

半導体パッケージ用基板 / 両面, 4層 (φ0.05mm - φ2mm)
Package Substrate / Double sided & 4-layer

φ2mmシャンク"K-シリーズ"用加工条件
For φ2mm shank "K-series"



穴明け機主軸回転数 (Max 値) 300 krpm

Maximum spindle speed 300 krpm

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直径 Diameter		回転数 Spindle speed	(周速) *1 (Velocity) *1	送り速度 Infeed rate		(チップロード) *1 (Chipload) *1	上昇速度 Retract rate		捨て板切り込み深さ Depth into back-up board		ヒット数 *3, *4 Hits *3, *4	再研磨回数 *4 Number of reprints *4	基板重ね枚数 Stack height *4 基板厚 Board thickness [mm]		
[mm]	[inch]			[rpm]	[m/min]		[IPM]	[m/min]	[IPM]	[mm]			[inch]	t 0.1	t 0.2
0.05	0.0020	300,000	(47)	1.50	59	(5)	10	394	0.1	0.0039	1,000 - 2,000	1	1 - 2	1	1
0.075	0.0030	300,000	(71)	1.50	59	(5)	10	394	0.1	0.0039	1,000 - 2,000	1	2 - 3	1 - 2	1
0.09	0.0035	300,000	(85)	1.50	59	(5)	10	394	0.1	0.0039	1,000 - 2,000	1	3 - 4	2 - 3	1 - 2
0.1	0.0039	300,000	(94)	1.50	59	(5)	10	394	0.1	0.0039	1,000 - 2,000	1	4 - 6	3 - 4	2 - 3
0.12	0.0047	300,000	(113)	2.25	89	(8)	10	394	0.15	0.0059	1,000 - 2,000	1	4 - 6	3 - 4	2 - 3
0.15	0.0059	300,000	(141)	2.25	89	(8)	15	591	0.15	0.0059	1,000 - 2,000	2	5 - 8	3 - 4	3 - 4
0.2	0.0079	250,000	(157)	2.40	94	(10)	25	984	0.2	0.0079	1,000 - 2,000	2	6 - 10	5 - 8	3 - 4
0.25	0.0098	200,000	(157)	2.40	94	(12)	50	1969	0.25	0.0098	1,000 - 2,000	2	6 - 10	5 - 8	4 - 5
0.3	0.0118	150,000	(141)	2.25	89	(15)	50	1969	0.25	0.0098	1,000 - 2,000	2	6 - 10	6 - 10	4 - 6
0.35	0.0138	135,000	(148)	2.13	84	(16)	50	1969	0.25	0.0098	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.4	0.0157	120,000	(151)	2.00	79	(17)	50	1969	0.25	0.0098	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.45	0.0177	105,000	(148)	1.80	71	(17)	50	1969	0.25	0.0098	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.5	0.0197	90,000	(141)	1.60	63	(18)	50	1969	0.25	0.0098	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.55	0.0217	82,500	(143)	1.50	59	(18)	50	1969	1.25	0.0492	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.6	0.0236	75,000	(141)	1.40	55	(19)	50	1969	2.25	0.0886	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.65	0.0256	70,000	(143)	1.30	51	(19)	50	1969	3.25	0.1280	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.7	0.0276	65,000	(143)	1.20	47	(18)	50	1969	4.25	0.1673	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.75	0.0295	62,500	(147)	1.15	45	(18)	50	1969	5.25	0.2067	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.8	0.0315	60,000	(151)	1.10	43	(18)	50	1969	6.25	0.2461	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.85	0.0335	57,500	(154)	1.10	43	(19)	50	1969	0.3	0.0118	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.9	0.0354	55,000	(156)	1.10	43	(20)	50	1969	0.35	0.0138	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
0.95	0.0374	50,000	(149)	1.00	39	(20)	50	1969	0.4	0.0157	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
1	0.0394	45,000	(141)	0.90	35	(20)	50	1969	0.45	0.0177	2,000 - 3,000	2	6 - 10	6 - 10	4 - 6
1.05	0.0413	45,000	(148)	0.90	35	(20)	50	1969	0.5	0.0197	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.1	0.0433	45,000	(156)	0.90	35	(20)	50	1969	0.55	0.0217	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.15	0.0453	42,500	(154)	0.85	33	(20)	50	1969	0.6	0.0236	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.2	0.0472	40,000	(151)	0.80	31	(20)	50	1969	0.65	0.0256	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.25	0.0492	40,000	(157)	0.80	31	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.3	0.0512	40,000	(163)	0.80	31	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.35	0.0531	39,000	(165)	0.78	31	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.4	0.0551	38,000	(167)	0.76	30	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.45	0.0571	38,000	(173)	0.76	30	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.5	0.0591	38,000	(179)	0.76	30	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.55	0.0610	37,000	(180)	0.74	29	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.6	0.0630	36,000	(181)	0.72	28	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.65	0.0650	36,000	(187)	0.72	28	(20)	50	1969	0.7	0.0276	2,000 - 3,000 *3	3	6 - 10	6 - 10	4 - 6
1.7	0.0669	36,000	(192)	0.72	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
1.75	0.0689	35,500	(195)	0.71	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
1.8	0.0709	35,000	(198)	0.70	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
1.85	0.0728	35,000	(203)	0.70	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
1.9	0.0748	35,000	(209)	0.70	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
1.95	0.0768	35,000	(214)	0.70	28	(20)	50	1969	0.7	0.0276	1,000 - 2,000 *3	3	6 - 10	6 - 10	4 - 6
2	0.0787	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2

*1 周速ならびにチップロードはメートル表記です。
 *2 2mm以上は穴明けメーカーの推奨をご参照下さい。
 *3 ヒット数はあらかじめ穴明け機に設定された条件、または穴明け機メーカーの推奨条件に従って下さい。
 *4 ヒット数、再研磨回数、重ね枚数は目安です。穴品質をご確認の上設定願います。
 *5 上記表に適合しない基板厚や重ね枚数で加工される場合には、別途お問い合わせ願います。
 *6 穴明け加工機のスピンドル性能等によっては条件設定を改善する必要があります。
 *7 穴明け加工機のプレッシャーフット、及びバキューム性能は、穴品質に影響を及ぼすことがありますので定期的な点検をお奨めします。
 *8 当板、捨て板の材料、厚さは穴品質に影響を及ぼすことがありますので、選定にあたっては十分ご注意ください。
 *9 基材メーカーならびに基材型番、銅箔厚さによって加工特性が大きく異なります。目標品質をクリアできるヒット数ならびに基板重ね枚数をご検討願います。

*1 Velocity and chipload are shown in metric units.
 *2 Hit counts should be set in accordance with the application or condition of the drilling machine and makers recommendation.
 *3 For diameters over 2mm please refer to the machine makers recommendation.
 *4 Where the board thickness and/or stack height are not shown in the table, please contact Union Tool's Technical support team.
 *5 These parameters can be affected by the condition and performance of both the spindle and drilling machine.
 *6 The pressure foot and vacuum performance of the drilling machine can affect hole quality. Periodic inspection, maintenance and measurement is strongly recommended.
 *7 The thickness of the entry and back-up board, together with the material type can affect the drilling conditions and care should be taken to choose an appropriate product for the application being drilled.
 *8 Drilling performance changes differently depending on PWB makers, model types and copper thickness.
 Hit counts and PWB stack height should be determined by hole quality target.