MQ7250R
Non-isolated4.5~14VDCinput, 0.69~5.5V output,10ADC-DC Converter

FEATURES

- 4.5~14V input voltage
- Output Voltage: 0.69V~5.5V
- Output Current up to 10A
- High Efficiency 95%
- Remote on/off control
- Over current /short-circuit protection
- Over-temperature protection
- Adjustable Under voltage Lockout (UVLO)
- High reliability: designed to meet 5 million hour MTBF
- Minimal space on PCB:
  - 22.10 mm x 15.7mm x 9.1mm or
  - 0.87 in x 0.62 in x 0.36 in
- Operating Temperature: -40℃ to +85℃
- UL/IEC/EN60950 compliant
- RoHS Compliant available
- PoLA Pin Configuration

APPLICATIONS

- Workstations, servers
- Desktop computers
- DSP applications
- Distributed power architectures
- Telecommunications equipment
- Data communications equipment
- Wireless communications equipment

Description

The **PoLAMQ7250R** series Power Modules are non-isolated dc-dc converters that operate over a wide input voltage range of 4.5Vdc to 14Vdc and provide a precisely (2%) regulated dc output with industry standard pin configuration. The MQ7250R requires a single resistor to set theoutput voltage to any value over the range, 0.69V to 5.5V. The wide input voltage range makes the MQ7260R particularly suitable for advanced computing and server applications that use anunregulated 8~12V intermediate distribution bus. Additionally, the wide input voltage range increases designflexibility by supporting operation with tightly regulated 5V, 8V, or 12V intermediate bus architectures.The modules have a maximum output currentrating of 10A at typical full-load efficiency over 93%.

The module incorporates a comprehensive list of features. Output over-current and over-temperature shutdownprotects against most load faults. A differential remote sense ensures tight load regulation. An adjustableunder-voltage lockout allows the turn-on voltage threshold to be customized. **EasyTrack™** sequencing is apopular feature that greatly simplifies the simultaneous power-up and power-down of multiple modules in apower system.

************************************* *Typical Application Circuit* ********************************
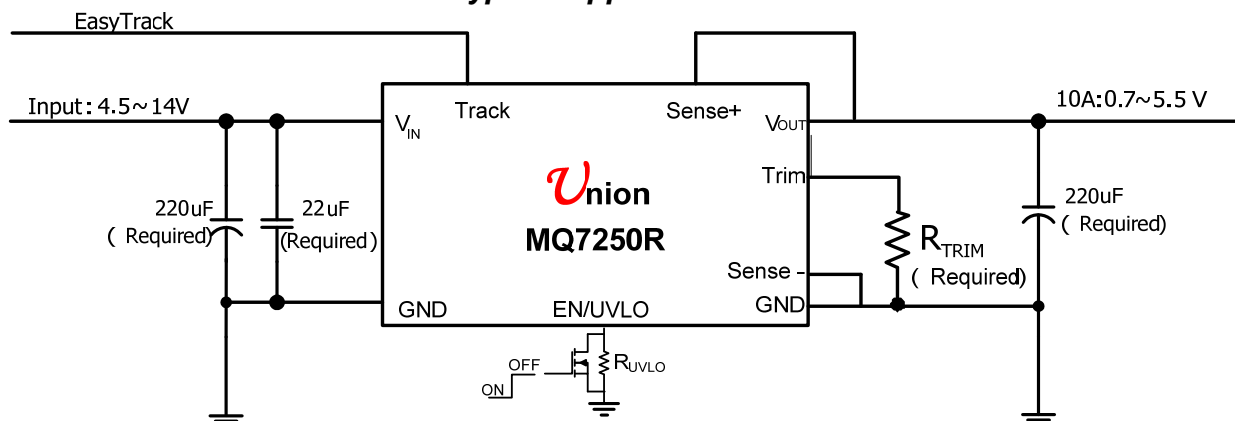
A. R$_{TRIM}$required to set the output voltage to a value higher than 0.69 V. See the Electrical Characteristics table.
B.If the Track pin is unused, this input should be connected to Vin.

Performance Specifications(at TA=+25℃)

Model	InputV$_{IN}$Range (V)	Output					Efficiency (%)
		I$_{OUT}$ (A)	TrimRange (V)	Regulation			
				Line (%)	Load (%)		
MQ7250R	4.5~14	10	0.69 ~ 5.5	0.5	0.5		95

Mechanical Specifications

Dimensions are mm (inches)

"T"

Pin	Description
1	N/A
2	Vin
3	GND
4	GND
5	Vout
6	Sense+
7	Sense-
8	*Trim*
9	*N/A*
10	*EasyTrack^{TM}*
11	EN/UVLO

"S"

Pin	Description
1	N/A
2	Vin
3	GND
4	GND
5	Vout
6	Sense+
7	Sense-
8	Trim
9	N/A
10	*EasyTrack^{TM}*
11	EN/UVLO

Ordering Information

MQ7250R2T

Union Microsystems
Power module P/N

Input Voltage Range:
4.5~14V

T: Through hole
S: Surface Mount

Absolute Maximum Ratings

Note: These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance Specifications Table is not implied.

Parameter	Symbol	Min	Max	Unit
Input Voltage	V_{IN}	-0.3	16	V
Storage Temperature	T_{STG}	-40	125	℃

MQ7250R Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
InputVoltageRange		V_{IN}	4.5		14	V
Output Current		Io	0		10	A
Output Voltage Set point	100% load	ΔVo	-2		+2	%
Temperature Regulation	T_A= $T_{A.MIN}$ To $T_{A.MAX}$	-		0.4		%$V_{O.SET}$
RemoteSenseRange					0.3	V
Line Regulation	See each output's corresponding character figure					
Load Regulation						
Output Ripple and Noise Voltage	Io=10A,0~20MHz			1		%Vout
Transient Response	2.5 A/μs load step 25% to 75% I_{Omax}, V_O = 2.5 V	C_O=220μF	Recovery Time	150		μSec
			Vo Overshoot	100		mV

General Specifications

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Maximum Capacitive Load	6A resistive load + Aluminum capacitor		220		10000	μF
	6A resistive load +Tantalum capacitor		220		10000	μF
Over current Protection				20		A
Output short-circuit current (average)	All				0.8	A
Under Voltage Lockout Trip Level	Rising and falling V_{IN}, 3% hysteresis			4.3		V
Start-up Time	10A resistive load, no external output capacitors			5		mS
Switching Frequency		Fo		300		KHz
Operating Temperature	Natural convection		-40		85	℃
Vibration	3 Axes, 5 Min Each	10~55Hz，0.35mm，5g				
	3 Axes, 6 Times Each	Peak Deviation 300g，Settling Time 6mS				
MTBF		5,000,000				Hour

Test Configurations
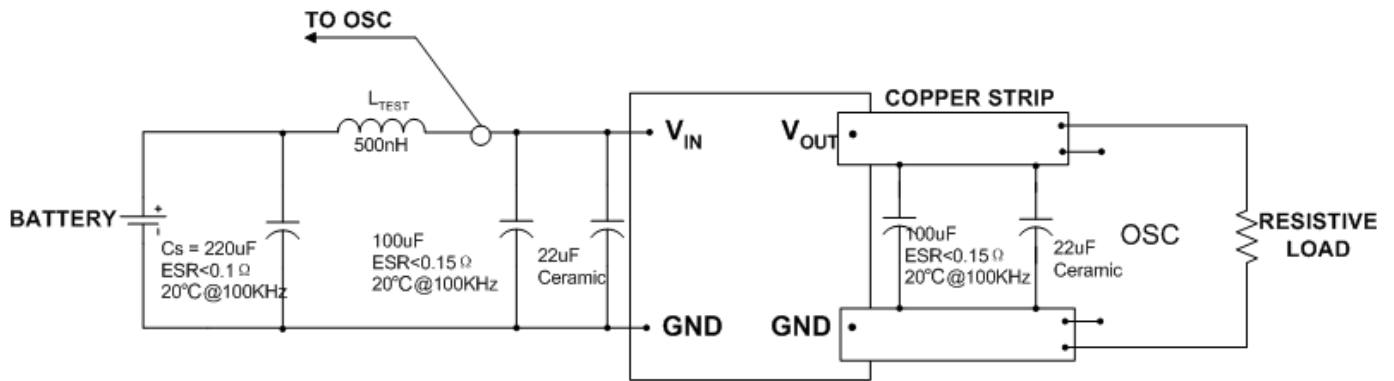
Fig 1 Test setup for input noise, output noise and ripple

Note:

Output noise is measured with 0.1μ F ceramic capacitor connected at the output. OSC measurement shouldbe made using a BNC socket.
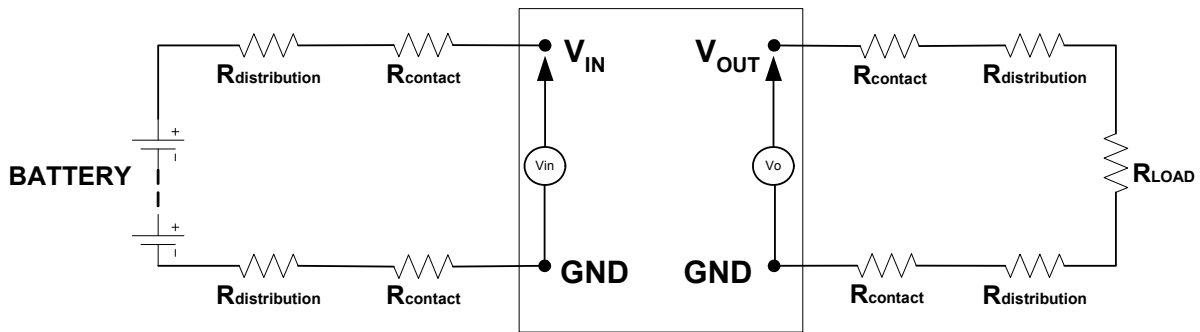
Fig 2 Test setup for efficiency

Note:

All voltage measurements must be taken at the module's terminals, as shown above. If sockets are needed, Kelvin connections are required at the module terminalsto avoid measurement errors due to socket contactresistance.

Technical Notes

EasyTrack™ Function

The *EasyTrack*^{TM} function is available with the all "Point-of-Load Alliance"(PoLA) products. *EasyTrack*^{TM} was designed to simplifythe amount of circuitry required to make the outputvoltage from each module power up and power down insequence. The sequencing of two or more supply voltagesduring power up is a common requirement for complexmixed-signal applications, which use dual-voltage VLSI ICssuch as DSPs, micro-processors, and ASICs.
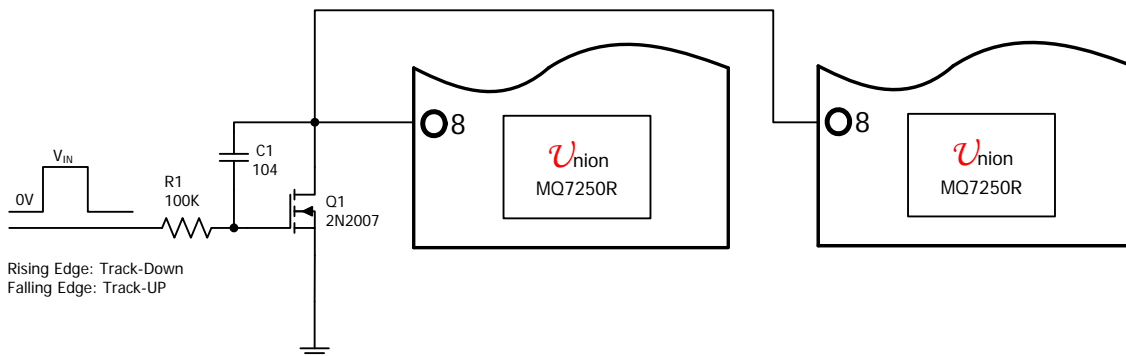
Fig3 SimultaneousPower Up and Power Down Using*EasyTrack*^{TM}

How *EasyTrack^TM* Works

EasyTrack^TM works by forcing the module's output voltageto follow a voltage presented at the *EasyTrack^TM* control pin. Thiscontrol range is limited to between 0 V and the module'sset-point voltage. Once the *EasyTrack^TM* control pin voltage is raisedabove the set-point voltage, the module's output remainsat its set-point . As an example, if the *EasyTrack^TM* control pin of a 2.5-Vregulator is at 1 V, the regulated output will be 1 V. Butif the voltage at the *EasyTrack^TM* control pin rises to 3 V, the regulatedoutput will not go higher than 2.5 V.When under *EasyTrack^TM* control, the regulated output fromthe module follows the voltage at its *EasyTrack^TM* control pin on a volt- for-volt basis. By connecting the *EasyTrack^TM* control pin of a numberof these modules together, the output voltages will followa common signal during power-up and power-down.The control signal can be an externally generated masterramp waveform, or the output voltage from another powersupply circuit. For convenience the *EasyTrack^TM* control incorporatesan internal RC charge circuit. This operates offthe module's input voltage to provide a suitable risingvoltage ramp waveform.

Input Voltage Range

The *MQ7250R* Series can be used in a wide variety of applications, esp. most of unregulated 5V or 12V intermediate power supply bus system.   Its wide input voltage ranges can tolerate worst voltage drop from cheap isolated Brick-type Bus-converter, so it reduces total system cost on power supply.

I/O Filtering

All the specifications of the *MQ7250R* Series are tested with specified output capacitors. However, certain input capacitors are necessary to improve the power modules' operating conditions and to reduce the ac impedance. For example, under some conditions, the power modules can't normally start up when fully loaded due to the high ac-impedance input source. External input capacitors serve primarily as energy-storage devices. They should be added close to the input pins of the *MQ7250R* and selected for bulk capacitance (at appropriate frequencies), low ESR, and high rms-ripple-current ratings. All external capacitors should have appropriate voltage ratings. To reduce the amount of ripple current fed back to the input supply (input reflected-ripple current), an external L-C filter can be added with the inductance as close to the power module as possible.

MQ7250R's output ripple and transient response can be improved with the increasing output capacitance. When using output capacitors, take care that the total output capacitance does not exceed *MQ7250R*'s Maximum Capacitive Load to avoid issuing the module's over-current protection mechanism in the start-up procedure.

