

Wakefield Engineering is recognized as a worldwide leader in innovative thermal management solutions. Their products range from board level heat sinks for both surface mount and thru-hole, to fan mounted heat sinks for microprocessors and CPUs. Wakefield Engineering offers a single source for all of your thermal requirements. DeltaPads are replacements to heat sink grease but without any mess. They are heat conducting, electrically isolating pads to go between the heat sink and your semiconductor device. TO-220 heatsinks will fit TO-202 and TO-126 packages.

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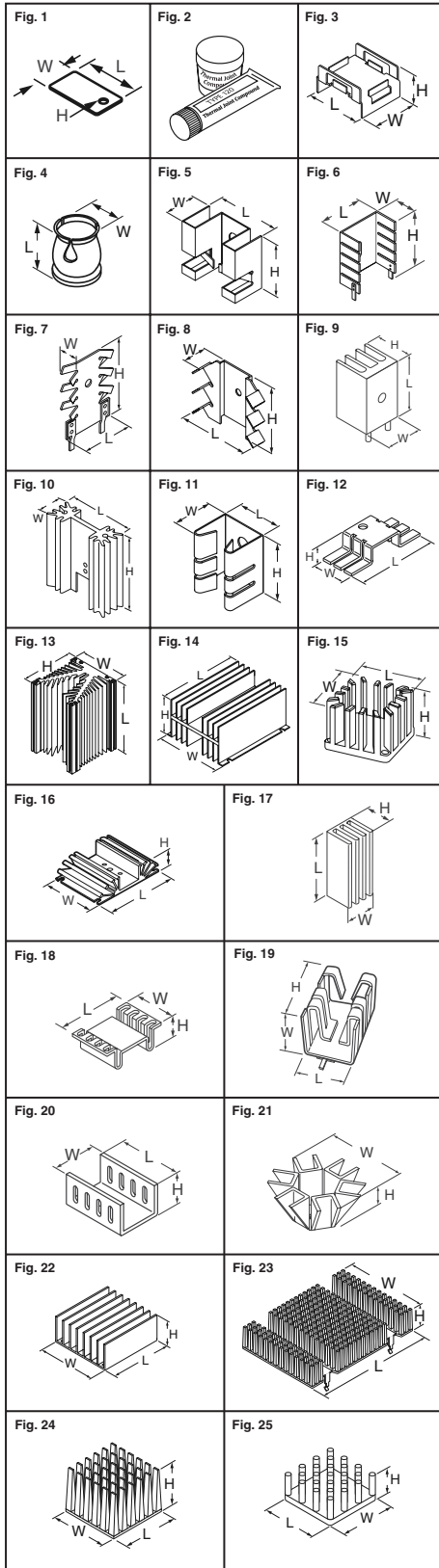


