



Texas Instruments

China Power Reference Design

PMP4357 Test Procedure

REV A

2/16/2013

1 General

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4357 using TI DC/DC converter LM5006
LM5006 operating frequency is 300 KHz

1.2 SPECIFICATIONS

Vin: 20V-75V

Vo1: 15V, 0.3A

Vo2: 14.5V, 0.3A

1.3 TEST EQUIPMENTS

DC Source: GPS3030C

E-load: Chroma6314A frame and 63103A, 63110A module

Oscilloscope: TDS3034C

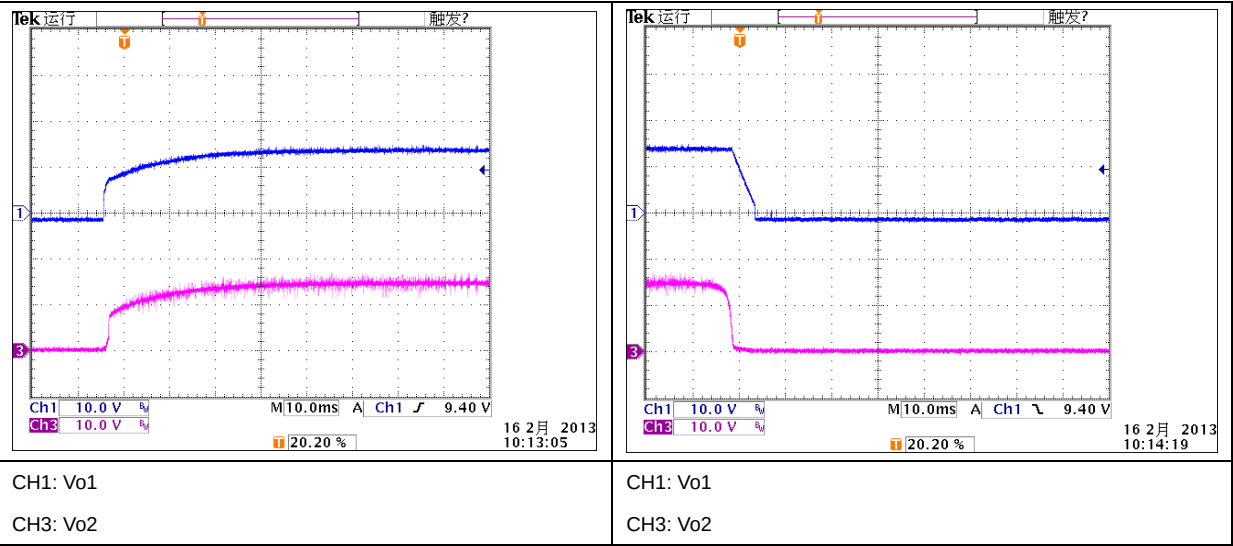
Multi-meter(current): Fluke 8845A

