

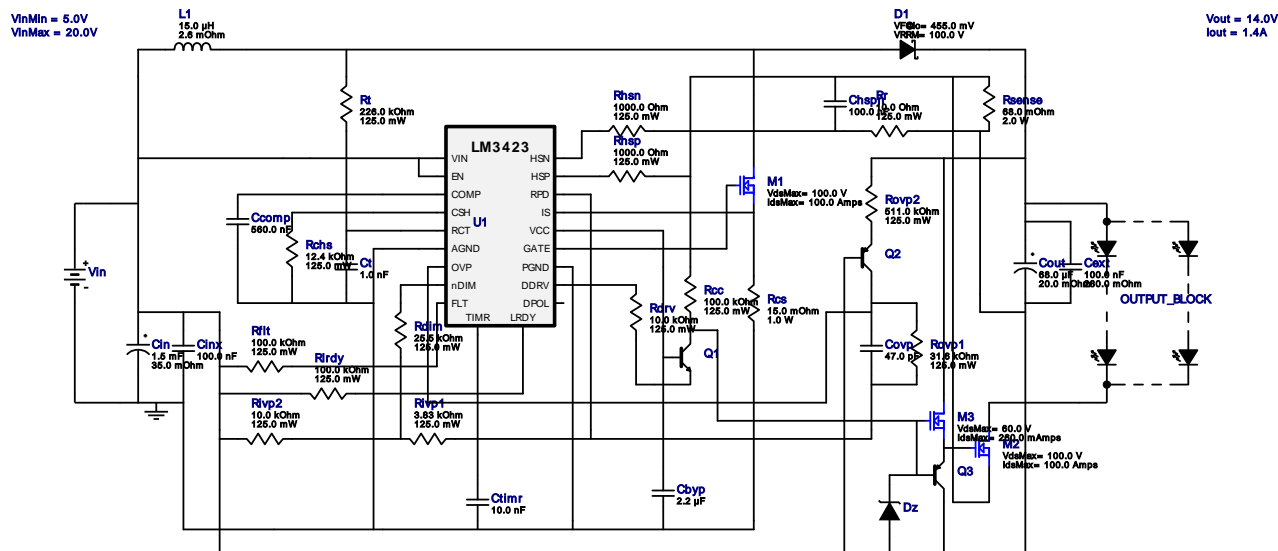


VinMin = 5.0V
 VinMax = 20.0V
 Vout = 14.0V
 Iout = 1.4A

Device = LM3423MHX/NOPB
 Topology = Buck_Boost
 Created = 7/23/15 7:59:43 PM
 BOM Cost = \$45.68
 Footprint = 2,536.0 mm²
 BOM Count = 52
 Total Pd = 1.69W

WEBENCH® Design Report






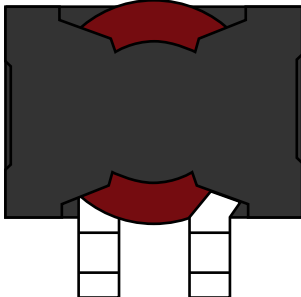








Design : 4384271/8 LM3423MHX/NOPB
 LM3423MHX/NOPB 5.0V-20.0V to 14.06V @ 1.3911190322580642A














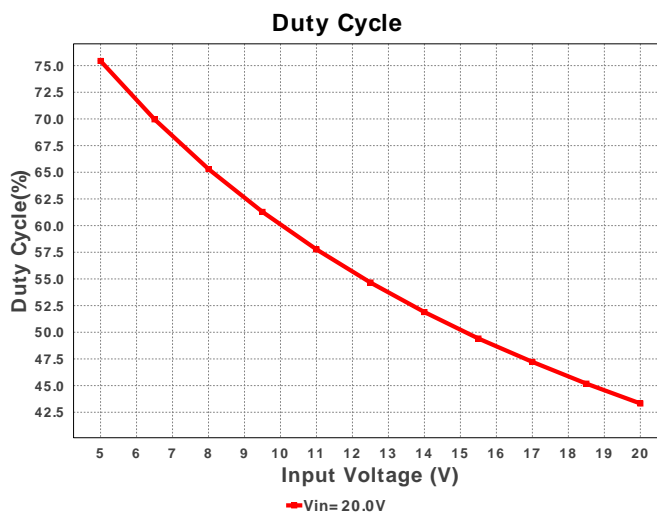
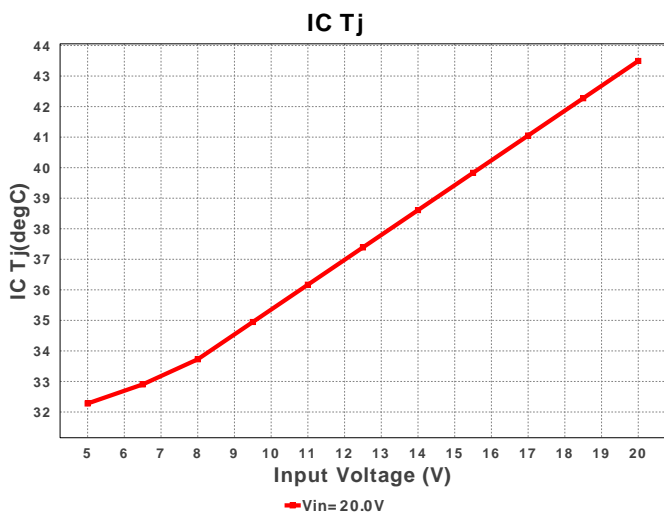
1. This regulator device is qualified for Automotive applications. All passives and other components selected in this design may not be qualified for Automotive applications. The user is required to verify that all components in the design meet the qualification and safety requirements for their specific application. View WEBENCH(R) Disclaimer.

