



VERSAL Discrete Solution

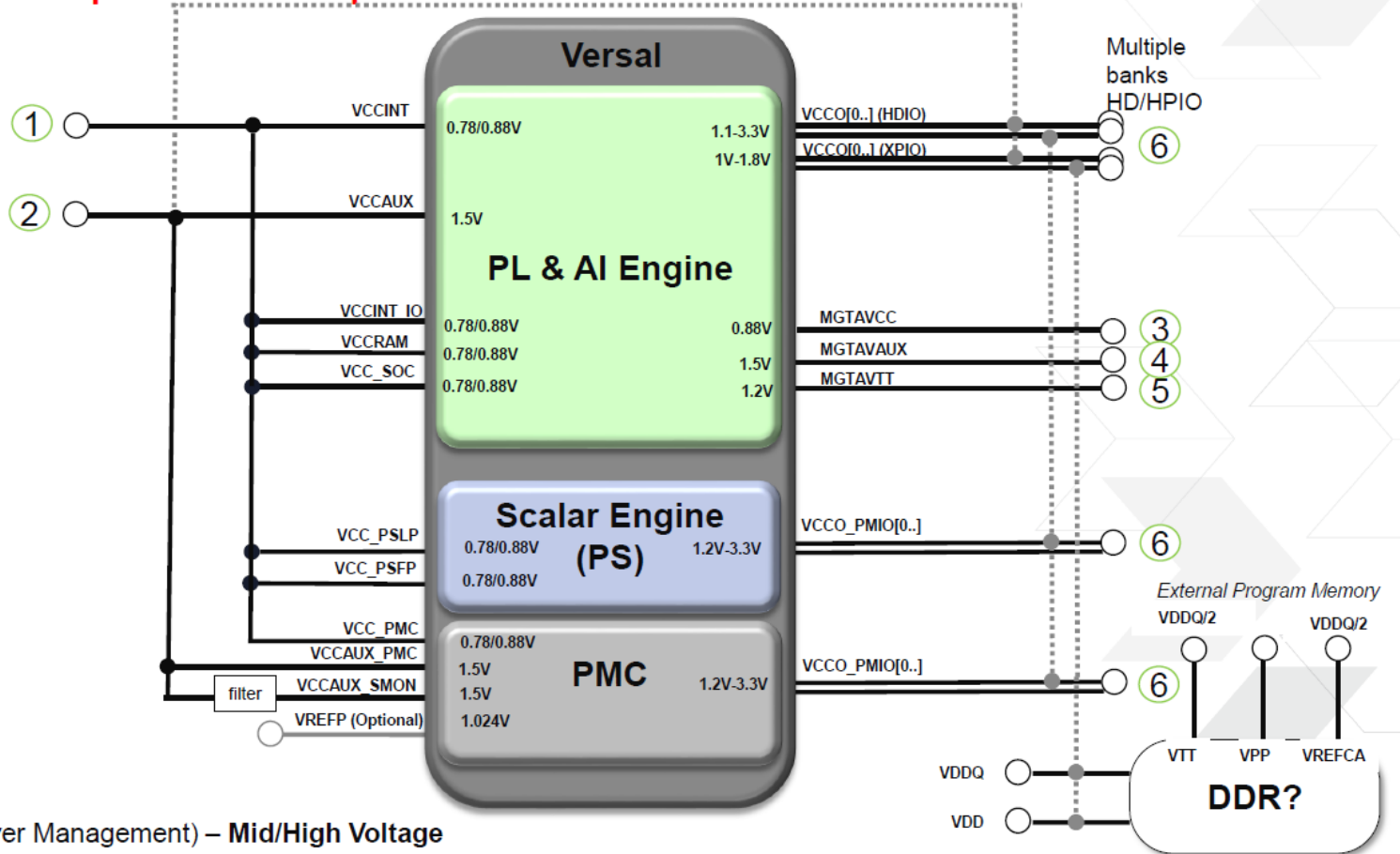
May 01, 2019

MPS[®]
Simple, Easy Solutions™

VERSAL - UC1, UC2
UC1- Always ON, Optimized for cost
UC3 – Always ON, Optimized for PL performance

VERSAL UC1, UC3

UC1: Always on - Optimized for cost
 UC3: Always on - Optimized for PL performance



Minimum Rails (No Power Management) – Mid/High Voltage

MPS solutions for VERSAL UC1,UC3

Always ON, Optimized for cost & performance

Discrete (Lowest cost)

Rail	Power Rail	Vin (V)	Vout (V)	Tolerance (%)	Iout (A)	MPS part#	Area (mm2)	Efficiency	PMBus/I2C
Rail1	VCCINT, VCC_PSLP, VCC_PSFP, VCC_PMC VCC_IO, VCCRAM, VCC_SOC	12	0.78	3%	165	MP8796 (6x)	1500	90%	no
Rail2	VCCAUX, VCCAUX_SMON, VCCAUX_PMC	12	1.5	3%	3.9	MP2326	90	85%	no
Rail3	MGTYAVCC	12	0.88	3%	3.1	MP2326	90	82%	no
Rail4	MGTYAUAUX	12	1.5	3%	0.3	MP2321	90	82%	no
Rail5	MGTYAVTT	12	1.2	3%	4.8	MP8770C	170	94%	no
Rail6	VCCO [1..] HDIO - 1.1V-3.3V	12	1.8	5%	4	MP2326	90	85%	no
Total							2030	89.5%	

