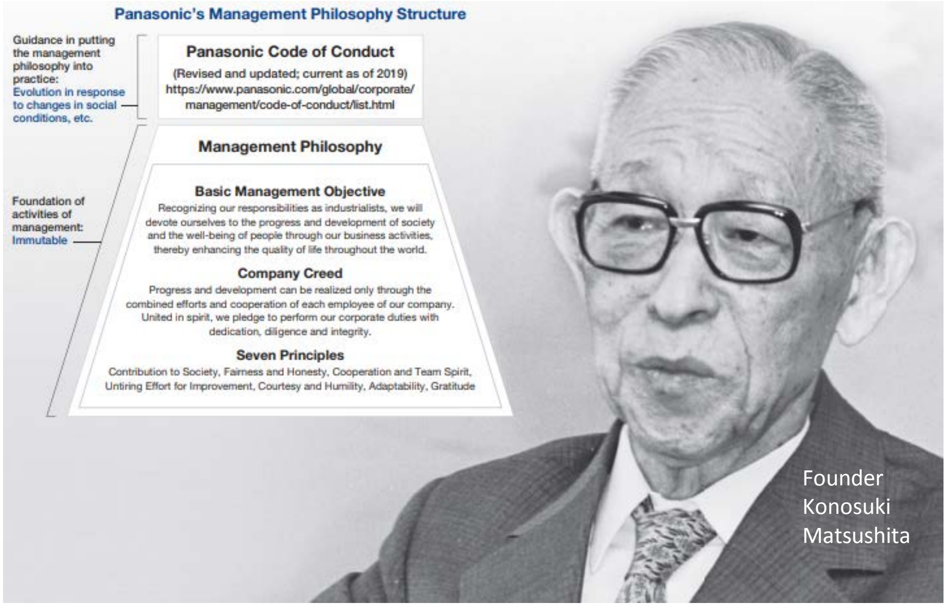
Panasonic Electronic Materials Division Overview

Founding Principles and History



Founder Konosuke Matsushita

Corporate History

1918 Matsushita Electric Housewares Manufacturing Works (today's Panasonic) established. Two new products, an attachment plug and, a two-way socket, launched on the market.

1927 Square bicycle lamp launched under the name "National Lamp," reflecting the hope that it would become ***indispensable to the nation's citizens***. The product became popular throughout Japan as a safe light source.

1931 Sales of radios commenced. This radio that ***"wouldn't break down"*** delighted consumers and it brought news and culture into people's homes.

1932 Trade department established and ***export business commenced***.

1950s Washing machines, black and white TVs, refrigerators and other products launched that ***reduced the burden of housework*** and made life easier.

1961 Panasonic's ***first overseas manufacturing facility***, National Thai Manufacturing Company, established. Manufacturing facilities were subsequently established in countries with difficulty importing household appliances due to foreign exchange shortages.

1965 Five-day work week introduced ahead of other companies. With a slogan of "One day of study, and one day of rest," the change played a major role in raising employee ***productivity and motivation***.

1987 Joint venture to produce picture tubes (CRTs) for color TVs established in Beijing with a view to ***China's modernization***. It was the first joint venture in China for Panasonic.

1988 Promoting ***world peace*** through sport. In accord with this philosophy of the Olympic Games, Panasonic has, since the Olympic Winter Games Calgary 1988, supported the Movement over 30 years as the highest ranking sponsor in "The Olympic Partner (TOP)" program.

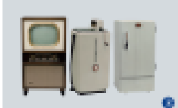
2008 To make the Company ***a truly global corporation***, the company name was changed to "Panasonic Corporation," and its corporate brands were unified as "Panasonic" worldwide.

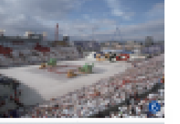
2010 Mass production of lithium-ion batteries for hybrid EV automobiles commenced, helping to ***popularize eco-cars***.

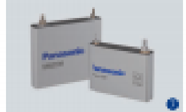
2014 Fujisawa Sustainable Smart Town established for ***eco-conscious*** and ***comfortable*** lifestyles while ensuring ***safety and security***.

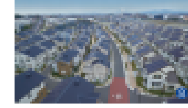
2018 Marking ***the 100th anniversary of its founding***, Panasonic introduced ***"Lifestyle Updates*" as its future direction to take***.

