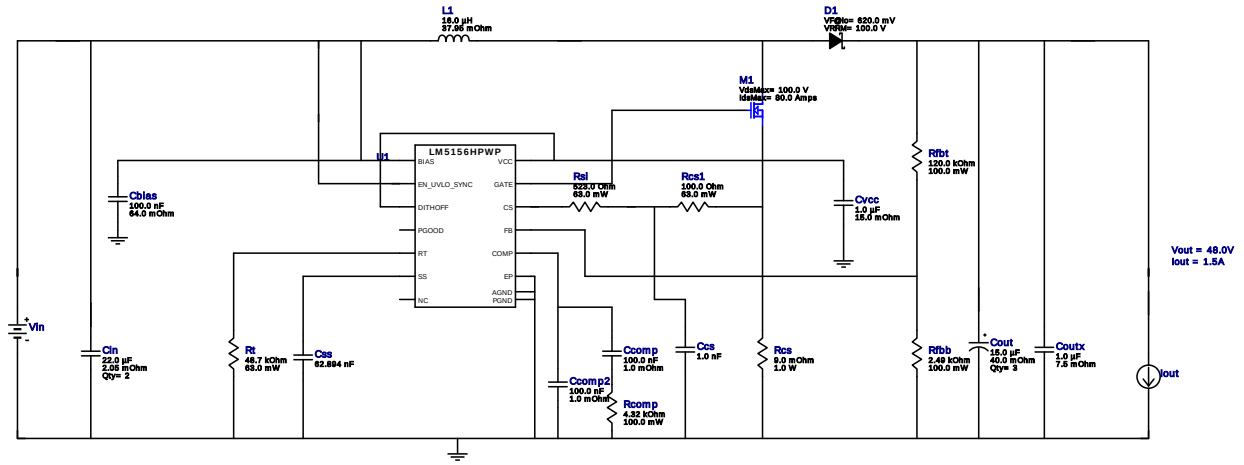
VinMin = 10.0V
VinMax = 26.0V
Vout = 48.0V
Iout = 1.5A

Device = LM5156HPWPR
Topology = Boost
Created = 2021-08-20 00:37:21.312
BOM Cost = NA
BOM Count = 23
Total Pd = 5.27W

WEBENCH® Design Report

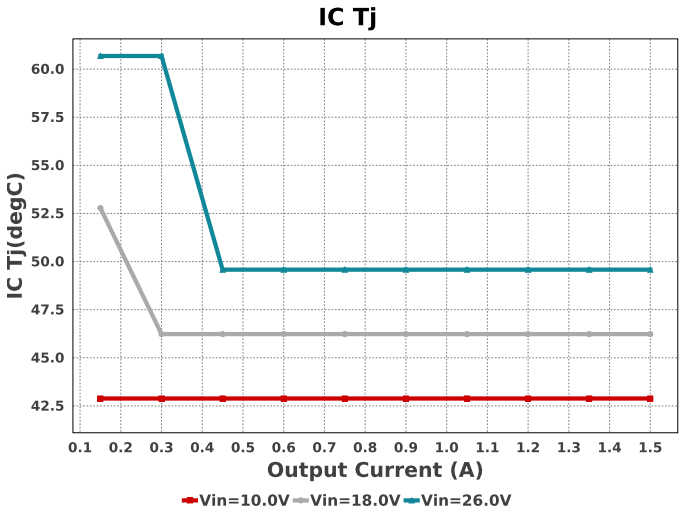
Design : 35 LM5156HPWPR
LM5156HPWPR 10V-26V to 48.00V @ 1.5A