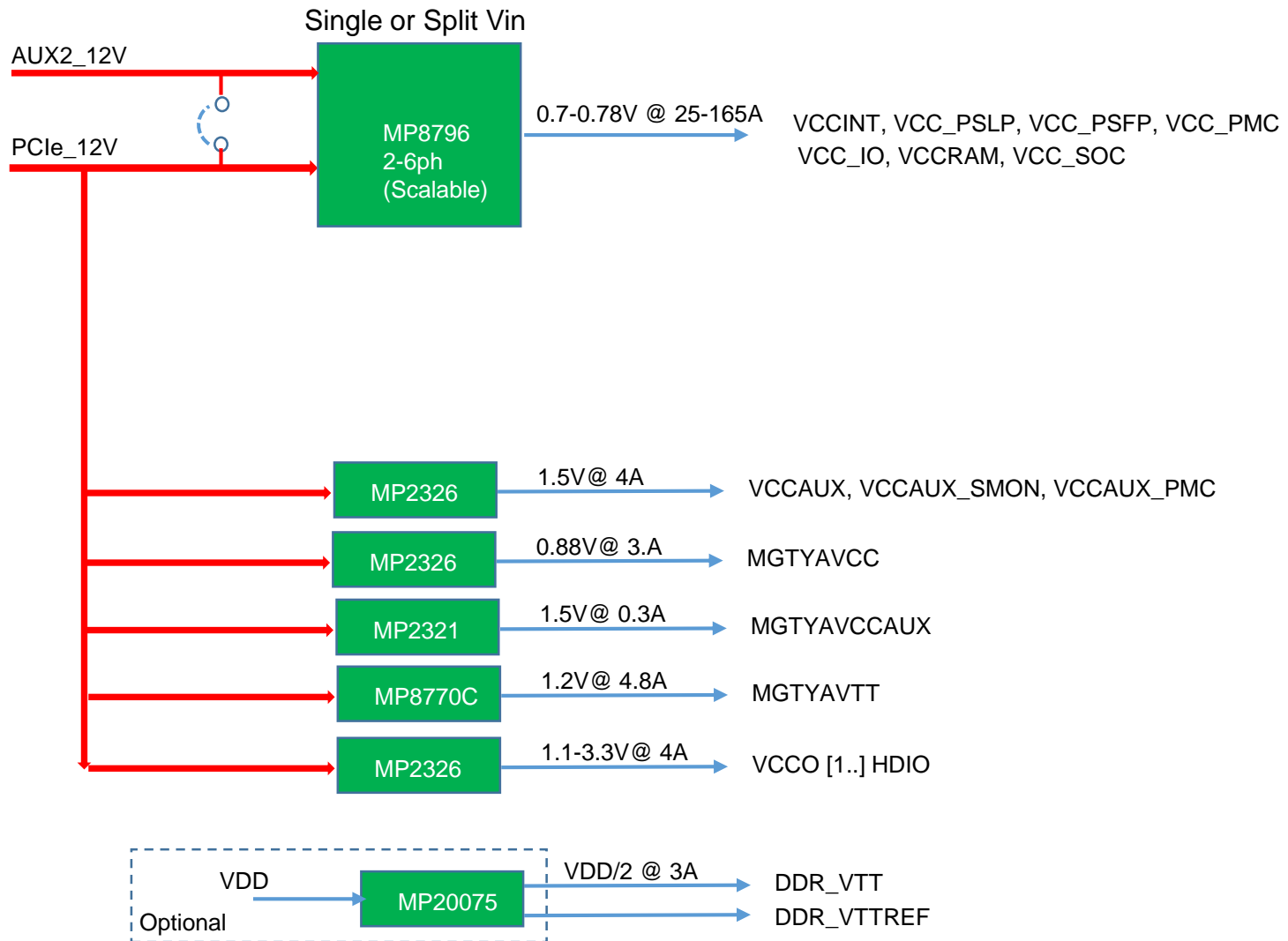
PMBus/I2C

Rail	Power Rail	Vin (V)	Vout (V)	Tolerance (%)	Iout (A)	MPS part#	Area (mm2)	Efficiency	PMBus/I2C
Rail1	VCCINT, VCC_PSLP, VCC_PSFP, VCC_PMC VCC_IO, VCCRAM, VCC_SOC	12	0.78	3%	165	MP8796B (6x)	1500	90%	yes
Rail2	VCCAUX, VCCAUX_SMON, VCCAUX_PMC	12	1.5	3%	3.9	MP8854	90	94%	yes
Rail3	MGTYAVCC	12	0.88	3%	3.1	MP8854	90	89%	yes
Rail4	MGTYAUAUX	12	1.5	3%	0.3	MP2321	90	82%	no
Rail5	MGTYAVTT	12	1.2	3%	4.8	MP8865	190	86%	yes
Rail6	VCCO [1..] HDIO - 1.1V-3.3V	12	1.8	5%	4	MP8854	90	94%	yes
Total							2050	90.1%	

