LM5020 LED Driver

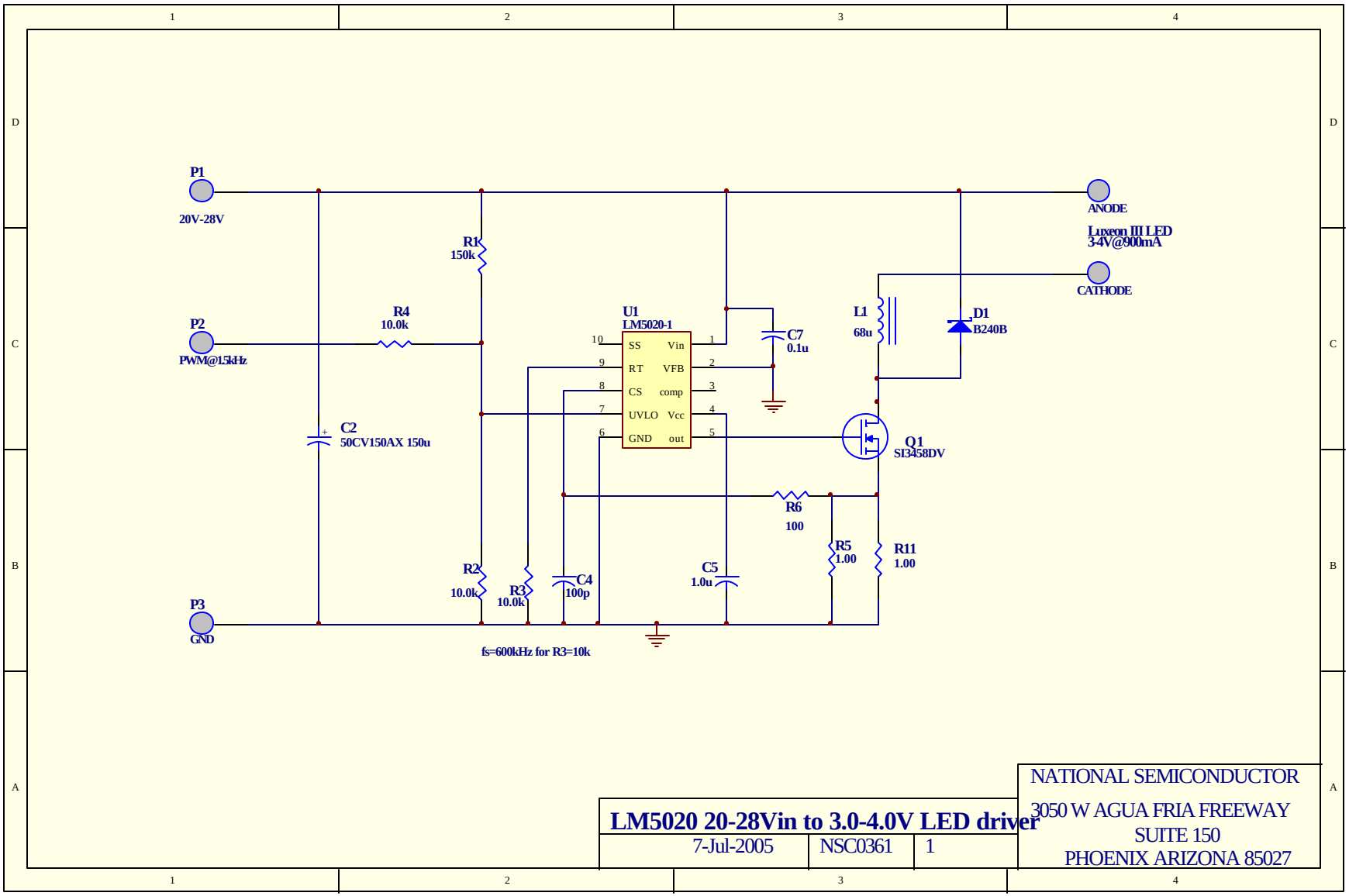
1.1 Specifications

