DUT:TW6

L.Godfrey,A.Hill,M.Borri

20260430

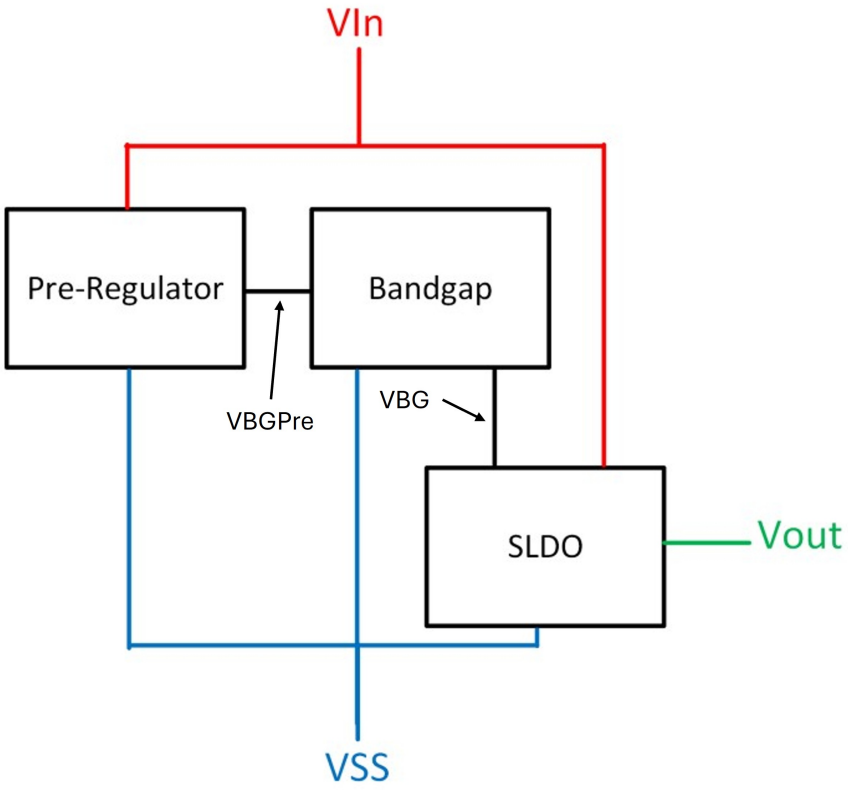
Content:

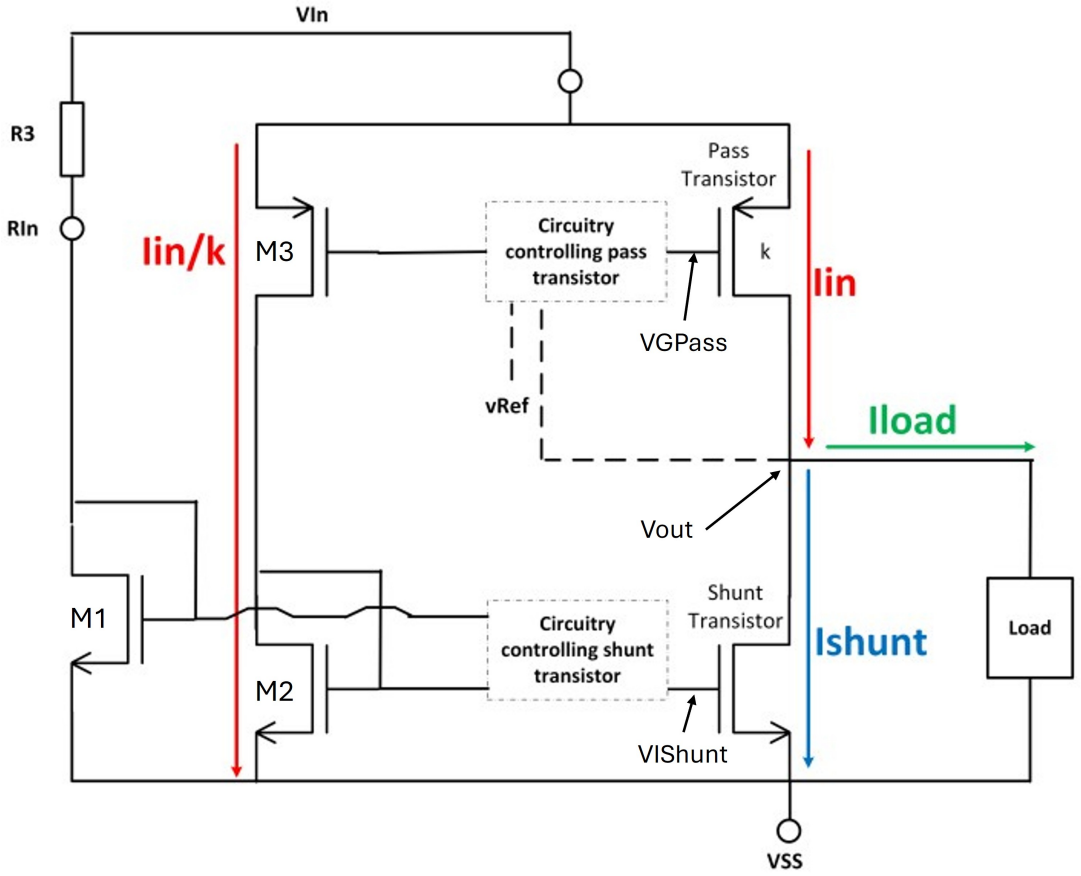
- Dac scan at different Vin, w and wo load enabled;
- Dac scan at different Vin, w min R3;
- Vout sampling at const dac at different temperatures;

Overview

- A dac scan was repeated for different values of Vin.
- Vin [V]: 1.500,1.525,1.550,1.575,1.600, 1.625,1.650,1.675,1.700,1.725,1.750,1.775,1.800
- Vout range (by design): 1.1 V - 1.4 V
- Tests were performed in three different range of operations (R3 and load): 40mA, 500mA, 900mA.
- Tests were repeated with load ON and OFF.
  (V)IShunt (i.e. Vgs shunt transistor) increased as expected when load is off (all currents is shunted).
  The chip is generally hotter when it shunts more current i.e. with load OFF.
  The effect of temperature of dac scans is more pronounced with load OFF. (curves futher apart)
- At 40mA, 500mA, 900mA, Vout range is mainly 1.05 V - 1.4 V, and it is fairly linear, independently of load ON or OFF.
- Tests were performed in three different range of operations (loads): 40mA, 500mA, 900mA with a constant, high Iin 1.1mA (R3: 1157 ohm).
  Temperatures are increasing with more current shunted.
- Finally, the chip was operated at 900mA load with its tuned R3 1180 ohm.
  Vout and all diagnistcs were plotted as a funtion of temperature.
  The chip was switched ON, configured and monitored for 12 mins.
  This shows the effect of:
  -shunted current on chip temperature (DAC:0,16,31);
  -chip temperature on voltages and currents;

Circuit reminder



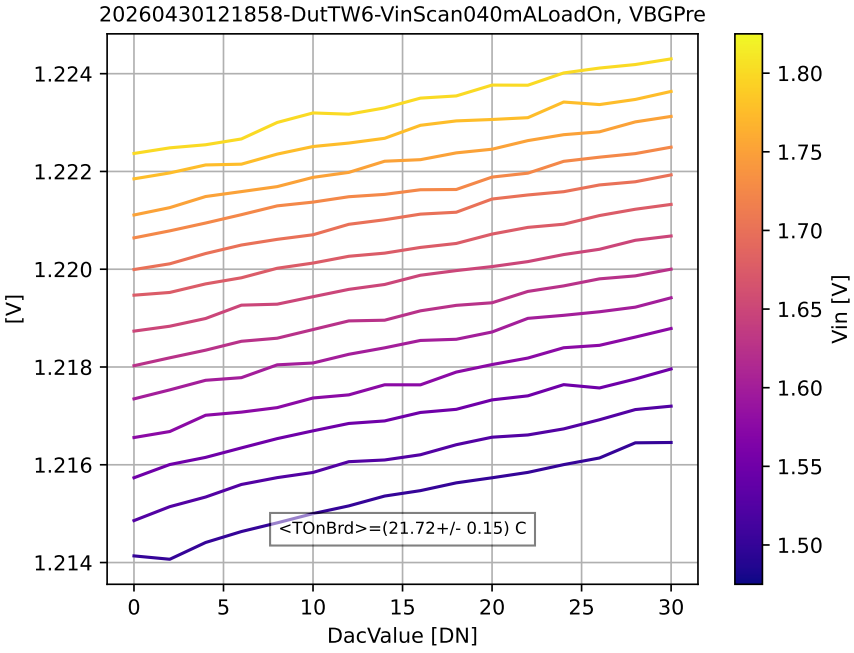


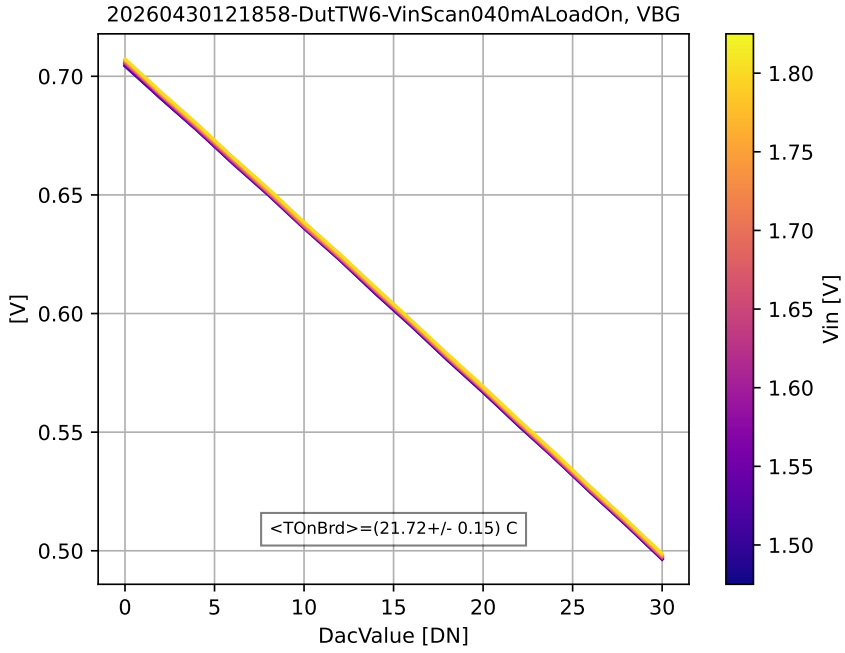
Load: 40mA range

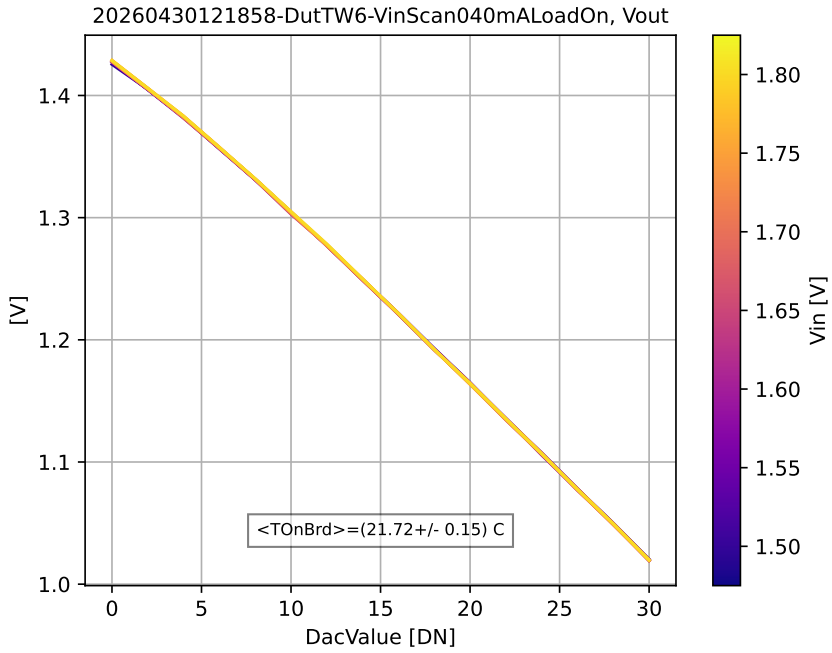
(R3 at (1695 + 47k) ohm, tuned for Iin $\sim$40mA range)

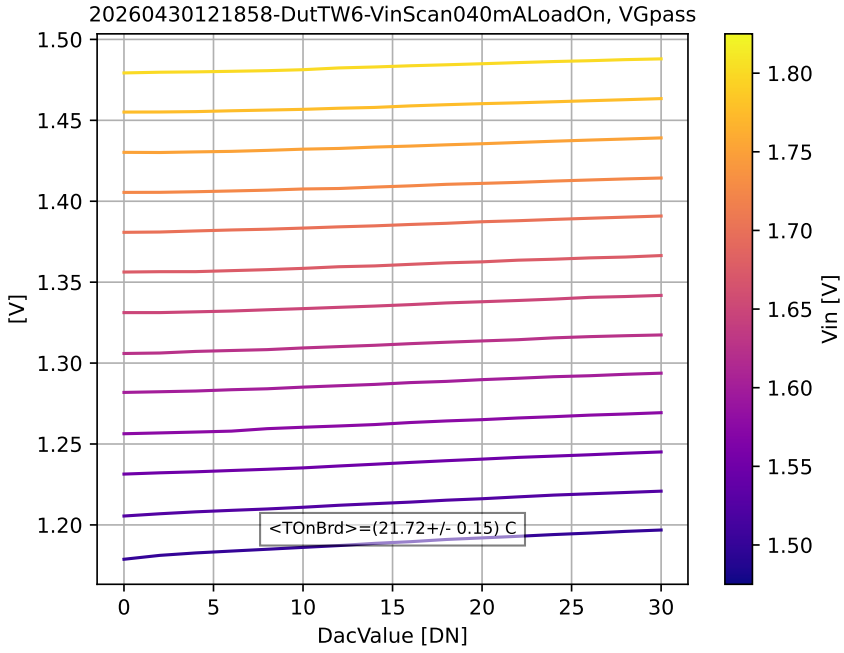
Load: 40mA range,
load ON

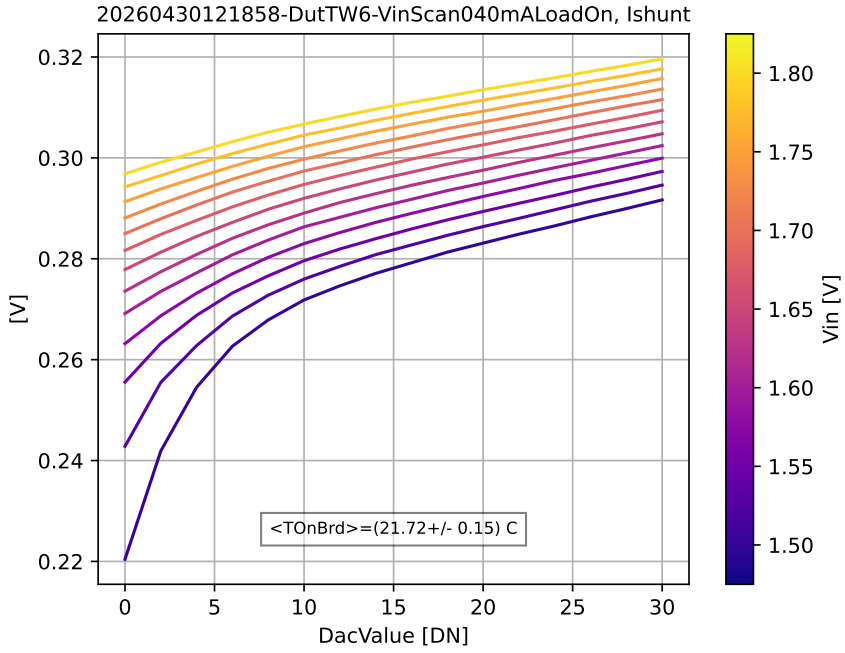
(R3 at (1695 + 47k) ohm, tuned for lin $\sim$40mA range)

