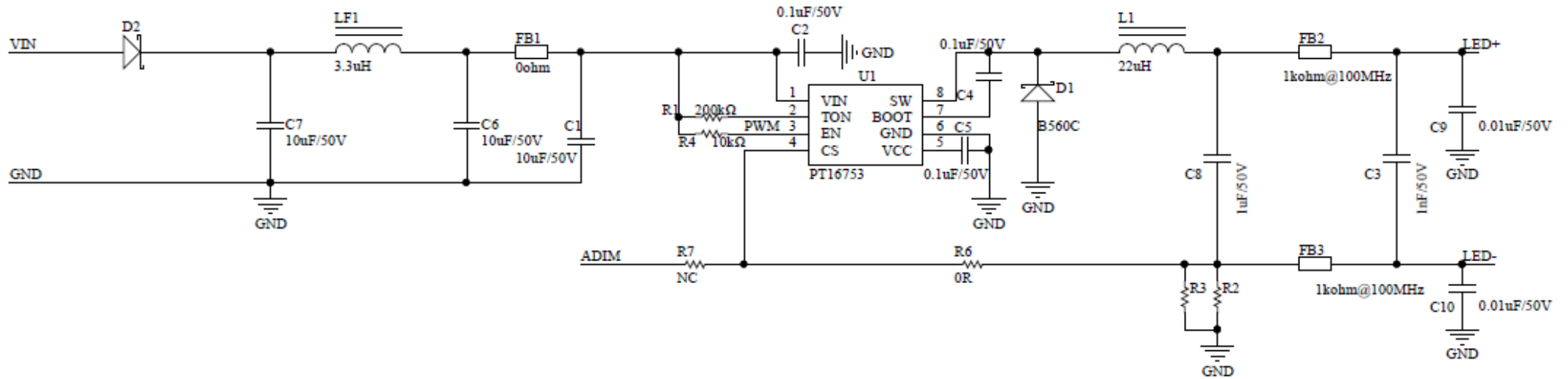




PT16753 LED Driver test report

Parameter	Specifications
Topology	BUCK
Input voltage range	9~14V
Output voltage range	3~9V (1~3 LEDs)
Output current	200~3000mA
Efficiency (Input voltage = 12V, 2 LEDs, ILED = 1000mA)	≈90%
Switching frequency	430 kHz

1. Schematic





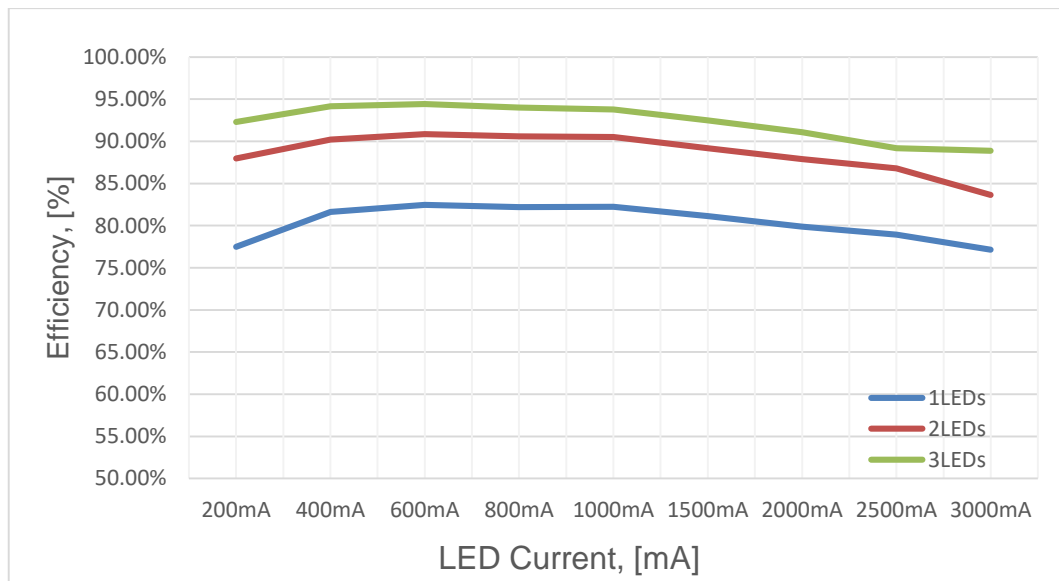
Designator	Qty	Value	Description	Package
C1, C6, C7	3	10uF	CAP, CERM, 10μF, 50 V, +/-10%, X7R	1206
C2, C4, C5	3	0.1uF	CAP, CERM, 0.1uF, 50 V, +/-10%, X7R	0805
C3	1	1nF	CAP, CERM, 1nF, 50 V, +/-10%, X7S	0805
C8	1	1uF	CAP, CERM, 1uF, 50 V, +/-10%, X7R	0805
C9, C10	2	10nF	CAP, CERM, 10nF, 50 V, +/-10%, X7S	0805
D2	1	PDS5100	Diode, Schottky, 100 V, 5 A, AEC-Q101	PowerDI5
D1	1	B560C	Diode, Schottky, 60 V, 5 A, AEC-Q101	SMC
LF1	1	SPM6530T-3R3M	Inductor, 3.3uH ±20% 7.3A	7.1mmX6.5mm
L1	1	ETQP5M220YFC	Inductor, 22uH ±20% 8.8A	10.7mmX10mm
R1	1	200K	RES, 200k, 1%, 0.125 W	0805
R2	1	0.1 Ω	RES, 0.1 OHM, 1%, 0.25 W	1206
R3	1	NC		1206
R4	1	10K	RES, 10k, 1%, 0.125 W	0805
R6	1	0 Ω	RES, 0 OHM, 1%, 0.125 W	0805
R7	1	NC		0805
FB1	1	0 Ω	RES, 0 OHM, 1%, 0.25 W	1206
FB2, FB3	2	1kΩ@100MHz	1kΩ@100MHz ± 25%, 3A	1206
U1	1	PT16753	Buck Regulator Constant-Current LED Driver	HSOP8