When an external L-C filter is added to reduce ripple on load, for best results, the filter components should be mounted close to the load circuit rather than the power module.

When testing the relationship between external capacitors and output voltage noise, the oscilloscope's probe should be applied to the module's end directly with scope probe ground   less than 10mm in length。

Input Fusing

The MQ7250RSeries is not internally fused. Certain applications and/or safety agencies may require the installation of fuses at the inputs of power conversion components. The selection of the fuses should conform to the following：

1. The fuse value should be selected to be greater than the maximum input current of the modules, which occurs at the minimum input voltage.

2. Use fast-blow fuses.

3. Both input traces must be capable of carrying a current of 1.5 times the value of the fuse without opening.

Safety Considerations

MQ7250R's are non-isolated DC/DC converters. In general, all DC-DC's must be installed in compliance with relevant safety-agency specifications (usually UL/IEC/EN60950). In particular, for a non-isolated converter's output voltage to meet SELV (safety extra low voltage) requirements, its input must be SELV compliant. If the output needs to be ELV (extra low voltage), the input must be ELV.

Remote Sense

MQ7250R Power Modules offer a positive output sense function on pin SENSE. The sense function enables point-of-use regulation for overcoming moderate IR drops in conductors and/or cabling.   The sense line carries very liRle current and consequently requires a minimal cross-sectional-area conductor. As such, it is not a low-impedance point and must be treated with care in layout and cabling. Sense lines should be run adjacent to signals (preferably ground). If the remote sense is not needed the sense pin should be left open or connected to V_{OUT} directly.

Use of trim and sense functions can cause the output voltage to increase, thereby increasing output power beyond the *MQ7250R*'s specified rating. Therefore:

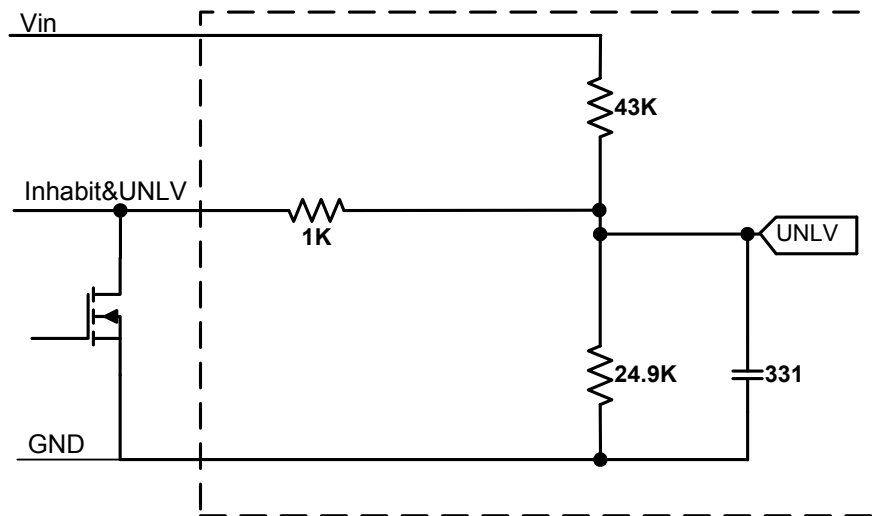$$V_{OUT} \text{ (at pins) } \times I_{OUT} \leq P \text{ (rated output power)}$$

Output ON/OFF Inhabit

Fig5, Output ON/OFF Inhabit Implementation with Open Collector/Drain transistor for positive logic control

The *MQ7250R* power modules featurean On/Off pin(Pin11: On/Off) for remote On/Off operation with positive logic. If not usingthe remote On/Off pin, leave the pin open (module willbe ON). The On/Off pin signal (Von/Off) is referencedto ground. To switch module on and off using remoteOn/Off, refer to Figure5.

Output Over voltage Protection

MQ7250R Series products do not incorporate output over voltage protection. If the operating circuit requires protection against abnormal output voltage, voltage-limiting circuitry must be provided external to the power module.

Output Overcurrent Protection (OCP)

MQ7250R incorporates over current and short circuit protection. If the load current exceeds the overcurrent protection setpoint, the *MQ7250R*'s internal over current-protection circuitry immediately turns off the module, which then goes into Hiccup mode.The unit operates normallyonce the output current is brought back into itsspecified range. The typical average output currentduring hiccup is less than 0.8A.

Caution：Be careful never to operate *MQ7250R* in a "heavy overload" condition that is between the rated output current and the overcurrent protection setpoint. This can cause permanent damage to the components.

Over temperatureProtection (OTP)

To ensure MQ7250R's reliability and avoid damaging its internal components，MQ7250R incorporates over-temperature protection circuit. When the temperature of the PCB is above 125℃, the over temperature protection circuit will be enabled andthe module will stop working. When the temperature ofthe temperature-testing component is below about 110℃, the over temperature protection circuit will release and the module will automatically recover from shutdown. To avoid permanently damaging components, the surface temperature of MQ7250R's power components, esp. of the MOSFET (T_{REF}in Fig 6) should be ensured below 125℃.
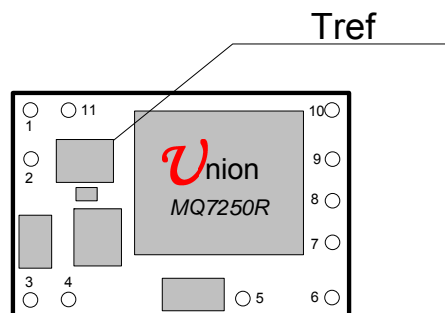
Fig 6, Temperature Reference Point

Note： *The over temperature protection may be issued when MQ7250R operates in a "heavy overload" condition for a long time. Thus, the airflow should be improved.*

Output Voltage Trimming

MQ7250R's output voltage can be trimmed in certain ranges. See Performance Specifications for allowable trim ranges in detail. Also customized products are offered.

Trim with external resistor (Fig 7), the equation as below：

$$R_{TRIM} = \frac{10 \times 0.69}{V_o - 0.69} - 1.43$$

Resistor values are in kΩ; V_O is desired output voltage.
For examples, to trim output to 1.5V, then

$$R_{TRIM} = \frac{10 \times 0.69}{1.5 - 0.69} - 1.43 = 7.08$$

So, R_{TRIM} = 6.98kΩ
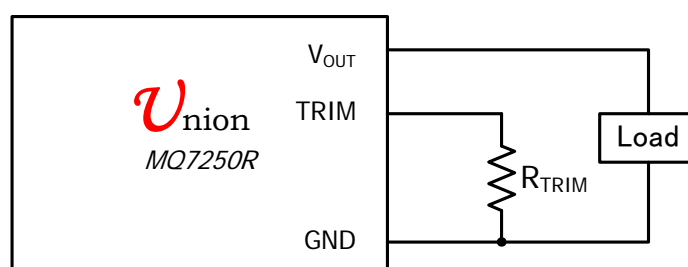
Fig7. Circuit configuration for programming output voltage using external resistor

For most common voltages, the required Trim resistors as Table 2.

Table 2, the required trim resistors R_{TRIM} for most common voltages

R_{TRIM}	V_{OUT}
OPEN	0.69V
20.5K	1.0V
12.1K	1.2V
6.98K	1.5V
4.7K	1.8V
2.37K	2.5V
1.2K	3.3V
0.169K	5.0V

Under voltagelockout(UVLO)

The MQ7250R power modules incorporate an input under voltage lockout (UVLO). The UVLO featureprevents the operation of the module until there is sufficient input voltage to produce a valid output voltage. Thisenables the module to provide a clean, monotonic powerup for the load circuit, and also limits the magnitude ofcurrent drawn from the regulator's input source during the power-up sequence.

The UVLO characteristic is defined by the ON threshold (V_{THD}) voltage. Below the ON threshold, the ON/OFFcontrol is overridden, and the module does not produce an output. The hysteresis voltage, which is the differencebetween the ON and OFF threshold voltages, is set at 500 mV. The hysteresis prevents start-up oscillations,which can occur if the input voltage droops slightly when the module begins drawing current from the inputsource.

The UVLO feature of the MQ7250R module allows for limited adjustment of the ON threshold voltage.The adjustment is made via the ON/OFF control pin (pin 11) using a single resistor (see Figure 8). Whenpin 11 is left open circuit, the ON threshold voltage is internally set to its default value, which is 4.3 V. The ONthreshold might need to be raised if the module is powered from a tightly regulated 12-V bus. Adjusting thethreshold prevents the module from operating if the input bus fails to completely rise to its specified regulationvoltage.

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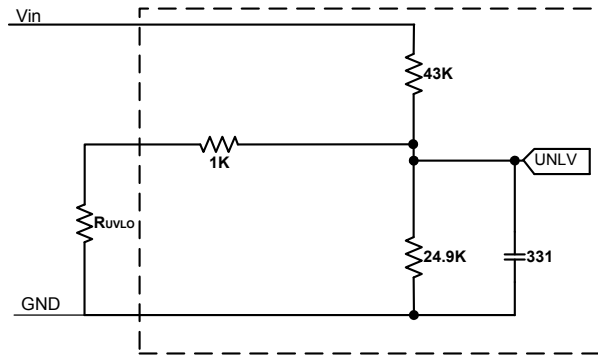
Figure 8UVLO Implementation

The following equation determines the value of R$_{UVLO}$ required adjusting V$_{THD}$ to a new value. The default value is 4.3 V, and it may be adjusted, but only to a higher value.

$$R_{UVLO} = \frac{70.74 - V_{THD}}{V_{THD} - 4.26}(k\Omega)$$

The table below shows a chart of standard resistor values for R$_{UVLO}$ for different options of the on-threshold (V$_{THD}$) voltage.

V$_{THD}$(V)	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0
R$_{UVLO}$(KΩ)	88.7	52.3	37.4	28.7	23.2	19.6	16.9	14.7	13.0	11.8	10.5	9.76	8.87

Typical Characteristics–output adjusted to 0.69V

General conditions:

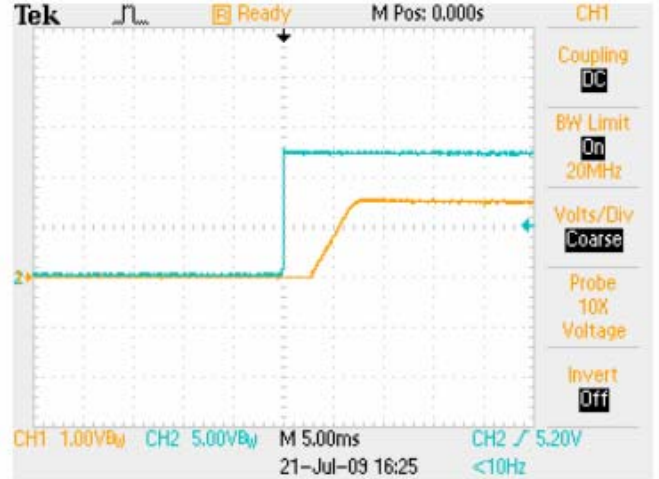**Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2**
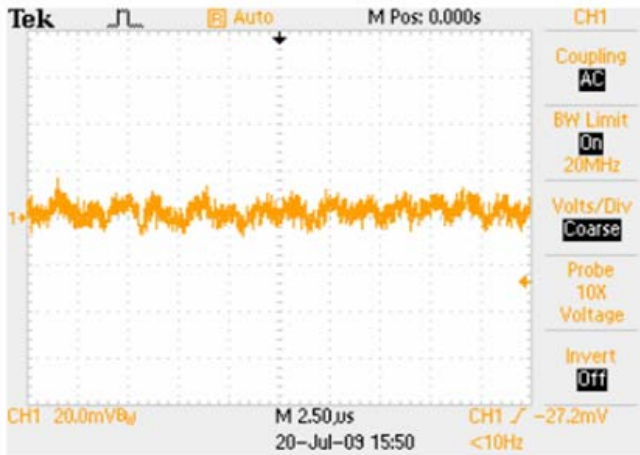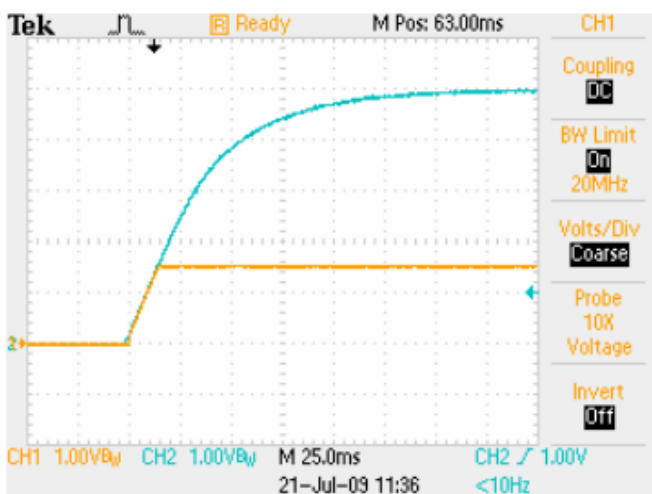

Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth
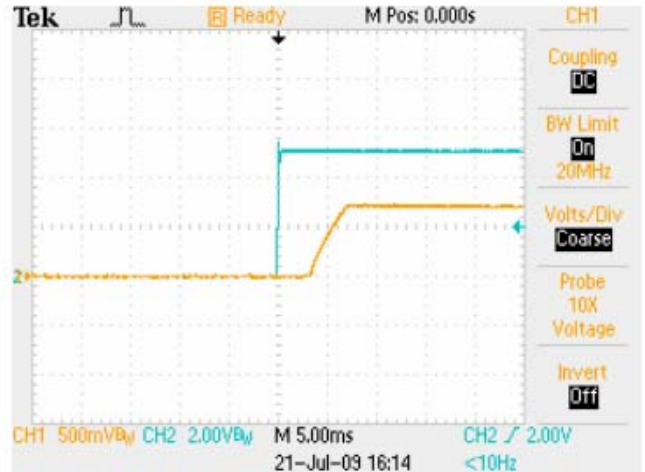
Start-up V_{IN}=5V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage
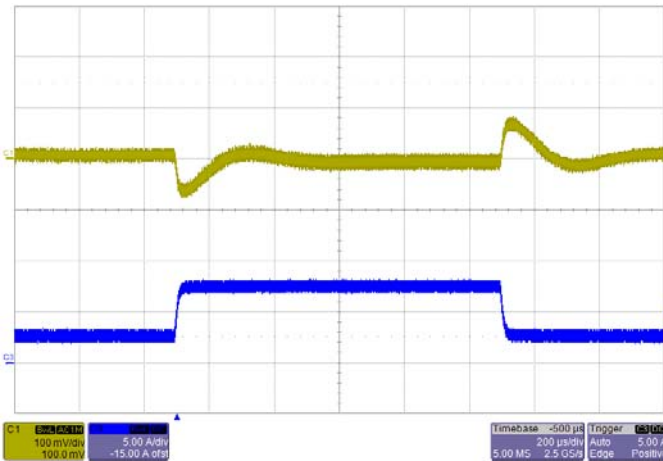
Transient Response V_{IN}=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple
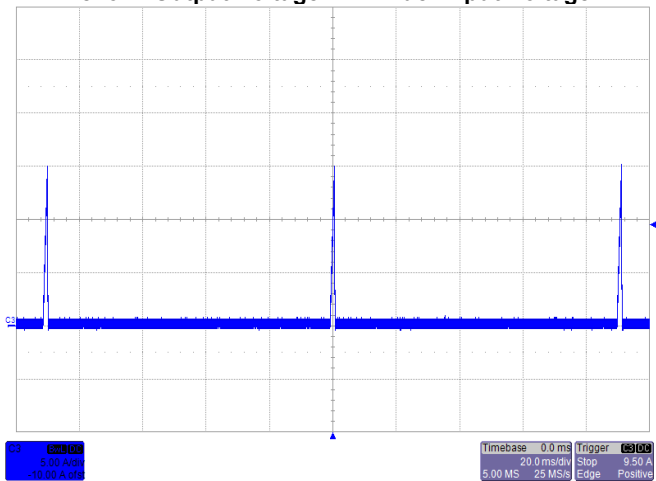
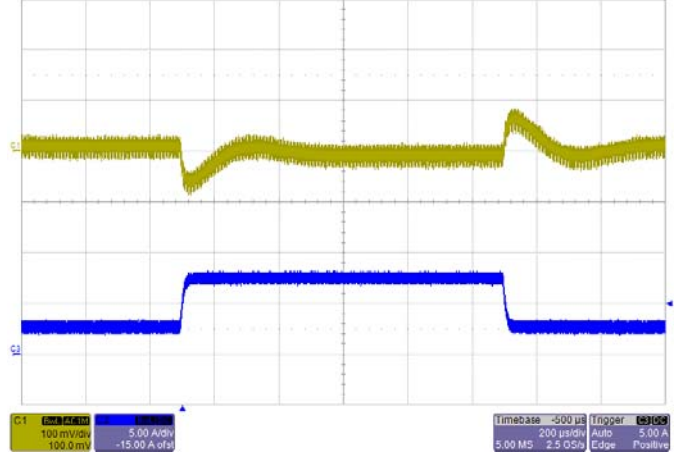**Short Circuit Protection, V_{IN}=5V**

Power Up with *EasyTrack^{TM}* Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack^{TM}* Control V_{Track}=5V, I_O=10A
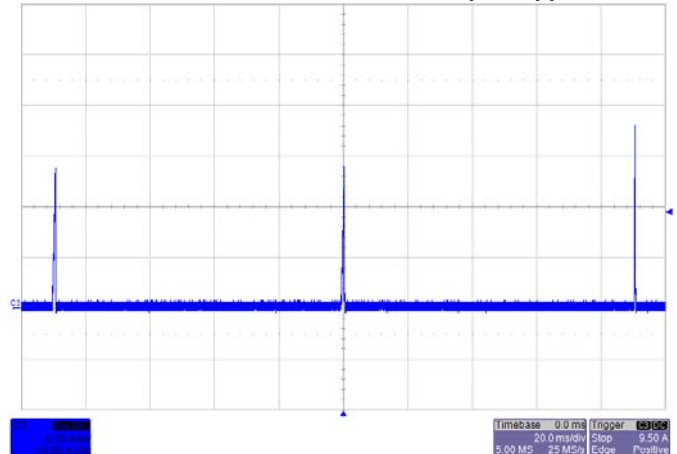**Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage**
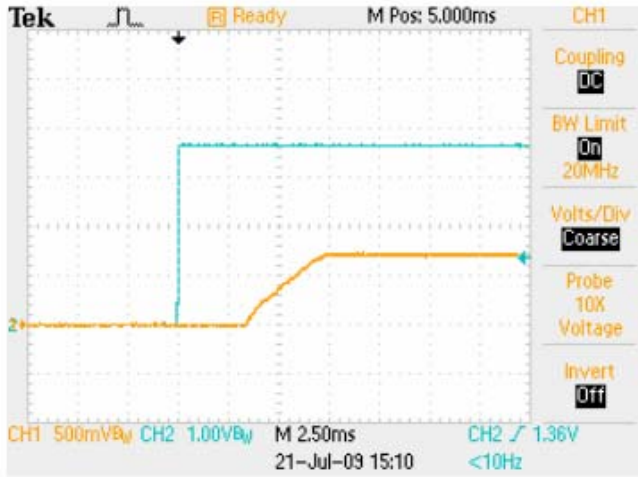
Power Up with ON/OFF Control, V_IN=5V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage
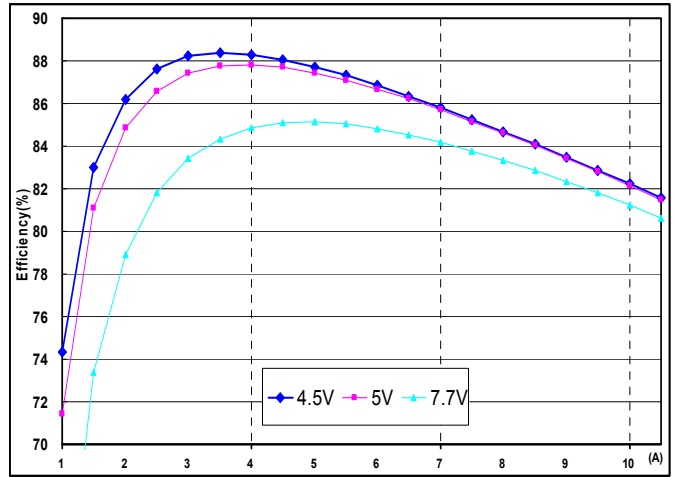
Efficiency vs. Load Current
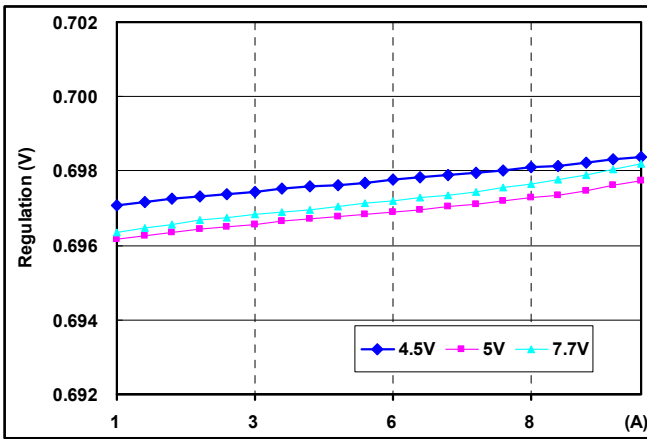
Regulation
Output voltage vs. Load Current
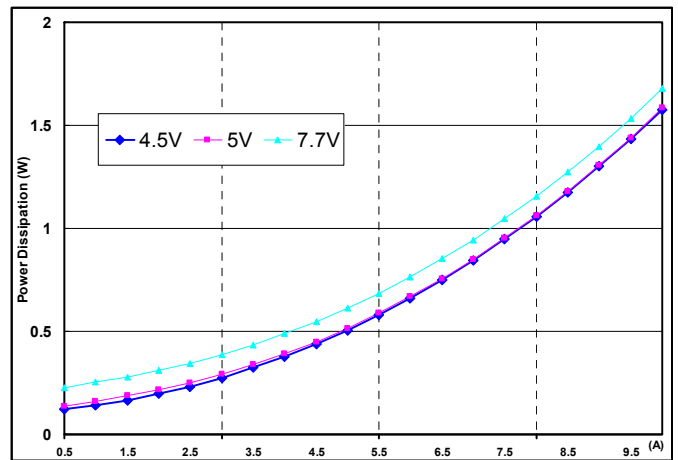
Power Dissipation vs. Load Current

Output Current Derating
（Input filter:68uF/20V*3 TAN；
Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 1.0V
General conditions:
Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2
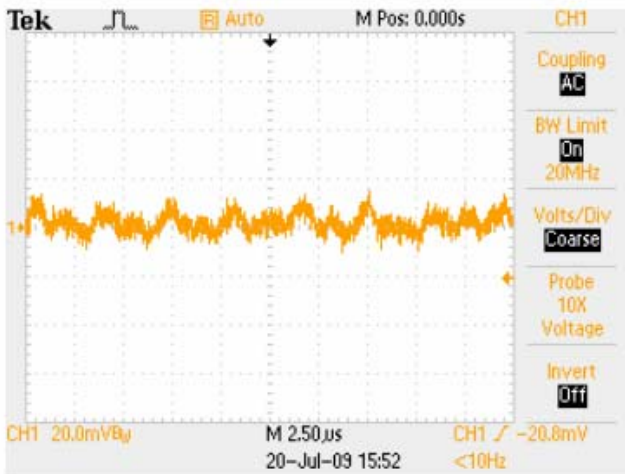
Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth
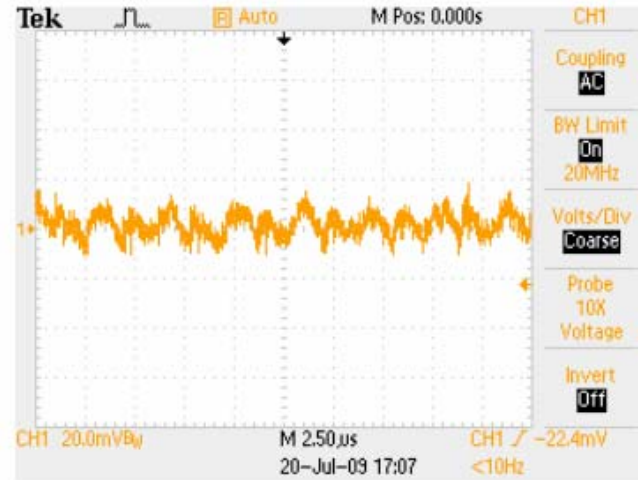
Noise V_{IN}=11V, I_O=10A, 5~20MHz Bandwidth
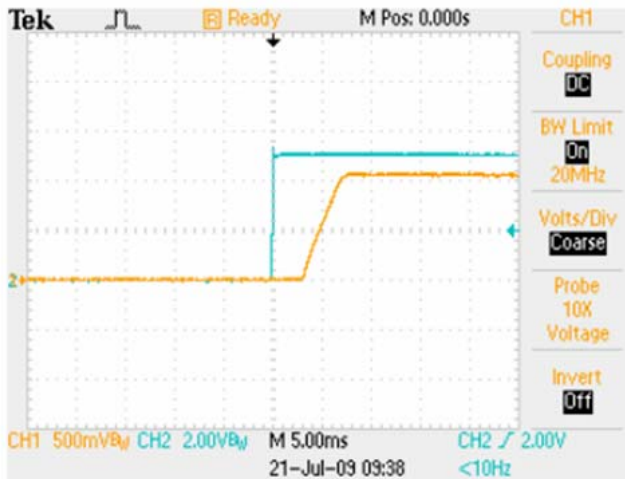
Start-up V_{IN}=5V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage
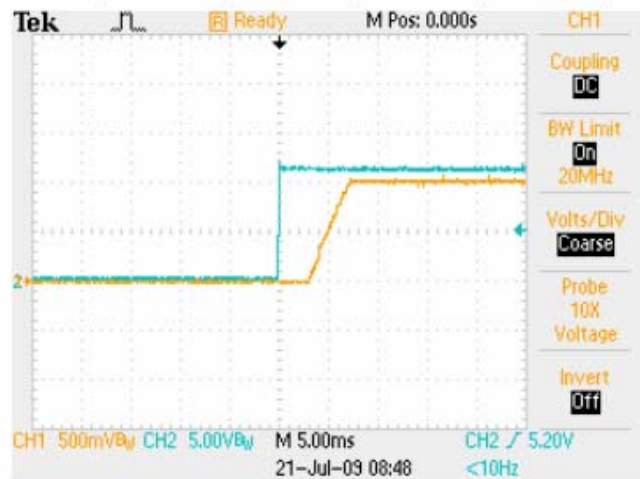
Start-up V_{IN}=11V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