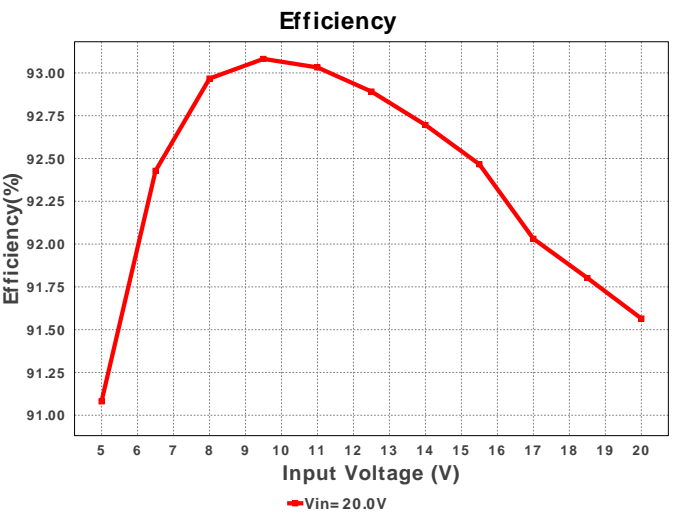
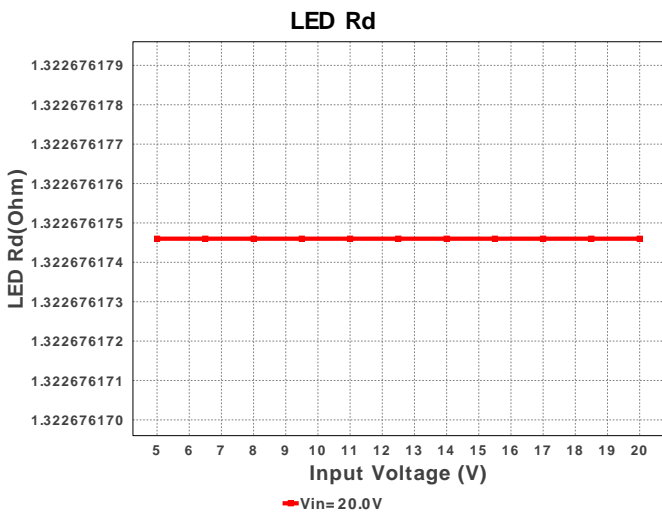
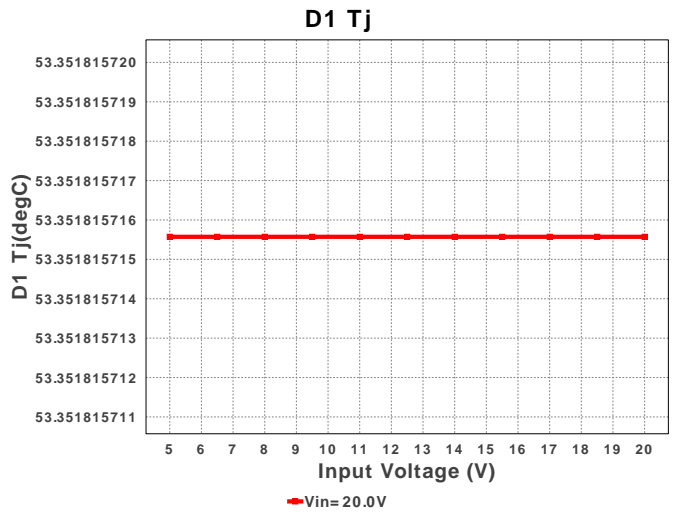
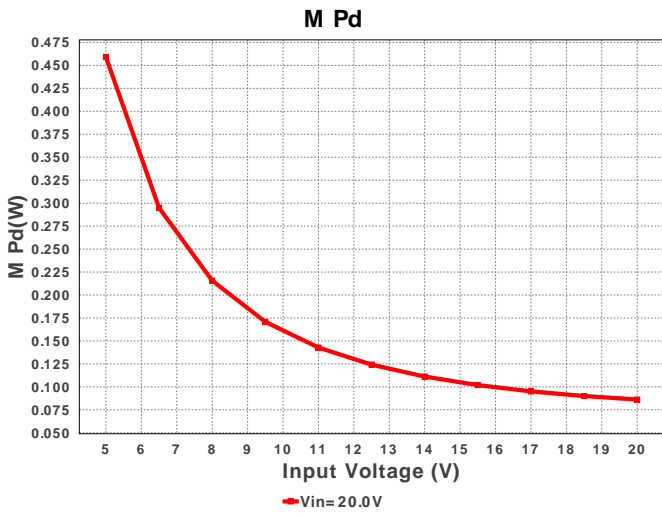
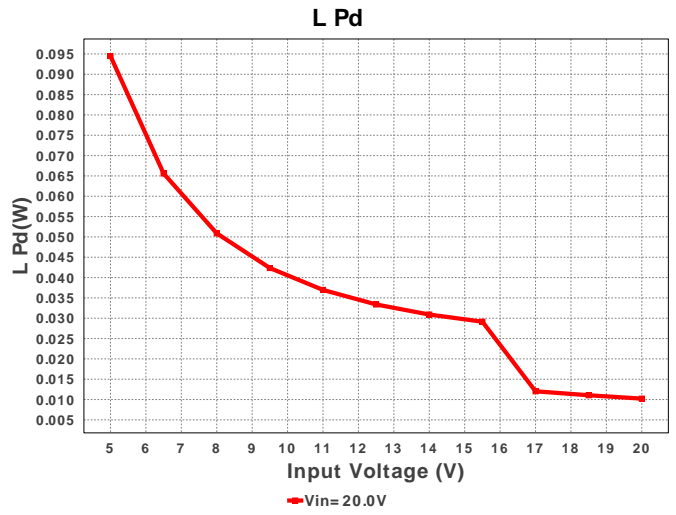
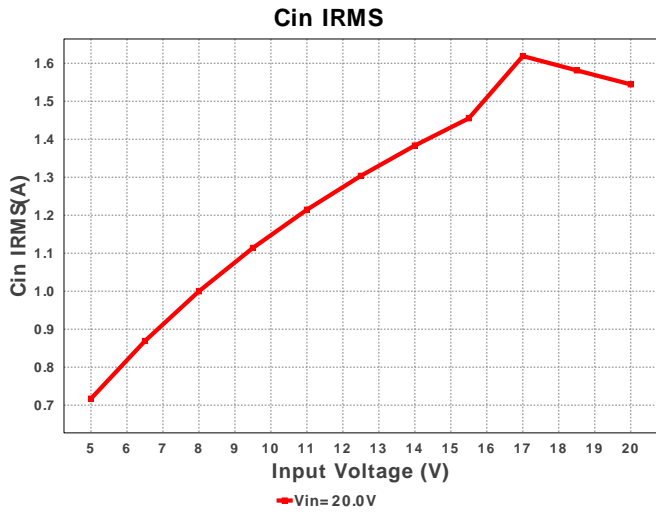
Electrical BOM