2. Performance Data and Typical Characteristic Curves

2.1 Efficiency

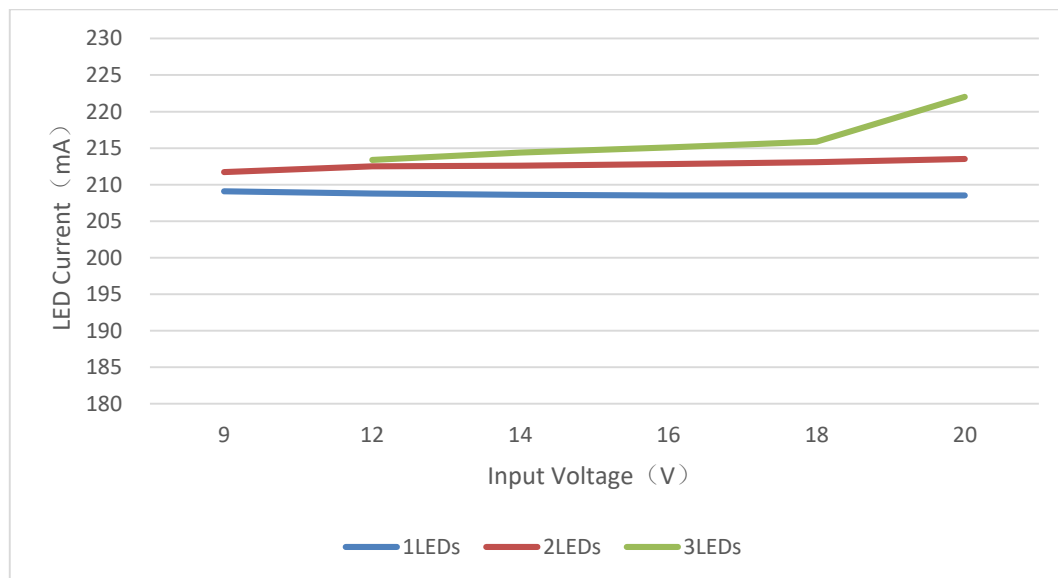
Test condition: VIN=12V (Short the Diode D2 when test efficiency)

	200mA	400mA	600mA	800mA	1000mA	1500mA	2000mA	2500mA	3000mA
1LEDs	77.50%	81.62%	82.47%	82.20%	82.25%	81.13%	79.90%	78.94%	77.17%
2LEDs	87.96%	90.21%	90.87%	90.60%	90.50%	89.18%	87.90%	86.78%	83.64%
3LEDs	92.31%	94.18%	94.43%	94.01%	93.80%	92.51%	91.11%	89.17%	88.90%



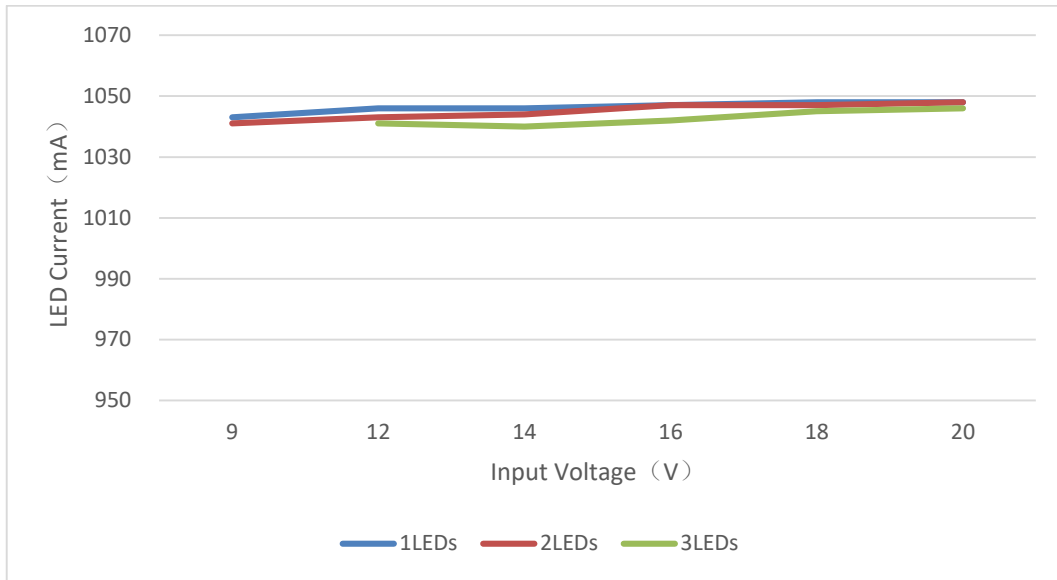
2.2 Line Regulation

Vin (V) \ LED Current (mA)	9	12	14	16	18	20
1LED	209	209	209	209	209	209
2LEDs	212	213	213	213	213	214
3LEDs	NA	213	214	215	216	222