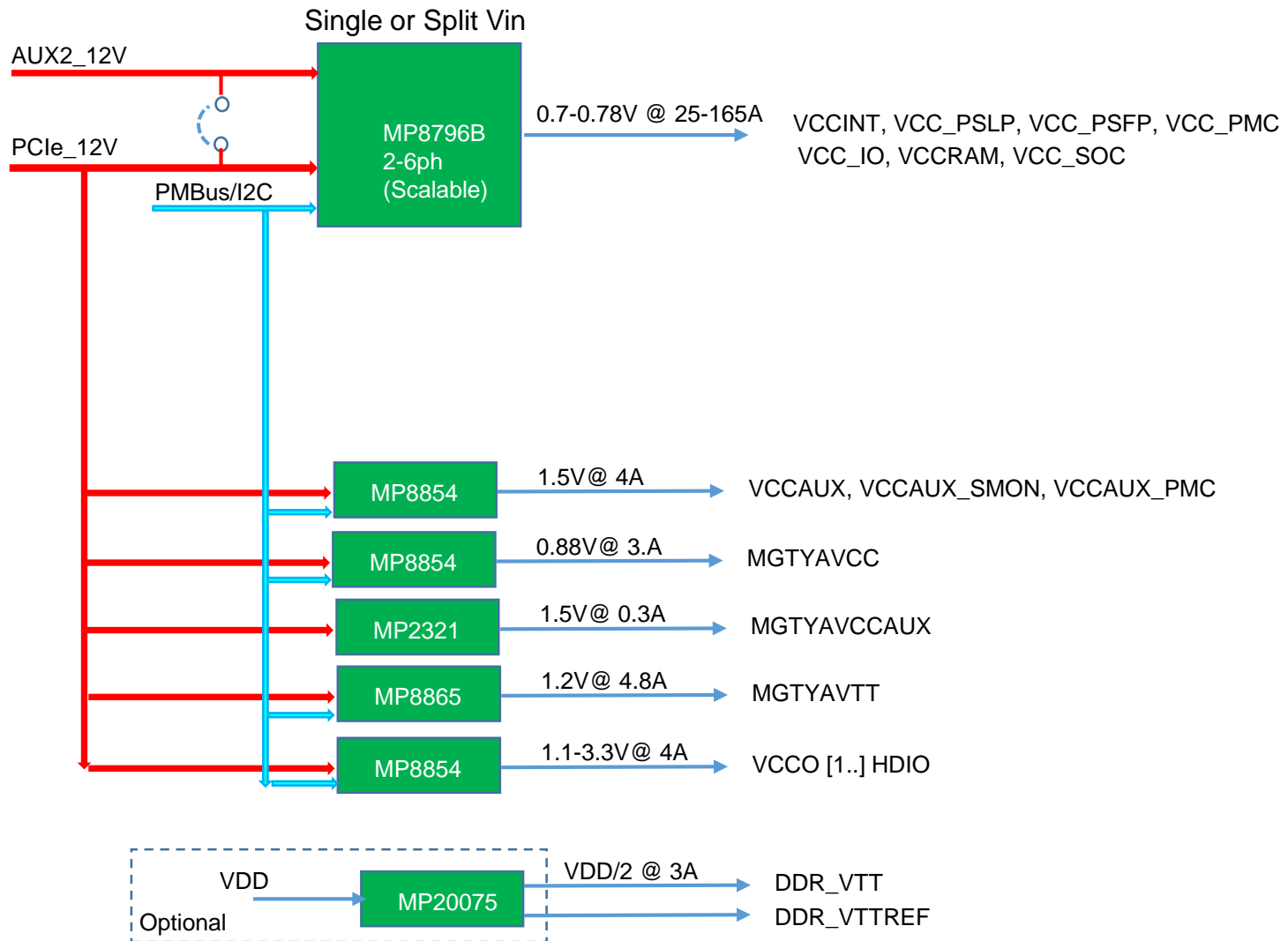
Please contact MPS for pricing

VERSAL UC1,UC3

Lowest Cost

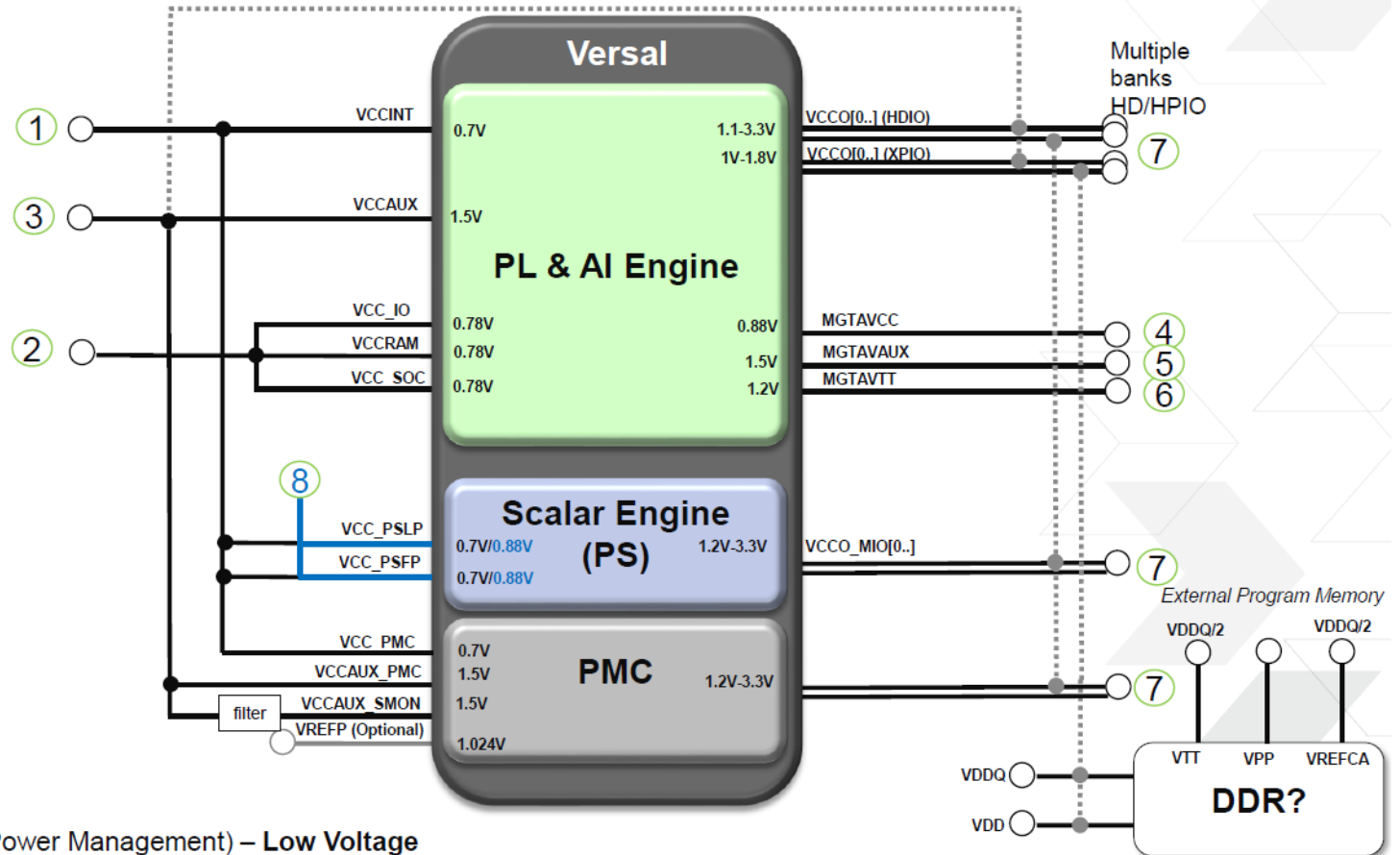


VERSAL UC1,UC3 with PMBus/I2C



VERSAL – UC2
UC2- Always ON, Optimized for Efficiency

UC2 – Always On, Optimized for Efficiency



Minimum Rails (No Power Management) – Low Voltage

MPS solutions for VERSAL UC2

Always ON, Optimized for Power/efficiency

Discrete (Lowest cost)

Rail	Power Rail	Vin (V)	Vout (V)	Tolerance (%)	Iout (A)	MPS part#	Area (mm2)	Efficiency	PMBus/I2C
Rail1	VCCINT, VCC_PSLP, VCC_PSPF, VCC_PMC	12	0.7	3%	165	MP8796 (6x)	1500	90%	no
Rail2	VCC_IO, VCCRAM, VCC_SOC	12	0.78	3%	6	MP8770C	170	90%	no
Rail3	VCCAUX, VCCAUX_SMON, VCCAUX_PMC	12	1.5	3%	3.9	MP2326	90	85%	no
Rail4	MGTYAVCC	12	0.88	3%	3.1	MP2326	90	82%	no
Rail5	MGTYAUAUX	12	1.5	3%	0.3	MP2321	90	82%	no
Rail6	MGTYAVTT	12	1.2	3%	4.8	MP8770C	170	94%	no
Rail7	VCCO [1..] HDIO - 1.1V-3.3V	12	1.8	5%	4	MP2326	90	85%	no
Total							2200	89.5%	

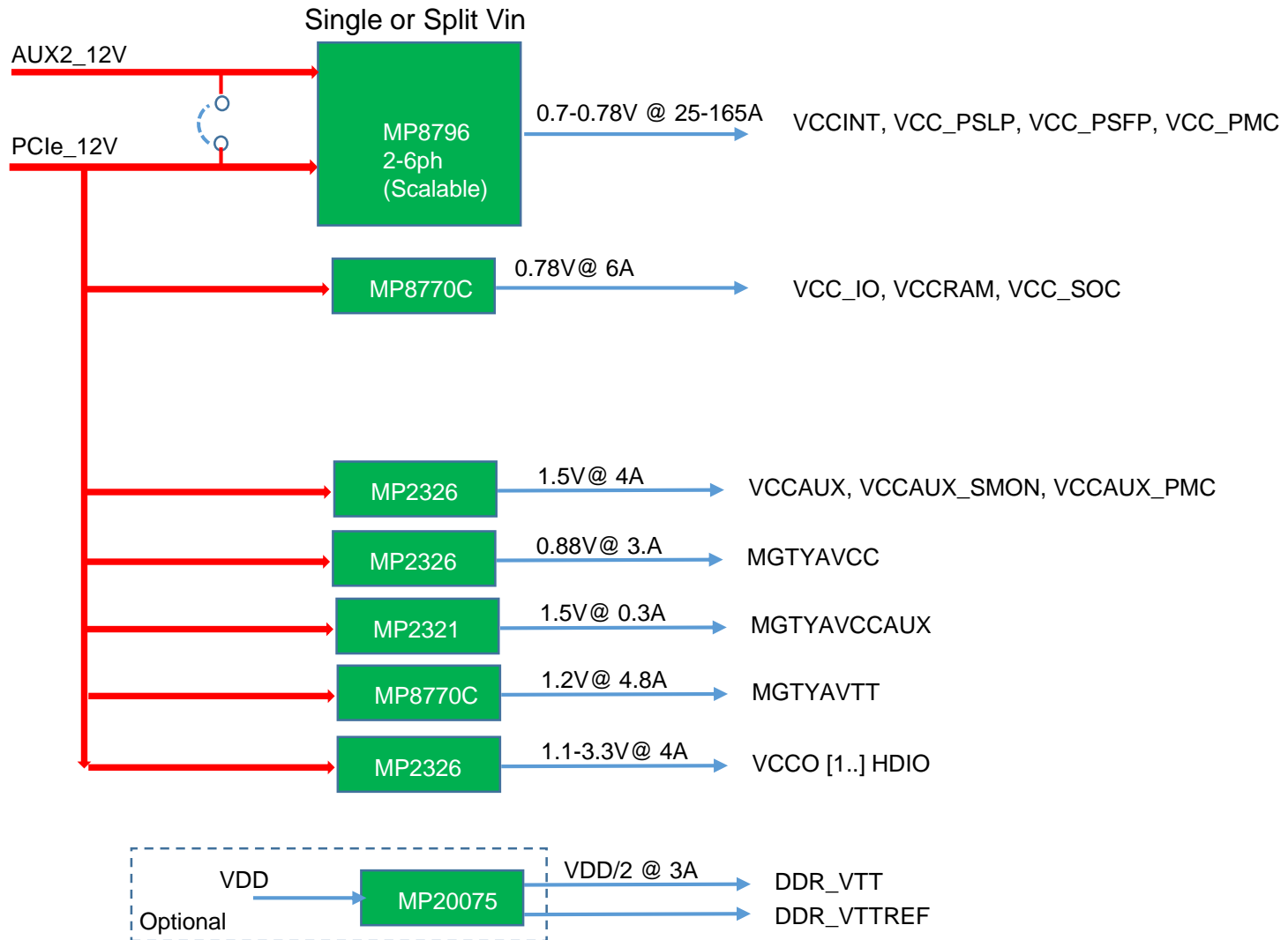
PMBus/I2C

Rail	Power Rail	Vin (V)	Vout (V)	Tolerance (%)	Iout (A)	MPS part#	Area (mm2)	Efficiency	PMBus/I2C
Rail1	VCCINT, VCC_PSLP, VCC_PSPF, VCC_PMC	12	0.7	3%	165	MP8796B (6x)	1500	90%	yes
Rail2	VCC_IO, VCCRAM, VCC_SOC	12	0.78	3%	6	MP8865	190	80%	yes
Rail3	VCCAUX, VCCAUX_SMON, VCCAUX_PMC	12	1.5	3%	3.9	MP8854	90	94%	yes
Rail4	MGTYAVCC	12	0.88	3%	3.1	MP8854	90	89%	yes
Rail5	MGTYAUAUX	12	1.5	3%	0.3	MP2321	90	82%	no
Rail6	MGTYAVTT	12	1.2	3%	4.8	MP8865	190	86%	yes
Rail7	VCCO [1..] HDIO - 1.1V-3.3V	12	1.8	5%	4	MP8854	90	94%	yes
Total							2240	89.8%	