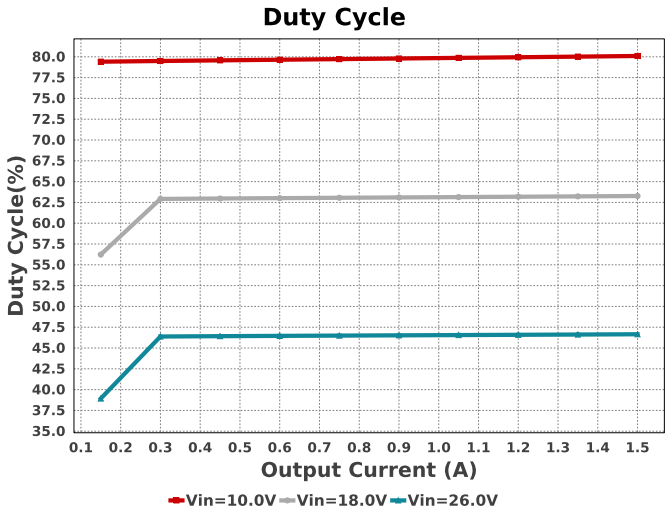


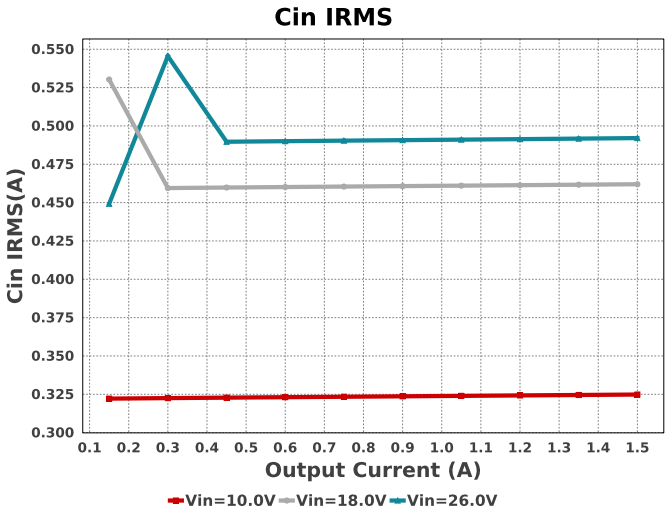
Electrical BOM

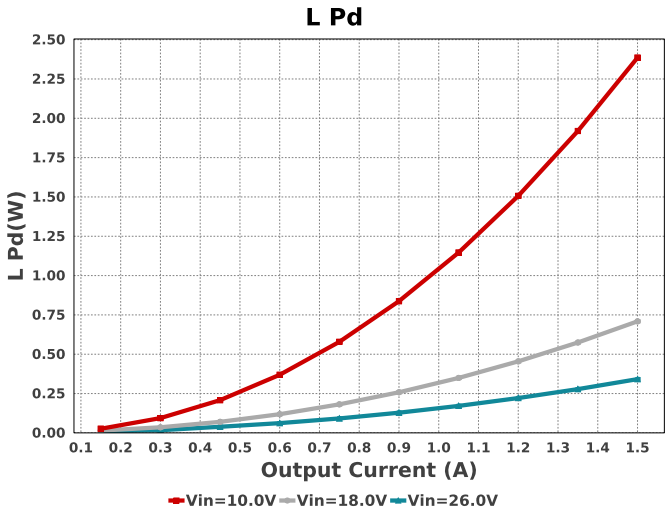
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
Cbias	Kemet	C0805C104M5RACTU Series= X7R	Cap= 100.0 nF ESR= 64.0 mOhm VDC= 50.0 V IRMS= 1.64 A	1	$0.01	0805 7 mm²
Ccomp	Yageo	CC0805KRX7R8BB104 Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
Ccomp2	Yageo	CC0805KRX7R8BB104 Series= X7R	Cap= 100.0 nF ESR= 1.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.02	0805 7 mm²
Ccs	MuRata	GRM1555C1H102JA01J Series= C0G/NP0	Cap= 1.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0402 3 mm²
Cin	TDK	C2012X5R1V226M125AC Series= X5R	Cap= 22.0 uF ESR= 2.05 mOhm VDC= 35.0 V IRMS= 4.5559 A	2	$0.33	0805 7 mm²
Cout	Panasonic	100SXV15M Series= SXV	Cap= 15.0 uF ESR= 40.0 mOhm VDC= 100.0 V IRMS= 2.35 A	3	$1.18	CAPSMT_62_E12 106 mm²
Coutx	TDK	C3216X7R2A105M160AA Series= X7R	Cap= 1.0 uF ESR= 7.5 mOhm VDC= 100.0 V IRMS= 5.9235 A	1	$0.12	1206 11 mm²
Css	CUSTOM	CUSTOM Series= ?	Cap= 62.894 nF VDC= 0.0 V IRMS= 0.0 A	1	NA	CUSTOM 0 mm²
Cvcc	Kemet	C0805C105K4RACTU Series= X7R	Cap= 1.0 uF ESR= 15.0 mOhm VDC= 16.0 V IRMS= 8.19 A	1	$0.02	0805 7 mm²