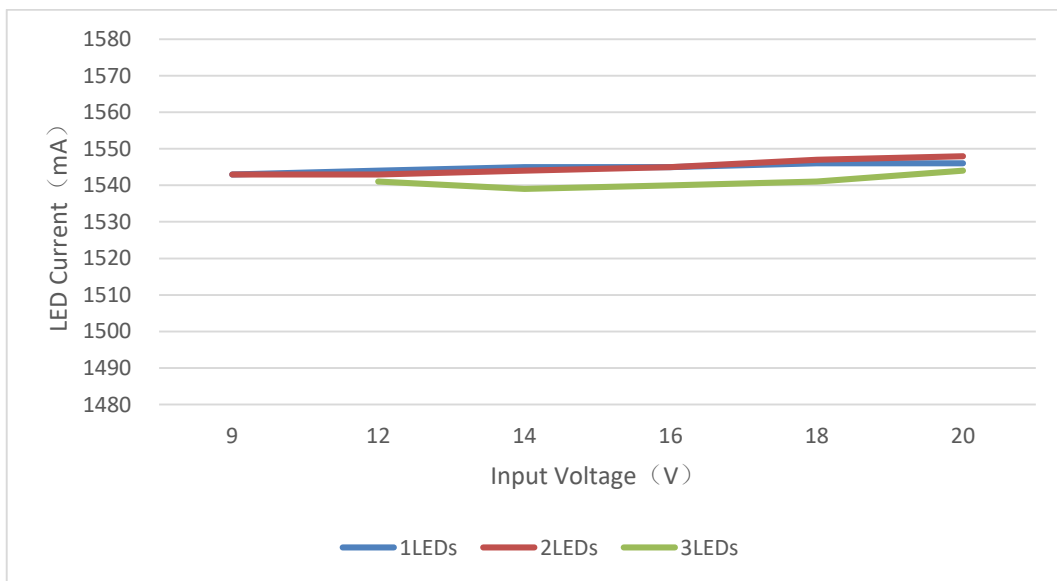
Output LED Current vs. Input Voltage (I_{LED}=200mA)

V_{in} (V) \ LED Current (mA)	9	12	14	16	18	20
1LED	1043	1046	1046	1047	1048	1048
2LEDs	1041	1043	1044	1047	1047	1048
3LEDs	NA	1041	1040	1042	1045	1046



Output LED Current vs. Input Voltage ($I_{LED}=1000mA$)

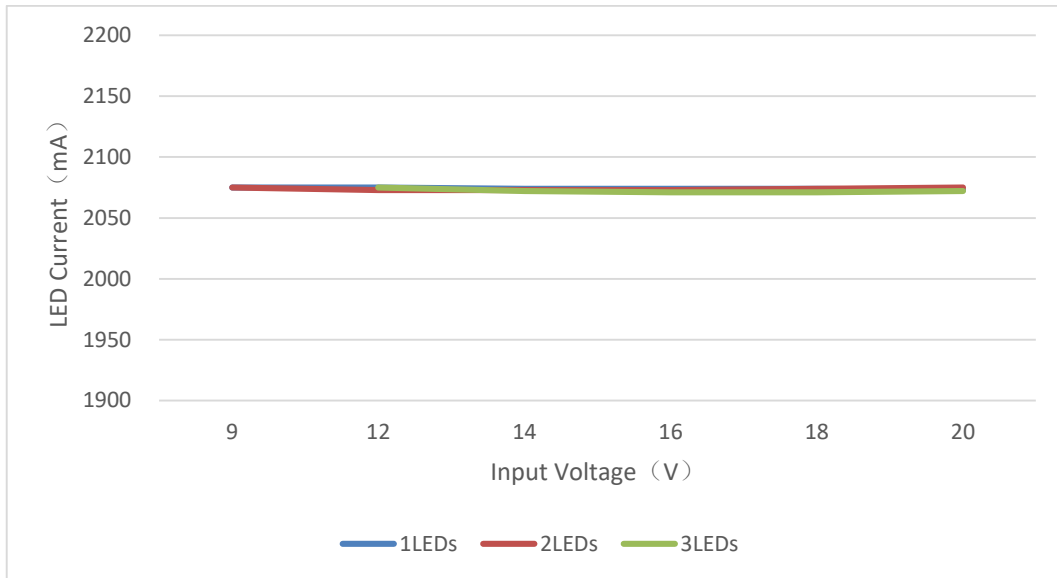
V_{in} (V) \ LED Current (mA)	9	12	14	16	18	20
1LED	1543	1544	1545	1545	1546	1546
2LEDs	1543	1543	1544	1545	1547	1548
3LEDs	NA	1541	1539	1540	1541	1544



