

WEBENCH® Design Report

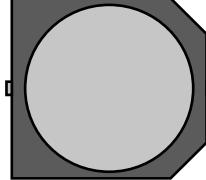
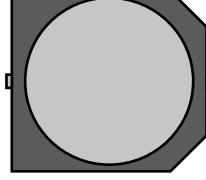
Design : 11 LM5171PHPR
 LM5171PHPR 40V-52V to 24.00V @ 60A

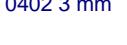
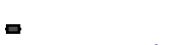
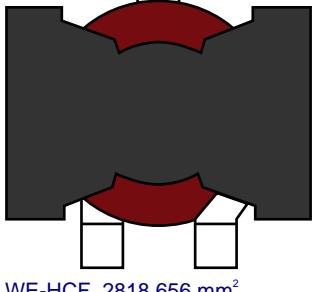
VinMin = 40.0V
 VinMax = 52.0V
 Vout = 24.0V
 Iout = 60.0A

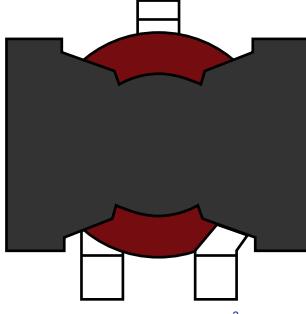
Device = LM5171PHPR
 Topology = Buck
 Created = 2026-01-21 16:14:23.066
 BOM Cost = \$37.59
 BOM Count = 90
 Total Pd = 58.28W

Electrical BOM

Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Ccomp1	MuRata	GRM155R61A103KA01D Series= X5R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Ccomp2	MuRata	GRM155R61A103KA01D Series= X5R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Ccs1	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Ccs2	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	0402 3 mm ²
Chb1	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 35.47 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	0805 7 mm ²

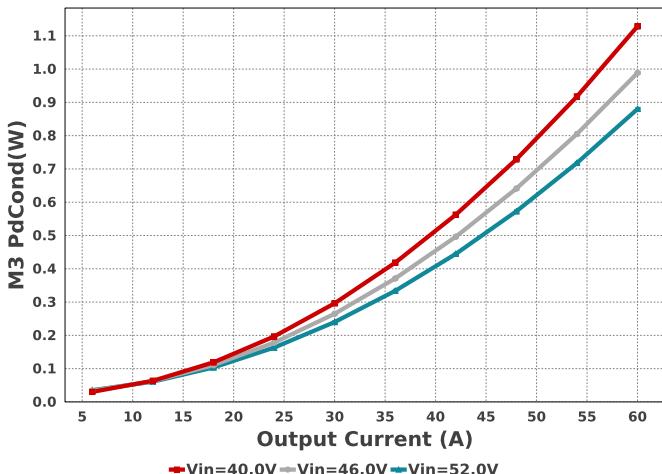
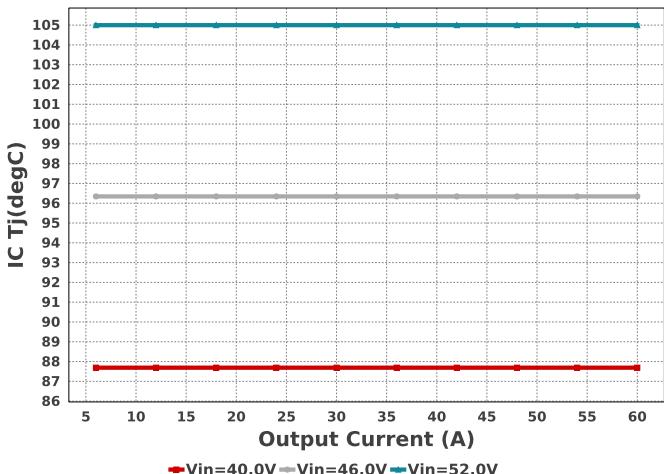
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Chb2	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 35.47 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	■ 0805 7 mm ²
Chcomp	MuRata	GRM155R71A563KA01D Series= X7R	Cap= 56.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Chf1	MuRata	GRM155R71H561KA01D Series= X7R	Cap= 560.0 pF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Chf2	MuRata	GRM155R71H561KA01D Series= X7R	Cap= 560.0 pF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Chhf	Kemet	C0805C331J5GACTU Series= C0G/NP0	Cap= 330.0 pF ESR= 38.0 mOhm VDC= 50.0 V IRMS= 1.04 A	1	\$0.01	■ 0805 7 mm ²
Chv	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 35.47 mOhm VDC= 50.0 V IRMS= 1.64 A	1	\$0.01	■ 0805 7 mm ²
Chv1	Panasonic	EEV-FK1K331M Series= FK	Cap= 330.0 uF ESR= 170.0 mOhm VDC= 80.0 V IRMS= 793.0 mA	2	\$0.98	
Chv2	Panasonic	EEV-FK1K331M Series= FK	Cap= 330.0 uF ESR= 170.0 mOhm VDC= 80.0 V IRMS= 793.0 mA	2	\$0.98	
Cimon1	MuRata	GRM155R61A103KA01D Series= X5R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Cimon2	MuRata	GRM155R61A103KA01D Series= X5R	Cap= 10.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Cipk	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Ciset	Kemet	C0805C101K5GACTU Series= C0G/NP0	Cap= 100.0 pF ESR= 74.0 mOhm VDC= 50.0 V IRMS= 524.0 mA	1	\$0.01	■ 0805 7 mm ²
Clcomp	MuRata	GRM155R71A333KA01D Series= X7R	Cap= 33.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²
Clhf	MuRata	GRM155R71H122KA01D Series= X7R	Cap= 1.2 nF ESR= 1.0 mOhm VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	■ 0402 3 mm ²

