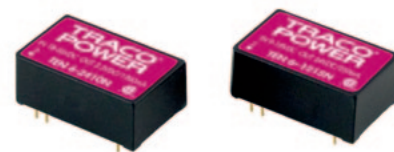


# TEN-6N Series ▶ 6 W



- ▶ Wide 2:1 input range
- ▶ Operating temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ▶ I/O isolation 1500VDC
- ▶ Input filter to meet EN 55022, class A
- ▶ Industry standard pinout



**NEW**  
Product

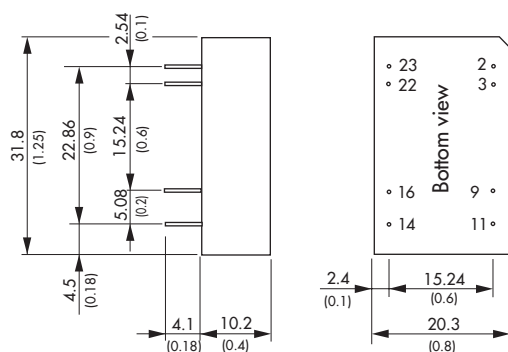
## Specifications

Line regulation	0.5 % max.
Load regulation	1.2 % typ.
Ripple & noise	<80 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	84 % typ. 3.3 VDC models 77 % typ.
Operating temperature range	$-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ 3.3 & 5.0 VDC models, above $60^{\circ}\text{C}$ derating 2.5 %/K other models, above $70^{\circ}\text{C}$ derating 3.3 %/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, (report pending)
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/ten6n.pdf">www.tracopower.com/products/ten6n.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 6-1210N		3.3 VDC	1200 mA
TEN 6-1211N		5 VDC	1200 mA
TEN 6-1212N		12 VDC	500 mA
TEN 6-1213N	9 – 18 VDC	15 VDC	400 mA
TEN 6-1215N		24 VDC	250 mA
TEN 6-1221N		$\pm 5$ VDC	$\pm 500$ mA
TEN 6-1222N		$\pm 12$ VDC	$\pm 250$ mA
TEN 6-1223N		$\pm 15$ VDC	$\pm 200$ mA
TEN 6-2410N		3.3 VDC	1200 mA
TEN 6-2411N		5 VDC	1200 mA
TEN 6-2412N		12 VDC	500 mA
TEN 6-2413N	18 – 36 VDC	15 VDC	400 mA
TEN 6-2415N		24 VDC	250 mA
TEN 6-2421N		$\pm 5$ VDC	$\pm 500$ mA
TEN 6-2422N		$\pm 12$ VDC	$\pm 250$ mA
TEN 6-2423N		$\pm 15$ VDC	$\pm 200$ mA
TEN 6-4810N		3.3 VDC	1200 mA
TEN 6-4811N		5 VDC	1200 mA
TEN 6-4812N		12 VDC	500 mA
TEN 6-4813N	36 – 75 VDC	15 VDC	400 mA
TEN 6-4815N		24 VDC	250 mA
TEN 6-4821N		$\pm 5$ VDC	$\pm 500$ mA
TEN 6-4822N		$\pm 12$ VDC	$\pm 250$ mA
TEN 6-4823N		$\pm 15$ VDC	$\pm 200$ mA

## Dimensions



() = Inches

Pin	Single output	Dual output
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No pin	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# TEN-6WIN Series ▶ 6 W



- ▶ Ultra wide 4:1 Input Range
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Models with 1'500 VDC and 3'000 VDC I/O isolation (functional insulation)
- ▶ Input filter to meet EN 55022, class A
- ▶ Industry standard pinout



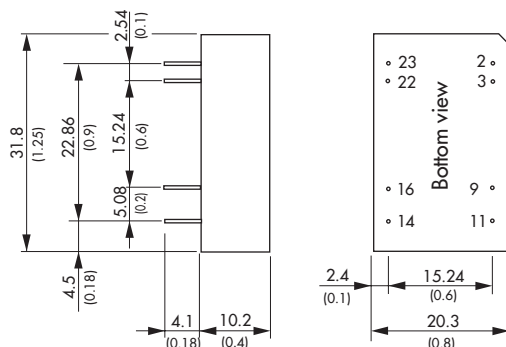
**NEW**  
Product

Specifications	
Line regulation	0.5 % max.
Load regulation	1.2% typ.
Ripple & noise	<80 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	84% typ. 3.3 VDC models 77% typ.
Operating temperature range	-40 °C to +85 °C 3.3 & 5.0 VDC models, above 60°C derating 2.5 %/K other models, above 70°C derating 3.3 %/K
I/O isolation voltage	1500 VDC, 3000 VDC with suffix -HI (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, (report pending)
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/ten6win.pdf">www.tracopower.com/products/ten6win.pdf</a>

Models			
Order code <sup>1)</sup>	Input voltage	Output voltage	Output current max.
TEN 6-2410WIN		3.3 VDC	1200 mA
TEN 6-2411WIN		5 VDC	1200 mA
TEN 6-2412WIN		12 VDC	500 mA
TEN 6-2413WIN	9 – 36 VDC	15 VDC	400 mA
TEN 6-2415WIN		24 VDC	250 mA
TEN 6-2421WIN		± 5 VDC	± 500 mA
TEN 6-2422WIN		± 12 VDC	± 250 mA
TEN 6-2423WIN		± 15 VDC	± 200 mA
TEN 6-4810WIN		3.3 VDC	1200 mA
TEN 6-4811WIN		5 VDC	1200 mA
TEN 6-4812WIN		12 VDC	500 mA
TEN 6-4813WIN	18 – 75 VDC	15 VDC	400 mA
TEN 6-4815WIN		24 VDC	250 mA
TEN 6-4821WIN		± 5 VDC	± 500 mA
TEN 6-4822WIN		± 12 VDC	± 250 mA
TEN 6-4823WIN		± 15 VDC	± 200 mA

1) Add suffix **-HI** for models with 3000 VDC I/O isolation voltage

## Dimensions



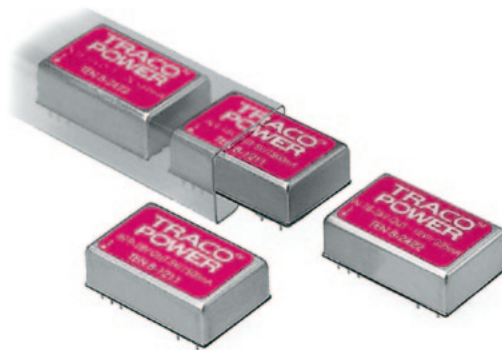
( ) = Inches

Pin	Single output	Dual output
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No pin	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# TEN-8 Series ▶ 8 W



- ▶ DIP-24 metal package
- ▶ Wide 2:1 input range
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Industry standard pinout



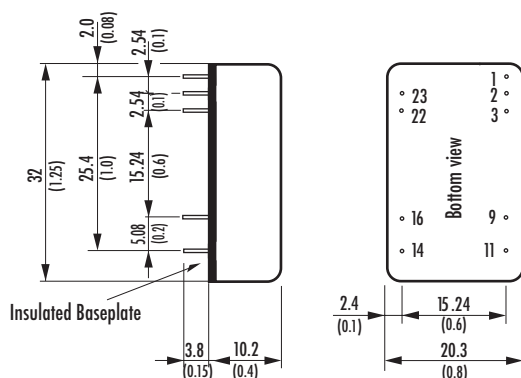
## Specifications

Line regulation	0.2% max.
Load regulation	1.0% max.
Ripple & noise	<50 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	83% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 3.3%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, 5-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten8.pdf">www.tracopower.com/products/ten8.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 8-1210		3.3 VDC	2000 mA
TEN 8-1211		5 VDC	1500 mA
TEN 8-1212		12 VDC	665 mA
TEN 8-1213	9 – 18 VDC	15 VDC	535 mA
TEN 8-1221		$\pm 5$ VDC	$\pm 800$ mA
TEN 8-1222		$\pm 12$ VDC	$\pm 335$ mA
TEN 8-1223		$\pm 15$ VDC	$\pm 265$ mA
TEN 8-2410		3.3 VDC	2000 mA
TEN 8-2411		5 VDC	1500 mA
TEN 8-2412		12 VDC	665 mA
TEN 8-2413	18 – 36 VDC	15 VDC	535 mA
TEN 8-2421		$\pm 5$ VDC	$\pm 800$ mA
TEN 8-2422		$\pm 12$ VDC	$\pm 335$ mA
TEN 8-2423		$\pm 15$ VDC	$\pm 265$ mA
TEN 8-4810		3.3 VDC	2000 mA
TEN 8-4811		5 VDC	1500 mA
TEN 8-4812		12 VDC	665 mA
TEN 8-4813	36 – 75 VDC	15 VDC	535 mA
TEN 8-4821		$\pm 5$ VDC	$\pm 800$ mA
TEN 8-4822		$\pm 12$ VDC	$\pm 335$ mA
TEN 8-4823		$\pm 15$ VDC	$\pm 265$ mA

## Dimensions



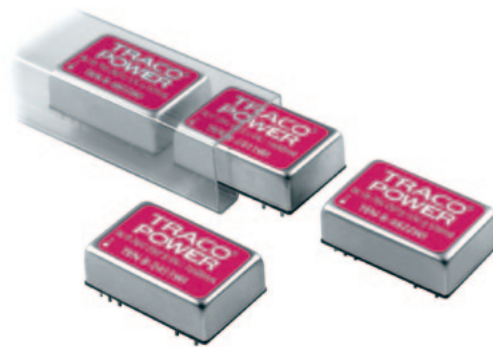
() = Inches

Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No con.	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# TEN-8WI Series ▶ 8 W



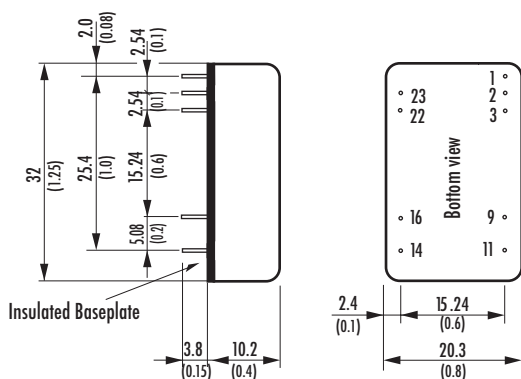
- ▶ DIP-24 metal package
- ▶ Ultra wide 4:1 input range and high input voltage up to 160VDC
- ▶ Immunity for railway applications
- ▶ High efficiency across load range
- ▶ Operating temperature range -40°C to +100°C
- ▶ Input under voltage lockout
- ▶ I/O isolation 1500VDC
- ▶ Remote On/Off
- ▶ Industry standard pinout



Specifications	
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & Noise	<50 mVpk-pk (20 MHz BW) <75 mVp-p (20 MHz BW) for 43-160 VDC input models
EMC	- Conducted noise: EN 55022, class A and FCC, level A (with external capacitor) - Immunity: EN 50155
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	-40 °C to +100 °C above 80 °C derating 4.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1, EN 50155
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, 5-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten8wi.pdf">www.tracopower.com/products/ten8wi.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
TEN 8-2410WI		3.3 VDC	2400 mA
TEN 8-2411WI		5 VDC	1600 mA
TEN 8-2412WI		12 VDC	666 mA
TEN 8-2413WI	9 – 36 VDC	15 VDC	533 mA
TEN 8-2421WI		± 5 VDC	± 800 mA
TEN 8-2422WI		± 12 VDC	± 333 mA
TEN 8-2423WI		± 15 VDC	± 267 mA
TEN 8-4810WI		3.3 VDC	2400 mA
TEN 8-4811WI		5 VDC	1600 mA
TEN 8-4812WI		12 VDC	666 mA
TEN 8-4813WI	18 – 75 VDC	15 VDC	533 mA
TEN 8-4821WI		± 5 VDC	± 800 mA
TEN 8-4822WI		± 12 VDC	± 333 mA
TEN 8-4823WI		± 15 VDC	± 267 mA
TEN 8-7210WI		3.3 VDC	2400 mA
TEN 8-7211WI		5 VDC	1600 mA
TEN 8-7212WI		12 VDC	666 mA
TEN 8-7213WI	43 – 160 VDC	15 VDC	533 mA
TEN 8-7221WI		± 5 VDC	± 800 mA
TEN 8-7222WI		± 12 VDC	± 333 mA
TEN 8-7223WI		± 15 VDC	± 267 mA

## Dimensions



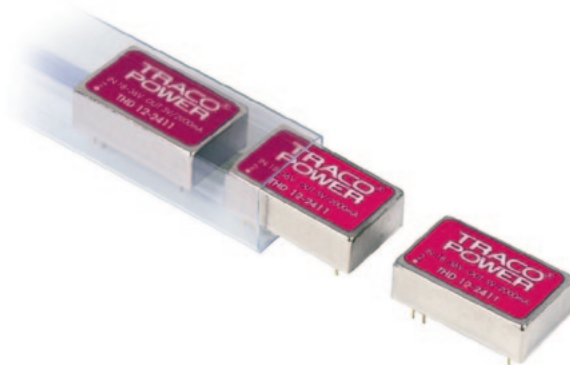
() = Inches

Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No con.	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# THD-12 Series ▶ 12 W



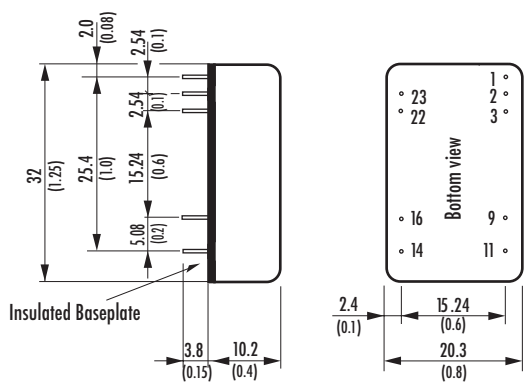
- ▶ DIP-24 metal package
- ▶ Wide 2:1 input range
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Remote On/Off
- ▶ Industry standard pinout



Specifications	
Casing	metal, 6-side shielded with insulated baseplate
Line regulation	0.5% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & noise	<85 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	-40 °C to +85°C above 65 °C derating 2.5%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 5-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thd12.pdf">www.tracopower.com/products/thd12.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
THD 12-1209		2.5 VDC	3500 mA
THD 12-1210		3.3 VDC	3500 mA
THD 12-1211	9 – 18 VDC	5.1 VDC	2400 mA
THD 12-1212		12 VDC	1000 mA
THD 12-1222		± 12 VDC	± 500 mA
THD 12-1223		± 15 VDC	± 400 mA
THD 12-2409		2.5 VDC	3500 mA
THD 12-2410		3.3 VDC	3500 mA
THD 12-2411	18 – 36 VDC	5.1 VDC	2400 mA
THD 12-2412		12 VDC	1000 mA
THD 12-2422		± 12 VDC	± 500 mA
THD 12-2423		± 15 VDC	± 400 mA
THD 12-4809		2.5 VDC	3500 mA
THD 12-4810		3.3 VDC	3500 mA
THD 12-4811	36 – 75 VDC	5.1 VDC	2400 mA
THD 12-4812		12 VDC	1000 mA
THD 12-4822		± 12 VDC	± 500 mA
THD 12-4823		± 15 VDC	± 400 mA

## Dimensions



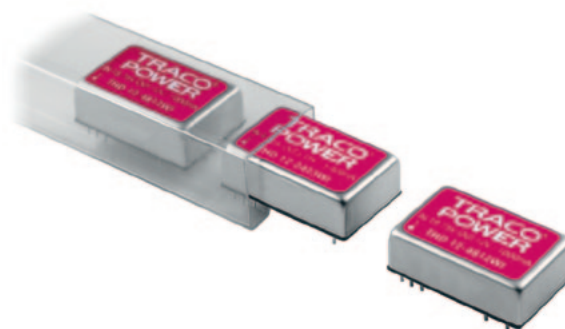
() = Inches

Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No con.	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# THD-12WI Series ▶ 12 W



- ▶ DIP-24 metal package
- ▶ Ultra wide 4:1 Input Range
- ▶ Very high efficiency up to 88 %
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Remote On/Off
- ▶ Industry standard pinout



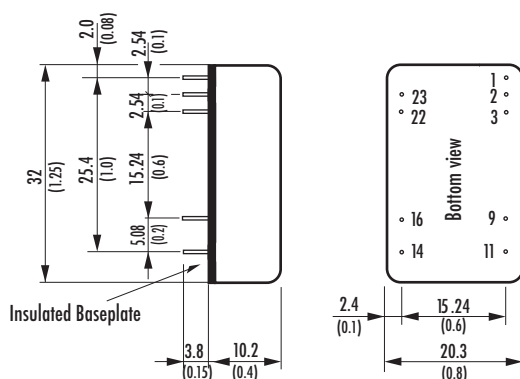
## Specifications

Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & noise	<85 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	-40 °C to +85°C above 65 °C derating 2.5 %/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 5-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thd12wi.pdf">www.tracopower.com/products/thd12wi.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THD 12-2410WI		3.3 VDC	3500 mA
THD 12-2411WI		5.1 VDC	2400 mA
THD 12-2412WI		12 VDC	1000 mA
THD 12-2413WI	9 – 36 VDC	15 VDC	800 mA
THD 12-2421WI		± 5 VDC	± 1200 mA
THD 12-2422WI		± 12 VDC	± 500 mA
THD 12-2423WI		± 15 VDC	± 400 mA
THD 12-4810WI		3.3 VDC	3500 mA
THD 12-4811WI		5.1 VDC	2400 mA
THD 12-4812WI		12 VDC	1000 mA
THD 12-4813WI	18 – 75 VDC	15 VDC	800 mA
THD 12-4821WI		± 5 VDC	± 1200 mA
THD 12-4822WI		± 12 VDC	± 500 mA
THD 12-4823WI		± 15 VDC	± 400 mA