Multi-meter(voltage): Fluke 287C, Fluke 17B

2 OUTPUT CHARACTERISTICS

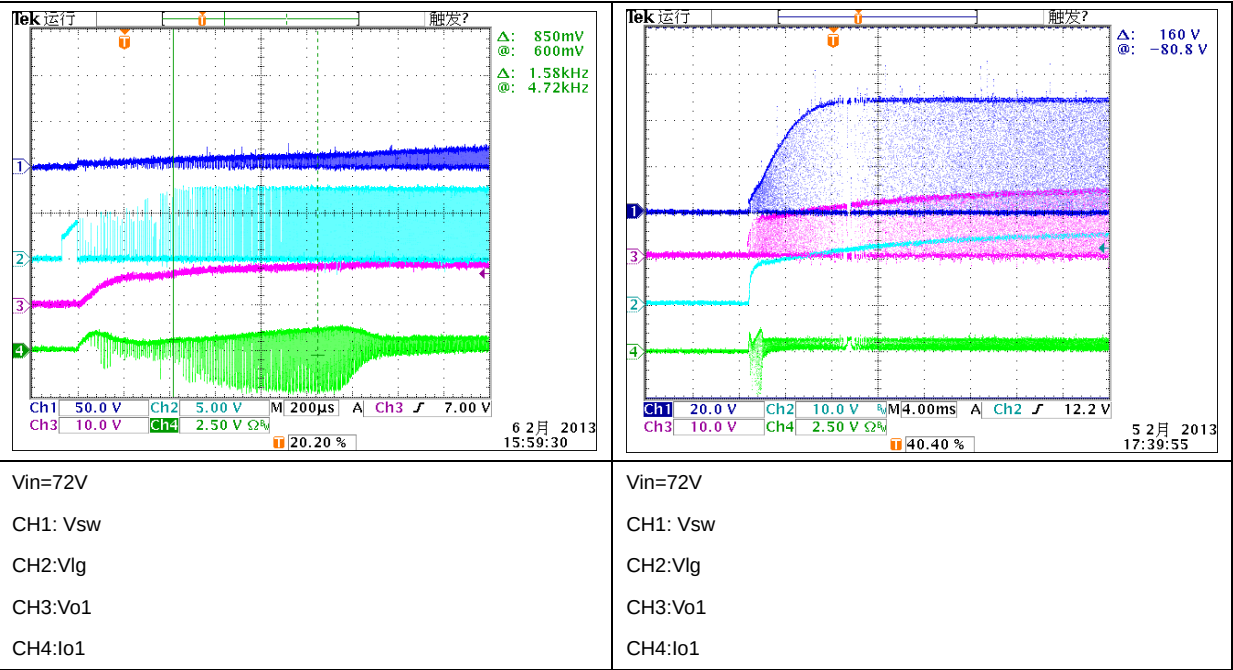
2.1 Start up and shut down waveform

Test condition: Vin=48V, Io1=0.3A, Io2=0.3A



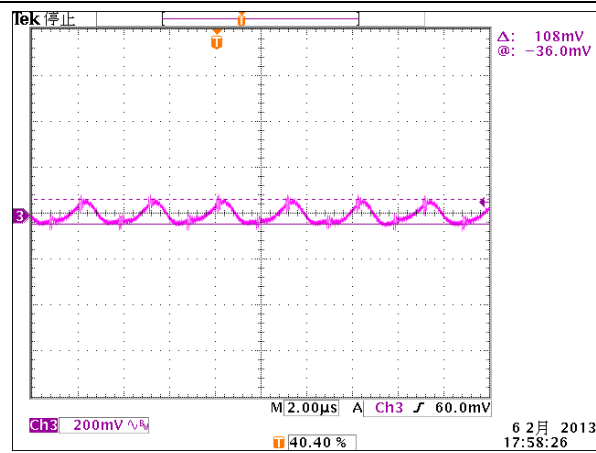
2.2 startup waveform

Test condition: Vin=72V and 48V, Io1=0.3A, Io2=0.3A

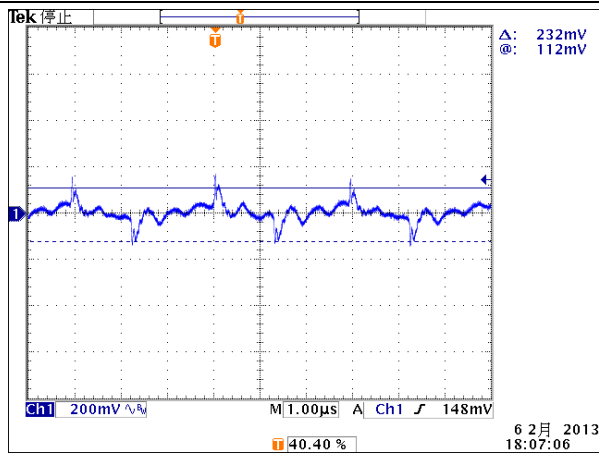


2.3 Output Ripple

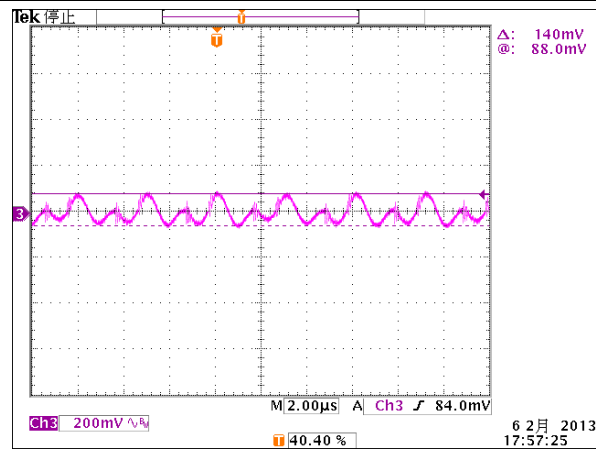
Test condition: Vin=36V, 48V and 72V. Io1=0.3A, Io2=0.3A