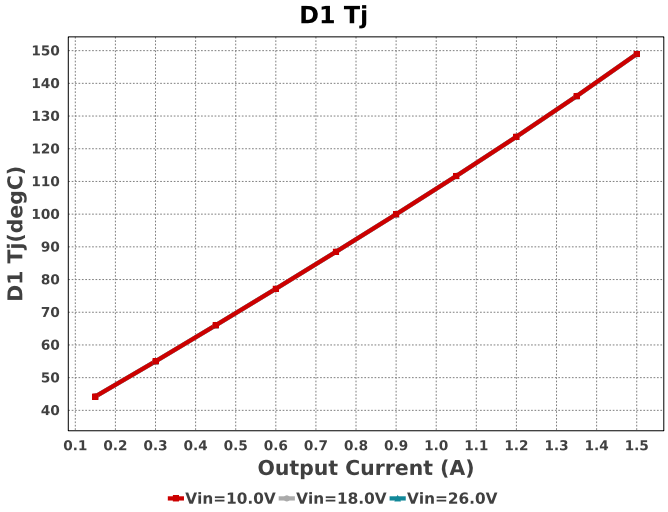
Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
D1	ON Semiconductor	MBRS3100T3G	VF@Io= 620.0 mV VRRM= 100.0 V	1	$0.18	 SMC 83 mm²
L1	Wurth Elektronik	7443251600	L= 16.0 µH 37.95 mOhm	1	$2.87	WE-HCI_1050 152 mm²
M1	ON Semiconductor	FDWS86068-F085	VdsMax= 100.0 V IdsMax= 80.0 Amps	1	$0.85	PowerDFN56 55 mm²
Rcomp	Yageo	RT0603BRD074K32L Series= ?	Res= 4.32 kOhm Power= 100.0 mW Tolerance= 0.1%	1	$0.04	 0603 5 mm²
Rcs	Susumu Co Ltd	PRL1632-R009-F-T1 Series= PRL1632	Res= 9.0 mOhm Power= 1.0 W Tolerance= 1.0%	1	$0.20	 0612 11 mm²
Rcs1	Vishay-Dale	CRCW0402100RFKED Series= CRCW..e3	Res= 100.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
Rfbb	Susumu Co Ltd	RG1608P-2491-B-T5 Series= RG1608	Res= 2.49 kOhm Power= 100.0 mW Tolerance= 0.1%	1	$0.06	 0603 5 mm²
Rfbt	Susumu Co Ltd	RG1608P-124-B-T5 Series= RG1608	Res= 120.0 kOhm Power= 100.0 mW Tolerance= 0.1%	1	$0.06	 0603 5 mm²
Rsl	Vishay-Dale	CRCW0402523RFKED Series= CRCW..e3	Res= 523.0 Ohm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
Rt	Vishay-Dale	CRCW040248K7FKED Series= CRCW..e3	Res= 48.7 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	 0402 3 mm²
U1	Texas Instruments	LM5156HPWPR	Switcher	1	$0.73	PWP0014H 59 mm²

