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Product Lineup of
Automotive MLCC

August 2024

Normal
Mid/High Voltage
High Bending Strength
Fail Safe
High Temperature
ESD Protection
Low ESL

SAMSUNG
ELECTRO-MECHANICS

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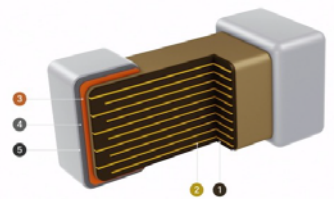
Normal Capacitors

Normal

Features

- Manufactured by state-of-the-art facilities, recommended for registration of ISO 9001 & IATF 16949
- AEC-Q200 and JEDEC-020-D qualified products.
- RoHS compliant products.
- X7R dielectric components have BME and metal-epoxy terminations with a Ni/Sn plated overcoat.
- C0G dielectric components contain BME and copper terminations with a Ni/Sn plated overcoat.



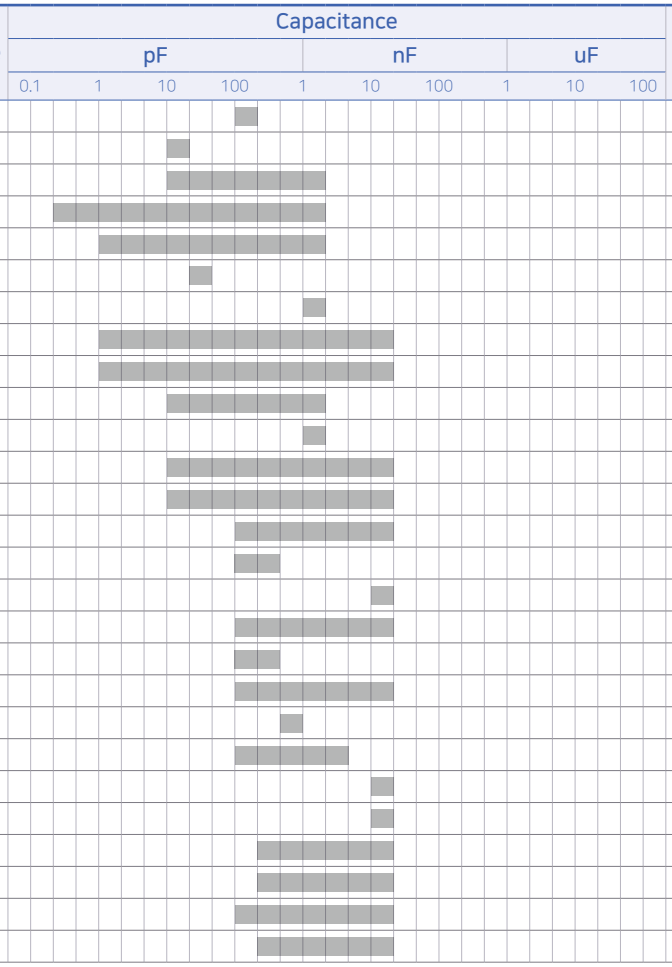
❶ Ceramic Body
❷ Electrode(Ni/Cu*)
❸ Termination(Cu or Cu+Metal Epoxy)
❹ Plating(Ni)
❺ Plating(Sn)

* Cu internal electrodes are only applicable to select products.