## Dimensions



() = Inches

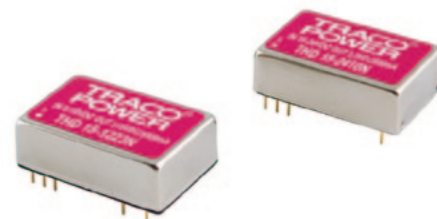
Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No con.	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)



# THD-15N Series ▶ 15 W



- ▶ Highest power density in DIP 24 metal package
- ▶ Wide 2:1 input range
- ▶ Very high efficiency up to 90%
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Industry standard pinout



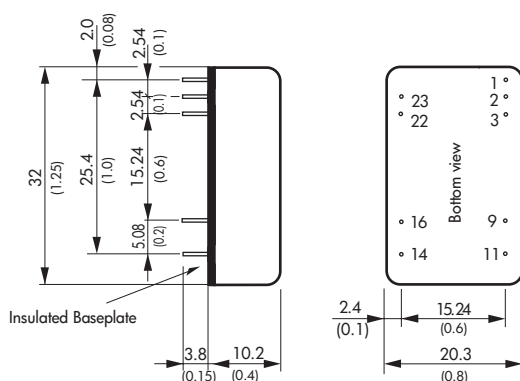
## Specifications

Line regulation	0.5% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & noise	<60 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	88% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 4.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thd15n.pdf">www.tracopower.com/products/thd15n.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THD 15-1210N		3.3 VDC	4000 mA
THD 15-1211N		5.1 VDC	3000 mA
THD 15-1212N		12 VDC	1250 mA
THD 15-1213N	9 – 18 VDC	15 VDC	1000 mA
THD 15-1221N		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THD 15-1222N		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THD 15-1223N		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$
THD 15-2410N		3.3 VDC	4000 mA
THD 15-2411N		5.1 VDC	3000 mA
THD 15-2412N		12 VDC	1250 mA
THD 15-2413N	18 – 36 VDC	15 VDC	1000 mA
THD 15-2421N		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THD 15-2422N		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THD 15-2423N		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$
THD 15-4810N		3.3 VDC	4000 mA
THD 15-4811N		5.1 VDC	3000 mA
THD 15-4812N		12 VDC	1250 mA
THD 15-4813N	36 – 75 VDC	15 VDC	1000 mA
THD 15-4821N		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THD 15-4822N		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THD 15-4823N		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$

## Dimensions



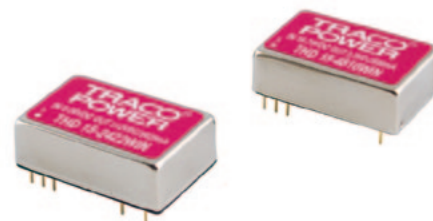
() = Inches

Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	- Vin (GND)	- Vin (GND)
3	- Vin (GND)	- Vin (GND)
9	No con.	Common
11	No con.	- Vout
14	+ Vout	+ Vout
16	- Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)

# THD-15WIN Series ▶ 15 W

CB    
Scheme UL 60950-1

- ▶ Highest power density in DIP 24 metal package
- ▶ Ultra wide 4:1 input range
- ▶ Very high efficiency up to 90%
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Industry standard pinout



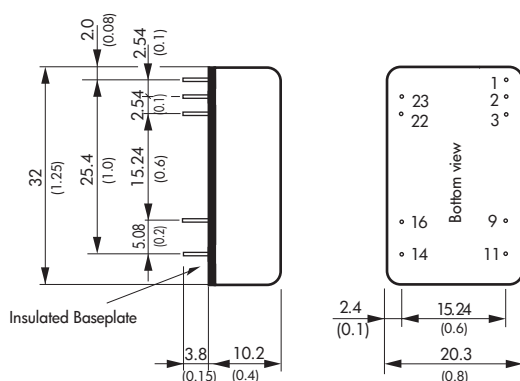
## Specifications

Line regulation	0.5% max.
Load regulation	– Single output models: 0.5% max. – Dual output models: 1.0% max.
Ripple & noise	<60 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	88% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 4.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thd15win.pdf">www.tracopower.com/products/thd15win.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THD 15-2410WIN		3.3 VDC	4000 mA
THD 15-2411WIN		5.1 VDC	3000 mA
THD 15-2412WIN		12 VDC	1250 mA
THD 15-2413WIN	9 – 36 VDC	15 VDC	1000 mA
THD 15-2421WIN		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THD 15-2422WIN		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THD 15-2423WIN		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$
THD 15-4810WIN		3.3 VDC	4000 mA
THD 15-4811WIN		5.1 VDC	3000 mA
THD 15-4812WIN		12 VDC	1250 mA
THD 15-4813WIN	18 – 75 VDC	15 VDC	1000 mA
THD 15-4821WIN		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THD 15-4822WIN		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THD 15-4823WIN		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$

## Dimensions



( ) = Inches

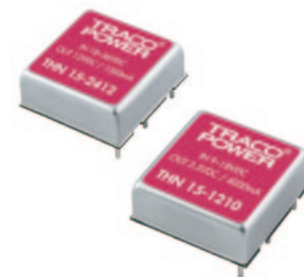
Pin	Single output	Dual output
1	Remote On/Off	Remote On/Off
2	– Vin (GND)	– Vin (GND)
3	– Vin (GND)	– Vin (GND)
9	No con.	Common
11	No con.	– Vout
14	+ Vout	+ Vout
16	– Vout	Common
22	+ Vin (Vcc)	+ Vin (Vcc)
23	+ Vin (Vcc)	+ Vin (Vcc)



# THN-15 Series ▶ 15 W



- ▶ 1" x 1" x 0.4" metal package
- ▶ Wide 2:1 input voltage range
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Remote On/Off
- ▶ Adjustable output voltage
- ▶ Industry standard pinout



## Specifications

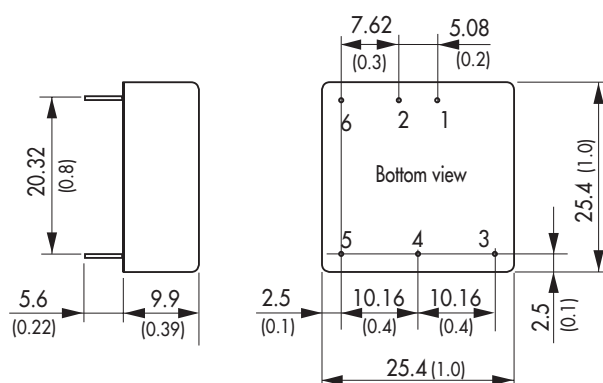
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Output voltage adjustment	$\pm 10\%$ by external resistor
Ripple & noise	$<100\text{ mVpk-pk}$ (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 2.8%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, CB-report
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thn15.pdf">www.tracopower.com/products/thn15.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THN 15-1210		3.3 VDC	4000 mA
THN 15-1211		5.0 VDC	3000 mA
THN 15-1212		12 VDC	1300 mA
THN 15-1213	9 – 18 VDC	15 VDC	1000 mA
THN 15-1221		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THN 15-1222		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THN 15-1223		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$
THN 15-2410		3.3 VDC	4000 mA
THN 15-2411		5.0 VDC	3000 mA
THN 15-2412		12 VDC	1300 mA
THN 15-2413	18 – 36 VDC	15 VDC	1000 mA
THN 15-2421		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THN 15-2422		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THN 15-2423		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$
THN 15-4810		3.3 VDC	4000 mA
THN 15-4811		5.0 VDC	3000 mA
THN 15-4812		12 VDC	1300 mA
THN 15-4813	36 – 75 VDC	15 VDC	1000 mA
THN 15-4821		$\pm 5\text{ VDC}$	$\pm 1500\text{ mA}$
THN 15-4822		$\pm 12\text{ VDC}$	$\pm 625\text{ mA}$
THN 15-4823		$\pm 15\text{ VDC}$	$\pm 500\text{ mA}$

Optional heatsink: [THN-HS1](#)

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

# THN-15WI Series ▶ 15 W

CB  US  
Scheme UL 60950-1

- ▶ 1" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input voltage range
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Remote On/Off
- ▶ Adjustable output voltage
- ▶ Industry standard pinout



## Specifications

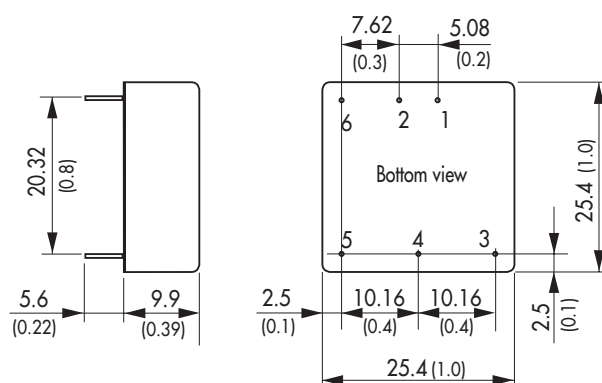
Line regulation	0.5% max.
Load regulation	- Single output models: 0.2% max. - Dual output models: 1.0% max.
Output voltage adjustment	±10% by external resistor (single output models only)
Ripple & noise	<100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	-40 °C to +85 °C above 65 °C derating 2.5 %/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, CB-report
Remote On/Off	shutdown input for low current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thn15wi.pdf">www.tracopower.com/products/thn15wi.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THN 15-2410WI		3.3 VDC	4000 mA
THN 15-2411WI		5.0 VDC	3000 mA
THN 15-2412WI		12 VDC	1300 mA
THN 15-2413WI	9 – 36 VDC	15 VDC	1000 mA
THN 15-2421WI		± 5 VDC	± 1500 mA
THN 15-2422WI		± 12 VDC	± 625 mA
THN 15-2423WI		± 15 VDC	± 500 mA
THN 15-4810WI		3.3 VDC	4000 mA
THN 15-4811WI		5.0 VDC	3000 mA
THN 15-4812WI		12 VDC	1300 mA
THN 15-4813WI	18 – 75 VDC	15 VDC	1000 mA
THN 15-4821WI		± 5 VDC	± 1500 mA
THN 15-4822WI		± 12 VDC	± 625 mA
THN 15-4823WI		± 15 VDC	± 500 mA

Optional heatsink: **THN-HS1**

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

# THN-20 Series ▶ 20 W



- ▶ High power density 20W converter
- ▶ 1" x 1" x 0.4" metal package
- ▶ Wide 2:1 input voltage range
- ▶ Very high efficiency up to 91 %
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

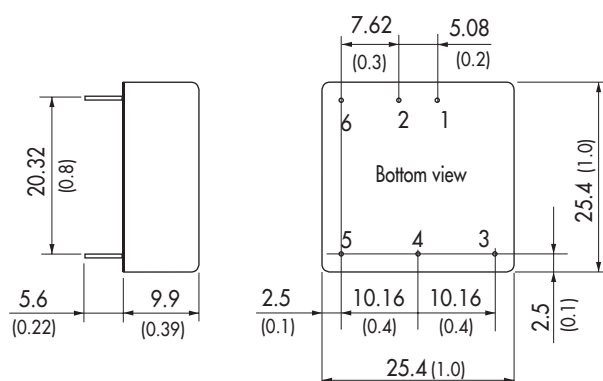
Line regulation	0.5% max.
Load regulation	- Single output models: 0.2% max. - Dual output models: 1.0% max.
Output voltage adjustment	±10% by external resistor
Ripple & noise	<100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	89% typ.
Operating temperature range	-40 °C to +75 °C above 60°C derating 3.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low current (1.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thn20.pdf">www.tracopower.com/products/thn20.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THN 20-1210		3.3 VDC	4500 mA
THN 20-1211		5.0 VDC	4000 mA
THN 20-1212	9 – 18 VDC	12 VDC	1670 mA
THN 20-1213		15 VDC	1330 mA
THN 20-1222		± 12 VDC	± 833 mA
THN 20-1223		± 15 VDC	± 667 mA
THN 20-2410		3.3 VDC	4500 mA
THN 20-2411		5.0 VDC	4000 mA
THN 20-2412	18 – 36 VDC	12 VDC	1670 mA
THN 20-2413		15 VDC	1330 mA
THN 20-2422		± 12 VDC	± 833 mA
THN 20-2423		± 15 VDC	± 667 mA
THN 20-4810		3.3 VDC	4500 mA
THN 20-4811		5.0 VDC	4000 mA
THN 20-4812	36 – 75 VDC	12 VDC	1670 mA
THN 20-4813		15 VDC	1330 mA
THN 20-4822		± 12 VDC	± 833 mA
THN 20-4823		± 15 VDC	± 667 mA

Optional heatsink: **THN-HS1**

## Dimensions

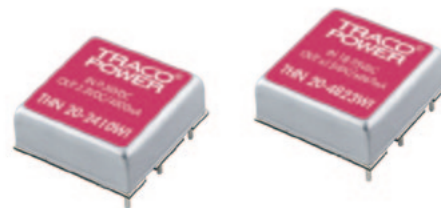


Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

# THN-20WI Series ▶ 20 W

CB   
Scheme UL 60950-1

- ▶ High power density 20W converter
- ▶ 1" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input voltage range
- ▶ Very high efficiency up to 91%
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input under voltage lockout
- ▶ Low input current at no load
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

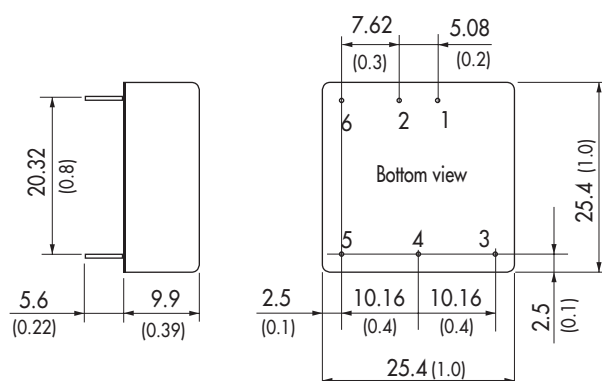
Line regulation	0.5% max.
Load regulation	- Single output models: 0.2% max. - Dual output models: 1.0% max.
Output voltage adjustment	±10% by external resistor
Ripple & noise	<100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	89% typ.
Operating temperature range	-40 °C to +75 °C above 60 °C derating 3.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low current (1.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thn20wi.pdf">www.tracopower.com/products/thn20wi.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THN 20-2410WI		3.3 VDC	4500 mA
THN 20-2411WI		5.0 VDC	4000 mA
THN 20-2412WI	9 – 36 VDC	12 VDC	1670 mA
THN 20-2413WI		15 VDC	1330 mA
THN 20-2422WI		± 12 VDC	± 833 mA
THN 20-2423WI		± 15 VDC	± 667 mA
THN 20-4810WI		3.3 VDC	4500 mA
THN 20-4811WI		5.0 VDC	4000 mA
THN 20-4812WI	18 – 75 VDC	12 VDC	1670 mA
THN 20-4813WI		15 VDC	1330 mA
THN 20-4822WI		± 12 VDC	± 833 mA
THN 20-4823WI		± 15 VDC	± 667 mA

Optional heatsink: [THN-HS1](#)

## Dimensions



Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

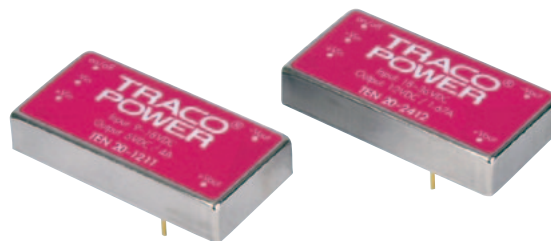
www.tracopower.com

High Performance DC/DC Converters

# TEN-20 Series ▶ 20 W

 CB   
 Scheme UL 60950-1

- ▶ 2" x 1" x 0.4" metal package
- ▶ Wide 2:1 input range
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input filter to meet EN 55022 class A
- ▶ Remote On/Off
- ▶ Industry standard pinout



## Specifications

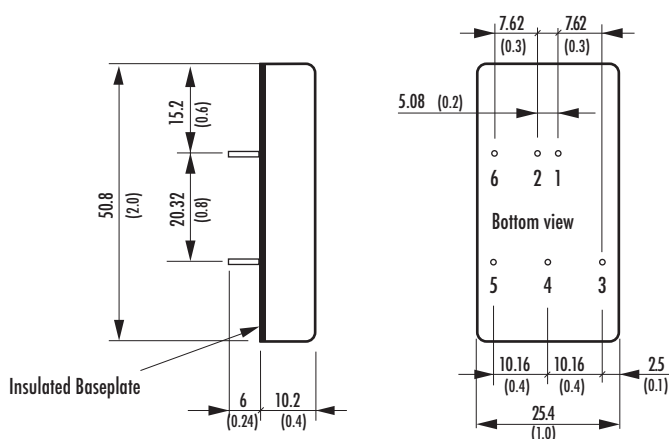
Line regulation	0.3% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & noise	<80 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	85% typ.
Operating temperature range	-40 °C to +85 °C above 70 °C derating 3.5%/K 5V models above 60 °C derating 4%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten20.pdf">www.tracopower.com/products/ten20.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 20-1210		3.3 VDC	4000 mA
TEN 20-1211		5 VDC	4000 mA
TEN 20-1212	9 – 18 VDC	12 VDC	1670 mA
TEN 20-1213		15 VDC	1340 mA
TEN 20-1222		± 12 VDC	± 835 mA
TEN 20-1223		± 15 VDC	± 670 mA
TEN 20-2410		3.3 VDC	4000 mA
TEN 20-2411		5 VDC	4000 mA
TEN 20-2412	18 – 36 VDC	12 VDC	1670 mA
TEN 20-2413		15 VDC	1340 mA
TEN 20-2422		± 12 VDC	± 835 mA
TEN 20-2423		± 15 VDC	± 670 mA
TEN 20-4810		3.3 VDC	4000 mA
TEN 20-4811		5 VDC	4000 mA
TEN 20-4812	36 – 75 VDC	12 VDC	1670 mA
TEN 20-4813		15 VDC	1340 mA
TEN 20-4822		± 12 VDC	± 835 mA
TEN 20-4823		± 15 VDC	± 670 mA

Optional heatsink: [TEN-HS4](#)

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	No pin	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