Power Up with *EasyTrack*[TM] Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack*[TM] Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack*[TM] Control V_{Track}=5V, I_O=10A
Blue: *EasyTrack*[TM] Control Voltage   Yellow: Output Voltage
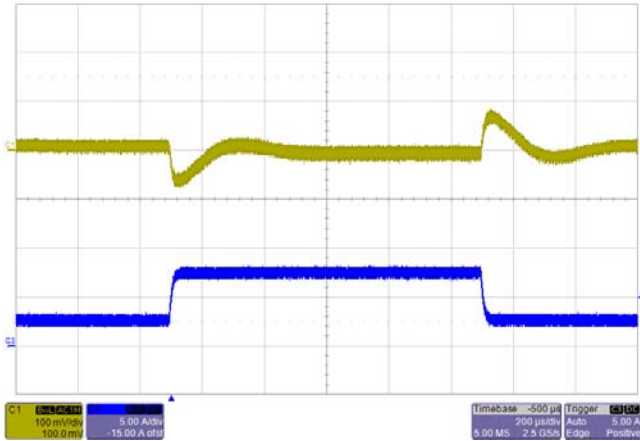
Transient Response V$_{IN}$=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple
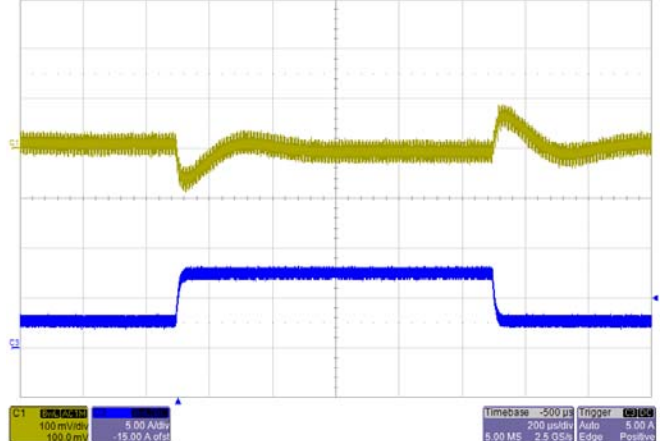
Transient Response V$_{IN}$=11V, Step from 2.5A~7.5A~2.5A, Co=220uF
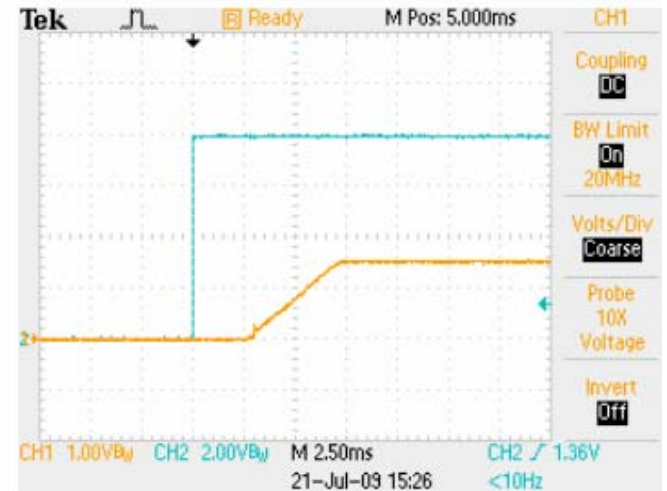**Blue: Load Current   Yellow: Output Ripple**
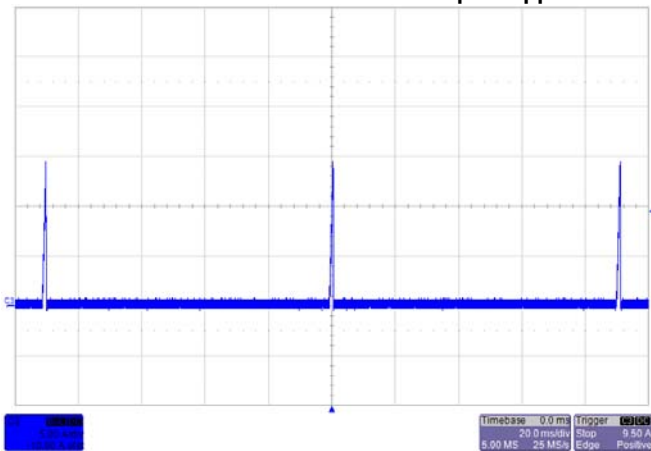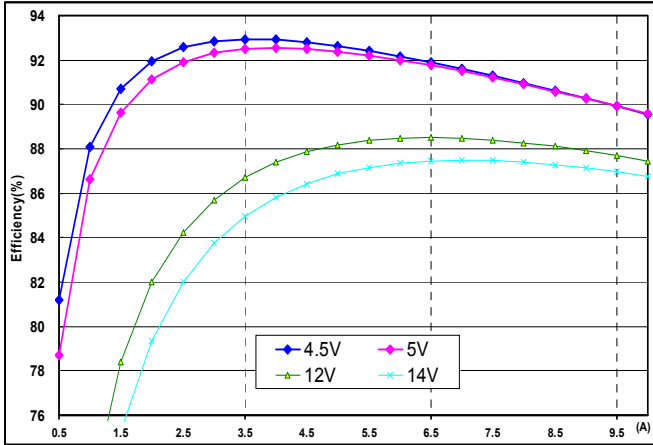

Short Circuit Protection, V$_{IN}$=5V
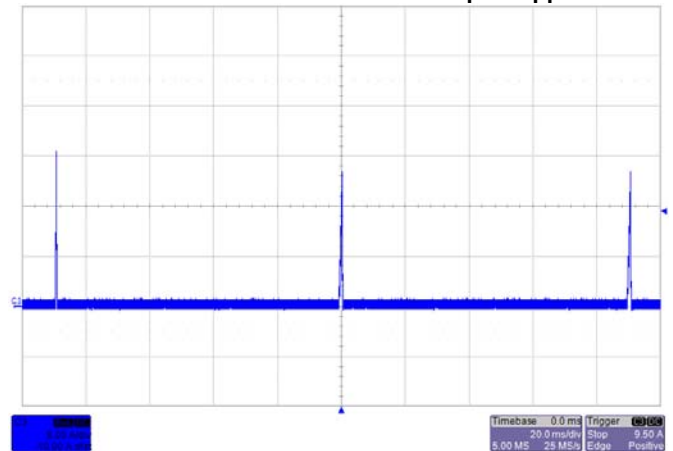
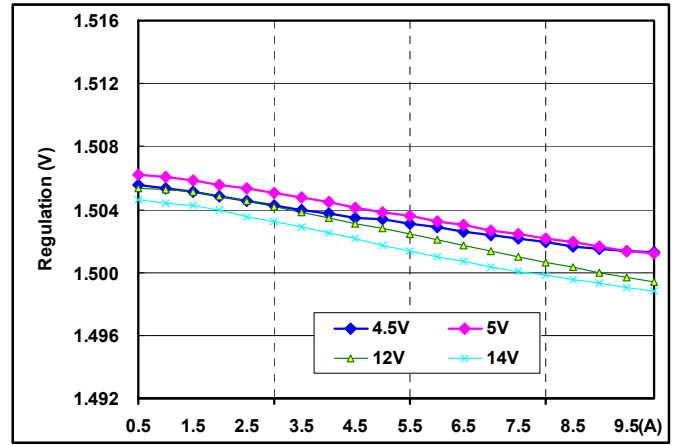**Short Circuit Protection, V$_{IN}$=12V**

Power Up with ON/OFF Control, V$_{IN}$=5V
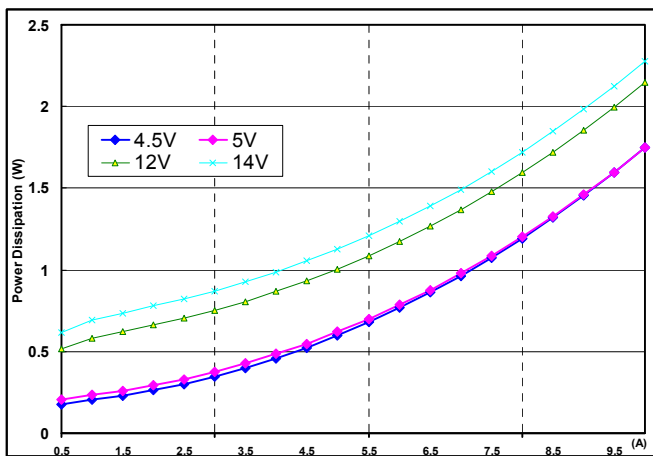**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Power Up with ON/OFF Control, V$_{IN}$=11V
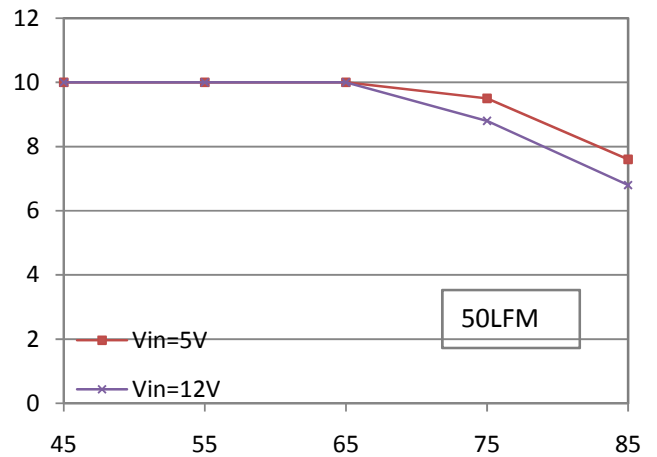**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**
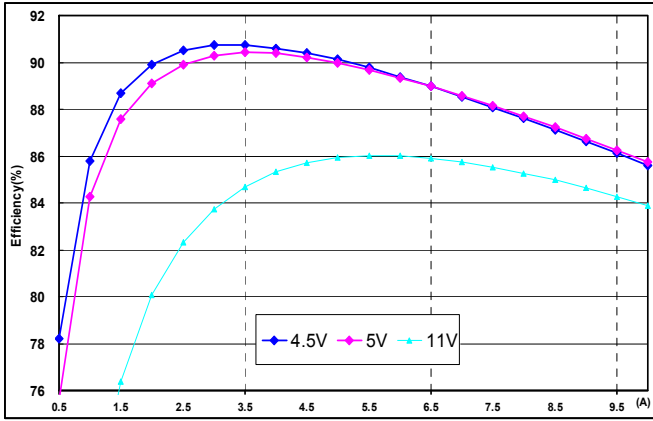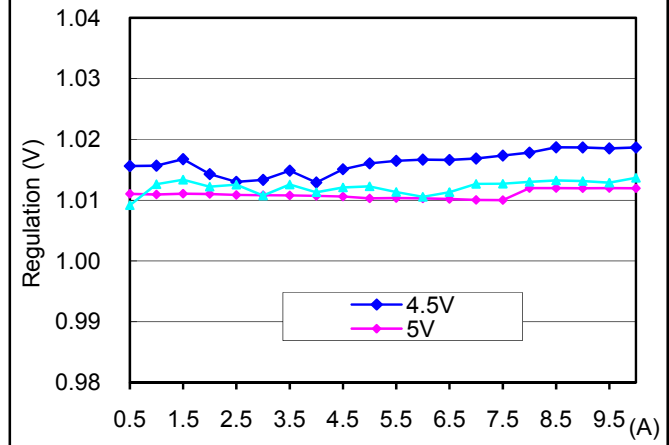
Efficiency vs. Load Current

Regulation
Output voltage vs. Load Current
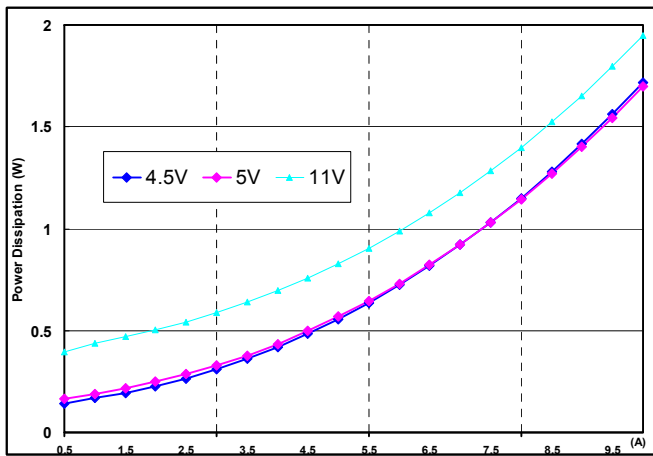
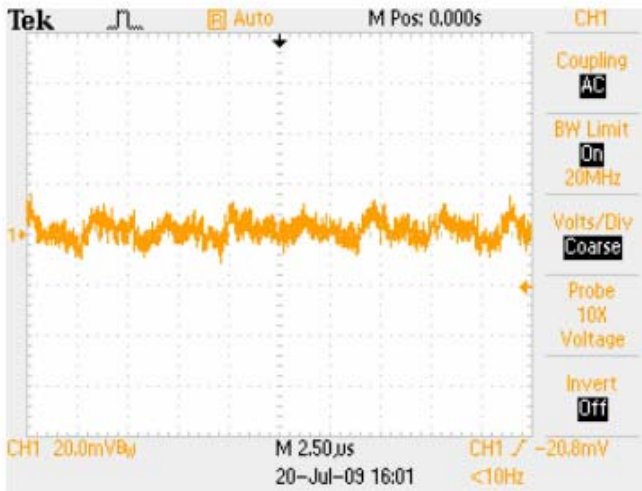**Power Dissipation vs. Load Current**
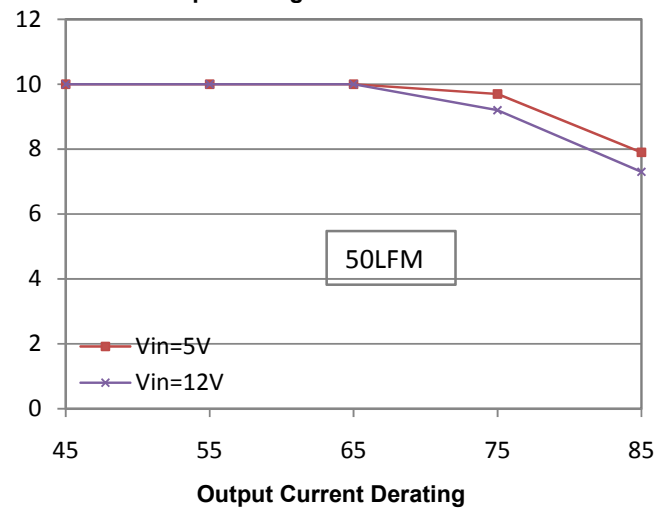
Output Current Derating
（Input filter:68uF/20V*3 TAN；
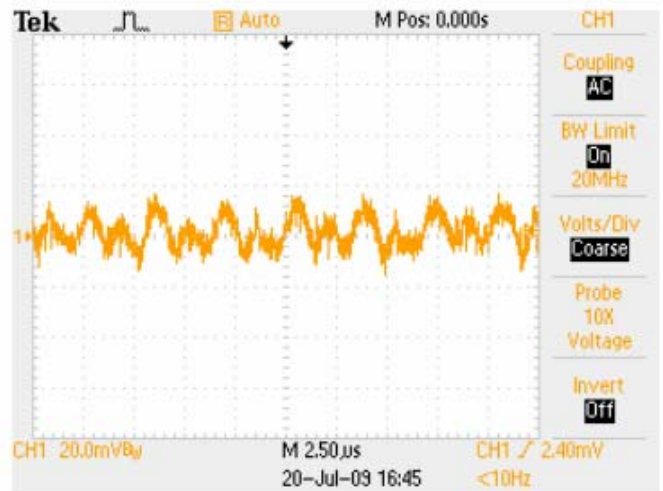Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 1.2V
General conditions:
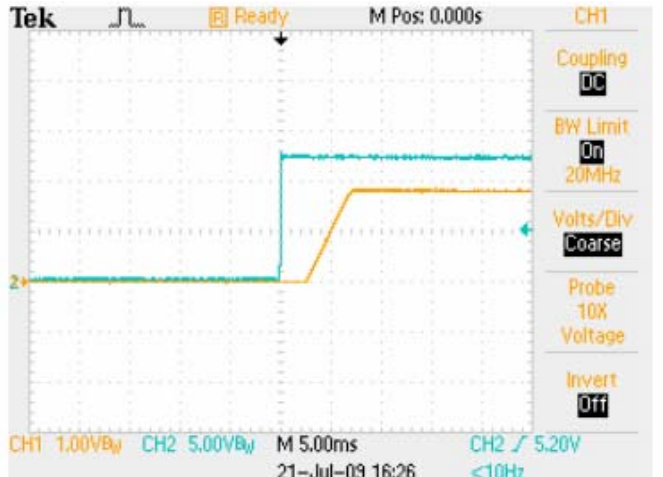Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2
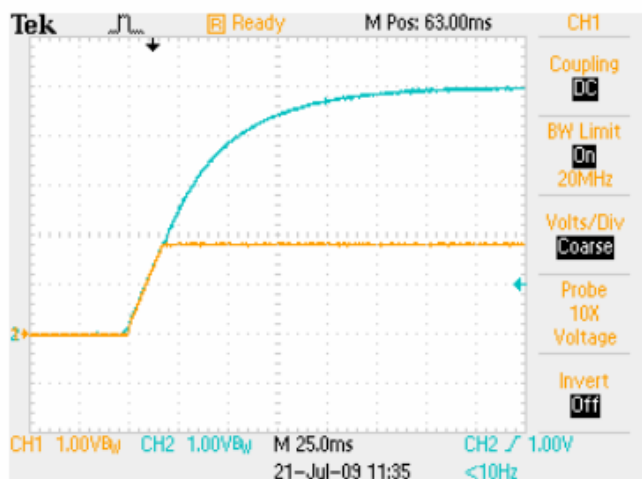

Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth
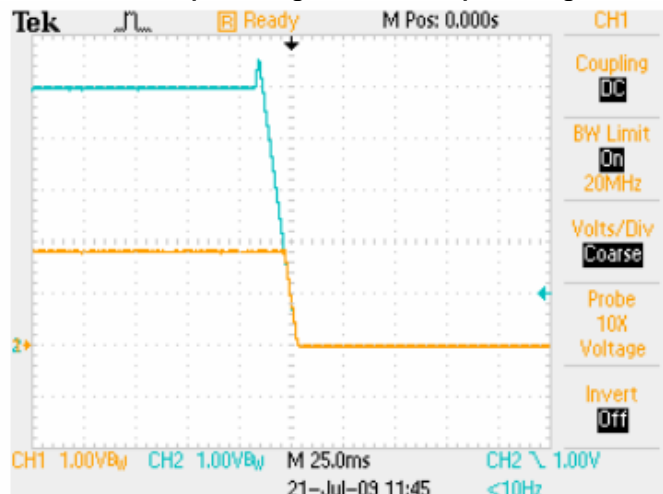

Noise V_{IN}=12V, I_O=10A, 5~20MHz Bandwidth

Start-up V_{IN}=5V, I_O=10A
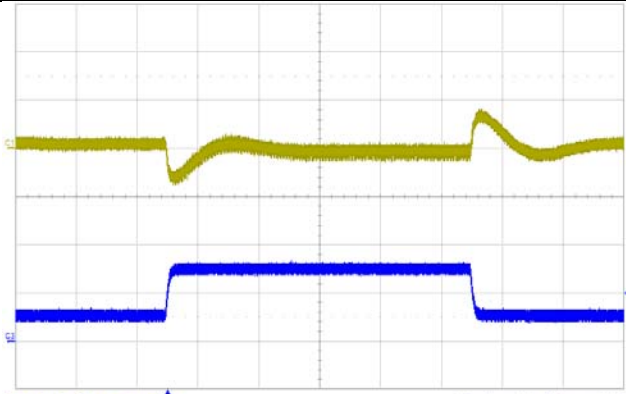**Yellow: Output Voltage   Blue: Input Voltage**

Start-up V_{IN}=12V, I_O=10A
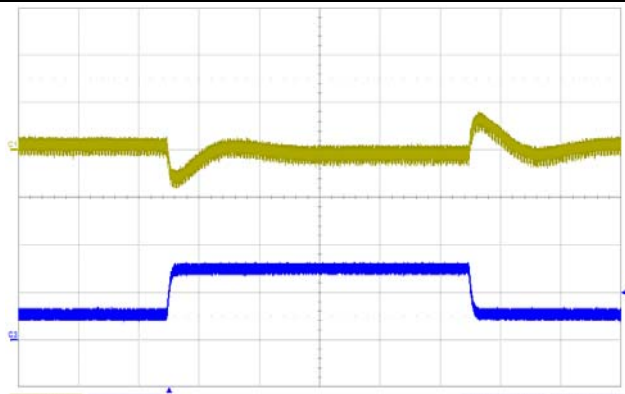**Yellow: Output Voltage   Blue: Input Voltage**

Power Up with *EasyTrack^TM* Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack^TM* Control Voltage   Yellow: Output Voltage
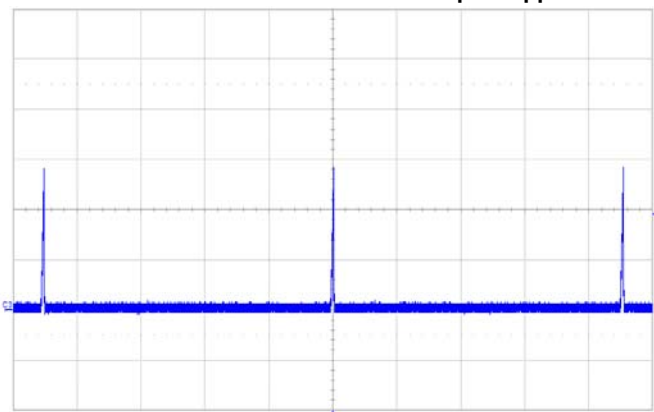

Power Down with *EasyTrack^TM* Control V_{Track}=5V, I_O=10A
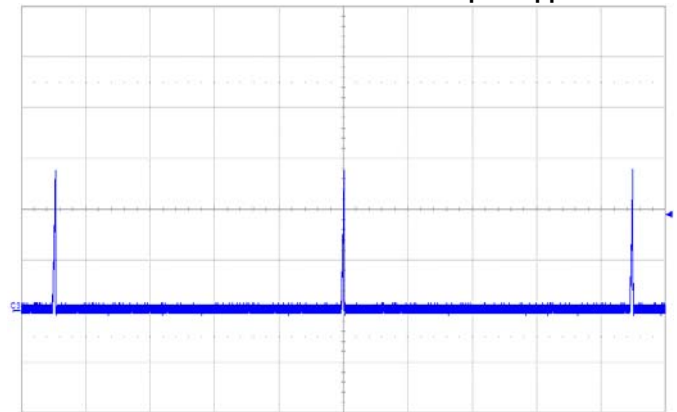**Blue: *EasyTrack^TM* Control Voltage   Yellow: Output Voltage**

Transient Response V$_{IN}$=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
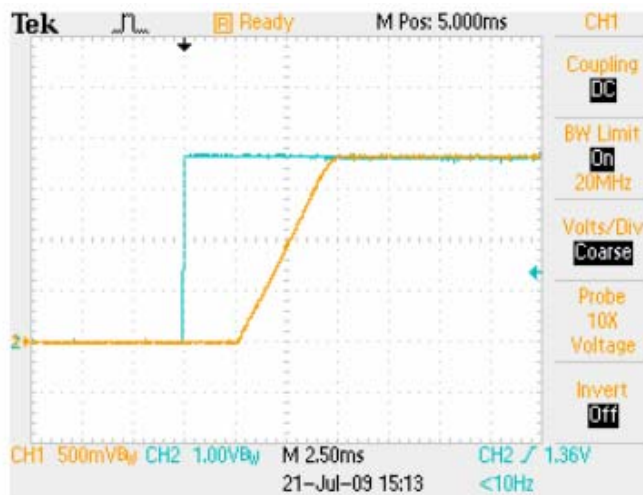**Blue: Load Current   Yellow: Output Ripple**

Transient Response V$_{IN}$=12V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple
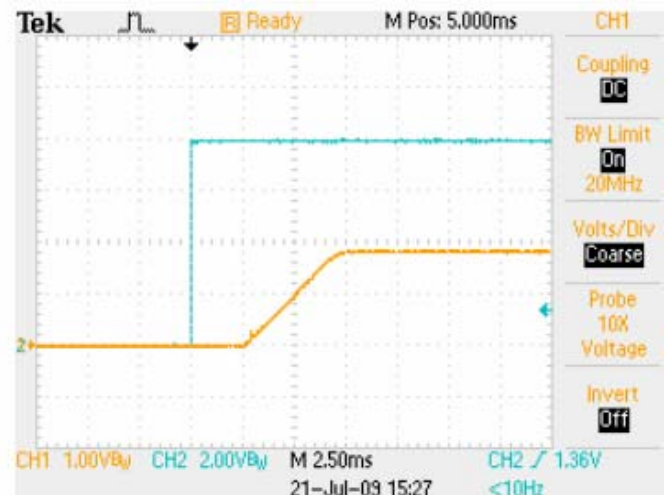

Short Circuit Protection, V$_{IN}$=5V

Short Circuit Protection, V$_{IN}$=12V

Power Up with ON/OFF Control, V$_{IN}$=5V
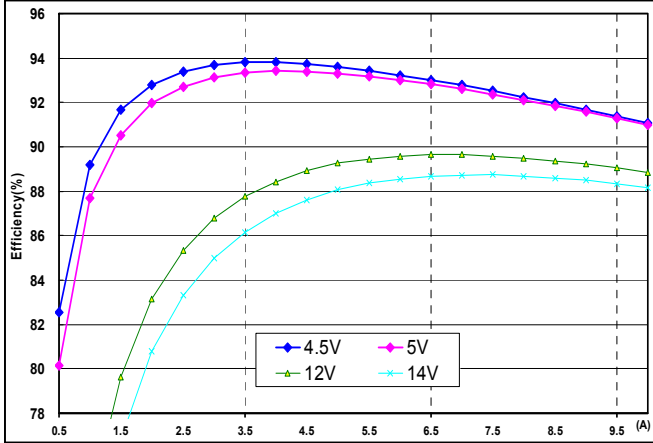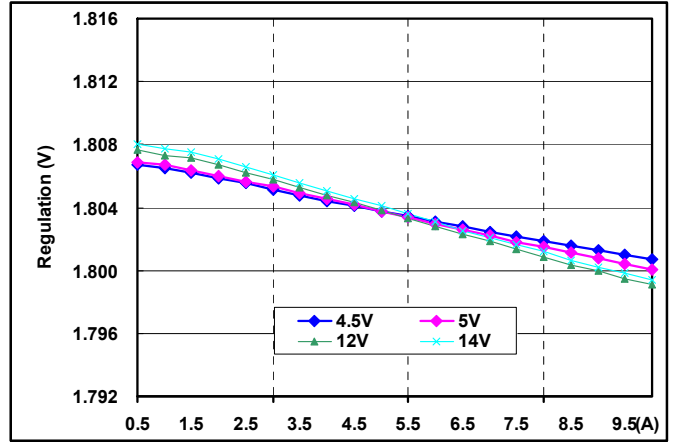**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Power Up with ON/OFF Control, V$_{IN}$=12V
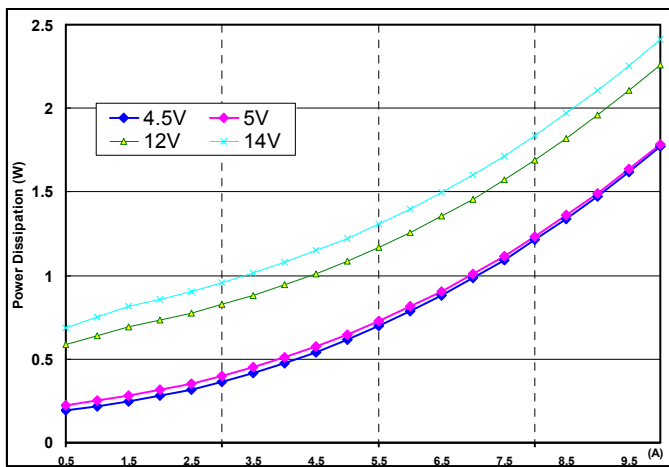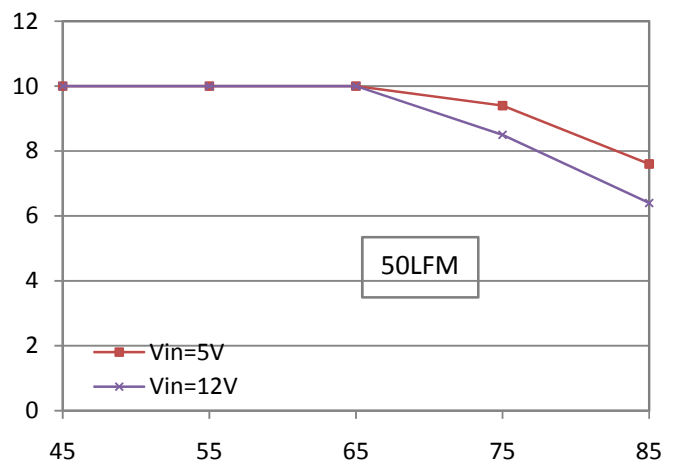**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Efficiency vs. Load Current