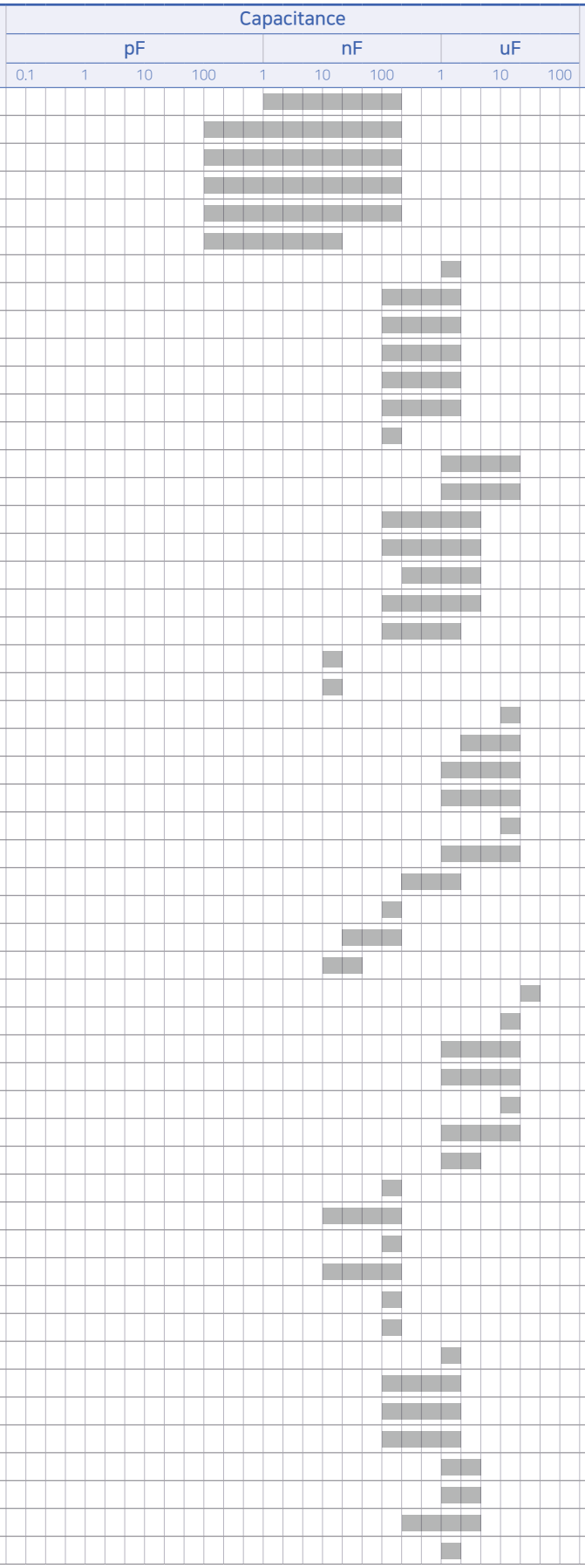
Applications

- Powertrain, Safety, Body & Chassis, Convenience, Infotainment, ADAS and Electric Vehicle

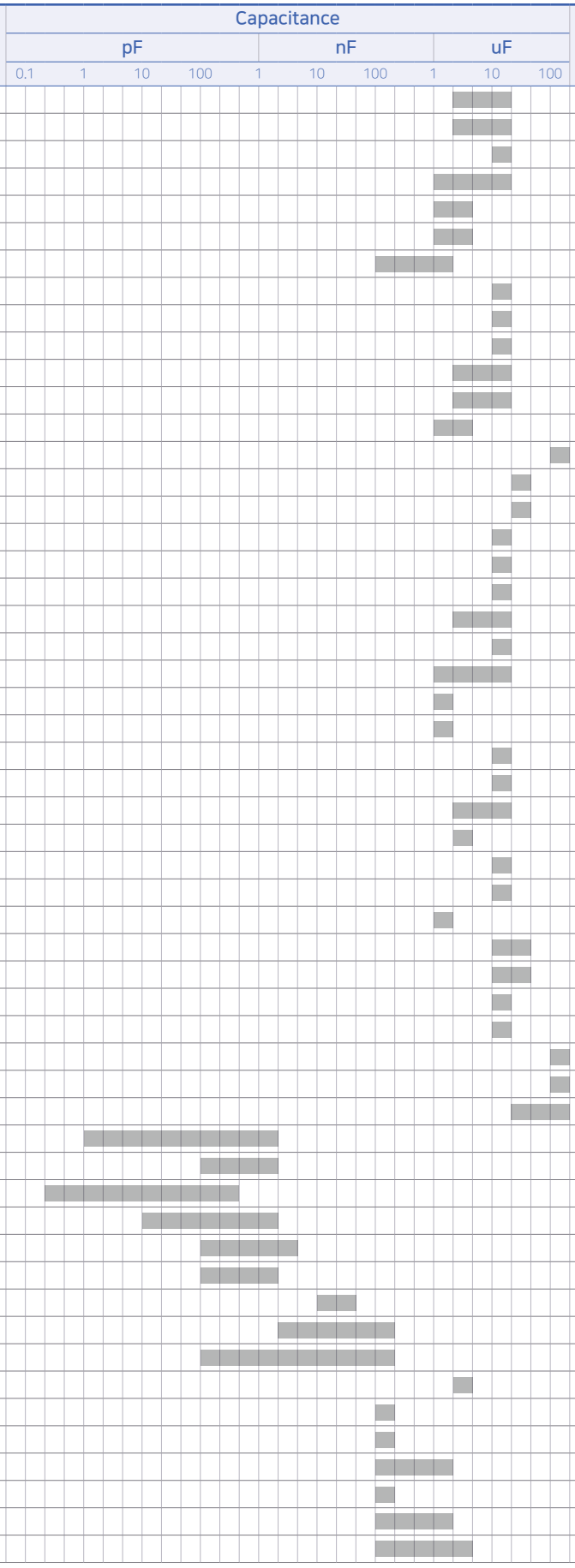
Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	C0G (125℃)	0402/1005	10	220pF - 220pF
			16	27pF - 27pF
			25	10pF - 1nF
			50	1pF - 1nF
			100	1pF - 1nF
		0603/1608	16	47pF - 47pF
			25	1nF - 1nF
			50	1pF - 10nF
			100	1pF - 10nF
			250	10pF - 1nF
		0805/2012	25	3.3nF - 3.3nF
			50	10pF - 33nF
			100	10pF - 10nF
			250	270pF - 10nF
			630	270pF - 560pF
		1206/3216	50	22nF - 22nF
			100	220pF - 10nF
			200	220pF - 680pF
			250	220pF - 33nF
			500	820pF - 820pF
			630	150pF - 4.7nF
		1210/3225	630	22nF - 33nF
			1000	22nF - 22nF
	X7R (125℃)	0201/0603	6.3	680pF - 10nF
			10	680pF - 10nF
			16	330pF - 10nF
			25	100pF - 10nF



