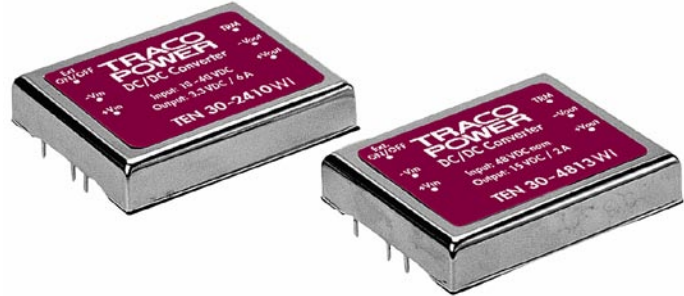


Features

- ◆ High power density: 30 W in a 51x41x10 mm (2"x1.6"x0.4") package
- ◆ Ultra wide 4:1 input voltage range
- ◆ Single output voltage models from 1.8 to 15 VDC
- ◆ Dual output voltage models
- ◆ Extended operating temperature range: -40°C to 85°C
- ◆ Under voltage lockout
- ◆ Remote On/Off
- ◆ Shielded metal case with insulated baseplate
- ◆ Optional heatsink
- ◆ Lead free design - RoHS compliant
- ◆ 3-year product warranty



The TEN 30WI series is a family of high performance 30W dc-dc converters featuring ultra wide 4:1 input voltage ranges in a compact low profile package with industry-standard footprint. A very high efficiency allows operating temperatures up to 85°C. A built-in filter for both input and output minimizes the need for external filtering. Further standard features include remote On/Off, output voltage trimming, over voltage protection, under voltage lockout and short circuit protection. Typical applications for these products are battery operated equipment and distributed power architectures in communication and industrial electronics, everywhere where isolated, tightly regulated voltages are required and space is limited on the PCB.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 30-2408WI	10 – 40 VDC (nominal 24 VDC)	1.8 VDC	8'000 mA	80 %
TEN 30-2409WI		2.5 VDC	8'000 mA	85 %
TEN 30-2410WI		3.3 VDC	6'000 mA	87 %
TEN 30-2411WI		5.0 VDC	6'000 mA	87 %
TEN 30-2412WI		12 VDC	2'500 mA	87 %
TEN 30-2413WI		15 VDC	2'000 mA	88 %
TEN 30-2422WI		±12 VDC	±1'250 mA	85 %
TEN 30-2423WI		±15 VDC	±1'000 mA	86 %
TEN 30-4808WI	18 – 75 VDC (nominal 48 VDC)	1.8 VDC	8'000 mA	81 %
TEN 30-4809WI		2.5 VDC	8'000 mA	86 %
TEN 30-4810WI		3.3 VDC	6'000 mA	87 %
TEN 30-4811WI		5.0 VDC	6'000 mA	88 %
TEN 30-4812WI		12 VDC	2'500 mA	87 %
TEN 30-4813WI		15 VDC	2'000 mA	88 %
TEN 30-4822WI		±12 VDC	±1'250 mA	86 %
TEN 30-4823WI		±15 VDC	±1'000 mA	87 %

Input Specifications

Input current at no load	24 Vin:	1.8 Vout models: 45 mA typ. 2.5/3.3 Vout models: 60 mA typ. other models: 80 mA typ.
	48 Vin:	1.8 Vout models: 25 mA typ. 2.5/3.3 Vout models: 40 mA typ. other models: 55 mA typ.
Input current at full load	24 Vin:	1.8 Vout models: 760 mA typ. 2.5/3.3 Vout models: 1000 mA typ. other models: 1500 mA typ.
	48 Vin:	1.8 Vout models: 390 mA typ. 2.5 / 3.3 Vout models: 500 mA typ. other models: 750 mA typ.
Input voltage variation (dv/dt)		5 V/ms, max. (complies with ETS 300 132 part. 4.4)
Start-up voltage / under voltage lockout		24 Vin models: 10 VDC / 8 VDC (typ.) 48 Vin models: 18 VDC / 16 VDC (typ.)
Surge voltage (100 msec. max.)		24 Vin models: 50 V max. 48 Vin models: 100 V max.
Conducted noise (input)		EN 55022 level A, FCC part 15, level A with external capacitor (see note 1)
ESD (input)		EN 61000-4-2, perf. criteria B
Fast transient (input)		EN 61000-4-4, perf. criteria B
Surge (input)		EN 61000-4-5, perf. criteria B

