SGS-THOMSON MICROELECTRONICS

GS70/100T300 Family

70W/100W DC-DC CONVERTERS FAMILY

Type	V_i	V_o	I_o
GS70T300-3.5	200 to 400 V	3,5 V	20 A
GS100T300-5	200 to 400 V	5,2 V	20 A
GS100T300-12	200 to 400 V	12,0 V	8,3 A
GS100T300-15	200 to 400 V	15,0 V	6,6 A
GS100T300-24	200 to 400 V	24,0 V	4,2 A
GS100T300-48	200 to 400 V	48,0 V	2,0 A

FEATURES

- High input voltage range bus: 200 to 400Vdc
- UL, TUV approved
- High output power (up to 100W)
- High efficiency (80% min. on GS100T300-5 module)
- Output voltages range: 3.5-5.2-12-15-24 and 48V
- Output voltage adjustable by external pin
- Remote load voltage sense compensation
- Output short-circuit protection
- Output overvoltage protection
- Undervoltage lock-out
- Minimal overshoot during load transients
- 3750V_{RMS} input to output isolation voltage
- Internal input and output filtering
- Softstart
- PCB or chassis mountable
- Mechanical Dimensions 101,6 • 50,8 • 20 mm (4,00 • 2,00 • 0,79 inches)

DESCRIPTION

The GS70/100T300 family includes 70/100W DC-DC converters used to generate isolated output voltages with an output current up to 20A from a wide range input voltage (200 to 400Vdc).
All the GS70/100T300 family modules require an external fuse (1 Amps.) on the input side.

GS70T300-3.5 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 3.5V I_O = 0 to 20A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 20A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 20A	3.43	3.5	3.57	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 20A (see fig. 2)	1.75		3.5	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 20A BW = 0 to 20Mhz		35	40	mVpp
V_{ol}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 20A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 20A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 20A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 10A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		55		dB
I_o	Output Current	V_i = 200 to 400V V_O = 3.3V	0		20	A
I_{ol}	Overcurrent Limit Initiation	Vi = 300V	21	23	25	A
I_{osc}	Shortcircuit Output Current	Vi = 300V	18	23	28	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 10A		300		µs
t_{on}	Turn-on Time	V_i = 200V I_O = 20A		6	10	ms
V_{is}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Input to Baseplate	2500			
		Output to Baseplate	500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 20A		150		kHz
η	Efficiency	V_i = 300V I_O = 20A	78	79		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

GS100T300-5 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 5V I_O = 0 to 20A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 20A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 20A	5.09	5.20	5.30	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 20A (see fig. 2)	2.6		5.20	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 20A BW = 0 to 20Mhz		40	50	mVpp
V_{OI}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 20A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 20A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 20A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 1A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		55		dB
I_O	Output Current	V_i = 200 to 400V V_O = 5V	0		20	A
I_{OI}	Overcurrent Limit Initiation	Vi = 300V	21	23	25	A
I_{OSC}	Shortcircuit Output Current	Vi = 300V	18	23	28	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 1A		300		µs
t_{on}	Turn-on Time	V_i = 200V I_O = 20A		6	10	ms
V_{is}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Output to Baseplate	500			
		Input to Baseplate	2500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 20A		150		kHz
η	Efficiency	Vi = 300V I_O = 20A	80	81		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

GS100T300-12 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 12V I_O = 0 to 8.3A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 8.3A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 8.3A	11.76	12.00	12.24	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 8.3A (see fig. 2)	6.0		13.2	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 8.3A BW = 0 to 20Mhz		100	120	mVpp
V_{OI}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 8.3A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 8.3A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 8.3A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 4A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		45		dB
I_O	Output Current	V_i = 200 to 400V V_O = 12V	0		8.3	A
I_{OI}	Overcurrent Limit Initiation	Vi = 300V	8.8	9.1	11.0	A
I_{osc}	Shortcircuit Output Current	Vi = 300V	7.5	9.0	11.0	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 4A		300		µs
t_{on}	Turn-on Time	V_i = 200V I_O = 8.3A		6	10	ms
V_{is}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Input to Baseplate	2500			
		Output to Baseplate	500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 8.3A		150		kHz
η	Efficiency	Vi = 300V I_O = 8.3A	83	84		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

