MQ7290R2
Non-isolated 4.5~14V/8~14VDC input, 0.7~3.6V/3~5.25V output, 50A/40A DC-DC Converter

APPLICATIONS

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

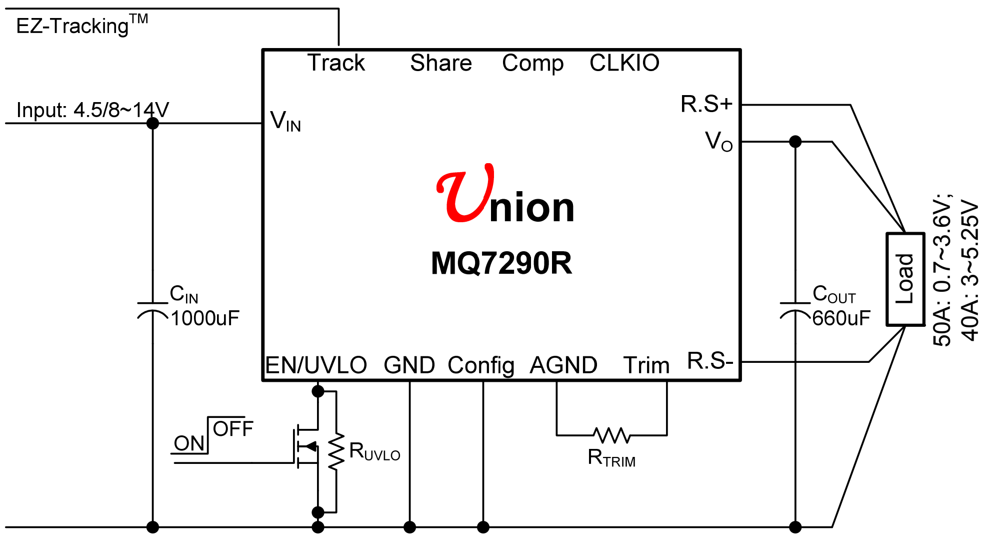
FEATURES

- Wide operating voltage:
  - MQ7290R2A: 4.5~14V
  - MQ7290R2B: 8~14V
- Output Voltage: 0.7~3.6V/3~5.25V
- Output Current up to
  - MQ7290R2A: 50A;
  - MQ7290R2B: 40A
- Output voltage ripple: 40mV$_{PP}$
- High Efficiency 96%
- Remote on/off control
- Overcurrent /shortcircuit protection
- Over-temperature protection
- Differential Remote Sense
- *EasyTrack*™
- High reliability: designed to meet 5 million hour MTBF
- Minimal space on PCB:
  - 38.6 mm x 25.9 mm x 10.6mm or
  - 1.52 in x 1.02in x 0.42in
- Operating Temperature: -40℃ to +85℃
- UL/IEC/EN60950 compliant
- RoHS Compliant available
- PoLA Pin Configuration

Description

The ***CompatXT™***MQ7290R2 series Power Modules are non-isolated dc-dc converters that operate over a wide input voltage range of4.5Vdc/8Vdc to 14Vdc and provide a precisely (2%) regulated dc output with industry standard pin configuration. Such a module is suitable to application with unregulated 5V and/or 12V power supply bus. The modules have a maximum output current rating of 50A at typical full-load efficiency over 96%. Standard features include remote on/off with positive logic and output voltage adjustment, over-current protection, over-temperature protection. Option features include through hole or SMD.

************************************** ***Typical Application Circuit*** *********************************

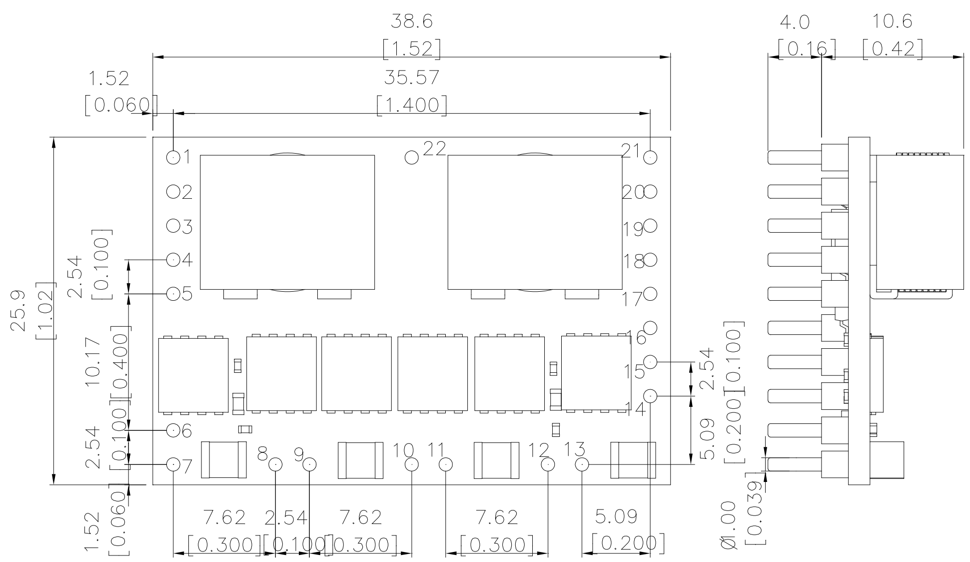


Performance Specifications(at TA=+25℃)

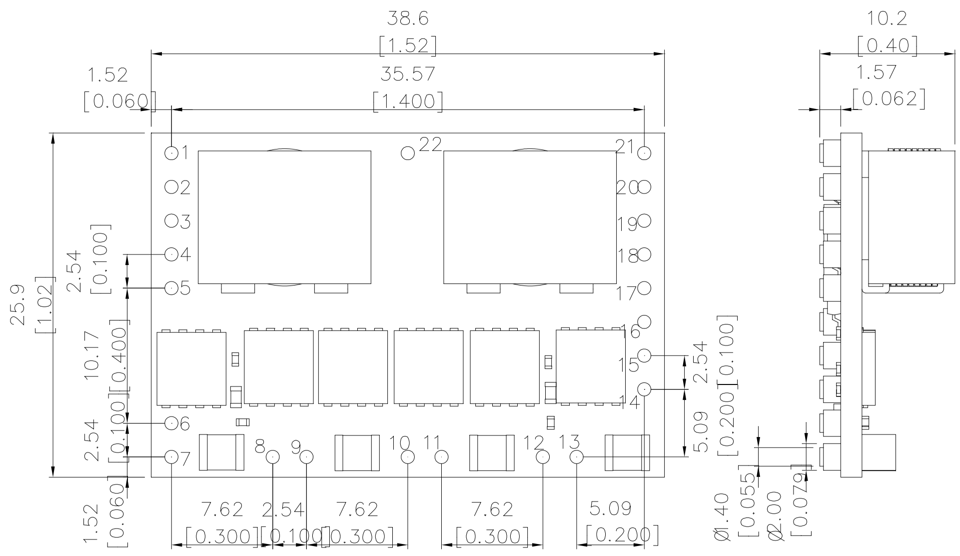
Model	Input V_{IN} Range (V)	Output				Efficiency (%)
		I_{OUT} (A)	TrimRange (V)	Regulation		
				Line (%)	Load (%)	
MQ7290R2AT	4.5 ~ 14	50	0.7 ~ 3.6	0.5	0.5	96
MQ7290R2AS						
MQ7290R2BT	8 ~ 14	40	3 ~ 5.25			95
MQ7290R2BS						

Mechanical Specifications

Dimensions are in millimeters (inches)



PIN	Desc
1	Config
8,9,12,13	GND
2	share
3	Comp
4	AGND
5	CLKIO
6,7,14,15	Vi
10,11	Vo
17	R.S+
16	R.S-
18	Trim
20	Track
21	EN/UVLO
19,22	Not used



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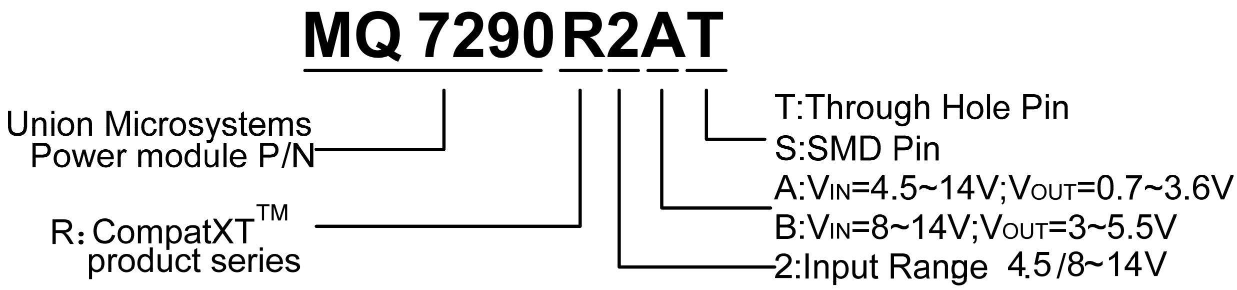
Ordering Information



PIN Description

PIN	Name	Description
1	Config	This pin is used to configure the module as either MASTER or SLAVE. To configure the module as the MASTER, connect this pin to GND when not sharing current. When two modules are connected together to share load current one must be configured as the MASTER and the other as the SLAVE.
8,9,12,13	GND	This is the common GND.
2	share	When two modules are paralleled, the pin of both modules must be connected together. When not paralleled, this pin **MUST** be left open (floating).
3	Comp	When two modules are paralleled, the pin of both modules must be connected together. When not paralleled, this pin **MUST** be left open (floating).
4	AGND	This pin provides the return path for the V_O Trim resistor (R_{SET}). When two modules are paralleled, the pin of both modules must be connected together. **Also, when two modules are paralleled, R_{SET} must be connected only on the MASTER module.**
5	CLKIO	When two modules are paralleled, the pin of both modules must be connected together. When not sharing current, this pin **MUST** be left open (floating).
6,7,14,15	Vi	Regulator's positive input.
10,11	Vo	Regulator's positive output.
17	R.S+	Remote sense positive input, allows the regulator to compensate for IR voltage droop at output positive trace.
16	R.S-	Remote sense negative input allows the regulator to compensate for IR voltage droop at output negative trace.
18	Trim	Connecting a resistor between this pin and pin4 (AGND) to set the output voltage.
20	Track	This input enables the output voltage to follow an external control signal which becomes active typically 25 ms after a valid input voltage has been applied, and allows direct control of the output voltage from 0 V up to the set-point voltage. If this function not used, just left it floating or connecting to Vin.
21	EN/UVLO	The EN pin is an open-collector/drain, negative logic input that is referenced to GND. Applying a low level ground signal to this input disables the module's output and turns off the output voltage. If the EN pin is left open-circuit or floating, the module produces an output whenever a valid input source is applied. This pin is also used to program input undervoltage lockout (UVLO) by connecting a resistor from this pin to AGND allows the ON threshold of the UVLO to be adjusted higher than the default value.
19,22	Not used	No connection inside.

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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	℃

MQ7290R2 Electrical Specifications: *(T_A=+25°C)*

Parameter	Condition	Symbol	Min	Typ.	Max	Unit
InputVoltageRange	MQ7290R2A	V_{IN}	4.5		14	V
	MQ7290R2B		8		14	
Output Current	MQ7290R2A	Io	0		50	A
	MQ7290R2B				40	
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					0.5	V
Line Regulation	See each output's corresponding character figure					
Load Regulation						
Output Ripple and Noise Voltage	Io=20A,0~20MHz（***Detail Please see corresponding figure***）					
Transient Response						

General Specifications

Parameter	Condition		Symbol	Min	Typ.	Max	Unit
Maximum Capacitive Load	50A resistive load + Aluminum capacitor				Tbd		μF
	50A resistive load +Sanyo POSCAP				Tbd		
Overcurrent Protection				80		120	A
Output short-circuit current (average)	All					5	A
Under Voltage Lockout Trip Level	Rising and falling V_{IN}, 3% hysteresis	MQ7290R2A				4.3	V
		MQ7290R2B				7.5	
Start-up Delay					20		mS
Start-up Time	50A resistive load, no external output capacitors				2	5	mS
Switching Frequency			Fo	300	350	400	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

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Test Configurations

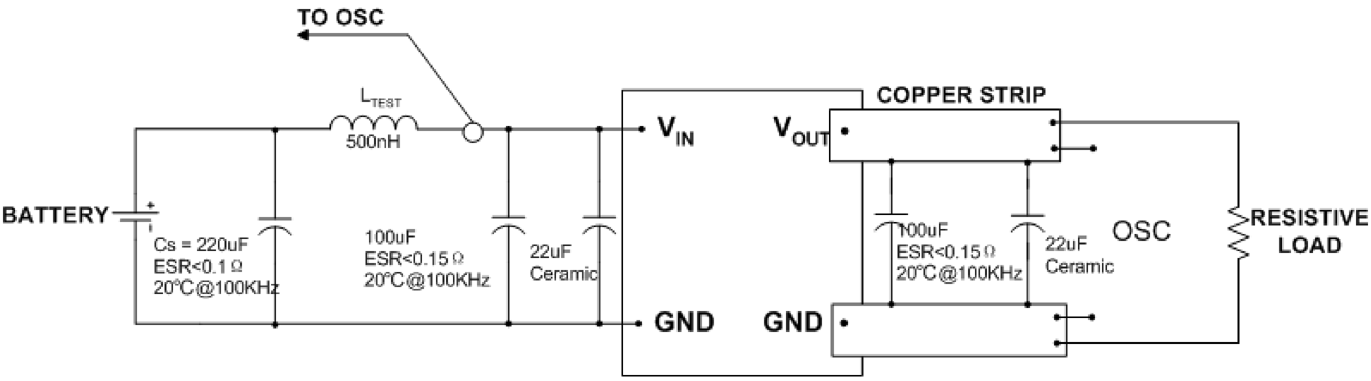

Fig 1 Test setup for input noise, output noise and ripple

Note:

Output noise is measured with 0.1μ F ceramic capacitor connected at the output. OSC measurement shouldbe made using a BNC socket. Position the load between 50mm and 75mm（2in. and 3in）from the testedmodule.

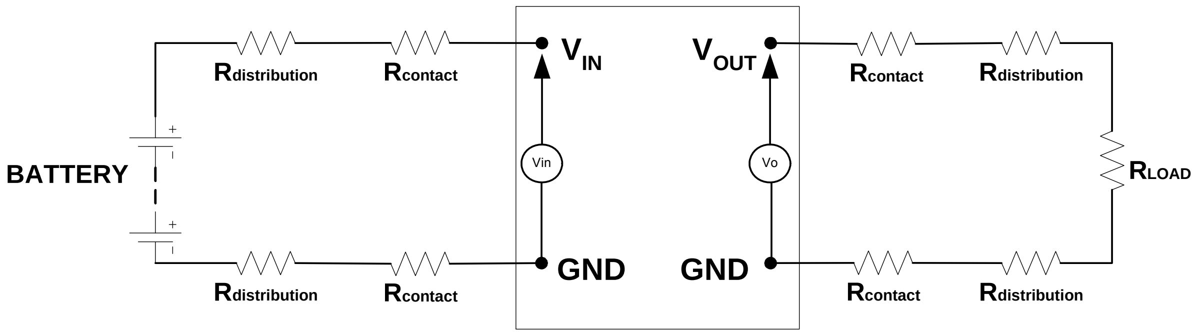

Fig 2 Test setup for efficiency

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 POLA-series products. ***EasyTrack***TMwas 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, that use dual-voltage VLSI ICssuch as DSPs, micro-processors, and ASICs.

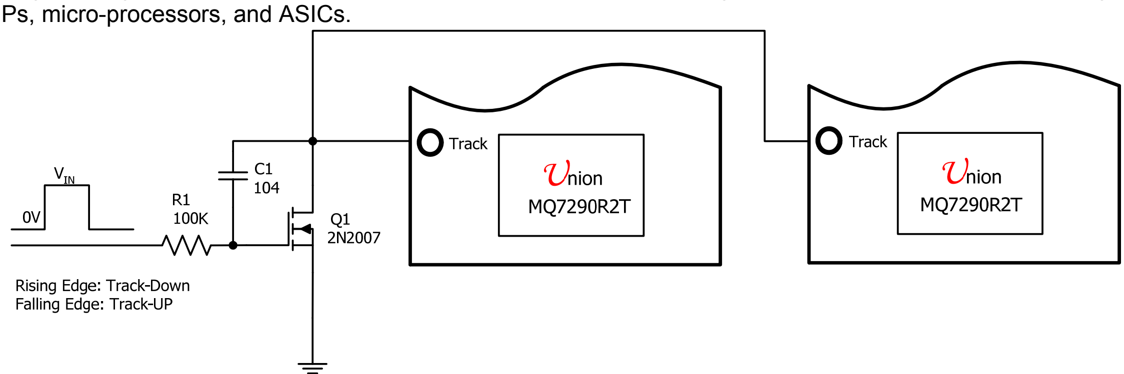

Fig3 SimultaneousPower Up and Power Down Using *EasyTrack*TM

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How EasyTrack™ Works

EasyTrack™ works by forcing the module's output voltageto follow a voltage presented at the **EasyTrack™** control pin. Thiscontrol range is limited to between 0 V and the module'sset-point voltage. Once the **EasyTrack™** control pin voltage is raisedabove the set-point voltage, the module's output remainsat its set-point. As an example, if the **EasyTrack™** control pin of a 3.3-Vregulator is at 1.2V, the regulated output will be 1.2V. Butif the voltage at the **EasyTrack™** control pin rises to 4V, the regulatedoutput will not go higher than 2.5V.When under **EasyTrack™** control, the regulated output fromthe module follows the voltage at its **EasyTrack™** control pin on a volt- for-volt basis. By connecting the**EasyTrack™** 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™** control incorporatesan internal RC charge circuit. This operates offthe module's input voltage to provide a suitable risingvoltage ramp waveform.

InputVoltageRange

The*MQ7290R2*Series can be used in a wide variety of applications, esp. most of unregulated 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.

Return Current Paths

The *MQ7290R2*Series arenon-isolated DC/DC converters. ALL Common pins are connected to each other internally. To the extent possible with the intent of minimizing ground loops, input return current should be directed through pin 1,3 (also referred to as---Input or Input Return), and output return current should be directed through pin 7,10 (also referred to as---Output or Output Return) as short as possible.

I/O Filtering

All the specifications of the MQ7290R2Series 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 MQ7290R2 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.

MQ7290R2'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 MQ7290R2'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 MQ7290R2 Series 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 either slow-blow or normal-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

MQ7290R2'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

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MQ7290R2 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 little 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 MQ7290R2's specified rating. Therefore:

V_{OUT} (at pins) x I_{OUT} ≤P (rated output power)

Enable Control

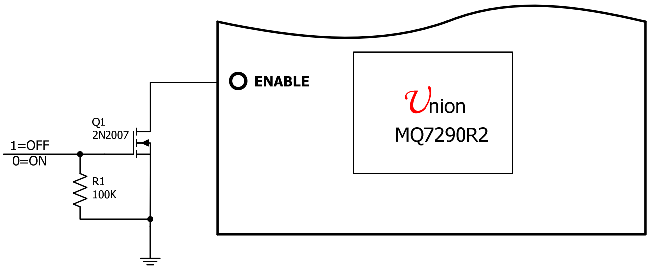

Fig 4, Remote Enable Implementation with Open Drain transistor

The MQ7290R2 power modules featurean Enable pin 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 Figure 4.