# TEN-20WIN Series ▶ 20 W



- ▶ 2" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input voltage range
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage
- ▶ Industry standard pinout



## Specifications

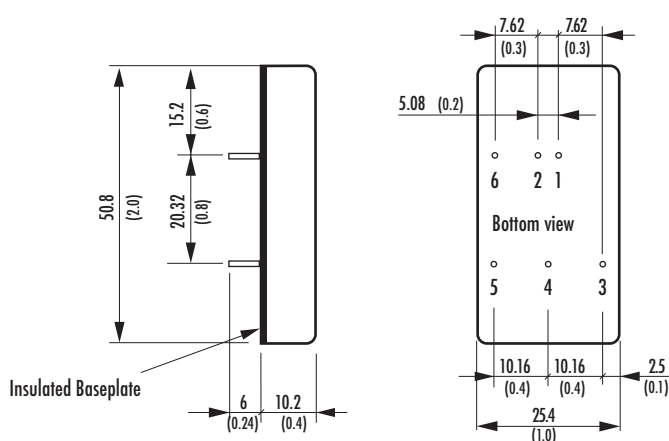
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Output voltage adjustment	Single output models only: ±10% (by external resistor)
Ripple & noise	- Single output models: <75 mVpk-pk (20 MHz BW) - Dual output models: <100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	85% typ.
Operating temperature range	-40 °C to +85 °C above 70 °C derating 2.8%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten20win.pdf">www.tracopower.com/products/ten20win.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
<a href="#">TEN 20-2410WIN</a>		3.3 VDC	5500 mA
<a href="#">TEN 20-2411WIN</a>		5 VDC	4000 mA
<a href="#">TEN 20-2412WIN</a>		12 VDC	1670 mA
<a href="#">TEN 20-2413WIN</a>	9 – 36 VDC	15 VDC	1330 mA
<a href="#">TEN 20-2421WIN</a>		± 5 VDC	± 2000 mA
<a href="#">TEN 20-2422WIN</a>		± 12 VDC	± 835 mA
<a href="#">TEN 20-2423WIN</a>		± 15 VDC	± 665 mA
<a href="#">TEN 20-4810WIN</a>		3.3 VDC	5500 mA
<a href="#">TEN 20-4811WIN</a>		5 VDC	4000 mA
<a href="#">TEN 20-4812WIN</a>		12 VDC	1670 mA
<a href="#">TEN 20-4813WIN</a>	18 – 75 VDC	15 VDC	1330 mA
<a href="#">TEN 20-4821WIN</a>		± 5 VDC	± 2000 mA
<a href="#">TEN 20-4822WIN</a>		± 12 VDC	± 835 mA
<a href="#">TEN 20-4823WIN</a>		± 15 VDC	± 665 mA

Optional heatsink: [TEN-HS1](#)

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off

# TEN-20WIR Series ▶ 20 W



- ▶ 2" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input range up to 160 VDC
- ▶ Immunity for railway applications
- ▶ High efficiency across load range
- ▶ Low input current at no load
- ▶ Input under voltage lockout
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ I/O isolation 1500 VDC
- ▶ Input filter to meet EN 55022 class A
- ▶ Remote On/Off
- ▶ Industry standard pinout



**NEW**  
Product

## Specifications

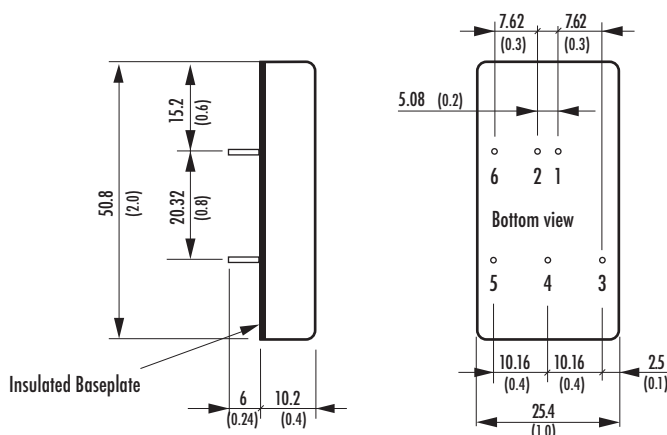
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Ripple & Noise	<75 mVpk-pk (20 MHz BW)
Conducted EMI	- Conducted noise: EN 55022, class A and FCC, level A EN 55022, class B for 18-75VDC and 43-160VDC models (with external capacitor) - Immunity: EN 50155
Short circuit protection	continuous, automatic recovery
Efficiency	88% typ.
Operating temperature range	-40 °C to +85 °C above 70 °C derating 4.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1, EN 50155
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten20wir.pdf">www.tracopower.com/products/ten20wir.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 20-2410WIR		3.3 VDC	4500 mA
TEN 20-2411WIR		5 VDC	4000 mA
TEN 20-2412WIR		12 VDC	1670 mA
TEN 20-2413WIR	9 – 36 VDC	15 VDC	1330 mA
TEN 20-2422WIR		± 12 VDC	± 833 mA
TEN 20-2423WIR		± 15 VDC	± 667 mA
TEN 20-4810WIR		3.3 VDC	4500 mA
TEN 20-4811WIR		5 VDC	4000 mA
TEN 20-4812WIR		12 VDC	1670 mA
TEN 20-4813WIR	18 – 75 VDC	15 VDC	1330 mA
TEN 20-4822WIR		± 12 VDC	± 833 mA
TEN 20-4823WIR		± 15 VDC	± 667 mA
TEN 20-7210WIR		3.3 VDC	4500 mA
TEN 20-7211WIR		5 VDC	4000 mA
TEN 20-7212WIR		12 VDC	1670 mA
TEN 20-7213WIR	43 – 160 VDC	15 VDC	1330 mA
TEN 20-7222WIR		± 12 VDC	± 833 mA
TEN 20-7223WIR		± 15 VDC	± 667 mA

Optional heatsink: **TEN-HS1**

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	+ Vout	+ Vout
4	No pin	Common
5	- Vout	- Vout
6	Remote On/Off	Remote On/Off



# TEN-25WI Series ▶ 25 to 30 W



- ▶ Ultra wide 4:1 input range
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Input filter to meet EN 55022, class A
- ▶ Remote On/Off
- ▶ Adjustable output voltage
- ▶ Industry standard pinout



## Specifications

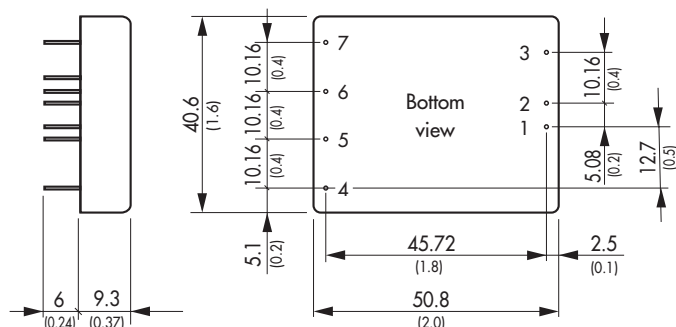
Line regulation	0.5% max.
Load regulation	– Single output models: 1.0% max. – Dual output models: 2.0% max.
Output voltage adjustment	$\pm 10\%$ (by external resistor)
Ripple & noise	$< 80\text{ mVpk-pk}$ (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	88% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $55\text{ }^{\circ}\text{C}$ derating 2.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten25wi.pdf">www.tracopower.com/products/ten25wi.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 25-2410WI		3.3 VDC	5500 mA
TEN 25-2411WI		5 VDC	5000 mA
TEN 25-2412WI	10 – 40 VDC	12 VDC	2500 mA
TEN 25-2413WI		15 VDC	2000 mA
TEN 25-2422WI		$\pm 12\text{ VDC}$	$\pm 1250\text{ mA}$
TEN 25-2423WI		$\pm 15\text{ VDC}$	$\pm 1000\text{ mA}$
TEN 25-4810WI		3.3 VDC	5500 mA
TEN 25-4811WI		5 VDC	5000 mA
TEN 25-4812WI	18 – 75 VDC	12 VDC	2500 mA
TEN 25-4813WI		15 VDC	2000 mA
TEN 25-4822WI		$\pm 12\text{ VDC}$	$\pm 1250\text{ mA}$
TEN 25-4823WI		$\pm 15\text{ VDC}$	$\pm 1000\text{ mA}$

Optional heatsink: [TEN-HS5](#)

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	– Vin (GND)	– Vin (GND)
3	Remote On/Off	Remote On/Off
4	No pin	+ Vout
5	+ Vout	Common
6	– Vout	– Vout
7	Trim	Trim

# THN-30 Series ▶ 30 W



- ▶ Highest power density 30 W converter
- ▶ 1" x 1" x 0.4" shielded metal package
- ▶ Wide 2:1 input voltage range
- ▶ Very high efficiency up to 91 %
- ▶ Low input current at no load
- ▶ High efficiency accross load range
- ▶ Operating temperature range -40 °C to +80 °C
- ▶ Over-temperature protection
- ▶ I/O-isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



**NEW**  
Product

## Specifications

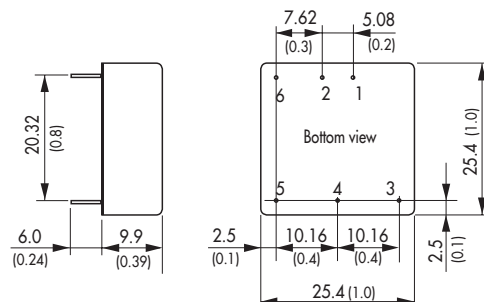
Line regulation	- Single output models: 0.2% max. - Dual output models: 0.5% max.
Load regulation	- Single output models: 0.2% max. - Dual output models: 1.0% max.
Output voltage adjustment	12 & 15 VDC models: +20 / -10% other single output models: ±10% by external resistor
Ripple & noise	<100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor and inductor)
Short circuit protection	continuous, automatic recovery
Efficiency	90% typ.
Operating temperature range	-40 °C to +80 °C above 55 °C derating 2.2%/K
Thermal protection	shutdown at 115 °C
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 (reports pending)
Remote On/Off	shutdown input for low input current (2 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/thn30.pdf">www.tracopower.com/products/thn30.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THN 30-1210		3.3 VDC	7000 mA
THN 30-1211		5.0 VDC	6000 mA
THN 30-1212		12 VDC	2500 mA
THN 30-1213	9 – 18 VDC	15 VDC	2000 mA
THN 30-1215		24 VDC	1250 mA
THN 30-1222		±12 VDC	±1250 mA
THN 30-1223		±15 VDC	±1000 mA
THN 30-2410		3.3 VDC	7000 mA
THN 30-2411		5.0 VDC	6000 mA
THN 30-2412		12 VDC	2500 mA
THN 30-2413	18 – 36 VDC	15 VDC	2000 mA
THN 30-2415		24 VDC	1250 mA
THN 30-2422		±12 VDC	±1250 mA
THN 30-2423		±15 VDC	±1000 mA
THN 30-4810		3.3 VDC	7000 mA
THN 30-4811		5.0 VDC	6000 mA
THN 30-4812		12 VDC	2500 mA
THN 30-4813	36 – 75 VDC	15 VDC	2000 mA
THN 30-4815		24 VDC	1250 mA
THN 30-4822		±12 VDC	±1250 mA
THN 30-4823		±15 VDC	±1000 mA

Optional heatsink: THN-HS1

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout

# THN-30WI Series ▶ 30 W

CB   
Scheme UL 60950-1

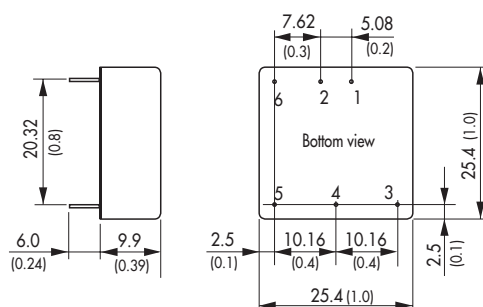
- ▶ Highest power density 30 W converter
- ▶ 1" x 1" x 0.4" shielded metal package
- ▶ Ultra wide 4:1 input voltage range
- ▶ Very high efficiency up to 91 %
- ▶ Low input current at no load
- ▶ High efficiency accross load range
- ▶ Operating temperature range -40 °C to +80 °C
- ▶ Over-temperature protection
- ▶ I/O-isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



**NEW**  
Product

Specifications		Models			
Line regulation	- Single output models: 0.2 % max. - Dual output models: 0.5 % max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	- Single output models: 0.2 % max. - Dual output models: 1.0 % max.	THN 30-2410WI		3.3 VDC	7000 mA
Output voltage adjustment	12 & 15 VDC models: +20 / -10% other single output models: ±10% by external resistor	THN 30-2411WI		5.0 VDC	6000 mA
Ripple & noise	<100 mVpk-pk (20 MHz BW)	THN 30-2412WI		12 VDC	2500 mA
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor and inductor)	THN 30-2413WI	9 – 36 VDC	15 VDC	2000 mA
Short circuit protection	continuous, automatic recovery	THN 30-2415WI		24 VDC	1250 mA
Efficiency	90 % typ.	THN 30-2422WI		±12 VDC	±1250 mA
Operating temperature range	-40 °C to +80 °C above 55 °C derating 2.4 %/K	THN 30-2423WI		±15 VDC	±1000 mA
Thermal protection	shutdown at 115 °C	THN 30-4810WI		3.3 VDC	7000 mA
I/O isolation voltage	1500 VDC (60 sec.)	THN 30-4811WI		5.0 VDC	6000 mA
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 (reports pending)	THN 30-4812WI		12 VDC	2500 mA
Remote On/Off	shutdown input for low input current (2 mA) in standby operation	THN 30-4813WI	18 – 75 VDC	15 VDC	2000 mA
Casing	6-side shielded metal, with insulated baseplate	THN 30-4815WI		24 VDC	1250 mA
Full datasheet	<a href="http://www.tracopower.com/products/thn30wi.pdf">www.tracopower.com/products/thn30wi.pdf</a>	THN 30-4822WI		±12 VDC	±1250 mA
		THN 30-4823WI		±15 VDC	±1000 mA
		Optional heatsink: <b>THN-HS1</b>			

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout

# TEN-30 Series ▶ 30 W



- ▶ 2" x 1" x 0.4" shielded metal package
- ▶ Wide 2:1 input voltage range
- ▶ Very high efficiency up to 91 %
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Over-temperature protection
- ▶ I/O-isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

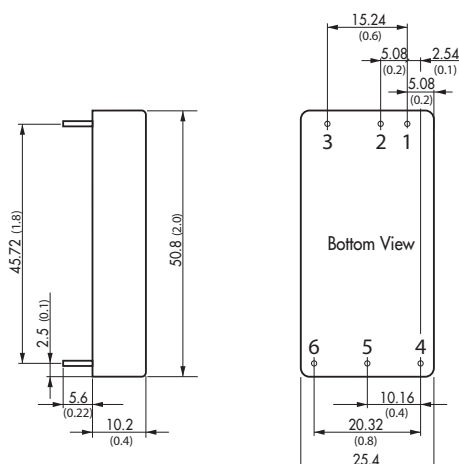
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Output voltage adjustment	±10% by external resistor (single output models only)
Ripple & noise	- Single output models: <100 mVpk-pk (20 MHz BW) - Dual output models: <150 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	89% typ.
Operating temperature range	-40 °C to +85 °C above 65 °C derating 2.6%/K
Thermal protection	shutdown at 115 °C
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten30.pdf">www.tracopower.com/products/ten30.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 30-1207		1.5 VDC	8500 mA
TEN 30-1209		2.5 VDC	8000 mA
TEN 30-1210		3.3 VDC	8000 mA
TEN 30-1211		5.1 VDC	6000 mA
TEN 30-1212	9 – 18 VDC	12 VDC	2500 mA
TEN 30-1213		15 VDC	2000 mA
TEN 30-1221		±5 VDC	±3000 mA
TEN 30-1222		±12 VDC	±1250 mA
TEN 30-1223		±15 VDC	±1000 mA
TEN 30-2407		1.5 VDC	8500 mA
TEN 30-2409		2.5 VDC	8000 mA
TEN 30-2410		3.3 VDC	8000 mA
TEN 30-2411		5.1 VDC	6000 mA
TEN 30-2412	18 – 36 VDC	12 VDC	2500 mA
TEN 30-2413		15 VDC	2000 mA
TEN 30-2421		±5 VDC	±3000 mA
TEN 30-2422		±12 VDC	±1250 mA
TEN 30-2423		±15 VDC	±1000 mA
TEN 30-4807		1.5 VDC	8500 mA
TEN 30-4809		2.5 VDC	8000 mA
TEN 30-4810		3.3 VDC	8000 mA
TEN 30-4811		5.1 VDC	6000 mA
TEN 30-4812	36 – 75 VDC	12 VDC	2500 mA
TEN 30-4813		15 VDC	2000 mA
TEN 30-4821		±5 VDC	±3000 mA
TEN 30-4822		±12 VDC	±1250 mA
TEN 30-4823		±15 VDC	±1000 mA

Optional heatsink: [TEN-HS1](#)

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout

# TEN-30WIN Series ▶ 30 W



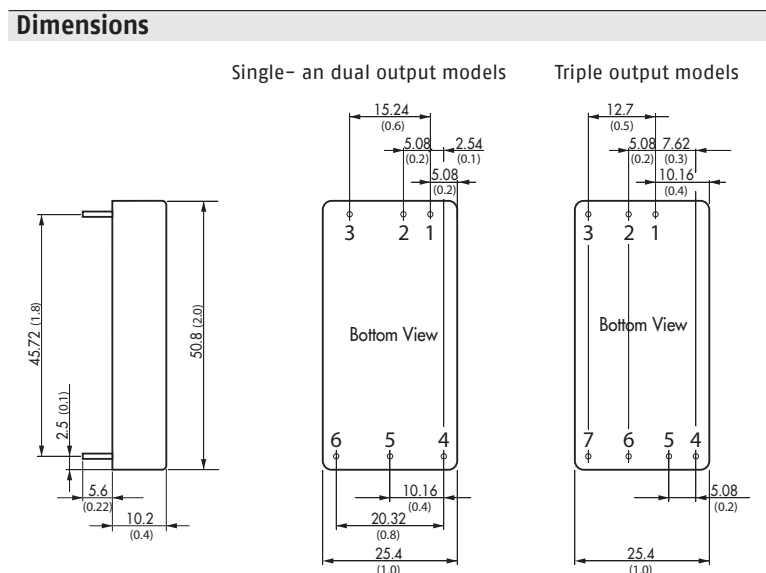
- ▶ 2" x 1" x 0.4" shielded metal package
- ▶ Ultra wide 4:1 input voltage range
- ▶ Single- dual- and triple output models
- ▶ Very high efficiency up to 91%
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Over temperature protection
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



