FCOL™

Carsem
Your Technology Partner

Flip Chip On Leadframe

Highlights

Same package with up to 4 times larger die

High-frequency applications to 20 GHz

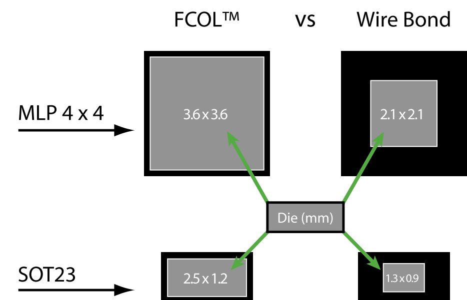
FCOL™

Carsem's FCOL™ (Flip Chip On Leadframe) is the process of flipping a bumped die onto a lead frame and then molding it using standard plastic package assembly processes. This significantly increases the maximum die size allowed in a standard package when compared to a wire-bonded version. It also greatly improves the products electrical performance by reducing inductance and capacitance by approximately 60% and thermal resistance by about 15%. FCOL™ is available in standard packages such as MLP, SOT23, SC70, QSOP and narrow body SOICs.

Applications:

Ideal choice when maximum use of silicon space and high performance is essential, especially in the areas of RF and power management devices for wireless applications such as mobile phones, WiFi and Bluetooth™.

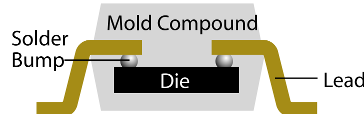
Typical Maximum Die Size



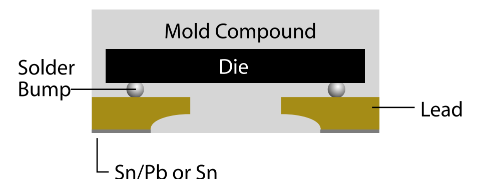
Features:

- Allows up to 4 times larger die size when compared to a wire-bonded version.
- 60% improvement in self-inductance and capacitance when compared to a wire bonded version.
- 15% lower thermal resistance.
- Reduced wire bond resistance from typical 19 m-ohm to 0.6 m-ohm when using FCOL™.
- Current FCOL™ product offering meets MSL Level 1.
- Withstands 260°C solder shock test.
- Carsem's manufacturing expertise for improved yields and quality.
- Complete Assembly & Test Solution including RF testing, tape and reel plus drop ship.

FCOL™



SOT23



MLP

FCOL™

Flip Chip On Leadframe

Maximum Die Size Advantages for FCOL™

Package*	Lead Count	Maximum Die Size (mils)		Die Size Area Increase (x)
		Wire Bond	FCOL™	
MLP (2 x 2)	5	24 x 52	63 x 63	3.2
MLP (3 x 2)	6	33 x 48	102 x 63	4.0
MLP (3 x 3)	8	59 x 91	102 x 102	1.9
MLP (4 x 4)	16	84 x 84	142 x 142	2.9
MLP (5 x 5)	32	136 x 136	181 x 181	1.8
MLP (7 x 7)	48	203 x 203	259 x 259	1.6
SOT23/TSOT	3	60 x 34	96 x 36	1.8
	5	53 x 35	96 x 47	2.5
	6	53 x 29	96 x 47	3.0
	8	65 x 18	96 x 47	4.0
SC70	3	30 x 26	63 x 34	2.7
	5	28 x 27	63 x 34	2.9
	6	32 x 19	63 x 34	3.5
SOICN	8	135 x 90	177 x 138	2.1
QSOP	16	120 x 86	173 x 134	2.3

* Other options in development. Contact Carsem for further details.
MLP FCOL available in either 0.75mm or 0.9mm package height.

FCOL™ vs Wirebond: Thermal & Electrical Data

Package Type	Inductance (nH)		Capacitance (pF)		Resistance	Theta Ja
	L11	L12	C11	C12	(mΩ)	(°C/W)
MLP (5x5) FCOL™	0.28	0.07	0.20	0.06	35.28	14.27
MLP (5x5) Wirebond	0.91	0.17	0.17	0.04	146.10	35.90

L11 - Self Inductance (nH)
L12 - Mutual Inductance to 1st adjacent lead
Theta Ja measured to 0 air velocity at 1W

C11 - Self Capacitance (pF)
C12 - Mutual Capacitance to 1st adjacent lead
Wire Diameter used is 1.3 mil

All Values measured at 2. GHz
Data also available at 100 MHz.
Values are lead & bump or lead & wire

FCOL™ Reliability Test Results

Description	Condition	Results
MSL Level 1*	85°C/85%RH for 168 Hrs; 3 x IR @ 260°C	Pass
Auto Clave	121°C/100%RH; 15PSIG; 1008 Hrs	Pass
Temperature Cycle	-65°C/150°C; Air; 1000 Cycles	Pass
Thermal Shock	-55°C/125°C; Liquid; 1000 Cycles	Pass
High Temperature Storage	150°C; 1000 Hrs	Pass

* Depending on body size.

This guide is for reference only and Carsem makes no warranty or guarantee of its accuracy. For inquiries or official Carsem documentation, please contact any of our Sales Offices or visit our web site.

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