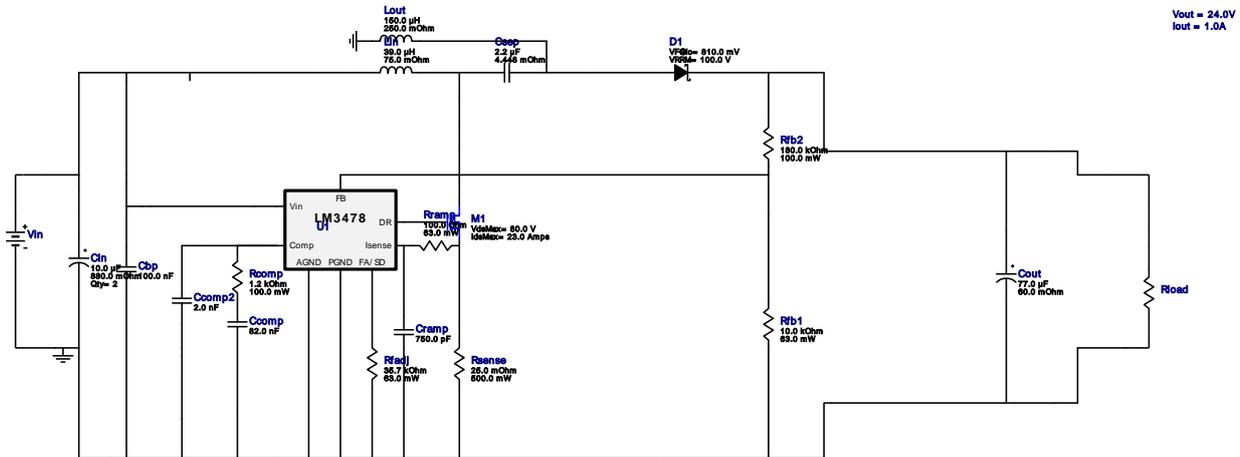


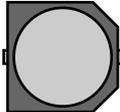
WEBENCH[®] Design Report

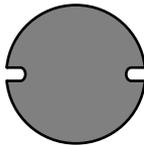
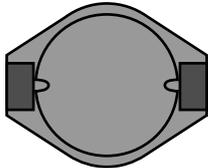
 Design : 4000282/220 LM3478MMX/NOPB
 LM3478MMX/NOPB 18.0V-28.0V to 24.00V @ 1.0A


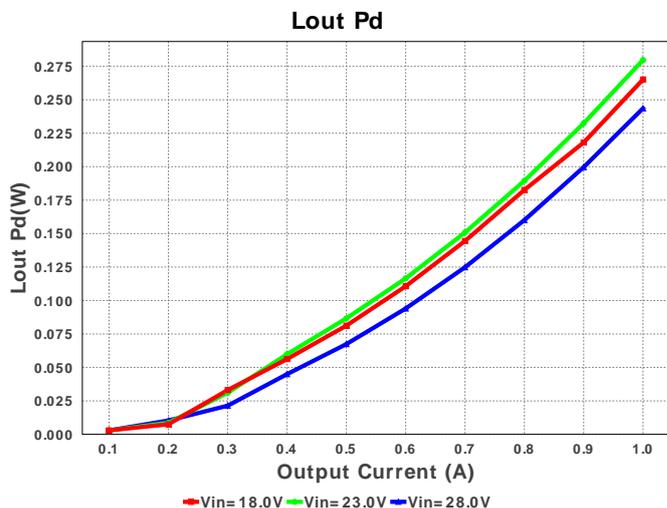
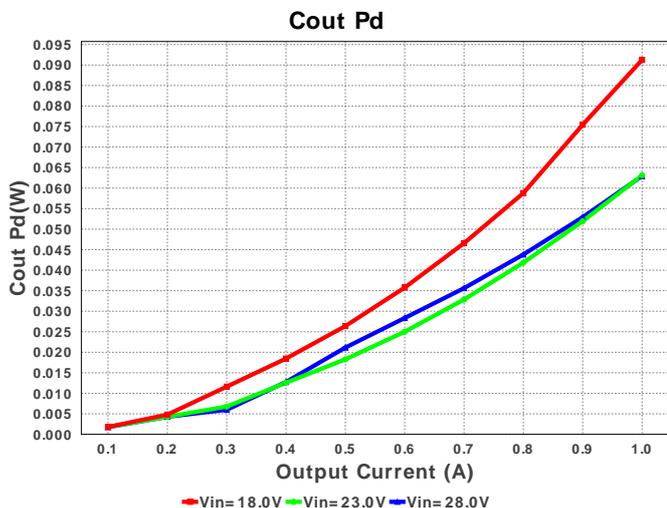
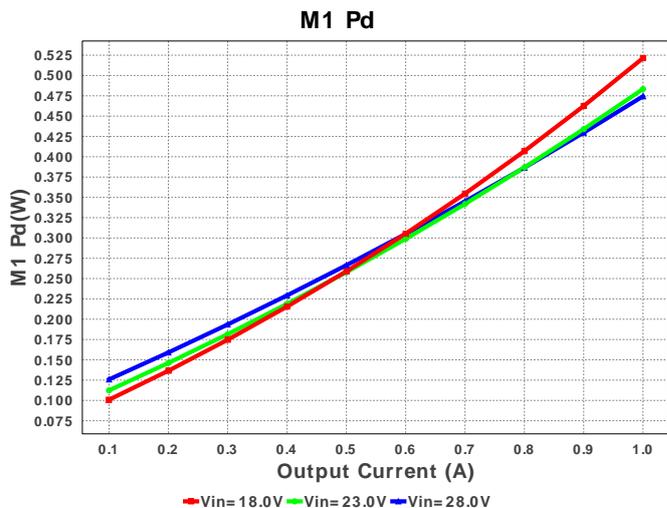
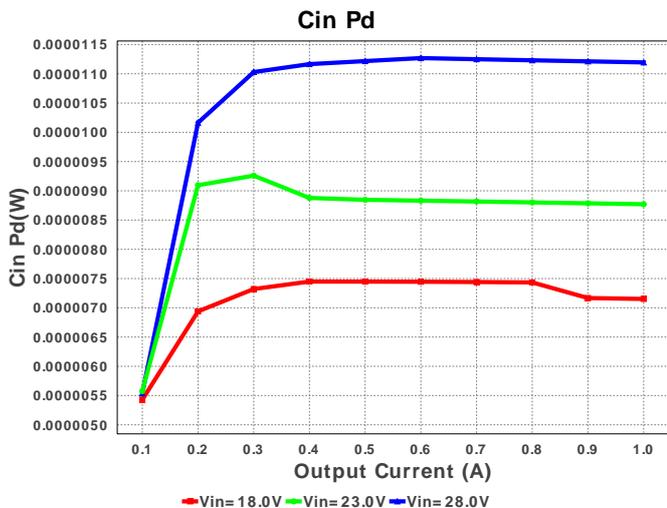
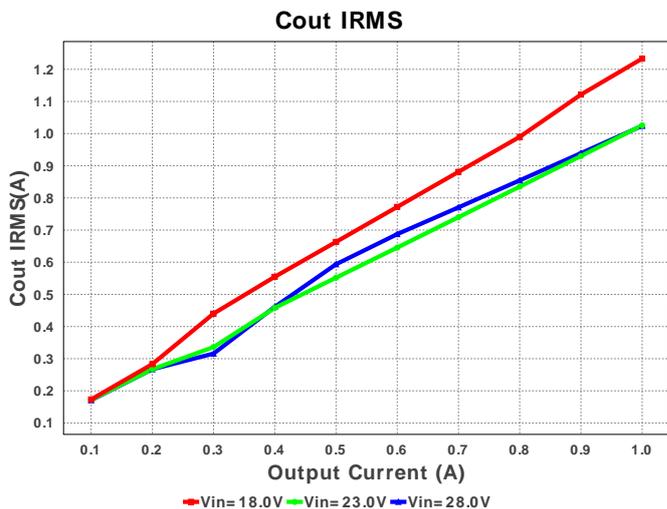
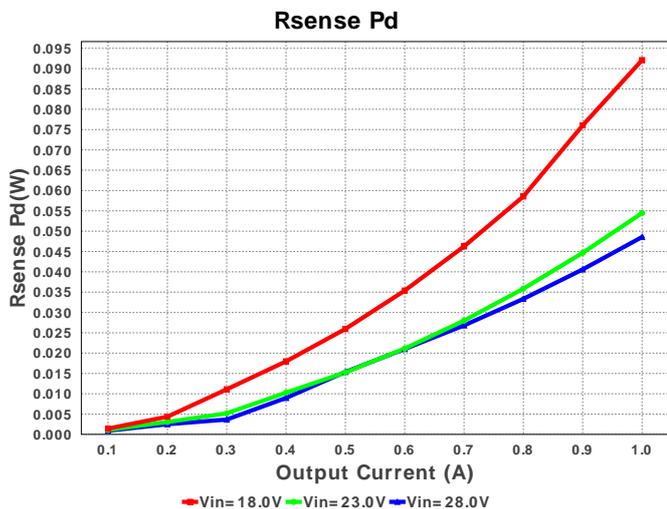
My Comments

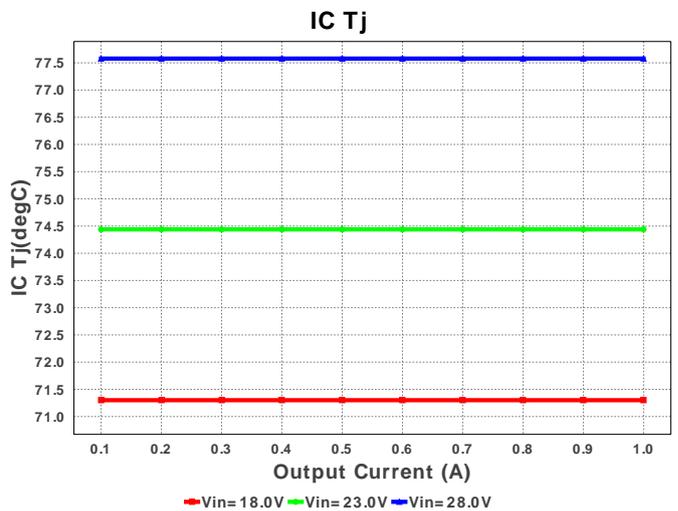
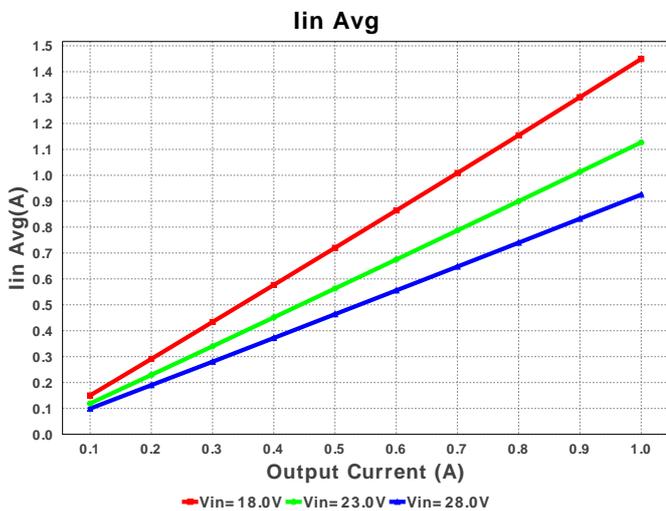
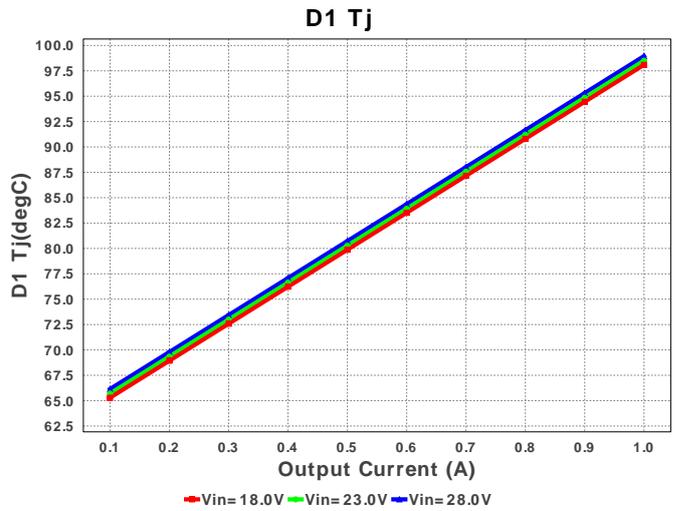
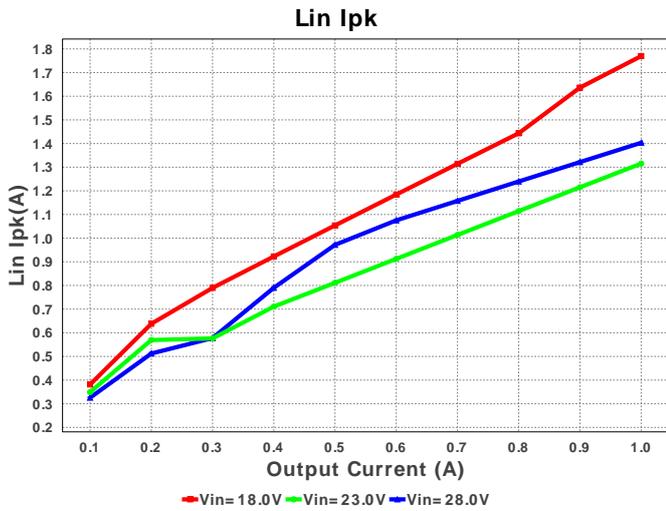
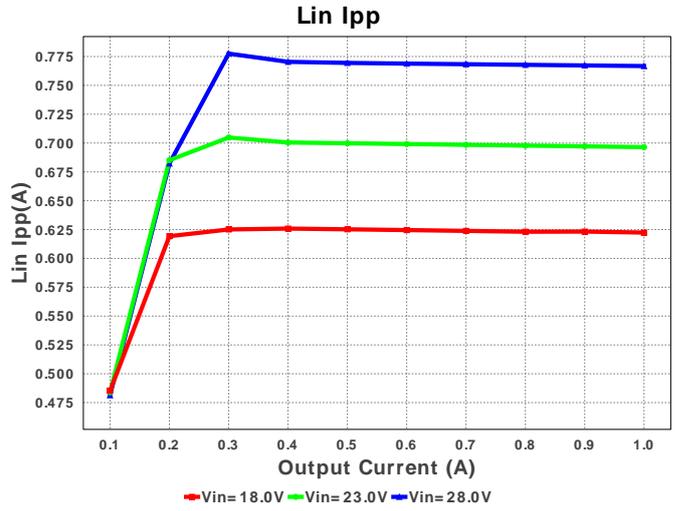
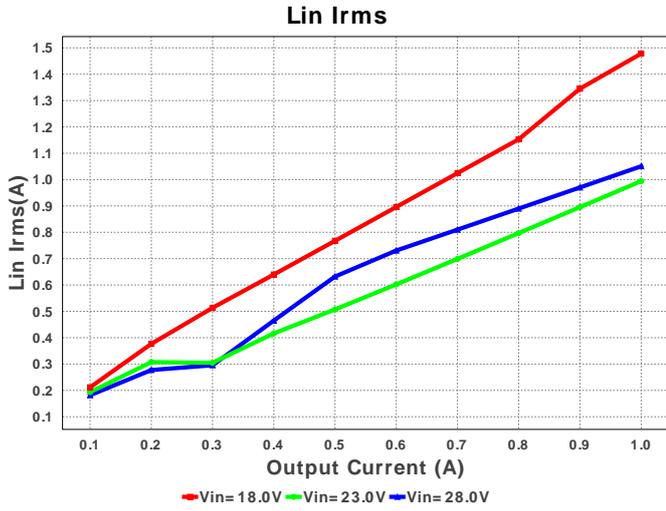
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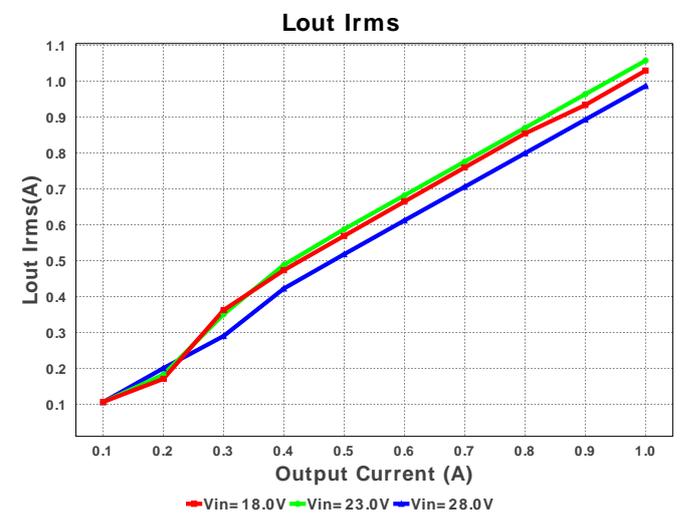
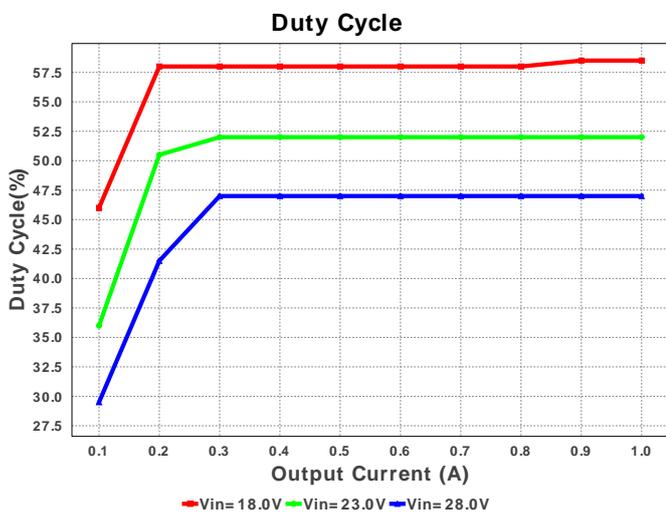