Output Specifications

Voltage set accuracy		±1 %
Output voltage adjustment		±10 %
Regulation	– Input variation Vin min. to Vin max.	±0.5 % max.
	– Load variation 10 – 100%:	single output models: ±0.5 % max. dual output models: ±1.0 % max.
	– Load cross variation 25 % / 100 %	±5 % max.
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz Bandwidth):		75 mVpk-pk max.
Start up time (nominal Vin and constant resistive load)		10 ms typ.
Transient response setting time (25% load step change)		300 µs typ.
Short circuit protection		indefinite (automatic recovery)
Over load protection		150 % of Iout max typ. foldback
Thermal shutdown		@ 115°C typ
Over voltage protection	1.8 / 2.5 Vout models:	3.0 / 3.6 V
	3.3 / 5.0 Vout models:	3.9 / 6.2 V
	12 / 15 Vout models:	15 / 18 V
Minimum load (only for dual output models)		10% of rated max current (operation at lower load condition will not damage these converters, however, they may not meet all listed specifications)
Capacitive load	1.8 / 2.5 Vout models:	65'000 µF max./ 33'000 µF max.
	3.3 / 5.0 Vout models:	19'500 µF max./ 10'200 µF max.
	12 / 15 Vout models:	3'300 µF max./ 1'100 µF max.
	±12 / ±15 Vout models:	±1'000 µF max./ ±680 µF max. (per output)

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

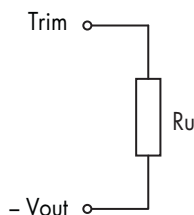
Temperature ranges	- Operating - Case temperature - Storage	-40°C to +85°C +100°C max. -55°C to +105°C
Thermal impedance	- with heat-sink TEN-HS2 - without heat-sink	8.24 K/Watt 10 K/Watt
Derating		see graphs on page 4 to 6
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTF (MIL-HDBK-217F, @ +25°C, ground benign)		>350'000 h
Isolation voltage (60 sec)	- Input / Output	1'500 VDC
Isolation resistance	- Input / Output	>1'000 M Ohm
Isolation capacity	- Input / Output	1000 pF max.
Remote On/Off	- On: - Off: - Off idle current:	3.5 ... 12 VDC or open circuit. 0 ... 1.2 VDC or short circuit pin 3 and pin 2 3 mA typ.
Switching frequency		300 kHz typ. (pulse width modulation PWM)
Vibration		10–55Hz, 2G, 30 minutes along X,Y,Z
Safety standards		UL 60950, IEC/EN 60950, compliance up to 60 VDC input voltage (SELV limit)
Safety approvals	- UL/cUL	www.ul.com -> certifications -> File: E188913

Note 1:

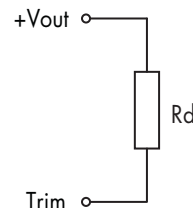
In order to meet conducted emissions EN55022-A and EN55011-A a capacitor between +Vin and -Vin has to be installed. The capacitor should be capable to handle 1 A ripple current. A suggestion is KMF Series of Nippon chemi-con, 220µF/100V, ESR 90mOhm.

Output Voltage Adjustment

Trim up



Trim down



Ru [kohm]*

output	1.8V	2.5V	3.3V	5.0V
+5%	1.2	4.3	6.8	4.7
+10%	0.068	0.82	1.5	0.56
output	12V	15V	±12V	±15V
+5%	47	47	27	33
+10%	8.2	6.8	2.2	2.7