Specifications	
Line regulation	- Single and dual output models: 0.2% max. - Triple output models: 1.0% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max. - Triple output models: Vout 1: 1% max, Vout 2: 5.0% max.
Output voltage adjustment	±10% by external resistor (single output models only)
Ripple & noise	- Single output models: <100 mVpk-pk (20 MHz BW) - Dual output models: <150 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	87% typ.
Operating temperature range	-40 °C to +85 °C above 60 °C derating 2.4%/K
Thermal protection	shutdown at 115 °C
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten30win.pdf">www.tracopower.com/products/ten30win.pdf</a>

Models			
Order code	Input voltage	Output 1 Vout / Iout max.	Output 2 Vout / Iout max.
TEN 30-2407WIN		1.5 VDC / 8.5 A	
TEN 30-2409WIN		2.5 VDC / 8.0 A	
TEN 30-2410WIN		3.3 VDC / 7.5 A	
TEN 30-2411WIN		5.1 VDC / 6.0 A	
TEN 30-2412WIN		12 VDC / 2.5 A	
TEN 30-2413WIN		15 VDC / 2.0 A	
TEN 30-2421WIN	9 - 36 VDC	+5 VDC / 3.0 A	-5 VDC / 3.0 A
TEN 30-2422WIN		+12 VDC / 1.25 A	-12 VDC / 1.25 A
TEN 30-2423WIN		+15 VDC / 1.0 A	-15 VDC / 1.0 A
TEN 30-2433WIN		3.3 VDC / 5.0 A	±12 VDC / ±0.42 A
TEN 30-2434WIN		3.3 VDC / 5.0 A	±15 VDC / ±0.33 A
TEN 30-2431WIN		5 VDC / 4.0 A	±12 VDC / ±0.42 A
TEN 30-2432WIN		5 VDC / 4.0 A	±15 VDC / ±0.33 A
TEN 30-4807WIN		1.5 VDC / 8.5 A	
TEN 30-4809WIN		2.5 VDC / 8.0 A	
TEN 30-4810WIN		3.3 VDC / 7.5 A	
TEN 30-4811WIN		5.1 VDC / 6.0 A	
TEN 30-4812WIN		12 VDC / 2.5 A	
TEN 30-4813WIN		15 VDC / 2.0 A	
TEN 30-4821WIN	18 - 75 VDC	+5 VDC / 3.0 A	-5 VDC / 3.0 A
TEN 30-4822WIN		+12 VDC / 1.25 A	-12 VDC / 1.25 A
TEN 30-4823WIN		+15 VDC / 1.0 A	-15 VDC / 1.0 A
TEN 30-4833WIN		3.3 VDC / 5.0 A	±12 VDC / ±0.42 A
TEN 30-4834WIN		3.3 VDC / 5.0 A	±15 VDC / ±0.33 A
TEN 30-4831WIN		5 VDC / 4.0 A	±12 VDC / ±0.42 A
TEN 30-4832WIN		5 VDC / 4.0 A	±15 VDC / ±0.33 A

Optional heatsink: TEN-HS1



Pin	Single output	Dual output	Triple output
1	+ Vin (Vcc)	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off	Remote On/Off
4	Vout 1	Vout 1	+ Vout 2
5	Common	Common	- Vout 2
6	Trim	Vout 2	Common
7	No pin	No pin	Vout 1

# TEN-40N Series ▶ 40 W



- ▶ High power density 40 W converter
- ▶ 2" x 1" x 0.4" metal package
- ▶ Wide 2:1 input range
- ▶ Excellent efficiency up to 92 %
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

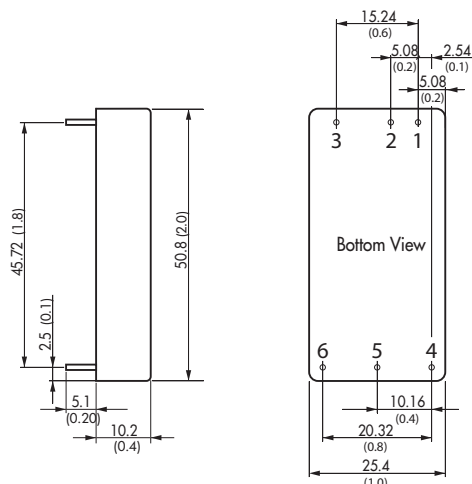
Line regulation	0.5% max.
Load regulation	- Single output models: 1.0% max. - Dual output models: 2.0% max.
Output voltage adjustment	±10% by external resistor (single output models)
Ripple & noise	100 mVpk-pk typ. (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	90% typ.
Operating temperature range	-40 °C to +75 °C above 45 °C derating 1.6%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten40n.pdf">www.tracopower.com/products/ten40n.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 40-1210N		3.3 VDC	8000 mA
TEN 40-1211N		5.0 VDC	8000 mA
TEN 40-1212N	9 – 18 VDC	12 VDC	3333 mA
TEN 40-1213N		15 VDC	2666 mA
TEN 40-1222N		±12 VDC	±1666 mA
TEN 40-1223N		±15 VDC	±1333 mA
TEN 40-2410N		3.3 VDC	8000 mA
TEN 40-2411N		5.0 VDC	8000 mA
TEN 40-2412N	18 – 36 VDC	12 VDC	3333 mA
TEN 40-2413N		15 VDC	2666 mA
TEN 40-2422N		±12 VDC	±1666 mA
TEN 40-2423N		±15 VDC	±1333 mA
TEN 40-4810N		3.3 VDC	8000 mA
TEN 40-4811N		5.0 VDC	8000 mA
TEN 40-4812N	36 – 75 VDC	12 VDC	3333 mA
TEN 40-4813N		15 VDC	2666 mA
TEN 40-4822N		±12 VDC	±1666 mA
TEN 40-4823N		±15 VDC	±1333 mA

Optional heatsink: [TEN-HS4](#)

## Dimensions



Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout



# TEN-40WIN Series ▶ 40 W



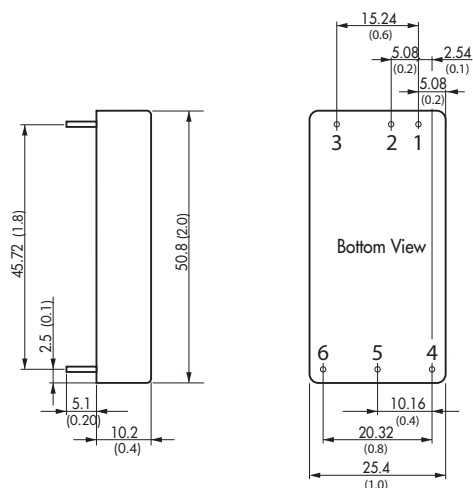
- ▶ High power density 40 W converter
- ▶ 2" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input range
- ▶ Excellent efficiency up to 90%
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



**NEW**  
Product

Specifications		Models			
Line regulation	0.5% max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	- Single output models: 0.5% max. - Dual/Triple output models: 1.0% max.	TEN 40-2410WIN		3.3 VDC	8000 mA
Output voltage adjustment	±10% by external resistor	TEN 40-2411WIN		5.0 VDC	8000 mA
Ripple & noise (20 MHz BW)	- 3.3 / 5 VDC output models: <100 mVpk-pk - other output models: <150 mVpk-pk	TEN 40-2412WIN	9 – 36 VDC	12 VDC	3333 mA
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)	TEN 40-2413WIN		15 VDC	2666 mA
Short circuit protection	continuous, automatic recovery	TEN 40-2422WIN		±12 VDC	±1666 mA
Efficiency	89% typ.	TEN 40-2423WIN		±15 VDC	±1333 mA
Operating temperature range	-40 °C to +75 °C above 45 °C derating 1.6%/K	TEN 40-4810WIN		3.3 VDC	8000 mA
I/O isolation voltage	1500 VDC (60 sec.)	TEN 40-4811WIN		5.0 VDC	8000 mA
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1 (report pending)	TEN 40-4812WIN	18 – 75 VDC	12 VDC	3333 mA
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation	TEN 40-4813WIN		15 VDC	2666 mA
Casing	metal, shielded with insulated baseplate	TEN 40-4822WIN		±12 VDC	±1666 mA
Full datasheet	<a href="http://www.tracopower.com/products/ten40win.pdf">www.tracopower.com/products/ten40win.pdf</a>	TEN 40-4823WIN		±15 VDC	±1333 mA
		Optional heatsink: TEN-HS4			

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout



# TEN-40WIR Series ▶ 40 W



- ▶ High power density 40 W converter
- ▶ 2" x 1" x 0.4" metal package
- ▶ Ultra wide 4:1 input range up to 160 VDC
- ▶ Immunity for railway applications
- ▶ High efficiency across load range
- ▶ Low input current at no load
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Over temperature protection
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



**NEW Product**

## Specifications

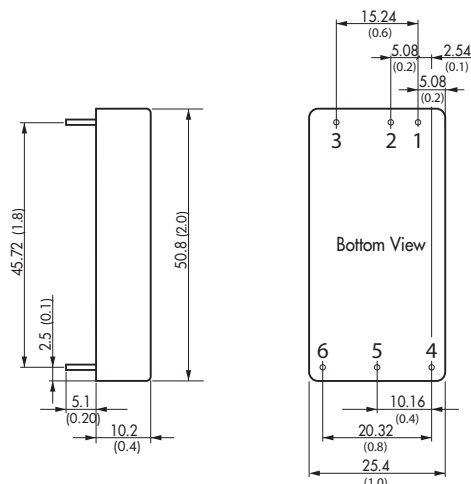
Line regulation	0.5% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max.
Output voltage adjustment	±10% by external resistor (single output models)
Ripple & noise	100 mVpk-pk typ. (20 MHz BW)
EMC	- Conducted noise: EN 55022, class A and FCC, level A (with external capacitor) - Immunity: EN 50155
Short circuit protection	continuous, automatic recovery
Efficiency	90% typ.
Operating temperature range	-40 °C to +85 °C above 60 °C derating 2.6%/K
Thermal protection	shutdown at 115 °C
I/O isolation voltage	1500 VDC (60 sec.)
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, EN 50155, reports pending
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten40wir.pdf">www.tracopower.com/products/ten40wir.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 40-2410WIR		3.3 VDC	10'000 mA
TEN 40-2411WIR		5 VDC	8000 mA
TEN 40-2412WIR		12 VDC	3333 mA
TEN 40-2413WIR	9 – 36 VDC	15 VDC	2666 mA
TEN 40-2415WIR		24 VDC	1666 mA
TEN 40-2422WIR		± 12 VDC	± 1666 mA
TEN 40-2423WIR		± 15 VDC	± 1333 mA
TEN 40-4810WIR		3.3 VDC	10'000 mA
TEN 40-4811WIR		5 VDC	8000 mA
TEN 40-4812WIR		12 VDC	3333 mA
TEN 40-4813WIR	18 – 75 VDC	15 VDC	2666 mA
TEN 40-4815WIR		24 VDC	1666 mA
TEN 40-4822WIR		± 12 VDC	± 1666 mA
TEN 40-4823WIR		± 15 VDC	± 1333 mA
TEN 40-7210WIR		3.3 VDC	10'000 mA
TEN 40-7211WIR		5 VDC	8000 mA
TEN 40-7212WIR		12 VDC	3333 mA
TEN 40-7213WIR	43 – 160 VDC	15 VDC	2666 mA
TEN 40-7215WIR		24 VDC	1666 mA
TEN 40-7222WIR		± 12 VDC	± 1666 mA
TEN 40-7223WIR		± 15 VDC	± 1333 mA

Optional heatsink: **TEN-HS1**

## Dimensions



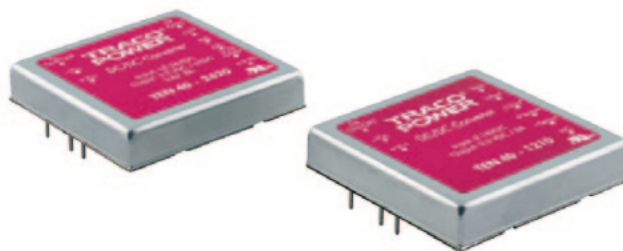
( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	+ Vout	+ Vout
5	- Vout	Common
6	Trim	- Vout

## TEN-40 Series ▶ 40 W




- ▶ Models with 2 isolated outputs (3.3 V / 5 V)
- ▶ Triple output models
- ▶ Wide 2:1 input range
- ▶ Very high efficiency up to 90 %
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+75\text{ }^{\circ}\text{C}$
- ▶ I/O isolation 1500 VDC
- ▶ Short circuit protection
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

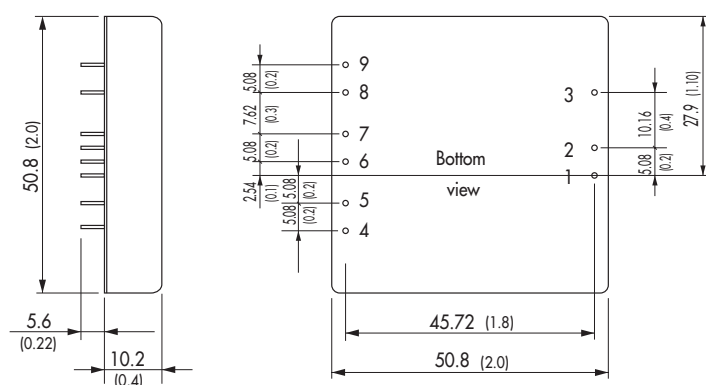
Line regulation	1.0% max.
Load regulation	- Single output models: 0.5% max. - Dual output models: 1.0% max. - Triple output models: Vout 1: 1% max, Vout 2: 5.0% max.
Output voltage adjustment	$\pm 10\%$ by external resistor (only for single and symmetric dual output models)
Ripple & noise (20 MHz BW)	- 3.3 / 5 VDC output models: $<50\text{ mVpk-pk}$ - Symmetric dual output models: $<150\text{ mVpk-pk}$ - Asymmetric dual output models: $<100\text{ mVpk-pk}$ - all other output models $<75\text{ mVpk-pk}$
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$ for derating see datasheet
Thermal protection	shutdown at $115\text{ }^{\circ}\text{C}$
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten40.pdf">www.tracopower.com/products/ten40.pdf</a>

## Models

Order code	Input voltage	Output 1 Vout / Imax.	Output 2 Vout / Imax
TEN 40-1210		3.3 VDC/8.0 A	
TEN 40-1211		5 VDC/8.0 A	
TEN 40-1212		12 VDC/3.3 A	
TEN 40-1220		*3.3 VDC/8.0 A	*5 VDC/8.0 A
TEN 40-1222	9 – 18 VDC	+12 VDC/1.8 A	-12 VDC/1.8 A
TEN 40-1223		+15 VDC/1.4 A	-15 VDC/1.4 A
TEN 40-1233		3.3 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-1234		3.3 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$
TEN 40-1231		5 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-1232		5 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$
TEN 40-2410		3.3 VDC/8.0 A	
TEN 40-2411		5 VDC/8.0 A	
TEN 40-2412		12 VDC/3.3 A	
TEN 40-2420		*3.3 VDC/8.0 A	*5 VDC/8.0 A
TEN 40-2422	18 – 36 VDC	+12 VDC/1.8 A	-12 VDC/1.8 A
TEN 40-2423		+15 VDC/1.4 A	-15 VDC/1.4 A
TEN 40-2433		3.3 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-2434		3.3 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$
TEN 40-2431		5 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-2432		5 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$
TEN 40-4810		3.3 VDC/8.0 A	
TEN 40-4811		5 VDC/8.0 A	
TEN 40-4812		12 VDC/3.3 A	
TEN 40-4820		*3.3 VDC/8.0 A	*5 VDC/8.0 A
TEN 40-4822	36 – 75 VDC	+12 VDC/1.8 A	-12 VDC/1.8 A
TEN 40-4823		+15 VDC/1.4 A	-15 VDC/1.4 A
TEN 40-4833		3.3 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-4834		3.3 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$
TEN 40-4831		5 VDC/6.0 A	$\pm 12\text{ VDC}/\pm 0.4\text{ A}$
TEN 40-4832		5 VDC/6.0 A	$\pm 15\text{ VDC}/\pm 0.3\text{ A}$

\*dynamic current allocation, max. 8 A total output current  
Optional heatsink: TEN-HS3

## Dimensions



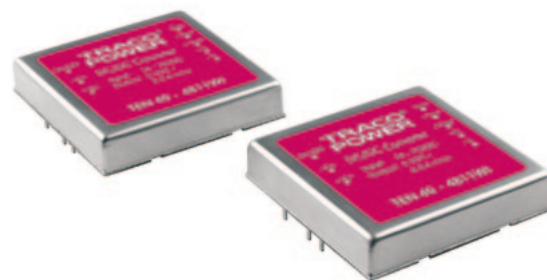
( ) = Inches

Pin	Single output	Dual output symmetric	Dual output asymmetric	Triple output
1	+ Vin (Vcc)	+ Vin (Vcc)	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)	- Vin (GND)	- Vin (GND)
3	Remote On/Off			
4	No con.	No pin	+Vout 1	+Vout 2
5	-Sense	Vout 1	-Vout 1	Common 2
6	+Sense	Common 1/2	No con.	-Vout 2
7	+Vout	Common 1/2	No con.	+Vout 1
8	-Vout	Vout 2	+Vout 2	-Vout 1
9	Trim	Trim	-Vout 2	No con.