Fig.	Description	Dimensions - mm L x W x H	Digi-Key Part No.	Price Each	100	Wakefield Part No.
1	DeltaPad Thermal Pad TO-220 No Adhesive (.18mm)	18.0 x 12.7 x 3.6 dia.	345-1000-ND	.63	.45	32
	DeltaPad Thermal Pad TO-220, Adhesive (.18mm)	19.1 x 12.7 x 3.7 dia.	345-1079-ND	.84	.60	42
	DeltaPad Thermal Pad TO-220, No Adhesive (.23mm)	19.1 x 12.7 x 3.2 dia.	345-1080-ND	.53	.38	27
	DeltaPad Thermal Pad TO-220, No Adhesive (.23mm)	19.1 x 12.7 x 3.7 dia.	345-1001-ND	.95	.68	48
	Kapton Thermal Pad, TO-220, No Adhesive (.15mm)	18.0 x 12.7 x 3.6 dia.	345-1002-ND	.49	.35	25
	Kapton Thermal Pad TO-220, No Adhesive (.15mm)	19.1 x 12.7 x 3.2 dia.	345-1003-ND	.39	.28	20
2	Silicon Thermal Grease, 4 gram Plastic Pack	—	345-1006-ND	5.04	3.36	2.61
	Silicon Thermal Grease, 2 Oz. Jar	—	345-1007-ND	13.02	8.68	6.73
	Silicon Thermal Grease, 5 Oz. Tube	—	345-1008-ND	24.43	17.10	14.66
	Silicon Thermal Grease, 8 Oz. Jar	—	345-1009-ND	29.78	20.85	17.87
	Silicon Thermal Grease, 5 Lbs. Can	—	345-1010-ND	147.95	103.57	88.77
	Synthetic Non-Silicon Thermal Compound 4 Oz Tube	—	345-1011-ND	26.23	18.36	15.74
3	D-Pack/SOT-23 Heat Sink, Pretinned, Autoinsertable	18.80 x 15.24 x 9.14	345-1012-ND	.53	.38	27
	D-Pack/SOT-23 Heat Sink, Pretinned, Autoinsertable	18.80 x 15.24 x 9.14	345-1099-ND	.45	.30	24
4	TO-5 Clip-On Cup Style With 4-40 Thd Base	9.40 x 9.65 dia.	345-1013-ND	14.94	9.96	7.72
5	TO-220, Self-Locking, Horizontal/Vertical Mount, Black	25.40 x 12.70 x 21.59	345-1016-ND	.67	.48	34
6	TO-220, Vertical Mount Wave-Solderable, With Tabs, Black	25.40 x 12.70 x 29.97	345-1018-ND	1.89	1.35	95
	TO-220, Low Cost Horizontal/Vertical Mount, Black	25.40 x 12.70 x 18.03	345-1019-ND	.42	.30	21
	TO-220, Dual Low Cost Horizontal/Vertical Mount, Black	25.40 x 12.70 x 29.97	345-1020-ND	.60	.43	30
	TO-220, Dual Mount Low Cost, Black	25.40 x 12.70 x 29.97	345-1021-ND	.60	.43	30
	TO-220, Low Cost Horizontal/Vertical Mount, Black	19.05 x 9.52 x 19.05	345-1022-ND	.56	.40	28
	TO-220, Low Cost Horizontal/Vertical Mount, Black	13.21 x 9.52 x 19.05	345-1023-ND	.42	.30	21
7	TO-220, Vertical Mount, Black	25.4 x 12.7 x 30.0	345-1081-ND	1.12	.80	56
	TO-220, Wave-Solderable Low-Cost Heat Sinks	25.4 x 12.7 x 30.0	345-1088-ND	1.89	1.35	95
8	TO-220, Vertical Mount Wave-Solderable, With Tabs	22.23 x 5.46 x 31.75	345-1024-ND	1.72	1.23	86
	TO-220 Self-Locking, Vertical Mount, Black	25.40 x 9.14 x 21.84	345-1025-ND	.88	.63	44
9	TO-220 Power Vertical Mount With Pins/6-32Thds, Black	16.26 x 16.26 x 25.40	345-1026-ND	2.70	1.93	135
	TO-220 Power Vertical Mount With Pins/6-32Thds, Black	16.26 x 16.26 x 38.1	345-1091-ND	2.91	2.08	146
	TO-220 Power Vertical Mount With Pins/6-32Thds, Black	16.26 x 16.26 x 50.80	345-1027-ND	3.05	2.18	153
10	TO-220 Power Vertical Mount With Pins, Black	34.93 x 12.70 x 25.40	345-1028-ND	2.31	1.65	116
	TO-220 Power Vertical Mount With Pins, Black	34.93 x 12.70 x 38.10	345-1029-ND	2.49	1.78	125
	TO-220 Power Vertical Mount With Pins, Black	34.93 x 12.70 x 50.80	345-1030-ND	2.84	2.03	142
	TO-220 Power Vertical Mount With Pins, Black	41.91 x 25.40 x 25.40	345-1031-ND	2.70	1.93	135
	TO-220 Power Vertical Mount With Pins, Black	41.91 x 25.40 x 38.10	345-1032-ND	2.98	2.13	149
	TO-220 Power Vertical Mount With Pins, Black	41.91 x 25.40 x 38.10	345-1033-ND	2.45	1.75	123
11	TO-220 Power Vertical Mount With Pins, Black	41.91 x 25.40 x 38.10	345-1034-ND	2.45	1.75	123
	TO-220 Power Vertical Mount With Pins, Black	41.91 x 25.40 x 50.80	345-1035-ND	2.98	2.13	149
	TO-220 Pwr. SpeedClip Mount With Pins (Order clip below)	34.93 x 12.70 x 25.40	345-1037-ND	3.15	2.25	158
	SpeedClip, Stainless Steel for 667 Series	—	345-1039-ND	.95	.68	48
	TO-220 Self-Locking Horizontal/Vertical Mount, Black	14.48 x 12.70 x 19.05	345-1040-ND	.56	.40	28
	TO-220 Low Cost Horizontal/Vertical Mount, Black	44.45 x 9.52 x 17.78	345-1041-ND	.49	.35	25
12	TO-220 Top Mount Booster for 270,272,280 Series, Black	44.45 x 12.70 x 17.78	345-1042-ND	.56	.40	28
	TO-220 Dual Mount Horizontal, Black	44.45 x 9.52 x 36.83	345-1043-ND	.67	.48	34
13	IGBT and SSRs Power Modules Black	180.01 x 124.97 x 135.64	345-1046-ND	120.13	84.09	72.08
14	TO-3 Power Horizontal Mount Double Fin, Black	120.65 x 38.10 x 31.75	345-1047-ND	12.75	8.50	6.59
	Power Heat Sink Horizontal, Double Fin, No Holes	120.65 x 38.10 x 31.75	345-1048-ND	12.75	8.50	6.59
	Power Heat Sink, Horizontal, Double Fin, No Holes	120.65 x 76.20 x 66.55	345-1049-ND	15.30	10.20	7.91
	Power Heat Sink, Horizontal, Double Fin, No Holes	120.65 x 139.70 x 66.55	345-1050-ND	19.33	13.53	11.60
15	TO-3 Power, Horizontal Mount, Omnidirectional, Black	45.97 x 45.97 x 31.75	345-1051-ND	12.42	8.28	6.42
16	TO-3 Heavy Duty Power, Horizontal Mount, Black	104.78 x 76.20 x 25.40	345-1052-ND	10.89	7.26	5.63
	Power Heat Sink, Horizontal Mount, No Holes, Black	104.78 x 76.20 x 25.40	345-1053-ND	10.89	7.26	5.63
17	14-16 Dip IC Heat Sink, Glue On, Black	19.05 x 10.54 x 6.10	345-1054-ND	1.96	1.40	.98
18	Surface Mount, Black	22.9 x 8.0 x 10.2	345-1082-ND	.91	.65	.46
	Surface Mount, Aluminum Natural	26.2 x 12.7 x 10.2	345-1083-ND	1.05	.75	.53
19	TO-220, Horizontal and Vertical Mount, Black	14.5 x 12.7 x 19.1	345-1085-ND	.67	.48	34
20	TO-220, Low-Height Wave-Solderable, Black	19.1 x 12.7 x 13.2	345-1087-ND	.42	.30	21
21	Stud-Mount, Black, ID=5.1mm	— x 33.8 x 12.3	345-1095-ND	2.00	1.43	1.00
22	Half Brick DC/DC Converter, Vertical, Black	57.91 x 60.96 x 24.13	345-1055-ND	3.96	2.64	2.05
	Half Brick DC/DC Converter With Hardware/Thermal Pad	57.91 x 60.96 x 24.13	345-1056-ND	7.53	5.02	3.90
	Half Brick DC/DC Converter Vertical, Black	57.91 x 60.96 x 11.43	345-1057-ND	3.39	2.26	1.76

◆ RoHS Compliant

## CPU, PGA and BGA Heat Sinks

609 Series: Fits PowerPC 601, 604, 255BGA 628 Series: Fits IntelDX4, Intel 80486DX2, AM486DX2/DX4 658 Series: Fits IntelDX4, AM29240, PowerPC 603