Output LED Current vs. Input Voltage ($I_{LED}=1500mA$)

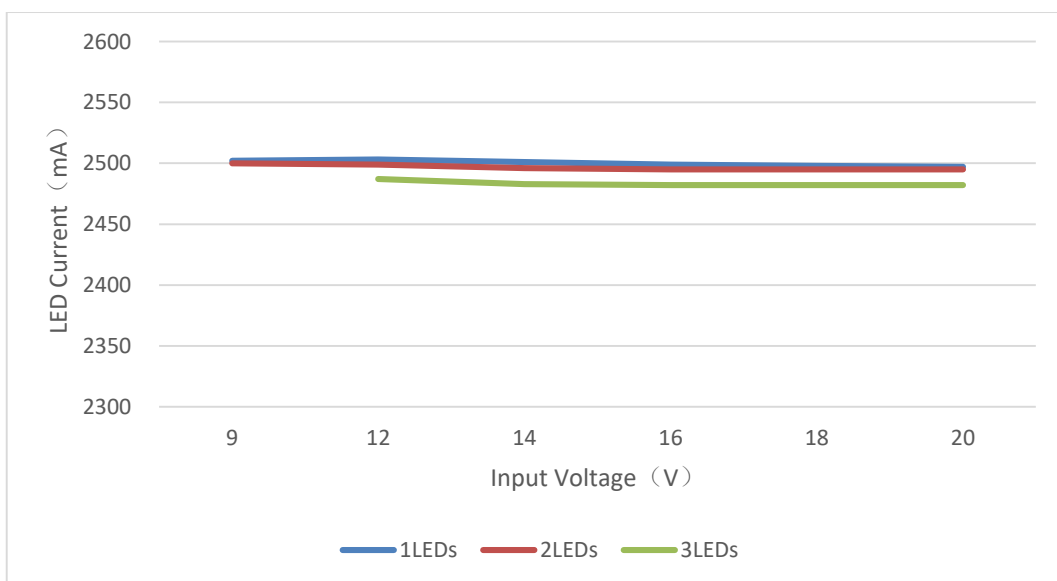


Vin (V) LED Current (mA)	9	12	14	16	18	20
1LED	2075	2075	2074	2074	2074	2073
2LEDs	2075	2073	2073	2073	2074	2075
3LEDs	NA	2075	2072	2071	2071	2072



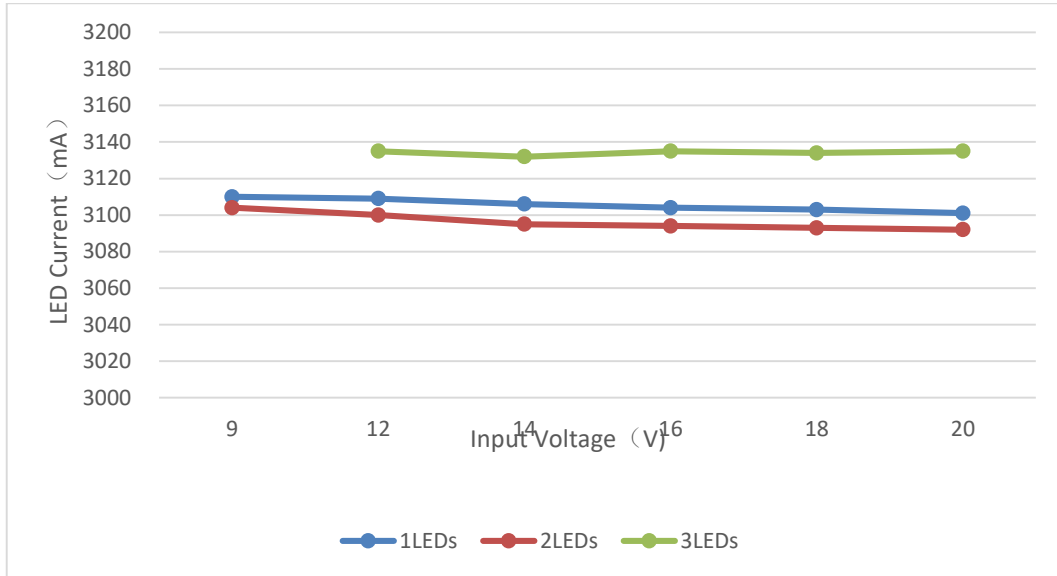
Output LED Current vs. Input Voltage ($I_{LED}=2000mA$)

Vin (V) LED Current (mA)	9	12	14	16	18	20
1LED	2502	2503	2501	2499	2498	2497
2LEDs	2500	2499	2496	2495	2495	2495
3LEDs	NA	2487	2483	2482	2482	2482



Output LED Current vs. Input Voltage ($I_{LED}=2500mA$)