* Please refer to "Achieving Lifestyle Updates" in the section "Message from the CEO."









Position in the Electronics Manufacturing Value Chain

Datacenter equipment

Smart phones

<OEM>
Electronic Instruments

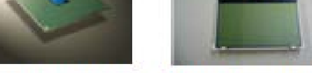
PC Tablets

Digital appliances

Automotive

< EMS / ODM >
- Devise Assembly
- Design products

Semiconductors



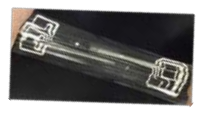
Module Components

Automotive components

Circuit Boards

< Devices and Components >
- Circuit Boards
- Semiconductors
- Automotive parts and others

NEW
Stretchable Circuit Materials



Circuit Board Materials

<Electronic Materials>
- Circuit Board Materials
- Semiconductor Encapsulation Materials
- Thermosetting Molding Materials
- Advanced Films

Encapsulation Materials

Advanced Films

Molding Compound

Circuit Board Materials BU | **Plastic Materials BU**

Electronic Materials Division Product Brands

FineTiara

Advanced Optical Films

MEGTRON GX

Circuit Board Materials

ECOM SuperFine

Semiconductor Encapsulation Materials

Halogen Free

Multi Layer Copper Clad Laminate Boards

ECOM FineFlow

Liquid Encapsulant

Adhesives Underfill

FELIOS

Flexible Circuit Board Materials

Mass Lamination Boards

Electronic Materials Division Locations

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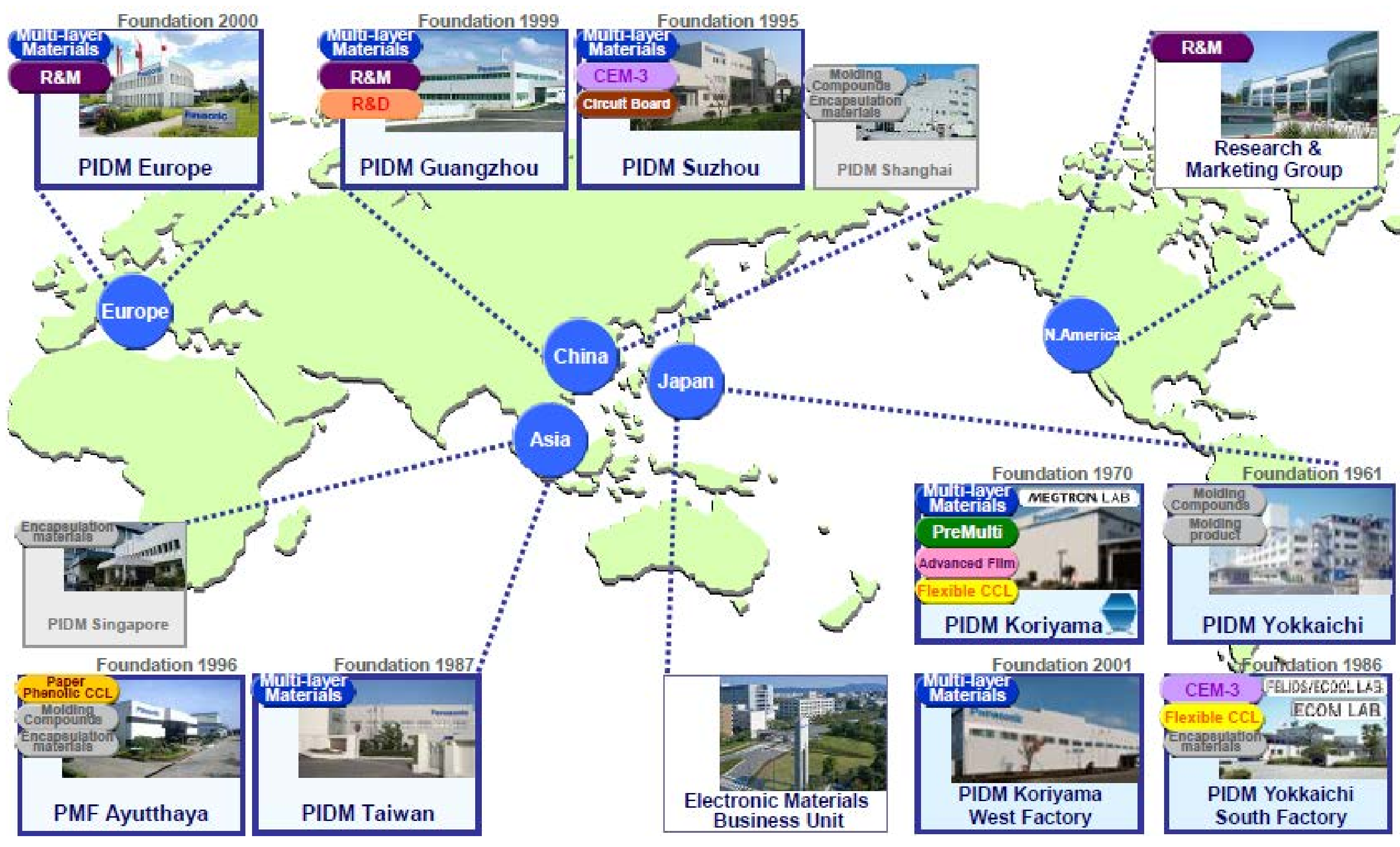

