



日電貿股份有限公司
NICHIDENBO CORPORATION



NDB Group

(Lipers Enterprise Co., Ltd.)

Honesty · Service · Growth · Co-Prosperity



Affiliate Companies



Nichidenbo Corporation

LIPERS

Lipers Enterprise



Scope Technology



Advance Electronic Supply Inc.



VIC-DAWN Enterprise



TONSAM Corporation



KOHO (Taiwan)

NDB Group Company Profile

NICHIDENBO CORPORATION



Establishment: January, 1993

Taiwan Public-List Company (Stock # 3090)

Total member number of NDB Group: 7



Paid Capital: USD 63 million (Till end of 2021)

CY 2022 Sales Revenue: USD 339 million

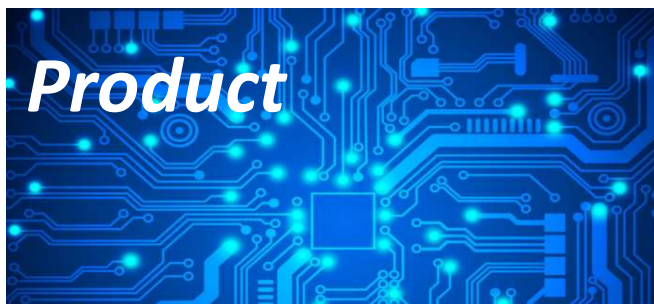
Total Employee Number: 360



Headquarter: New Taipei City, Taiwan

Greater China Area: Suzhou, Wuhan, Shenzhen, Hong Kong

South Asia Area : Indonesia, Thailand, Vietnam, India

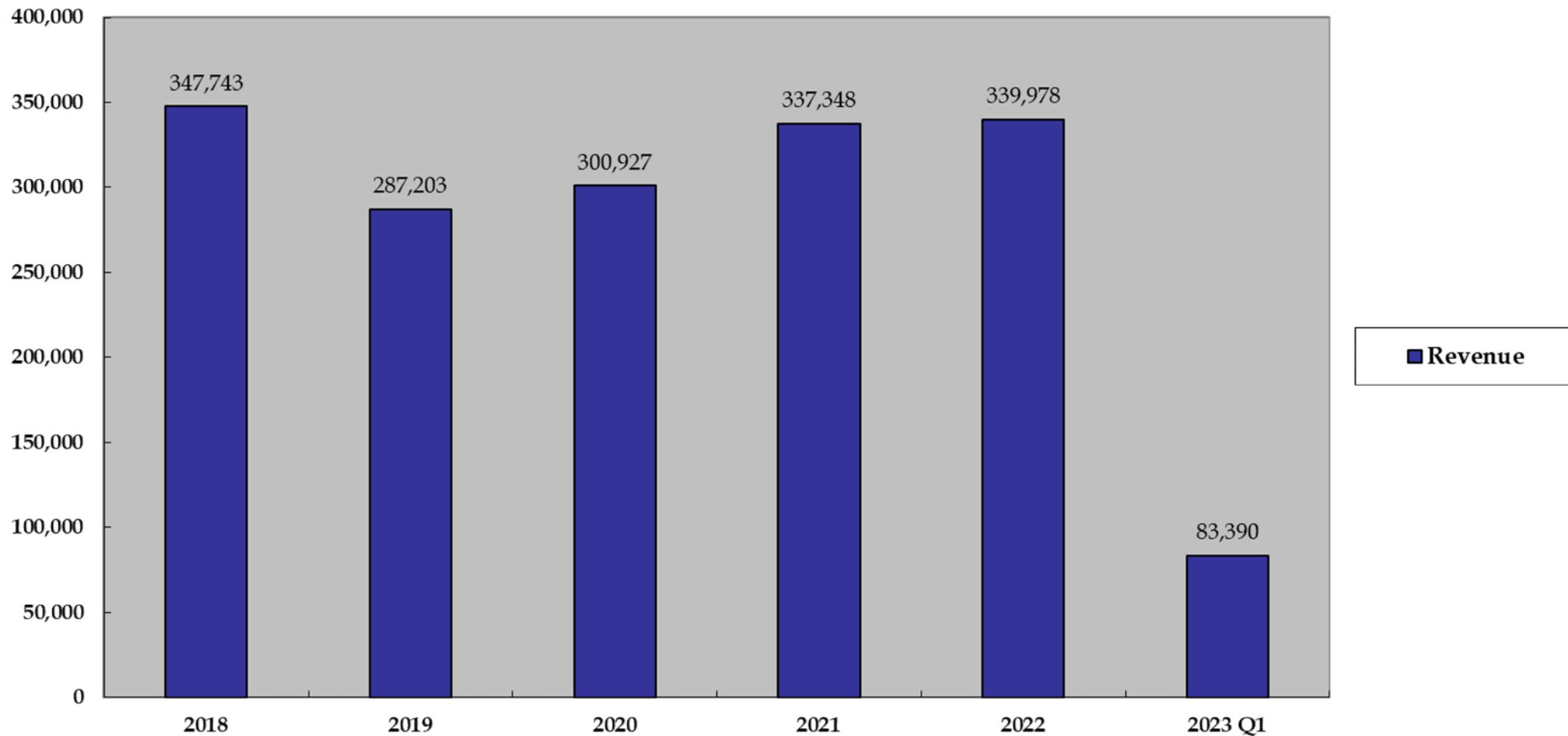


Main Product: Passive Components (CRL)

Main Scope: Design , Testing, & Distributing

Passive component Solution Service

Consolidated Revenue and Net Income (2018 ~2023 Q1)



NDB Group Company Product Line

NICHIDENBO CORPORATION

AICtech



FUJITSU

Electronic Components
KEMET
CHARGED!

SAMSUNG

ALPSALPINE



HOLTEK

KYOCERA

sumida

EVERLIGHT



NIPPON
CHEMI-CON

TDK



nuvoTon

Sentelic



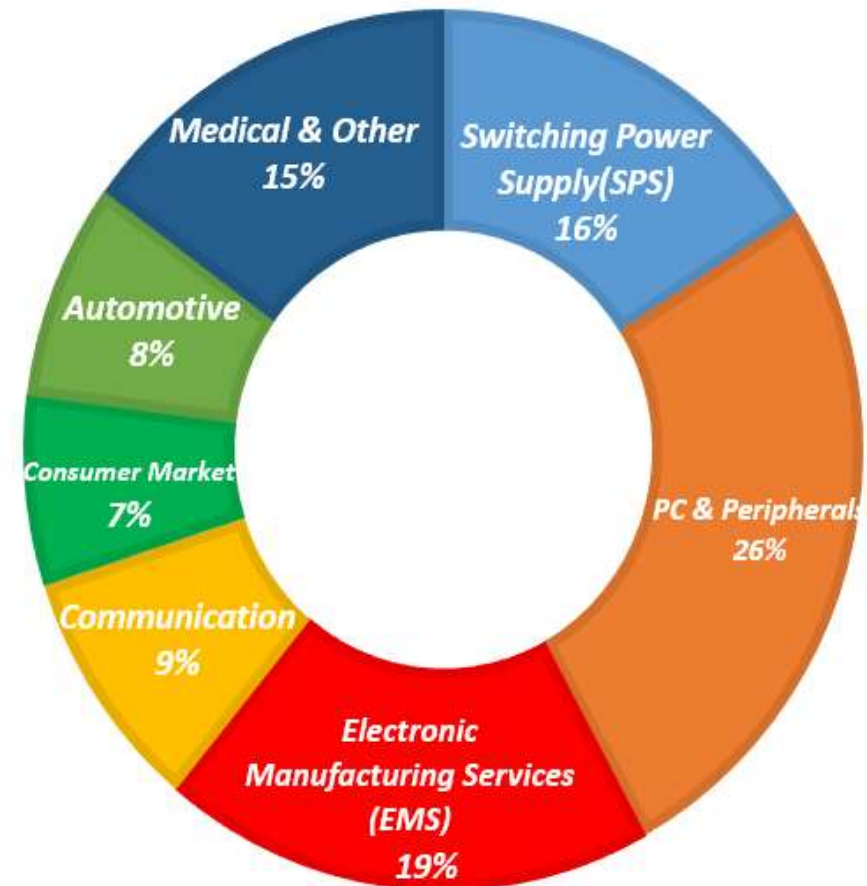
Panasonic

MARKET SEGMENT



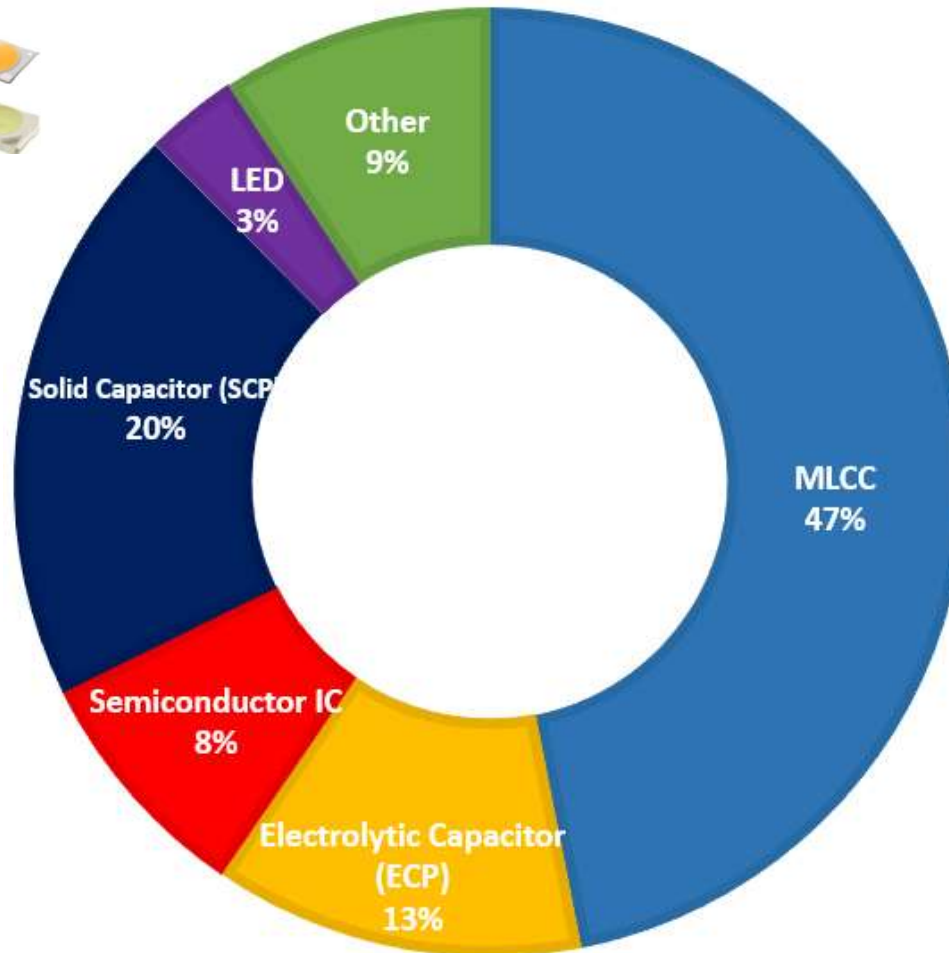
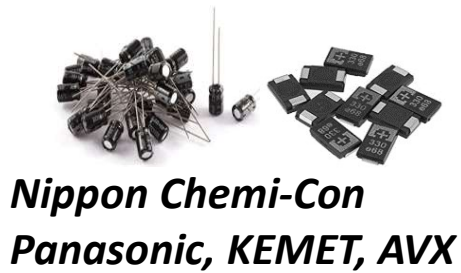
- *Switching Power Supply(SPS)*
- *Electronic Manufacturing Services (EMS)*
- *Consumer Market*

