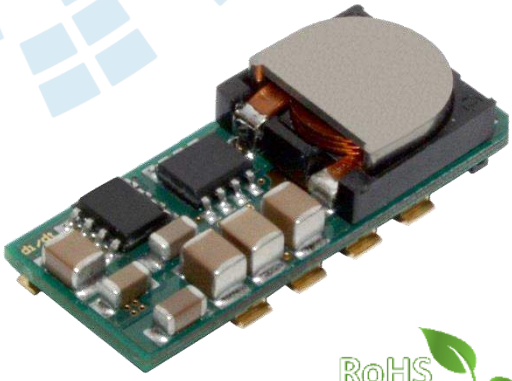
YNC12S100xy
DC-DC Converter Series

9.6 – 14 VDC Input; 1.0 – 5.0 VDC Programmable @ 10 A



RoHS Compliant

The YNL12S100xy non-isolated DC-DC converters deliver up to 10 A of output current in an industry-standard surface-mount package. The YNL12S100xy converters operate from a 9.6 – 14 VDC input. These converters are ideal choices for Intermediate Bus Architectures where point-of-load power delivery is generally a requirement.

Within the YNL12S100xy family, converters come in individual output voltage versions, allowing coverage of the output voltage range from 1.0 to 5.0 V. Each version is capable of providing an extremely tight, highly regulated, and trimmable output.

The YNL12S100xy converters provide exceptional thermal performance, even in high temperature environments with minimal airflow. No derating is required up to 85 °C (up to 70 °C for 5 V output). This is accomplished through the use of circuitry, packaging, and processing techniques to achieve ultra-high efficiency, excellent thermal management, and a very low body profile.

The low body profile and the preclusion of heat sinks minimize impedance to system airflow, thus enhancing cooling for both upstream and downstream devices. The use of 100% automation for assembly, coupled with advanced power electronics and thermal design, results in a product with extremely high reliability.

Key Features

- RoHS lead-free solder and lead-solder-exempted products are available
- Delivers up to 10 A (50 W)
- No derating up to 85 °C (70 °C for 5 V output)
- Surface-mount package
- Industry-standard footprint and pinout
- Small size and low profile: 1.30” x 0.53” x 0.314” (33.02 x 13.46 x 7.98mm)
- Weight: 0.22 oz [6.12 g]
- Start-up into pre-biased output
- No minimum load required
- Output voltage trim +/-10%
- Operating ambient temperature: -40 °C to 85 °C
- Remote output sense
- Remote ON/OFF (Positive or Negative)
- Fixed-frequency operation
- Auto-reset output overcurrent protection
- Auto-reset overtemperature protection
- High reliability, MTBF = TBD Million Hours
- All materials meet UL94, V-0 flammability rating
- Approved to the latest edition and amendment of ITE Safety standards, UL/CSA 60950-1 and IEC60950-1

Applications

- Intermediate Bus Architectures
- Telecommunications
- Data Communications
- Distributed Power Architectures
- Servers, Workstations

Benefits

- High Efficiency – no heat sink required
- Reduces Total Solution Board Area
- Tape and Reel Packing
- Compatible with Pick & Place Equipment

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North America
+1 866 513 2839

Asia-Pacific
+86 755 29885888

Europe, Middle East
+353 61 225 977

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1. ELECTRICAL SPECIFICATIONS

Conditions: T_A = 25 °C, Airflow = 200 LFM (1 m/s), Vin = 12 VDC, Vout = 1.0 - 5.0 V, unless otherwise specified.

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
Absolute Maximum Ratings					
Input Voltage	Continuous	-0.3		15	VDC
Operating Ambient Temperature		-40		85	°C
Storage Temperature		-55		125	°C
Feature Characteristics					
Switching Frequency			300		kHz
Output Voltage Trim Range	See Trim Equations	-10		+10	%
Remote Sense Compensation				0.5	VDC
Turn-On Delay Time	Full resistive load				
With Vin = (Converter Enabled, then Vin applied)	From Vin = Vin(min) to Vo=0.1* Vo(nom)		3		ms
With Enable (Vin = Vin(nom) applied, then enabled)	From enable to Vo=0.1*Vo(nom)		3		ms
Rise time	From 10% to 90%, full resistive load		4		ms
ON/OFF Control (Positive Logic)[1]	Converter Off	-5		0.8	VDC
	Converter On	2.4		V_{IN}	VDC
ON/OFF Control (Negative Logic) [1]	Converter Off	2.4		V_{IN}	VDC
	Converter On	-5		0.8	VDC
Input Characteristics					
Operating Input Voltage Range		9.6	12	14	VDC
Input Under Voltage Lockout	Turn-on Threshold		9.0		VDC
	Turn-off Threshold		8.5		VDC
Maximum Input Current	10 ADC Out @ 9.6 VDC In				
	V_{OUT} = 5.0 VDC			5.5	ADC
	V_{OUT} = 3.3 VDC			3.7	ADC
	V_{OUT} = 2.5 VDC			2.8	ADC
	V_{OUT} = 2.0 VDC			2.3	ADC
	V_{OUT} = 1.8 VDC			2.1	ADC
	V_{OUT} = 1.5 VDC			1.8	ADC
	V_{OUT} = 1.2 VDC			1.5	ADC
	V_{OUT} = 1.0 VDC			1.3	ADC
Input Stand-by Current (converter disabled)			5		mA
Input No Load Current (converter enabled)	V_{OUT} = 5.0 VDC		76		mA
	V_{OUT} = 3.3 VDC		60		mA
	V_{OUT} = 2.5 VDC		45		mA
	V_{OUT} = 2.0 VDC		41		mA
	V_{OUT} = 1.8 VDC		38		mA
	V_{OUT} = 1.5 VDC		35		mA
	V_{OUT} = 1.2 VDC		33		mA
	V_{OUT} = 1.0 VDC		30		mA
Input Reflected-Ripple Current - i_s	V_{OUT} = 5.0 VDC		36		mA_{P-P}
See Fig. F for setup. (BW = 20 MHz)	V_{OUT} = 3.3 VDC		34		mA_{P-P}
	V_{OUT} = 2.5 VDC		32		mA_{P-P}
	V_{OUT} = 2.0 VDC		31		mA_{P-P}
	V_{OUT} = 1.8 VDC		30		mA_{P-P}
	V_{OUT} = 1.5 VDC		29		mA_{P-P}
	V_{OUT} = 1.2 VDC		26		mA_{P-P}
	V_{OUT} = 1.0 VDC		23		mA_{P-P}
Input Voltage Ripple Rejection	120 Hz		72		dB

Note:

[1] Converter is on if ON/OFF pin is left open.

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YNC12S100xy Series

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
Output Characteristics					
Output Voltage Set Point (no load)		-1.5	Vout	+1.5	%Vout
Output Regulation					
Over Line	Full resistive load		0.5	2	mV
Over Load	From no load to full load		5	12	mV
Output Voltage Range	Overall operating input voltage, resistive load and temperature conditions until end of life	-2.5		+2.5	%Vout
Output Ripple and Noise - 20 MHz bandwidth (Fig. F)	Over line, load, and temperature				
Peak-to-Peak	V_{OUT} = 1.0 VDC		10	20	mV_{P-P}
Peak-to-Peak	V_{OUT} = 5.0 VDC		25	40	mV_{P-P}
External Load Capacitance	Plus full load (resistive)				
Min. ESR > 1 mΩ				1000	µF
Min. ESR > 10 mΩ				5000	µF
Output Current Range		0		10	ADC
Output Current Limit Inception (I_{OUT})			15		A
Output Short- Circuit Current	Short=10 mΩ, continuous		3		A_{rms}
Dynamic Response					
Iout step from 5 A to 10 A with di/dt = 5 A/µs	Co = 10 µF tant. + 1 µF ceramic		150/(180[2])		mV
Settling Time (V_{OUT} < 10% peak deviation)			30		µs
Iout step change from 10 A – 5 A with di/dt = -5 A/µs	Co = 10 µF tant. + 1 µF ceramic		150/(180[2])		mV
Settling Time (V_{OUT} < 10% peak deviation)			30		µs
Iout step from 5 A to 10 A with di/dt = 5 A/µs	Co = 330 µF polymer capacitors		100/(120[2])		mV
Settling Time (V_{OUT} < 10% peak deviation)			55		µs
Iout step from 10 A – 5 A with di/dt = -5 A/µs	Co = 330 µF polymer capacitors		100/(120[2])		mV
Settling Time (V_{OUT} < 10% peak deviation)			55		µs
Efficiency	*Full Load (10 A)*				
	V_{OUT} = 5.0 VDC		95.0		%
	V_{OUT} = 3.3 VDC		94.0		%
	V_{OUT} = 2.5 VDC		93.0		%
	V_{OUT} = 2.0 VDC		91.5		%
	V_{OUT} = 1.8 VDC		90.5		%
	V_{OUT} = 1.5 VDC		89.5		%
	V_{OUT} = 1.2 VDC		87.5		%
	V_{OUT} = 1.0 VDC		86.0		%

Note:

[2] For V_{OUT} = 5.0 V only.

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2. OPERATIONS

2.1. INPUT AND OUTPUT IMPEDANCE

The YNL12S100xy converter should be connected via a low impedance to the DC power source. In many applications, the inductance associated with the distribution from the power source to the input of the converter can affect the stability of the converter. It is recommended to use decoupling capacitors in order to ensure converter stability and reduce input ripple voltage. The converter has an internal input capacitance of 20 µF with very low ESR (ceramic capacitors).

In a typical application, low - ESR tantalum or POS capacitors will be sufficient to provide adequate ripple voltage filtering at the input of the converter. However, very low ESR ceramic capacitors 47 µF-100 µF are recommended at the input of the converter in order to minimize the input ripple voltage. They should be placed as close as possible to the input pins of the converter.

The YNL12S10 has been designed for stable operation with no external capacitance as well with external capacitance. Low ESR ceramic capacitors placed as close as possible to the load (minimim of 47µF) are recommended for improved transient performance and lower output voltage ripple.

