

1W Isolated Dual Output DC/DC Converters

DESCRIPTION

The TPA series of industrial temperature range DC/DC converters are the standard building blocks for on-board distributed power systems. They are suited for providing dual rail supplies, both SIP and DIP are available.

FEATURES

RoHS compliant	Efficiency up to 80%	Power density up to 0.85W/cm ³
Wide temperature performance at full 1 Watt load, -40°C to 85°C	Dual output from a single input rail	UL 94V-0 package material
Power sharing on output	1kVDC isolation	Industry standard pinout
Output voltage 5V, 9V, 12V, 15V	Input voltage 5V, 12V, & 15V	

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	Package Style
	V	V	mA	mA	%	pF	
TPA0505D	5	±5	±100	287	67	28	DIP
TPA0509D	5	±9	±54	267	76	31	
TPA0512D	5	±12	±43	260	79	35	
TPA0515D	5	±15	±33	255	78	38	
TPA0505S	5	±5	±100	287	67	28	SIP
TPA0509S	5	±9	±54	267	76	31	
TPA0512S	5	±12	±43	260	79	35	
TPA0515S	5	±15	±33	255	78	38	
TPA1205D	12	±5	±100	120	68	35	DIP
TPA1209D	12	±9	±54	114	74	45	
TPA1212D	12	±12	±43	112	77	55	
TPA1215D	12	±15	±33	112	75	56	
TPA1205S	12	±5	±100	120	68	35	SIP
TPA1209S	12	±9	±54	114	74	45	
TPA1212S	12	±12	±43	112	77	55	
TPA1215S	12	±15	±33	112	75	56	
TPA1505D	15	±5	±100	92	71	40	DIP
TPA1512D	15	±12	±43	86	77	70	
TPA1515D	15	±15	±33	85	80	83	
TPA1505S	15	±5	±100	92	71	40	
TPA1512S	15	±12	±43	86	77	70	SIP
TPA1515S	15	±15	±33	85	80	83	

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	5V input variants	4.5	5	5.5	V
	12V input variants	10.7	12	13.1	
	15V input variants	13.5	15	16.5	
Reflected ripple current			22	45	mA p-p

ABSOLUTE MAXIMUM RATINGS

Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	450mW
Input voltage V_{IN} , TPA05 variants	7V
Input voltage V_{IN} , TPA12 variants	15V
Input voltage V_{IN} , TPA15 variants	18V

All specifications typical at $T_A=25^{\circ}\text{C}$, nominal input voltage and rated output current unless otherwise specified.

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	$T_A=-40^{\circ}\text{C}$ to 120°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High V_{IN} to low V_{IN}		1.0	1.2	%/%
Load Regulation 10% load to rated load	5V & 12V input	5V output	10	13	%
		9V output	9	10	
		12V output	7	8	
		15V output	6	7.0	
	15V input	5V output	6	10	
		12V output	3	4	
		15V output	3	4	

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	1000			VDC
Resistance	$V_{iso}=1000\text{VDC}$		10		GΩ

GENERAL CHARACTERISTICS

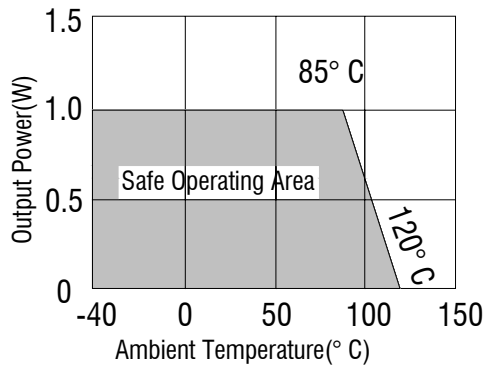
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	5V input		110		kHz
	12V input		130		
	15V input		90		

TEMPERATURE CHARACTERISTICS

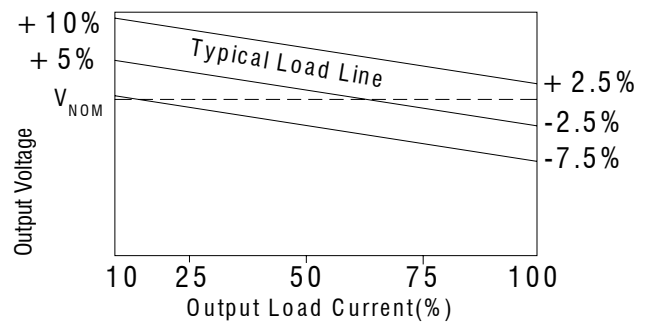
Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output	-40		85	$^{\circ}\text{C}$
Storage		-50		130	
Cooling	Free air convection				

