2012 Application Guide
SAMSUNG ELECTRO-MECHANICS
MLCC (Multi-Layer Ceramic Chip Capacitor)
Chip Inductor
Chip Resistor
Trantalum Capacitor
Crystal Unit
ACI Division
HDI (High Density Interconnection)
SEMBrid
Package Substrate
OMS Division
Camera Module
Linear Vibrator
HDD Motor
CDS Division
Tuner
NFC (Near Field Communication Module)
Power Module
Wi-Fi Module
Cellular Module
ESL (ESL Solution)
Bluetooth Module
www.samsungsem.co.kr
1. MLCC (Multi-Layer Ceramic Chip Capacitor)
As a major passive component, MLCC is the most prevalent type of capacitor today which temporarily stores electrical charge and decouples the noise in electronic circuits. Its main body is made up of interleaved layers of dielectric and metal inner electrode which is usually nickel. The external electrodes or terminations provide physical and electrical connection of MLCC to printed circuit board or hybrid IC module.

2. Chip Inductor
Chip inductors are a kind of SMD type passive component of inductance. They are made by thick film multi-layer process. They are mainly used for impedance matching of telecommunication devices, LC resonance circuits and elimination of electromagnetic noise of digital devices.

3. Chip Resistor
Chip resistors are general passive components which are useful for controlling current and duration voltage in the circuit. Also, it can be mounted on the surface of the PCB.

4. Tantalum Capacitor
Tantalum capacitors are designed with excellent performance characteristics for filtering, by-passing, coupling, blocking and R-C tuning circuit. They are used extensively in industrial, commercial, entertainment and medical electronic equipments.

5. Crystal Unit
Quartz crystal units are passive components used reverse-piezoelectricity. Samsung’s crystal units are designed to be applicable for the requirement of high precision specification such as mobile devices.

ACI division stands for Advanced Circuit Interconnection. Main products are HDI, RF-PCB, FCxGA and BGA. PCB (printed circuit board) is a device that provides electrical interconnections and a surface for mounting electronic components. Most PCBs are made from a flat rigid or flexible material layered between insulating and conductive elements through which electrical currents travel.

1. HDI (High Density Interconnection)
It refers to high-density PCBs created with fine pattern and pitch to exchange electrical signals between electrical components mounted onto a PCB.

2. SEMBrid
SEMBrid is the acronym of “SEM” + “Hybrid”, meaning multi-layer rigid-flex PCB manufactured by Samsung Electro-Mechanics.

3. Package Substrate
Package substrate is a substitution technology of lead frame in chip packages. The sort of package substrates is UT-CSP, BOC, RF-Sip, FC-CSP and others. These products are used in Application processor, DRAM module, RF-Module, Flash memory. Main purpose is mobile phone.
CDS Division

CDS division stands for Circuit Drive Solution. Main products are digital tuners, network modules, power modules, and ubiquitous modules. We are continuing making an effort to boost sales of premium products, such as power module and network module products keep developing for customer diversification.

1. Power Module
   The power module converts externally supplied electricity to the required output voltage for electronic products.
   - SMPS for LED TV, LCD TV etc
   - Adapter for Note PC, Tablet PC etc
   - Power module for LED Lighting, Data Server

2. Tuner
   The digital tuner is an essential component for the digital broadcasting industry. This front-end component is built into LCD TVs and other broadcasting receivers to select the right signals from broadcasters so that viewers can watch their desired channels.

3. NFC (Near Field Communication Module)
   NFC module is device that enables wireless communication for unencrypted information exchanges in a short distance within 10 cm by using RFID technology.

4. Wi-Fi Module
   The Wi-Fi module is a sophisticated device that enables personal computers, smart phone and other products to access the internet in real time. Samsung Electro-Mechanics is manufacturing a various combo module such as WLAN + BT

5. Cellular Module
   The cellular module uses broadband frequencies for mobile phones to provide smart phones, tablet PCs and other handhelds with high-speed internet connectivity. This device is expected to be a requirement for operating in a mobile internet environment

6. ESL (ESL Solution)
   S-Label Tag is a product that displays price electronically and it can display information customer’s needs such as price, discount rate and sale signs on the tag. And it is capable of supporting a multi-mode which can display additional information such as producing center, manufacturer, inventory and sales volume for the store managers. A safety lock has been added to prevent theft of the tag, and various colors and designs are available for displaying store logos

OMS Division

OMS division stands for Opto and Mechatronics Solution. Main Products are camera modules, precision, motors and HDD Motor. We are also expanding into camera modules specifically for smartphones and tablet PCs as well as new areas into the new markets automotive electronic system and sensing applications.

