Texas Instruments

China Power Reference Design

PMP4358 Test Procedure

REV A

3/12/2013

1 General

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4358 using TI DC/DC converter TPS54478
TPS54478 operating frequency is 500 KHz

1.2 SPECIFICATIONS

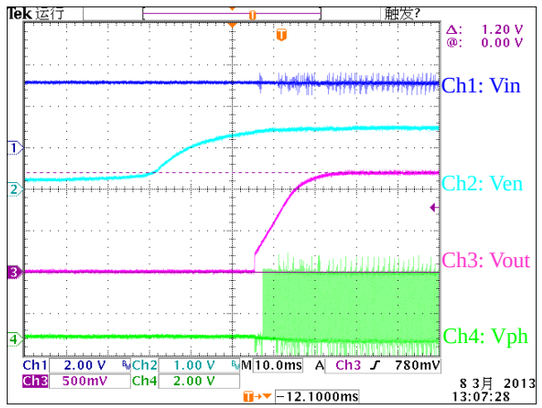
‘Vin: 3V-5.7V
Vo: 0.8V-3.7V, 3A, Vo is fixed to 1.2V in this EVM

1.3 TEST EQUIPMENTS

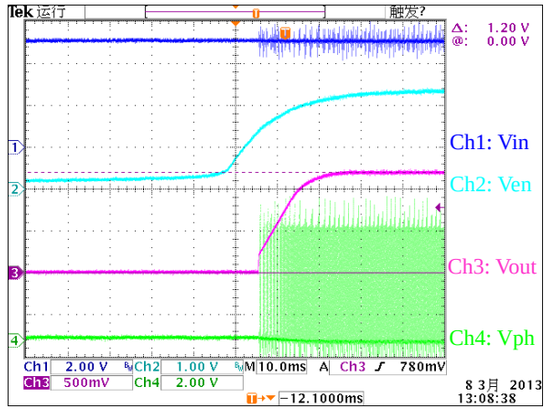
DC Source: GPS3030C
E-load: Chroma6314A frame and 63105A module
Oscillograph: TDS3034C
Multi-meter(current): Fluke 8845A
Multi-meter(voltage): Fluke 287C, Fluke 17B

2 OUTPUT CHARACTERISTICS

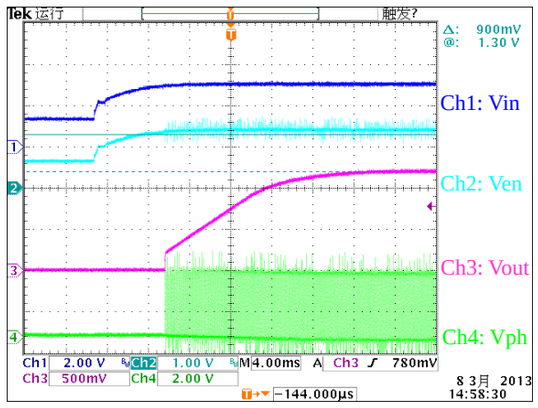
2.1 Start up waveform



Test condition: Vin=3V, Io=3A resistor , External EN signal

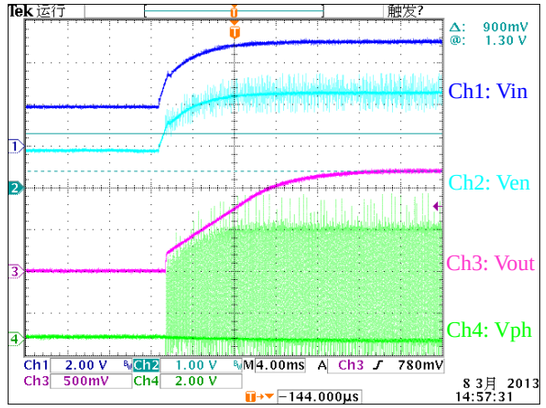


Test condition: Vin=5V, Io=3A resistor, External EN signal



Test condition: Vin=3V, Io=3A resistor load, with EN signal

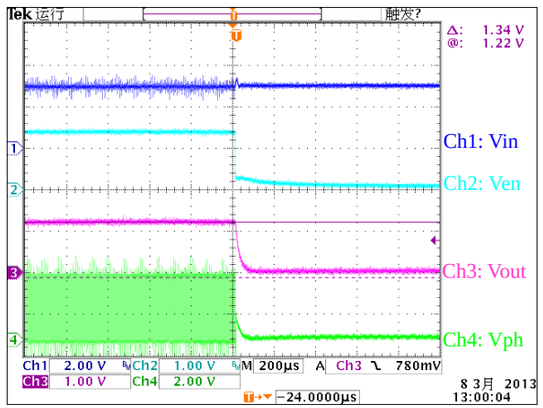
Using broken line box value for EN control on schematic