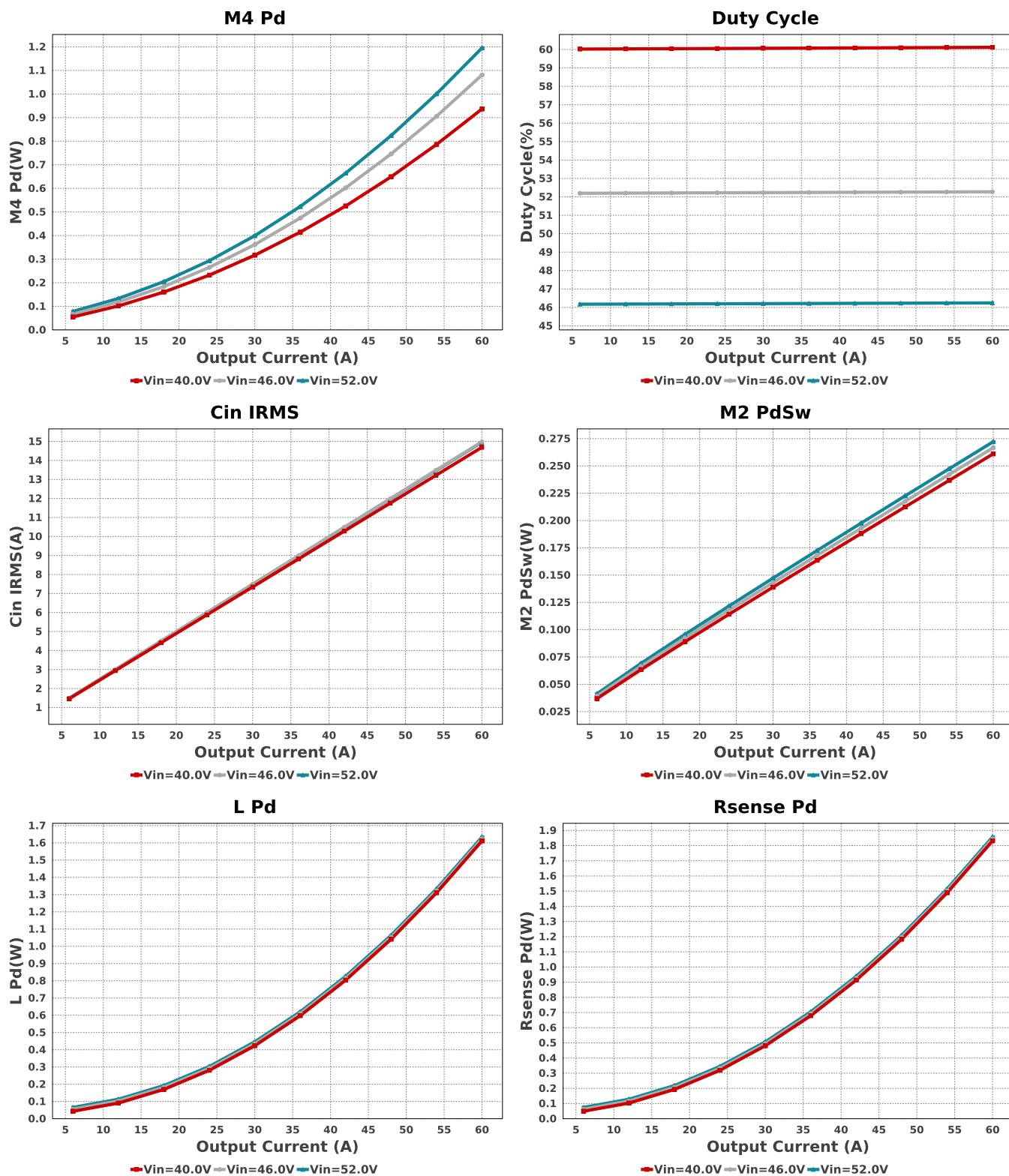
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Clv1	Chemi-Con	EMVY350ADA221MHA0G Series= MVY	Cap= 220.0 uF ESR= 300.0 mOhm VDC= 35.0 V IRMS= 450.0 mA	2	\$0.28	 CAPSMT_62_HA0 106 mm ²
Clv2	Chemi-Con	EMVY350ADA221MHA0G Series= MVY	Cap= 220.0 uF ESR= 300.0 mOhm VDC= 35.0 V IRMS= 450.0 mA	2	\$0.28	 CAPSMT_62_HA0 106 mm ²
Css	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
Cuv	MuRata	GRM155C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
Cvcc	MuRata	GRM21BR71A225KA01L Series= X7R	Cap= 2.2 uF ESR= 4.22 mOhm VDC= 10.0 V IRMS= 2.08454 A	1	\$0.03	 0805 7 mm ²
Cvdd	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
Cvref	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
Cvset	MuRata	GRM155R71A104KA01D Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
D1	Comchip Technology	CDBK0520L-HF	VF@Io= 385.0 mV VRRM= 20.0 V	1	\$0.07	 SOD-123F 12 mm ²
D2	Comchip Technology	CDBK0520L-HF	VF@Io= 385.0 mV VRRM= 20.0 V	1	\$0.07	 SOD-123F 12 mm ²
Daux	Infineon Technologies	BAS1602VH6327XTSA1	VF@Io= 1.25 V VRRM= 80.0 V	1	\$0.06	 SOD-523 5 mm ²
Dhb1	SMC Diode Solutions	SK19TR	VF@Io= 850.0 mV VRRM= 90.0 V	1	\$0.06	 SMB 44 mm ²
Dhb2	SMC Diode Solutions	SK19TR	VF@Io= 850.0 mV VRRM= 90.0 V	1	\$0.06	 SMB 44 mm ²
Lm1	Wurth Elektronik	7443640680B	L= 6.8 uH 880.0 uOhm	1	\$6.62	 WE-HCF_2818 656 mm ²

