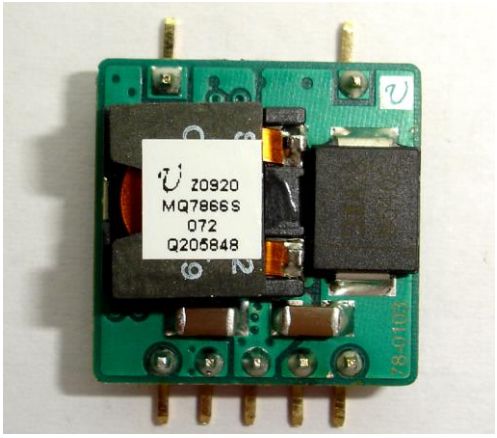
PowerBean™ MQ7866
Compact, 3~5.5V input, 3A/15W output, Boost DC-DC Converter



Features

- Wide Operating Voltage: 3V ~ 5.5V
- Output Voltage: 5V ~ 18V
- Output Current Up to 3A
- Output Power Up to 15W
- Low output voltage ripple
- Minimal space on PCB:
  - SIP PIN out
    - 17.78 mm x 17.78 mm x 6.7 mm or
    - 0.7 in x 0.7 in x 0.26 in
  - SMT PIN out
    - 17.78 mm x 17.78 mm x 8.8 mm or
    - 0.7 in x 0.7 in x 0.34 in
- No derating to +55℃, natural convection
- UL/IEC/EN60950 compliant
- RoHS Compliant

Applications

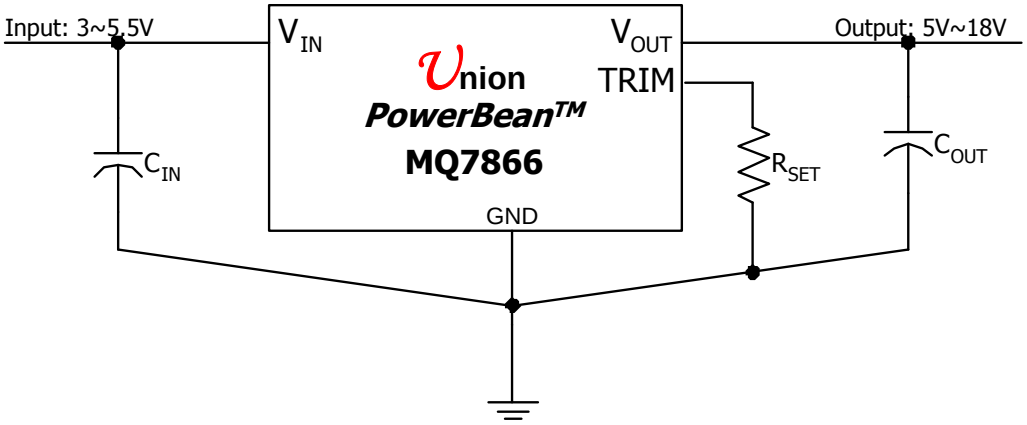
- Industry Control
- Audio Video Devices
- Data Acquisition Equipment

Description

The ***PowerBean™*** MQ7866 Series Power Modules are non-isolated dc-dc converters that operate over a wide input voltage range of 3Vdc to 5.5Vdc and provide a precisely (2%) regulated dc output. Such a module is suitable to application with 3.3V or 5V power supply bus to generate 5V, 12V, 15V, and 18V etc bias supply. The modules have a maximum output current rating of 3A at a typical full-load efficiency over 93.5%. Standard features include remote on/off with negative logic and output voltage adjustment, over-current protection, over-temperature protection.

MQ7866 series can load 3A/15W in a very small size. This improves PCB layout and system integration capability.

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

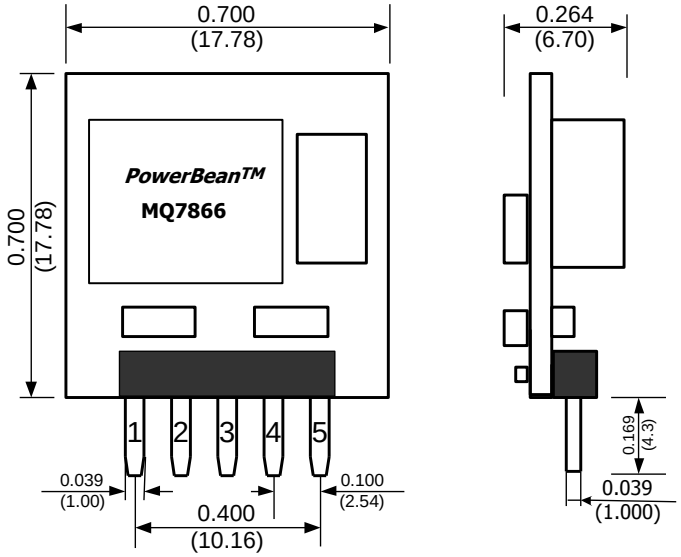


Performance Specifications (at TA=+25℃)

Model	Input V_{IN} Range (V)	Output				Efficiency (%)
		I_{OUT} (A)	Trim Range (V)	Regulation		
				Line (%)	Load (%)	
MQ7866T050	3~5.5	3	10%	2	1	90
MQ7866S050				2	1	
MQ7866T120		1.25		2	1	93.5
MQ7866S120				2	1	
MQ7866T150		1		2	1	93.5
MQ7866S150				2	1	

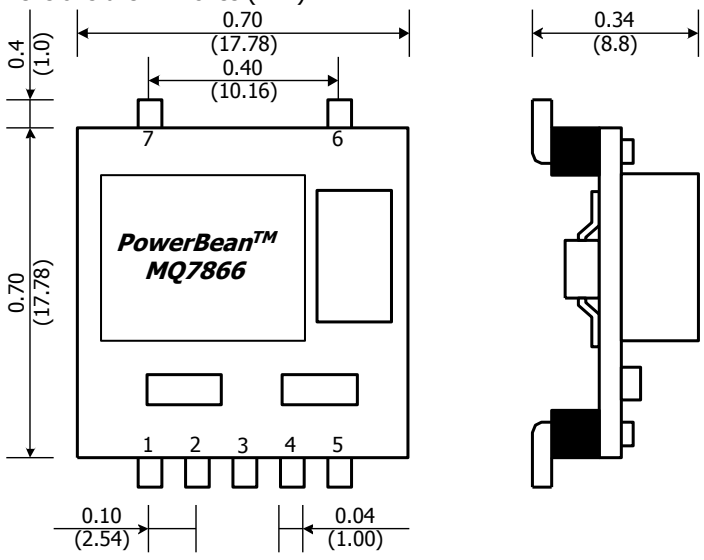
Mechanical Specifications

MQ7866T- Dimensions are in inches (mm)



PIN	DESCRIPTION
1	No Connect
2	V_{in}
3	GND
4	V_{out}
5	T_{rim}

MQ7866S- Dimensions are in inches (mm)



PIN	DESCRIPTION
1	No Connect
2	V_{in}
3	GND
4	V_{out}
5	T_{rim}
6	No Connect
7	No Connect

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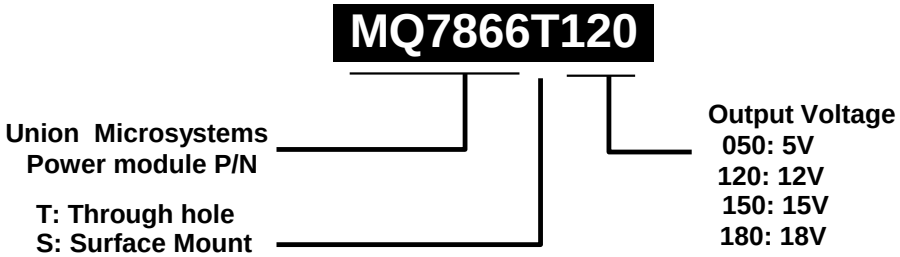
Ordering Information



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	6	V
Storage Temperature	T_{STG}	-40	125	℃

MQ7866T/S050 Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Input Voltage Range		V_{IN}	3		5.5	V
Output Current	Vo.set =5V	Io			3	A
Output Voltage Set point	100% load	Δ Vo	-2		+2	%
Temperature Regulation	T_A= $T_{A.MIN}$ To $T_{A.MAX}$	-		0.2		%$V_{O.SET}$
Line Regulation				2%		
Load Regulation				1%		
Output Ripple and Noise Voltage	See Typical Characteristic					
Transient Response						

