LINK BOARD PROJECT UPGRADE

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Outline

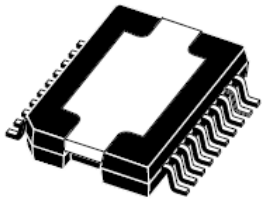
- LB CAD project
- LVDS suppressor studies
- LV regulator studies
- Open questions
- To be done

LV Regulator LHC4913

LHC4913 SERIES

3A POSITIVE LOW DROP VOLTAGE REGULATOR WITH INHIBIT FUNCTION

- LOW OUTPUT CAPACITANCE: 1µF
- LOW DROP VOLTAGE:
  0.5V @ I_O=1A
  1.5V @ I_O=3A
- OVERTEMPERATURE PROTECTION
- OVERCURRENT PROTECTION
- OUTPUT SHORT CIRCUIT MONITORING, SIGNALLED BY TTL OUTPUT
- ON/OFF EXTERNAL CONTROL BY MEANS OF TTL COMPATIBLE INPUT
- ADJUSTABLE CURRENT LIMITATION PROTECTS OUTPUTS FROM DAMAGING SHORTCIRCUITS
- REMOTE SENSING OPERATION

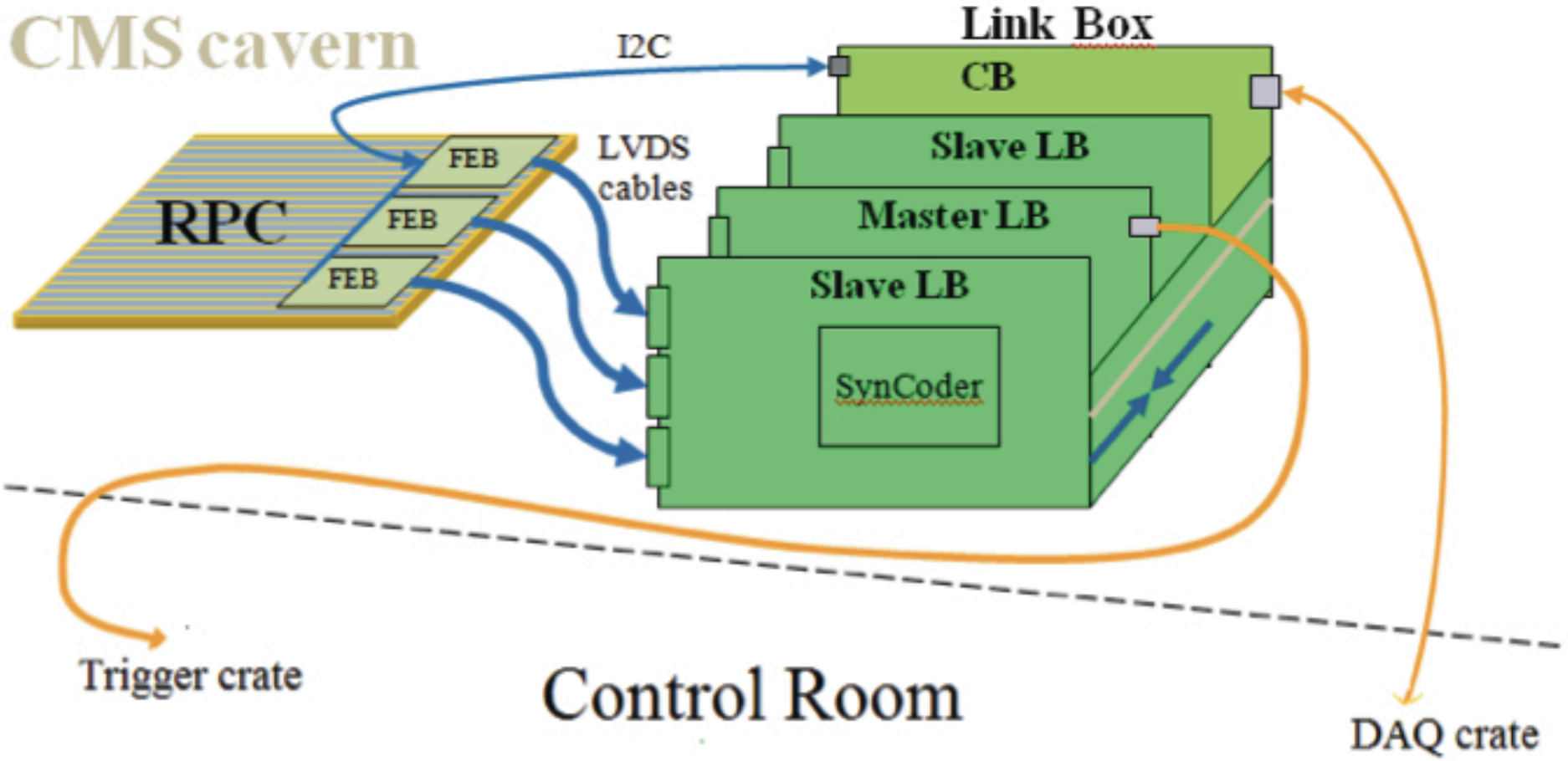


PowerSO-20 slug-up

DESCRIPTION

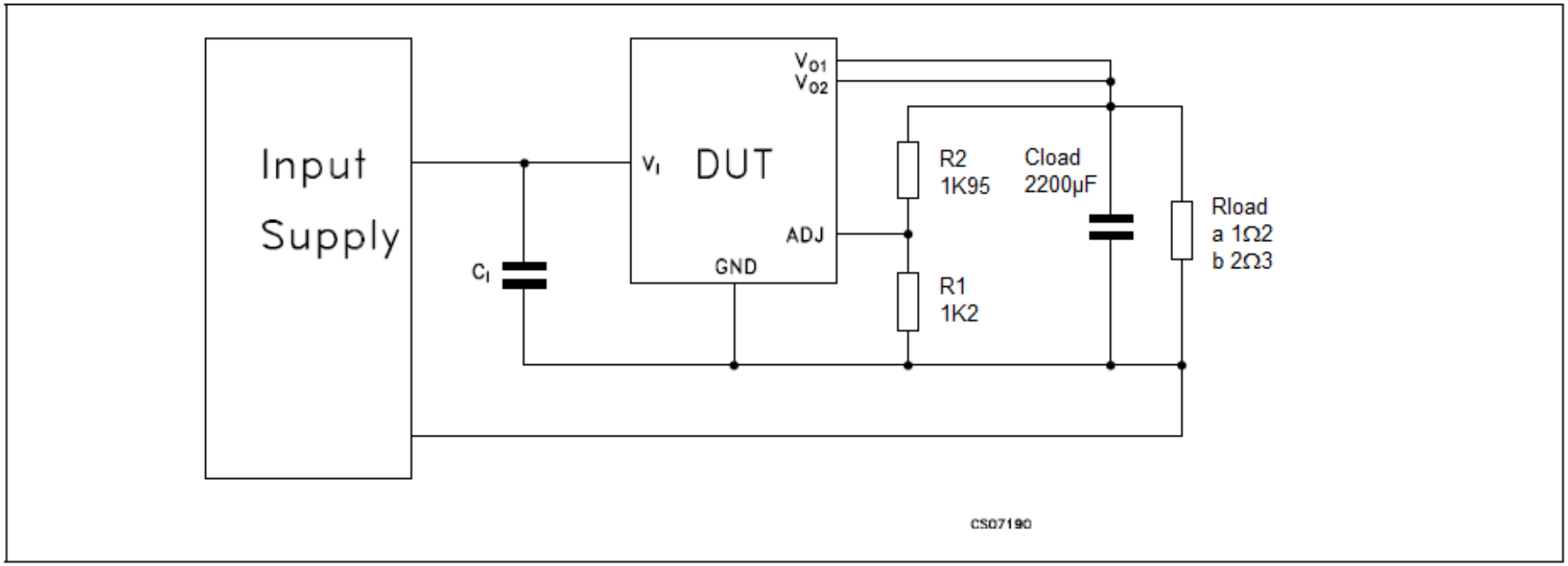
The LHC4913 is a positive Voltage Regulator family including both fixed and adjustable versions. Housed into SO-20 slug-up package with stand off zero, it is specifically intended for applications in rugged environments, such as Nuclear Physics, in which it has to withstand large amounts of radiation doses during operating life. The fixed output voltages available are 2.5, 3.0, 3.3, 5.0 and 8.0V. Input voltage ranges from 3 to 12V.