It is important to keep low resistance and low inductance PCB traces for connecting load to the output pins of the converter in order to maintain good load regulation.

2.2. ON/OFF (PIN 1)

The ON/OFF pin is used to turn the power converter on or off remotely via a system signal. There are two remote control options available, positive logic (standard option) and negative logic, and both are referenced to GND. Typical connections are shown in Fig. A.

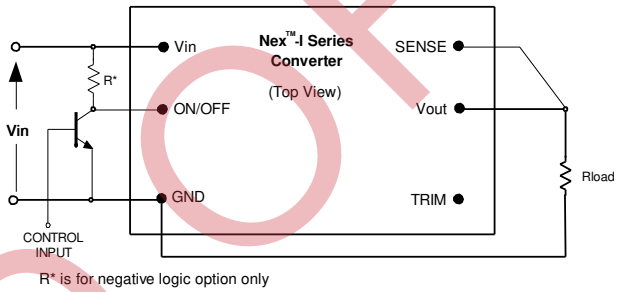

Fig. A: Circuit configuration for ON/OFF function.

The positive logic version turns the converter on when the ON/OFF pin is at a logic high or left open, and turns the converter off when at a logic low or shorted to GND.

The negative logic version turns the converter on when the ON/OFF pin is at a logic low or left open, and turns converter off when the ON/OFF pin is at a logic high or connected to Vin.

ON/OFF pin is internally pulled-up to Vin for positive logic version, and pulled-down for negative logic version. A TTL or CMOS logic gate, open collector (open drain) transistor can be used to drive ON/OFF pin. When using open collector (open drain) transistor with a negative logic option, add a pull-up resistor (R*) of 75 k to Vin as shown in Fig. A; This device must be capable of:

- sinking up to 0.2 mA at a low level voltage of ≤ 0.8 V
- sourcing up to 0.25 mA at a high logic level of 2.3 V – 5 V
- sourcing up to 0.75 mA when connected to Vin

2.3. REMOTE SENSE (PIN 2)

The remote sense feature of the converter compensates for voltage drops occurring only between Vout pin of the converter and the load. The SENSE pin should be connected at the load or at the point where regulation is required (see Fig. B). There is no sense feature on the output GND return pin, where the solid ground plane should provide low voltage drop.

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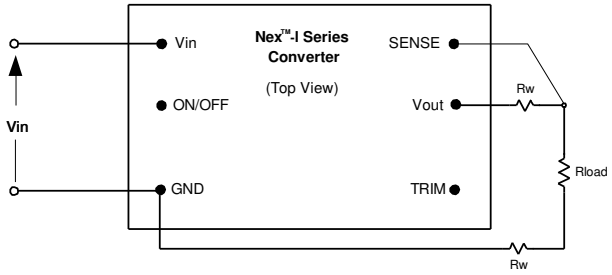

Fig. B: Remote sense circuit configuration.

If remote sensing is not required, the SENSE pin must be connected to the Vout pin to ensure the converter will regulate at the specified output voltage. If these connections are not made, the module will deliver an output voltage that is slightly higher than the specified value.

Because the sense lead carries minimal current, large trace on the end-user board is not required. However, sense trace should be located close to a ground plane to minimize system noise and insure optimum performance. The maximum voltage between the SENSE pin and Vout pin must not exceed 0.5V.

When utilizing the remote sense feature, care must be taken not to exceed the maximum allowable output power capability of the converter, equal to the product of the nominal output voltage and the allowable output current for the given conditions.

When using remote sense, the output voltage at the converter can be increased up to 0.5V above the nominal rating in order to maintain the required voltage across the load. Therefore, the designer must, if necessary, decrease the maximum current (originally obtained from the derating curves) by the same percentage to ensure the converter's actual output power remains at or below the maximum allowable output power.

2.4. OUTPUT VOLTAGE ADJUST /TRIM (PIN 3)

The output voltage can be adjusted up 10% or down 10% using external resistor.

To trim up the output voltage, refer to Fig. C. A trim resistor, $R_{T\text{-}INCR}$, should be connected between the TRIM pin (Pin 3) and output GND pin (Pin 5), with a value of:

$$R_{T\text{-}INCR} = \frac{10.5}{(V_{O\text{-}REQ} - V_{O\text{-}NOM})} - 1 \qquad [k\Omega]$$

where,

$R_{T\text{-}INCR}$ = Required value of trim-up resistor [kΩ]

$V_{O\text{-}REQ}$ = Desired (trimmed) output voltage [V]

$V_{O\text{-}NOM}$ = Nominal output voltage [V]

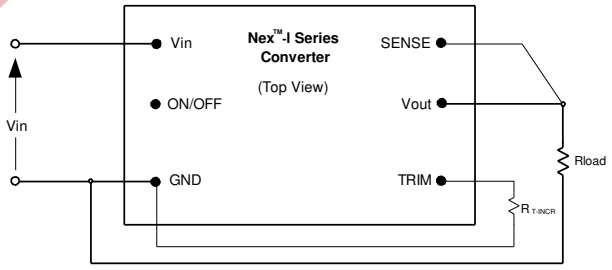

Fig. C: Configuration for increasing output voltage.

To trim down the output voltage (Fig.D), a trim resistor, $R_{T\text{-}DECR}$, should be connected between the TRIM pin (Pin 3) and SENSE pin (Pin 2), with a value of:

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$$R_{T\text{-}DECR} = \frac{(V_{O\text{-}REQ} - 0.7) * 15}{(V_{O\text{-}NOM} - V_{O\text{-}REQ})} - 1 \qquad [k\Omega]$$

where,

$R_{T\text{-}DECR}$ = Required value of trim-down resistor [kΩ]

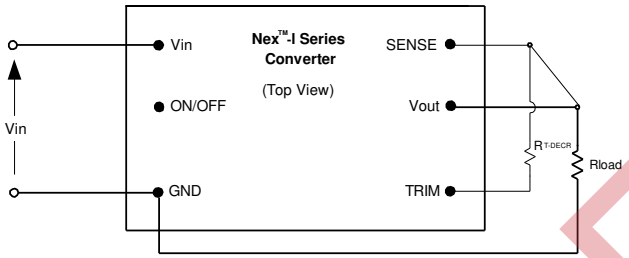

Fig. D: Configuration for programming output voltage.

Tables 1 and 2 provide the values of resistor for trimming up and down respectively. Standard 1% and 5% resistors can be used for trimming. Ground pin of the trim resistor should be connected directly to the converter GND pin (Pin 5) with no voltage drop in between. In Table 1 and Table 2, Δ is a percentage of increase or decrease of $V_{O\text{-}NOM}$.

Δ	Nominal value of output voltage $V_{0\text{-}NOM}$ [V]							
[%]	1.0	1.2	1.5	1.8	2.0	2.5	3.3	5.0
1	1049	874	699	582	524	419	317	209
2	524	437	349	291	262	209	158	104
3	349	291	232	193	174	139	105	69
4	262	218	174	145	130	104	79	52
5	209	174	139	116	104	83	63	41
6	174	145	116	96	87	69	52	34
7	149	124	99	82	74	59	44	29
8	130	108	87	72	65	52	39	25
9	116	96	77	64	57	46	34	22
10	104	87	69	57	52	41	31	20

Table1: Trim-up Resistor RT-INCR [kΩ]

Δ	Nominal value of output voltage $V_{0\text{-}NOM}$ [V]							
[%]	1.0	1.2	1.5	1.8	2.0	2.5	3.3	5.0
-1	434	609	784	901	959	1064	1166	1274
-2	209	297	384	442	472	524	575	629
-3	134	192	251	290	309	344	378	414
-4	97	140	184	213	228	254	279	307
-5	74	109	144	167	179	200	220	242
-6	59	88	117	137	147	164	181	199
-7	48	73	98	115	123	138	153	168
-8	40	62	84	99	106	119	132	145
-9	34	53	73	86	92	104	115	127
-10	29	47	64	76	82	92	102	113

Table 2: Trim-down Resistor RT-DECR [kΩ]

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3. PROTECTION FEATURES

3.1. INPUT UNDERVOLTAGE LOCKOUT

Input undervoltage lockout is standard with this converter. The converter will shut down when the input voltage drops below a pre-determined voltage; it will start automatically when Vin returns to a specified range.

The input voltage must be at least 9.6 V (typically 9 V) for the converter to turn on. Once the converter has been turned on, it will shut off when the input voltage drops below typically 8.5 V.

3.2. OUTPUT OVERCURRENT PROTECTION (OCP)

The converter is protected against overcurrent and short-circuit conditions. Upon sensing an over-current condition, the converter will enter hiccup mode. Once an overload or short-circuit condition is removed, Vout will return to nominal value.

3.3. OVER-TEMPERATURE PROTECTION (OTP)

The converter will shut down under an over-temperature condition to protect itself from overheating caused by operation outside the thermal derating curves, or operation in abnormal conditions such as system fan failure. After the converter has cooled to a safe operating temperature, it will automatically restart.

3.4. SAFETY REQUIREMENTS

The converter meets North American and International safety regulatory requirements per UL60950 and EN60950. The maximum DC voltage between any two pins is Vin under all operating conditions. Therefore, the unit has ELV (extra low voltage) output; it meets SELV requirements under the condition that all input voltages are ELV.

The converter is not internally fused. To comply with safety agencies requirements, a recognized fuse with a maximum rating of 15 Amps must be used in series with the input line.

4. CHARACTERIZATION

4.1. GENERAL INFORMATION

The converter has been characterized for many operational aspects, to include thermal derating (maximum load current as a function of ambient temperature and airflow) for vertical and horizontal mounting, efficiency, start-up and shutdown parameters, output ripple and noise, transient response to load step-change, overload and short circuit.

The figures are numbered as Fig. x.y, where x indicates the different output voltages, and y associates with specific plots (y = 1 for the vertical thermal derating, …). For example, Fig. x.1 will refer to the vertical thermal derating for all the output voltages in general.

The following pages contain specific plots or waveforms associated with the converter. Additional comments for specific data are provided below.