ADJUSTING THE UVLO

The MQ7290R2 power modules incorporate UVLO (input under-voltage lockout) to preventthe module operating with insufficient input voltage, and ensure the module with clean and monotonic output, and limit the inrush current from input source duringpower-up.

The modules implement UVLO and Enable function with same PIN, so when voltage's on the PIN is lower than UVLO's ON threshold ($V_{ON.THD}$), the Enable control will be ignored and the module is OFF.To prevent start-up oscillations, 100mV hysteresis voltage is set between the ON and OFF thresholds.

The UVLO's ON threshold voltage can be adjusted by using one resistor from EN/UVLO pin to ground, refer to Figure 5. When the Pin is left open or just one open-drain transistor connected (like Figure 5), the ON threshold is **4.3V for MQ7290R2A, or 7.2V for MQ7290R2B**.

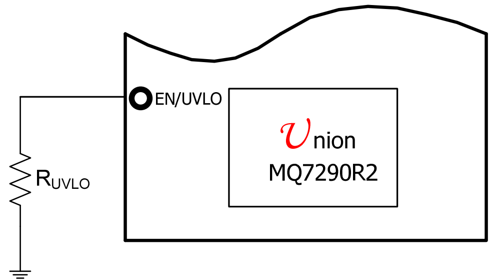

Fig 5, Set new UVLO threshold

Following Equation is used to determine the value of $R_{UVLO}$for required $V_{ON.THD}$.

$$R_{UVLO} = \frac{R_{DEFAULT}}{V_{DESIRED} - V_{DEFAULT}}$$

Unit for R_{UVLO} is kΩ.
$V_{DESIRED}$ is required UVLO ON voltage.
For MQ7290R2A, $R_{DEFAULT}$=230, $V_{DEFAULT}$=4.3V
For MQ7290R2B, $R_{DEFAULT}$=250, $V_{DEFAULT}$=7.2V

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

For MQ7290R2A

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

For MQ7290R2B

V_{THD}(V)	8.0	8.5	9.0	9.5	10.0	10.5	11.0
R_{UVLO}(KΩ)	357	210	147	113	93.1	78.7	68.1

Output Over-voltage Protection

MQ7290R2 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)

MQ7290R2 incorporates overcurrent and short circuit protection. If the load current exceeds the overcurrent protection setpoint, the MQ7290R2's internal overcurrent-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 5A.

Caution**：**Be careful never to operate MQ7290R2 in a "heavy overload" condition that is between the rated output current and the over current protection setpoint. This can cause permanent damage to the components.

Over temperature Protection (OTP)

To ensure MQ7290R2's reliability and avoid damaging its internal components，MQ7290R2 incorporates over-temperature protection circuit。When the temperature of the PCB is above 125℃, the over temperature protection circuit will be enabled and the module will stop working. When the temperature of the temperature-testing component is below about 80℃, the over temperature protection circuit will release and the module will automatically recover from shutdown. To avoid permanently damaging components, the surface temperature of MQ7290R2's power components, esp. of the MOSFET (T_{REF} in Fig6) should be ensured below 125℃.

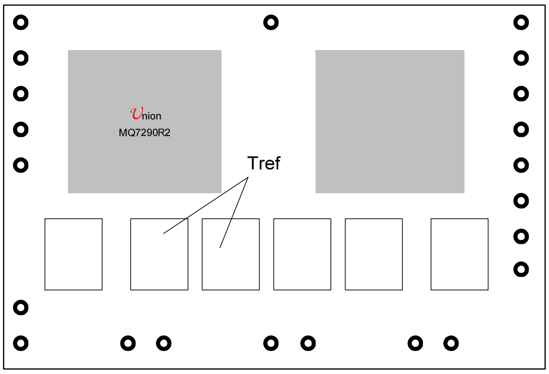

Fig 6, Temperature Reference Point

Note**：**The over temperature protection may be issued when MQ7290R2 operates in a "heavy overload" condition for a long time. Thus, the airflow should be improved.

Output Voltage Trimming

MQ7290R2A's output voltage can be trimmed in certain ranges. See Figure 7 for the programming method. See performance Specifications for allowable trim ranges in detail. Also customized products are offered.

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

For MQ7290R2A:

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$$R_{TRIM} = \frac{21070}{V_O - 0.7} - 6490$$

For MQ7290R2B:

$$R_{TRIM} = \frac{21070}{V_O - 2.807} - 8250$$

Resistor values are in Ω; V_O is desired output voltage.
If trim the output of MQ7290R2A to 1.5V, then

$$R_{TRIM} = \frac{21070}{1.5 - 0.7} - 6490 = 19847.5$$

So, R_{TRIM} =19.6kΩ

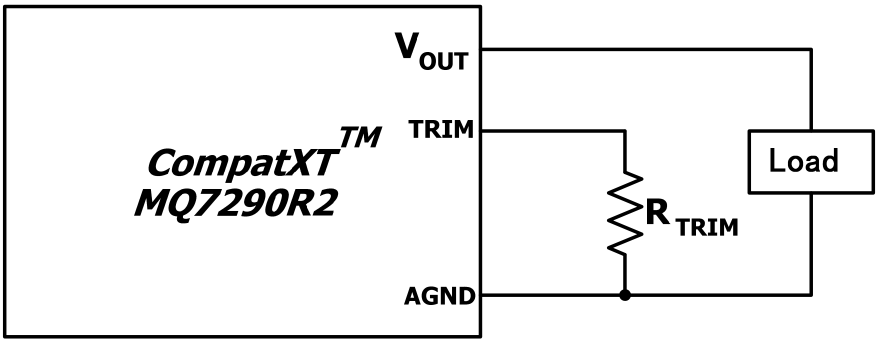


Fig7. Circuit configuration for programming output voltage using external resistor

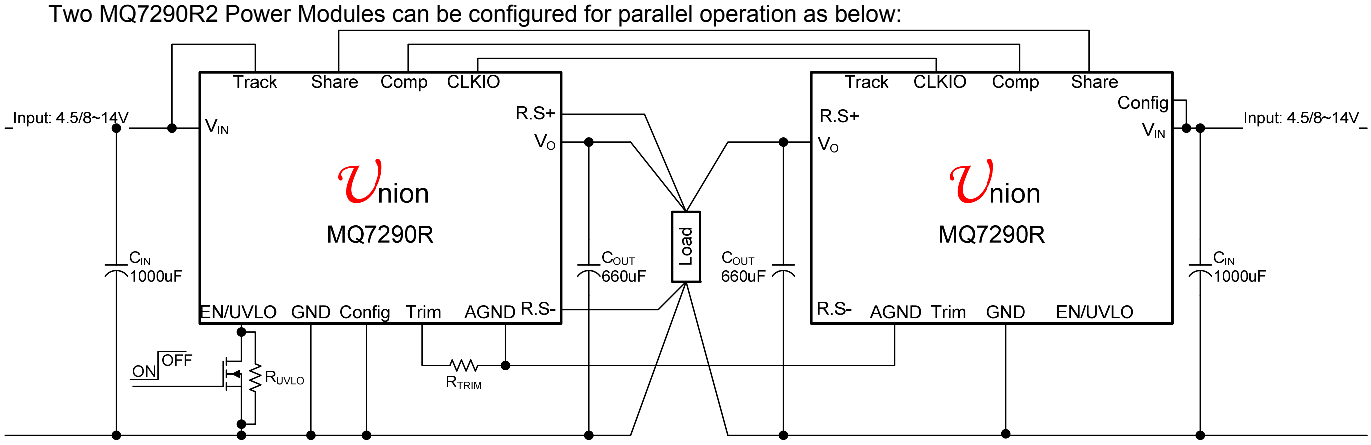
For most common voltages, the required Trim resistors as Table 2.

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

R_{TRIM}	V_{OUT} MQ7290R2A	R_{TRIM}	V_{OUT} MQ7290R2B
Open	0.7V	100k	3.0V
63.4k	1.0V	34k	3.3V
35.7k	1.2V	18.2k	3.6V
19.6k	1.5V	6.81k	4.2V
12.7k	1.8V	4.22k	4.5V
5.23k	2.5V	2.32k	4.8V
1.62k	3.3V	1.37k	5.0V
205Ω	N/A	374Ω	5.25V

Parallel operation

Two MQ7290R2 Power Modules can be configured for parallel operation as below:



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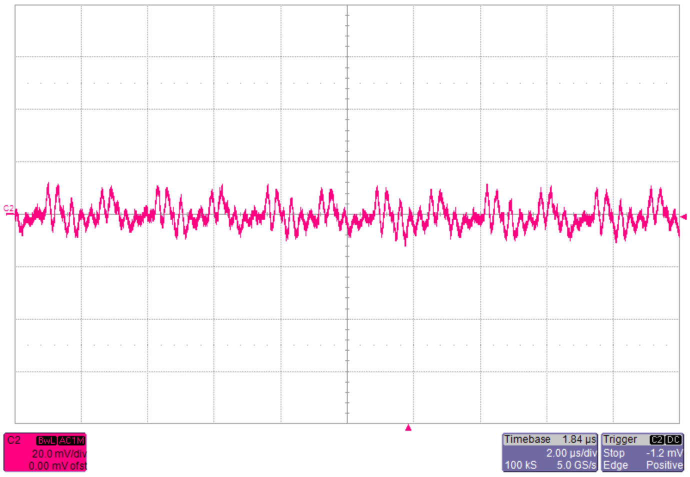
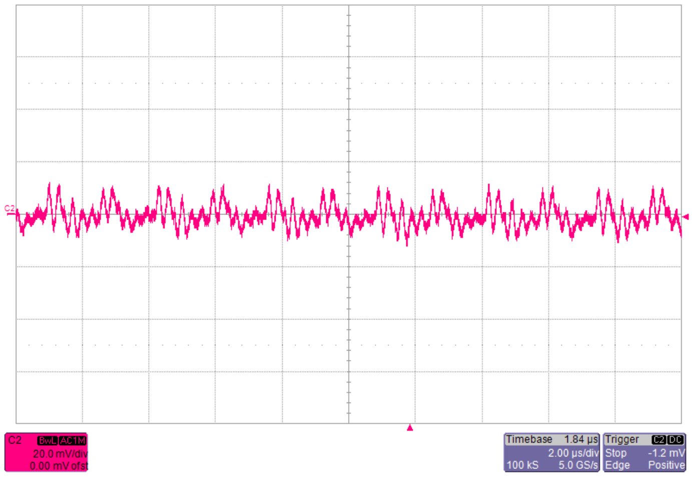
Typical Characteristics– output adjusted to0.7V

General conditions(MQ7290R2A):

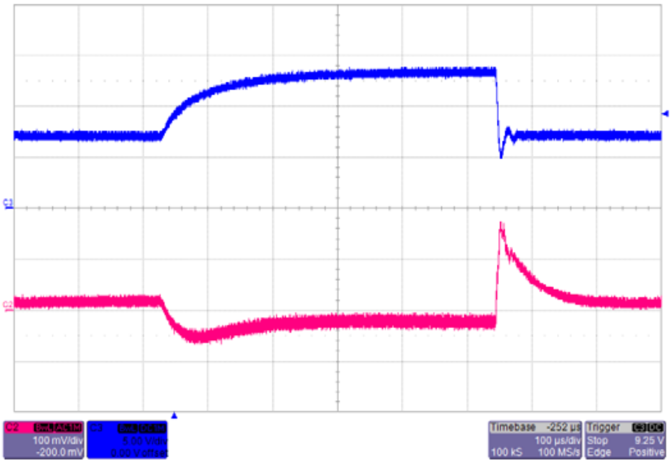
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



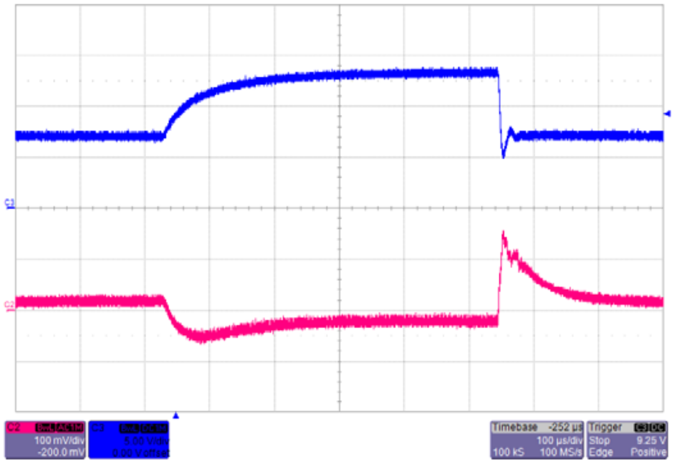
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP



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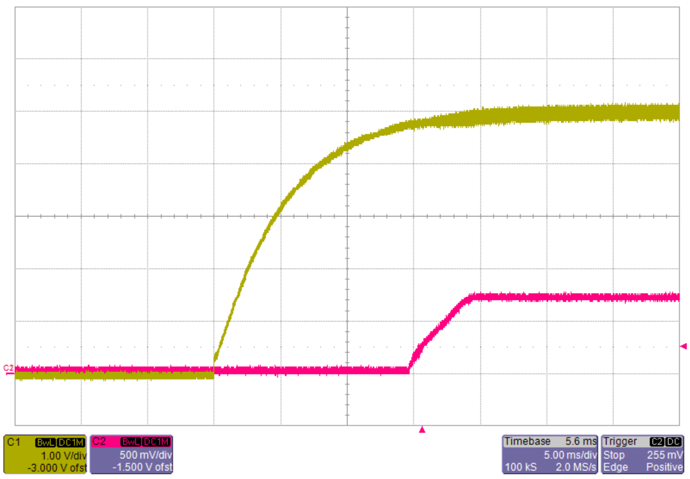
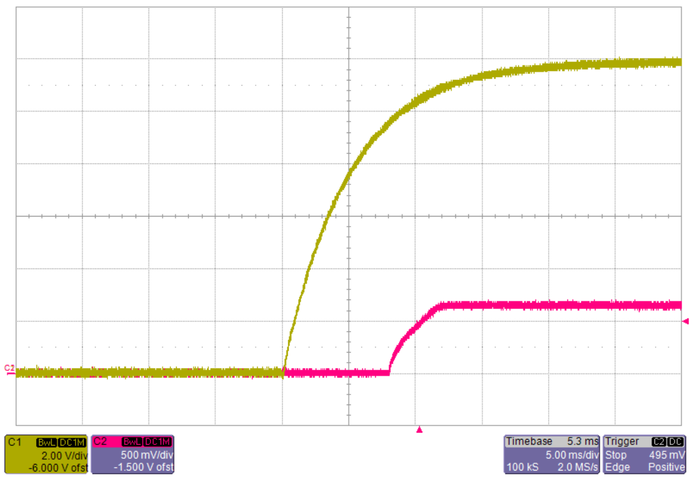
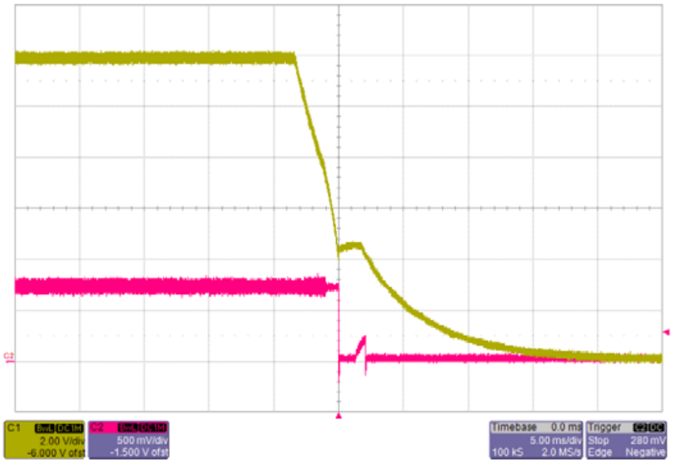


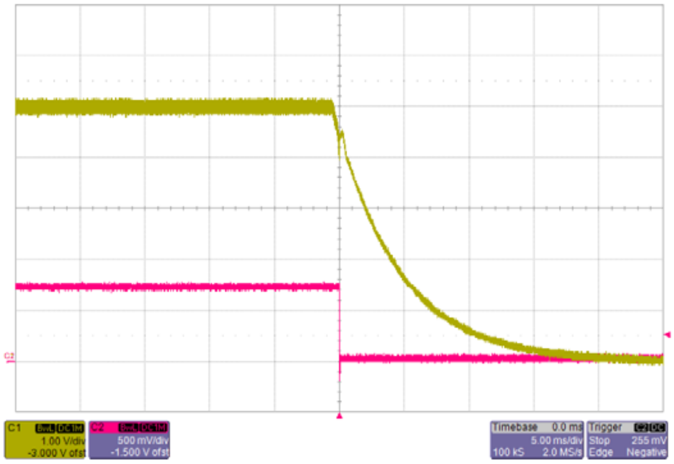
Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



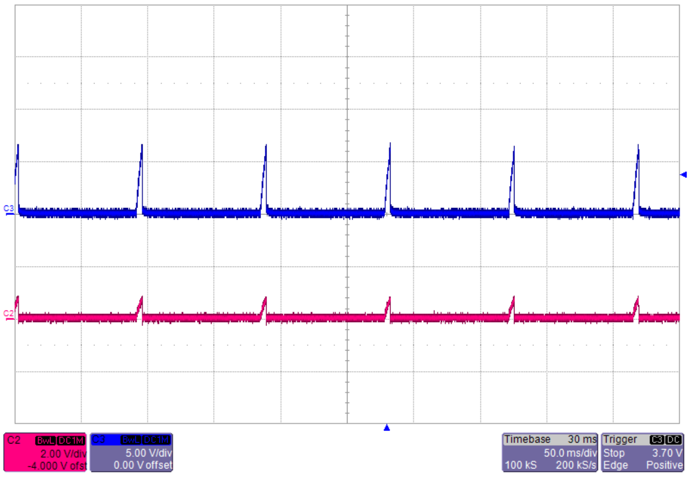
Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



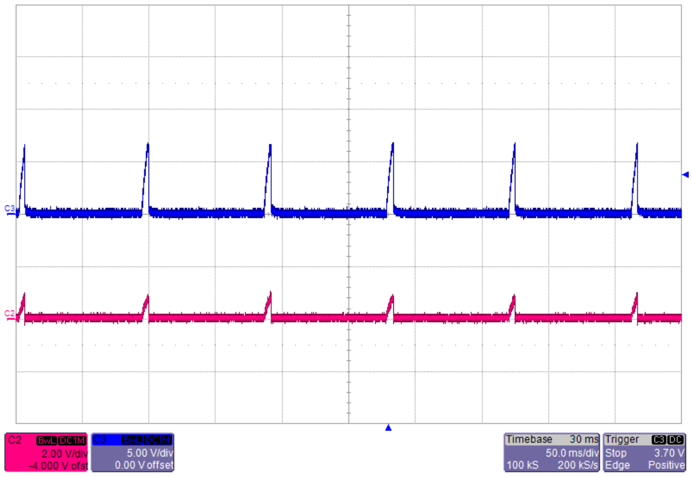
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



