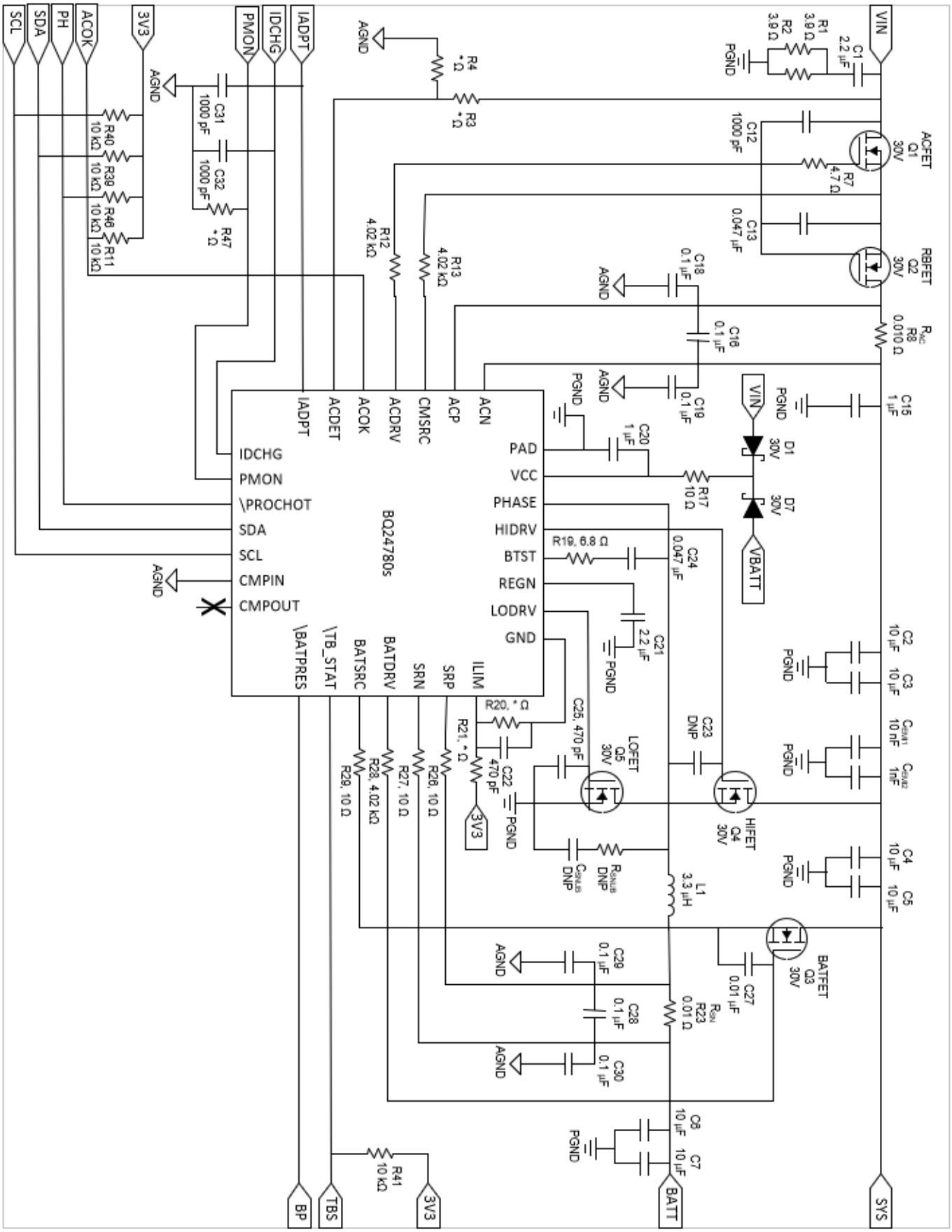