Vin (V) LED Current (mA)	9	12	14	16	18	20
1LED	3110	3109	3106	3104	3103	3101
2LEDs	3104	3100	3095	3094	3093	3092
3LEDs	NA	3135	3132	3135	3134	3135

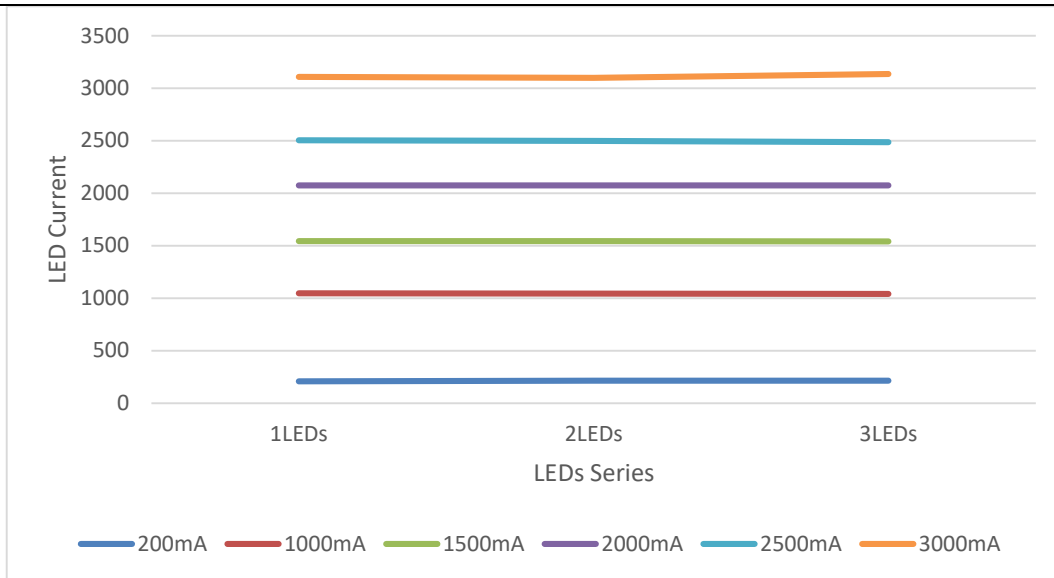


Output LED Current vs. Input Voltage (I_{LED}=3000mA)

2.3 Load Regulation

Test condition: VIN=12V

Load LED Current (mA)	1LED	2LEDs	3LEDs
200mA	208.8	212.5	213.4
1000mA	1046	1043	1041
1500mA	1544	1543	1541
2000mA	2075	2073	2075
2500mA	2503	2499	2487
3000mA	3109	3100	3135