Fig.	Description	Dimensions - mm L x W x H	Digi-Key Part No.	Price Each	100	Wakefield Part No.
<b>CPU Cooler</b>						
17	35mm BGA Unidirectional Fin Heat Sink	35.00 x 35.00 x 11.4	345-1092-ND	2.28	1.63	1.14
22	16.5mm BGA/PGA With Thermal Tape, Black	16.5 x 16.5 x 8.9	345-1101-ND	2.35	1.68	1.18
23	40mm QFP and 21mm BGA With Clips and Thermal Tape, Black	73.41 x 50.80 x 12.70	345-1058-ND	10.65	7.10	5.51
	21mm BGA With Thermal Double Sided Tape	21.01 x 21.01 x 6.35	345-1059-ND	3.29	2.35	1.65
	21mm BGA With Thermal Double Sided Tape	21.01 x 21.01 x 6.35	345-1098-ND	2.82	1.88	1.46
	25mm BGA With Thermal Double Sided Tape	24.99 x 24.99 x 6.35	345-1060-ND	3.71	2.65	1.86
	17x17 PGA No Tape, Black	44.45 x 43.18 x 10.16	345-1061-ND	2.66	1.90	1.33
	17x17 PGA No Tape, Black	44.45 x 43.18 x 16.51	345-1062-ND	2.40	1.60	1.24
	28-38mm CQFP No Tape, Black	27.94 x 27.94 x 6.35	345-1063-ND	1.58	1.13	.79
	28-38mm CQFP With Thermal Tape (Chomerics T-405), Black	27.94 x 27.94 x 6.35	345-1065-ND	3.36	2.40	1.68
	28-38mm CQFP With Thermal Tape (Arclad 8223) Black	27.94 x 27.94 x 6.35	345-1096-ND	3.27	2.18	1.69
	28-38mm CQFP With Thermal Tape (Chomerics T-412), Black	27.94 x 27.94 x 6.35	345-1065-ND	3.21	2.18	1.66
24	28-38mm CQFP No Tape, Black	27.94 x 27.94 x 8.89	345-1066-ND	1.65	1.18	.83
	28-38mm CQFP With Thermal Tape (Chomerics T-412), Black	27.94 x 27.94 x 8.89	345-1067-ND	3.27	2.18	1.69
	28-38mm CQFP With Thermal Tape (Chomerics T-410), Black	27.94 x 27.94 x 8.89	345-1068-ND	3.33	2.22	1.73
	28-38mm CQFP With Thermal Tape (Chomerics T-410), Black	27.94 x 27.94 x 8.89	345-1109-ND	3.33	2.22	1.73
	28-38mm CQFP No Tape, Black	27.94 x 27.94 x 11.43	345-1069-ND	1.72	1.23	.86
	28-38mm CQFP With Thermal Tape (Chomerics T-412), Black	27.94 x 27.94 x 11.43	345-1097-ND	3.39	2.26	1.76
	28-38mm CQFP With Thermal Tape (Chomerics T-410), Black	27.94 x 27.94 x 11.43	345-1071-ND	3.48	2.30	1.68
	28-38mm CQFP No Tape, Black	27.94 x 27.94 x 15.24	345-1072-ND	2.00	1.43	1.00
	28-38mm CQFP With Thermal Tape (Chomerics T-405), Black	27.94 x 27.94 x 15.24	345-1073-ND	3.27	2.18	1.69
	28-38mm CQFP With Thermal Tape (Chomerics T-412), Black	27.94 x 27.94 x 15.24	345-1075-ND	3.24	2.36	1.63
25	21mm BGA With Omnidirectional Pin Fin Heat Sink, Black	21.01 x 21.01 x 11.4	345-1089-ND	3.29	2.35	1.65
	25mm BGA With Omnidirectional Pin Fin Heat Sink, Black	24.99 x 24.99 x 11.4	345-1090-ND	2.31	1.65	1.16
	Pin Fin Heat Sinks, Black	40.6 x 40.6 x 13.3	345-1093-ND	3.33	2.38	1.67
	Omnidirectional Pin Fin, Black	27.9 x 27.9 x 15.2	345-1094-ND	3.60	2.40	1.86
<b>CPU Composite Cooler — RoHS Compliant</b>						
25	CPU Composite Cooler for 84-1000FP, 169BGA, No Tape, Black	16.51 x 16.51 x 10.16	345-1076-ND	2.03	1.45	1.02
	CPU Composite Cooler for 128-2000FP, 313BGA, No Tape, Black	21.59 x 21.59 x 10.16	345-1077-ND	2.52	1.80	1.26

◆ RoHS Compliant

More Product Available Online: [www.digkey.com](http://www.digkey.com)

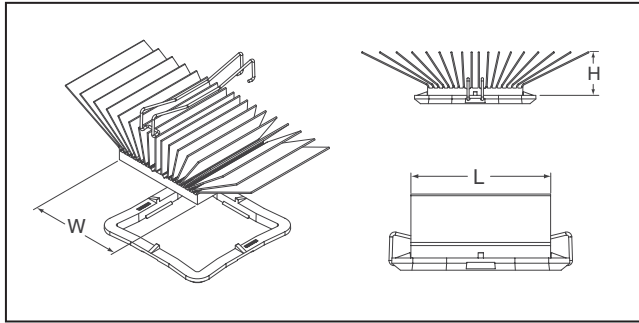
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ATS maxiFLOW™ Heat Sinks have a low profile, spread fin array to maximize surface area for more effective convection (air) cooling. Their extruded aluminum fabrication minimizes thermal resistance and weight. Testing at an air flow rate of just 100 lfm shows that device junction temperatures (Tj) can be reduced by more than 40 percent below the temperatures achieved using other heat sinks.

The maxiGRIP™ Heat Sink Attachment System features a plastic frame clip that snaps securely around a component's perimeter. A stainless steel spring clip runs through the heat sink's fin field, fastens securely to the plastic frame and applies steady, even pressure to the component. The system allows easy sink detachment and reattachment with no damage to the component.

There is no over or under tightening of the sink to the processor. Component/heat sink assemblies using maxiGRIP meet Telcordia GR-63-Core Office Vibration; ETSI 300 019 Transportation Vibration; and MIL-STD-810 Shock Testing and Unpackaged Drop Testing standards.

**BGA Cooling Solutions**



**maxiFLOW Standard Height Heat Sink with maxiGRIP attachment. Designed for component heights from 3 to 4.5mm, Blue Anodized, Phase Change Material**

Component height is defined as the distance from the top of the PCB to the top of the component.

Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
17	17	7.5	18.2	13.9	ATS1000-ND†	10.17	7.74	6.63
19	19	7.5	16.5	12.9	ATS1001-ND†	10.26	7.81	6.69
21	21	7.5	11.9	8.8	ATS1002-ND†	10.37	7.90	6.77
23	23	7.5	10.9	8.3	ATS1003-ND†	10.47	7.97	6.83
25	25	7.5	8.6	6.1	ATS1004-ND†	10.58	8.05	6.90
27	27	7.5	7.9	5.8	ATS1005-ND†	10.67	8.12	6.96
29	29	7.5	7.4	5.6	ATS1006-ND†	10.79	8.21	7.04
30	30	7.5	7.1	5.4	ATS1007-ND†	10.90	8.30	7.11
31	31	7.5	6.9	5.3	ATS1008-ND†	10.99	8.37	7.17
32.5	32.5	7.5	5.9	4.2	ATS1009-ND†	11.11	8.46	7.25
33	33	7.5	5.8	4.2	ATS1010-ND†	11.16	8.49	7.28
35	35	7.5	5.3	3.4	ATS1011-ND†	11.22	8.54	7.32
37.5	37.5	7.5	4.9	3.3	ATS1012-ND†	11.34	8.63	7.40
40	40	7.5	4.5	3.2	ATS1013-ND†	11.45	8.72	7.47
42.5	42.5	7.5	4.3	3.0	ATS1014-ND†	11.32	8.71	7.30
45	45	7.5	4.0	2.6	ATS1015-ND†	11.43	8.79	7.37
17	17	12.5	11.1	9.0	ATS1016-ND†	10.99	8.37	7.17
19	19	12.5	10.2	8.4	ATS1017-ND†	11.11	8.46	7.25
21	21	12.5	7.2	5.7	ATS1018-ND†	11.22	8.54	7.32
23	23	12.5	6.7	5.4	ATS1019-ND†	11.34	8.63	7.40
25	25	12.5	5.2	4.0	ATS1020-ND†	11.45	8.72	7.47
27	27	12.5	4.8	3.8	ATS1021-ND†	11.32	8.71	7.30
29	29	12.5	4.5	3.7	ATS1022-ND†	11.43	8.79	7.37
30	30	12.5	4.4	3.6	ATS1023-ND†	11.54	8.88	7.44
31	31	12.5	4.3	3.5	ATS1024-ND†	11.66	8.97	7.52
32.5	32.5	12.5	3.5	2.8	ATS1025-ND†	11.79	9.07	7.60
33	33	12.5	3.5	2.7	ATS1026-ND†	11.84	9.10	7.63
35	35	12.5	3.0	2.2	ATS1027-ND†	11.90	9.16	7.68
37.5	37.5	12.5	2.8	2.1	ATS1028-ND†	12.02	9.24	7.75
40	40	12.5	2.6	2.0	ATS1029-ND†	12.13	9.33	7.82
42.5	42.5	12.5	2.4	2.0	ATS1030-ND†	12.26	9.43	7.91
45	45	12.5	2.1	1.6	ATS1031-ND†	12.38	9.52	7.98
17	17	17.5	8.3	6.8	ATS1032-ND†	11.68	8.98	7.53
19	19	17.5	7.7	6.4	ATS1033-ND†	11.81	9.09	7.62
21	21	17.5	5.4	4.3	ATS1034-ND†	11.93	9.17	7.69
23	23	17.5	5.1	4.1	ATS1035-ND†	12.04	9.26	7.76
25	25	17.5	3.9	3.0	ATS1036-ND†	12.17	9.36	7.85
27	27	17.5	3.7	2.9	ATS1037-ND†	12.29	9.45	7.92

Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
29	29	17.5	3.5	2.8	ATS1038-ND†	12.42	9.55	8.01
30	30	17.5	3.4	2.7	ATS1039-ND†	12.53	9.64	8.08
31	31	17.5	3.3	2.7	ATS1040-ND†	12.67	9.74	8.17
32.5	32.5	17.5	2.7	2.1	ATS1041-ND†	12.78	9.83	8.24
33	33	17.5	2.7	2.1	ATS1042-ND†	12.85	9.88	8.28
35	35	17.5	2.3	1.7	ATS1043-ND†	12.92	9.93	8.33
37.5	37.5	17.5	2.1	1.6	ATS1044-ND†	13.05	10.04	8.41
40	40	17.5	2.0	1.6	ATS1045-ND†	13.19	10.14	8.50
42.5	42.5	17.5	1.9	1.5	ATS1046-ND†	13.30	10.23	8.57
45	45	17.5	1.6	1.3	ATS1047-ND†	13.43	10.33	8.66

**maxiFLOW Low Profile Heat Sink with maxiGRIP attachment. Designed for component heights from 1.5 to 2.99mm, Black Anodized, Phase Change Material**

Component height is defined as the distance from the top of the PCB to the top of the component.

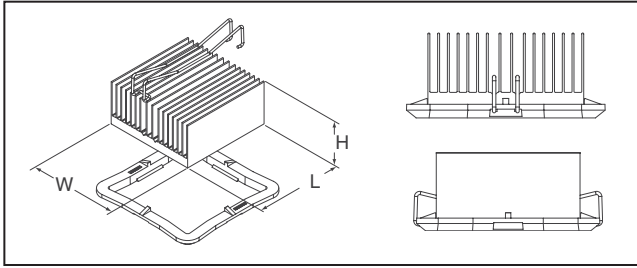
Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
17	17	9.5	18.5	12.6	ATS1048-ND†	10.44	7.95	6.81
19	19	9.5	16.7	11.6	ATS1049-ND†	10.60	8.07	6.92
21	21	9.5	12.0	8.0	ATS1050-ND†	10.76	8.19	7.02
23	23	9.5	11.0	7.5	ATS1051-ND†	10.93	8.32	7.13
25	25	9.5	8.6	5.5	ATS1052-ND†	11.09	8.44	7.23
27	27	9.5	8.0	5.3	ATS1053-ND†	11.27	8.58	7.35
29	29	9.5	7.4	5.0	ATS1054-ND†	11.43	8.70	7.46
30	30	9.5	7.2	4.9	ATS1055-ND†	11.30	8.69	7.28
31	31	9.5	7.0	4.8	ATS1056-ND†	11.39	8.76	7.34
32.5	32.5	9.5	6.0	3.8	ATS1057-ND†	11.50	8.84	7.41
33	33	9.5	5.9	3.8	ATS1058-ND†	11.54	8.88	7.44
35	35	9.5	5.3	3.1	ATS1059-ND†	11.59	8.91	7.47
37.5	37.5	9.5	4.9	3.0	ATS1060-ND†	11.70	9.00	7.54
40	40	9.5	4.5	2.8	ATS1061-ND†	11.81	9.09	7.62
42.5	42.5	9.5	4.3	2.7	ATS1062-ND†	11.90	9.16	7.68
45	45	9.5	4.0	2.3	ATS1063-ND†	12.02	9.24	7.75
17	17	14.5	10.9	8.5	ATS1064-ND†	11.32	8.61	7.38
19	19	14.5	10.1	7.9	ATS1065-ND†	11.48	8.74	7.49
21	21	14.5	7.2	5.4	ATS1066-ND†	11.41	8.78	7.36
23	23	14.5	6.6	5.1	ATS1067-ND†	11.59	8.91	7.47
25	25	14.5	5.1	3.8	ATS1068-ND†	11.77	9.05	7.59
27	27	14.5	4.8	3.6	ATS1069-ND†	11.95	9.19	7.70
29	29	14.5	4.5	3.4	ATS1070-ND†	12.13	9.33	7.82
30	30	14.5	4.3	3.4	ATS1071-ND†	12.24	9.42	7.89
31	31	14.5	4.2	3.3	ATS1072-ND†	12.33	9.48	7.95
32.5	32.5	14.5	3.5	2.6	ATS1073-ND†	12.44	9.57	8.02
33	33	14.5	3.4	2.6	ATS1074-ND†	12.51	9.62	8.07
35	35	14.5	2.9	2.1	ATS1075-ND†	12.56	9.66	8.10
37.5	37.5	14.5	2.7	2.0	ATS1076-ND†	12.67	9.74	8.17
40	40	14.5	2.5	1.9	ATS1077-ND†	12.78	9.83	8.24
42.5	42.5	14.5	2.4	1.8	ATS1078-ND†	12.92	9.93	8.33
45	45	14.5	2.1	1.5	ATS1079-ND†	13.03	10.02	8.40
17	17	19.5	8.1	6.5	ATS1080-ND†	12.02	9.24	7.75
19	19	19.5	7.5	6.1	ATS1081-ND†	12.20	9.38	7.86
21	21	19.5	5.3	4.2	ATS1082-ND†	12.38	9.52	7.98
23	23	19.5	5.0	4.0	ATS1083-ND†	12.58	9.68	8.11
25	25	19.5	3.8	2.9	ATS1084-ND†	12.76	9.81	8.23
27	27	19.5	3.6	2.8	ATS1085-ND†	12.96	9.97	8.36
29	29	19.5	3.4	2.7	ATS1086-ND†	13.16	10.13	8.49
30	30	19.5	3.3	2.6	ATS1087-ND†	13.28	10.21	8.56
31	31	19.5	3.2	2.6	ATS1088-ND†	13.39	10.30	8.63
32.5	32.5	19.5	2.7	2.0	ATS1089-ND†	13.22	10.40	8.72
33	33	19.5	2.6	2.0	ATS1090-ND†	13.27	10.44	8.75
35	35	19.5	2.2	1.6	ATS1091-ND†	13.33	10.49	8.79
37.5	37.5	19.5	2.1	1.6	ATS1092-ND†	13.44	10.57	8.86
40	40	19.5	2.0	1.5	ATS1093-ND†	13.57	10.68	8.95
42.5	42.5	19.5	1.9	1.5	ATS1094-ND†	13.71	10.78	9.04
45	45	19.5	1.6	1.2	ATS1095-ND†	13.82	10.87	9.11

