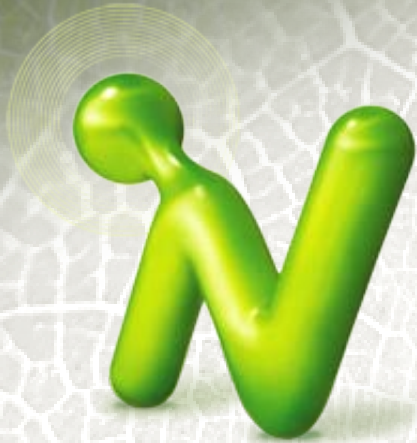


VIVA Tech





- **Company Information**
- **Supercapacitor Overview**
- **Supercapacitor Application**
- **Strength of VinaTech**

COMPANY INFORMATION OVERVIEW



Standard Products



EDLC(3V Series)



P-EDLC



Module

▪ Founded	1999. 07. 26
▪ CEO	Do-Kyung Sung
▪ Capital	USD 1.6M
▪ Assets	USD 20M ['12]
▪ Revenue	USD 16.3M ['12] / USD 22.1M ['13]
▪ Staff	125 people (R&D 22 people)
▪ Head office	Jeonju City, Korea
▪ Sales office	Gunpo, Korea
▪ Home page	www.vina.co.kr www.supercapacitorvina.com

COMPANY INFORMATION HISTORY

2013	<ul style="list-style-type: none"> 07. Listed on Konex stock market 06. Acquired Quality Management System (TS16949) certification 05. Certified Specialized Parts Enterprise
2012	<ul style="list-style-type: none"> 12. New Technology (NET) Certification / Awarded \$5M Exporter 09. Awarded 'Technology Innovation' Prize by President of Korea 01. Selected as a Global Strong Small & Medium company by SMBA
2011	<ul style="list-style-type: none"> 11. Relocated HQ to Jeonju City / Best HRD Re-certified 07. Set-Up New Factory in JeonJu City (Production Capacity: 2.5Mpcs/Month)
2010	<ul style="list-style-type: none"> 11. Developed 3V Super-Capacitor 06. ATC (Advanced Technology Center) designated
2009	<ul style="list-style-type: none"> 06. Selected as the Company for 'Industry-Laboratory Joint Technology Development Project' (The Next Generation Hybrid Supercapacitor for Renewable Energy) 03. Selected as the Company for 'IT Original Technology Development Project' (Pouch / Radial Type Li-Ion Capacitor for Ubiquitous Power)
2008	<ul style="list-style-type: none"> 09. Awarded Best HRD (Human Resource Development) by Government
2007	<ul style="list-style-type: none"> 07. Selected as the Company for 'The Next Generation New Technology Development Project' (INNO-BIZ)
2004	<ul style="list-style-type: none"> 12. Started Mass-production for Supercapacitor (2.3V/2.5V/2.7V Series Radial Type) 07. Acquired ISO 9001 / ISO 14001 Certification
2003	<ul style="list-style-type: none"> 06. Started Super-Capacitor R&D
1999	<ul style="list-style-type: none"> 07. Established VINATech co., Ltd.

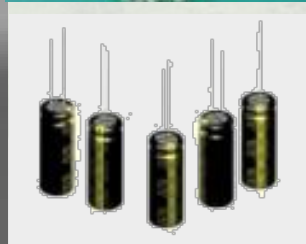
COMPANY INFORMATION ORGANIZATION



COMPANY INFORMATION **FACTORY**



- **Factory Site** : 11,213m²
- **Building Area** : 4,565m²
- **Production Capa. : 1st Investment US\$30.1M / Year**
 - Small 1F ~ 25F : 3,000K/Mon.,
 - Middle 50F ~ 500F : 1,400K/Mon.
 - Large 650F ~ 3000F : 5K/Mon.