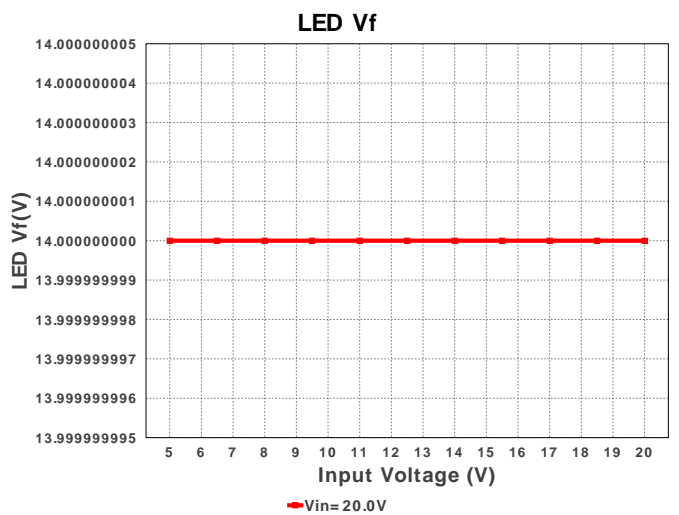
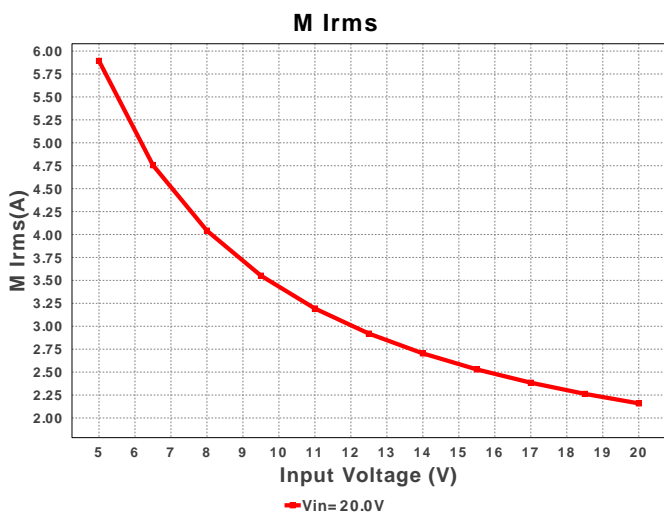
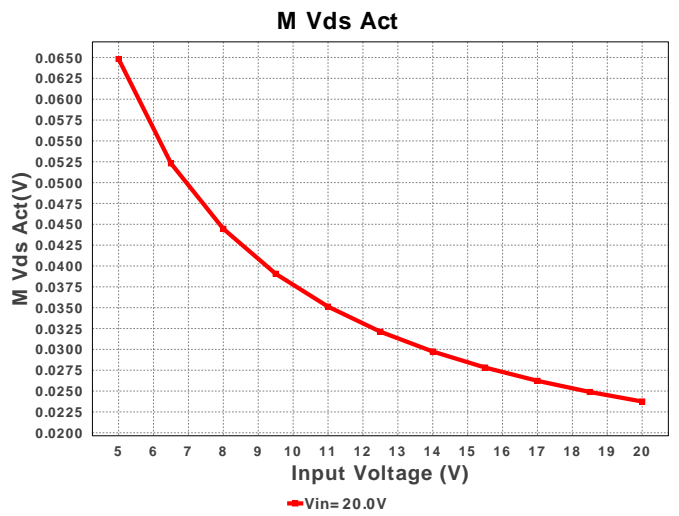
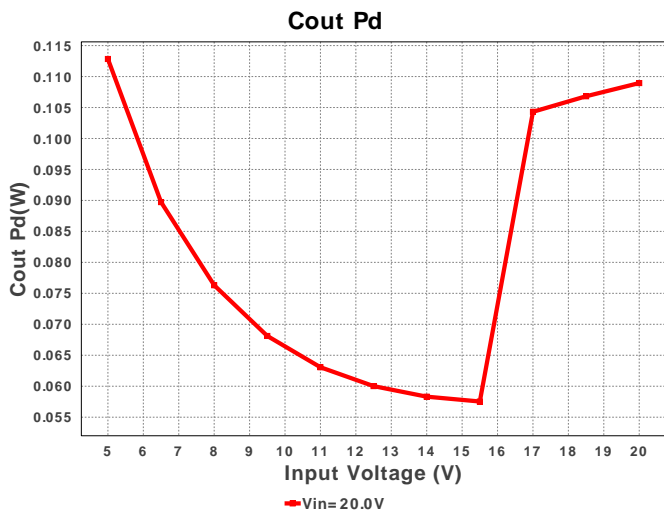
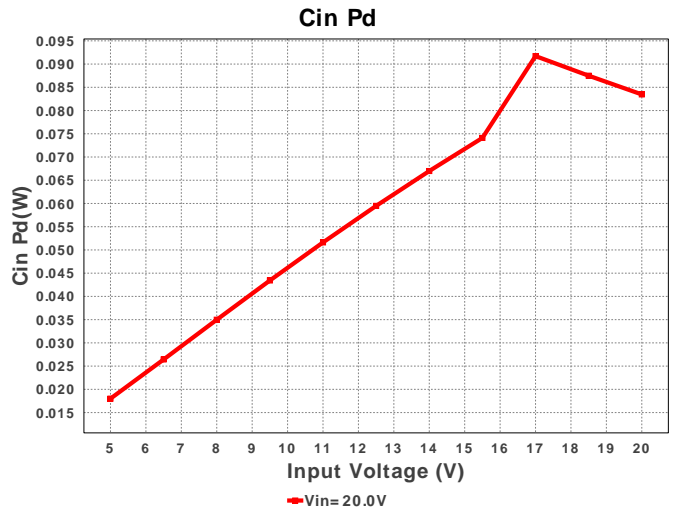
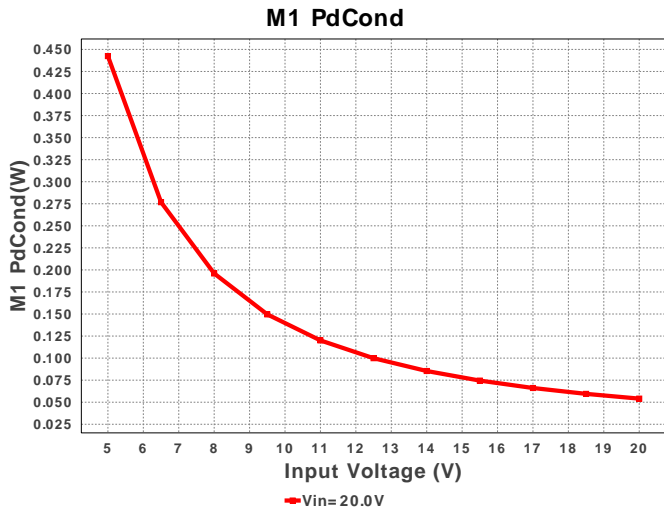
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1.	Cbyp	Taiyo Yuden	EMK212B7225KG-T Series= X7R	Cap= 2.2 uF VDC= 16.0 V IRMS= 0.0 A	1	\$0.03	0805 7 mm ²
2.	Ccomp	MuRata	GRM21BR71E564KA88L Series= X7R	Cap= 560.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.05	0805 7 mm ²
3.	Cext	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
4.	Chspn	MuRata	GRM21BR71E104KA01L Series= X7R	Cap= 100.0 nF VDC= 25.0 V IRMS= 0.0 A	1	\$0.01	0805 7 mm ²
5.	Cin	Panasonic	EEV-FK1V152M Series= FK	Cap= 1.5 mF ESR= 35.0 mOhm VDC= 35.0 V IRMS= 1.8 A	1	\$0.74	 SM_RADIAL_J16 399 mm ²
6.	Cinx	Kemet	C0603C104K5RACTU Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	0603 5 mm ²
7.	Cout	Panasonic	50SVPF68M Series= SVPF	Cap= 68.0 uF ESR= 20.0 mOhm VDC= 50.0 V IRMS= 4.3 A	1	\$0.92	 CAPSMT_62_F12 151 mm ²