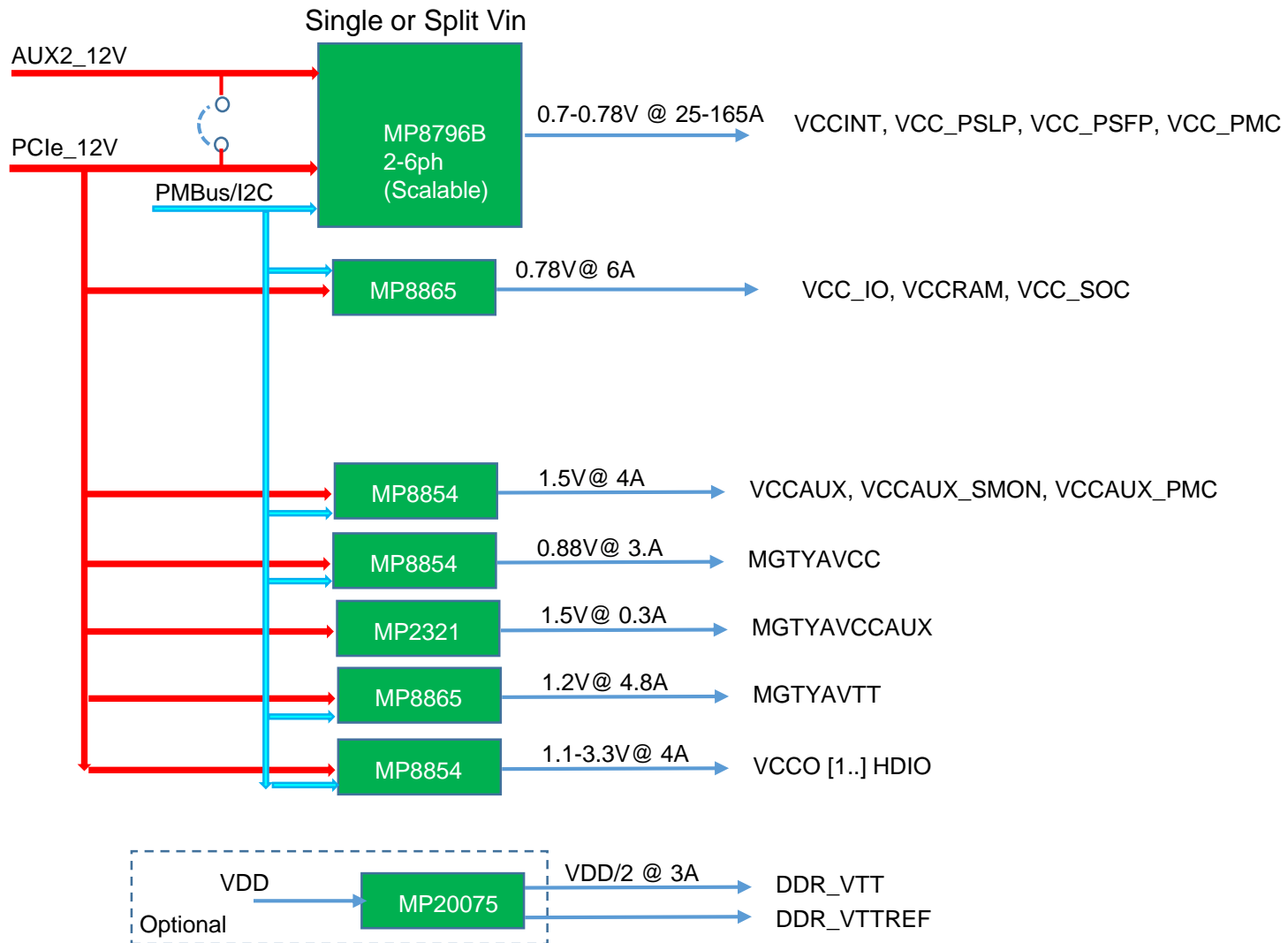
Please contact MPS for pricing

VERSAL UC2

Lowest cost



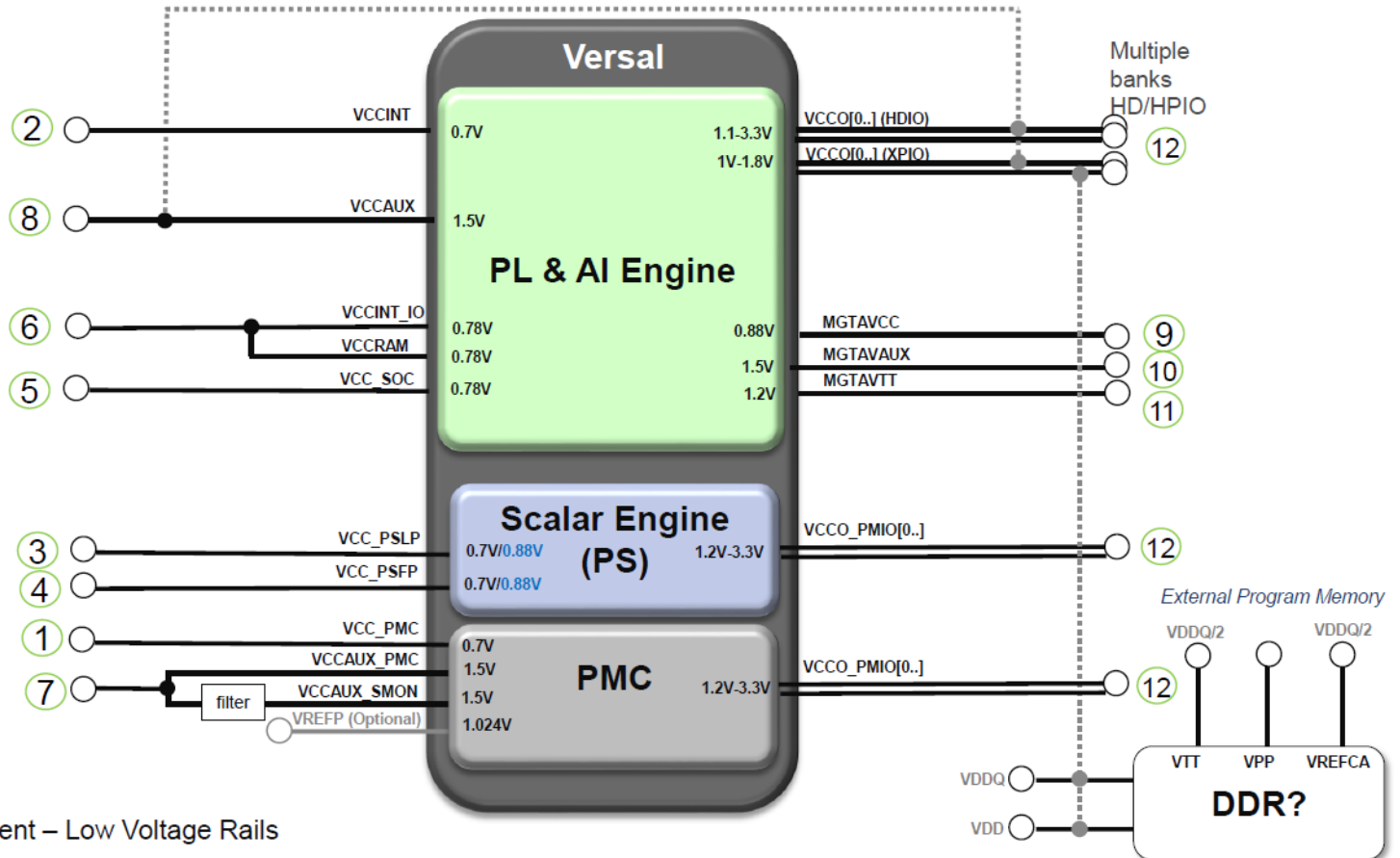
VERSAL UC2 with PMBus/I2C



VERSAL – UC4

UC4- Full Power Management Flexibility

UC4 - Full Power Management Flexibility – Low Voltage



Full Power Management – Low Voltage Rails

MPS solutions for VERSAL UC4

UC4 – Full Power Management Flexibility

Discrete (Lowest cost)