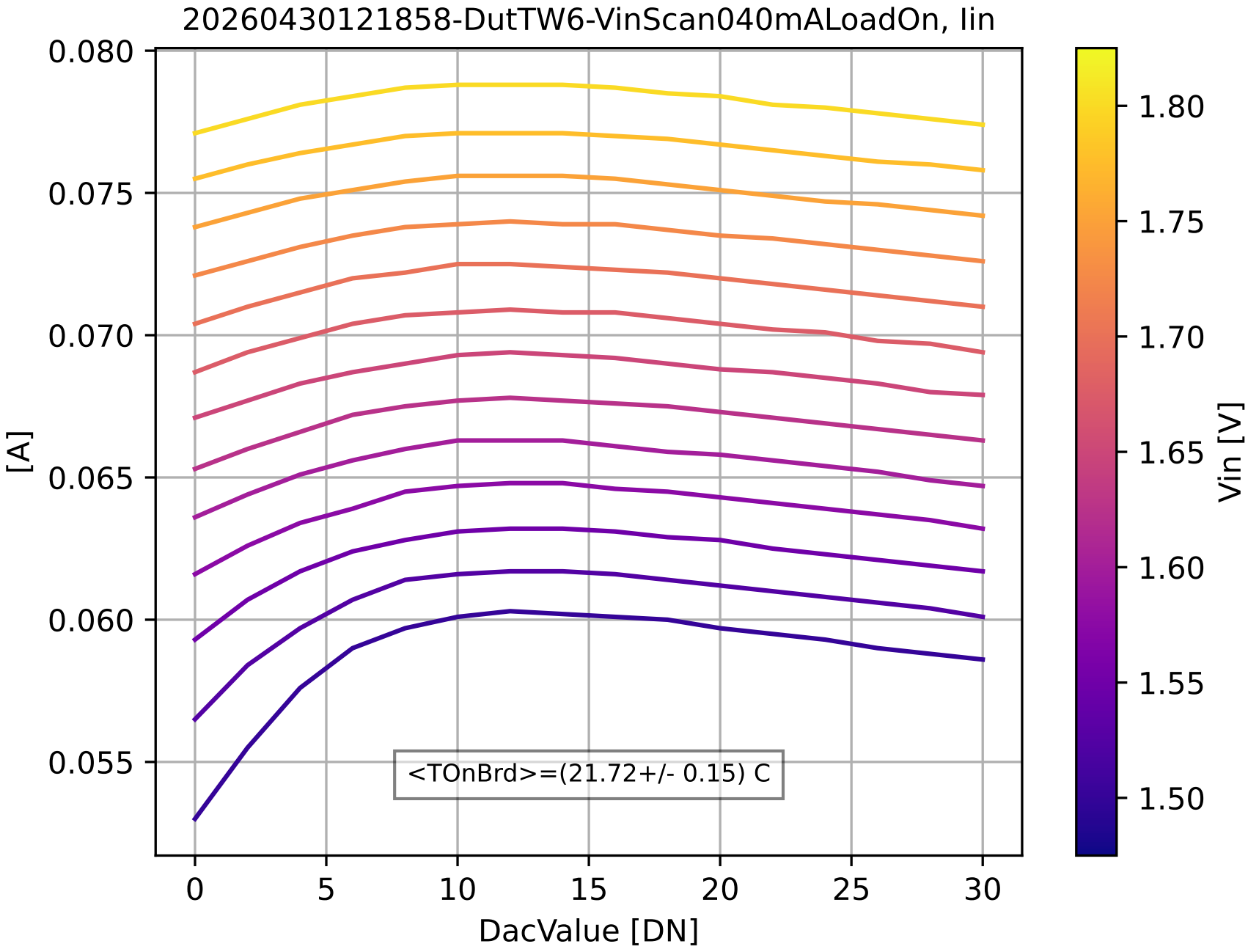

20260430121858-DutTW6-VinScan040mALoadOn, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(21.72+/- 0.15) C


20260430121858-DutTW6-VinScan040mALoadOn, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(21.72+/- 0.15) C


20260430121858-DutTW6-VinScan040mALoadOn, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(21.72+/- 0.15) C

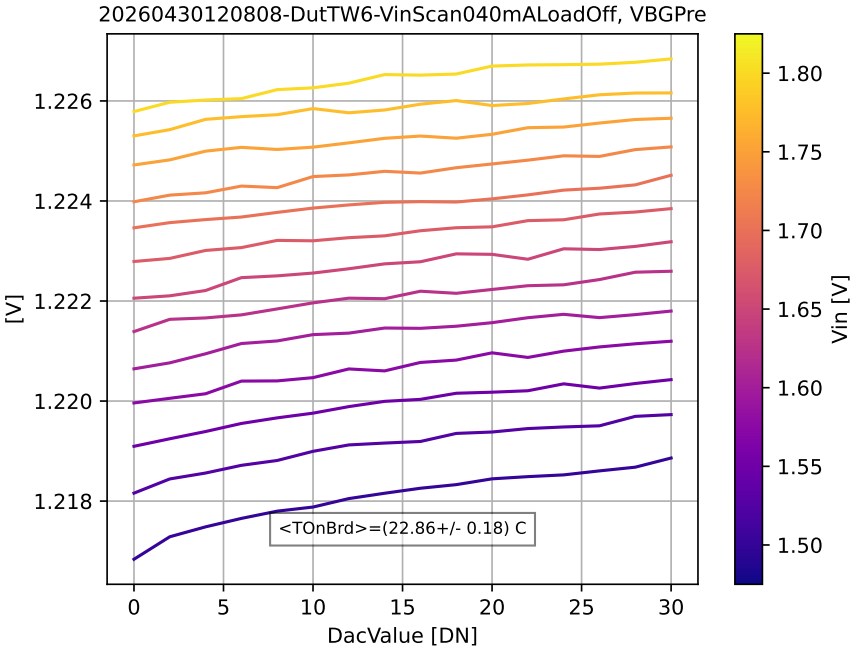

20260430121858-DutTW6-VinScan040mALoadOn, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(21.72+/- 0.15) C

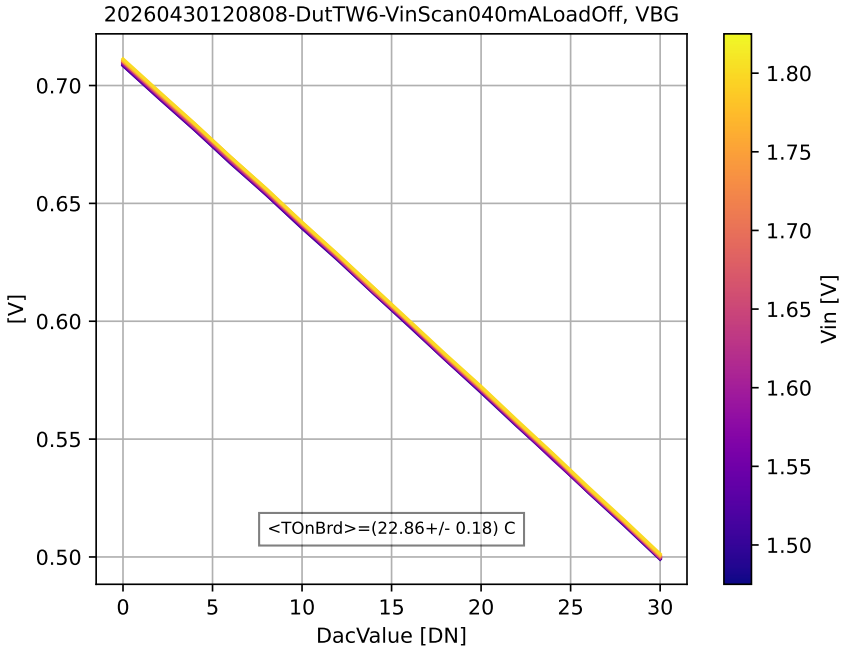

20260430121858-DutTW6-VinScan040mALoadOn, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(21.72+/- 0.15) C

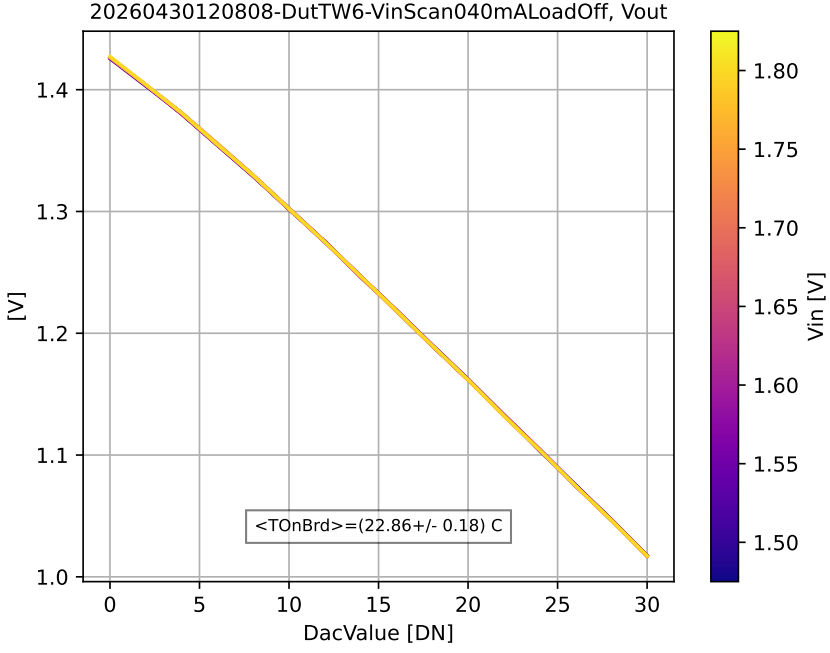

20260430121858-DutTW6-VinScan040mALoadOn, Iin
0.080
0.075
0.070
0.065
0.060
0.055
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(21.72+/- 0.15) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

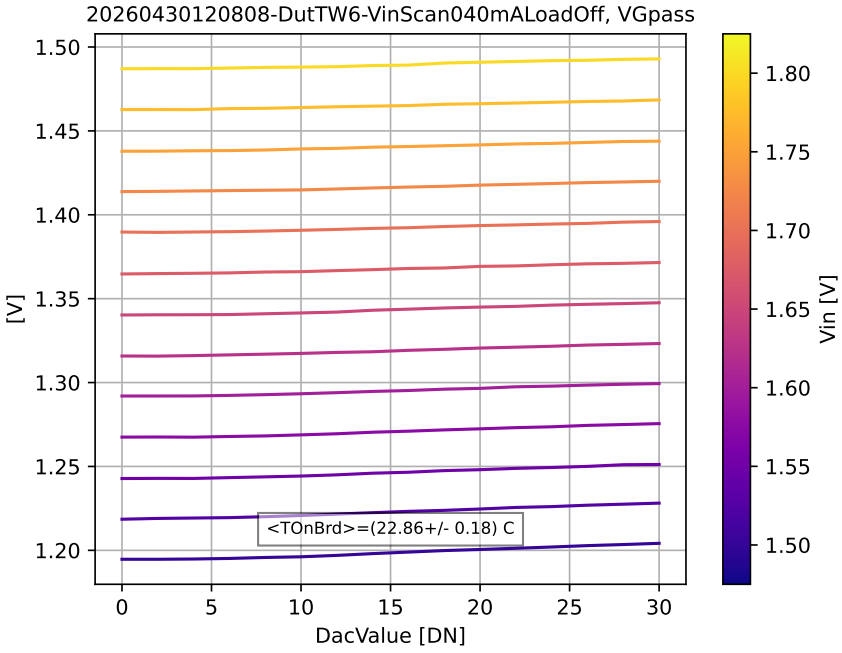
Load: 40mA range, load OFF

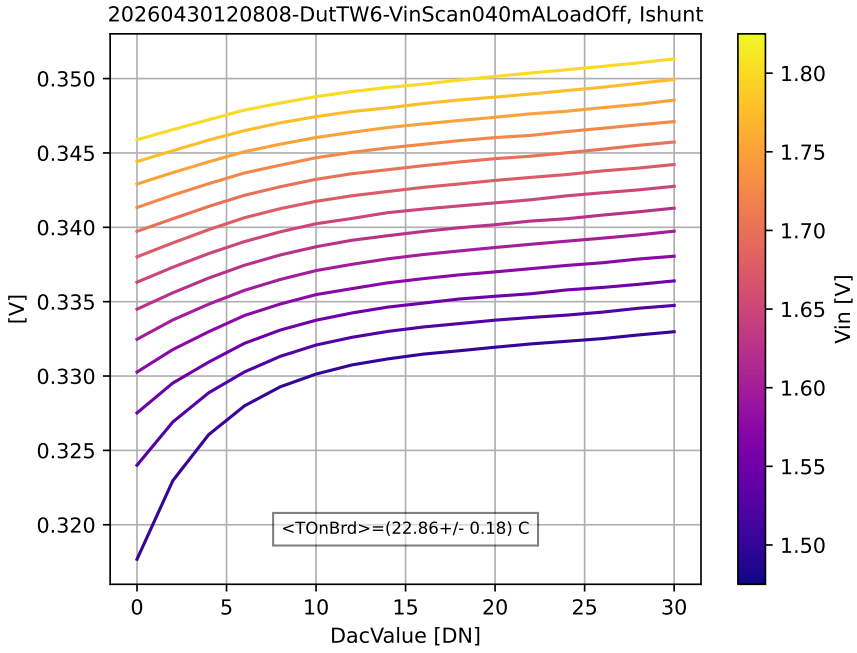
(R3 at (1695 + 47k) ohm, tuned for lin ∼40mA range)

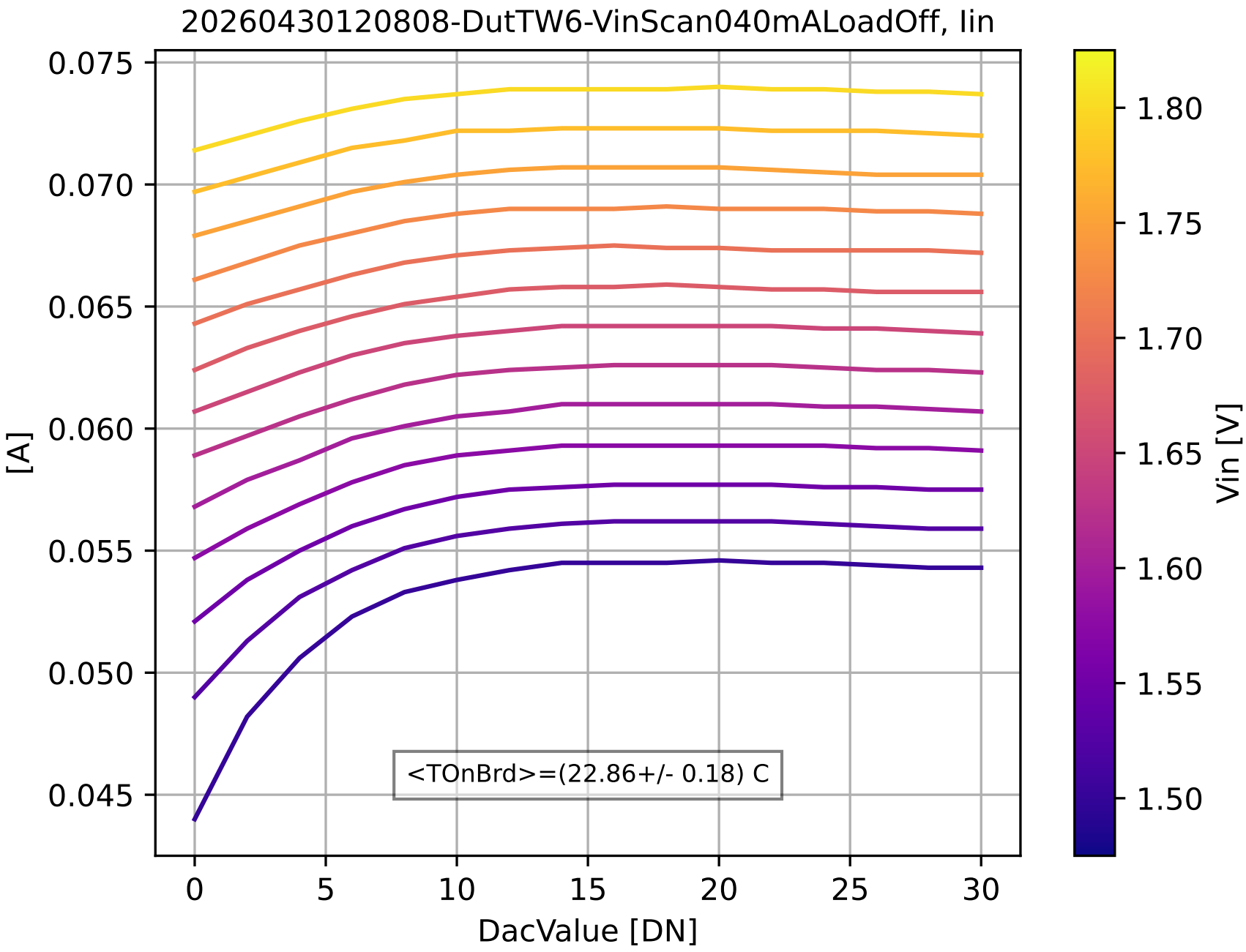

20260430120808-DutTW6-VinScan040mALoadOff, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(22.86+/- 0.18) C


20260430120808-DutTW6-VinScan040mALoadOff, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(22.86+/- 0.18) C


20260430120808-DutTW6-VinScan040mALoadOff, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(22.86+/- 0.18) C


20260430120808-DutTW6-VinScan040mALoadOff, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(22.86+/- 0.18) C