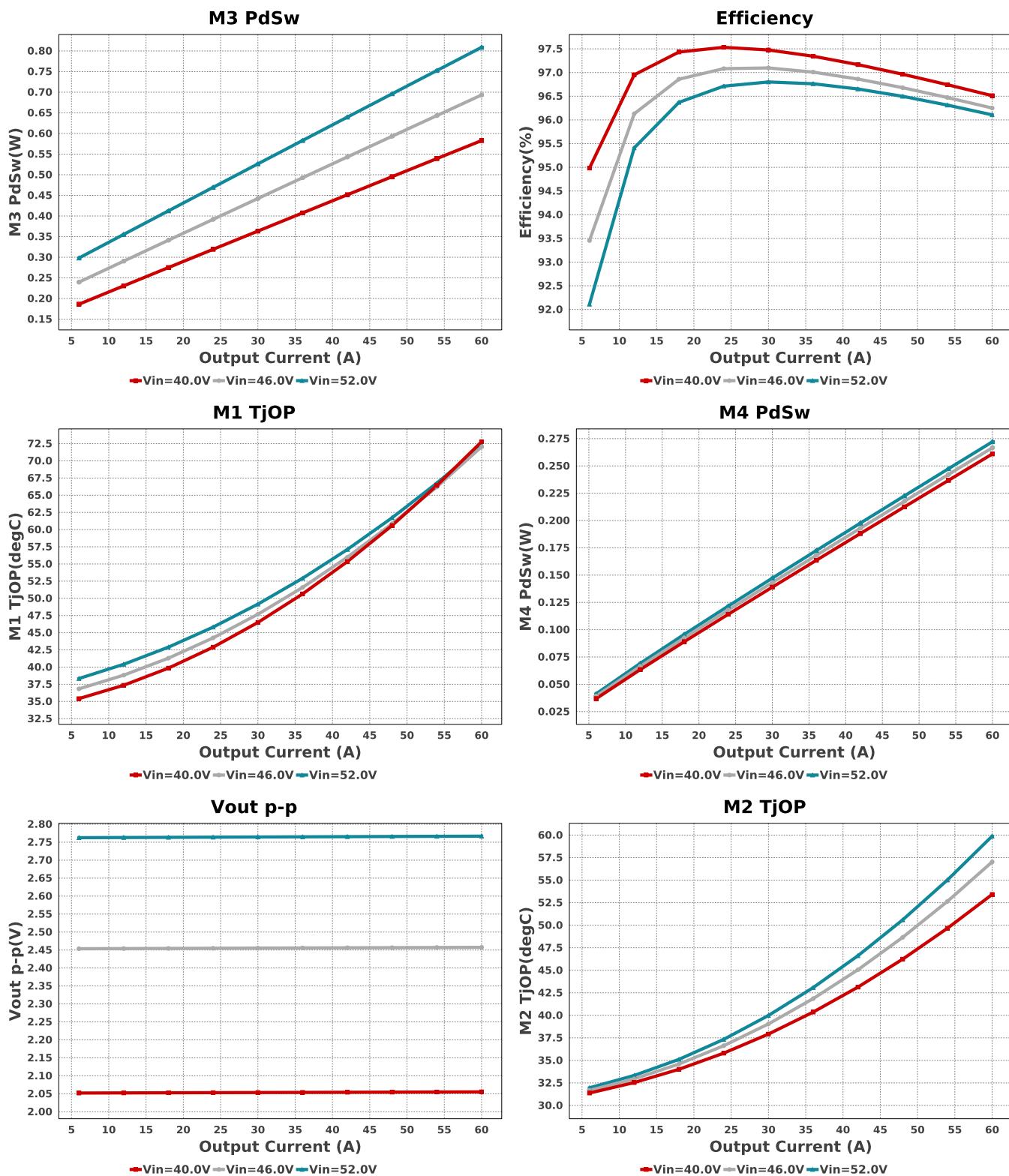
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Lm2	Wurth Elektronik	7443640680B	L= 6.8 μ H 880.0 μ Ohm	1	\$6.62	 WE-HCF_2818 656 mm ²
M1	Texas Instruments	CSD19502Q5B	VdsMax= 80.0 V IdsMax= 200.0 Amps	2	\$0.74	 DQK0006C 9 mm ²
M2	Infineon Technologies	BSC037N08NS5ATMA1	VdsMax= 80.0 V IdsMax= 200.0 Amps	2	\$1.69	 PG-TDSON-8 55 mm ²
M3	Texas Instruments	CSD19502Q5B	VdsMax= 80.0 V IdsMax= 200.0 Amps	2	\$0.74	 DQK0006C 9 mm ²
M4	Infineon Technologies	BSC037N08NS5ATMA1	VdsMax= 80.0 V IdsMax= 200.0 Amps	2	\$1.69	 PG-TDSON-8 55 mm ²
M5	Vishay-Siliconix	IRL640PBF	VdsMax= 200.0 V IdsMax= 17.0 Amps	1	\$1.32	 TO-220AB 79 mm ²
Rcfg	Vishay-Dale	CRCW04023K32FKED Series= CRCW..e3	Res= 3.32 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcomp1	Vishay-Dale	CRCW04025K49FKED Series= CRCW..e3	Res= 5.49 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcomp2	Vishay-Dale	CRCW04025K49FKED Series= CRCW..e3	Res= 5.49 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcs1	Stackpole Electronics Inc	CSNL2010FT1L00 Series= CSNL	Res= 1.0 mOhm Power= 1.5 W Tolerance= 1.0%	1	\$0.19	 2010 32 mm ²
Rcs2	Stackpole Electronics Inc	CSNL2010FT1L00 Series= CSNL	Res= 1.0 mOhm Power= 1.5 W Tolerance= 1.0%	1	\$0.19	 2010 32 mm ²
Rcsa1	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcsa2	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcsb1	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rcsb2	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rdt	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
Rhb1	Vishay-Dale	CRCW04022R00FKED Series= CRCW..e3	Res= 2.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²