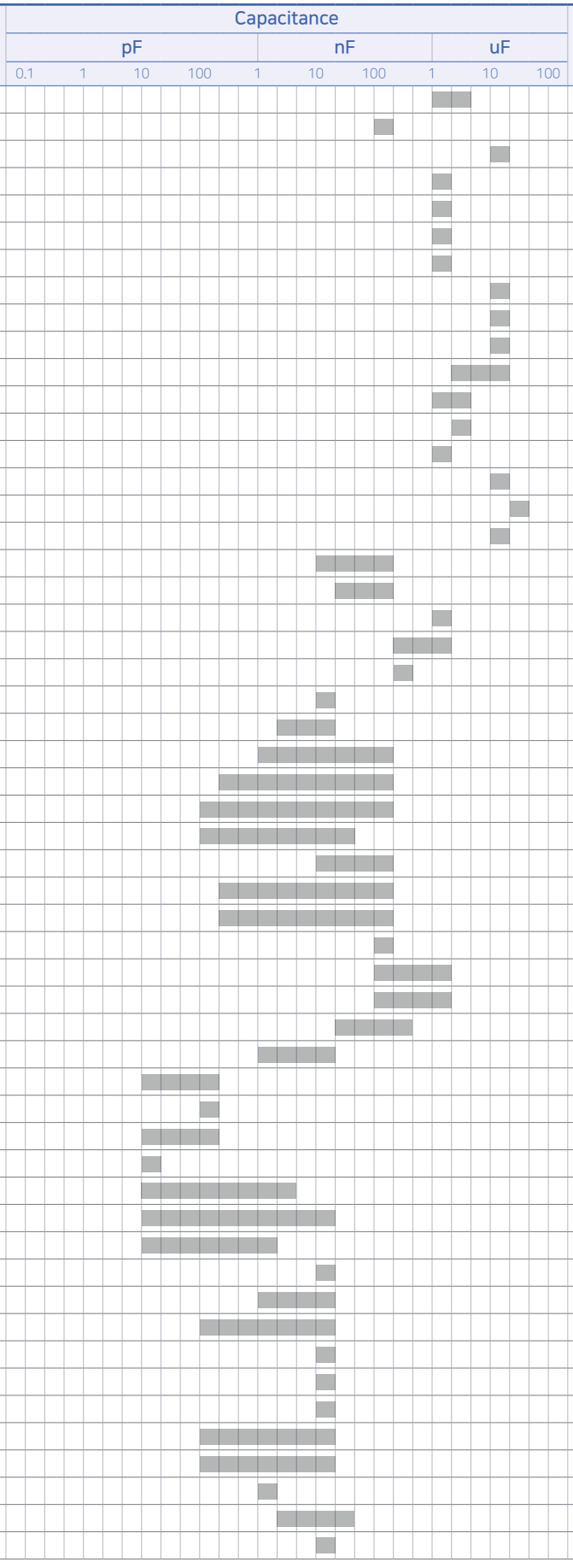
Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	X7R (125℃)	0402/1005	6.3	1nF - 220nF
			10	330pF - 220nF
			16	330pF - 220nF
			25	330pF - 220nF
			50	220pF - 100nF
			100	220pF - 10nF
		0603/1608	6.3	1uF - 2.2uF
			10	220nF - 1uF
			16	150nF - 1uF
			25	150nF - 1uF
			35	330nF - 1uF
			50	100nF - 1uF
			100	100nF - 100nF
		0805/2012	6.3	1.5uF - 10uF
			10	1uF - 10uF
			16	100nF - 4.7uF
			25	150nF - 4.7uF
			35	680nF - 4.7uF
			50	120nF - 4.7uF
			100	150nF - 1uF
			200	22nF - 22nF
			250	22nF - 22nF
		1206/3216	6.3	15uF - 22uF
			10	6.8uF - 22uF
			16	2.2uF - 10uF
			25	1.5uF - 10uF
			35	10uF - 10uF
			50	1.5uF - 10uF
			100	680nF - 2.2uF
			200	100nF - 100nF
			250	47nF - 100nF
			630	15nF - 47nF
		1210/3225	6.3	47uF - 47uF
			10	22uF - 22uF
			16	3.3uF - 22uF
			25	2.2uF - 22uF
			35	22uF - 22uF
			50	1uF - 10uF
			100	1uF - 4.7uF
			250	220nF - 220nF
			630	10nF - 100nF
	X7S (125℃)	0201/0603	4	100nF - 100nF
			6.3	22nF - 100nF
			10	100nF - 100nF
			16	100nF - 100nF
		0402/1005	4	1uF - 1uF
			6.3	220nF - 1uF
			10	220nF - 1uF
			16	220nF - 1uF
		0603/1608	6.3	2.2uF - 4.7uF
			10	1.5uF - 4.7uF
			16	680nF - 4.7uF
			25	2.2uF - 2.2uF



Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	X7S (125℃)	0805/2012	6.3	6.8uF - 10uF
			10	4.7uF - 10uF
			16	10uF - 10uF
			25	2.2uF - 10uF
			35	2.2uF - 4.7uF
			50	2.2uF - 4.7uF
			100	330nF - 1uF
		1206/3216	10	22uF - 22uF
			16	10uF - 22uF
			25	10uF - 10uF
			35	6.8uF - 10uF
			50	4.7uF - 10uF
			100	2.2uF - 4.7uF
		1210/3225	4	100uF - 100uF
			6.3	47uF - 47uF
			10	47uF - 47uF
			16	22uF - 22uF
			25	15uF - 22uF
			35	10uF - 10uF
			50	6.8uF - 10uF
			75	10uF - 10uF
			100	3.3uF - 10uF
	X7T (125℃)	0201/0603	2.5	1uF - 1uF
			4	1uF - 1uF
		0603/1608	2.5	22uF - 22uF
			4	10uF - 22uF
			6.3	4.7uF - 10uF
			10	4.7uF - 4.7uF
		0805/2012	4	22uF - 22uF
			6.3	10uF - 22uF
			50	2.2uF - 2.2uF
		1206/3216	4	33uF - 47uF
			6.3	22uF - 47uF
			35	10uF - 10uF
			50	10uF - 10uF
		1210/3225	2.5	100uF - 220uF
			4	100uF - 100uF
			6.3	47uF - 100uF
	X8G (150℃)	0402/1005	50	1pF - 1nF
			100	270pF - 1nF
		0603/1608	50	0.47pF - 680pF
			100	10pF - 1nF
		0805/2012	50	100pF - 6.8nF
			100	100pF - 1.5nF
	X8L (150℃)	0402/1005	16	15nF - 47nF
			25	6.8nF - 100nF
			50	330pF - 100nF
		0603/1608	6.3	4.7uF - 4.7uF
			16	150nF - 220nF
			25	100nF - 220nF
			50	100nF - 1uF
			100	100nF - 100nF
		0805/2012	16	330nF - 1uF
			25	330nF - 4.7uF



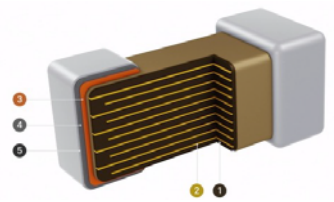
Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	X8L (150℃)	0805/2012	35	2.2uF - 4.7uF
			50	220nF - 220nF
		1206/3216	10	22uF - 22uF
			16	1.5uF - 2.2uF
			25	1uF - 10uF
			50	1uF - 1uF
			100	1uF - 2.2uF
		1210/3225	10	10uF - 10uF
			16	10uF - 10uF
			25	22uF - 22uF
			50	4.7uF - 10uF
			100	2.2uF - 4.7uF
	X8M (150℃)	0603/1608	6.3	4.7uF - 4.7uF
			50	1uF - 1uF
		0805/2012	16	10uF - 10uF
		1206/3216	4	47uF - 47uF
			35	10uF - 10uF
	X8R (150℃)	0603/1608	50	10nF - 100nF
		0805/2012	50	47nF - 330nF
		1206/3216	25	1uF - 1uF
			50	470nF - 1uF
			100	470nF - 470nF
AEC-Q200 Open	C0G(125℃)		250	22nF - 22nF
	X7R (125℃)	0603/1608	10	3.9nF - 10nF
			16	1.2nF - 100nF
			25	390pF - 100nF
			50	150pF - 100nF
			100	220pF - 68nF
		0805/2012	25	10nF - 100nF
			50	470pF - 100nF
			100	470pF - 100nF
		1206/3216	16	330nF - 330nF
			25	100nF - 1uF
			50	100nF - 1uF
			100	68nF - 470nF
	X8L(150℃)	0603/1608	50	1nF - 10nF
AEC-Q200 Series	C0G (125℃)	0805/2012	250	10pF - 220pF
			500	100pF - 220pF
			630	10pF - 220pF
		1206/3216	50	12pF - 12pF
			250	10pF - 5.6nF
			630	10pF - 10nF
			1000	10pF - 1nF
		1210/3225	630	15nF - 15nF
			1000	1nF - 15nF
	X7R (125℃)	0805/2012	250	220pF - 15nF
		1206/3216	200	10nF - 10nF
			250	15nF - 33nF
			500	22nF - 22nF
			630	220pF - 22nF
			1000	220pF - 22nF
			2000	1nF - 2.2nF
		1210/3225	630	4.7nF - 47nF
			1000	22nF - 22nF



Mid/High Voltage Capacitors

Features

- Manufactured by state-of-the-art facilities, recommended for registration of ISO 9001 & IATF 16949
- Meet AEC-Q200 and JEDEC-020-D qualified products.
- RoHS compliant products.
- Voltage rating of 250V ~ 2000V.
- 3mm bending strength guaranteed.
- Operating temperature range : -55 to 125°C.
- X7R dielectric components have BME and metal-epoxy terminations with a Ni/Sn plated overcoat.
- C0G dielectric components contain BME and copper terminations with a Ni/Sn plated overcoat.



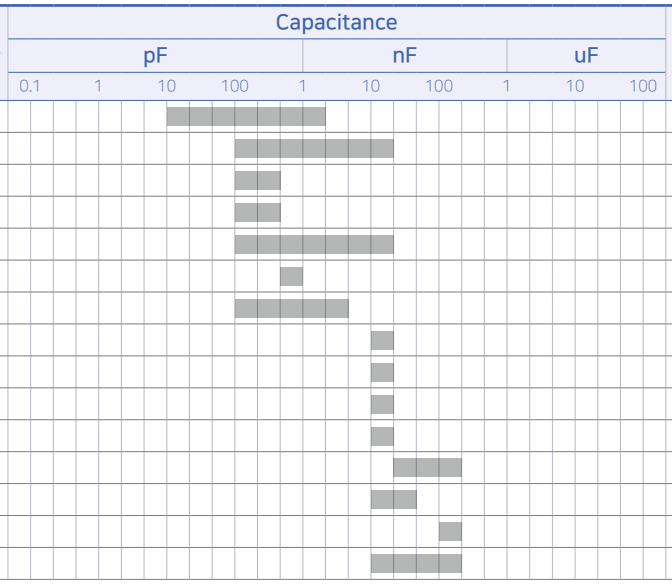
❶ Ceramic Body
❷ Electrode(Ni/Cu*)
❸ Termination(Cu or Cu+Metal Epoxy)
❹ Plating(Ni)
❺ Plating(Sn)

* Cu internal electrodes are only applicable to select products.