2nd Investment US\$54.7M / Year
(Module & Chip EDLC)

COMPANY INFORMATION MISSION & VISION

Mission

Based on happiness of all our members, we offer environment-friendly products and contribute to the continuous prosperity of society

Vision 2017

Energy Division

- World Best Supercap Provider
 - Sales \$70M
 - Profit \$17M

Strategic Plan 2014

- Radial type
 - 60% global market share
- Large Axial type marketing
- Global Network enhancing
 - Europe, America, Asia market

COMPANY INFORMATION OVERSEAS NETWORKS



Domestic office - 2

Overseas office - 4

Global network - 13

COMPANY INFORMATION CERTIFICATIONS

Certification

ISO 14001



INNOBIZ
Certification System Ver3

ISO 9001



VENTURE

UL



Enterprise
R&D Center

Best HRD



Export Prospect
Enterprise

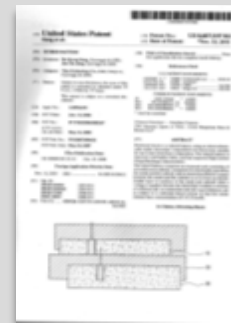


ISO/TS 16949:2009

Certified Specialized
Parts Enterprise

Intellectual Property

Patent : **Hybrid Battery** and 65 Subjects

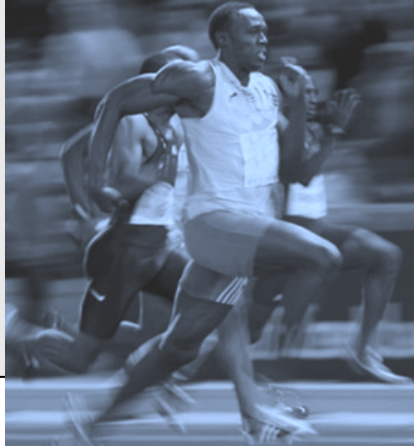


Brand : Hy-Cap / Xelled

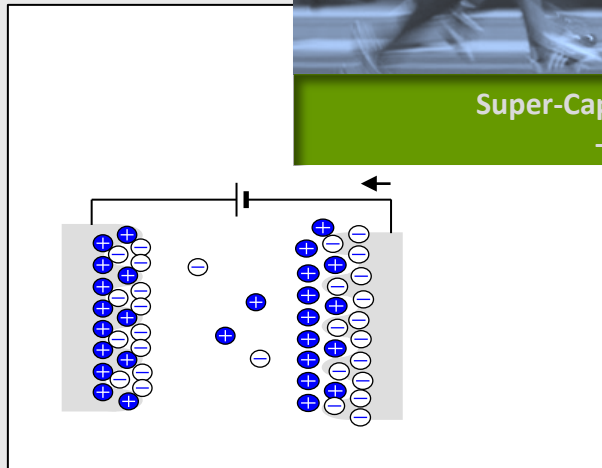


SUPERCAPACITOR OVERVIEW **FUNDAMENTALS**

✓ Charge and Discharge principle



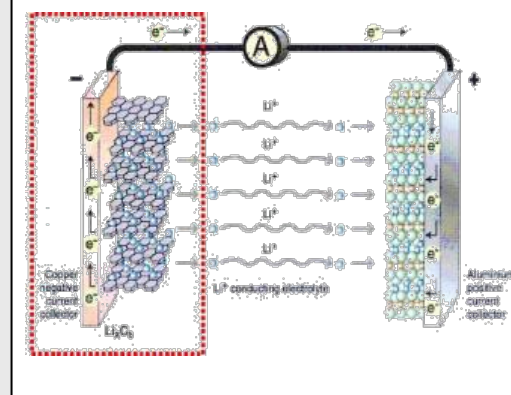
Super-Capacitor
- Asec -



Physical adsorption -
Desorption



Li Ion Battery
- mAhr -



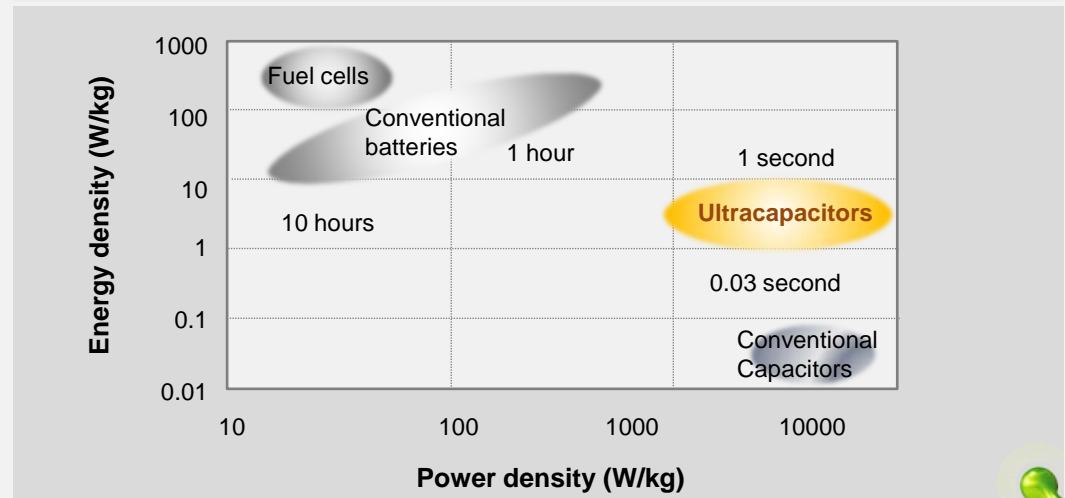
Chemical Reaction

SUPERCAPACITOR OVERVIEW **BENEFITS**

Features & Benefits

- High Power Density (>2kW/kg),
- Quick charge & Discharge (seconds)
- Wider Operating Temperature
(AN -40 °C ~ 65 °C / PC -25 °C ~ 70 °C)
- Long Term Reliable Charge & Discharge