GS100T300-15 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 15V I_O = 0 to 6.6A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 6.6A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 6.6A	14.7	15.0	15.3	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 6.6A (see fig. 2)	7.5		16.5	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 6.6A BW = 0 to 20Mhz		110	150	mVpp
V_{OI}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 6.6A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 6.6A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 6.6A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 3.3A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		45		dB
I_O	Output Current	V_i = 200 to 400V V_O = 15V	0		6.6	A
I_{OI}	Overcurrent Limit Initiation	Vi = 300V	7.1	7.5	8.0	A
I_{osc}	Shortcircuit Output Current	Vi = 300V	6.5	8.0	10.0	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 3.3A		300		µs
t_{on}	Turn-on Time	V_i = 200V I_O = 6.6A		6	10	ms
V_{is}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Input to Baseplate	2500			
		Output to Baseplate	500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 6.6A		150		kHz
η	Efficiency	Vi = 300V I_O = 6.6A	84	85		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

GS100T300-24 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

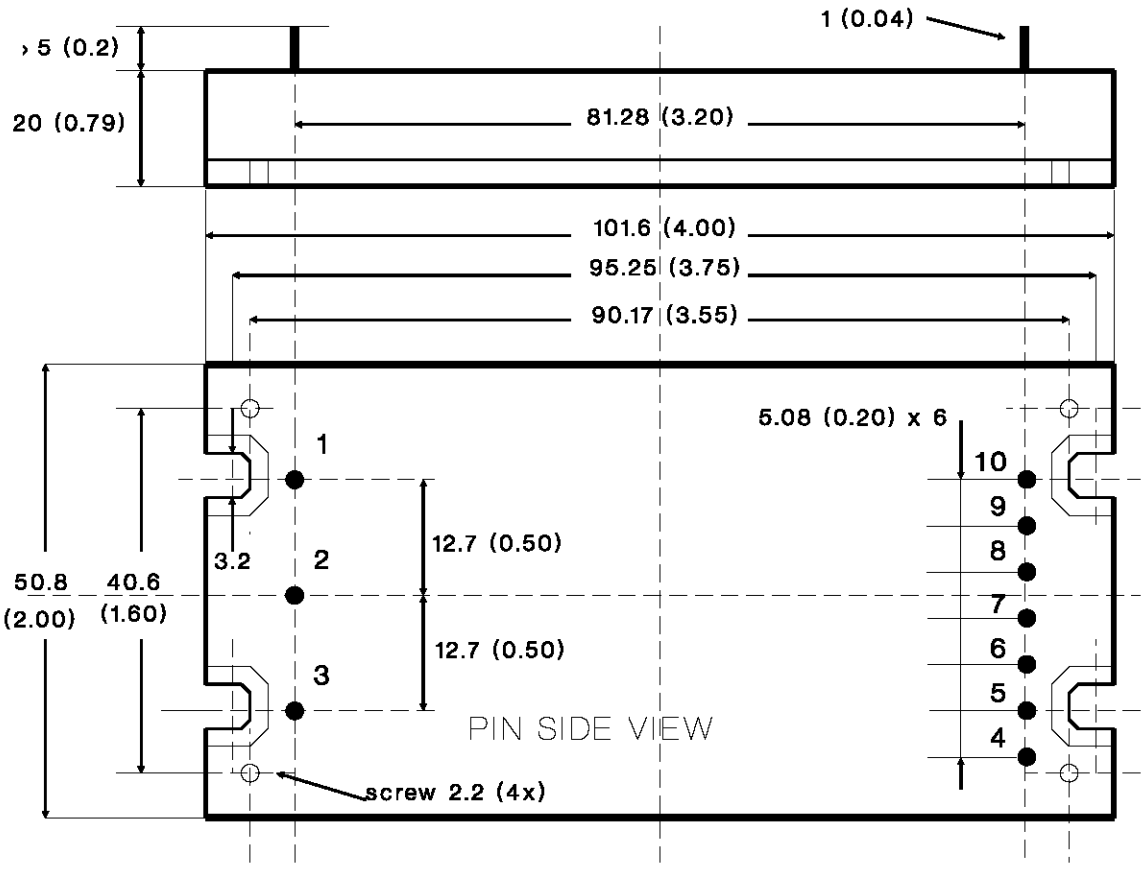
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 24V I_O = 0 to 4.2A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 4.2A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 4.2A	23.5	24.0	24.5	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 4.2A (see fig. 2)	12.0		26.4	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 4.2A BW = 0 to 20Mhz		200	240	mVpp
V_{OI}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 4.2A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 4.2A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 4.2A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 2.1A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		40		dB
I_O	Output Current	V_i = 200 to 400V V_O = 24V	0		4.2	A
I_{OI}	Overcurrent Limit Initiation	Vi = 300V	4.5	5.0	5.5	A
I_{OSC}	Shortcircuit Output Current	Vi = 300V	3.8	4.5	6.0	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 2.1A		300		µs
t_{ON}	Turn-on Time	V_i = 200V I_O = 4.2A		6	10	ms
V_{IS}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Input to Baseplate	2500			
		Output to Baseplate	500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 4.2A		150		kHz
η	Efficiency	Vi = 300V I_O = 4.2A	84	85		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