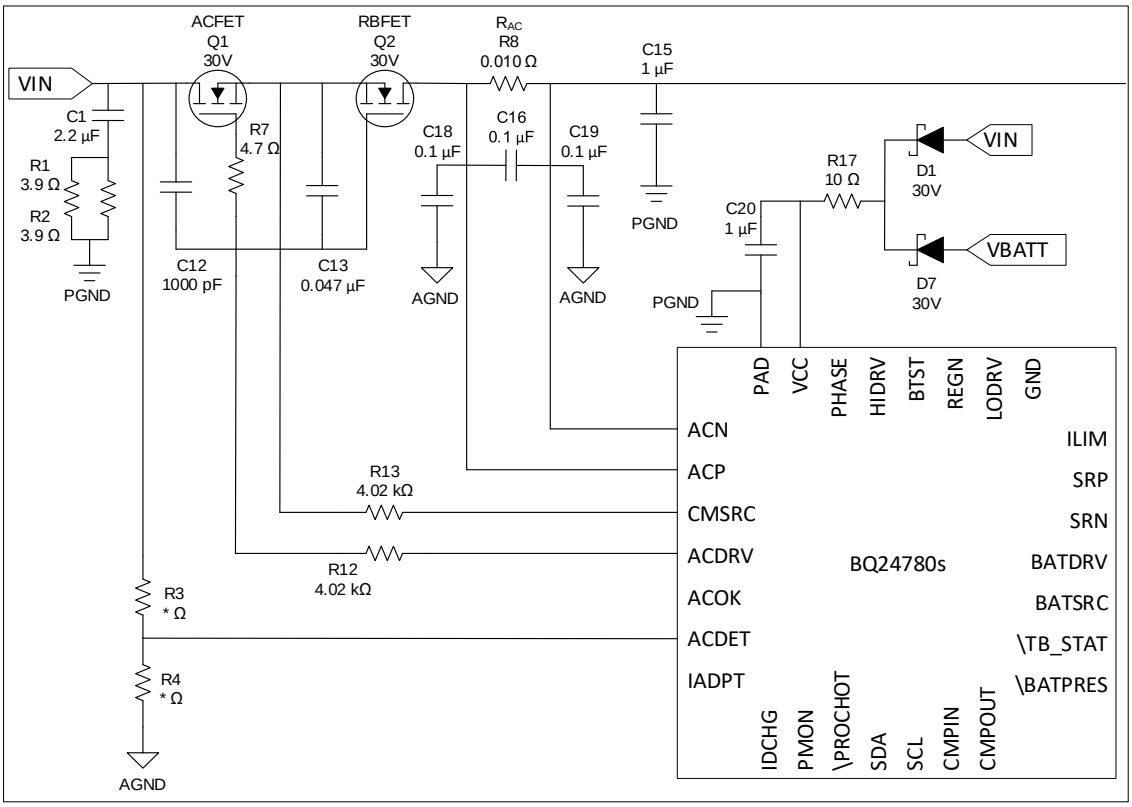
BQ24780s TYPICAL SCHEMATIC