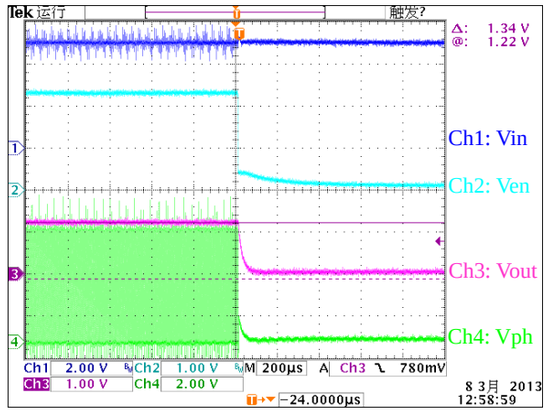
Test condition: Vin=5V, Io=3A resistor load, with EN signal

Using broken line box value for EN control on schematic

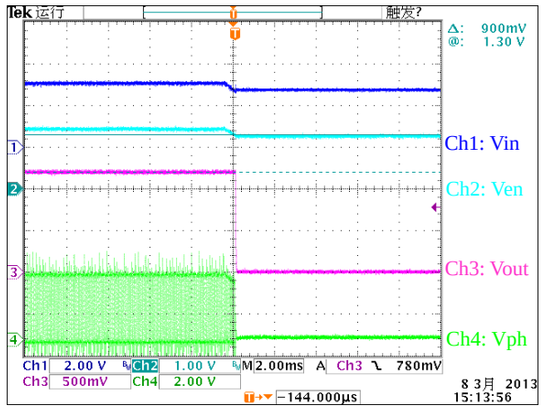
2.2 shutdown waveform



Test condition: Vin=3V, Io=3A resistor load, with external EN signal

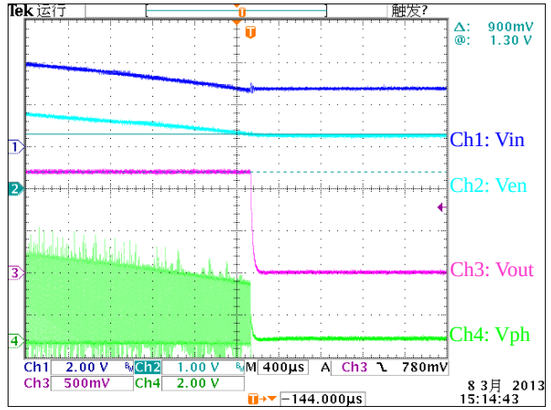


Test condition: Vin=5V, Io=3A resistor load, with external EN signal



Test condition: Vin=3V, Io=3A resistor load, with EN signal

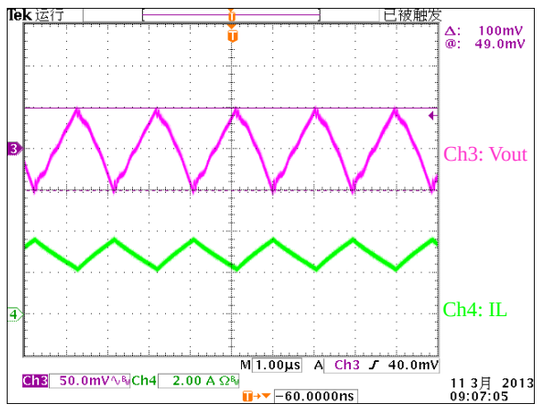
Using broken line box value for EN control on schematic