Regulation
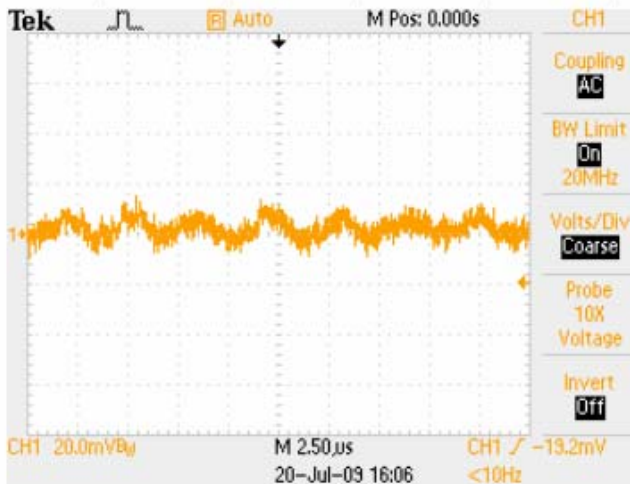Output voltage vs. Load Current

Power Dissipation vs. Load Current

Output Current Derating

（Input filter:68uF/20V*3 TAN；
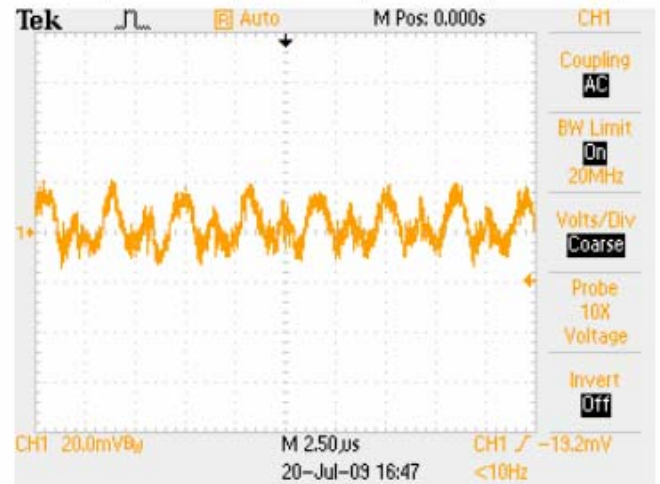Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 1.5V

General conditions:

Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2

Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth

Noise V_{IN}=12V, I_O=10A, 5~20MHz Bandwidth

Start-up V_{IN}=5V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

Start-up V_{IN}=12V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

Power Up with *EasyTrack*^{TM} Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack*^{TM} Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack*^{TM} Control V_{Track}=5V, I_O=10A
Blue: *EasyTrack*^{TM} Control Voltage   Yellow: Output Voltage

Transient Response V_IN=5V, Step from 2.5A~7.5A~2.5A,
Co=220uF
Blue: Load Current   Yellow: Output Ripple

Transient Response V_IN=12V, Step from 2.5A~7.5A~2.5A,
Co=220uF
Blue: Load Current   Yellow: Output Ripple

Short Circuit Protection, V_IN=5V

Short Circuit Protection, V_IN=12V

Power Up with ON/OFF Control, V_IN=5V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Power Up with ON/OFF Control, V_IN=12V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Efficiency vs. Load Current

Regulation
Output voltage vs. Load Current

Power Dissipation vs. Load Current

Output Current Derating
（Input filter:68uF/20V*3 TAN；
Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 1.8V
General conditions:
Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2
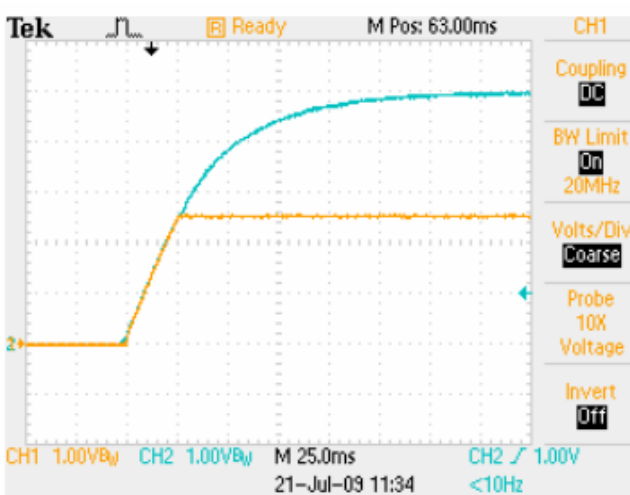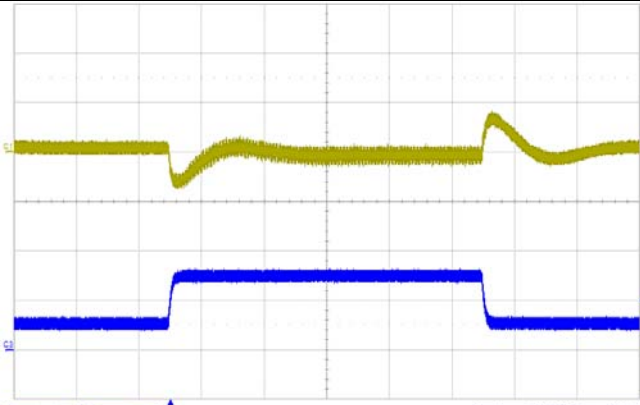

Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth

Noise V_{IN}=12V, I_O=10A, 5~20MHz Bandwidth

Start-up V_{IN}=5V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

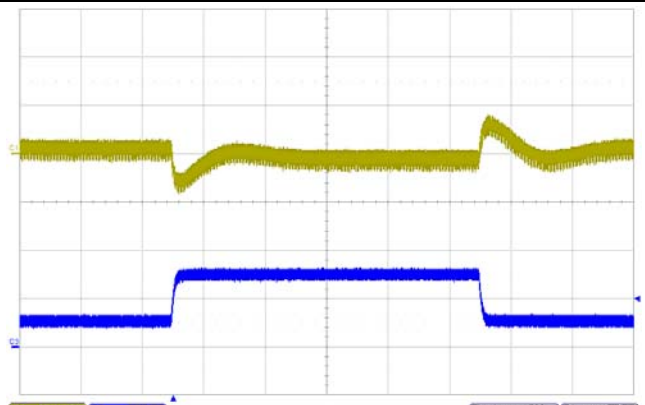**Start-up V_{IN}=12V, I_O=10A**
Yellow: Output Voltage   Blue: Input Voltage

Power Up with *EasyTrack*^TM^ Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack*^TM^ Control Voltage   Yellow: Output Voltage
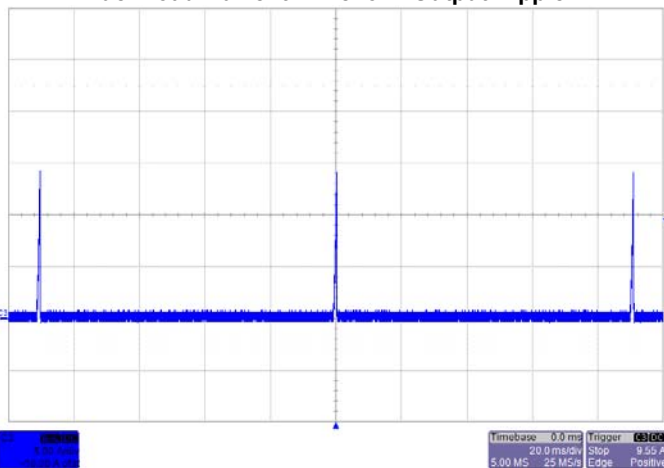

Power Down with *EasyTrack*^TM^ Control V_{Track}=5V, I_O=10A
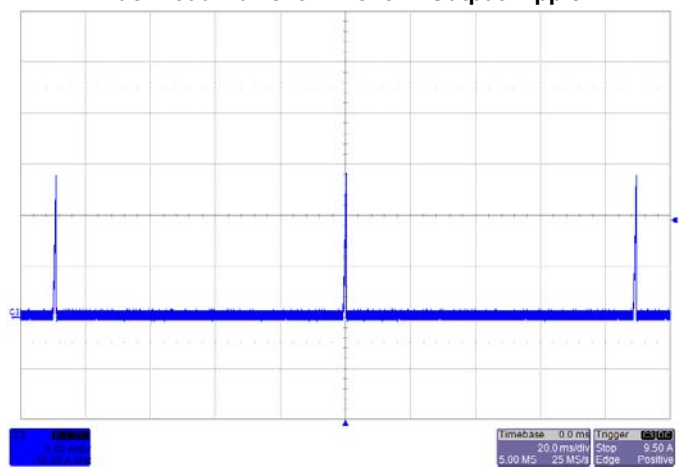**Blue: *EasyTrack*^TM^ Control Voltage   Yellow: Output Voltage**

Transient Response V$_{IN}$=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple

Transient Response V$_{IN}$=12V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple
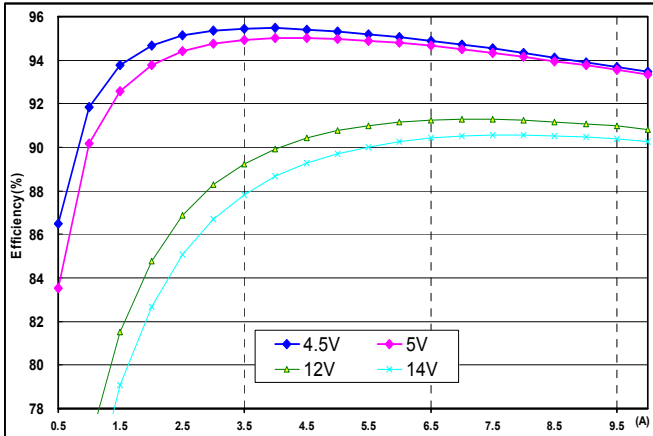

Short Circuit Protection, V$_{IN}$=5V
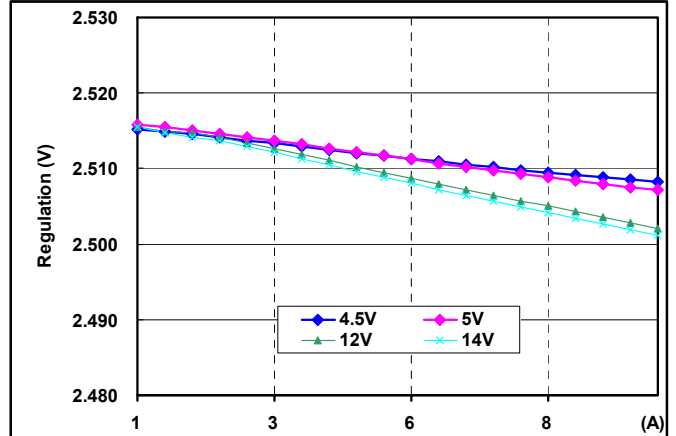

Short Circuit Protection, V$_{IN}$=12V

Power Up with ON/OFF Control, V$_{IN}$=5V
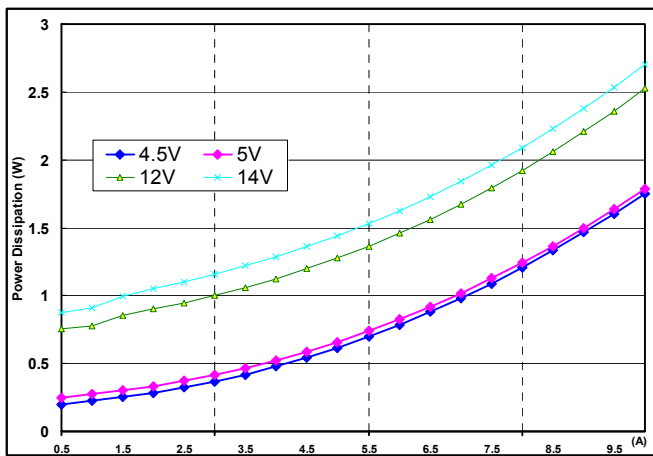**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Power Up with ON/OFF Control, V$_{IN}$=12V
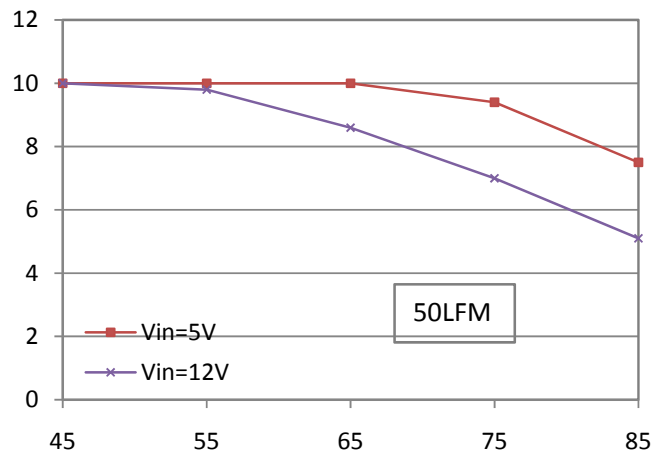**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Efficiency vs. Load Current

**Regulation
Output voltage vs. Load Current**
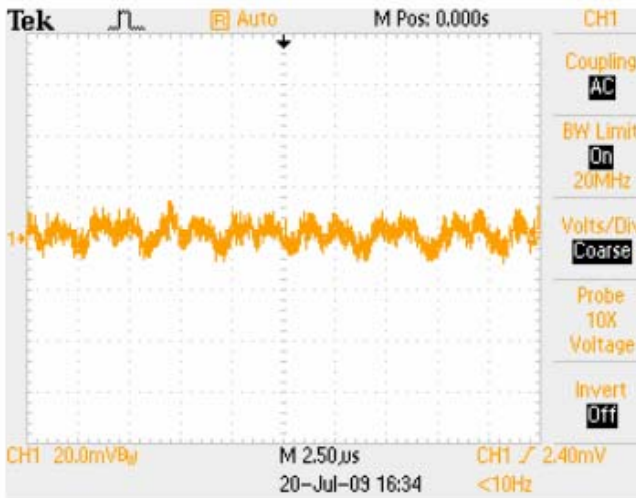
Power Dissipation vs. Load Current

