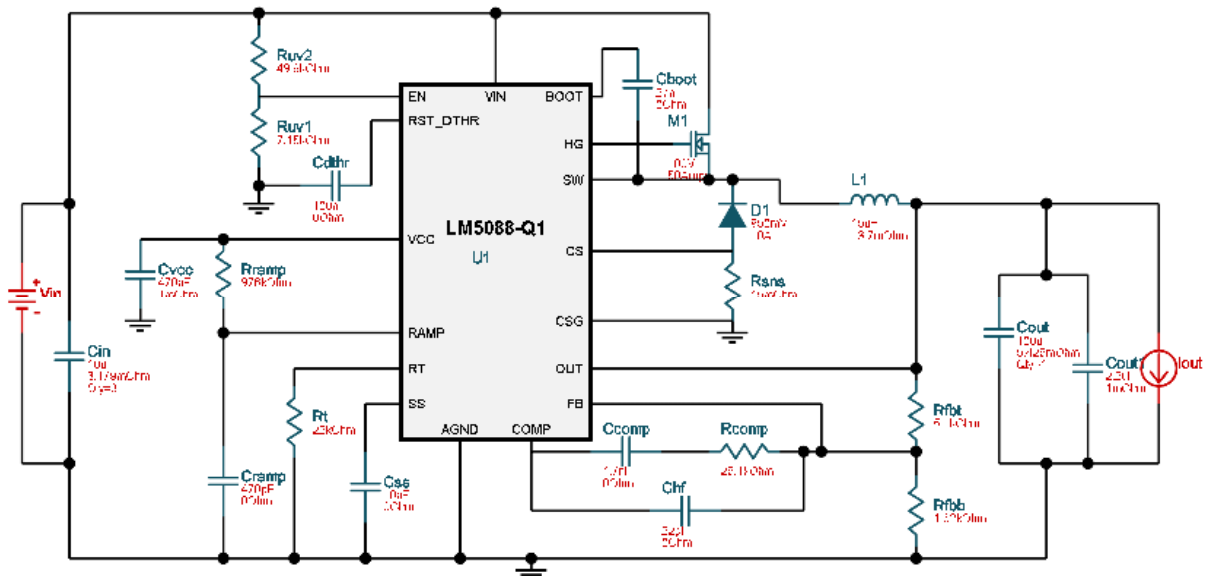
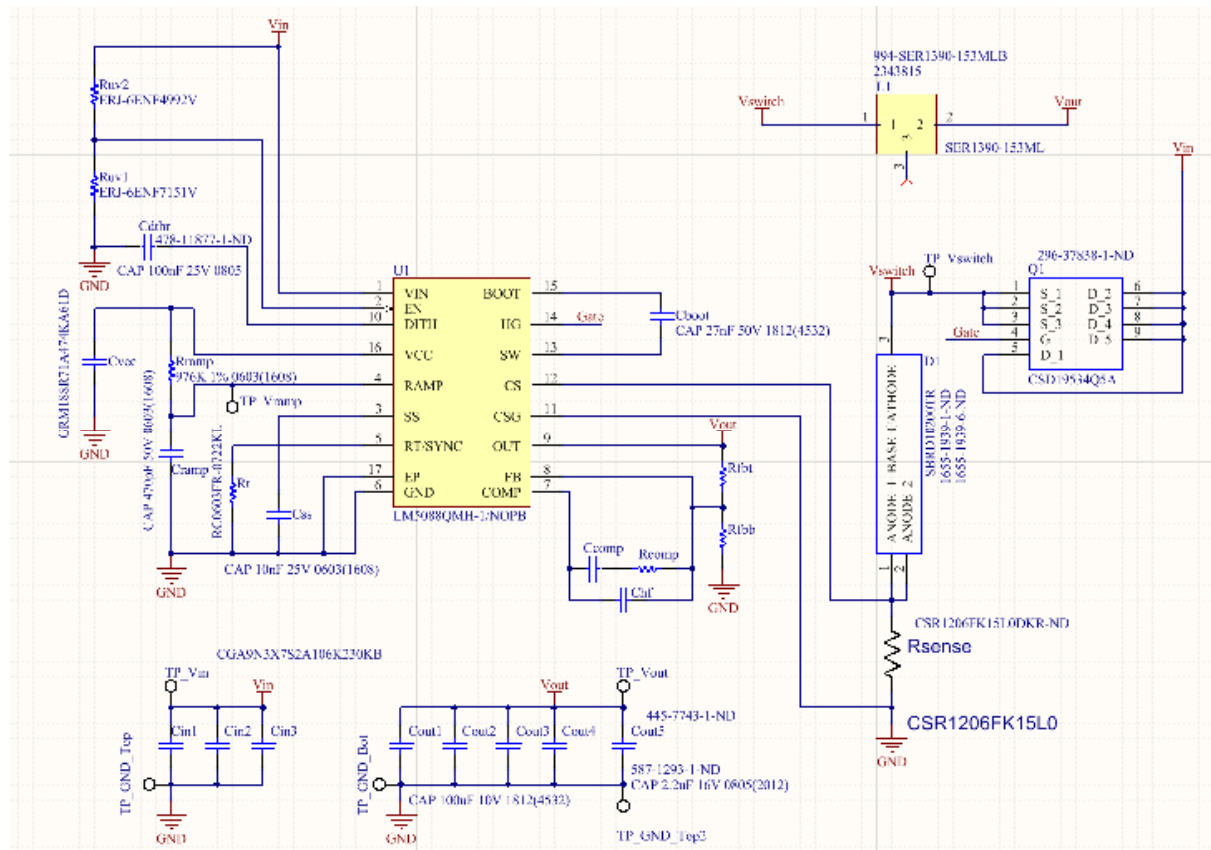




Calculations:

Schematics based on Power Designer suggestion:



Note: during measurment Cboot was Populated with 2x 27nF

Bill of Material:

Description	Quantity	Designator	Manufacturer 1	Manufacturer Part Number 1
CAP 27nF 50V ±5% 1812 (4532 Metric) Thickness 2.3mm SMD See Note:	1	Cboot	KEMET	C1812C273J5GACTU
CAP 4.7nF 50V ±5% 0603 (1608 Metric) Thickness 1mm SMD	1	Ccomp	KEMET	C0603C472J5RAC
CAP 100nF 25V ±5% 0805 (2012 Metric) Thickness 1mm SMD	1	Cdthr	Yageo	CC0805JRX7R8BB104
CAP 22pF 50V ±5% 0603 (1608 Metric) Thickness 1mm SMD	1	Chf	Vishay Vitramon	VJ0603A220JXAAC
Chip Capacitor, 10 uF, +/- 10%, 100 V, -55 to 125 degC, 2220 (5750 Metric), RoHS, Tape and Reel	3	Cin1, Cin2, Cin3	TDK	CGA9N3X7S2A106K230KB
CAP 100uF 10V ±20% 1812 (4532 Metric) Thickness 3.1mm SMD	4	Cout1, Cout2, Cout3, Cout4	TDK	C4532X5R1A107M280KC
CAP 2.2uF 16V ±10% 0805 (2012 Metric) Thickness 1.45mm SMD	1	Cout5	Murata	GRM21BR71C225KA12L
CAP 470pF 50V ±10% 0603 (1608 Metric) Thickness 1mm SMD	1	Cramp	Kyocera AVX	06035A471KAT2A
CAP 10nF 25V ±5% 0603 (1608 Metric) Thickness 1mm SMD	1	Css	KEMET	C0603C103J3RACTU
	1	Cvcc	Murata	GRM188R71A474KA61D
SCHOTTKY RECTIFIER	1	D1	SMC	SBRD10200TR
	1	L1	Coilcraft	SER1390-153MLB
100V, N-Channel NexFET Power MOSFET	1	Q1	Texas Instruments	CSD19534Q5AT
	1	Rcomp	Vishay	CRCW060326K1FKEA
	1	Rfbb	Vishay	CRCW04021K62FKED
	1	Rfbt	Susumu	RR1220P-512-D
976K 0.1W 1% 0603 (1608 Metric) SMD	1	Rramp	Yageo	RC0603FR-07976KL
	1	Rsense	Stackpole Electronics	CSR1206FK15L0
Chip Resistor, 22 KOhm, +/- 1%, 0.1 W, -55 to 155 degC, 0603 (1608 Metric), RoHS, Tape and Reel	1	Rt	Yageo	RC0603FR-0722KL
	1	Ruv1	Panasonic	ERJ-6ENF7151V
	1	Ruv2	Panasonic	ERJ-6ENF4992V
Test Point, 1 Position SMD, RoHS, Tape and Reel	7	TP_GND_Bot, TP_GND_Top, TP_GND_Top2, TP_Vin, TP_Vout, TP_Vramp, TP_Vswitch	Keystone Electronics	5019
Wide Input Range Non-Synchronous Buck Controller, AEC-Q100 Grade 1, 16-pin TSSOP-EP, Dithering, 73 Rail	1	U1	TI National Semiconductor	LM5088QMH-1/NOPB

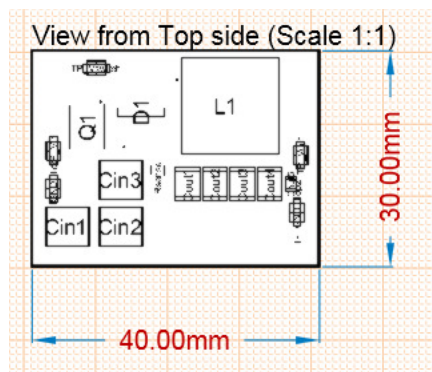
Note: Cboot was populated with 2x 27nF Caps on top of each other

PCB Layer Stack

Layer Stack Legend							
Material	Layer	Thickness	Dielectric	Material	Type	Gerber	
	Top Paste				Paste Mask	GTP	
	Top Overlay				Legend	GTO	
Surface Material	Top Solder	0.02mm	Solder Resist		Solder Mask	GTS	
Copper	Top Layer	0.04mm			Signal	GTL	
Prepreg		0.07mm	FR4		Dielectric		
Prepreg		0.07mm	FR4		Dielectric		
Copper	Internal Plane 1	0.04mm			Internal Plane	GP1	
Core		1.20mm	FR4		Dielectric		
Copper	Internal Plane 2	0.04mm			Internal Plane	GP2	
Prepreg		0.07mm	FR4		Dielectric		
Prepreg		0.07mm	FR4		Dielectric		
Copper	Bottom Layer	0.04mm			Signal	GBL	
Surface Material	Bottom Solder	0.02mm	Solder Resist		Solder Mask	GBS	
	Bottom Overlay				Legend	GBO	
	Bottom Paste				Paste Mask	GBP	
Total thickness: 1.65mm							

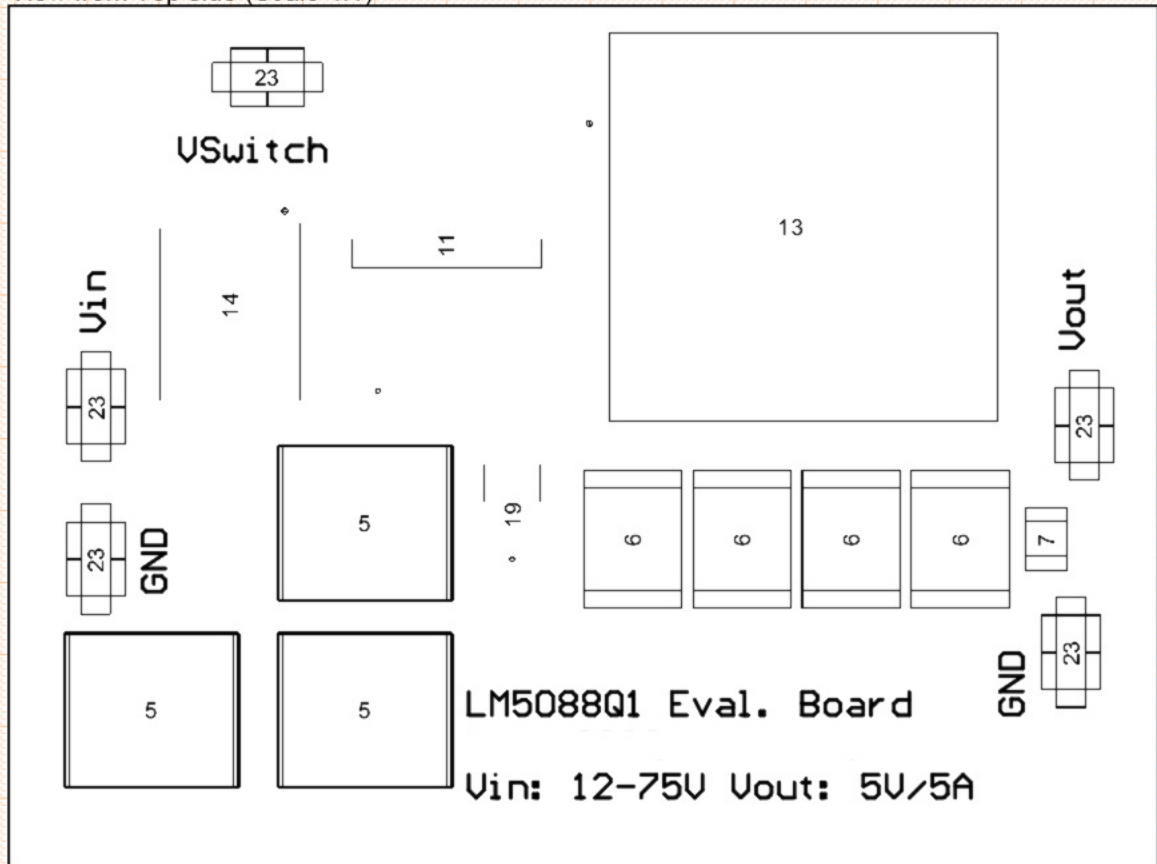
Simple cheap stackup, internal Plane 1 and 2 are GND

PCB-Size:

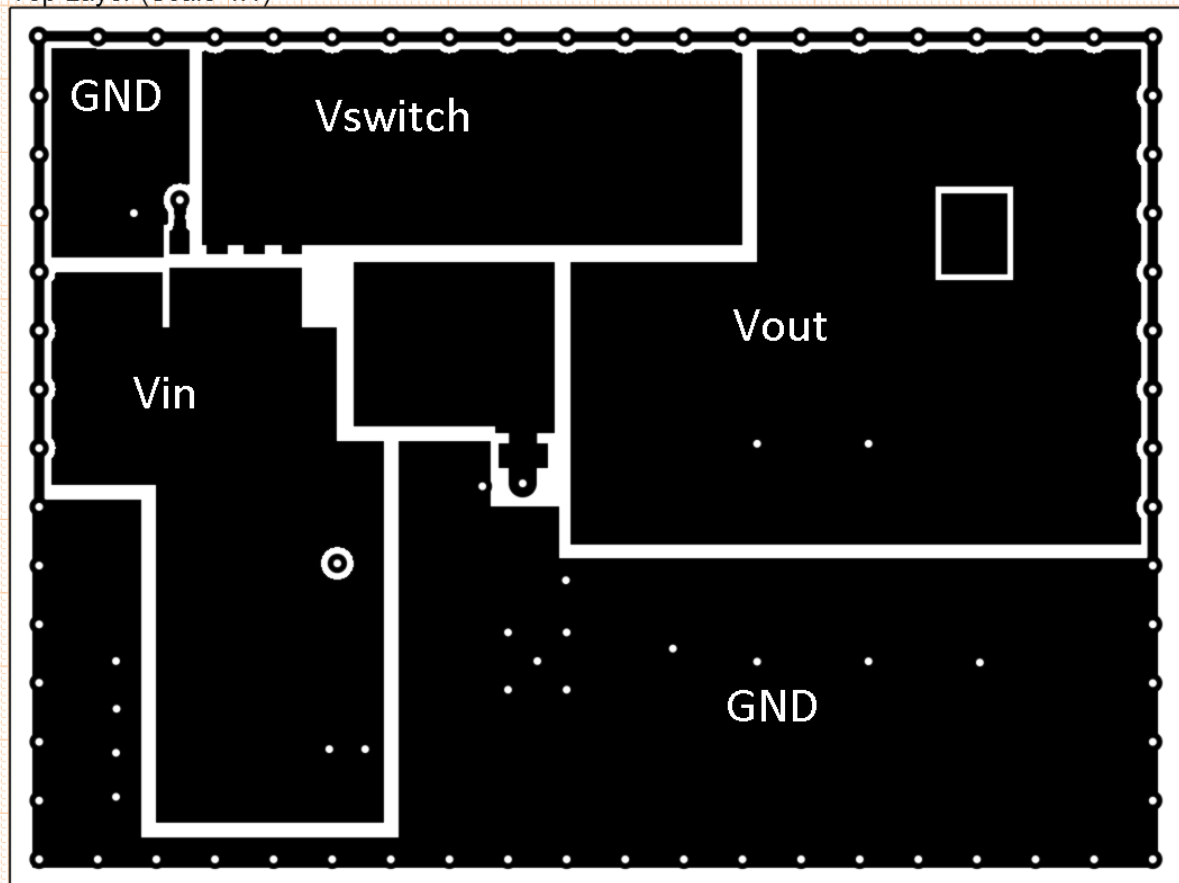


Top Layer:

View from Top side (Scale 4:1)

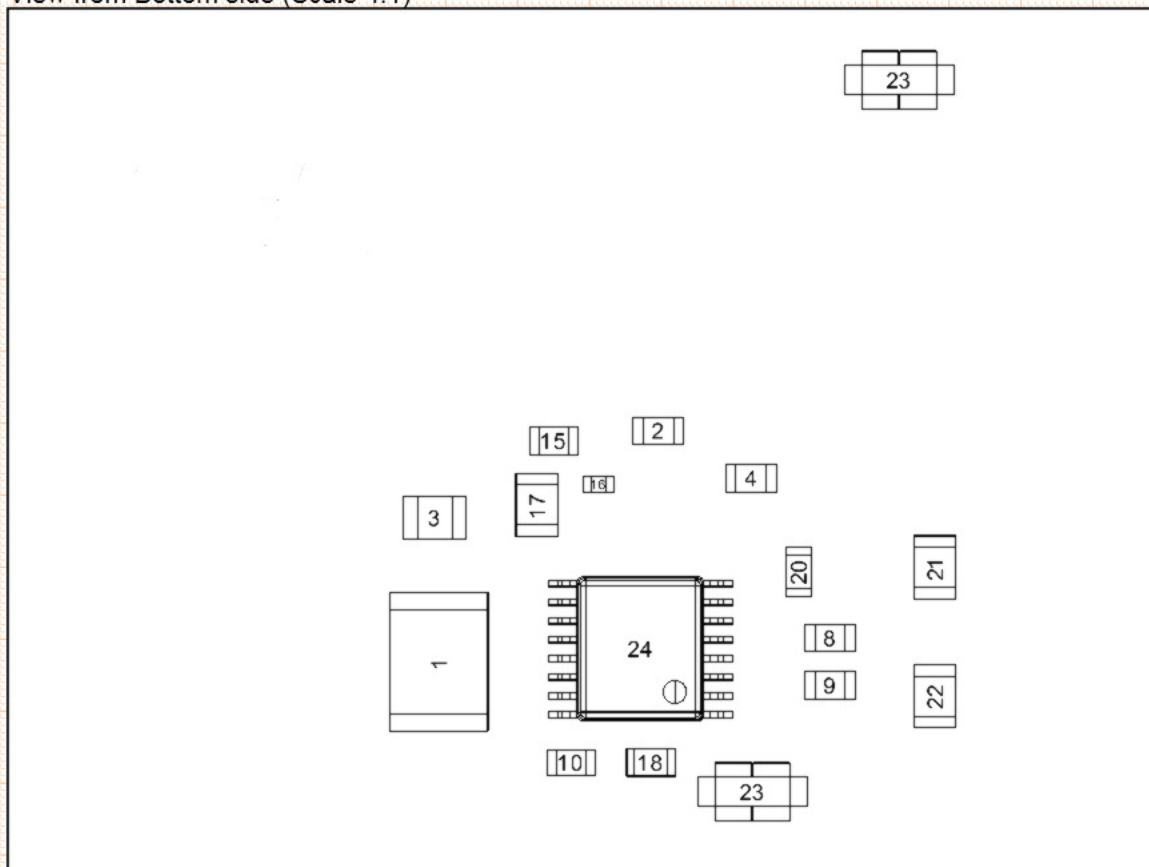


Top Layer (Scale 4:1)