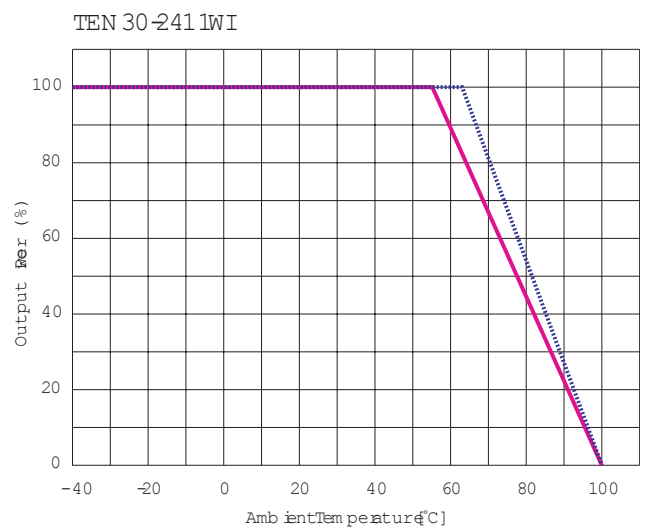
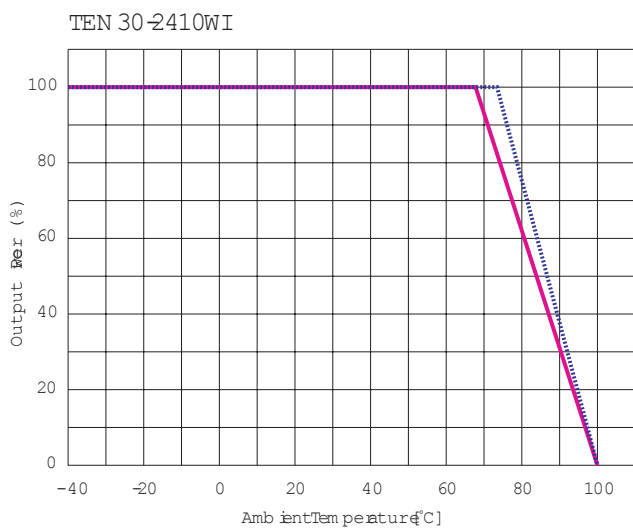
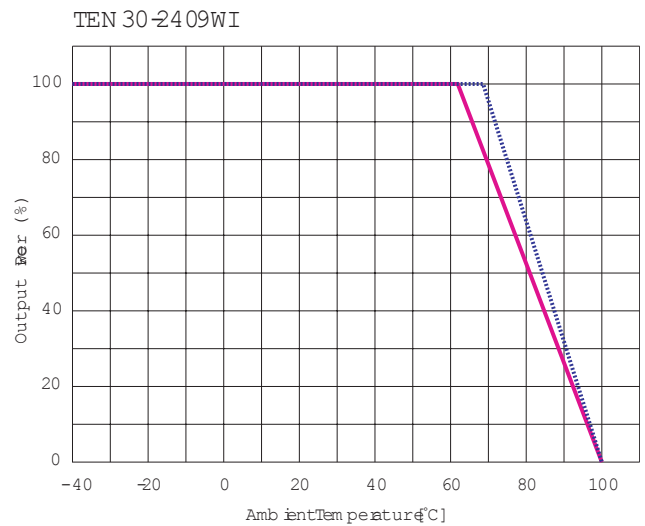
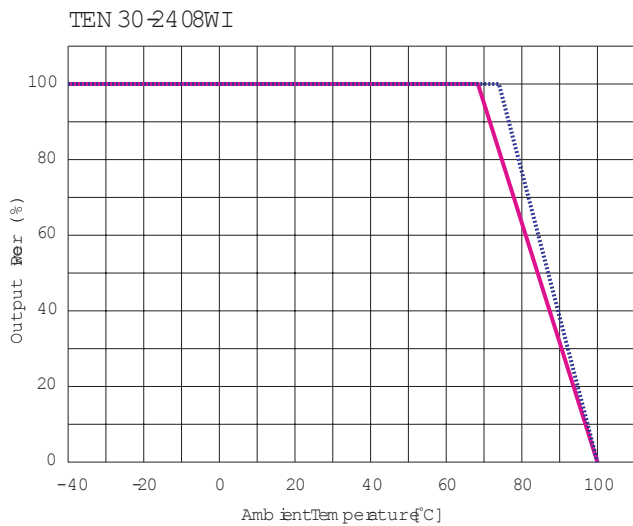
Ru [kohm]*

output	1.8V	2.5V	3.3V	5.0V
-5%	1.8	6.8	8.2	5.6
-10%	0.1	0.82	0.68	0.68
output	12V	15V	±12V	±15V
-5%	56	56	33	39
-10%	5.6	2.2	2.7	3.3