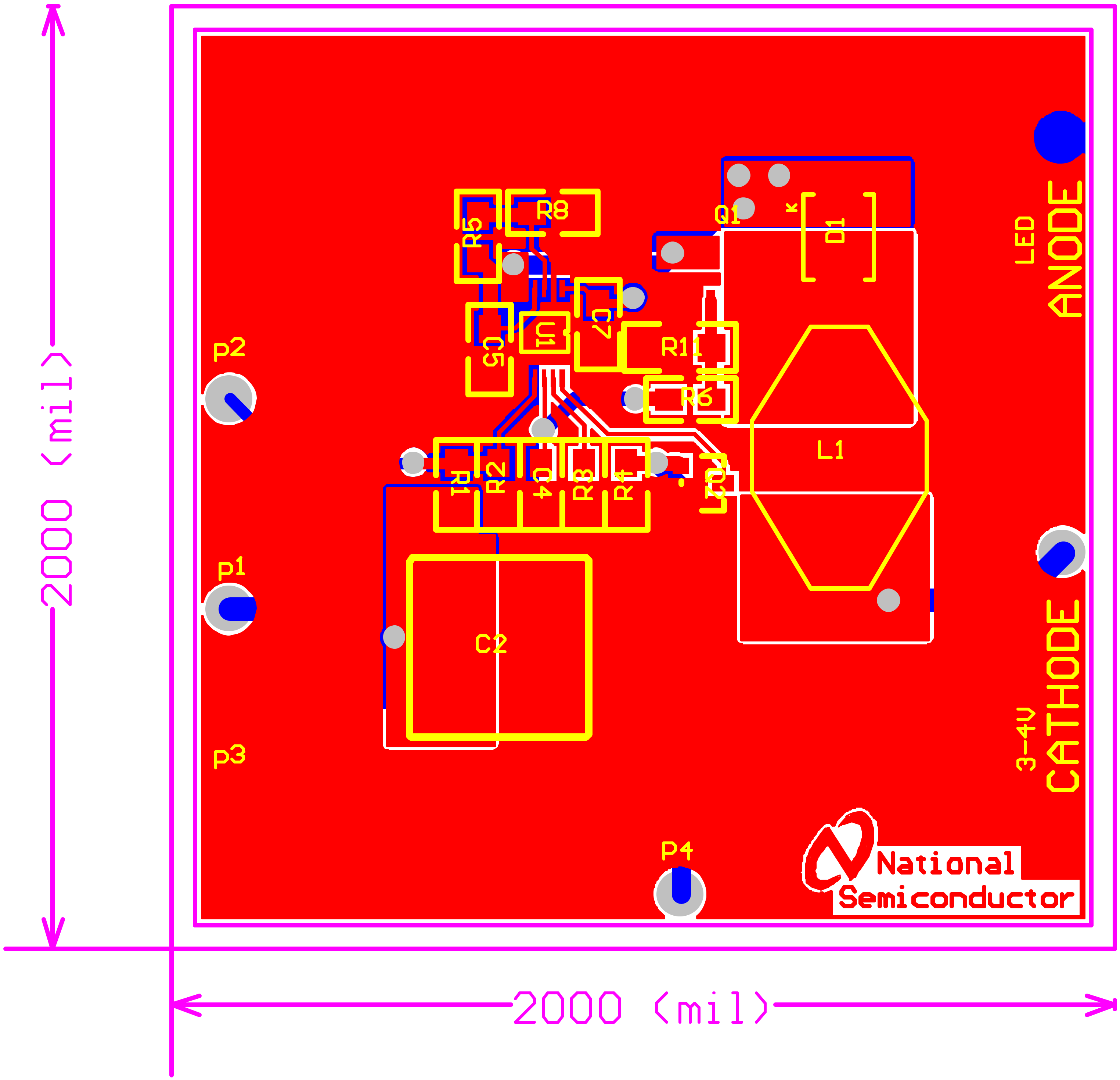
Vin: Min 20V Max 28V
Vout: 3-4V
Iout: 0.9A