4.2. TEST CONDITIONS

All thermal and efficiency data presented were taken with the converter soldered to a test board, specifically a 0.060” thick printed wiring board (PWB) with four layers. The top and bottom layers were not metalized. The two inner layers, comprising two-ounce copper, were used to provide traces for connectivity to the converter.

The lack of metalization on the outer layers as well as the limited thermal connection ensured that heat transfer from the converter to the PWB was minimized. This provides a worst-case but consistent scenario for thermal derating purposes.

All measurements requiring airflow were made in vertical and horizontal wind tunnel facilities using Infrared (IR) thermography and thermocouples for thermometry.

Ensuring components on the converter do not exceed their ratings is important to maintaining high reliability. If one anticipates operating the converter at or close to the maximum loads specified in the derating curves, it is prudent to check actual operating temperatures in the application. Thermographic imaging is preferable; if this capability is not available, then thermocouples may be used. Bel Power Solutions recommends the use of AWG #40 gauge

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thermocouples to ensure measurement accuracy. Careful routing of the thermocouple leads will further minimize measurement error. Refer to Fig. E for optimum measuring thermocouple location.

4.3. THERMAL DERATING

Load current vs. ambient temperature and airflow rates are given in Figs. x.1 to x.2 for maximum temperature of 110°C. Ambient temperature was varied between 25°C and 85°C, with airflow rates from 30 to 500 LFM (0.15 m/s to 2.5 m/s), and vertical and horizontal converter mounting. The airflow during the testing is parallel to the short axis of the converter, going from pin 1 and pin 6 to pins 2 – 5.

For each set of conditions, the maximum load current was defined as the lowest of:

(i) The output current at which either any MOSFET temperature did not exceed a maximum specified temperature (110 °C) as indicated by the thermographic image, or

(ii) The maximum current rating of the converter (10 A)

During normal operation, derating curves with maximum FET temperature less than or equal to 110 °C should not be exceeded. Temperature on the PCB at the thermocouple location shown in Fig. E should not exceed 110 °C in order to operate inside the derating curves.

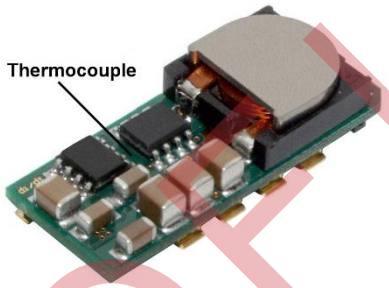

Fig. E: Location of the thermocouple for thermal testing.

4.4. EFFICIENCY

Figure x.3 shows the efficiency vs. load current plot for ambient temperature of 25 °C, airflow rate of 200 LFM (1 m/s) and input voltages of 9.6 V, 12 V, and 14 V.

4.5. POWER DISSIPATION

Fig. x.4 shows the power dissipation vs. load current plot for Ta = 25 °C, airflow rate of 200 LFM (1 m/s) with vertical mounting and input voltages of 9.6 V, 12 V. and 14 V.

4.6. RIPPLE AND NOISE

The output voltage ripple waveform is measured at full rated load current. Note that all output voltage waveforms are measured across a 1 µF ceramic capacitor.

The output voltage ripple and input reflected ripple current waveforms are obtained using the test setup shown in Fig. F.

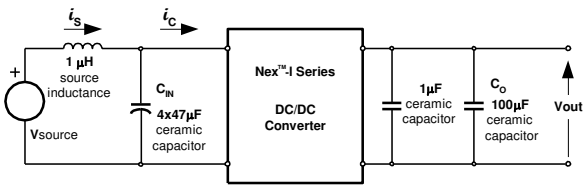

Fig. F: Test setup for measuring input reflected ripple currents, is and ic and output voltage ripple.

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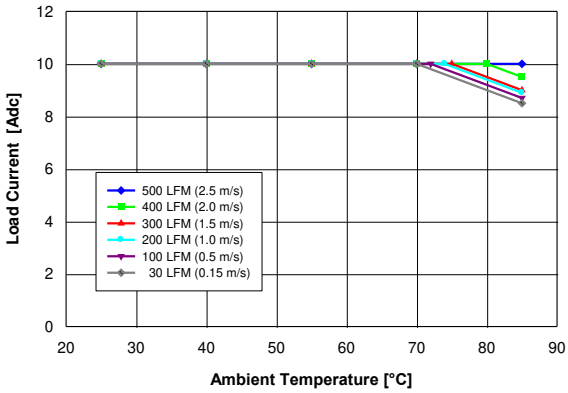

Fig. 5.0V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10050 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

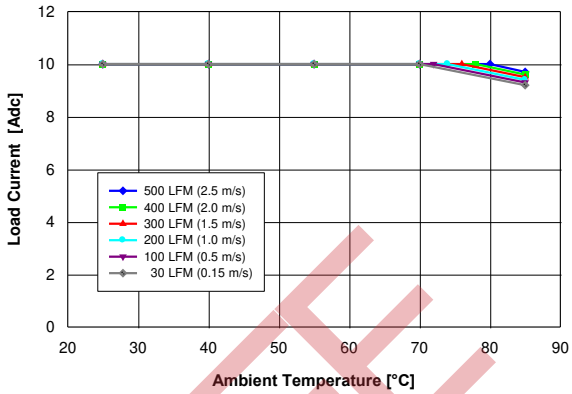

Fig. 5.0V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10050 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

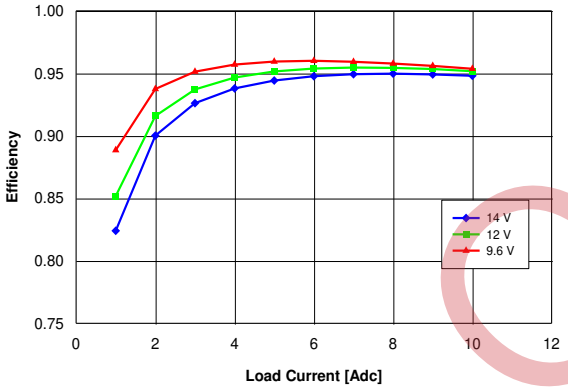

Fig. 5.0V.3: Efficiency vs. load current and input voltage for YNL12S10050 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

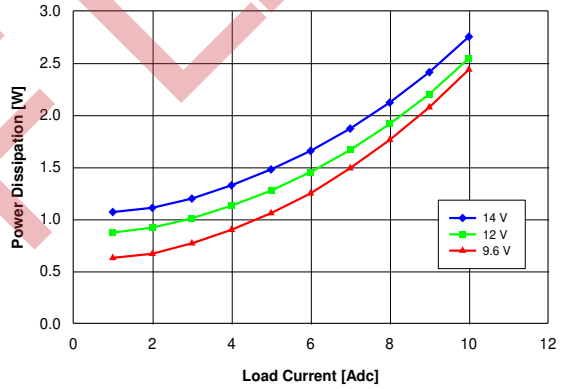

Fig. 5.0V.4: Power loss vs. load current and input voltage for YNL12S10050 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

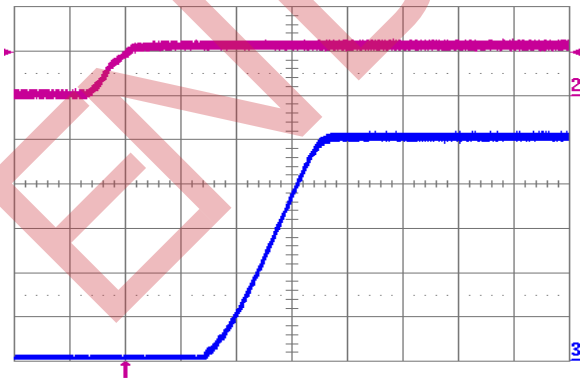

Fig. 5.0V.5: Turn-on transient (YNL12S10050) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

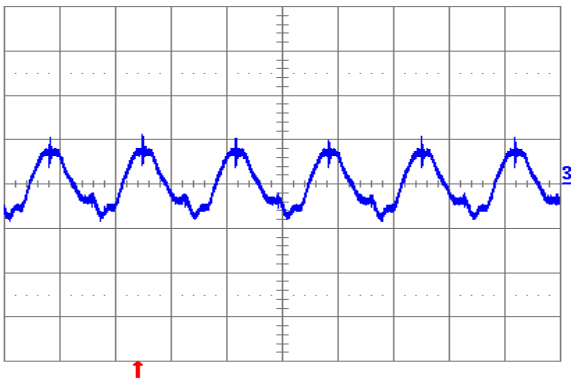

Fig. 5.0V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12V (YNL12S10050). Time scale: 2 µs/div.

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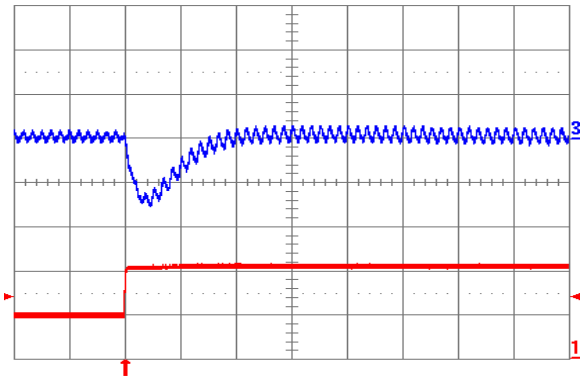

Fig. 5.0V.7: Output voltage response (YNL12S10050) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100µF ceramic. Time scale: 20 µs/div.