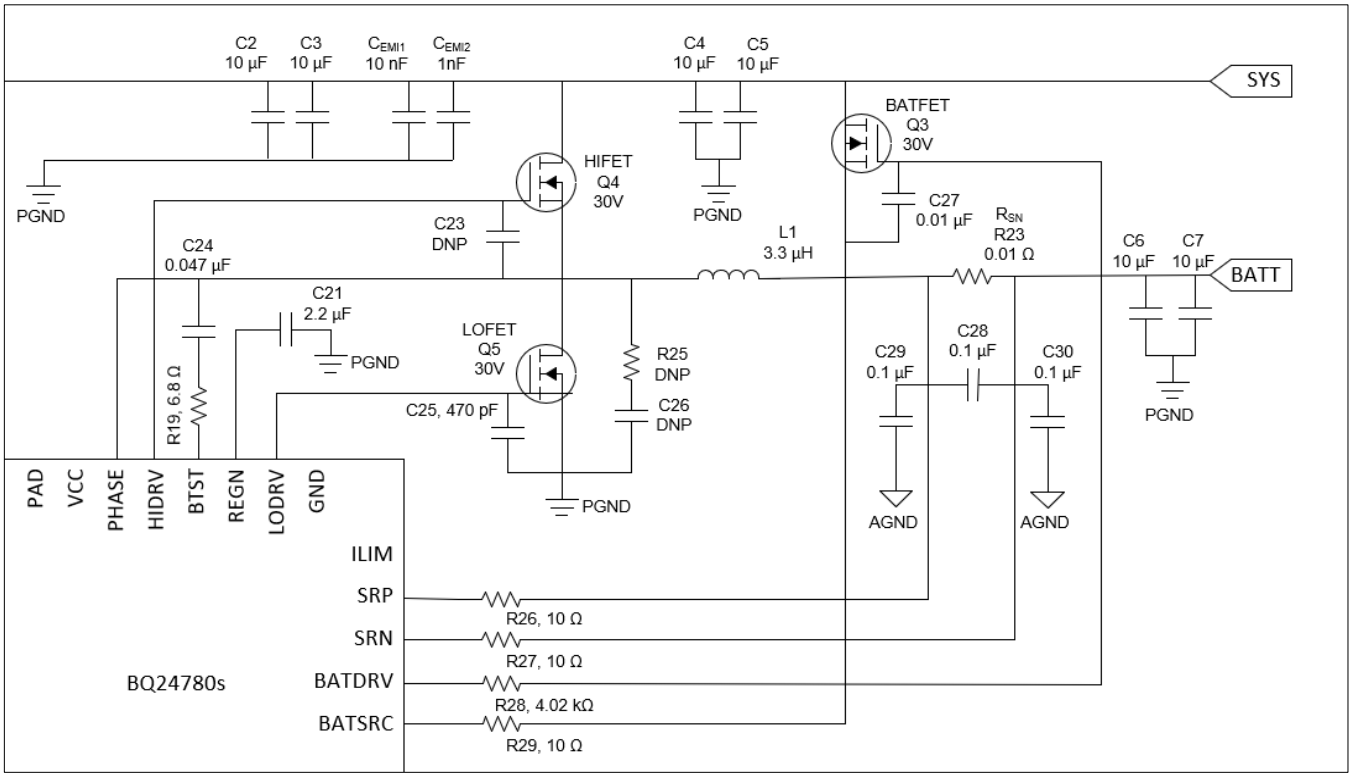


BQ24780s - Input Power Design



INPUT POWER - DESIGN CHECKLIST								
PIN NAME		**REQUIREMENT**	**COMPONENT**	**MIN**	**TYP**	**MAX**	**DESCRIPTION**	**COMMENTS AND RELEVANT EQUATIONS**
							Input source to the charger	
	-	Required	Q1		-		Back-to-back input protection N-Channel MOSFETs	Used to isolate the battery and adapter. This blocks reverse current from the battery back to the input and prevents short from adapter into battery.
			Q2		-			
		Required	R12		4.02 kΩ		Current-limiting resistors	
			R13		4.02 kΩ			
		Recommended	R1 /R2		2 Ω		Input hot-plug snubber circuit	Used to dampen the ringing due to input inrush current
			C1		2.2 uF			
		Recommended	R7		4.7 Ω		Input MOSFETs turn-on/turn-off delay	
			C12		1000 pF			
			C13		0.047 uF			
							Differential input current sensing	
ACP-ACN	pin 1 and pin 2	Required	R9 (R_{AC})		10 mΩ		Input current sensing resistor	
		Recommended	C15		1 uF		Switching noise filtering	
		Recommended	C16		0.1 uF		Differential mode noise filtering	
		Recommended	C18		0.1 uF		Common mode noise filtering	
		Recommended	C19		0.1 uF			
							AC Detect Resistor-Divider	
ACDET	6	Required	R3		* kΩ		High side of resistor-divider for adapter detection threshold	$V_{th} = 2.4V\frac{R_3 + R_4}{R_3}$ $R_3 + R_4 \approx 1\ M\Omega$
		Required	R4		* kΩ		Low side of resistor-divider for adapter detection threshold	
							IC power positive supply	
VCC	28	Required	R17		10 Ω		VCC inrush current limiting	
		Required	C20		1.0 uF		VCC decoupling capacitor	
		Required	D1		-		Adapter/Battery Diode-OR	
			D7		-		Adapter/Battery Diode-OR	