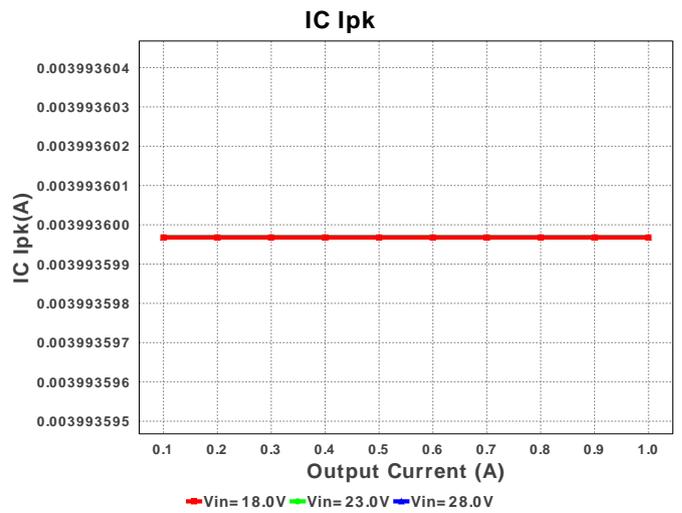
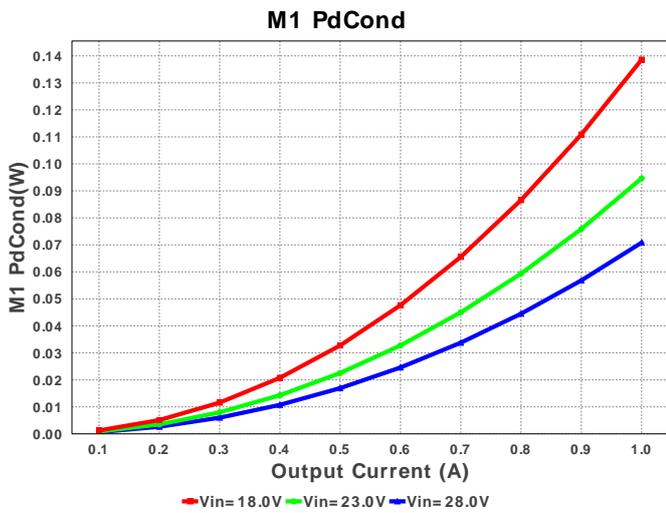
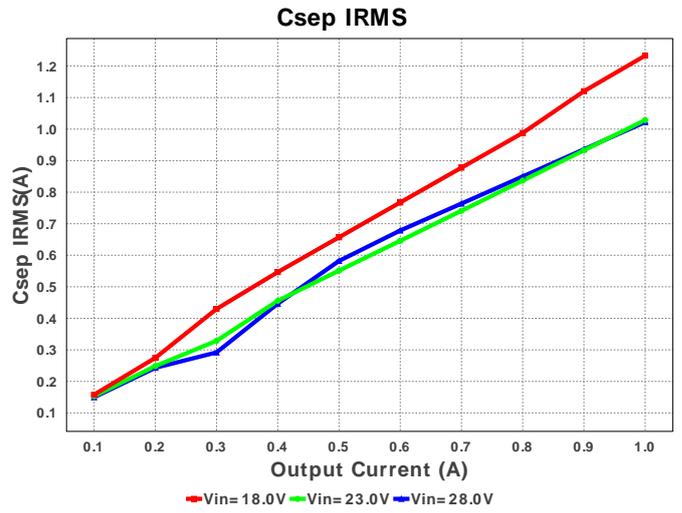
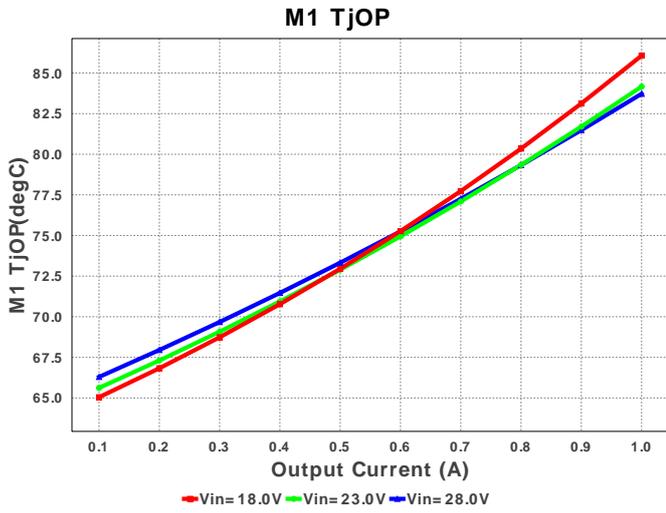
Electrical BOM

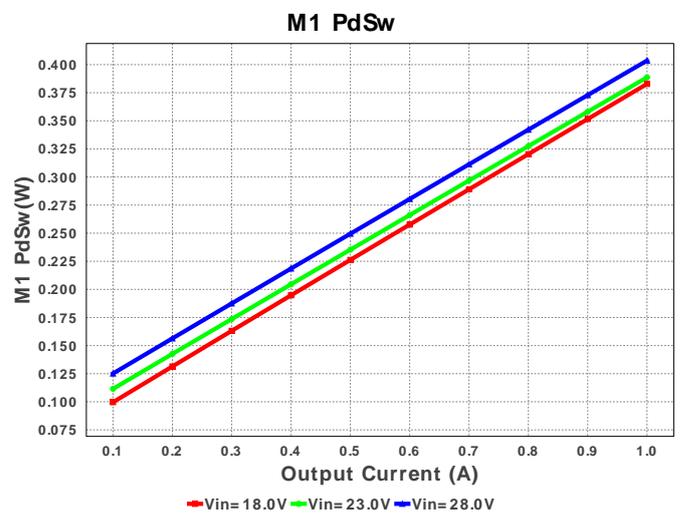
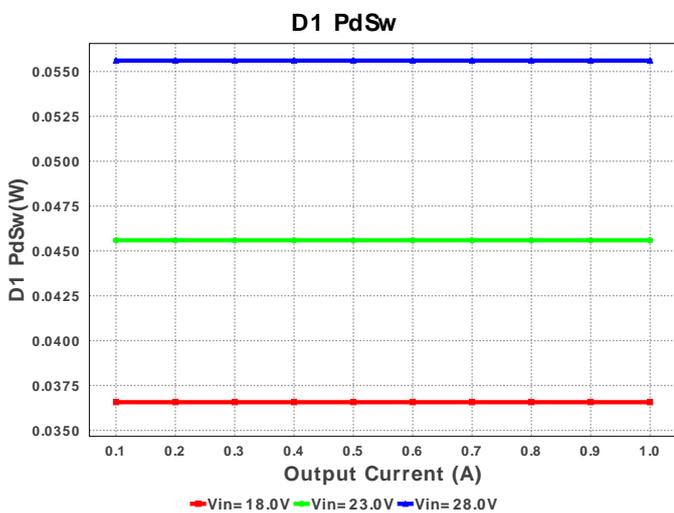
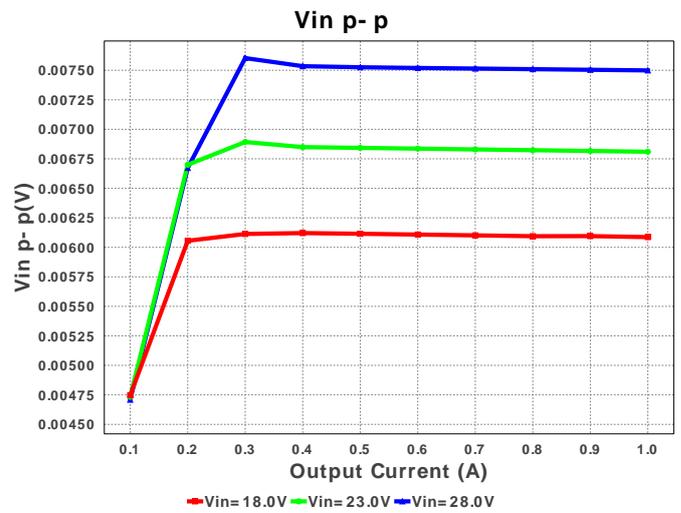
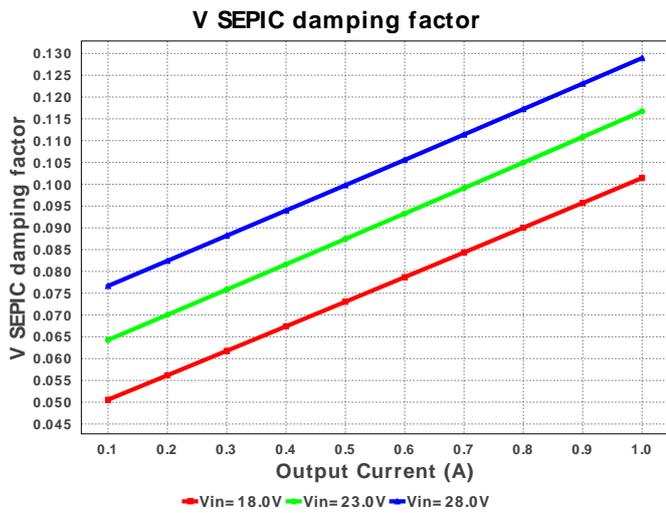
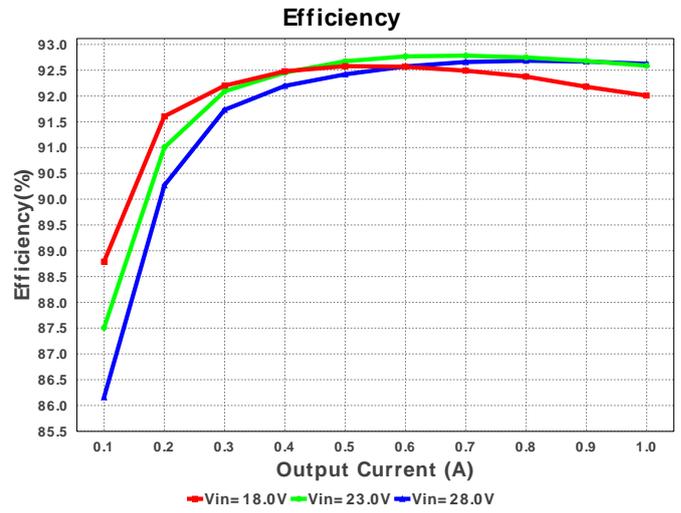
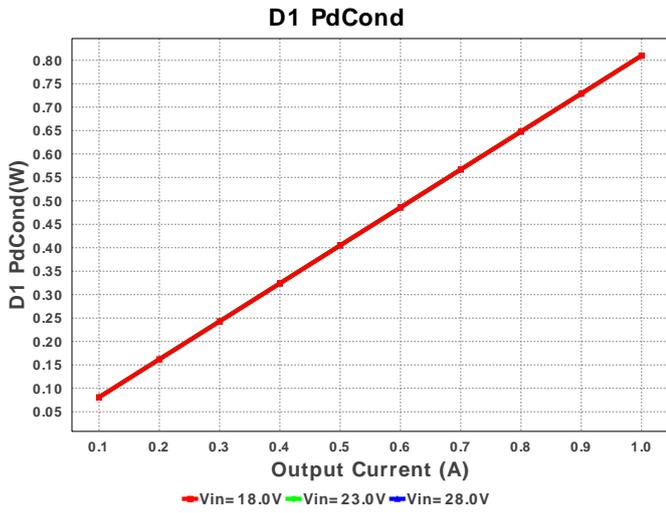
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cbp	Kemet	C0603C104K5RACTU Series= X7R	Cap= 100.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm ²
2.	Ccomp	MuRata	GRM155R61A823KA01D Series= X5R	Cap= 82.0 nF VDC= 10.0 V IRMS= 0.0 A	1	\$0.01	 0402 3 mm ²
3.	Ccomp2	MuRata	GRM1885C1H202JA01D Series= C0G/NP0	Cap= 2.0 nF VDC= 50.0 V IRMS= 0.0 A	1	\$0.01	 0603 5 mm ²
4.	Cin	Nichicon	UUD1H100MCL1GS Series= uD	Cap= 10.0 uF ESR= 880.0 mOhm VDC= 50.0 V IRMS= 165.0 mA	2	\$0.10	 SM_RADIAL_6.3AMM 80 mm ²
