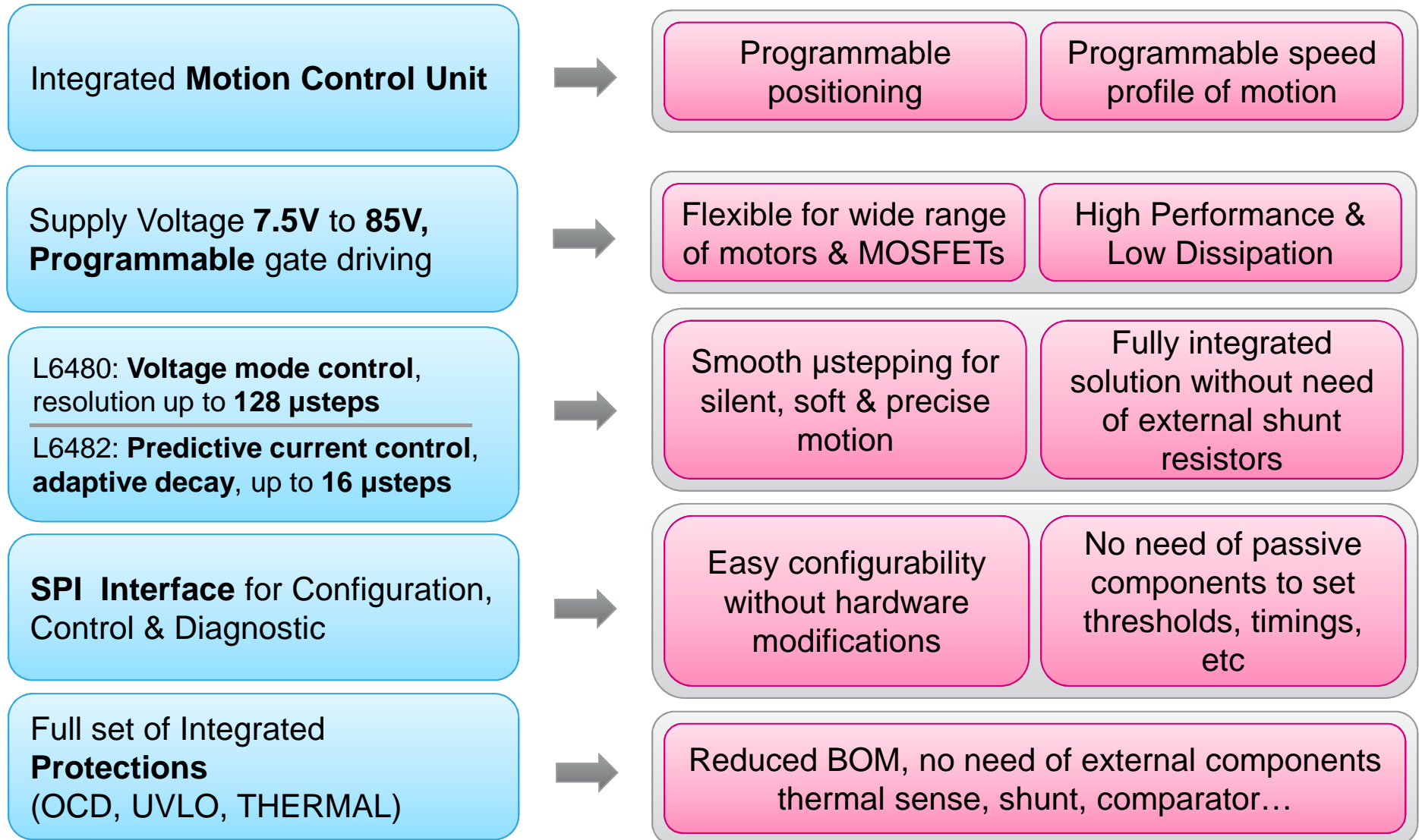
Advanced controller for external MOSFETs



Power up to ~100W

Power up to ~850W

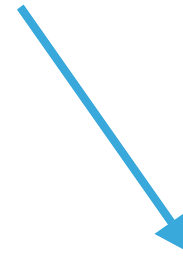
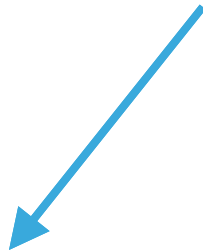
cSPIN - L6480/82 Features & Benefits



cSPIN – Which option to use?