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TEMPERATURE DERATING GRAPHS



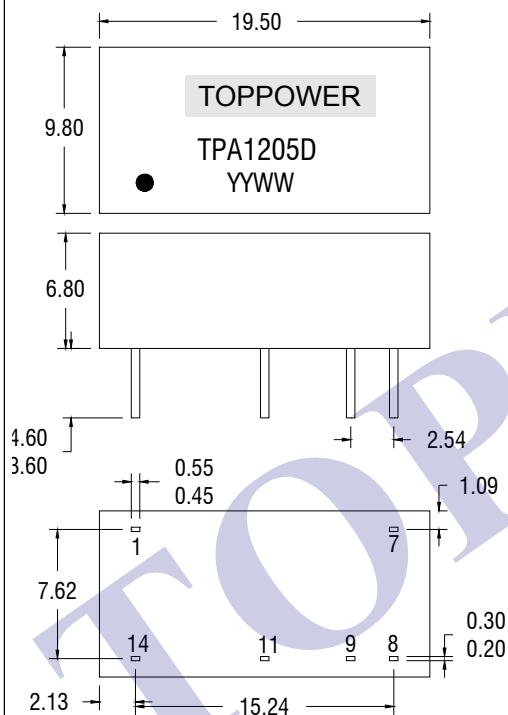
TOLERANCE ENVELOPES



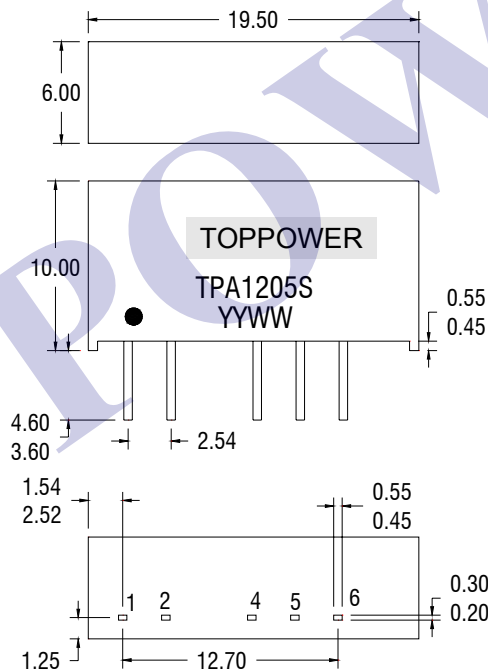
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

DIP Package



SIP Package



PIN CONNECTIONS-14PIN DIP

PIN	Function
1	-VIN
7	NC
8	OV
9	+VOUT
11	-VOUT
14	+VIN

PIN CONNECTIONS-7PIN SIP

PIN	Function
1	+VIN
2	-VIN
4	-VOUT
5	OV
6	+VOUT

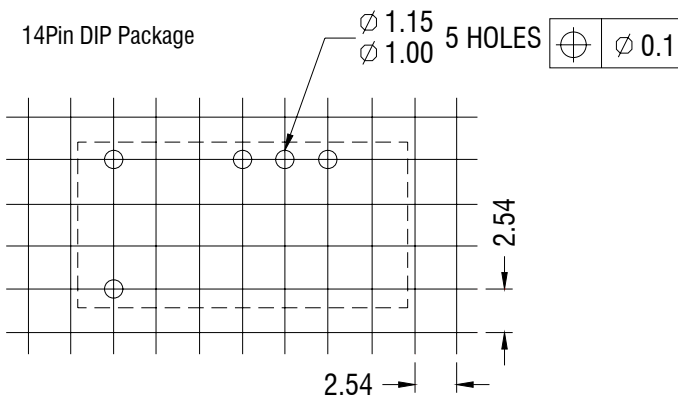
All dimensions in mm ± 0.25 mm. All pins on a 2.54mm pitch and within ± 0.25 mm of true position.

