

Magnetics

Roadmap

February 2014

Product Management Inductive Components

BOURNS®

Bourns® Inductors

Through-hole

Standard

High Current

Axial Series

Radial Series

Axial Series

Radial Series

Toroid Series

Common Mode Series



SMD

Dual Chokes (CMC)

Chip Inductors

Power Chokes

CMC

Signal Line

Multilayer

Wirewound

Ferrite

Ceramic

Non-Shielded

Semi-Shielded

Shielded

High Current

SRF Series

DR331
DR221

Standard
CS Series

Standard
CI Series

Open
CW Series

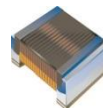
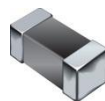
Sealed
CM Series

SDR Series

SRN Series

SRR Series
SRU Series

SRP Series



BOURNS®

Inductors

Standard model Series ➔

all Inductors

- Inductor models on the Bourns webpage

• Chip Inductors	ml 7, ww 18 (6 JWM)	tot	25
• Inductors (CMC)	chip 4, toro 14 (+5 TH)	tot	23
• Non Shielded	21 models + 12 JWM	tot	23
• Semi Shielded	7 models		7
• Fully Shielded	54 models + 12 JWM	tot	66
• High Current	18 models + 9 TH	tot	27
• Radial TH	16, +14 JWM, +13 toroid	tot	43
• Axial TH	14 models	tot	14
• Automotive	13 models		13

➔ Grand total Inductor model Series total 241

Magnetics Product Roadmap

Q2 13	Q3 13	Q4 13	Q1 14	Q2 14	Q3 14	Q4 14	Q1 15	Q2 15
SRP5030T Series (Introduced) High Current Power Inductor 6.5 x 4.0mm Sampling Q1 13/Prod. Q2 13		SRP1038A Series High Current Power Inductor 10 x 4.0mm Sampling Q4 13/Prod. Q2 14		SRP2012 Series High Current Power Inductor 2 x 1.2mm Sampling Q1 14/Prod. Q2 14				
SRP6540 Series (Introduced) High Current Power Inductor 6.5 x 4.0mm Sampling Q1 13/Prod. Q2 13		SRP1245A Series High Current Power Inductor 12 x 4.0mm Sampling Q4 13/Prod. Q2 14		SRP2512 Series High Current Power Inductor 2.5 x 1.2mm Sampling Q1 14/Prod. Q2 14				
SRN4018 Series (introduced) Semi Shielded Power Inductor 4 x 1.8mm Sampling Q3 12/Prod. Q1 13		SRP1265A Series High Current Power Inductor 12 x 6.5mm Sampling Q4 13/Prod. Q2 14		SRP4012TA Series High Current Power Inductors 4 x 1.2mm Sampling Q2 14/ Prod. Q2 14				
SRN5020 Series (Introduced) Semi Shielded Power Inductor 5 x 4mm Sampling Q3 12/Prod. Q1 13		SRP7028A Series High Current Power Inductors 7 x 3mm Sampling Q4 13/ Prod. Q2 14		SRP4020TA Series High Current Power Inductors 4 x 2mm Sampling Q2 14/ Prod. Q2 14				
SRN1060 Series (introduced) Semi Shielded Power Inductor 10 x 6mm Sampling Q3 12/Prod. Q1 13		SRP1238A Series High Current Power Inductor 12 x 4.0mm Sampling Q4 13/Prod. Q2 14		SRN6028 Series Semi Shielded Power Inductor 6 x 3mm Sampling Q1 14/Prod. Q1 14				
		SRN4012, 26 Series Semi Shielded Power Ind 4 x 1.2/2.5mm Sampling Q1 14/Prod. Q1 14						
		SRN5040 Series Semi Shielded Power Inductor 5 x 2mm Sampling Q1 14/Prod. Q1 14						
		SRN2010, 2012 Series Semi Shielded Power Ind 2 x 1/1.2mm Sampling Q1 14/Prod. Q1 14						
		SRN2510, 2512 Series Semi Shielded Power Ind 2.5 x 1/1.2mm Sampling Q1 14/Prod. Q1 14						
Part number <i>Description</i> Sampling/Prod. Date Development Part number <i>Description</i> Sampling/Prod. Date Concept								

Inductors

Semi Shielded → SRN Series round or square shape

- 3mm to 10mm sizes
- 7 models 1.0mm to 6.0mm body height
- Up to 2 models with only one board layout
- Current up to 10Amps
- Low DCR
- Lab Kits available