5.	Cout	Panasonic	35SVPD18M Series= SVPD	Cap= 77.0 uF ESR= 60.0 mOhm VDC= 35.0 V IRMS= 1.8 A	1	\$0.70	 SM_RADIAL_10AMM 160 mm ²
6.	Cramp	Samsung Electro-Mechanics	CL21C751JBCNNNC Series= C0G/NP0	Cap= 750.0 pF VDC= 50.0 V IRMS= 0.0 A	1	\$0.03	 0805 7 mm ²
7.	Csep	MuRata	GRM31CR71H225KA88L Series= X7R	Cap= 2.2 uF ESR= 4.448 mOhm VDC= 50.0 V IRMS= 2.2252 A	1	\$0.05	 1206_190 11 mm ²
8.	D1	Vishay-Semiconductor	30WQ10FNPBF	Vf@Io= 810.0 mV VRRM= 100.0 V	1	\$0.37	 DPAK 102 mm ²

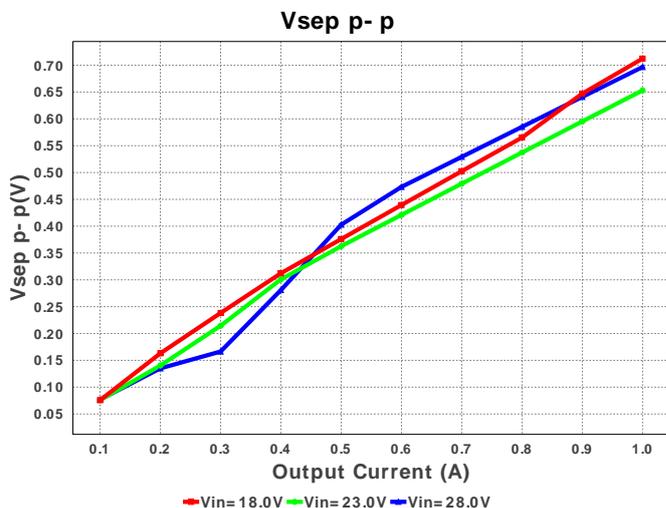
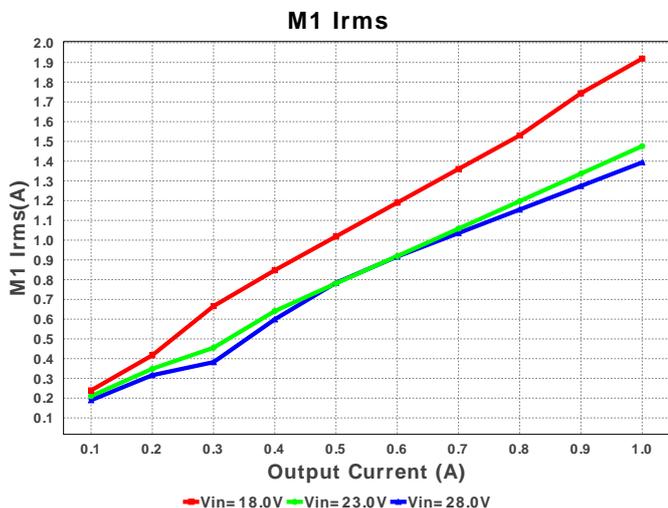
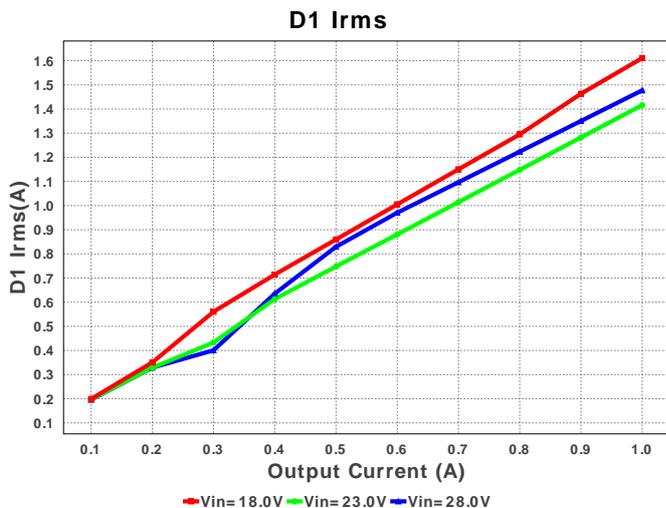
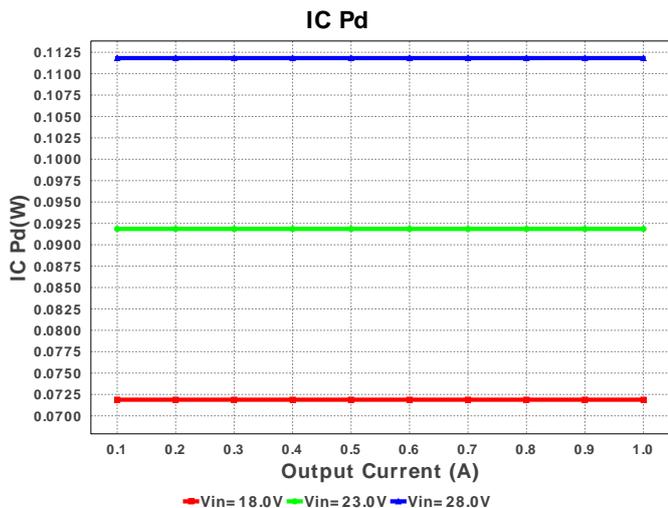
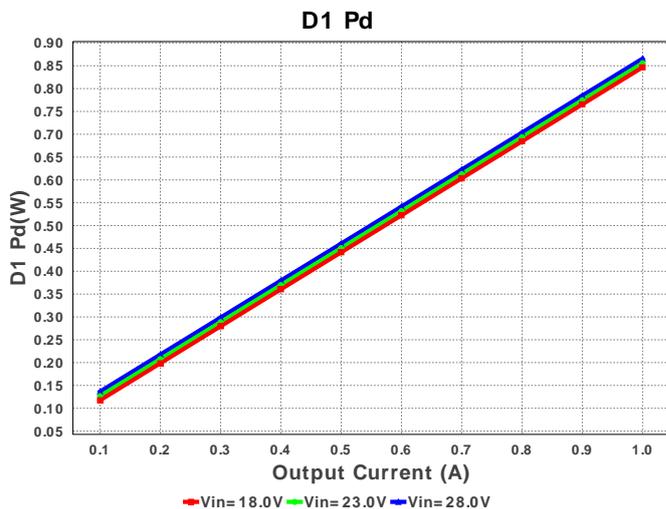
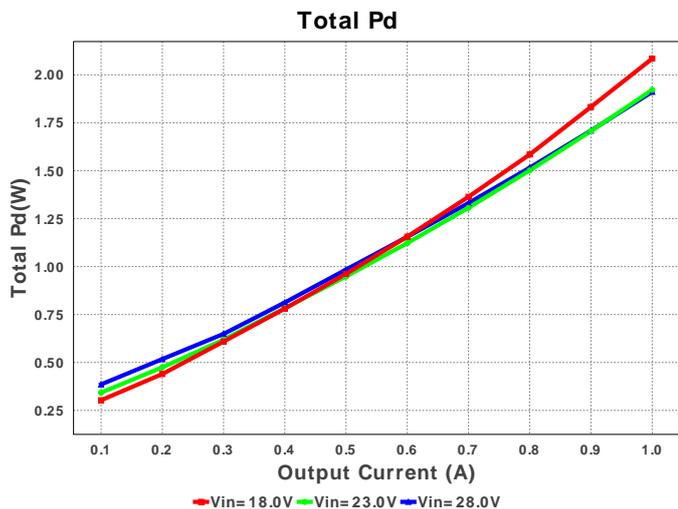
#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
9.	Lin	Bourns	SDR1307-390KL	L= 39.0 μ H DCR= 75.0 mOhm	1	\$0.35	 SDR1307 227 mm ²