50LFM

Output Current Derating
（Input filter:68uF/20V*3 TAN；
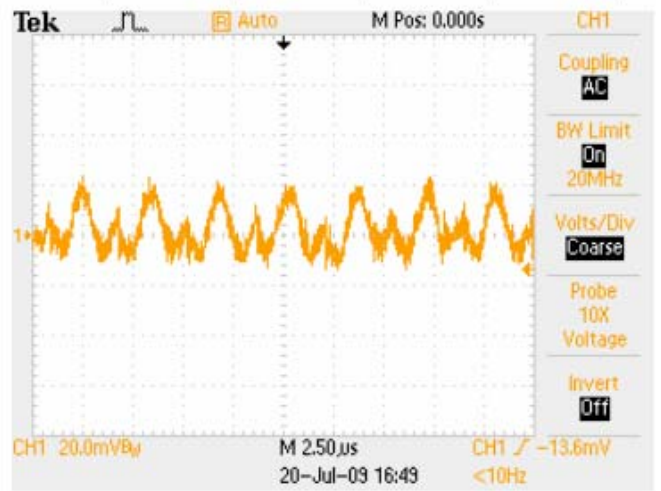Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 2.5V
General conditions:
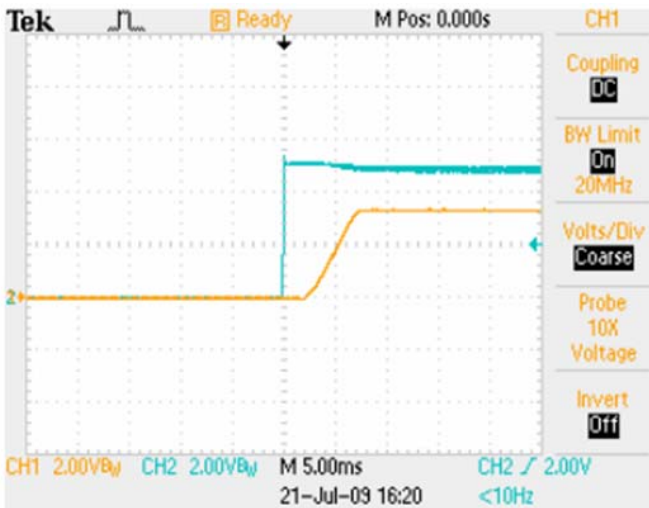Input filter 22μF Ceramic + 100μF TAN (100mΩ ESR), Output filter 22μF Ceramic*2 + 100μF TAN (100mΩ ESR)*2
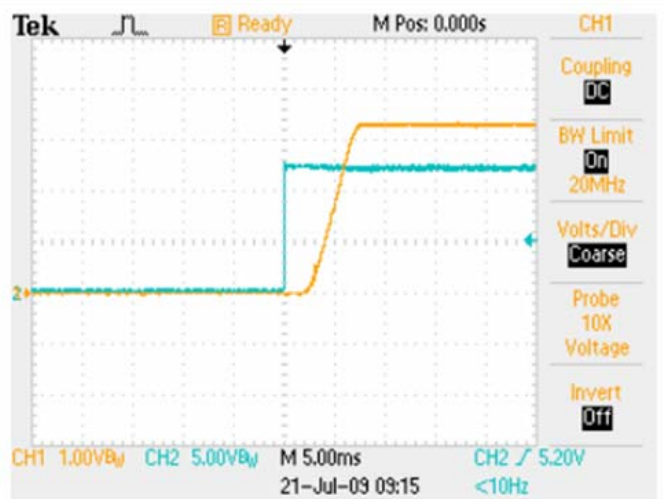

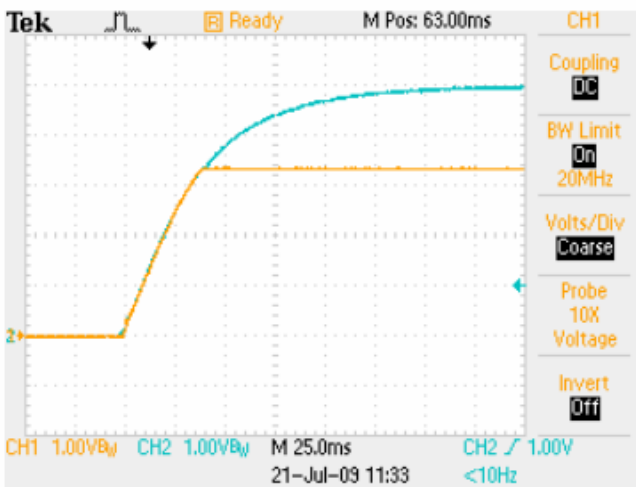Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth

Noise V_{IN}=12V, I_O=10A, 5~20MHz Bandwidth
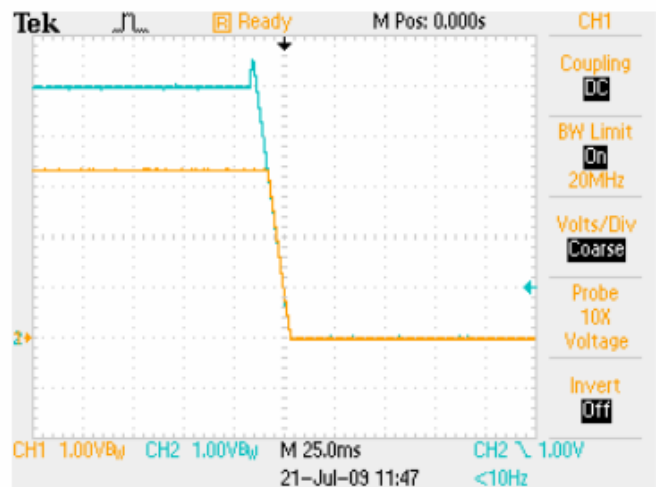

Start-up V_{IN}=5V, I_O=10A
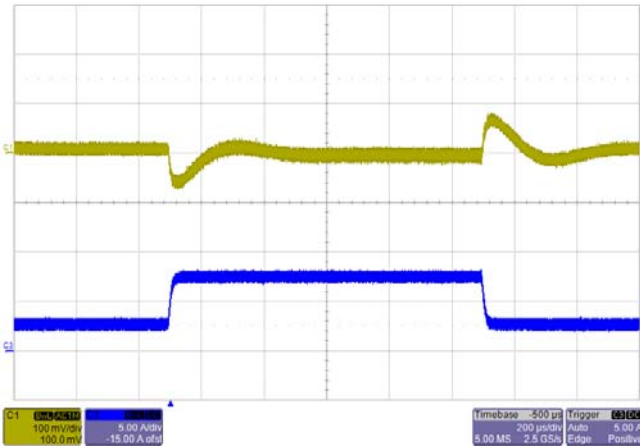Yellow: Output Voltage   Blue: Input Voltage

Start-up V_{IN}=12V, I_O=10A
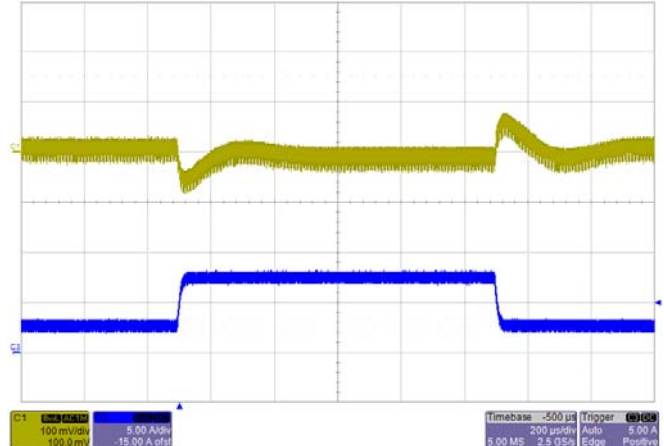Yellow: Output Voltage   Blue: Input Voltage

Power Up with *EasyTrack*[TM] Control V_{Track}=5.0V, I_O=10A
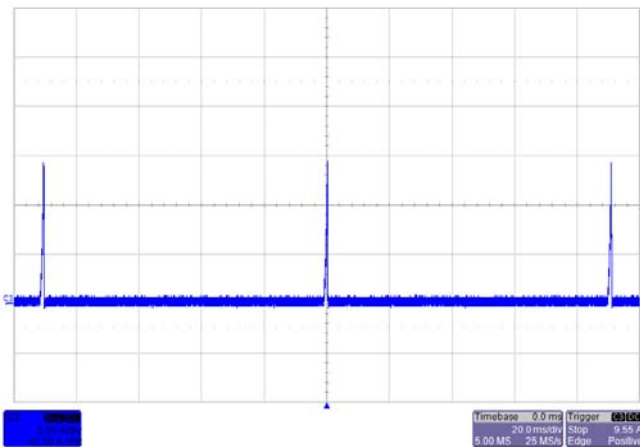Blue: *EasyTrack*[TM] Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack*[TM] Control V_{Track}=5V, I_O=10A
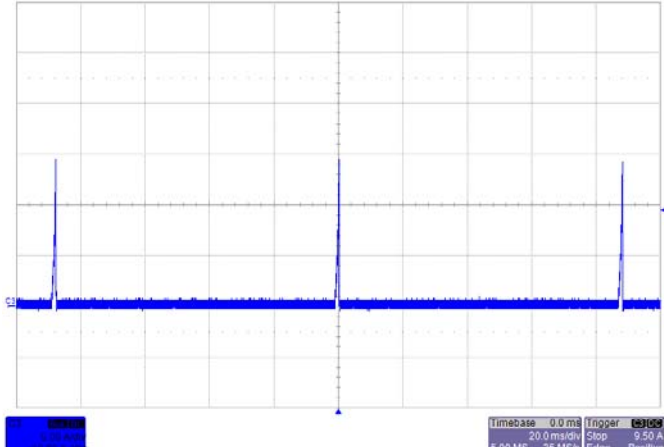Blue: *EasyTrack*[TM] Control Voltage   Yellow: Output Voltage

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Transient Response V_{IN}=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple

Transient Response V_{IN}=12V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple

Short Circuit Protection, V_{IN}=5V

Short Circuit Protection, V_{IN}=12V

Power Up with ON/OFF Control, V_{IN}=5V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Power Up with ON/OFF Control, V_{IN}=12V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Efficiency vs. Load Current

Regulation
Output voltage vs. Load Current

Power Dissipation vs. Load Current

Output Current Derating
（Input filter:68uF/20V*3 TAN；
Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 3.3V
General conditions:
Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2

Noise V_{IN}=5V, I_O=10A, 5~20MHz Bandwidth

Noise V_{IN}=12V, I_O=10A, 5~20MHz Bandwidth

Start-up V_{IN}=5V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

Start-up V_{IN}=12V, I_O=10A
Yellow: Output Voltage   Blue: Input Voltage

Power Up with *EasyTrack^{TM}* Control V_{Track}=5.0V, I_O=10A
Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack^{TM}* Control V_{Track}=5V, I_O=10A
Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage

Transient Response V_{IN}=5V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple

Transient Response V_{IN}=12V, Step from 2.5A~7.5A~2.5A, Co=220uF
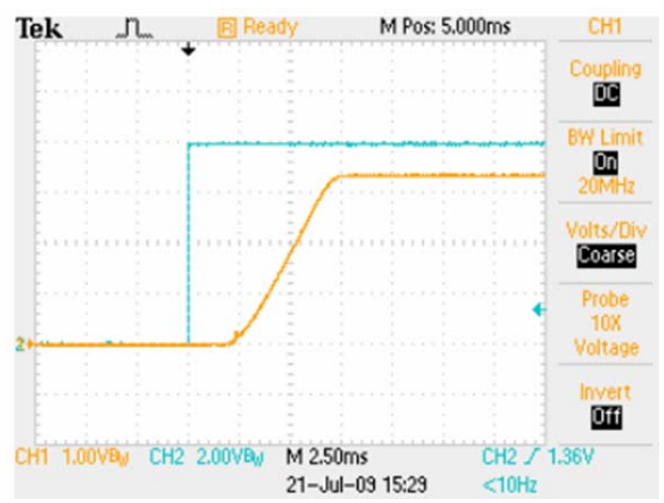**Blue: Load Current   Yellow: Output Ripple**

Short Circuit Protection, V_{IN}=5V
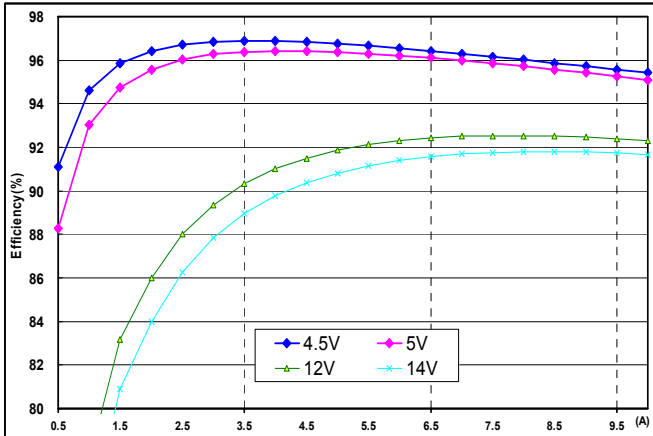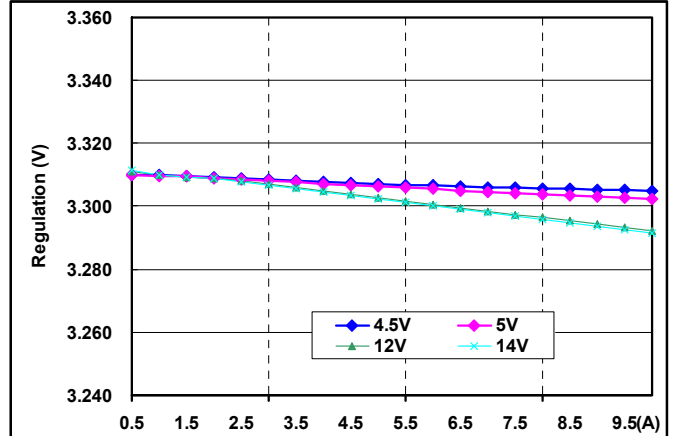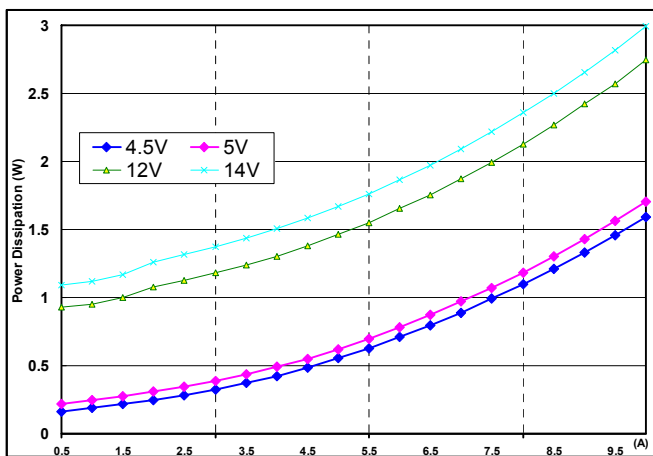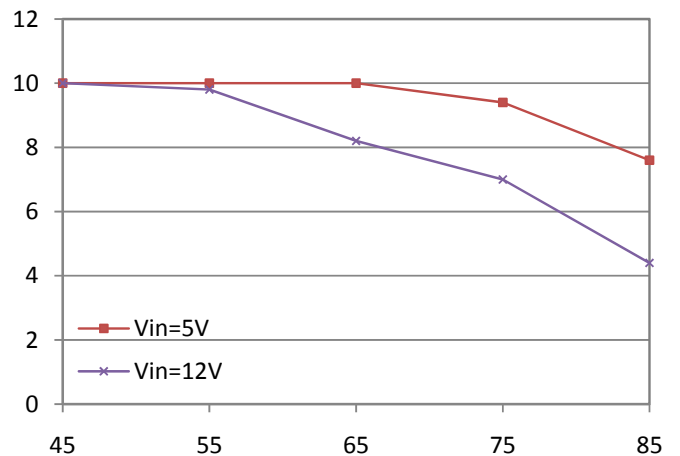
Short Circuit Protection, V_{IN}=12V