Inductors

Semi Shielded ➔ SRN Series round or square shape

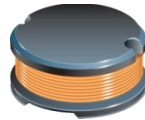
- Introduced Q4 2011
 - 3 series
 - 3mm SRN3015, 6mm SRN6045, 8mm SRN8040
- Introduced Q1 2013
 - 4 series
 - 3mm SRN3010, 4mm SRN4018, 5mm SRN5020 and 10mm SRN1060
- Planned Q1 2014
 - 4 new series
 - 2mm SRN2010 and 2012, 2.5mm SRN2510 and 2512
- Planned Q1 2014
 - 3 new series
 - 4mm SRN4012, 4026, 5mm SRN5040, 6mm SRN6028
- Main competitors

TDK, Tayio Yuden and Murata

Inductors

Semi Shielded → SRN Series round or square shape

- End of Q2 2014 we will have 14 models
 - SRN2010 and 2012 (2mm) one layout
 - SRN2510 and 2512 (2.5mm) one layout
 - SRN3010 and 3015 (3mm) one layout
 - SRN4018 and 4026 (4mm) one layout
 - SRN5020 and 5040 (5mm) one layout
 - SRN6028 and 6045 (6mm) one layout
 - SRN8040 (8mm)
 - SRN1060 (10mm)
- Plan to add 3 additional Lab-kits with the new models Q2/3
- More models will follow in future



Inductors

Semi Shielded ➔ SRN Series round or square shape

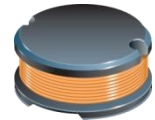
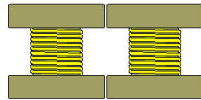
- Technology
 - Semi Shielded SMD Power Inductors are of a different technology compared to the Fully shielded (2 cores used) and Non shielded (1 core used)
 - The Semi Shielded models use 1 core / 1 shield as a metal epoxy covering the winding, no 2nd core needed.
 - Advantage of this technology
 - Better priced then fully shielded
 - Fully automated in production (no manual used)
 - Easier quality control
 - Disadvantage
 - EMI shielding not as good as the fully shielded
 - Due to the fully automated production, higher quantities are needed in order to run a stable production.

Inductors

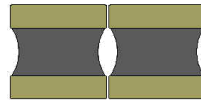
Semi Shielded → SRN Series round or square shape

- Technology comparison

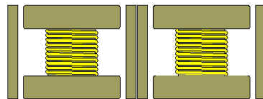
- Non Shielded, you can see the wire



- Semi Shielded, metal epoxy used to cover the wire



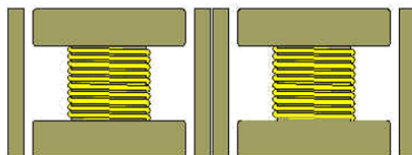
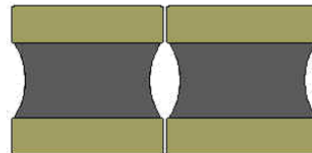
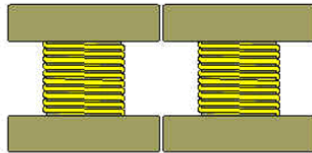
- Fully Shielded, a second core is used



