

Tracker Dimensions and Mass

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Tracker Vertical Dimensions

	Base	No Conv	superGLAST	Regular	Top	Nom Dim
Top SSD thickness	0.000400	0.000400	0.000400	0.000400	0.000000	0.000400
SSD-Bias plane bond thickness	0.000075	0.000075	0.000075	0.000075	0.000000	0.000075
Bias plane thickness	0.000152	0.000152	0.000152	0.000152	0.000000	0.000152
Bias plane to face sheet bond thickness	0.000075	0.000075	0.000075	0.000075	0.000000	0.000075
Top face sheet thickness	0.000225	0.000225	0.000450	0.000225	0.000225	
Top face sheet to close-out bond thickness	0.000075	0.000075	0.000075	0.000075	0.000075	0.000075
Close-out thickness	0.033909	0.027920	0.027920	0.027920	0.027920	
Close-out to bottom face sheet bond thickness	0.000075	0.000075	0.000075	0.000075	0.000075	0.000075
Bottom face sheet thickness	0.000225	0.000225	0.000450	0.000225	0.000225	
Face sheet to converter bond thickness	0.000000	0.000000	0.000075	0.000075	0.000075	0.000075
Converter radiation length	0.00%	0.00%	25.00%	2.50%	2.50%	
Converter thickness	0.000000	0.000000	0.001400	0.000140	0.000140	
Converter to bias plane bond thickness	0.000000	0.000075	0.000075	0.000075	0.000075	0.000075
Bias plane thickness	0.000000	0.000152	0.000152	0.000152	0.000152	0.000152
Bias plane to SSD bond thickness	0.000000	0.000075	0.000075	0.000075	0.000075	0.000075
Bottom SSD thickness	0.000000	0.000400	0.000400	0.000400	0.000400	0.000400
Loaded tray thickness	0.035211	0.029924	0.031849	0.030139	0.029437	
Height above close-out	0.001002	0.001002	0.001227	0.001002	0.000300	
Close-out thickness	0.033909	0.027920	0.027920	0.027920	0.027920	
Height below close-out	0.000300	0.001002	0.002702	0.001217	0.001217	
Loaded tray thickness	0.035211	0.029924	0.031849	0.030139	0.029437	

Total number of Trays	1	2	4	11	1	19
SSD X-to-Y nominal separation	0.002000	0.002000	0.002000	0.002000	0.002000	0.002

<u>Spacer block thickness</u>						
Base-No Conv	0.004004					1
No Conv-No Conv		0.004004				1
No Conv-superGLAST		0.005704				1
superGLAST-superGLAST			0.005929			3
superGLAST-Regular			0.004444			1
Regular-Regular				0.004219		10
Regular-Top				0.004219		1
Top Snubber Height					0.000300	1

<u>Height Stack-up</u>						
Base-No Conv (from bot of face sheet)	0.038213					1
No Conv-No Conv		0.031924				1
No Conv-superGLAST		0.033624				1
superGLAST-superGLAST			0.033849			3
superGLAST-Regular			0.032364			1
Regular-Regular				0.032139		10
Regular-Top				0.032139		1
Top Tray and Snubber (to top of SSD)					0.028220	1
Total Height of each tray type	0.038213	0.065548	0.133911	0.353529	0.02822	0.619421

Core density 32 32 90 32 32 kg/m^3

Tracker Mass Accounting

Tray Component Mass	Base	No Conv	superGLAST	Regular	Top	Tot. Area	Density
SSD's	0.126215	0.126215	0.126215	0.126215	0.000000	0.135424	2330
SSD-Bias plane bond	0.018282	0.018282	0.018282	0.018282	0.000000	0.135424	1800
Bias plane	0.005200	0.005200	0.005200	0.005200	0.005200		0.0052
Bias plane to face sheet bond	0.019249	0.019249	0.019249	0.019249	0.000000	0.142582	1800
Top face sheet	0.059350	0.059350	0.118699	0.059350	0.059350	0.142582	1850
Top face sheet to close-out bond	0.019249	0.019249	0.019249	0.019249	0.019249	0.142582	1800
Close-out	0.301000	0.175000	0.175000	0.175000	0.175000		
Core honeycomb	0.154714	0.127388	0.358279	0.127388	0.127388		
Close-out to bottom face sheet bond	0.019249	0.019249	0.019249	0.019249	0.019249	0.142582	1800
Bottom face sheet	0.059350	0.059350	0.118699	0.059350	0.059350	0.142582	1850
Face sheet to converter bond	0.000000	0.000000	0.017515	0.017515	0.017515	0.129738	1800
Converter	0.000000	0.000000	2.059725	0.205972	0.205972	0.129738	11340
Converter to bias plane bond	0.000000	0.017515	0.017515	0.017515	0.017515	0.129738	1800
Bias plane	0.000000	0.005200	0.005200	0.005200	0.005200		0.0052
Bias plane to SSD bond	0.000000	0.018282	0.018282	0.018282	0.018282	0.135424	1800
SSD's	0.000000	0.126215	0.126215	0.126215	0.126215	0.135424	2330