MQ7866T/S120 Electrical Specifications: *(T_A=+25℃)*

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Input Voltage Range		V_{IN}	3		5.5	V
Output Current	Vo.set =12V	Io			1	A
Output Voltage Set point	100% load	Δ Vo	-2		+2	%
Temperature Regulation	T_A= $T_{A.MIN}$ To $T_{A.MAX}$	-		0.2		%$V_{O.SET}$
Line Regulation				2%		
Load Regulation				1%		
Output Ripple and Noise Voltage	See Typical Characteristic					
Transient Response						

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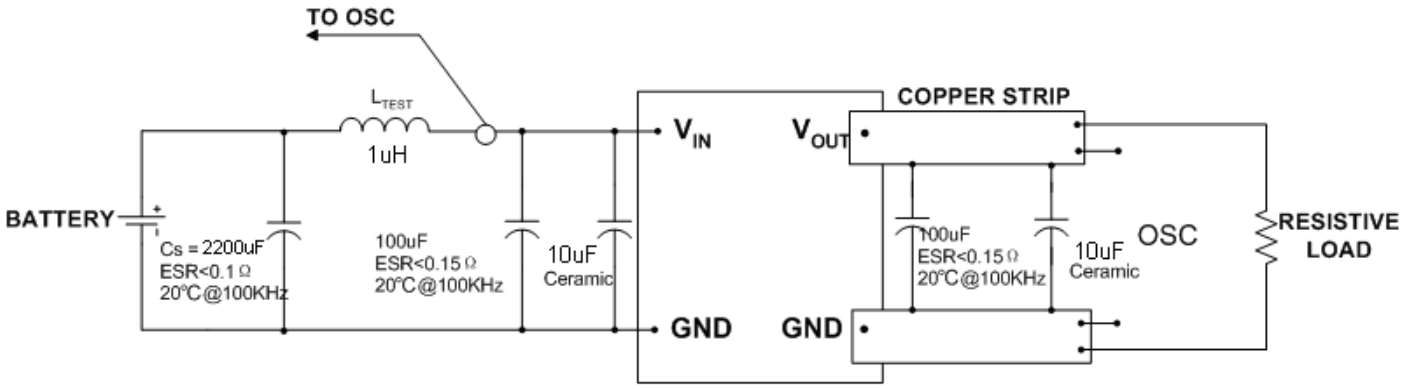
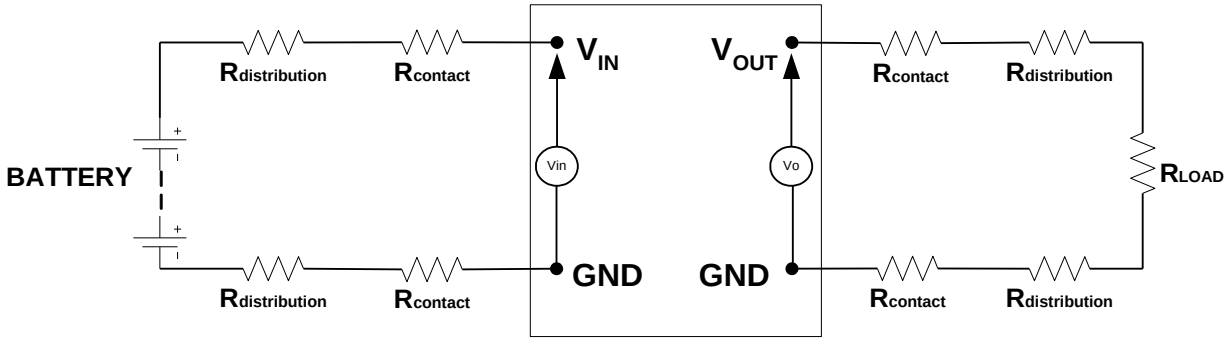
Test Configurations



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 should be made using a BNC socket. Position the load between 50mm and 75mm（2in. and 3in）from the tested module.



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 terminals to avoid measurement errors due to socket contact resistance.

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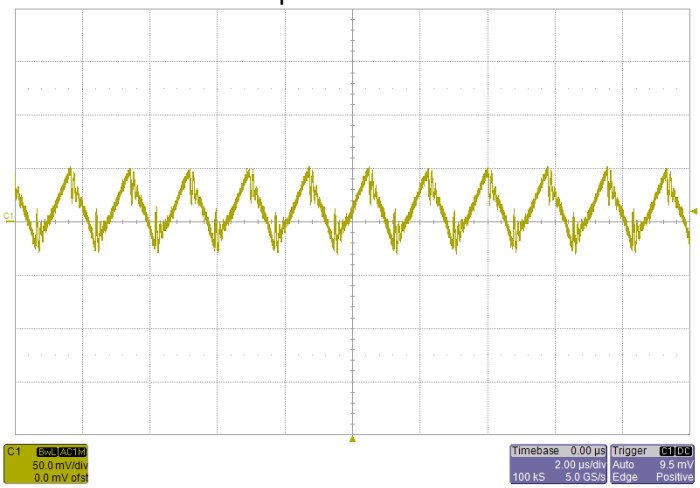
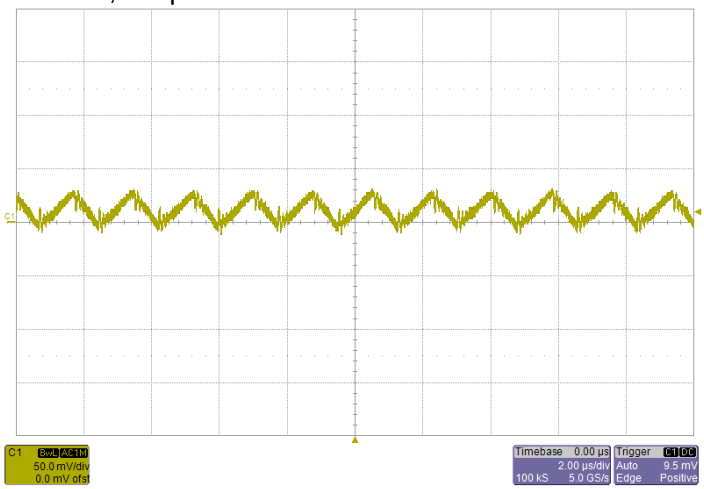
Typical Characteristics (Output:5V):

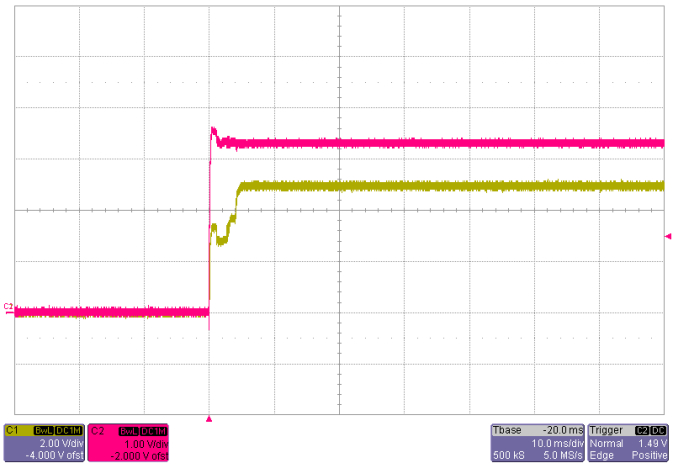
General Conditions: Input: 2200uF AL+100uF TAN+10uF Ceramic; Output: 200uF AL+10uF Ceramic



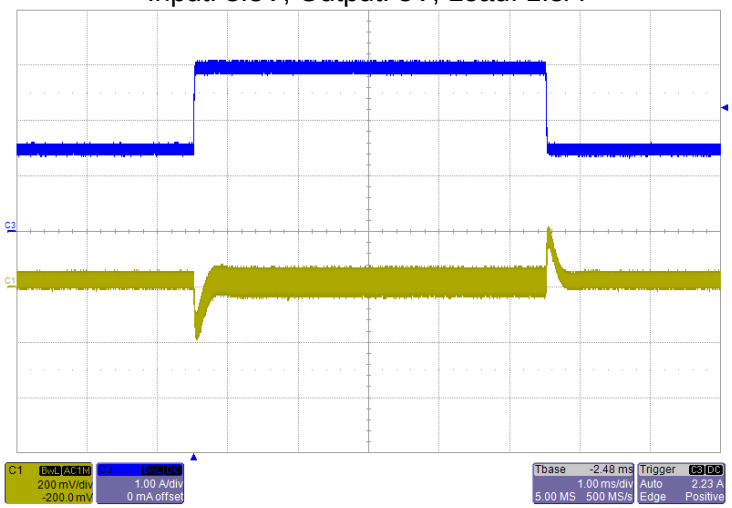
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 5V, Load: 3A