- *PC & Peripherals*
- *Communication*
- *Automotive*



4. Sales Ratio by Product Line

2023 Q1



NDB Group Company Operations in Greater China

NICHIDENBO CORPORATION



Eastern China
Suzhou Branch

Central China
Wuhan Office

Taiwan
New Taipei City H.Q.
Taichung Office
Kaohsiung Office

Southern China
Shenzhen Branch
Hong Kong Branch

NDB Group Company Operations in South Asia

NICHIDENBO CORPORATION



NDB Group Company Logistic / Hub Center

NICHIDENBO CORPORATION



Taipei Logistics Hub, Taiwan

Zhonghe District, New Taipei City



Hong Kong Logistics Hub, China

Tuen Mun, New Territories, Hong Kong



Shanghai Logistics Hub, China

Pudong New Area, Shanghai



Suzhou Logistics Hub, China

Suzhou Industrial Park



Chongqing Logistics Hub, China

Shapingba District, Chongqing



Shenzhen Logistics Hub, China

Futian District, Shenzhen



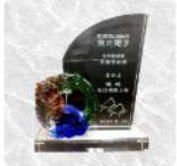
NDB Group Company Honor / Award List

NICHIDENBO CORPORATION

2016



《日電貿》華泰電子
優秀供應商



《健略》億光電子
全球經銷商業績貢獻獎



《仕野》ALPS
中華圈代理店優秀賞



《合順電子》LG Innotek
Outstanding Performance



《日電貿》中華徵信所
大型企業TOP5000

2015



《日電貿》亞源集團
最佳貢獻獎



《日電貿》華泰電子
優秀供應商



《力垣》KEMET
Distributor of the Year



《健略》華泰電子
績優廠商



《仕野》泰金寶電通
國內績優廠商獎

2012



《日電貿》亞源集團
優秀供應商



《日電貿》華泰電子
優秀供應商



《健略》群豐科技
績優廠商



《力垣香港》建華電機
優秀協力廠商



《日電貿》天下雜誌
500大服務業

2011



《日電貿》亞源科技
優秀供應商



《日電貿》華泰電子
優秀供應商



《日電貿》日本佳美工
感謝狀



《日電貿》佳美工
80週年感謝狀

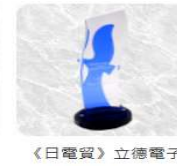


《日電貿》天下雜誌
500大服務業

2010



《日電貿》華泰電子
優秀供應商



《日電貿》立德電子
Best Partner



《日電貿》亞源科技
優秀協力廠商



《日電貿》天下雜誌
500大服務業

2014



《巨馳》新唐科技
代理商年度FAE獎



《合順》崧盛電子
優秀供應商



《日電貿》亞源集團
優秀供應商



《日電貿》華泰電子
優秀供應商



《力垣》建準集團
最佳年度協力廠商

2013



《力垣》可立克
進步供應商



《巨馳》新唐科技
特別貢獻獎



《日電貿》中華徵信所
大型企業TOP5000



《日電貿》亞源集團
優秀供應商



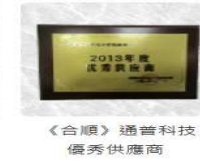
《日電貿》華泰電子
優秀供應商



《力垣》建準集團
最佳服務協力廠商



《健略》群豐科技
績優廠商



《合順》通普科技
優秀供應商



《日電貿》天下雜誌
500大服務業



《日電貿》中華徵信所
大型企業TOP5000

2009



《日電貿》亞源科技
優秀協力廠商



《日電貿》天下雜誌
500大服務業

2007



《日電貿》Fairchild
最佳代理商



《日電貿》香港佳美工
Excellence
Performance Award

2005



《日電貿》MiTAC
Green Partner

2004



《日電貿》華泰Supplier
Excellence Award



《日電貿》海韻
優良協力廠商



《日電貿》NF希望工程
慈善募款紀念



《日電貿》順達電腦
績優廠商



《日電貿》崇實科技
最佳代理商

2003



《日電貿》台灣佳美工
感謝狀



《日電貿》台灣佳美工
20週年感謝獎座



《日電貿》聯德電子
績優廠商



《日電貿》吉電社
感謝函



《日電貿》台灣佳美工
感謝獎座

1999



《日電貿》台灣佳美工
感謝獎座

1997

NDB Group Company Social Responsibility

NICHIDENBO CORPORATION





Thanks for your attention



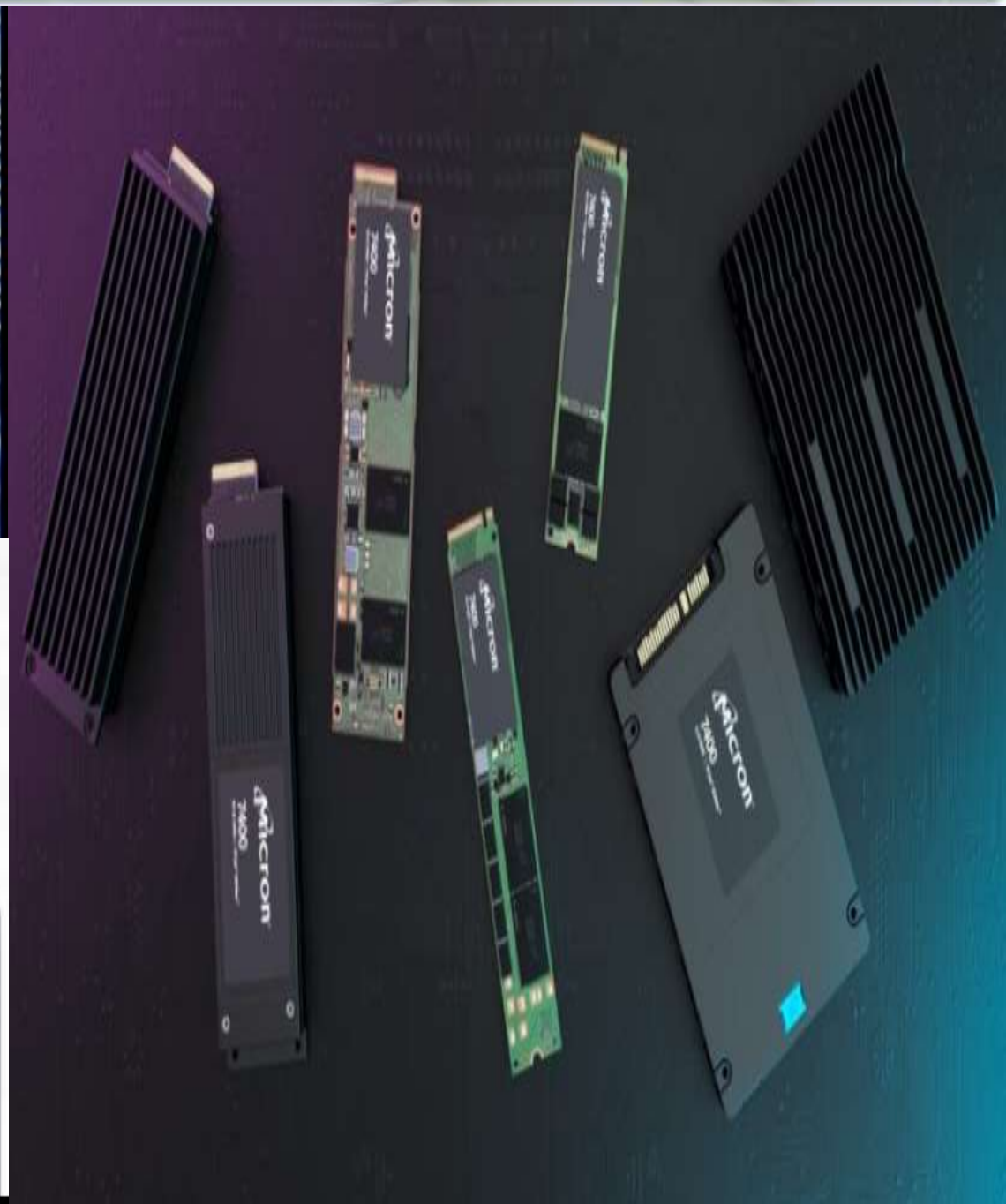
Major Industry / Application Business in NDB

NICHIDENBO CORPORATION



Major Industry / Application Business in NDB

NICHIDENBO CORPORATION



Major Industry / Application Business in NDB

NICHIDENBO CORPORATION



Major Industry / Application

NICHIDENBO CORPORATION



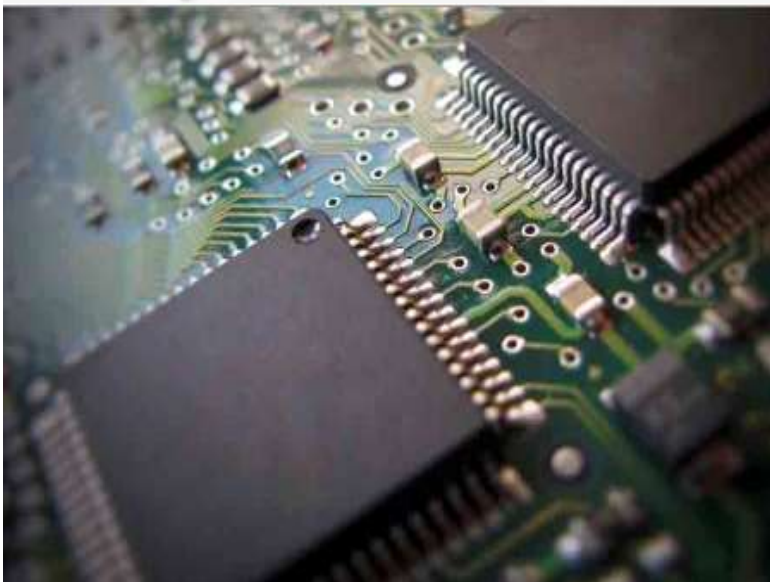
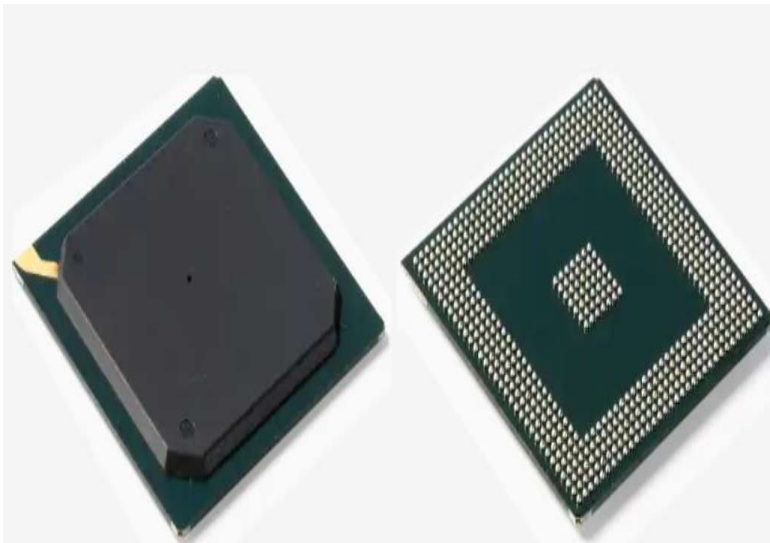
Major Industry / Application Business in NDB

NICHIDENBO CORPORATION



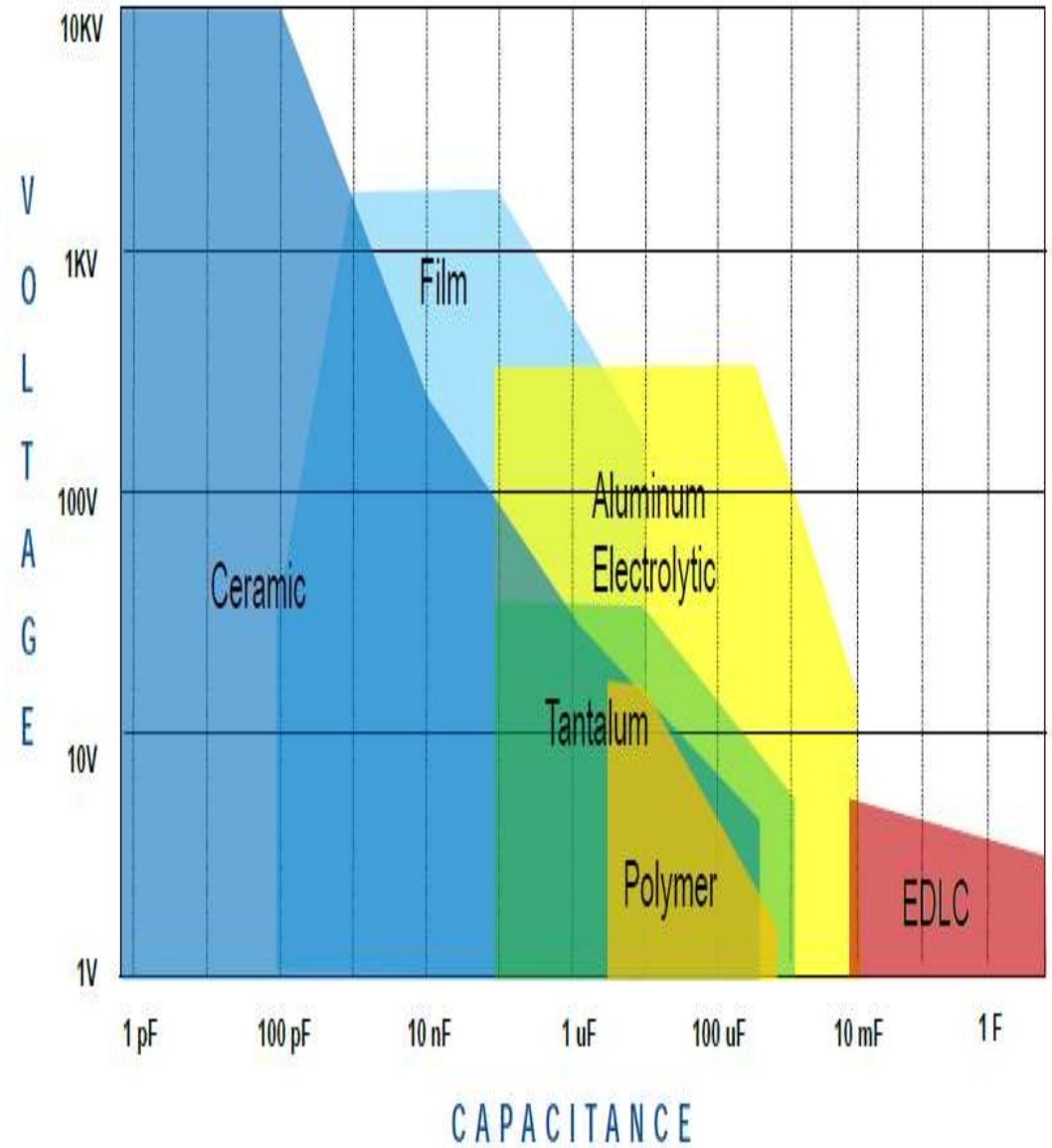
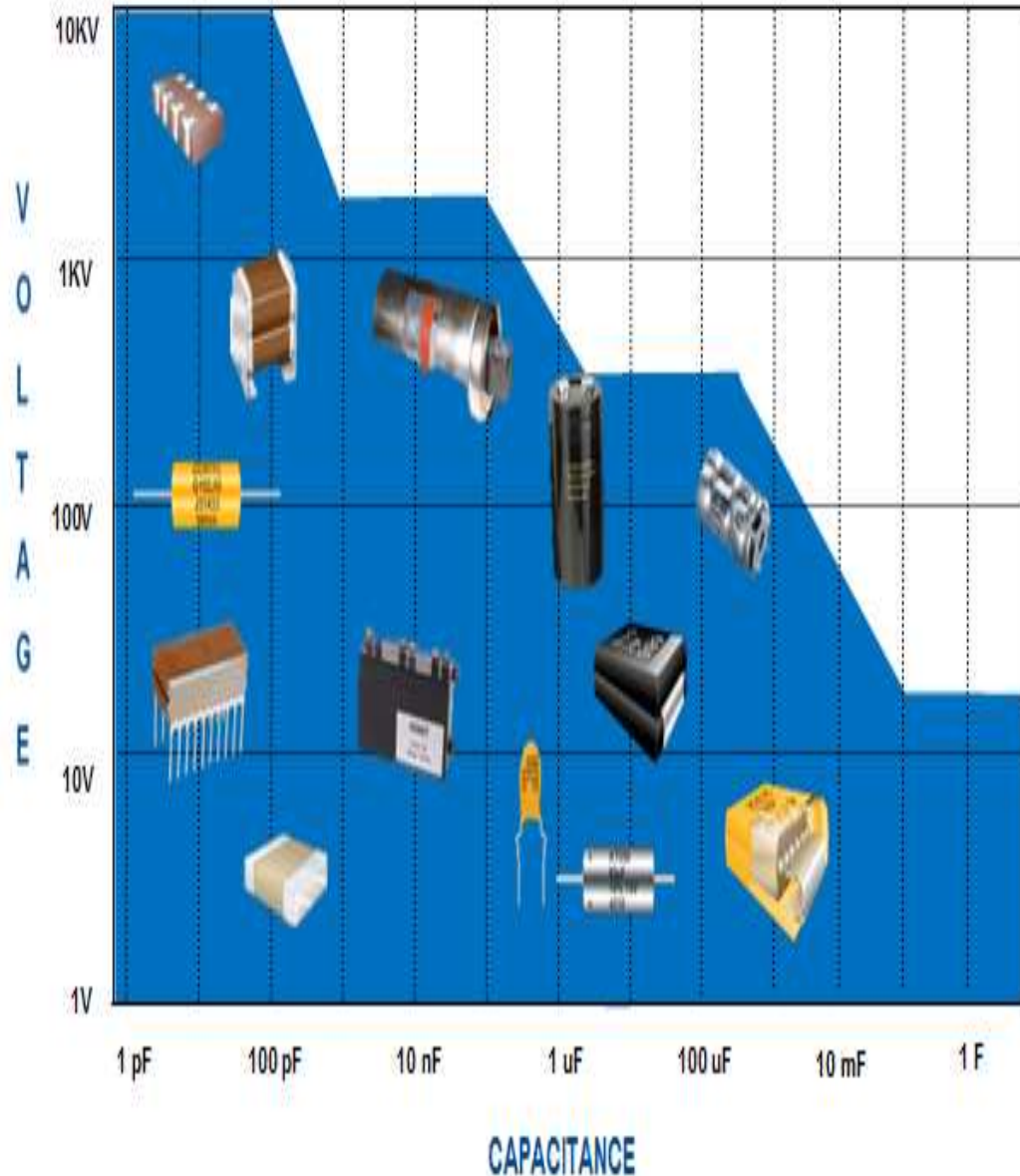
Major IC-Package Customers

NICHIDENBO CORPORATION

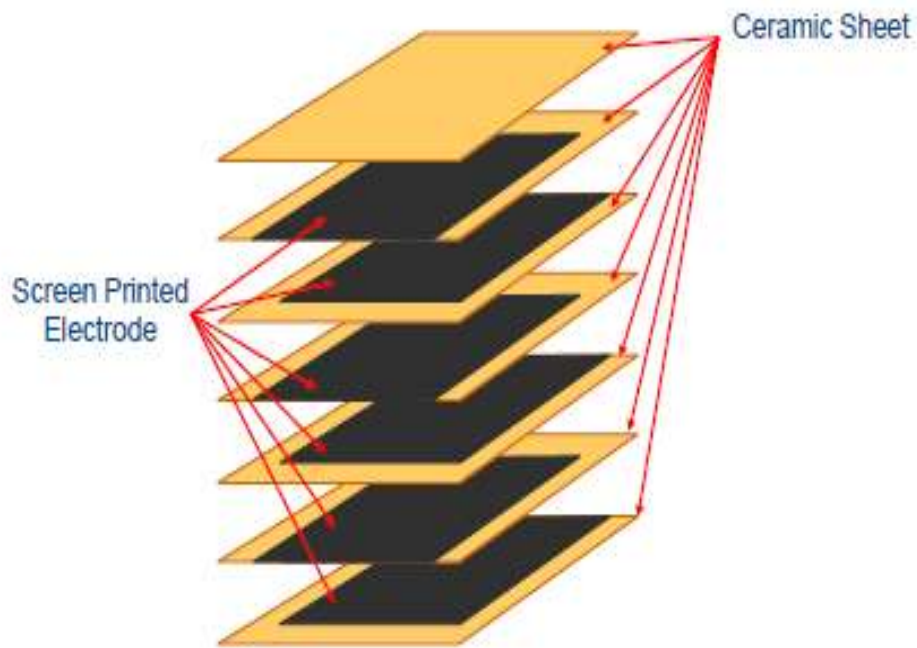
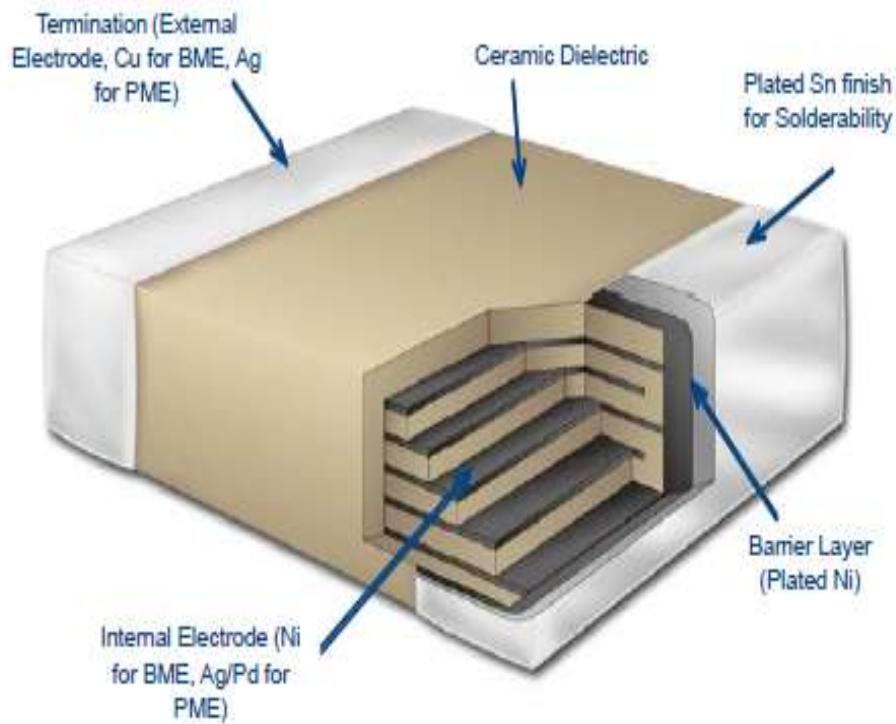
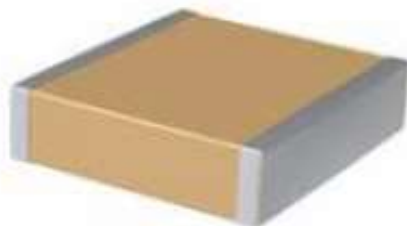