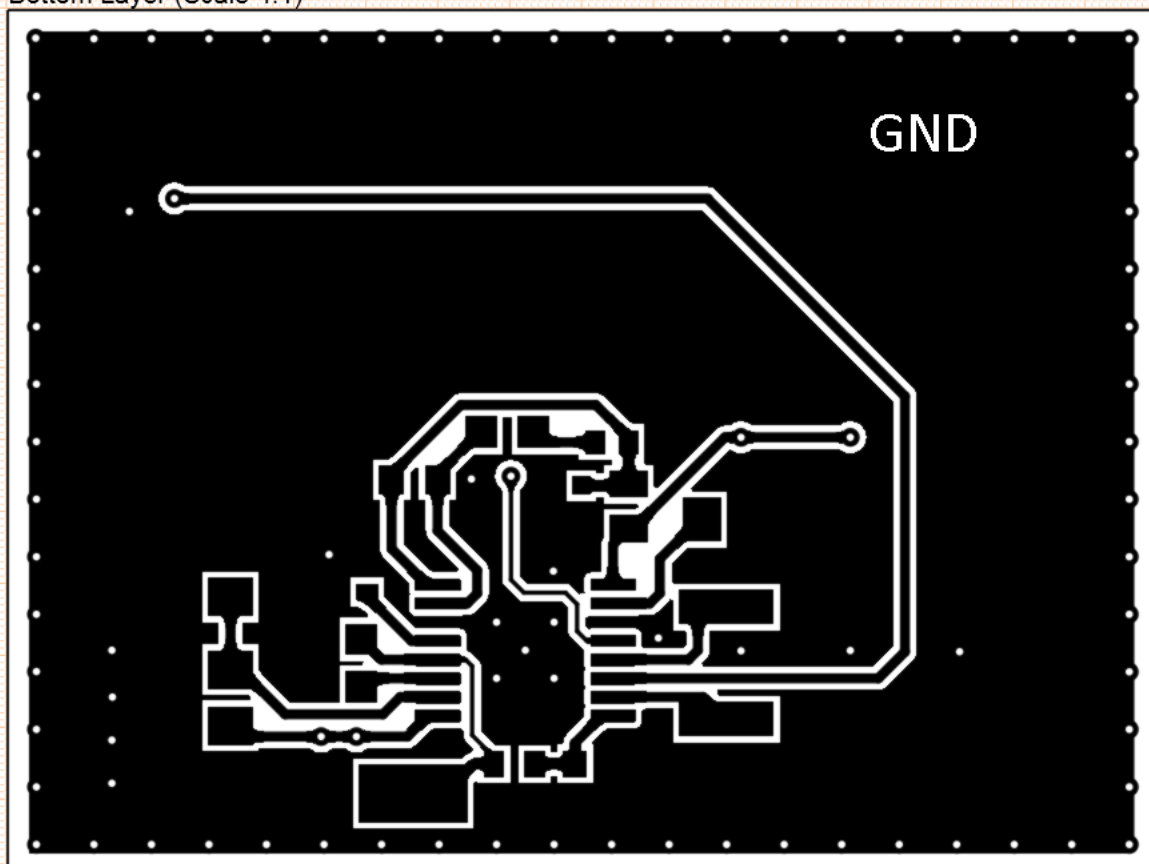


Bottom Layer:

View from Bottom side (Scale 4:1)



Bottom Layer (Scale 4:1)

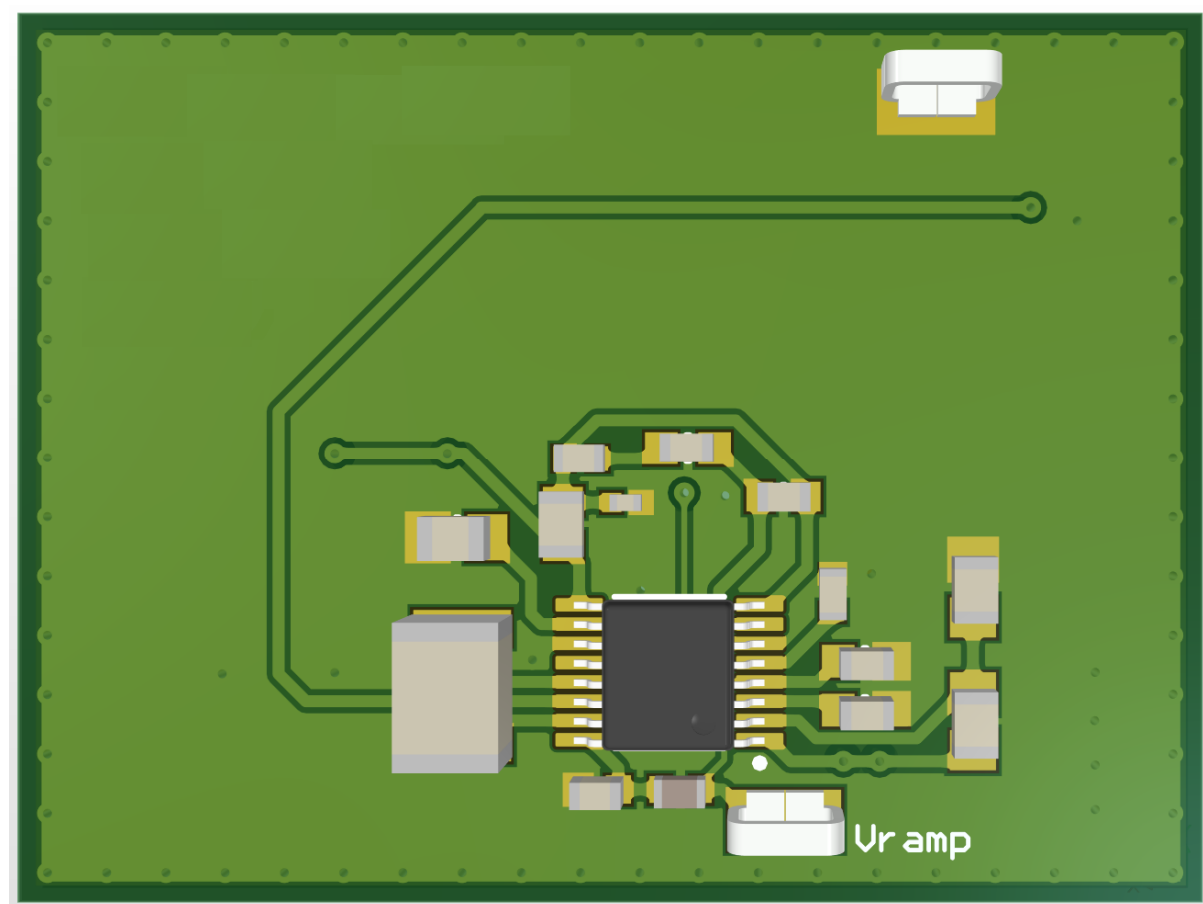
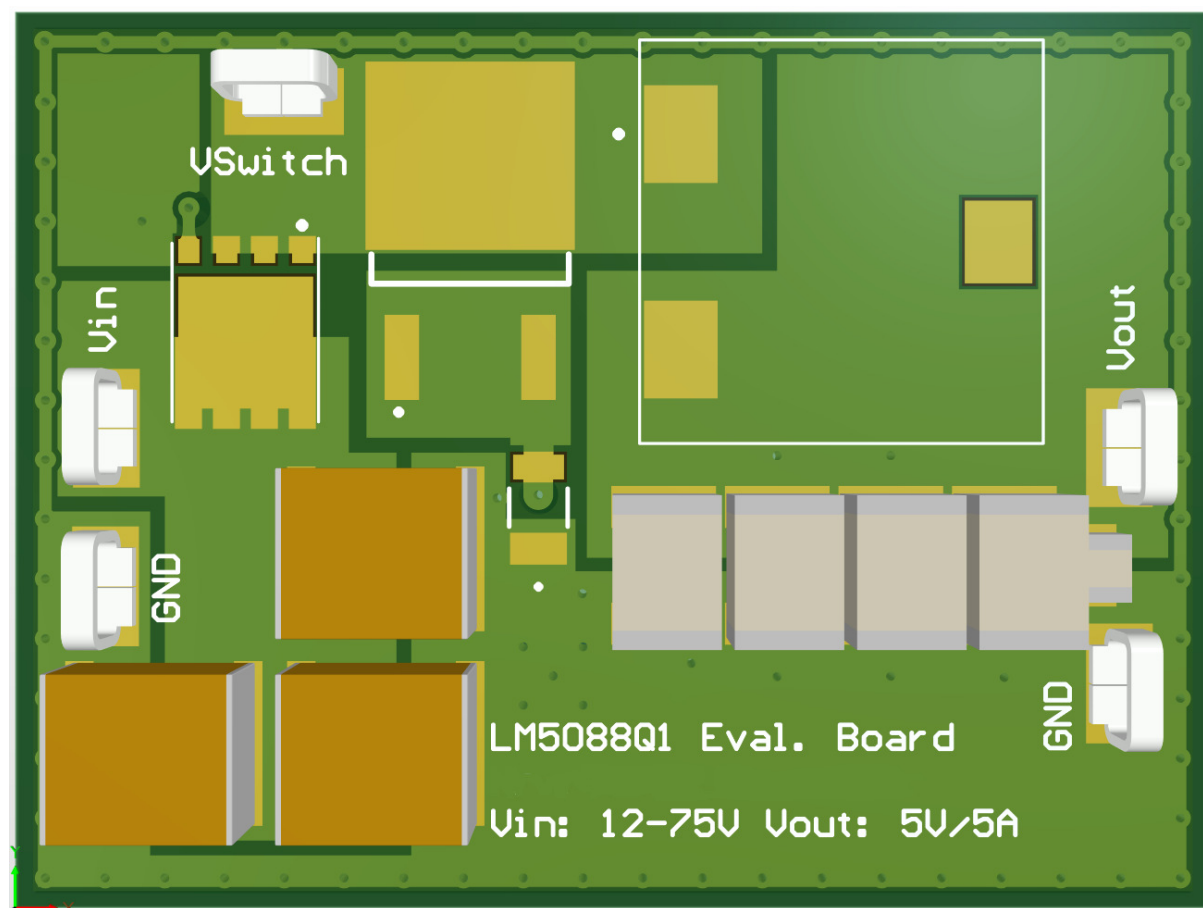