20260430120808-DutTW6-VinScan040mALoadOff, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(22.86+/- 0.18) C

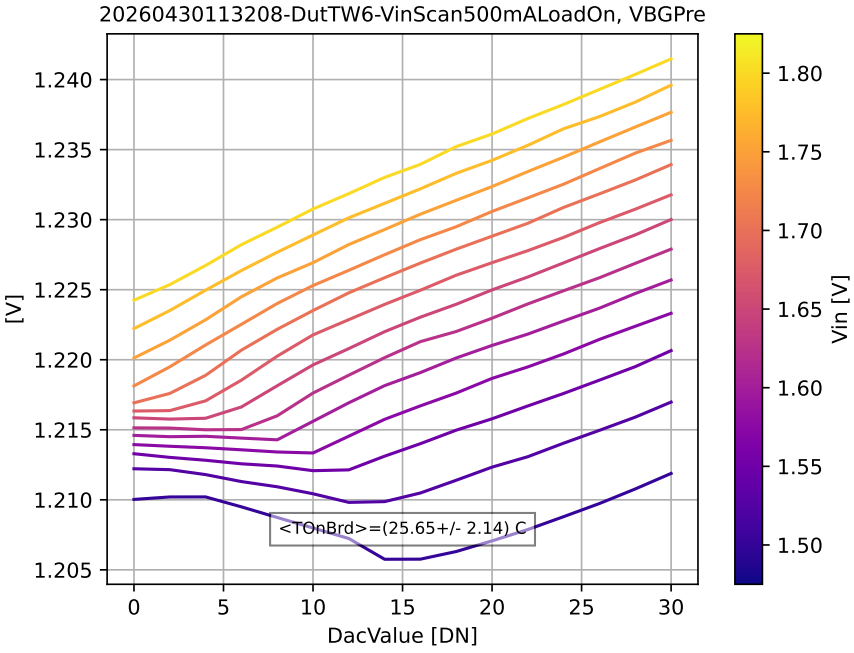

20260430120808-DutTW6-VinScan040mALoadOff, lin
0.075
0.070
0.065
0.060
0.055
0.050
0.045
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(22.86+/- 0.18) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

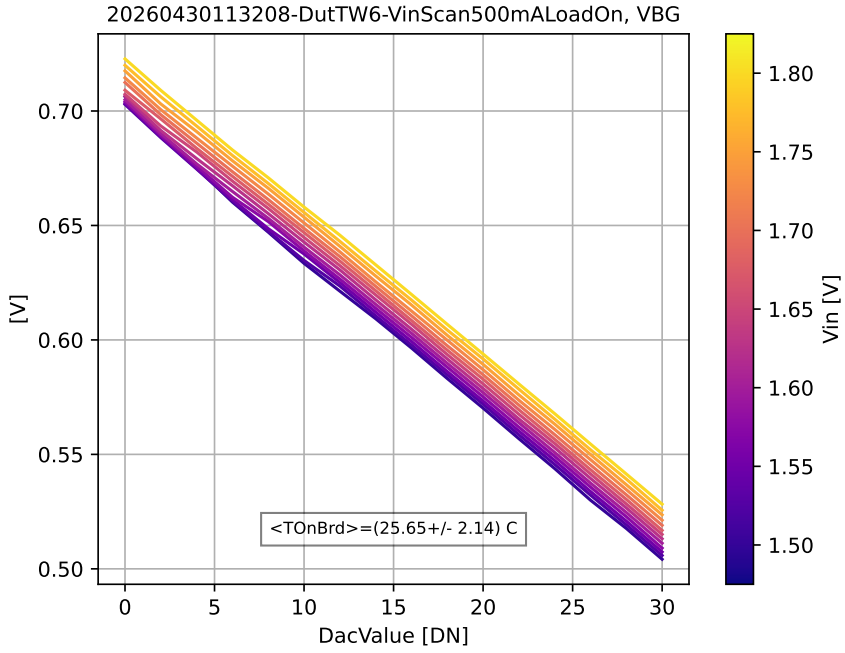
Load: 500mA range

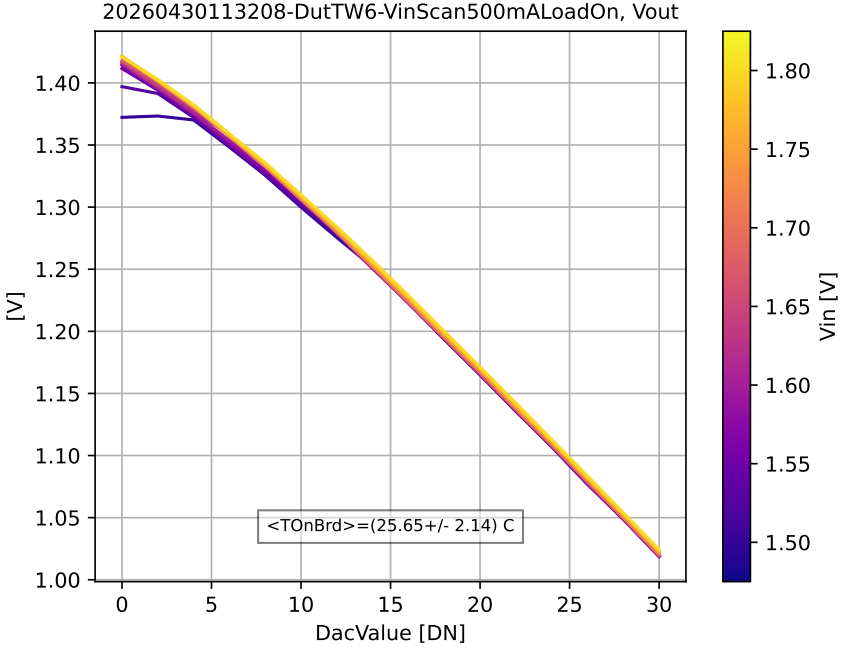
(R3 at 1295 ohm, tuned for Iin $\sim$500mA range)

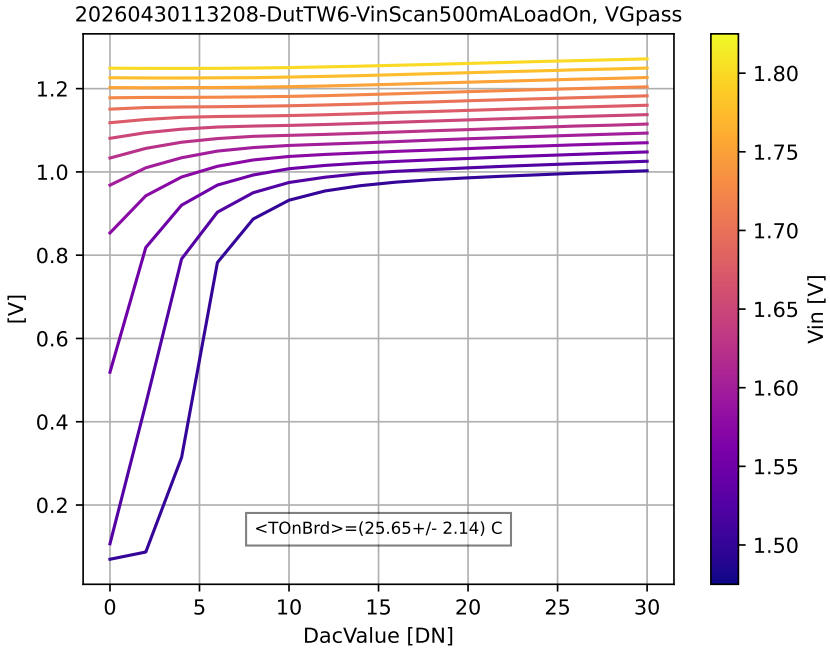
Load: 500mA range, load ON

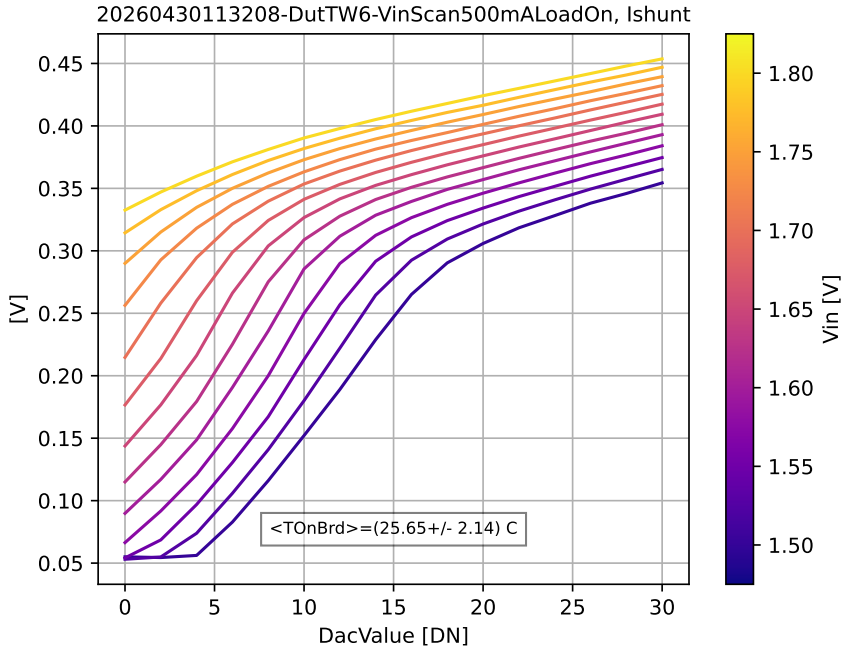
(R3 at 1295 ohm, tuned for Iin $\sim$500mA range)

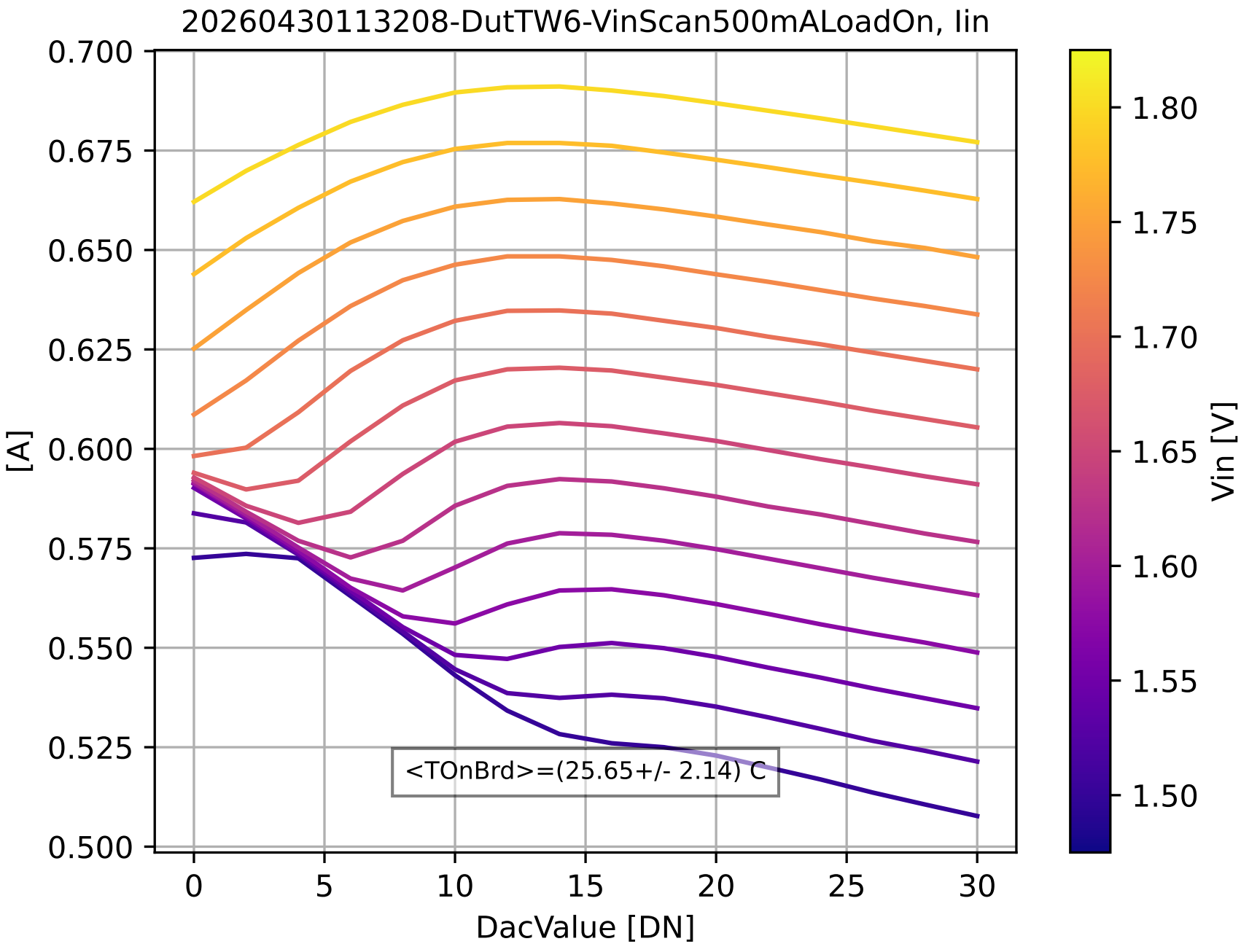

20260430113208-DutTW6-VinScan500mALoadOn, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(25.65+/- 2.14) C


20260430113208-DutTW6-VinScan500mALoadOn, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(25.65+/- 2.14) C


20260430113208-DutTW6-VinScan500mALoadOn, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(25.65+/- 2.14) C

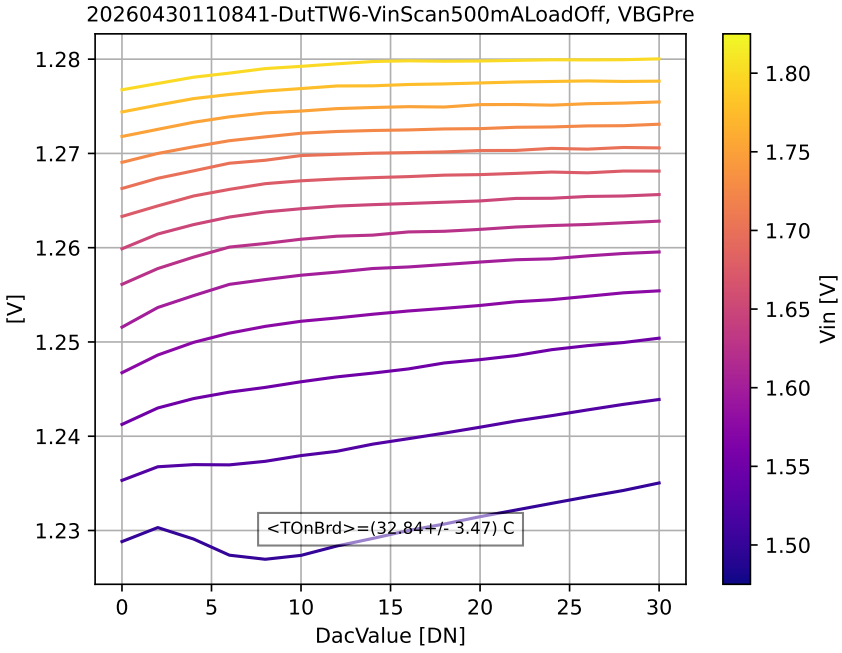

20260430113208-DutTW6-VinScan500mALoadOn, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(25.65+/- 2.14) C

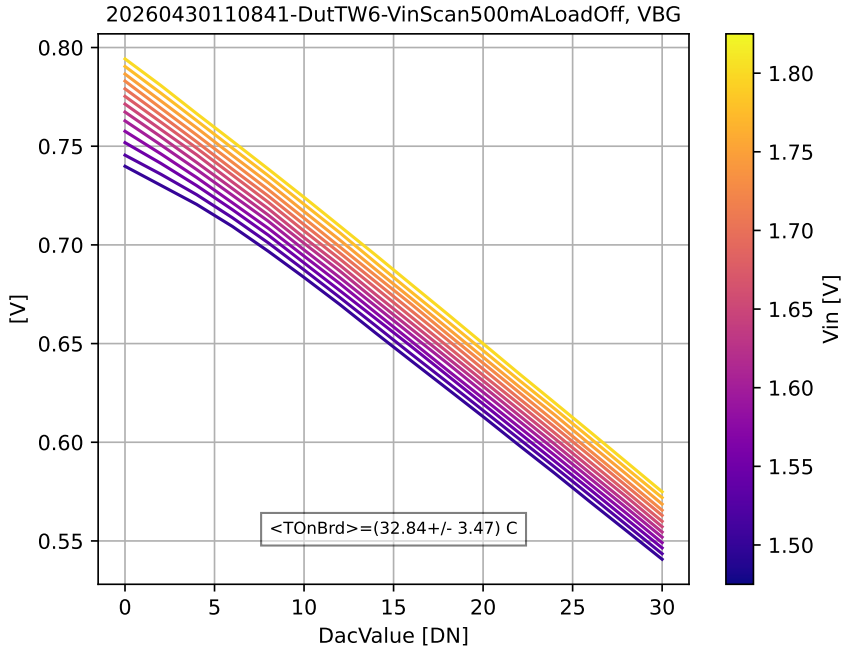

20260430113208-DutTW6-VinScan500mALoadOn, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(25.65+/- 2.14) C