LB project schema



Test schema LHC4913

APPLICATION DIAGRAM FOR ADJUSTABLE VERSION

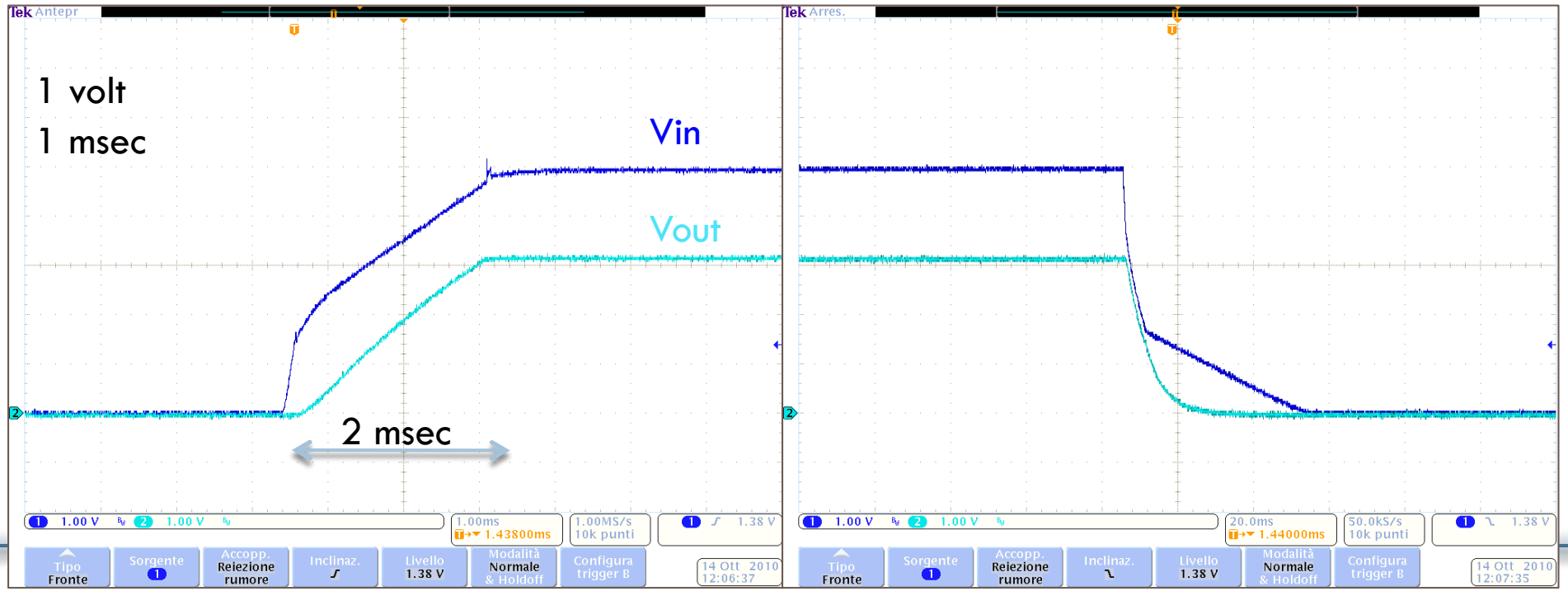


Temperature Tests

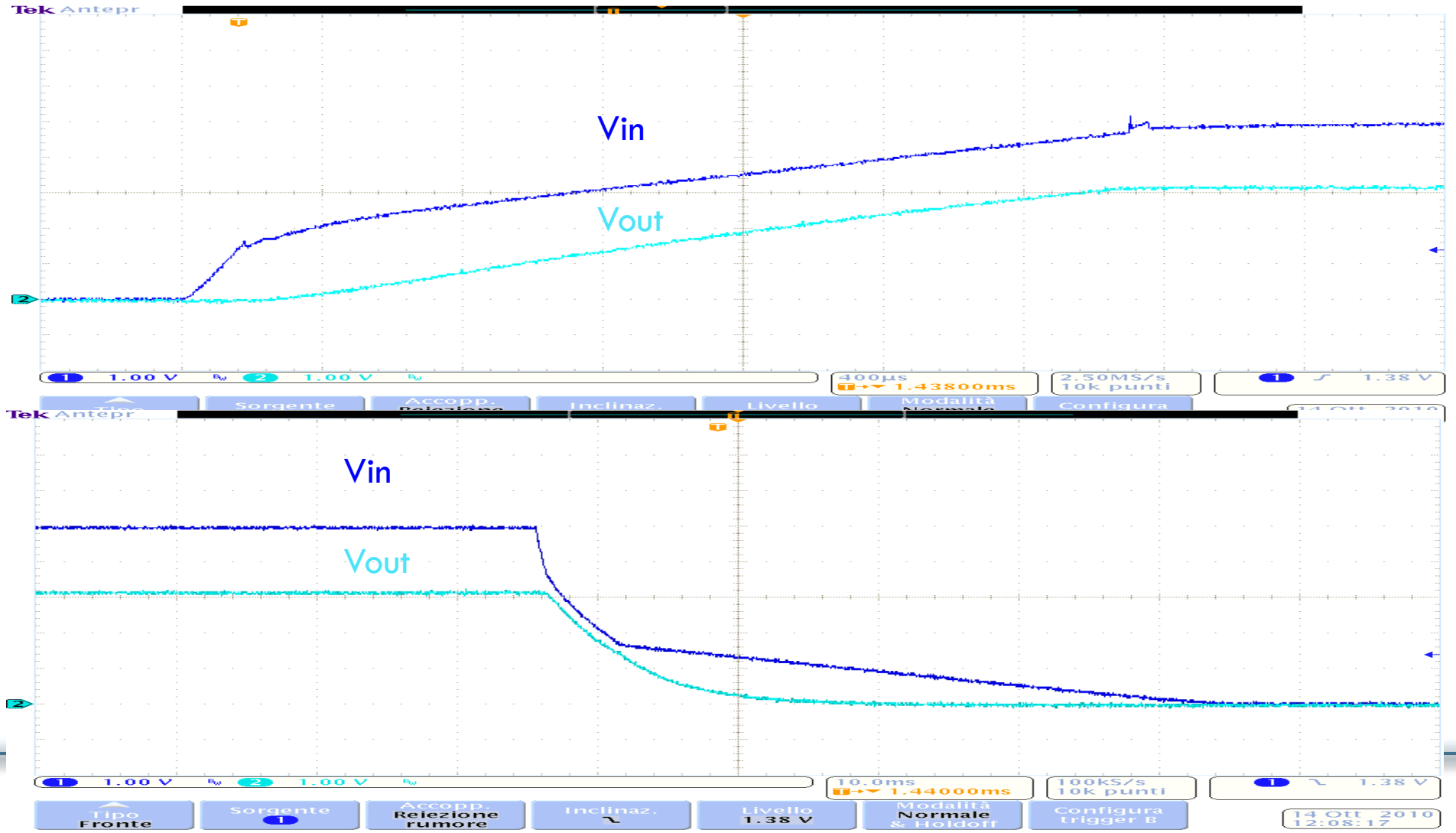
Vin = 5V

Vout = 3.3V

Iout = 1.4A (Load=2.3Ω//2200uF); Ta = 27°C; Td = 91°C



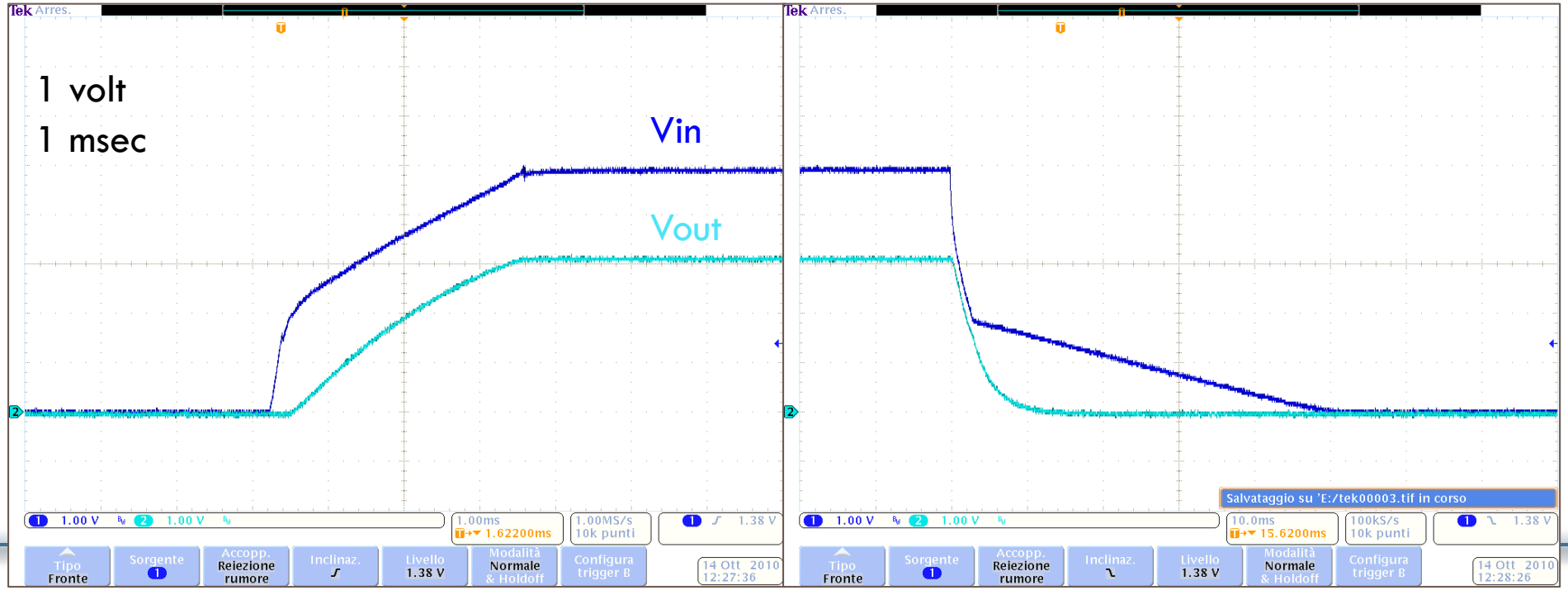