Applications

- Powertrain, Safety, Body & Chassis, Convenience, Infotainment, ADAS, EV

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	C0G (125℃)	0603/1608	250	10pF - 1nF
		0805/2012	250	270pF - 10nF
			630	270pF - 560pF
		1206/3216	200	220pF - 680pF
			250	220pF - 33nF
			500	820pF - 820pF
			630	150pF - 4.7nF
		1210/3225	630	22nF - 33nF
			1000	22nF - 22nF
	X7R (125℃)	0805/2012	200	22nF - 22nF
			250	22nF - 22nF
		1206/3216	250	47nF - 100nF
			630	15nF - 47nF
		1210/3225	250	220nF - 220nF
			630	10nF - 100nF



Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance (pF: 0.1 – 100; nF: 1 – 100; uF: 1 – 100)	Capacitance Range
AEC-Q200 Series	C0G (125℃)	0805/2012	250		10pF - 220pF
			500		100pF - 220pF
			630		10pF - 220pF
		1206/3216	250		10pF - 5.6nF
			630		10pF - 10nF
			1000		10pF - 1nF
		1210/3225	630		15nF - 15nF
			1000		1nF - 15nF
	X7R (125℃)	0805/2012	250		220pF - 15nF
		1206/3216	200		10nF - 10nF
			250		15nF - 33nF
			500		22nF - 22nF
			630		220pF - 22nF
			1000		220pF - 22nF
			2000		1nF - 2.2nF
		1210/3225	630		4.7nF - 47nF
			1000		22nF - 22nF

High Bending Strength Capacitors

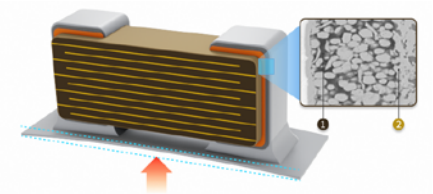
High Bending Strength

Features

MLCC with Increased Durability

It is a product that applies stress-management technology against external deformation to prevent MLCC defects from taking place when mechanical and thermal deformation of the PCB occurs. With greater durability than existing products, it can be used in applications that require safety.

- **Bending Crack Prevention**
  Use of Conductive Epoxy Material Technology that can Absorb Deformation Stress to Prevent Bending Cracks Caused by PCB Deformation
- **5mm Bending Guarantee**
  Board Flex 5mm Guarantee