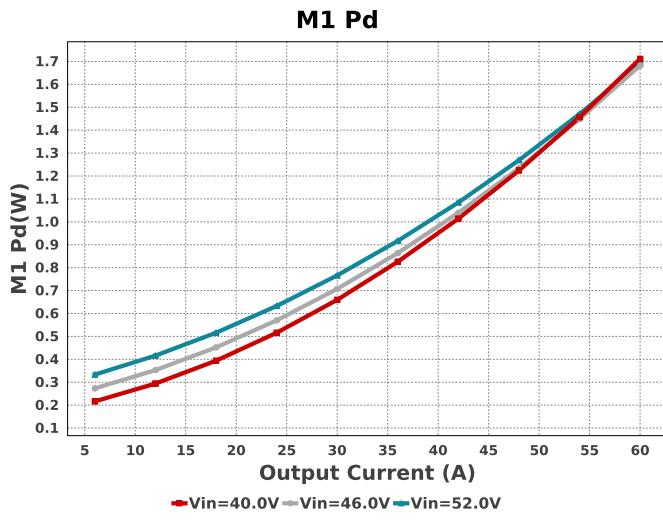
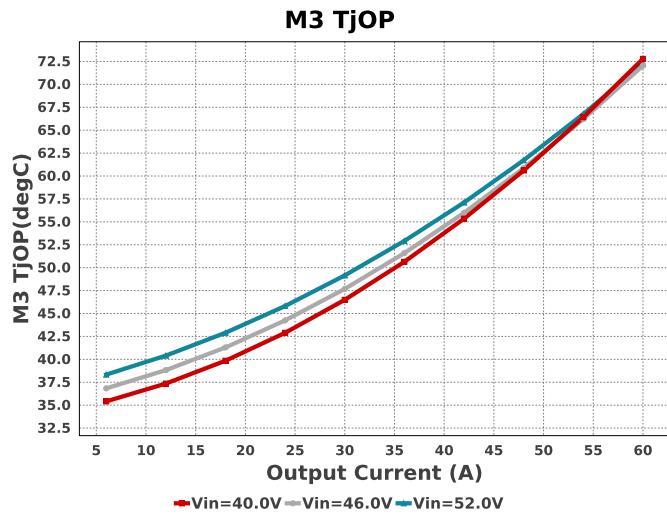
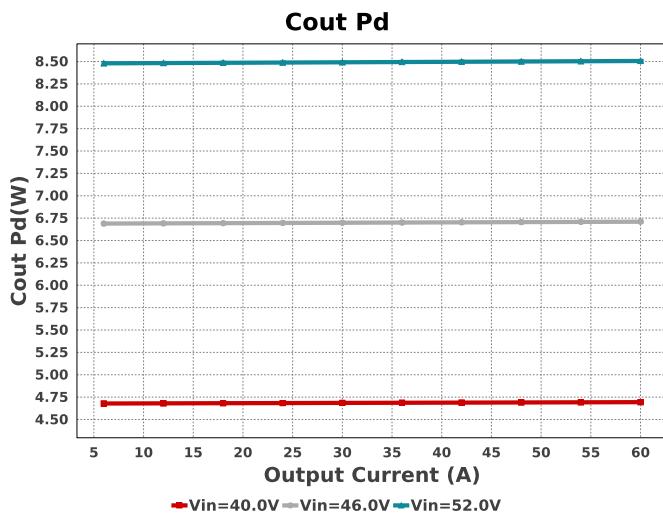
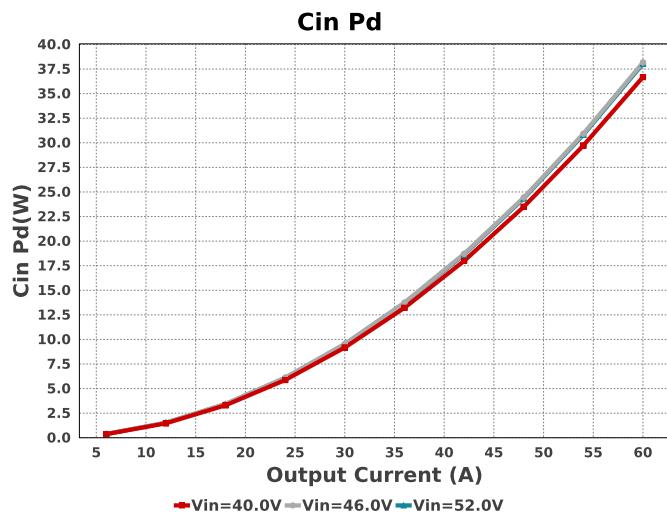
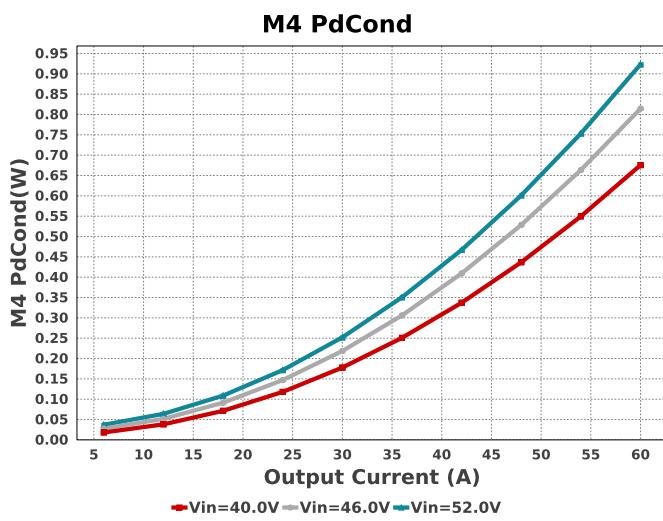
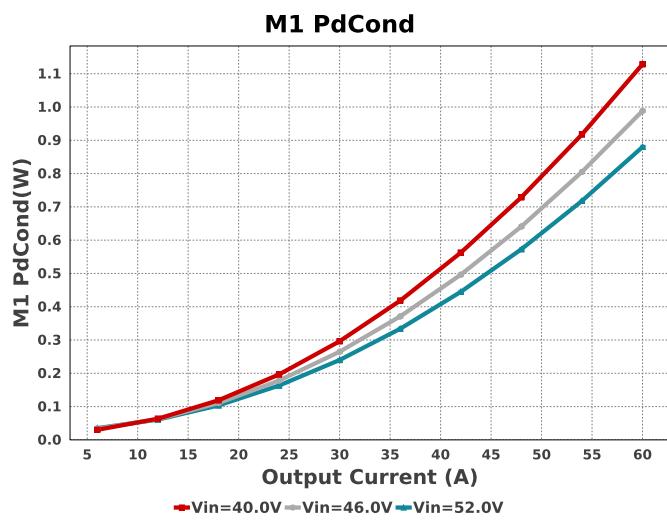
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Rhb2	Vishay-Dale	CRCW04022R00FKED Series= CRCW..e3	Res= 2.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rhcomp	Vishay-Dale	CRCW040233K2FKED Series= CRCW..e3	Res= 33.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rhfbb	Vishay-Dale	CRCW04022K10FKED Series= CRCW..e3	Res= 2.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rhfbt	Vishay-Dale	CRCW040246K4FKED Series= CRCW..e3	Res= 46.4 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rhv	Vishay-Dale	CRCW040210R0FKED Series= CRCW..e3	Res= 10.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rimon1	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rimon2	Vishay-Dale	CRCW040210K5FKED Series= CRCW..e3	Res= 10.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Ripkb	Vishay-Dale	CRCW04029K76FKED Series= CRCW..e3	Res= 9.76 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Ripkt	Vishay-Dale	CRCW040225K5FKED Series= CRCW..e3	Res= 25.5 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Risetb	Vishay-Dale	CRCW04023K01FKED Series= CRCW..e3	Res= 3.01 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Risett	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	Res= 1000.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rlcomp	Vishay-Dale	CRCW040214K0FKED Series= CRCW..e3	Res= 14.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rlfbb	Vishay-Dale	CRCW04024K42FKED Series= CRCW..e3	Res= 4.42 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rlfbt	Vishay-Dale	CRCW040248K7FKED Series= CRCW..e3	Res= 48.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm1d	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm1g	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm2d	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm2g	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm3d	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm3g	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²
Rm4d	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	- 0402 3 mm ²