Cycles (>500,000 cycles)
- Eco-friendly energy storage device
Which can solve battery's safety and
environmental problem

Features	Super-Capacitor	Battery
Ionic Reaction	Physical absorption-desorption on electrode surface	Chemical bonding inside electrode
Energy Density (Wh/kg)	Mid. (3 ~ 5)	High (20 ~ 150)
Power Density (kW/kg)	High (2.0 ~ 3.0)	Low (0.05 ~ 0.3)
Charge time	Quick Charge	More than hours
Charge & Discharge Efficiency (%)	90 ~ 95	70 ~ 85
Operating Temperature (°C)	-40 ~ +70	-20 ~ +70
Environment	Environment-friendly	No Good
Life	>500,000 Cycle	2~3 years / 1,000 Cycle



SUPERCAPACITOR OVERVIEW **MAJOR PRODUCTS**

- **P-EDLC** [Hybrid Capacitor]



Features

Rated 2.3V

Higher Energy Density (2 times of EDLC)

Over 50,000 cycle life

Low current & long-term backup applications

Operating temperature : -25°C ~ 60°C

- **EDLC** [Electric Double Layer Capacitor]



Features

Rated 2.5V & 2.7 & 3.0V

Higher PowerDensity (low ESR)

Over 500,000 cycle life (semi-permanent)

Short-term Peak Power assist applications

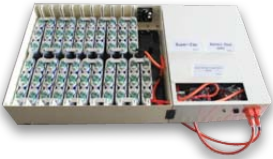



Operating temperature

- Rated 2.5V : -25°C ~ 70°C

- Rated 2.7V & 3.0V : -40°C ~ 65°C

SUPERCAPACITOR OVERVIEW **PRODUCT LINEUP**

PRODUCT LINEUP

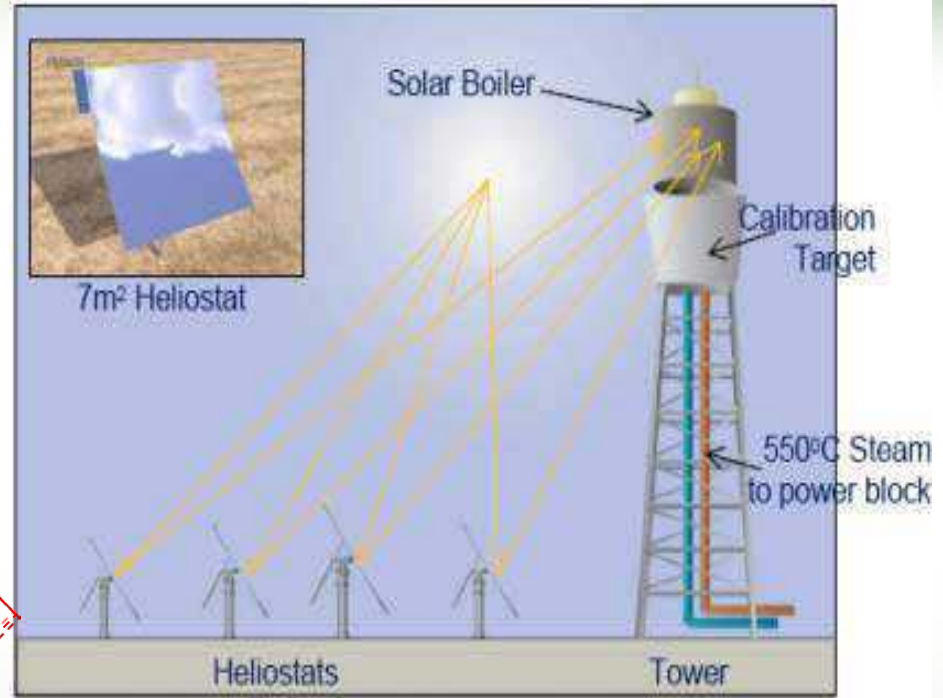
Type	P-EDLC			EDLC				
	Volt. (V)	Size (mm)	Capacitance (F)	Volt. (V)	Size (mm)	Capacitance (F)		
Radial Type	2.3	0820~1840	10~120	2.5~3.0	0813~1840	1~60		
Snap-in Type	2.3	2245~3570	220~900	2.5~3.0	2245~3580	100~500		
Axial Type	-			2.7V	6152~61138	650 ~ 3000		
Module	Customer Specifications							
								