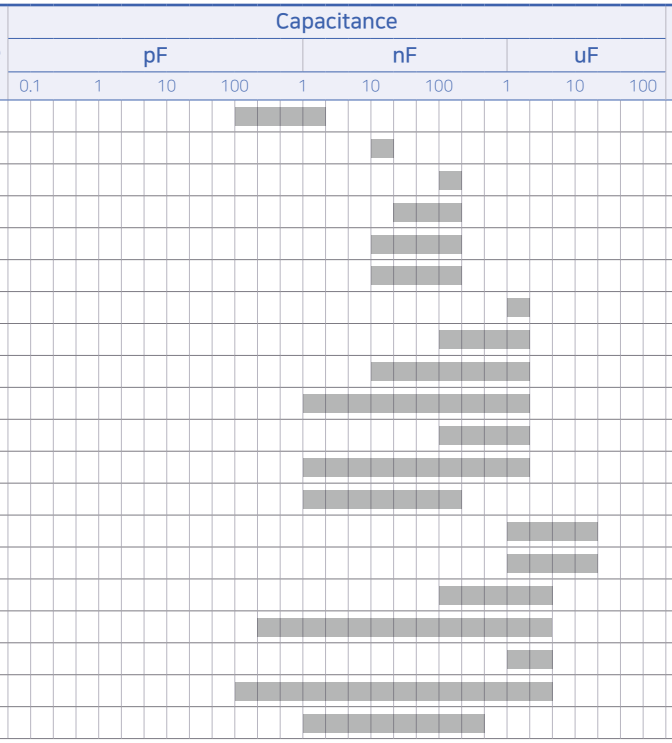


1 Metal Epoxy
2 Cu Termination

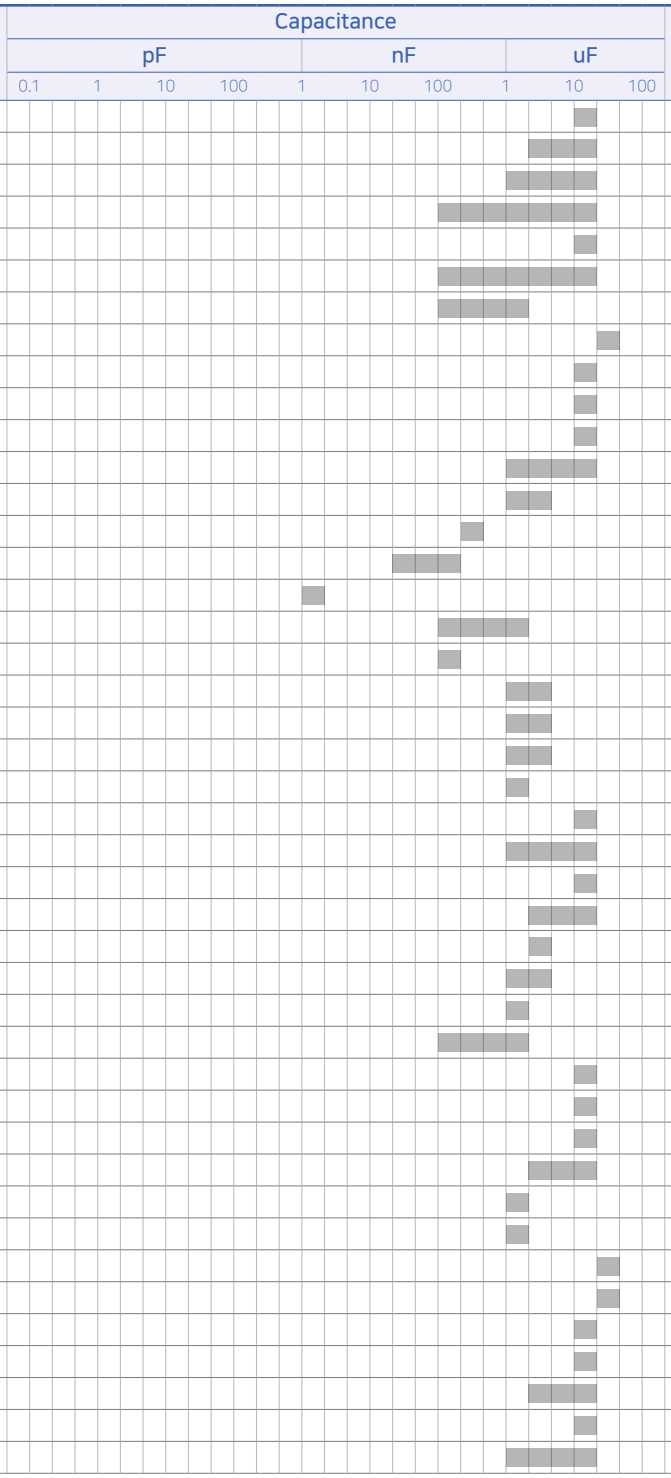
Applications

- Critical circuits and battery line circuits.
  (Cracking caused by flexing stress after board mounting is minimized)

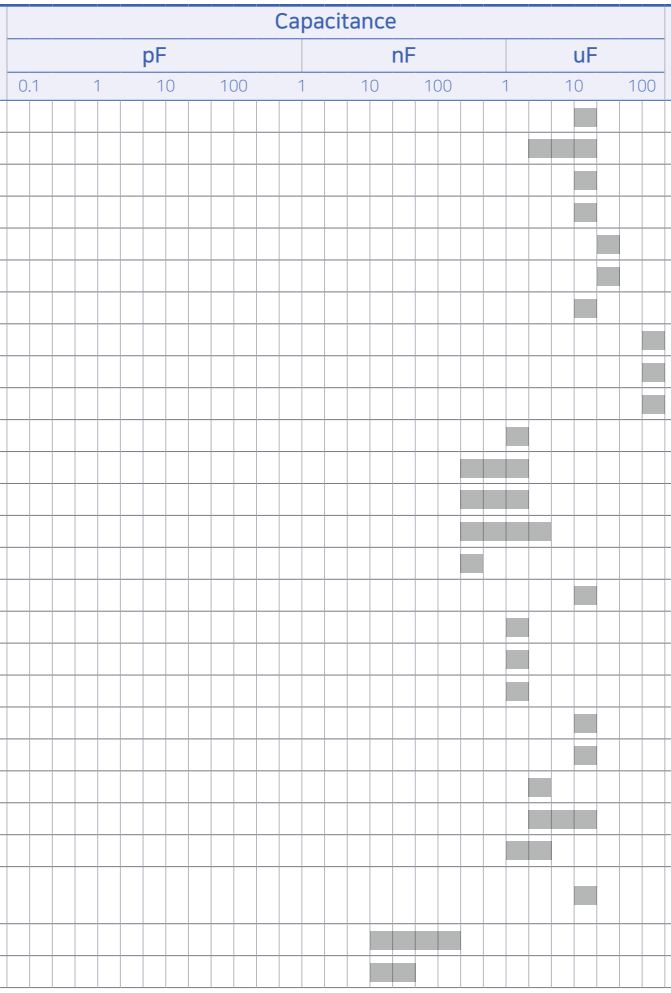
Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Soft Termination	C0G (125℃)	0603/1608	50	150pF - 1nF
		1210/3225	630	33nF - 33nF
	X7R (125℃)	0402/1005	10	100nF - 100nF
			16	47nF - 220nF
			25	10nF - 220nF
			50	10nF - 100nF
		0603/1608	6.3	1uF - 1uF
			10	150nF - 1uF
			16	10nF - 1uF
			25	1nF - 1uF
			35	220nF - 1uF
			50	1nF - 1uF
			100	1nF - 100nF
		0805/2012	6.3	1.5uF - 10uF
			10	1.5uF - 10uF
			16	330nF - 4.7uF
			25	680pF - 4.7uF
			35	2.2uF - 4.7uF
			50	330pF - 4.7uF
			100	1nF - 470nF



Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Soft Termination	X7R (125℃)	1206/3216	6.3	22uF - 22uF
			10	6.8uF - 22uF
			16	1uF - 10uF
			25	100nF - 10uF
			35	10uF - 10uF
			50	100nF - 10uF
			100	100nF - 2.2uF
		1210/3225	6.3	47uF - 47uF
			10	22uF - 22uF
			16	22uF - 22uF
			25	10uF - 10uF
			50	1uF - 10uF
			100	1uF - 4.7uF
		1812/4532	250	470nF - 470nF
			630	47nF - 220nF
			2000	2.2nF - 2.2nF
	X7S (125℃)	0402/1005	10	330nF - 1uF
			16	220nF - 220nF
		0603/1608	6.3	2.2uF - 4.7uF
			10	2.2uF - 4.7uF
			16	2.2uF - 4.7uF
			25	2.2uF - 2.2uF
		0805/2012	6.3	10uF - 10uF
			10	2.2uF - 10uF
			16	10uF - 10uF
			25	4.7uF - 10uF
			35	4.7uF - 4.7uF
			50	2.2uF - 4.7uF
			75	1uF - 1uF
			100	150nF - 1uF
		1206/3216	16	22uF - 22uF
			25	10uF - 10uF
			35	10uF - 10uF
			50	4.7uF - 10uF
			75	2.2uF - 2.2uF
			100	2.2uF - 2.2uF
		1210/3225	6.3	47uF - 47uF
			10	47uF - 47uF
			16	22uF - 22uF
			25	15uF - 22uF
			50	6.8uF - 10uF
			75	10uF - 10uF
			100	3.3uF - 10uF



Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Soft Termination	X7T (125℃)	0603/1608	4	10uF - 10uF
			6.3	4.7uF - 10uF
		0805/2012	4	22uF - 22uF
			6.3	22uF - 22uF
		1206/3216	4	47uF - 47uF
			6.3	47uF - 47uF
			35	10uF - 10uF
		1210/3225	2.5	100uF - 100uF
			4	100uF - 100uF
			6.3	100uF - 100uF
	X8L (150℃)	0603/1608	50	1uF - 1uF
		0805/2012	16	680nF - 1uF
			25	470nF - 1uF
			35	470nF - 4.7uF
			50	470nF - 470nF
		1206/3216	10	22uF - 22uF
			25	1uF - 1uF
			35	1uF - 1uF
			100	1uF - 1uF
		1210/3225	10	10uF - 10uF
			16	10uF - 10uF
			25	4.7uF - 4.7uF
			50	4.7uF - 10uF
			100	2.2uF - 4.7uF
	X8M (150℃)	0805/2012	16	10uF - 10uF
	X8R (150℃)	0603/1608	50	10nF - 100nF
			100	10nF - 47nF



Fail Safe Capacitors

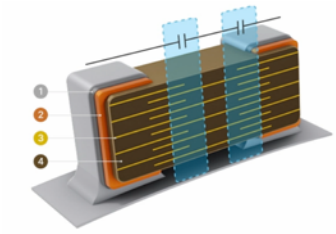
Fail Safe

Features

MLCC with The Highest Degree of Safety

Designed to prevent circuit malfunction even if the MLCC product is cracked and a short circuit occurs inside.In addition, the product guarantees Board Flex 5mm and is the MLCC product with the highest degree of safetyamong other products to prevent defects caused by PCB deformation.

- **5mm Bending Guarantee**
  Board Flex 5mm Guarantee
- **Series Design**
  Designed to Operate like Two MLCCs in a Series Even if a Defect such as a Crack Occurs on One Side, the Circuit can be Protected on the Other Side



1. Plating layer(Ni/Sn)
2. Outer electrode(Cu & Metal-epoxy:X7R)
3. Inner electrode(Ni)
4. Ceramic

Applications

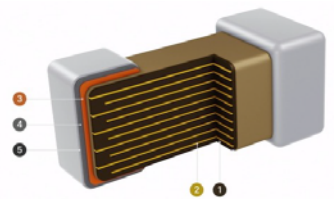
- All automotive application include 12V Battery line, circuit near hole and connector.

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance (pF: 0.1 – 100; nF: 1 – 100; uF: 1 – 100)	Capacitance Range
AEC-Q200 Fail Safe/ Soft Termination (5mm)	X7R (125℃)	0603/1608	50		10nF - 22nF
			100		10nF - 22nF
		0805/2012	50		10nF - 100nF
			100		10nF - 100nF

High Temperature Capacitors

Features

- Manufactured by state-of-the-art facilities, recommended for registration of ISO 9001 & IATF 16949
- Meet AEC-Q200 and JEDEC-020-D qualified products.
- RoHS compliant products.
- Operating temperature range : -55 to 150°C.
- High reliability MLCC that ensure the heating environment of Powertrain network and EV high temperature products.



