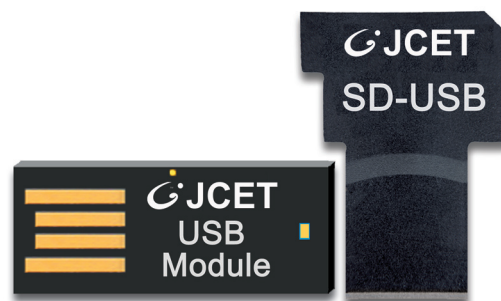


USB Cards

Highlights

- Cost-effective removable NAND flash memory solutions
- Utilizes bare die level assembly, pre-packaged die assembly or a combination of both
- Multi-die, side-by-side & stacked
- Complete turnkey services (wafer to card test)
- Mixed IC technology & SMT components
- Standard and green materials sets



Features

- Custom body sizes to meet housing requirements
- Traditional IC packaging process flows
- Wafer backgrinding & polishing
- Surface mount technology
- Die stacking
- Die level & pre-packed memory supported
- Die attach with epoxy & film
- Wire bonding (traditional, reverse, FFL, etc.)
- Vacuum molding
- Laser & ink marking
- Singulation using blade, waterjet, edge grinder or laser
- Chamfering
- Lid attach using B-stage epoxy or ultrasonic welder
- Mechanical card assembly
- Label attach
- High speed integrated curve-cutting
- Lead-free & green materials set
- Memory & Final Test capabilities

Applications

- Digital still & video cameras
- Mobile handsets
- GPS devices
- PDAs, MP3 players, etc.

Memory Card Formats

We offer tooling for the following memory card formats:

- USB Module
- SD-USB

Description

We offer several USB card options within its family of solutions for removable solid-state storage (RS3) applications. USB options utilize bare die level assembly, prepackaged die assembly or a combination of both. The USB module is an example of an integrated solution using NAND and controller die, while the SD-USB is an example of a package that uses bare and prepackaged die. A majority of our card packaging processes are common with traditional packaging and leverage the most up to date technologies and processes unique to memory cards, including integrated curve-cutting, labelling, mechanical card assembly and card packaging.

The key to maximizing the full value of packaging integration in removable solid-state storage devices is to provide a complete solution of design, test development, advanced packaging, memory test, card assembly and card test.

USB Module

Our USB module design utilizes System-in-Package (SiP) and three dimensional (3D) die stacking technology to integrate NAND flash memory die, controller and passives onto a single packaging substrate for a cost-effective module solution. A typical USB drive design uses discrete NAND flash memory and controllers along with passives mounted onto a printed circuit board (PCB), thus consuming most of the usable area allowed by the form factor of the USB flash drive. On the other hand, the USB module can accommodate multiple die configurations and be customized depending on the requirements of the end application. Integrating all of the key components into a single package saves considerable space and allows for more effective signal routing at a lower overall cost.

Integrating the key components of a USB drive at the packaging level provides a number of benefits including increased design flexibility and advanced die stacking capability along with a reduction in size and overall cost. With our combined experience in memory card manufacturing, SiP and 3D integration technology and our advanced design capabilities, we can offer the USB module as a cost-effective NAND flash memory solution.

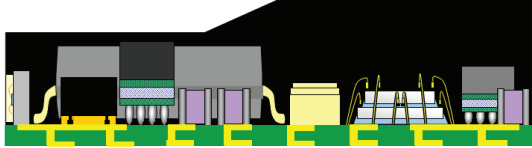


Specifications

Die Thickness	60 – 355 μ m (2.4 - 14mils)
Gold Wire	0.6 - 1.3 μ m diameter, 99.99% Au
SMT Components	0603, 0402, 0201, 01005, odd parts, x-tals, filters, LEDs, etc.
Bill of Materials	Standard and lead-free
Packing Options	JEDEC tray or tape & reel

Cross Sections

SD-USB



USB Module



Reliability

Temperature Cycling	-40°C ~125°C, 1000 cycles
Thermal Shock	-40°C ~80°C, 100 cycles
Unbiased HAST	130°C/85% RH/33.3psia, 100 hrs
High Temperature Storage	150°C, 1000 hrs
Low Temperature Storage	-40°C, 168 hrs
Blend Test	15N at center 5X
Drop Test	1.5m height, 6 surfaces
Twist Test	.5Nm torque, 5X CW, 5X CCW
Salt Water Spray	3% NaCl @ 35°C, 24 hrs

Package Configurations

A variety of wirebond stacked die configurations are in production and under development. In addition, many standard package configurations can be integrated to address customer specific solutions.