1.2 BOM

NSC0361 24-28Vin to 3-4Vout@0.9A LED DRIVER BUCK Converter 8/11/2004

Designator	Part Type	Manufacturer	Description
C2	150u	Sanyo/50CV150AX	Capacitor SMD electrolytic
C4	100p	Vitramon/VJ0805	Capacitor Ceramic X7R
C5	1.0u	TDK/C2012X7R1H105K	Capacitor Ceramic X7R
C7	0.1u	Vitramon/VJ0805	Capacitor Ceramic X7R
D1	B240B	Diodes/B240B	Schottky rectifier
L1	68u	Coilcraft/DO3326P-683	Surface mount power inductor
Q1	SI3458DV	Vishay/SI3458DV	N-channel power MOSFET
R1	150k	Dale/CRCW0805	1% Thick Film
R2	10.0k	Dale/CRCW0805	1% Thick Film
R3	10.0k	Dale/CRCW0805	1% Thick Film
R4	10.0k	Dale/CRCW0805	1% Thick Film
R5	1.00	Dale/CRCW0805	1% Thick Film
R6	100	Dale/CRCW0805	1% Thick Film
R11	1.00	Dale/CRCW0805	1% Thick Film
U1	LM5020-1	National/LM5020-1	100V Current Mode PWM Controller