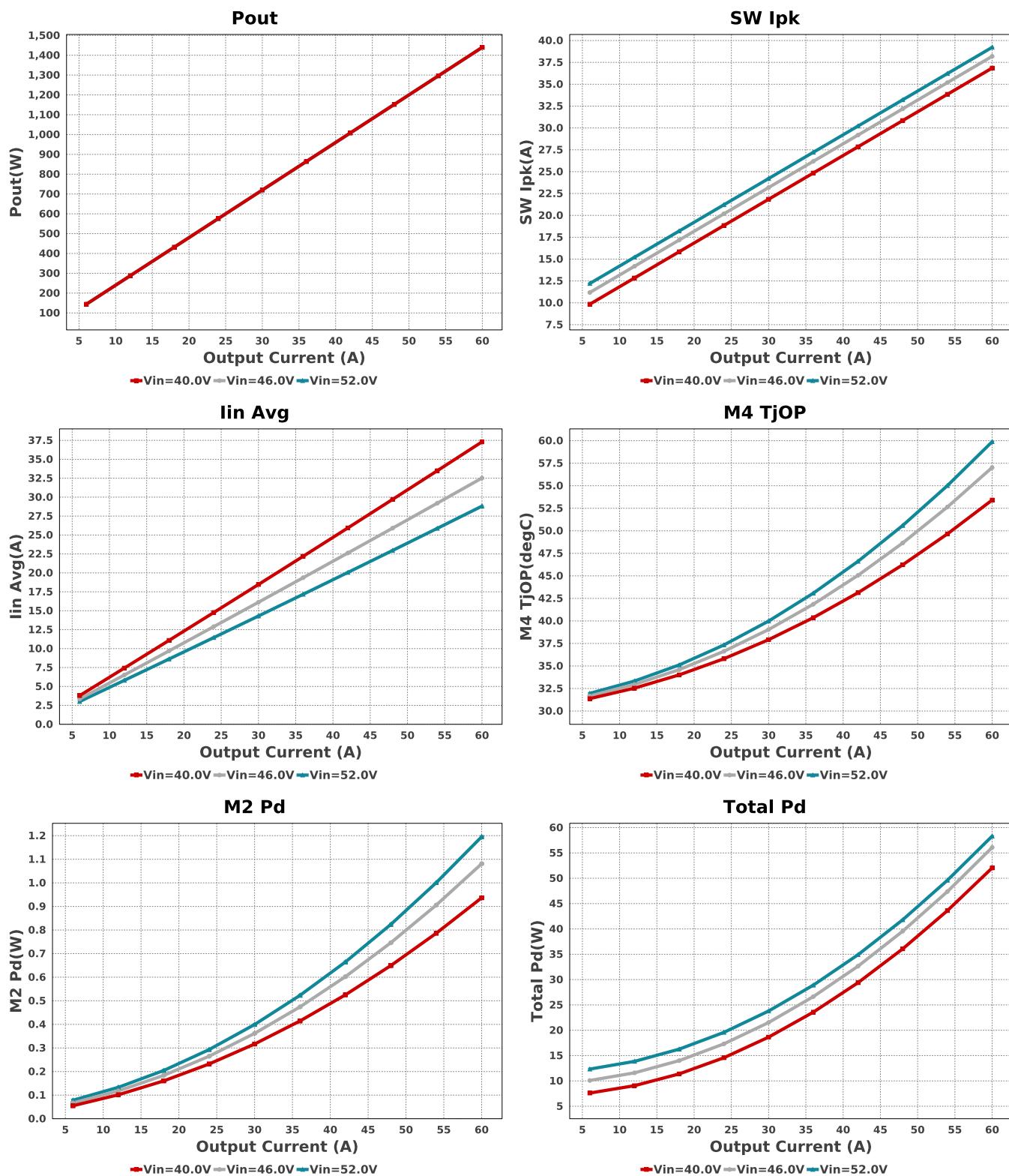
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Rm4g	Vishay-Dale	CRCW04021R00FKED Series= CRCW..e3	Res= 1.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Ropvb	Vishay-Dale	CRCW04024K99FKED Series= CRCW..e3	Res= 4.99 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Ropvt	Vishay-Dale	CRCW0402143KFKED Series= CRCW..e3	Res= 143.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Rosc	Vishay-Dale	CRCW040240K2FKED Series= CRCW..e3	Res= 40.2 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Ruvb	Vishay-Dale	CRCW040297K6FKED Series= CRCW..e3	Res= 97.6 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Ruvhyst	Vishay-Dale	CRCW0402806RFKED Series= CRCW..e3	Res= 806.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Ruvt	Vishay-Dale	CRCW040248K7FKED Series= CRCW..e3	Res= 48.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Rvsetb	Vishay-Dale	CRCW040220K0FKED Series= CRCW..e3	Res= 20.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
Rvsett	Vishay-Dale	CRCW040215K0FKED Series= CRCW..e3	Res= 15.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	■ 0402 3 mm ²
U1	Texas Instruments	LM5171	Switcher	1	\$4.01	 PHP0048E 121 mm ²
U1	Texas Instruments	LM5171	Switcher	1	\$4.01	 PHP0048E 121 mm ²