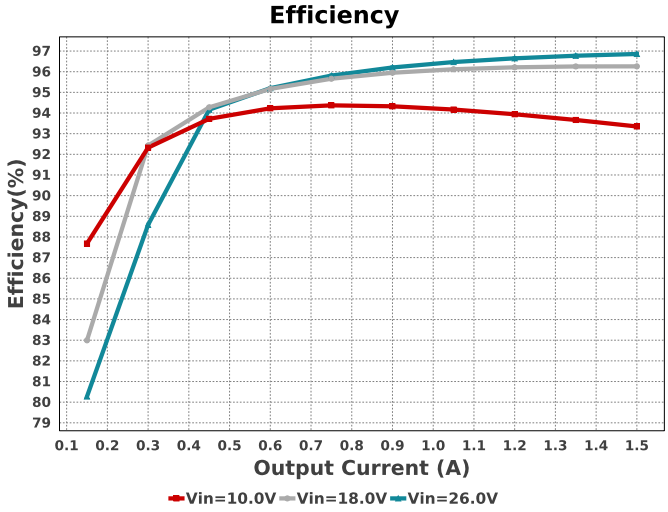


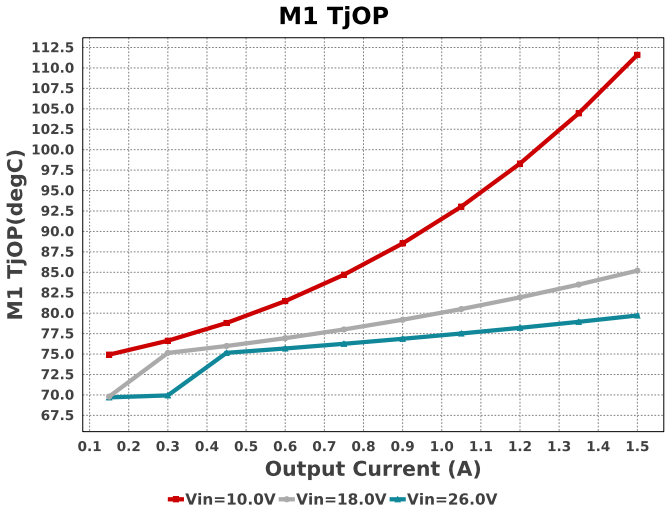


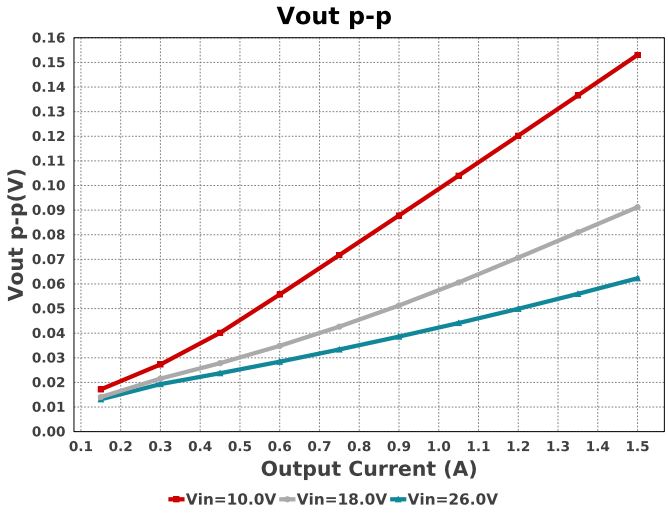


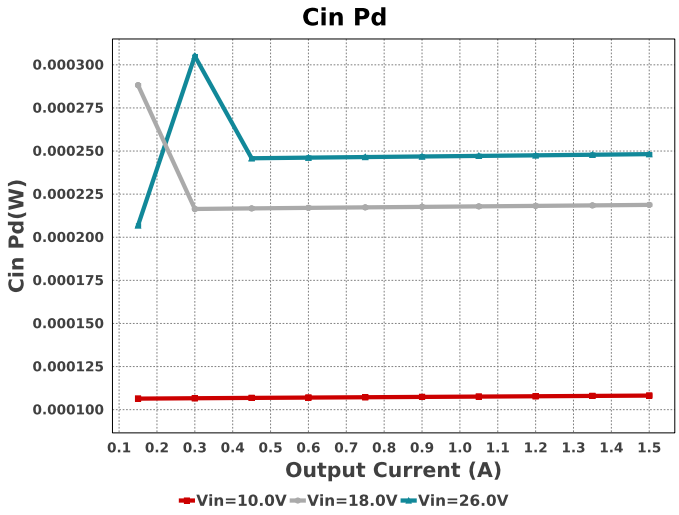


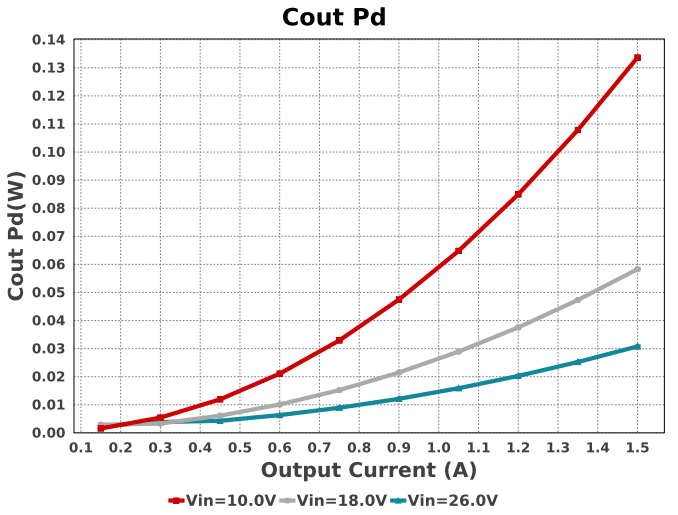


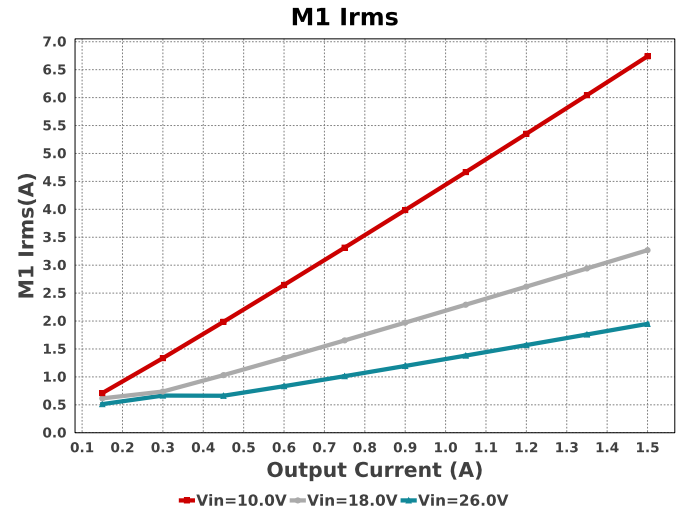


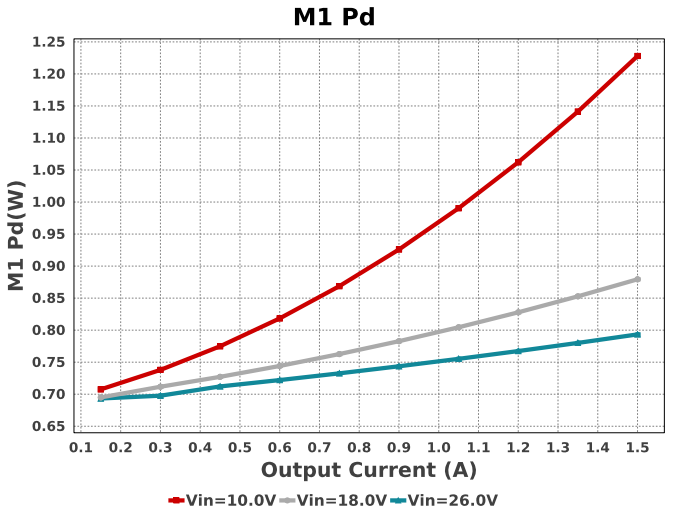


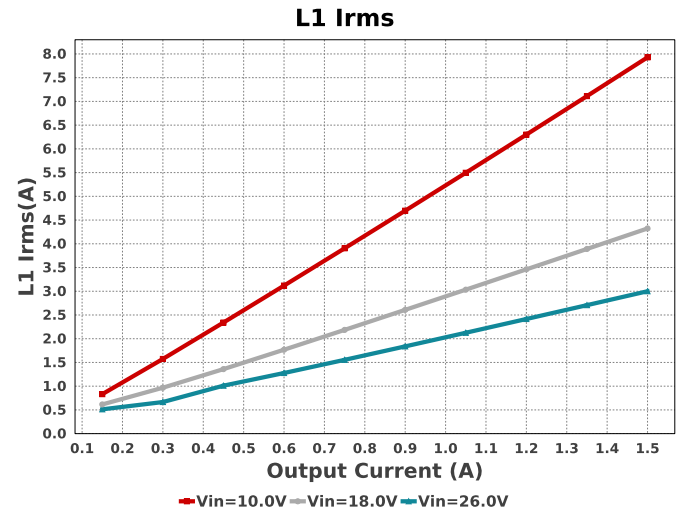


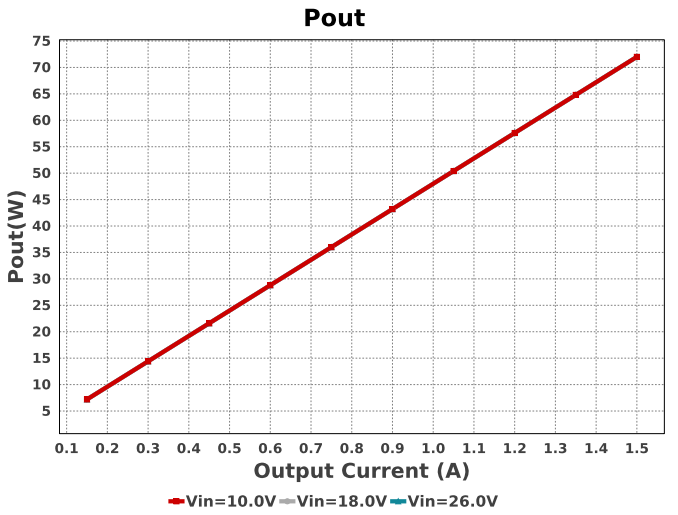


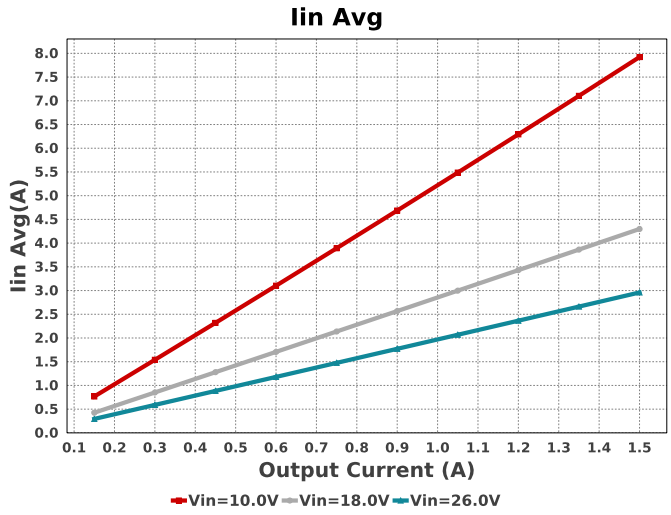


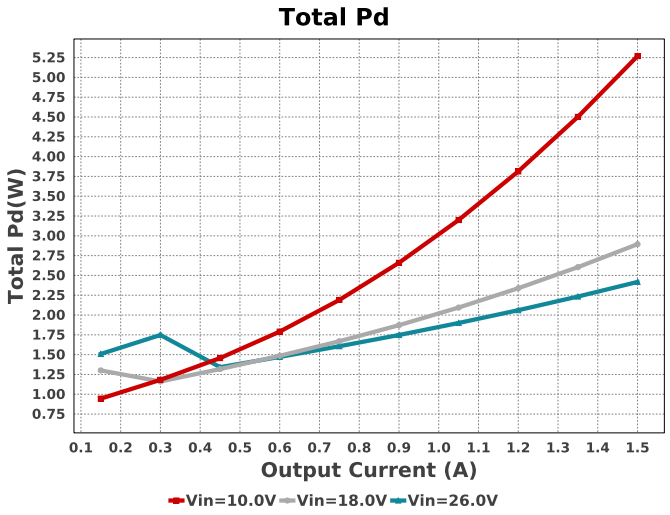


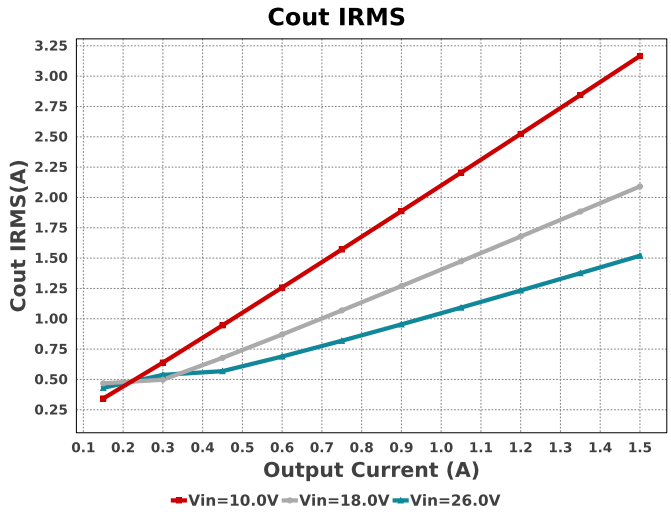


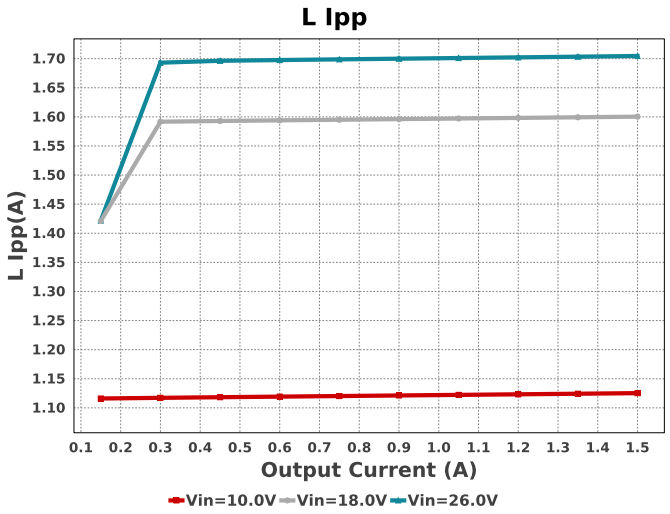


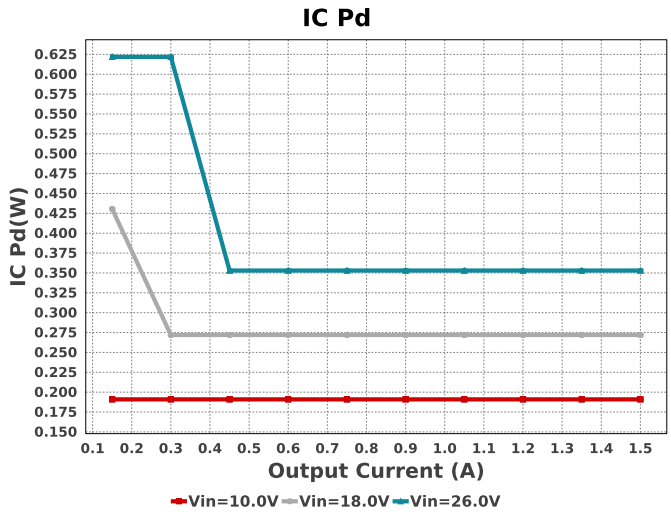


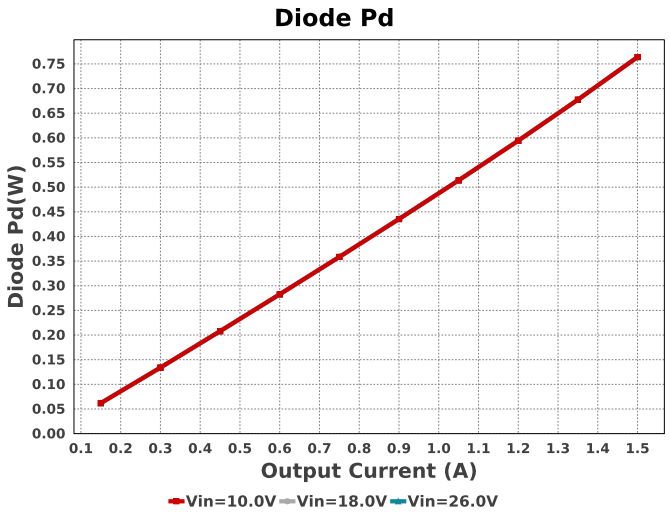


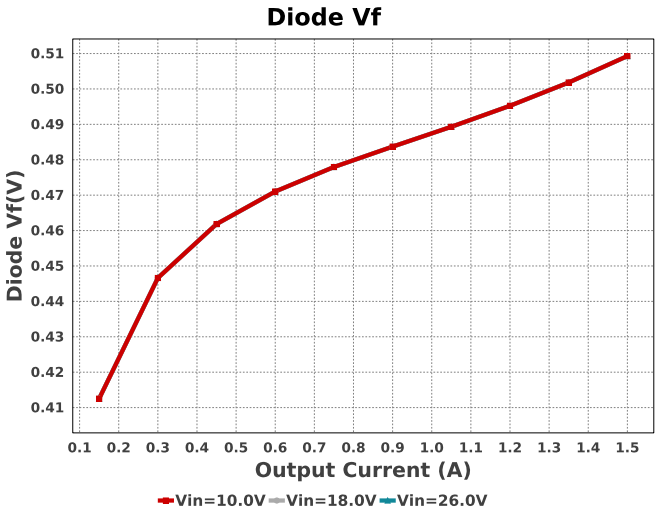


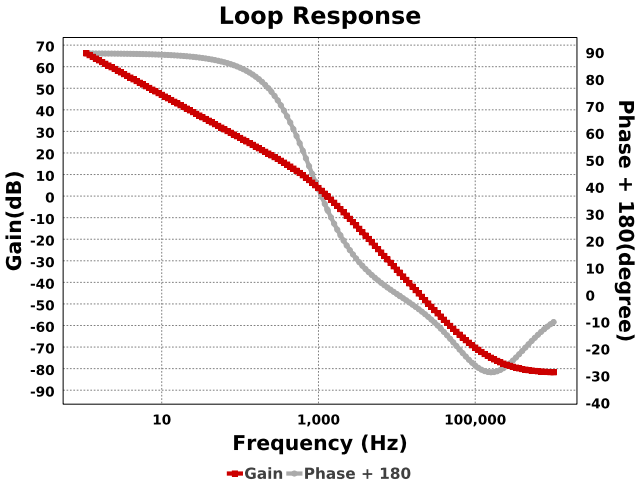