Inductors

Semi Shielded → SRN Series round or square shape

Non-S / Semi-S / Shielded Inductor Percent Coupling - K



Series Adding Inductance: $L_a = L_1 + L_2 + 2M$

Series Bucking Inductance: $L_b = L_1 + L_2 - 2M$

Mutual inductance: $M = (L_a - L_b) / 4$

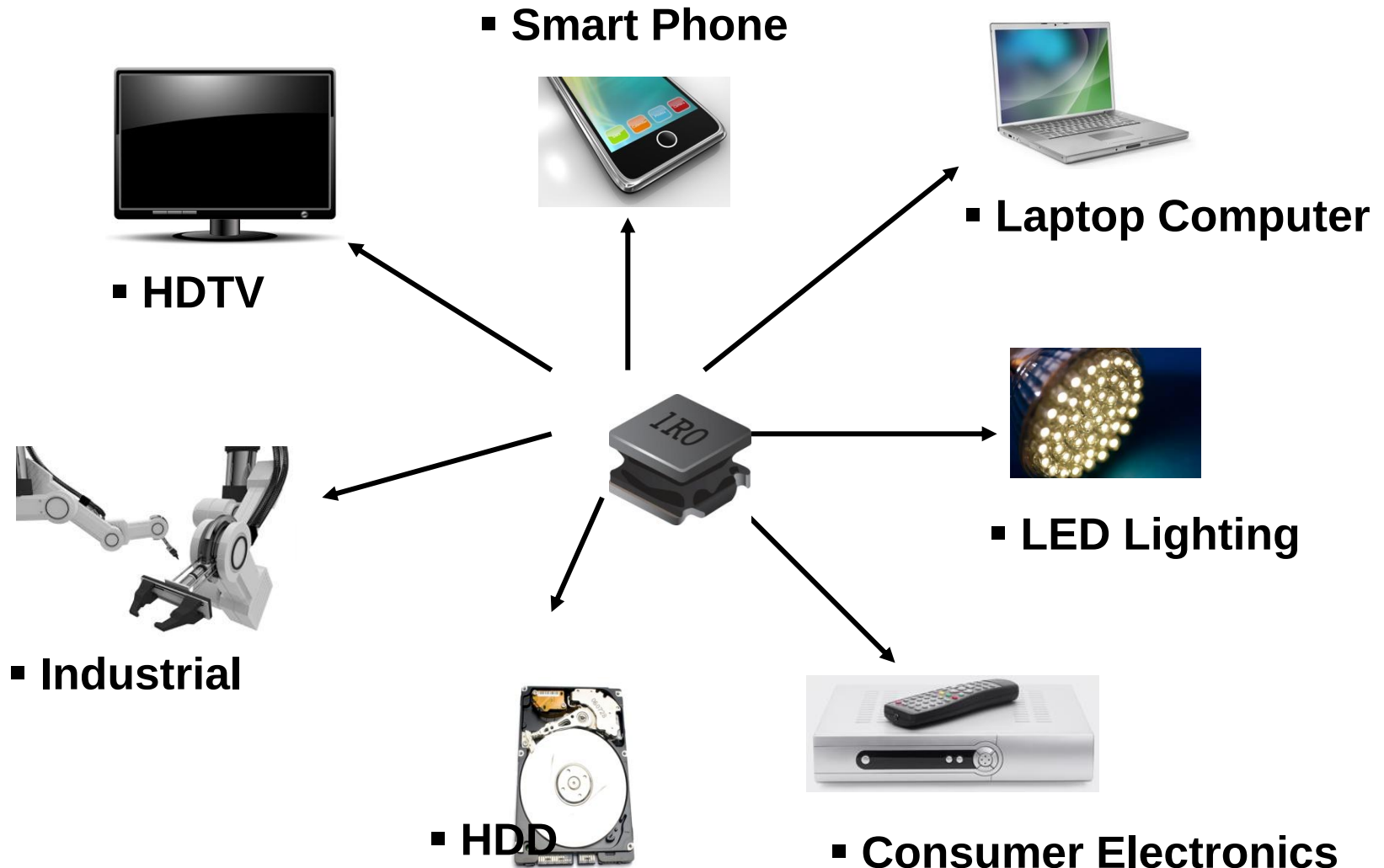
Percent Coupling $k = (M / \sqrt{L_1 \times L_2}) \times 100\%$

P/N	SRR3018 10uH L×W×H(mm) 3.8×3.8×1.65	SRN4018 10uH L×W×H(mm) 3.95×3.95×1.6	SDR3015 10uH L×W×H(mm) 3.0×2.8×1.5
	Shielded	Semi Shielded	Unshielded
L1 (uH)	10.86	11.25	9.94
L2 (uH)	10.63	11.78	9.64
L _a (uH)	21.53	30.05	32.31
L _b (uH)	21.46	21.42	17.51
M (uH)	0.0175	2.1575	3.7000
L ₁ ×L ₂	115.442	132.525	95.822
K	0.16%	18.74%	37.80%

L measured at 1KHz

Inductors

Semi-Shielded Applications



Inductors

Shielded →

SRP High Current models

- Size from 4 to 13mm
- 11 models (2 models with toroid)
- Inductance Range, 0.1uH to 15uH
- Current up to 60A
- E12/6 Series
- Lab Kit available SRP-LAB1, SRP-LAB2
- In preparation 2 and 2.5mm size SRP2012, SRP2512 Q2/14
- SRP1038A, SRP1238A, SRP1245A, SRP1265A, SRP7028A introduction, Q2 2014
- Plan for additional 3 SRP Lab-Kits with the new models Q2/3