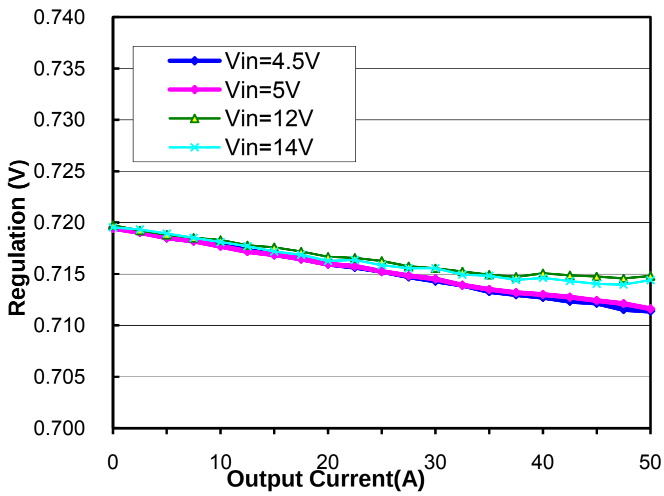
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



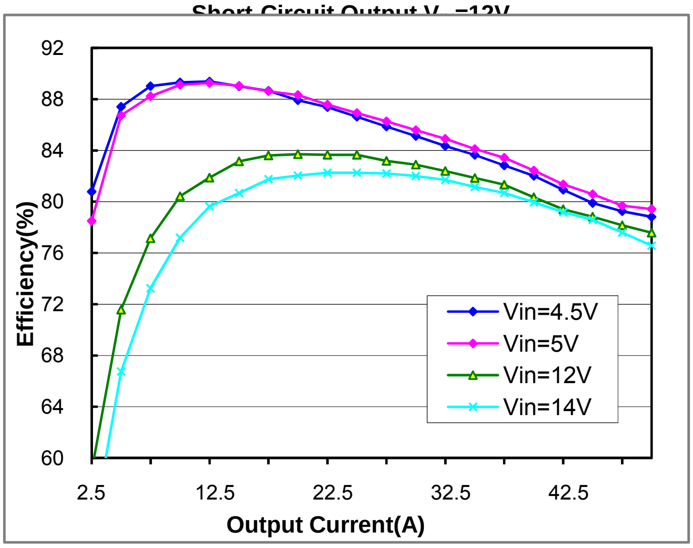
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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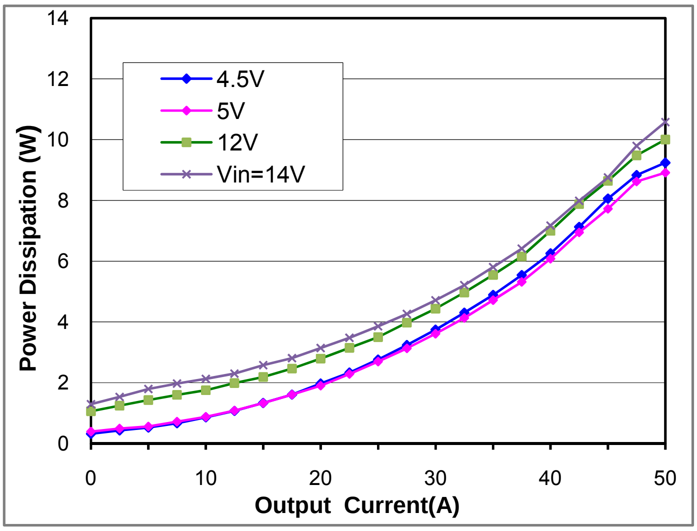
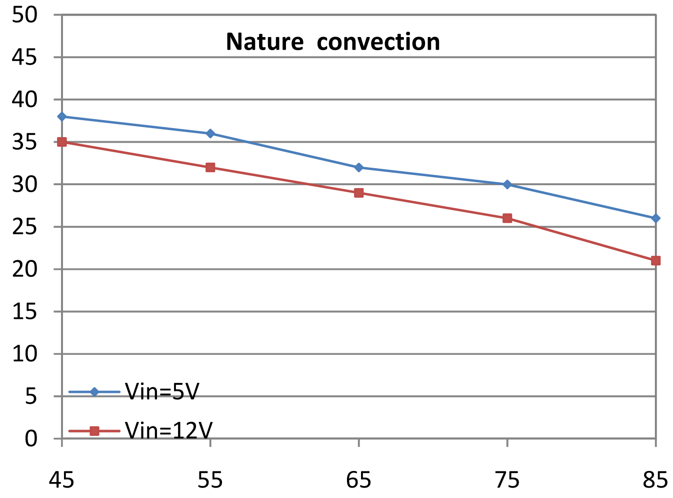


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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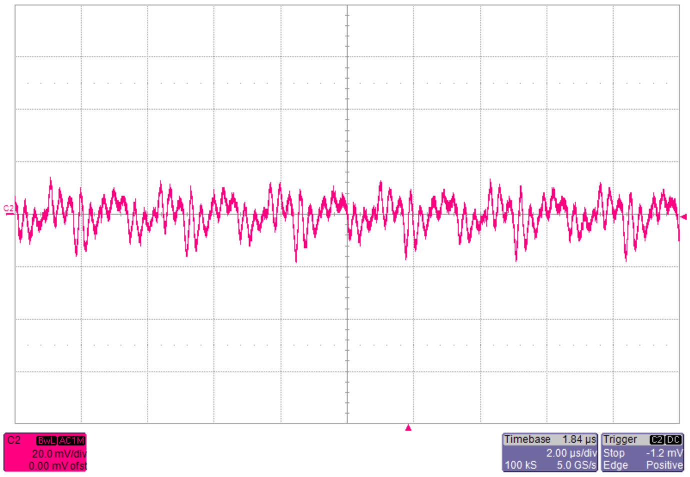
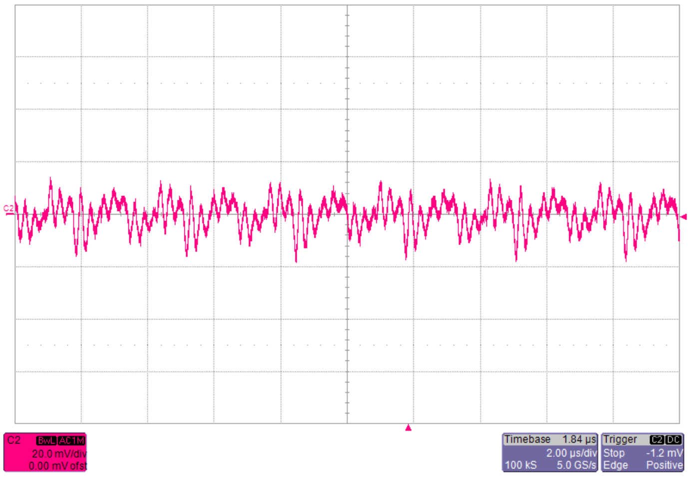
Typical Characteristics– output adjusted to 1V

General conditions(MQ7290R2A):

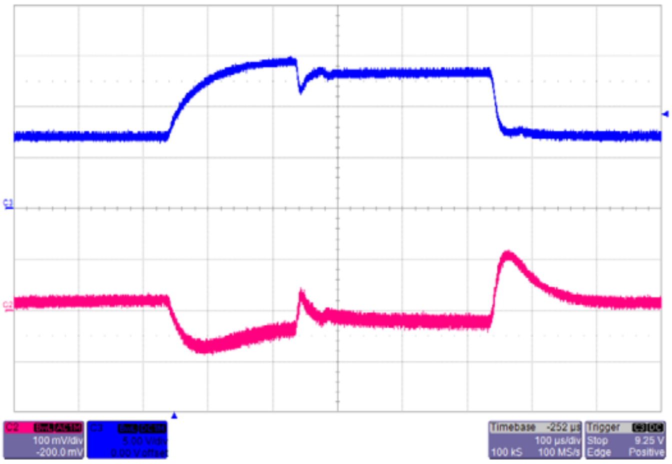
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



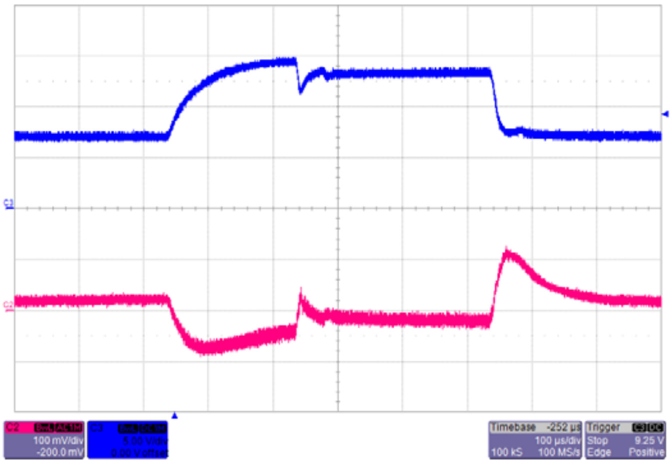
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



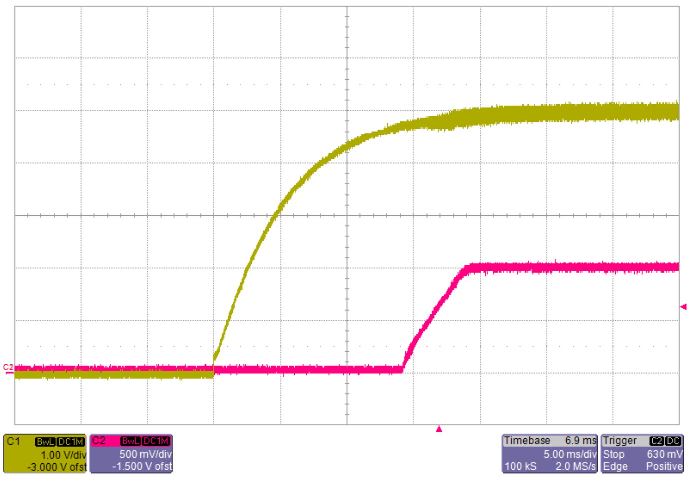
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



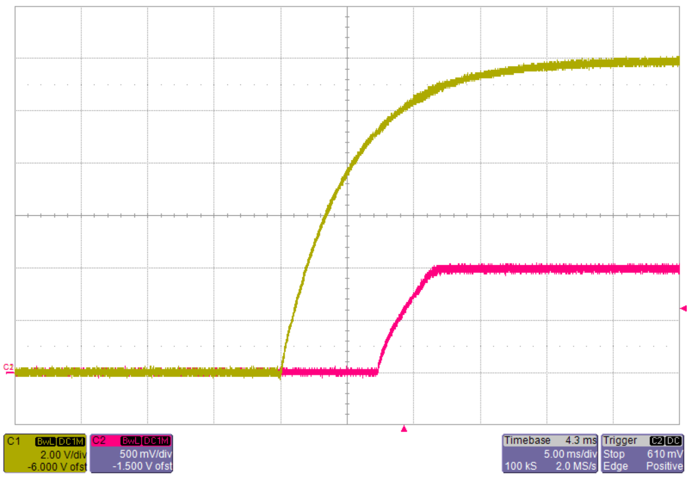
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage

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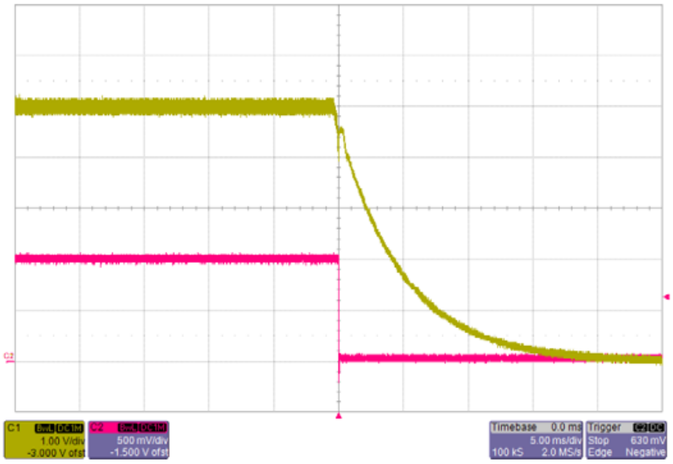
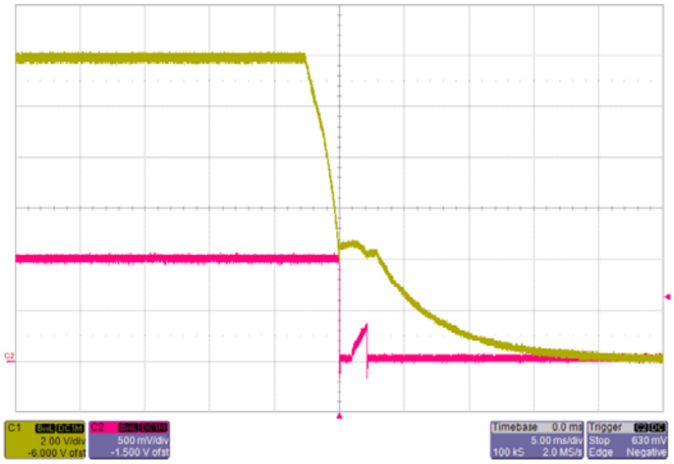
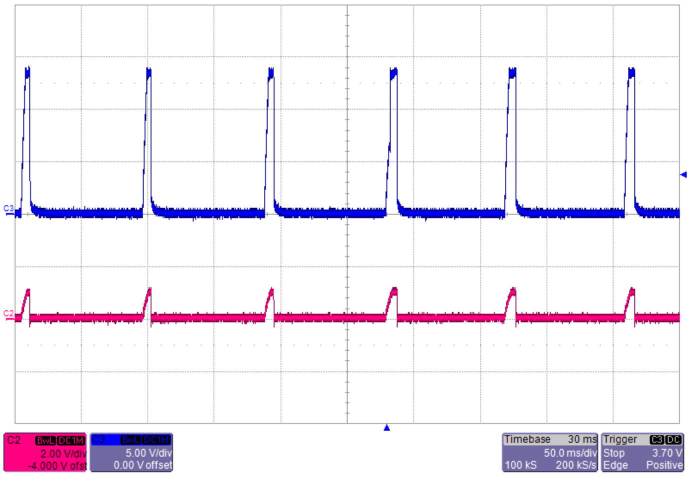


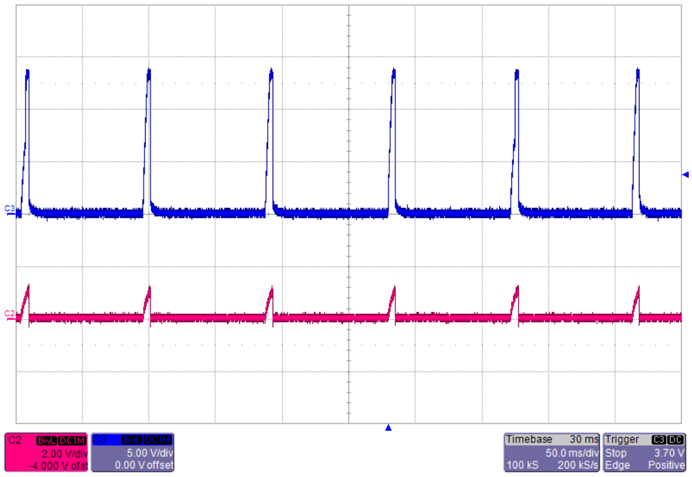
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



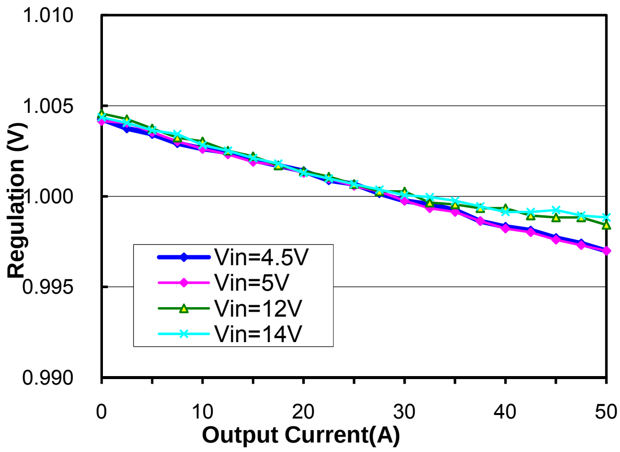
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



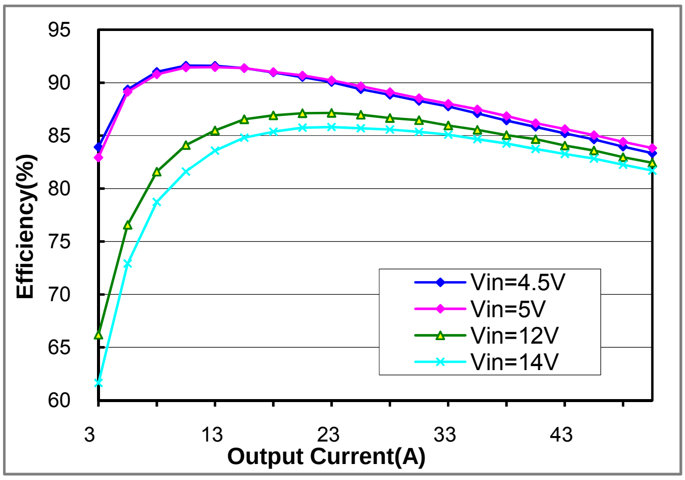
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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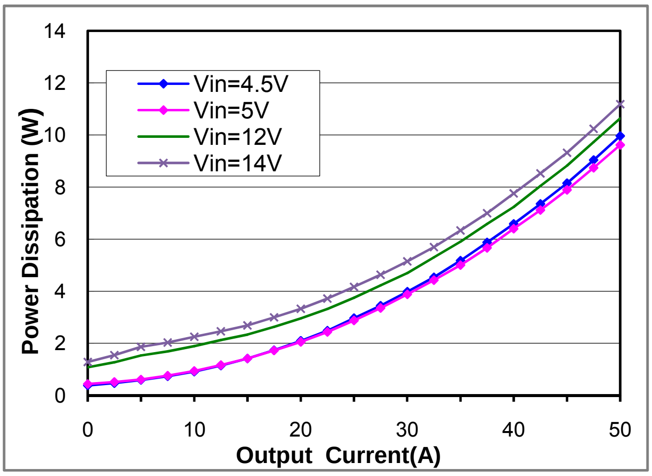
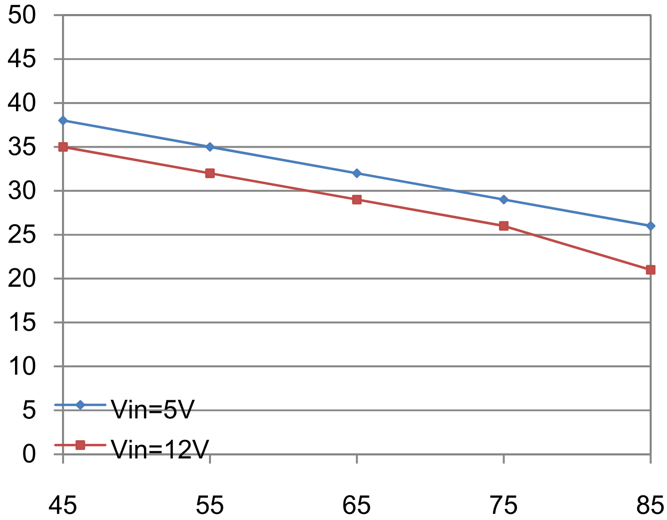