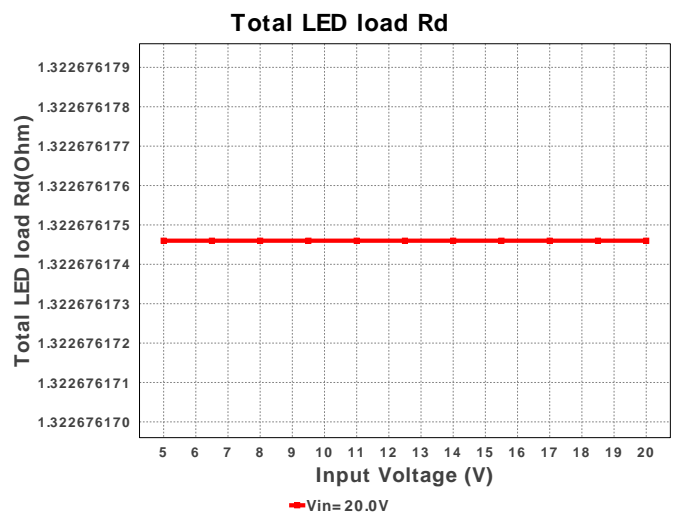
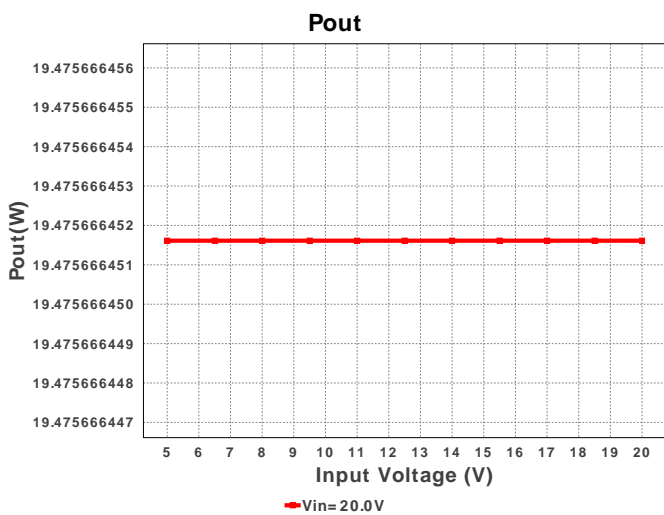
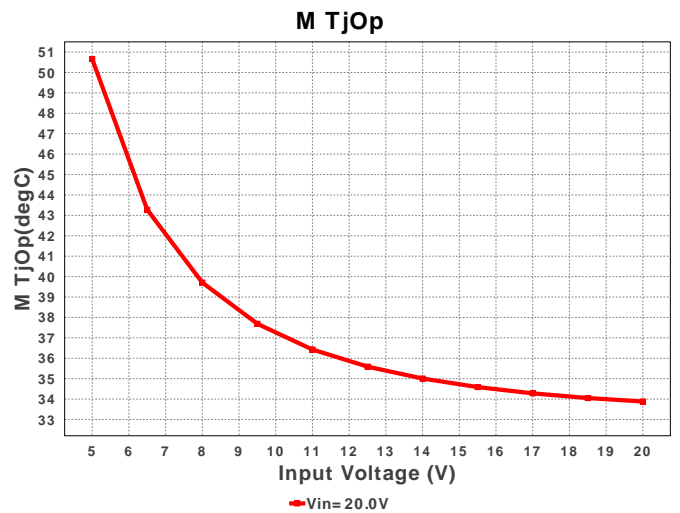
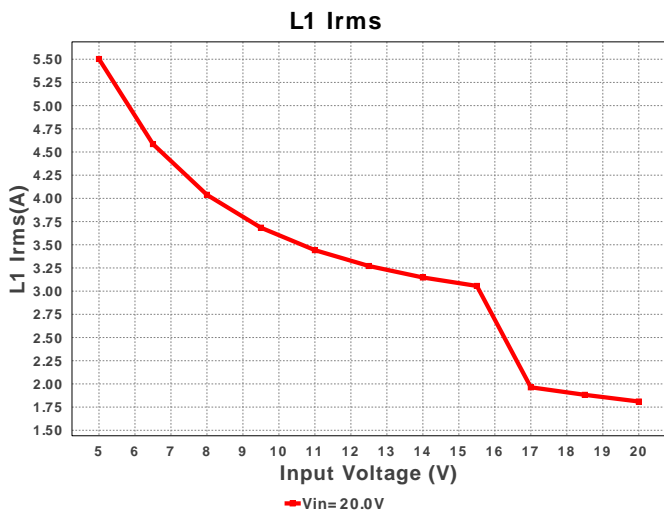
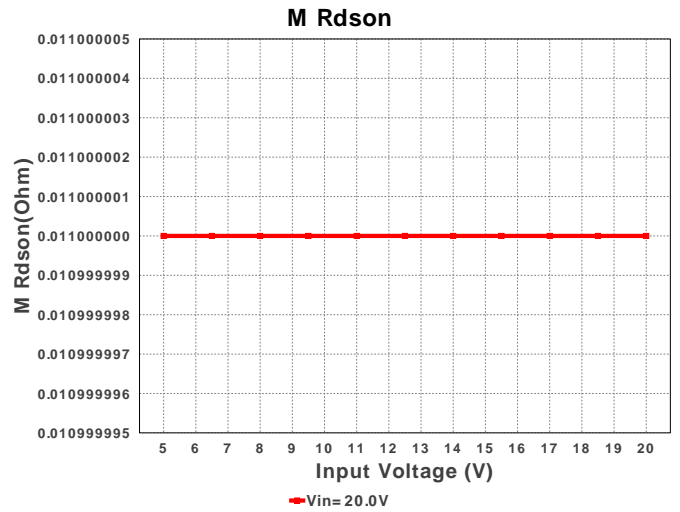
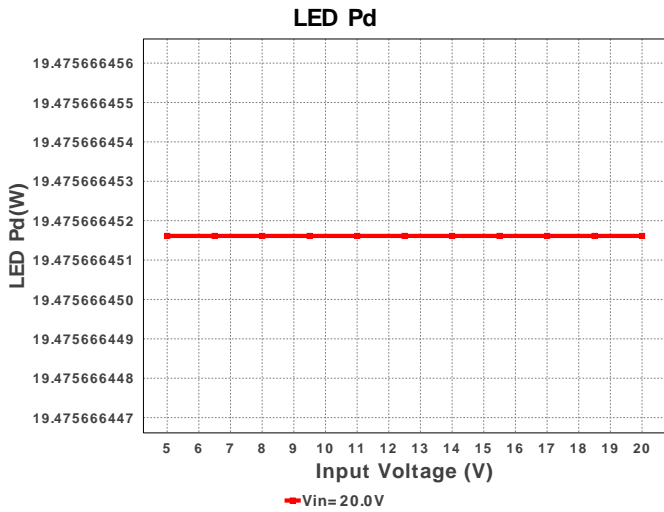
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8.	Covp	Kemet	C0805C470K5GACTU Series= C0G/NP0	Cap= 47.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
9.	Ct	Yageo America	CC0805JRNPO9BN102 Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
10.	Ctimr	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0805 7 mm ²
11.	D1	STMicroelectronics	STPS20M100SG-TR	VF@Io= 455.0 mV VRRM= 100.0 V	1	\$1.33	 DDPAK 210 mm ²
12.	D_LED	Avago	ASMT-JW11-NTT01	LED	16	\$2.22	 asmt_j 42 mm ²
13.	Dz	ON Semiconductor	BZX84C10LT1G	Zener	1	\$0.02	 SOT-23 14 mm ²
14.	L1	Coilcraft	SER2918H-153KL	L= 15.0 µH DCR= 2.6 mOhm	1	\$2.65	 SER2918H 652 mm ²
15.	M1	Infineon Technologies	BSC082N10LS G	VdsMax= 100.0 V IdsMax= 100.0 Amps	1	\$1.28	 PG-TDSON-8 55 mm ²
16.	M2	Infineon Technologies	BSC082N10LS G	VdsMax= 100.0 V IdsMax= 100.0 Amps	1	\$1.28	 PG-TDSON-8 55 mm ²
17.	M3	ON Semiconductor	2N7002ET1G	VdsMax= 60.0 V IdsMax= 260.0 mAmps	1	\$0.02	 SOT-23 14 mm ²
18.	Q1	Diodes Inc.	MMBT3904-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
19.	Q2	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
20.	Q3	Diodes Inc.	MMBT3906-7-F	Bipolar Transistor	1	\$0.02	 SOT-23 14 mm ²
21.	Rcc	Panasonic	ERJ-6ENF1003V Series= ERJ-6E	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
22.	Rchs	Panasonic	ERJ-6ENF1242V Series= ERJ-6E	Res= 12.4 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²
23.	Rcs	Susumu Co Ltd	PRL1632-R015-F-T1 Series= PRL1632	Res= 15.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	\$0.19	 1206 11 mm ²
24.	Rdim	Panasonic	ERJ-6ENF2552V Series= ERJ-6E	Res= 25.5 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm ²