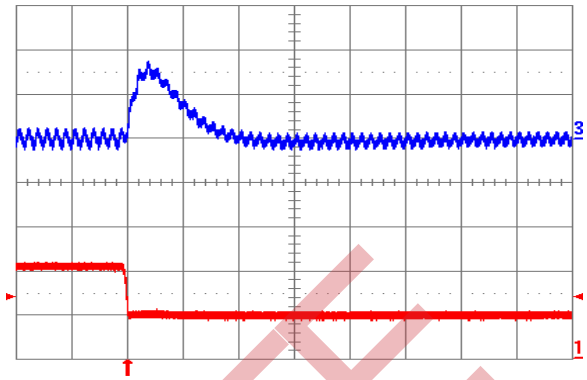

Fig. 5.0V.8: Output voltage response (YNL12S10050) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

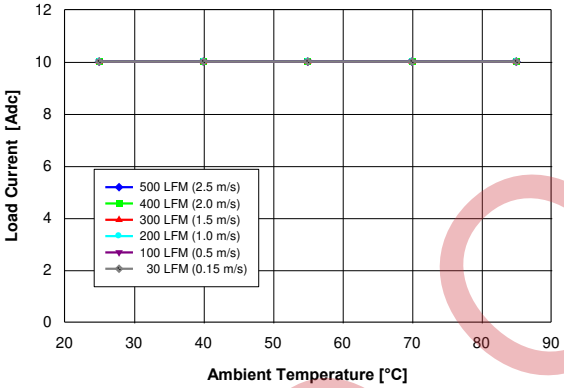

Fig. 3.3V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10033 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

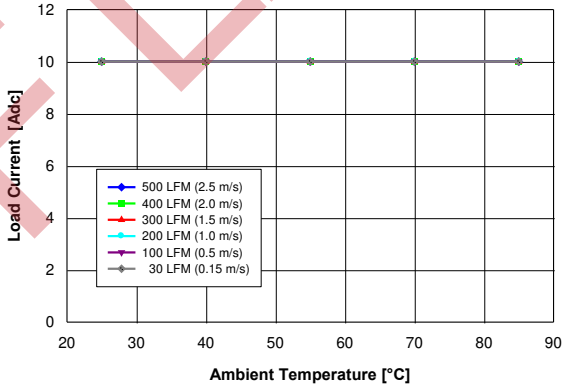

Fig. 3.3V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10033 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

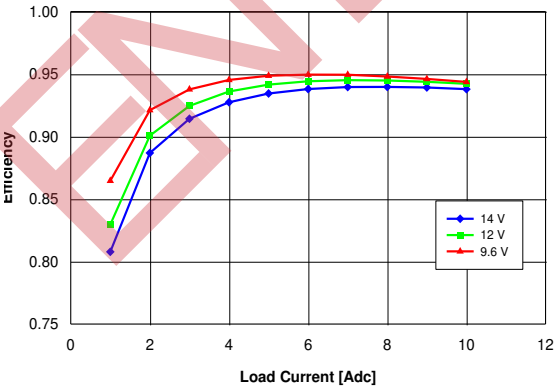

Fig. 3.3V.3: Efficiency vs. load current and input voltage for YNL12S10033 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

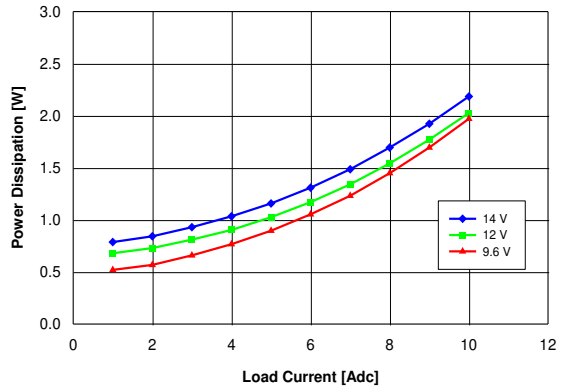

Fig. 3.3V.4: Power loss vs. load current and input voltage for YNL12S10033 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

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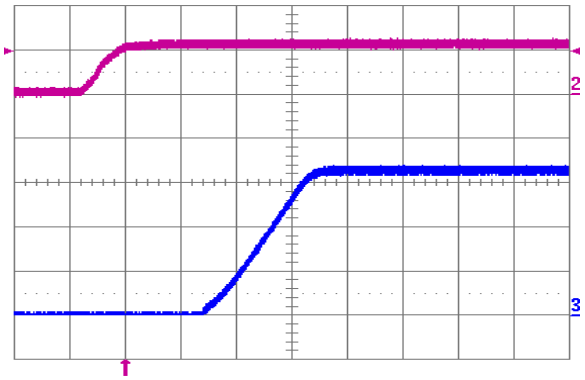

Fig. 3.3V.5: Turn-on transient (YNL12S10033) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

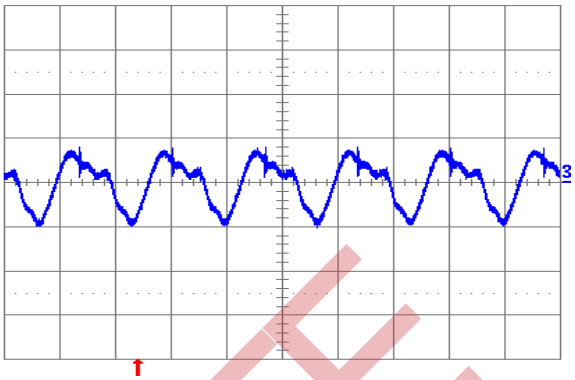

Fig. 3.3V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10033). Time scale: 2 µs/div.

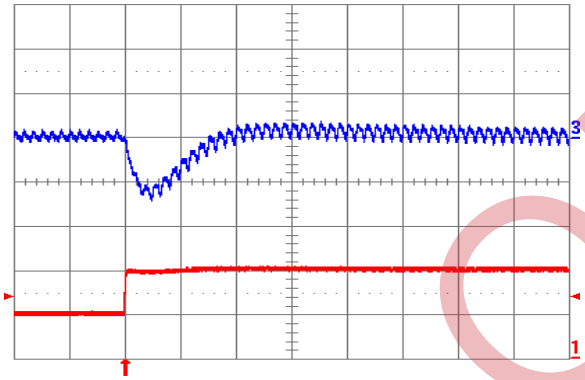

Fig. 3.3V.7: Output voltage response (YNL12S10033) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

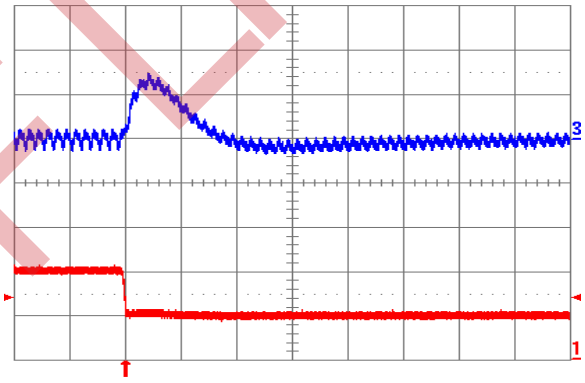

Fig. 3.3V.8: Output voltage response (YNL12S10033) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

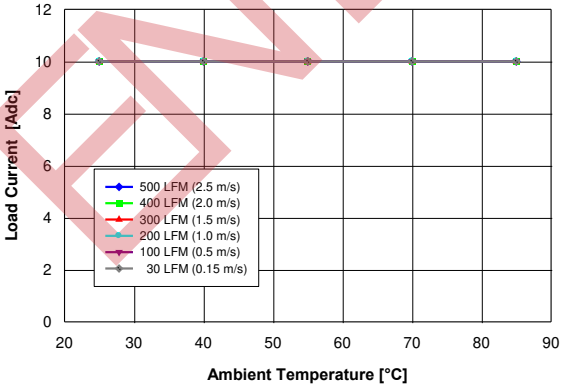

Fig. 2.5V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10025 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

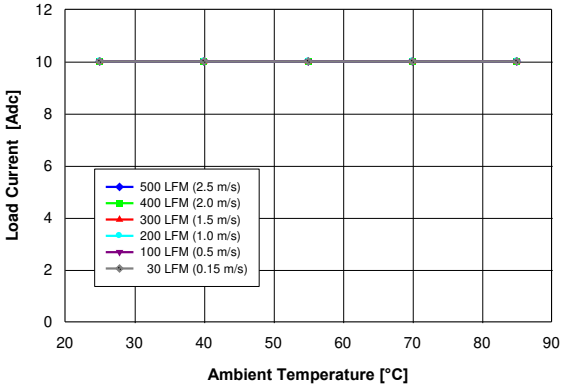

Fig. 2.5V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10025 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

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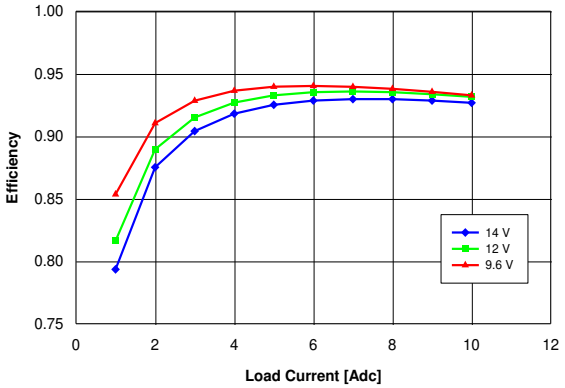

Fig. 2.5V.3: Efficiency vs. load current and input voltage for YNL12S10025 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

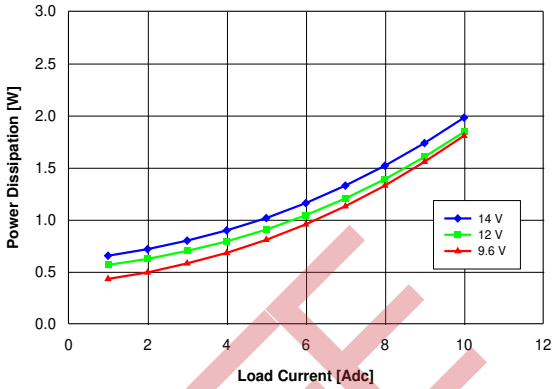

Fig. 2.5V.4: Power loss vs. load current and input voltage for YNL12S10025 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

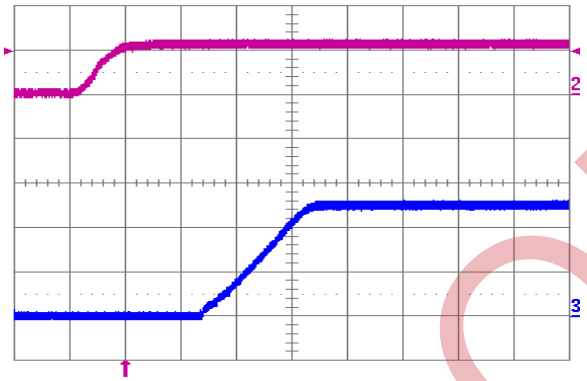

Fig. 2.5V.5: Turn-on transient (YNL12S10025) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

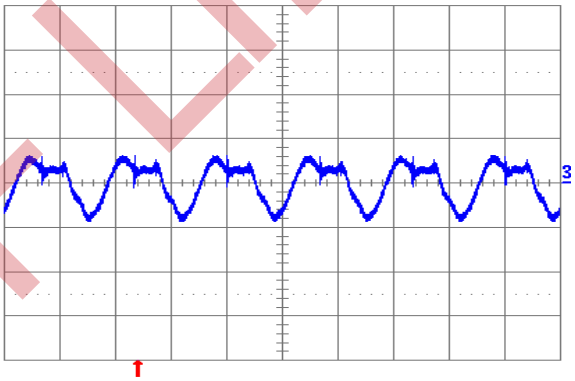

Fig. 2.5V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10025). Time scale: 2 µs/div.

