

single output
up to 480 Watt

Switching Regulators
without isolation



- 19"-rack version / open / chassis mounting
- Platform / Frontend-supply
- No-load capable
- Extreme high efficiency
- Wide Input voltage range
- EMC EN50121.3.2 / 50022.B
- Inhibit-function
- Dyn./stat. short circuit proof
- Limited parallel operation
- Over voltage protection logic
- Over temperature protection

for Telecommunication / Vehicle applications /
Installation technology / Railway technology



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Series LSR-Q

Main points:

Output:

- Accuracy absolute $\pm 1\%$
- Regulation $\Sigma(U_{in}+I_{out}+T_U) < \pm 1,5\%$
- Ripple $< 30 \text{ mV}_{\text{rms}}$ const. over T_U
- Spikes $< 100 \text{ mV}_{\text{rms}}$ (T 1:1/50MHz)
- Response time $\Delta I=50\% \leq 1\text{ms}$
- Short circuit current $\leq 1,2 I_{o \text{ max}}$
- Output spike filter C - L - C
- Over voltage protection logic 1,2 $U_{o \text{ max}}$
- Thyristor at defect U_o -protection 120%
- Output adjustable (option)
- Sense lines
- No-load capable / Load-step 0-100%

Input:

- Wide input voltage range
- Input fuse external (customer)
- Reverse pol. protection (option) on fuse
- Very low stand-by current
- No external application circuit necessary
- Under voltage switch-off with hysteresis
- Surge proof 1,8kV / 42 Ω 2): yes 3): no
- Input filter acc. to EN 55022.A
- ON-OFF-control (Inhibit / ME/o)
- floating, polarity independent, surge proof
- open = OFF / $> 10V/U_i = \text{ON}$

General:

- 19"-rack version 3U / 10TE
- Connection: H15-connector
- Option:
 - 10TE-Frontplatte für 19"-Einschub
 - Chassis mounting with cover and screw clamps/height 60mm (on request)
- Ambient temperature $-25^\circ\text{C} / +70^\circ\text{C}$
- Option: $-40^\circ\text{C} / +85^\circ\text{C}$
- Derating 2%/ $^\circ\text{C}$ $> 70^\circ\text{C}$
- 1) Derating 1,2% $\geq 60^\circ\text{C}$
- Max. heat sink temperature \star -point 95°C
- Free air convection
- Over temperature switch-off
- Filter frequency $> 200\text{kHz}$
- Chopper current operation with foil-capacitors
- Common 0V input-output
- MTBF on request
- Shock/vibration acc. to EN 50155
- Weight approx. 0,7kg

U_{in} Min / Range V	U_{out} Min / Nom V	I_{out} A	η %	Model number
9,6 / 13,5 - 27 ^{2) 4)}	8 / 12	25 ¹⁾	95	LSR.Q 12·12·250
11,5 / 13,5 - 36 ^{2) 4)}	10 / 12	20	94	LSR.Q 24·12·200
13,5 - 60 ^{2) 4)}	12	20	93	LSR.Q 30.12.200
16 / 20,5 - 36 ^{2) 4)}	14,5 / 19	20	96	LSR.Q 24.19.200
22 / 26 - 60 ^{3) 4)}	20,5 / 24	20	97	LSR.Q 36.24.200
26 - 80 ^{3) 4)}	24	16	96	LSR.Q 48.24.160
26 - 110 ²⁾	24	14	93	LSR.Q 72.24.140
27 - 154 ²⁾	24	12 ¹⁾	93	LSR.Q 10.24.120
38 - 80 ³⁾	36	16	95	LSR.Q 60.36.160
38 - 110 ²⁾	36	12	94	LSR.Q 72.36.120
40 - 154 ³⁾	36	10 ¹⁾	94	LSR.Q 10.36.100
51 - 154 ³⁾	48	10 ¹⁾	94	LSR.Q 10.48.100

(H)