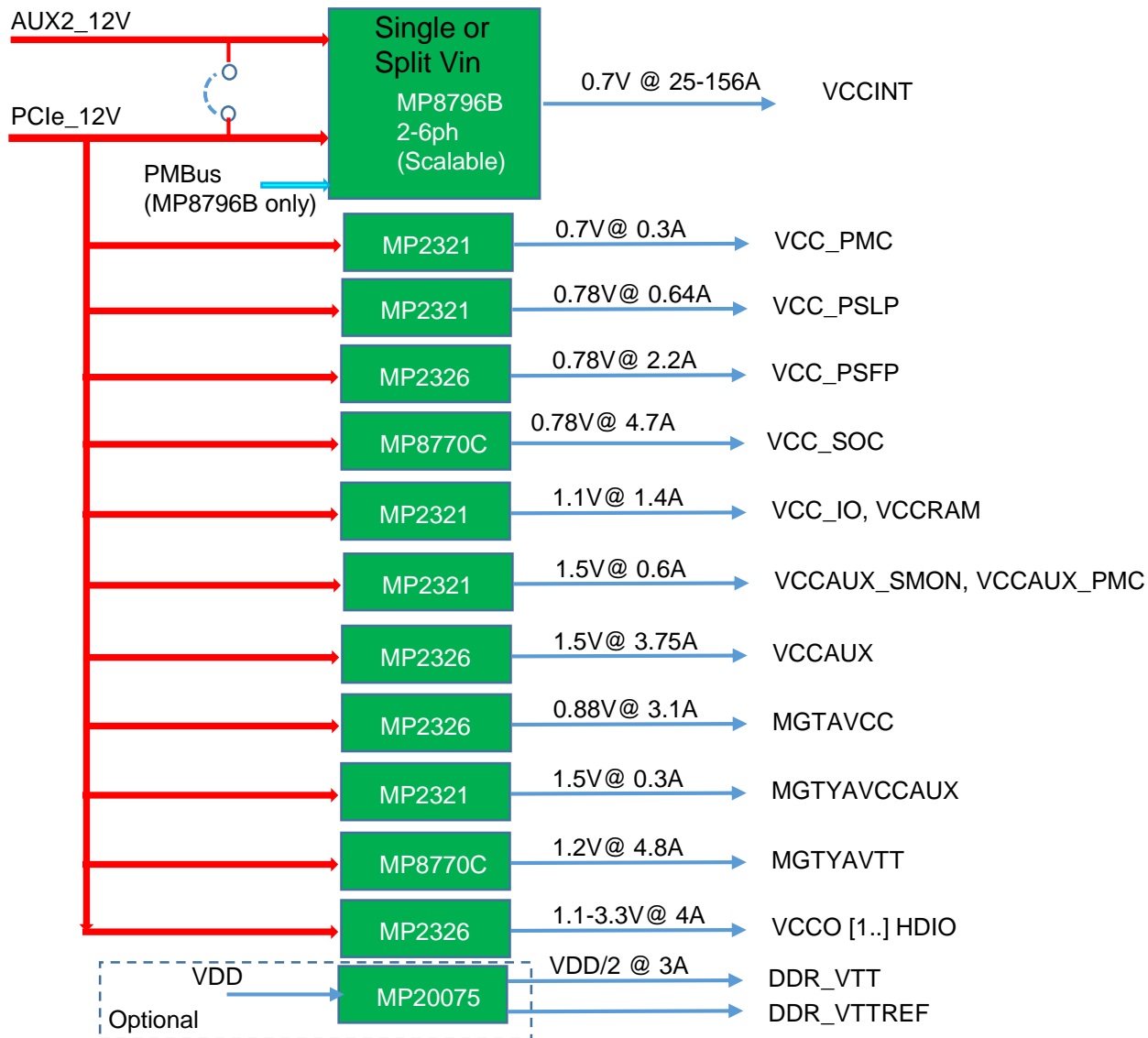
Rail	Power Rail	Vin (V)	Vout (V)	Tolerance (%)	Iout (A)	MPS part#	Area (mm2)	Efficiency	PMBus/I2C
Rail1	VCC_PMC	12	0.7	3%	0.3	MP2321	90	80%	no
Rail2	VCCINT	12	0.7	3%	156	MP8796 (6x)	1500	90%	no
Rail3	VCC_PSLP	12	0.78	3%	0.64	MP2321	90	83%	no
Rail4	VCC_PSFPP	12	0.78	3%	2.2	MP2326	90	84%	no
Rail5	VCC_SOC	12	0.78	3%	4.7	MP8770C	170	90%	no
Rail6	VCC_IO, VCCRAM	12	1.1	3%	1.4	MP2321	90	87%	no
Rail7	VCCAUX_SMON, VCCAUX_PMC	12	1.5	3%	0.16	MP2321	90	84%	no
Rail8	VCCAUX	12	1.5	3%	3.75	MP2326	90	86%	no
Rail9	MGTYAVCC	12	0.88	3%	3.1	MP2326	90	82%	no
Rail10	MGTYAVALUX	12	1.5	3%	0.3	MP2321	90	83%	no
Rail11	MGTYAVTT	12	1.2	3%	4.8	MP8770C	170	90%	no
Rail12	VCCO [1..] HDIO - 1.1V-3.3V	12	1.8	5%	4	MP2326	90	85%	no