# TEN-40WI Series ▶ 40 W



- ▶ Ultra wide 4:1 input range
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ Over temperature protection
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



## Specifications

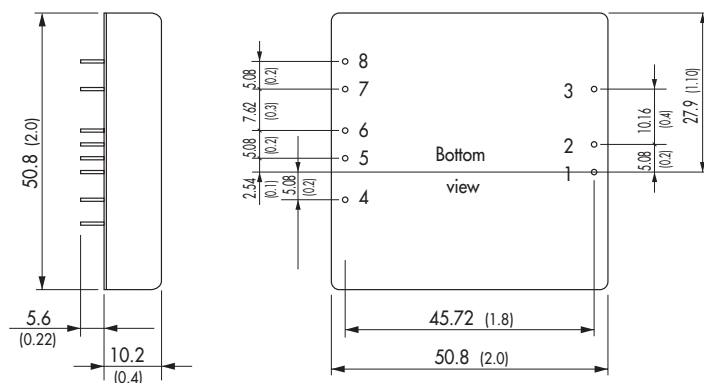
Line regulation	0.2% max.
Load regulation	- Single output models: 0.5% max. - Dual/Triple output models: 1.0% max.
Output voltage adjustment	$\pm 10\%$ by external resistor
Ripple & noise (20 MHz BW)	- 3.3 / 5 VDC output models: $<50\text{ mVpk-pk}$ - other single output models: $<75\text{ mVpk-pk}$ - dual output models: $<150\text{ mVpk-pk}$
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	86% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $55\text{ }^{\circ}\text{C}$ derating 2.0%/K
Thermal protection	shutdown at $110\text{ }^{\circ}\text{C}$
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1 CB-report
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Casing	6-side shielded metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten40wi.pdf">www.tracopower.com/products/ten40wi.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 40-2410WI		3.3 VDC	10000 mA
TEN 40-2411WI		5 VDC	8000 mA
TEN 40-2412WI	9 – 36 VDC	12 VDC	3330 mA
TEN 40-2413WI		15 VDC	2660 mA
TEN 40-2422WI		$\pm 12\text{ VDC}$	$\pm 1667\text{ mA}$
TEN 40-2423WI		$\pm 15\text{ VDC}$	$\pm 1333\text{ mA}$
TEN 40-4810WI		3.3 VDC	10000 mA
TEN 40-4811WI		5 VDC	8000 mA
TEN 40-4812WI	18 – 75 VDC	12 VDC	3333 mA
TEN 40-4813WI		15 VDC	2666 mA
TEN 40-4822WI		$\pm 12\text{ VDC}$	$\pm 1667\text{ mA}$
TEN 40-4823WI		$\pm 15\text{ VDC}$	$\pm 1333\text{ mA}$

Optional heatsink: [TEN-HS3](#)

## Dimensions



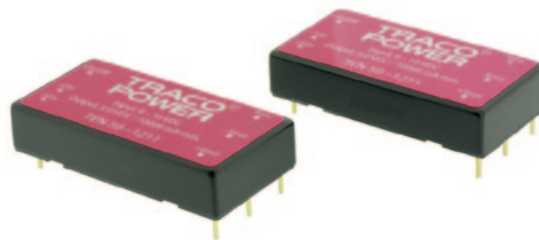
( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
3	Remote On/Off	Remote On/Off
4	- Sense	+ Vout
5	+ Sense	Common
6	+ Vout	Common
7	- Vout	- Vout
8	Trim	Trim

## TEN-50 Series ▶ 50 W



- ▶ Highest power density 50 W converter
- ▶ 2" x 1" x 0.4" metal package
- ▶ Wide 2:1 input range
- ▶ Excellent efficiency up to 92%
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ I/O isolation 1500 VDC
- ▶ Remote On/Off
- ▶ Adjustable output voltage



**NEW**  
Product

## Specifications

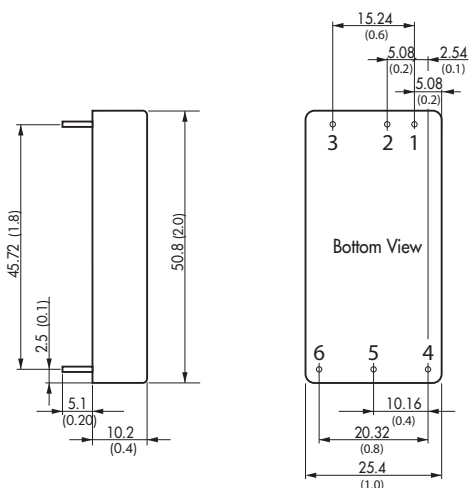
Line regulation	0.5% max.
Load regulation	0.5% max.
Output voltage adjustment	±10% by external resistor (single output models)
Ripple & noise	100 mVpk-pk typ. (20 MHz BW)
Short circuit protection	continuous, automatic recovery
Efficiency	92% typ.
Operating temperature range	-40 °C to +75 °C above 55 °C derating 2.0%/K
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, (reports pending)
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten50.pdf">www.tracopower.com/products/ten50.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TEN 50-1210		3.3 VDC	10000 mA
TEN 50-1211	9 – 18 VDC	5 VDC	10000 mA
TEN 50-1212		12 VDC	4167 mA
TEN 50-1213		15 VDC	3333 mA
TEN 50-2410		3.3 VDC	10000 mA
TEN 50-2411	18 – 36 VDC	5 VDC	10000 mA
TEN 50-2412		12 VDC	4167 mA
TEN 50-2413		15 VDC	3333 mA
TEN 50-4810		3.3 VDC	10000 mA
TEN 50-4811	36 – 75 VDC	5 VDC	10000 mA
TEN 50-4812		12 VDC	4167 mA
TEN 50-4813		15 VDC	3333 mA

Optional heatsink: TEN-HS4

## Dimensions



( ) = Inches

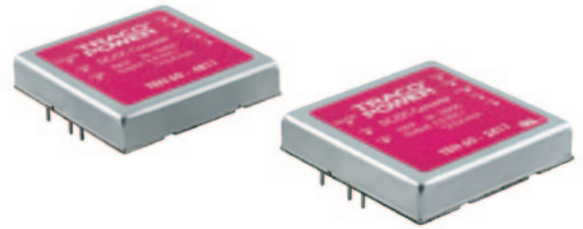
## Pin

Pin	Single output
1	+ Vin (Vcc)
2	- Vin (GND)
3	Remote On/Off
4	+ Vout
5	- Vout
6	Trim

# TEN-60 Series ▶ 60 W



- ▶ 2" x 2" x 0.4" metal package
- ▶ Highest power density
- ▶ Wide 2:1 input voltage range
- ▶ Very high efficiency up to 91 %
- ▶ Operating temperature range -40 °C to +80 °C
- ▶ Over temperature protection
- ▶ Input under-/ over voltage lockout
- ▶ I/O isolation 1500 VDC
- ▶ Thermal protection
- ▶ Remote On/Off
- ▶ Adjustable output voltage

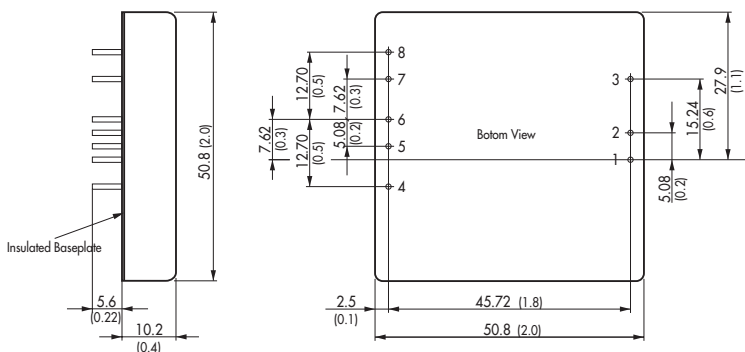


Specifications	
Line regulation	0.2 % max.
Load regulation	0.5 % max.
Output voltage adjustment	±10% by external resistor
Ripple & noise	- 3.3 / 5 VDC output models <75 mVpk-pk (20 MHz BW) - all other output models <100 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A and FCC, level A (with external capacitor)
Short circuit protection	continuous, automatic recovery
Efficiency	90 % typ.
Operating temperature range	-40 °C to +80 °C above 40 °C derating 1.5%/K
Thermal protection	shutdown at 120 °C
I/O isolation voltage	1500 VDC (60 sec.)
Safety standards / approvals	cUL /UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (2.5 mA) in standby operation
Casing	metal, 6-side shielded with insulated baseplate
Full datasheet	<a href="http://www.tracopower.com/products/ten60.pdf">www.tracopower.com/products/ten60.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
TEN 60-2410	18 – 36 VDC	3.3 VDC	14000 mA
TEN 60-2411		5 VDC	12000 mA
TEN 60-2412		12 VDC	5000 mA
TEN 60-2413	36 – 75 VDC	15 VDC	4000 mA
TEN 60-2415		24 VDC	2500 mA
TEN 60-4810		3.3 VDC	14000 mA
TEN 60-4811	36 – 75 VDC	5 VDC	12000 mA
TEN 60-4812		12 VDC	5000 mA
TEN 60-4813		15 VDC	4000 mA
TEN 60-4815	36 – 75 VDC	24 VDC	2500 mA

Optional heatsink: [TEN-HS3](#)

## Dimensions



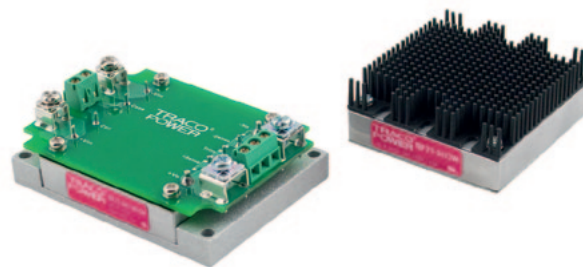
() = Inches

Pin	Description
1	+ Vin (Vcc)
2	- Vin (GND)
3	Remote On/Off
4	- Sense
5	+ Sense
6	+ Vout
7	- Vout
8	Trim

# TEP-75WI Series ▶ 75 W



- ▶ Rugged compact metal casing
- ▶ Ultra wide 4:1 input voltage range up to 160 VDC
- ▶ Very high efficiency up to 90%
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ EN 50155 approval for railway applications (43-160 VDC)
- ▶ Input under voltage lockout
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Adjustable output voltage
- ▶ Optional chassis mount adapter with screw terminal and adapter for DIN-rail mount



(Models pictured with chassis mount adapter and heat-sink)

Specifications	
Line regulation	0.2% max.
Load regulation	0.3% max.
Output voltage	+10% / -20% adjustable by external resistor
Ripple & noise	<1 % of Vout (20 MHz BW)
Conducted EMI	- Conducted noise: EN 55022, class A and FCC, level A (with CMF option). On request: Common mode chokes for filter proposals to meet EN55022 class A/B - Immunity: EN 50155
Short circuit protection	continuous, automatic recovery
Reverse input protection	parallel diode
Efficiency	88% typ.
Operating temperature range	-40 °C to +85°C with heat-sink for derating see datasheet
Thermal protection	shutdown at 115 °C
I/O isolation voltage	2250 VDC (60 sec.), basic insulation
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, EN50155
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F
Full datasheet	<a href="http://www.tracopower.com/products/tep75wi.pdf">www.tracopower.com/products/tep75wi.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
TEP 75-2411WI		5.0 VDC	15.0 A
TEP 75-2412WI		12 VDC	6.3 A
TEP 75-2413WI	9 – 36 VDC	15 VDC	5.0 A
TEP 75-2415WI		24 VDC	3.2 A
TEP 75-2416WI		28 VDC	2.7 A
TEP 75-2418WI		48 VDC	1.6 A
TEP 75-4811WI		5.0 VDC	15.0 A
TEP 75-4812WI		12 VDC	6.3 A
TEP 75-4813WI	18 – 75 VDC	15 VDC	5.0 A
TEP 75-4815WI		24 VDC	3.2 A
TEP 75-4816WI		28 VDC	2.7 A
TEP 75-4818WI		48 VDC	1.6 A
TEP 75-7211WI		5.0 VDC	15.0 A
TEP 75-7212WI		12 VDC	6.3 A
TEP 75-7213WI	43 – 160 VDC	15 VDC	5.0 A
TEP 75-7215WI		24 VDC	3.2 A
TEP 75-7216WI		28 VDC	2.7 A
TEP 75-7218WI		48 VDC	1.6 A

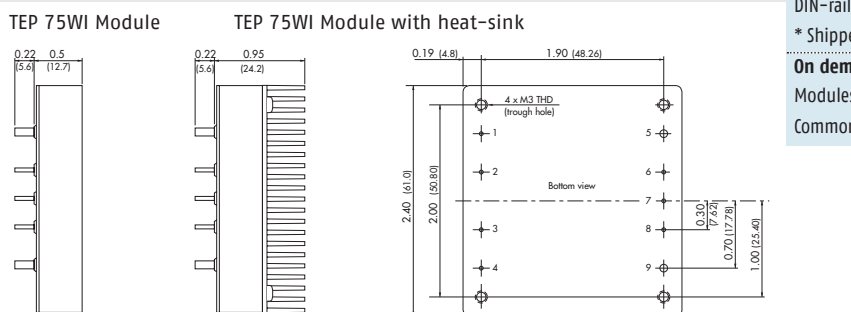
**Options**

Heat-sink: **TEP-HS1** (separate part, assembling on demand)  
 Chassis mount adapter: add suffix **-CM\***  
 Chassis mount adapter with EMI-filter: add suffix **-CMF\***  
 DIN-rail mounting clip for chassis mount versions: **TEP-MK1**  
 \* Shipped assembled with converter module

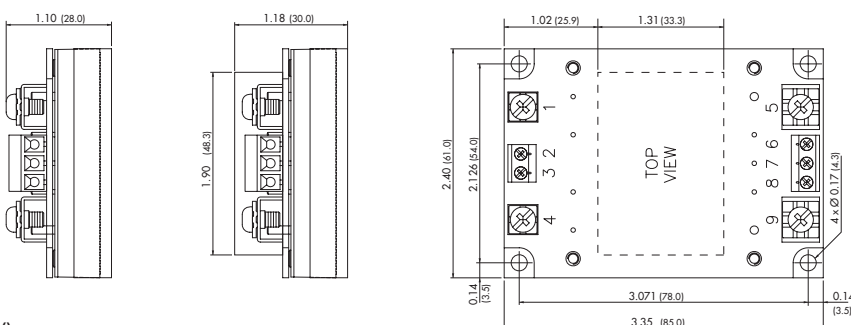
**On demand:**

Modules with output voltages of 3.3 VDC  
 Common mode chokes for filter proposals to meet EN55022 class A/B

## Dimensions



TEP 75WI Module on Chassis mount adapter      TEP 75WI Module on Chassis mount adapter with EMI-filter



( ) = mm

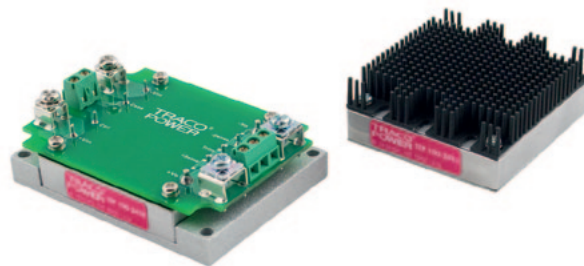
Pin	
1	- Vin (GND)
2	Case
3	Remote On/Off
4	+ Vin (Vcc)
5	- Vout
6	- Sense
7	Trim
8	+ Sense
9	+ Vout



# TEP-100 Series ▶ 100 W



- ▶ Rugged compact metal casing
- ▶ Wide 2:1 input voltage range
- ▶ Excellent efficiency up to 93 %
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Input under voltage lockout
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Adjustable output voltage
- ▶ Optional chassis mount adapter with screw terminal and adapter for DIN-rail mount



(Models pictured with chassis mount adapter and heat-sink)

## Specifications

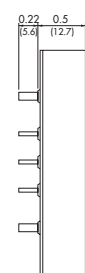
Line regulation	0.2% max.
Load regulation	0.3% max.
Output voltage adjustmt	+10% / -20% adjustable by external resistor
Ripple & noise (20 MHz BW)	- 5 VDC output models: <75 mVpk-pk - other output models: <1 % of Vout
Conducted EMI	EN 55022, class A and FCC, level A (with CMF option) On request: Common mode chokes for filter proposals to meet EN55022 class A/B
Short circuit protection	continuous, automatic recovery
Reverse input protection	parallel diode
Efficiency	92% typ.
Operating temperature range	-40 °C to +85 °C (with heat-sink) for derating see datasheet
Thermal protection	shutdown at 115 °C
I/O isolation voltage	2250 VDC (60 sec.), basic insulation
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Casing	shielded metal case with aluminium baseplate
Full datasheet	<a href="http://www.tracopower.com/products/tep100.pdf">www.tracopower.com/products/tep100.pdf</a>

## Models

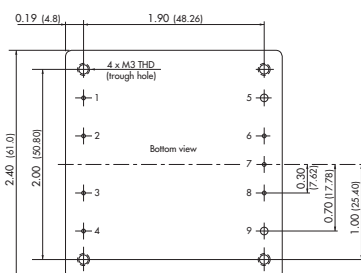
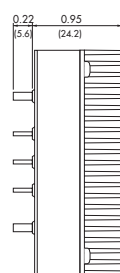
Order code	Input voltage	Output voltage	Output current max.
TEP 100-1210		3.3 VDC	25.0 A
TEP 100-1211		5.0 VDC	20.0 A
TEP 100-1212		12 VDC	8.4 A
TEP 100-1213	9 – 18 VDC	15 VDC	6.7 A
TEP 100-1215		24 VDC	4.2 A
TEP 100-1216		28 VDC	3.6 A
TEP 100-1218		48 VDC	2.1 A
TEP 100-2410		3.3 VDC	25.0 A
TEP 100-2411		5.0 VDC	20.0 A
TEP 100-2412		12 VDC	8.4 A
TEP 100-2413	18 – 36 VDC	15 VDC	6.7 A
TEP 100-2415		24 VDC	4.2 A
TEP 100-2416		28 VDC	3.6 A
TEP 100-2418		48 VDC	2.1 A
TEP 100-4810		3.0 VDC	25.0 A
TEP 100-4811		5.0 VDC	20.0 A
TEP 100-4812		12 VDC	8.4 A
TEP 100-4813	36 – 75 VDC	15 VDC	6.7 A
TEP 100-4815		24 VDC	4.2 A
TEP 100-4816		28 VDC	3.6 A
TEP 100-4818		48 VDC	2.1 A