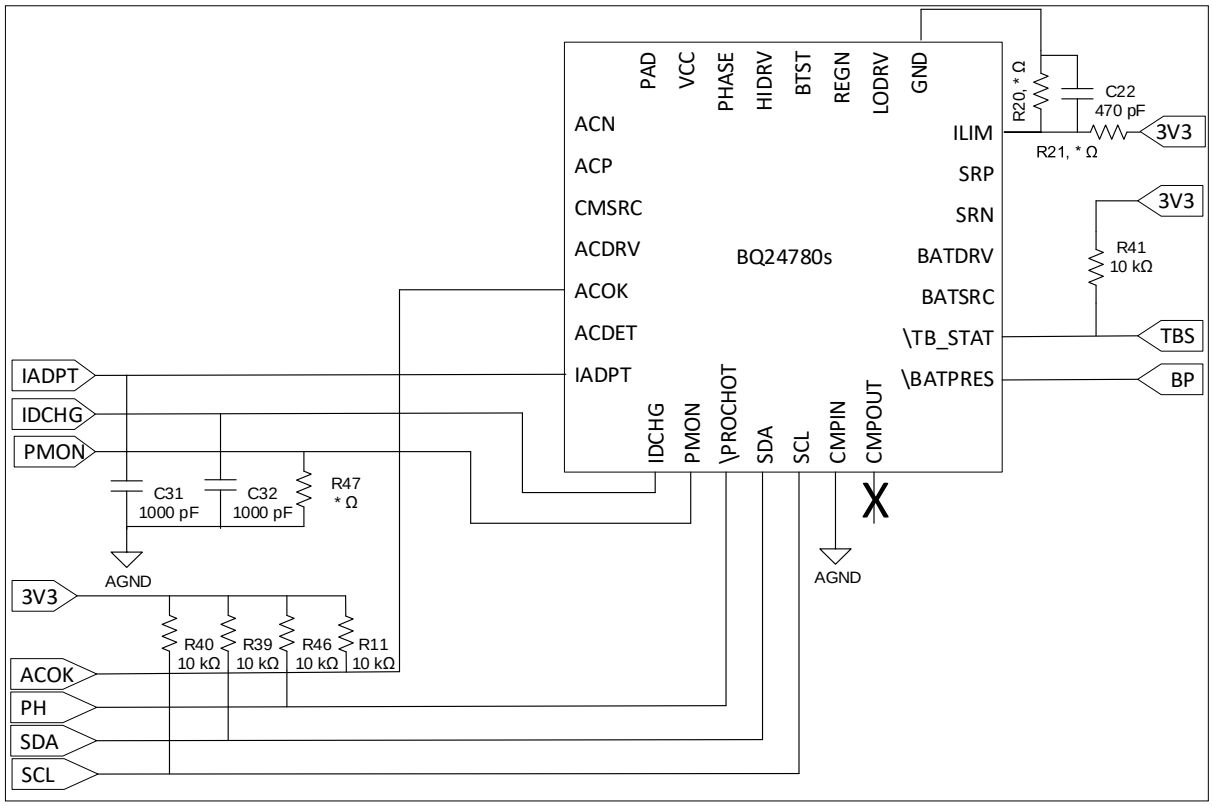
BQ24780s - Output Power Design



OUTPUT POWER - DESIGN CHECKLIST								
PIN NAME		**REQUIREMENT**	**COMPONENT**	**MIN**	**TYP**	**MAX**	**DESCRIPTION**	**COMMENTS AND RELEVANT EQUATIONS**
							System output	
	-	Required	C2/C3		20 uF		High frequency converter input capacitor(s)	
		Required	C4/C5		20 uF		Power path noise filtering capacitor(s)	
		Required	C10 on EVM		22 uF		System output noise filtering capacitor(s)	For more information please refer to EVM and "8.2.2.5 Input Capacitor" of the datasheet
							BATFET power path gate driver	
BATDRV	18	Required	Q3		-		External N-Channel BATFET for power path	
		Required	R28		4.02 kΩ		BATDRV current limiting resistor	
		Recommended	C27		0.01 uF		BATFET turn on/off delay capacitor	
							Switching Regulator Output Stage	
Switching Regulator Output Stage	-	Required	L1		*uH		Switching regulator inductor	**Recommended: 10 kHz < fo < 20 kHz, typical L= 3.3 uH, C = 20 uF. Refer to "8.2.2.6 Output Capacitor" of the datasheet**
		Required	C6/C7		*uF		Switching regulator ouput capacitor(s)	$f_o = \frac{1}{2 \cdot \pi \cdot \sqrt{L_{out} \cdot C_{out}}}$
							Differential charge current sensing	
SRP-SRN	19-20	Required	R23 (R_{SR})		10 mΩ		Charge current sensing resistor	
		Recommended	C28		0.1 uF		Differential mode noise filtering	
		Recommended	C29		0.1 uF		Common mode noise filtering	
		Recommended	C30		0.1 uF			
							Internal LDO output	
REGN	24	Required	C21		2.2 uF		Internal LDO output stabilizing capacitor	
							Low-Side N-Channel MOSFET driver	
LODRV	23	Recommended	C25		470 pF		Low-side FET timing capacitor	Slowing MOSFET turn-on/off reduces noise and EMI, but also reduces efficiency.
		Required	Q5		-		Converter Low-Side N-Channel MOSFET	
		Required	C24		0.047 uF		Converter bootstrap capacitor	
PHASE & BTST	25 & 27	Recommended	R19		6.8 Ω		Bootstrap capacitor snubbing resistor	