Tray Misc. Mass	1	2	2	2	1	Tot. Vol.	Density
SSD edge bonds	0.000060	0.000119	0.000119	0.000119	0.000060	3.312E-08	1800
SSD wire bond encapsulant	0.000000	0.000318	0.000318	0.000318	0.000159	8.832E-08	1800
HDI circuit board(s), fully loaded	0.000000	0.060000	0.060000	0.060000	0.030000	1.0	0.03
Kapton rt-angle circuit(s)	0.000000	0.003059	0.003059	0.003059	0.001529	8.496E-07	1800
HDI mounting bolts	0.000000	0.000481	0.000481	0.000481	0.000240	3.063E-08	7850
Spacer blocks	0.000395	0.000563	0.000585	0.000416	0.000030		7850

Tray Total Mass					
Silicon mass	0.126215	0.252430	0.252430	0.252430	0.126215
Lead mass	0.000000	0.000000	2.059725	0.205972	0.205972
Epoxy mass	0.076087	0.112262	0.129777	0.129777	0.092027
Structural mass	0.574413	0.421087	0.770678	0.421087	0.421087
Other mass	0.005595	0.074502	0.074524	0.074356	0.042199
Total mass of each tray type	0.782311	0.860282	3.287134	1.083623	0.887502
Total number of Trays	1	2	4	11	1
Mass of all trays of each type	0.782311	1.720564	13.148536	11.919848	0.887502

Tower Misc. Mass						Tot. Vol.	Density
Walls	2.606529	W x H x T:	0.377600	0.619421	0.001500		1850
Wall mounting bolts	0.07986081	# W, L, H	9	6	19	1.78E-08	7850
Vectran cables	0						
Cable crimps	0						
Bottom tray mounting bolts	0.03788715	Qty:	24			2.01E-07	7850
Top tray ACD snubbers	0.8	Qty:	8				0.1
Kapton flex cables	1.24	Qty:	8				0.155

Total Mass of 1 tower	33.223
Total Tracker mass	531.569

Tracker Lateral Dimensions

Tray Lateral Dimensions		Dimensions Along Ladder	
<u>Dimensions Across Ladder</u>			
Pitch	0.000201		
Number of Channels	448		
Number of processors	7.00		
Edge to outside guard ring	0.000746		0.000806
Edge to inside bias ring	0.000901		0.000966
Active width	0.090048	Active length	0.090048
Edge-active area	0.000976	Edge-active area	0.000976
SSD outside width	0.092	SSD outside length	0.092
# ladders/tray	4	# SSDs in a ladder	4
ladder-ladder gap	0.000100	Edge bond thickness	0.000075
Width	0.368300	Ladder length	0.368225
SSD edge to close-out max dim	0.004650		0.004687
Tray nom outside width/length	0.377600		0.377600
Converter width	0.090048	Converter length	0.090048
Gap between converters	0.002052		0.002027
Gap from converter to tray edge	0.005626		0.005663

TKR Module Lateral Dimensions	
Tray nominal dimensions	0.377600
Wall thickness	0.001500
Tray/tower size, align tol.	0.000200
Tower stay-clear dimension	0.381000
Tower-tower nominal gap	0.001000
TKR module pitch	0.382000
Total width of TKR array	1.527000

Comment	Source of mass number	Reserve	Reserve
	Calculated from dims		
100% fill of bond under SSD	Calculated from dims		
kg	Rough est. from Ponslet		
100% fill of bond under bias pl	Calculated from dims		
Tray outside dims	Calculated from dims		
100% coverage under face sh	Calculated from dims		
C-C design	Rough est. from Ponslet		
C-C, uses close-out dims	Rough est. from Ponslet		
Same as top	Calculated from dims		
Same as top	Calculated from dims		
100% fill of bond over convert	Calculated from dims		
	Calculated from dims		
100% fill of bond under conver	Calculated from dims		
Same as top	Calculated from dims		
Same as top	Calculated from dims		
Same as top	Calculated from dims		
	Calculated from dims		
2*width of edge bond x .4 mm	Calculated from dims		
kg	Rough est. from Ponslet		
1.5 x 1.5 mm x-section	Calculated from dims		
13* (M1 x 3 mm lg) per HDI	Calc'd from BTEM design		
Uses max of hts for each tray,	Calculated from dims		
#2-56UNC x 3/16 lg	Calc'd from BTEM design		
#5-40 UNC x 1 lg			
WAG	WAG		
Wt/cable from Ponslet	Ponslet's mass table		