Total 2650 89.2%

Please contact MPS for pricing

VERSAL UC4

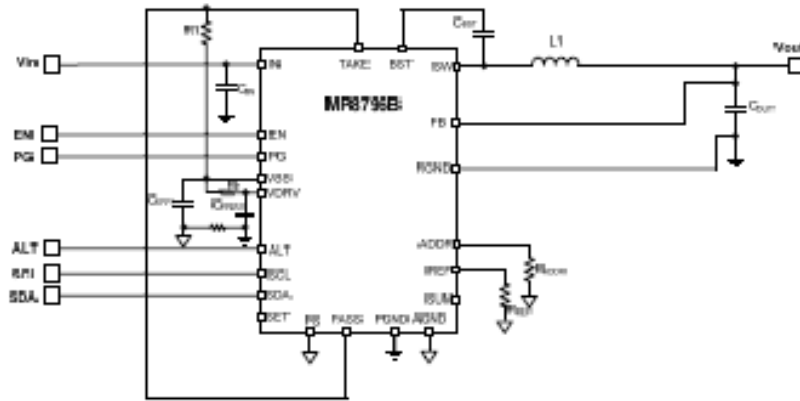
Lowest cost



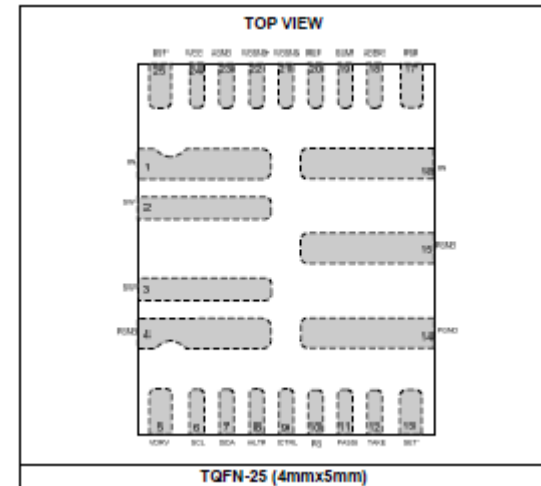
Discrete

- MP8796/B
- MP8770C
- MP8865
- MP8854
- MP8904
- MP2326
- MP2321
- MP20075

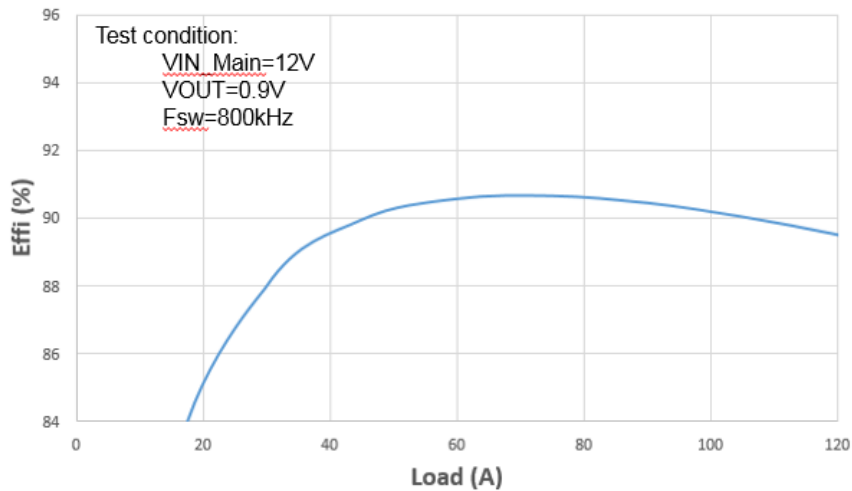
Schematics



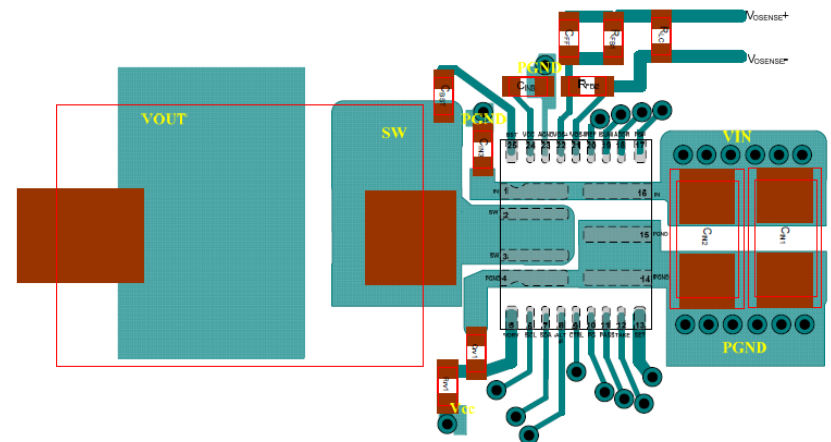
Package



Efficiency



Layout



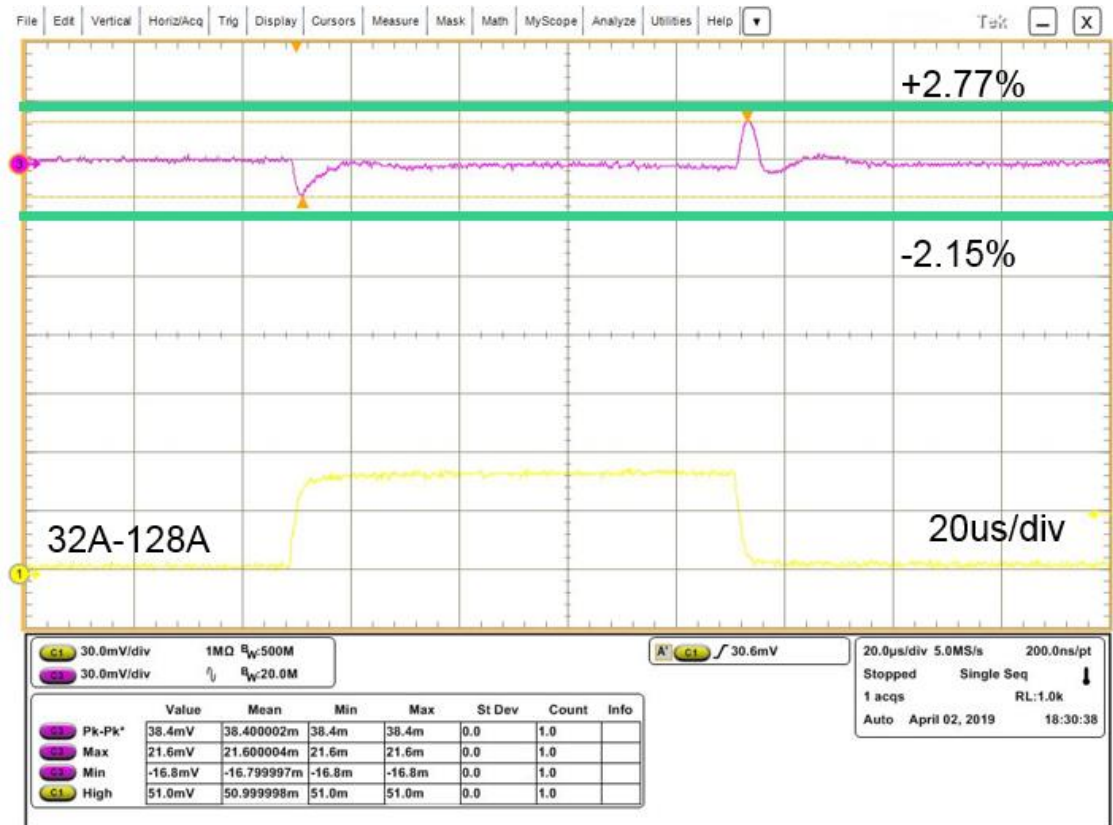
MP8796/B

Transient performance

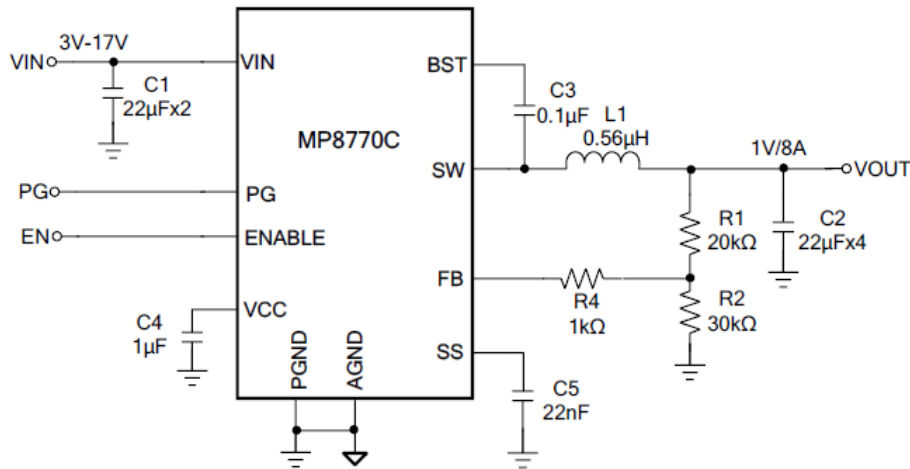
Parameter	Value
Input voltage	12V
Output voltage	0.78V
Transient load step	96A
Slew rate	100A/us
Switching frequency	600kHz
Number of phases	6
Inductor P/N	Cooper FP1008-R100
Inductance	100nH
Maximum output current	180A
Ceramic output capacitor	47uFx4 per phase 6.3V 0805
SP-Cap output capacitor	220uFx9 total

VOUT/AC
(20mV/div)

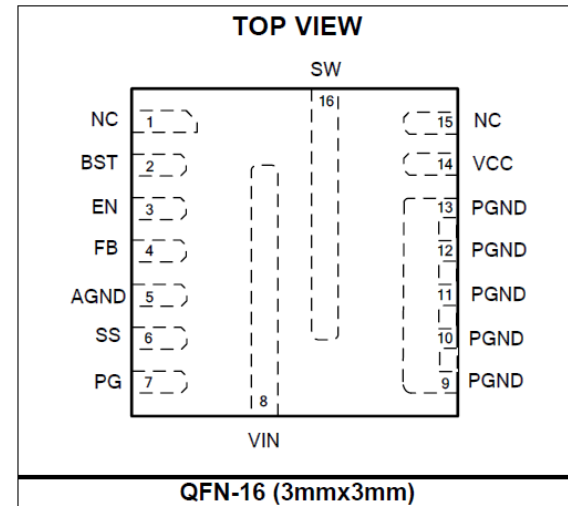
IOUT
(0.5mV/A)



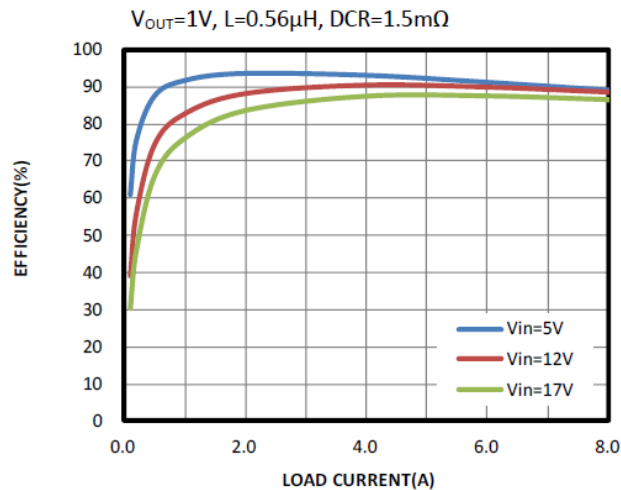
Schematics



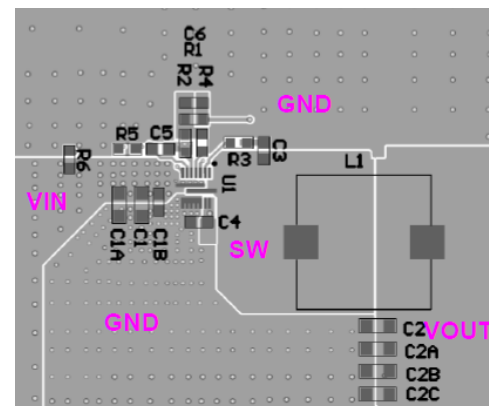
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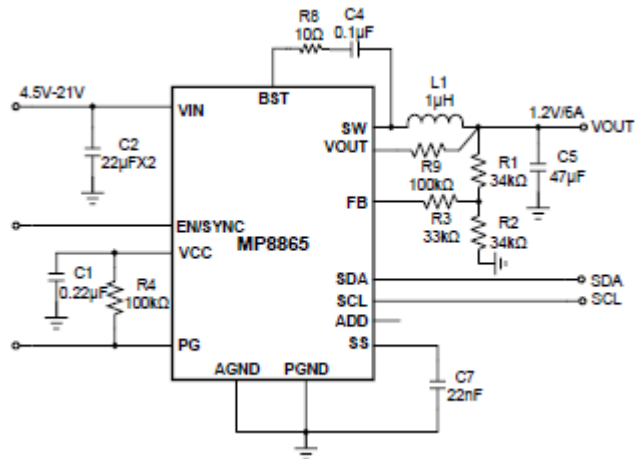
Efficiency