		Optional	R25		* Ω		Switching converter snubber circuit	Snubber circuit values empirically determined if required. Recommend unpopulated footprint on new designs.
			C26		* uF			

HIDRV	26						High-Side N-Channel MOSFET driver	
		Required	Q4		-		Converter active High-Side N-Channel MOSFET	
		Optional (DNP)	C23		* pF		High-Side MOSFET timing capacitor	Slowing MOSFET turn-on/off reduces noise and EMI, but also reduces efficiency.
EMI Reduction							EMI	
		Optional	CEMI2		1 nF		HI-side FET EMI Filter Caps	
	HIFET	Optional	CEMI1		10 nF			

BQ24780s - Miscellaneous Components Design



Miscellaneous - DESIGN CHECKLIST

PIN		REQUIREMENT	COMPONENT	MIN	TYP	MAX	DESCRIPTION	COMMENTS AND RELEVANT EQUATIONS
SDA/SCL	pin 11 and pin 12						I2C Pullups	
		Required	R39		10 kΩ		Pull-up resistors to 3.3V	
		Required	R40		10 kΩ			
ACOK	5						ACOK Pullup	
		Required	R11		10 kΩ		ACOK pull-up resistor to 3.3V	
\PROCHOT	10						Prochot Pullup	
		Required	R46		10 kΩ		\PROCHOT pull-up resistor to 3.3V	
PMON	9						Power Monitor	
		Optional	R47		* Ω			
		Optional	C33 on EVM		0	100 pF		
IDCHG	8						Discharge Current	
		Optional	C32		100 pF	100 pF		
IADPT	7						Adapter Current	
		Optional	C31		100 pF	100 pF		
ILIM	21						External Current Limit	
		Required	R20 on EVM		* Ω		ILIM Resistor divider	
		Required	R21 on EVM		* Ω		ILIM Resistor divider	Refer to "Pin Functions" section of datasheet

TB_STAT	16						**Turbo Boost Status**	
		Optional	R41		10 kΩ		TB_STAT pull-up resistor to 3.3V	
CMPIN/CMPOUT	13-14						**Independent Comparator**	
		Optional			-			If unused, Ground CMPIN and float CMPOUT
GND & PAD	22 & PAD						**IC Ground return**	Recommend separate analog and power ground. GND pin 22 connects to analog ground, PAD connects to power ground. Join analog and power ground at single point with 0-ohm resistor, net tie or 10 mil trace
		Required	-		-		IC Ground return	