GS100T300-48 ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_i	Input Voltage	V_O = 48V I_O = 0 to 2.1A (Operating Conditions)	200	300	400	V_{DC}
Q_i	Inrush Charge	V_i = 400V I_O = 2.1A		$40 \bullet 10^{-6}$		C
P_i	Input Power	V_i = 300V I_O = 0A (No Load)		2.5		W
V_O	Output Voltage	V_i = 200 to 400V I_O = 0 to 2.1A	47.04	48.00	48.96	V
V_O	Output Voltage Range	V_i = 200 to 400V I_O = 0 to 2.1A (see fig. 2)	24.0		52.8	V
V_{orn}	Output Ripple and Noise Voltage	V_i = 300V I_O = 2.1A BW = 0 to 20Mhz		400	500	mVpp
V_{OI}	Output Overvoltage Limit Initiation	V_i = 200 to 400V I_O = 0 to 2.1A		1.2•Vo		V
δV_{OL}	Line Regulation	V_i = 200 to 400V I_O = 2.1A			±0.1	%
δV_{OO}	Load Regulation	V_i = 300V I_O = 0 to 2.1A			±0.1	%
ΔV_O	Total Remote Sense Compensation	V_i = 200 to 400V			0.6	V
δV_O	Peak Load Transient Response	Vi = 300V δI_O = 1A		500		mVp
SVR	Supply Voltage Rejection	f = 100Hz		35		dB
I_O	Output Current	V_i = 200 to 400V V_O = 48V	0		2	A
I_{OI}	Overcurrent Limit Initiation	Vi = 300V	2.1	2.3	2.5	A
I_{osc}	Shortcircuit Output Current	Vi = 300V	1.8	2.3	2.8	A
t_S	Load Transient Settling Time	V_i = 300V δI_O = 1A		300		µs
t_{on}	Turn-on Time	V_i = 200V I_O = 2.1A		6	10	ms
V_{is}	Isolation Voltage	Input to Output	3750			V_{RMS}
		Input to Baseplate	2500			
		Output to Baseplate	500			
f_S	Switching Frequency	V_i = 200 to 400V I_O = 0 to 2.1A		150		kHz
η	Efficiency	Vi = 300V I_O = 2.1A	84	85		%
R_{th}	Thermal Resistance	Baseplate to Ambient		7.5		°C/W
T_{cop}	Operating Case Temperature Range		0		+70	°C
T_{stg}	Storage Temperature Range		– 40		+100	°C

CONNECTION DIAGRAM AND MECHANICAL DATA

Figure 1.



Package R; dimensions in mm (inches)

PIN DESCRIPTION

Pin	Function	Description
1	ENABLE	The converter is ON (Enable) when the voltage applied to this pin with reference to pin 2 is lower than 1.2V. The converter is OFF (Inhibit) for a control voltage in the range of 2.1 to 5V. When the pin is unconnected the converter is OFF (Inhibit).
2	- Vin	Negative input voltage.
3	+ Vin	Positive input voltage. Unregulated input voltage in the range of 200 to 400Vdc must be applied between pin 2-3.
4,5	+ Vo	+Vo output voltage.
6,7	- Vo	+Vo output voltage return.
8	+ SENSE	Senses the remote load high side. To be connected to pins 4,5 when remote sense is not used.
9	- SENSE	Senses the remote load return. To be connected to pins 6,7 when remote sense is not used.
10	ADJ	Adjust output voltage pin. A voltage generator between the ADJ. pin and -SENSE pin sets the Vo. When unconnected Vo is at nominal value (see fig. 2).