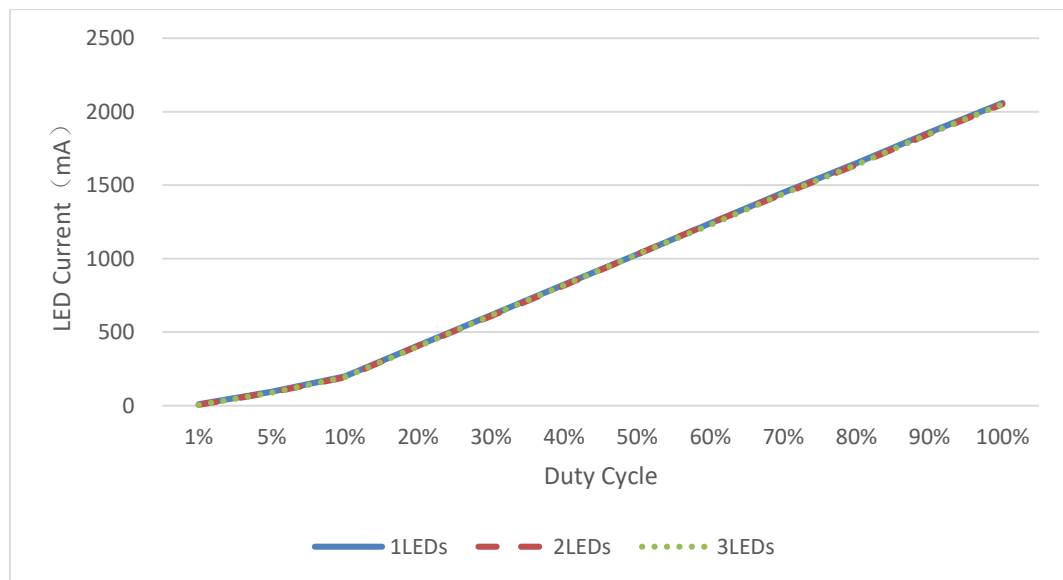


Output LED Current vs. LED String Configuration

2.4 PWM DIMMING

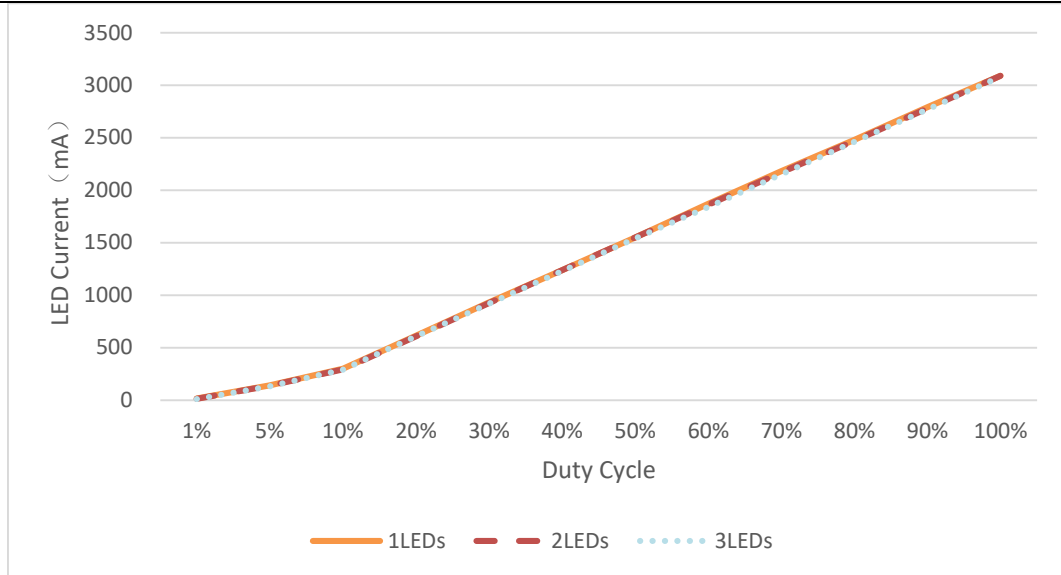
Test condition: VIN=12V, LED Current=2000mA, PWM frequency=100Hz

Duty Cycle LED Current (mA)	1%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1LED	10	94	199	409	616	825	1030	1240	1450	1650	1860	2060
2LEDs	6	91	192	405	609	818	1030	1240	1440	1640	1850	2050
3LEDs	6	89	194	403	612	820	1030	1230	1440	1640	1850	2050



Output LED Current vs. PWM duty cycle (ILED=2000mA, fPWM=100Hz)

Duty Cycle LED Current (mA)	1%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1LED	17	142	299	615	931	1240	1550	1870	2180	2480	2790	3090
2LEDs	14	137	293	609	923	1240	1550	1860	2170	2470	2780	3090
3LEDs	8	133	291	606	919	1230	1540	1840	2150	2460	2770	3080

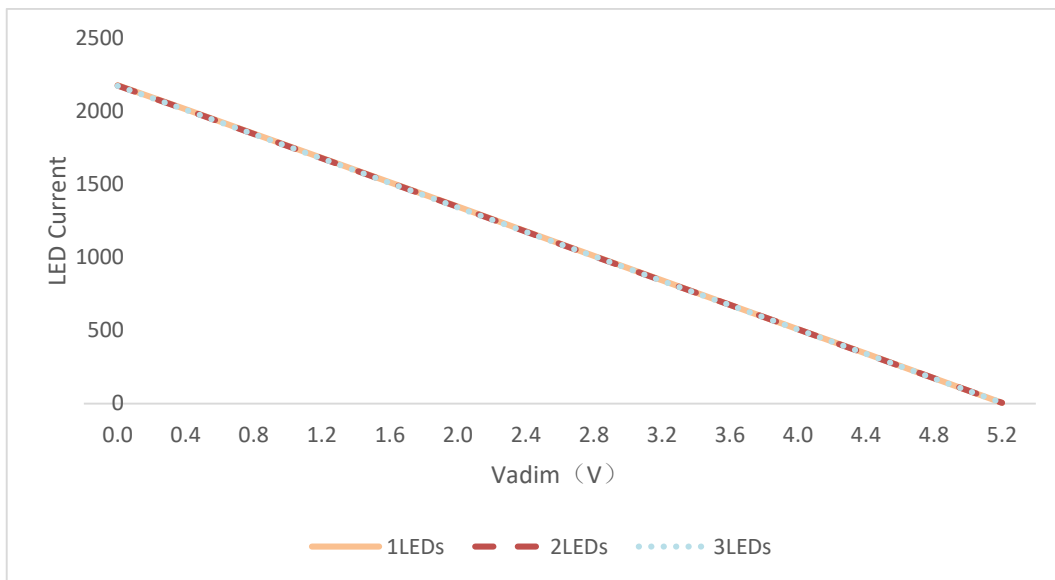


Output LED Current vs. PWM duty cycle (I_{LED}=3000mA, f_{PWM}=100Hz)