1. Camera Module
   Camera modules, akin to an “electronic eye,” transform images that pass through the lens into digital signals for taking pictures and recording video. SEM is working on exceptional camera modules for smart phones with high resolution solution, subminiature camera, auto focus, vibration compensation and high quality actuators/lens. The company is also expanding into camera modules specifically for smartphones and tablet PCs as well as new areas into the new markets automotive electronic system and sensing applications

2. Linear Vibrator
   Precision motors are built inside smartphones and game consoles to generate vibrations that convey messages such as silent alerts of incoming calls or text messages. With today’s popular smartphones, the use of vibration is evolving to include haptic functions, which interface with the user through the sense of touch. In addition, R&D resources are being focused on the development of smaller, thinner, and more durable precision motors suitable for mobile applications.

3. HDD Motor
   Hard Disk Drive Motor revolves the disks installed in HDD of computers, while Optical Disc Drive Motor is used in CD and DVD players at rated speed.
1 Smart Phone / Feature Phone

**RF Components**
- In mold antenna
- MLCC
- Chip inductor
- Chip bead
- Crystal unit

**Network**
- WiFi+BT combo module
- Bluetooth module
- NFC module (Near field communication)

**Baseband**
- Transceiver

**Application IC**
- Memory

**Motor**
- Motor

**Transceiver**
- Mobile TV Tuner

**Camera**
- Camera

**RF Front End**
- Wireless LAN

**Bluetooth**
- Bluetooth

**GPS**
- GPS

**Application IC**
- Application

**Display**
- Display

**PMIC**
- PMIC

**Power Control**
- MLCC
- Tantalum capacitor
- Power inductor
- Chip bead
- Chip resistor
- Wireless power transfer
- Adapter

**Multimedia**
- Camera module
- Mobile TV Tuner
- Optical navigation module

**Chipset**
- FCCSP
- RFSP
- Crystal unit

**Main Board**
- HDI
- HDI-flex
- MLCC
- Tantalum capacitor
- Power inductor
- Chip inductor
- Chip bead
- Chip resistor
- Crystal unit
- Hall IC

**Power Control**
- Vibration motor
- Linear motor
- Adapter

**Motor**
- Linear motor

**Display**
- Rigid-flex

**Main Board**
- HDI-flex
- MLCC
- Tantalum capacitor
- Power inductor
- Chip inductor
- Chip bead
- Chip resistor
- Crystal unit
- Hall IC
2

Desktop / Tablet Computer

1. Chipset
   - CSP(Ultra thin)
   - FCPG
   - MLCC

2. Memory
   - BOC
   - MLCC
   - Chip resistor

3. HDD
   - HDD Motor

4. Network
   - WIFI+BT combo module
   - WiMAX module
   - Cellular module
   - NFC (Near Field Communication)

5. DVD
   - ODD Motor

6. Power System
   - Adapter
   - Server Power

7. Main Board
   - HDI
   - MLCC
   - Tantalum capacitor
   - Chip inductor
   - Chip bead
   - Chip resistor
   - Crystal unit