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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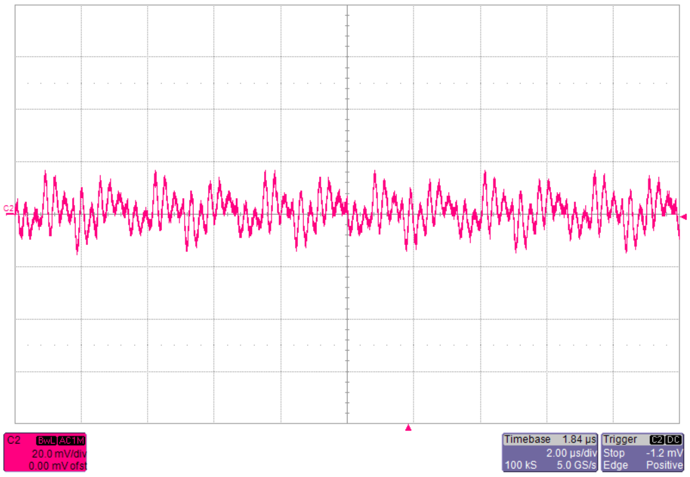
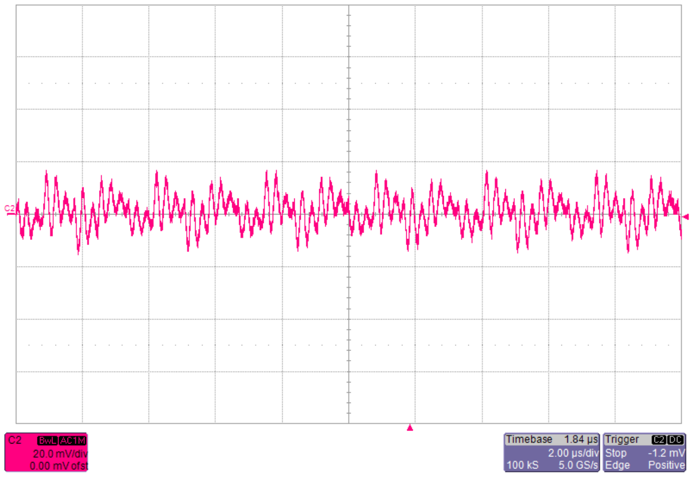
Typical Characteristics– output adjusted to 1.2V

General conditions(MQ7290R2A):

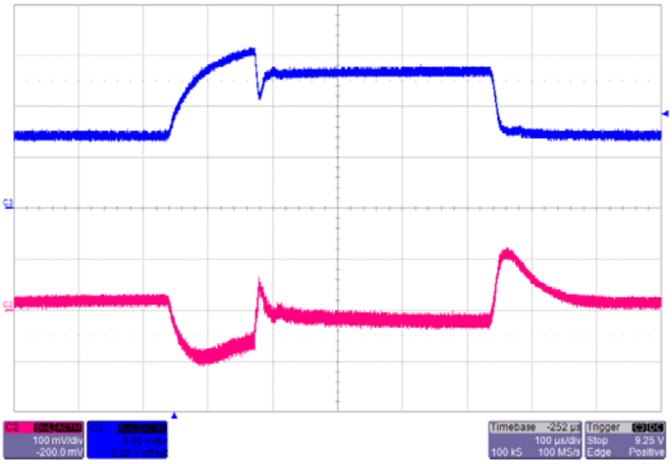
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



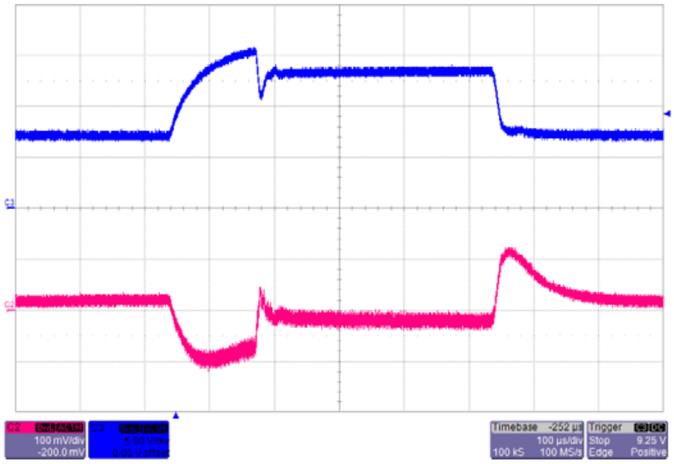
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



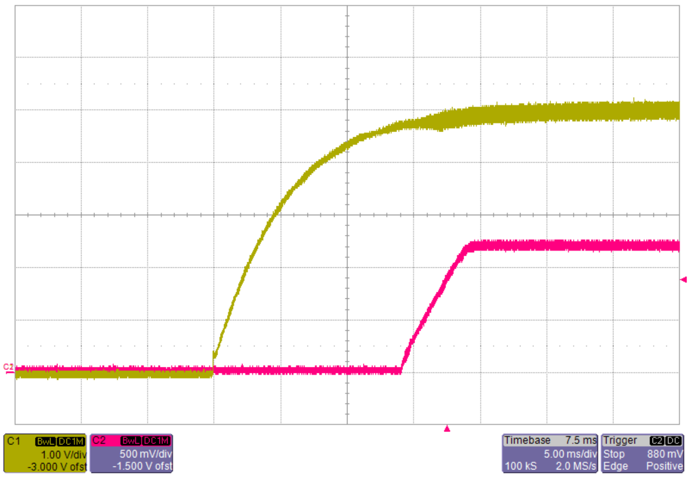
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



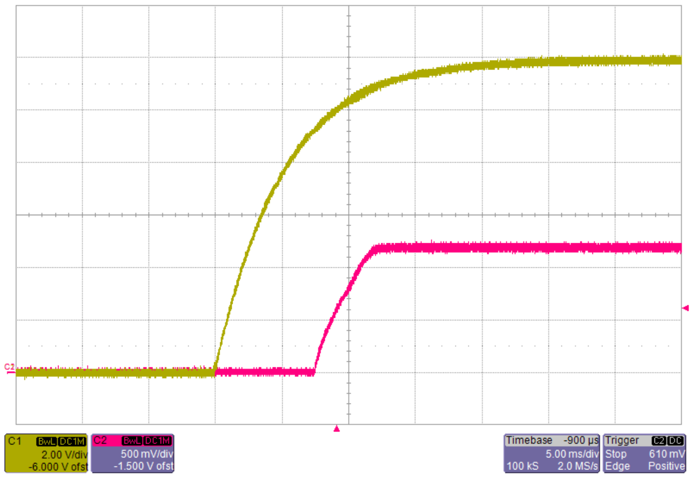
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage

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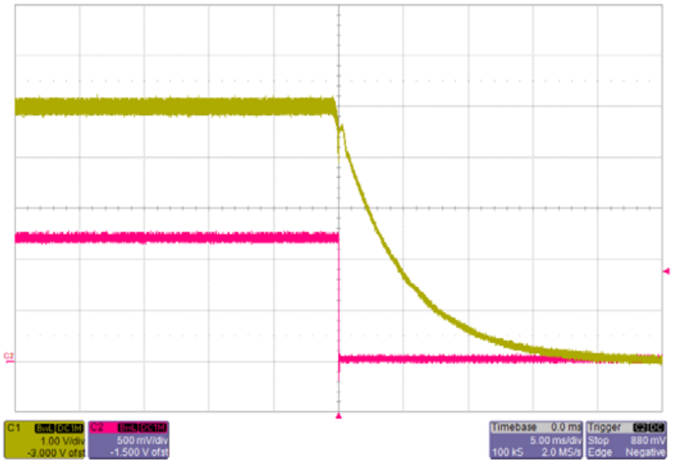
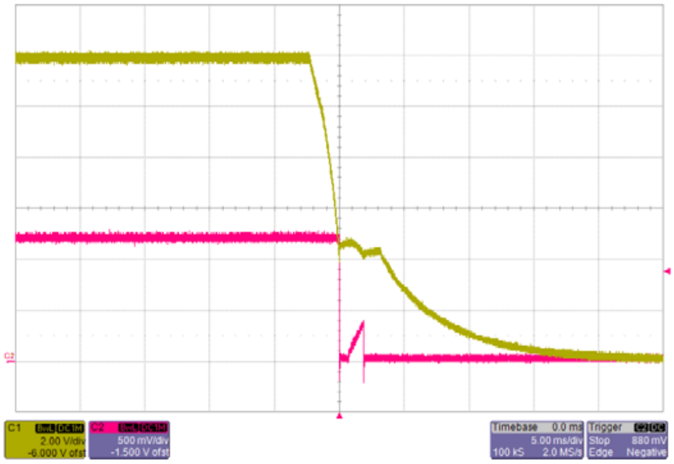
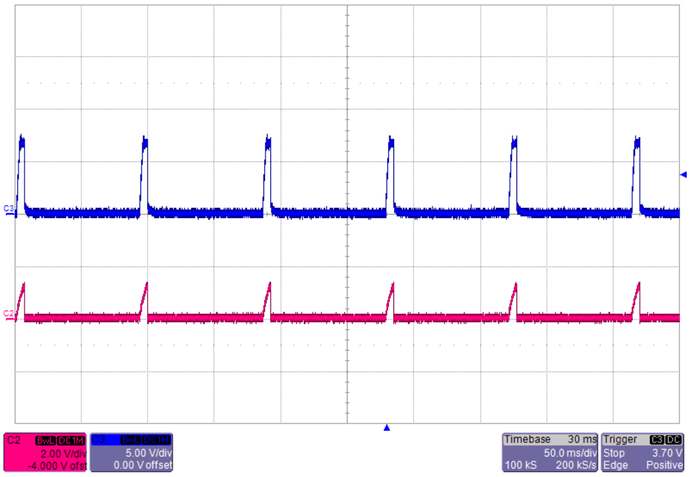


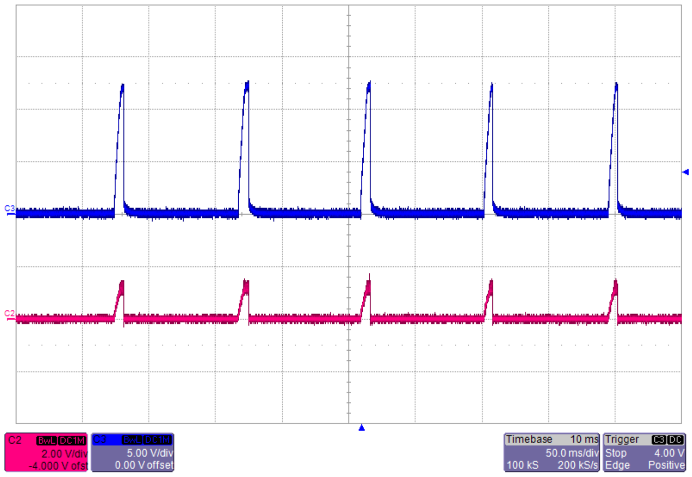
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



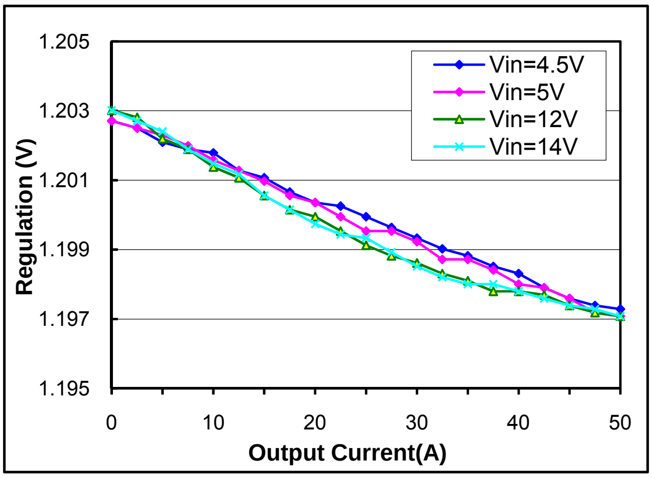
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



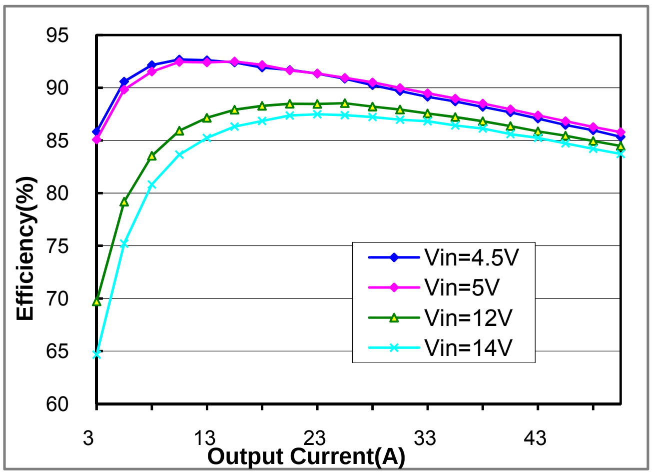
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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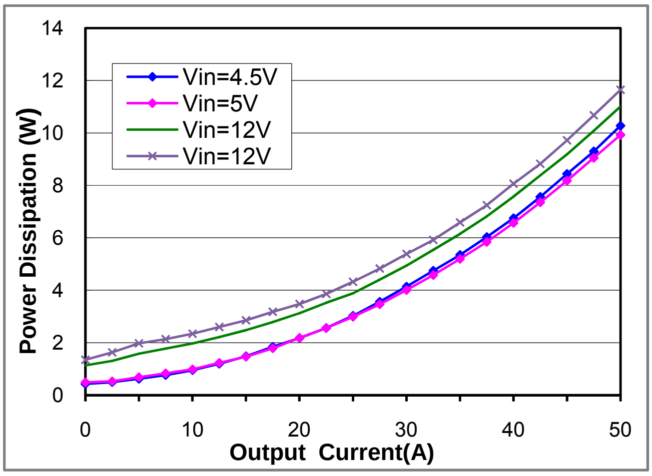
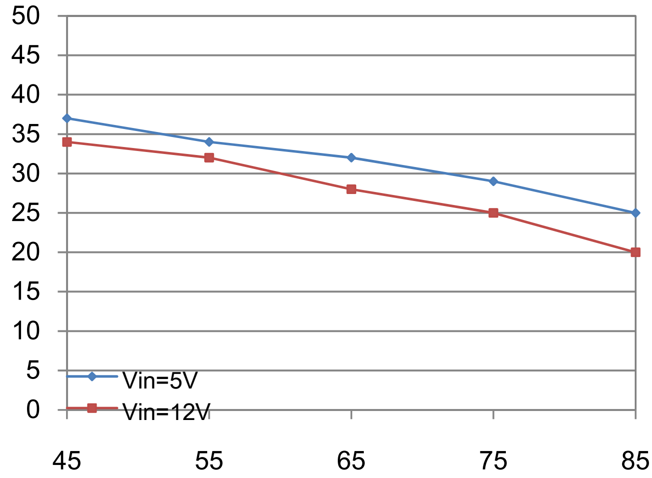


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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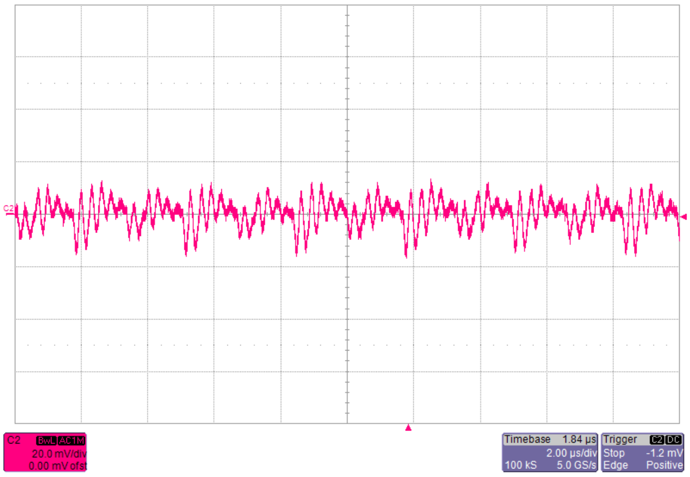
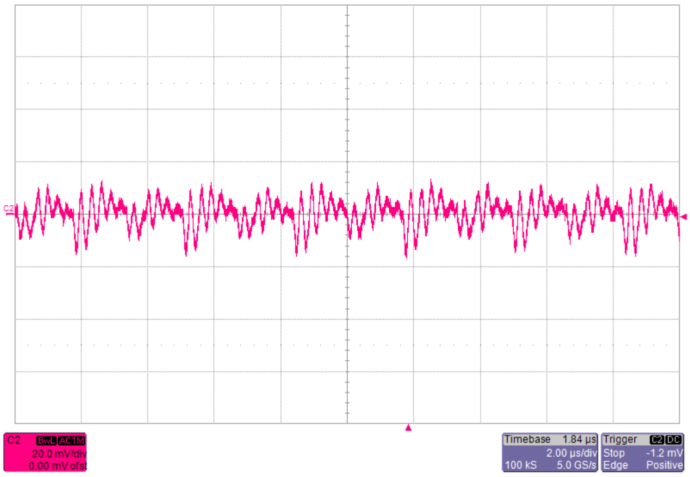
Typical Characteristics– output adjusted to 1.5V

General conditions(MQ7290R2A):

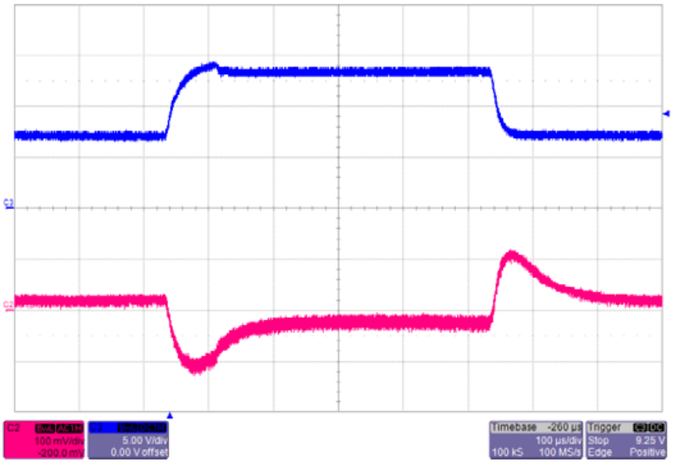
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