Distribution Chart of different type of Capacitors

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MLCC (Multi-Layer Ceramic Capacitor)



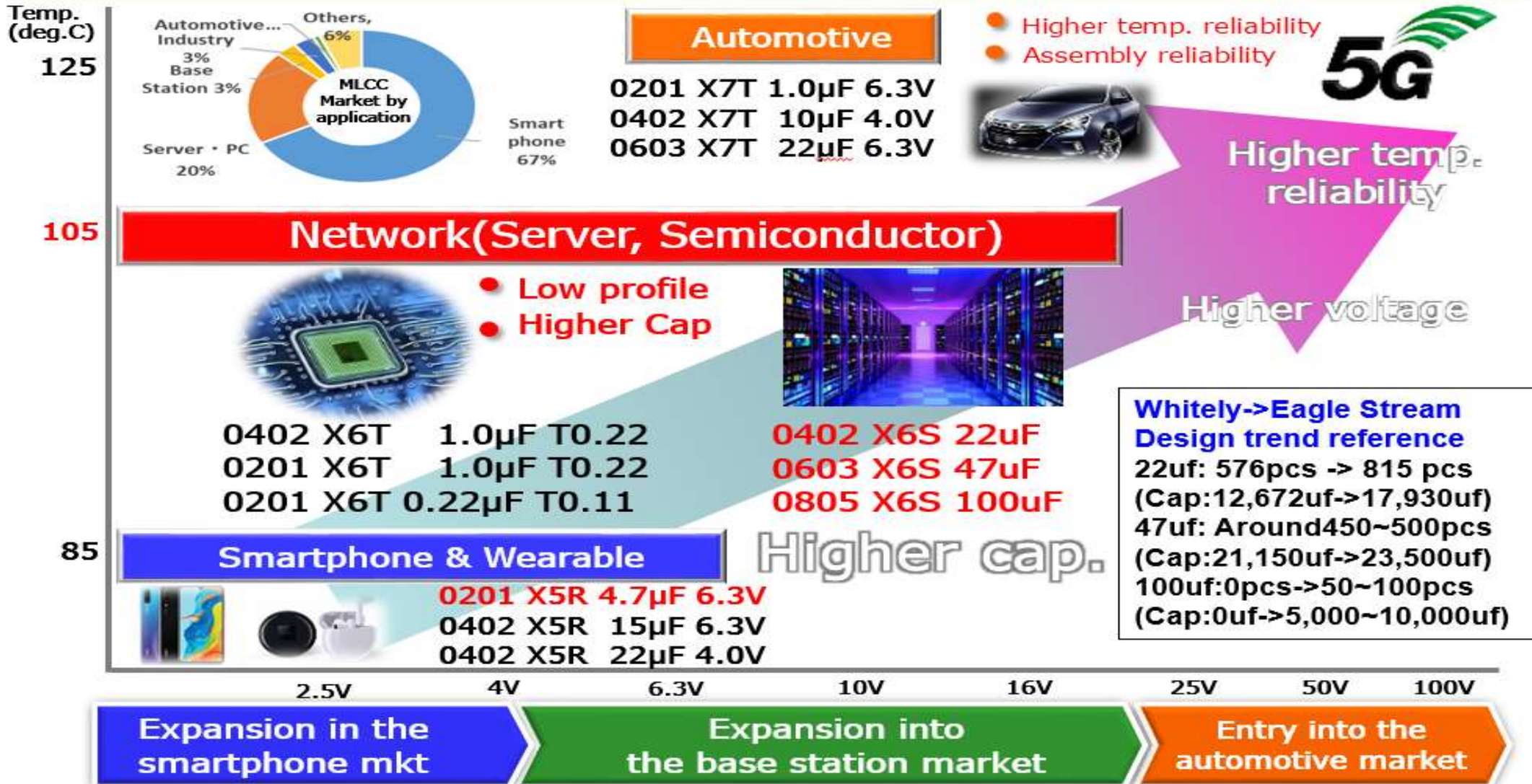
Ceramic Capacitor characteristic

Dielectric	C0G (NP0)	X7R	X6S	X5R	Y5V	Z5U
Temperature (Low)	-55°C	-55°C	-55°C	-55°C	-30°C	+10°C
Temperature (High)	125 °C	125 °C	105 °C	85 °C	85 °C	85 °C
Capacitance change over temperature Range	±30ppm	±15%	±22%	±15%	+22% -82%	+22% -56%
Capacitance loss (decade hour)(Max)	0%	2~4%	5%	5%	7%	7%
Effect of Voltage	Stable ← → Unstable					

Kyocera MLCC (Competitive Advantage Items)

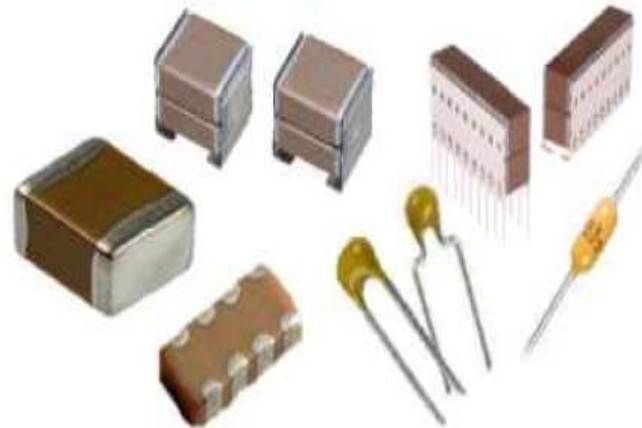
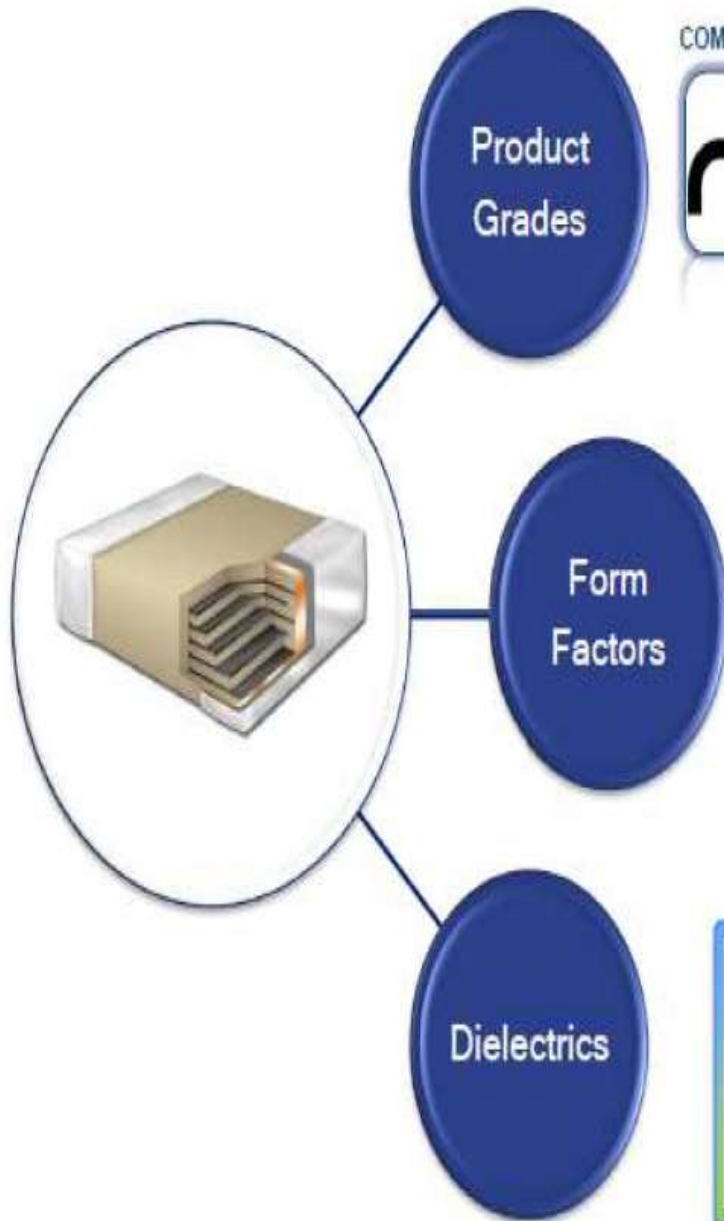
NICHIDENBO CORPORATION

MLCC Strategies



KEMET MLCC (Competitive Advantage Items)

NICHIDENBO CORPORATION



C0G	U2J	X7R	X5R	Y5V	Z5U
X8R	X8L	BP	BX	BR	BQ

- Focus on**
1. OEM Case
 2. Auto Grade MLCC
 3. Specialty MLCC

Engine Electronics
Transmission Electronics
Chassis Electronics
Active Safety
Driver Assistance
Passenger Comfort
Entertainment Systems



Samsung MLCC (Competitive Advantage Items)

NICHIDENBO CORPORATION

Focus on High-Capacitance Value
Range from 1 μ F (105) to 100 μ F (107)
Dielectric Range: X5R and X7R

Samsung Electro-Mechanics is Leading the Change

In the 5G era, the importance of MLCC is expected to grow with the development of electronic devices, self-driving cars, and the expansion of IoT. Samsung Electro-Mechanics possesses high technological capability to produce high-capacity MLCC stacked up to 600 layers. In line with market trends, Samsung Electro-Mechanics is developing ultra-small and ultra-high-capacity products, and is striving to develop high-reliability, high-quality, high-tech MLCC.



Ultra Small,
Ultra High Capacity



Quality Reliability



Global Market Leader



Multi-Layer Ceramic Chip Capacitor

M Series

Key Features

NPO (COG)

Size: 0201 0402, 0603, 0805, 1206

Vdc: 10V to 50V

Cap Range: 0R5 pF to 10nF

Tolerance: +/- 0.1pF to 5%

X5R/X7R

Size: 0201 0402, 0603, 0805, 1206, 1210, 1812, 2220

Vdc: 2.5V to 50V

Cap Range: 100pF to 100uF

Tolerance: +/-10% +/-20%



Focus on

1. Open AVL
2. High-Voltage MLCC
3. General Type MLCC
4. High-Capacitance



High -Voltage Multi-Layer Ceramic Chip Capacitor

MH Series

Key Features

NPO (COG)

Size: 0603, 0805, 1206, 1206, 1808, 1812

Vdc: 100V to 3000V

Cap Range: 0R5pF to 4.7nF

Tolerance: +/-0.1pF to 5%

X5R/ X7R

Size: 0603, 0805, 1206, 1206, 1808, 1812, 2220











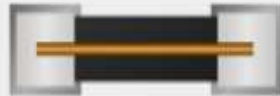
Vdc: 100V to 5000V

Cap Range: 100pF to 10uF

Tolerance: +/-10%

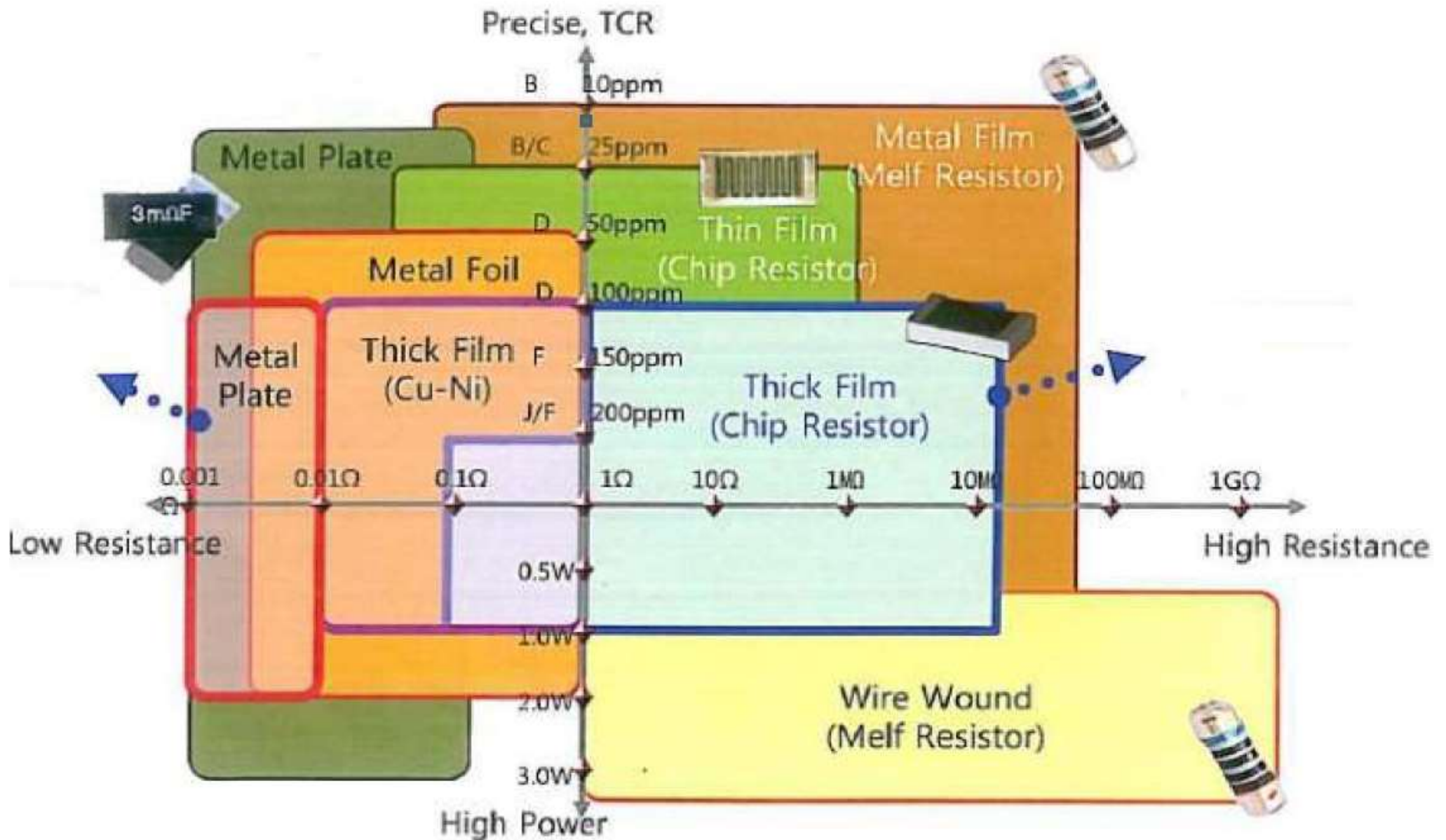
Chip Resistor Type

NICHIDENBO CORPORATION

	Thick film single-sided type	Thick film double-sided type	Wide terminal type	Metal plate type		
Appearance						
Structure						
Features	Reasonable price range	Thick film type with low resistance range from a minimum of 5 mΩ	High connection reliability, small size, high power guaranteed	Minimum of 0.45 mΩ and low TCR		
Purposes	Size reduction of equipment	Size reduction of equipment Rapid charging	High power High adhesion to circuit boards	Rapid charging Reduction of losses due to heat generation		
Power Rating (W)	0.1 ~ 1	0.2 ~ 1	0.33 ~ 1.33	2 ~ 5	0.25 ~ 3	1
Resistance (Ω)	0.047 ~ 9.1	0.005 ~ 0.1	0.005 ~ 10M	0.0005 ~ 0.01	0.001 ~ 0.015	0.001 ~ 0.02