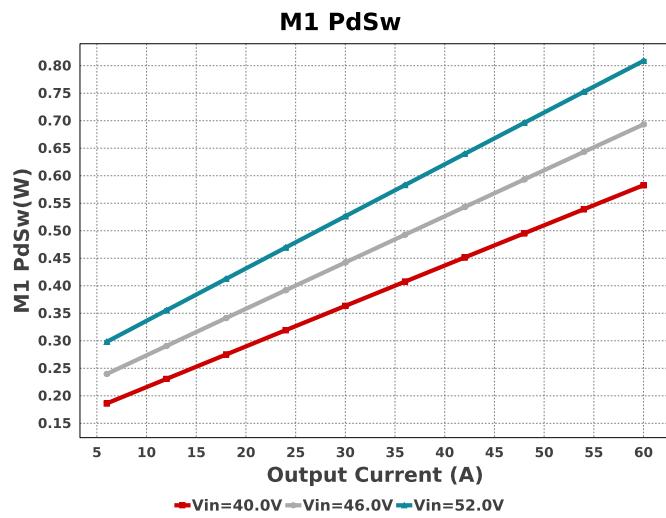
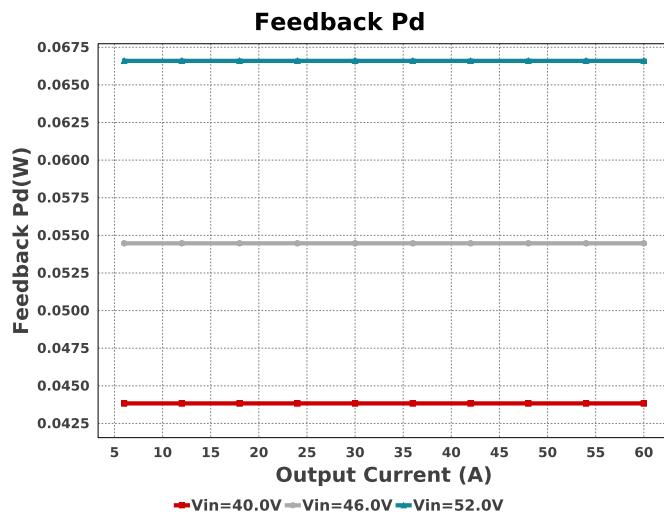
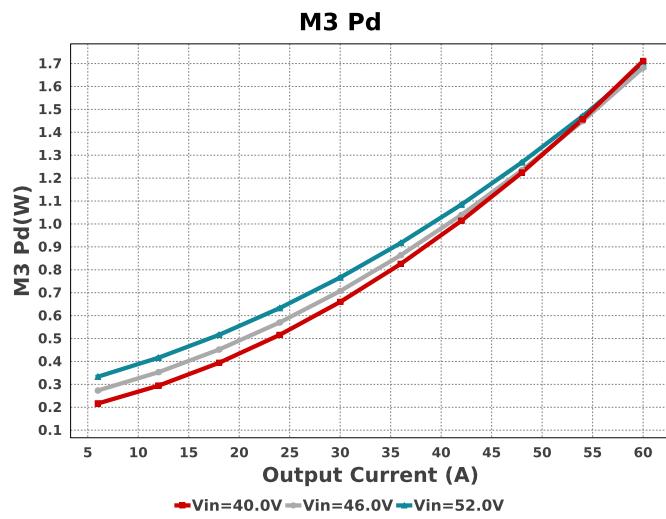
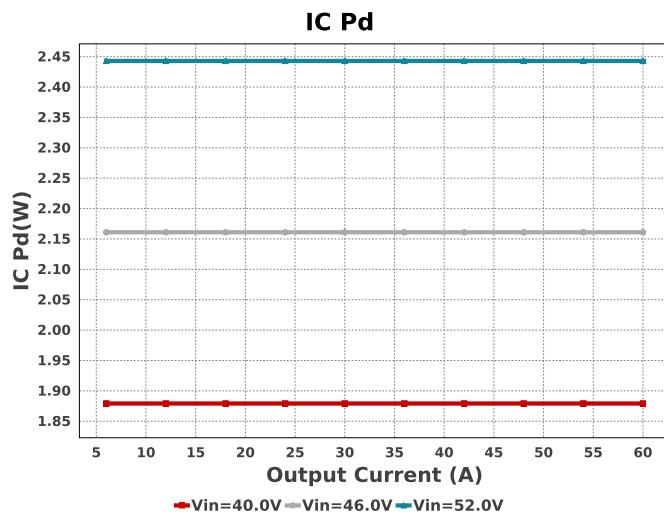
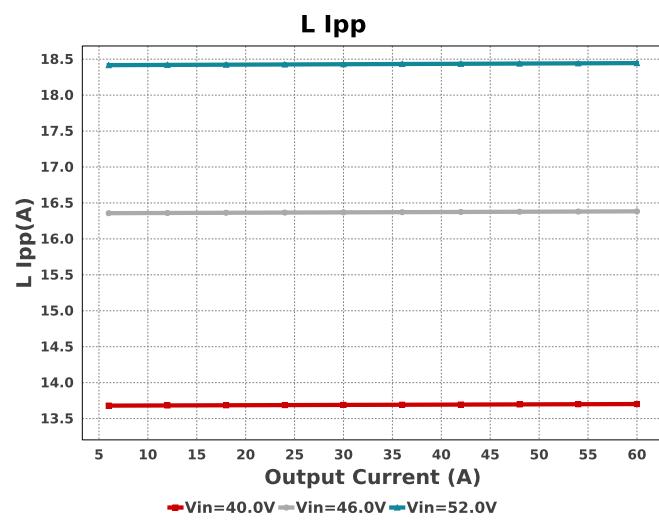
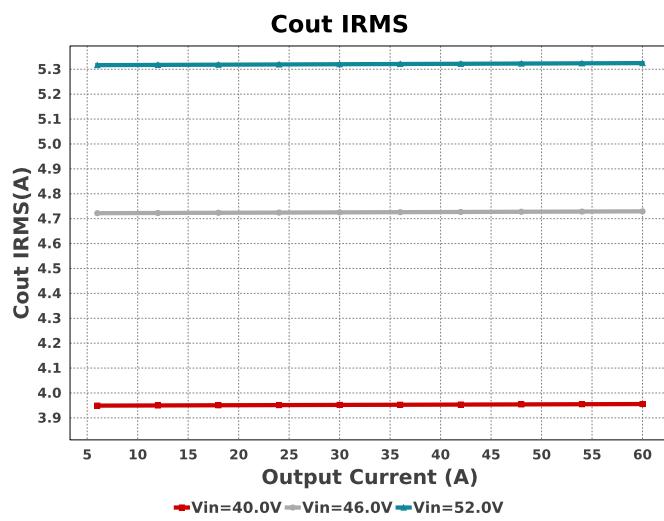
M3 PdCond**IC Tj**