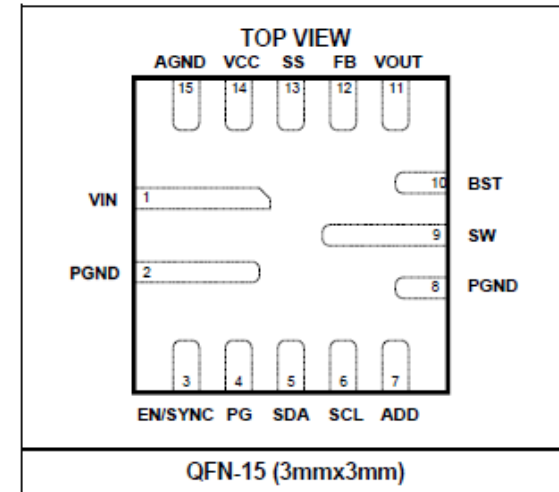
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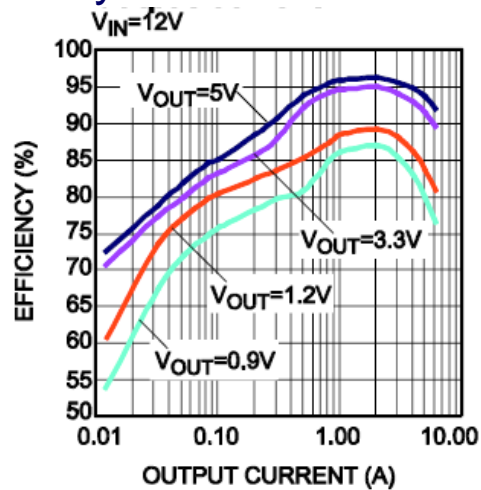
Schematics



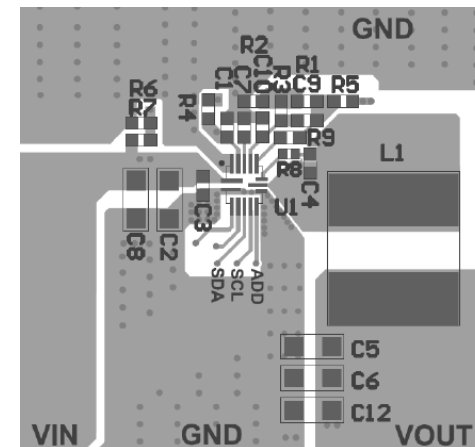
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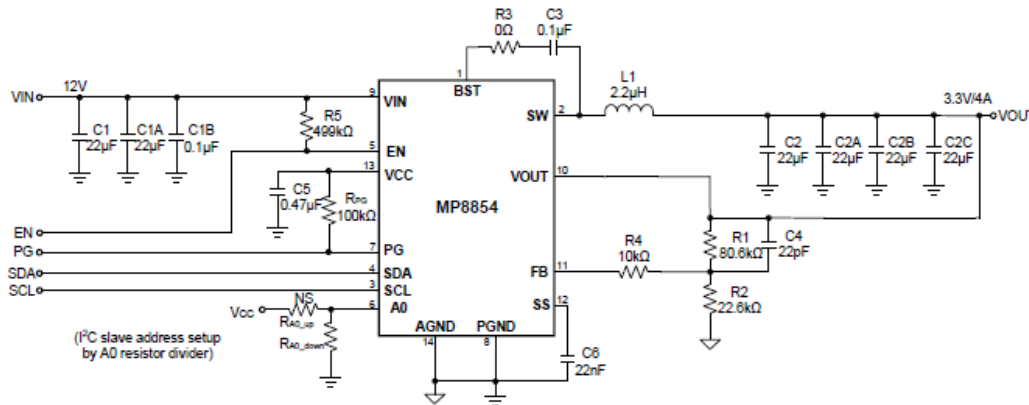
Efficiency



Layout

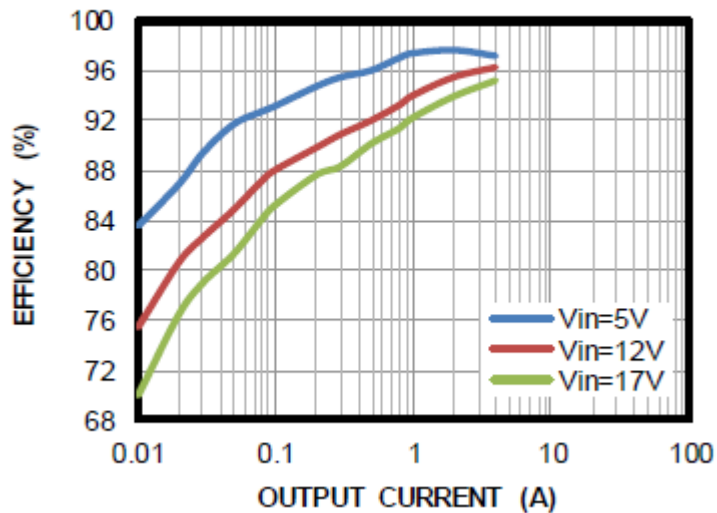


Schematics

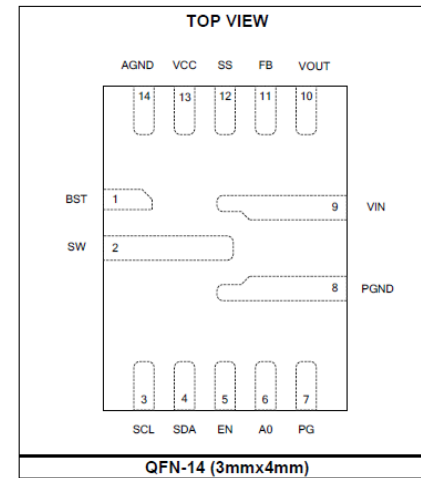


Efficiency vs. Output Current

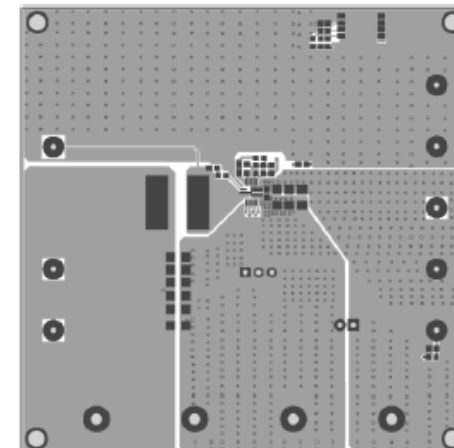
$V_{OUT}=3.3V$, $L=2.2\mu H$, $DCR=3m\Omega$



