SparkIO Temperature
Sensing Shield
CharPCB Rev A
1. RAW
2. GND
3. TX
4. RX
5. A7
6. A6
7. A5
8. A4
9. A3
10. A2
11. A1
12. A0
24. 3V3
23. RST
22. VDDA
21. GND
20. D7
19. D6
18. D5
17. D4
16. D3
15. D2
14. D1
13. D0
H1
H2
C13
C7
C12
C8
SparkIO
Core
R19
DS1
3.3V
TB1
TB2
C10
R4
C11
R17
R2
R7
U1
R16
C1
R5
C3
R3
C2
R6
J1
R1
R8
U3
C9
R10
R15
U2
R12
C4
R9
C6
R11
C5
R14
J2
R13
R18
J3
J4
ThrmstrA
ThrmstrB
K Thermocouple A
K Thermocouple B

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:16:23 PM

Visible Layer(s)

Top Overlay

[M1] Board Outline

[M15] Top Component Keepout

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:16:43 PM

Visible Layer(s)

Top Overlay

[M1] Board Outline

[M15] Top Component Keepout

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:23 PM

Visible Layer(s)

[1] Top Layer

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:24 PM

Visible Layer(s)

[2] Bottom Layer

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:24 PM

Visible Layer(s)

Top Overlay

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:25 PM

Visible Layer(s)

Top Paste

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:25 PM

Visible Layer(s)

Top Solder

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:25 PM

Visible Layer(s)

Bottom Solder

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:26 PM

Visible Layer(s)

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:26 PM

Visible Layer(s)

[M1] Board Outline

[M15] Top Component Keepout

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:26 PM

Layer Stack Up Detail:
Final PCB Thickness is 62.0mil

Layer Name	Gerber Document	Copper Thickness (Final Weight)	Dielectric Height	Material
Top Solder Mask	(.GTS)		0.5mil	PSR 4000 Taiyo
Top Layer	(.GTL)	1.4mil (1oz)		
- - - - - - - - - - - -			58.2mil	Lam, 370HR
Bottom Layer	(.GBL)	1.4mil (1oz)		
Bottom Solder Mask	(.GBS)		0.5mil	PSR 4000 Taiyo

Visible Layer(s)

[M1] Board Outline

Drill Drawing

Fabrication
i. Green Solder Mask SMOBC, in accordance to IPC-SM-840
ii. White Silkscreen on Top Side: No ink shall be on exposed pads
iii. ENIG Surface Finish
iv. PCB shall be RoHS material and RoHS process compliant, T(g) > 130C, T(d)-288 test >5 minutes
v. PCB is 10mil min trace/space design
vi. Drill sizes are finished size after plating
vii. PCB core is 58.2mil thick 370HR material or equivalent

Assembly
i. RoHS Clean process, in accordance to IPC-A-600 and IPC-A-610 Class II
ii. Top Side contains through-hole and surface-mount components
iii. Bottom Side contains no components, design is single sided
iv. Only populate the components marked as 'Fitted' in the Bill of Materials
v. No electrical testing required

Symbol	Hit Count	Finished Hole Size	Plated	Hole Type
⊠	3	196.85mil (5.000mm)	PTH	Round
✪	12	69.69mil (1.770mm)	PTH	Round
⌘	24	50.00mil (1.270mm)	PTH	Round
✡	30	47.24mil (1.200mm)	PTH	Round
▽	15	15.00mil (0.381mm)	PTH	Round
	84 Total			

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:34 PM

Visible Layer(s)

[1] Top Layer

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:17:57 PM

Visible Layer(s)

[2] Bottom Layer

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:18:19 PM

Visible Layer(s)

Top Overlay

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:18:39 PM

Visible Layer(s)

Top Paste

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:18:54 PM

Visible Layer(s)

Top Solder

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:19:10 PM

Visible Layer(s)

Bottom Solder

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:19:25 PM

Visible Layer(s)

[M1] Board Outline

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:19:32 PM

Visible Layer(s)

[M1] Board Outline

[M15] Top Component Keepout

Project: SparkIO Thermal Shield
Revision: A
Drawn By: Jim Griszbacher
Date: 8/3/2014
Time: 6:19:48 PM

Visible Layer(s)