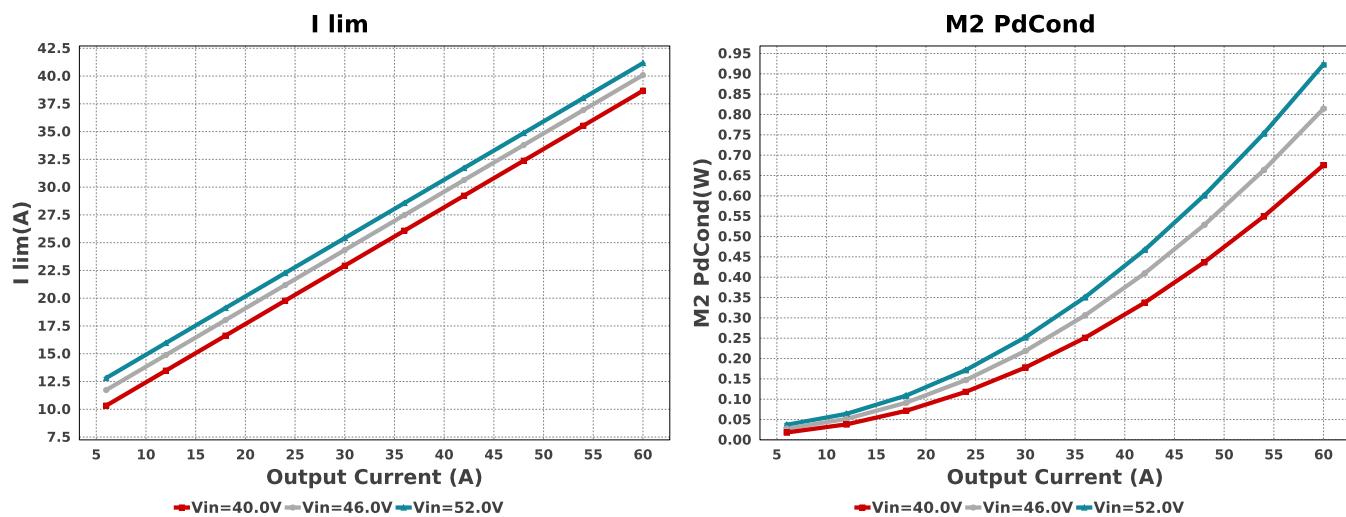












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	14.958 A	Capacitor	Input capacitor RMS ripple current
2.	Cin Pd	38.034 W	Capacitor	Input capacitor power dissipation
3.	Cout IRMS	5.325 A	Capacitor	Output capacitor RMS ripple current
4.	Cout Pd	8.506 W	Capacitor	Output capacitor power dissipation
5.	I lim	40.95 A	Current	Current limit threshold
6.	IC Pd	2.443 W	IC	IC power dissipation
7.	IC Tj	104.997 degC	IC	IC junction temperature
8.	IC Tolerance	10.0 mV	IC	IC Feedback Tolerance
9.	ICThetaJA	30.7 degC/W	IC	IC junction-to-ambient thermal resistance
10.	Iin Avg	28.813 A	IC	Average input current
11.	L Ipp	18.445 A	Inductor	Peak-to-peak inductor ripple current
12.	L Pd	1.634 W	Inductor	Inductor power dissipation
13.	M1 Pd	1.689 W	Mosfet	M1 MOSFET total power dissipation
14.	M1 PdCond	880.1 mW	Mosfet	M1 MOSFET conduction losses
15.	M1 PdSw	808.78 mW	Mosfet	M1 MOSFET switching losses
16.	M1 TjOP	72.222 degC	Mosfet	M1 MOSFET junction temperature
17.	M2 Pd	1.186 W	Mosfet	M2 MOSFET total power dissipation
18.	M2 PdCond	923.22 mW	Mosfet	M2 MOSFET conduction losses
19.	M2 PdSw	262.62 mW	Mosfet	M2 MOSFET switching losses
20.	M2 TjOP	59.646 degC	Mosfet	M2 MOSFET junction temperature
21.	M3 Pd	1.689 W	Mosfet	M3 MOSFET total power dissipation
22.	M3 PdCond	880.1 mW	Mosfet	M3 MOSFET conduction losses
23.	M3 PdSw	808.78 mW	Mosfet	M3 MOSFET switching losses
24.	M3 TjOP	72.222 degC	Mosfet	M3 MOSFET junction temperature
25.	M4 Pd	1.186 W	Mosfet	M4 MOSFET total power dissipation
26.	M4 PdCond	923.22 mW	Mosfet	M4 MOSFET conduction losses
27.	M4 PdSw	262.62 mW	Mosfet	M4 MOSFET switching losses
28.	M4 TjOP	59.646 degC	Mosfet	M4 MOSFET junction temperature
29.	Cin Pd	38.034 W	Power	Input capacitor power dissipation
30.	Cout Pd	8.506 W	Power	Output capacitor power dissipation
31.	Feedback Pd	66.596 mW	Power	Power Dissipation in Feedback Resistors
32.	IC Pd	2.443 W	Power	IC power dissipation
33.	L Pd	1.634 W	Power	Inductor power dissipation
34.	M1 Pd	1.689 W	Power	M1 MOSFET total power dissipation
35.	M1 PdCond	880.1 mW	Power	M1 MOSFET conduction losses
36.	M1 PdSw	808.78 mW	Power	M1 MOSFET switching losses
37.	M2 Pd	1.186 W	Power	M2 MOSFET total power dissipation
38.	M2 PdCond	923.22 mW	Power	M2 MOSFET conduction losses
39.	M2 PdSw	262.62 mW	Power	M2 MOSFET switching losses
40.	M3 Pd	1.689 W	Power	M3 MOSFET total power dissipation
41.	M3 PdCond	880.1 mW	Power	M3 MOSFET conduction losses
42.	M3 PdSw	808.78 mW	Power	M3 MOSFET switching losses
43.	M4 Pd	1.186 W	Power	M4 MOSFET total power dissipation
44.	M4 PdCond	923.22 mW	Power	M4 MOSFET conduction losses
45.	M4 PdSw	262.62 mW	Power	M4 MOSFET switching losses
46.	Rsense Pd	1.857 W	Power	LED Current Rsns Power Dissipation
47.	Total Pd	58.283 W	Power	Total Power Dissipation
48.	Feedback Pd	66.596 mW	Resistor	Power Dissipation in Feedback Resistors
49.	Rsense Pd	1.857 W	Resistor	LED Current Rsns Power Dissipation
50.	BOM Count	90	System Information	Total Design BOM count