10.	Lout	NIC Components	NPI52W151MTRF	L= 150.0 μ H DCR= 250.0 mOhm	1	\$0.26	 IND_NPI52W 358 mm ²
11.	M1	Infineon Technologies	BSC340N08NS3 G	VdsMax= 80.0 V IdsMax= 23.0 Amps	1	\$0.19	 PG-TDSON-8 55 mm ²
12.	Rcomp	Yageo America	RC0603FR-071K2L Series= ?	Res= 1.2 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
13.	Rfadj	Vishay-Dale	CRCW040235K7FKED Series= CRCW..e3	Res= 35.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
14.	Rfb1	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
15.	Rfb2	Yageo America	RC0603FR-07180KL Series= ?	Res= 180.0 kOhm Power= 100.0 mW Tolerance= 1.0%	1	\$0.01	 0603 5 mm ²
16.	Rramp	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	\$0.01	 0402 3 mm ²
17.	Rsense	Stackpole Electronics Inc	CSR1206FK25L0 Series= ?	Res= 25.0 mOhm Power= 500.0 mW Tolerance= 1.0%	1	\$0.10	 1206 11 mm ²
18.	U1	Texas Instruments	LM3478MMX/NOPB	Switcher	1	\$0.80	 MUA08A 24 mm ²

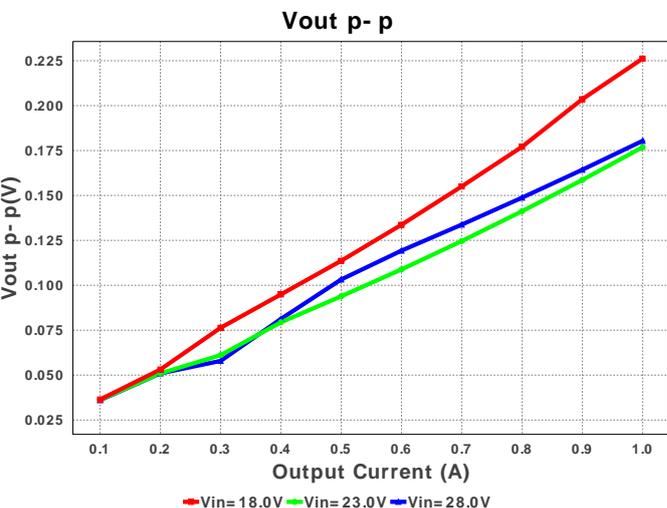