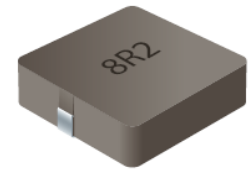
Inductors

Shielded ➔

SRP High Current models

Core Materials

- Sendust: SRP4012, SRP4020, SRP7030F
- Iron: SRP7030, SRP1040, SRP1235, SRP1250, SRP1270
- Ferrite: SRP1045, SRP1055, SRP1204, SRP1205, SRP1206



Inductors

Shielded →

SRP High Current models

- Introduction Q2 2014
 - 5 SRP High Current models
 - SRP5030T series 5.2mm x 3.0mm (introduced April 2013)
 - SRP6540 series 6.5mm x 4.0mm (introduced April 2013)
 - SRP7028A series 7.0mm x 3.2mm (AEC Q200 tested)
 - SRP1038A series 10mm x 1.0mm (AEC Q200 tested)
 - SRP1238A, 1245A, 1265A series 12mm x 3.8, 5, 7mm (AEC Q200 tested)
 - SRP2012, 2512 series 2, 2.5mm x 1.2mm
 - SRP4012TA, 4020TA series 4mm x 1.2, 2mm (AEC Q200 tested)
 - Plan is to replace the models having a «clip» with models «without the clips». The «clip» version has an additional piece part, which may some quality issue during soldering, the clip can «move», possible risk for a short on the PCB :
 - SRP7030 → SRP7028A
 - SRP1040 → SRP1038A
 - SRP1235 → SRP1238A
 - SRP1250 → SRP1245A
 - SRP1270 → SRP1265A
 - Main Competitors
 - Vishay, Toko, TTE, Cyntec

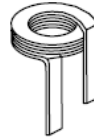


Inductors

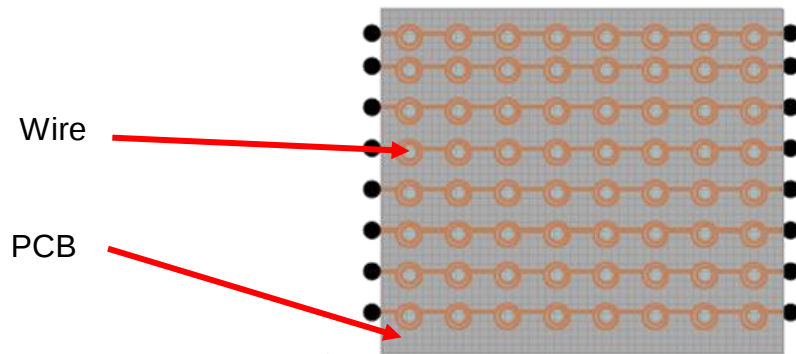
Shielded →

SRP High Current models

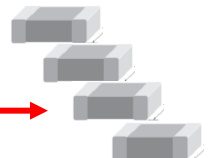
- Present Products
 - 4mm size to 12mm size
 - 11 models available, 9 planned to introduce Q2 2014
 - Round wire or Flat wire used then molded by Iron Power or Sundust
 - Single unit production.



- New technology for smaller models SRP2012, SRP2512
 - 2.5mm and 2.0mm sizes (introduction planned Q2 2014)
 - Wire on a PCB Array (like Multilayer Chip Inductors)
 - Many «units» on a PCB, then molded, cut and print terminals
 - Competition Toko, TDK



Finished
units with
terminals



Inductors

Automotive ➔

SMD Power Inductors/CMC

- Introduced Q3 2013 : 13 AEC Q200 tested series

- | | | | |
|------------|--------------|----------------|-----------|
| • SDE1006A | 10mm x 6mm | Standard model | ➔ SDR1006 |
| • SDR1307A | 13mm x 7mm | Standard model | ➔ SDR1306 |
| • SRR0735A | 7mm x 3.5mm | Standard model | ➔ SRR7032 |
| • SRR1260A | 12mm x 6mm | Standard model | ➔ SRR1260 |
| • SRR1280A | 12mm x 8mm | Standard model | ➔ SRR1280 |
| • SRU3028A | 3mm x 2.8mm | Standard model | ➔ SRU3028 |
| • SRU5028A | 5mm x 2.8mm | Standard model | ➔ SRU5028 |
| • SRU6025A | 6mm x 2.5mm | Standard model | ➔ SRU6025 |
| • SRU8028A | 8mm x 2.8mm | Standard model | ➔ SRU8028 |
| • SRU1028A | 10mm x 2.8mm | Standard model | ➔ SRU1028 |
| • SRU1038A | 10mm x 3.8mm | Standard model | ➔ SRU1038 |
| • SRU1048A | 10mm x 4.8mm | Standard model | ➔ SRU1048 |
| • SRF1260A | 10mm x 6mm | Standard model | ➔ SRF1260 |