Chip Resistor Application Guide

NICHIDENBO CORPORATION



TS16949. AEC-Q200



Thick Film Array Chip Resistor (AUTO)

■ AEC-Q200 Array Chip Resistor



Thick Film Chip Resistor (AUTO)

■ AEC-Q200 Chip Resistor



Chip Resistor Promoting items (Competitive)

NICHIDENBO CORPORATION

▪ Automotive Grade

Automotive Grade (AEC-Q200) & TS16949

▪ General Purpose

General Type (5%, J% 0 ohm ~ 1M ohm)

▪ Thick Film Precision Grade

Precision Type (Tolerance Under 1%, TCR: under 100ppm)

▪ High Ohmic

High-Ohmic Type (10m Ohm or above)

▪ Low Ohmic

Low-Ohmic Type (Under 0 Ohm)

▪ Thin Film

Thin Film (High-Watt with Low PPM Value)

▪ Current Sensor

Current Sensor Resistor (Detecting over current)

▪ Array/Network

Array (0402 x 2) (0402 x4) (0603 x 4) Concave or Convex)

▪ Trimmable

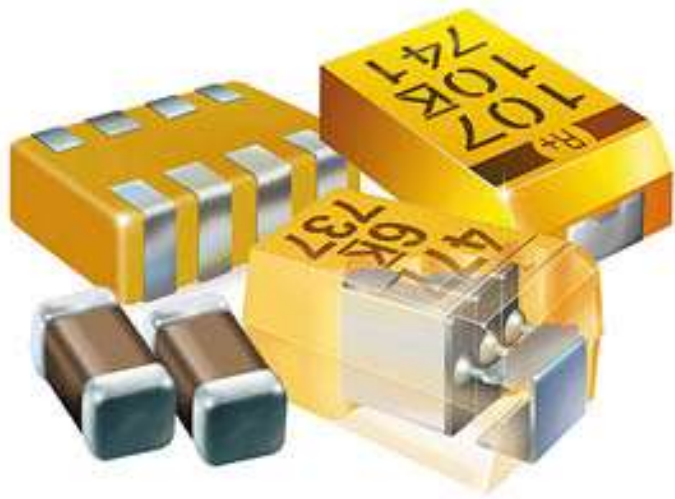
Adjustable type Resistor

▪ High Voltage

2Watt or Above

Polymer Capacitor (Tantalum & Aluminum)

NICHIDENBO CORPORATION

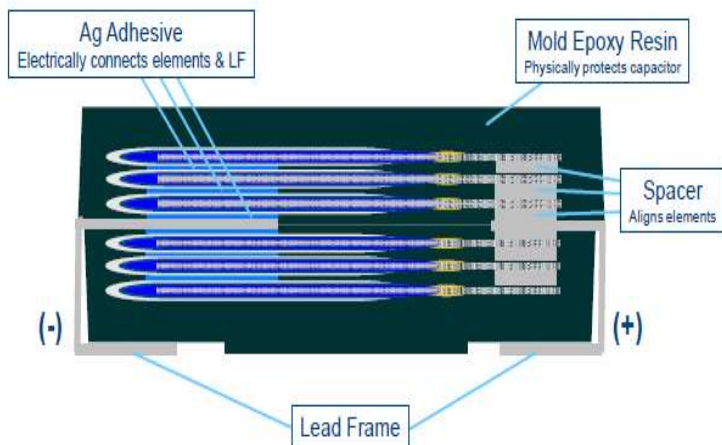
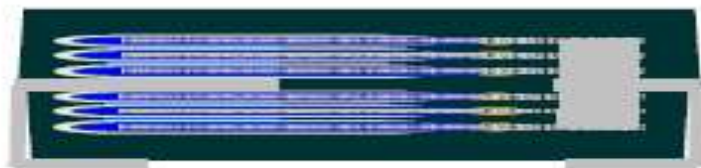


Polymer Capacitors (Two Type of SMD)

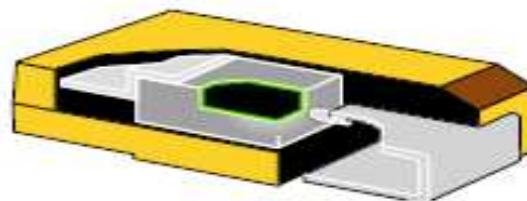
Polymer Aluminum



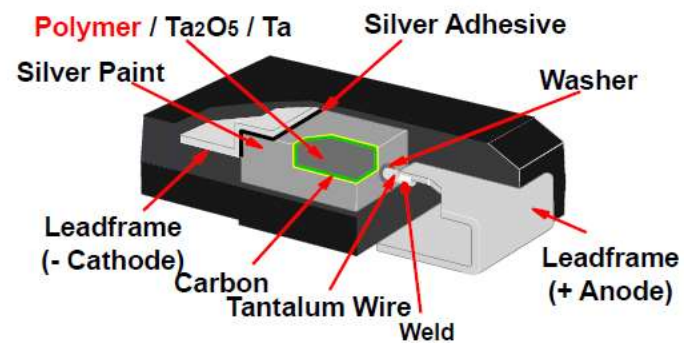
AO-Cap



Polymer Tantalum





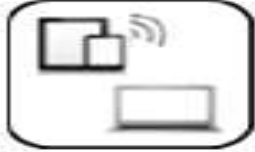

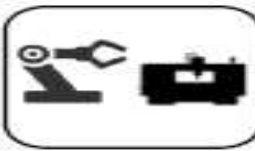




Ta-MnO₂
&
KO-Cap



Tantalum / Polymer Major Market

NICHIDENBO CORPORATION

		Smaller/ Thinner	Lower ESR/ESL	Higher Voltage	Perf. & Rel
					
Portable Computing		✓	✓		
Telecom and Cloud		✓	✓	✓	✓
Industrial		✓	✓	✓	✓
Auto			✓	✓	✓
Mil/Aero					✓

Polymer Capacitors (Markers Position)

NICHIDENBO CORPORATION

Panasonic

SANYO

*SP-Cap – Aluminum-Polymer
POS-Cap – Tantalum-Polymer
Highest market share
Some of SP-Cap items are EOL*



The Capacitance Company
KEMET
CHARGED.™

NEC/TOKIN

*KO-Cap & Neo-Cap
Focus on Tantalum-Polymer Capacitor
Competitive in High-Voltage Polymer*



AVX

nichicon

*MnO₂ Tantalum Capacitor
Biggest Runner in MnO₂ in Market Share
Focus on High-Voltage Spec
Nichicon and Rohm are focus on Small size*



ROHM
SEMICONDUCTOR

VISHAY.

HEC

*Polymer Capacitor
Second Tier Player*



SSD Power Back Solution T545,

Features and Benefit :

- ✓ Replace super capacitor, no wear out problem)
- ✓ Long life time,
- ✓ non-ignition failure mode
- ✓ Very low FIT
- ✓ Wide working temperature range
(-55 °C ~85 °C, 105 °C, 125 °C)
- ✓ Low profile component
(H=1.0, 1.2, 1.5, 1.9, 2.8mm)
- ✓ Wide rated voltage offering
(4V, 6.3V, 10V, 16V, 20V, 25V, 35V, 50V, 63V)

$$\text{Energy(Joule)} = \frac{1}{2} C (V_1^2 - V_2^2)$$



T545H158M006ATE055

H case: WxLxH=7.2x6.0x1.9mm

1500uF/6.3V/Max ESR=55mohm



Seagate



Intel


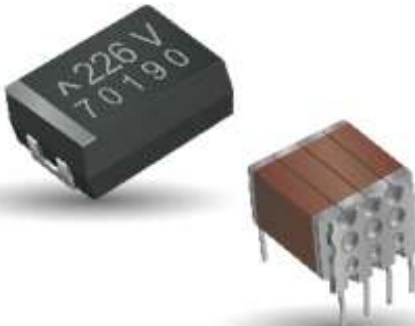





Micron



Memo-right



MLCC Advanced	RF / Microwave	EDLC	High Reliability
			
Interconnect	Antennas	Polymer	Sensing and Control
			

Super-Capacitor > EDLC (Electro-Chemical Double-Layer Capacitor)



AVX EDLC Super-Capacitor characteristics of ultra-fast charge time, high current handling, no wear-down on million of charge / discharge cycles, makes AVX's Bestcap, SCC and SCM series of Super-capacitors a popular component in Power-holdup, Pulse power and Energy Harvesting applications.

Focus Products

Key Selling Features

Target Applications



SCC Series

- Single can, 1F to 3000F
- 2.7V (65C), 2.3V (85C)

- IOTs, Industrial PDA , SSD, Router
- Smart meter , Switch Hub , Server
- Dying-gasp , Power-backup ,



SCM Series

- Double can, 0.33 to 7.5F
- 5.0V to 8.1V (85C)

(No balancing resistor required)

- IOTs, Industrial PDA , SSD, Router
- Smart meter , Switch Hub , Server
- Dying-gasp , Power-backup ,



Rohm – Products Promotion (Tantalum)



Conductive Polymer Capacitors

Extra Large Capacitance, Bottom Electrode Type (TCSO)

Large Capacitance, Bottom Electrode Type (TCTO)

Standard J-lead Type (TCO)

Tantalum Capacitors

Extra Large Capacitance, Bottom Electrode Type (TCS)

Large Capacitance, Bottom Electrode Type (TCT/TC)

Standard J-lead Type (TC)



The World's 2.7 Billion Gamers Will Spend \$159.3 Billion on Games in 2020; The Market Will Surpass \$200 Billion by 2023



Tom Wijman

May 8 2020

Last week, we published our latest games market estimates for subscribers to our Global Games Market Report (and also via [Newzoo's Analytics Platform](#)). We forecast that 2020's global games market will generate revenues of \$159.3 billion, a healthy year-on-year growth of +9.3%.

In this article, we'll explore the 2020 revenues for mobile, PC, and console gaming. We also provide our outlook for the overall games market, diving into our revenue estimates towards 2023.





Proposal of **Large current** and **High reliability** performance

Al-Lytic

High reliability



Liquid electrolyte
Technology

Self-repairing of oxide film

- High Voltage
- High Temp.
- Low LC

Polymer Cap.

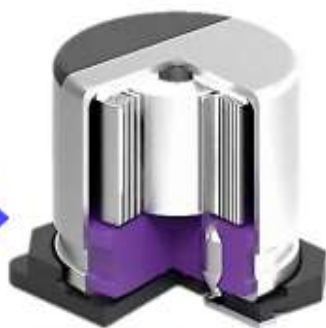
Large current



Polymer
Technology

High electric conductivity

- Low ESR
- Miniaturization



Hybrid
(Liquid + Polymer)

Large Current
High Reliability

Panasonic Hybrid Capacitor Major Application

NICHIDENBO CORPORATION

Market Change and Required Performance

Confidential

Large current and High reliability performance are required

Automotive market



Conventional

Future

Market change

Gasoline car
Mechanical power

EV
High Current motor

Requirement

High reliability
Al-Lytic cap advantage

Motorization
High reliability +
Large current

Information market (ICT/infrastructure)



Conventional

Future

4G
(Small cell)

5G
(Micro/Pico cell)

5years warranty

10years warranty

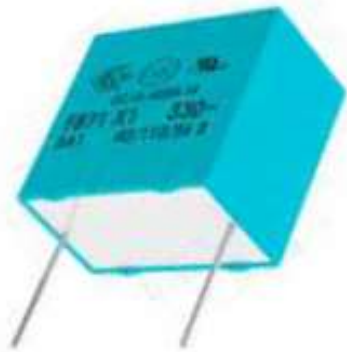
Large current
Polymer-cap advantage

Large current +
High reliability
(Not short circuit)

Large current and High reliability performance are required

Film Capacitor (MKP & MKT)

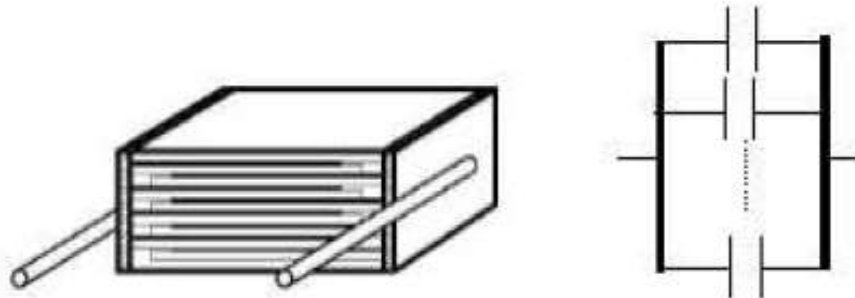
NICHIDENBO CORPORATION



Film Capacitor Technology (dielectric materials used)

Features	PP (MKP)	PET (MKT)
Working temperature	-55°C ÷ +105°C	-55°C ÷ +125°C
Dissipation factor (1KHz)	2 E-4	50 E-4
Max temperature peak	140°C	230°C
Dielectric constant	80	100
Behavior vs. frequency	Good	Medium
Self-healing properties	Good	Medium
Minimum thickness	2.8 μm	1 μm
Price	Medium	Low

Stacked Capacitors



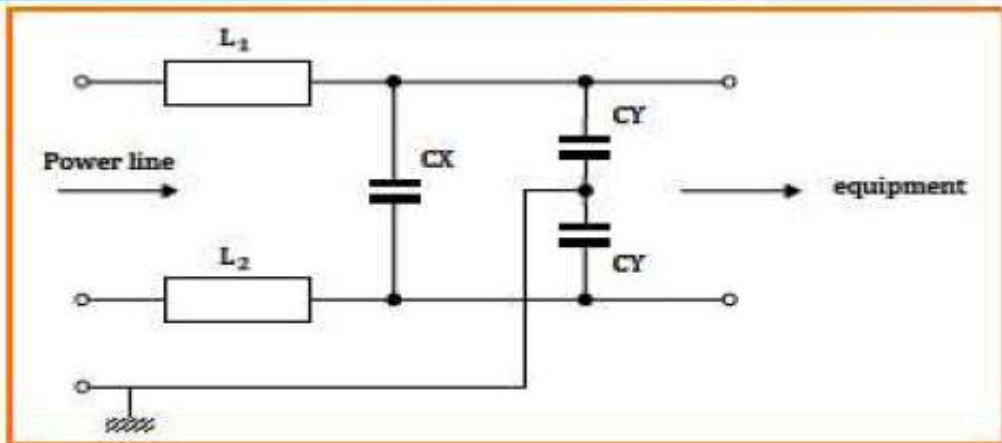
- ❖ SELF-HEALING CAPABILITY
- ❖ GOOD BEHAVIOUR UNDER PULSES.
Open circuit failure mode against over current.
- ❖ MAXIMUM Capacitance versus Volume
- ❖ CUSTOMIZED SIZES.
(uncoated stacked-capacitor)

Wound Capacitors



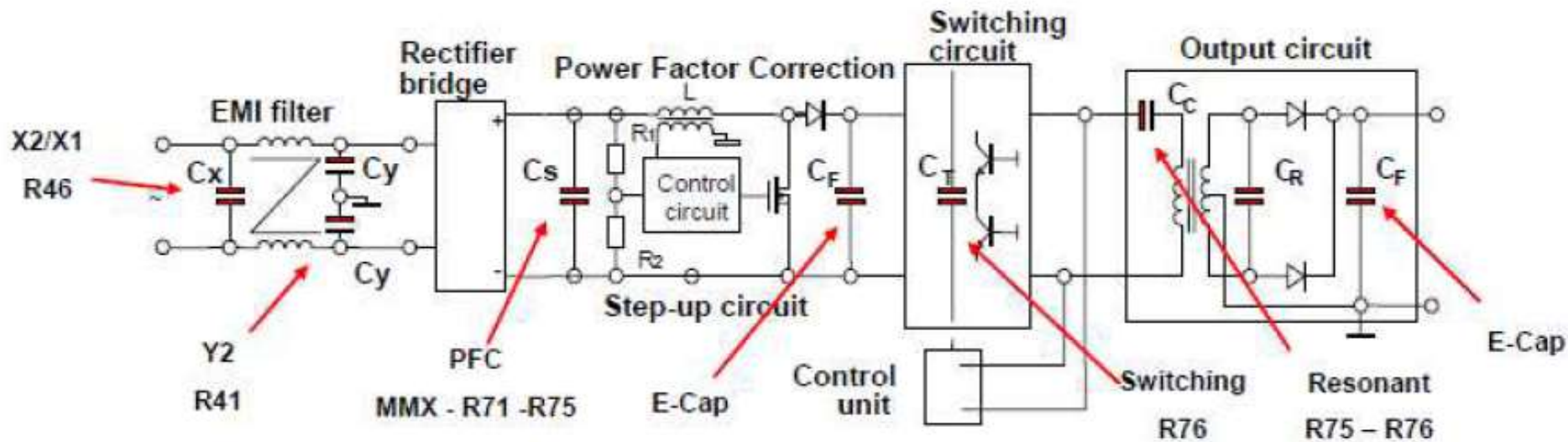
- ❖ SELF-HEALING CAPABILITY
- ❖ HIGH V_{RMS} vs. FREQUENCY
- ❖ LOW SELF-HEATING
- ❖ LOW CORROSION
- ❖ NO VOLTAGE LIMITATION
- ❖ HIGH POWER APPLICATIONS