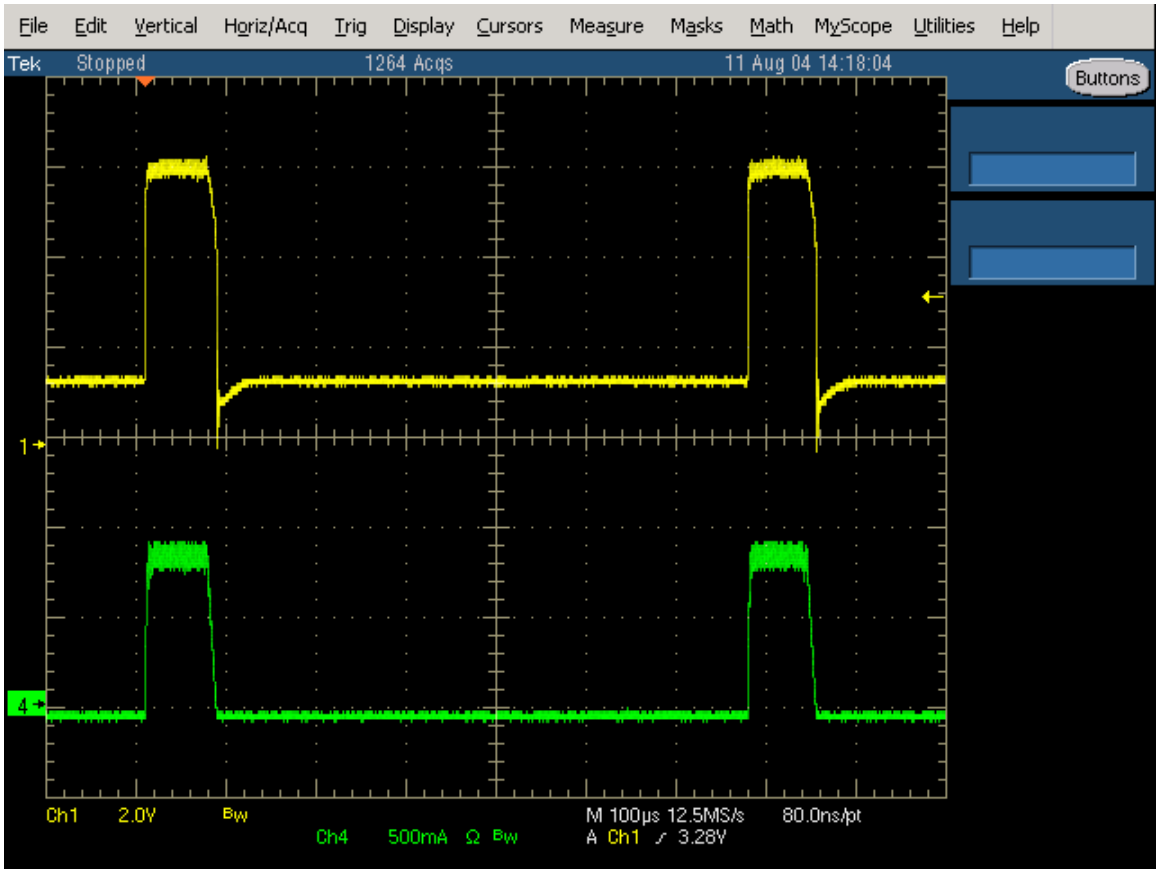

P1
20V-28V
P2
PWM@15kHz
P3
GND
R1
150k
R4
10.0k
C2
50CV150AX 150u
U1
LM5020-1
SS
RT
CS
UVLO
GND
Vin
VFB
comp
Vcc
out
C7
0.1u
L1
68u
D1
B240B
ANODE
Luxeon III LED
3-4V@900mA
CATHODE
Q1
SI3458DV
R6
100
R5
1.00
R11
1.00
R2
10.0k
R3
10.0k
C4
100p
C5
1.0u
fs=600kHz for R3=10k
LM5020 20-28Vin to 3.0-4.0V LED driver
7-Jul-2005
NSC0361
1
NATIONAL SEMICONDUCTOR
3050 W AGUA FRIA FREEWAY
SUITE 150
PHOENIX ARIZONA 85027


2000 (mil)
2000 (mil)
P2
P1
P3
P4
R5
R8
Q1
D1
C5
U1
C7
R11
R6
R1
R2
C4
R3
R4
C3
L1
C2
LED
ANODE
3-4V
CATHODE
National
Semiconductor

1.5 Circuit Waveforms

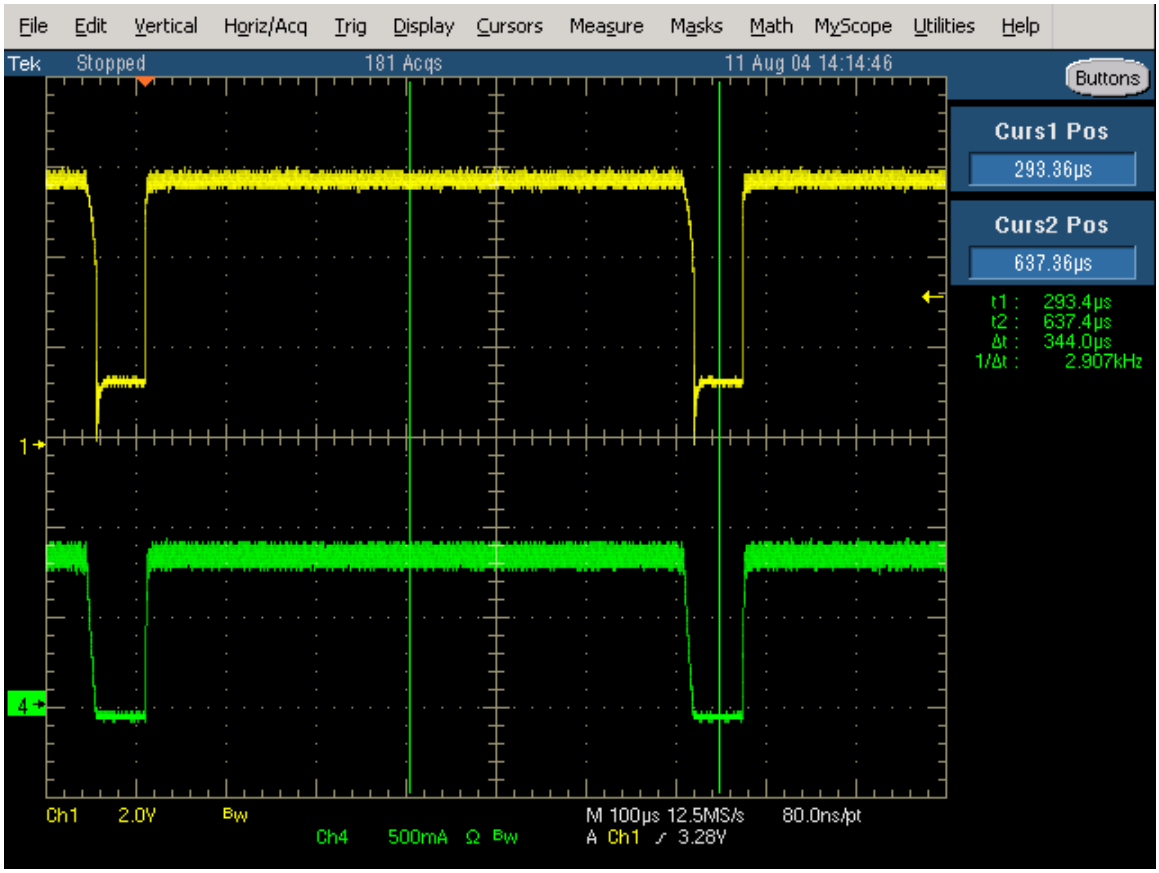
LED Current for Vin = 26V and 10% Duty Cycle