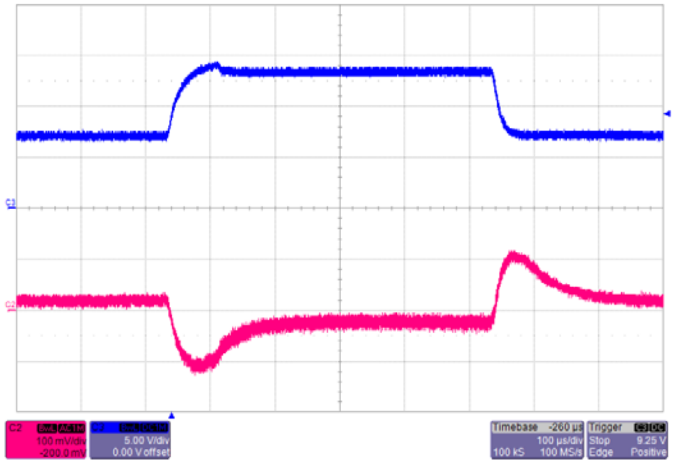
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



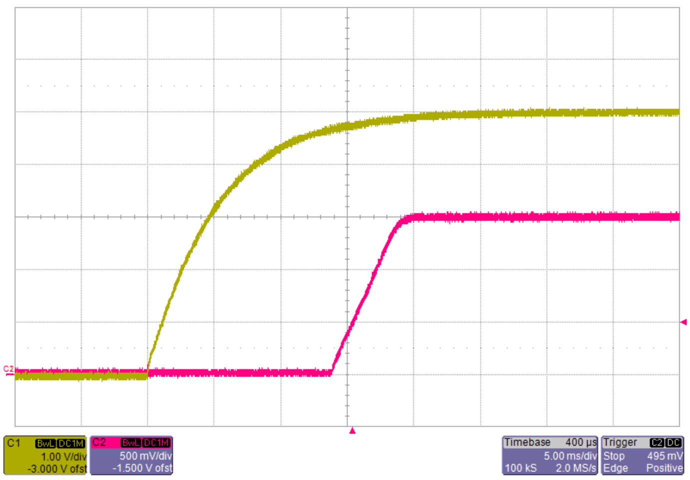
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



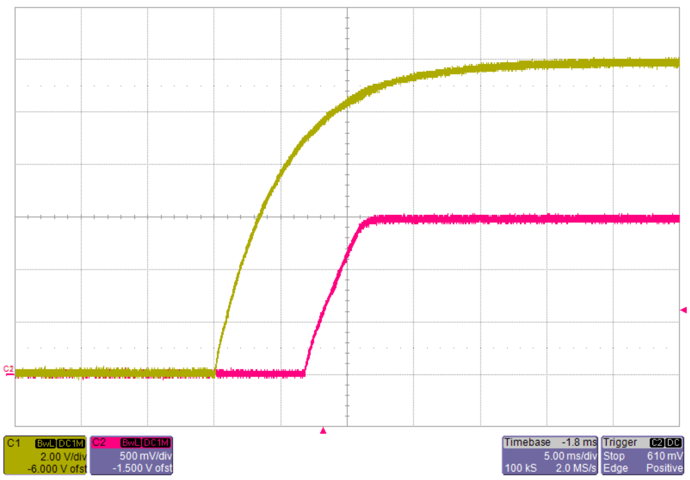
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage

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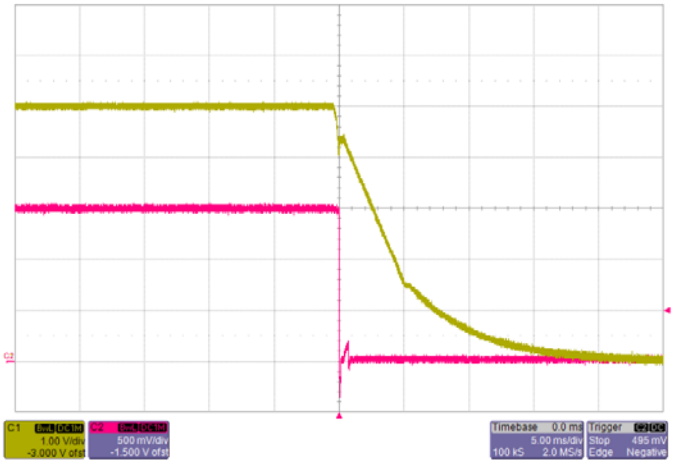
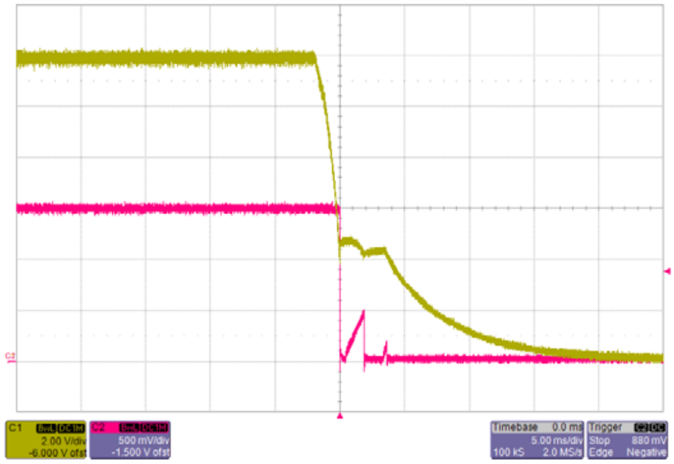
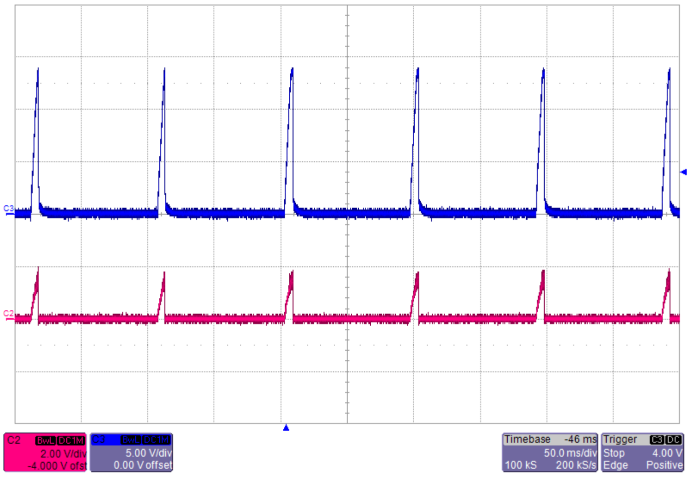


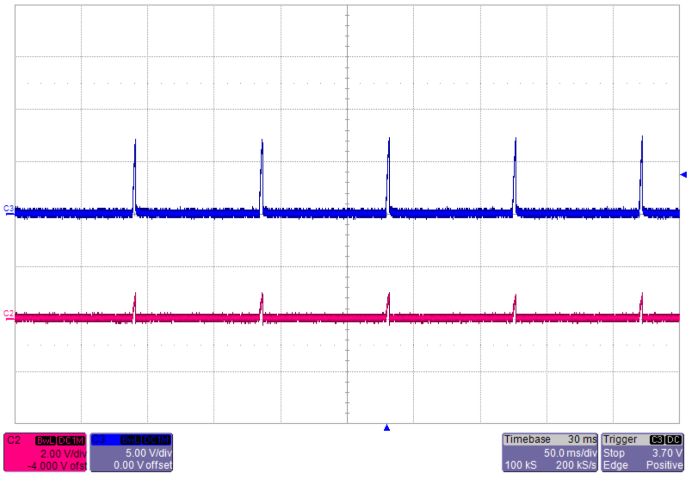
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



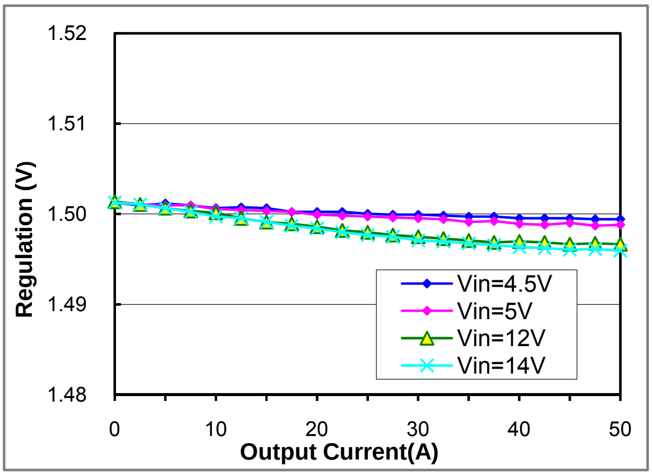
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



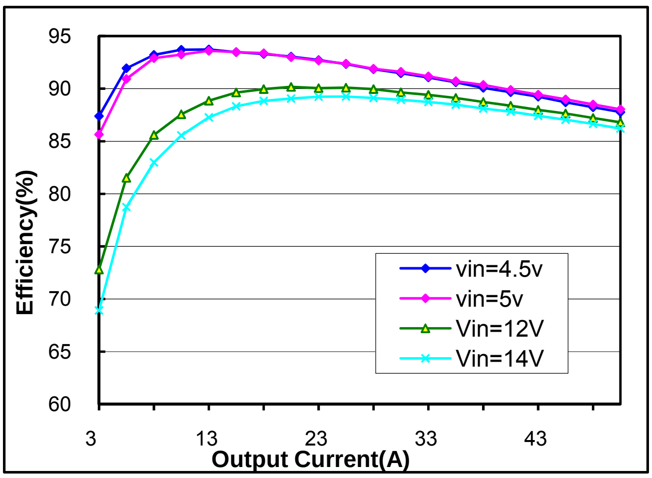
Short-Circuit Output V_{IN}=12V



Short-Circuit Output V_{IN}=5V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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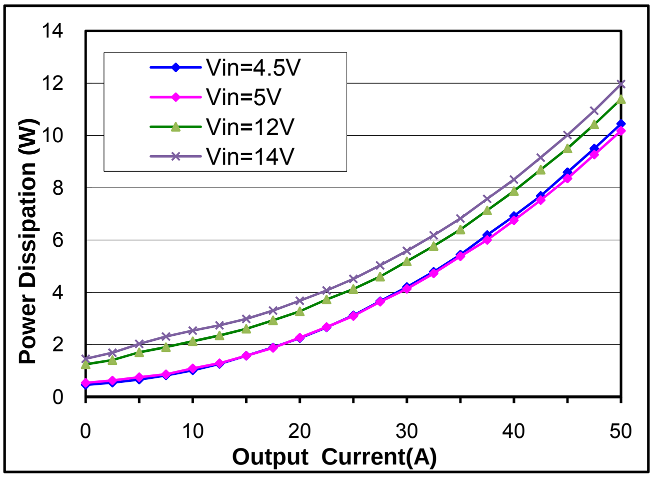
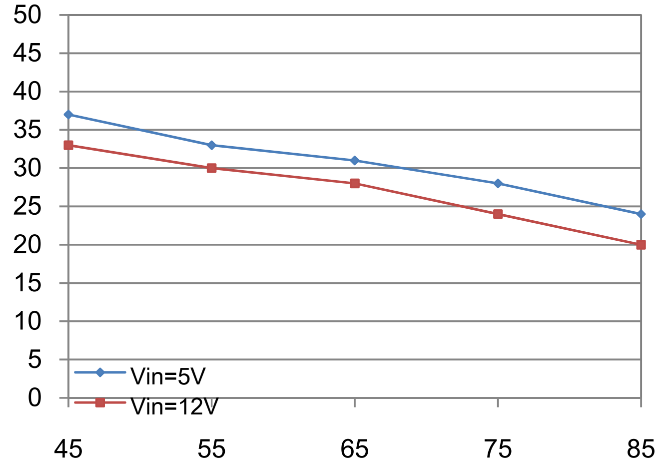


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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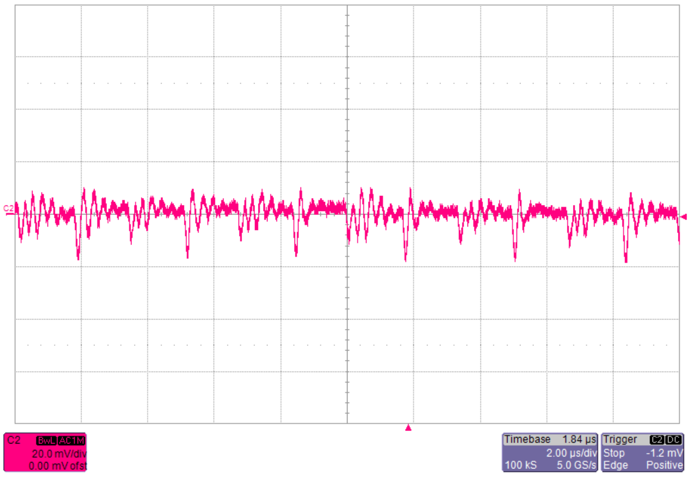
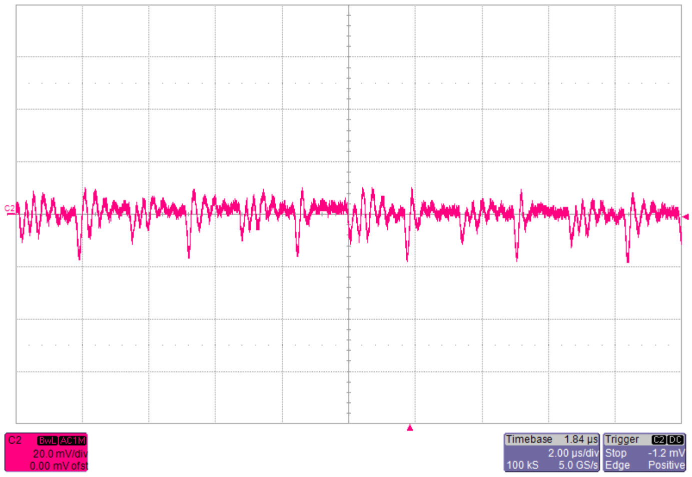
Typical Characteristics– output adjusted to 1.8V

General conditions(MQ7290R2A):

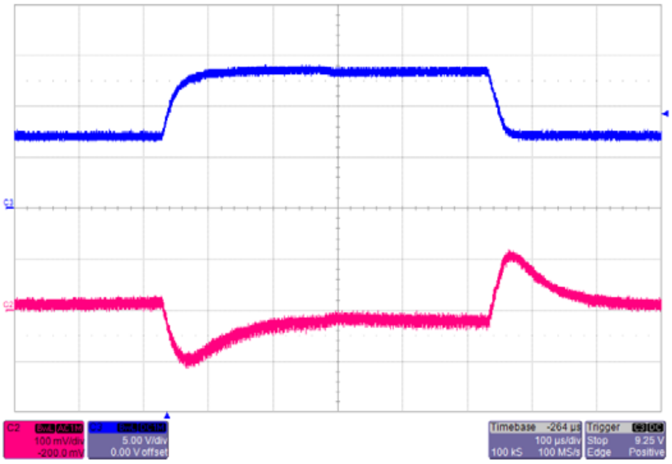
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



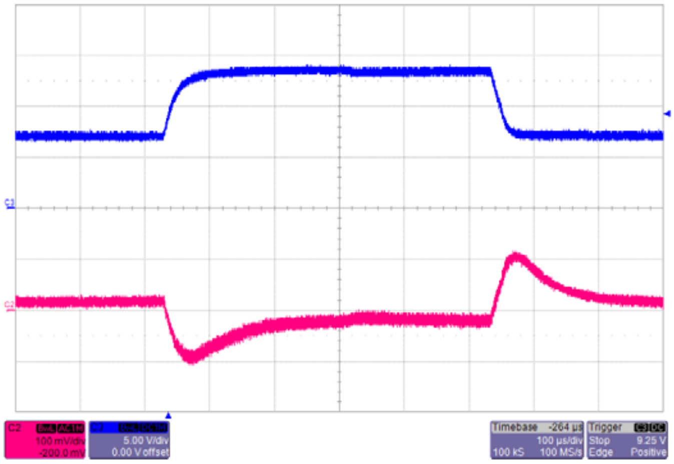
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



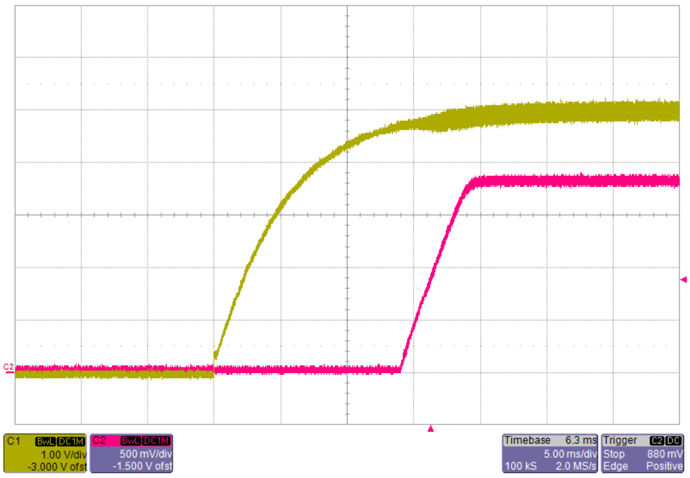
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



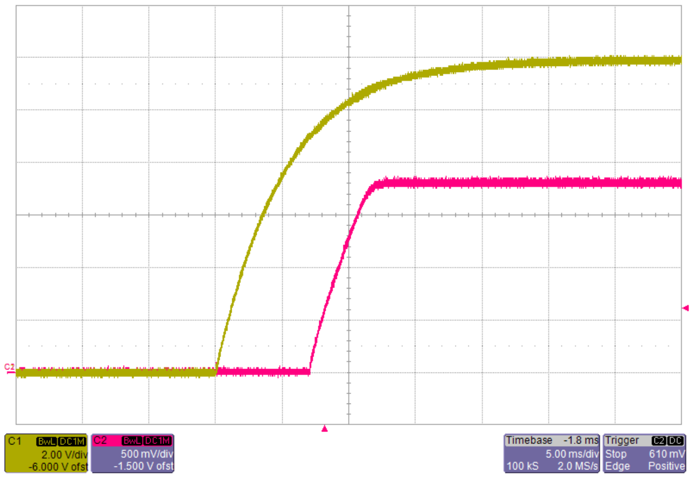
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage

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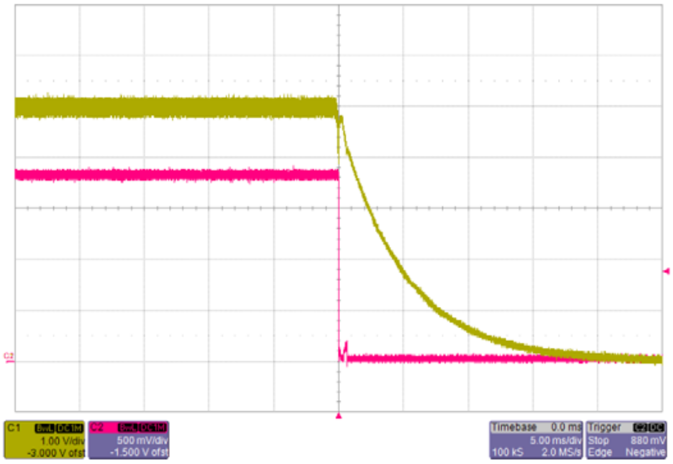
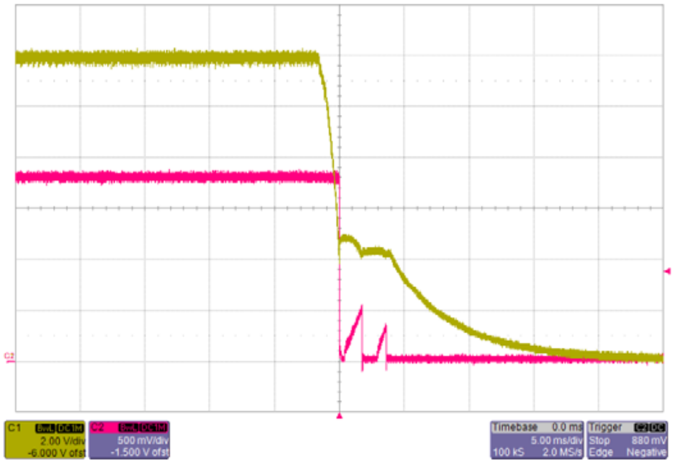
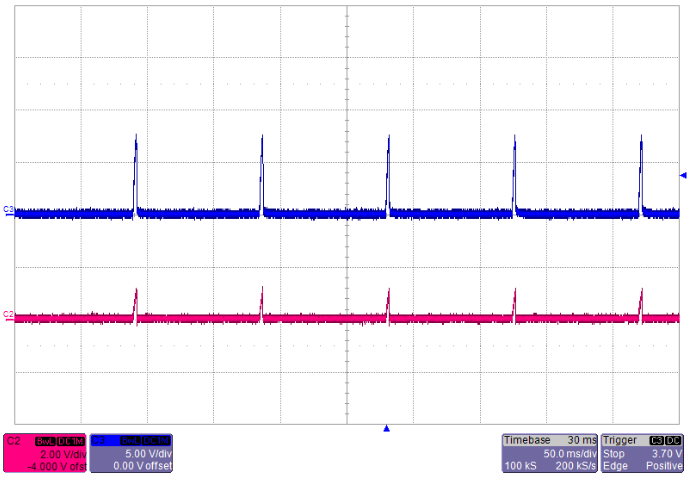
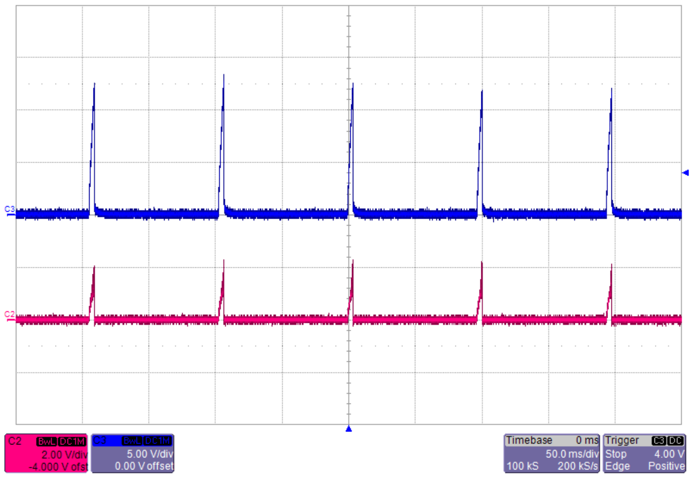




Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage   C2: Output Voltage

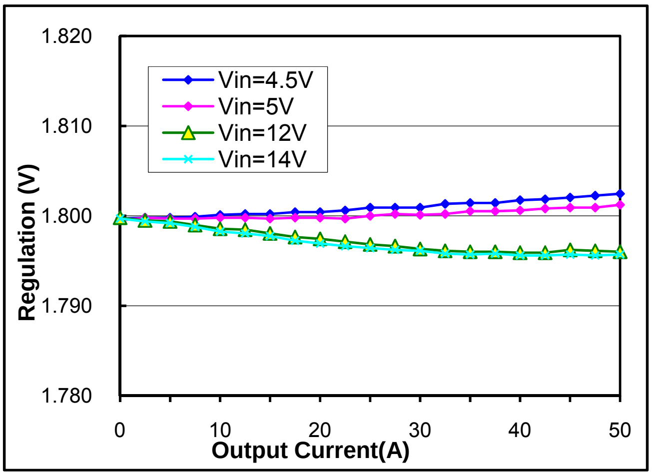
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage   C2: Output Voltage

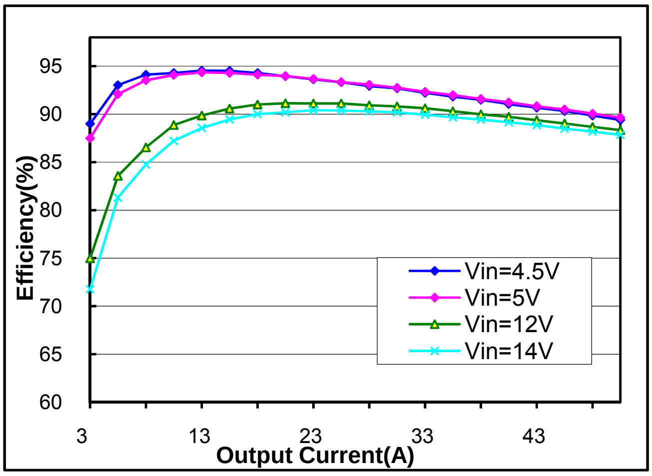




Short-Circuit Output V_{IN}=5V

Short-Circuit Output V_{IN}=12V





Regulation
Output voltage vs. Load Current

Efficiency vs. Load Current

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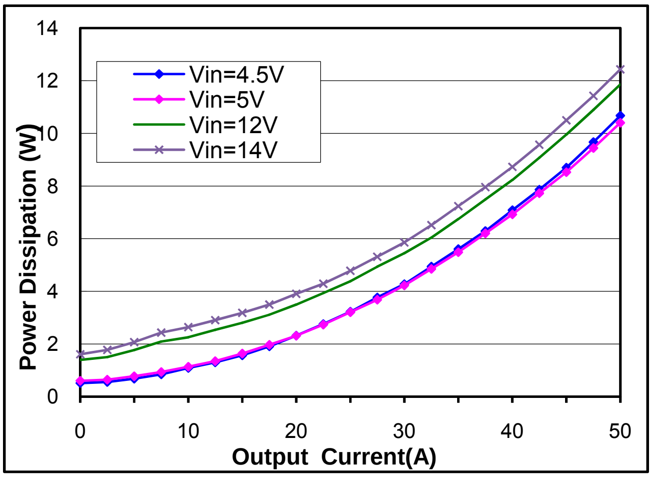
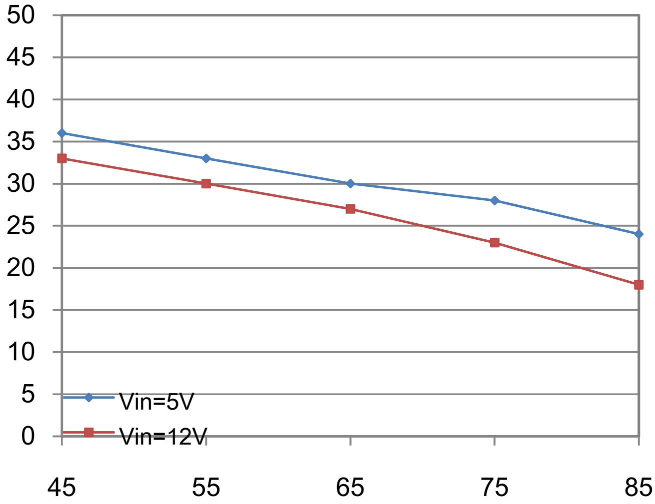


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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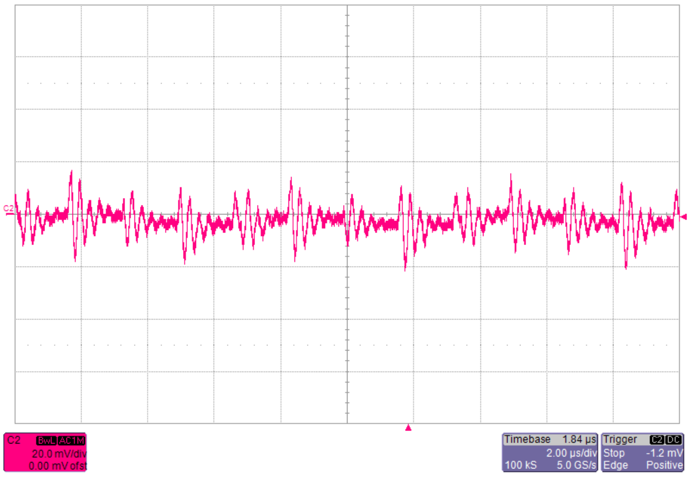
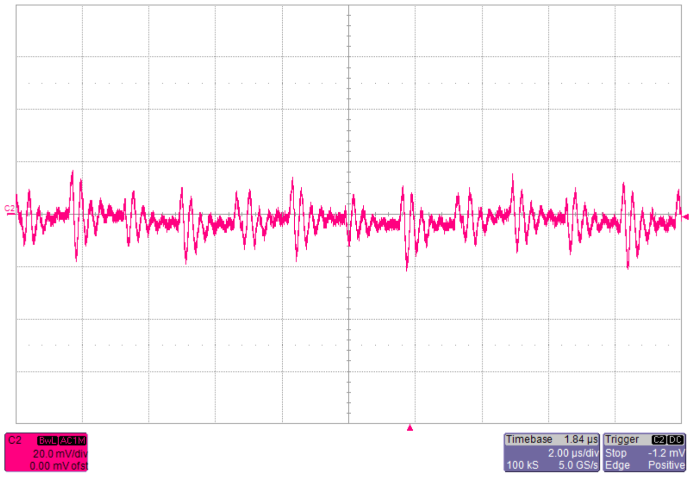
Typical Characteristics– output adjusted to 2.5V

General conditions(MQ7290R2A):

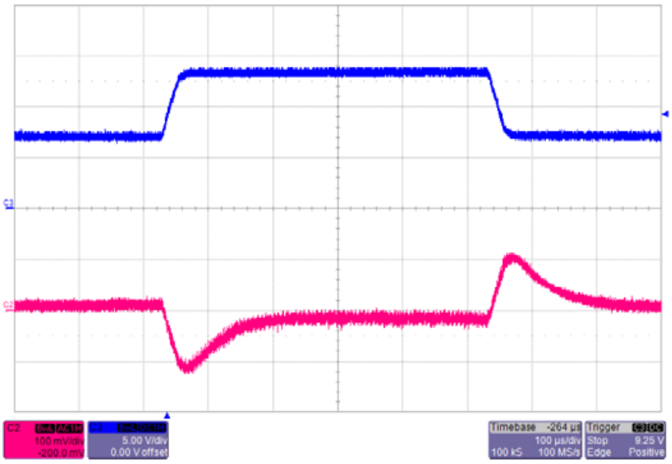
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



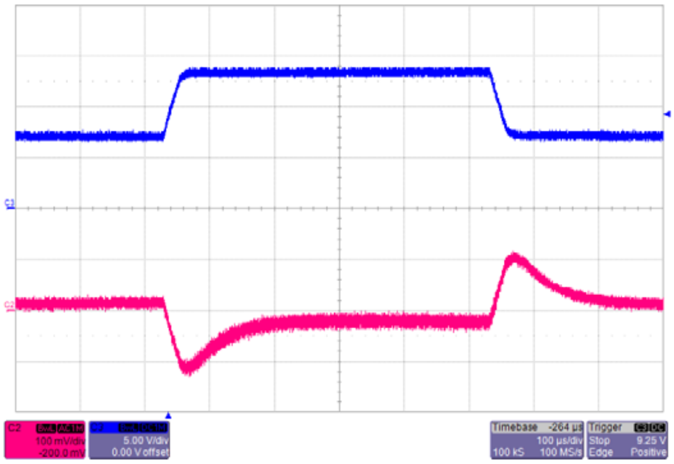
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



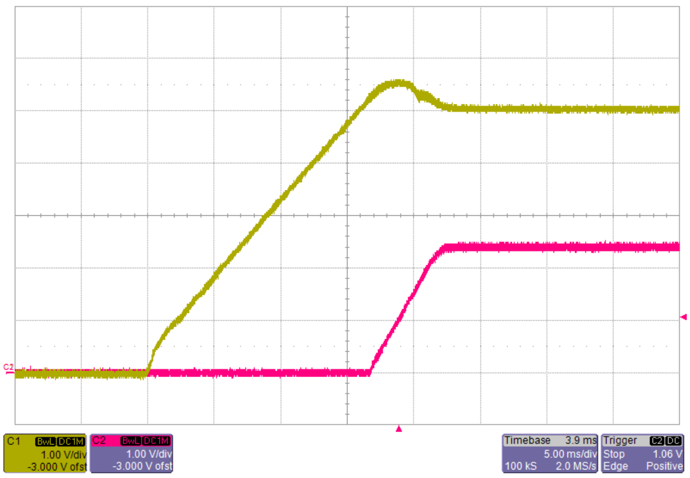
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth

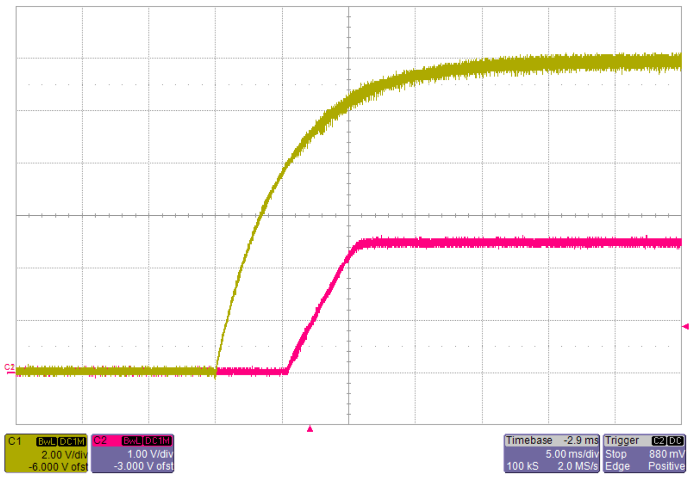


Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage





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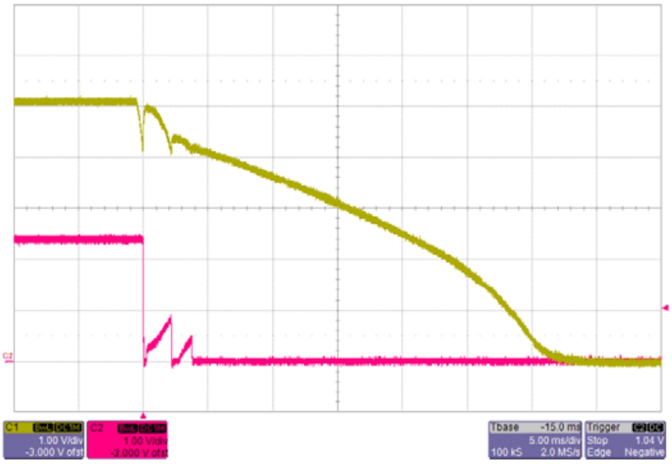
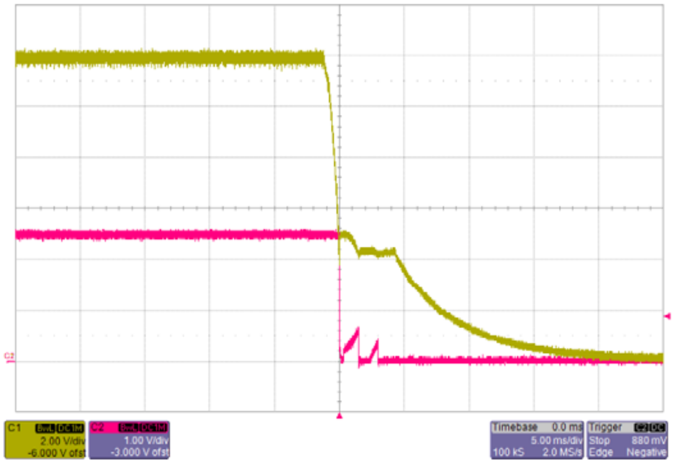
Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage   C2: Output Voltage

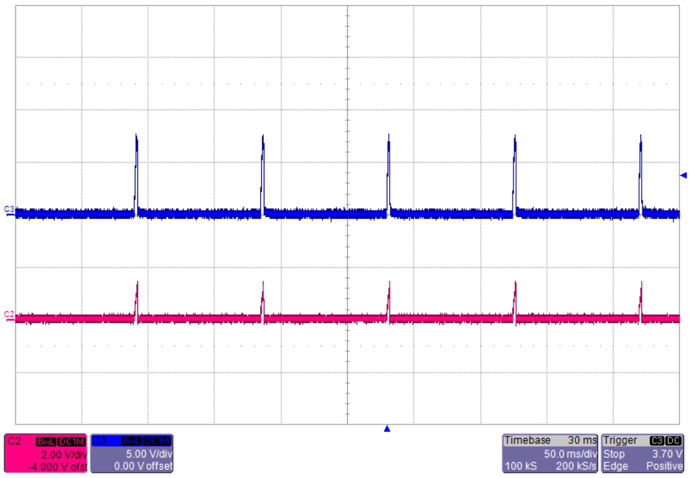
Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage   C2: Output Voltage



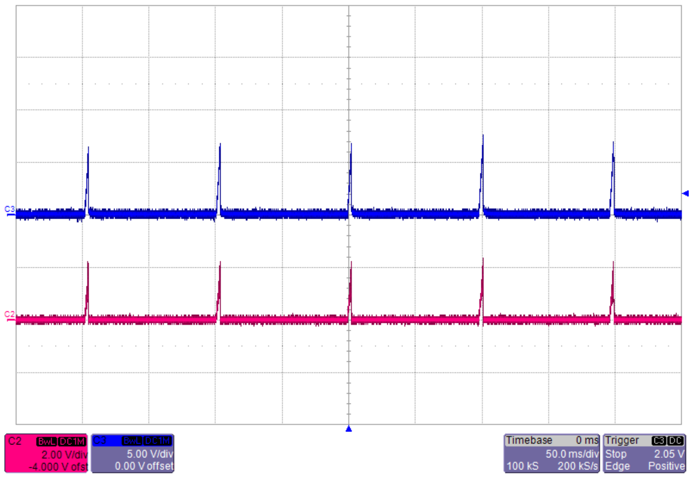
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage   C2: Output Voltage



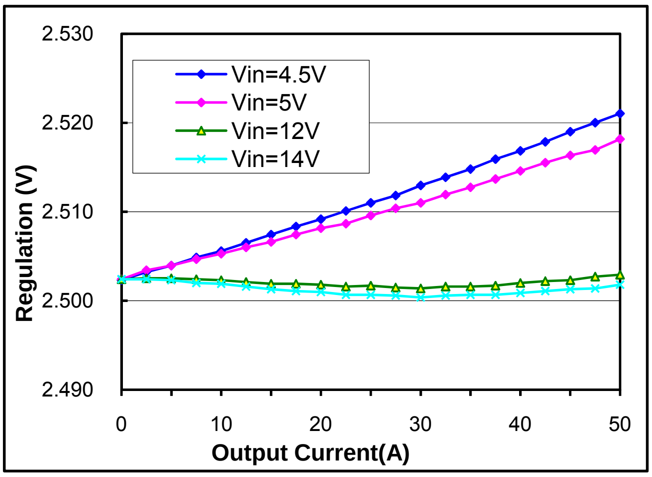
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage   C2: Output Voltage