EMI cap in power supply



class	Series	Temp	Vac	Halogen Free		Plant
X2	R46	110°C	275Vac	No	Consumer,Industrial	ANT,Suzhou
X2	R46	110°C	300Vac	No	Industrial	ANT,Suzhou
X2	F862	110°C	310 Vac	Yes	Industrial , 85°C, 85 R.H,1000Hours	BTM,Suzhou
X2	R47	110°C	440 Vac	No	Industrial	ANT,Suzhou
X1	R47	110°C	440 Vac	No	Industrial	ANT,Suzhou
X1	R49	110°C	330/310 Vac	No	Industrial	ANT,Suzhou
X1	PHE844	105°C	480V ac	No	Industrial	BTM,SSM(p37.5)
X1	PHE845	105°C	760V ac	No	Industrial	BTM,SSM(p37.5)
Y2	R41	110°C	300 Vac	No	Consumer,Industrial	ANT,Suzhou

Switch Mode Power Supply



Film & Paper

Market Segment: Industrial & Green Energy

Typologies to sell by application: UPS, Motor Drives



UPS
RFI
Pulse
AC filtering



Motor Drives
RFI
Pulse
AC filtering
DC Link



Film & Paper

Market Segment: Industrial & Green Energy

Typologies to sell by application: Windmills, Solar Inverters



Wind Mills
RFI
AC Filtering
Pulse
DC Link



Ingeteam



Solar Inverter
EMI suppression
AC Filtering
Pulse
DC Link



ABB

[e]enphase
ENERGY



Film Capacitor major market

Film & Paper

Market Segment: Consumer Home Appliances

Typology to sell by application Washer Dryer Refrigerator Dishwasher



Whitegoods auxiliary loads
RFI
F862 X2 for Capacitive Power Supply
Pulse



Induction Cooking
RFI
Pulse



Film & Paper
Market Segment: Consumer Home Appliances
Typology to sell by application: Energy Meter

200 MUnits to be installed in Europe by the CY2020.



Energy Meter
F862 X2 for Capacitive Power supply
R75L Pulse for Capacitive Power Supply

ESNIG members

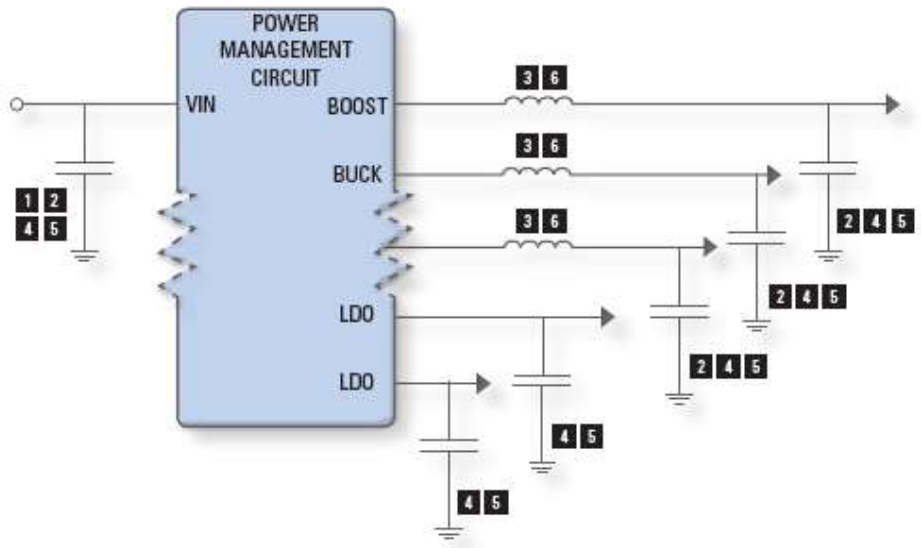


Electrolytic Aluminum Capacitor (ECAP)

NICHIDENBO CORPORATION



DC POWER DISTRIBUTION



1 SMT ALUMINUM ELECTROLYTIC



2 KO-CAP®



3 POWER INDUCTOR



4 MLCC
X7R, X5R



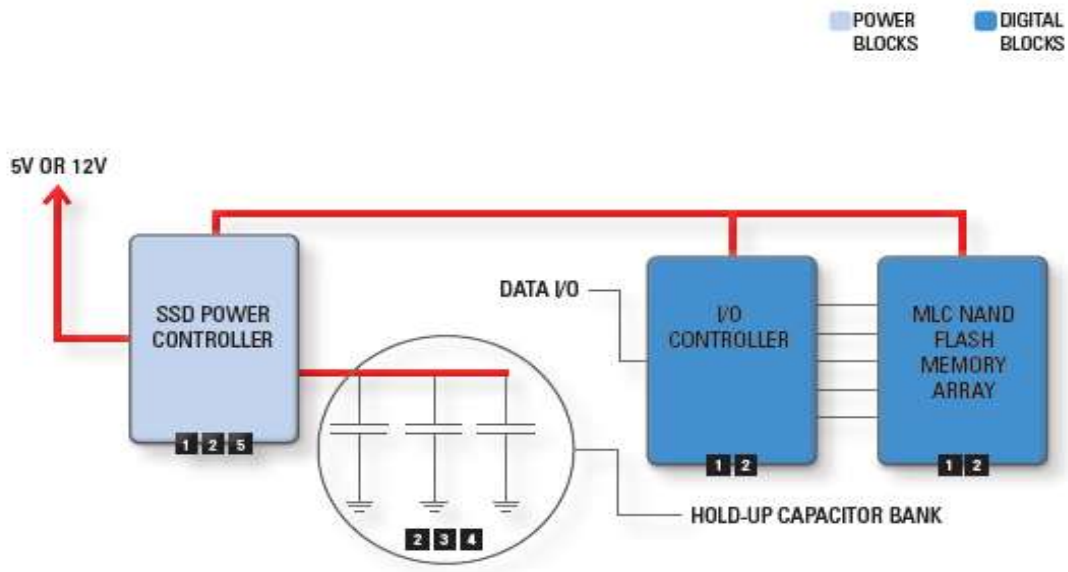
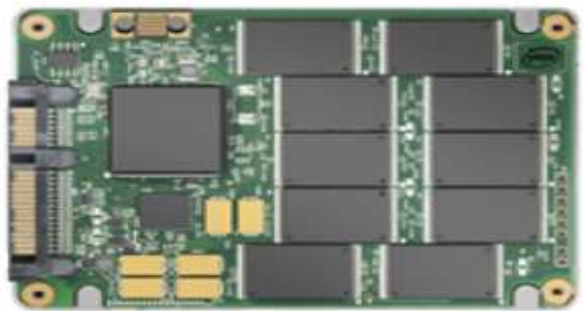
5 ALUMINUM POLYMER



6 CHIP INDUCTORS



SOLID STATE DRIVE (SSD)



1 MLCC
X7R, X5R



2 KO-CAP



3 RADIAL ALUMINUM ELECTROLYTICS



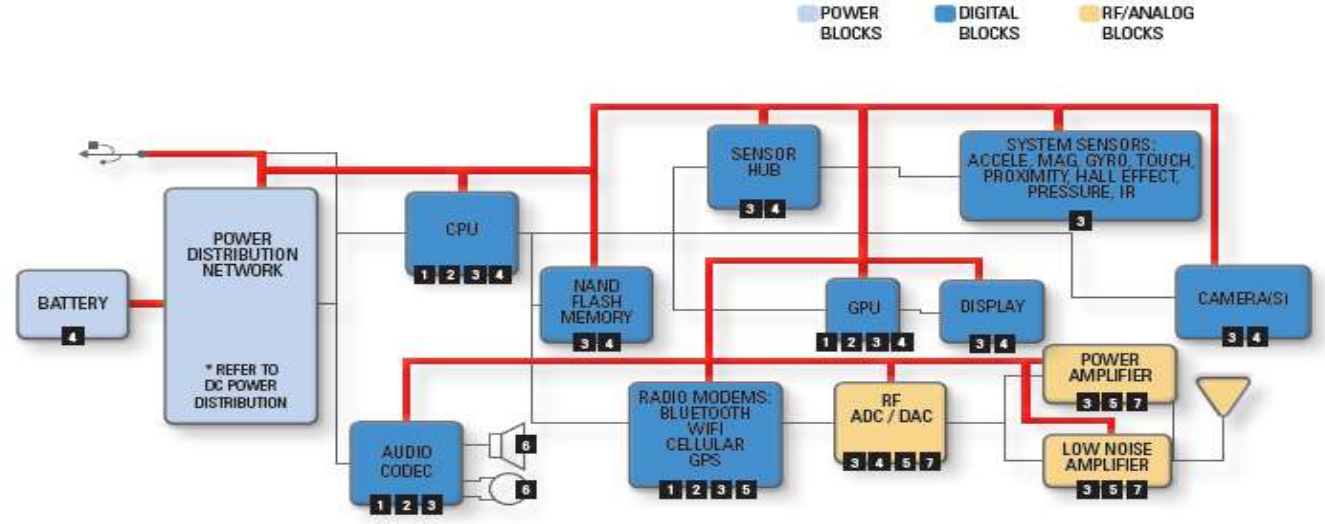
4 RADIAL SUPERCAPACITORS



5 INDUCTORS



SMARTPHONE/ TABLET



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T528, T521, T529



3 MLCC
CoG, X7R, X5R



4 FLEX SUPPRESSOR
EFH, EFG, EFF



5 RF MLCC
CBR



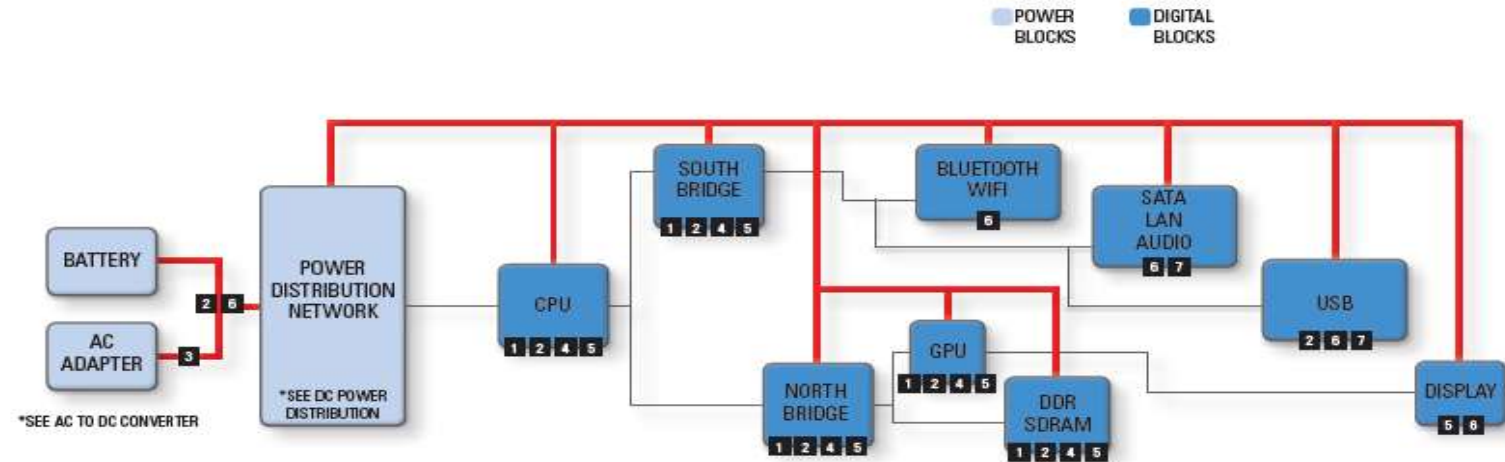
6 ACOUSTIC MODULE
MINIATURE ACUTATOR Rxx