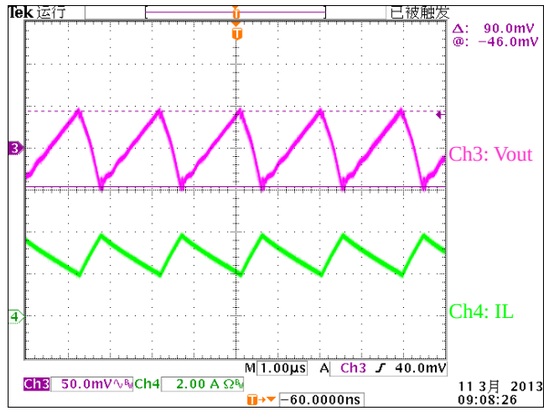
Test condition: Vin=5V, with EN signal

Using broken line box value for EN control on schematic

2.3 Input Ripple

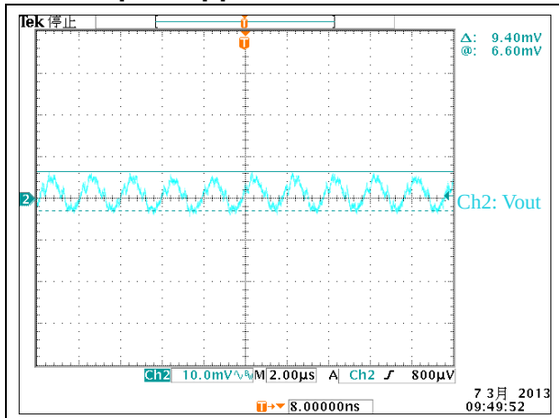


Test condition: Vin=3V, Io=3A

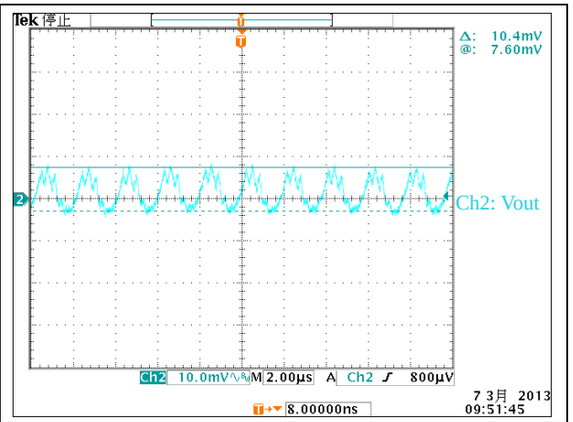


Test condition: Vin=5V, Io=3A

2.4 Output Ripple

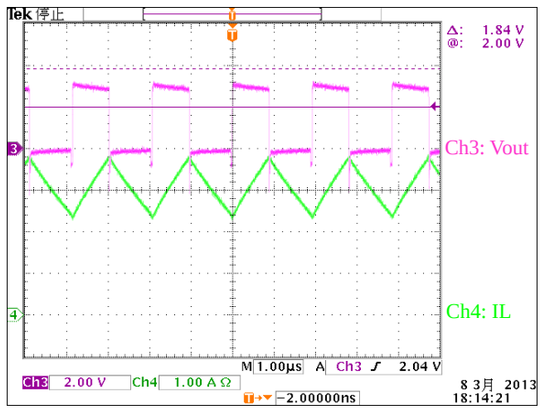


Test condition: Vin=3V, Io=3A

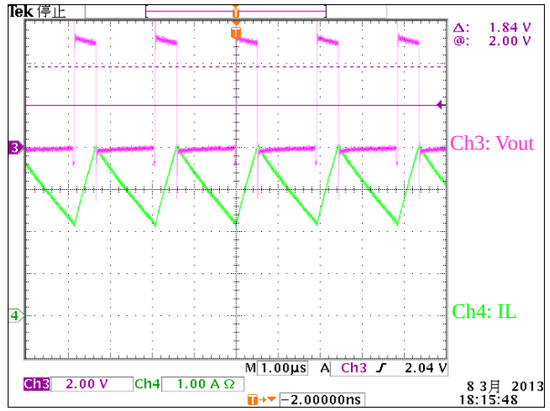