Rumping up and down



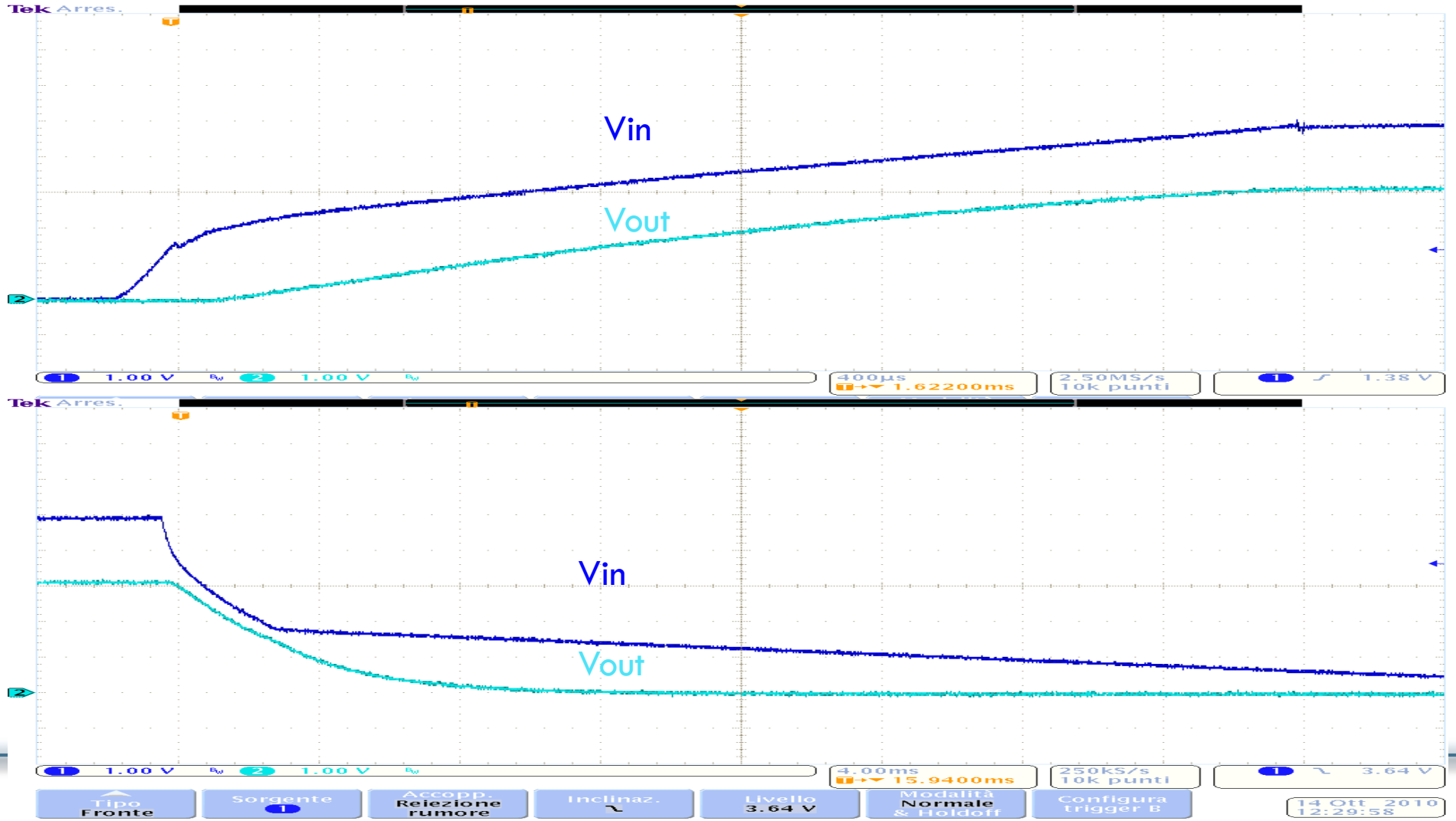
Temperature Tests

Vin=5V; Vout=3.3V

Iout=2.6A (Load=1.2Ω//2200uF); Ta=27°C; Td=135°C



Rumping up and down

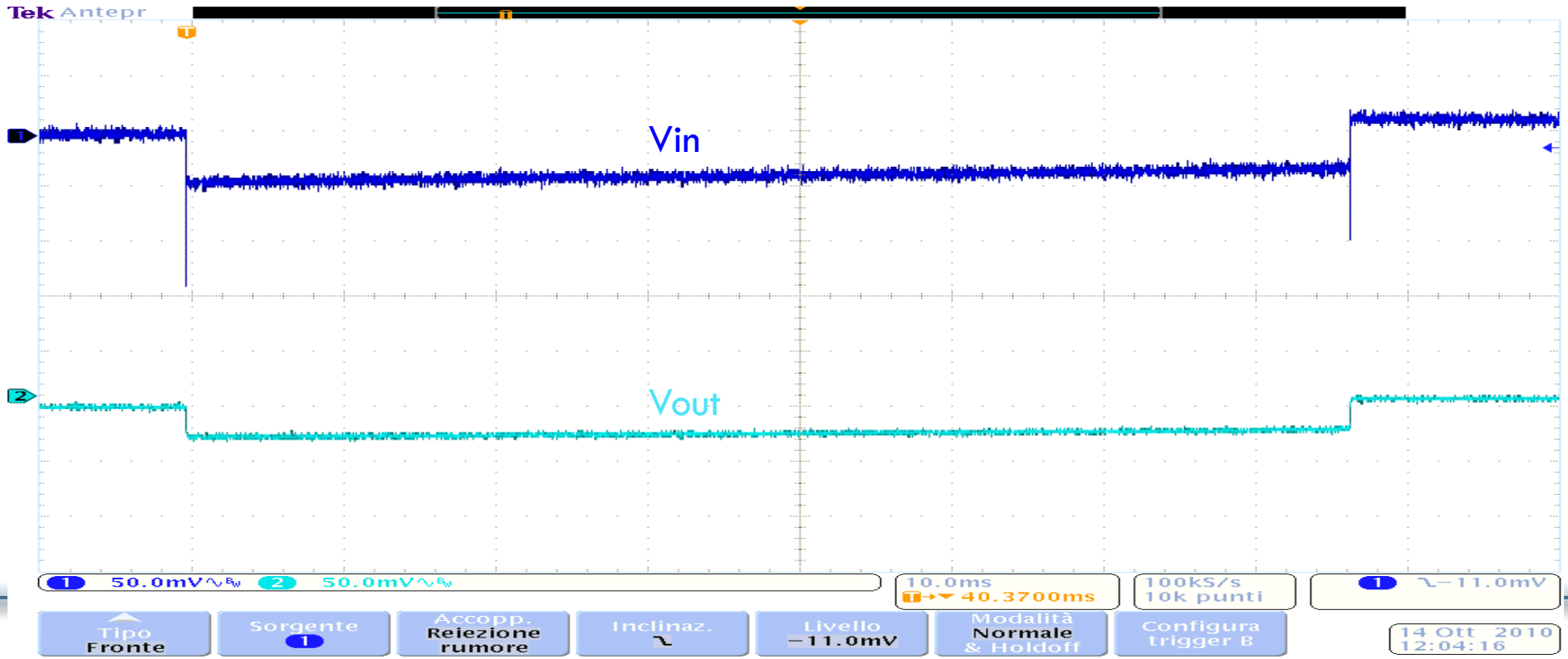


Different Loads

Vin=5V; Vout=3.3V

Iout1=1.4A (Load=2.3Ω//2200uF)