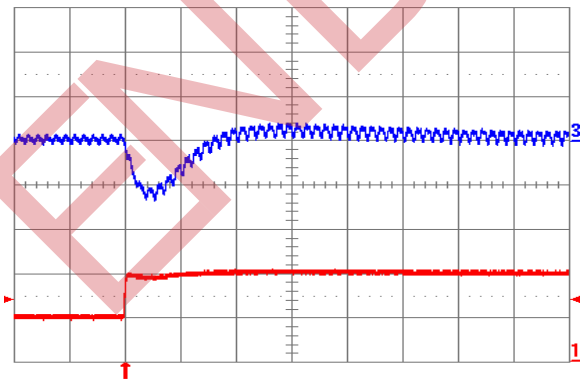

Fig. 2.5V.7: Output voltage response (YNL12S10025) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

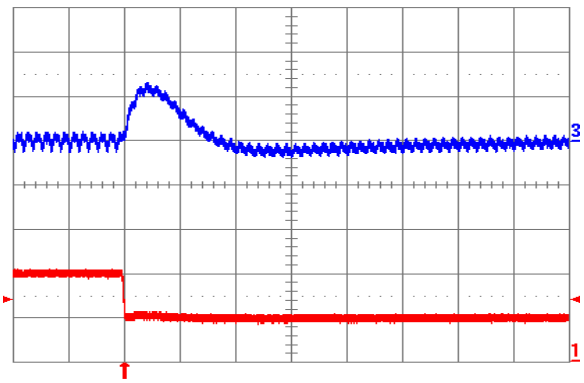

Fig. 2.5V.8: Output voltage response (YNL12S10025) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

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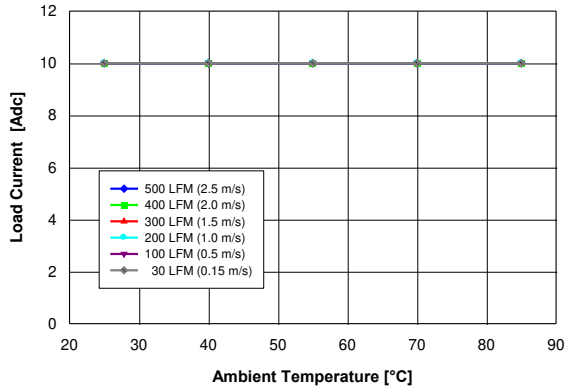

Fig. 2.0V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10020 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

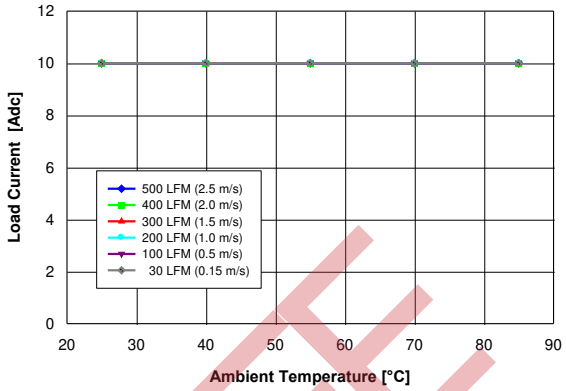

Fig. 2.0V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10020 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

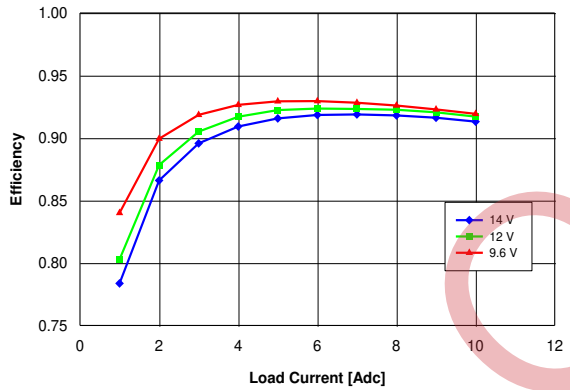

Fig. 2.0V.3: Efficiency vs. load current and input voltage for YNL12S10020 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

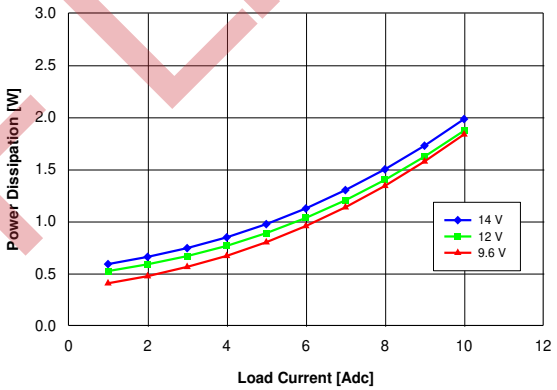

Fig. 2.0V.4: Power loss vs. load current and input voltage for YNL12S10020 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

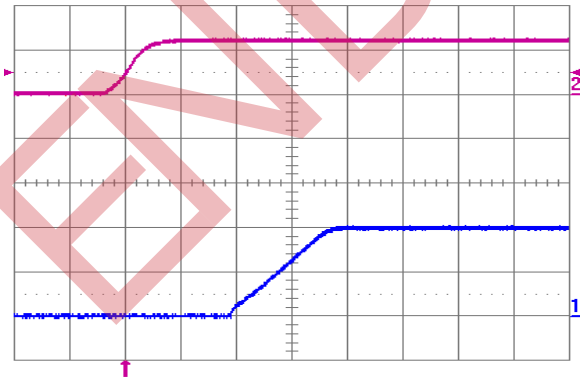

Fig. 2.0V.5: Turn-on transient (YNL12S10020) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

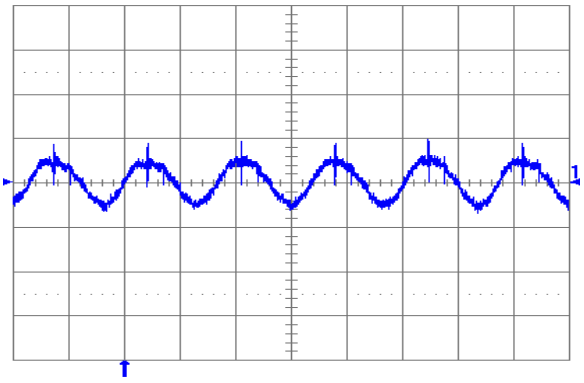

Fig. 2.0V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10020). Time scale: 2 µs/div.

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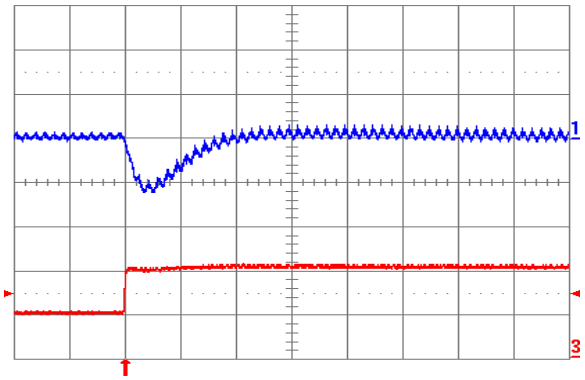

Fig. 2.0V.7: Output voltage response (YNL12S10020) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

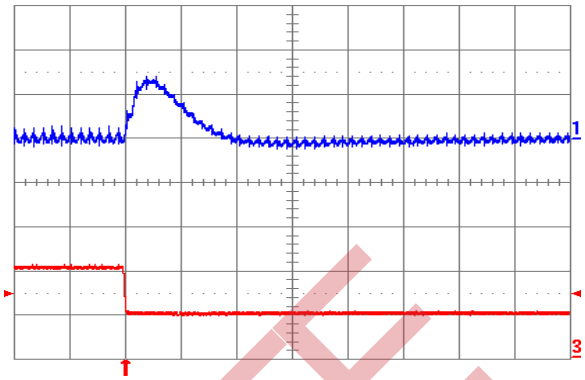

Fig. 2.0V.8: Output voltage response (YNL12S10020) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

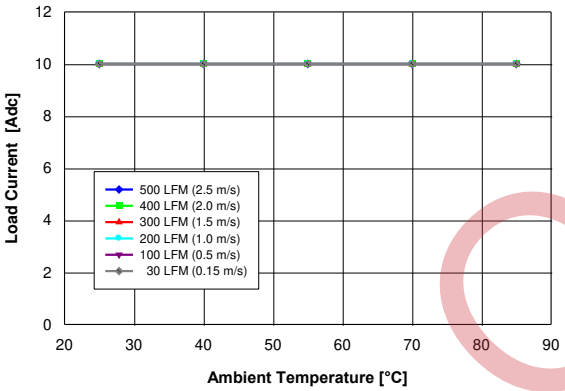

Fig. 1.8V.1: Available load current vs. ambient temperature and airflow rates YNL12S10018 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

