

Features

- Step-down Converter with very high Efficiency (> 91%)
- 3.3 VDC or 5.0 VDC Output, up to 6.0 A
- Fast Transient Response
- Remote ON/OFF
- Overload Protection
- Low Output Noise
- Standby Current only 100 µA
- Small SIL- or DIP-Package
- 2 Year Product Warranty



This new generation of step-down converters provides designers with a cost-effective solution for converting a 5 VDC resp. 12 VDC voltage down to 3.3 VDC or to 5 VDC. To achieve highest efficiency, these dc/dc converters are using advanced circuit techniques, as amorphous ferrite, solid aluminum capacitors and a synchronous commutation IC.

The TSI-20 series needs no further external components to operate within its specifications. A very high efficiency allows operation without additional heatsink. This product finds many applications in distributed powersystems where voltage conversion at the point of load is required.

Models					
Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.	Package
TSI-3.3S3R0 TSI-3.3S3R0F	4.8 – 13.6 VDC	* + 3.3 VDC	3000 mA	91.0 %	SIP DIP
TSI-5.0S3R0 TSI-5.0S3R0F	6.0 – 16.5 VDC	+ 5.0 VDC	3000 mA	95.0 %	SIP DIP
TSI-3.3S6R0P TSI-3.3S6R0FP	4.8 – 7.5 VDC	* + 3.3 VDC	6000 mA	88.0 %	SIP DIP
TSI-5.0S4R0P TSI-5.0S4R0FP	6.0 – 16.5 VDC	+ 5.0 VDC	4000 mA	92.0 %	SIP DIP

* Output adjustable 2.8 to 3.3 VDC

Input Specifications

Input current (no load)	15 Watt models 20 Watt models	1 mA max. 1 mA max.
Input current (at full load)	15 Watt models 20 Watt models	1350 mA max. (12 Vin) 1800 mA max. (12 Vin)

Stand-by current	100 μ A typ
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Output Specifications

Output voltage tolerance	$\pm 3.0 \%$
Output voltage adjustment (TSI-3.3S only)	+2.8 VDC to +3.3 VDC
Regulation – Input variation – Load variation 0 – 100 %	$\pm 0.5 \%$ < 2.0 %
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk typ.
Transient response time 15 Watt models (with 220 μ F output cap.) 20 Watt models (with 2 x 220 μ F output cap.)	50 % Load change: Vout over-/undershoot: 80 μ sec typ. 70 mV typ. 50 % Load change: Vout over-/undershoot: 100 μ sec typ. 130 mV typ.
Temperature coefficient	$\pm 0.01 \%$ / °C
Short circuit protection	constant current >105%
Capacitive load	20'000 μ F
Remote ON/OFF control	ON = Pin 5 (ON/OFF Pin) to pin 4 (GND) open OFF = Pin 5 (ON/OFF Pin) to pin 4 (GND) short

General Specifications

Temperature ranges – Operating – Storage Derating above 50 °C	– 10 °C ... +70 °C – 25 °C ... +85 °C 3 % / °C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)	15 Watt models 20 Watt models > 400'000 h @ 40 °C > 350'000 h @ 40 °C
Isolation Input/Output	none
Switching frequency	190 kHz typ. (PWM modulation)

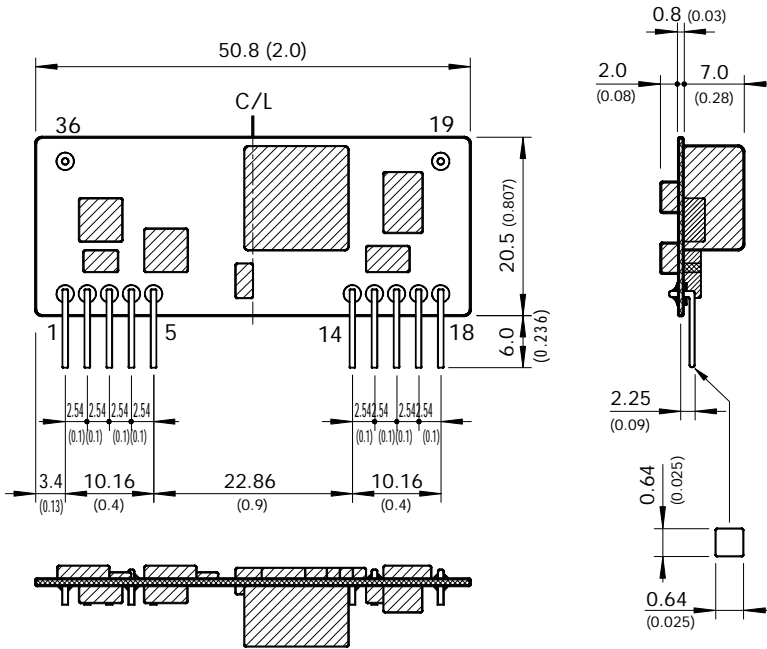
Physical Specifications

Vibration	5 to 10 Hz amplitude 10 mm pk-pk 10 to 55 Hz acceleration 2 G
Shock	acceleration 20 G max. time 11 ms
Package weight 15 Watt models 20 Watt models	10 g (0.35 oz) 13 g (0.46 oz)
Soldering temperature	max. 230°C max. / 10 sec.

