DEMKE ELECTRONIC GMBH

Servosysteme
Leistungselektronik

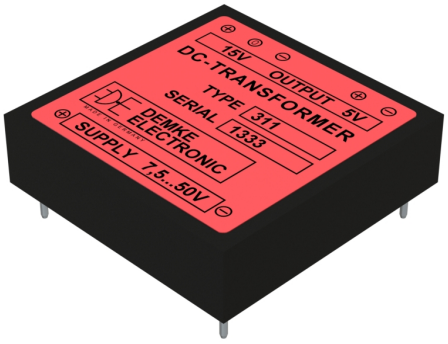
DC-Transformer Type 311-15015-05

Article number 311.001

12 Watt - single and bipolar output - buck-boost converter

General

- 1 : 6.7 input voltage range from 7.5 VDC up to 40 VDC
- Peak efficiency 92%
- Continuous no load and short circuit proof
- Input and output galvanically isolated
- Very low input ripple and noise
- Integrated EMI input and output filter
- No external circuitry required
- For ambient temperatures up to +85°C
- Electromagnetic emission EN 55022 < A
- No derating
- Compact 38.2 × 38.2 × 10.2 mm plastic case



Description

The DC Transformer 311-15015-05 stands out to its low noise and very high efficiency, making it to a superior power supply in high end applications with different voltage buses. The tranformer 311-15015-05 is a member of the 300-series push-pull power converter with a bipolar and one additional single output voltage bus. The transformer includes a ***softstart***, an ***input undervoltage lockout*** and a ***permanent short circuit protection*** to ensure efficient module protection. The soft start allows current limitation and eliminates inrush current during start up. Since the transformer is voltage and current regulated, the module passes into constant current mode, when an overload or even a short circuit is applied. This feature makes this transformer unique in limiting the maximum output power. The device immediately restore to normal operation when the overload is removed and they are able to deliver the full output power within the specified temperature range.

311 series types

Standard Types	Input voltage range / VDC	Output	
		VDC / VDC	IDC / A
311-vv0vv-vv	7,5 ... 40	15	0.4
311-15015-05	7,5 ... 40	15	0.4

vv0vv - replace vv0vv by a desired bipolar output voltage
vv - replace vv by a desired output voltage

nominal input voltage = 24 VDC

Modifications are available upon request!

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Electrical specifications

Characteristic	Symbol	Conditions	min	typ	max	Unit
Input voltage range	U_i	I_{oNom}	7.5	24	40	VDC
Input startup voltage	U_{Start}			8.5		VDC
Undervoltage lockout	U_{UVLO}			6.5		VDC
typ. Input surge voltage	U_{I_Surge}			60		VDC
Output voltage	U_O	U_{iNom}, I_{oNom}	14.7	15	15.3	VDC
max. Output current	I_{O_max}	U_{iNom}			0.4	A
max. Input current	I_{I_max}				t.b.d.	A
No load input current	I_{iNL}	U_{iNom}, $I_o = 0$		45		mA
Input current in shutdown condition	I_{iSD}			no shut down mode		mA
min. load to obtain specified output voltage	L_{min}	U_{iNom}	t.b.d.			%
Initial switch on time	t_{on}	U_{iNom}, I_{oNom}		35		ms
SoftStart ramp-up-time	t_{SS}			t.b.d.		ms
Output voltage overshoot at initial switch-on	U_{OOs}			0 (4)		mV
Input current overshoot at initial switch-on	I_{OOs}			10		%
Reflected ripple current at the input(1)	I_{IRR}			10		mA
Generated ripple at the line voltage @20MHz(2)	ΔU_{iR}			20		mV
Generated noise at the line voltage @20MHz(2)	ΔU_{iN}			40		mV
Switching frequency	f_{SW}			200		kHZ
Output voltage ripple @20MHz	ΔU_{OR}	U_{iNom}, I_{oNom}		30		mV
Output voltage noise @20MHz	ΔU_{ON}			40		mV
Output voltage accuracy	ΔU_O	U_{iMin} .. U_{iMax} I_{oMin} .. I_{oMax}		2		%
Static line regulation	ΔU_{IL}	U_{iMin} .. U_{iMax} I_{oNom}		0.1		%
Static load regulation	ΔU_{OL}	U_{iNom} I_o=(0 .. 1)*I_{oNom}		0.3		%
Dynamic load regulation(3)	t_d	U_{iMin} .. U_{iMax} I_o=(0.1 .. 0.9)*I_{oNom}		1		ms
Efficiency	η	U_{iNom}, I_{oNom}		89		%
		U_{iNom}, 0.5*I_{oNom}		90		
Maximum admissible capacitive load	C_{oExt}	U_{iNom}, I_{oNom}			infinite	µF
Mean Time To Failure	MTTF	SN29500 @ 70°C		t.b.d.		h

Table 2 - Electrical input and output data

Test conditions, unless otherwise noted:
Ui_nom = 24 VDC and full load, Ta = 25°C
all measurements without external components

(1) measured with a current probe (Tek -TCPA300)
(2) measured directly at the input/output pins with no external filter (Yokogawa DL9040)
(3) load jump performed with Electronic Load (Keisoku Giken ELA305)
(4) overdamped step response

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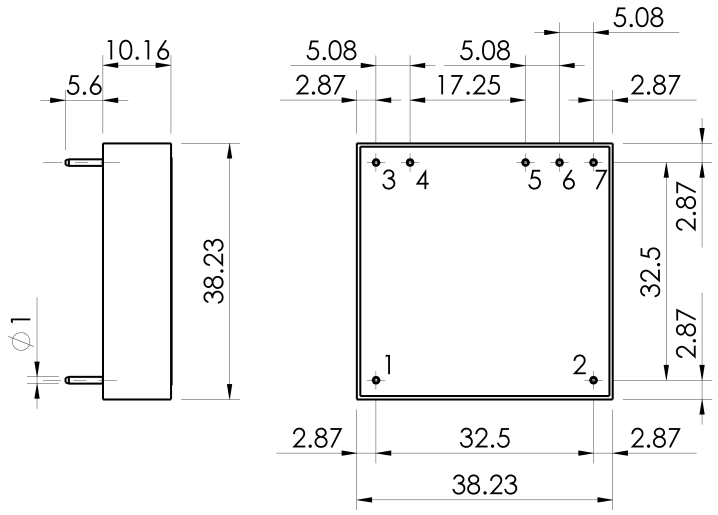
Thermal characteristics

Characteristic	Symbol	min	max	Unit
Ambient temperature	T_A	-40	85	°C
max. case temperature (before thermal shutdown)	no thermal shutdown implemented			
storage temperature (device not in operation)	T_S	-10	65	°C
maximum relative humidity during storage	RH		75	%
max. storage time under worst conditions	t_{Smax}		25	d

Electromagnetic interference compliance

Norm	Description	satisfied
EN 55022	EN 55022 < A	yes
EN 61000-6-4	Emission standard for industrial environments	yes

Mechanical data and connections



Pin	Symbol	Function
1	Vi-	Input voltage negative
2	Vi+	Input voltage positive
3	Vo2-	Output voltage 2 negative
4	Vo2+	Output voltage 2 positive
5	Vo1-	Output voltage 1 negative
6	Vo1com	Output voltage 1 common
7	Vo1+	Output voltage 1 positive

38.2 × 38.2 × 10.2 mm plastic case with plastic bottom cover, UL94-0 rated

connector: 1 mm Ø Pins for PCB / THT mounting

dimensions in mm

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