	Customize for Hybrid Vehicle, Bus & Truck		Standard Module (48V 166F)		Axial Type cells		Radial & Snap - In	

SUPERCAPACITOR APPLICATION

“Environment-friendly” Energy Storage and Generating Device

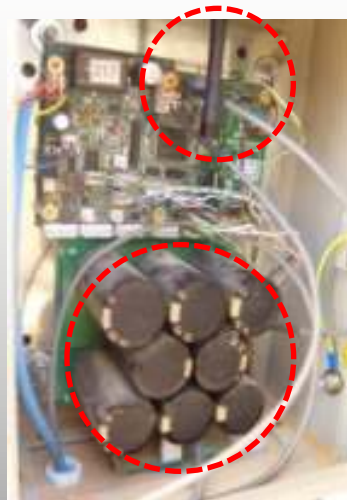
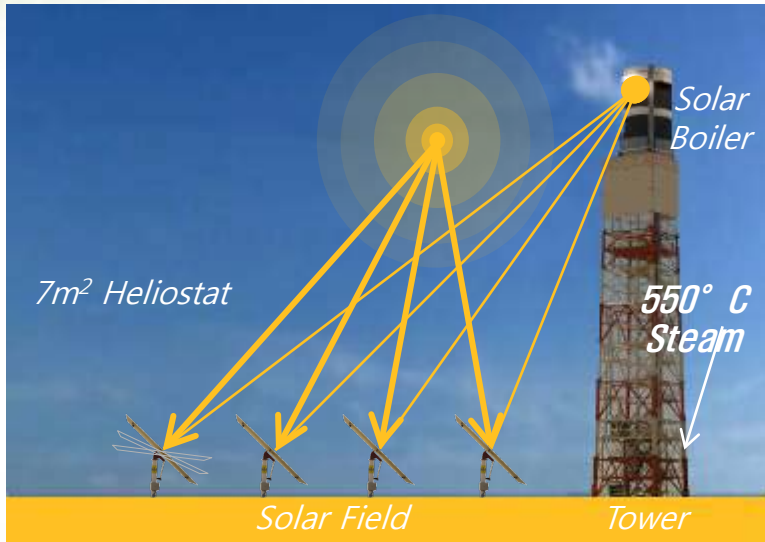


SUPERCAPACITOR APPLICATION **Solar Tracking**



- ◇ Purpose
 - : Energy Storage for powering motors
- ◇ Advantage
 - : No maintenance
 - Temperature

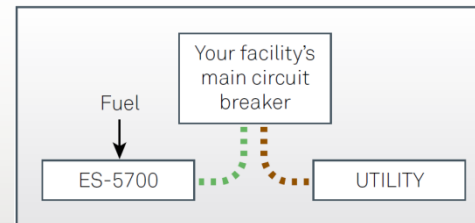
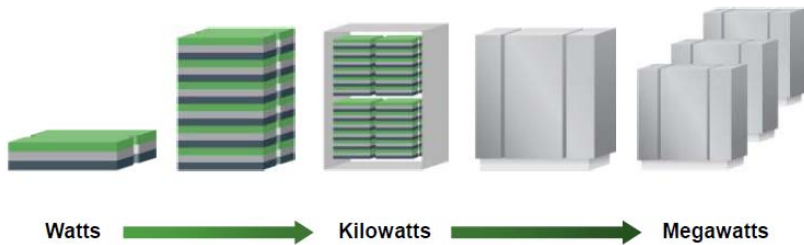
SUPERCAPACITOR APPLICATION **Solar Tracking**