Iout2=2.6A (Load=1.2Ω//2200uF)

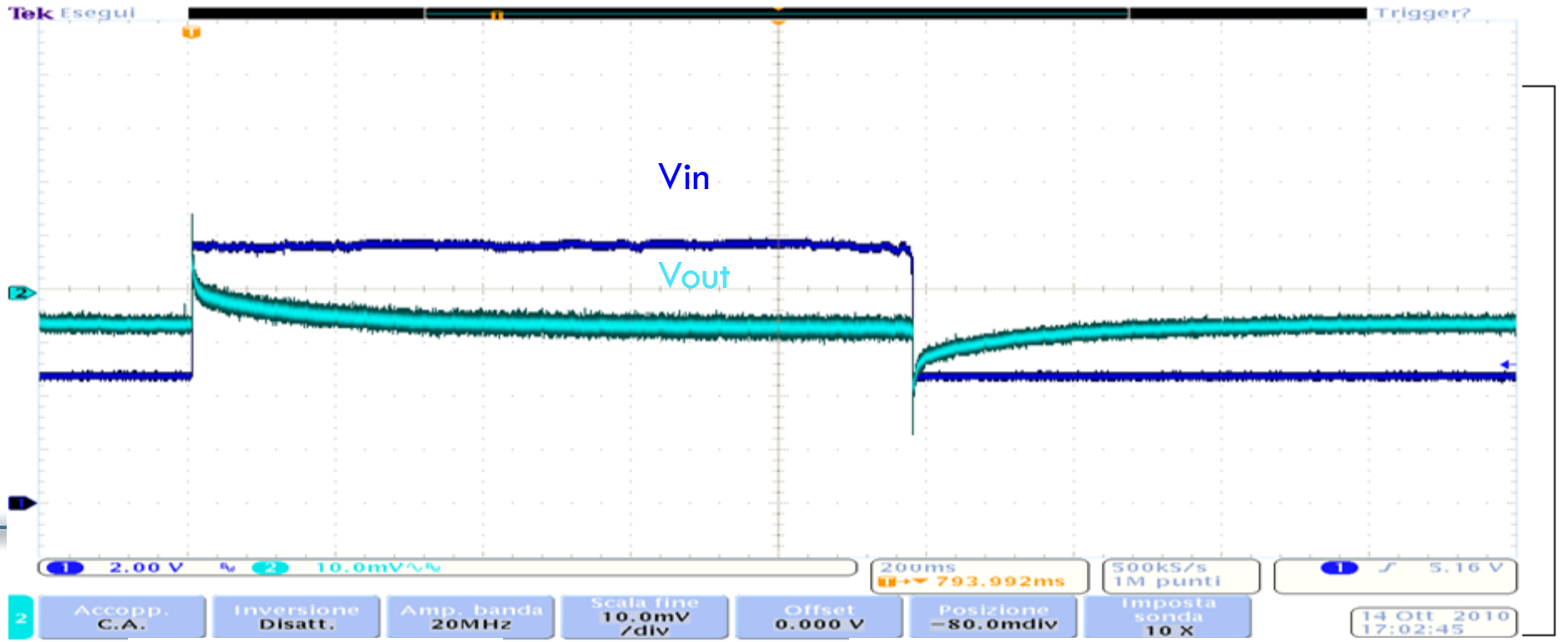


How does react to input spikes

Vin=5V; Vout=3.3V

Iout1=1.4A (Load=2.3Ω//2200uF)

Spike=5V / Vin=10V → Spike su Vout > 10mV



Heat Dissipation

Tmax (junction) = 125°C; Rcase (junction) = 2°C/W (datasheet)