BOM with Line # as placement Info:

Bill Of Materials

Line #	Designator	Comment	Quantity
1	Cboot	CAP 27nF 50V 1812(4532)	1
2	Ccomp	CAP 4.7nF 50V 0603(1608)	1
3	Cdthr	CAP 100nF 25V 0805	1
4	Chf	CAP 22pF 50V 0603(1608)	1
5	Cin1, Cin2, Cin3	CGA9N3X7S2A106K230KB	3
6	Cout1, Cout2, Cout3, Cout4	CAP 100uF 10V 1812(4532)	4
7	Cout5	CAP 2.2uF 16V 0805(2012)	1
8	Cramp	CAP 470pF 50V 0603(1608)	1
9	Css	CAP 10nF 25V 0603(1608)	1
10	Cvcc	GRM188R71A474KA61D	1
11	D1	SBRD10200TR	1
12	Designator11	Comment	1
13	L1	SER1390-153ML	1
14	Q1	CSD19534Q5A	1
15	Rcomp	CRCW060326K1FKEA	1
16	Rfbb	CRCW04021K62FKED	1
17	Rfbt	RR1220P-512-D	1
18	Rramp	976K 1% 0603(1608)	1
19	Rsense	CSR1206FK15L0	1
20	Rt	RC0603FR-0722KL	1
21	Ruv1	ERJ-6ENF7151V	1
22	Ruv2	ERJ-6ENF4992V	1
23	TP_GND_Bot, TP_GND_Top, TP_GND_Top2, TP_Vin, TP_Vout, TP_Vramp, TP_Vswitch	5019	7
24	U1	LM5088QMH-1/NOPB	1

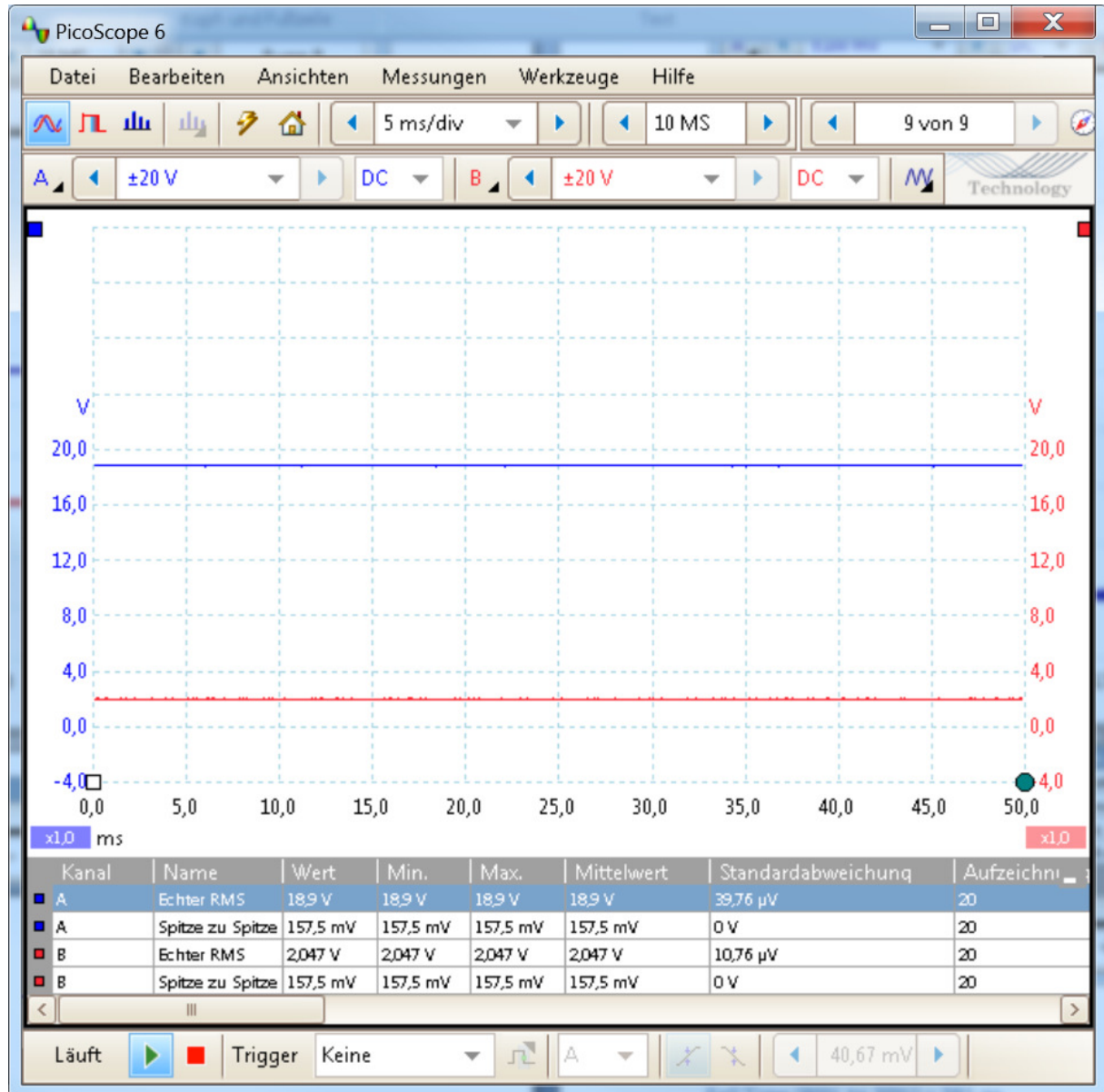
PCB 3D View:



Measurements with 220 Ohm(+/-5%) Load at Vout:

PicoScope 3206B 200MHz, DC Power Supply

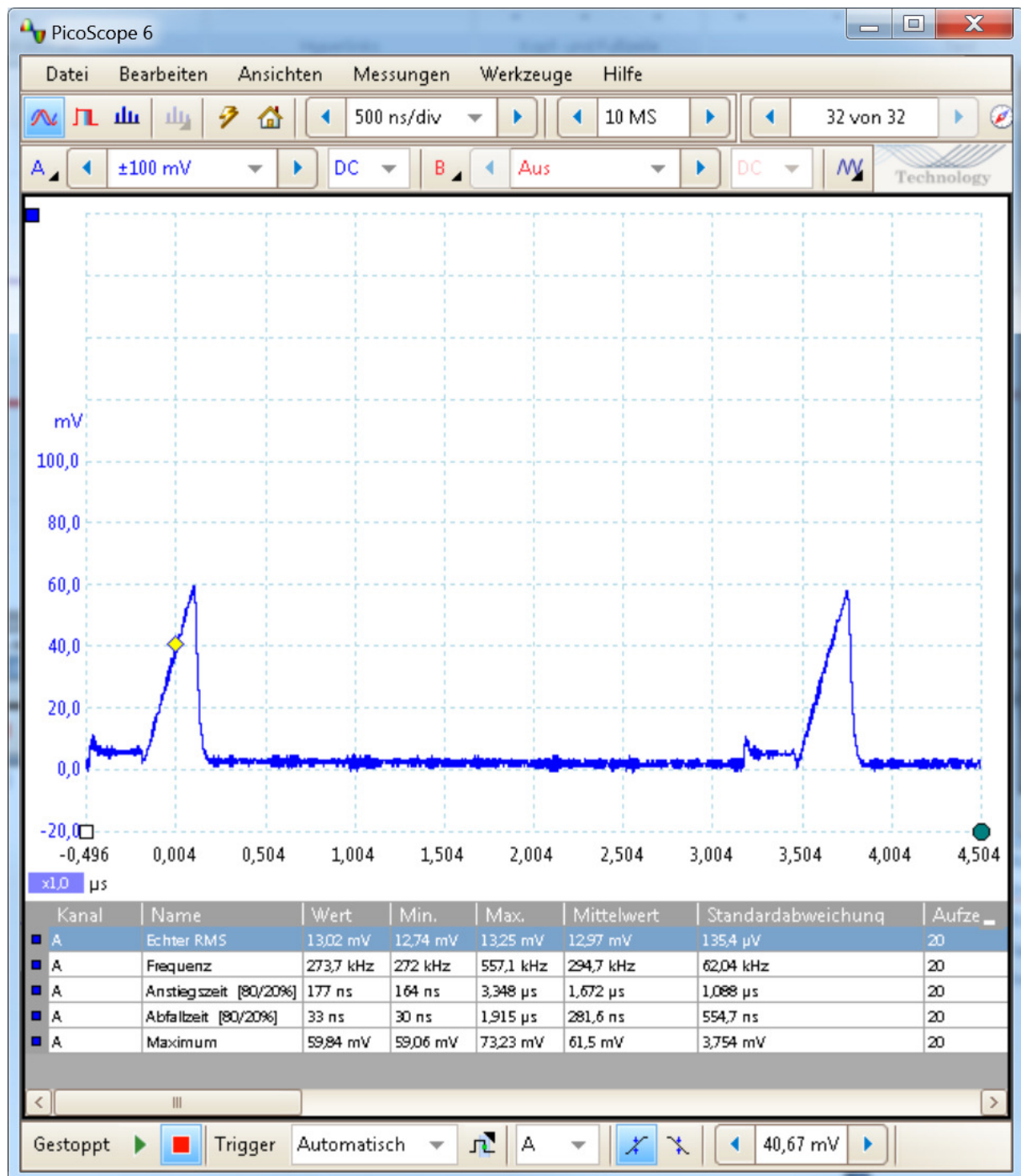
Vin and Vout



BLUE = Vin (18,9V)

RED = Vout(2,05V)