Panasonic

Megtron Series – High Speed Circuit Board Materials

Transmission loss (dB/m)

0
-20
-40
-60
-80

PTFE

0
5
10
15

Frequency (GHz)

MEGTRON7
R-5785(N) [Cu : H-VLP]

MEGTRON7
R-5785 [Cu : H-VLP]
MEGTRON6
R-5775(N) [Cu : H-VLP]

MEGTRON6
R-5775 [Cu : H-VLP]

MEGTRON M
R-5735 [Cu : RT]
MEGTRON4S
R-5725S [Cu : RT]
MEGTRON4
R-5725 [Cu : RT]

Halogen-free
MEGTRON2
R-1577 [Cu : RT]

HIPER V
R-1755V [Cu : RT]

EcooL - Circuit Board Materials for LEDs

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Thermally Conductive Laminates

- Inorganic resin composite for thermal conductivity (1.5W/m·K)
- Excellent cost performance
- Industry's highest level of tracking resistance (CTI≧600V),
- Excellent CAF resistance
- Halogen-free

Thermal resistance (℃/W)
0.5
5
10

EcooL
[1.5W/m·K type]
R-1586 (H)

EcooL
[1.1W/m·K type]
R-1787

Our conventional
FR-4
R-1705

Metal PCB

Cost
Low
High

Applications

LED lighting
(1W-3W)
Wireless charger

Local dimming type backlight
(1W-2W)
Base light
Amusement

LED lighting
(1W)

Decoration lighting
(0.3W)

Application ranges will differ according to heat dissipation design specification.

Felios - Flexible Circuit Board Materials

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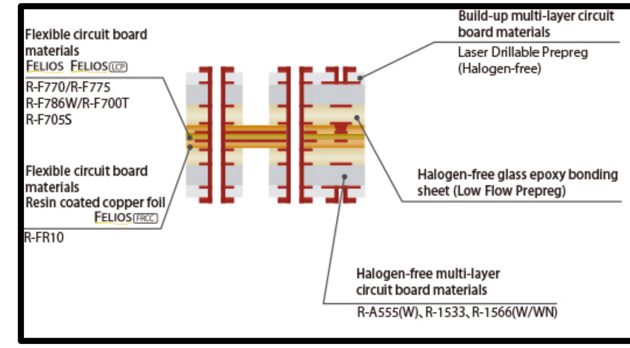
	FELIOS	FELIOS LCP	FELIOS FRCC
	Flexible circuit board materials FCCL Excellent dimensional stability and Spring back performance Line up of thick polyimide and thick copper foil	Flexible circuit board materials LCP(Liquid crystal polymer) FCCL Excels in high frequency and moisture resistance characteristics	Flexible circuit board materials Resin coated copper foil Available to multi-layer circuit board thinner and decrease a manufacture process.
Smart phones Tablet PC Mobile phones	Main board, Module (LCD, Battery, NFC, WPC)	Antenna (LTE Support)	module (Multilayer, Thin)
Portable digital appliances	Module (Camera module)	SSD (Note PC)	Camera module (Multilayer, Thin)
High speed networking equipment		Network cable	
Automotive Medical care Aerospace field	Gear BOX Electronic Control Unit	Millimeter wave radar	
LED radiation use	Backlight (Note PC)	LED module (LED lighting)	

