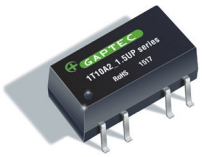
1T10A2_1.5UP series

1W - Dual Output DC-DC Converter - Isolated & Unregulated



DC-DC Converter 1 Watt

- 10-Pin SMD Package
- No-load input current as low as 5mA
- Continuous short-circuit protection
- High efficiency up to 87%
- Unregulated output types
- 1.5kVDC Isolation
- Operating temperature: -40°C to +105°C
- Industry standard pinout
- Design meets IEC62368, UL62368, EN62368

Introducing our latest 1T10A2_1.5UP series, designed in a compact SMD package with a no-load input current as low as 5mA. It offers continuous short-circuit protection and achieves high efficiency of up to 87%. Featuring unregulated output types and isolation of 1.5kVDC, this unit is capable of operating in extreme temperatures from -40°C to +105°C.

Common specifications

Short circuit protection	Continuous
Operation temperature	-40°C ~+105°C
Storage temperature	-55°C ~+125°C
Humidity	95 %RH (Non Condensing)
MTBF: (MIL-HDBK-217F@25°C)	3,500,000 Hours
Case material	Epoxy Resin (UL94V-0)
Switching frequency	Full load, nominal input @3.3V, 5V Vin 215/370 KHz Full load, nominal input @other Vin 250 KHz
Dimensions	15.24 x 8.0 x 7.3 mm
Weight	1.36 g
Cooling	Free air Convection

Input specifications

Item	Test condition	Min	Typ	Max	Units
Voltage Range	• Vo,Io Nom @Vin:3.3V,5V,9V • Vo,Io Nom Vin:12V,15V,24V		±10 ±20		
Input filter	Capacitor				

Example:
1T10A2_0509D1.5UP
1 = 1Watt; T10 = SMT10; A = Pinning; 05 = 5Vin; 09 = 9Vout; D = Dual Output; 1.5 = 1.5kVDC; U = Unregulated Output; P = Short Circuit Protection

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Line regulation	For 1.0% OF Vin			1.2	%
Load regulation	3.3V (10% to 100% F.L) 5V (10% to 100% F.L) 9V (10% to 100% F.L) 12V (10% to 100% F.L) 15V (10% to 100% F.L) 24V (10% to 100% F.L)		15 10 8 7 6 5	20 15 10 10 10 10	%
Ripple & Noise*	• BW = DC to 20MHz @ Vo: 3.3V, 5V, 9V, 12V,15V • BW = DC to 20MHz @ Vo: 24V		30 50	75 100	mVp-p

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Insulation resistance	500Vdc	1000			MΩ
Isolation capacitance	Input-output, 100KHz/0.1V		20		pF

EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)
EMI	RE	CISPR32/EN55032 CLASS B (see Fig. 1 for recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

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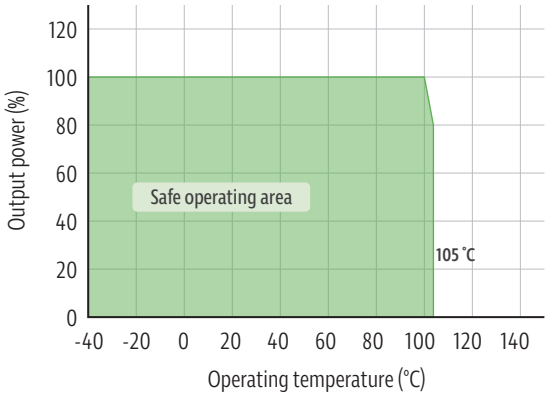
Product Selection Guide - Dual output