Working case

Vin = 5V; Vout = 3.3V; Iout = 1.5A

Power to dissipate = (5V - 3.3V) * 1.5A = 2.55W; Tamb=25°C

Rtot = $\Delta T/W$ = (125°C – 25°C)/2.55W = 39°C/W

$R_{heatsink}$ = Rtot-Rjc = 37°C/W

Worst case

Vin=6V; Vout=3V; Iout=3A

Power to dissipate= (6V – 3V) * 3A = 9W; Tamb = 40°C

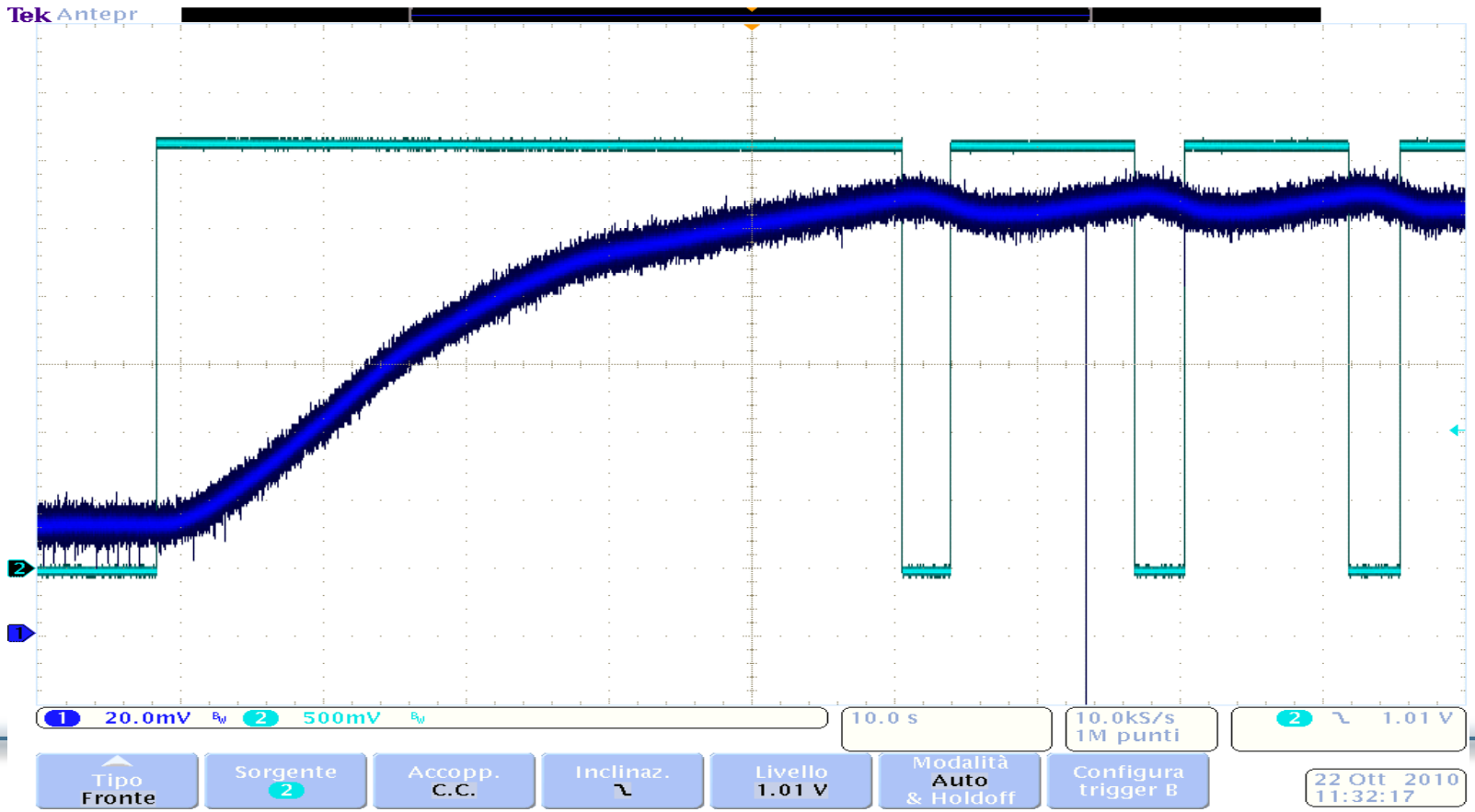
Rtot = $\Delta T/W$ = (100°C - 40°C)/9W = 6.6°C/W