Mobile Phone Applications

Applications	Requirement	Product Suggestions	
Antenna, Antenna module	Low-transmission loss	Dk: 3.0 PI : 75 μm(3mil) 100 μm(4mil) 125 μm(5mil) 150 μm(6mil)	FELIOS R-F775 FELIOS LCP R-F705S
LCD module	Impedance control	Cu: 2 μm, 6 μm Dk: 3.0	FELIOS R-F775 FELIOS LCP R-F705S
Battery module	High electric current safety	Cu: 70 μm(2oz)	FELIOS R-F775
NFC & WPC module	High electric current, Current efficiency	Cu: 70 μm(2oz) 105 μm(3oz)	FELIOS R-F775

Rigid-Flex Construction



Megtron GX - IC Substrates and Applications

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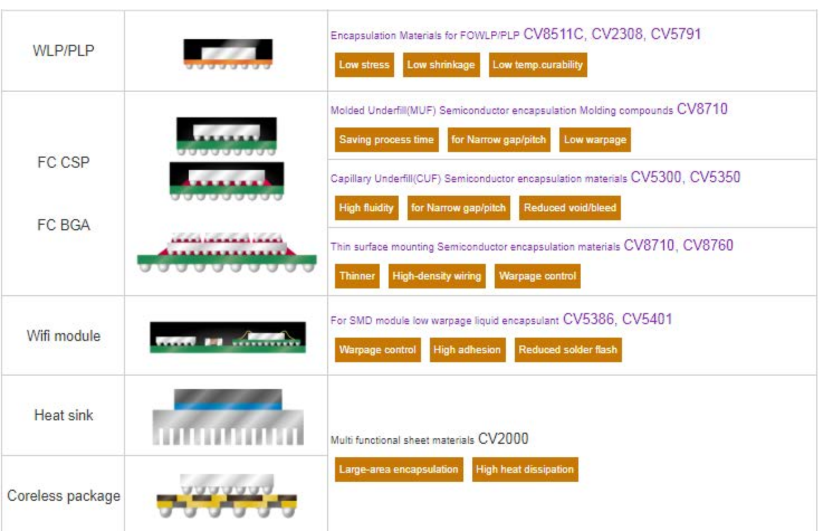
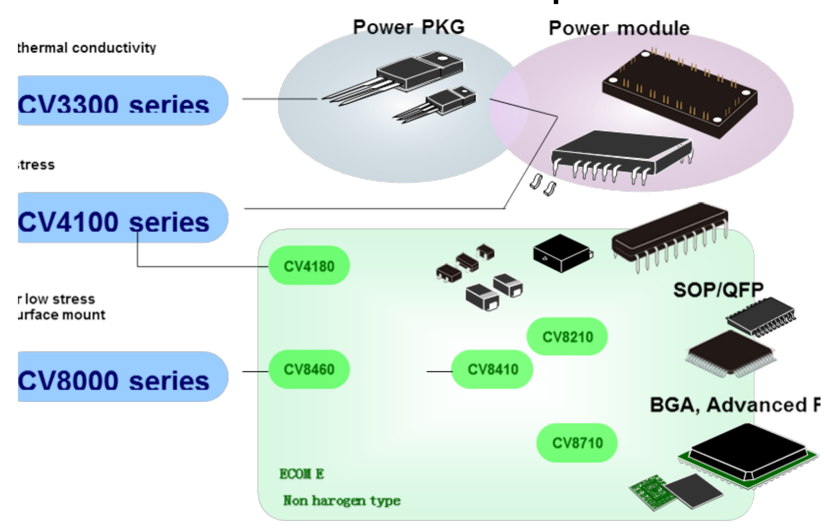
Package Type	CSP	FC-CSP	FC-BGA
	• Single-chip • Stacked-chip • NAND-Flash etc.	• PoP-Bottom over mold • PoP-Bottom TMV* • Flip-Chip etc.	• Flip-Chip etc.
Product	MEGTRON GX R-G545L/R-G545E Low Df/Dk		
	MEGTRON GX R-G525T/R-G525F Low stress		MEGTRON GX R-1515W Low CTE/ High modulus
	MEGTRON GX R-1515E Ultra thin material		MEGTRON GX R-1515A Low CTE
Product Thickness	0.04～0.2mm	0.06～0.2mm	0.2～0.8mm