Inductors

Automotive ➔

SMD Power Inductors/CMC

- Additional 10 models planned for Q2 2014, AEC Q200 tested series

• SDE0403A	4mm x 3mm	Standard model ➔	SDR0403
• SDE0604A	6mm x 4mm	Standard model ➔	SDR0604
• SDE0805A	8mm x 5mm	Standard model ➔	SRR0805
• SRR0745A	7mm x 4.5mm	Standard model ➔	SRR7045
• SRR0905A	9mm x 5mm	Standard model ➔	SRR0905
• SRR6040A	6mm x 4mm	Standard model ➔	SRR6038
• SRR1210A	12mm x 10mm	Standard model ➔	SRR1210
• SRF0703A	7mm x 3mm	Standard model ➔	SRF0703
• SRF0905A	9mm x 5mm	Standard model ➔	SRF0905
• SRF1280A	12mm x 8mm	Standard model ➔	SRF1280

Inductors

Competition ➔

Overview

- Following competitors have been loaded to our competition cross on the Bourns webpage
- Partnumber to Partnumber
 - Murata
 - Coilcraft
 - Wuerth
 - Sumida
 - TDK
 - Epcos
- We are constantly working to bring more pn to pn crosses to our Bourns page

Competitor	Competitor part	BournsPart
TDK-series	ACM2012-2P	SRF2012
TDK	ACM2012-900-2P	SRF2012-900Y
TDK	ACM2012-121-2P	SRF2012-121Y
TDK	ACM2012-201-2P	SRF2012-201Y
TDK	ACM2012-361-2P	SRF2012-361Y
TDK-series	ACM2012-2P	SRF2012-A
TDK	ACM2012-900-2P	SRF2012-900YA
TDK	ACM2012-121-2P	SRF2012-121YA
TDK	ACM2012-201-2P	SRF2012-201YA
TDK	ACM2012-361-2P	SRF2012-361YA
TDK-series	ACM3225-2P	SRF3216
TDK	ACM3225-161-2P	SRF3216-161Y
TDK	ACM3225-102-2P	SRF3216-102Y
TDK-series	CLF10040	SRP1040
TDK	CLF10040T-1R5N	SRP1040-1R5M
TDK	CLF10040T-2R2N	SRP1040-2R2M
TDK	CLF10040T-3R3N	SRP1040-3R3M
TDK	CLF10040T-4R7N	SRP1040-4R7M
TDK	CLF10040T-6R8N	SRP1040-6R8M
TDK	CLF10040T-100M	SRP1040-100M
TDK	CLF10040T-150M	SRP1040-150M
TDK	CLF10040T-220M	SRP1040-220M
TDK-series	LTF5018T	SRU5018
TDK	LTF5018T-4R7N1R2-LC	SRU5018-4R7Y
TDK	LTF5018T-6R8N1R0-LC	SRU5018-6R8Y

Inductors

Designer Kits →

Overview

- SMD Non-shielded, Semi Shielded, Fully Shielded and High Current Inductors
- 15 Kits available and 6 Kits in preparation

Bourns® SMD Non-Shielded Power Inductor Design Kit Power Management Applications

RoHS
Compliant

RoHS Directive 2002/95/EC Jan 27 2003
Including Annex

- Bourns® 3 mm to 8 mm SDR Series**
- SDR0302 Series: 8 Inductance Values / 3 Components Each Min.
 - SDR0403 Series: 8 Inductance Values / 3 Components Each Min.
 - SDR0604 Series: 8 Inductance Values / 3 Components Each Min.
 - SDR0805 Series: 8 Inductance Values / 3 Components Each Min.

Design Kits for most Bourns® product lines are available.
Contact your nearest Bourns sales office for more information.



SDR-LAB1

BOURNS®

Bourns® SMD Shielded Power Inductor Design Kit Power Management Applications

RoHS
Compliant

RoHS Directive 2002/95/EC Jan 27 2003
Including Annex

- Bourns® 12 mm SRR Series**
- SRR1240 Series: 8 Inductance Values / 3 Components Each Min.
 - SRR1260 Series: 8 Inductance Values / 3 Components Each Min.
 - SRR1280 Series: 8 Inductance Values / 3 Components Each Min.
 - SRR1210 Series: 8 Inductance Values / 3 Components Each Min.