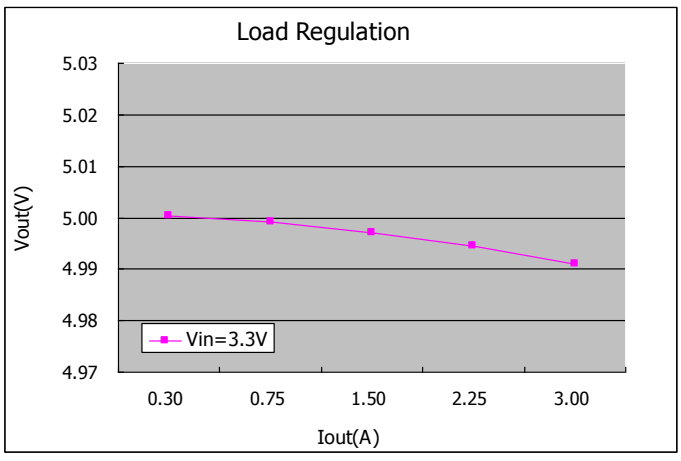
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 5V, Load: 1.5A

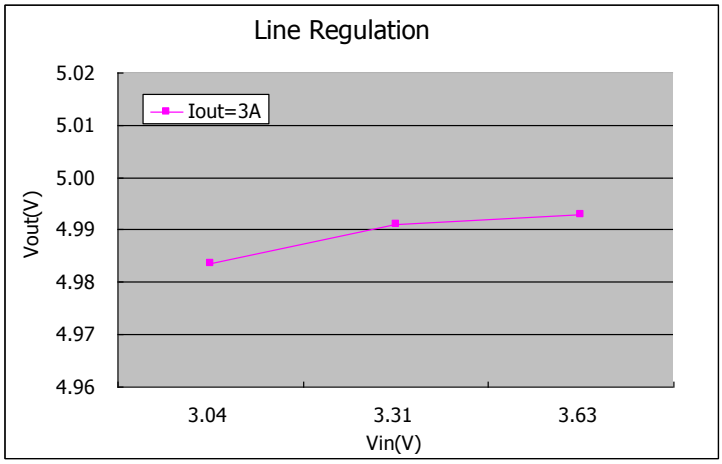


Start-up Input:3.3V



Transient Response (C1: output, C3: Load Current)
Load current Step from 1.5A~3A~1.5A,
Input: 3.3V, Output: 5V





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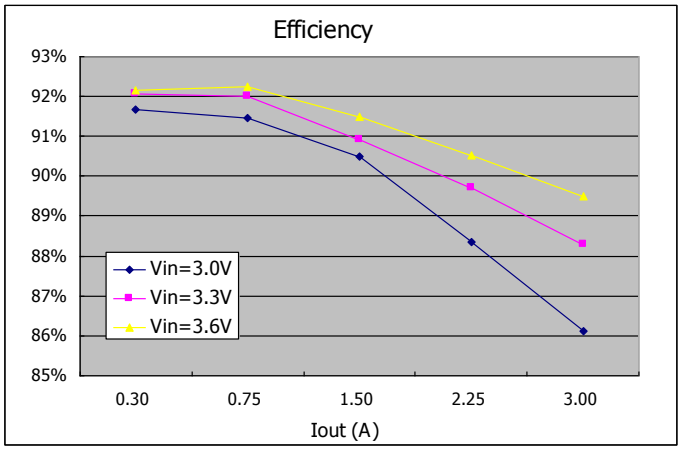
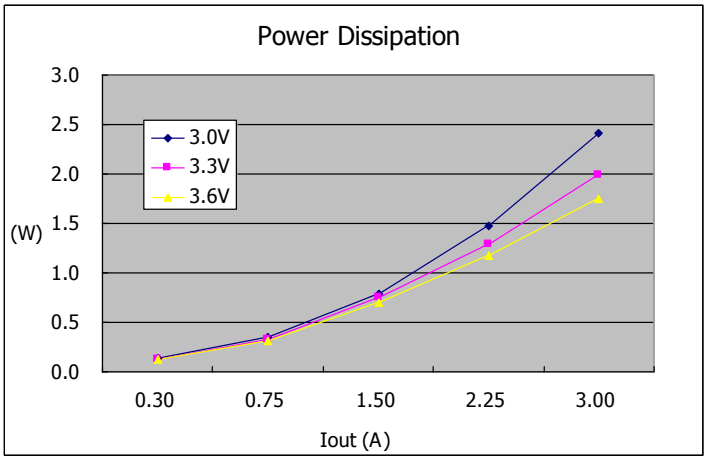
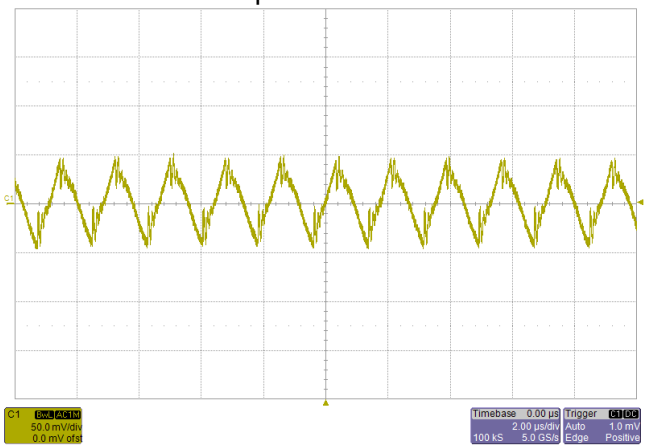

Efficiency
93%
92%
91%
90%
89%
88%
87%
86%
85%
Vin=3.0V
Vin=3.3V
Vin=3.6V
0.30
0.75
1.50
2.25
3.00
Iout (A)

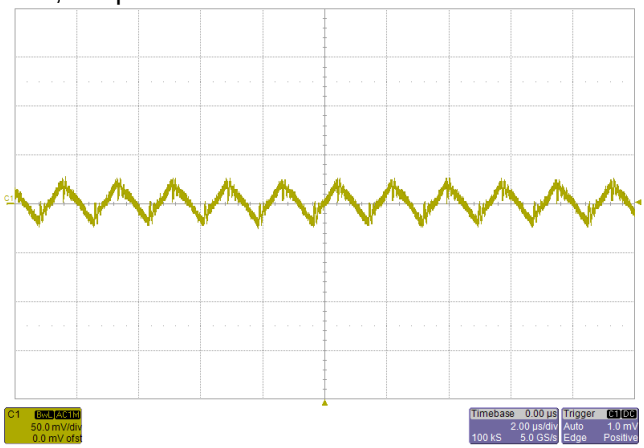

Power Dissipation
3.0
2.5
2.0
1.5
1.0
0.5
0.0
(W)
3.0V
3.3V
3.6V
0.30
0.75
1.50
2.25
3.00
Iout (A)

Typical Characteristics (Output:7.2V):

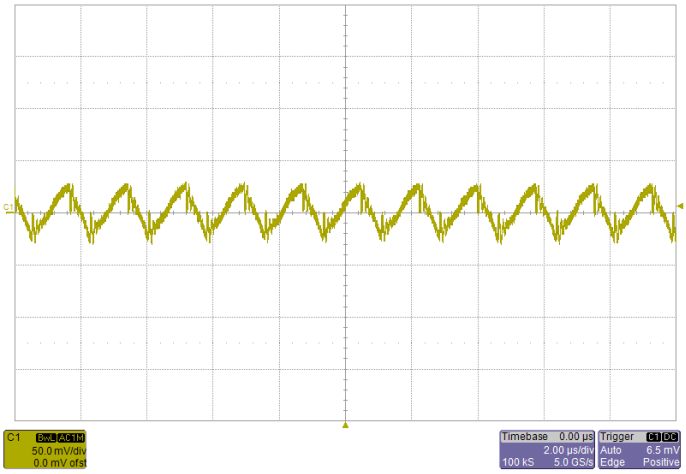
General Conditions: Input: 2200uF AL+100uF TAN+10uF Ceramic; Output: 200uF AL+10uF Ceramic