SUPERCAPACITOR APPLICATION Fuel Cell System

● Peak Power Back-Up & Auxiliary Power

Fuel Cells → Stacks → Modules → Systems → Solution



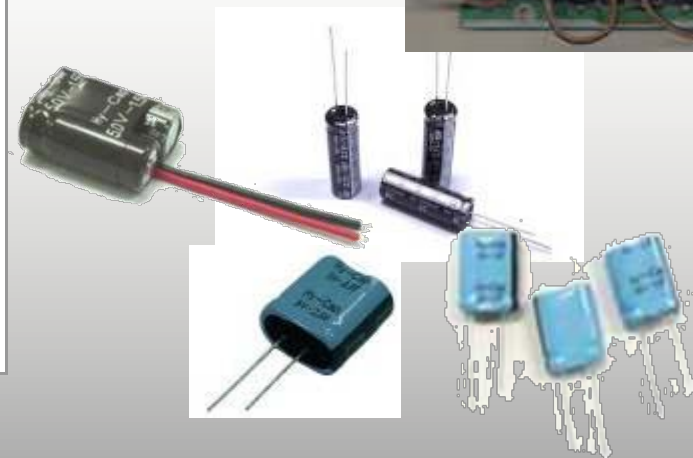
- Power Back-Up Until Fuel Cell Start Up
- Peak Power Compensation & Power Back-up to Critical Utility When Power Failure

SUPERCAPACITOR APPLICATION **Metering System**

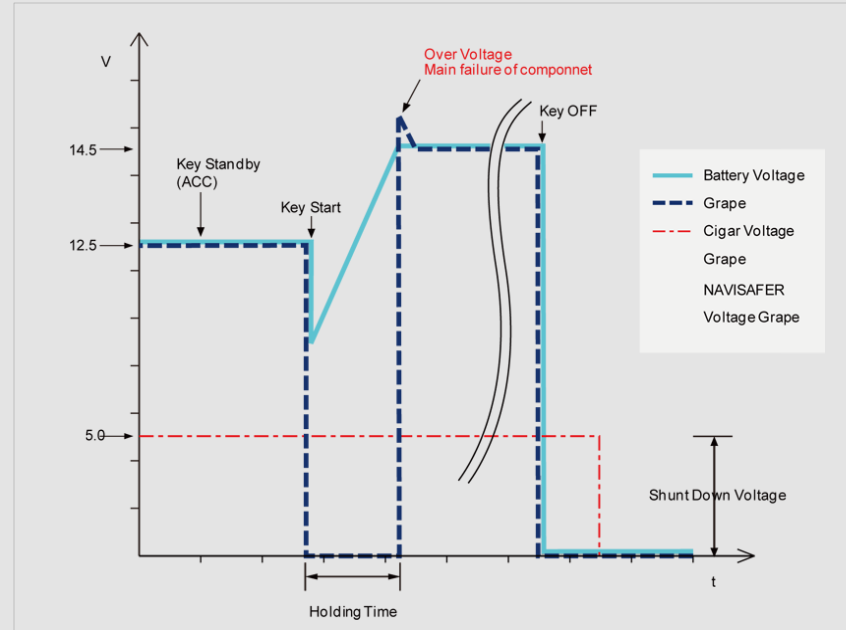
- AMR / GPRS / Security access net



- Power backup when outage & signal
- Long life : No maintenance
- Wider temperature : -40°C to 65°C



SUPERCAPACITOR APPLICATION NAVIGATION



Vehicle Component (H Company)

- Application: Navigation system backup
- Schedule : 2011 ~
- Sales Estimation : Year 2011 \$ 0.5M ~

SUPERCAPACITOR APPLICATION **BLACK BOX**

- **Purpose**

- Data keeping(15 sec) on accident or emergency

- **Advantage**

- Instantaneous reaction
- No maintenance (no need of battery cover)



