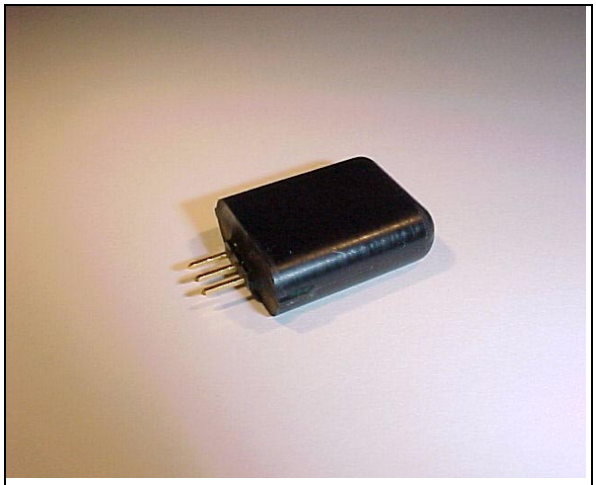
GS-R12VXXX1.5

1.8W TO 7.5W STEP DOWN SWITCHING REGULATOR FAMILY

PRELIMINARY

FEATURE

- MTBF 1 000 000 hours (T_{amb}=25°C)
- 1.5A max output current
- 15V max input voltage
- 1.5V max drop-out voltage
- Not-latching overload and short circuit protection
- Thermal shutdown
- No heatsink required



ORDERING NUMBER: GS-R12VXXX1.5

DESCRIPTION

The GS-R12VXXX1.5 series is a family of high efficiency step down switching voltage regulator, designed to replace linear regulators.

The foot print of GS-R12V perfectly fits a standard TO220 package.

Based on STM L5973 device, this non isolated family of regulators are suitable for the full spectrum of applications including telecom, industry, computer and distributed power system applications having a widely ranging input voltage.