-40°C up to $+85^\circ\text{C}$

Additional charge

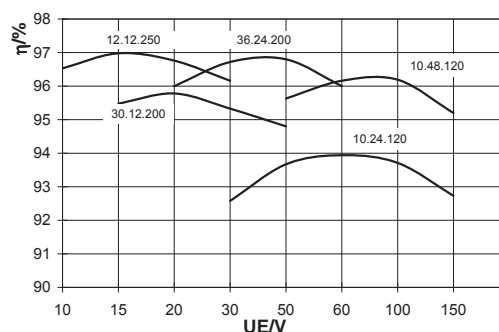
Modification costs for possible changes above values

on request

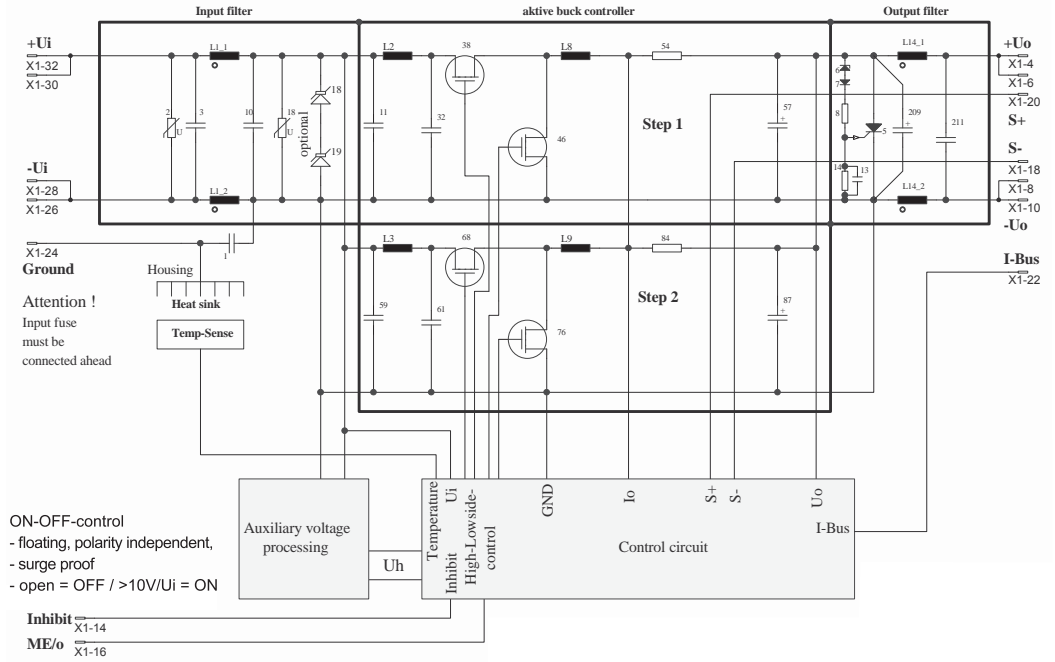
4) Warning: (Synchronous switches)

Output sided energy carrier like batteries/High-Caps must be decoupled over diodes.
The parallel operation without decoupling diodes is generally not allowed.

Efficiency



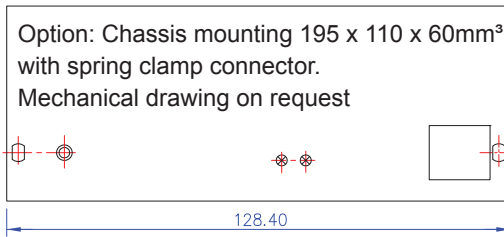
High power converters of the **LSR.Q** series have been developed to generate a non-isolated, constant supply voltage for a platform-solution. Extreme high efficiency up to 98%, the very high functionality and the choice of components lead to a very high availability over wide input voltage ranges, temperature and shock/vibration by high chopping-currents. External ventilation up to 70°C ambient temperature is not necessary when the possibility of free air convection is given. The filter frequency of $\geq 200\text{kHz}$ minimises the input and output voltage ripples. The no-load capability allows load steps from no-load to $I_{o,max}$ with the normal regulation characteristic. The **LSR.Q** series works as a Buck converter with



approx. 1V dropout-voltage up to a minimum input voltage of $0,8 \times U_{o,norm}$ and secondary external voltages lower than the nominal voltage. With a connection of a output sided energy carrier (Battery/High-Cap) the converter works with a stable run-up and a nominal operation and must be decoupled over diodes. The parallel operation without decoupling diodes is generally not allowed. When a security relevant operation is needed (to prevent the break through), a converter from the product line B must be used.

Pin-assignment

H15	LSR-Q
4	+Uo
6	+Uo
8	-Uo
10	-Uo
12	n.c.
14	Inhibit
16	- Inhibit
18	-sense
20	+sense
22	I-Bus [Option]
24	Ground
26	-Ui
28	-Ui
30	+Ui
32	+Ui



Mechanics
Frontpanel =
Option