7 CHIP INDUCTORS
RMS



LAPTOP COMPUTER



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T528, T521, T529



3 EMI CORE
ESD



4 FLEX SUPPRESSOR
EFH, EFG, EFF



5 MLCC
COG, X7R, X5R



6 ALUMINUM ELECTROLYTIC
A758, A765, EDH, EDK

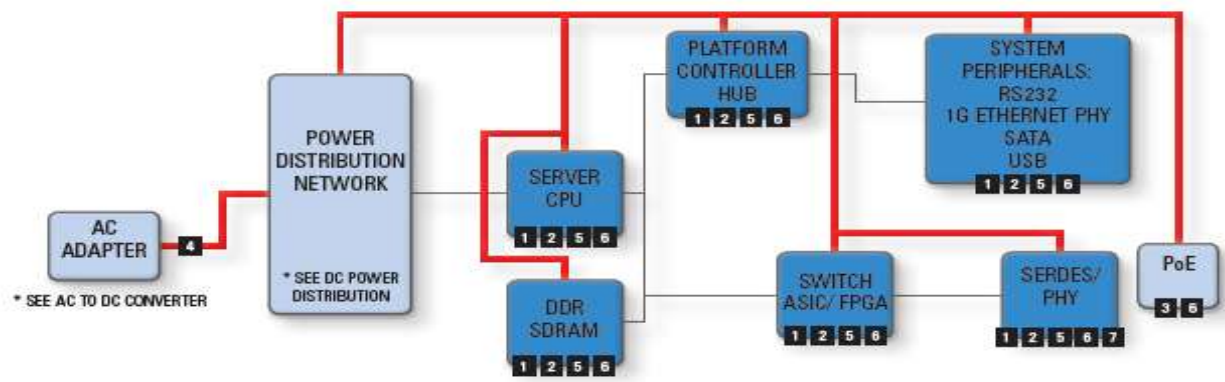


7 INDUCTORS
PWS, PWI, PWR, PWF



NETWORK SWITCH

POWER BLOCKS DIGITAL BLOCKS



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T521, T530



3 CURRENT SENSOR
MDCS



4 EMI CORE
ESD



5 FLEX SUPPRESSOR
EFH, EFG, EFF



6 MLCC
X7R, CoG, X5R

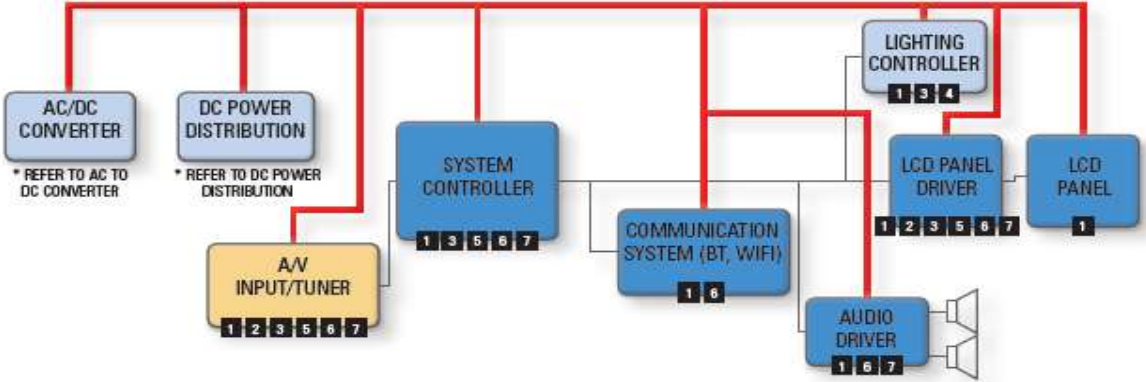


7 SIGNAL RELAY
UB2, UD2



FLAT PANEL TV

POWER BLOCKS DIGITAL BLOCKS RF/ANALOG BLOCKS



1 MLCC
X7R, X5R



2 CHIP FILTER
M-500CT, M-600T



3 KO-CAP
T520, T521



4 POWER INDUCTOR
MPC, CPI, HDI, PLC, SBS



5 FLEX SUPPRESSOR
EFH, EFG, EFF



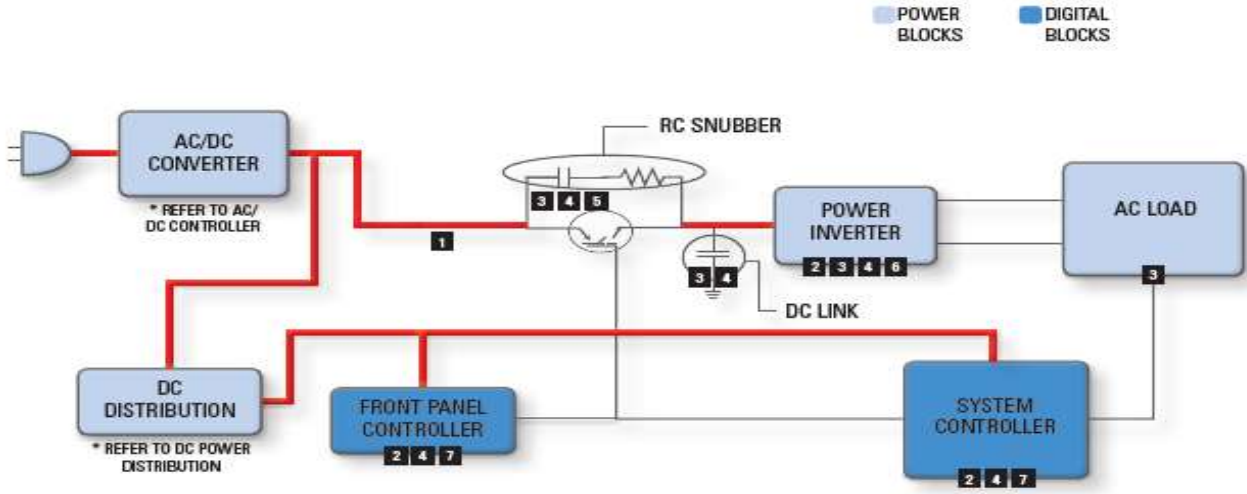
6 MLCC
COG



7 INDUCTORS
PWS, PWI, PWR, PWF



HIGH EFFICIENCY APPLIANCES



1 EMI CORE
ESD

2 ALUMINUM ELECTROLYTIC
ALC10, ALC40, EDH, ESK, ELH

3 FILM
C4AE

4 MLCC
CoG, X7R, X5R

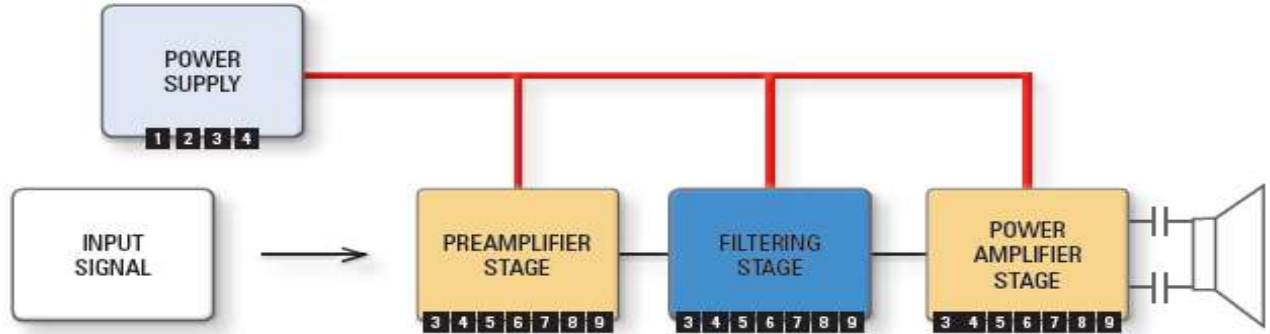
5 FILM OR RC SNUBBER
R71, R73, R76, C4AS, F43

6 KO-CAP
T520, T521

7 RADIAL SUPERCAPACITOR
FG, FE, FM, FR

HIGH-END AUDIO

POWER BLOCKS DIGITAL BLOCKS ANALOG BLOCKS



1 CLASS II MLCC
X7R, X5R

2 KO-CAP
T520, T521, T530

3 SNAP-IN ALUMINUM ELECTROLYTIC
ALC10S

4 POWER INDUCTOR
MPC, CPI, HDI, PLC, MPL, MPLC, MPGH

5 LEADED CERAMIC
Goldmax

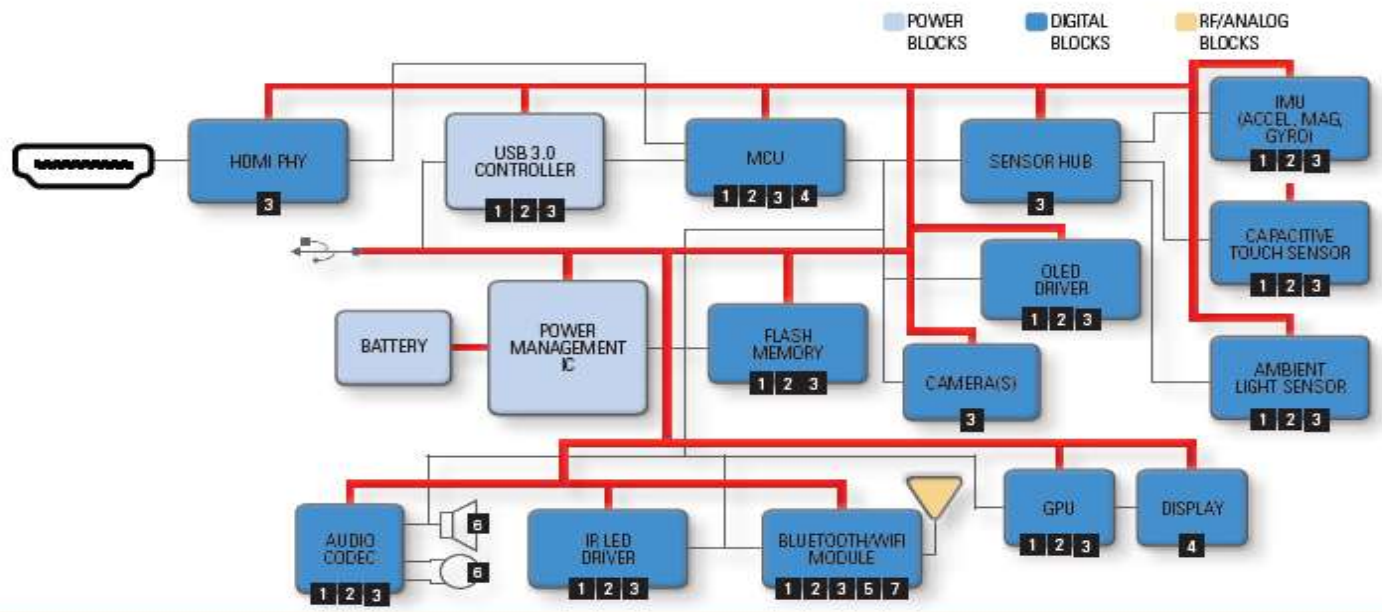
6 LEADED FILM
A50

7 CLASS I MLCC
U2J, C0G

8 POLYPROPYLENE FILM
R75

9 LEADED INDUCTOR
SBC, SBCP

AR/VR HEADSET



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T528, T521, T529



3 MLCC
CoG, X7R, X5R



4 FLEX SUPPRESSOR
EFH, EFG, EFF



5 RF MLCC
CBR



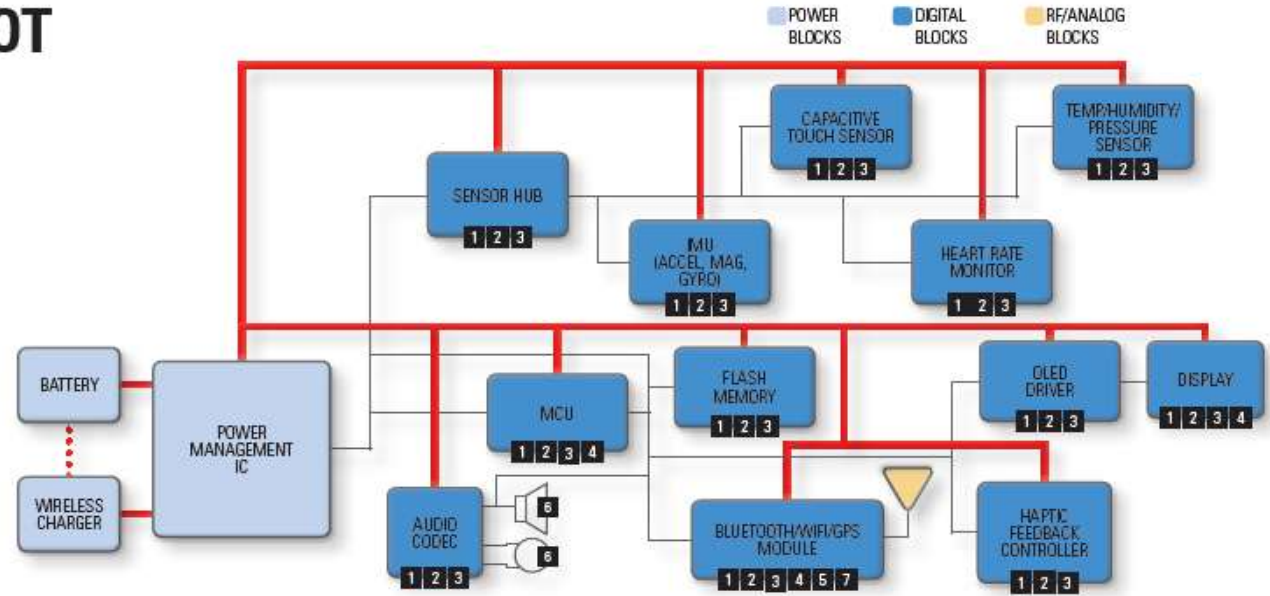
6 ACOUSTIC MODULE
MINIATURE ACUTATOR Rxx



7 CHIP INDUCTORS
RMS



WEARABLE DEVICE/IOT



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T528, T521, T529



3 MLCC
CoG, X7R, X5R



4 FLEX SUPPRESSOR
EFH, EFG, EFF



5 RF MLCC
CBR



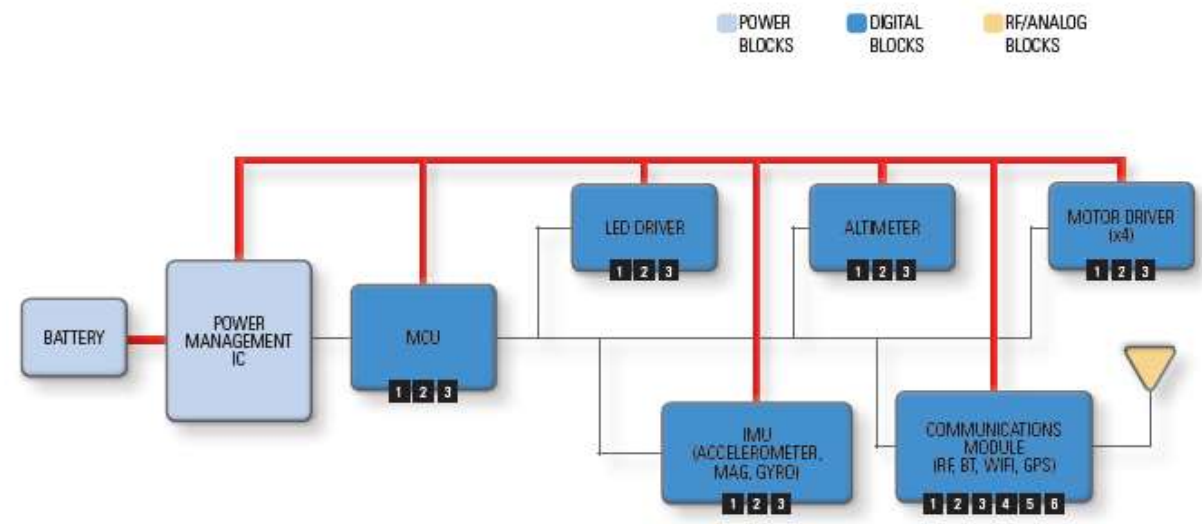
6 ACOUSTIC MODULE
MINIATURE ACUTATOR Rxx



7 CHIP INDUCTORS
RMS



DRONE



1 ALUMINUM POLYMER
A700, A720



2 KO-CAP
T520, T528, T521, T529



3 MLCC
CoG, X7R, X5R



4 FLEX SUPPRESSOR
EFH, EFG, EFF



5 RF MLCC
CBR

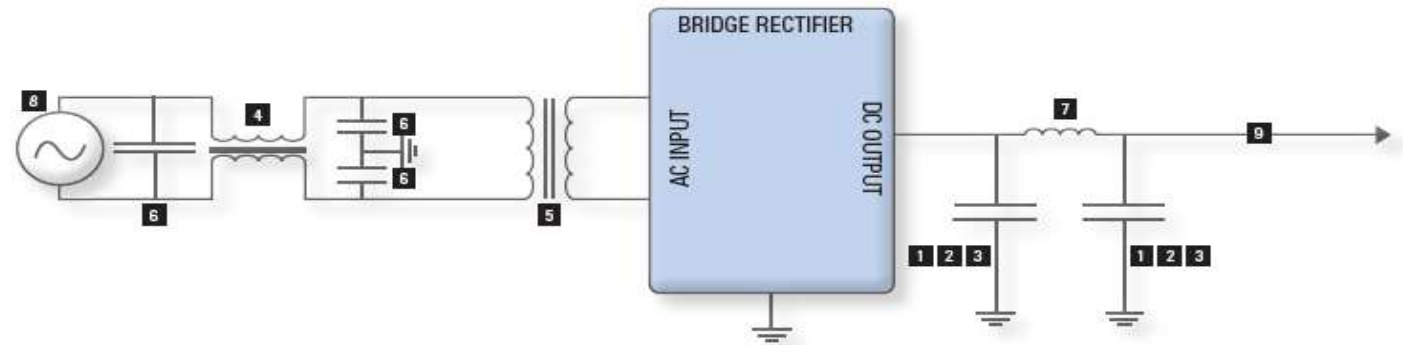


6 CHIP INDUCTORS
RMS





AC TO DC CONVERTER



1 ALUMINUM ELECTROLYTIC
ALC10, ALC40, ALS30, EDH, EDK



2 KO-CAP
T520, T521, T530



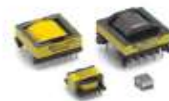
3 MLCC
X7R, X5R



4 AC LINE FILTER
SS, SU, SC



5 TRANSFORMER
EB



6 X/Y SAFETY CAP
C900, R46, R47



7 POWER INDUCTOR
MPC, CPI, HDI, PLC, MPL, MPLC, MPGH



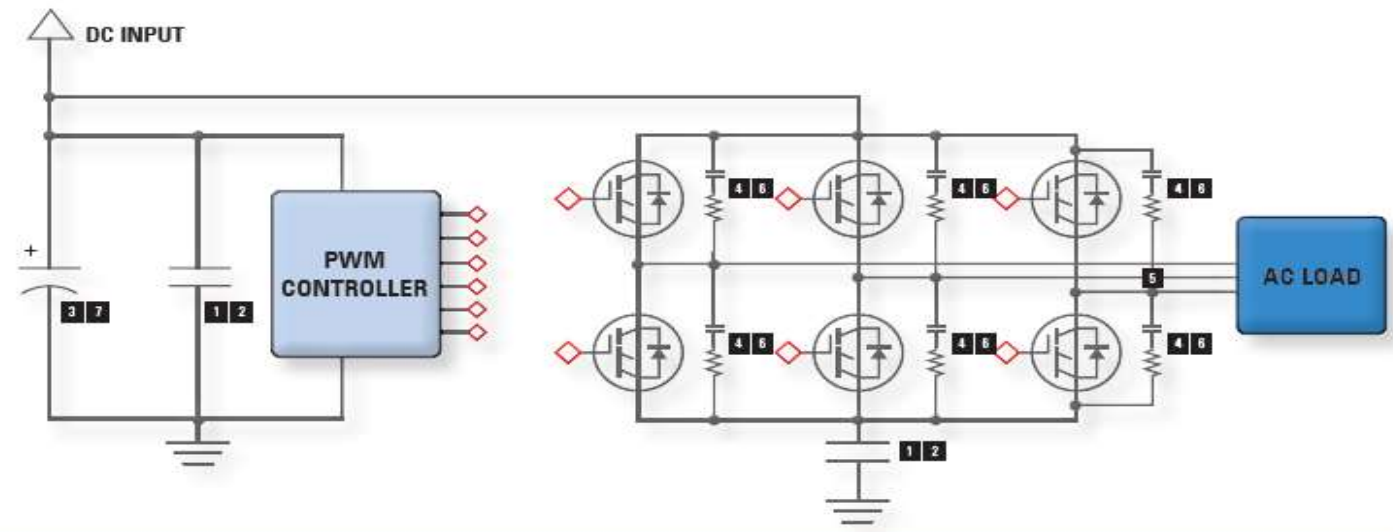
8 FB INLET FILTER
GL-C, GL-FVP, GL-H, GL-M, DECTRON FB