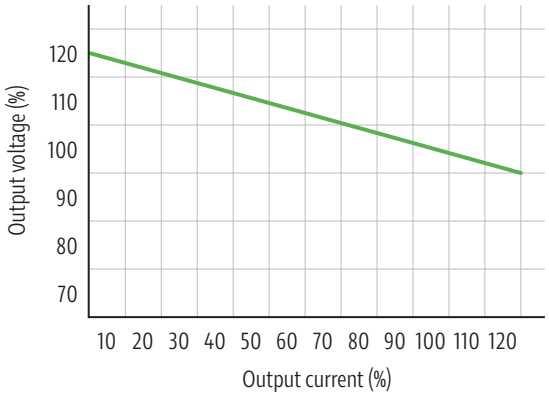
Approval	Model	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA) Max./Min.	Full Load Efficiency (%) Min./Typ.	Capacitive Load (µF)Max.
	1T10A2_0303D1.5UP	3.3	±3.3	±151	76	±1200
	1T10A2_0503D1.5UP	5	±3.3	±151	76	±1200
	1T10A2_0903D1.5UP	9	±3.3	±151	76	±1200
	1T10A2_1203D1.5UP	12	±3.3	±151	78	±1200
	1T10A2_1503D1.5UP	15	±3.3	±151	78	±1200
	1T10A2_2403D1.5UP	24	±3.3	±151	78	±1200
	1T10A2_0305D1.5UP	3.3	±5	±100	82	±1200
	1T10A2_0505D1.5UP	5	±5	±100	82	±1200
	1T10A2_0905D1.5UP	9	±5	±100	82	±1200
	1T10A2_1205D1.5UP	12	±5	±100	82	±1200
	1T10A2_1505D1.5UP	15	±5	±100	82	±1200
	1T10A2_2405D1.5UP	24	±5	±100	82	±1200
	1T10A2_0309D1.5UP	3.3	±9	±56	83	±470
	1T10A2_0509D1.5UP	5	±9	±56	83	±470
	1T10A2_0909D1.5UP	9	±9	±56	83	±470
	1T10A2_1209D1.5UP	12	±9	±56	85	±680
	1T10A2_1509D1.5UP	15	±9	±56	85	±680
	1T10A2_2409D1.5UP	24	±9	±56	85	±680
	1T10A2_0312D1.5UP	3.3	±12	±42	84	±220
	1T10A2_0512D1.5UP	5	±12	±42	84	±220
	1T10A2_0912D1.5UP	9	±12	±42	84	±220
	1T10A2_1212D1.5UP	12	±12	±42	85	±330
	1T10A2_1512D1.5UP	15	±12	±42	85	±330
	1T10A2_2412D1.5UP	24	±12	±42	85	±330
	1T10A2_0315D1.5UP	3.3	±15	±34	84	±1000
	1T10A2_0515D1.5UP	5	±15	±34	84	±1000
	1T10A2_0915D1.5UP	9	±15	±34	84	±1000
	1T10A2_1215D1.5UP	12	±15	±34	87	±220
	1T10A2_1515D1.5UP	15	±15	±34	87	±220
	1T10A2_2415D1.5UP	24	±15	±34	87	±220
	1T10A2_0324D1.5UP	3.3	±24	±21	85	±47
	1T10A2_0524D1.5UP	5	±24	±21	85	±47
	1T10A2_0924D1.5UP	9	±24	±21	85	±47
	1T10A2_1224D1.5UP	12	±24	±21	85	±100
	1T10A2_1524D1.5UP	15	±24	±21	85	±100
	1T10A2_2424D1.5UP	24	±24	±21	85	±100

Typical characteristics

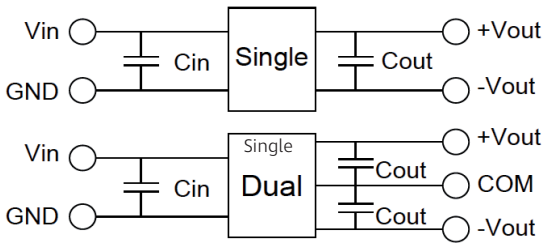
Temperature derating graph



Tolerance envelope graph



Recommended Test Circuit



Vin	Cin	Single Vout	Cout	Dual Vout	Cout
3.3VDC	4.7µF/25V	3.3VDC	10µF/16V	±3.3VDC	±4.7µF/16V
5VDC	4.7µF/25V	5VDC	10µF/16V	±5VDC	±4.7µF/16V
9VDC	4.7µF/25V	9VDC	2.2µF/16V	±9VDC	±1µF/16V
12VDC	2.2µF/25V	12VDC	2.2µF/25V	±12VDC	±1µF/25V
15VDC	2.2µF/25V	15VDC	1µF/25V	±15VDC	±1µF/25V
24VDC	1µF/50V	24VDC	1µF/50V	±24VDC	±1µF/50V