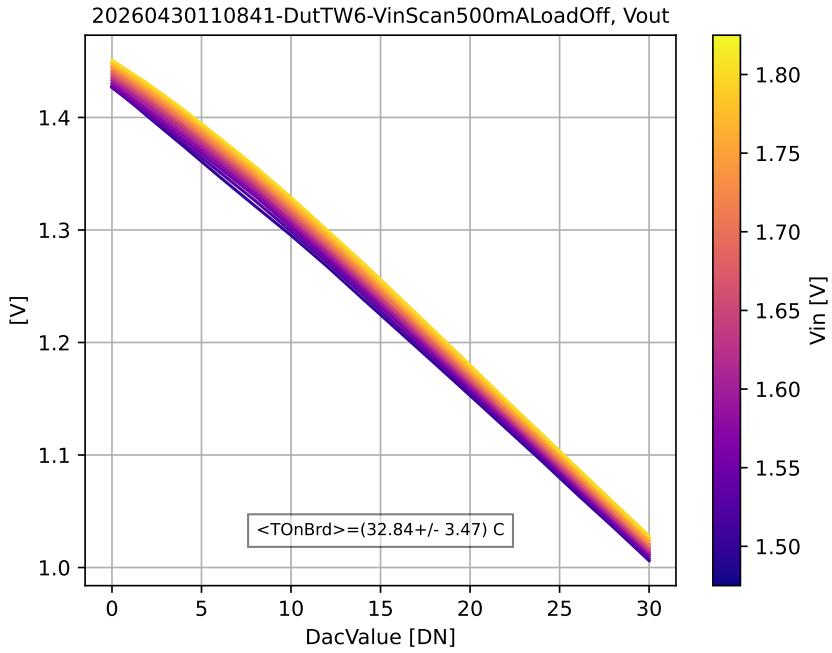

20260430113208-DutTW6-VinScan500mALoadOn, Iin
0.700
0.675
0.650
0.625
0.600
0.575
0.550
0.525
0.500
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(25.65+/- 2.14) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

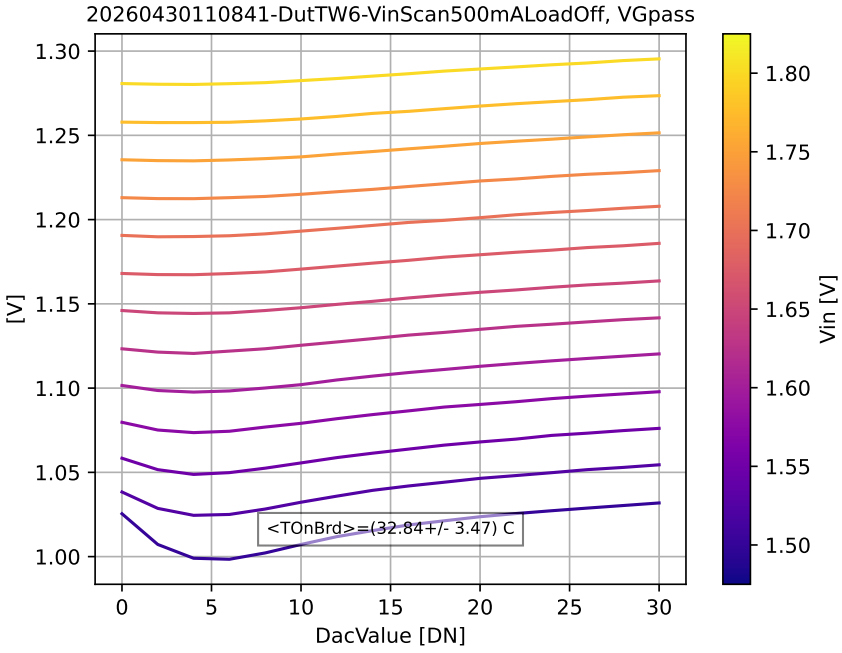
Load: 500mA range, load OFF

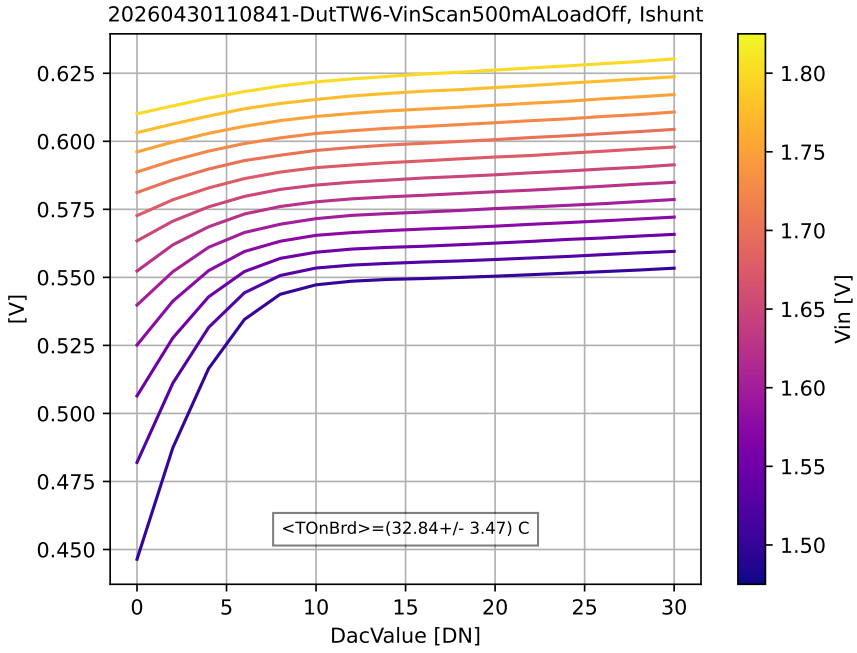
(R3 at 1295 ohm, tuned for Iin $\sim$500mA range)

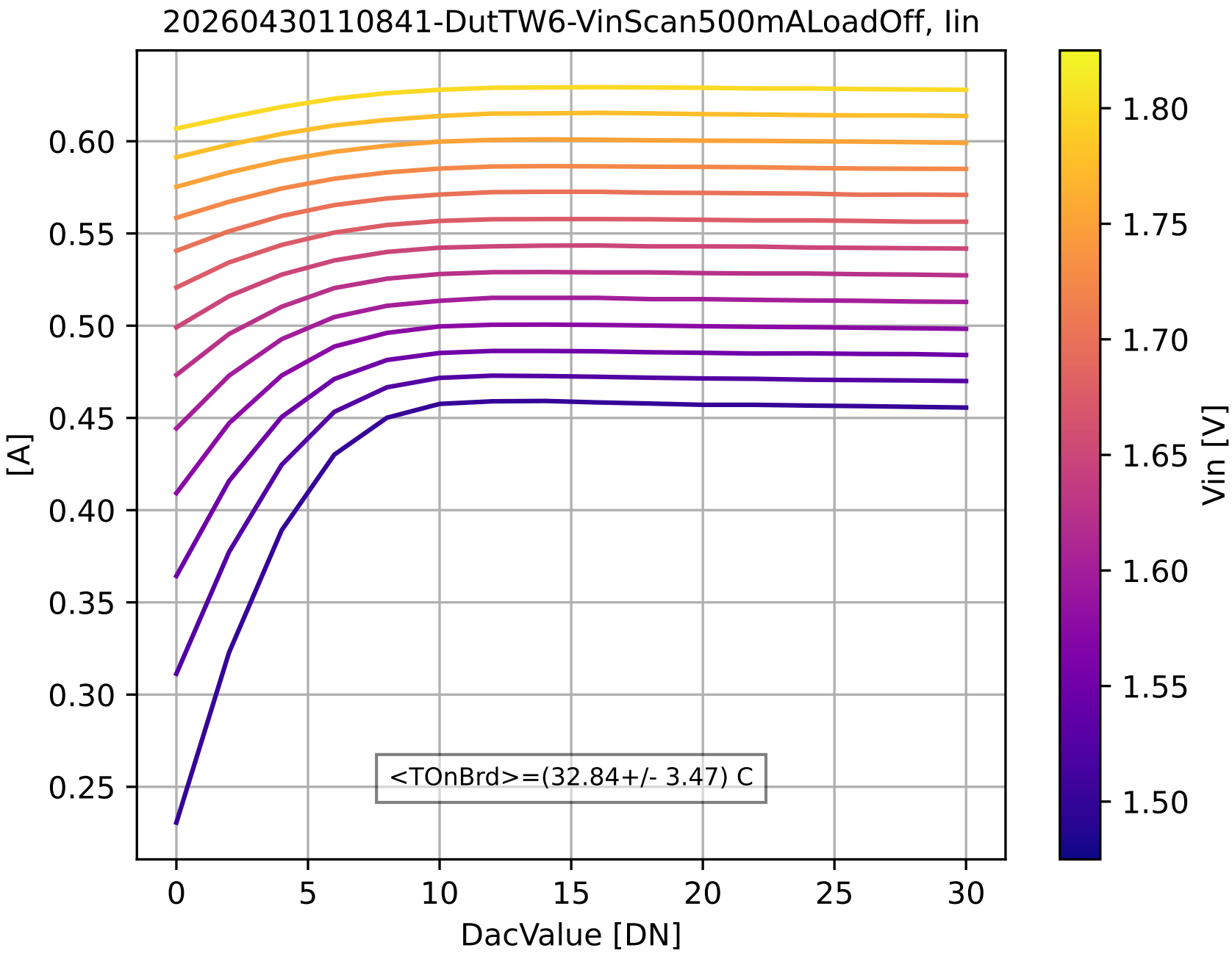

20260430110841-DutTW6-VinScan500mALoadOff, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(32.84+/- 3.47) C


20260430110841-DutTW6-VinScan500mALoadOff, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(32.84+/- 3.47) C


20260430110841-DutTW6-VinScan500mALoadOff, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(32.84+/- 3.47) C


20260430110841-DutTW6-VinScan500mALoadOff, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(32.84+/- 3.47) C


20260430110841-DutTW6-VinScan500mALoadOff, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(32.84+/- 3.47) C

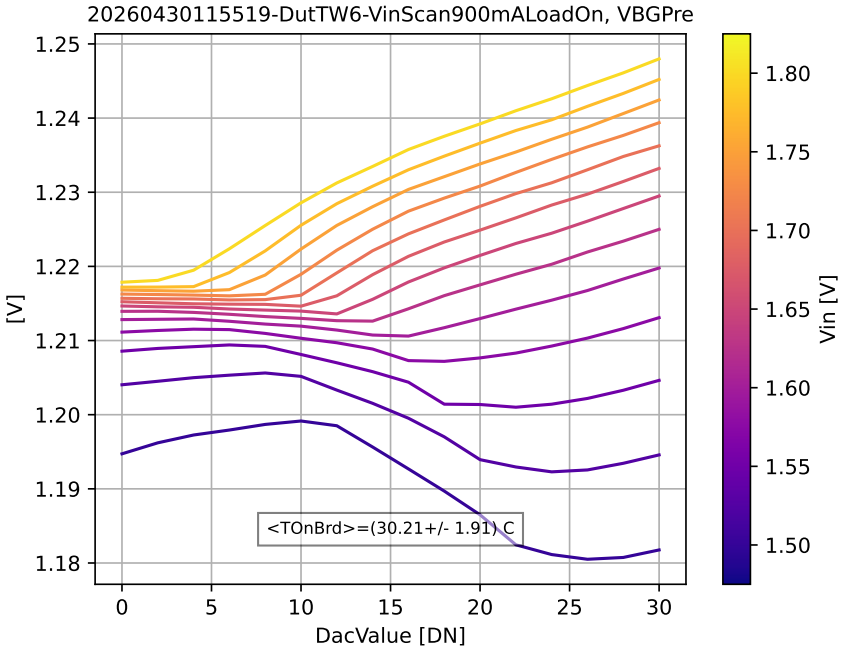

20260430110841-DutTW6-VinScan500mALoadOff, Iin
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(32.84+/- 3.47) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

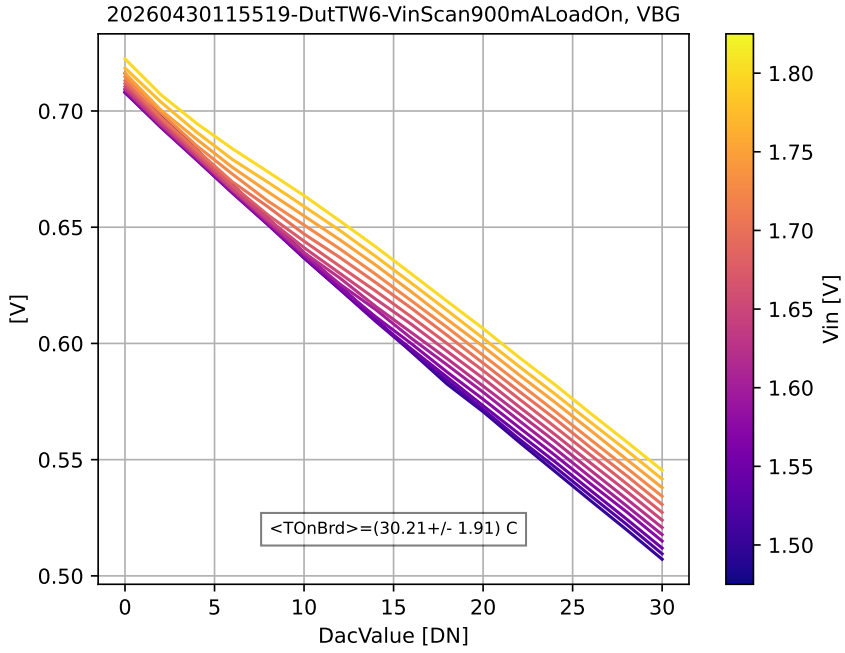
Load: 900mA range

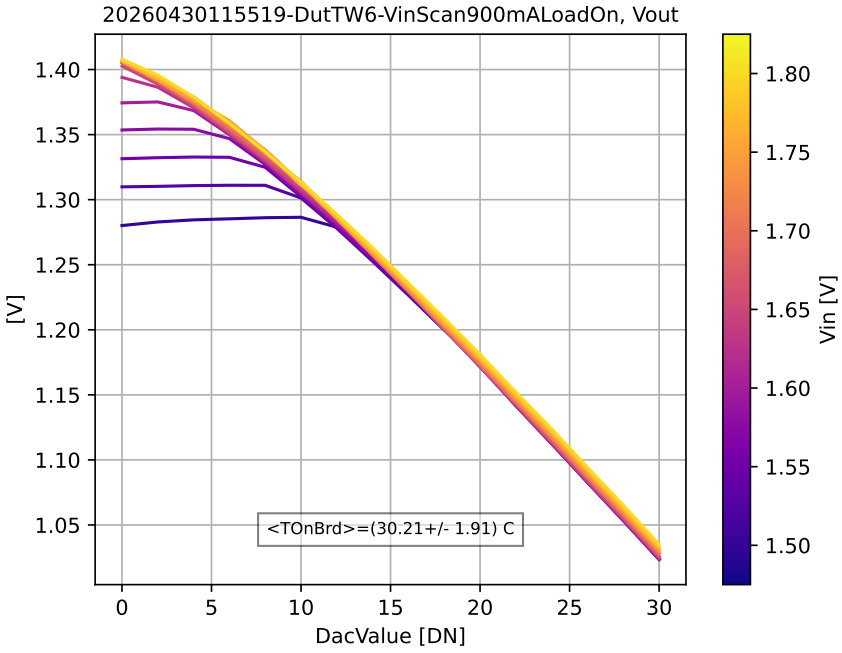
(R3 at 1180 ohm, tuned for Iin $\sim$900mA range)

