## LV MOSFET

Name of speaker: Lay LV





Power Transistor Division & LV MOSFET BU General Overview

Topics

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### F7 Technology Positioning and Performance

STripFET F7 Product Portfolio

Package Solution

## **Power Transistor Division**

Major Technologies and Advanced Packaging





### **Power Transistor Division** PTD Revenues by BUs and Major Focus Applications

### PTD revenues 2018 by BUs

### % of 2018 PTD Revenue



(\*) Wide Band Gap







**Major Focus Applications** 

### Industrial

- SMPS & Lighting
- Motor Control
- Energy Generation



### Automotive

- Car Electrification
- Chassis & Safety
- Body & Convenience



## Industrial Applications – A Solid Base ST Leadership in Power Solutions







- Power tools
- Medical Diagnostic
- Security & Surveillance
- Networking system
- Building Safety
  - systems
- ....





**MOTOR CONTROL** 



## LV BU Key Markets











### **Power Management**

**Motor Control** 

### **Renewable Energy**

### **Automotive**







# Topics

## STripFET Technology Platforms... What's Next?

8



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Technology Evolution





## 40V STripFET<sup>™</sup> "F7" at a Glance ■1

STripFET improvement: 7<sup>th</sup> vs 6<sup>th</sup> gen



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## 60V STripFET<sup>™</sup> "F7" at a Glance <sup>12</sup>

STripFET improvement: 7<sup>th</sup> vs 6<sup>th</sup> gen

VDS

60 V

RDS(on) max

0.0014 Ω

Ь

40 A

RDS(on) x Area @10V



**FoM @10V** 



- Lower conduction losses
- Lower switching losses •





## Intrinsic Diode STripFET F7 VS Competition





Quite good Softness Factor



## STripFET F7 Series Highlights

### EMI performances

### > Most important MOSFET parameter for good EMI performances:

- Crss/ Ciss ratio
- Crss/ Ciss variation





F7 is well optimized with respect to EMI with low Crss/Ciss

(<0.4)

Well contained Crss/Ciss variations (0.1 ÷ 0.3)







New STH410N4F7-6AG shows the best EMC performance

over all tested components

15

### 100V F7 series in DC motor (H-bridge configuration)

## 

#### STL40N10F7:

- Improved switching behavior, without any HF ringing between gate and source
- Entire system EMI performance enhancement



Agilent 1908:57 I	ec 43, 55 File
Ref 53,69 dBµ// A Peak	ten 5 dB 39.02 dBµ0 Catalo
2 d8/	System, Algometris, Aliga Nov, All required Sav
	Loa
	Delet
HL 12 53 FS	
man il Ma	Renam
Start 38 MHz Res BH 3 MHz	Stop 1 GHz Moi UEW 3 MHz Sweep 4 ws (491 pts)
R:\TRRCE021.CSV file	saved



## \$ STripFET F7 Application

# Topics



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## Low Voltage MOSFETs

### A bunch of success stories with STripFET<sup>™</sup> F7 series



- Excellent for Motor Driving Superior EMI/EMC behavior Outstanding intrinsic body diode
- Automotive Grade Series

STripFET F7 MOSFETs





### STripFET<sup>TM</sup> F7 MOSFETS Focus Application









# Topics

## MOSFETS' R<sub>DS</sub> Main Contributors 21





## Through Hole/Module 22





## Surface Mounting





23

### High Current H<sup>2</sup>PAK Package Options 24

### **Key Features**

- High current capability (>120 A)
- Better R<sub>DS</sub> vs standard D<sup>2</sup>PAK with same POA

### **Applications**

- Motor Control
- **Synchronous Rectification**
- OR-ing

### **Ribbon bonding**





H<sup>2</sup>PAK With Wires

H<sup>2</sup>PAK With Ribbon

R<sub>DS</sub>(on) reduction: 22%



## Powerflat Family 25

### Key features

- Low thickness/weight
- Low Rthj-pcb thermal resistance
- Low parasitic inductance .
- Low parasitic package resistance
- Multiple sources
- Small form factor .

#### **Benefits**

- High power dissipation •
- High switching frequency operation
- High current handling
- Top side heat dissipation

### Configurations







## Powerflat<sup>TM</sup> 5x6 Dual Side Cooling

### **Increased Power Density and Thermal Performance**



**AEC-Q101** Qualified







Good thermal and electrical performances combined to high reliability and robustness



AEC-Q101 qualification ongoing



## Takeaway



- Wide offer of power transistor for both industrial and automotive market
- Excellent performance of LV MOSFET STripFET F7 technology
- New coming F8 technology to fulfill the gap vs best competition where missing F7 products.
- All type of package solution available.
- Complete industrialization of new power packages LFPAK 5x6



## WEB Support ST App Finder









MOSFET



















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Brand new finders, to allow an easier and faster recollect of the most important information about any power transistor in ST's portfolio.

## Thank You!