Common Features (L6480 + L6482)

- High power applications where monolithic drivers are not able to deliver the current or dissipate the power losses
- Applications with strict requirements on power dissipation



Distinguishing Features L6480




- High end applications requiring extremely smooth / precise operation, e.g. Stage Lighting – Moving Heads...
- Chip configuration done precisely for each motor parameters

Distinguishing Features L6482

- Wide range of applications benefiting from universality & simplicity of current control mode
- Applications with loads with high dynamic
- Single configuration can be used for wide range of motors



Differentiation vs. Competition

Feature / Chip	L6480  augmented	L6482  augmented	Competition IC	Comment  augmented
Supply Voltage	10.5V – 85V	10.5V – 85V	12V – 50V	Wide motor supply range
Gate drive current	Configurable up to ~100mA	Configurable up to ~100mA	Fixed, ~110mA	Optimal adjustment according to ext. MOS
Miller clamp	Embedded	Embedded	N/A	Immunity to high dV/dt
µsteps	Up to 128	Up to 16	Up to 64	Highest resolution
Control mode	Advanced Voltage Mode	Predictive Current with Adaptive Decay	Current	Voltage mode control / sophisticated current control
Speed / Positioning commands	Yes, thanks to intelligent core	Yes, thanks to intelligent core	N/A	Means much less load for the microcontroller
Current sensing	Not dissipative No ext. shunt	Not dissipative No ext. shunt	Shunt	Fully embedded non dissipative sensing
Stall detection	Sensorless	N/A	N/A	Motor stall detected without ext. components
Serial interface	Yes, multiple devices support	Yes, multiple devices support	Yes, multiple devices support	One SPI can manage multiple motor control



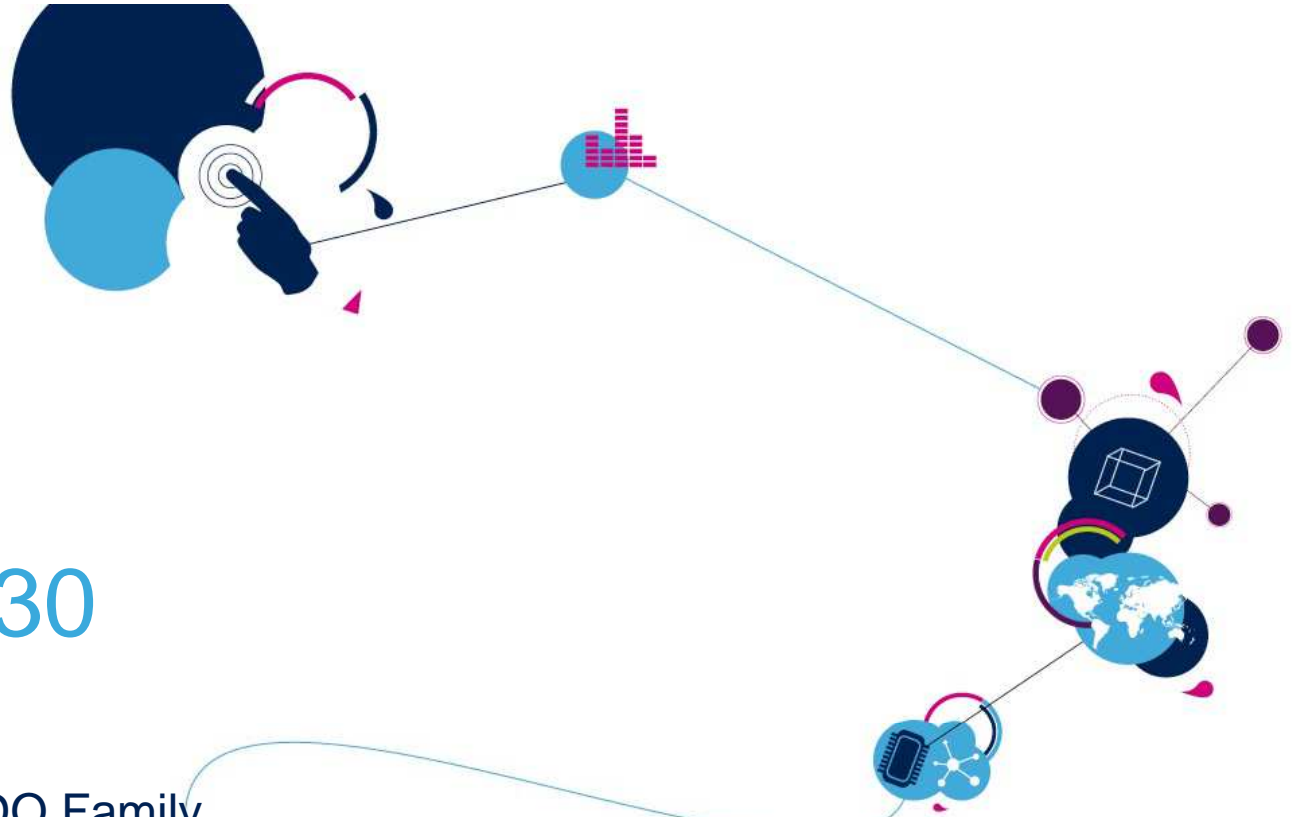
Embedded motion control engine + most advanced implementation today on the market !