Molding Materials

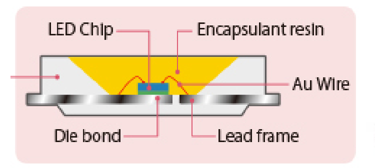


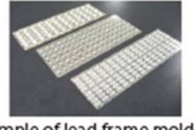
Application	Package	Materials
WLP/PLP		Encapsulation Materials for FOWLP/PLP CV8511C, CV2308, CV5791 Low stress / Low shrinkage / Low temp.curability
FC CSP FC BGA		Molded Underfill(MUF) Semiconductor encapsulation Molding compounds CV8710 Saving process time / for Narrow gap/pitch / Low warpage
		Capillary Underfill(CUF) Semiconductor encapsulation materials CV5300, CV5350 High fluidity / for Narrow gap/pitch / Reduced void/bleed
		Thin surface mounting Semiconductor encapsulation materials CV8710, CV8760 Thinner / High-density wiring / Warpage control
Wifi module		For SMD module low warpage liquid encapsulant CV5386, CV5401 Warpage control / High adhesion / Reduced solder flash
Heat sink		Multi functional sheet materials CV2000 Large-area encapsulation / High heat dissipation
Coreless package		

Lead Frame Mold Compounds



LED Mold Compounds





Example of lead frame molding

Example of LED package

Encapsulation and Assembly Materials

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Power device		For Automotive IC package Delamination free surface mounting semiconductor encapsulation materials CV8213 High adhesion, low stress / AEC-Q100/grade 0 / for Clip-bond PKG
		For Power modules High thermal conductive semiconductor encapsulation materials CV4180, CV4380 High heat dissipation / Stress reduction / High adhesion
		For Intelligent Power Module (IPM) High heat resistance semiconductor encapsulation materials X8540 Low warpage, Low stress / High heat resistance / High volume resistivity
Potting/Casting		Potting material CV5000 Low stress / High adhesion

CSP BGA Image Sensor		Low-temperature curing Secondary mounting Underfill materials CV5350AS Cures at a low temp of 80°C / Tg is 140°C or greater
		High heat resistance Secondary mounting Underfill materials CV5794, CV5797 Tg 180°C / for large size PKG / Refrigerated storage
		For secondary mounting reinforcement Drop impact resistance liquid encapsulant CV5313, CV5314 Drop impact resistance / Underfill/Sidefill reinforcement
Camera Module		Thermosetting Adhesive/UV curing Adhesive CV5000, CV7000 Bonding of various materials / Solvent resistance / Time-lagged curing
Electronic Components		Resin reinforced Low temperature Solder paste CV6511B Simultaneous processing of conduction and reinforcement

Molding Compound Formats, Processes and Applications

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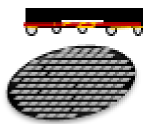
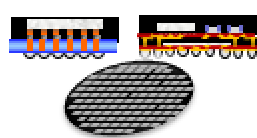
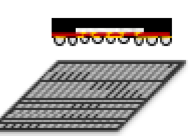
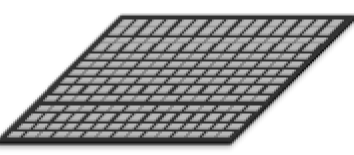
	Tablet	Liquid	Granule	Sheet
Material form				
Process	Transfer molding	Compression molding （Face up/down)		Vacuum lamination
Features	• Grind less(free) • Low material cost	• MP experience • Excellent flow-ability • Low mold shrinkage	• Good process ability (High Tg, Chem. resistance)	• Short dispense time • Thinness • Low process cost (lamination)
Target PKG form	• Low density WLP	• High density WLP (2.5D, 3D,) • WLP with under fill	• Middle density WLP • Large size PLP	• Larger size PLP • Thin PLP









Panasonic

A Better Life,
A Better World
Panasonic