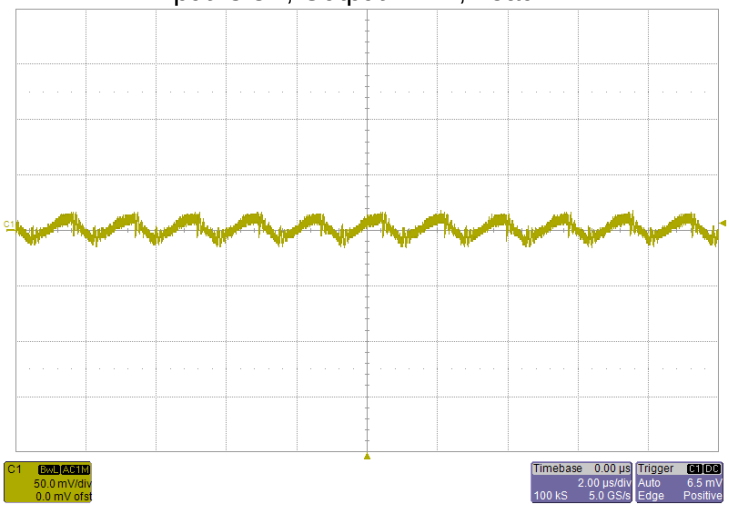
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 7.2V, Load: 2A



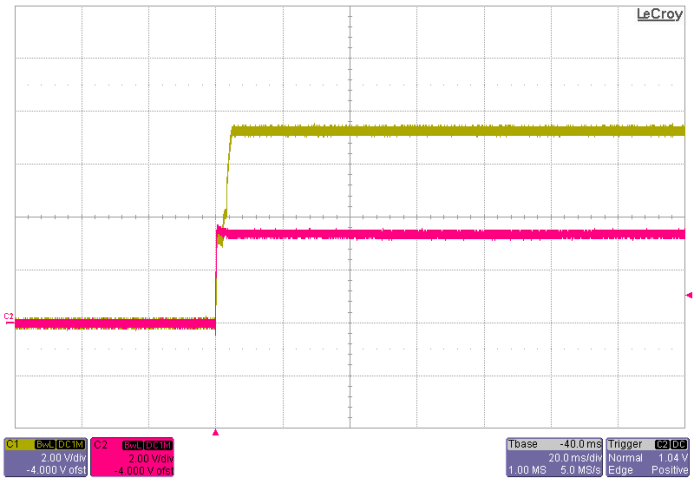
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 7.2V, Load: 1A



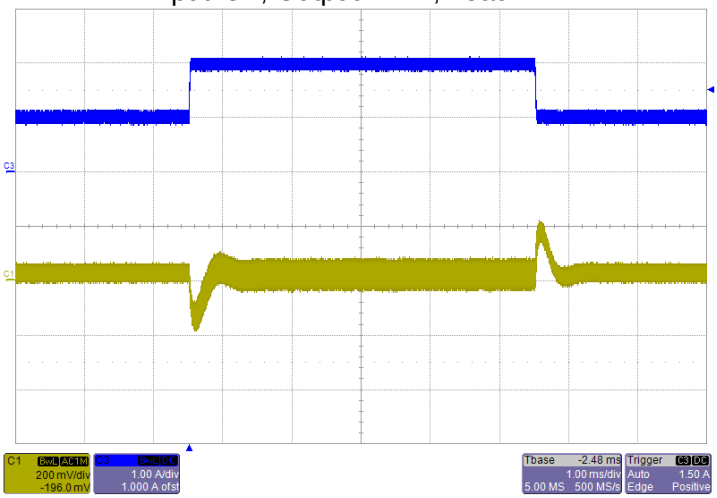
Ripple and Noise (0~20MHz)
Input: 5V, Output: 7.2V, Load: 2A



Ripple and Noise (0~20MHz)
Input: 5V, Output: 7.2V, Load: 1A



Start-up Input: 3.3V



Transient Response (C1: output, C3: Load Current)
Load current Step from 2A~1A~2A, 0.1A/uS
Input: 3.3V, Output: 7.2V

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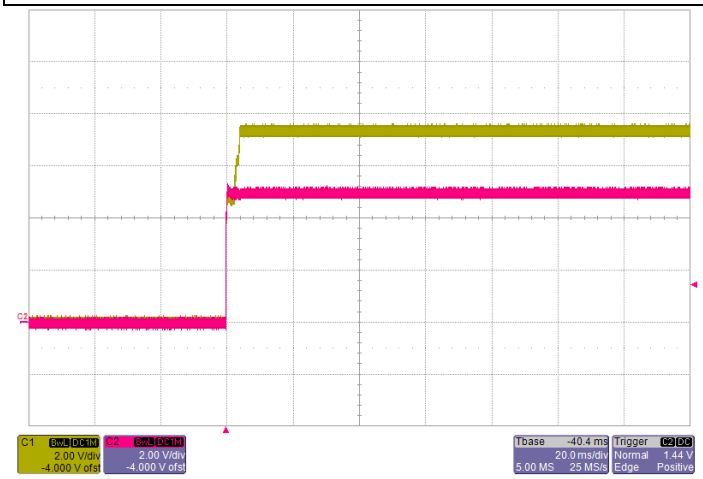
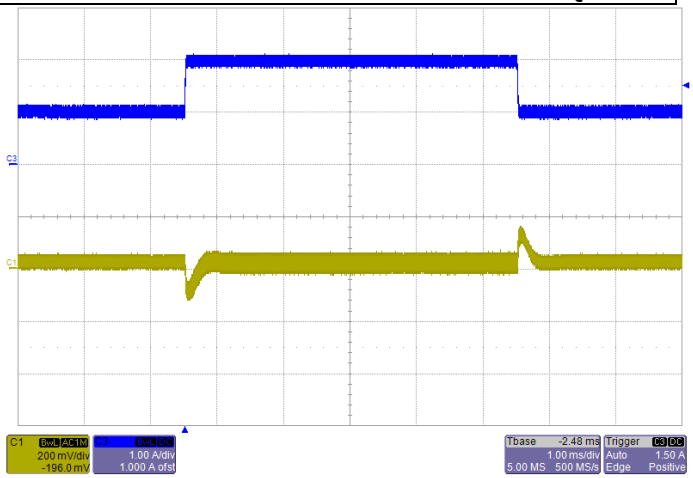
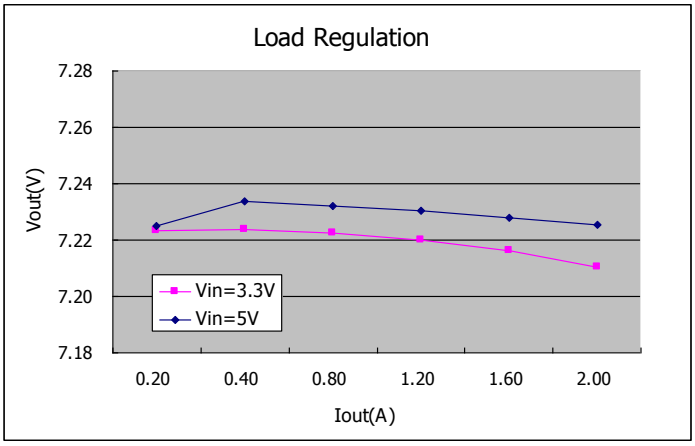
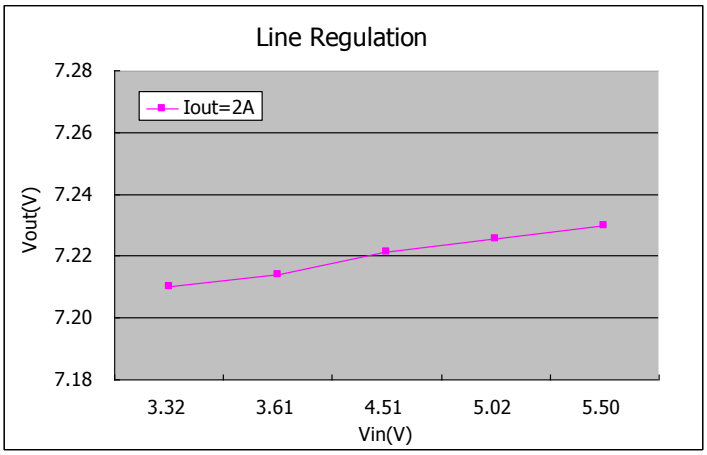