9 EMI CORE
ESD



H-BRIDGE INVERTER



1 CERAMIC
X7R, X5R

2 KO-CAP
T520, T521

3 POWER FILM
C44H, C44P

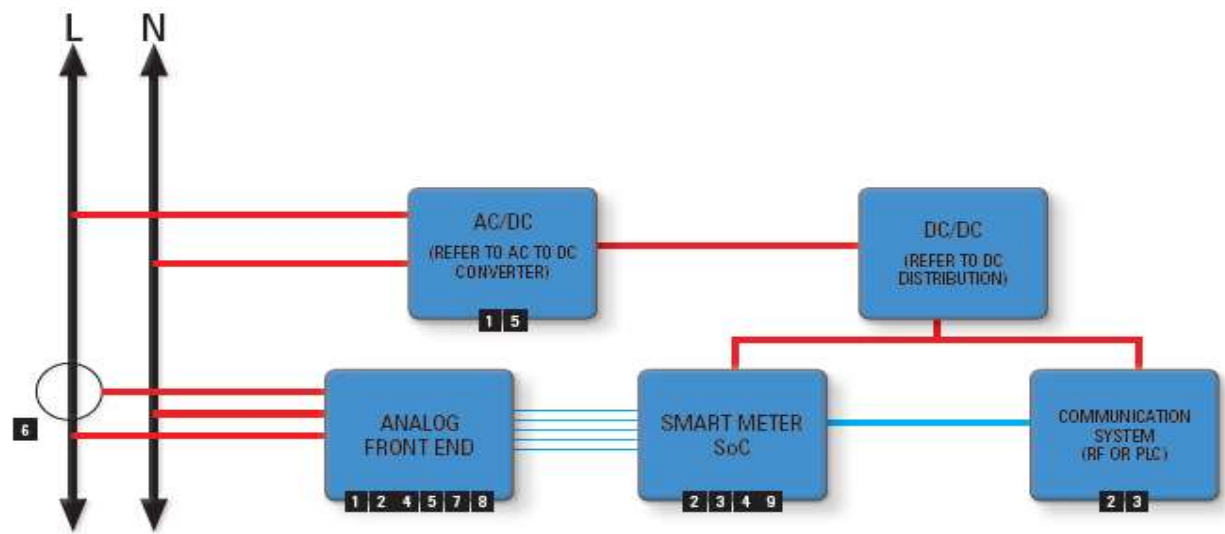
4 PULSE CAPS
R71, R76

5 CURRENT SENSOR
CT

6 CERAMIC
HV COG

7 ALUMINUM ELECTROLYTIC
ALC10, ALC40, ALS30, EDH, EDK

SMART METER



1 VARISTOR
VP



2 CERAMIC
X7R, X5R, CoG, CBR



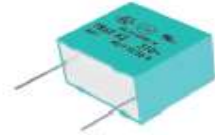
3 POLYMER
A700, T520, T521



4 SMT ALUMINUM ELECTROLYTIC
A750, A765, EDH, EDK, EEV, EXV



5 FILM
F862



6 CURRENT SENSOR
CT



7 POWER INDUCTOR
MPCx



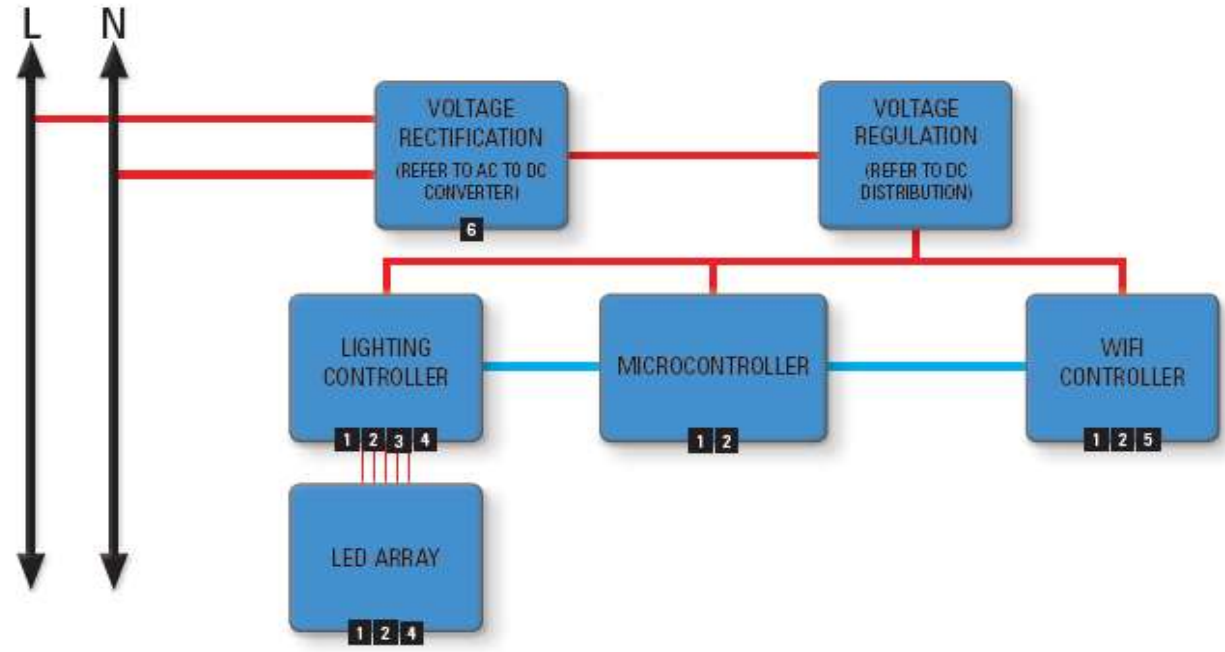
8 COMMON MODE CHOKE
SS, SC, SCR



9 SUPERCAPACITOR
HVZ



SMART LIGHTING



1 MLCC
X7R, X5R, U2J, CoG, CBR



2 POLYMER
A700, A720, A750, T520, T521



3 ELECTROLYTIC
ESK, ESE, ESH, EDH



4 POWER INDUCTOR
SBC, MPCH, MPLGC



5 FLEX SUPPRESSOR
EFX, EFH



6 VARISTORS
VP, VE



TS16949. AEC-Q200



Ceramic

⚡ CAPACITANCE
0.1 pF - 100 uF

⚡ VOLTAGE DC
4 VDC - 10000 VDC



Polymer

⚡ CAPACITANCE
0.68 uF - 8200 uF

⚡ VOLTAGE DC
2 VDC - 250 VDC



Tantalum

⚡ CAPACITANCE
.0022 uF - 8,200 uF

⚡ VOLTAGE DC
2 VDC - 180 VDC



Aluminum

⚡ CAPACITANCE
.47 uF - 1,300,000 uF

⚡ VOLTAGE DC
2 VDC - 600 VDC

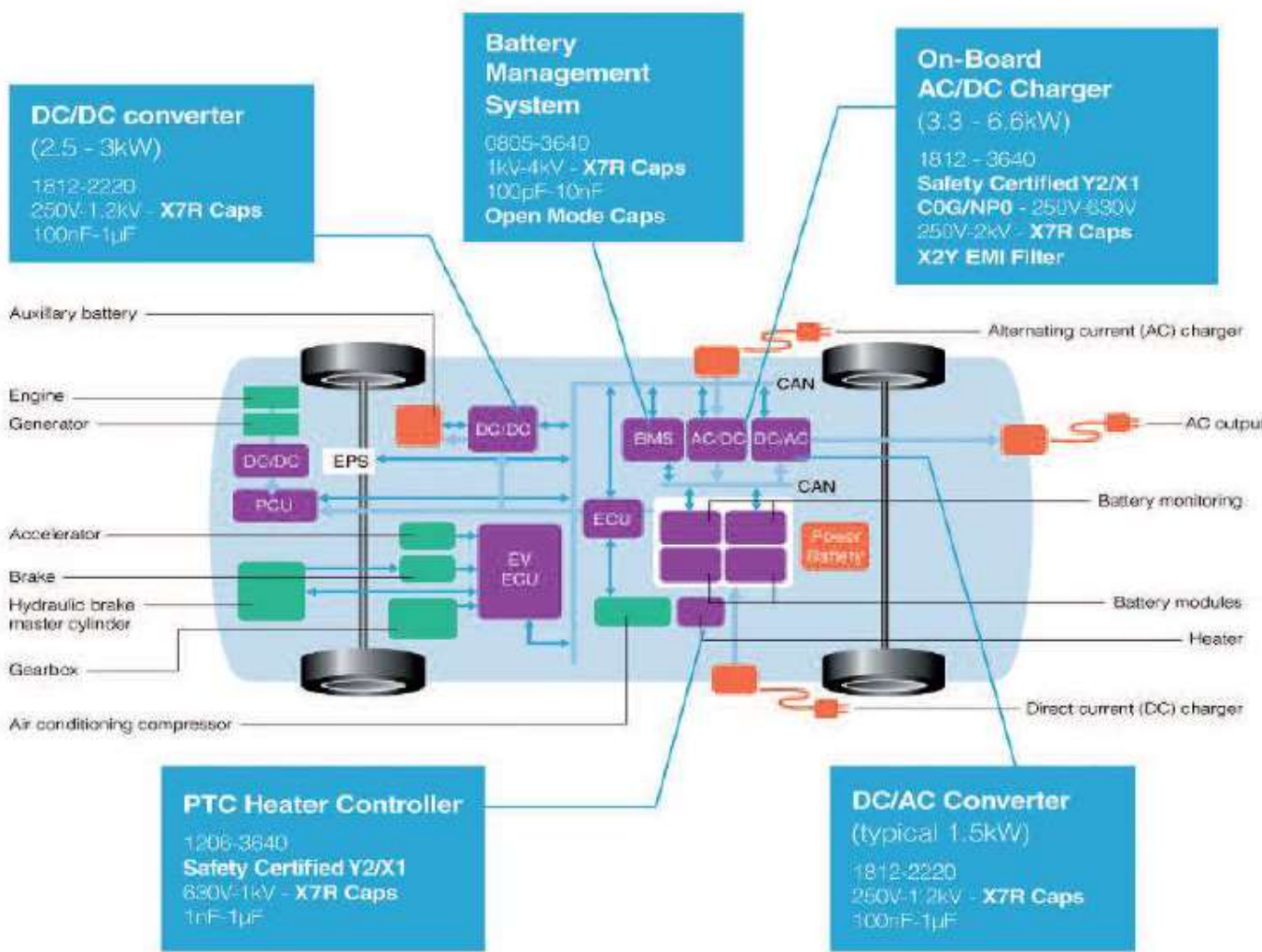


Film

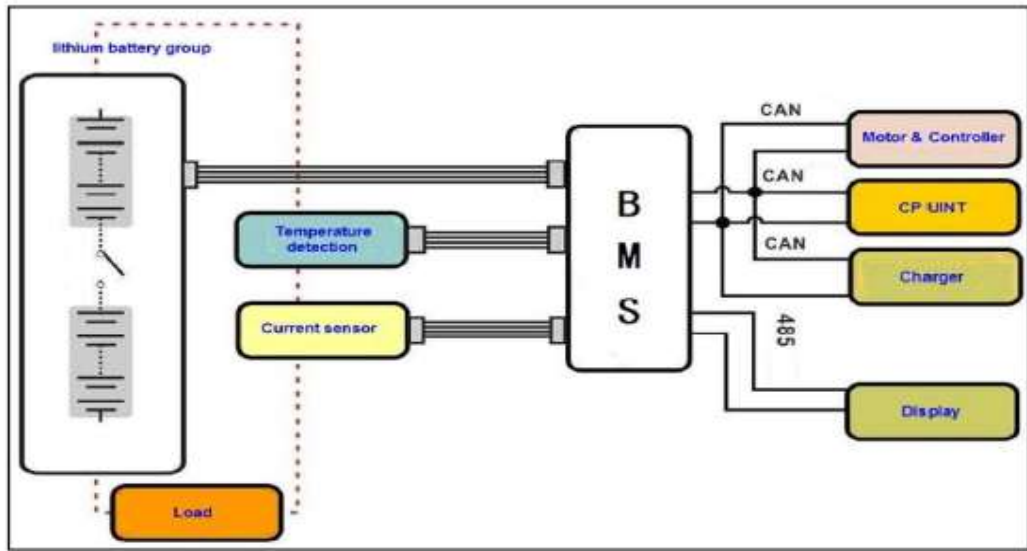
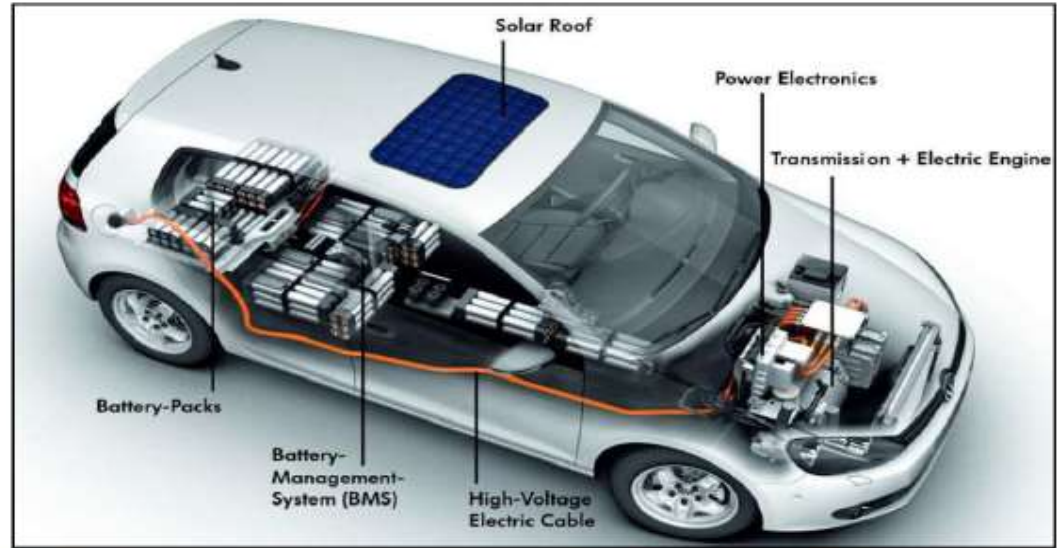
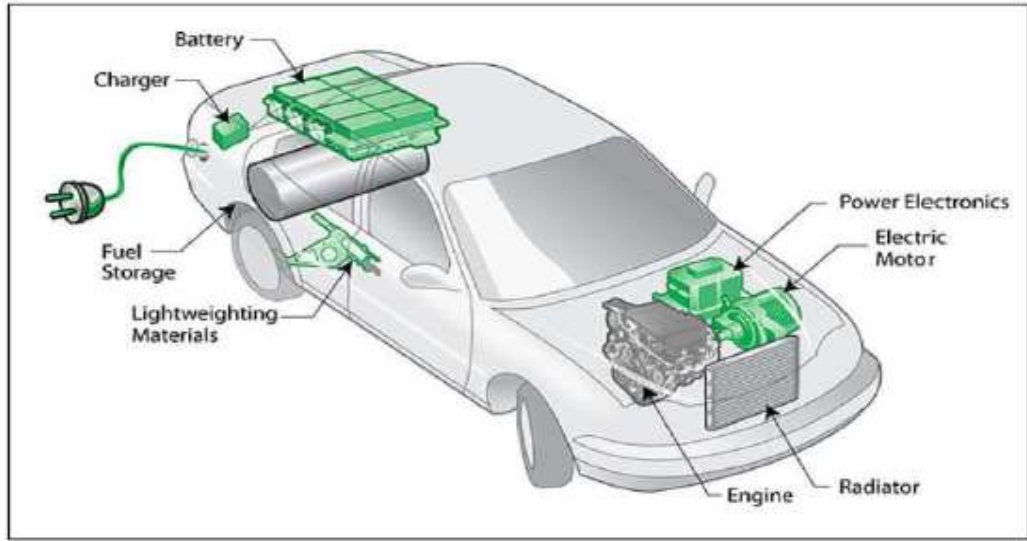
⚡ CAPACITANCE
47 pF - 600 uF