Weight: 2.4g (DIP) 2.1g (SIP)

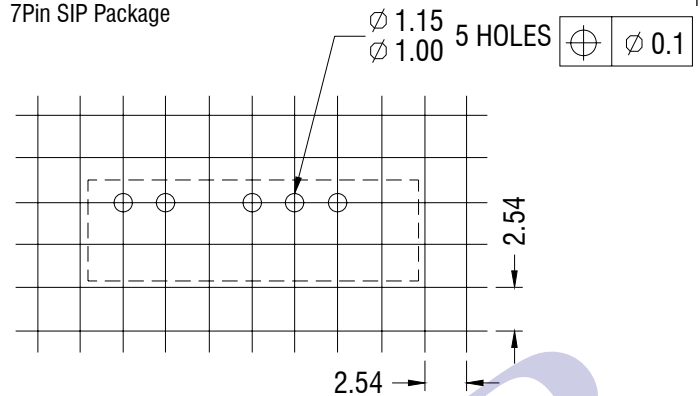
PACKAGE SPECIFICATIONS (continued)

RECOMMENDED FOOTPRINT DETAILS

14Pin DIP Package

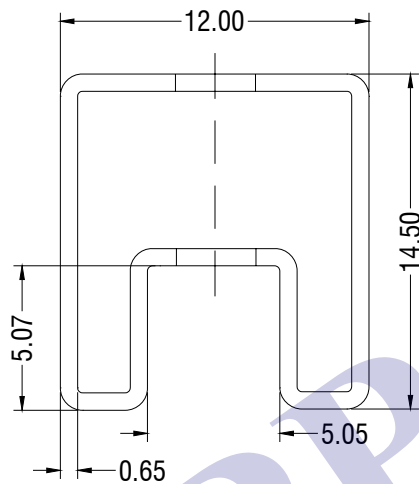


7Pin SIP Package



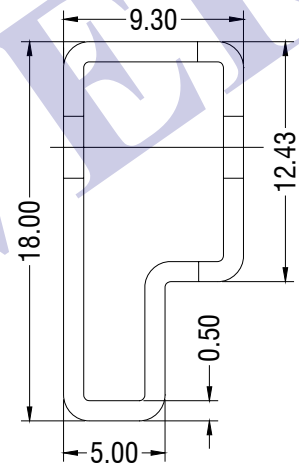
TUBE OUTLINE DIMENSIONS

14Pin DIP Tube



Tube length (14 Pin DIP) : 520mm $\pm$ 2mm.

7Pin SIP Tube



Tube Quantity : 25

RoHS COMPLIANCE INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Both SIP and DIP types in this series are backward compatible with Sn/Pb soldering systems.



DESCRIPTION

The TPA series of DC/DC converters are the standard building blocks for on-board distributed power systems. They are ideally suited for providing dual rail supplies, both SIP and DIP are available.

FEATURES

RoHS compliant	Efficiency up to 81%	Power density up to 0.86W/cm ³
Dual output from a single input rail	UL 94V-0 package material	No heatsink required
1kVDC isolation	Industry standard pinout	Power sharing on output
Input voltage: 24V , 48V	Output voltage: 5V, 9V, 12V, 15V	

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Efficiency	Isolation Capacitance	Package Style
	V	V	mA	%	pF	
TPA2405D	24	±5	±100	69	40	DIP
TPA2409D	24	±9	±56	78	90	
TPA2412D	24	±12	±41	81	70	
TPA2415D	24	±15	±32	81	95	
TPA2405S	24	±5	±100	69	40	SIP
TPA2409S	24	±9	±54	78	86	
TPA2412S	24	±12	±42	81	70	
TPA2415S	24	±15	±34	80	96	
TPA4805D	48	±5	±100	69	25	DIP
TPA4809D	48	±9	±56	80	40	
TPA4812D	48	±12	±42	80	50	
TPA4815D	48	±15	±34	79	55	
TPA4805S	48	±5	±100	70	25	SIP
TPA4809S	48	±9	±55	79	40	
TPA4812S	48	±12	±43	79	52	
TPA4815S	48	±15	±33	79	60	

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	24V input variants	22	24	27	V
	48V input variants	44	48	53	

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power ²	T _A =0°C to 70°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High V _{IN} to low V _{IN}			1.2	%/%
Load Regulation(10% load to rated load)	5V output			14	%
	all other output			12	

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	450mW
Input voltage V _{IN} , TPA24	28V
Input voltage V _{IN} , TPA48	54V