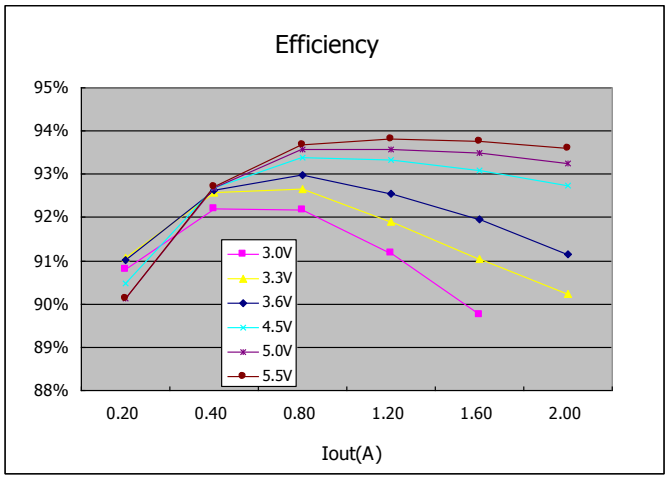
Start-up Input: 5V

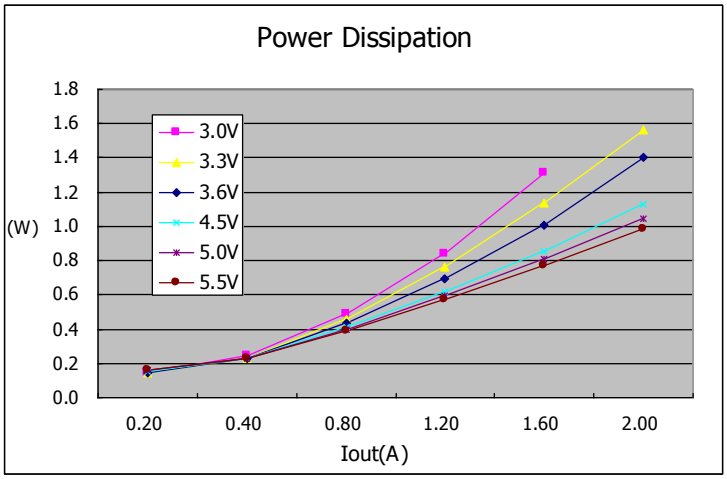


Transient Response (C1: output, C3: Load Current)
Load current Step from 2A~1A~2A, 0.1A/uS
Input: 5V, Output: 7.2V









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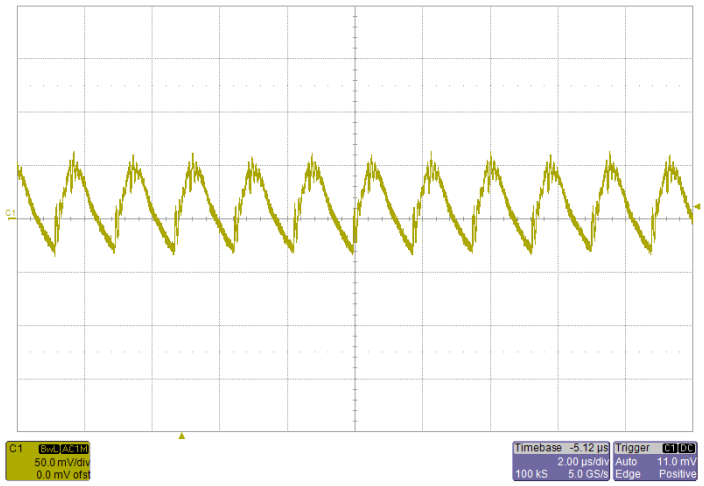
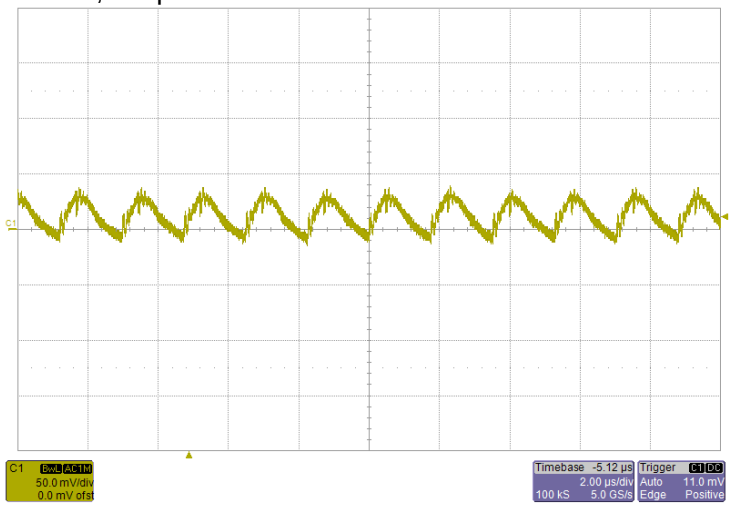
Typical Characteristics (Output:12V):

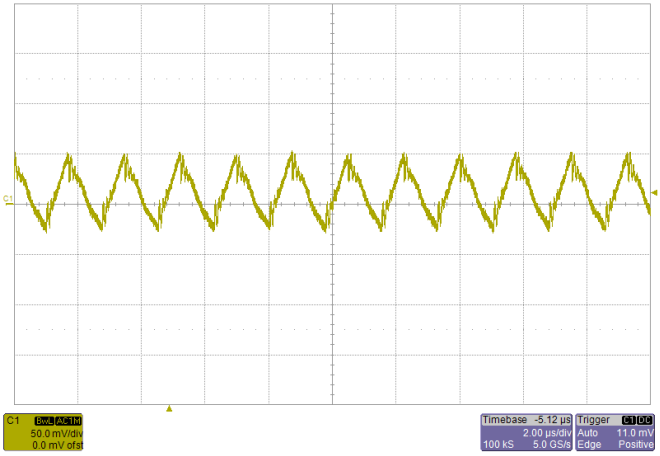
General Conditions: Input: 2200uF AL+100uF TAN+10uF Ceramic; Output: 200uF AL+10uF Ceramic



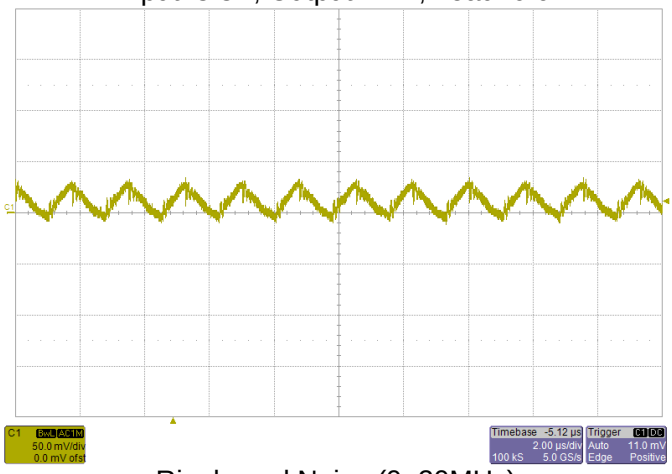
Ripple and Noise (0~20MHz)
Input: 3.3V, Output:12V, Load: 1.2A



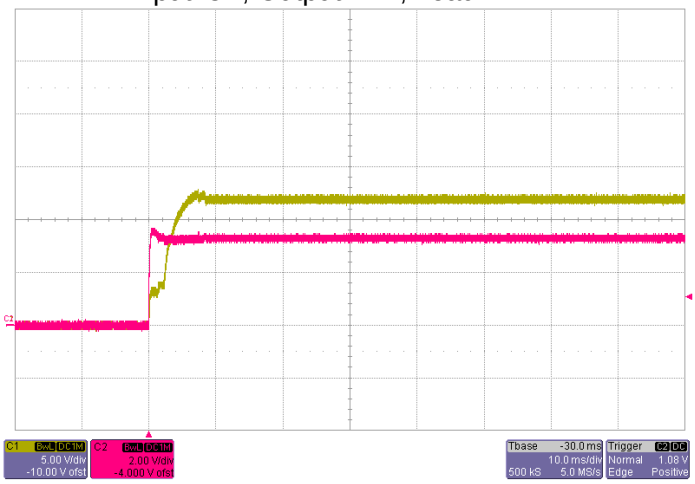
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 12V, Load: 0.6A