SUPERCAPACITOR APPLICATION

High Power Energy Source

HEV/EV



Toyota RX400h



Honda Civic



Ford Escape Hybrid



Toyota Prius II



GM Silverado

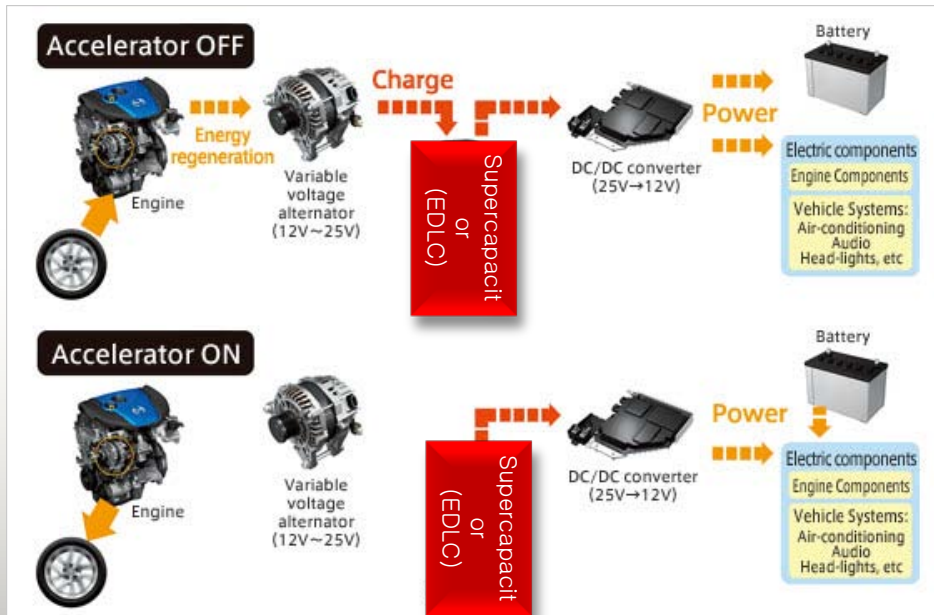
SUPER-CAPACITOR SOLUTION

1. Back-Up Power for ECU / Brake System
2. Peak Power Assist for Steering Wheel
3. HEV Power Assist
4. Regen. Braking Energy : Idling & Stop
5. X by Wire System

► Need High Power Storage Solution

SUPERCAPACITOR APPLICATION HYBRID SYSTEMS

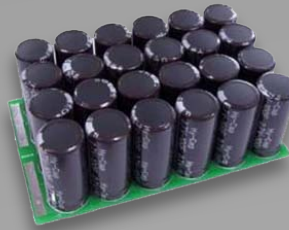
- **Purpose**
: Engine + Electric motor with supercapacitor
(covering peak power when acceleration or engine starting)
- **Advantage**
- Long life cycle (over 500,000 cycles)



SUPERCAPACITOR APPLICATION MODULE EXAMPLES



2F / 125V



4F / 60V



16F / 15V



18F / 30V

MODULE EXAMPLES



100F / 17V

STRENGTHS OF VINA TECH

1. **World First 3V EDLC Mass-Production**

2. **Stable Production Capacity for Market Demands [Small Cell]**

3. **P-EDLC Mass-Production with PC Electrolyte**

- Advantage of PC Electrolyte : High temperature stability & Environmental friendly
- Quality(leakage) & Safety
- Lower ½ than EDLC based on Energy density

4. **Low Cost Production : Aging-Selecting Automated Process etc.**

5. **Patents of Various Electrodes' Production Technology**

- Using an asymmetric metal-oxide electrode technology (P-EDLC, LiC, Power Battery)

6. **Conducting 8 Governmental Technology Development Projects**

- Securing 2M/year governmental subsidy based on 2012 year

A 3D rendered green figure resembling a stylized person or a letter 'N'. It has a rounded head and two thick, rounded legs. Behind the head are several concentric, thin white circles, creating a halo effect. The figure is set against a white background with a soft shadow underneath.

Thank
You!

The logo for VIVA Tech. The word 'VIVA' is in a bold, black, sans-serif font. The letter 'V' is stylized with a small green dot above it. The word 'Tech' is in a smaller, black, sans-serif font.

VIVATech