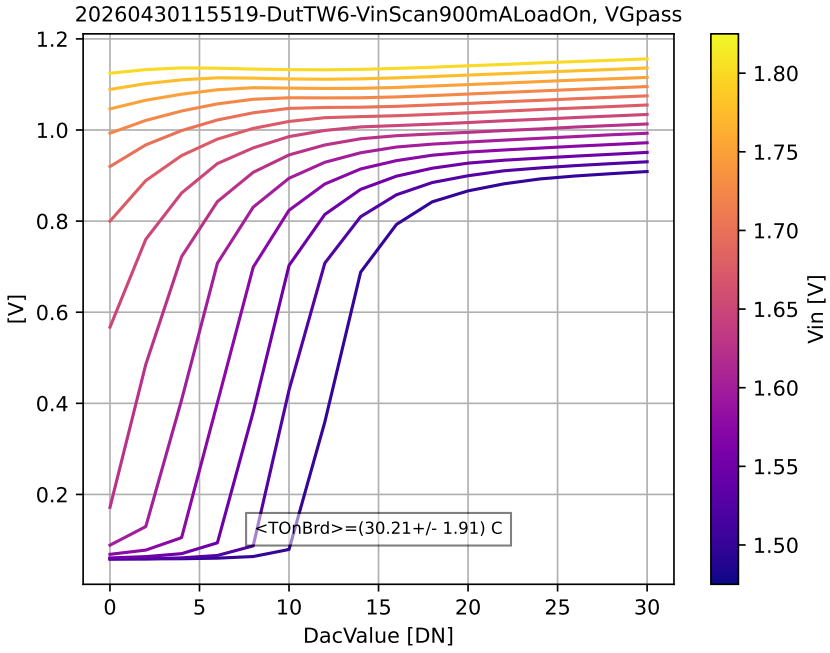
Load: 900mA range, load ON

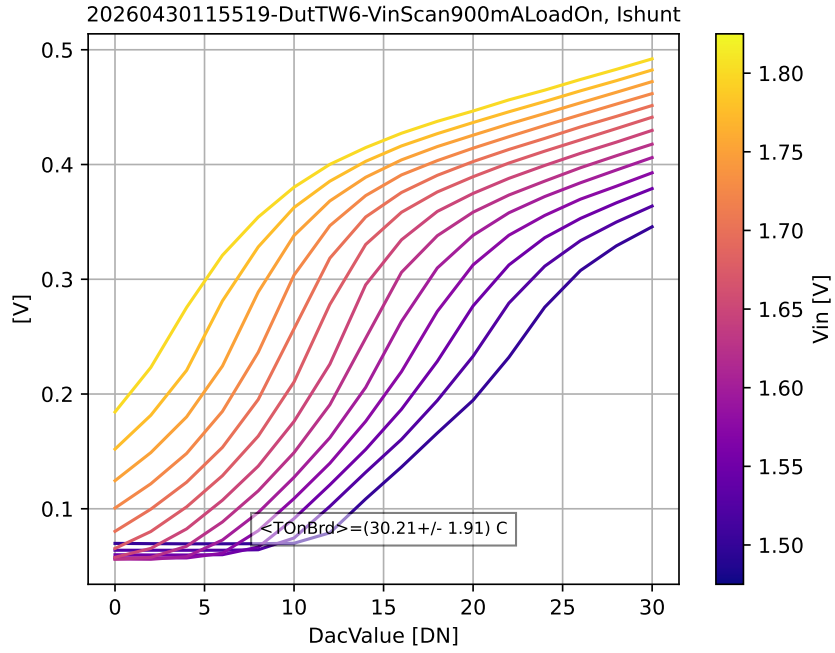
(R3 at 1180 ohm, tuned for Iin $\sim$900mA range)

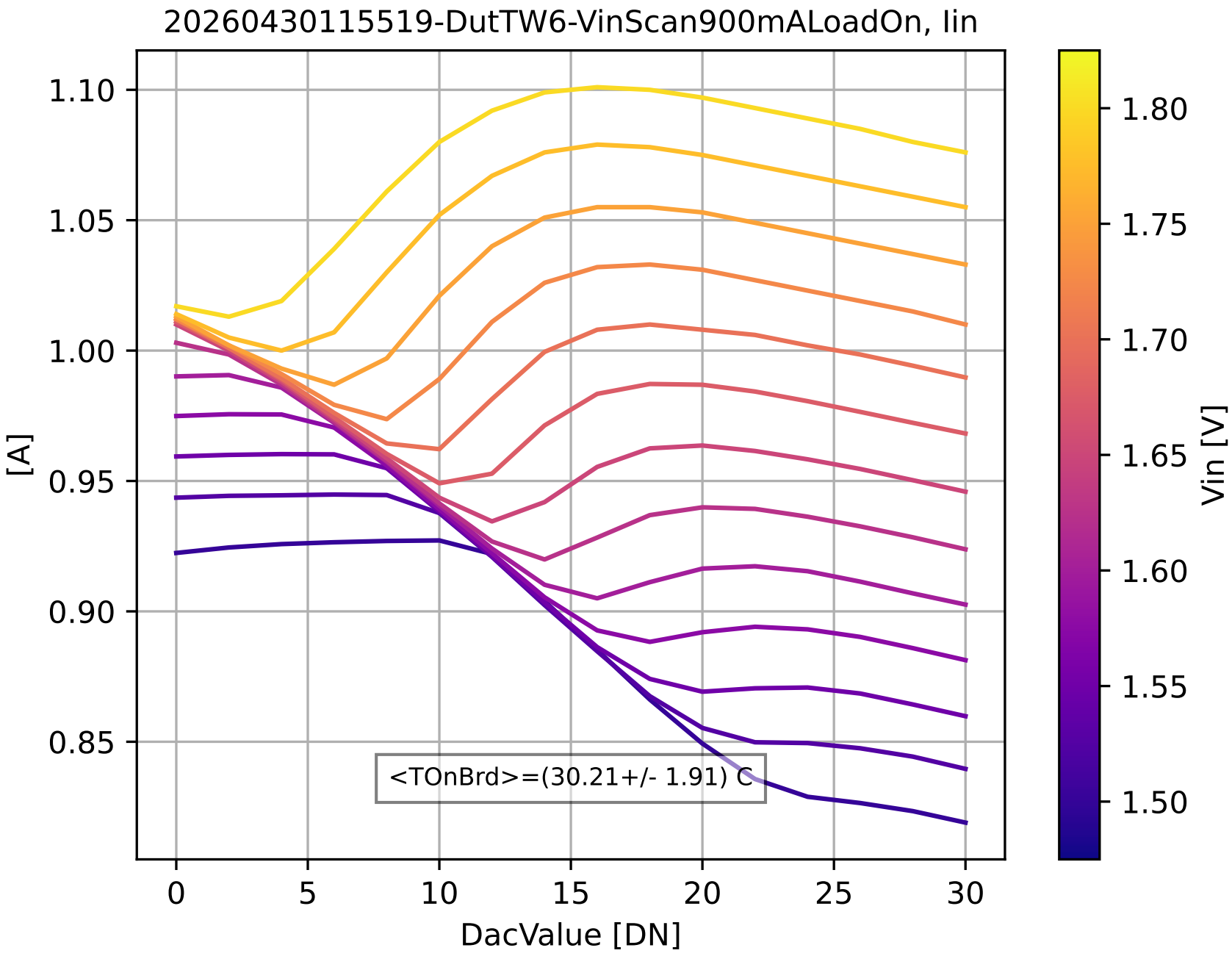

20260430115519-DutTW6-VinScan900mALoadOn, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(30.21+/- 1.91) C


20260430115519-DutTW6-VinScan900mALoadOn, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(30.21+/- 1.91) C


20260430115519-DutTW6-VinScan900mALoadOn, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(30.21+/- 1.91) C

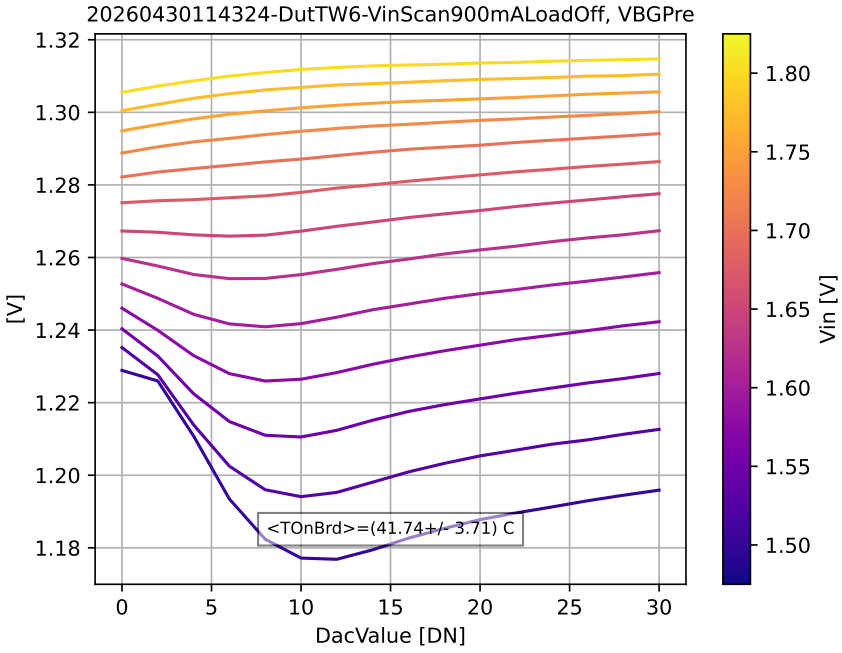

20260430115519-DutTW6-VinScan900mALoadOn, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(30.21+/- 1.91) C

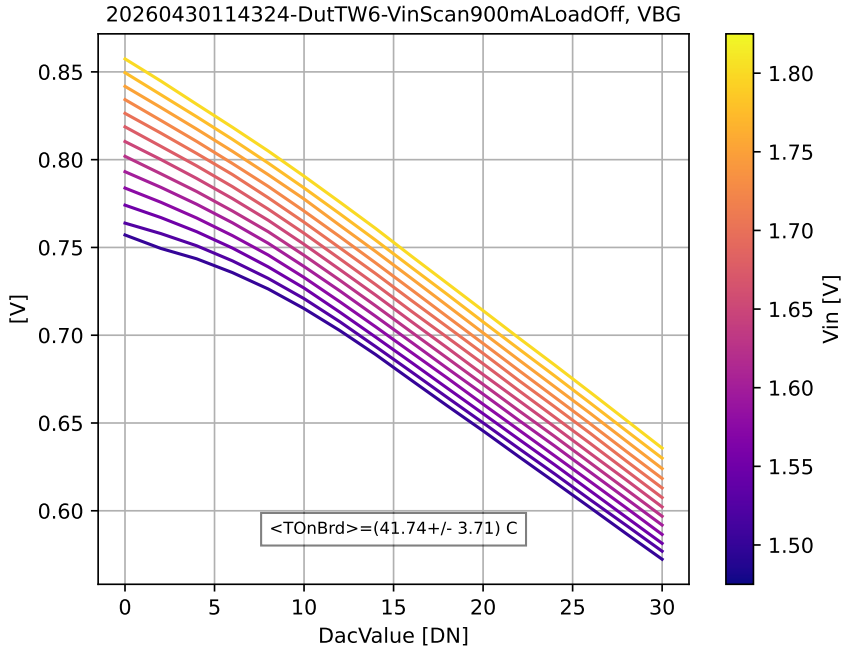

20260430115519-DutTW6-VinScan900mALoadOn, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(30.21+/- 1.91) C

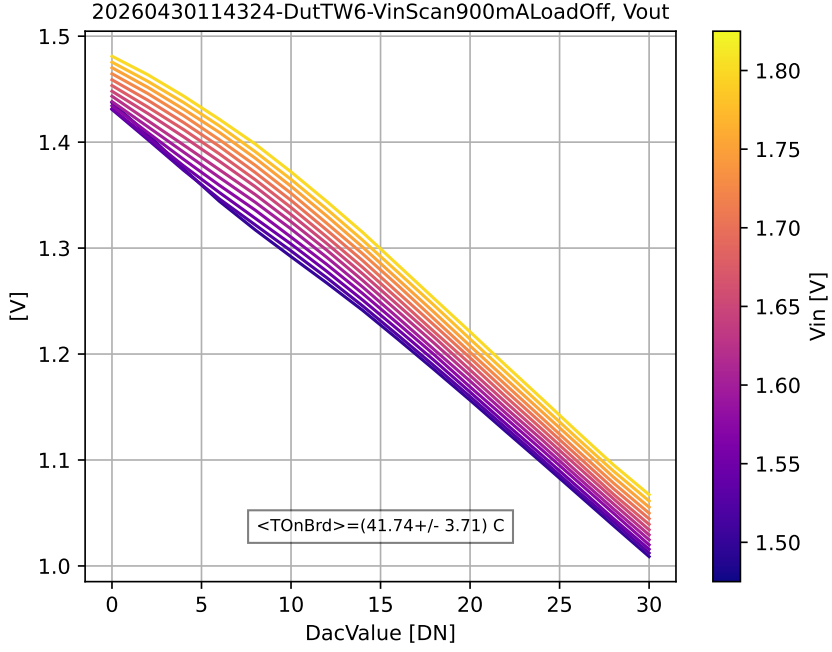

20260430115519-DutTW6-VinScan900mALoadOn, Iin
1.10
1.05
1.00
0.95
0.90
0.85
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(30.21+/- 1.91) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

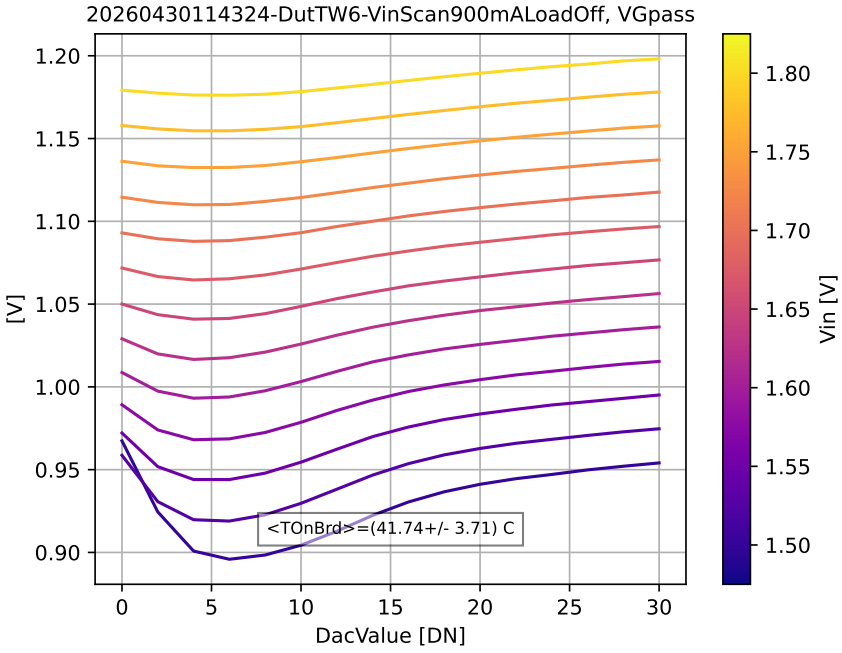
Load: 900mA range, load OFF

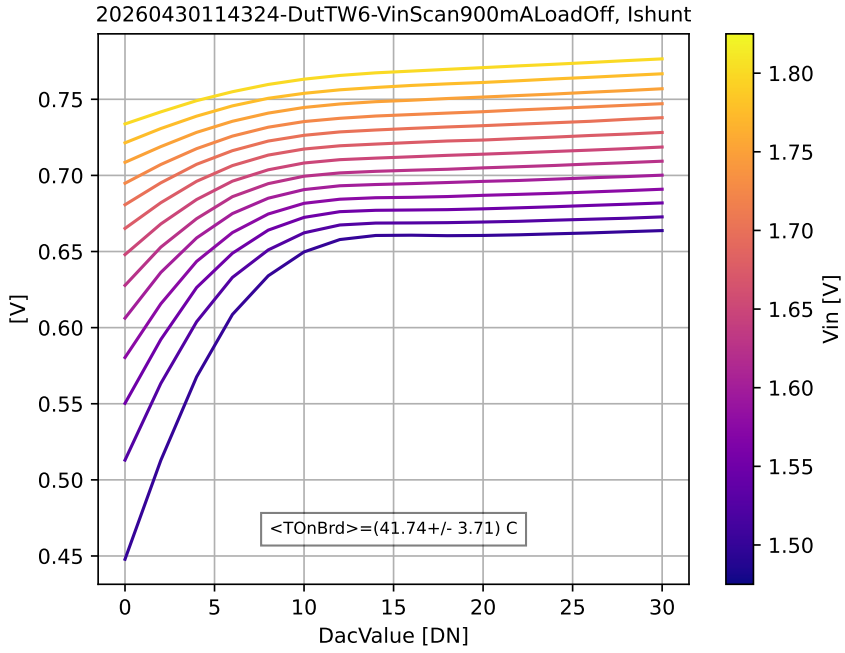
(R3 at 1180 ohm, tuned for Iin $\sim$900mA range)