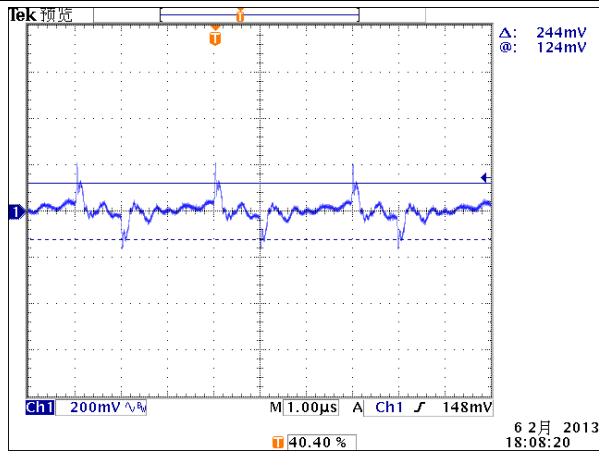
Vin=36V, Vo1 ripple



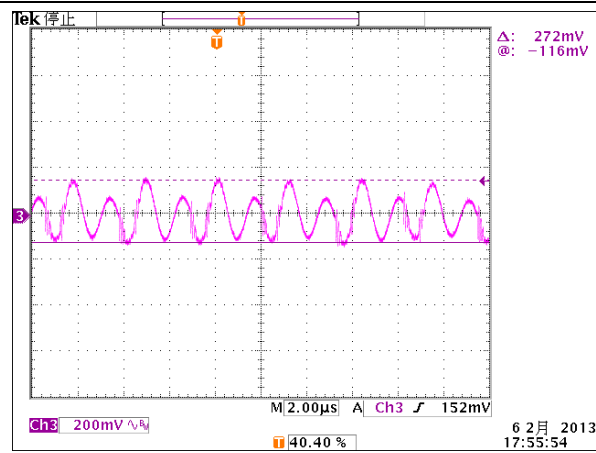
Vin=36V, Vo2 ripple



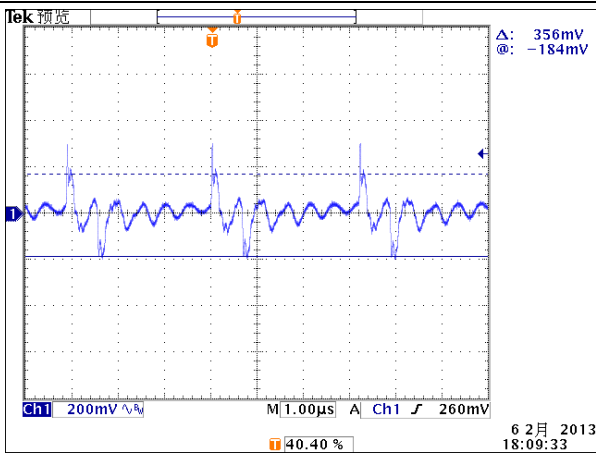
Vin=48V, Vo1 ripple



Vin=48V, Vo2 ripple



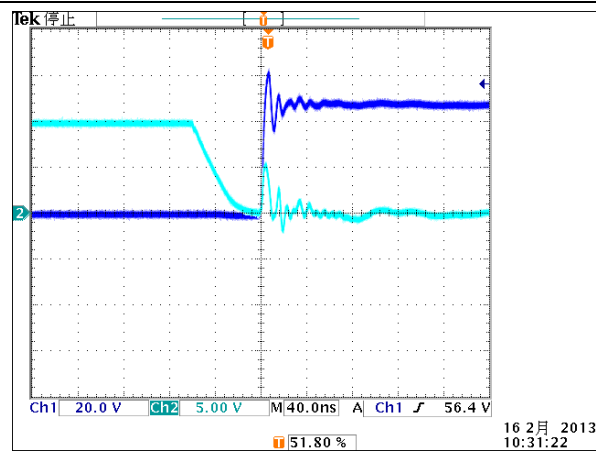
Vin=72V, Vo1 ripple



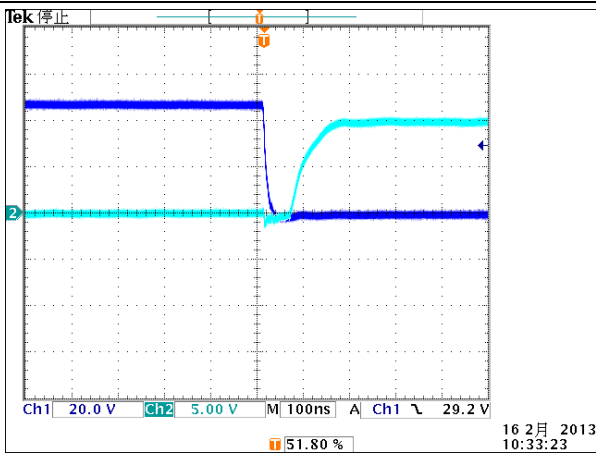
Vin=72V, Vo2 ripple

2.4 Vsw and Vlg cross point waveform

Test condition: Vin=48V, Io1=0.3A, Io2=0.3A



Vsw rise time



Vsw fall time

CH1: Vsw	CH1: Vsw
CH2: Vlg	CH2: Vlg

3 CROSS REGULATION

Vi n=72V					Vi n=36V				
Vo1(V)	15. 31	15. 36	15. 18	15. 37	Vo1(V)	15. 29	15. 35	15. 06	15. 07
I o1(A)	0. 3	0	0. 3	0	I o1(A)	0. 3	0	0. 3	0
Vo2(V)	14. 64	14. 42	15. 32	15. 79	Vo2(V)	14. 21	13. 96	15. 16	14. 95
I o2(A)	0. 3	0. 3	0	0	I o2(A)	0. 3	0. 3	0	0
Vi n=48V					Vi n=24V				
Vo1(V)	15. 29	15. 35	15. 12	15. 34	Vo1(V)	15. 25	15. 31	14. 95	14. 99
I o1(A)	0. 3	0	0. 3	0	I o1(A)	0. 3	0	0. 3	0
Vo2(V)	14. 49	14. 24	15. 34	15. 38	Vo2(V)	12. 82	12. 88	15. 12	14. 75
I o2(A)	0. 3	0. 3	0	0	I o2(A)	0. 3	0. 3	0	0