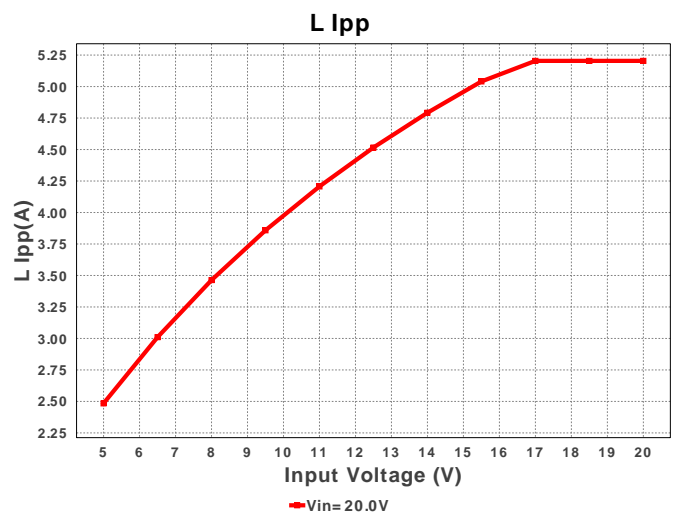
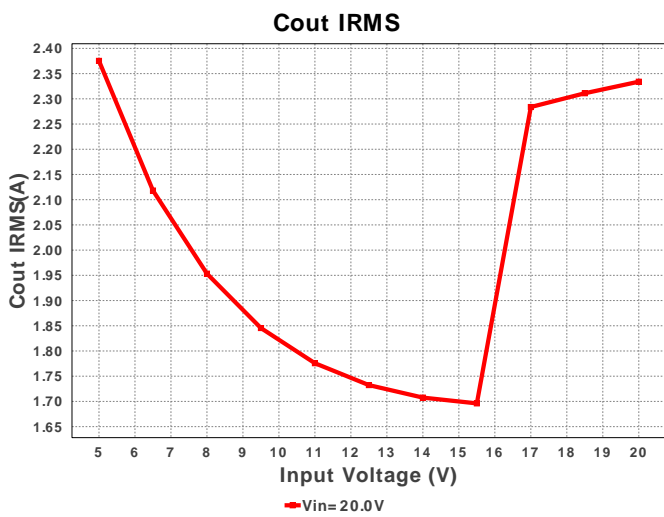
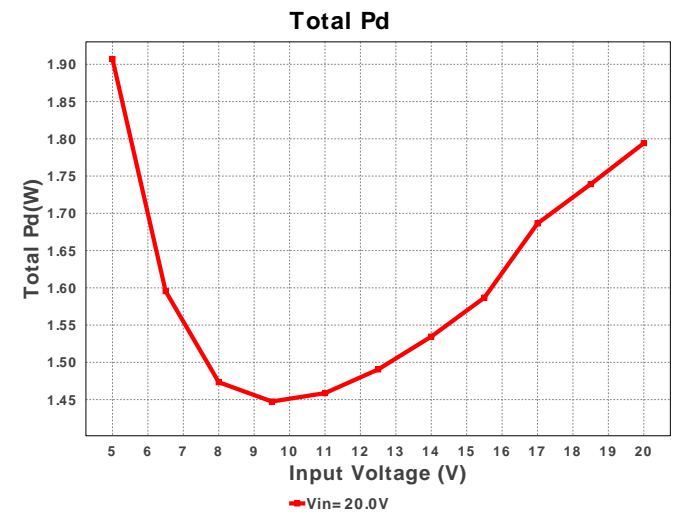
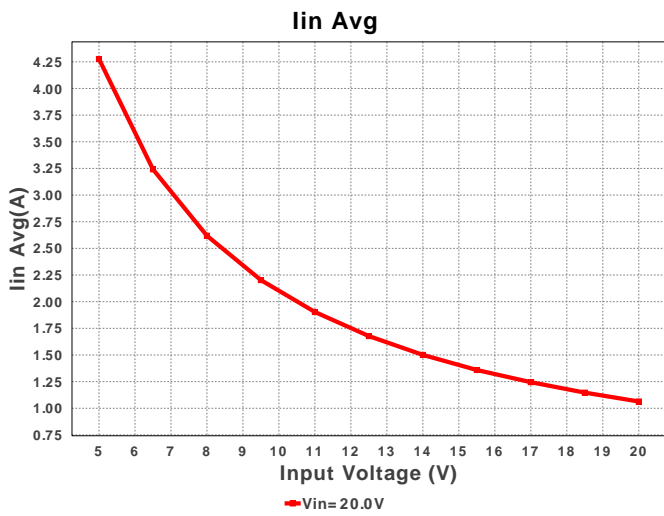
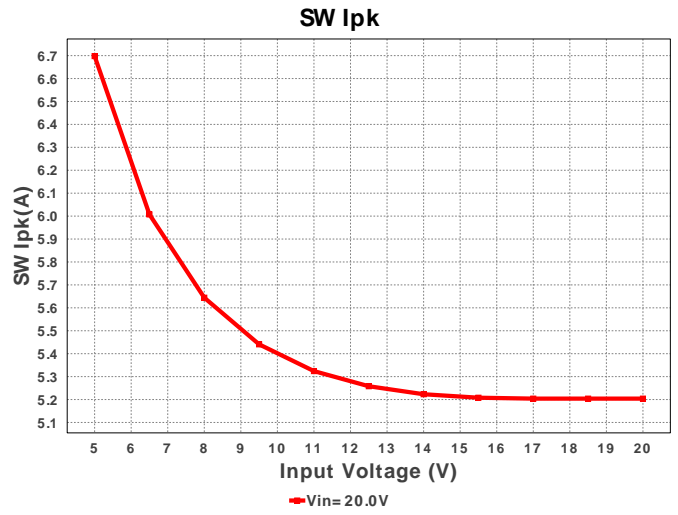
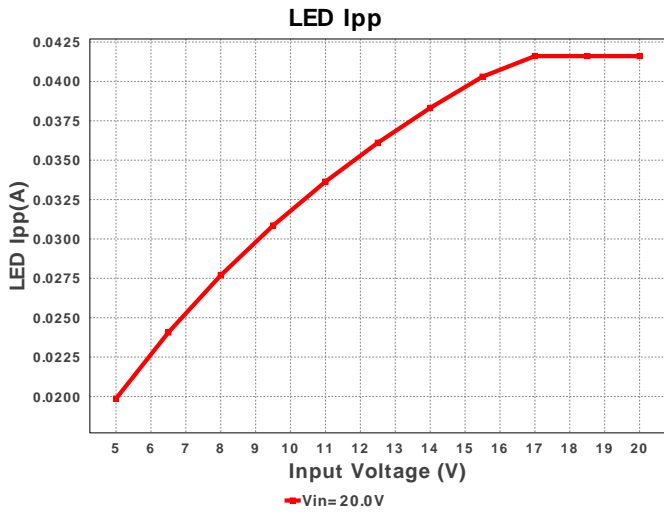
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25.	Rdrv	Panasonic	ERJ-6ENF1002V Series= ERJ-6E	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
26.	Rflt	Panasonic	ERJ-6ENF1003V Series= ERJ-6E	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
27.	Rhsn	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
28.	Rhsp	Panasonic	ERJ-6ENF1001V Series= ERJ-6E	Res= 1000.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
29.	Rivp1	Panasonic	ERJ-6ENF3831V Series= ERJ-6E	Res= 3.83 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
30.	Rivp2	Panasonic	ERJ-6ENF1002V Series= ERJ-6E	Res= 10.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
31.	Rlrdy	Panasonic	ERJ-6ENF1003V Series= ERJ-6E	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
32.	Rovp1	Panasonic	ERJ-6ENF3162V Series= ERJ-6E	Res= 31.6 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
33.	Rovp2	Panasonic	ERJ-6ENF5113V Series= ERJ-6E	Res= 511.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
34.	Rr	Vishay-Dale	CRCW080510R0FKEA Series= CRCW...e3	Res= 10.0 Ohm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
35.	Rsense	Stackpole Electronics Inc	CSRN2512FK68L0 Series= ?	Res= 68.0 mOhm Power= 2.0 W Tolerance= 1.0%	1	\$0.14	 2512 43 mm²
36.	Rt	Panasonic	ERJ-6ENF2263V Series= ERJ-6E	Res= 226.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	\$0.01	 0805 7 mm²
37.	U1	Texas Instruments	LM3423MHX/NOPB	Switcher	1	\$1.25	 MXA20A 71 mm²