**NEW! Thermal Management Design Kit**

The Thermal Management Design Kit contains maxiFLOW™ heat sinks and maxiGRIP™ sink attachment systems (1 each of 96 parts denoted).

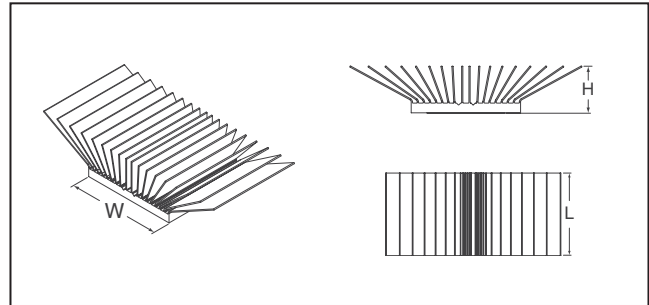
† ATS1397-ND (ATS-TMDK-96) .....\$870.00  
(Continued)

**maxiGRIP™ Heat Sink Attachment Assembly with Straight-Fin Heat Sink, Black Anodized, Thermal Tape**



**BGA Cooling Solutions**

**maxiFLOW™ Heat Sink Using Thermal Tape Attachment, Blue Anodized**



**C**

Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
17	17	9.5	24.3	12.3	ATS1147-ND	9.71	7.39	6.33
19	19	9.5	22.0	11.6	ATS1148-ND	9.80	7.46	6.39
21	21	9.5	20.2	10.9	ATS1149-ND	9.89	7.53	6.45
23	23	9.5	16.8	7.6	ATS1150-ND	10.01	7.62	6.53
25	25	9.5	15.3	7.3	ATS1151-ND	10.10	7.69	6.59
27	27	9.5	14.1	7.0	ATS1152-ND	10.21	7.77	6.66
29	29	9.5	13.1	6.7	ATS1153-ND	10.30	7.84	6.72
30	30	9.5	12.7	6.6	ATS1154-ND	10.40	7.91	6.78
31	31	9.5	12.0	5.1	ATS1155-ND	10.51	8.00	6.86
32.5	32.5	9.5	11.3	5.0	ATS1156-ND	10.63	8.09	6.93
33	33	9.5	11.1	5.0	ATS1157-ND	10.65	8.11	6.95
35	35	9.5	10.3	4.8	ATS1158-ND	10.72	8.16	6.99
37.5	37.5	9.5	10.0	3.8	ATS1159-ND	10.83	8.25	7.07
40	40	9.5	9.1	3.7	ATS1160-ND	10.95	8.33	7.14
42.5	42.5	9.5	8.4	3.6	ATS1161-ND	11.04	8.40	7.20
45	45	9.5	8.4	2.9	ATS1162-ND	11.16	8.49	7.28
17	17	14.5	13.1	7.8	ATS1163-ND	10.47	7.97	6.83
19	19	14.5	12.0	7.4	ATS1164-ND	10.56	8.04	6.89
21	21	14.5	11.1	7.1	ATS1165-ND	10.67	8.12	6.96
23	23	14.5	8.8	4.9	ATS1166-ND	10.79	8.21	7.04
25	25	14.5	8.1	4.7	ATS1167-ND	10.88	8.28	7.10
27	27	14.5	7.6	4.5	ATS1168-ND	10.99	8.37	7.17
29	29	14.5	7.1	4.4	ATS1169-ND	11.11	8.46	7.25
30	30	14.5	6.9	4.3	ATS1170-ND	11.22	8.54	7.32
31	31	14.5	6.2	3.3	ATS1171-ND	11.34	8.63	7.40
32.5	32.5	14.5	5.9	3.2	ATS1172-ND	11.45	8.72	7.47
33	33	14.5	5.8	3.2	ATS1173-ND	11.50	8.75	7.50
35	35	14.5	5.4	3.1	ATS1174-ND	11.32	8.71	7.30
37.5	37.5	14.5	5.0	2.4	ATS1175-ND	11.43	8.79	7.37
40	40	14.5	4.6	2.4	ATS1176-ND	11.54	8.88	7.44
42.5	42.5	14.5	4.3	2.3	ATS1177-ND	11.66	8.97	7.52
45	45	14.5	4.1	1.9	ATS1178-ND	11.77	9.05	7.59
17	17	19.5	9.3	5.6	ATS1179-ND	10.93	8.32	7.13
19	19	19.5	8.4	5.3	ATS1180-ND	11.02	8.39	7.19
21	21	19.5	7.8	5.1	ATS1181-ND	11.13	8.47	7.26
23	23	19.5	7.3	4.9	ATS1182-ND	11.25	8.56	7.34
25	25	19.5	5.7	3.4	ATS1183-ND	11.36	8.65	7.41
27	27	19.5	5.3	3.3	ATS1184-ND	11.48	8.74	7.49
29	29	19.5	5.0	3.2	ATS1185-ND	11.34	8.72	7.31
30	30	19.5	4.8	3.1	ATS1186-ND	11.45	8.81	7.39
31	31	19.5	4.7	3.1	ATS1187-ND	11.57	8.90	7.46
32.5	32.5	19.5	4.1	2.3	ATS1188-ND	11.68	8.98	7.53
33	33	19.5	4.1	2.3	ATS1189-ND	11.72	9.02	7.56
35	35	19.5	3.8	2.2	ATS1190-ND	11.79	9.07	7.60
37.5	37.5	19.5	3.5	2.2	ATS1191-ND	11.93	9.17	7.69
40	40	19.5	3.2	1.7	ATS1192-ND	12.04	9.26	7.76
42.5	42.5	19.5	3.0	1.7	ATS1193-ND	12.15	9.35	7.83
45	45	19.5	2.8	1.6	ATS1194-ND	12.29	9.45	7.92

Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
15	15	7.5	19.7	14.6	ATS1096-ND	7.35	5.44	4.50
17	17	7.5	18.2	13.9	ATS1097-ND	7.43	5.50	4.55
19	19	7.5	16.5	12.9	ATS1098-ND	7.50	5.55	4.59
21	21	7.5	11.9	8.8	ATS1099-ND	7.58	5.46	4.55
23	23	7.5	10.9	8.3	ATS1100-ND	7.65	5.51	4.59
25	25	7.5	8.6	6.1	ATS1101-ND	7.73	5.57	4.64
27	27	7.5	7.9	5.8	ATS1102-ND	7.80	5.62	4.68
29	29	7.5	7.4	5.6	ATS1103-ND	7.88	5.67	4.73
30	30	7.5	7.1	5.4	ATS1104-ND	7.95	5.73	4.77
31	31	7.5	6.9	5.3	ATS1105-ND	8.03	5.78	4.82
32.5	32.5	7.5	5.9	4.2	ATS1106-ND	8.13	5.85	4.88
33	33	7.5	5.8	4.2	ATS1107-ND	7.82	5.87	4.89
35	35	7.5	5.3	3.4	ATS1108-ND	7.87	5.91	4.92
37.5	37.5	7.5	4.9	3.3	ATS1109-ND	7.94	5.96	4.97
40	40	7.5	4.5	3.2	ATS1110-ND	8.02	6.02	5.01
42.5	42.5	7.5	4.3	3.0	ATS1111-ND	8.11	6.09	5.07
45	45	7.5	4.0	2.6	ATS1112-ND	8.18	6.14	5.12
15	15	12.5	11.7	9.4	ATS1113-ND	8.35	6.27	5.22
17	17	12.5	11.1	9.0	ATS1114-ND	8.45	6.34	5.28
19	19	12.5	10.2	8.4	ATS1115-ND	8.52	6.39	5.33
21	21	12.5	7.2	5.7	ATS1116-ND	8.62	6.47	5.39
23	23	12.5	6.7	5.4	ATS1117-ND	8.71	6.54	5.45
25	25	12.5	5.2	4.0	ATS1118-ND	8.78	6.59	5.49
27	27	12.5	4.8	3.8	ATS1119-ND	8.88	6.66	5.55
29	29	12.5	4.5	3.7	ATS1120-ND	8.98	6.74	5.61
30	30	12.5	4.4	3.6	ATS1121-ND	9.07	6.81	5.67
31	31	12.5	4.3	3.5	ATS1122-ND	9.14	6.86	5.72
32.5	32.5	12.5	3.5	2.8	ATS1123-ND	9.24	6.93	5.78
33	33	12.5	3.5	2.7	ATS1124-ND	9.29	6.97	5.81
35	35	12.5	3.0	2.2	ATS1125-ND	9.34	7.01	5.84
37.5	37.5	12.5	2.8	2.1	ATS1126-ND	9.43	7.08	5.90
40	40	12.5	2.6	2.0	ATS1127-ND	9.53	7.15	5.96
42.5	42.5	12.5	2.4	2.0	ATS1128-ND	9.62	7.02	6.02
45	45	12.5	2.1	1.6	ATS1129-ND	9.72	7.09	6.08
15	15	17.5	8.7	7.1	ATS1130-ND	9.82	7.16	6.14
17	17	17.5	8.3	6.8	ATS1131-ND	9.91	7.23	6.20
19	19	17.5	7.7	6.4	ATS1132-ND	10.01	7.30	6.26
21	21	17.5	5.4	4.3	ATS1133-ND	9.71	7.39	6.33
23	23	17.5	5.1	4.1	ATS1134-ND	9.80	7.46	6.39
25	25	17.5	3.9	3.0	ATS1135-ND	9.89	7.53	6.45
27	27	17.5	3.7	2.9	ATS1136-ND	10.01	7.62	6.53
29	29	17.5	3.5	2.8	ATS1137-ND	10.10	7.69	6.59
30	30	17.5	3.4	2.7	ATS1138-ND	10.19	7.76	6.65
31	31	17.5	3.3	2.7	ATS1139-ND	10.30	7.84	6.72
32.5	32.5	17.5	2.7	2.1	ATS1140-ND	10.40	7.91	6.78
33	33	17.5	2.7	2.1	ATS1141-ND	10.44	7.95	6.81
35	35	17.5	2.3	1.7	ATS1142-ND	10.51	8.00	6.86
37.5	37.5	17.5	2.1	1.6	ATS1143-ND	10.60	8.07	6.92
40	40	17.5	2.0	1.6	ATS1144-ND	10.72	8.16	6.99
42.5	42.5	17.5	1.9	1.5	ATS1145-ND	10.83	8.25	7.07
45	45	17.5	1.6	1.3	ATS1146-ND	10.93	8.32	7.13

**maxiGRIP™ Installation and Removal Tools**

Heat Sink Size is referring to maxiGRIP Heat Sink Attachment Assemblies compatible with tools.

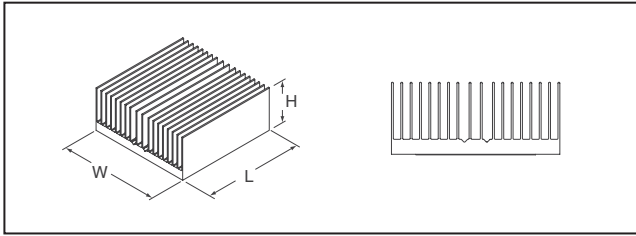
Heat Sink Size (mm)		Digi-Key Part No.	Price Each	ATS Part No.
L	W			
19	19	ATS1382-ND	71.91	MGT190
21	21	ATS1383-ND	71.91	MGT210
23	23	ATS1384-ND	71.91	MGT230
25	25	ATS1385-ND	71.91	MGT250
27	27	ATS1386-ND	71.91	MGT270
29	29	ATS1387-ND	71.91	MGT290
30	30	ATS1388-ND	71.91	MGT300
31	31	ATS1389-ND	71.91	MGT310
32.5	32.5	ATS1390-ND	71.91	MGT325
33	33	ATS1391-ND	71.91	MGT330
35	35	ATS1392-ND	71.91	MGT350
37.5	37.5	ATS1393-ND	71.91	MGT375
40	40	ATS1394-ND	71.91	MGT400
42.5	42.5	ATS1395-ND	71.91	MGT425
45	45	ATS1396-ND	71.91	MGT450