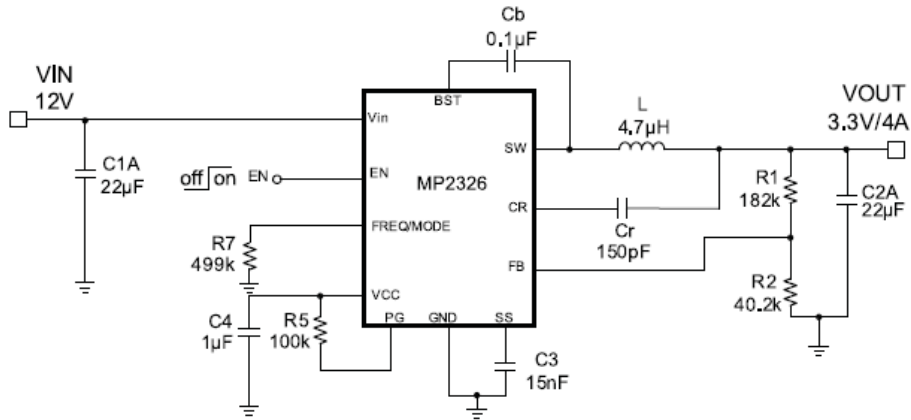
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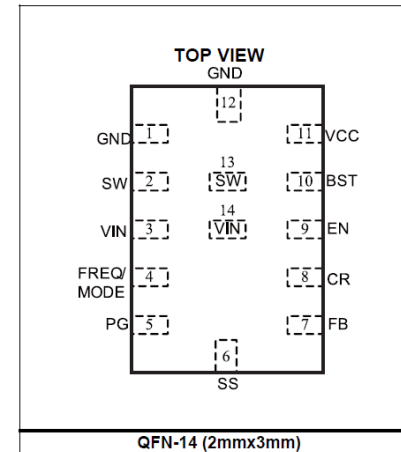
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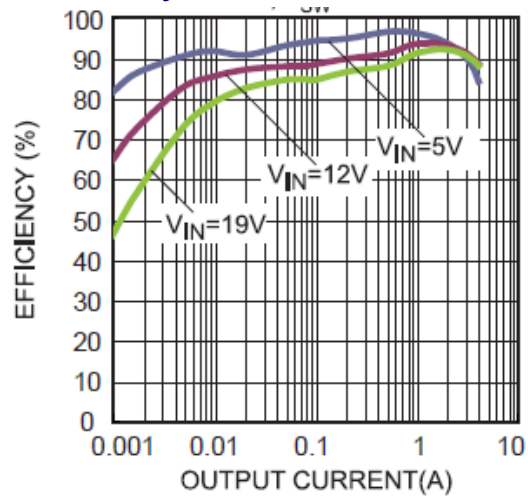
Schematics



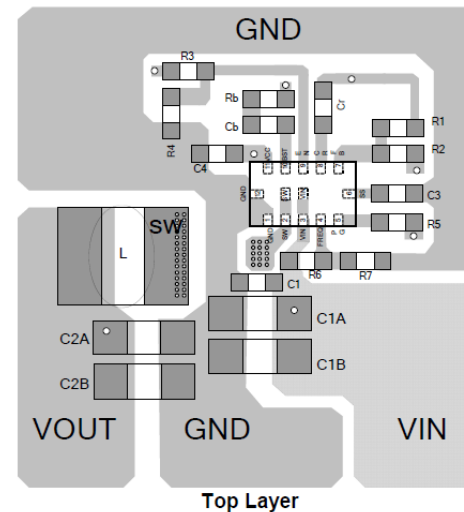
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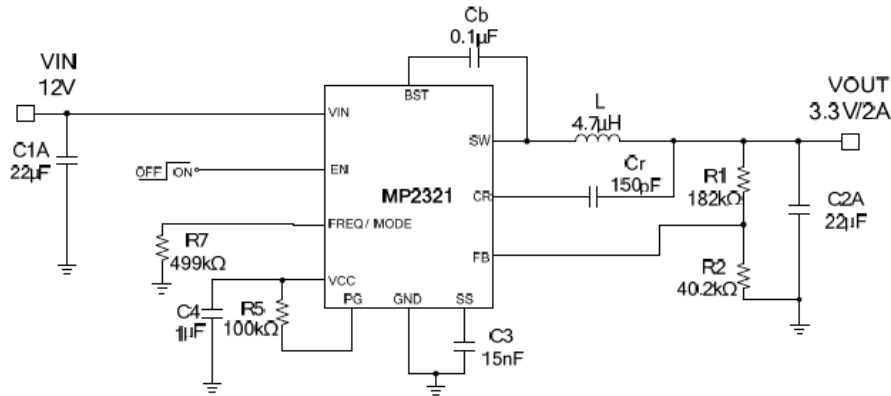
Efficiency



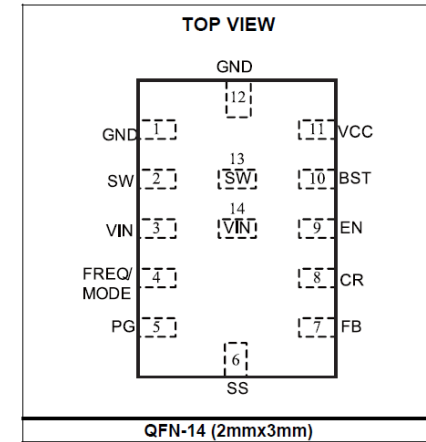
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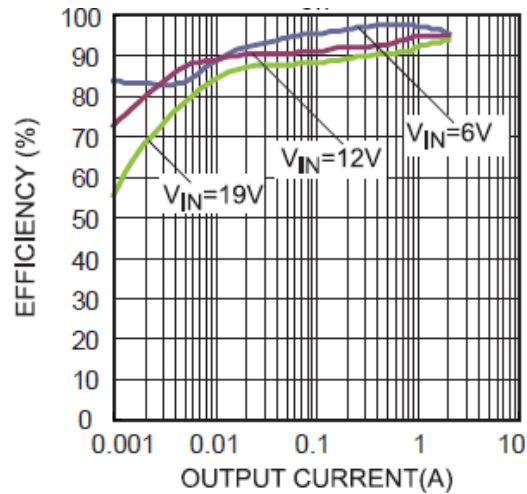
Schematics



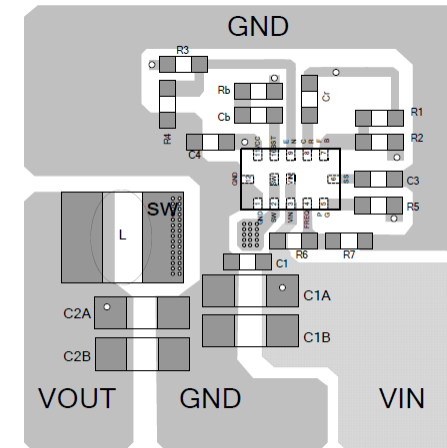
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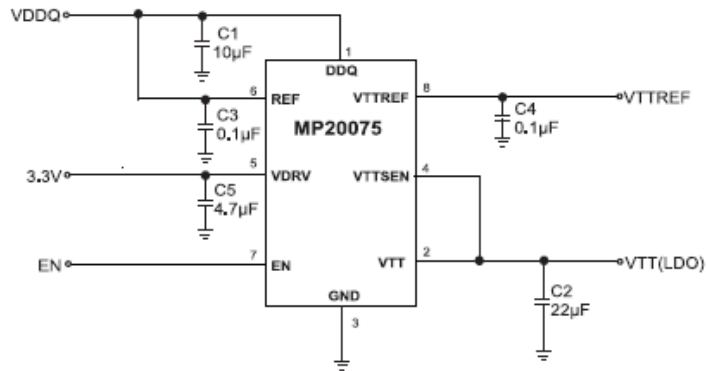
Efficiency



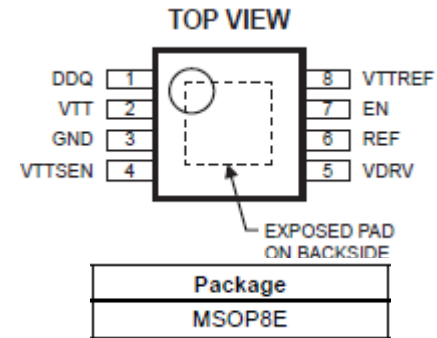
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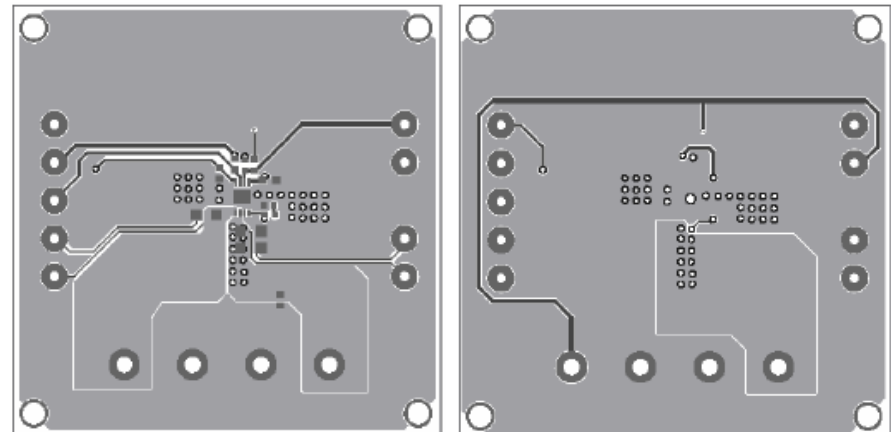
Schematics



Package



Layout



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MPS Reference Design Team at referencedesign@monolithicpower.com

For general information

<http://www.monolithicpower.com>