8. Display
   - Camera module
   - LED driver IC
   - Linear vibrator
3 LCD TV (LED TV)

4 PDP TV

1 Power Control
- Super IP board
- SMPS(LCD)
- Inverter
- Power driver for LED TV
- LED Driver

2 Tuner
- Digital tuner (Silicon tuner)
- Slim tuner for LED TV

3 Main Board
- PBGA
- FCBGA
- MLCC
- Chip inductor
- Chip bead
- Chip resistor

4 Network
- WiFi module

5 Main Board
- PBGA
- FCBGA
- MLCC
- Chip inductor
- Chip bead
- Chip resistor
5  LCD Monitor

1 Power System
   IP board

2 Tuner
   Digital tuner (Silicon tuner)

3 LCD Panel
   LED driver IC

4 Main Board
   PBGA
   MLCC
   Chip inductor
   Chip bead
   Chip resistor

6  Set-top Box

1 Tuner
   Digital tuner (Silicon tuner)

2 Network
   WiFi module

3 Main Board
   MLCC
   Chip inductor
   Chip bead
   Chip resistor

4 Power System
   MLCC
   Chip resistor
   SMPS
9 Digital Video Camcoder

1 Chipset
- CSP
- FCCSP

2 Main Board
- HDI
- MLCC
- Tantalum capacitor
- Power inductor
- Chip inductor
- Chip bead
- Chip resistor
- Crystal unit

3 Memory Card
- IEEE 1394 I/F

4 Lens
- CCD
- CDS AGC

10 Navigation

1 Multimedia
- Mobile tuner
- WiFi+BT combo module

2 Display
- Linear vibrator

3 Network
- WIFI+BT combo module

4 Main Board
- HDI
- CSP
- FCCSP
- MLCC
- Tantalum capacitor
- Chip inductor
- Chip bead
- Chip resistor
- Crystal unit
11 Portable Multimedia Player

1. Chipset / Memory
   - CSP
   - FCCSP

2. Multimedia
   - Camera module

3. Network
   - WiFi+BT combo module

12 MP3 Player

1. Main Board
   - MLCC
   - Tantalum capacitor
   - Power inductor
   - Chip inductor
   - Chip bead
   - Chip resistor
   - Crystal unit

2. Display
   - Linear vibrator

3. Chipset / Memory
   - CSP
### e-Book

**Network**
- WiFi+BT combo module

**Main Board**
- HDI
- CSP
- FCCSP
- MLCC
- Tantalum capacitor
- Chip inductor
- Chip bead
- Chip resistor
- Crystal unit

**Display Controller (E-Ink Controller)**

**Battery**

**Controller**

**Input Device**

**Memory**

**Main Processor**

### Laser Printer

**Network**

**Controller**

**Memory**

**Main Board**

**Power System**

**Controller**

**Display**

**Motor**

**Network**

**Controller**

**Memory**

**Main Board**

**Power System**

**Network**

**Controller**

**Display**

**Motor**

**Power System**
15 Copy Machine

16 Projector

1 Main Board
- HDI
- PBGA
- MLCC
- Tantalum capacitor
- Chip inductor
- Chip bead
- Chip resistor

2 Main Board
- HDI
- MLCC
- Tantalum capacitor
- Chip inductor
- Chip bead
- Chip resistor
17 Hard Disk Drive

1 Main Board
MLCC
Tantalum capacitor
Chip inductor
Chip bead
Chip resistor
Crystal unit
EMI filter
CSP

2 Disk Enclosure
VCM / Head
Motor Driver
Pre-amplifier
Read / Write IC
ASIC
SVC Servo Control
DC 12V
Interface

18 Solid State Drive

1 Controller IC
Regulator
Controller IC
Data Buffer
Crystal
Interface
Flash memory bus
Control signal

2 Memory
CSP
MLCC
Power inductor
Chip inductor
Chip bead
Chip resistor
Crystal unit

3 Regulator
HDI
MLCC
Chip resistor
19 Electronic Shelf Label

20 LED Lighting

1 S-Label
EPD Type ESL Tag
TN LCD Type ESL Tag
Active Matrix Tag

2 Gateway
ESL+ Client
Print
TCP/IP Network
Monitor Server
Store Server

3 Power System
SMPS
Bulb
Down Light
L-Tube
Flat Panel Light
Street Light

Network
DALI
Dimming (PWM/Analog)
Memory
Power System
LED Lighting

Network
DALI
Dimming (PWM/Analog)
Memory
Power System
LED Lighting
21 Automotive

1 Information, Comfort
- MLCC

2 Safety
- 2-1. TPMS (Tire Pressure Monitoring System)
- 2-2. Camera Module
  - SVM: Side View Monitoring
  - NVC: Night Vision Camera
  - RVC: Rear View Camera

3 Car Connectivity
- Telematics System
  - Bluetooth Module
  - WiFi Module
  - Cellular Module

4 xEV Powertrain
- On-Board Charger
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Global Network

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