Ordering Information & Available Tools

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- Product pages: www.st.com/cspin
- **cSPIN** order codes:
 - L6480/82 H (TR) HTSSOP38, Tube (Tape & Reel)
- **cSPIN** price information:
 - L6480/82 are at the same price
 - L6480/82 controllers cost approximately **20% less** than the fully integrated L6470H (dSPIN) driver
- Evaluation boards:
 - L6480/82: **EVAL6480H & EVAL6482H**
 - Communication board **STEVAL-PCC009V2**
- PC Application with Graphical User Interface
 - Download will be available on the product web page
 - First version available on request





LDK120/130

The new low-cost LDO Family

5.5 V, 200/300 mA

RtM, Q3 2012

ST LDO: Where are we going?

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NEW!

Performance /
Price
Optimization

- Focus: **WHITE GOODS, INDUSTRIAL, CONSUMER**
- New Technology / Good Performance
- $V_{IN} = 5.5\text{ V} \ \& \ 18\text{ V}$: $I_{OUT} = 200\text{-}300\text{ mA} / 1.2\text{ A}$

High Efficiency at
Light Loads

- Focus: **INDUSTRIAL** and BATTERY POWERED
- Input voltage up to 24V
- Very low quiescent current: $\sim\mu\text{A}$ range

High Precision

- Focus: **PORTABLE** devices
- High PSRR
- Low Noise

Space Constraint

- Focus: **PORTABLE** devices
- Miniaturized Package (CPS)
- Capless

High Performance

LDK/LDL series: Low Cost LDO Programme

50

Realized in New Technology BCD6s2

- Low Cost replacement of LDOs such as **LD39015, LD59015, LD3985**
(*parameters and package to be checked case by case*)

Positioning in LDO Portfolio: cost/performance trade-off

- Average in drop-out and quiescent current
- For higher performances, other families can be proposed:
 - STLQ50, STLQ015, ST715 (Ultra low quiescent)
 - LD39/LD59/LDCL/LDLN (Ultra-low drop, low noise, high PSRR)

Target applications

- Consumer
- Appliances
- Industrial



LDK/LDL Series Roadmap

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• LDK120/130

- Vin:1.9 to 5.5 V
- Iout = 200 mA (LDK120),300 mA (LDK130)
- Low Vdrop:150 mV (typ)
- Iq:80 μ A @ full load
- Packages: SOT23-5L, SOT323-5L(SC70), DFN6L