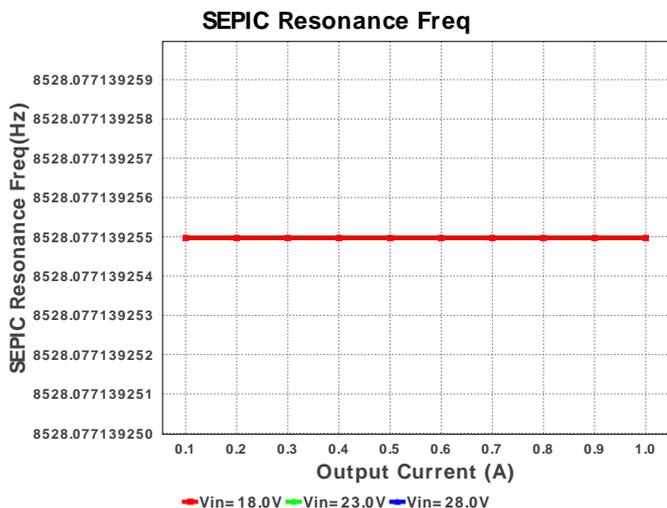
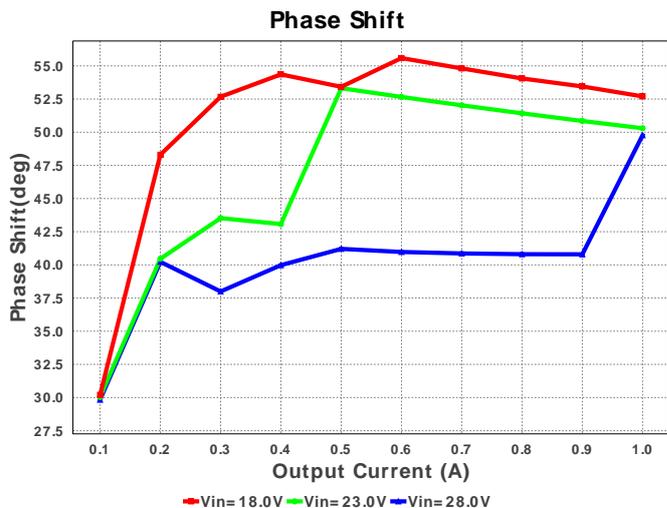
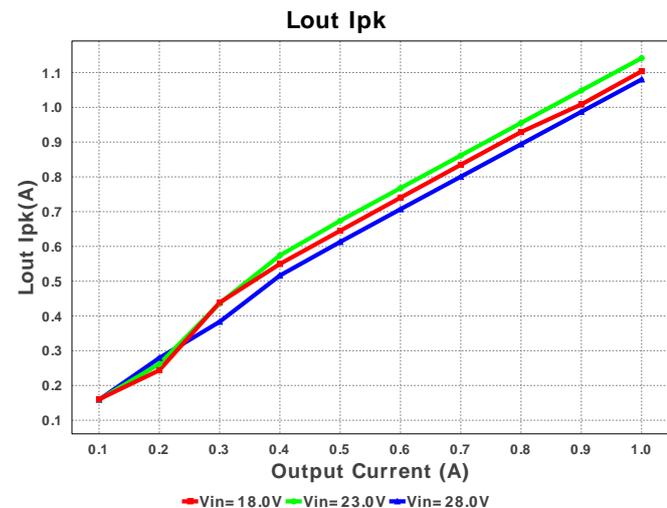
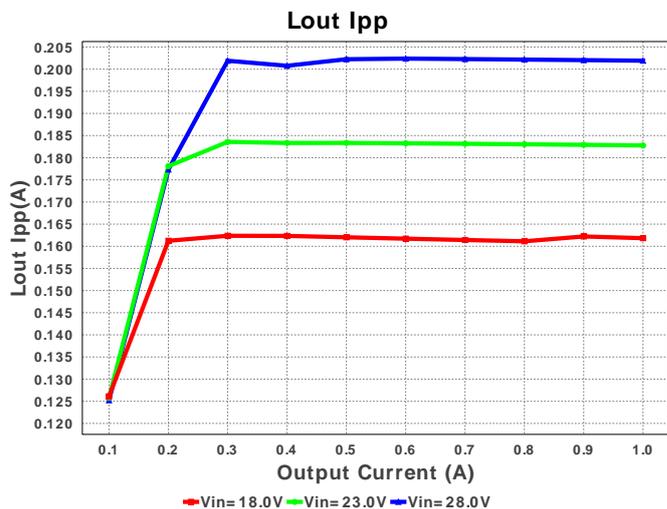
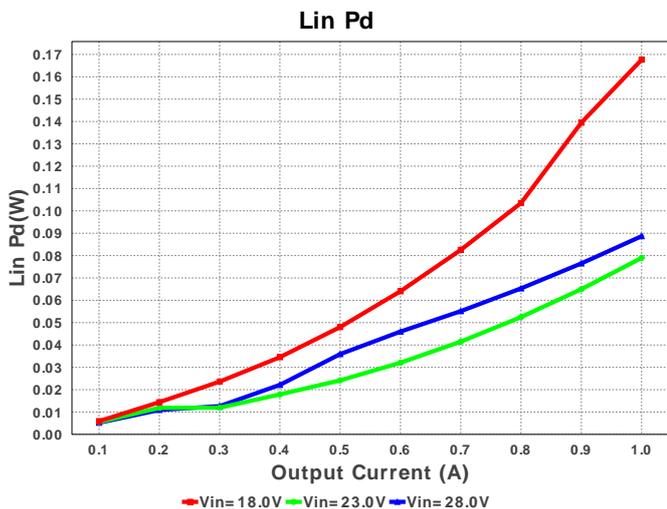


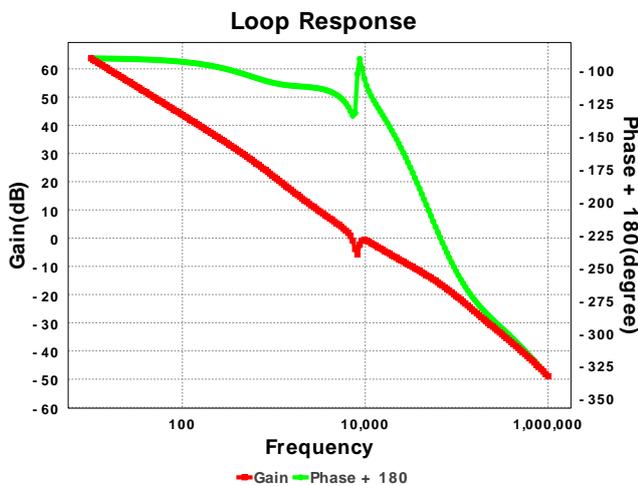
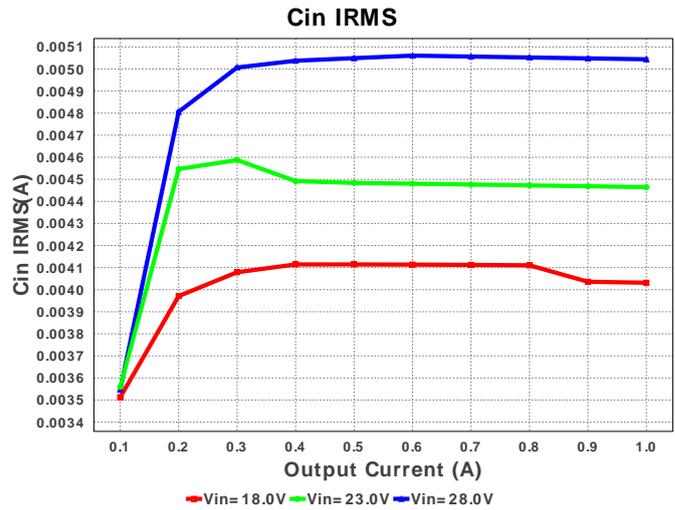
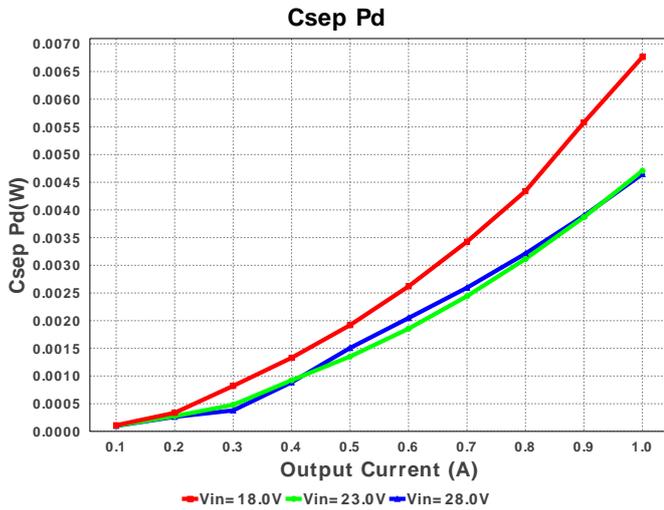












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	4.06 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	1.23 A	Current	Output capacitor RMS ripple current
3.	Csep IRMS	1.23 A	Current	SEPIC capacitor RMS ripple current
4.	D1 Irms	1.607 A	Current	D1 Irms
5.	IC Ipk	3.989 mA	Current	Peak switch current in IC
6.	Iin Avg	1.449 A	Current	Average input current
7.	Iin Ipk	1.763 A	Current	Iin peak current
8.	Iin Ipp	625.652 mA	Current	Peak-to-peak input inductor ripple current
9.	Iin Irms	1.47 A	Current	Iin ripple current