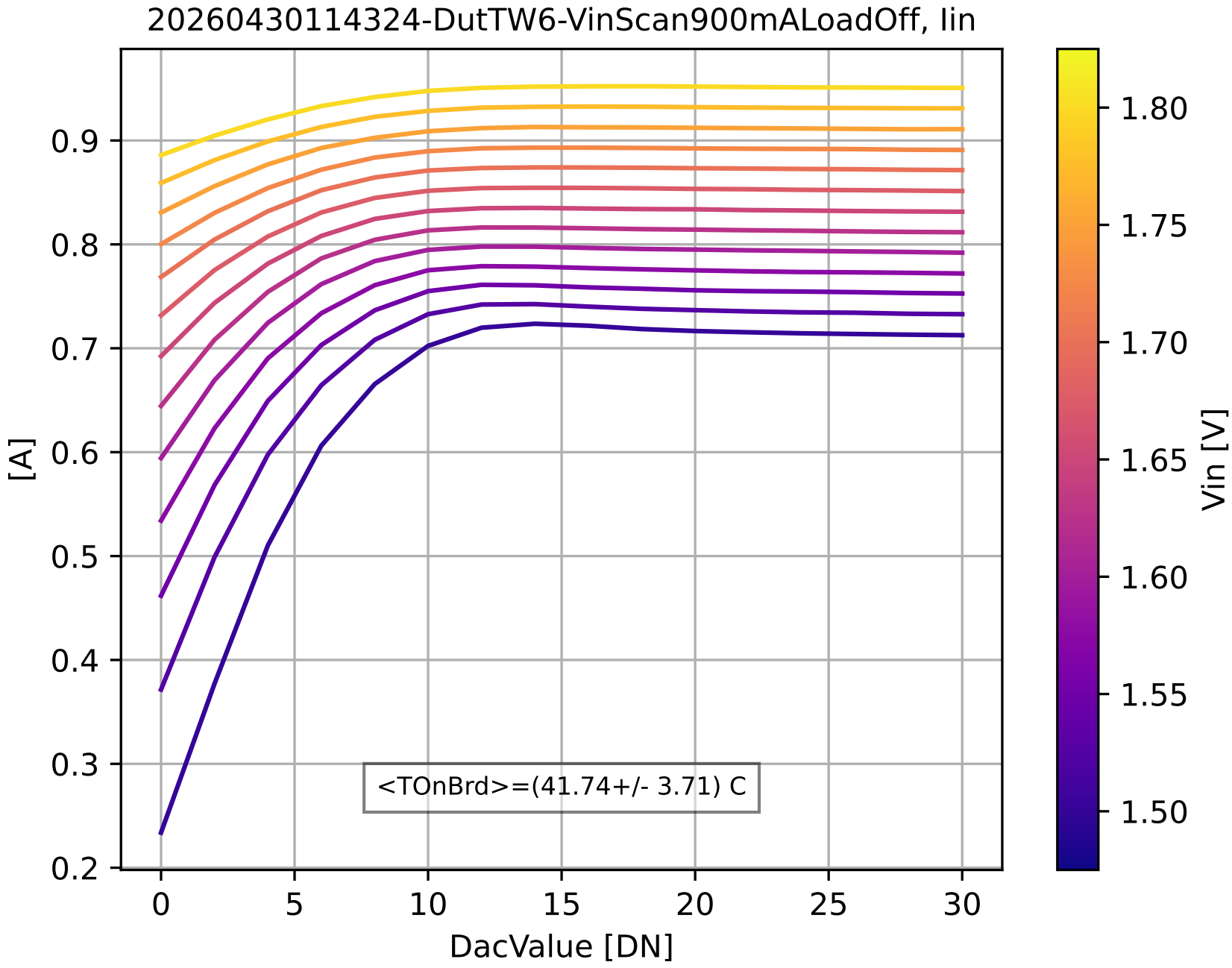

20260430114324-DutTW6-VinScan900mALoadOff, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.74+/- 3.71) C


20260430114324-DutTW6-VinScan900mALoadOff, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.74+/- 3.71) C


20260430114324-DutTW6-VinScan900mALoadOff, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.74+/- 3.71) C

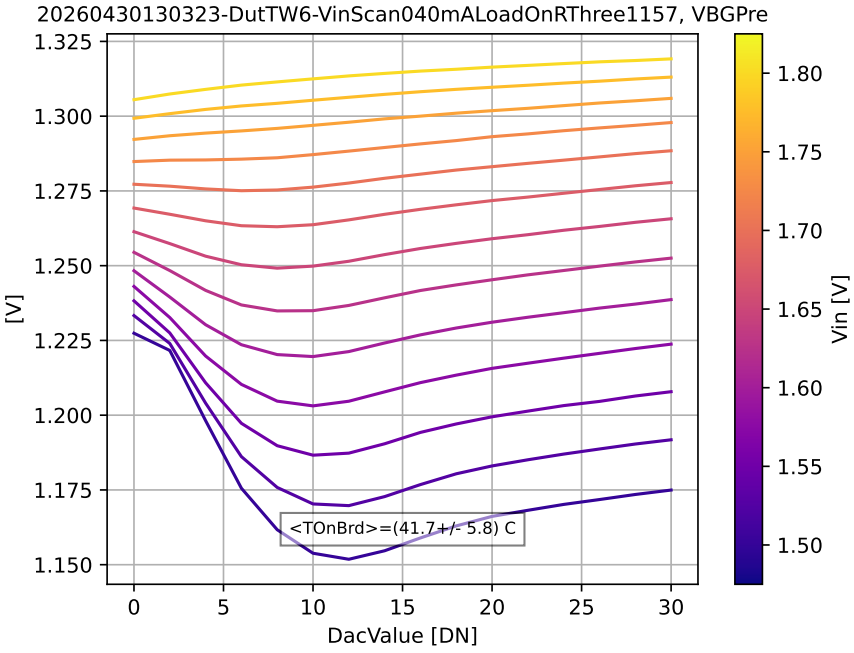

20260430114324-DutTW6-VinScan900mALoadOff, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.74+/- 3.71) C

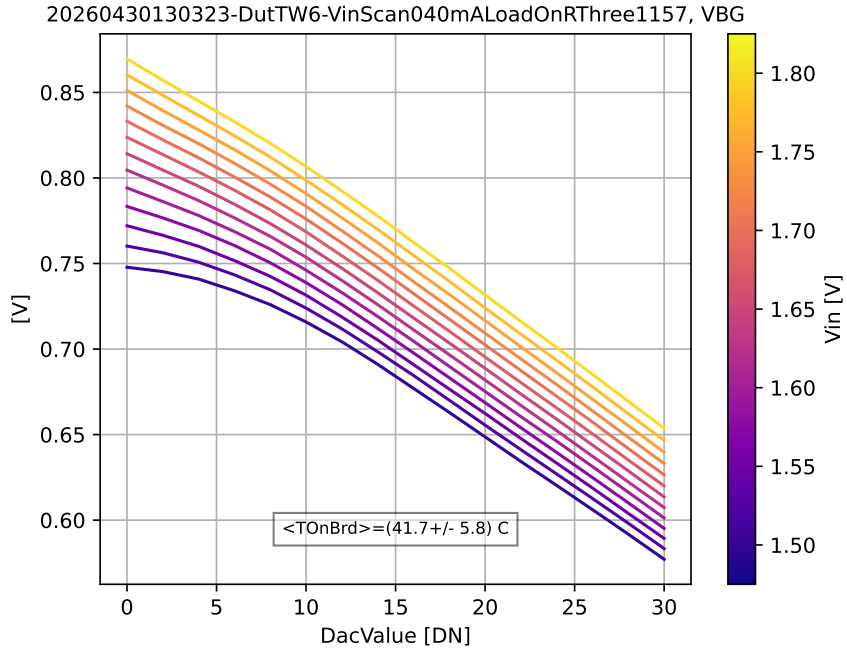

20260430114324-DutTW6-VinScan900mALoadOff, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.74+/- 3.71) C

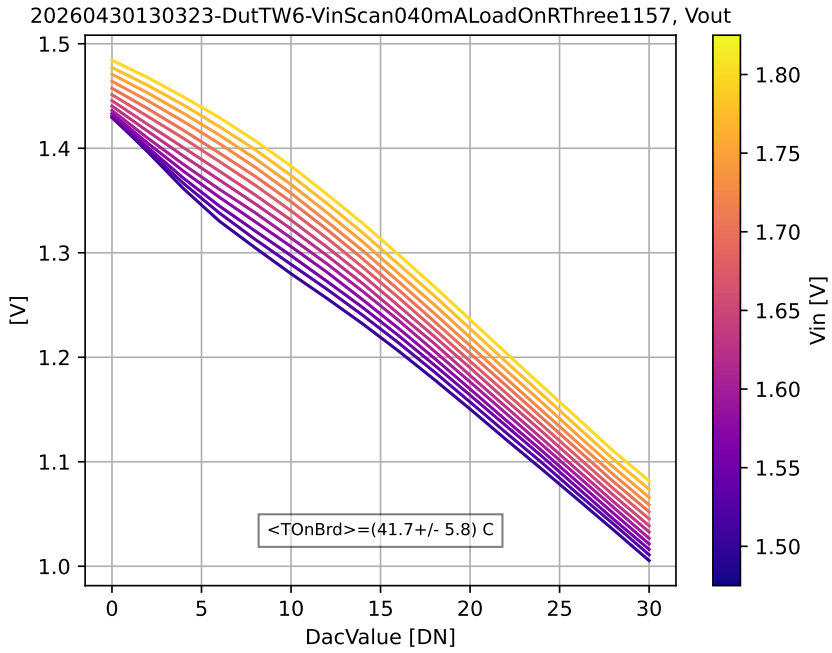

20260430114324-DutTW6-VinScan900mALoadOff, Iin
[A]
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(41.74+/- 3.71) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

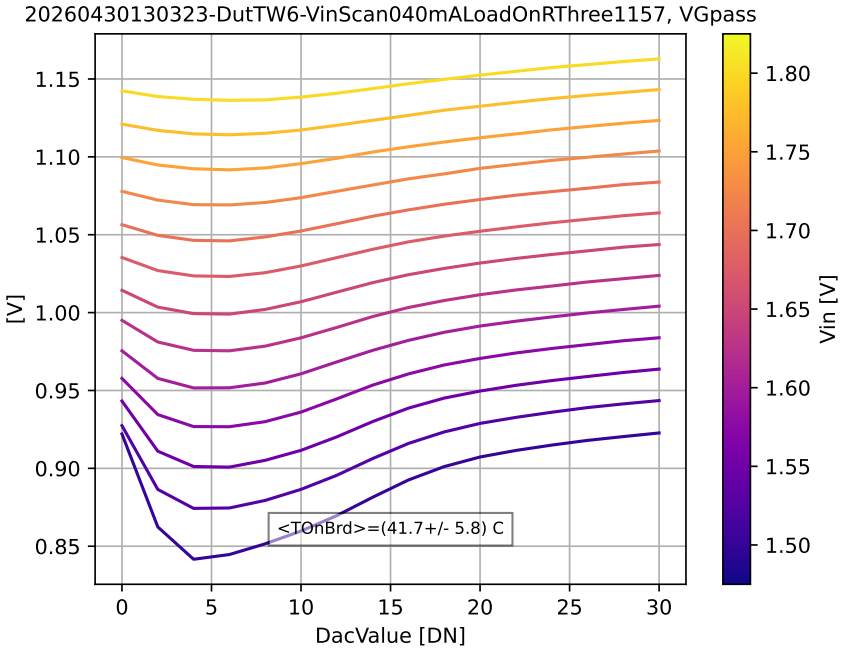
R3 at 1157 ohm
(tuned for a nominal Iin of 1.1A)

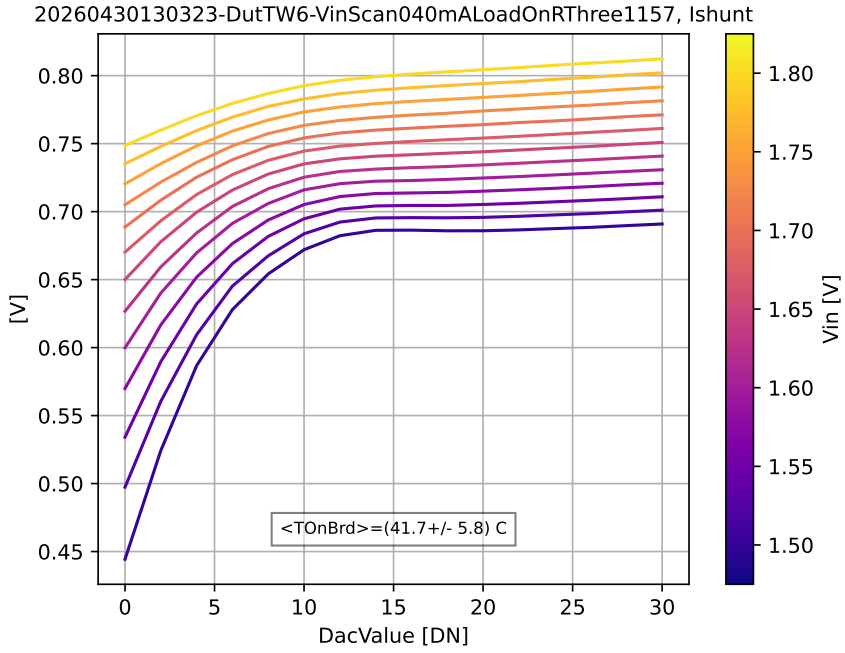
Load: 40mA range,
w load ON
(R3 at 1157 ohm)

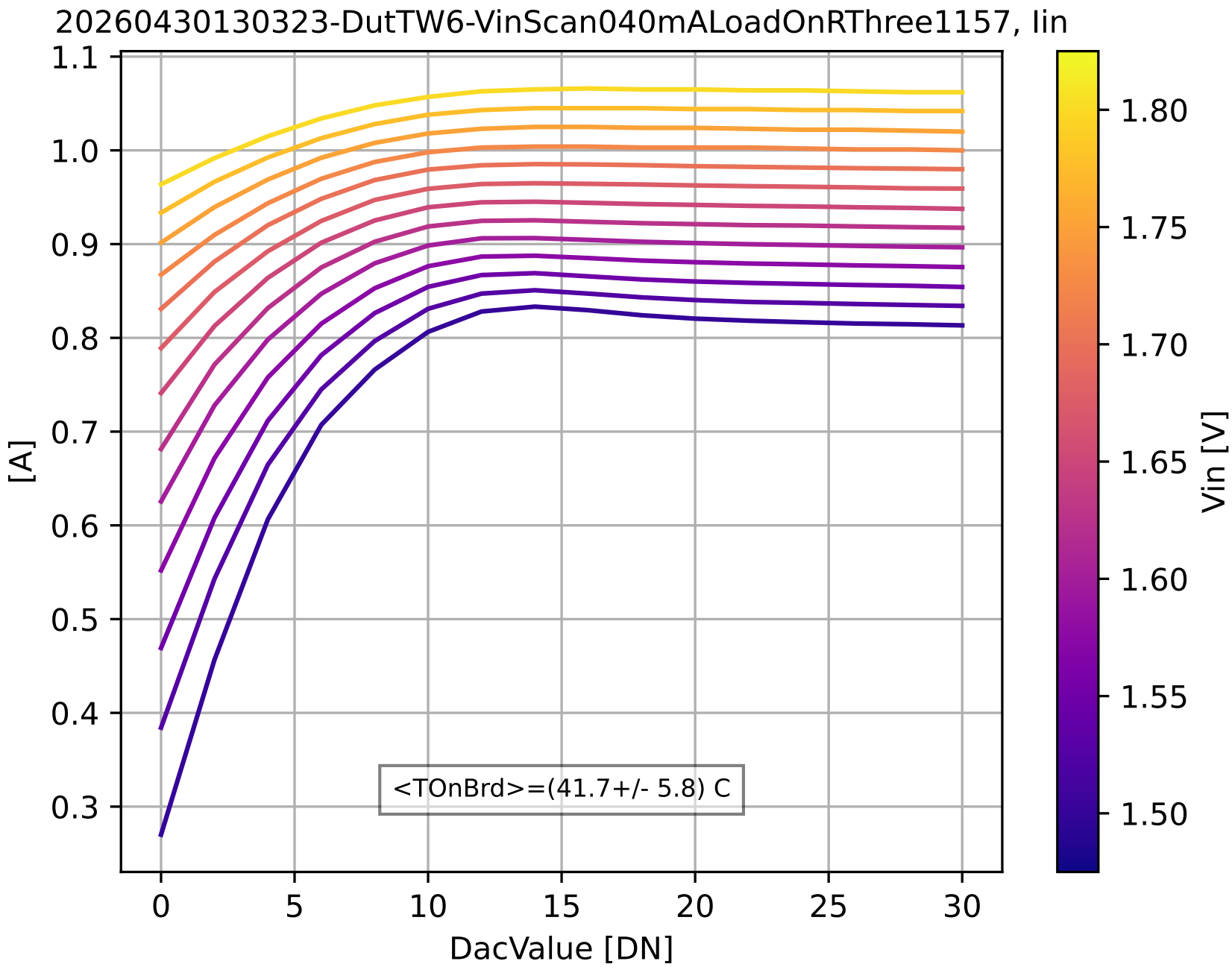

20260430130323-DutTW6-VinScan040mALoadOnRThree1157, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.7+/- 5.8) C