Test condition: Vin=5V, Io=3A

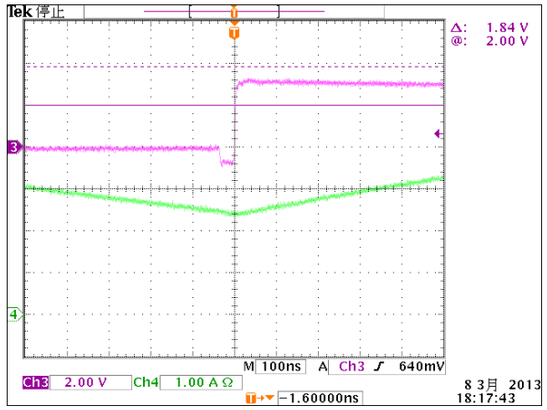
2.5 Vph and IL waveform



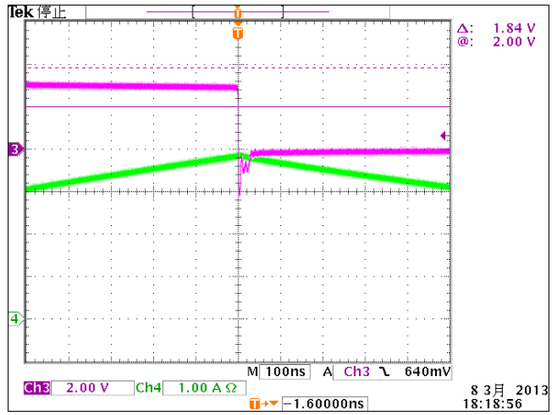
Test condition: Vin=3V, Io=3A



Test condition: Vin=5V, Io=3A

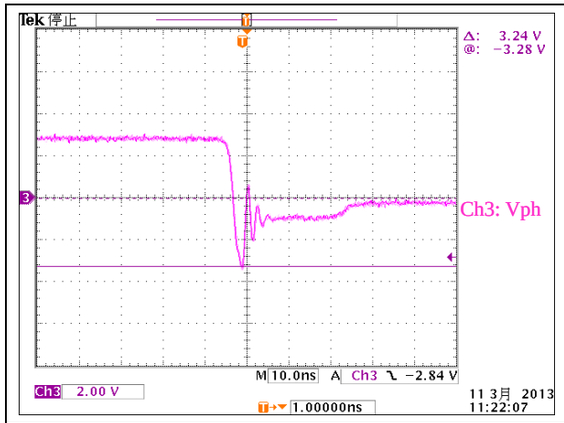
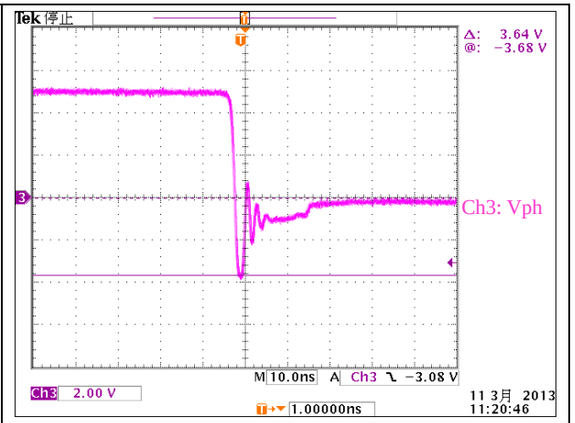


Test condition: Vin=3V, Io=3A, extending waveform

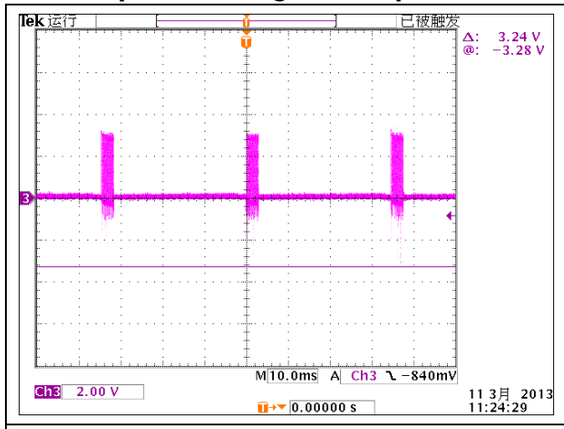
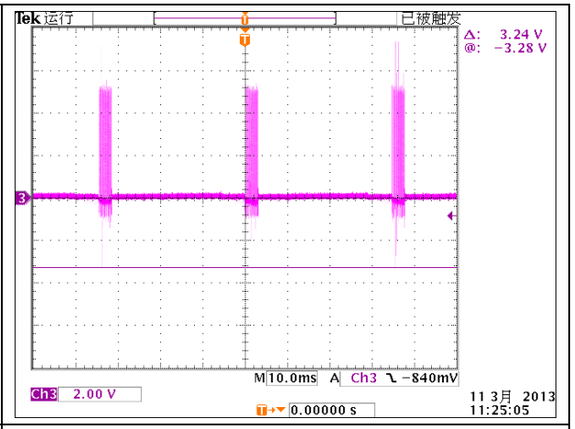