10.	Iout Ipk	1.106 A	Current	Iout peak current
11.	Iout Ipp	162.701 mA	Current	Peak-to-peak output inductor ripple current
12.	Iout Irms	1.031 A	Current	Iout ripple current
13.	M1 Irms	1.915 A	Current	M1 MOSFET Irms
14.	BOM Count	19	General	Total Design BOM count
15.	FootPrint	1.144 k mm ²	General	Total Foot Print Area of BOM components
16.	Frequency	430.0 kHz	General	Switching frequency
17.	IC Tolerance	24.3 mV	General	IC Feedback Tolerance
18.	Mode	CCM	General	Conduction Mode
19.	Total BOM	\$3.13	General	Total BOM Cost
20.	D1 Tj	98.088 degC	Op_Point	D1 junction temperature
21.	SEPIC Resonance Freq	8.528 kHz	Op_Point	SEPIC Resonance Frequency
22.	V SEPIC damping factor	101.475 m	Op_Point	V SEPIC damping factor
23.	Vin p-p	6.119 mV	Op_Point	Peak-to-peak input voltage
24.	Vsep p-p	711.514 mV	Op_Point	Peak-to-peak sepic voltage
25.	Cross Freq	6.906 kHz	Op_point	Bode plot crossover frequency
26.	Duty Cycle	58.5 %	Op_point	Duty cycle