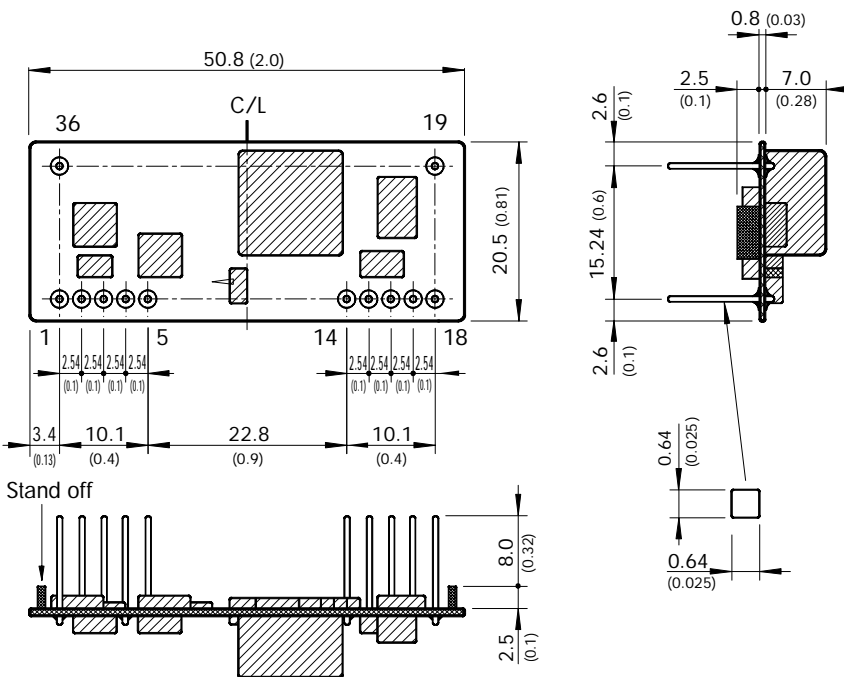
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Outline Dimensions mm (inches)

SIP package



DIP package



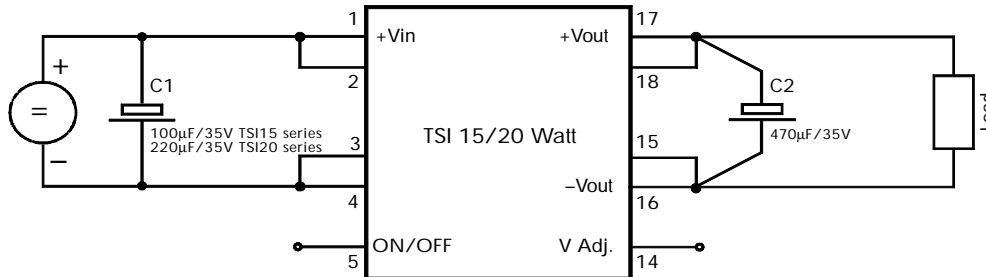
Pin-Out

Pin	DIP	SIP
1	+V Input (Vcc)	+V Input (Vcc)
2	+V Input (Vcc)	+V Input (Vcc)
3	-V Input (GND)	-V Input (GND)
4	-V Input (GND)	-V Input (GND)
5	Remote on/off	Remote on/off
14	V Output adj	V Output adj
15	-V Output	-V Output
16	-V Output	-V Output
17	+V Output	+V Output
18	+V Output	+V Output
19	No function	No pin
36	No function	No pin

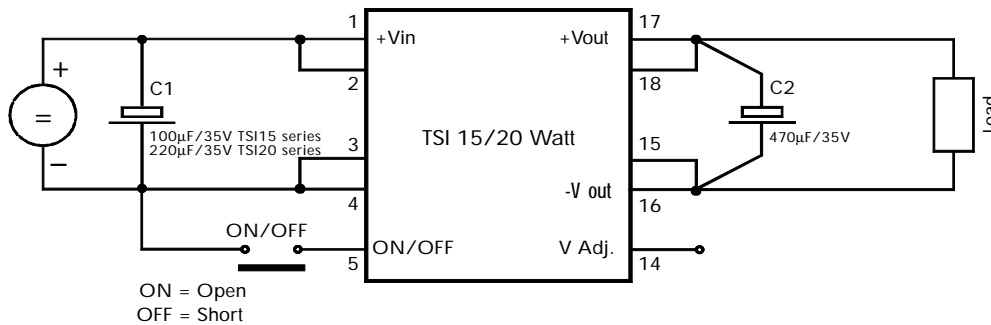
Specifications can be changed without notice

Connections

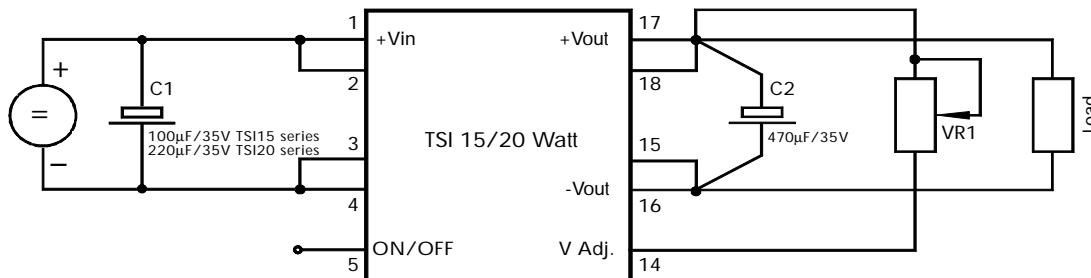
Normal Connection (Standard)



Remote ON/OFF Connection



Output Voltage Adjustment Connection (TSI-3.3S only)



Capacitors:

C1 ==> SXE series Mfg. Chemi-Con

C2 ==> SH series Mfg. Sanyo OS-CON

VR1 = kOhm

Vout = VDC

$$VR1 = \frac{3200.83}{82.07 - 39 \cdot (Vout - 1.195)} - 10$$

Specifications can be changed without notice