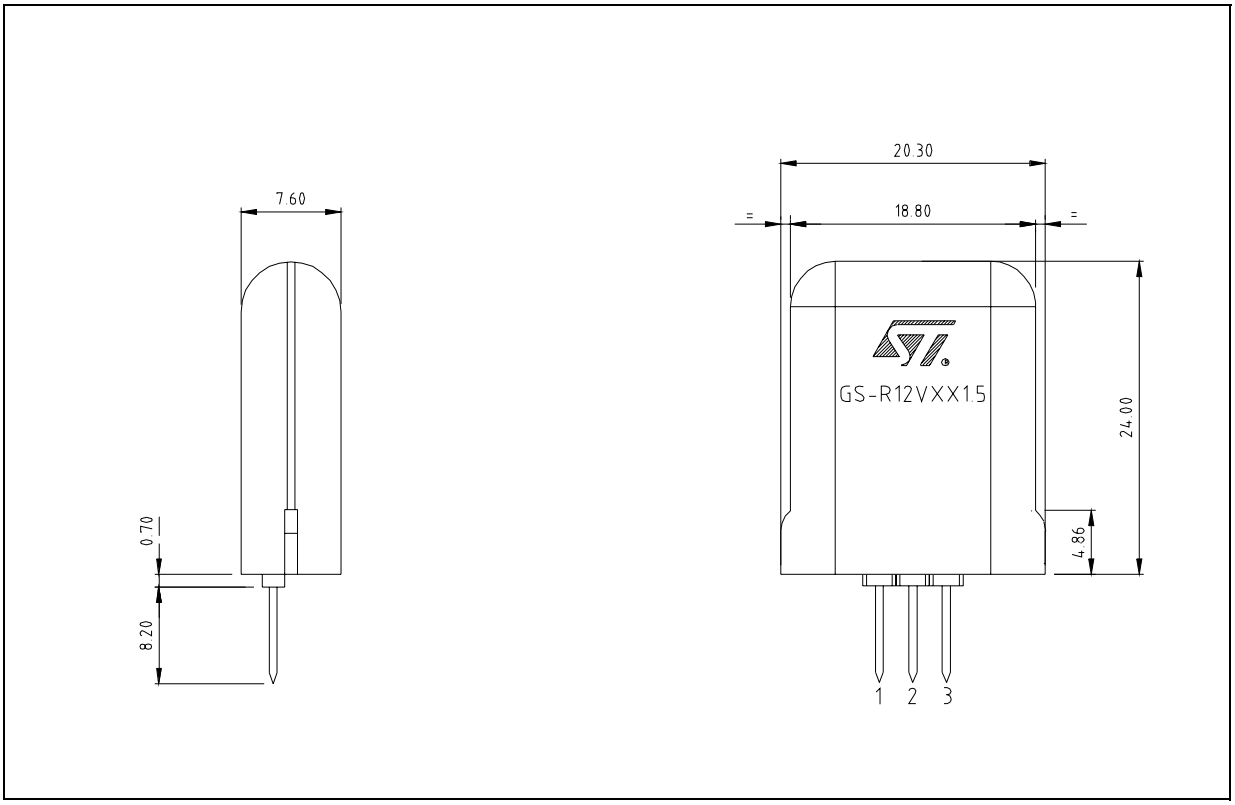
SELECTION CHART

Type Ordering Number	Output Voltage [V]	Input Voltage [V]	Output Ripple [mVpp]	Efficiency [%]	Notes
GS-R12V0121.5	1.235 ± 3%	4.5 ÷ 15	35	68	Fixed output voltage
GS-R12V0181.5	1.8 ± 4%	4.5 ÷ 15	35	72	Fixed output voltage
GS-R12V0251.5	2.5 ± 4%	4.5 ÷ 15	35	76	Fixed output voltage
GS-R12V0331.5	3.3 ± 4%	4.5 ÷ 15	35	82	Fixed output voltage
GS-R12V0501.5	5.0 ± 4%	6.6 ÷ 15	35	85	Fixed output voltage

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_i	DC Input Voltage	16	V
I_{out}	Maximum Output Current	int. limit	
T_{stg}	Storage Temperature Range	-40 ÷ 105	°C
T_{op}	Operating Ambient Temperature	-25 ÷ 70	°C

CONNECTION DIAGRAM AND MECHANICAL DATA



PIN DESCRIPTION

Pin	Function	Description
1	+ input	DC input voltage
2	GND	Common GND
3	+ output	Regulated DC output voltage

ELECTRICAL CHARACTERISTICS (T_{amb}=25°C, unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
	Temperature Stability	$V_i = V_o$ + 1.5V I_o = 1.5A				mV/°C
I_o	Output Current	V_i =4.5 ÷ 15V	0		1.5	A
I_{oL}	Current Limit	V_i =4.5 ÷ 15V		2.5		A
I_q	Quiescent Current	V_i =12V I_o = 0A		1.8	2.5	mA
f_s	Switching Frequency	V_i =12V I_o = 1.5A	225	250	275	kHz
SRV	Supply Voltage Rejection					mV/V
V_r	Ripple Voltage	V_i =12V I_o = 1A/1.5A		25/35		mVpp
R_{th}	Thermal Resistance	Case to ambient				°C/W

USER NOTES

Input Voltage

The recommended operating maximum DC Input Voltage is 15V inclusive of ripple voltage.

Current protection

The device has two current limit protections, pulse by pulse and frequency fold back.

The current is sensed through a resistor and if reaches the threshold, the on time is reduced and consequently the output voltage too.

Since the minimum switch ON time (necessary to avoid false overcurrent signal) is not enough to obtain a sufficiently low duty cycle at 250 Hz, the output current, in strong overcurrent or short circuit conditions, could increase again.

For this reason the switching frequency is also reduced, so keeping the inductor current under its maximum threshold.

The frequency depends on the feedback voltage.

As the feedback voltage decreases (due to the reduced duty cycle), the switching frequency decrease too.

Thermal shutdown

The shutdown block generates a signal that turns off the power stage if the temperature of the internal chip goes higher than a fixed internal threshold (150 ºC).

The sensing element of the chip is very close to the PDMOS area, so ensuring an accurate and fast temperature

detection.

An hysteresis of approximately 20ºC avoids that the devices turns on and off continuously.

Thermal Characteristics

ADDITIONAL FEATURES AND PROTECTIONS

Feedback disconnection

In case of feedback disconnection, the duty cycle increases versus the maximum allowed value, bringing the output voltage close to the input supply.

THis condition could destroy the load.

To avoid this dangerous condition, the device is turned off if the internal feedback pin remains floating.

Output overvoltage protection

The overvoltage protection, OVP, is realized by using an internal comparator, which input is connected to the feedback, that turns off the power stage when the OVP threshold is reached.

This threshold is typically 30% higher than the feedback voltage.