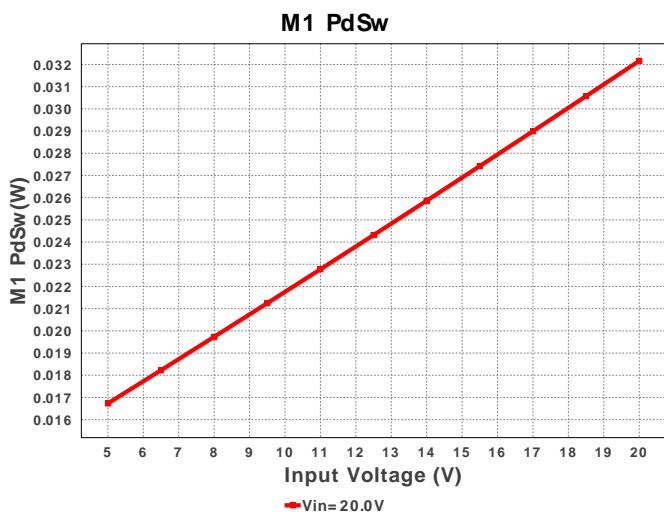
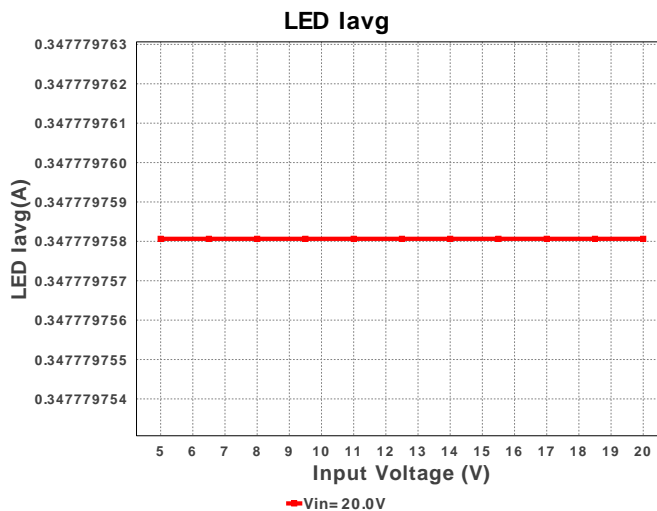
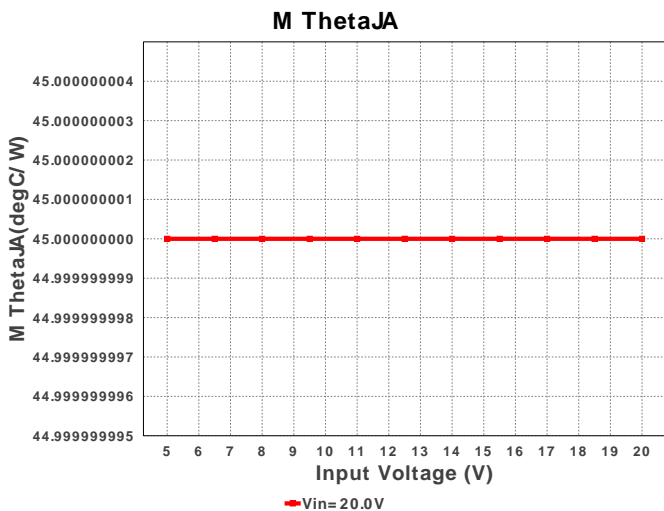
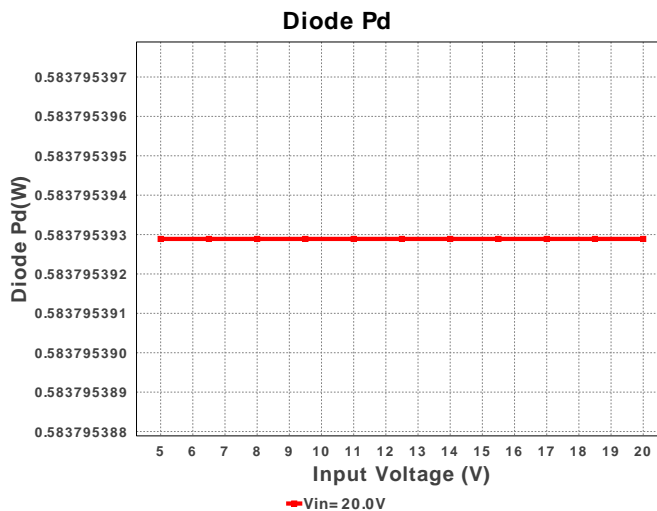
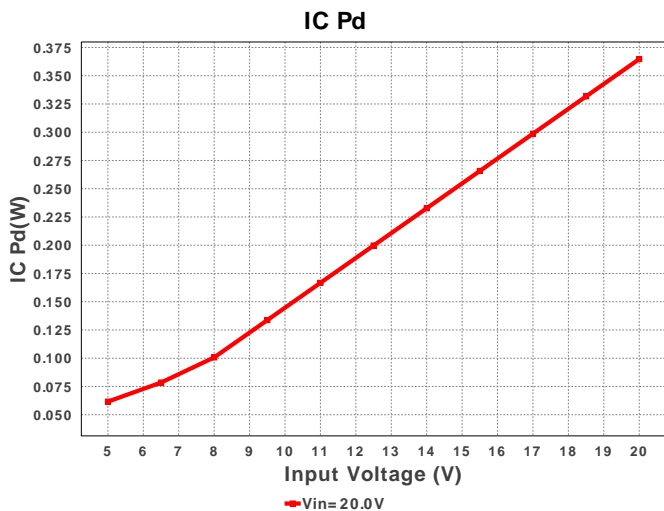