NOW

• LDL112

- Vin:1.9 to 5.5 V
- Iout:1.2A
- Vdrop:300mV(Typ)@max I out
- Iq:80 μ A @ 250 mA load
- Reverse current protection
- Package:DFN 2x2 6L,DFN 3x3-6L

H2
2013

• LDK220

- Vin:2.5 to 16 V
- Iout =200 mA
- Low Vdrop:200 mV (Typ)
- Iq:80 μ A @ 250 mA load
- Packages: SOT23-5L,SOT323-5L (SC70),DFN-6L

Q1
2013

• LDL212

- Vin:2.5 to 16V
- Iout =1.2A
- Low Vdrop: 300 mV @ max Iout
- Iq: 80 μ A @ 250 mA load
- Packages: DFN 2x2-6L, DFN3x3-6L, SO8 BW

H1
2013



life.augmented



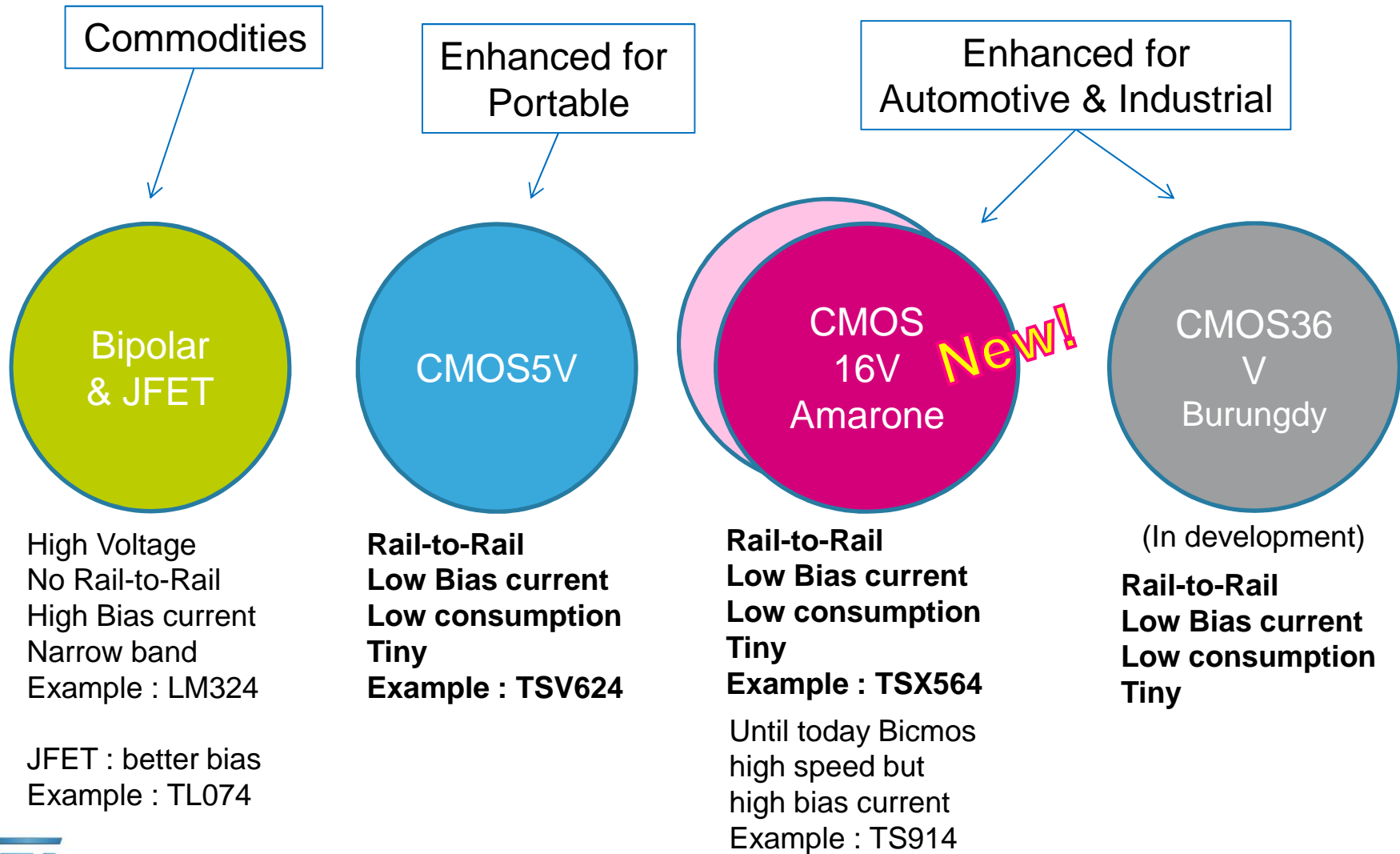
TSX561 TSX562 TSX564

16V CMOS Rail-to-Rail Op-Amps

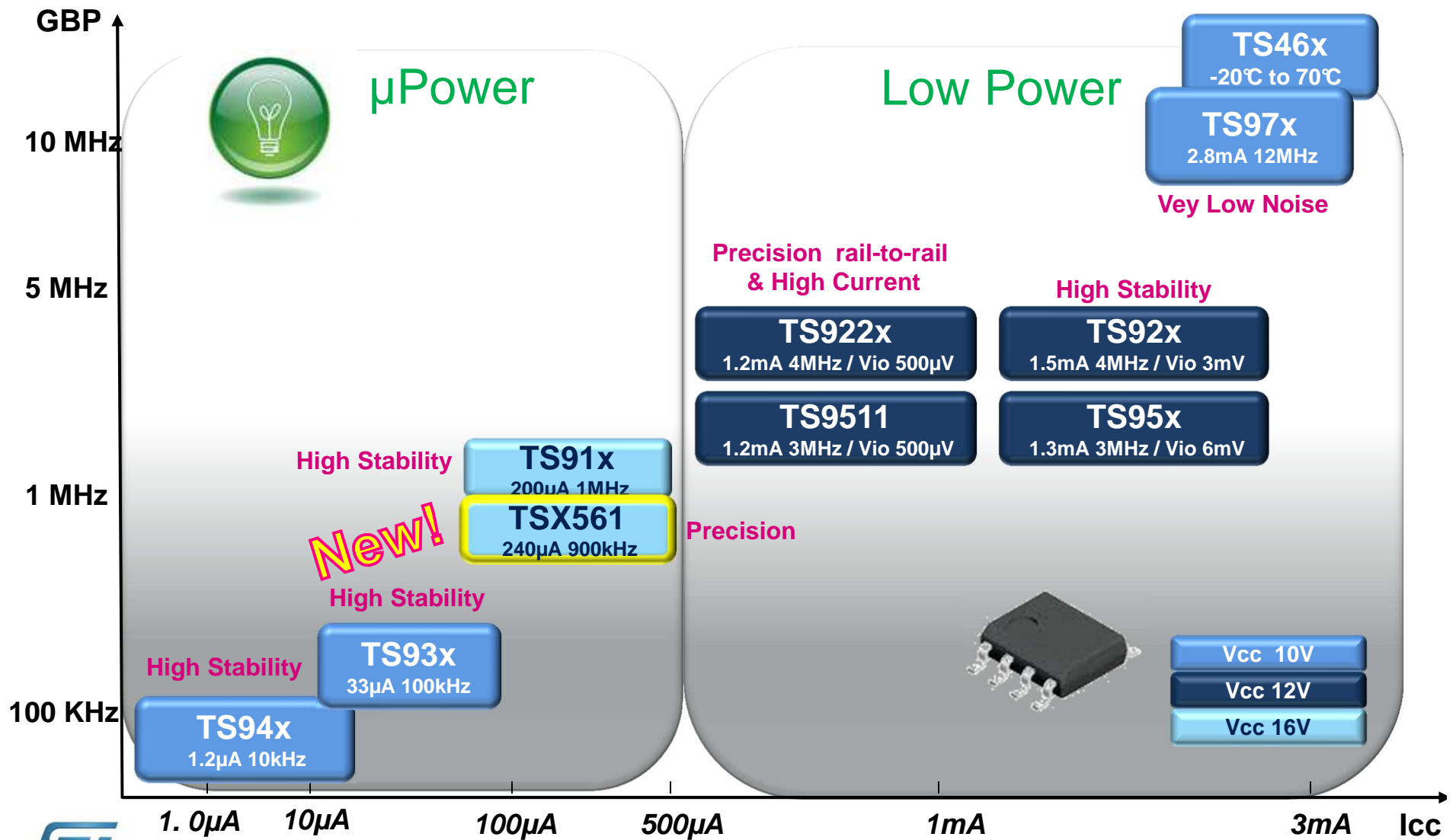
RtM, Q3 2012

Op-Amps Technologies in ST

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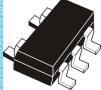

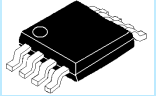
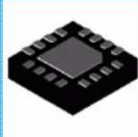

High Voltage Amplifiers Portfolio (10 to 16V)



TSX56x Family: Features

Features

- Low power consumption:
240 μ A typ at 5 V
- Supply voltage:
3 V to 16 V
- Gain bandwidth product:
900 kHz typ
- Low offset voltage:
600 μ V max
- Low input bias current:
1 pA typ
- High tolerance to ESD:
HBM 4 kV
- Wide temperature range:
-40 C to +125 C
- Also automotive qualification

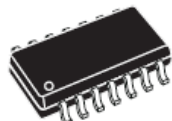
<p>TSX561 Mat 29 Q2-12 Auto Q2-13</p>	Single	 <p>SOT23-5</p>
<p>TSX562 Mat 29 Q3-12 Auto Q2-13</p>	dual	  <p>DFN8 2x2 MiniSO8</p>
<p>TSX564 Mat 29 Q3-12 Auto Q2-13</p>	quad	  <p>QFN16 3x3 TSSOP14</p>

New! TSX564 compared with TS914

TSX56x : Enhanced Precision and Tiny Package

16V Rail-to-rail I/O Low Power Low bias	Icc max	Vio max	GBP	Package
TS914	350 μ A	10 mV	1.4 MHz	SO-14
TS914A	350 μ A	5 mV	1.4 MHz	SO-14
TSX564	300 μ A	1 mV	0.9 MHz	QFN16 or TSSOP14
TSX564A	300 μ A	0.6 mV	0.9 MHz	QFN16 or TSSOP14

TS914 / TS914A



8.6 x 6 mm

TSX654 / TSX564A



3 x 3 mm 6.4 x 5 mm

TSX561	single		SOT23-5
TSX562	dual	 	DFN8 2x2 MiniSO8
TSX564	quad	 	QFN16 3x3 TSSOP14

New!

TSX56 series Features & Benefits

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High voltage, low power & accurate

Most compact 16V with enhanced precision



Features	Benefits