Design Kits for most Bourns® product lines are available.
Contact your nearest Bourns sales office for more information.



SRR-LAB3

BOURNS®

Bourns® SMD Shielded Power Inductor Design Kit Power Management Applications

RoHS
Compliant

RoHS Directive 2002/95/EC Jan 27 2003
Including Annex

Bourns® 7 mm to 18 mm SRR Series

- SRR7032 Series: 8 Inductance Values / 3 Components Each Min.
- SRR7045 Series: 8 Inductance Values / 3 Components Each Min.
- SRR1005 Series: 8 Inductance Values / 3 Components Each Min.
- SRR1806 Series: 8 Inductance Values / 3 Components Each Min.

Design Kits for most Bourns® product lines are available.
Contact your nearest Bourns sales office for more information.



SRR-LAB2

BOURNS®

Bourns® SMD High Current Power Inductor Design Kit Power Management Applications

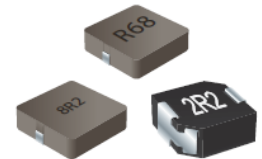
RoHS
Compliant

RoHS Directive 2002/95/EC Jan 27 2003
Including Annex

Bourns® 4 mm & 7 mm SRP Series

- SRP4020 Series (Flat Wire): 8 Inductance Values / 3 Components Each Min.
- SRP7030 Series (Round Wire): 8 Inductance Values / 3 Components Each Min.
- SRP7030F Series (Flat Wire): 16 Inductance Values / 3 Components Each Min.

Design Kits for most Bourns® product lines are available.
Contact your nearest Bourns sales office for more information.



SRP-LAB1

BOURNS®

BOURNS®

Inductors → Bourns Part-number Selection

TI - WEBENCH

My Designs

Back New Solutions Visualizer BOM Charts Schematic Optimize Op Vals Sim Thermal

Optimization Tuning

Lowest BOM Cost
Smallest Footprint
Highest Efficiency

Footprint: 411 BOM Cost: \$2.87 Efficiency: 80

Current Design: #51

IC	LM22676
VinMin	14 V
VinMax	22 V
Vout	3.3 V
Iout	2 A
ta	30
Optimization Factor	3

BILL OF MATERIALS

Export to: ☒ Excel BOM Cost: \$2.87 'Footprint is component footp

Part	Manufactur	Part Number	Qua	Price	Attributes	Foot	Top View
Cbst	Kemet	C0805C103K5RAC	1	\$0.01	Cap=10nF, ESR=1.7390hm, VDC=50V	13	
Cin	TDK	C3216X7R1H105K	2	\$0.05	Cap=1uF, ESR=0.010hm, VDC=50V	19	
Cout	TDK	C3216X5R0J476M	1	\$0.25	Cap=47uF, ESR=2m0hm, VDC=6.3V	19	
D1	Diodes Inc.	B340A-13-F	1	\$0.13	VFatlo=0.5V, Io=3A, VRRM=40V	37	
L1	Bourns	SRR1240-150M	1	\$0.43	L=15uH, DCR=0.0470hm, IDC=3.5A	210	
U1	National Sem	LM22676MR-ADJ	1	\$1.92		56	
Rfb1	Panasonic	ERJ-6ENF1001V	1	\$0.01	Resistance=	13	

Inductors →

Parametric Search

- www.bourns.com – Magnetics Page



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- ▶ Circuit Protection
- ▶ CO & Outside Plant Products
- ▶ Connectors
- ▶ Diodes
- ▶ Encoders
- ▶ LED Shunt Protectors
- ▶ Magnetic Products
- ▶ Microelectronic Modules
- ▶ Position Sensors
- ▶ Potentiometers
- ▶ Resistive Products
- ▶ Surge Protective Devices (SPDs)
- ▶ Switches
- ▶ Switching Spark Gap



Parametric Search

Magnetics, Inductors ▼

Inductance (μH) ▼
Current (mA) ▼
DCR (Ohms) ▼

Results

PART NUMBER	Inductance (μH)	Current (mA)	DCR (Ohms)	Coil Type	ProductCategory
SRN3015-100M	10	1000	0.276	SMPSS-Surface Mount, Power Semi-Shielded	Power Inductors (Semi-shielded)

The background is a deep blue gradient. A bright, white, curved light streak sweeps across the upper half of the image. Below this, numerous out-of-focus light circles (bokeh) are scattered across the lower half, creating a sense of depth and movement.

Thank you!

BOURNS®