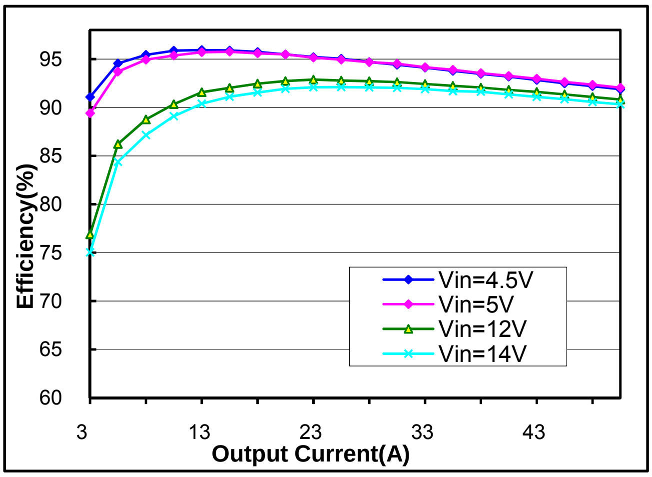
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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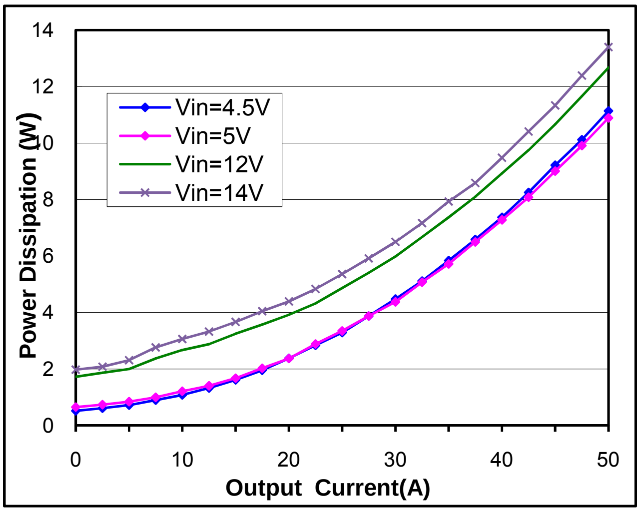
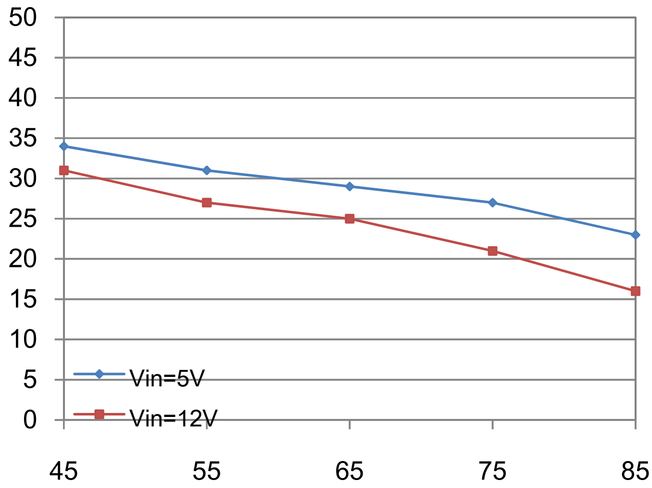


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22µF*2 Ceramic；
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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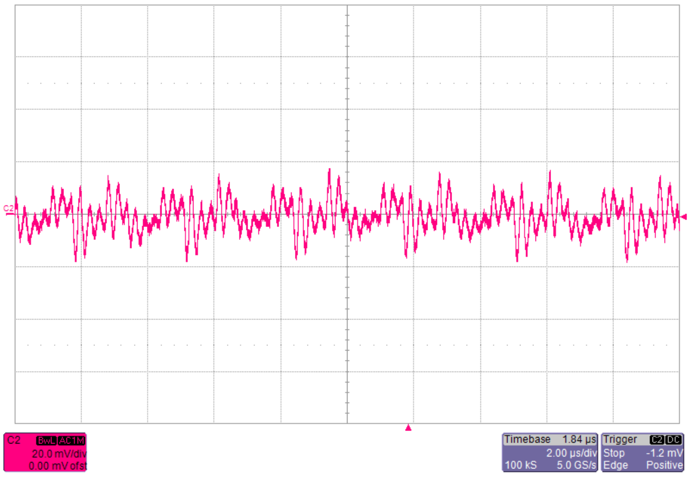
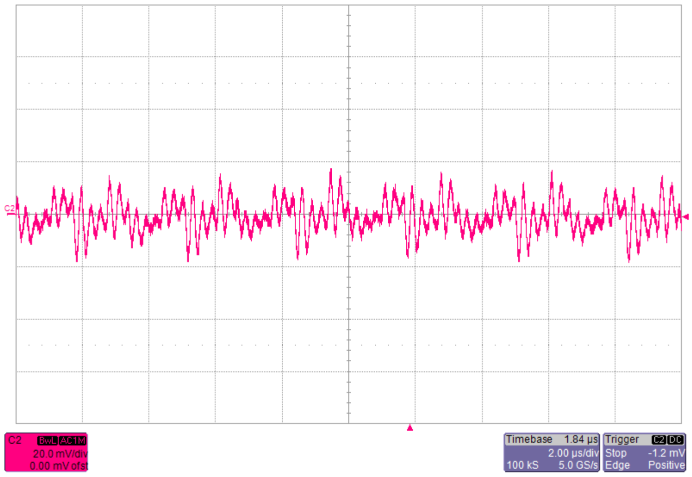
Typical Characteristics– output adjusted to 3.3V

General conditions(MQ7290R2A):

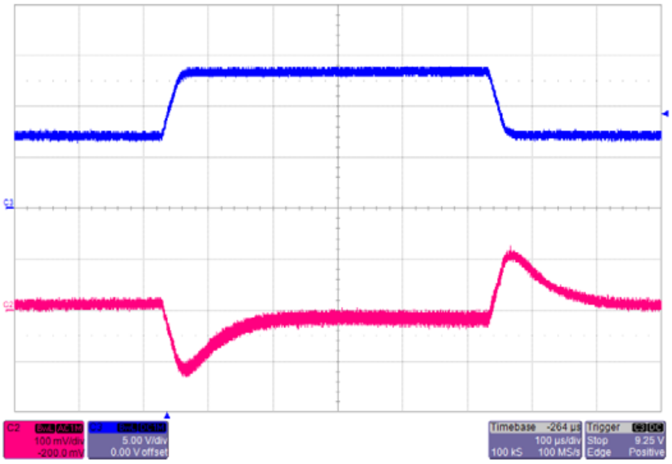
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



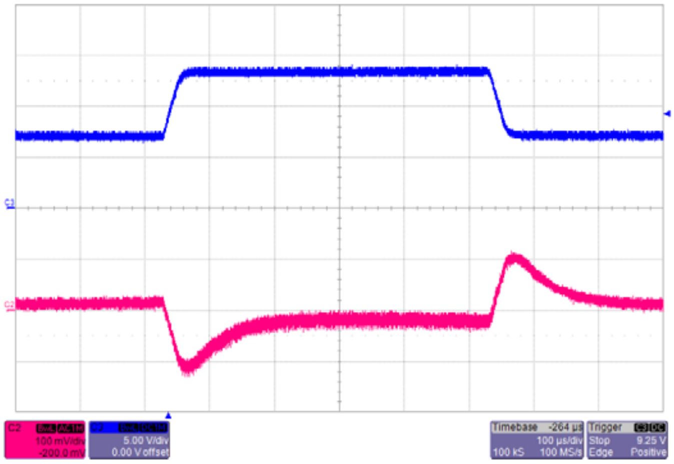
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



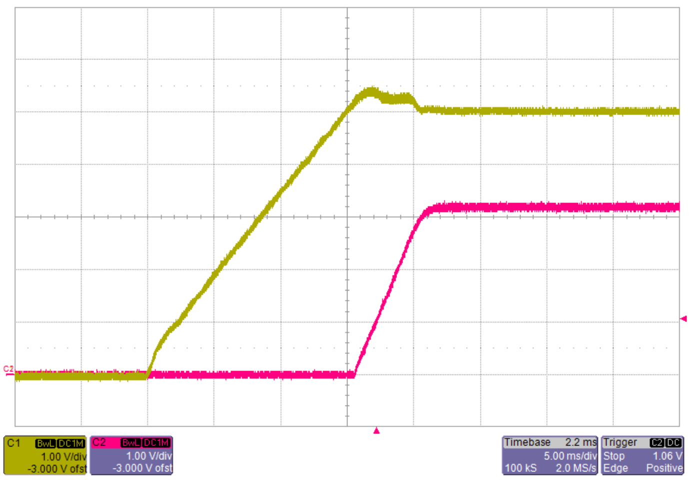
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



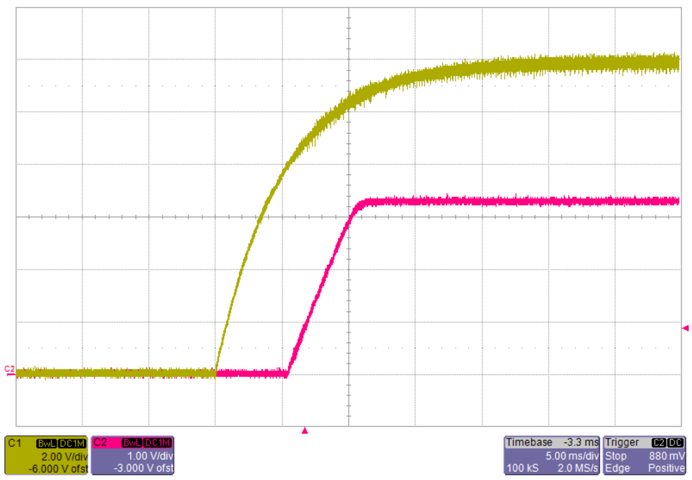
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current   C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current   C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage   C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage   C2: Output Voltage

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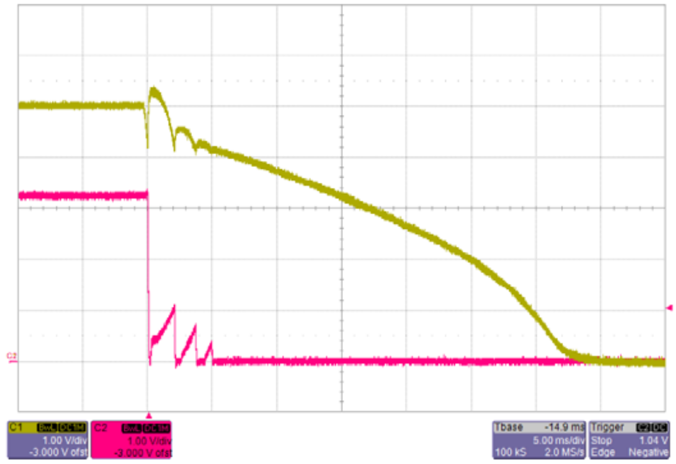
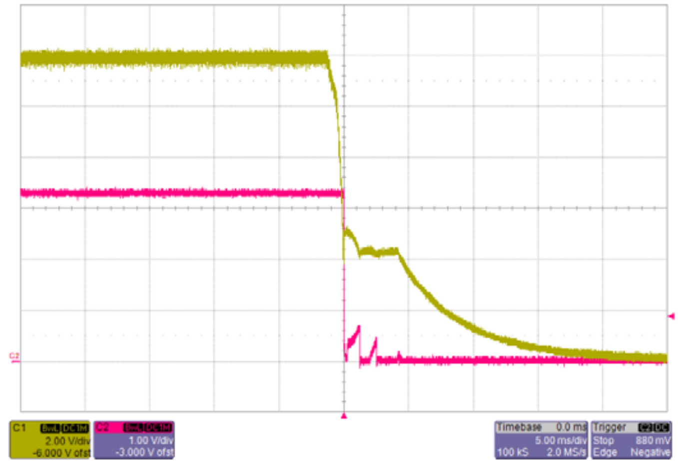
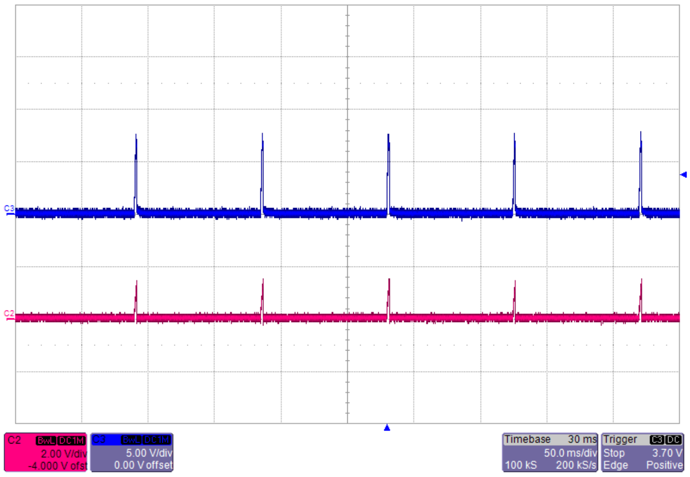


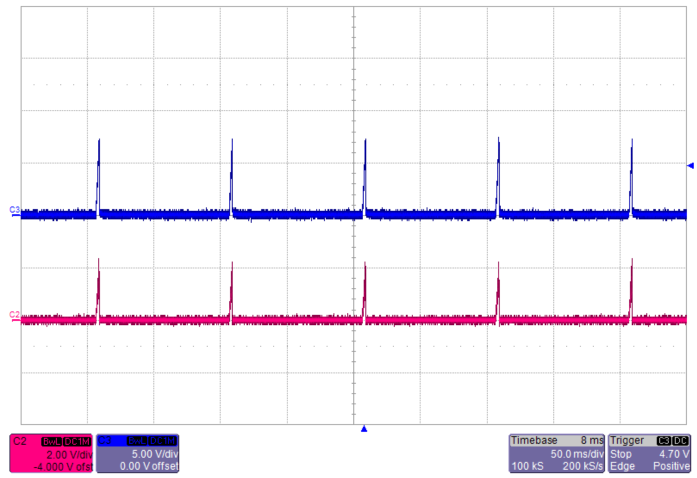
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage   C2: Output Voltage



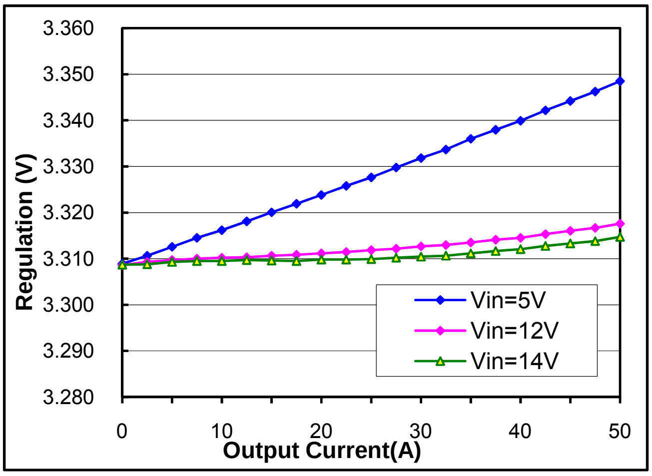
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage   C2: Output Voltage



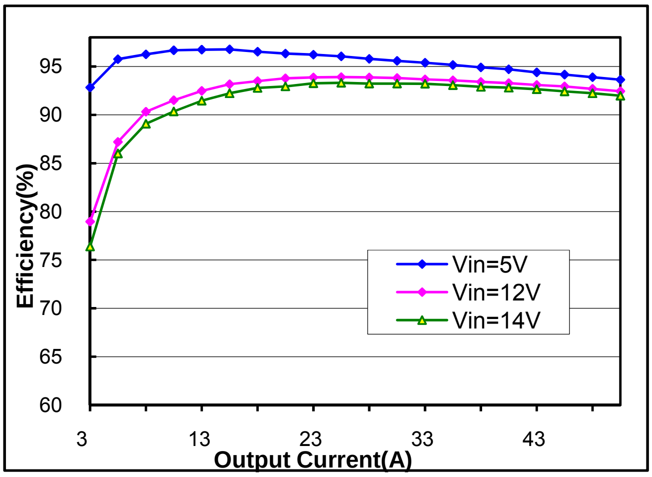
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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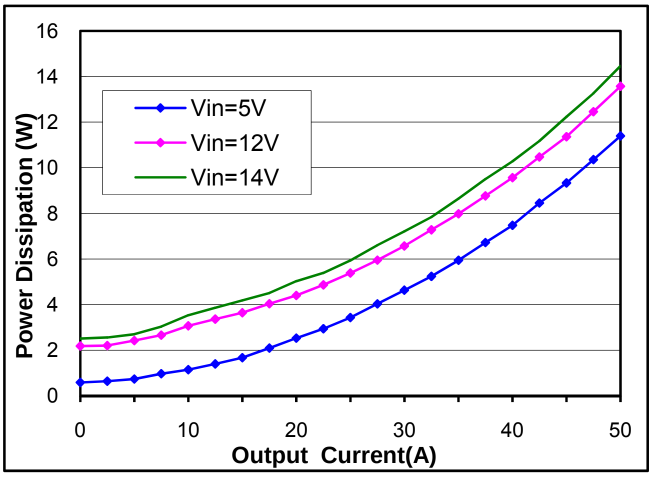
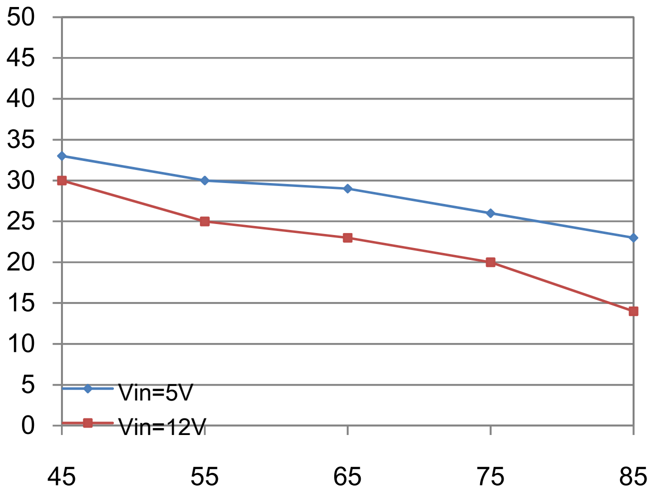