All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso= 500VDC	10			GΩ

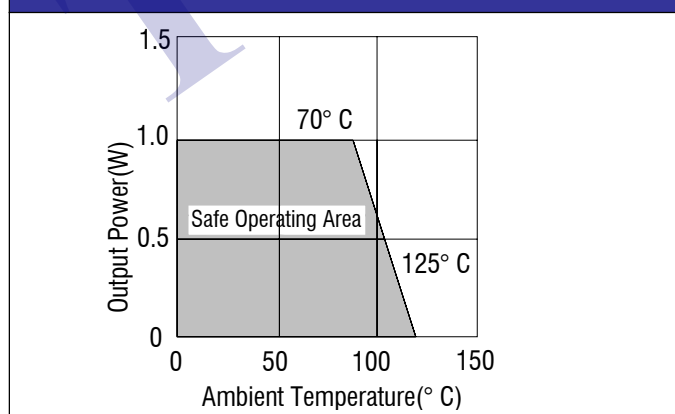
GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All input		110		kHz

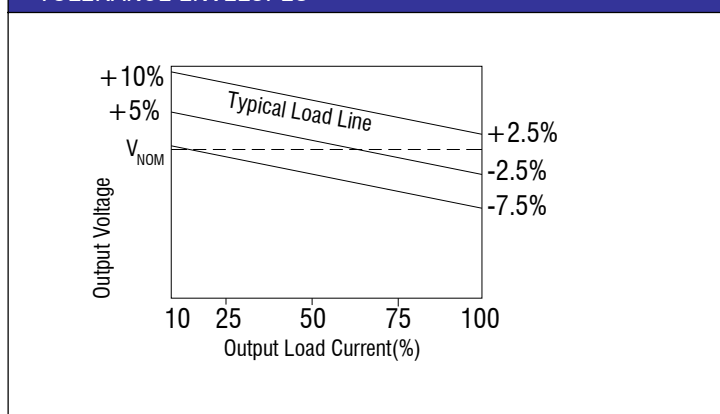
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output	0		70	°C
Storage		-55		150	
Cooling	Free air convection				

TEMPERATURE DERATING GRAPHS

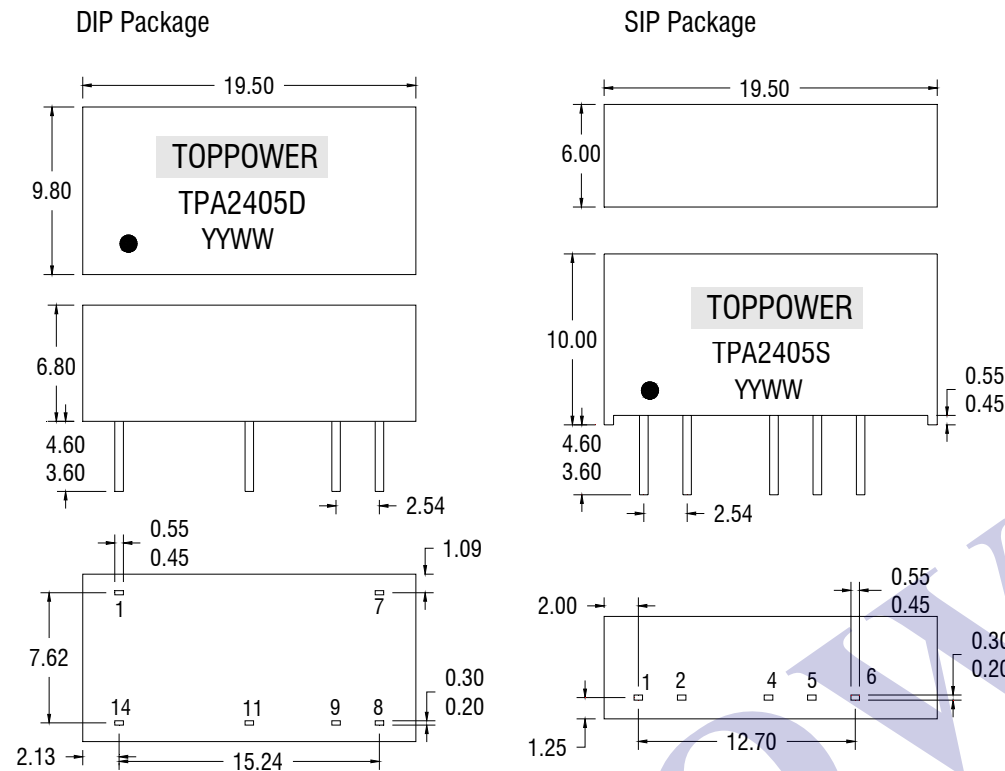


TOLERANCE ENVELOPES



PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



All dimensions in mm ± 0.25 mm. All pins on a 2.54 mm pitch and within ± 0.25 mm of true position.