Vramp



BLUE = Vramp

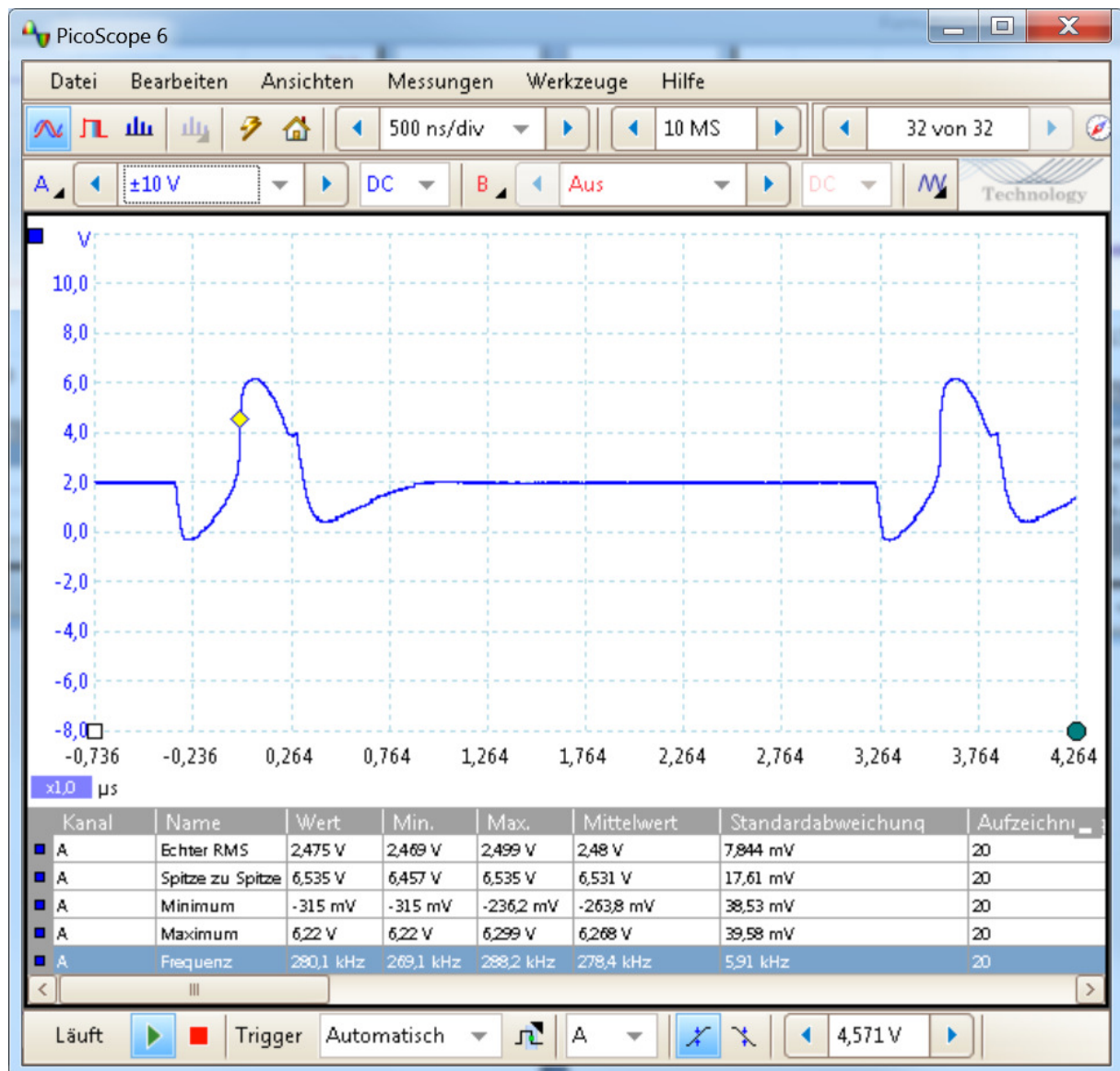
Vmax = 61,5mV

Rise Time (20% to 80%) = 1,6us

Fall Time (80% to 20%) = 281 ns

Frequency = 294kHz

Vswitch



BLUE = Vswitch

Max = 6,2V

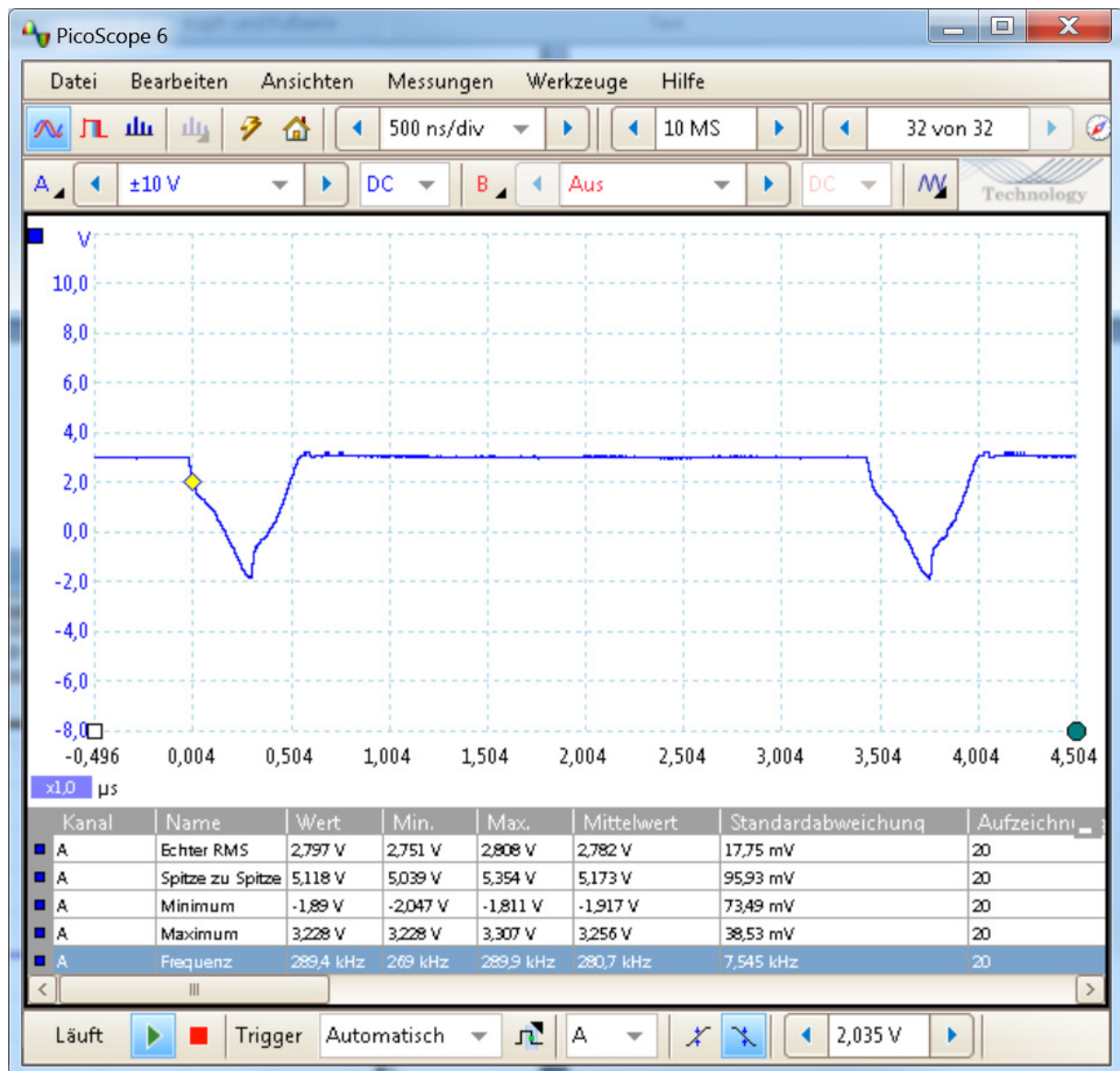
Min = -264mV

Frequency = 278kHz

Peak to Peak = 6,53V

RMS = 2,48V

V_{gs} (Q1 Gate with V_{switch} as Reference)