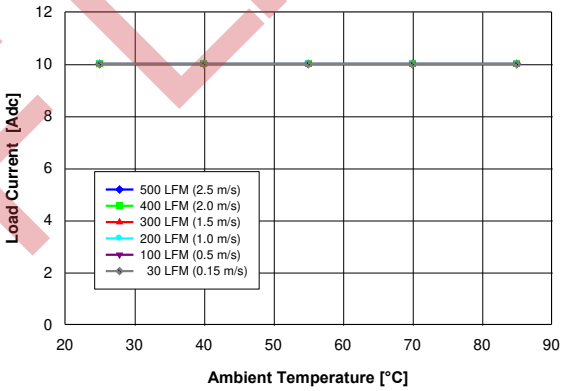

Fig. 1.8V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10018 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

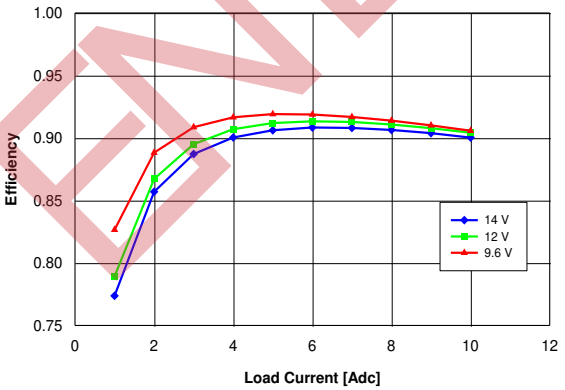

Fig. 1.8V.3: Efficiency vs. load current and input voltage for YNL12S10018 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

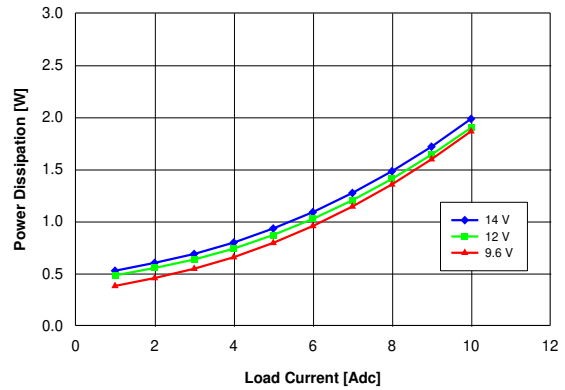

Fig. 1.8V.4: Power loss vs. load current and input voltage for YNL12S10018 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

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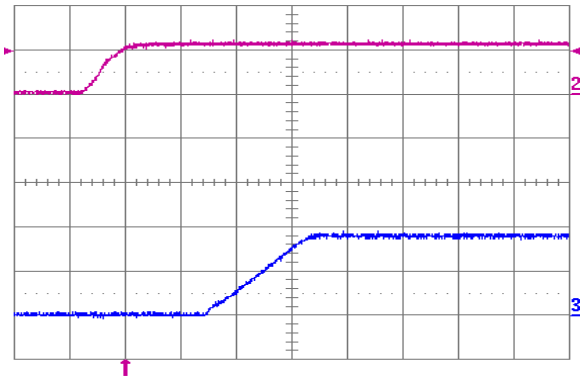

Fig. 1.8V.5: Turn-on transient (YNL12S10018) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

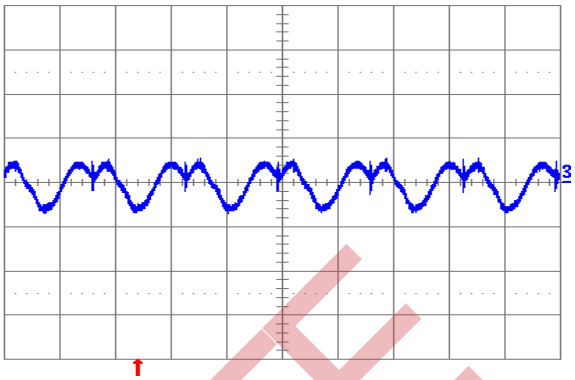

Fig. 1.8V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10018). Time scale: 2 µs/div.

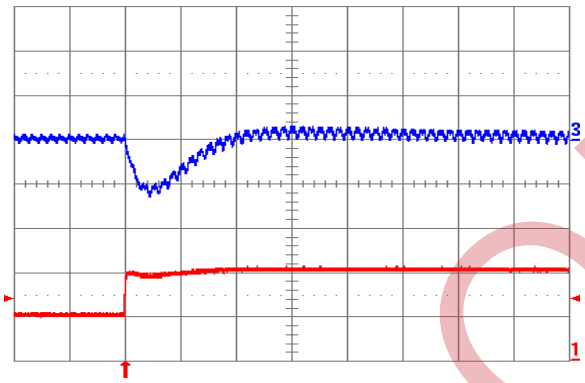

Fig. 1.8V.7: Output voltage response (YNL12S10018) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

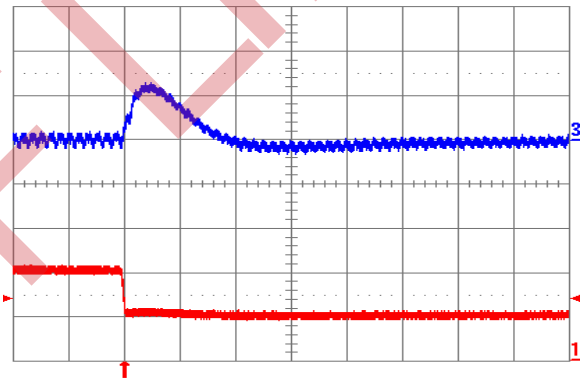

Fig. 1.8V.8: Output voltage response (YNL12S10018) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

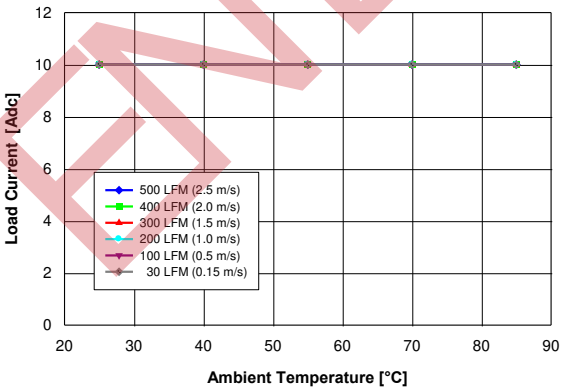

Fig. 1.5V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10015 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

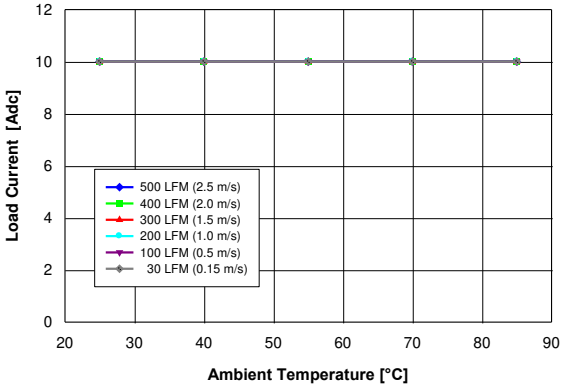

Fig. 1.5V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10015 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

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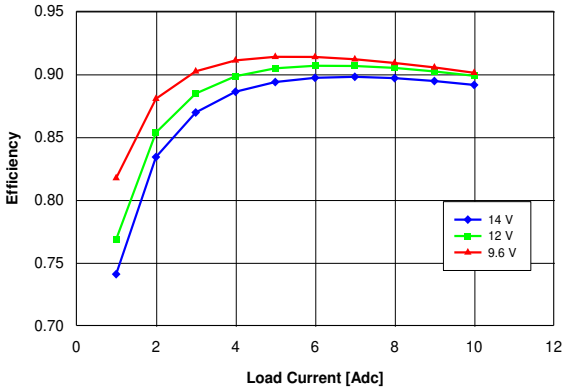

Fig. 1.5V.3: Efficiency vs. load current and input voltage for YNL05S10015 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

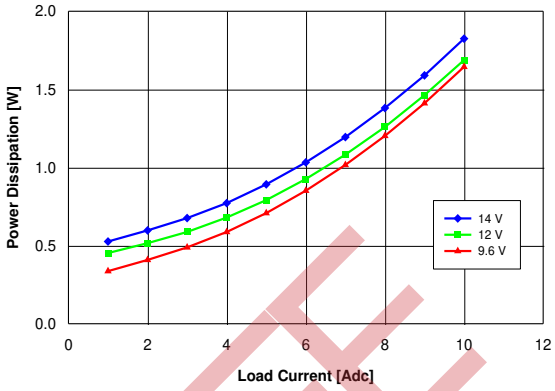

Fig. 1.5V.4: Power loss vs. load current and input voltage for YNL12S10015 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

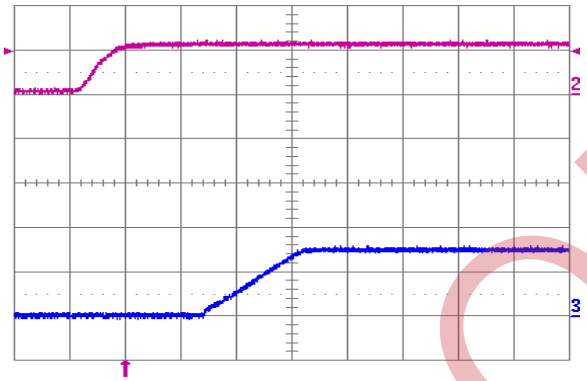

Fig. 1.5V.5: Turn-on transient (YNL12S10015) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

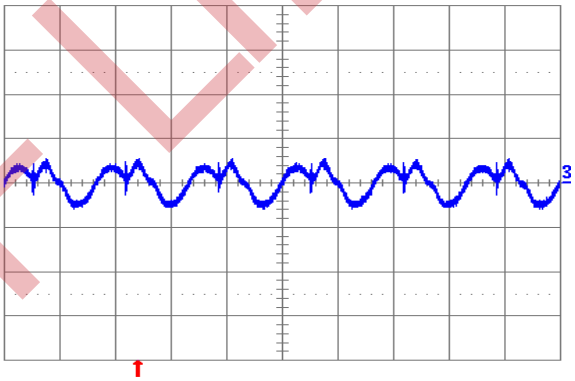

Fig. 1.5V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10015). Time scale: 2 µs/div.