4 EFFICIENCY CHARACTERISTICS

4.1 Efficiency data

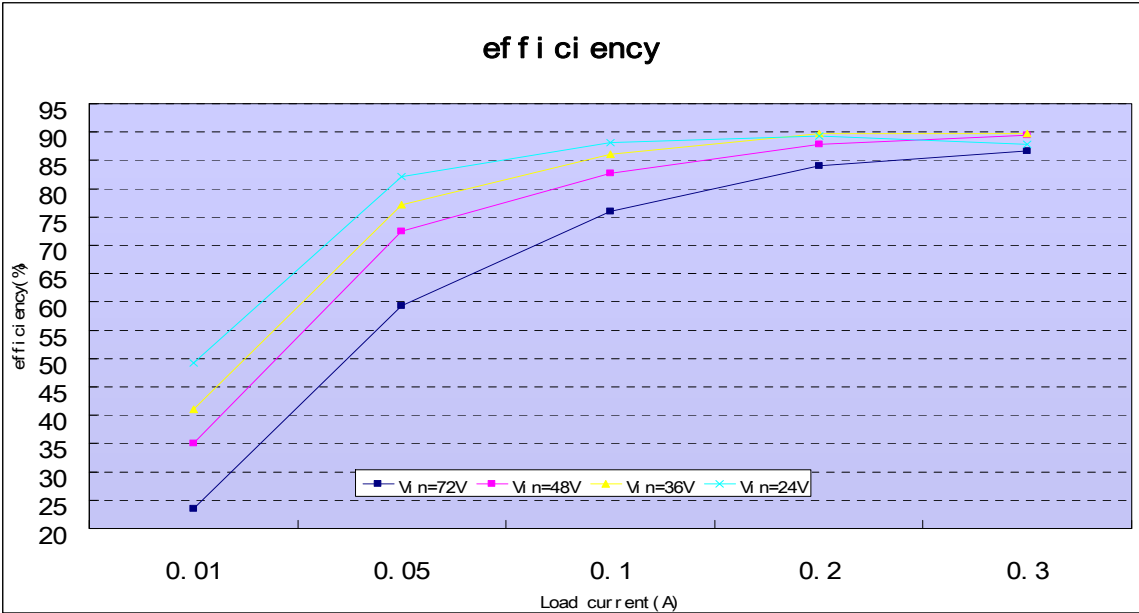
V _i n(V)	72	72. 16	72. 24	72. 28	72. 3
I _i n(A)	0. 144	0. 099	0. 055	0. 035	0. 018
V _{o1} (V)	15. 31	15. 27	15. 33	15. 36	15. 36
I _{o1} (A)	0. 3	0. 2	0. 1	0. 049	0. 01
V _{o2} (V)	14. 64	14. 73	14. 88	15. 02	15. 25
I _{o2} (A)	0. 3	0. 2	0. 1	0. 05	0. 01
ef f i ci ency	0. 867	0. 84	0. 76	0. 594	0. 235

V _i n(V)	48	48. 1	48. 19	48. 23	48. 25
I _i n(A)	0. 208	0. 141	0. 075	0. 043	0. 018
V _{o1} (V)	15. 29	15. 25	15. 2	15. 25	15. 36
I _{o1} (A)	0. 3	0. 2	0. 1	0. 05	0. 01
V _{o2} (V)	14. 49	14. 57	14. 68	14. 82	15. 11
I _{o2} (A)	0. 3	0. 2	0. 1	0. 05	0. 01
ef f i ci ency	0. 895	0. 879	0. 827	0. 725	0. 351

V _i n(V)	36	36. 1	36. 32	36. 42	36. 49
I _i n(A)	0. 274	0. 183	0. 095	0. 053	0. 02
V _{o1} (V)	15. 29	15. 22	15. 15	15. 12	15. 12
I _{o1} (A)	0. 3	0. 2	0. 1	0. 05	0. 01
V _{o2} (V)	14. 21	14. 4	14. 56	14. 63	14. 82
I _{o2} (A)	0. 3	0. 2	0. 1	0. 05	0. 01
ef f i ci ency	0. 897	0. 897	0. 861	0. 771	0. 41

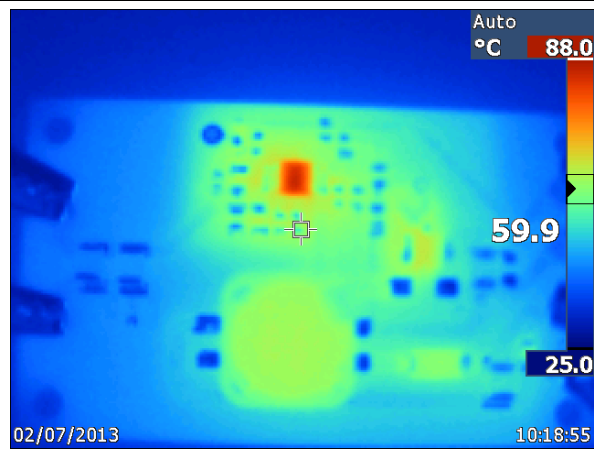
V _i n(V)	24	24. 42	24. 67	24. 8	24. 88
I _i n(A)	0. 399	0. 264	0. 134	0. 072	0. 024
V _{o1} (V)	15. 25	15. 19	15. 07	15. 02	14. 77
I _{o1} (A)	0. 3	0. 2	0. 1	0. 05	0. 01