Operating range: 3 to 16 V -40 C to +125 C temp. range AEC-Q100 in 2013 High ESD protection 4kV HBM	Suitable for Industrial & Automotive
Low Power 240 μ A (typ at 5V)	Power Saving
Low offset VIO = 600 μ V max	Precision
Tiny DFN8 & QFN16 package	Space Saving
Low bias current 1pA	Suitable for high impedance input
Rail-to-rail In/Out	Higher Flexibility

TSX56 Competition

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Drop-in, pick and place solution

Parameter	ST offering	Competition		
	TSX56	LMC648x	TLC27x	TLV27x
Temp. range (°C)	-40 to +125	-40 to +85	-40 to +125	-40 to +125
Vos max (µV)	600 (A version)	750	10000	5000
Iq max (µA) over temp range	350	500	1600	660
Rail to Rail	In /out	In /out	Out	Out
GBPW (kHz)	850	1500	1700	3000
Operating Voltage range (V)	3 to 16	3 to 15.5	3 to 16	2.7 to 16
Package	SC70-5, DFN, QFN, Mini SO, TSSOP	Mini SO,SO	Mini SO, SO, TSSOP	SOT-23-5, Mini SO, TSSOP
ESD	4 kV	1.5kV	2kV	Not specified



TSV521 TSV522 TSV524

High Merit Factor Low Voltage Op-Amps

RtM, Q3 2012

What is High Merit Factor Op-Amps ?