27.	Efficiency	92.023 %	Op_point	Steady state efficiency
28.	Gain Marg	10.695 db	Op_point	Bode Plot Gain Margin
29.	IC Tj	77.558 degC	Op_point	IC junction temperature

#	Name	Value	Category	Description
30.	IOUT_OP	1.0 A	Op_point	Iout operating point
31.	M1 TjOP	85.979 degC	Op_point	M1 MOSFET junction temperature
32.	Phase Marg	49.488 deg	Op_point	Bode Plot Phase Margin
33.	Phase Shift	52.734 deg	Op_point	Bode Plot Phase Shift
34.	VIN_OP	18.0 V	Op_point	Vin operating point
35.	Vout p-p	225.68 mV	Op_point	Peak-to-peak output ripple voltage
36.	Cin Pd	7.254 μ W	Power	Input capacitor power dissipation
37.	Cout Pd	90.77 mW	Power	Output capacitor power dissipation
38.	Csep Pd	6.728 mW	Power	SEPIC capacitor power dissipation
39.	D1 Pd	846.403 mW	Power	Diode power dissipation
40.	D1 PdCond	810.0 mW	Power	Diode conduction losses
41.	D1 PdSw	36.403 mW	Power	Diode switching losses
42.	IC Pd	111.692 mW	Power	IC power dissipation
43.	Lin Pd	165.833 mW	Power	Lin power dissipation
44.	Lout Pd	266.16 mW	Power	Lout power dissipation
45.	M1 Pd	519.575 mW	Power	M1 MOSFET total power dissipation
46.	M1 PdCond	138.549 mW	Power	M1 MOSFET conduction losses
47.	M1 PdSw	381.026 mW	Power	M1 MOSFET switching losses
48.	Rsense Pd	91.637 mW	Power	LED Current Rsns Power Dissipation
49.	Total Pd	2.081 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	1.0	Maximum Output Current
2.	VinMax	28.0	Maximum input voltage
3.	VinMin	18.0	Minimum input voltage
4.	Vout	24.0	Output Voltage
5.	base_pn	LM3478	Base Product Number
6.	source	DC	Input Source Type
7.	Ta	60.0	Ambient temperature
8.	UserFsw	430.0 k	Customer Selected Frequency

Design Assistance

1. **LM3478** Product Folder : <http://www.ti.com/product/LM3478> : contains the data sheet and other resources.

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