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**More Product Available Online: [www.digkey.com](http://www.digkey.com)**

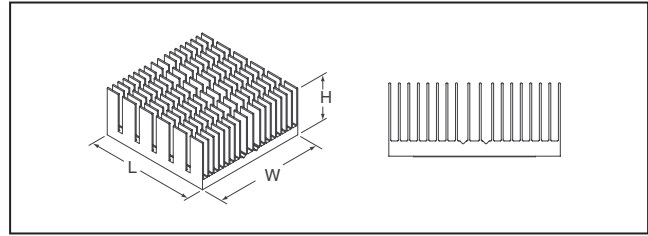
**High Aspect Ratio Extrusion**

**Straight Fin Heat Sink with Thermal Tape Attachment, Black Anodized**



Dimensions (mm)			Thermal Resistance		Digi-Key Part No.	Price Each		
L	W	H	Unducted Flow @ 200 LFM (1m/sec.)	Ducted Flow @ 200 LFM (1m/sec.)		1	10	100
15	15	9.5	26.2	12.7	ATS1195-ND	6.30	4.67	3.86
17	17	9.5	24.3	12.3	ATS1196-ND	6.35	4.70	3.89
19	19	9.5	22.0	11.6	ATS1197-ND	6.43	4.76	3.94
21	21	9.5	20.2	10.9	ATS1198-ND	6.48	4.80	3.97
23	23	9.5	16.8	7.6	ATS1199-ND	6.55	4.85	4.01
25	25	9.5	15.3	7.3	ATS1200-ND	6.63	4.91	4.06
27	27	9.5	14.1	7.0	ATS1201-ND	6.68	4.94	4.09
29	29	9.5	13.1	6.7	ATS1202-ND	6.75	5.00	4.14
30	30	9.5	12.7	6.6	ATS1203-ND	6.83	5.06	4.18
31	31	9.5	12.0	5.1	ATS1204-ND	6.88	5.09	4.21
32.5	32.5	9.5	11.3	5.0	ATS1205-ND	6.95	5.15	4.26
33	33	9.5	11.1	5.0	ATS1206-ND	6.98	5.17	4.27
35	35	9.5	10.3	4.8	ATS1207-ND	7.03	5.20	4.30
37.5	37.5	9.5	10.0	3.8	ATS1208-ND	7.10	5.26	4.35
40	40	9.5	9.1	3.7	ATS1209-ND	7.18	5.31	4.40
42.5	42.5	9.5	8.4	3.6	ATS1210-ND	7.23	5.35	4.43
45	45	9.5	8.4	2.9	ATS1211-ND	7.30	5.41	4.47
15	15	14.5	19.1	12.9	ATS1212-ND	7.45	5.52	4.56
17	17	14.5	13.1	7.8	ATS1213-ND	7.53	5.42	4.52
19	19	14.5	12.0	7.4	ATS1214-ND	7.60	5.48	4.56
21	21	14.5	11.1	7.1	ATS1215-ND	7.68	5.53	4.61
23	23	14.5	8.8	4.9	ATS1216-ND	7.75	5.58	4.65
25	25	14.5	8.1	4.7	ATS1217-ND	7.85	5.66	4.71
27	27	14.5	7.6	4.5	ATS1218-ND	7.93	5.71	4.76
29	29	14.5	7.1	4.4	ATS1219-ND	8.00	5.76	4.80
30	30	14.5	6.9	4.3	ATS1220-ND	8.08	5.82	4.85
31	31	14.5	6.2	3.3	ATS1221-ND	7.82	5.87	4.89
32.5	32.5	14.5	5.9	3.2	ATS1222-ND	7.92	5.94	4.95
33	33	14.5	5.8	3.2	ATS1223-ND	7.94	5.96	4.97
35	35	14.5	5.4	3.1	ATS1224-ND	7.99	6.00	5.00
37.5	37.5	14.5	5.0	2.4	ATS1225-ND	8.06	6.05	5.04
40	40	14.5	4.6	2.4	ATS1226-ND	8.16	6.12	5.10
42.5	42.5	14.5	4.3	2.3	ATS1227-ND	8.23	6.18	5.15
45	45	14.5	4.1	1.9	ATS1228-ND	8.33	6.25	5.21
15	15	19.5	13.4	9.5	ATS1229-ND	7.82	5.87	4.89
17	17	19.5	9.3	5.6	ATS1230-ND	7.92	5.94	4.95
19	19	19.5	8.4	5.3	ATS1231-ND	7.99	6.00	5.00
21	21	19.5	7.8	5.1	ATS1232-ND	8.06	6.05	5.04
23	23	19.5	7.3	4.9	ATS1233-ND	8.16	6.12	5.10
25	25	19.5	5.7	3.4	ATS1234-ND	8.23	6.18	5.15
27	27	19.5	5.3	3.3	ATS1235-ND	8.33	6.25	5.21
29	29	19.5	5.0	3.2	ATS1236-ND	8.40	6.30	5.25
30	30	19.5	4.8	3.1	ATS1237-ND	8.50	6.38	5.31
31	31	19.5	4.7	3.1	ATS1238-ND	8.57	6.43	5.36
32.5	32.5	19.5	4.1	2.3	ATS1239-ND	8.66	6.50	5.42
33	33	19.5	4.1	2.3	ATS1240-ND	8.69	6.52	5.43
35	35	19.5	3.8	2.2	ATS1241-ND	8.74	6.56	5.46
37.5	37.5	19.5	3.5	2.2	ATS1242-ND	8.83	6.63	5.52
40	40	19.5	3.2	1.7	ATS1243-ND	8.93	6.70	5.58
42.5	42.5	19.5	3.0	1.7	ATS1244-ND	9.00	6.75	5.63
45	45	19.5	2.8	1.6	ATS1245-ND	9.10	6.83	5.69
15	15	24.5	10.5	7.7	ATS1246-ND	9.07	6.81	5.67
17	17	24.5	7.1	4.5	ATS1247-ND	9.17	6.88	5.73
19	19	24.5	6.5	4.3	ATS1248-ND	9.26	6.95	5.79
21	21	24.5	6.0	3.8	ATS1249-ND	9.36	7.02	5.85
23	23	24.5	5.6	4.0	ATS1250-ND	9.46	7.10	5.91
25	25	24.5	4.4	2.7	ATS1251-ND	9.55	7.17	5.97
27	27	24.5	4.0	2.6	ATS1252-ND	9.65	7.04	6.03
29	29	24.5	3.8	2.6	ATS1253-ND	9.74	7.11	6.09
30	30	24.5	3.7	2.5	ATS1254-ND	9.84	7.18	6.15
31	31	24.5	3.6	2.5	ATS1255-ND	9.94	7.25	6.21
32.5	32.5	24.5	3.1	1.9	ATS1256-ND	10.03	7.32	6.27
33	33	24.5	3.1	1.9	ATS1257-ND	10.08	7.35	6.30
35	35	24.5	2.9	1.8	ATS1258-ND	9.71	7.39	6.33
37.5	37.5	24.5	2.7	1.8	ATS1259-ND	9.82	7.48	6.41
40	40	24.5	2.4	1.4	ATS1260-ND	9.91	7.55	6.47
42.5	42.5	24.5	2.2	1.3	ATS1261-ND	10.01	7.62	6.53
45	45	24.5	2.1	1.3	ATS1262-ND	10.12	7.70	6.60