$R_{heatsink}$ = Rtot-Rjc = 4.6°C/W

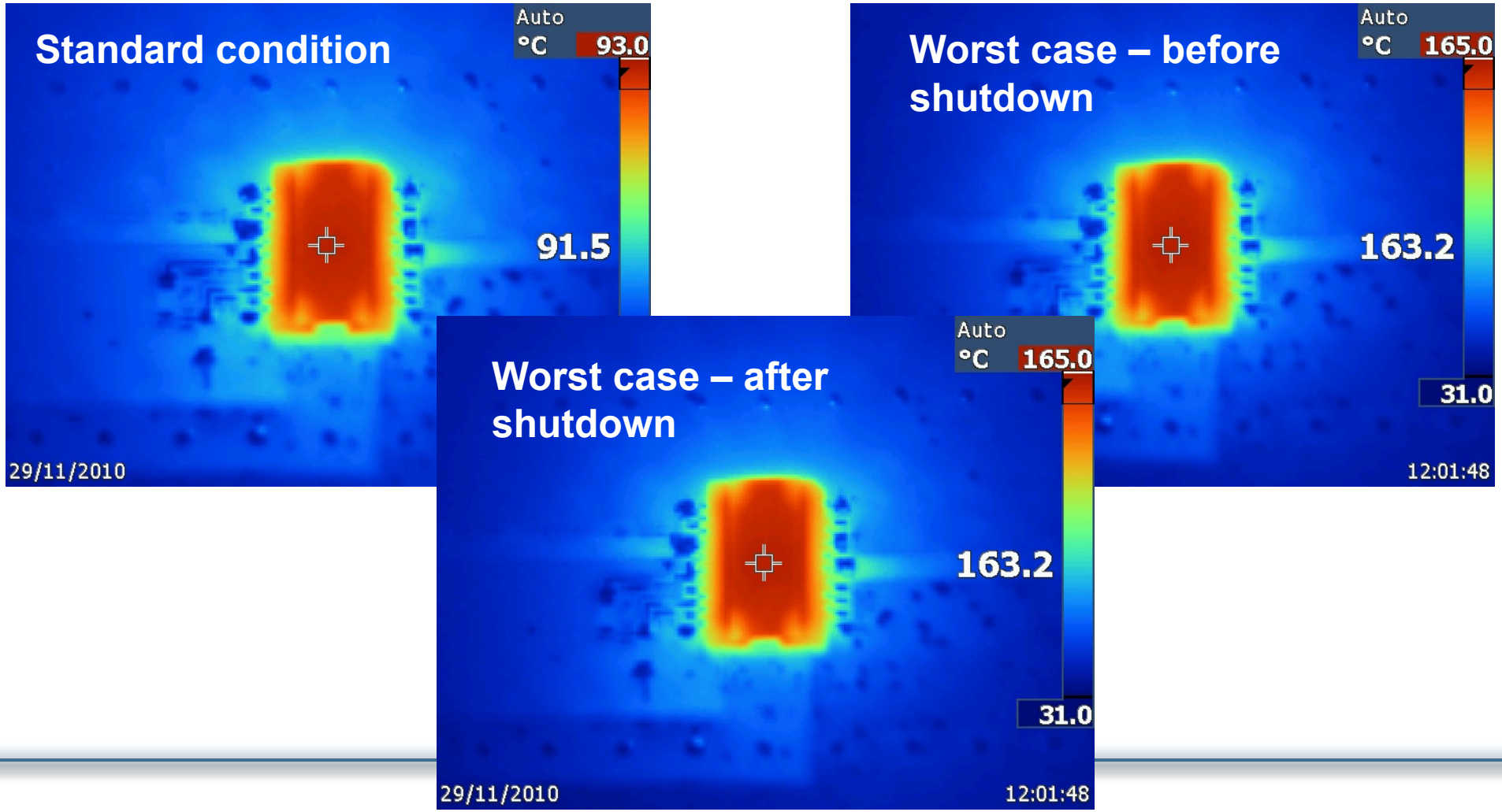
Max temperature behaviour

Test Conditions Vin=6V; Vout=3.3V; Iout=2.6A; Tamb=25°C

Temperature on the case: 155°C -:- 135°C



Regulator Infrared scan



Regulator heat sink tests

Tjmax=125°C; Rjcase=2°C/W (datasheet)

probe ISO-TECH ITA11

Working conditions:

Vin=5V; Vout=3.3V; Iout=1.5A

Power to dissipate= 5-3.3*1.5 = 2.55W; Tamb=25°C;

- No forced air flow
- Horizontal flip position

probe IR FLUKE Ti25

Worst case condition:

Vin=6V; Vout=3.3V; Iout=2.7A

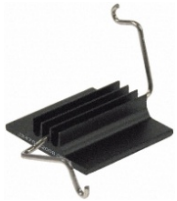
Power to dissipate= 6-3.3*2.7 = 7,3W; Tamb=25°C;