❶ Ceramic Body
❷ Electrode(Ni/Cu*)
❸ Termination(Cu or Cu+Metal Epoxy)
❹ Plating(Ni)
❺ Plating(Sn)

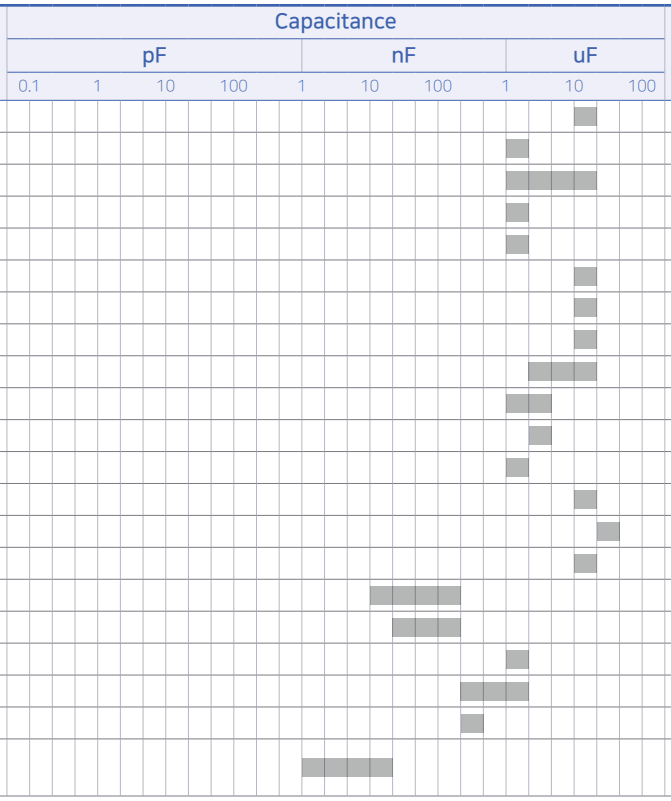
* Cu internal electrodes are only applicable to select products.

Applications

- Used in places with high power consumption and high operating temperature like Powertrain, Engine oil, Inverter, Lighting etc.

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	X8G (150℃)	0402/1005	50	1pF - 1nF
			100	270pF - 1nF
		0603/1608	50	0.47pF - 680pF
			100	10pF - 1nF
		0805/2012	50	100pF - 6.8nF
			100	100pF - 1.5nF
	X8L (150℃)	0402/1005	16	15nF - 47nF
			25	6.8nF - 100nF
			50	330pF - 100nF
		0603/1608	6.3	4.7uF - 4.7uF
			16	150nF - 220nF
			25	100nF - 220nF
			50	100nF - 1uF
			100	100nF - 100nF
		0805/2012	16	330nF - 1uF
			25	330nF - 4.7uF
			35	2.2uF - 4.7uF
			50	220nF - 220nF

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance Range
AEC-Q200 Features Normal	X8L (150℃)	1206/3216	10	22uF - 22uF
			16	1.5uF - 2.2uF
			25	1uF - 10uF
			50	1uF - 1uF
			100	1uF - 2.2uF
		1210/3225	10	10uF - 10uF
			16	10uF - 10uF
			25	22uF - 22uF
			50	4.7uF - 10uF
			100	2.2uF - 4.7uF
	X8M (150℃)	0603/1608	6.3	4.7uF - 4.7uF
			50	1uF - 1uF
		0805/2012	16	10uF - 10uF
		1206/3216	4	47uF - 47uF
			35	10uF - 10uF
	X8R (150℃)	0603/1608	50	10nF - 100nF
		0805/2012	50	47nF - 330nF
		1206/3216	25	1uF - 1uF
			50	470nF - 1uF
			100	470nF - 470nF
AEC-Q200 Open	X8L (150℃)	0603/1608	50	1nF - 10nF



ESD Protection Capacitors

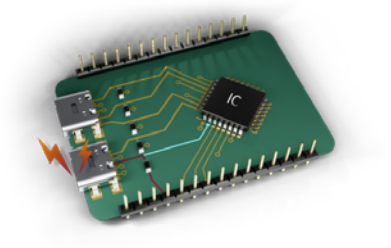
ESD

Features

MLCC to Protect Circuits

Specially designed for use in protecting circuits from ESD, this product guarantees a higher level of ESD than general MLCC products. It meets the IEC 61000-4-2 standard.

- **IEC 61000-4-2 Standard**
  ESD Testing According to the IEC 61000-4-2 Standard
- **DC Bias Stability**
  Improved DC Bias Characteristics Compared to General MLCCs



Applications

- Input and output sections in a wide range of automotive electronics.

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance											Capacitance Range
				pF				nF			uF				
				0.1	1	10	100	1	10	100	1	10	100		
AEC-Q200 ESD Protection	C0G (125℃)	0603/1608	100												1nF - 10nF
	X7R (125℃)		100												1nF - 10nF

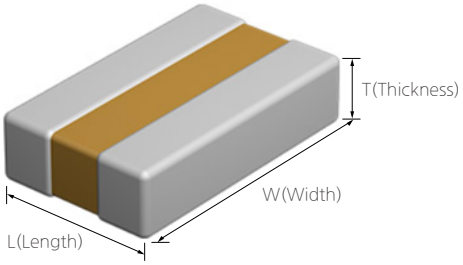
Low ESL Capacitors

Low ESL

Features

- MLCCs with low equivalent series inductance (ESL) can be used in circuits with limited mounting area, as a small quantity of such MLCCs can sufficiently replace high-speed IC MLCCs.
- AEC-Q200 and JEDEC-020-D qualified products.

Reversed Type



Applications

- ADAS, Infotainment, In-Vehicle Networking(IVN), Powertrain, Satety System

Category	TCC	Size Code (inch/mm)	Rated Voltage (Vdc)	Capacitance										Capacitance Range
				pF				nF			uF			
				0.1	1	10	100	1	10	100	1	10	100	
AEC -Q200 Reverse (Low ESL)	X7T (125℃)	0204/0510	2.5								■			1uF - 1uF
			4								■			1uF - 1uF

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