20260430130323-DutTW6-VinScan040mALoadOnRThree1157, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.7+/- 5.8) C

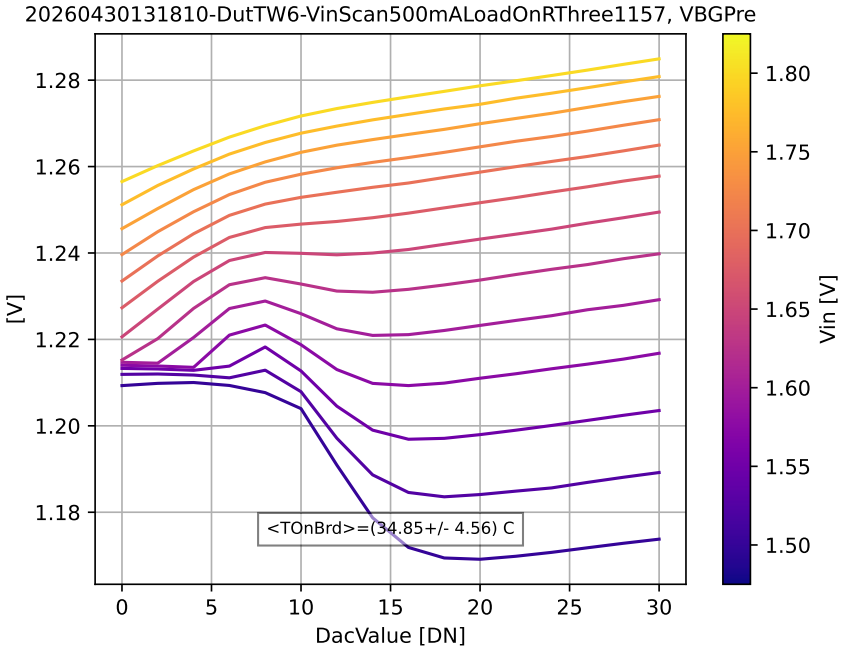

20260430130323-DutTW6-VinScan040mALoadOnRThree1157, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.7+/- 5.8) C

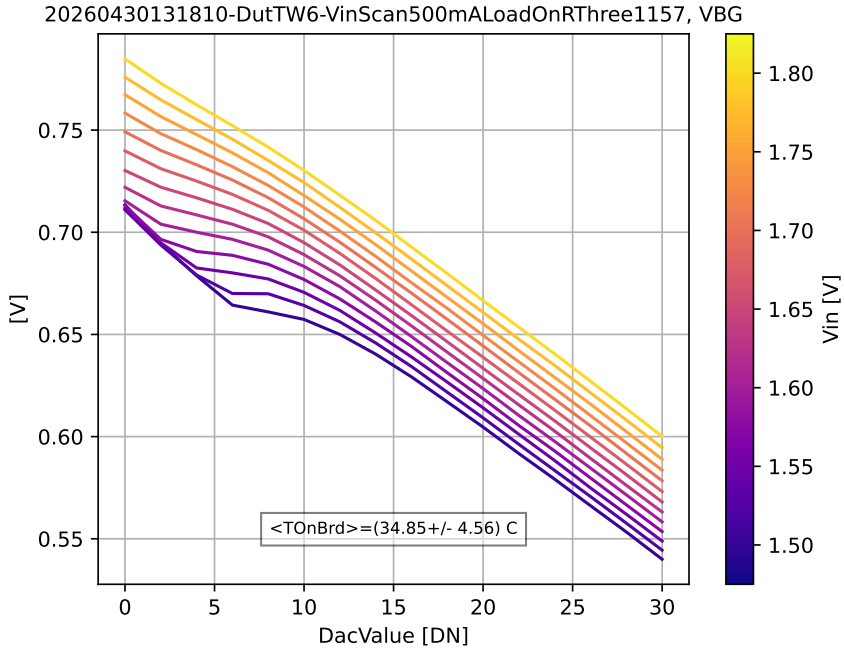

20260430130323-DutTW6-VinScan040mALoadOnRThree1157, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.7+/- 5.8) C

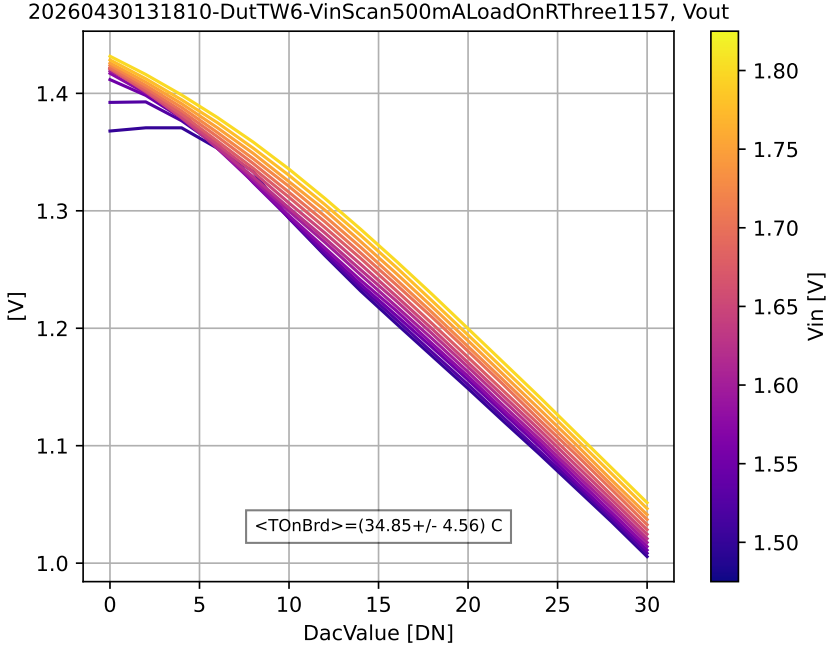

20260430130323-DutTW6-VinScan040mALoadOnRThree1157, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(41.7+/- 5.8) C

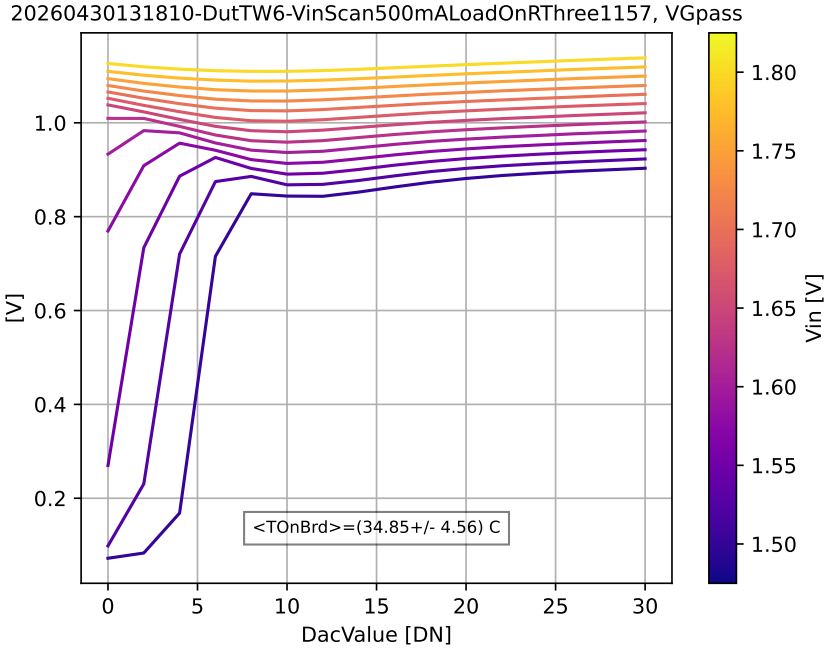

20260430130323-DutTW6-VinScan040mALoadOnRThree1157, lin
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
[A]
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(41.7+/- 5.8) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

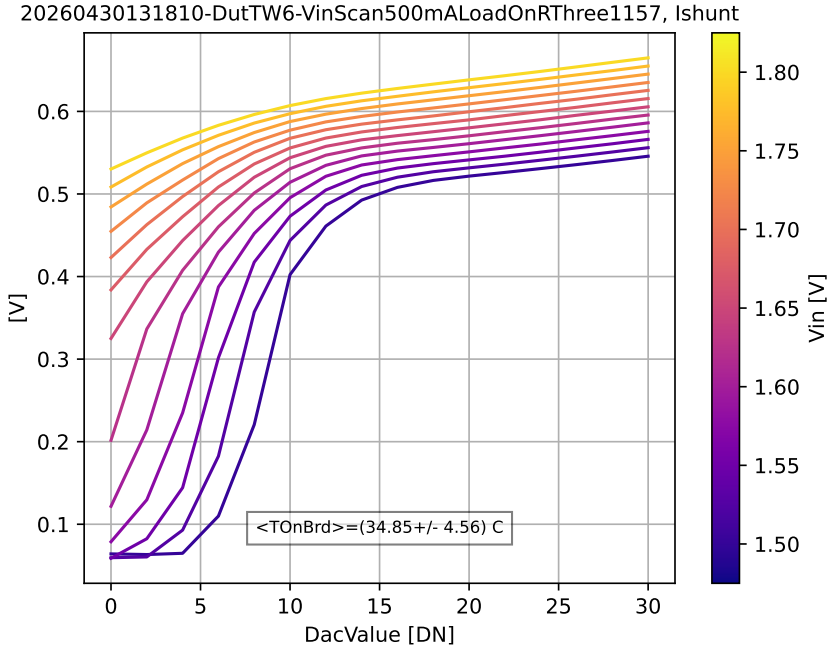
Load: 500mA range,
w load ON
(R3 at 1157 ohm)

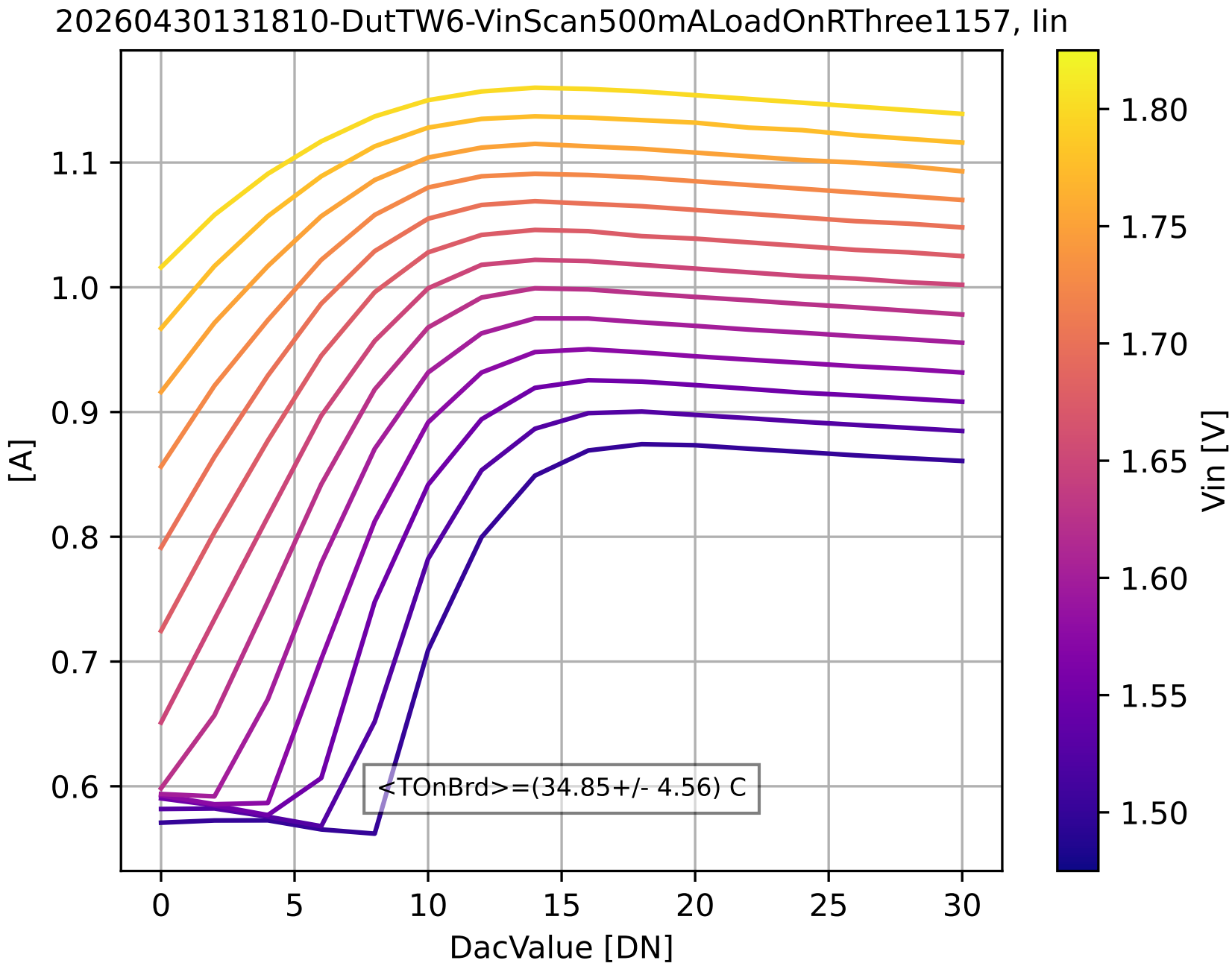

20260430131810-DutTW6-VinScan500mALoadOnRThree1157, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(34.85+/- 4.56) C


20260430131810-DutTW6-VinScan500mALoadOnRThree1157, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(34.85+/- 4.56) C

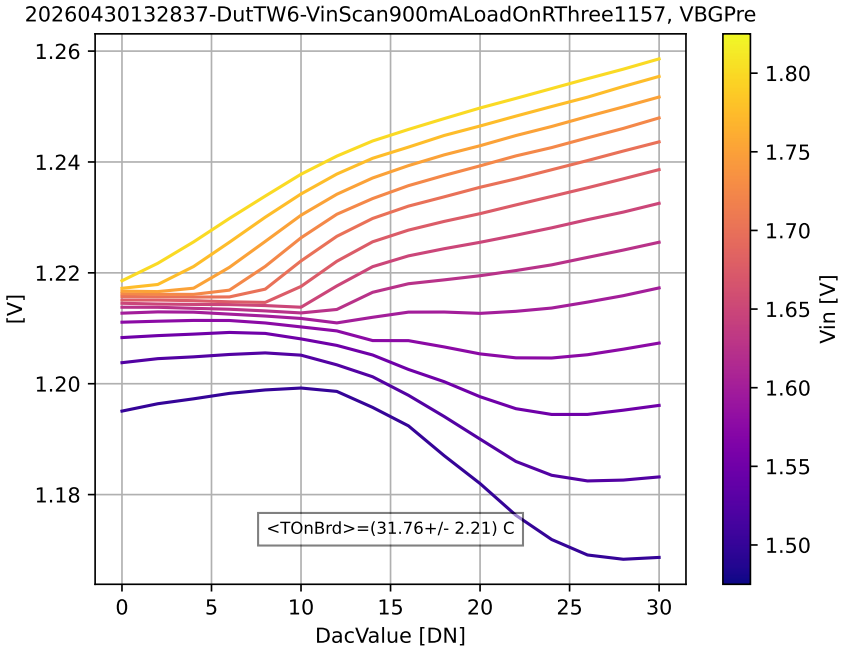

20260430131810-DutTW6-VinScan500mALoadOnRThree1157, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(34.85+/- 4.56) C

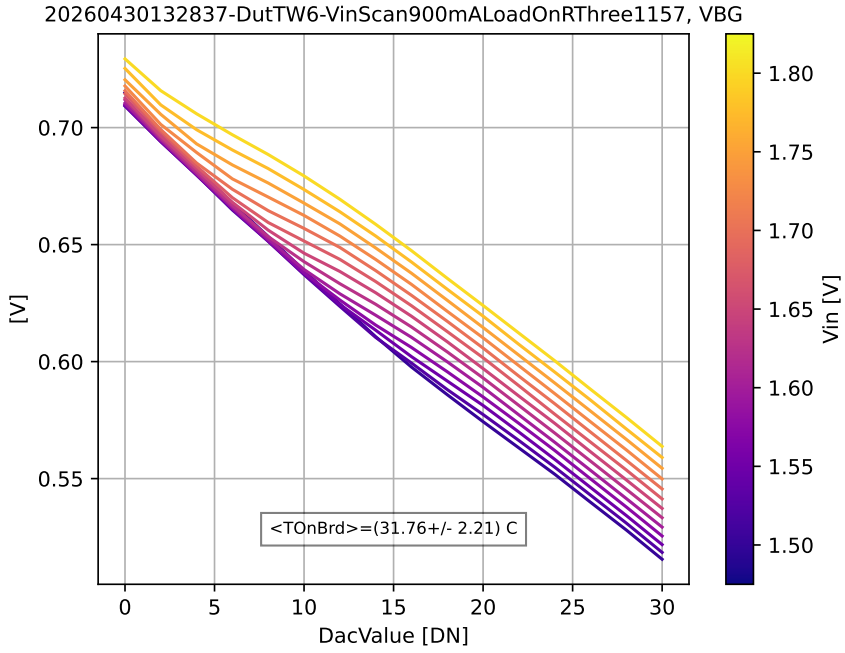

20260430131810-DutTW6-VinScan500mALoadOnRThree1157, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(34.85+/- 4.56) C