2.5 ANALOG DIMMING

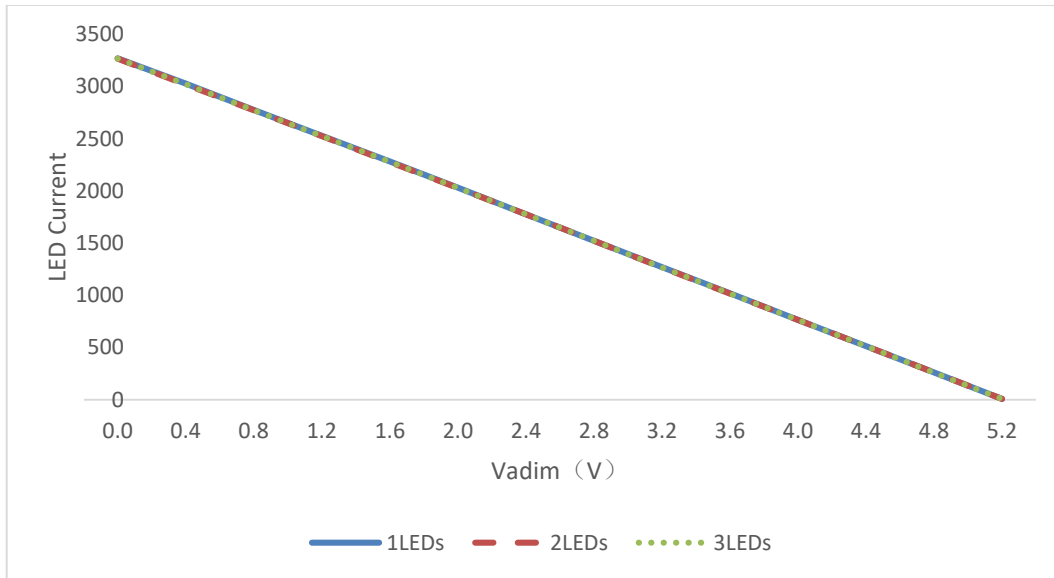
Test condition: VIN=12V, LED Current=2000mA

V _{dim} (V) \ LED Current (mA)	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2
1LED	2178	2014	1848	1681	1514	1347	1178	1011	844	676	509	342	173	5
2LEDs	2175	2011	1845	1678	1511	1345	1176	1009	842	675	508	341	173	5
3LEDs	2173	2009	1843	1676	1510	1341	1174	1007	840	673	507	339	171	4



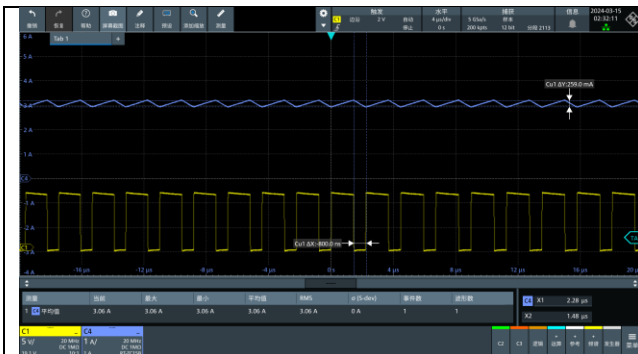
Output LED Current vs. analog dimming voltage (I_{LED}=2000mA)

V _{dim} (V) \ LED Current (mA)	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2
1LED	3272	3027	2778	2529	2283	2033	1776	1523	1270	1018	766	513	261	7
2LEDs	3267	3019	2773	2526	2278	2030	1777	1521	1269	1017	765	513	261	7
3LEDs	3267	3021	2774	2526	2279	2030	1776	1523	1269	1017	765	512	260	7



Output LED Current vs. analog dimming voltage ($I_{LED}=3000mA$)

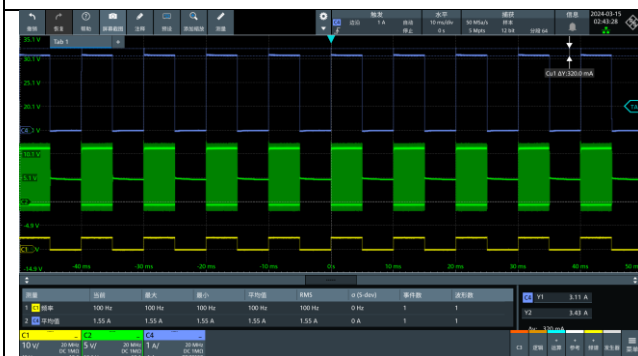
3. Typical Waveforms



Operation ($V_{in}=12V$, $I_{out}=3A$, LEDs=2)
CH1: SW pin voltage; CH4: Inductance Current



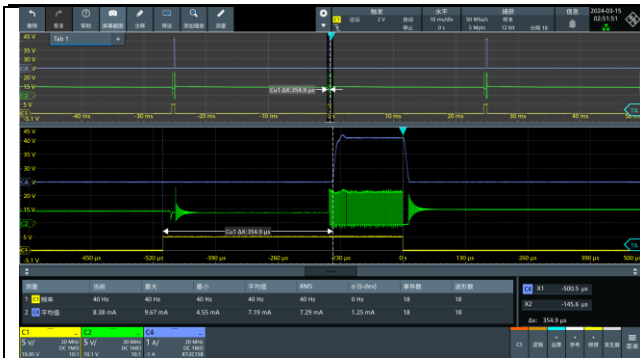
PWM Dimming ($D = 50\%$, Frequency = 1kHz)
CH1: V_{in} voltage; CH2: PWM input;
CH3: LED+ to GND voltage; CH4: LED current