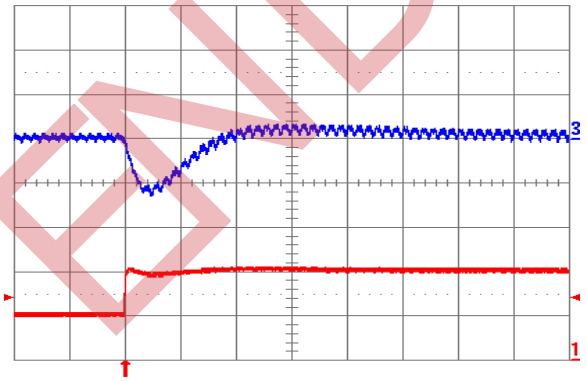

Fig. 1.5V.7: Output voltage response (YNL12S10015) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

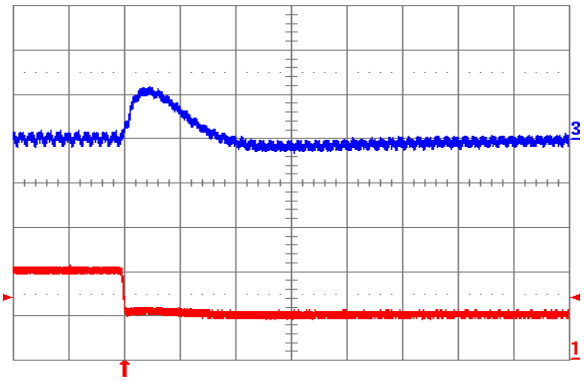

Fig. 1.5V.8: Output voltage response (YNL12S10015) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

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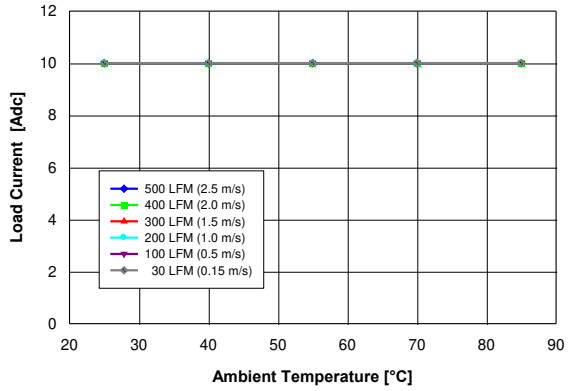

Fig. 1.2V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10012 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

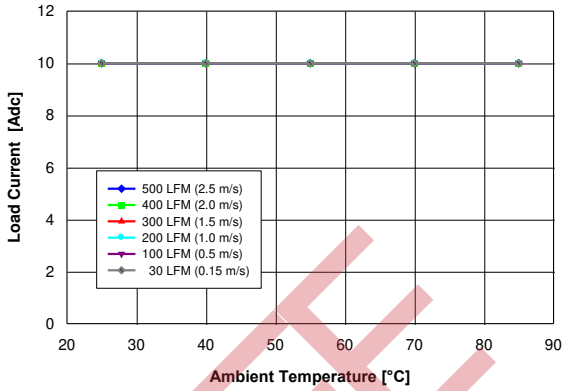

Fig. 1.2V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10012 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

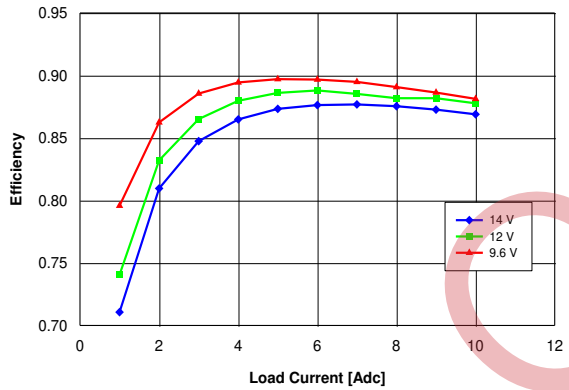

Fig. 1.2V.3: Efficiency vs. load current and input voltage for YNL12S10012 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

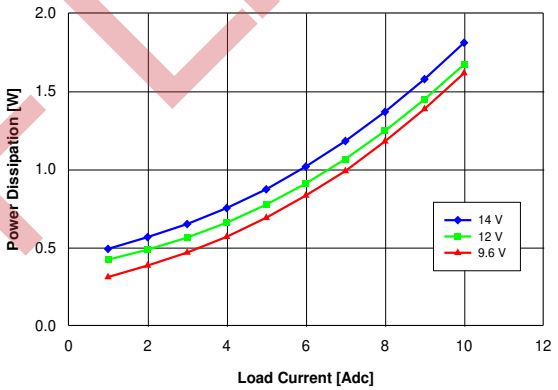

Fig. 1.2V.4: Power loss vs. load current and input voltage for YNL12S10012 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

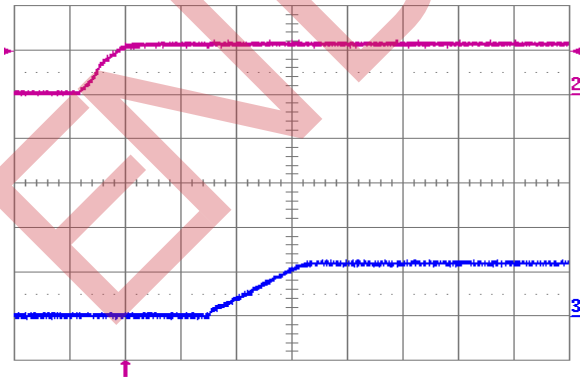

Fig. 1.2V.5: Turn-on transient (YNL12S10012) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

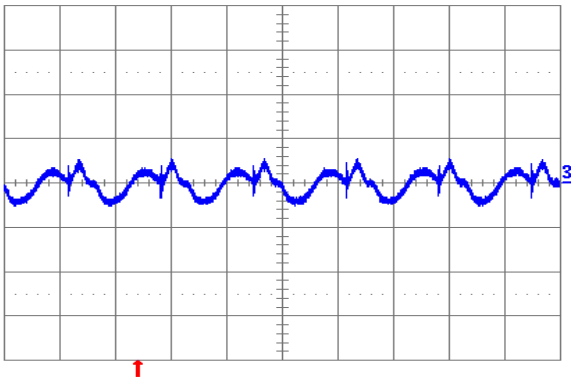

Fig. 1.2V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10012). Time scale: 2 µs/div.

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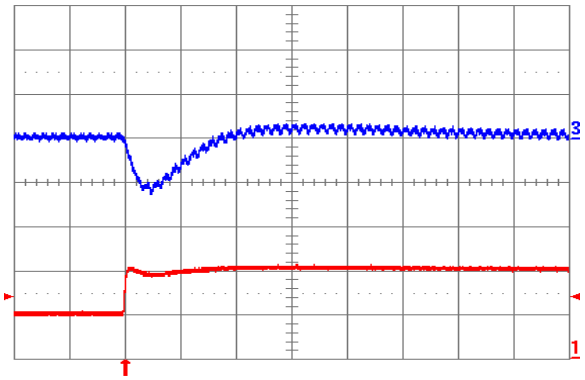

Fig. 1.2V.7: Output voltage response (YNL12S10012) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

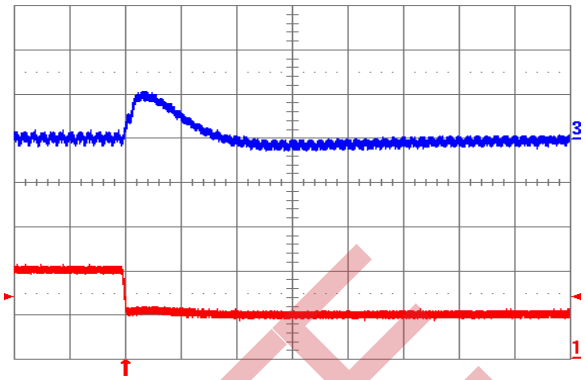

Fig. 1.2V.8: Output voltage response (YNL12S10012) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

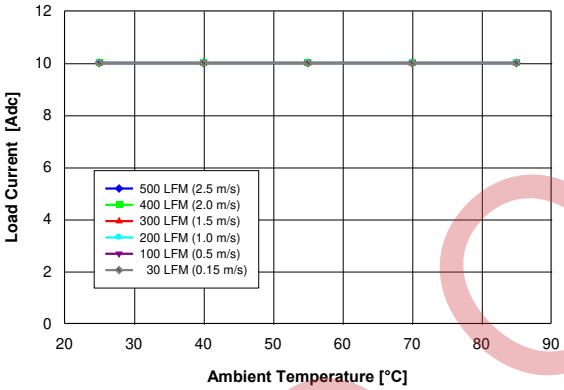

Fig. 1.0V.1: Available load current vs. ambient temperature and airflow rates for YNL12S10010 converter mounted vertically with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

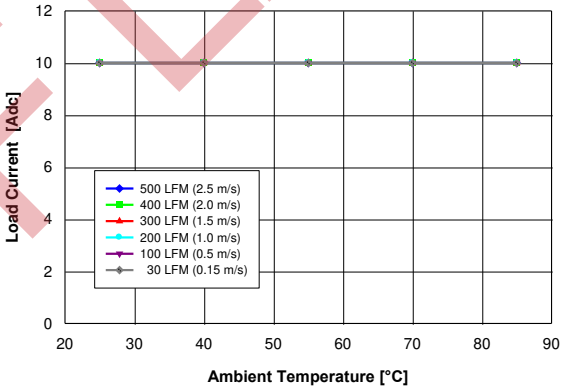

Fig. 1.0V.2: Available load current vs. ambient temperature and airflow rates for YNL12S10010 converter mounted horizontally with Vin = 12 V, and maximum MOSFET temperature ≤ 110 °C.