ADJUSTMENT OF THE OUTPUT VOLTAGE

The output voltage can be fixed following the indications given in fig. 2. The external reference voltage Vadj can be calculated using the following formula:

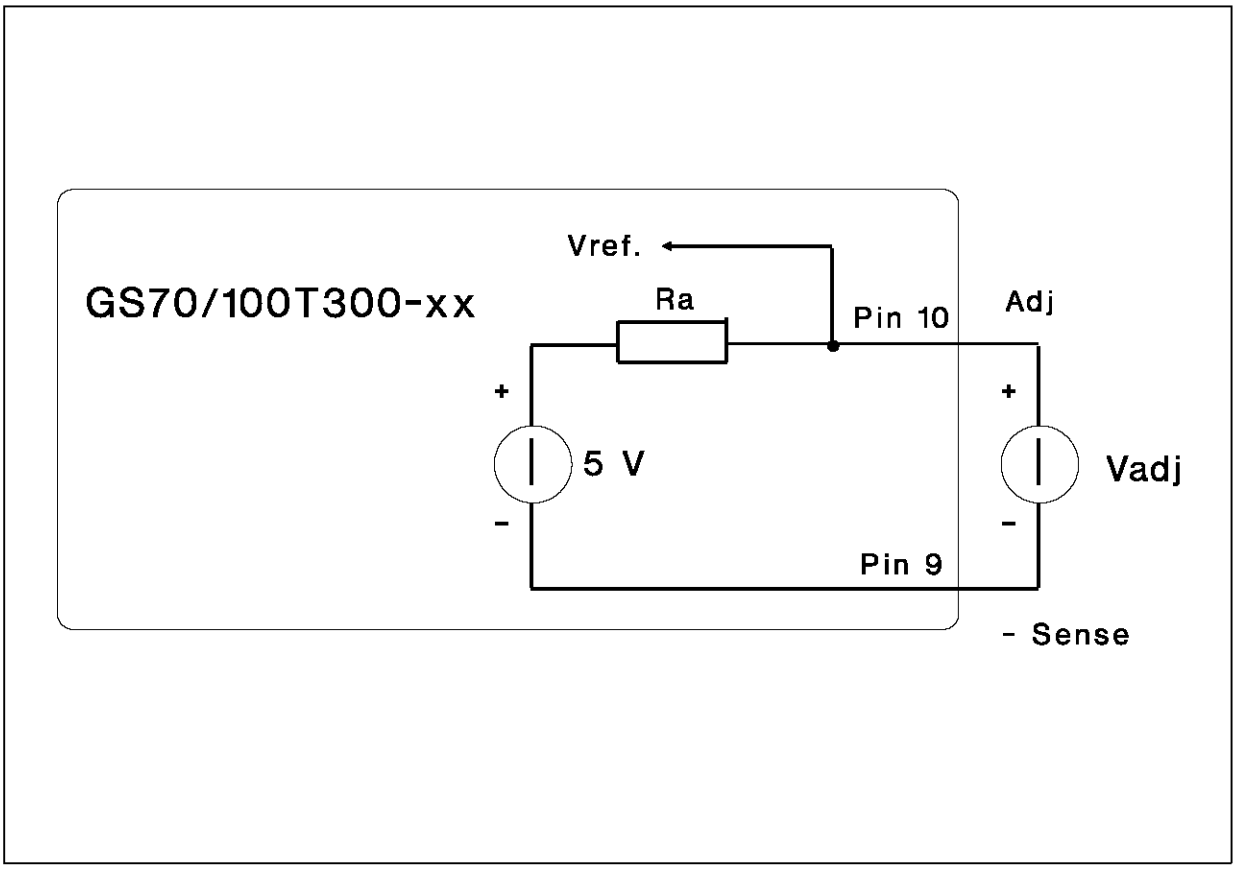
$$V_{adj} = 5 \bullet \frac{V_o}{V_{nom}}$$

The Vout and Vadj ranges are given in the following table:

Table 1: Output voltage generation with external voltage generator

Type	Nominal Output Voltage (V)	Output Voltage Range (V_{out})	External Voltage Generator allowed Range (V_{adj})
GS70T300-3.5	3.5	1.75 to 3.50	2.5 to 5.0
GS100T300-5	5.2	2.60 to 5.20	2.5 to 5.0
GS100T300-12	12.0	6.00 to 13.20	2.5 to 5.5
GS100T300-15	15.0	7.50 to 16.50	2.5 to 5.5
GS100T300-24	24.0	12.00 to 26.40	2.5 to 5.5
GS100T300-48	48.0	24.00 to 52.80	2.5 to 5.5

Figure 2. Output voltage adjustment



Safety approvals

The converter is agency certified to the following safety requirements.

Agency	Requirements	License Number
UL	UL-STD-1950	E141284
TUV	EN 60950	R 9371740.1

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