4.2 Efficiency curve

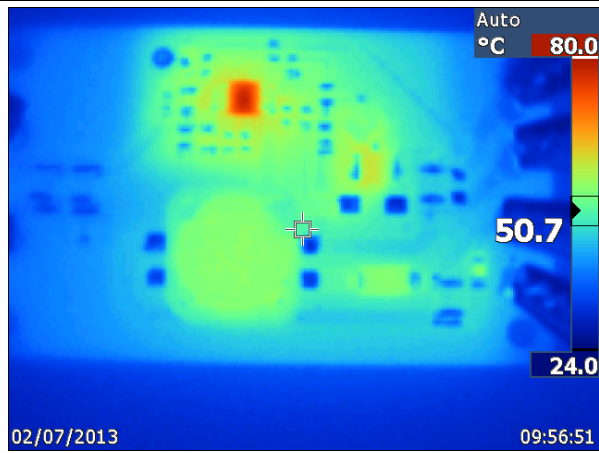


5 THERMAL CHARACTERISTICS

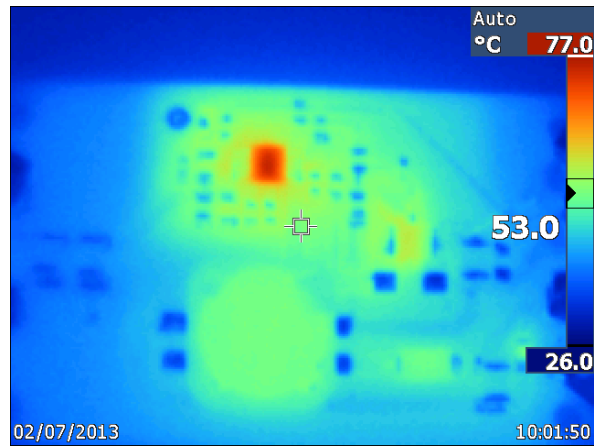
device temperature @ Vin=72V and Ta=25° C				
device case	U2	L1	Q1	D3
I o1=I o2=0. 3A	88° C	62° C	65° C	60° C
I o1=I o2=0. 25A	80° C	56° C	61° C	55° C
I o1=I o2=0. 2A	77° C	53° C	58° C	53° C
I o1=I o2=0. 15A	73° C	48° C	53° C	48° C
device temperature @ Vin=48V and Ta=25° C				
device case	U2	L1	Q1	D3
I o1=I o2=0. 3A	66° C	59° C	48° C	57° C
I o1=I o2=0. 25A	62° C	53° C	45° C	52° C
I o1=I o2=0. 2A	56° C	45° C	42° C	47° C
I o1=I o2=0. 15A	55° C	43° C	40° C	44° C