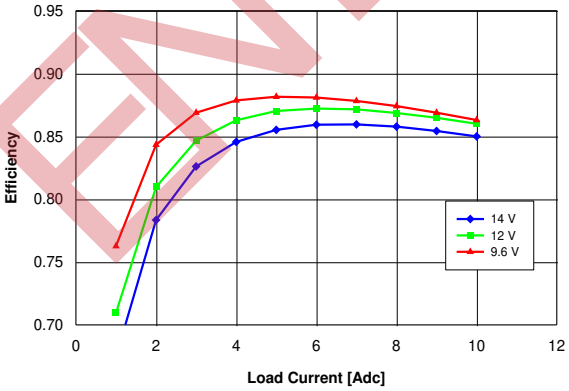

Fig. 1.0V.3: Efficiency vs. load current and input voltage for YNL05S10010 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

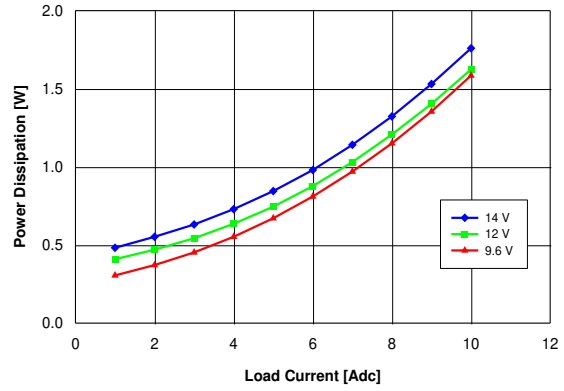

Fig. 1.0V.4: Power loss vs. load current and input voltage for YNL12S10010 converter mounted vertically with air flowing at a rate of 200 LFM (1 m/s) and Ta = 25 °C.

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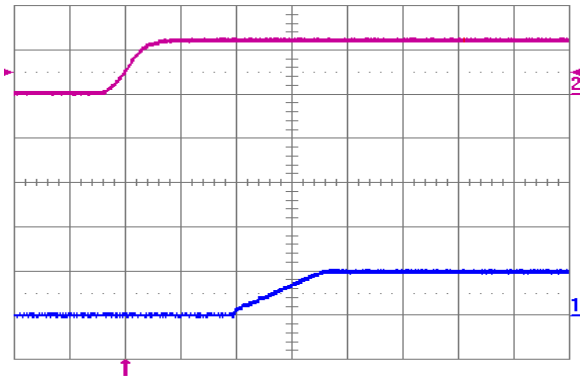

Fig. 1.0V.5: Turn-on transient (YNL12S10010) with application of Vin at full rated load current (resistive) and 100 µF external capacitance at Vin = 12 V. Top trace: Vin (10 V/div.); Bottom trace: output voltage (1 V/div.); Time scale: 2 ms/div.

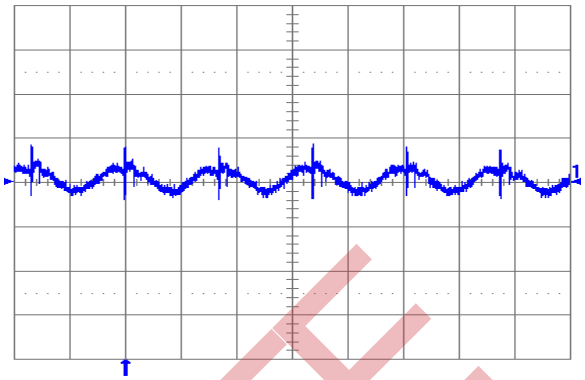

Fig. 1.0V.6: Output voltage ripple (20 mV/div.) at full rated load current into a resistive load with external capacitance 100 µF ceramic + 1 µF ceramic and Vin = 12 V (YNL12S10010). Time scale: 2 µs/div.

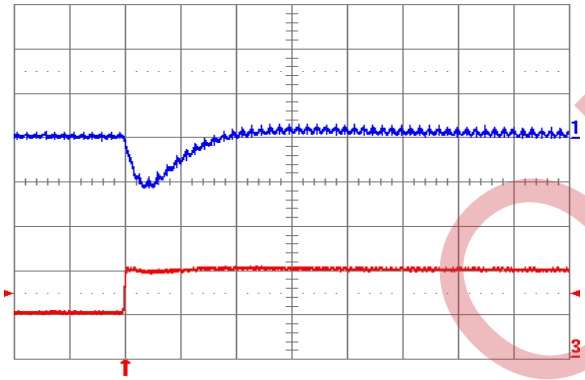

Fig. 1.0V.7: Output voltage response (YNL12S10010) to positive load current step change from 5 A to 10 A with slew rate of 5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

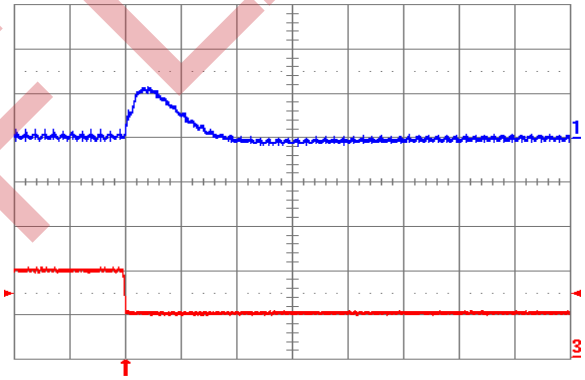

Fig. 1.0V.8: Output voltage response (YNL12S10010) to negative load current step change from 10 A to 5 A with slew rate of -5 A/µs at Vin = 12 V. Top trace: output voltage (100 mV/div.); Bottom trace: load current (5 A/div.). Co = 100 µF ceramic. Time scale: 20 µs/div.

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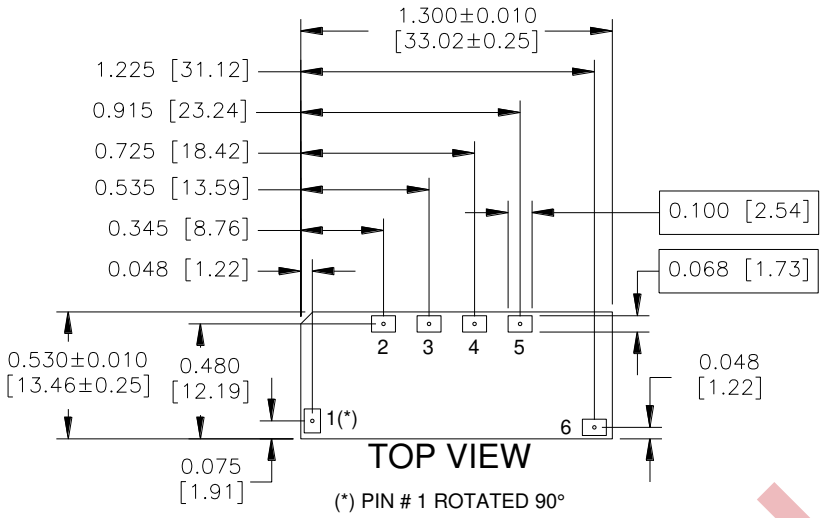
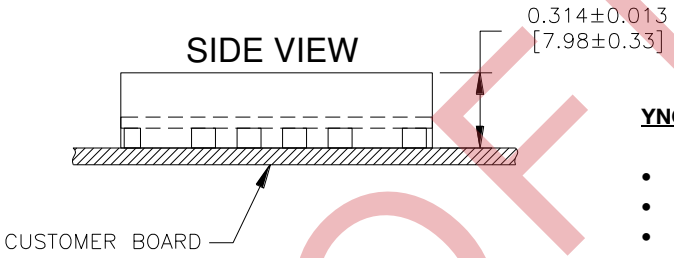
YNC12S100xy Series

Physical Information



PAD/PIN CONNECTIONS	
Pad/Pin #	Function
1	ON/OFF
2	SENSE
3	TRIM
4	Vout
5	GND
6	Vin



YNC12S Pinout (Surface Mount)

YNC12S Platform Notes

- All dimensions are in inches [mm]
- Connector Material: Copper
- Connector Finish: Gold over Nickel
- Module Weight: 0.22 oz [6.12 g]
- Module Height: 0.327” Max., 0.301” Min.
- Recommended Surface-Mount Pads: Min. 0.080” X 0.112” [2.03 x 2.84]

Ordering Information

PRODUCT SERIES	INPUT VOLTAGE	MOUNTING SCHEME	RATED LOAD CURRENT	OUTPUT VOLTAGE		ENABLE LOGIC	ROHS COMPATIBLE
YNL	**12**	**S**	**10**	**018**	**–**	**0**	
Y-Series	9.6 – 14 VDC	S ⇒ Surface-Mount	10 A (1.0 to 5.0 VDC)	010 ⇒ 1.0 V 012 ⇒ 1.2 V 015 ⇒ 1.5 V 018 ⇒ 1.8 V 020 ⇒ 2.0 V 025 ⇒ 2.5 V 033 ⇒ 3.3 V 050 ⇒ 5.0 V		0 ⇒ Standard (Positive Logic) D ⇒ Opposite of Standard (Negative Logic)	No Suffix ⇒ RoHS lead-solder-exempt compliant G ⇒ RoHS compliant for all six substances

The example above describes P/N YNL12S10018-0: 9.6 V – 14 V input, surface mount, 10 A @ 1.8 V output, standard enable logic, and the RoHS lead-solder-exemption feature. Please consult factory regarding availability of a specific version.

Model numbers highlighted in yellow or shaded are not recommended for new designs.

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For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.
TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.

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