*approximate values

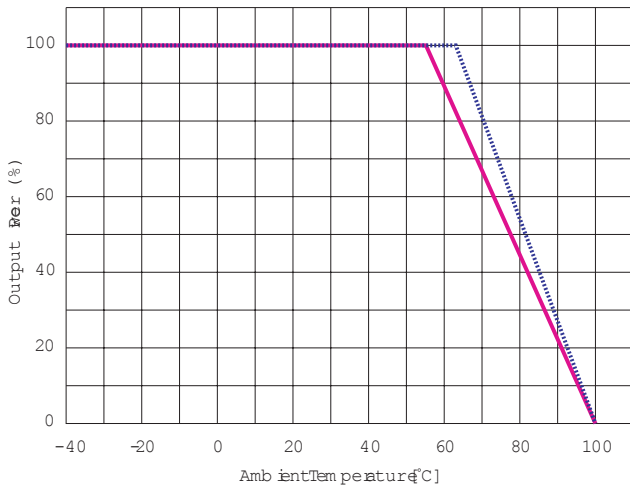
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Power De-rating

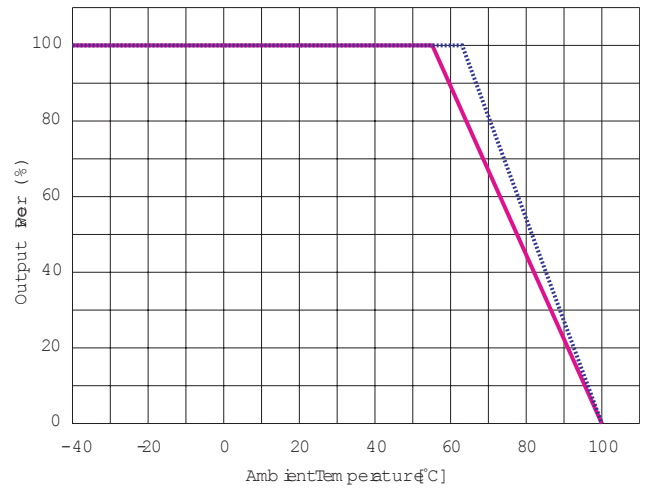


Power De-rating

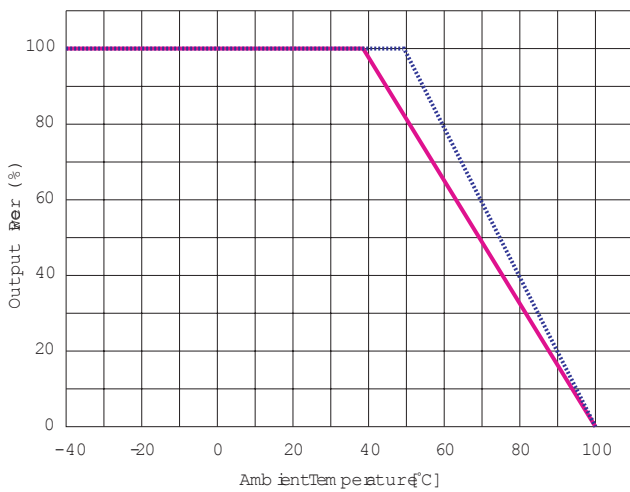
TEN 30-2412WI