- No forced air flow
- Horizontal flip position

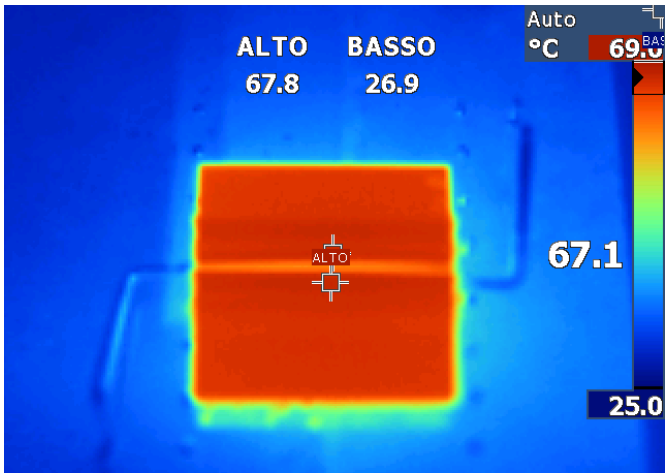
working case

V_{in}=5V;
V_{out}=3.3V
I_{out}=1.5A;
T_a=25°C;

Flip RS-492159

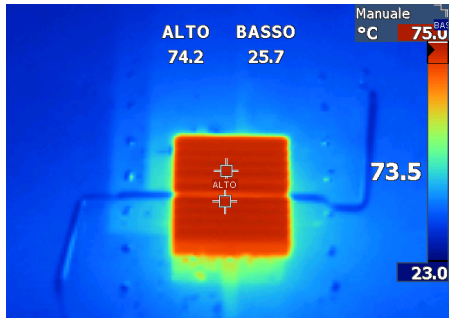


T_{ir}=**67°C** T_{tc}=**61°C**
(after 15 minutes)



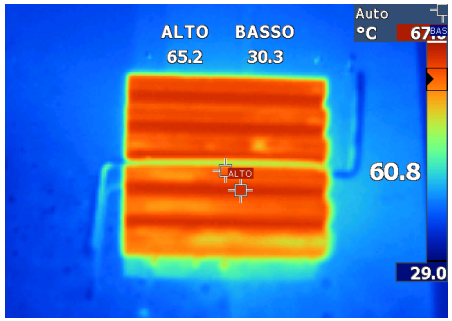
Flip RS-467451

T_{ir}=**74°C** / T_{tc}=**70°C**
(after 15 minutes)



Flip RS-6744709

T_{ir}=**65°C** / T_{tc}=**59°C**
(after 15 minutes)



worst case

V_{in}=6V;

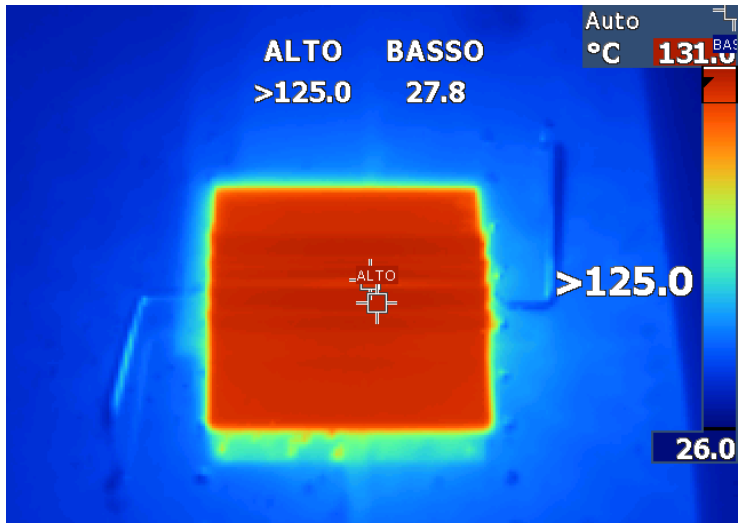
V_{out}=3.3V

I_{out}=2.7A;

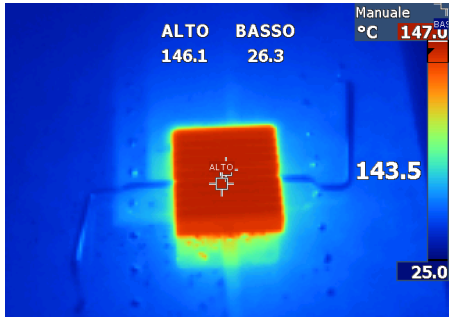
T_a=25°C;

