



Features

- ▶ Cu wire interconnect for lowest cost
- ▶ Standard JEDEC package outlines
- ▶ Multi-die production capability
- ▶ Turnkey test services, including strip test options
- ▶ Available in ExposedPad configuration (Ref: DS571)
- ▶ Green materials are standard – Pb-free and RoHS compliant
- ▶ Stealth dicing (narrow saw streets)
- ▶ Larger/higher density leadframe strips
- ▶ Leadframe roughening for improved MSL capability

Process Highlights

- ▶ Au plated PCC wire is standard, Au and Ag wire available
- ▶ Wafer backgrinding services available
- ▶ Multiple die and die stacking capability
- ▶ NiPdAu (PPF) lead finish is standard, Matte Sn is optional
- ▶ Laser mark on package body



TSSOP/MSOP

TSSOP (Thin Shrink Small Outline Package) and MSOP (Micro Small Outline Package) are leadframe based, plastic encapsulated packages that are well suited for applications requiring less than 1 mm mounted height. These industry standard packages run in very high volume and provide a value added, low cost solution for a wide range of applications.

Thermal Performance

Forced Convection, Single-layer PCB

Package	Body Size (mm)	θ_{JA} at (°C/W) by Velocity (LFPM)		
		0	200	500
16 Ld	4.4 x 5.0	137.1	118.2	106.8
20 Ld	4.4 x 6.5	114.5	98.0	88.0

Forced Convection, Multi-layer PCB

Package	Body Size (mm)	θ_{JA} at (°C/W) by Velocity (LFPM)		
		0	200	500
16 Ld	4.4 x 5.0	89.0	81.8	78.1
20 Ld	4.4 x 6.5	73.2	66.6	63.5

JEDEC Standard Test Boards

Electrical Performance

Simulated Results @ 100 MHz

Package	Body Size (mm)	Lead	Inductance (nH)	Capacitance (pF)	Resistance (mΩ)
8 Ld	4.4 x 3.0	Longest Shortest	1.470 0.725	0.224 0.177	13.7 7.5
28 Ld	4.4 x 9.7	Longest Shortest	2.100 0.713	0.368 0.180	16.1 6.8

Reliability Qualification

Amkor package qualification uses three independent production lots and a minimum of 77 units per test group. All testing includes JSTD-020 moisture preconditioning.

- ▶ Moisture Sensitivity Characterization: JEDEC Level 1, 85°C/85% RH, 168 hours, JEDEC Level 3, 30°C/60% RH, 192 hours
- ▶ uHAST: 130°C/85% RH, No bias, 96 hours
- ▶ Temperature Cycle: -65°C/+150°C, 500 cycles
- ▶ High Temperature Storage: 150°C, 1000 hours

TSSOP/MSOP

Services and Support

Amkor has a broad base of resources available to help customers bring quality products to market quickly and at the lowest possible cost.

- ▶ Full package characterization
- ▶ Thermal, mechanical stress and electrical performance modeling
- ▶ Turnkey assembly, test and drop ship
- ▶ World class reliability testing and failure analysis

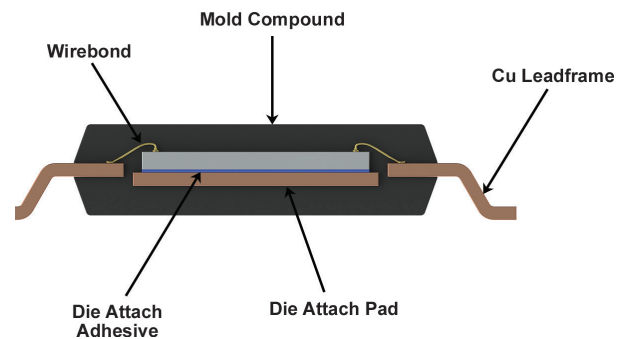
Test Services

- ▶ Program generation/conversion
- ▶ Wafer probe
- ▶ Burn-in capabilities
- ▶ -55°C to +165°C test available
- ▶ Strip test available

Shipping

- ▶ Clear anti-static tube, 20 inch
- ▶ Tape and reel
- ▶ Dry pack
- ▶ Drop ship

Cross Section TSSOP/MSOP



Configuration Options

TSSOP/MSOP Nominal Package Dimensions (mm)

Package Type	Lead Count	Body Width	Body Length	Body Thickness	Standoff	Overall Height	Lead Pitch	Tip-to-Tip	JEDEC
TSSOP	8	4.4	3.0	0.90	0.10	1.00	0.65	6.4	MO-153
	14	4.4	5.0	0.90	0.10	1.00	0.65	6.4	MO-153
	16	4.4	5.0	0.90	0.10	1.00	0.65	6.4	MO-153
	20	4.4	6.5	0.90	0.10	1.00	0.65	6.4	MO-153
	24	4.4	7.8	0.90	0.10	1.00	0.65	6.4	MO-153
	28	4.4	9.7	0.90	0.10	1.00	0.65	6.4	MO-153
	38	4.4	9.7	0.90	0.10	1.00	0.50	6.4	MO-153
MSOP	8	3.0	3.0	0.85	0.10	0.95	0.65	5.0	MO-187
	10	3.0	3.0	0.85	0.10	0.95	0.50	5.0	MO-187

Visit amkor.com or email sales@amkor.com for more information.



With respect to the information in this document, Amkor makes no guarantee or warranty of its accuracy or that the use of such information will not infringe upon the intellectual rights of third parties. Amkor shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon it and no patent or other license is implied hereby. This document does not in any way extend or modify Amkor's warranty on any product beyond that set forth in its standard terms and conditions of sale. Amkor reserves the right to make changes in its product and specifications at any time and without notice. The Amkor name and logo are registered trademarks of Amkor Technology, Inc. All other trademarks mentioned are property of their respective companies.
© 2019 Amkor Technology Incorporated. All Rights Reserved. DS350R Rev Date: 05/19