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	23		Total Design BOM count
2.	Total BOM	NA		Total BOM Cost
3.	Cin IRMS	324.839 mA	Capacitor	Input capacitor RMS ripple current
4.	Cin Pd	108.16 µW	Capacitor	Input capacitor power dissipation
5.	Cout IRMS	3.166 A	Capacitor	Output capacitor RMS ripple current
6.	Cout Pd	133.66 mW	Capacitor	Output capacitor power dissipation
7.	D1 Tj	148.976 degC	Diode	D1 junction temperature
8.	Diode Pd	763.91 mW	Diode	Diode power dissipation
9.	Diode Vf	509.276 mV	Diode	Forward voltage drop of diode D1
10.	IC Pd	190.92 mW	IC	IC power dissipation
11.	IC Tj	42.885 degC	IC	IC junction temperature
12.	ICThetaJA	41.3 degC/W	IC	IC junction-to-ambient thermal resistance
13.	Iin Avg	7.922 A	IC	Average input current
14.	L Ipp	1.125 A	Inductor	Peak-to-peak inductor ripple current
15.	L Pd	2.386 W	Inductor	Inductor power dissipation
16.	L1 Irms	7.928 A	Inductor	Inductor ripple current
17.	M1 Irms	6.74 A	Mosfet	Q Iavg
18.	M1 Pd	1.228 W	Mosfet	MOSFET power dissipation
19.	M1 TjOP	111.598 degC	Mosfet	M1 MOSFET junction temperature
20.	Cin Pd	108.16 µW	Power	Input capacitor power dissipation
21.	Cout Pd	133.66 mW	Power	Output capacitor power dissipation
22.	Diode Pd	763.91 mW	Power	Diode power dissipation
23.	IC Pd	190.92 mW	Power	IC power dissipation
24.	L Pd	2.386 W	Power	Inductor power dissipation
25.	M1 Pd	1.228 W	Power	MOSFET power dissipation