High Merit Factor :
 Good consumption @ bandwidth
 (& stable at unity gain)

Micro-power LV CMOS (*) Op-amps	GBW (MHz) Band	Icc max (µA) Consumption	Vio max (mV) Precision	Gain for stability
TSV629x	1.3	36	4	4
TSV629xA	1.3	36	0.8	4
TSV63x	0.88	69	3	1
TSV63xA	0.88	69	0.5	1
TSV52x	1.15	51	1.5	1
TSV52xA	1.15	51	0.8	1

Decompensated = higher GBW & lower consumption, but not stable for gain = 1

Recommended for signal amplification >4

High Merit = higher GBW & lower consumption and stable for gain = 1

Recommended For all other operations

New!



- * LV CMOS:
- Low voltage
 - Rail-to-rail I/O
 - Very low Bias

	Web Price
TSV521ICT	0.27 \$
TSV631ICT	0.35 \$
TSV6291ICT	0.35 \$

New! TSV52 series Features & Benefits

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Features	Benefits
<ul style="list-style-type: none">Enhanced merit factor: 1.15 MHz for 35 μA	Power saving
<ul style="list-style-type: none">Lower offset with VIO = 1.5 mV/ 800 μV (A version)	Precision
<ul style="list-style-type: none">DFN8 2 x 2 mm for dual	Space Saving
<ul style="list-style-type: none">Low input bias current: 1 pA	OK for high impedance input
<ul style="list-style-type: none">Rail-to-rail input and outputUnity gain stableOperating range: 2.7 to 5.5 VHigher ESD protection: 4 kVAECQ-100 in progress	Convenient for a wide range of applications, including automotive

Industry-Leading
Power-to-Performance Ratio

TSV52 applications

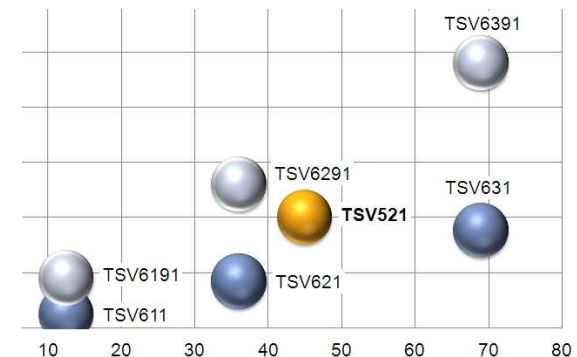


Feature	Application Matching
Low consumption	Battery operated
Low Bias & Precision	High impedance sensors : <ul style="list-style-type: none"> • pH probes • high impedance bridges • humidity sensors • capacitive sensors • pressure sensors • Photodiodes ...

Examples : Glucose meter, Led bulb...

Alternates:

- **TSV63x** : applications with lower Vcc
- **TSV629x** : application with gain > 4
- **LMV32x** : low cost / lower perf.



TSV52 Competition

Drop-in, pick and place solution

Parameter	ST offering	Competition		
	TSV52x	AD854x	MCP604x	OPAx348
Temp. range (°C)	-40 to +125	-40 to +125	-40 to +125	-40 to +125
Vos max (µV)	2500/800 (A version)	7000	4500	6000
Iq typical (µA)	35	38	45	45
Iq max (µA) over temp range	51	75	70	75
GBPW (kHz)	1150	980	1000	1000
Operating Voltage range (V)	2.7 to 5.5	2.7 to 5.5	1.8 to 6	2.1 to 5.5
Rail-to-rail	In/out	In/out	In/out	In/out
Unity gain stable	Yes	Yes	Yes	Yes
Input bias current Ib (pA)	1	4	100	1
Package	SC70-5, DFN, QFN, Mini SO, TSSOP	SC70-5, SOT-23- 5, SO, TSSOP	SC70-5, SOT-23- 5, SO, TSSOP	SC70-5, SOT-23-5, SO, TSSOP
ESD	4 kV	Not specified	4 kV	Not specified