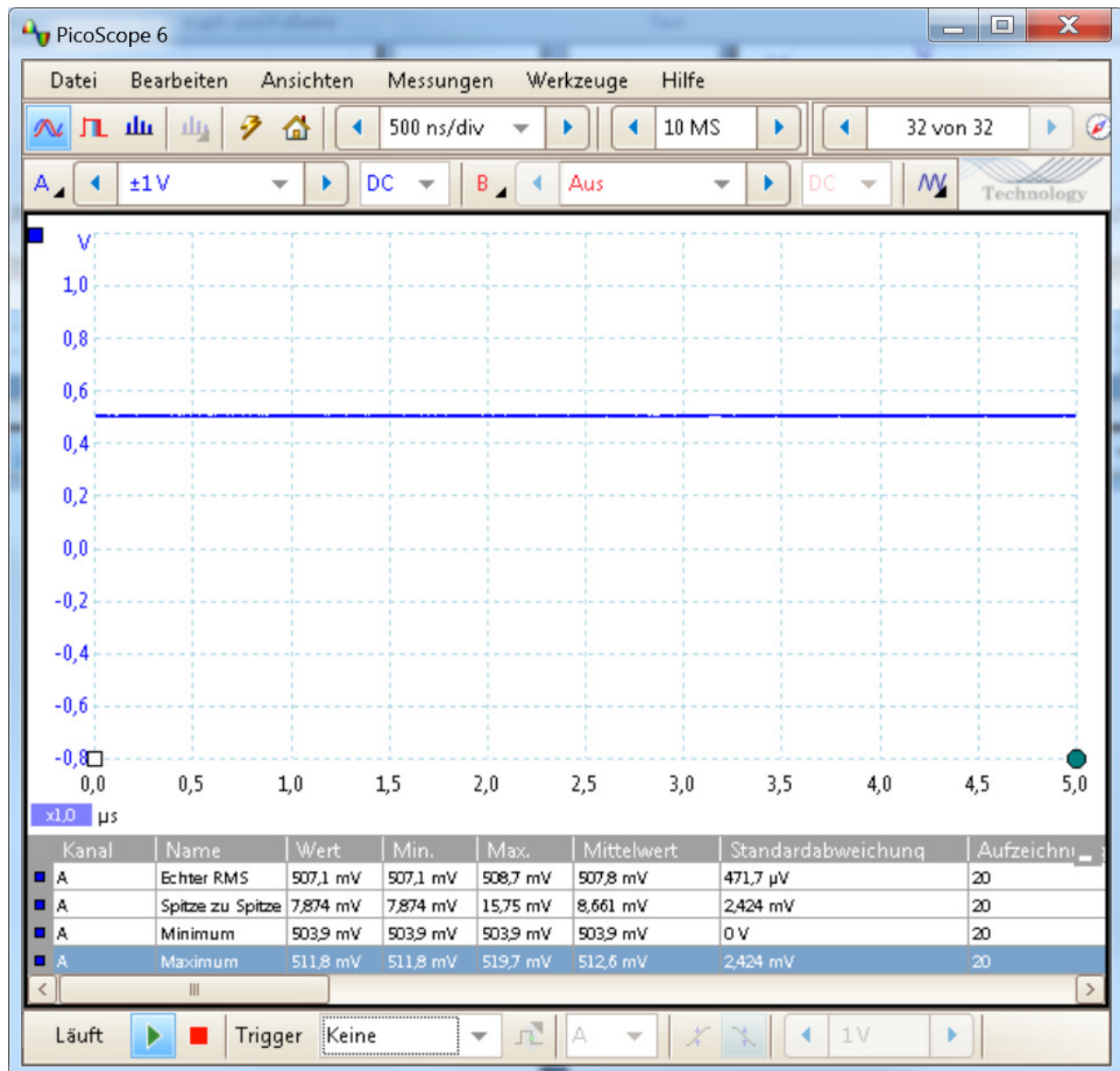


BLUE = V_{gs}

Peak to Peak = 5,1V

Max = 3,3V

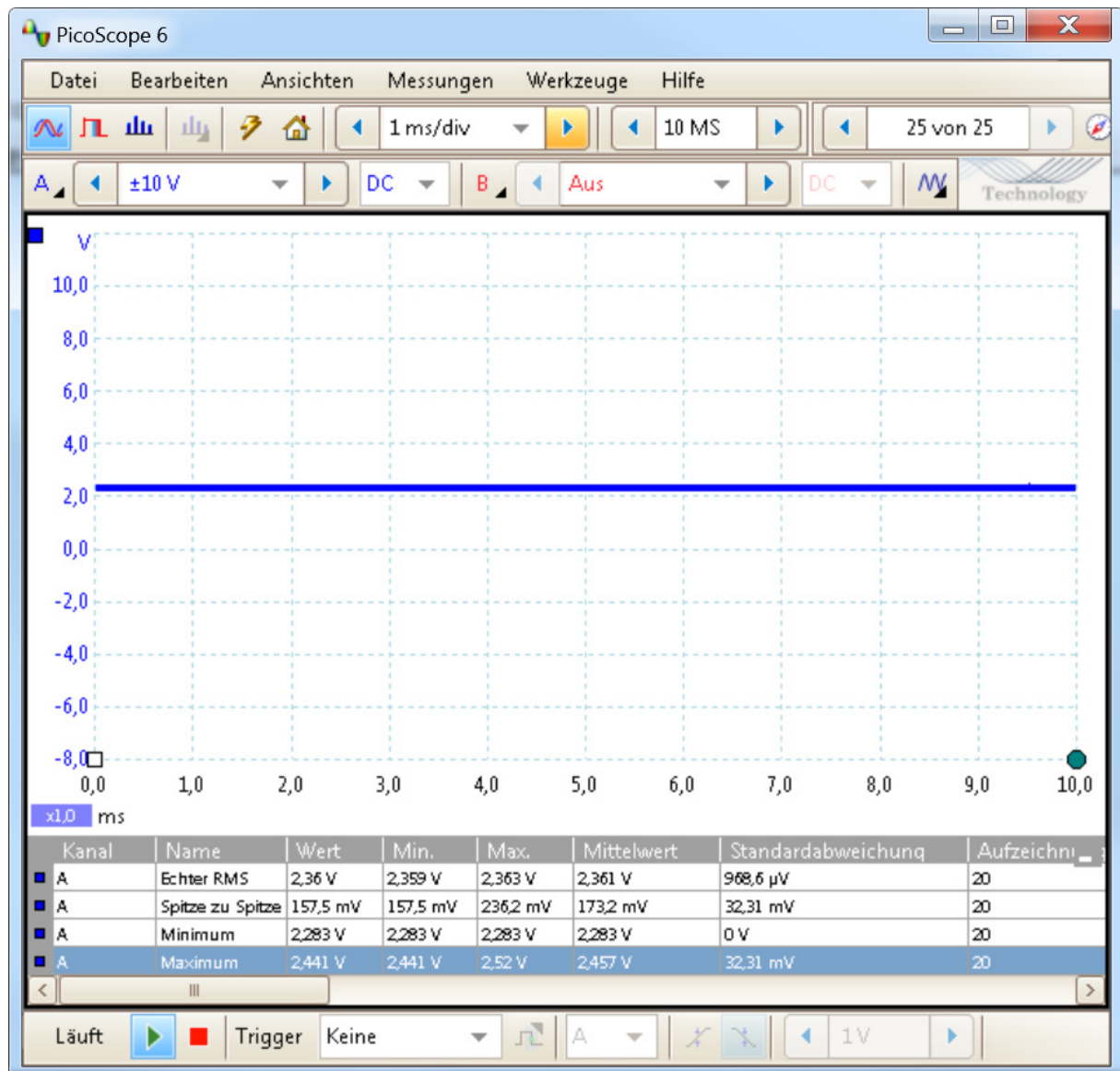
Vfb (LM5088-Q1 FB-Pin to GND)



BLUE = Vfb

RMS = 507mV

Ven (LM5088-Q1 EN-Pin to GND)



BLUE = Ven

RMS = 2,36V

Min = 2,28V

Max = 2,46V