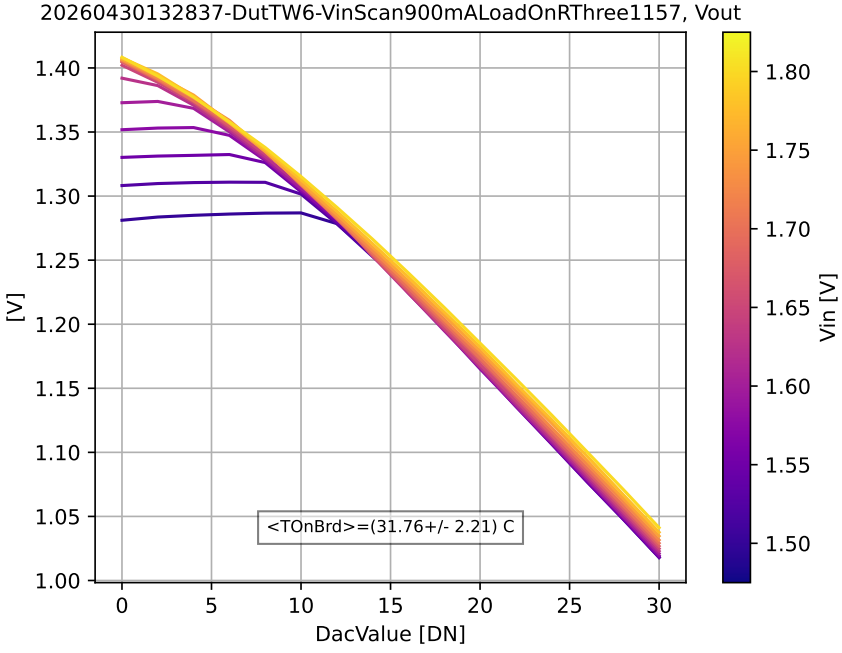

20260430131810-DutTW6-VinScan500mALoadOnRThree1157, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(34.85+/- 4.56) C

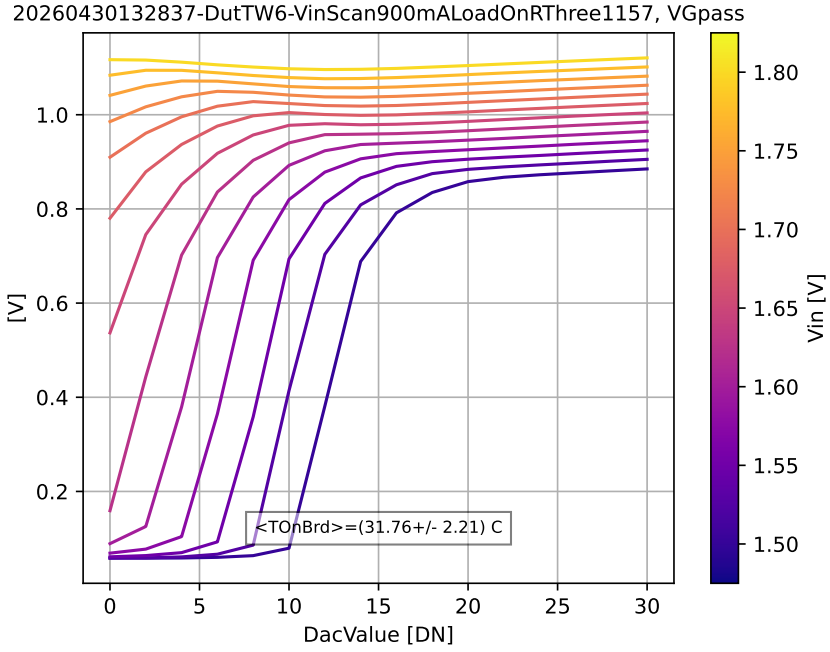

20260430131810-DutTW6-VinScan500mALoadOnRThree1157, lin
[A]
1.1
1.0
0.9
0.8
0.7
0.6
0
5
10
15
20
25
30
DacValue [DN]
<TOnBrd>=(34.85+/- 4.56) C
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

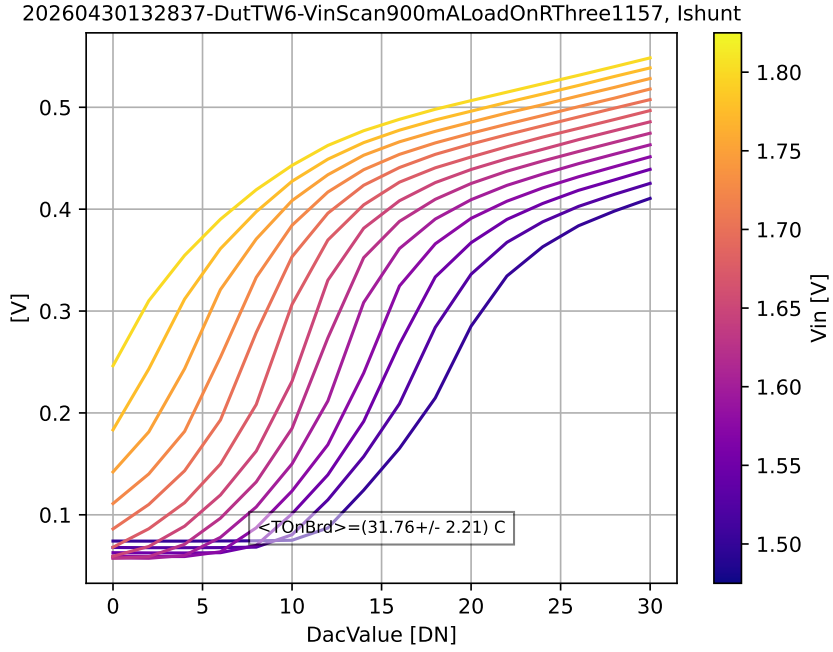
Load: 900mA range,
w load ON
(R3 at 1157 ohm)

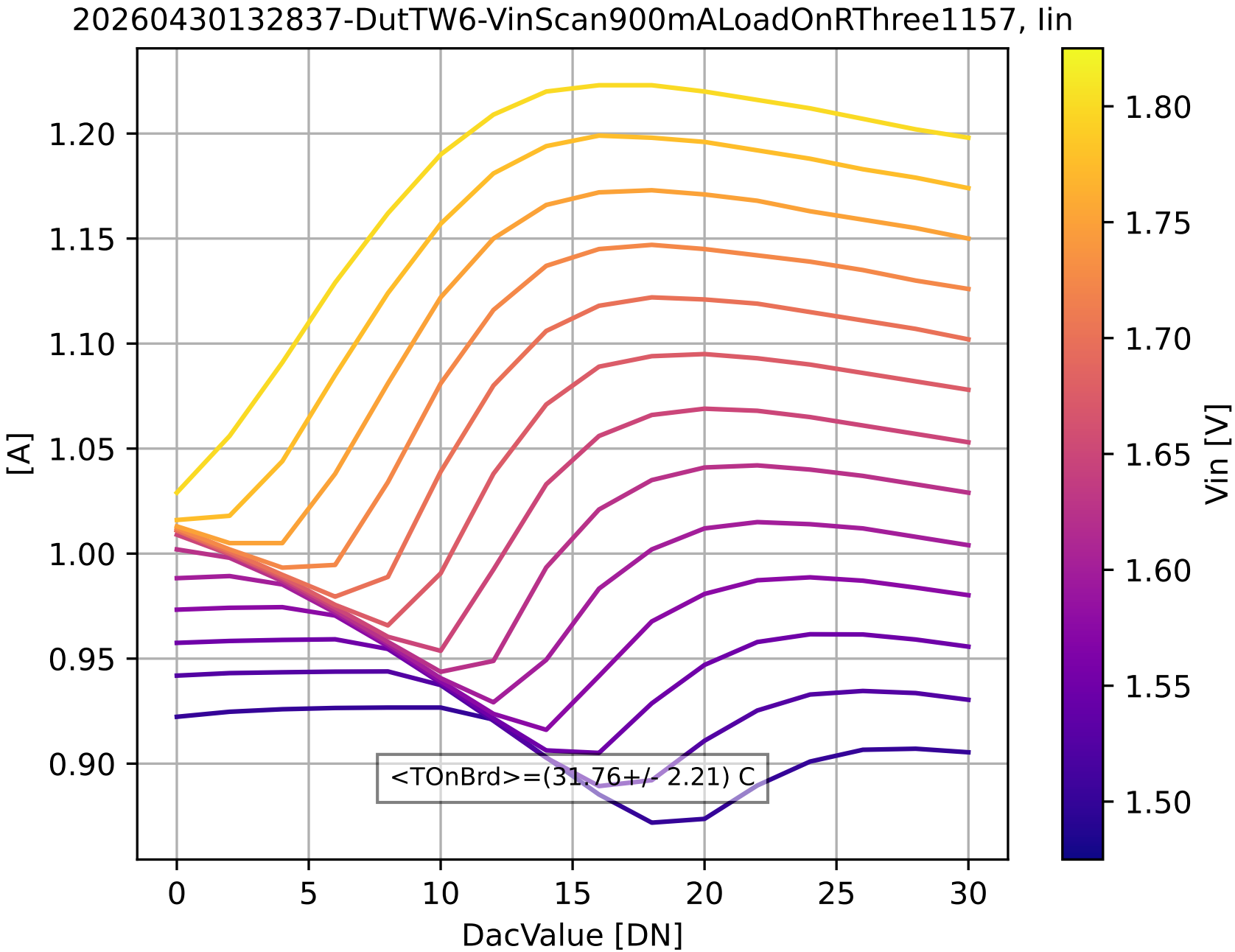

20260430132837-DutTW6-VinScan900mALoadOnRThree1157, VBGPre
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(31.76+/- 2.21) C


20260430132837-DutTW6-VinScan900mALoadOnRThree1157, VBG
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(31.76+/- 2.21) C


20260430132837-DutTW6-VinScan900mALoadOnRThree1157, Vout
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(31.76+/- 2.21) C

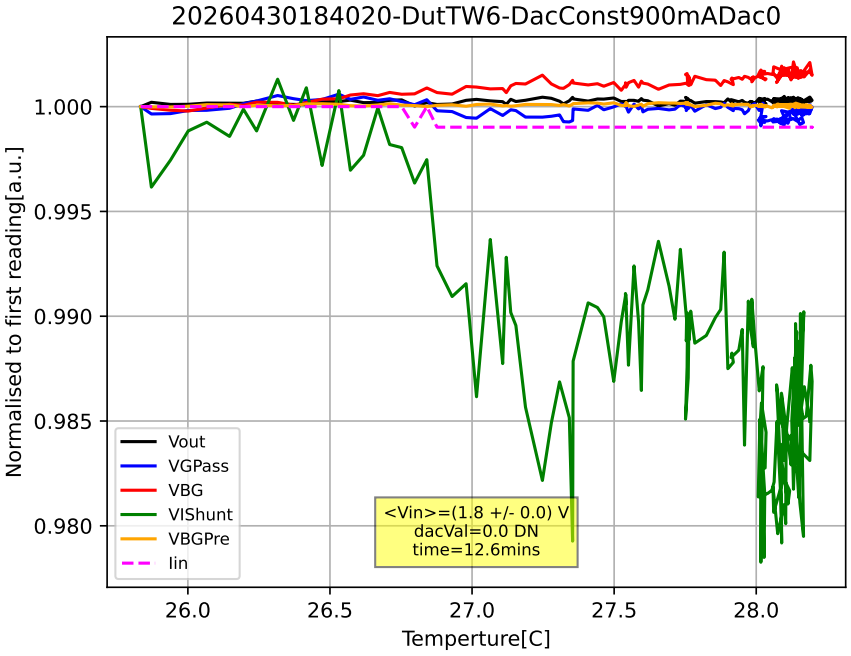

20260430132837-DutTW6-VinScan900mALoadOnRThree1157, VGpass
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(31.76+/- 2.21) C

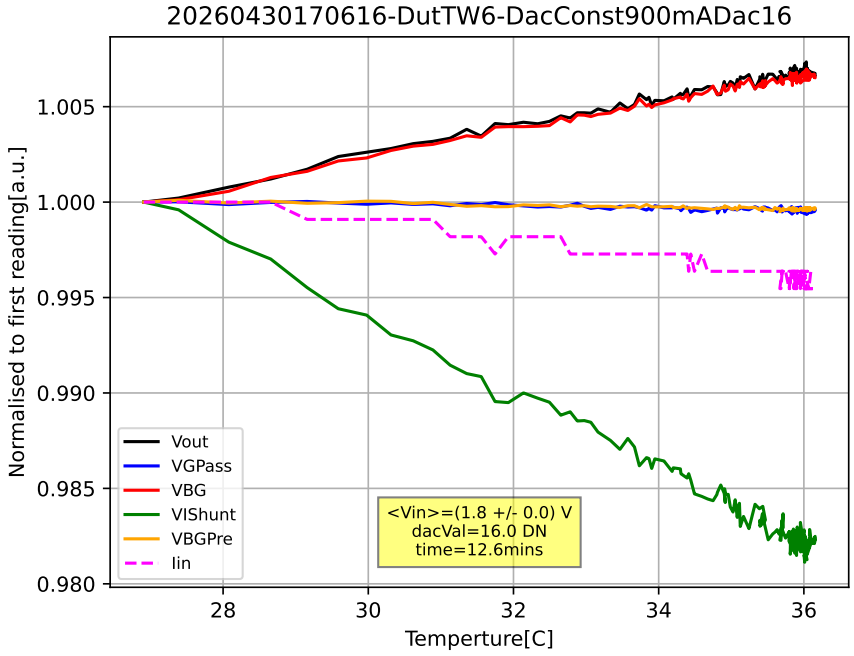

20260430132837-DutTW6-VinScan900mALoadOnRThree1157, Ishunt
[V]
DacValue [DN]
Vin [V]
<TOnBrd>=(31.76+/- 2.21) C

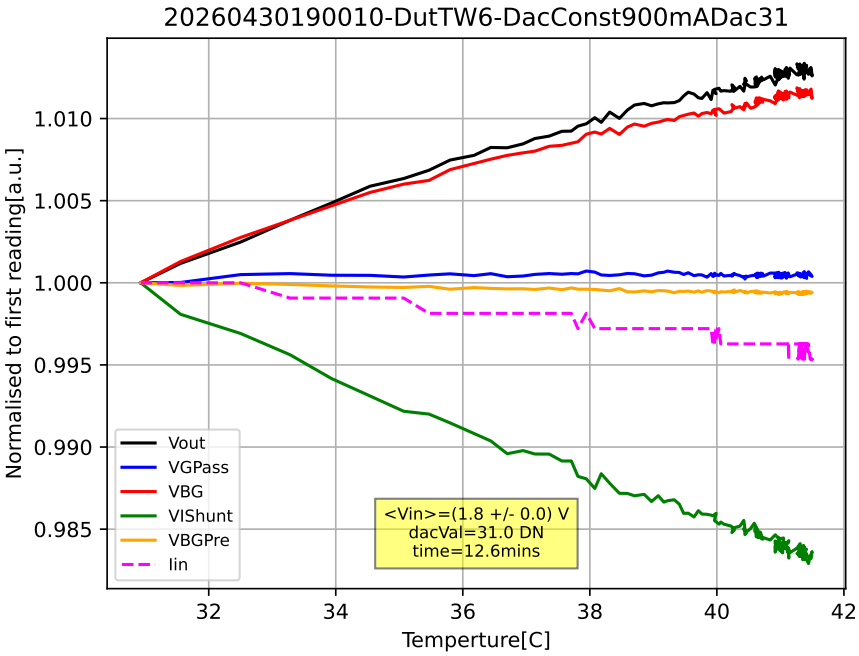

20260430132837-DutTW6-VinScan900mALoadOnRThree1157, lin
1.20
1.15
1.10
1.05
1.00
0.95
0.90
[A]
<TOnBrd>=(31.76+/- 2.21) C
0
5
10
15
20
25
30
DacValue [DN]
1.80
1.75
1.70
1.65
1.60
1.55
1.50
Vin [V]

Temp dependency w Load: 900mA range, w load ON

(R3 at 1180 ohm, i.e. tuned for this range)







- Vout depends on chip temperature.
- Chip temperature depends on amount of shunted current.