Ch1 = V_{LED}
Ch4 = I_{LED}
fPWM = 1.5kHz



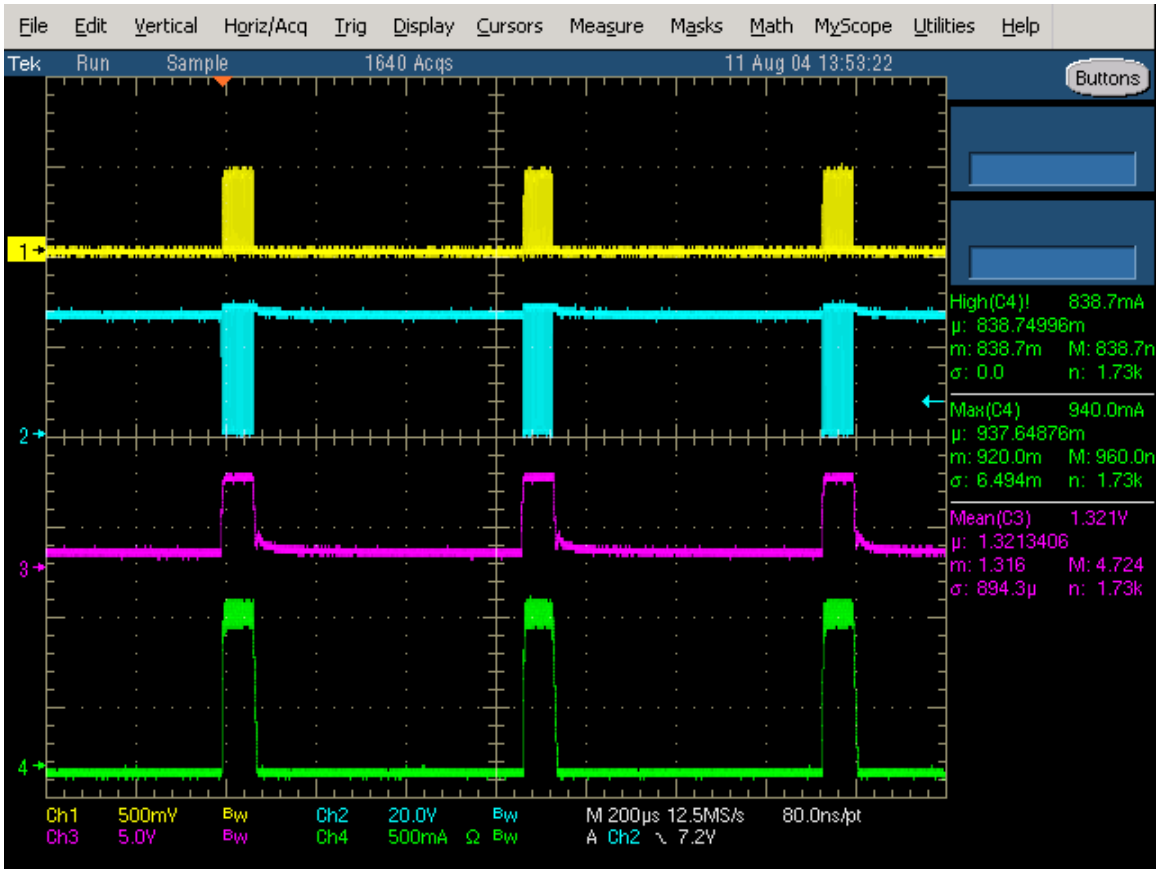
LED Current for Vin = 26V and 90% Duty Cycle