EMC (CLASS B) compliance circuit

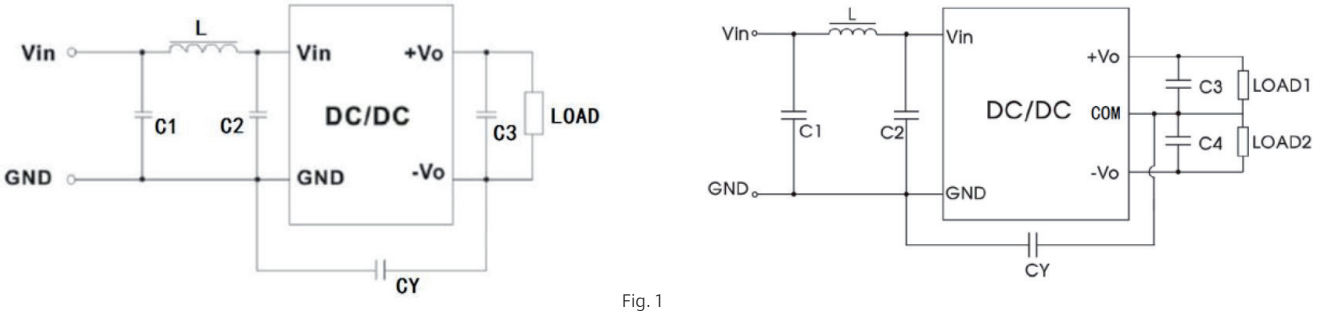


Fig. 1

EMC recommended circuit value table

EMI	C1	4.7µF /50V
EMI	C2	4.7µF /50V
EMI	CY	1nF/4kV
EMI	C3, C4	Recommended Test Circuit
EMI	L	6.8µH

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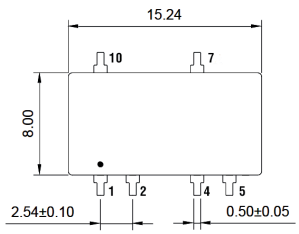
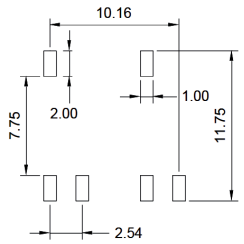
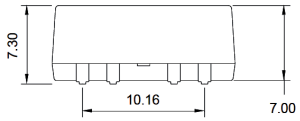
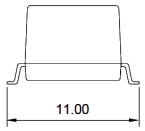
Mechanical dimensions





SUGGESTED PAD LAYOUT





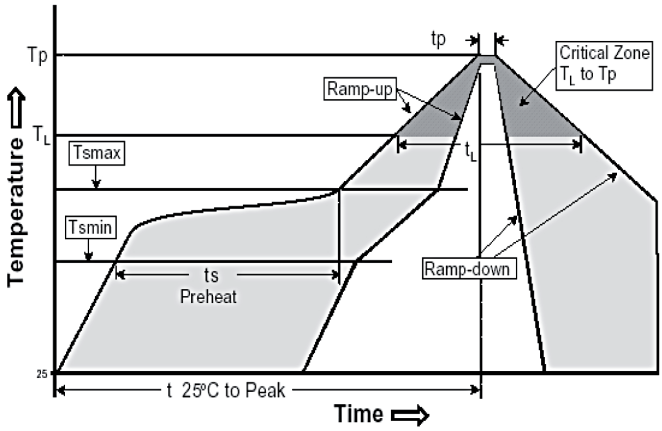
UNIT: mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection										
PIN	1	2	3	4	5	6	7	8	9	10
(Dual)	-Vin	+Vin	NC*	Com	-Vout	NC*	+Vout	NC*	NC*	NC

RoHS compliant type

Our RoHS parts just can withstand IR Reflow peak temperature: 240°C MAX as the following profile:

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts max to Tp)	3°C /second max.
Preheat -Temperature Min (Ts min) -Temperature Max (Ts max) -Time (ts min to ts max)	 150°C 200°C 60-180 seconds
Time maintained above -Temperature (TL) -Time (tL)	 217°C 60-150 seconds
Peak/Classification Temperature (Tp)	240°C max.
Time within 5°C of actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	6°C/seconds max.
Time 25°C to Peak Temperature	6 minutes max.



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