#	Name	Value	Category	Description
51.	Duty Cycle	46.245 %	System Information	Duty cycle
52.	Efficiency	96.11 %	System Information	Steady state efficiency
53.	FootPrint	4.298 k mm ²	System Information	Total Foot Print Area of BOM components
54.	Frequency	103.234 kHz	System Information	Switching frequency
55.	Iout	60.0 A	System Information	Iout operating point
56.	Mode	CCM	System Information	Conduction Mode
57.	Pout	1.44 kW	System Information	Total output power
58.	SW Ipk	39.223 A	System Information	Peak switch current
59.	Total BOM	\$37.59	System Information	Total BOM Cost
60.	Vin	52.0 V	System Information	Vin operating point
61.	Vout Tolerance	41.667 m%	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
62.	Vout p-p	2.767 V	System Information	Peak-to-peak output ripple voltage

Design Inputs

Name	Value	Description
Iout	60.0	Maximum Output Current
VinMax	52.0	Maximum input voltage
VinMin	40.0	Minimum input voltage
VinTyp	48.0	Typical input voltage
Vout	24.0	Output Voltage
base_pn	LM5171	Base Product Number
source	DC	Input Source Type
Ta	30.0	Ambient temperature

WEBENCH® Assembly

Component Testing

Some published data on components in datasheets such as Capacitor ESR and Inductor DC resistance is based on conservative values that will guarantee that the components always exceed the specification. For design purposes it is usually better to work with typical values. Since this data is not always available it is a good practice to measure the Capacitance and ESR values of C_{in} and C_{out} , and the inductance and DC resistance of L_1 before assembly of the board. Any large discrepancies in values should be electrically simulated in WEBENCH to check for instabilities and thermally simulated in WebTHERM to make sure critical temperatures are not exceeded.

Soldering Component to Board

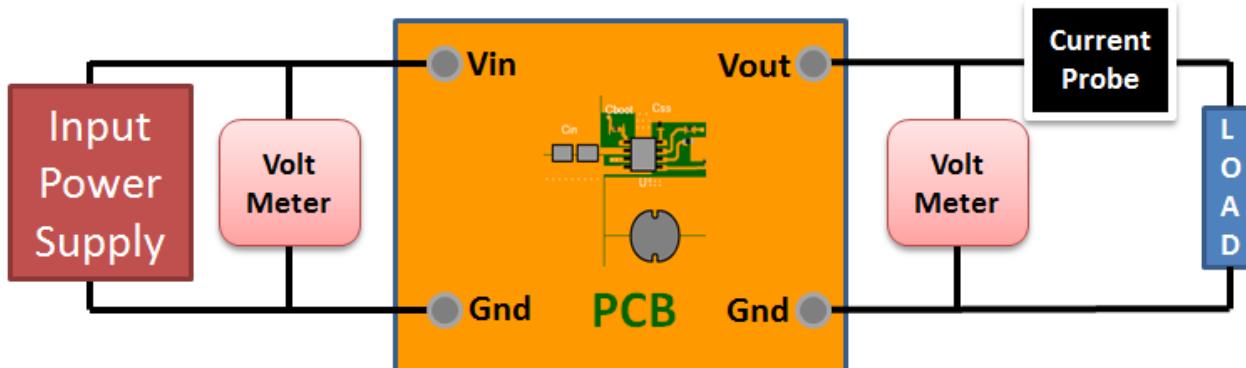
If board assembly is done in house it is best to tack down one terminal of a component on the board then solder the other terminal. For surface mount parts with large tabs, such as the DPAK, the tab on the back of the package should be pre-tinned with solder, then tacked into place by one of the pins. To solder the tab down to the board place the iron down on the board while resting against the tab, heating both surfaces simultaneously. Apply light pressure to the top of the plastic case until the solder flows around the part and the part is flush with the PCB. If the solder is not flowing around the board you may need a higher wattage iron (generally 25W to 30W is enough).

Initial Startup of Circuit

It is best to initially power up the board by setting the input supply voltage to the lowest operating input voltage 40.0V and set the input supply's current limit to zero. With the input supply off connect up the input supply to V_{in} and GND. Connect a digital volt meter and a load if needed to set the minimum I_{out} of the design from V_{out} and GND. Turn on the input supply and slowly turn up the current limit on the input supply. If the voltage starts to rise on the input supply continue increasing the input supply current limit while watching the output voltage. If the current increases on the input supply, but the voltage remains near zero, then there may be a short or a component misplaced on the board. Power down the board and visually inspect for solder bridges and recheck the diode and capacitor polarities. Once the power supply circuit is operational then more extensive testing may include full load testing, transient load and line tests to compare with simulation results.

Load Testing

The setup is the same as the initial startup, except that an additional digital voltmeter is connected between V_{in} and GND, a load is connected between V_{out} and GND and a current meter is connected in series between V_{out} and the load. The load must be able to handle at least rated output power + 50% (7.5 watts for this design). Ideally the load is supplied in the form of a variable load test unit. It can also be done in the form of suitably large power resistors. When using an oscilloscope to measure waveforms on the prototype board, the ground leads of the oscilloscope probes should be as short as possible and the area of the loop formed by the ground lead should be kept to a minimum. This will help reduce ground lead inductance and eliminate EMI noise that is not actually present in the circuit.



Design Assistance

1. Master key : 3E1D39EB58A581D0AEF2A44FF11C9AB8[v1]
2. **LM5171 Product Folder** : <https://www.ti.com/product/LM5171> : contains the data sheet and other resources.

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