[M1] Board Outline

Drill Drawing

Layer Stack Up Detail:
Final PCB Thickness is 62.0mil

Layer Name	Dielec Thickness	Copper Thickness (Final Weight)	Dielectric Height	Material
Top Solder Mask	(.015)		0.5mil	PSR 4000 Taiyo
Top Layer		(.071) 1.4mil (1oz)		
- - - - - - - - - - - -			58.2mil	Lam, 370HR
Bottom Layer		(.071) 1.4mil (1oz)		
Bottom Solder Mask	(.015)		0.5mil	PSR 4000 Taiyo

Fabrication
i. Green Solder Mask SM0BC, in accordance to IPC-SM-840
ii. White Silkscreen on Top Side: No ink shall be on exposed pads
iii. ENIG Surface Finish
iv. PCB shall be RoHS material and RoHS process compliant,
Tg > 130C, Td-288 test >5 minutes
v. PCB is 10mil min trace/space design
vi. Drill sizes are finished size after plating
vii. PCB core is 58.2mil thick 370HR material or equivalent

Panel Design
i. Panel is 18 inches by 24 inches with 500mil width rails
ii. Rows are 5 up with V-Score between each PCB
iii. 10 rows are fitted on the panel, each separated with a 100mil width route

Assembly
i. RoHS Clean process, in accordance to IPC-A-600 and IPC-A-610 Class II
ii. Top Side contains through-hole and surface-mount components
iii. Bottom Side contains no components, design is single sided
iv. Only populate the components marked as 'Fitted' in the Bill of Materials
v. No electrical testing required

Symbol	Hit Count	Finished Hole Size	Plated	Hole Type
⊠	150	196.85mil (5.000mm)	PTH	Round
○	600	69.69mil (1.770mm)	PTH	Round
▽	750	15.00mil (0.381mm)	PTH	Round
✠	1200	50.00mil (1.270mm)	PTH	Round
✡	1500	47.24mil (1.200mm)	PTH	Round
	4200 Total			

Item #	Designator	Fitted/Not Fitted	Quantity	Manufacturer	Manufacturer Part Number	Name	Supplier 1	Supplier Part Number 1
1	C1, C2, C3, C4, C5, C6	Fitted	6	TDK Corporation	C1608X7R1E103K080AA	CAP CER 10000PF 25V 10% X7R 0603	Digi-Key	445-5100-1-ND
2	C7, C8, C9, C10, C11, C12, C13	Fitted	7	TDK Corporation	C1608X7R1C105K080AC	CAP CER 1UF 16V 10% X7R 0603	Digi-Key	445-1604-1-ND
3	DS1	Fitted	1	LiteOn	LTST-C190KGKT	Green LED 20mA 2V Vf	Digi-Key	160-1435-1-ND
4	H1, H2	Fitted	2	Sullins Interconnect	PPTC121LFBN-RC	CONN HEADER FEM 12POS .1" SGL TIN	Digi-Key	S6100-ND
5	J1, J2	Fitted	2	Omega	PCC-SMP-K	K Type Thermocouple Mini Horizontal TH Connector	Newark	01H0905
6	J3, J4	Fitted	2	CUI Inc	MJ-2509N	3/32" Mono Audio Jack Right Angle TH	Digi-Key	CP-M2509N-ND
7	R1, R8, R13, R18	Fitted	4	Vishay	CRCW0603100KFKEA	RES 100K OHM 1/10W 1% 0603 SMD	Digi-Key	541-100KHCT-ND
8	R2, R7, R10, R15	Fitted	4	Vishay	CRCW060322K0FKEA	RES 22.0K OHM 1/10W 1% 0603 SMD	Digi-Key	541-22.0KHCT-ND
9	R3, R5, R9, R11, R19	Fitted	5	Vishay	CRCW06031K00FKEA	RES 1.00K OHM 1/10W 1% 0603 SMD	Digi-Key	541-1.00KHCT-ND
10	R4, R6, R12, R14, R16, R17	Fitted	6	Vishay	CRCW060310K0FKEA	RES 10.0K OHM 1/10W 1% 0603 SMD	Digi-Key	541-10.0KHCT-ND
11	TB1, TB2	Fitted	2	On Shore Technology	OSTTE120104	TERMINAL BLOCK 3.5MM 12POS PCB	Digi-Key	ED2737-ND
12	U1, U2	Fitted	2	Texas Instruments	OPA2376AIDR	IC Op Amp Dual GBP 5.5MHz 8SOIC	Digi-Key	296-22564-1-ND
13	U3	Fitted	1	Microchip	TC1046VNBTR	Precision Temperature Sensing IC	Digi-Key	TC1046VNBTRCT-ND