## Dimensions

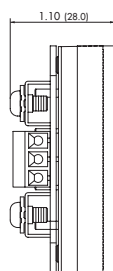
TEP 100 Module



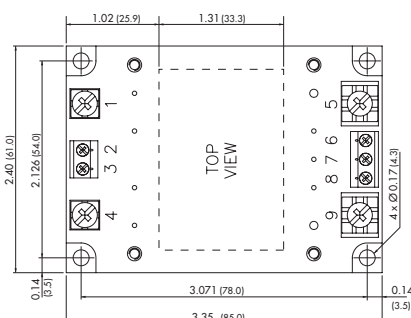
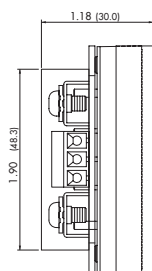
TEP 100 Module with Heat-sink



TEP 100 Module on Chassis mount adapter



TEP 100 Module on Chassis mount adapter with EMI-filter



( ) = mm

## Options

Heat-sink: **TEP-HS1** (separate part, assembling on demand)

Chassis mount adapter: add suffix **-CM\***

Chassis mount adapter with EMI-filter: add suffix **-CMF\***

DIN-rail mounting clip for chassis mount versions: **TEP-MK1**

\* Shipped assembled with converter module

## On demand:

Common mode chokes for filter proposals to meet EN55022 class A/B

Pin	
1	- Vin (GND)
2	Case
3	Remote On/Off
4	+ Vin (Vcc)
5	- Vout
6	- Sense
7	Trim
8	+ Sense
9	+ Vout



# TEP-150WI Series ▶ 150 W



- ▶ Highest power density
- ▶ Wide 4:1 input voltage range
- ▶ Over temperature protection
- ▶ Constant current characteristic at 100 % load for battery load applications
- ▶ Input under voltage lockout
- ▶ Operating temperature range -40 °C to +75 °C
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Easy chassis and wall mounting



Specifications	
Line regulation	0.2% max.
Load regulation	0.4% max.
Output voltage adjustment	+20 % by external resistor
Ripple & noise (20 MHz BW)	<1 % of Vout
Conducted EMI	EN 55022, class A and FCC, level A EN 55022, class B with filter module (suffix -F)
Short circuit protection	continuous, automatic recovery
Over-temperature protection	switch off at over-temperature, automatic restart.
Reverse input protection	parallel diode
Efficiency	86% typ.
Operating temperature range	-40 °C to +75 °C for derating see datasheet
I/O isolation voltage	2250 VDC (60 sec.), basic insulation
Safety standards	cUL/UL 60950-1, IEC/EN 60950-1, CB test report
Remote On/Off	shutdown input for low input current (3 mA) in standby operation (passive input = On) On demand: reverse function (passive input = off)
Casing	shielded metal case, IP55
Full datasheet	<a href="http://www.tracopower.com/products/tep150wi.pdf">www.tracopower.com/products/tep150wi.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
TEP 150-2412WI	9 – 36 VDC	12 VDC	12.5 A
TEP 150-2413WI		15 VDC	10.0 A
TEP 150-2415WI	18 – 75 VDC	24 VDC	6.3 A
TEP 150-2416WI		28 VDC	5.4 A
TEP 150-2418WI		48 VDC	3.2 A
TEP 150-4812WI	18 – 75 VDC	12 VDC	12.5 A
TEP 150-4813WI		15 VDC	10.0 A
TEP 150-4815WI		24 VDC	6.3 A
TEP 150-4816WI		28 VDC	5.4 A
TEP 150-4818WI		48 VDC	3.2 A

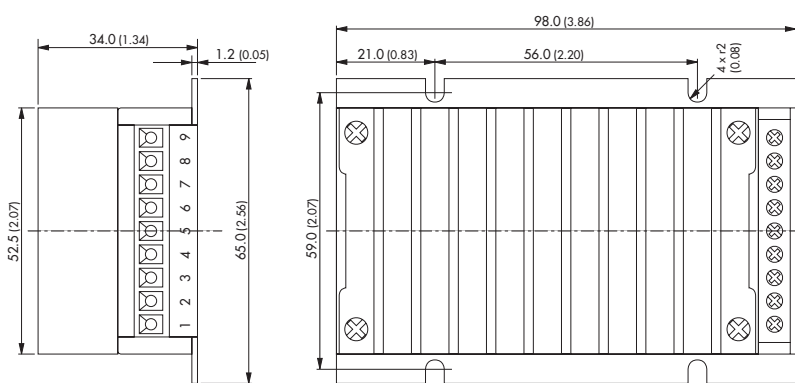
**NEW Models**

Modules with input filter to meet EN 55022 class B. Add suffix **-F**



See datasheet for details:  
[www.tracopower.com/products/tep150wi.pdf](http://www.tracopower.com/products/tep150wi.pdf)

## Dimensions



Con.	
1	+ Vin (Vcc)
2	+ Vin (Vcc)
3	- Vin (GND)
4	- Vin (GND)
5	Remote On/Off
6	+ Vout
7	- Vout
8	Trim
9	Trim

( ) = Inches

# TEP-160 Series ▶ 150 to 196 W



- ▶ High power density
- ▶ Wide 2:1 input voltage range
- ▶ Excellent efficiency up to 93 %
- ▶ Over temperatur protection
- ▶ Input under voltage lockout
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Adjustable output voltage
- ▶ Shielded metal case with aluminium baseplate



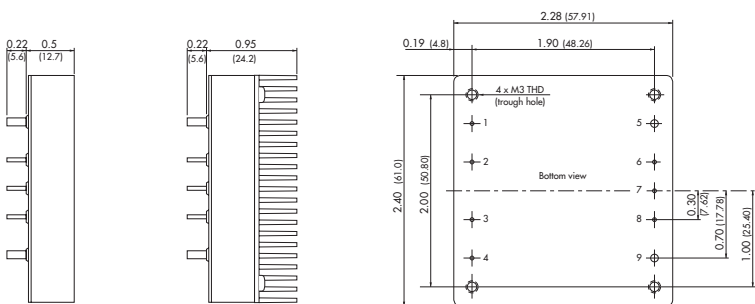
(Model pictured with mounted heat-sink)

Specifications		Models			
Line regulation	0.2% max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	0.3% max.	TEP 160-2412		12 VDC	13 A
Output voltage	+10% / -20 % adjustable by external resistor	TEP 160-2413		15 VDC	10 A
Ripple & noise (20 MHz BW)	- 5 VDC output models: <75 mVpk-pk - other output models: <1 % of Vout	TEP 160-2415	16.5 – 36 VDC	24 VDC	6.5 A
Short circuit protection	continuous, automatic recovery	TEP 160-2416		28 VDC	5.5 A
Reverse input protection	parallel diode	TEP 160-2418		48 VDC	3.3 A
Efficiency	90% typ.	TEP 160-4812		12 VDC	16 A
Operating temperature range	-40 °C to +75°C, for derating see datasheet	TEP 160-4813		15 VDC	13 A
Thermal protection	shutdown at 115 °C	TEP 160-4815	33 – 75 VDC	24 VDC	8 A
I/O isolation voltage	2250 VDC (60 sec.), basic insulation	TEP 160-4816		28 VDC	7 A
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, reports pending	TEP 160-4818		48 VDC	4 A
Remote On/Off	shutdown input for low input current (3 mA) in standby operation	TEP 160-48153		53 VDC	3.7 A
Full datasheet	<a href="http://www.tracopower.com/products/tep160.pdf">www.tracopower.com/products/tep160.pdf</a>	<b>Options:</b> Heat-sink: <b>TEP-HS1</b> (separate part, factory assembling on demand)			
		<b>On demand:</b> Modules with input voltage range of 8.5 – 22 VDC Modules with output voltages of 3.3 or 5.0 VDC Common mode chokes for filter proposals to meet EN55022 class A/B			

## Dimensions

TEP 160 Module

TEP 160 Module with heat-sink



( ) = mm

Pin	
1	- Vin (GND)
2	Case
3	Remote On/Off
4	+ Vin (Vcc)
5	- Vout
6	- Sense
7	Trim
8	+ Sense
9	+ Vout

# TEP-160WIR Series ▶ 144 to 182 W



- ▶ High power density
- ▶ Ultra wide 4:1 input voltage range up to 160 VDC
- ▶ Very high efficiency up to 91 %
- ▶ EN 50155 approval for railway applications
- ▶ Over temperatur protection
- ▶ Input under voltage lockout
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Adjustable output voltage
- ▶ Shielded metal case with aluminium baseplate



(Model pictured with mounted heat-sink)

Specifications		Models			
Line regulation	0.2% max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	0.25 % max.	TEP 160-2412WIR		12 VDC	12 A
Output voltage	+10% / -20 % adjustable by external resistor	TEP 160-2413WIR		15 VDC	9.5 A
Ripple & noise (20 MHz BW)	- 5 VDC output models: <75 mVpk-pk - other output models: <1 % of Vout	TEP 160-2415WIR	8.5 – 36 VDC	24 VDC	6.0 A
EMC	- Conducted noise: Common mode chokes for filter proposals to meet EN55022 class A/B on demand - Immunity: EN50155	TEP 160-2416WIR		28 VDC	5.0 A
Short circuit protection	continuous, automatic recovery	TEP 160-2418WIR		48 VDC	3.0 A
Reverse input protection	parallel diode	TEP 160-4812WIR		12 VDC	13 A
Efficiency	88% typ.	TEP 160-4813WIR		15 VDC	10 A
Operating temperature range	-40 °C to +75°C with heat-sink for derating see datasheet	TEP 160-4815WIR	16.5 – 75 VDC	24 VDC	6.5 A
Thermal protection	shutdown at 120 °C	TEP 160-4816WIR		28 VDC	5.5 A
I/O isolation voltage	2250 VDC (60 sec.), basic insulation	TEP 160-4818WIR		48 VDC	3.2 A
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, EN 50155, (reports pending)	TEP 160-7212WIR		12 VDC	15 A
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F	TEP 160-7213WIR		15 VDC	12 A
Remote On/Off	shutdown input for low input current (3 mA) in standby operation	TEP 160-7215WIR	43 – 160 VDC	24 VDC	7.5 A
Full datasheet	<a href="http://www.tracopower.com/products/tep160wir.pdf">www.tracopower.com/products/tep160wir.pdf</a>	TEP 160-7216WIR		28 VDC	6.5 A
		TEP 160-7218WIR		48 VDC	3.8 A

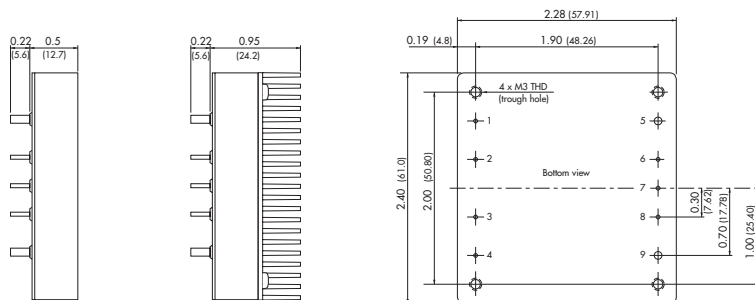
**Options:**  
Heat-sink: **TEP-HS1** (separate part, factory assembling on demand)

**On demand:**  
Modules with output voltages of 3.3 or 5.0 VDC  
Adapter for Chassis mount and DIN-rail mount (with screw terminal)  
Chassis mount models with input filter to meet EN 555022 class A  
Common mode chokes for filter proposals to meet EN55022 class A/B

## Dimensions

TEP 160WI Module

TEP 160WI Module with heat-sink



Pin	
1	- Vin (GND)
2	Case
3	Remote On/Off
4	+ Vin (Vcc)
5	- Vout
6	- Sense
7	Trim
8	+ Sense
9	+ Vout

( ) = mm

# TEP-200WIR Series ▶ 180 to 240 W



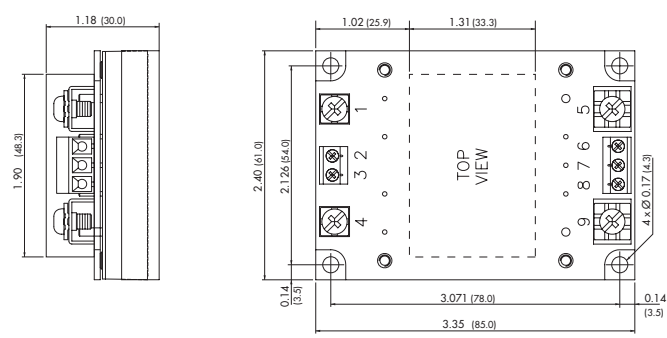
- ▶ Chassis mount converter with screw terminal
- ▶ Ultra wide 4:1 input voltage range
- ▶ EMI filter to meet EN 55022 class A
- ▶ Very high efficiency up to 91 %
- ▶ EN 50155 approval for railway applications
- ▶ Input under voltage lockout
- ▶ Over temperatur protection
- ▶ Reverse input protection
- ▶ I/O isolation 2250 VDC (basic insulation)
- ▶ Adjustable output voltage
- ▶ Optional adapter for DIN-rail mount



Specifications	
Line regulation	0.2% max.
Load regulation	0.3% max.
Output voltage	+10% / -20 % adjustable by external resistor
Ripple & noise	<1 % of Vout (20 MHz BW)
EMC	- Conducted noise: Common mode chokes for filter proposals to meet EN55022 class A/B on demand - Immunity: EN50155
Short circuit protection	continuous, automatic recovery
Reverse input protection	parallel diode
Efficiency	90% typ.
Operating temperature range	-40 °C to +75°C with heat-sink for derating see datasheet
Thermal protection	shutdown at 115 °C
I/O isolation voltage	2250 VDC (60 sec.), basic insulation
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, EN 50155
Thermal shock and shock & vibration	EN 61373 / MIL-STD-810F
Remote On/Off	shutdown input for low input current (3 mA) in standby operation
Full datasheet	<a href="http://www.tracopower.com/products/tep200wir.pdf">www.tracopower.com/products/tep200wir.pdf</a>

Models			
Order code	Input voltage	Output voltage	Output current max.
TEP 200-2412WIRCMF		12 VDC	15 A
TEP 200-2413WIRCMF		15 VDC	12 A
TEP 200-2415WIRCMF	8.5 – 36 VDC	24 VDC	7.5 A
TEP 200-2416WIRCMF		28 VDC	6.5 A
TEP 200-2418WIRCMF		48 VDC	3.7 A
TEP 200-4812WIRCMF		12 VDC	18 A
TEP 200-4813WIRCMF		15 VDC	14 A
TEP 200-4815WIRCMF	16.5 – 75 VDC	24 VDC	9.0 A
TEP 200-4816WIRCMF		28 VDC	7.5 A
TEP 200-4818WIRCMF		48 VDC	4.5 A
TEP 200-7212WIRCMF		12 VDC	20 A
TEP 200-7213WIRCMF		15 VDC	16 A
TEP 200-7215WIRCMF	43 – 160 VDC	24 VDC	10 A
TEP 200-7216WIRCMF		28 VDC	8.5 A
TEP 200-7218WIRCMF		48 VDC	5 A
<b>Options</b>			
Heatsink including adabter for DIN-rail mount and chassis mount: <b>TEP-HS3</b>			
<b>On demand</b>			
Models with 3.3 VDC or 5.0 VDC output			
Models with 53 VDC output (input voltage range 33 – 75 VDC)			
Models for PCB mount (EMI Filter not included)			
Negative (passive = Off) Remote On/Off function (standard is passive = On)			

## Dimensions



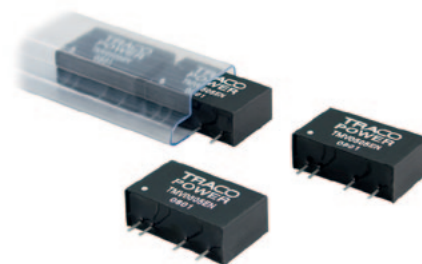
( ) = mm

Pin	
1	- Vin (GND)
2	Case
3	Remote On/Off
4	+ Vin (Vcc)
5	- Vout
6	- Sense
7	Trim
8	+ Sense
9	+ Vout

# TMV-EN Series ▶ 1 W

CB   
Scheme UL 60950-1

- ▶ SIP package
- ▶ I/O isolation voltage 3000 VACrms
- ▶ Reinforced insulation rated for 300 VAC working voltage
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ IEC/UL 60950-1 safety approvals