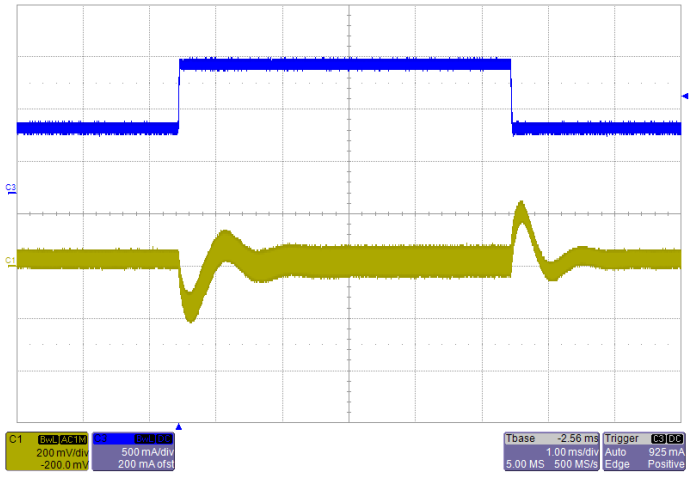
Ripple and Noise (0~20MHz)
Input: 5V, Output:12V, Load: 1.2A



Ripple and Noise (0~20MHz)
Input: 5V, Output: 12V, Load: 0.6A



Start-up Input: 3.3V



Transient Response (C1: output, C3: Load Current)
Load current Step from 1.2A~0.6A~1.2A, 0.1A/uS
Input: 3.3V, Output: 12V

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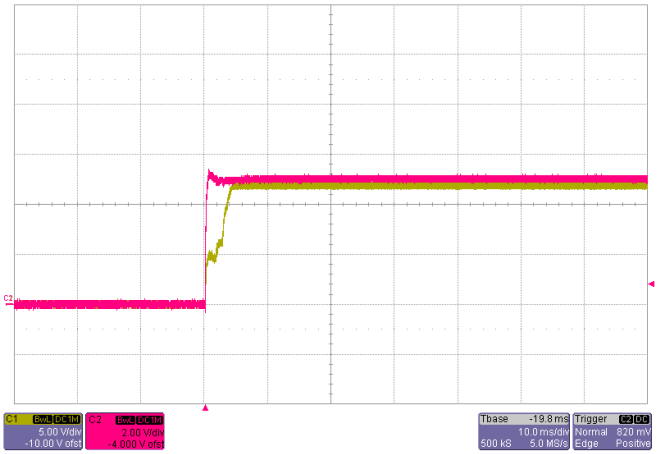
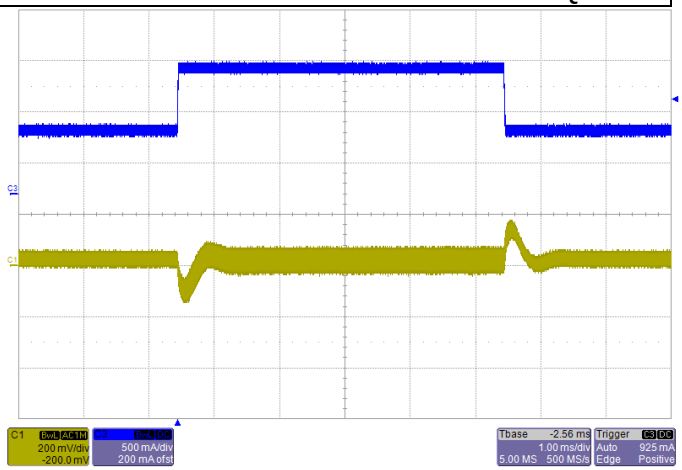
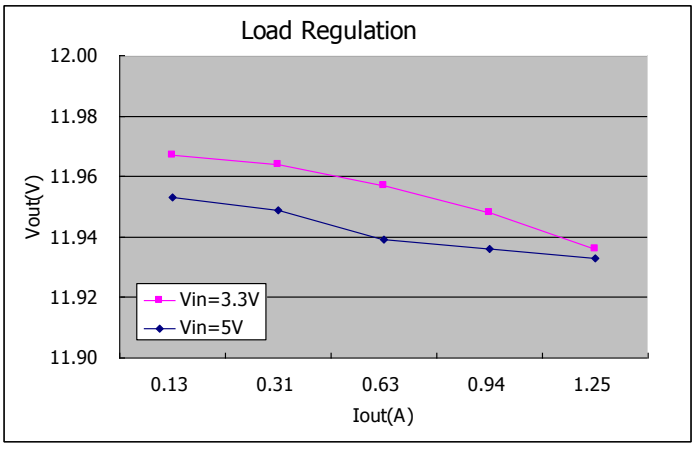
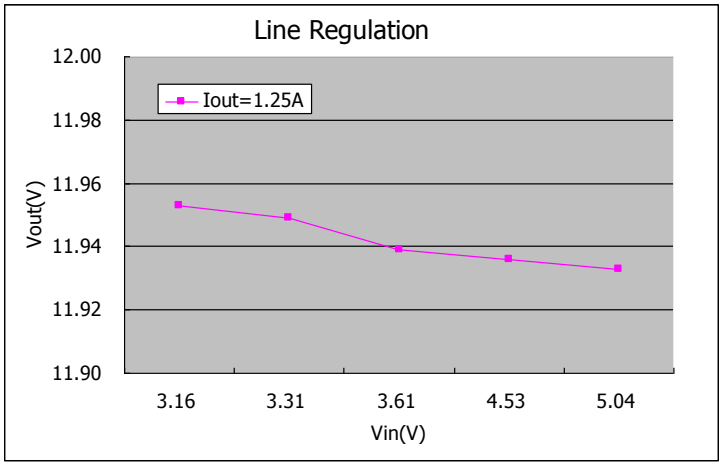


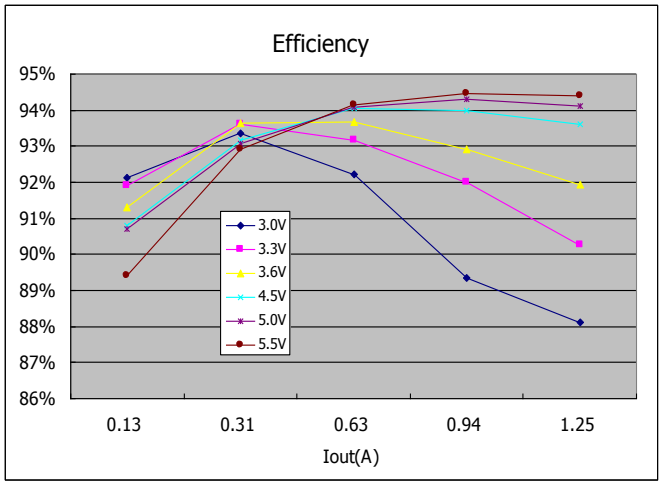
Start-up Input: 5V

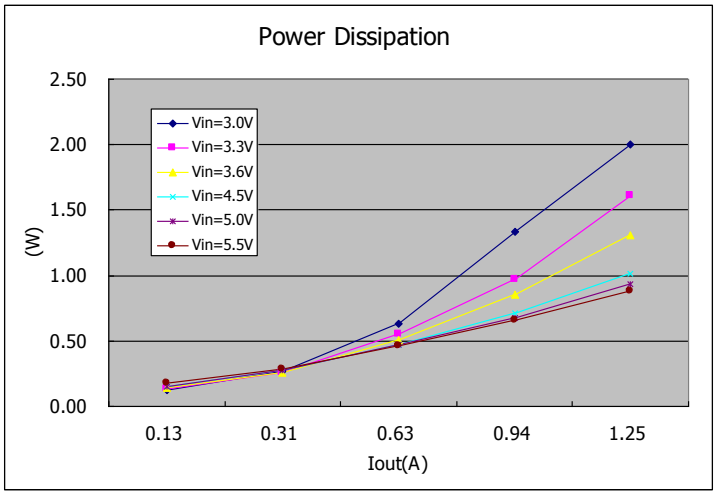


Transient Response (C1: output, C3: Load Current)
Load current Step from 1.2A~0.6A~1.2A, 0.1A/uS
Input: 5V, Output: 12V