Ch1 = V_{LED}
Ch4 = I_{LED}
fPWM = 1.5kHz



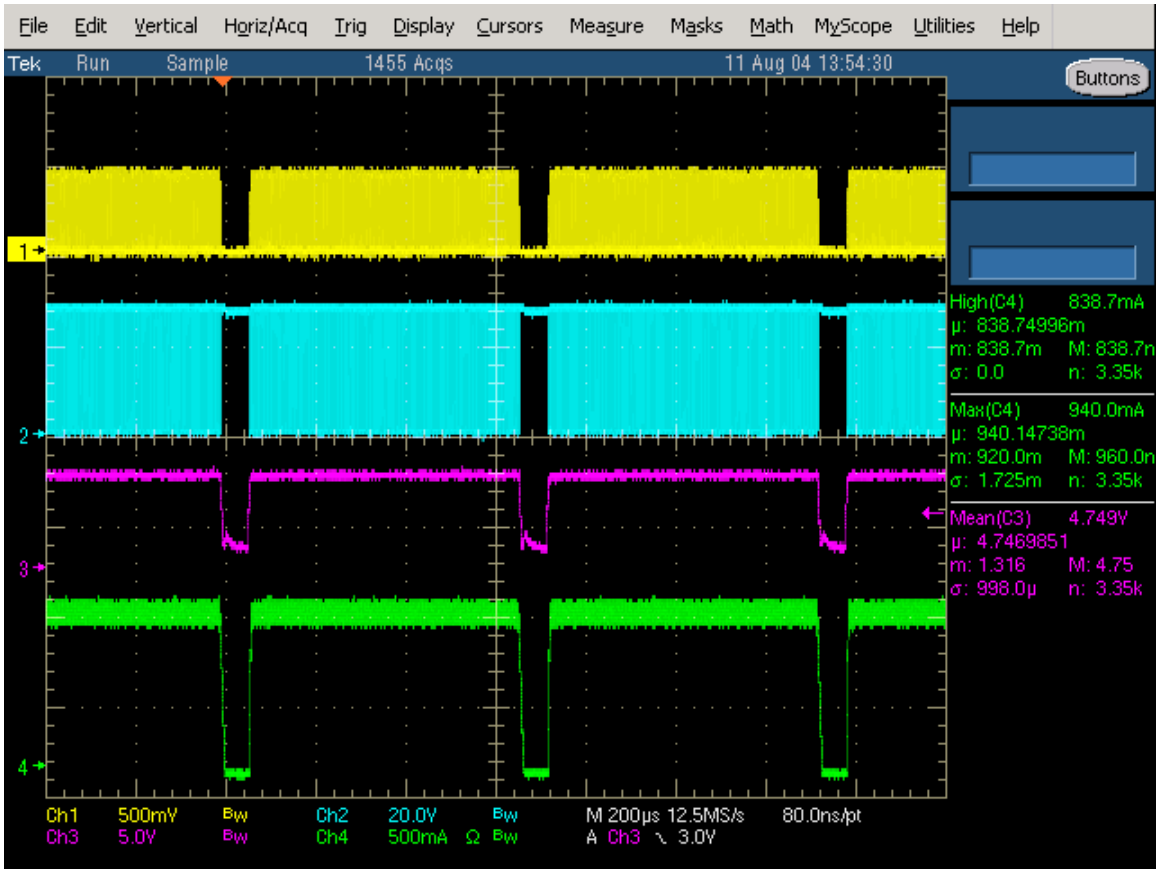
Vin = 26V at I_{LED} = 0.88A and 10% Duty Cycle