PWM Dimming ($D = 50\%$, Frequency = 100Hz)
CH1: PWM input; CH2: V_{sw} ; CH4: LED current



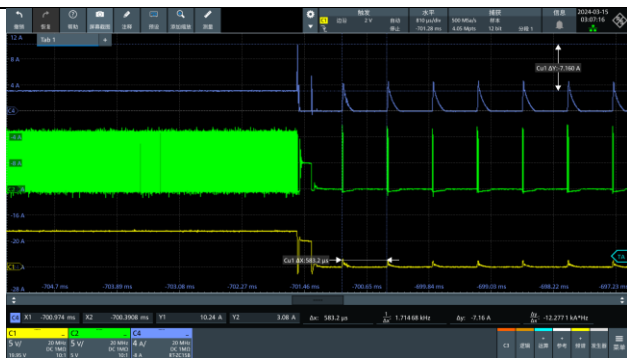
PWM Dimming ($D = 1\%$, Frequency = 40Hz)
CH1: PWM input; CH2: V_{sw} ; CH4: LED current



PWM Dimming (D = 1%, Frequency = 40Hz)
CH1: PWM input; CH2: Vsw; CH4: LED current



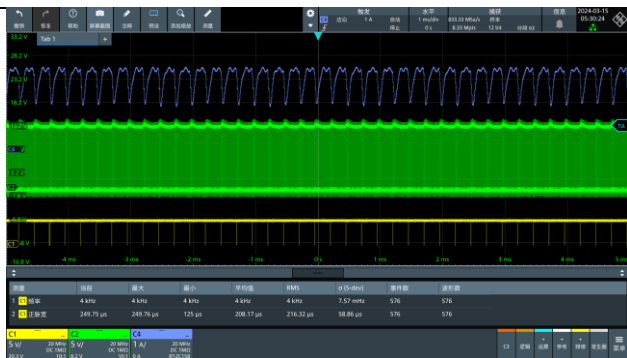
Output shorted (Vin=12V)
CH1: SW pin voltage; CH2: Vout;
CH4: Output Current;



LED+ shorted to GND (Vin=12V)
CH1: LED+ to GND voltage; CH2: SW pin voltage;
CH4: Output Current;

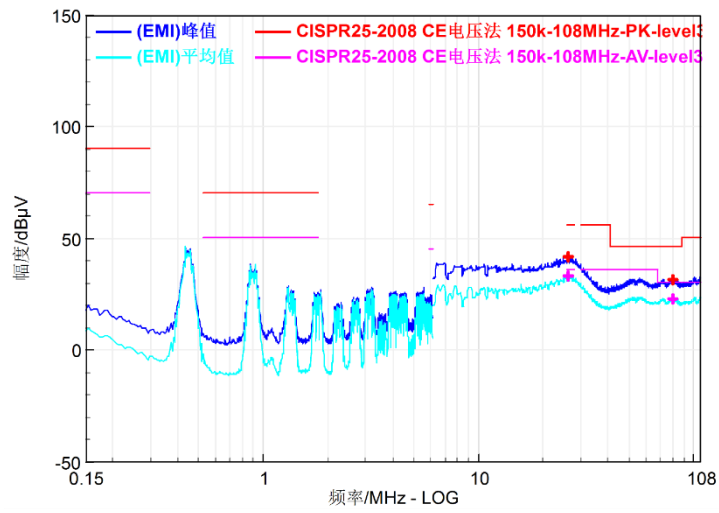


CS shorted to GND (Vin=12V)
CH1: LED+ to GND voltage; CH4: LED Current;

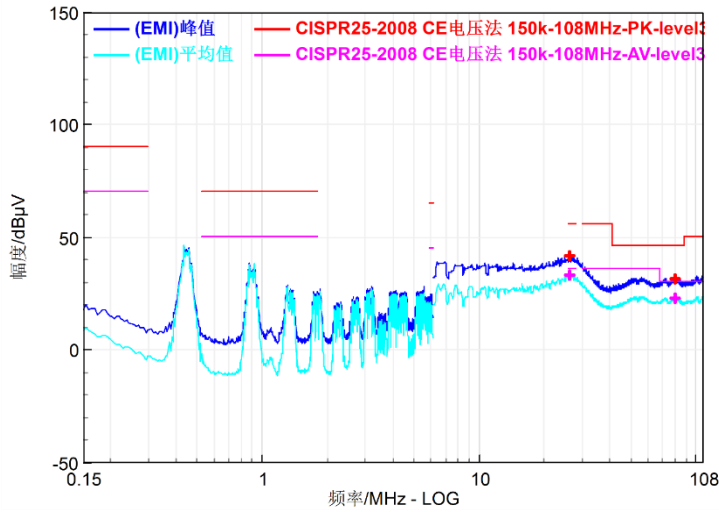


PWM Dimming (D = 99.9%, Frequency = 4kHz)
CH1: PWM input; CH2: Vsw; CH4: LED current

4. Conducted Emission



Conducted Emission Based on CISPR25 Class 3 Limits_VIN



Conducted Emission Based on CISPR25 Class 3 Limits_GND