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22µF*2 Ceramic；

Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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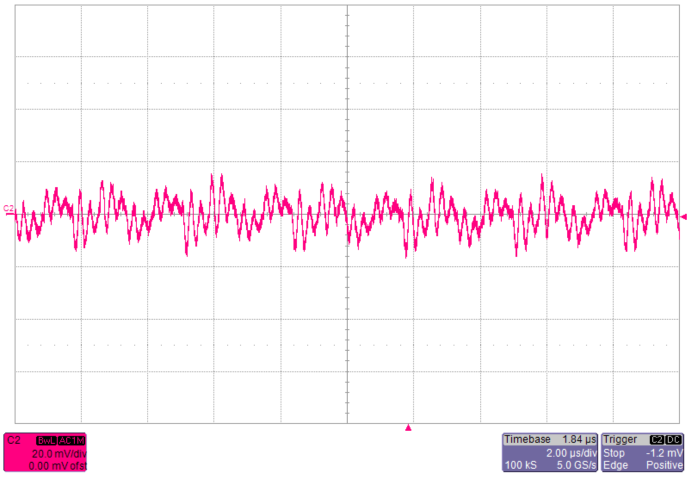
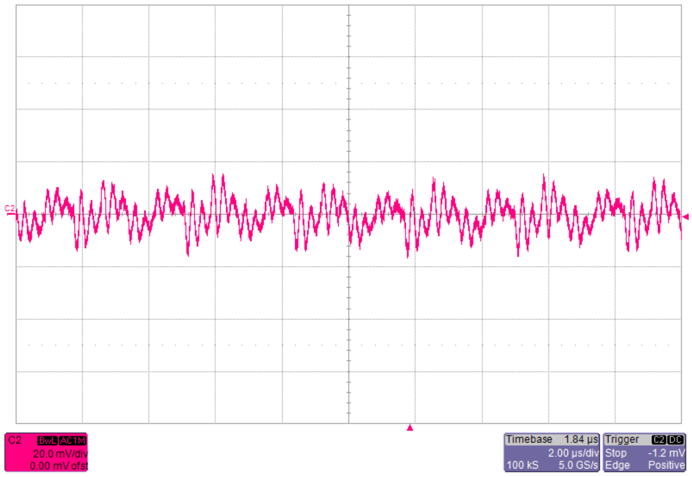
Typical Characteristics– output adjusted to 3.6V

General conditions(MQ7290R2A):

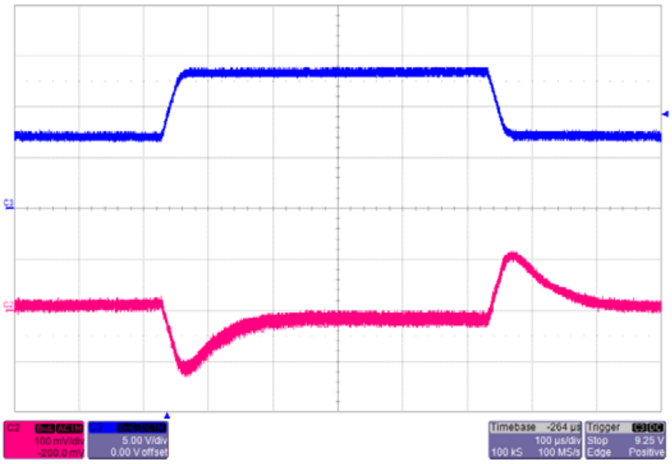
Input filter: 470μF*2 Electrolytic +22μF*2 Ceramic, Output filter: 220uF*4 TAN



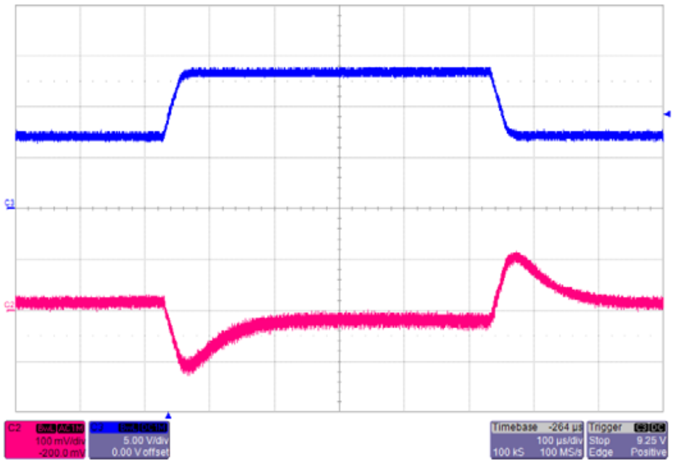
Ripple&Noise V_{IN}=5V, I_O=50A, 5~20MHz Bandwidth



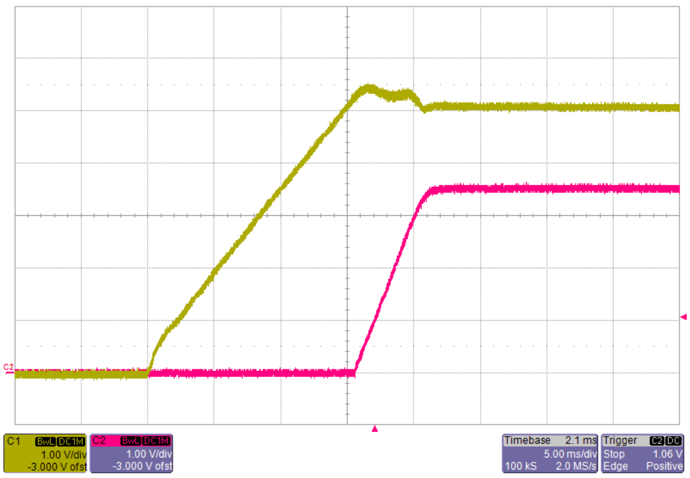
Ripple&Noise V_{IN}=12V, I_O=50A, 5~20MHz Bandwidth



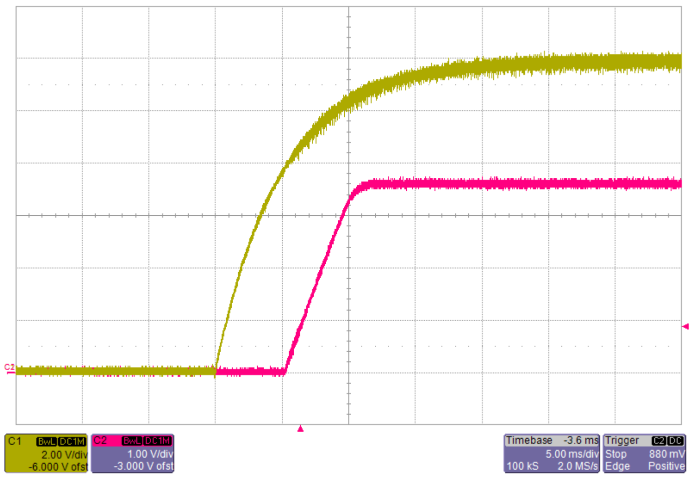
Transient Response V_{IN}=5V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Transient Response V_{IN}=12V, Step from 25A~50A~25A,
Input filter: 1000μF*2 Electrolytic+68uF*4TAN,
Output filter:220uF*4 TAN+820uF*2POSCAP
C3: Load Current C2: Output Voltage



Start-up V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



Start-up V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage

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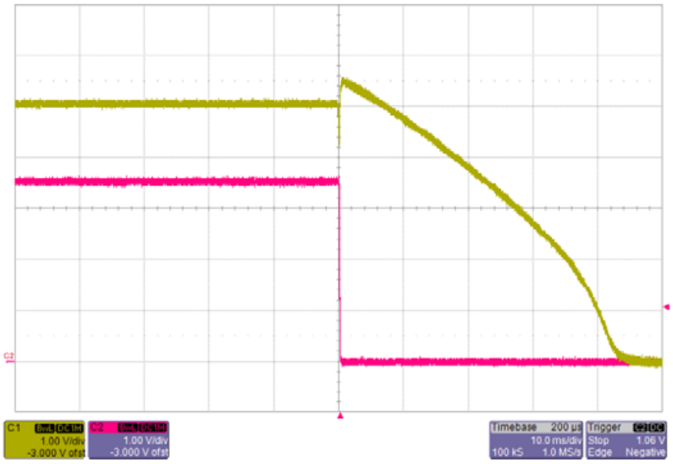
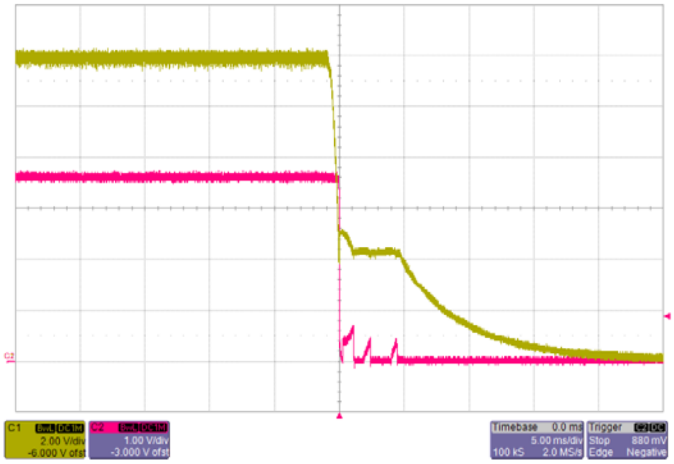
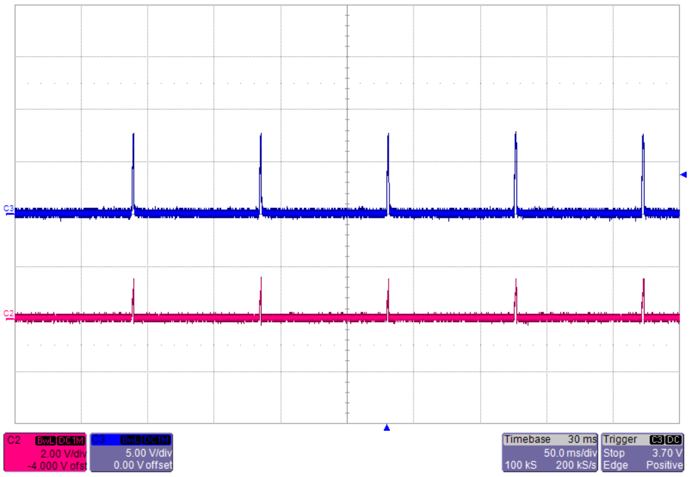


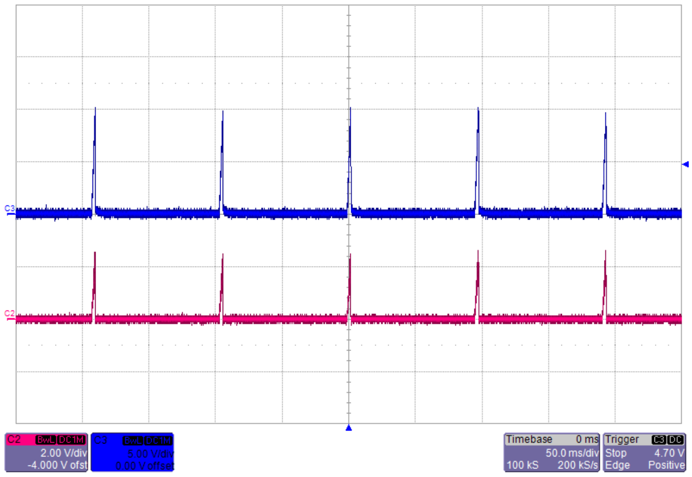
Shut-down V_{IN}=5V, I_O=50A
C1: Input Voltage C2: Output Voltage



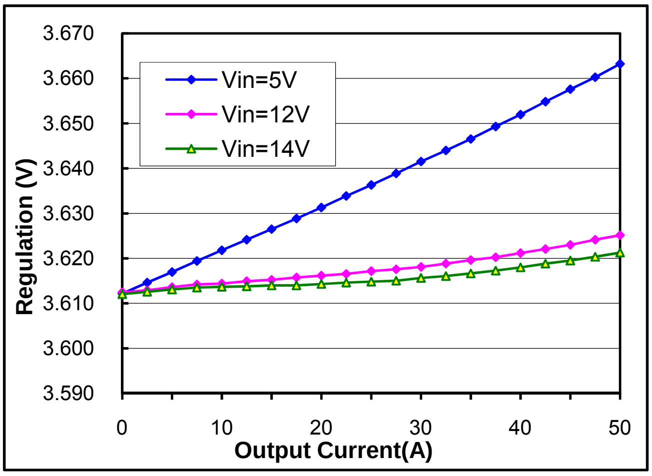
Shut-down V_{IN}=12V, I_O=50A
C1: Input Voltage C2: Output Voltage



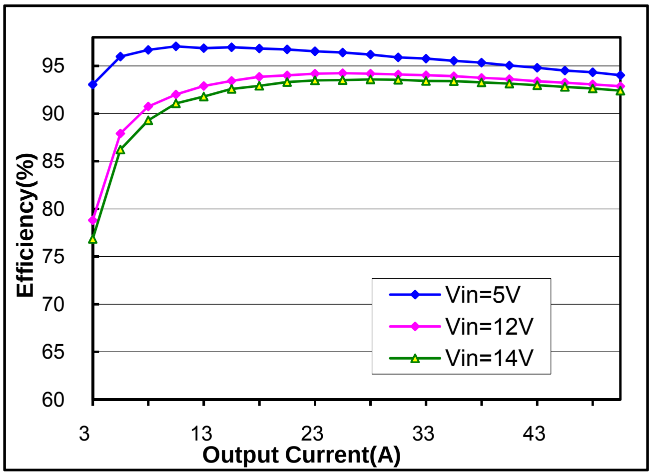
Short-Circuit Output V_{IN}=5V



Short-Circuit Output V_{IN}=12V



Regulation
Output voltage vs. Load Current



Efficiency vs. Load Current

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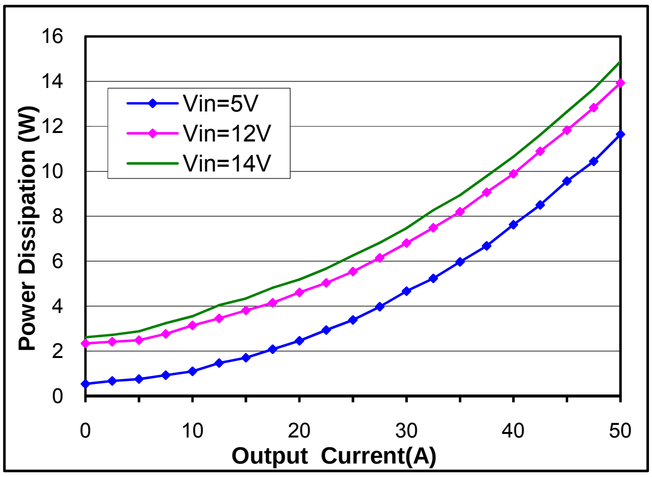
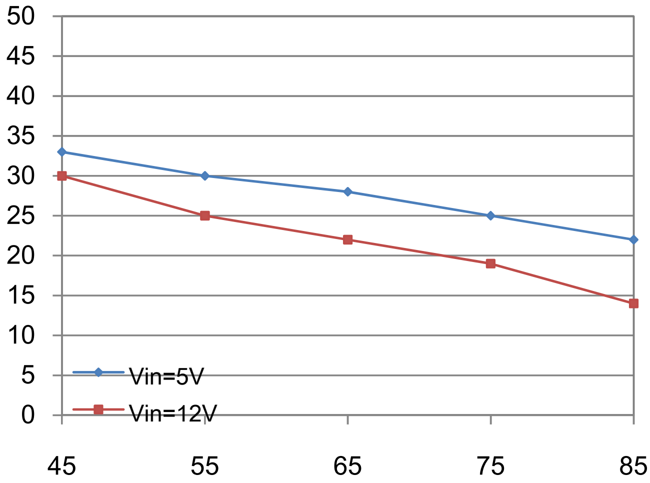


Power Dissipation vs. Load Current



Dearting

Input filter: multiple 68uF*4 TAN +1000uF/25V *2Electrolytic+22μF*2 Ceramic;
Output filter: multiple220uF*4 TAN +820uF *2 Solid CAP

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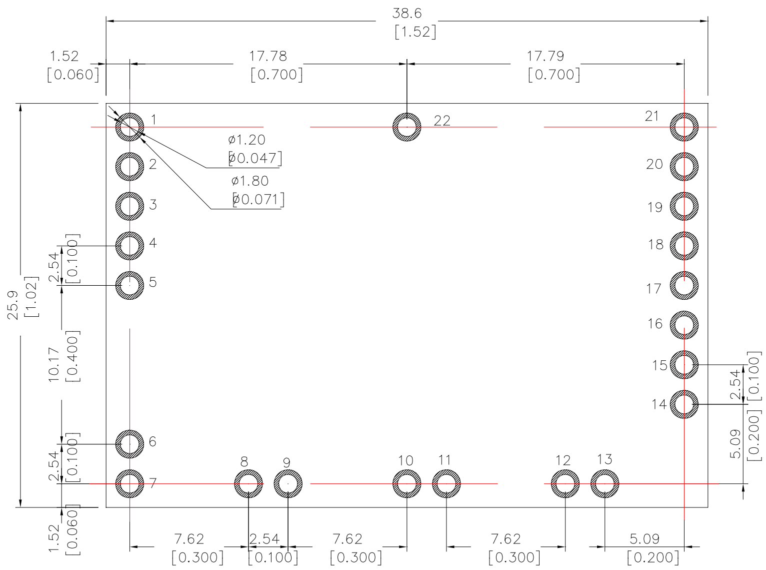
Recommended Hole Pattern for Through-Hole part

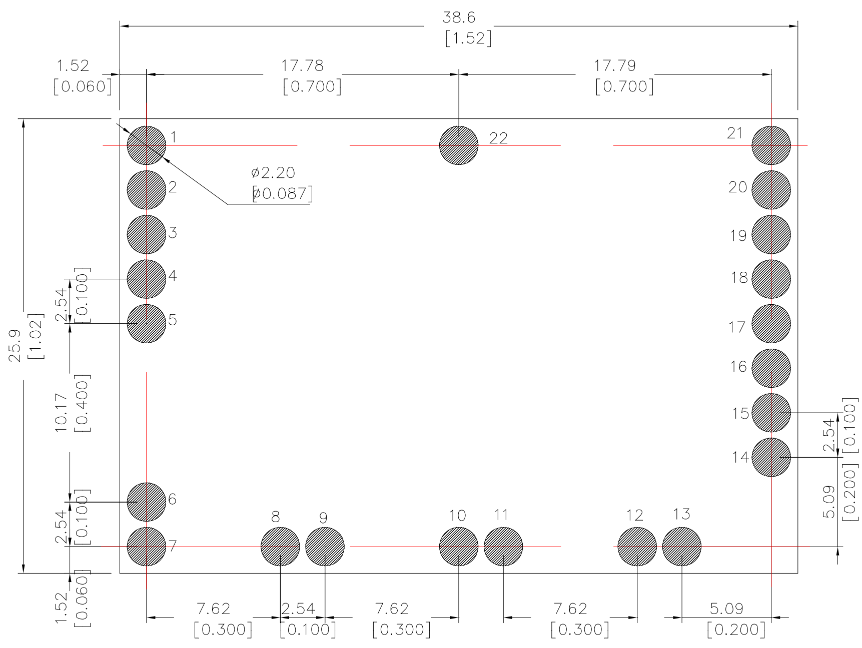
Dimensions are in millimeters (inches)



Component-side footprint

Recommended Hole Pattern for SMT part

Dimensions are in millimeters (inches)



Component-side footprint

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Application Notes

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