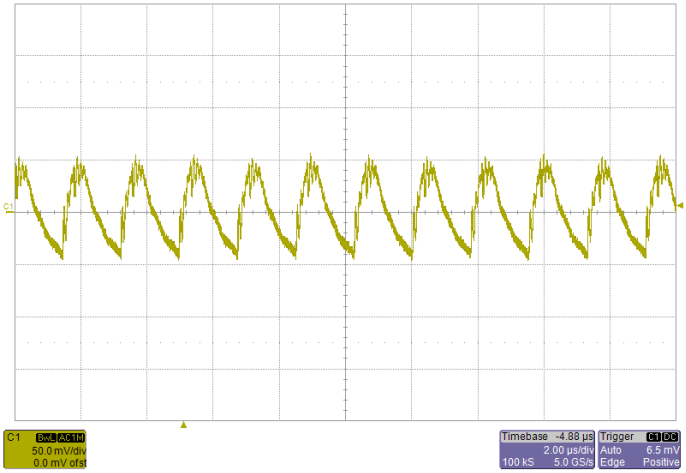




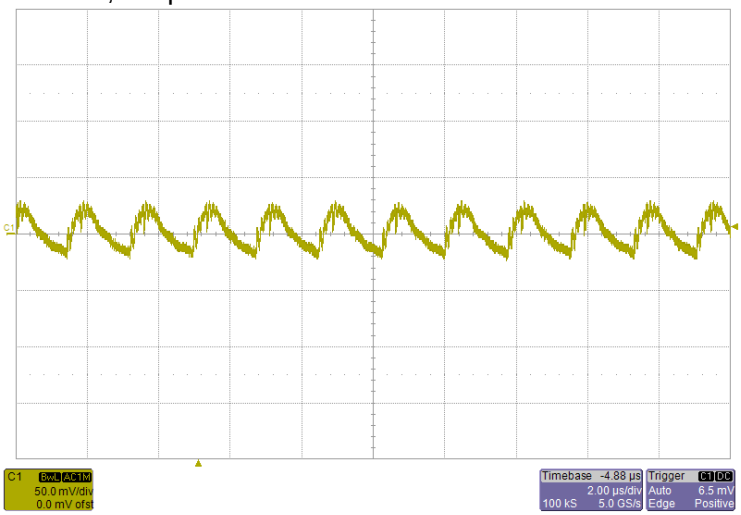


Typical Characteristics (Output:15V):

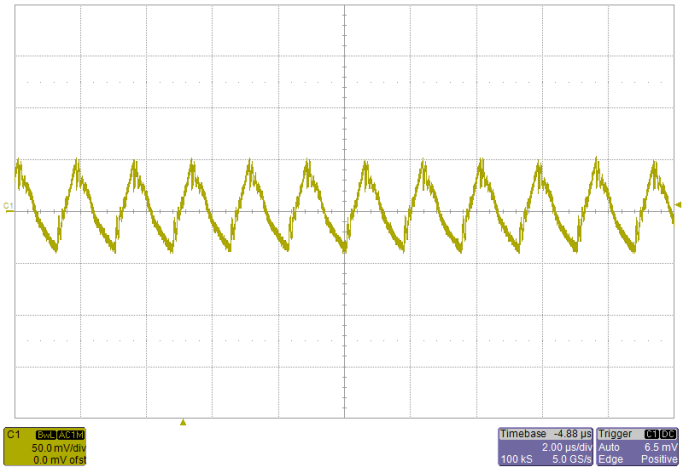
General Conditions: Input: 2200uF AL+100uF TAN+10uF Ceramic; Output: 200uF AL+10uF Ceramic



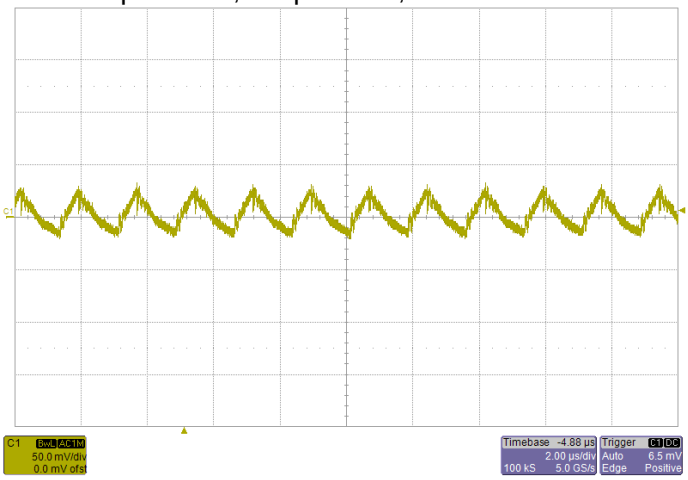
Ripple and Noise (0~20MHz)
Input: 3.3V, Output:15V, Load: 1A



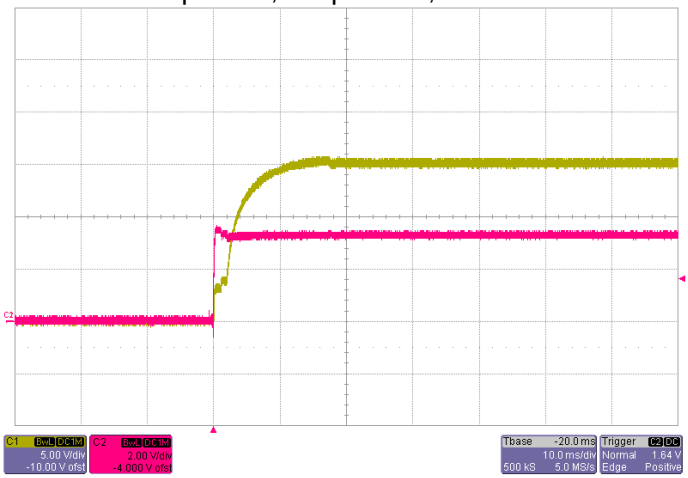
Ripple and Noise (0~20MHz)
Input: 3.3V, Output: 15V, Load: 0.5A



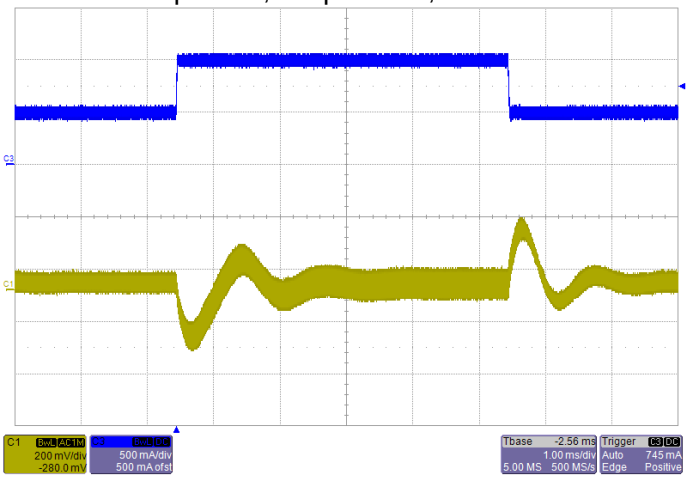
Ripple and Noise (0~20MHz)
Input: 5V, Output:15V, Load: 1A



Ripple and Noise (0~20MHz)
Input: 5V, Output: 15V, Load: 0.5A



Start-up Input: 3.3V



Transient Response (C1: output, C3: Load Current)
Load current Step from 1A~0.5A~1A, 0.1A/uS
Input: 3.3V, Output: 15V