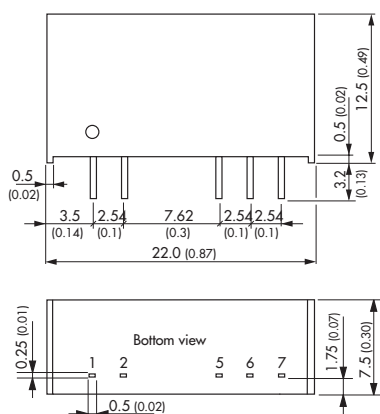
## Specifications

Line regulation	non regulated
Load regulation	$\pm 10\%$ max.
Ripple & noise	$<120\text{ mVpk-pk}$ (20 MHz BW)
Short circuit protection	limited 1 sec.
Efficiency	67% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 3.3 %/K
I/O isolation voltage	3000 VACrms (60 sec.), reinforced insulation, rated for 300 VAC working voltage
I/O isolation test voltage	6000 Vpk (1 sec.)
I/O isolation capacitance	10 pF typ.
I/O isolation resistance	$>10\text{ G}\Omega\text{hm}$
Safety standards / approvals	UL 60950-1, IEC/EN 60950-1, CB-report
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/tmv-en.pdf">www.tracopower.com/products/tmv-en.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
TMV 0505EN		5 VDC	200 mA
TMV 0512EN		12 VDC	80 mA
TMV 0515EN	5VDC $\pm 10\%$	15 VDC	65 mA
TMV 0505DEN		$\pm 5\text{ VDC}$	$\pm 100\text{ mA}$
TMV 0512DEN		$\pm 12\text{ VDC}$	$\pm 40\text{ mA}$
TMV 0515DEN		$\pm 15\text{ VDC}$	$\pm 30\text{ mA}$
TMV 1205EN		5 VDC	200 mA
TMV 1212EN		12 VDC	80 mA
TMV 1215EN	12VDC $\pm 10\%$	15 VDC	65 mA
TMV 1205DEN		$\pm 5\text{ VDC}$	$\pm 100\text{ mA}$
TMV 1212DEN		$\pm 12\text{ VDC}$	$\pm 40\text{ mA}$
TMV 1215DEN		$\pm 15\text{ VDC}$	$\pm 30\text{ mA}$

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	- Vin (GND)	- Vin (GND)
5	- Vout	- Vout
6	No pin	Common
7	+ Vout	+ Vout

# THI-2M Series ▶ 2 W



- ▶ Ultra compact DIP 16 package
- ▶ I/O isolation 4000 VACrms
- ▶ Reinforced insulation rated for working voltage up to 300 VAC
- ▶ Industrial and medical safety approval
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+71\text{ }^{\circ}\text{C}$



## Specifications

Line regulation	non regulated
Load regulation	10 % max.
Ripple & noise	<150 mVpk-pk (20 MHz BW)
Input filter	Pi-filter
Short circuit protection	limited 0.5 sec.
Efficiency	70 % typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+71\text{ }^{\circ}\text{C}$ above $60\text{ }^{\circ}\text{C}$ derating 2.5 %/K
I/O isolation voltage	4000 VACrms (60 sec.), reinforced insulation, rated for 300 VAC working voltage
I/O isolation test voltage	6000Vpk (1 sec.)
I/O isolation capacitance	20 pF typ.
I/O isolation resistance	>10,000 MOhm
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, cUL/UL 60601-1, IEC/EN 60601-1, CB-report
Casing	plastic (UL 94V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/thi2m.pdf">www.tracopower.com/products/thi2m.pdf</a>

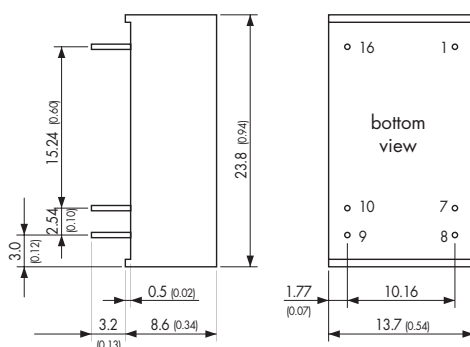
## Models

Order code	Input voltage	Output voltage	Output current max.
THI 2-0511M		5 VDC	400 mA
THI 2-0512M		12 VDC	165 mA
THI 2-0513M	5 VDC $\pm$ 10 %	15 VDC	133 mA
THI 2-0522M		$\pm$ 12 VDC	$\pm$ 83 mA
THI 2-0523M		$\pm$ 15 VDC	$\pm$ 66 mA
THI 2-1211M		5 VDC	400 mA
THI 2-1212M		12 VDC	165 mA
THI 2-1213M	12 VDC $\pm$ 10 %	15 VDC	133 mA
THI 2-1222M		$\pm$ 12 VDC	$\pm$ 83 mA
THI 2-1223M		$\pm$ 15 VDC	$\pm$ 66 mA
THI 2-2411M		5 VDC	400 mA
THI 2-2412M		12 VDC	165 mA
THI 2-2413M	24 VDC $\pm$ 10 %	15 VDC	133 mA
THI 2-2422M		$\pm$ 12 VDC	$\pm$ 83 mA
THI 2-2423M		$\pm$ 15 VDC	$\pm$ 66 mA

Product with same electrical specifications available in SMD package.

See TES-2M series page 9

## Dimensions



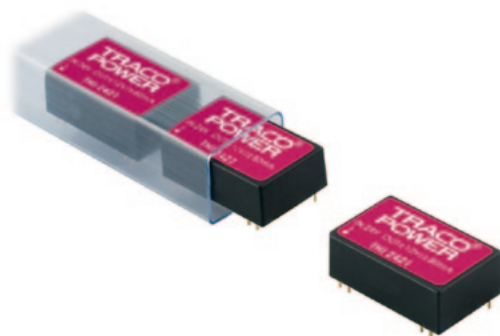
( ) = Inches

Pin	Single output	Dual output
1	- Vin (GND)	- Vin (GND)
7	No con.	No con.
8	No con.	Common
9	+ Vout	+ Vout
10	- Vout	- Vout
16	+ Vin (Vcc)	+ Vin (Vcc)



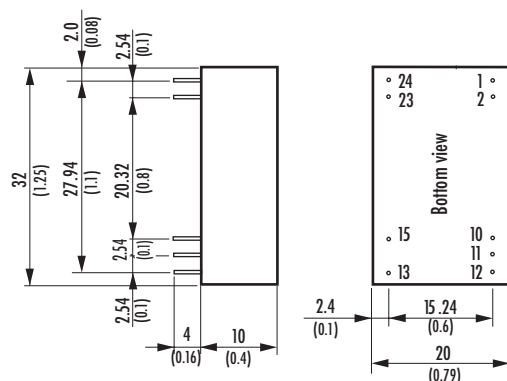
# THI-2 Series ▶ 2 W

- ▶ I/O isolation voltage 2500 VACrms
- ▶ Supplementary insulation rated for working voltage up to 250 VAC
- ▶ Regulated output
- ▶ Operating temperature range -40 °C to +85 °C
- ▶ Low coupling capacity



Specifications		Models			
Line regulation	0.5% max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	- Single output models: 1% max. - Dual output models: 1% max.	THI 0511		5 VDC	400 mA
Ripple & noise	<50 mVpk-pk (20 MHz BW)	THI 0512		12 VDC	165 mA
Input filter	Pi-filter	THI 0513	5 VDC ±10%	15 VDC	130 mA
Short circuit protection	continuous, automatic recovery	THI 0520		± 5 VDC	± 100 mA
Efficiency	61% typ.	THI 0521		± 12 VDC	± 80 mA
Operating temperature range	-40 °C to +85 °C above 70 °C derating 3%/K	THI 0522		± 15 VDC	± 65 mA
I/O isolation voltage	2500 VACrms (60 sec.), supplementary insulation, rated for 250 VAC working voltage	THI 1211		5 VDC	400 mA
I/O isolation test voltage	6000 Vpk (1 sec.)	THI 1212		12 VDC	165 mA
I/O isolation capacitance	20 pF typ.	THI 1213	12 VDC ±10%	15 VDC	130 mA
I/O isolation resistance	>10,000 MΩm	THI 1220		± 5 VDC	± 100 mA
Safety standards	IEC/EN 60950-1	THI 1221		± 12 VDC	± 80 mA
Casing	plastic (UL 94V-0 rated)	THI 1222		± 15 VDC	± 65 mA
Full datasheet	<a href="http://www.tracopower.com/products/thi.pdf">www.tracopower.com/products/thi.pdf</a>	THI 2411		5 VDC	400 mA
		THI 2412		12 VDC	165 mA
		THI 2413	24 VDC ±10%	15 VDC	130 mA
		THI 2420		± 5 VDC	± 100 mA
		THI 2421		± 12 VDC	± 80 mA
		THI 2422		± 15 VDC	± 65 mA

## Dimensions



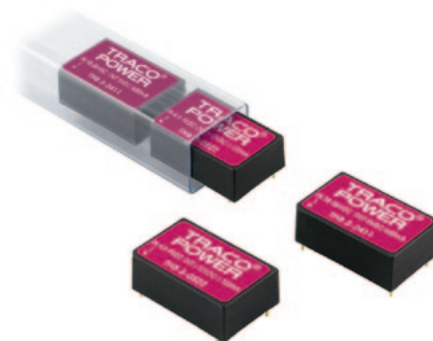
( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
2	+ Vin (Vcc)	+ Vin (Vcc)
10	No pin	Common
11	No pin	Common
12	- Vout	No pin
13	+ Vout	- Vout
15	No pin	+ Vout
23	- Vin (GND)	- Vin (GND)
24	- Vin (GND)	- Vin (GND)

# THB-3 Series ▶ 3 W



- ▶ Wide 2:1 input voltage range
- ▶ I/O isolation voltage 4000 VACrms
- ▶ Reinforced insulation rated for working voltage 300 VAC
- ▶ Industrial and medical safety approvals
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ Low coupling capacitance (13 pF)
- ▶ Input filter to meet EN 55022, class A



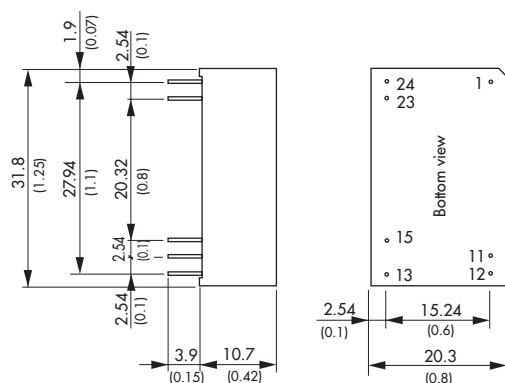
## Specifications

Line regulation	$\pm 0.5\%$ max.
Load regulation	– Single output models: 1% max. – Dual output models: 2% max.
Ripple & noise	<150 mVpk-pk (20 MHz BW)
Conducted EMI	EN 55022, class A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	83% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 3.3%/K
I/O isolation voltage	4000 VACrms (60 sec.) reinforced insulation, rated for 300 VAC working voltage
I/O isolation test voltage	6000 Vpk (1sec)
I/O isolation capacitance	13 pF max.
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, cUL/UL 60601-1, IEC/EN 60601-1, CB-report
Casing	plastic (UL 94V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/thb3.pdf">www.tracopower.com/products/thb3.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THB 3-0511		5 VDC	600 mA
THB 3-0512		12 VDC	250 mA
THB 3-0515	4.5 – 9 VDC	24 VDC	125 mA
THB 3-0522		$\pm 12$ VDC	$\pm 125$ mA
THB 3-0523		$\pm 15$ VDC	$\pm 100$ mA
THB 3-1211		5 VDC	600 mA
THB 3-1212		12 VDC	250 mA
THB 3-1215	9 – 18 VDC	24 VDC	125 mA
THB 3-1222		$\pm 12$ VDC	$\pm 125$ mA
THB 3-1223		$\pm 15$ VDC	$\pm 100$ mA
THB 3-2411		5 VDC	600 mA
THB 3-2412		12 VDC	250 mA
THB 3-2415	18 – 36 VDC	24 VDC	125 mA
THB 3-2422		$\pm 12$ VDC	$\pm 125$ mA
THB 3-2423		$\pm 15$ VDC	$\pm 100$ mA
THB 3-4811		5 VDC	600 mA
THB 3-4812		12 VDC	250 mA
THB 3-4815	36 – 75 VDC	24 VDC	125 mA
THB 3-4822		$\pm 12$ VDC	$\pm 125$ mA
THB 3-4823		$\pm 15$ VDC	$\pm 100$ mA

## Dimensions



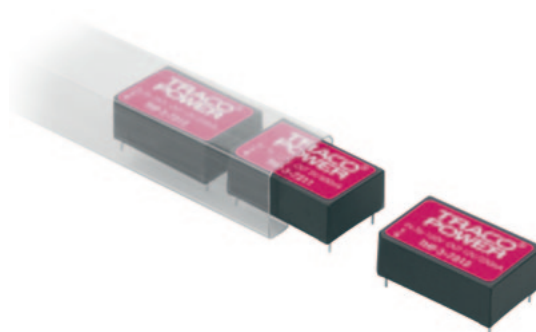
( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
11	No pin	Common
12	- Vout	No pin
13	+ Vout	- Vout
15	No pin	+ Vout
23	- Vin (GND)	- Vin (GND)
24	- Vin (GND)	- Vin (GND)

# THP-3 Series ▶ 3 W



- ▶ Ultra wide 4:1 input voltage range
- ▶ Input voltage up to 160 VDC
- ▶ I/O isolation voltage 4000VACrms
- ▶ Reinforced insulation rated for working voltage 300VAC
- ▶ Industrial and medical safety approvals
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$
- ▶ Low coupling capacitance (13pF)
- ▶ Input filter to meet EN 55022, class A



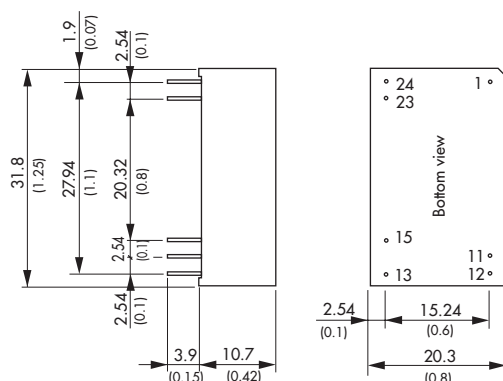
## Specifications

Line regulation	0.5% max.
Load regulation	– Single output models: 1% max. – Dual output models: 2% max.
Ripple & noise (20 MHz BW)	<100 mVpk-pk for 5 VDC models <150 mVpk-pk for other models
Conducted EMI	EN 55022, class A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	83% typ.
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ above $70\text{ }^{\circ}\text{C}$ derating 3.3%/K
I/O isolation voltage	4000 VACrms (60 sec.) reinforced insulation, rated for 300VAC working voltage
I/O isolation test voltage	6000Vpk (1sec)
I/O isolation capacitance	13 pF max.
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, UL 60601-1, IEC/EN 60601-1, CB-report
Casing	plastic (UL 94V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/thp3.pdf">www.tracopower.com/products/thp3.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THP 3-2411		5 VDC	600 mA
THP 3-2412	9 – 40 VDC	12 VDC	250 mA
THP 3-2422		$\pm 12$ VDC	$\pm 125$ mA
THP 3-2423		$\pm 15$ VDC	$\pm 100$ mA
THP 3-4811		5 VDC	600 mA
THP 3-4812	18 – 80 VDC	12 VDC	250 mA
THP 3-4822		$\pm 12$ VDC	$\pm 125$ mA
THP 3-4823		$\pm 15$ VDC	$\pm 100$ mA
THP 3-7211		5 VDC	600 mA
THP 3-7212	36 – 160 VDC	12 VDC	250 mA
THP 3-7222		$\pm 12$ VDC	$\pm 125$ mA
THP 3-7223		$\pm 15$ VDC	$\pm 100$ mA

## Dimensions



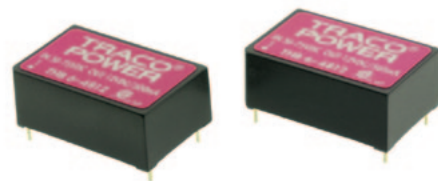
( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
11	No pin	Common
12	– Vout	No pin
13	+ Vout	– Vout
15	No pin	+ Vout
23	– Vin (GND)	– Vin (GND)
24	– Vin (GND)	– Vin (GND)

# THB-6 Series ▶ 6 W



- ▶ Ultra compact DIP-24 package
- ▶ Wide 2:1 input voltage range
- ▶ I/O isolation voltage 4000 VACrms
- ▶ Reinforced insulation rated for working voltage 300 VAC
- ▶ Industrial and medical safety approvals
- ▶ Operating temperature range -40 °C to +71 °C
- ▶ Low coupling capacitance (13 pF)
- ▶ Input filter to meet EN 55022, class A



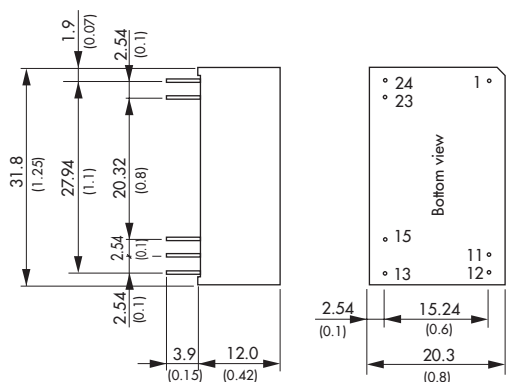
## Specifications

Line regulation	1.0 % max.
Load regulation	- Single output models: 1% max. - Dual output models: 2% max.
Ripple & noise (20 MHz BW)	<100 mVpk-pk for 5 VDC models <150 mVpk-pk for other models
Conducted EMI	EN 55022, class A (internal filter)
Short circuit protection	continuous, automatic recovery
Efficiency	80% typ.
Operating temperature range	-40 °C to +71 °C above 60 °C derating 3%/K
I/O isolation voltage	4000 VACrms (60 sec.) reinforced insulation, rated for 300 VAC working voltage
I/O isolation test voltage	6000 Vpk (1sec)
I/O isolation capacitance	13 pF max.
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, UL 60601-1, IEC/EN 60601-1, CB-report
Casing	plastic (UL 94V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/thb6.pdf">www.tracopower.com/products/thb6.pdf</a>

## Models

Order code	Input voltage	Output voltage	Output current max.
THB 6-1211		5 VDC	1000 mA
THB 6-1212	9 – 18 VDC	12 VDC	500 mA
THB 6-1222		± 12 VDC	± 250 mA
THB 6-1223		± 15 VDC	± 200 mA
THB 6-2411		5 VDC	1000 mA
THB 6-2412	18 – 36 VDC	12 VDC	500 mA
THB 6-2422		± 12 VDC	± 250 mA
THB 6-2423		± 15 VDC	± 200 mA
THB 6-4811		5 VDC	1000 mA
THB 6-4812	36 – 75 VDC	12 VDC	500 mA
THB 6-4822		± 12 VDC	± 250 mA
THB 6-4823		± 15 VDC	± 200 mA