Test condition: Vin=3V, Io=3A, extending waveform

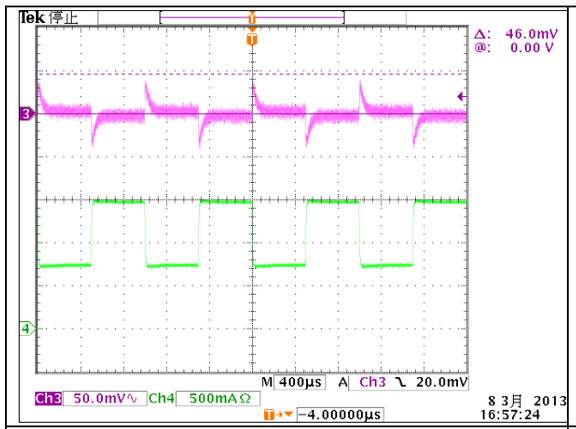
2.6 Voltage stress during output shorting-circuit

	
Test condition: Vin=3V, Io=3A, extending waveform	Test condition: Vin=5V, Io=3A, extending waveform

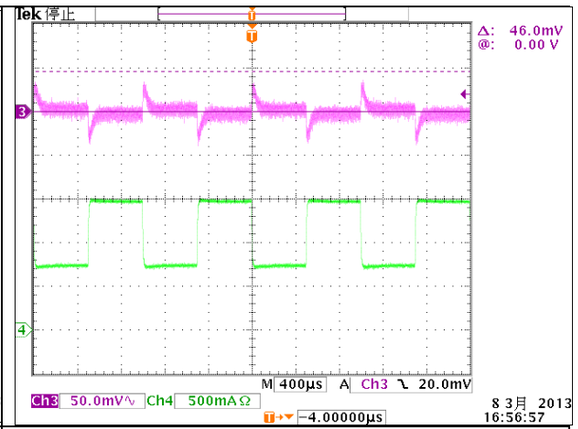
2.6 Output shorting-circuit protection

	
Test condition: Vin=3V	Test condition: Vin=5V

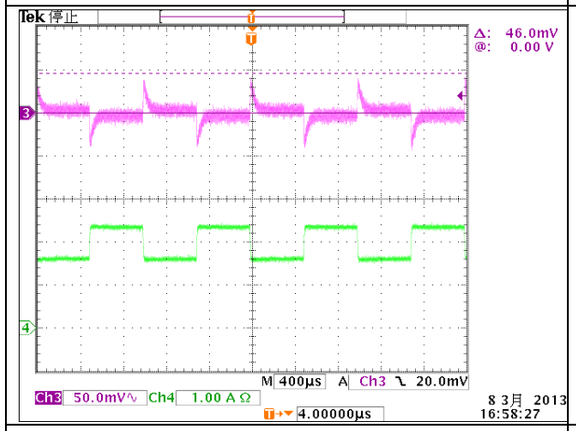
3 Dynamic Test



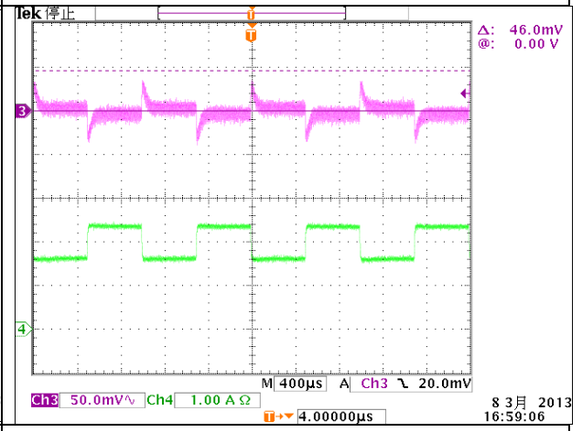
Test condition: Vin=3V, Io from 0.75A to 1.5A