26.	Total Pd	5.269 W	Power	Total Power Dissipation
27.	Cross Freq	692.71 Hz	System Information	Bode plot crossover frequency
28.	Duty Cycle	80.099 %	System Information	Duty cycle
29.	Efficiency	93.349 %	System Information	Steady state efficiency
30.	FootPrint	761.0 mm^2	System Information	Total Foot Print Area of BOM components
31.	Frequency	444.713 kHz	System Information	Switching frequency
32.	Iout	1.5 A	System Information	Iout operating point
33.	Mode	CCM	System Information	Conduction Mode
34.	Phase Marg	48.538 deg	System Information	Bode Plot Phase Margin
35.	Pout	72.0 W	System Information	Total output power
36.	Vin	10.0 V	System Information	Vin operating point
37.	Vout Actual	49.193 V	System Information	Vout Actual calculated based on selected voltage divider resistors
38.	Vout Tolerance	1.198 %	System Information	Vout Tolerance based on IC Tolerance (no load) and voltage divider resistors if applicable
39.	Vout p-p	153.033 mV	System Information	Peak-to-peak output ripple voltage

Design Inputs

Name	Value	Description
Iout	1.5	Maximum Output Current
VinMax	26.0	Maximum input voltage
VinMin	10.0	Minimum input voltage
Vout	48.0	Output Voltage
base_pn	LM5156H	Base Product Number
source	DC	Input Source Type
Ta	35.0	Ambient temperature

WEBENCH® Assembly

Design Assistance

1. Master key : 2B4ED45C5E64D05D[v1]
2. **LM5156H** Product Folder : http://www.ti.com/product/LM5156H : contains the data sheet and other resources.