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	721.015 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	2.382 A	Current	Output capacitor RMS ripple current
3.	Iin Avg	4.249 A	Current	Average input current
4.	L Ipp	2.498 A	Current	Peak-to-peak inductor ripple current
5.	L1 Irms	5.509 A	Current	Inductor ripple current
6.	LED Iavg	347.78 mA	Current	LED Average Current
7.	LED Ipp	19.97 mA	Current	LED Ripple Current
8.	M Irms	5.901 A	Current	MOSFET RMS ripple current
9.	SW Ipk	6.71 A	Current	Peak switch current
10.	BOM Count	52	General	Total Design BOM count
11.	FootPrint	2.536 k mm ²	General	Total Foot Print Area of BOM components

#	Name	Value	Category	Description
12.	Frequency	98.761 kHz	General	Switching frequency
13.	IC Tolerance	25.0 mV	General	IC Feedback Tolerance
14.	M Rdson	6.8 mOhm	General	Drain-Source On-resistance
15.	M Vds Act	40.126 mV	General	M Vds
16.	Pout	19.554 W	General	Total output power
17.	Total BOM	\$45.68	General	Total BOM Cost
18.	D1 Tj	55.318 degC	Op_Point	D1 junction temperature
19.	Vout OP	14.057 V	Op_Point	Operational Output Voltage
20.	Duty Cycle	75.321 %	Op_point	Duty cycle
21.	Efficiency	92.041 %	Op_point	Steady state efficiency
22.	IC Tj	31.214 degC	Op_point	IC junction temperature
23.	ICThetaJA	37.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
24.	IOUT_OP	1.391 A	Op_point	Iout operating point
25.	LED Rd	1.323 Ohm	Op_point	LED DynamicResistance
26.	LED Vf	14.057 V	Op_point	Total LED Forward Calculated Voltage
27.	M ThetaJA	50.0 degC/W	Op_point	MOSFET junction-to-ambient thermal resistance
28.	M TjOp	43.12 degC	Op_point	MOSFET junction temperature
29.	VIN_OP	5.0 V	Op_point	Vin operating point
30.	Cin Pd	18.195 mW	Power	Input capacitor power dissipation
31.	Cout Pd	113.448 mW	Power	Output capacitor power dissipation
32.	Diode Pd	632.959 mW	Power	Diode power dissipation
33.	IC Pd	32.799 mW	Power	IC power dissipation
34.	L Pd	94.677 mW	Power	Inductor power dissipation
35.	LED Pd	19.554 W	Power	LED Power Dissipation
36.	M Pd	262.404 mW	Power	MOSFET power dissipation
37.	M1 PdCond	253.937 mW	Power	M1 MOSFET conduction losses
38.	M1 PdSw	8.467 mW	Power	M1 MOSFET switching losses
39.	Total Pd	1.691 W	Power	Total Power Dissipation
40.	Total LED load Rd	1.323 Ohm	Unknown	Total LED Load DynamicResistance

Design Inputs

#	Name	Value	Description
1.	Iout	1.4	Maximum Output Current
2.	Iout1	1.4	Output Current #1
3.	VinMax	20.0	Maximum input voltage
4.	VinMin	5.0	Minimum input voltage
5.	Vout	14.0	Output Voltage
6.	Vout1	14.0	Output Voltage #1
7.	application	LED_DRIVER	LED Application
8.	base_pn	LM3423	Texas Instruments Base Part Number
9.	isLEDArchitect	N	LED Architect Project
10.	ledparallel	4.0	Number of LED in parallel
11.	ledpartnumber	ASMT-JW11-NTT01	LED Part number
12.	ledseries	4.0	Number of LED in series
13.	line_fsw	60.0	AC Line Frequency
14.	source	DC	Input Source Type
15.	ta	30.0	Ambient temperature
16.	userfsw	100.0 k	Customer Selected Frequency

Design Assistance

1. LM3423 Product Folder : <http://www.ti.com/product/LM3423> : contains the data sheet and other resources.

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