* 0.303 (7.70) for 48V variants

** 0.295 (7.50) for 48V

Weight: 2.4g (24V DIP) 2.9g (48V DIP) 2.2 g(24V SIP) 2.9g(48V SIP)

PIN COMMECTIONS-14PIN DIP

PIN	Function
1	-VIN
7	NC
8	OV
9	+VOUT
11	-VOUT
14	+VIN

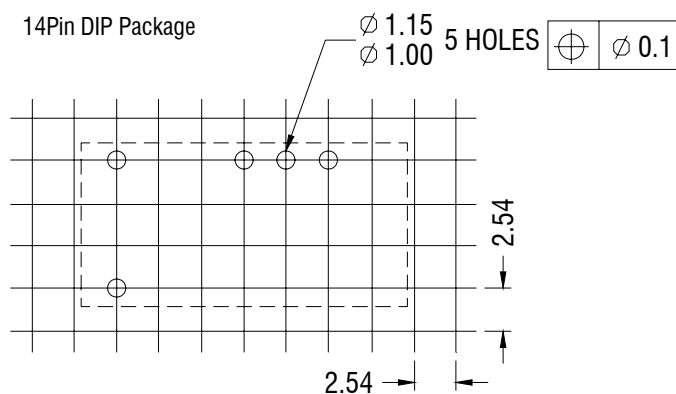
PIN CONNECTIONS-7PIN SIP

PIN	Function
1	+VIN
2	-VIN
4	-VOUT
5	OV
6	+VOUT

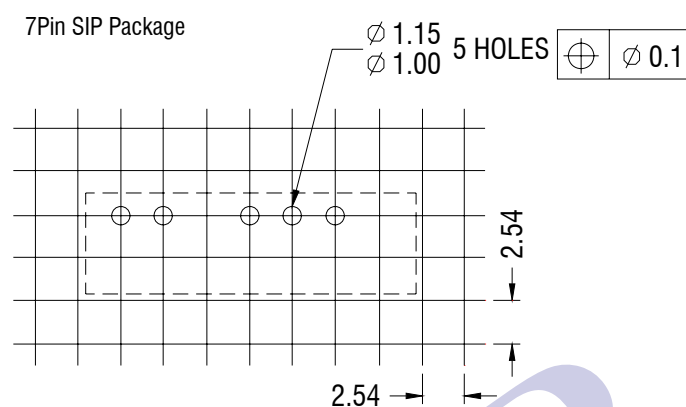
PACKAGE SPECIFICATIONS (continued)

RECOMMENDED FOOTPRINT DETAILS

14Pin DIP Package

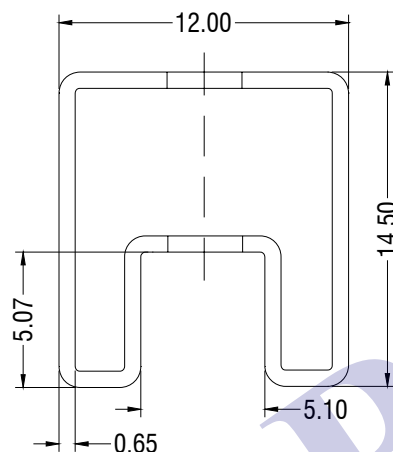


7Pin SIP Package



TUBE OUTLINE DIMENSIONS

14Pin DIP Tube

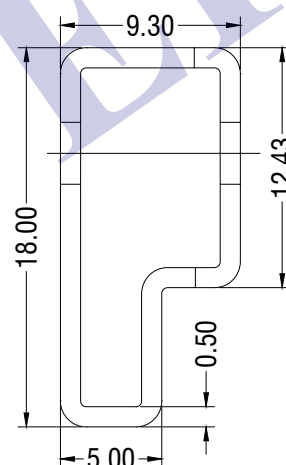


Unless otherwise stated all dimensions in mm ± 0.5 mm.

Tube length (14 Pin DIP) : 520mm ± 2 mm.

Tube length (7 Pin DIP) : 520mm ± 2 mm.

7Pin SIP Tube



Tube Quantity : 25

RoHS COMPLIANCE INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Both types in this series are backward compatible with Sn/Pb soldering systems.