## Dimensions



( ) = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
11	No pin	Common
12	- Vout	No pin
13	+ Vout	- Vout
15	No pin	+ Vout
23	- Vin (GND)	- Vin (GND)
24	- Vin (GND)	- Vin (GND)

# THB-10 Series ▶ 10 W



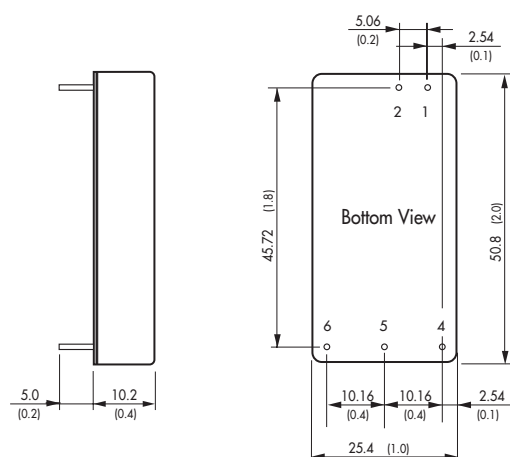
- ▶ Wide 2:1 input voltage range
- ▶ I/O isolation voltage 4000 VACrms
- ▶ Reinforced insulation rated for working voltage 300 VAC
- ▶ Industrial and medical safety approvals
- ▶ Operating temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+75\text{ }^{\circ}\text{C}$
- ▶ Low coupling capacitance (10 pF typ.)
- ▶ Input filter to meet EN 55022, class A



**NEW**  
Product

Specifications		Models			
Line regulation	0.5 % max.	Order code	Input voltage	Output voltage	Output current max.
Load regulation	1 % max.	THB 10-1211	9 – 18 VDC	5 VDC	1600 mA
Ripple & noise (20 MHz BW)	<100 mVpk-pk for 5 VDC models <150 mVpk-pk for other models	THB 10-1212		12 VDC	835 mA
Conducted EMI	EN 55022, class A (internal filter)	THB 10-1222		$\pm 12$ VDC	$\pm 417$ mA
Short circuit protection	continuous, automatic recovery	THB 10-1223		$\pm 15$ VDC	$\pm 333$ mA
Efficiency	78 % typ.	THB 10-2411	18 – 36 VDC	5 VDC	1600 mA
Operating temperature range	$-40\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$ above $55\text{ }^{\circ}\text{C}$ derating 2.5 %/K	THB 10-2412		12 VDC	835 mA
I/O isolation voltage	4000 VACrms (60 sec.) reinforced, rated for 300 VAC working voltage	THB 10-2422		$\pm 12$ VDC	$\pm 417$ mA
I/O isolation test voltage	6000 Vpk (1sec)	THB 10-2423		$\pm 15$ VDC	$\pm 333$ mA
I/O isolation capacitance	10 pF typ.	THB 10-4811	36 – 75 VDC	5 VDC	1600 mA
Safety standards / approvals	cUL/UL 60950-1, IEC/EN 60950-1, UL 60601-1, IEC/EN 60601-1, (reports pending)	THB 10-4812		12 VDC	835 mA
Casing	plastic (UL 94V-0 rated)	THB 10-4822		$\pm 12$ VDC	$\pm 417$ mA
Full datasheet	<a href="http://www.tracopower.com/products/thb10.pdf">www.tracopower.com/products/thb10.pdf</a>	THB 10-4823		$\pm 15$ VDC	$\pm 333$ mA

## Dimensions



() = Inches

Pin	Single output	Dual output
1	+ Vin (Vcc)	+ Vin (Vcc)
11	No pin	Common
12	- Vout	No pin
13	+ Vout	- Vout
15	No pin	+ Vout
23	- Vin (GND)	- Vin (GND)
24	- Vin (GND)	- Vin (GND)

# TSR-1 Series ▶ 1A

- ▶ High performance switching regulator
- ▶ Pin compatible with LM78xx linear regulators
- ▶ High efficiency up to 94 %
- ▶ No heat-sink required
- ▶ Low standby current
- ▶ Wide input voltage range 4.6–36 VDC
- ▶ Output voltages from 1.2 to 15 VDC
- ▶ Short circuit protection
- ▶ Low output ripple & noise



## Specifications

Line regulation	0.2 % max.
Load regulation	0.4 % max.
Ripple & noise (20 MHz BW)	<50 mVpk-pk for models up to 6.5 VDC output <75 mVpk-pk for models higher 6.5 VDC output
Short circuit protection	continuous, automatic recovery
Efficiency	90 % typ.
Operating temperature range	-40 °C to +85 °C above 60 °C derating 2.4 %/K
I/O isolation voltage	non-isolated
Standby input current	2 mA typ.
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/tsr1.pdf">www.tracopower.com/products/tsr1.pdf</a>

## SIP Models

Order code	Input voltage range *	Output voltage	Output current max.
TSR 1-2412	4.6 – 36 VDC	1.2 VDC	1000 mA
TSR 1-2415	4.6 – 36 VDC	1.5 VDC	1000 mA
TSR 1-2418	4.6 – 36 VDC	1.8 VDC	1000 mA
TSR 1-2425	4.6 – 36 VDC	2.5 VDC	1000 mA
TSR 1-2433	4.75 – 36 VDC	3.3 VDC	1000 mA
TSR 1-2450	6.5 – 36 VDC	5.0 VDC	1000 mA
TSR 1-2465	9.0 – 36 VDC	6.5 VDC	1000 mA
TSR 1-2490	12 – 36 VDC	9.0 VDC	1000 mA
TSR 1-24120	15 – 36 VDC	12 VDC	1000 mA
TSR 1-24150	18 – 36 VDC	15 VDC	1000 mA

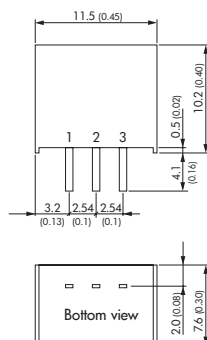
\* For an input voltage higher than 32 VDC an input capacitor 22  $\mu$ F / 50V is required

Product suitable for negative output voltage:

See TSRN-1 series page 90 (trough hole)

See TSRN-1SM series page 91 (SMD)

## Dimensions



() = Inches

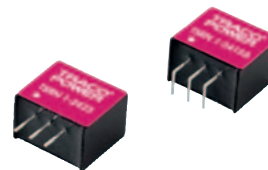
## Pinout SIP Models

Pin	
1	+Vin (Vcc)
2	GND
3	+Vout



# TSRN-1 Series ▶ 1A

- ▶ SIP-package fits existing TO-220 footprint
- ▶ Suitable for positive & negative output circuit
- ▶ Pin compatible with LMxx linear regulators
- ▶ Built in filter capacitors
- ▶ Operation temp. range -40°C to +85°C
- ▶ No heat-sink required
- ▶ Over-temperature protection
- ▶ Short circuit protection
- ▶ Wide input range up to 42 VDC
- ▶ Excellent line / load regulation
- ▶ Low standby current



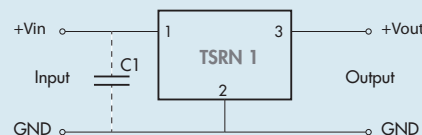
Specifications	
Line regulation	0.2% max.
Load regulation	1.0% typ.
Output voltage set accuracy	2.0% typ.
Ripple & noise	1.5 – 6.5 VDC output models: <50 mVpk-pk (20 MHz BW) 9.0 – 15.0 VDC output models: <75 mVpk-pk (20 MHz BW)
Short circuit protection	continuous, automatic recovery
Efficiency	90% typ.
Operating temperature range	-40 °C to +85 °C above 70 °C derating 2.7%/K
I/O isolation voltage	non-isolated
Standby input current	2.0 mA typ.
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/tsm1.pdf">www.tracopower.com/products/tsm1.pdf</a>

Models			
Order code 1) straight pins	Input voltage range <sup>2)</sup>	Output voltage	Output current max.
<b>Positive output circuit</b>			
TSRN 1-2415	4.6 – 42 VDC	1.5 VDC	1000 mA
TSRN 1-2418	4.6 – 42 VDC	1.8 VDC	1000 mA
TSRN 1-2425	4.6 – 42 VDC	2.5 VDC	1000 mA
TSRN 1-2433	4.6 – 42 VDC	3.3 VDC	1000 mA
TSRN 1-2450	6.5 – 42 VDC	5.0 VDC	1000 mA
TSRN 1-2465	8.0 – 42 VDC	6.5 VDC	1000 mA
TSRN 1-2490	10.5 – 42 VDC	9.0 VDC	1000 mA
TSRN 1-24120	13.5 – 42 VDC	12 VDC	1000 mA
TSRN 1-24150	16.5 – 42 VDC	15 VDC	1000 mA
<b>Negative output circuit</b>			
TSRN 1-2415	4.6 – 32 VDC	-1.5 VDC	600 mA
TSRN 1-2418	4.6 – 32 VDC	-1.8 VDC	600 mA
TSRN 1-2425	4.6 – 32 VDC	-2.5 VDC	600 mA
TSRN 1-2433	4.6 – 32 VDC	-3.3 VDC	600 mA
TSRN 1-2450	6.5 – 31 VDC	-5.0 VDC	400 mA
TSRN 1-2465	8.0 – 29 VDC	-6.5 VDC	300 mA
TSRN 1-2490	10.5 – 27 VDC	-9.0 VDC	300 mA
TSRN 1-24120	13.5 – 24 VDC	-12 VDC	300 mA
TSRN 1-24150	16.5 – 21 VDC	-15 VDC	200 mA

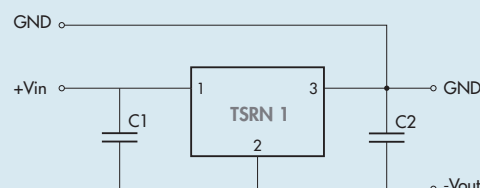
1) Order code for angular pins model suffix A.  
2) For input voltage higher 36 VDC an input capacitor 22 µF / 50 V is required.

## Connection

Positive output operation:

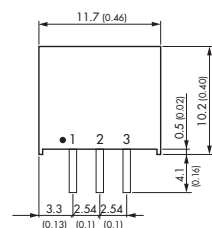
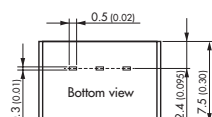


Negative output operation:

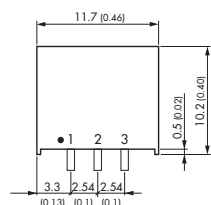
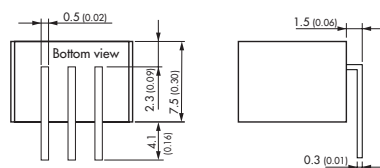


## Dimensions

Straight pin version



Angular pin version (suffix A)



( ) = Inches

# TSRN-1SM Series ▶ 1A

- ▶ Suitable for positive & negative output circuit
- ▶ Adjustable output voltage
- ▶ Built in filter capacitors
- ▶ Remote On/Off input
- ▶ Operation temp. range -40°C to +85°C
- ▶ Over-temperature protection
- ▶ Short circuit protection
- ▶ Excellent line / load regulation
- ▶ Wide input up to 42 VDC
- ▶ Low standby current
- ▶ Optional tape & reel package (400 pcs)



## Specifications

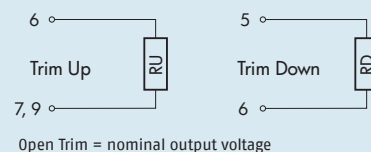
Line regulation	0.2 % max.
Load regulation	0.6 % max. (0-100 %)
Output voltage adjustment	see table
Ripple & noise	1.2 - 8.0 VDC output models: <50 mVpk-pk (20 MHz BW) 8.1 - 15.0 VDC output models: <75 mVpk-pk (20 MHz BW)
Short circuit protection	continuous, automatic recovery
Efficiency	90 % typ.
Operating temperature range	-40 °C to +85 °C above 60 °C derating 2.0%/K
I/O isolation voltage	non-isolated
Remote On/Off	shutdown input for low input current (1.2 mA) in standby operation
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/tsrn1sm.pdf">www.tracopower.com/products/tsrn1sm.pdf</a>

## Models

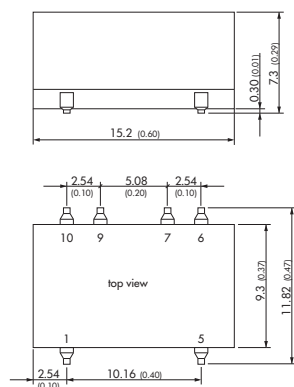
Order code <sup>1)</sup>	Input voltage range <sup>2)</sup>	Output voltage range (nominal) <sup>3)</sup>	Output current
<b>Positive output circuit</b>			
TSRN 1-0525SM	3.0-5.5 VDC	1.2-3.6 (2.5) VDC	1000 mA
TSRN 1-2433SM	4.6-42 VDC	1.5-5.5 (3.3) VDC	1000 mA
TSRN 1-2450SM	6.5-42 VDC	2.5-8.0 (5.0) VDC	1000 mA
TSRN 1-2490SM	10.5-42 VDC	4.5-12.6 (9.0) VDC	1000 mA
TSRN 1-24120SM	13.5-42 VDC	4.5-13.5 (12) VDC	1000 mA
TSRN 1-24150SM	16.5-42 VDC	15.5-4.5 (15) VDC	1000 mA
<b>Negative output circuit</b>			
TSRN 1-2433SM	4.6-32 VDC	-1.5-5.5 (-3.3) VDC	600 mA
TSRN 1-2450SM	4.6-31 VDC	-2.5-8.0 (-5.0) VDC	400 mA
TSRN 1-2490SM	7.0-27 VDC	-4.5-12.6 (-9.0) VDC	300 mA
TSRN 1-24120SM	7.0-24 VDC	-4.5-13.5 (-12) VDC	300 mA
TSRN 1-24150SM	7.0-21 VDC	-4.5-15.5 (-15) VDC	200 mA

- 1) Same order code for positive and negative output operation
- 2) For input voltage higher 36 VDC an input capacitor 22 µF / 50 V is required.
- 3) For positive output circuit, input voltage must be higher than output voltage set:>0.5V for TSRN1-0525SM and >1.5 V for other models. For negative output circuit, input voltage plus absolute output voltage set must not exceed 36 VDC (Vin + |Vout| <36 VDC)

## Connection

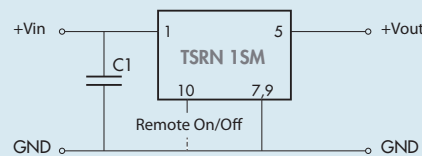


## Dimensions

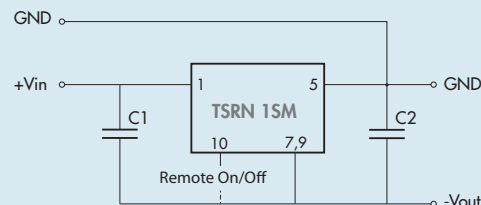


() = Inches

### Positive output operation

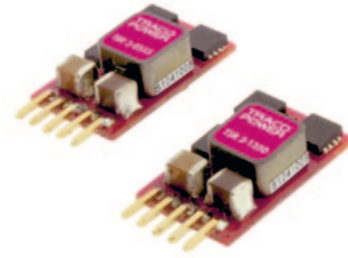


### Negative output operation



# TSR-3 Series ▶ 3A

- ▶ High performance switching regulator
- ▶ Highest efficiency up to 95 %
- ▶ Adjustable output voltage
- ▶ Remote On/Off
- ▶ Wide input voltage range 2.5-5.5, 4.5-14 and 10-30 VDC
- ▶ Output voltages from 0.6 to 15 VDC
- ▶ Short circuit protection
- ▶ Low output ripple & noise

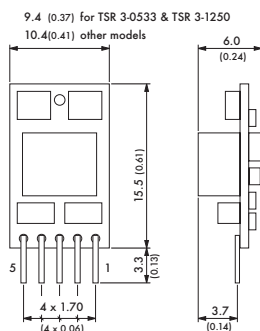


Specifications	
Line regulation	0.2 % max.
Load regulation	0.8 % max.
Output voltage adjustment	by external resistor.
Ripple & noise (20 MHz BW)	<75 mVpk-pk for models up to 6 VDC output <150 mVpk-pk for models higher 6 VDC output
Short circuit protection	continuous, automatic recovery
Efficiency	93 % typ.
Operating temperature range	-40 °C to +85 °C above 50 °C derating 1.5 %/K
I/O isolation voltage	non-isolated
Standby input current	20 mA typ.
Remote On/Off	shutdown input for low input current in standby operation
Casing	plastic (UL 94 V-0 rated)
Full datasheet	<a href="http://www.tracopower.com/products/tsr3.pdf">www.tracopower.com/products/tsr3.pdf</a>

Models			
Order code	Input voltage	Output voltage adjustable <sup>4)</sup>	Output current max.
<b>TSR 3-0533</b>	2.5 – 5.5 VDC <sup>1)</sup>	0.6 – 3.3 VDC	3000 mA
<b>TSR 3-1250</b>	4.5 – 14 VDC <sup>2)</sup>	0.6 – 6.0 VDC	3000 mA
<b>TSR 3-2450</b>	10 – 30 VDC <sup>3)</sup>	3.0 – 6.0 VDC	3000 mA
<b>TSR 3-24150</b>	10 – 30 VDC <sup>3)</sup>	5.0 – 15 VDC	3000 mA

- 1) input voltage must be 0.5 V higher than output
- 2) input voltage must be 2.0 V higher than output
- 3) input voltage must be 3.0 V higher than output
- 4) open trim input = min. output voltage

## Dimensions



() = Inches

Pin	
1	Remote On/Off
2	+Vin (Vcc)
3	GND
4	+Vout
5	Trim