Power Up with ON/OFF Control, V_{IN}=5V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Power Up with ON/OFF Control, V_{IN}=12V
Blue: ON/OFF Control Voltage   Yellow: Output Voltage

Efficiency vs. Load Current

Regulation
Output voltage vs. Load Current

Power Dissipation vs. Load Current
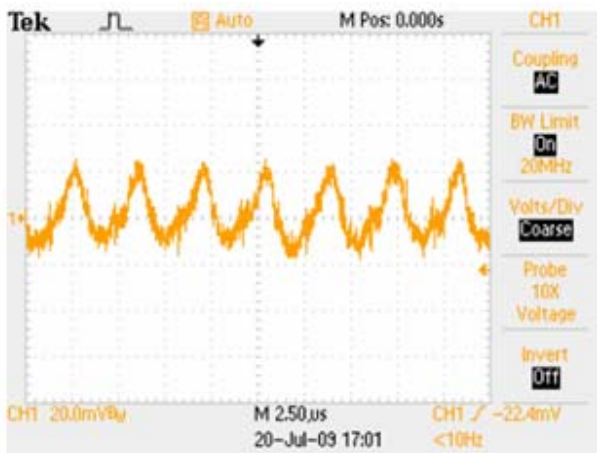

Output Current Derating

（Input filter:68uF/20V*3 TAN；
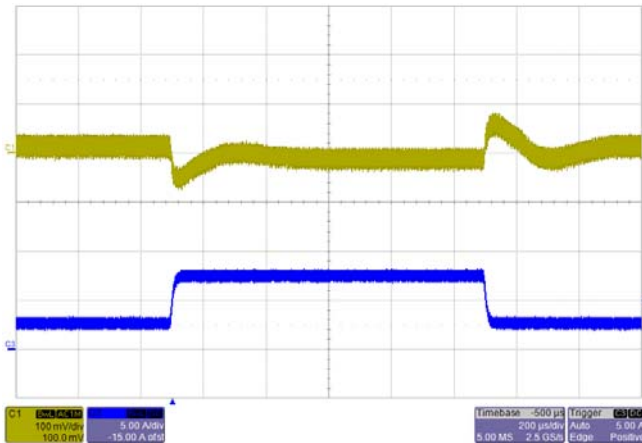Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）

Typical Characteristics–output adjusted to 5.0V
General conditions:
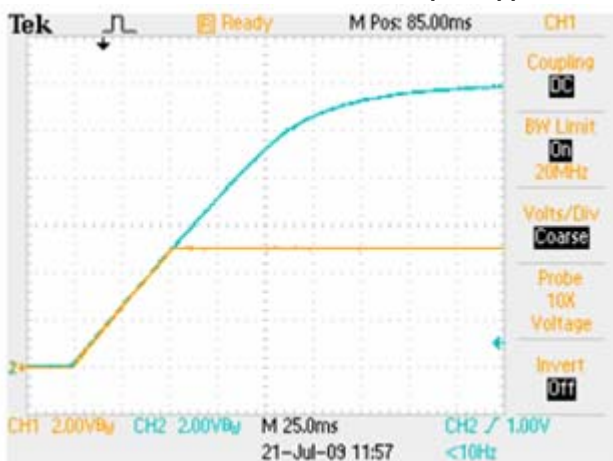**Input filter 22µF Ceramic + 100µF TAN (100mΩ ESR), Output filter 22µF Ceramic*2 + 100µF TAN (100mΩ ESR)*2**
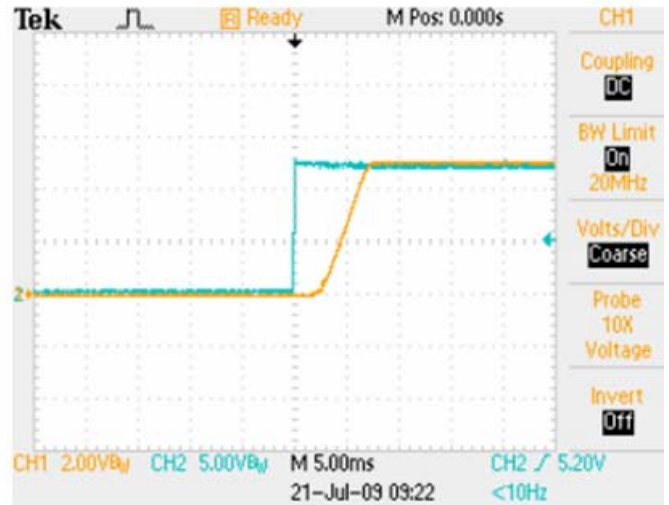

Noise V$_{IN}$=12V, I$_O$=10A, 5~20MHz Bandwidth

Start-up V$_{IN}$=12V, I$_O$=10A
Yellow: Output Voltage   Blue: Input Voltage

Transient Response V$_{IN}$=12V, Step from 2.5A~7.5A~2.5A, Co=220uF
Blue: Load Current   Yellow: Output Ripple

Short Circuit Protection, V$_{IN}$=12V

Power Up with *EasyTrack^{TM}* Control   V$_{Track}$=12V, I$_O$=10A
Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage

Power Down with *EasyTrack^{TM}* Control   V$_{Track}$=12V, I$_O$=10A
Blue: *EasyTrack^{TM}* Control Voltage   Yellow: Output Voltage

Union Microsystems
Tel: *+86 21 5109 5021*
Fax: *+86 21 5106 2878*
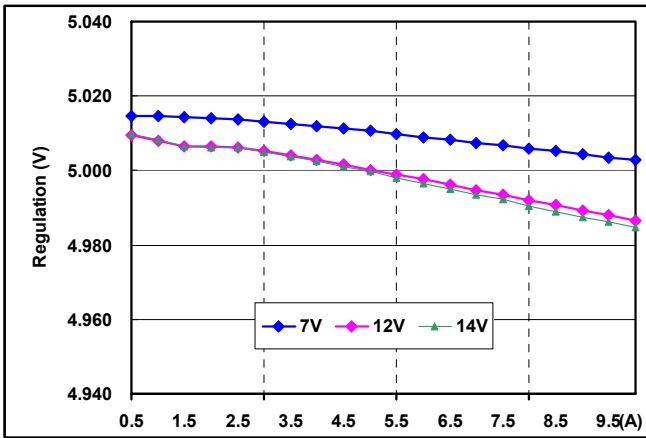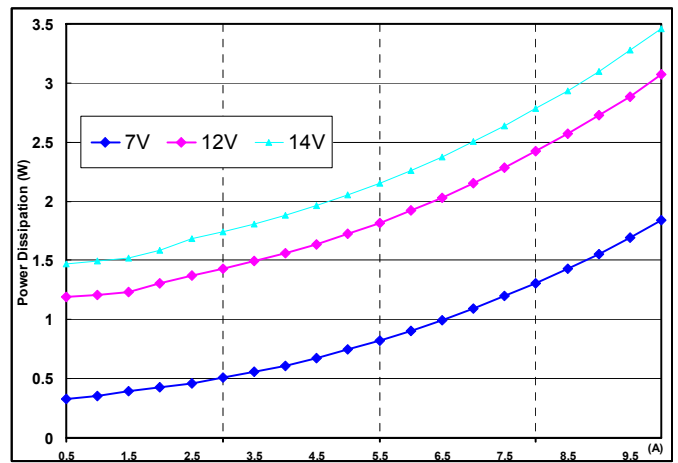sales@union-pwr.com
www.union-pwr.com

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Power Up with ON/OFF Control, V$_{IN}$=12V
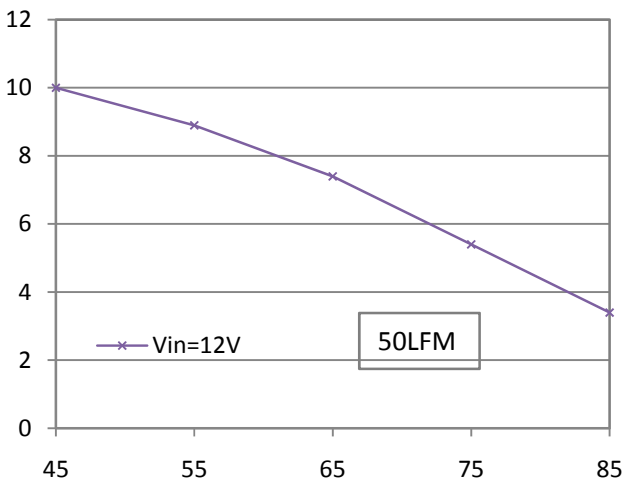**Blue: ON/OFF Control Voltage   Yellow: Output Voltage**

Efficiency vs. Load Current

Regulation
Output voltage vs. Load Current

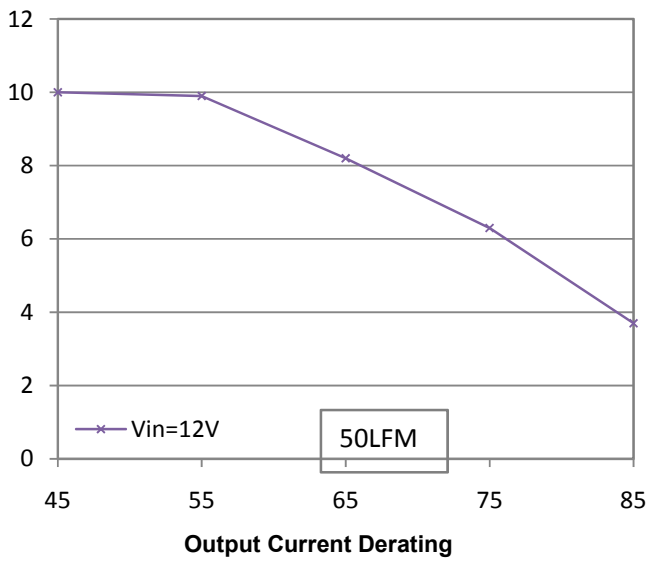**Power Dissipation vs. Load Current**

Output Current Derating
（Input filter:68uF/20V*3 TAN；
Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)）
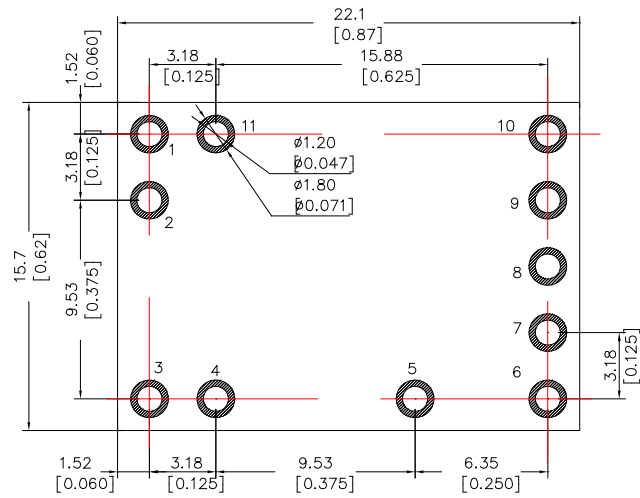
Typical Characteristics–output adjusted to 5.5V

Input filter:68uF/20V*3 TAN
Output filter:227/10V*4 TAN+47uF/6.3V*1 (陶瓷)

Output Current Derating
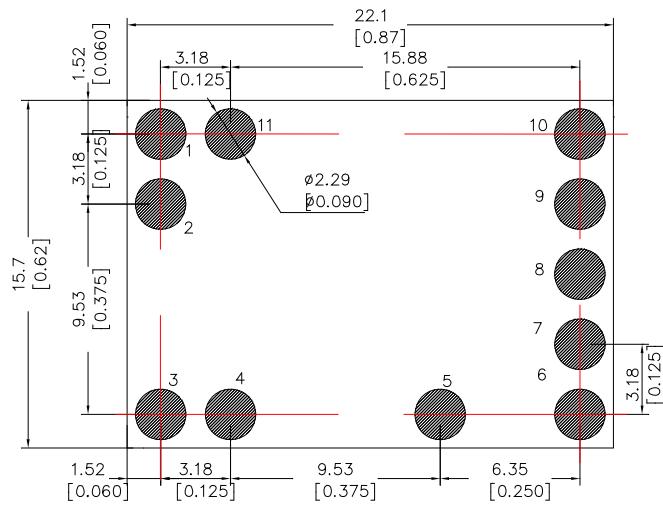
Recommended Patternfor "T" suffix

Dimensions are in mm (inches)

Component-side footprint

Recommended Patternfor "S" suffix

Dimensions are in mm (inches)

Component-side footprint

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