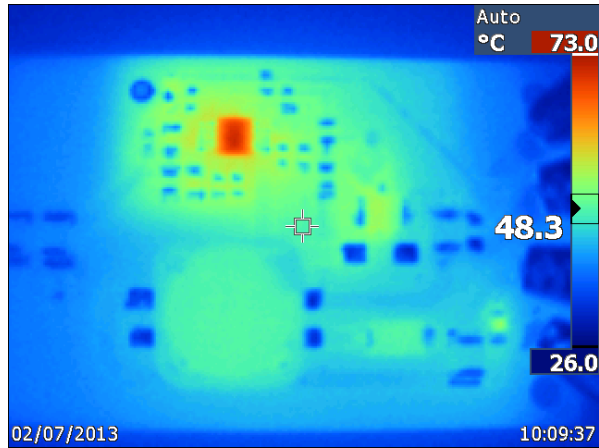
Vin=72V, Io1=Io2=0.3A



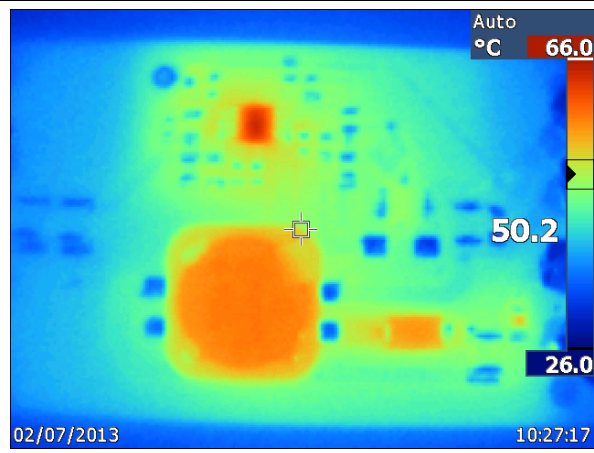
Vin=72V, Io1=Io2=0.25A



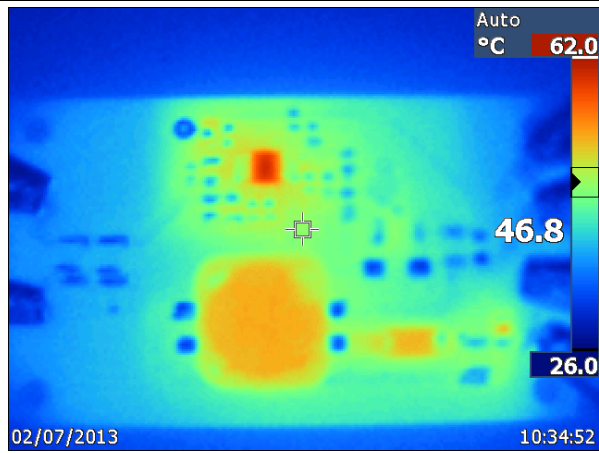
Vin=72V, Io1=Io2=0.2A



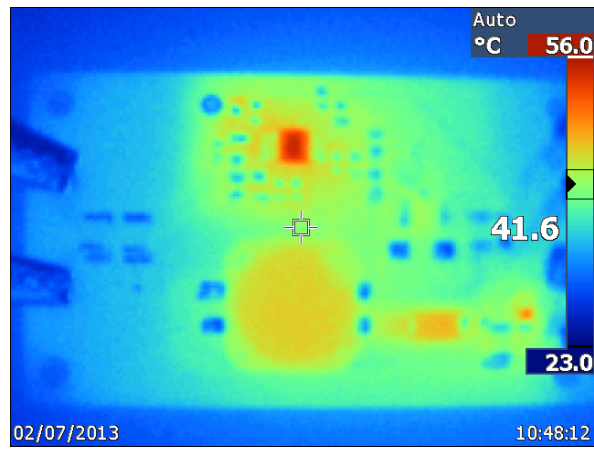
Vin=72V, Io1=Io2=0.15A



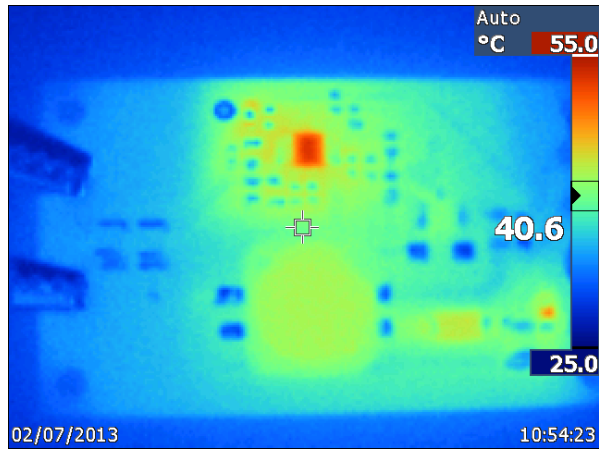
Vin=48V, Io1=Io2=0.3A



Vin=48V, Io1=Io2=0.25A



Vin=48V, Io1=Io2=0.2A



Vin=48V, Io1=Io2=0.15A

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