Flip RS-492159

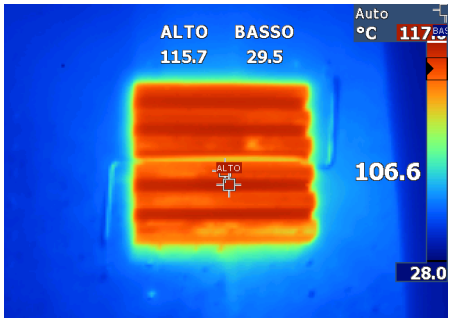
T_{ir}=125°C / T_{tc}=115°C
(after 15 minutes)



T_{ir}=146°C / T_{tc}=135°C
(after 15 minutes)

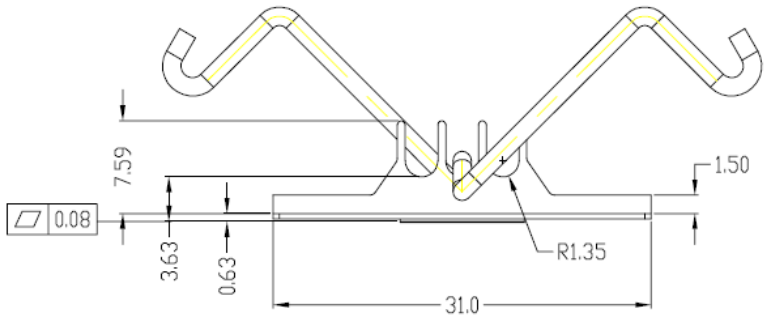


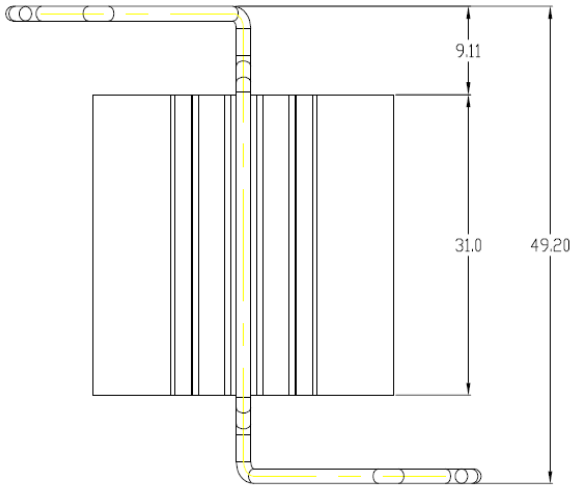
T_{ir}=115°C / T_{tc}=109°C
(after 15 minutes)

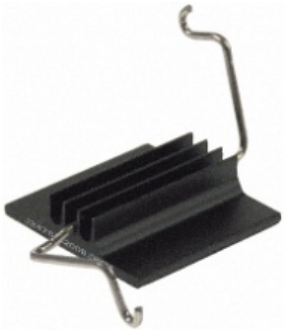


Heat sink choosen

Flip RS-492159 → **R=14.5°C/W**







Codice RS 492-159
Costruttore European Thermodynamics
Codice Costruttore 00C861101A
Pagina Catalogo 1 - 1911
Conformità RoHS RoHS (Visualizza dichiarazione)

Disponibile in stock - Consegna 24/48 h

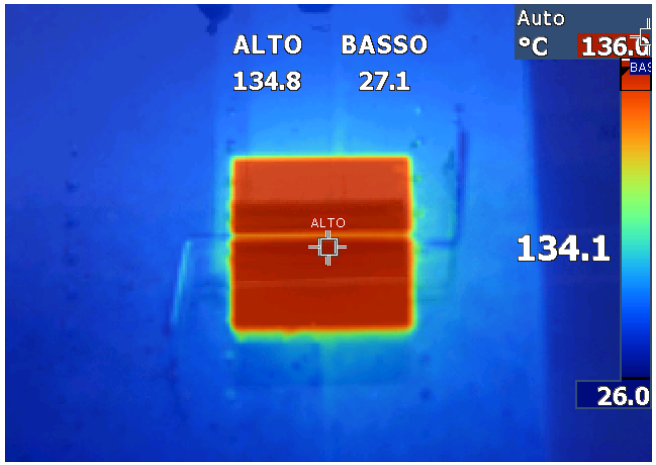
Quantità	Prezzo per 1
1	€ 1,40
10	€ 1,18
25	€ 1,01
50	€ 0,81
100	€ 0,62

Heat sink choosen

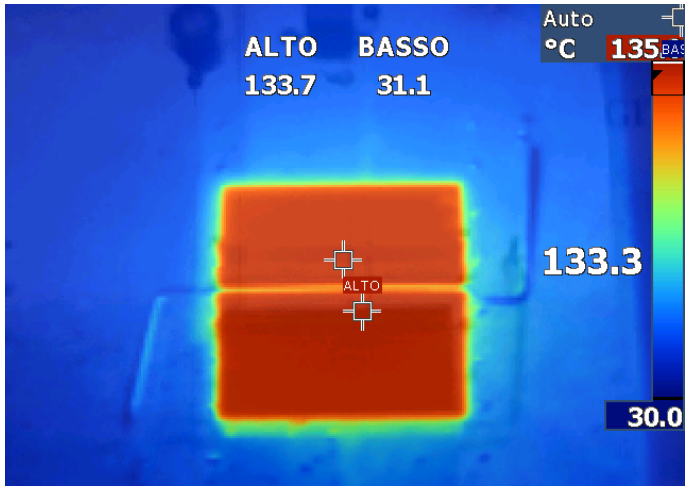
V_{in}=6V V_{out}=3.3V

I_{out}=2.7° **T_a=25°C** (fan OFF)

T_{ir}=134°C / T_{tc}=119°C (after 1 hour)



T_{ir}=133°C / T_{tc}=119°C (after 4 hours)



V_{in}=5V V_{out}=3.3V

I_{out}=1.5A **T_a=20°C;** (fan ON)

T_{ir}=56°C / T_{tc}=51°C

(after 20 minutes)