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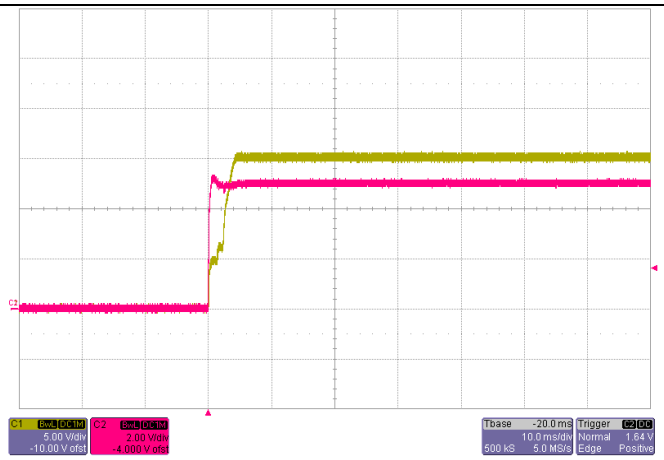
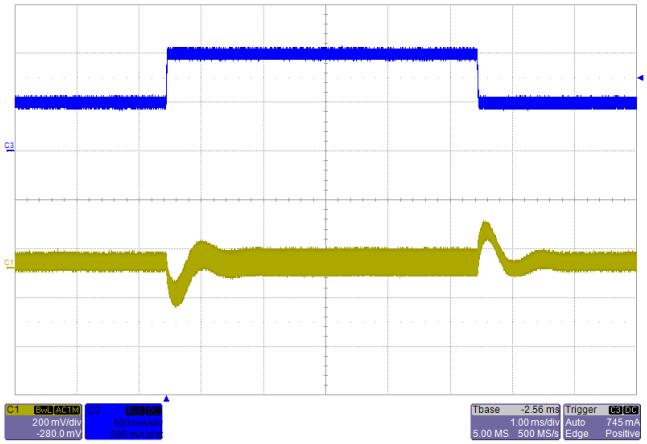
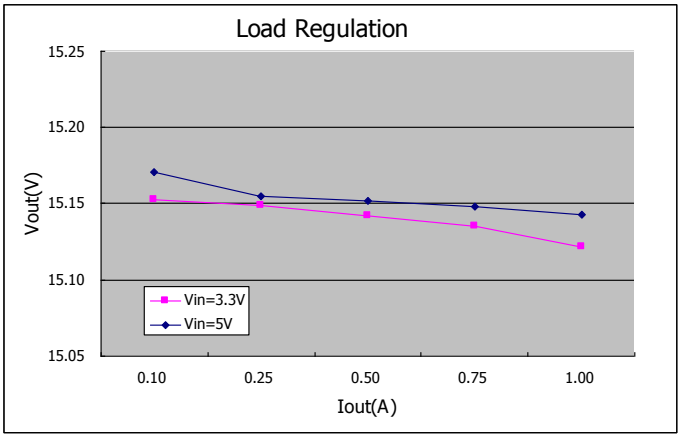
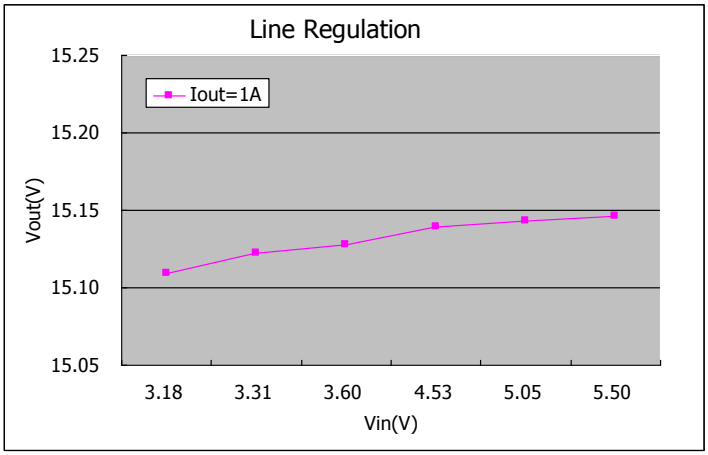


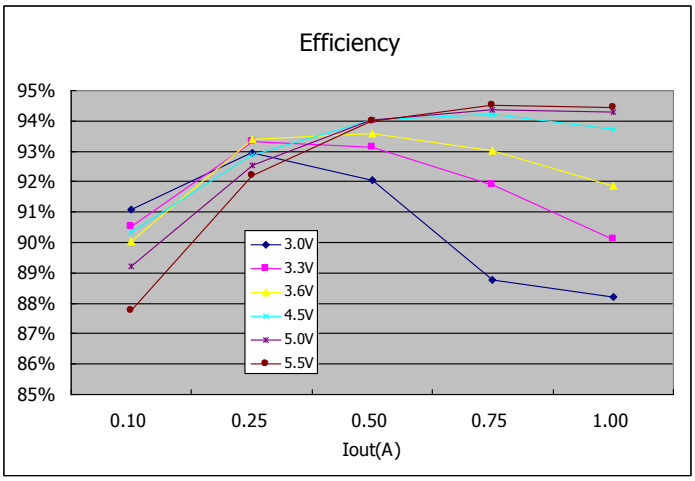
Start-up Input: 5V

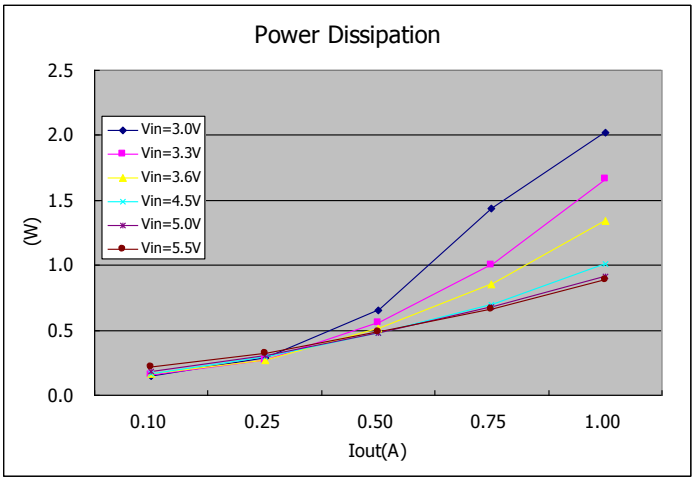


Transient Response (C1: output, C3: Load Current)
Load current Step from 1A~0.5A~1A, 0.1A/uS
Input: 5V, Output: 15V









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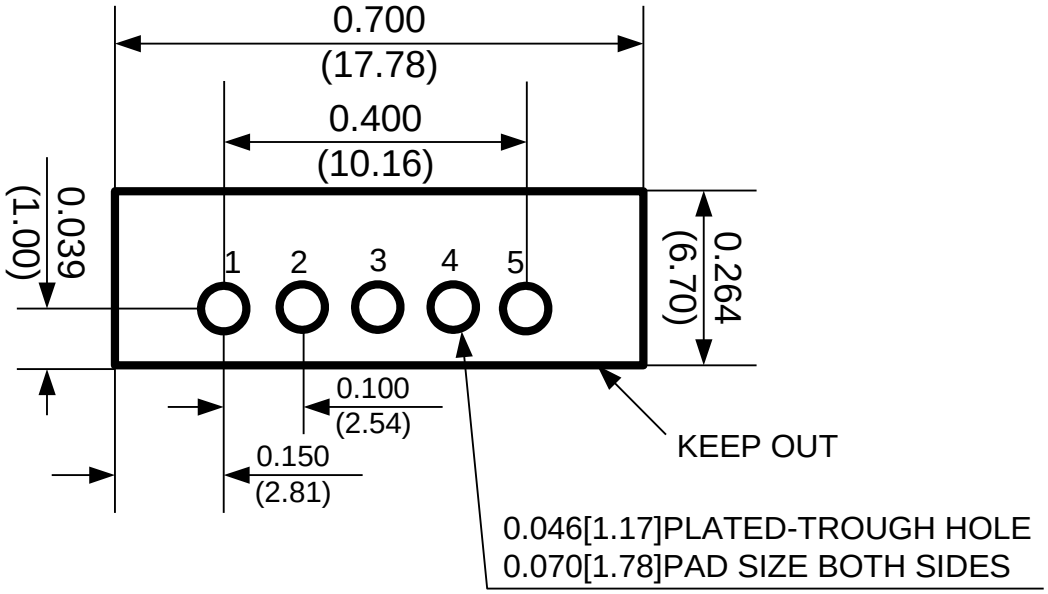
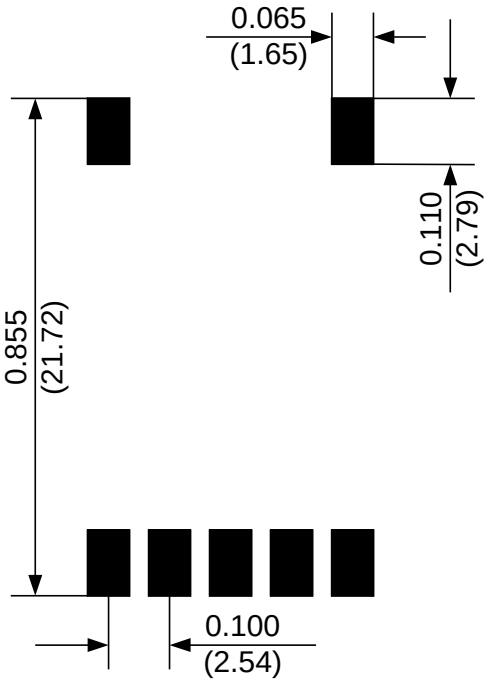
Recommended Hole Pattern

Dimensions are in inches (millimeters)



Component-side footprint for Through-Hole Pin Out



Component-side footprint for SMT Pin OUT

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