Ch1 = I_{sense}
Ch2 = MOSFET V_{DS}
Ch3 = Comp. pin
Ch4 = I_{LED}
fPWM = 1.5kHz



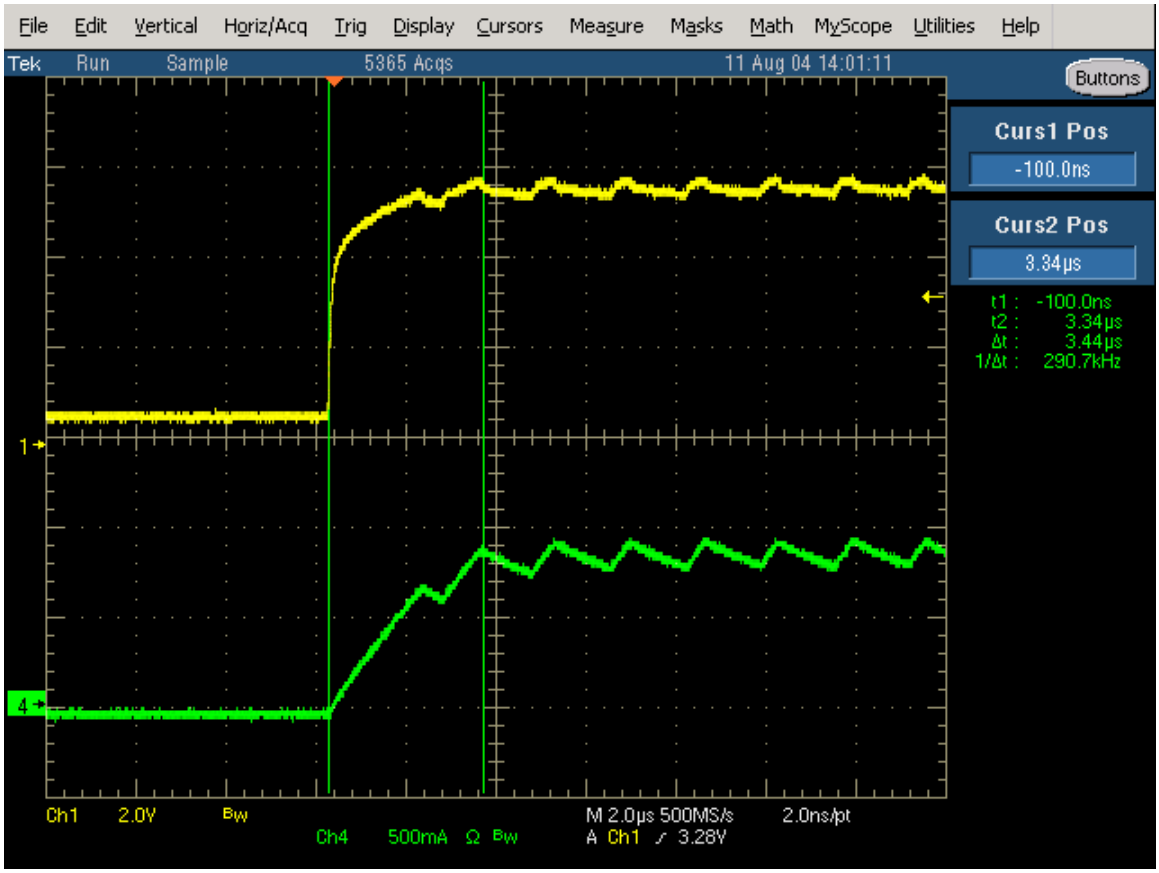
Vin = 26V at I_{LED} = 0.88A and 90% Duty Cycle

Ch1 = I_{sense}
Ch2 = MOSFET V_{DS}
Ch3 = Comp. pin
Ch4 = I_{LED}
fPWM = 1.5kHz



LED Current rise time detail for Vin=26V

Ch1 = V_{LED}
Ch4 = I_{LED}



LED Current fall time detail for Vin=26V

Ch1 = V_{LED}
Ch4 = I_{LED}