**Cross-Cut Heat Sink with Thermal Tape Attachment, Black Anodized**



Dimensions (mm)			Thermal Resistance Unducted Flow @ 200 LFM (1m/sec.)	Digi-Key Part No.	Price Each		
L	W	H			1	10	100
15	15	9.5	29.5	ATS1263-ND	6.38	4.72	3.91
17	17	9.5	28.0	ATS1264-ND	6.48	4.80	3.97
19	19	9.5	24.0	ATS1265-ND	6.58	4.87	4.03
21	21	9.5	21.9	ATS1266-ND	6.68	4.94	4.09
23	23	9.5	18.0	ATS1267-ND	6.78	5.02	4.15
25	25	9.5	16.5	ATS1268-ND	6.88	5.09	4.21
27	27	9.5	15.5	ATS1269-ND	6.98	5.17	4.27
29	29	9.5	14.5	ATS1270-ND	7.10	5.26	4.35
30	30	9.5	14.0	ATS1271-ND	7.15	5.30	4.38
31	31	9.5	13.5	ATS1272-ND	7.23	5.35	4.43
32.5	32.5	9.5	12.5	ATS1273-ND	7.28	5.39	4.46
33	33	9.5	12.3	ATS1274-ND	7.30	5.41	4.47
35	35	9.5	11.3	ATS1275-ND	7.35	5.44	4.50
37.5	37.5	9.5	11.1	ATS1276-ND	7.40	5.48	4.53
40	40	9.5	10.0	ATS1277-ND	7.48	5.54	4.58
42.5	42.5	9.5	9.2	ATS1278-ND	7.55	5.44	4.53
45	45	9.5	9.2	ATS1279-ND	7.63	5.49	4.58
15	15	14.5	21.4	ATS1280-ND	7.55	5.44	4.53
17	17	14.5	15.5	ATS1281-ND	7.68	5.53	4.61
19	19	14.5	13.1	ATS1282-ND	7.80	5.62	4.68
21	21	14.5	12.0	ATS1283-ND	7.90	5.69	4.74
23	23	14.5	9.5	ATS1284-ND	8.03	5.78	4.82
25	25	14.5	8.8	ATS1285-ND	7.82	5.87	4.89
27	27	14.5	8.3	ATS1286-ND	7.94	5.96	4.97
29	29	14.5	7.8	ATS1287-ND	8.06	6.05	5.04
30	30	14.5	7.6	ATS1288-ND	8.14	6.11	5.09
31	31	14.5	7.0	ATS1289-ND	8.21	6.16	5.13
32.5	32.5	14.5	6.5	ATS1290-ND	8.28	6.21	5.18
33	33	14.5	6.4	ATS1291-ND	8.33	6.25	5.21
35	35	14.5	5.9	ATS1292-ND	8.35	6.27	5.22
37.5	37.5	14.5	5.6	ATS1293-ND	8.42	6.32	5.27
40	40	14.5	5.1	ATS1294-ND	8.52	6.39	5.33
42.5	42.5	14.5	4.7	ATS1295-ND	8.59	6.45	5.37
45	45	14.5	4.5	ATS1296-ND	8.66	6.50	5.42
15	15	19.5	15.1	ATS1297-ND	7.94	5.96	4.97
17	17	19.5	11.3	ATS1298-ND	8.06	6.05	5.04
19	19	19.5	9.2	ATS1299-ND	8.18	6.14	5.12
21	21	19.5	8.4	ATS1300-ND	8.30	6.23	5.19
23	23	19.5	7.8	ATS1301-ND	8.42	6.32	5.27
25	25	19.5	6.2	ATS1302-ND	8.57	6.43	5.36
27	27	19.5	5.8	ATS1303-ND	8.69	6.52	5.43
29	29	19.5	5.5	ATS1304-ND	8.83	6.63	5.52
30	30	19.5	5.3	ATS1305-ND	8.90	6.68	5.57
31	31	19.5	5.3	ATS1306-ND	8.98	6.74	5.61
32.5	32.5	19.5	4.6	ATS1307-ND	9.07	6.81	5.67
33	33	19.5	4.5	ATS1308-ND	9.10	6.83	5.69
35	35	19.5	4.2	ATS1309-ND	9.14	6.86	5.72
37.5	37.5	19.5	3.9	ATS1310-ND	9.22	6.92	5.76
40	40	19.5	3.6	ATS1311-ND	9.31	6.99	5.82
42.5	42.5	19.5	3.3	ATS1312-ND	9.38	7.04	5.87
45	45	19.5	3.0	ATS1313-ND	9.48	7.11	5.93
15	15	24.5	11.7	ATS1314-ND	9.22	6.92	5.76
17	17	24.5	8.6	ATS1315-ND	9.34	7.01	5.84
19	19	24.5	7.1	ATS1316-ND	9.48	7.11	5.93
21	21	24.5	6.5	ATS1317-ND	9.62	7.02	6.02
23	23	24.5	6.0	ATS1318-ND	9.77	7.13	6.11
25	25	24.5	4.7	ATS1319-ND	9.94	7.25	6.21
27	27	24.5	4.5	ATS1320-ND	10.08	7.35	6.30
29	29	24.5	4.2	ATS1321-ND	9.80	7.46	6.39
30	30	24.5	4.1	ATS1322-ND	9.89	7.53	6.45
31	31	24.5	4.0	ATS1323-ND	9.98	7.60	6.51
32.5	32.5	24.5	3.5	ATS1324-ND	10.07	7.67	6.57
33	33	24.5	3.4	ATS1325-ND	10.12	7.70	6.60
35	35	24.5	3.1	ATS1326-ND	10.17	7.74	6.63
37.5	37.5	24.5	3.0	ATS1327-ND	10.26	7.81	6.69
40	40	24.5	2.6	ATS1328-ND	10.35	7.88	6.75
42.5	42.5	24.5	2.4	ATS1329-ND	10.44	7.95	6.81
45	45	24.5	2.3	ATS1330-ND	10.53	8.02	6.87

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