⚡ VOLTAGE DC
16 VDC - 3000 VDC

Automotive Grade MLCC

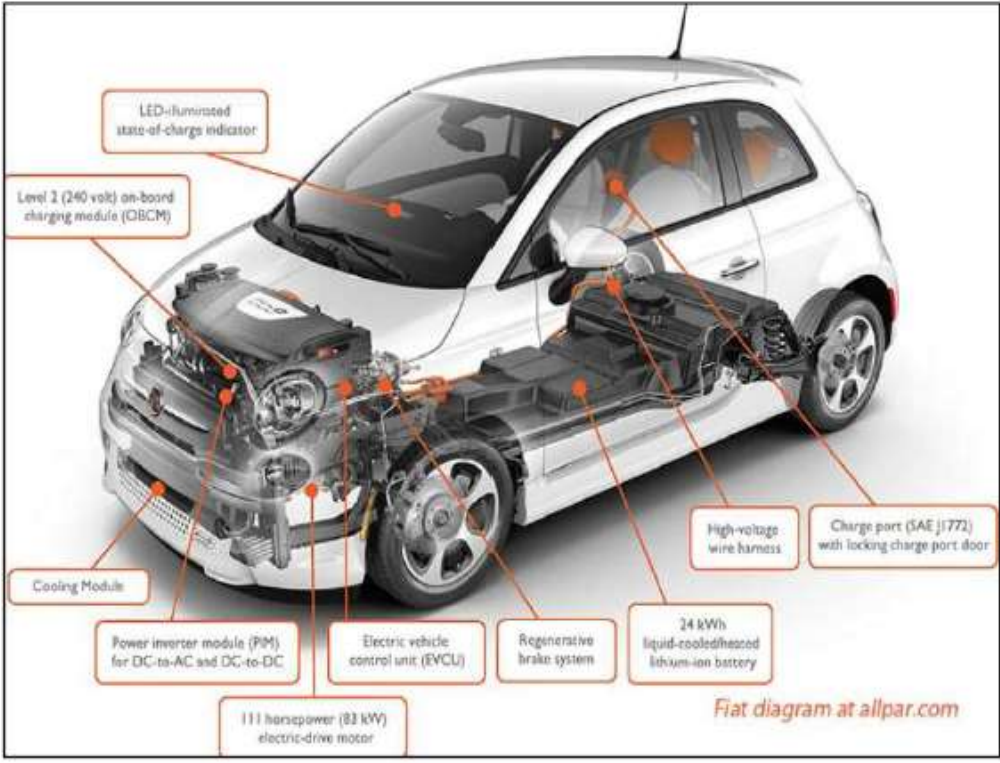


Battery Management System



Automotive Application Guide (case study)

FIAT 500 Hybrid Brick-Type Film Capacitor 150uF / 600Vdc



Dong Feng E30

Film Capacitor (3pcs) X1 X2 Y1 Y2

Super-Capacitor: Energy Backup -Holding 1pc)

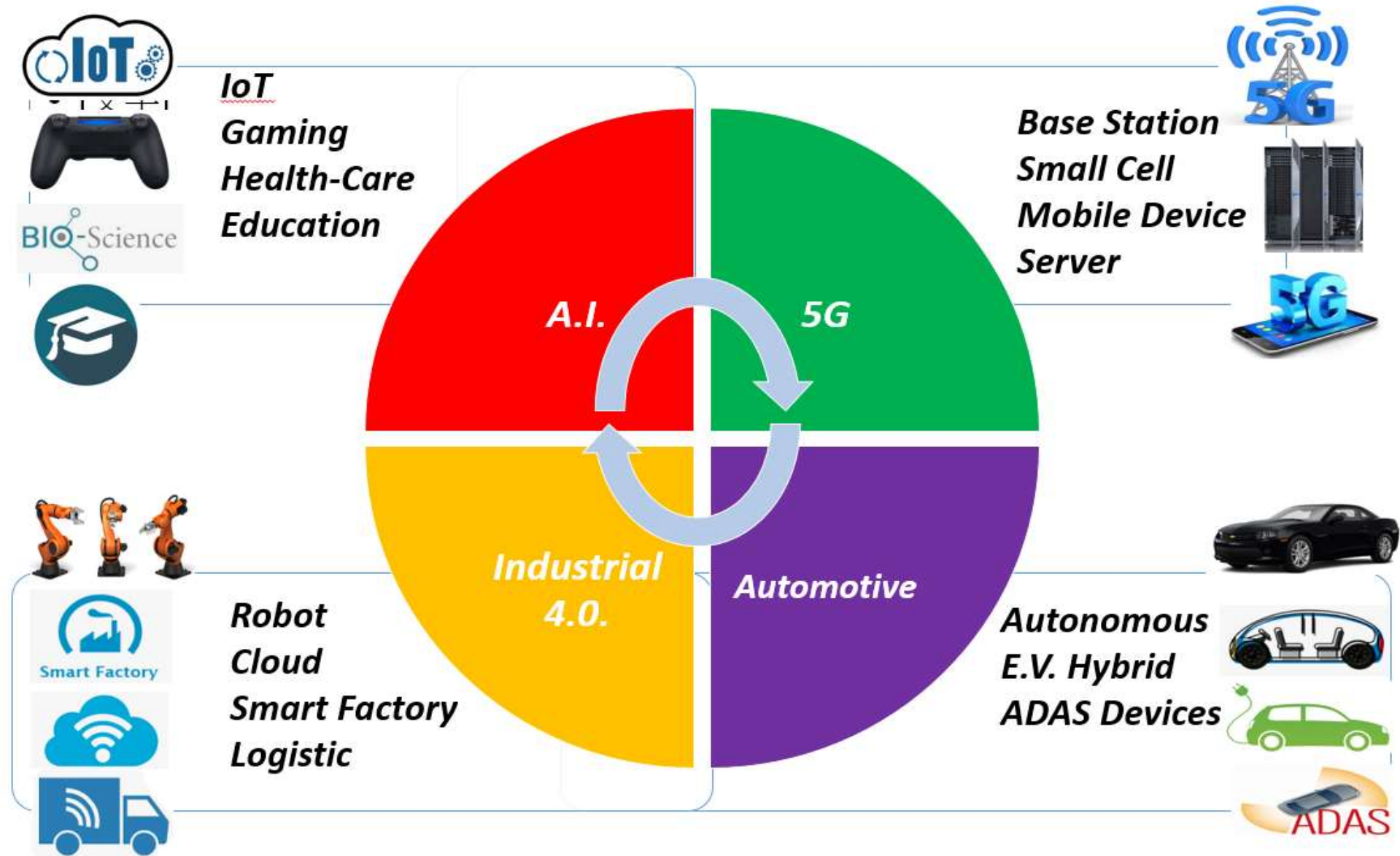
Aluminum Capacitor: (5pcs ~ 8pcs)

MLCC and Resistor: (>500pcs)



Outlook for Passive Component Trend 20s

NICHIDENBO CORPORATION



Overview for Passive Component Trend 20s

Estimation of Market Growth Rate



Low ← **Number of Usage Change Trend%** → High

Component Trend → High-Reliability, High-Cap, High-Vol, High-Q, High-Temp, Down-Sizing

↓75% ←88% ← **Market Share Variation %** → 12% → 25% ↑

The Major Application for MLCC Demand





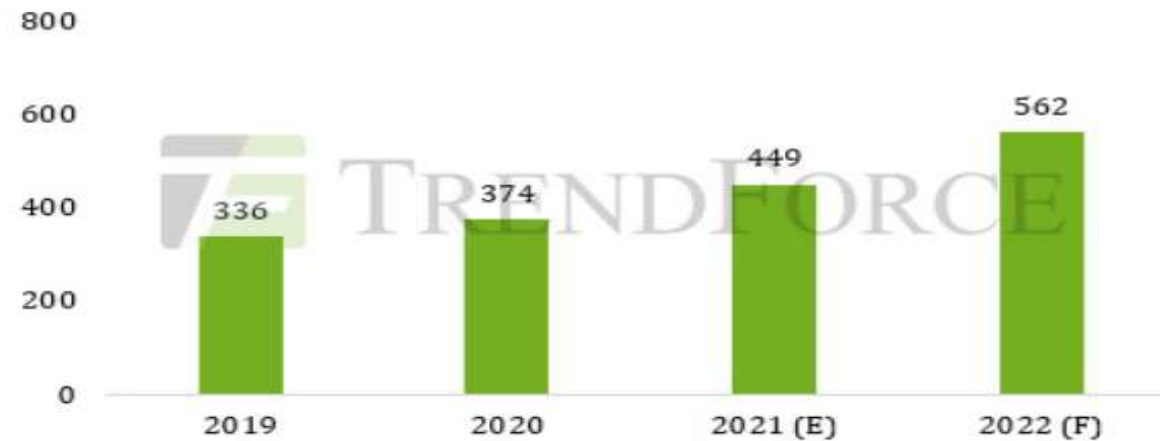
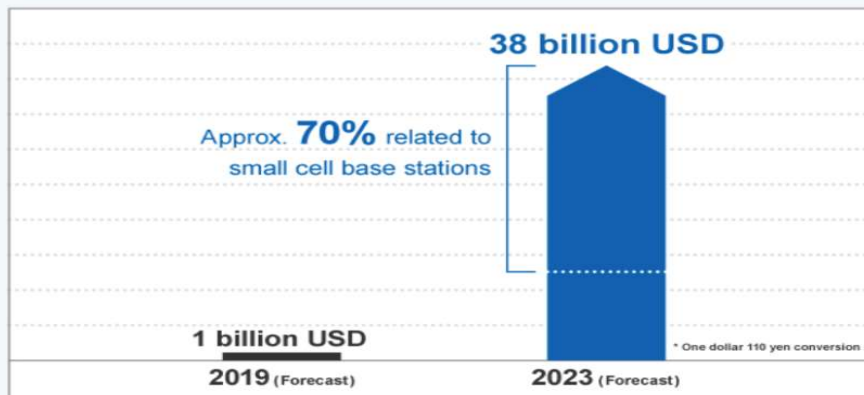
Application	BOM Usage (pcs)	Y2023 MLCC Consumption	
		Bpcs	YoY
Server 	5,000	75	5%
5G 	15,700	45	19%
Automobile 	Conventional Car: 3,500	750	15%
	EV: 18,000		
EV Charger 	2,000	14	45%

Figure 1: Annual Automotive MLCC Demand, 2019-2022
(Unit: Billion pcs)



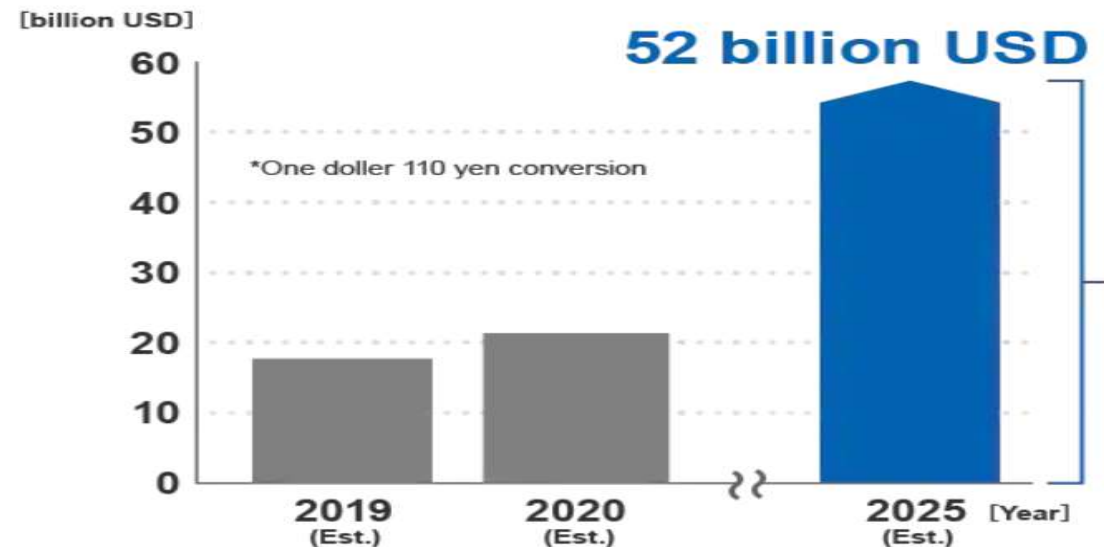
Source: TrendForce, Nov. 2021

Global market for 5G base stations



Fuji Chimera Research Institute, Inc., Future Perspective of Core Technology to Realize 5G/High Speed Large

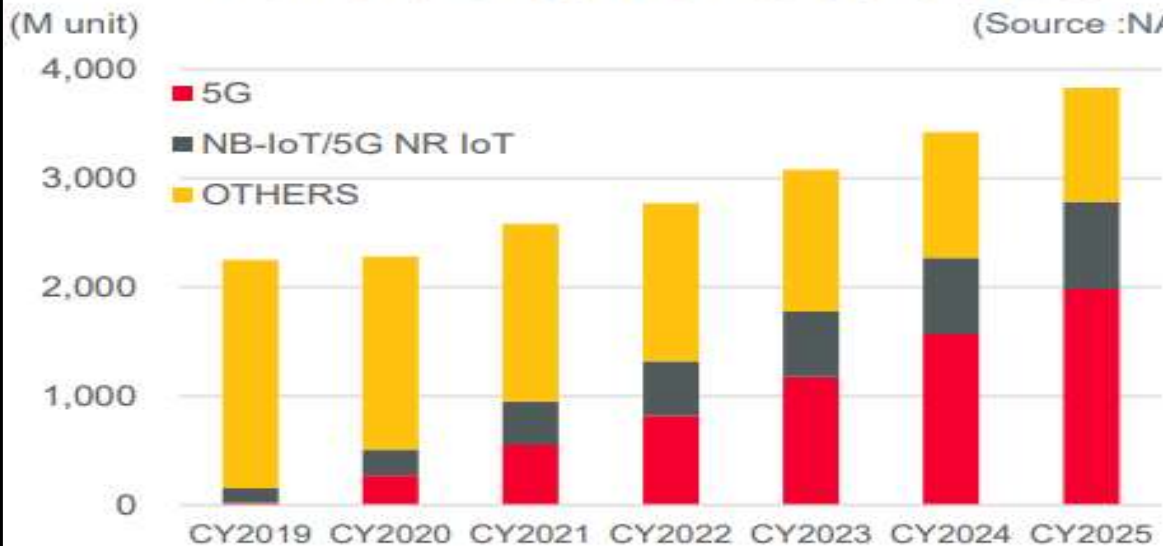
World market size for business/service robots



The Major Application for MLCC Demand

Demand for communication devices

(Source :NAVIAN)



Data center (server)



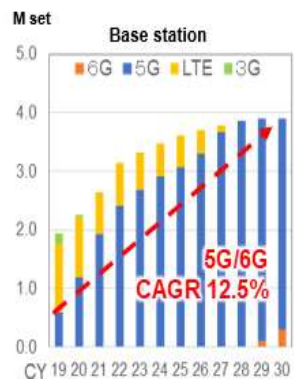
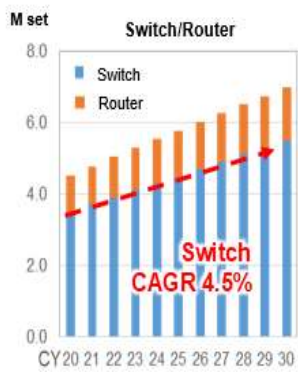
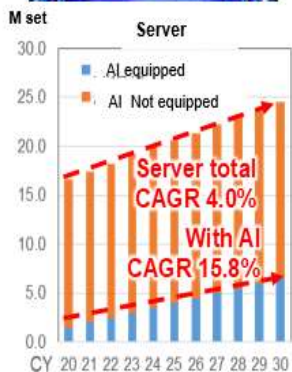
Data center (Switch, Router)



Base station



Automotive (ADAS)



Gartner Forecasts 6 Million Electric Cars Will Be Shipped in 2022

Table 1: Global Electric Vehicle Shipments, 2021-2022 (Actual Units)

	2021	2021	2022	2022
	Shipments	Growth (%)	Shipments	Growth (%)
Car	4,473,907	38.3	6,022,147	34.6
Bus	165,551	18.1	198,353	19.8
Van	86,274	56.1	126,607	46.8
Heavy Truck	15,171	41.5	22,663	49.4
Total	4,740,903	37.7	6,369,769	34.4

Due to rounding, some figures may not add up to the totals shown.

Source: Gartner (January 2022)





Thanks for your attention