Test condition: Vin=5V, Io from 0.75A to 1.5A



Test condition: Vin=3V, Io from 1.5A to 2.25A



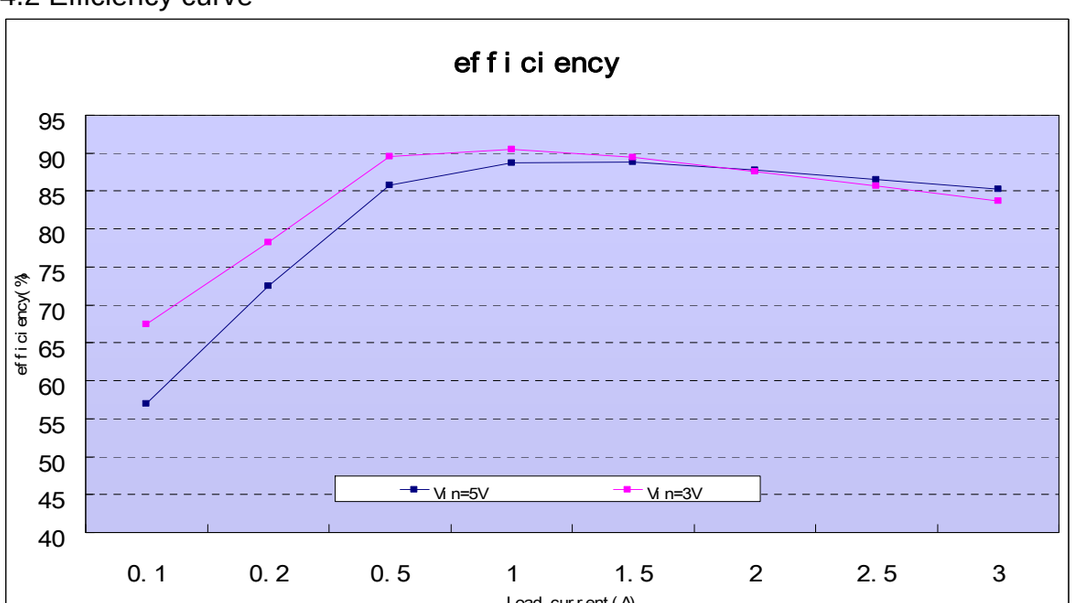
Test condition: Vin=5V, Io from 1.5A to 2.25A

4 EFFICIENCY CHARACTERISTICS

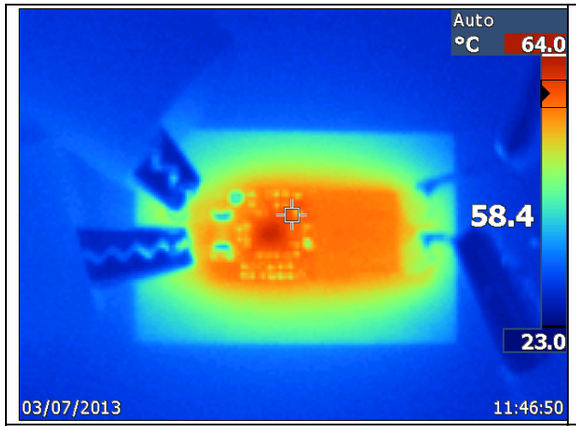
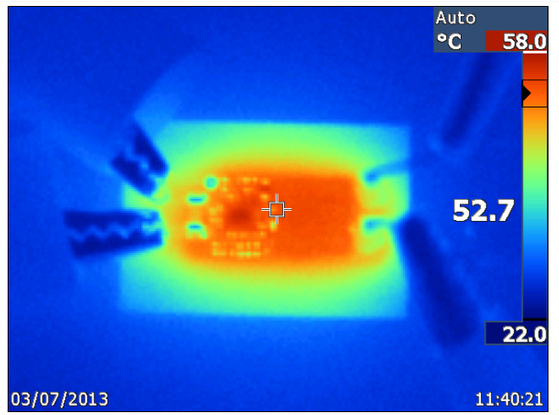
4.1 Efficiency data

Vin(V)	5	5	5.01	5.01	5	5	5	5
Iin(A)	0.827	0.68	0.537	0.4	0.268	0.139	0.066	0.042
Vo(V)	1.175	1.177	1.181	1.186	1.188	1.192	1.196	1.197
Io(A)	3.001	2.5	2	1.5	1	0.5	0.2	0.1
efficiency	0.853	0.865	0.878	0.888	0.887	0.858	0.725	0.57
Vin(V)	3	3	3	3	3	3	3.01	3.01
Iin(A)	1.409	1.15	0.903	0.666	0.439	0.222	0.102	0.059
Vo(V)	1.18	1.182	1.186	1.191	1.192	1.194	1.195	1.197
Io(A)	3	2.5	2	1.5	1	0.5	0.201	0.1
efficiency	0.837	0.857	0.876	0.894	0.905	0.896	0.782	0.674

4.2 Efficiency curve



5 THERMAL CHARACTERISTICS

	
Test condition: Vin=3V, Io=3A, Ta=25ºC	Test condition: Vin=5V, Io=3A, Ta=25ºC

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