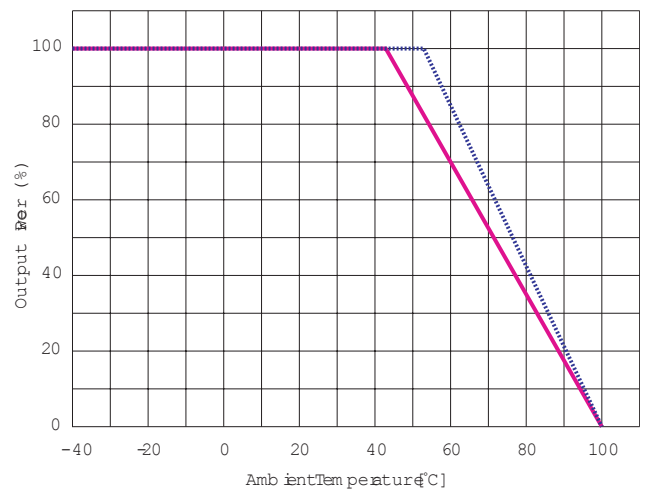
TEN 30-2413WI



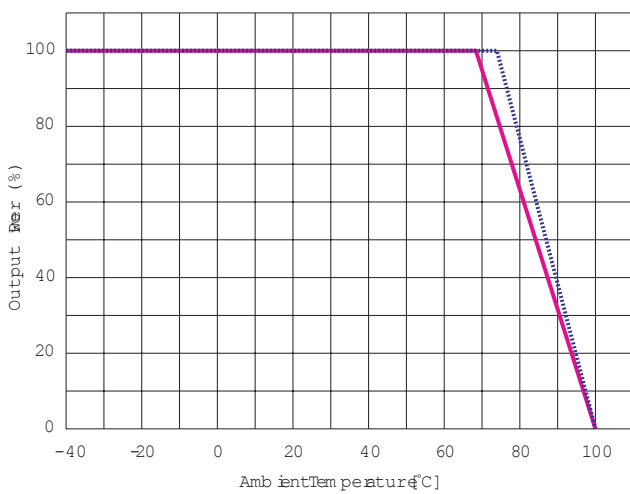
TEN 30-2422WI



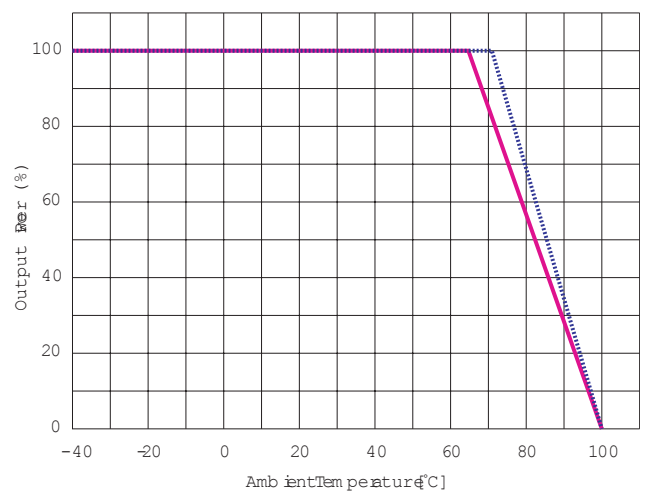
TEN 30-2423WI



TEN 30-408WI

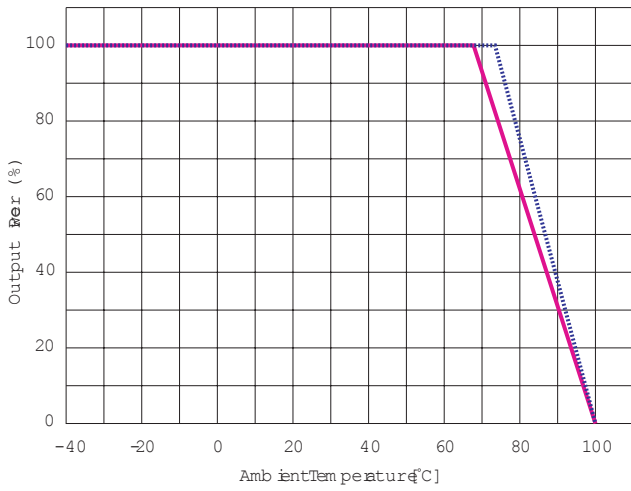


TEN 30-409WI

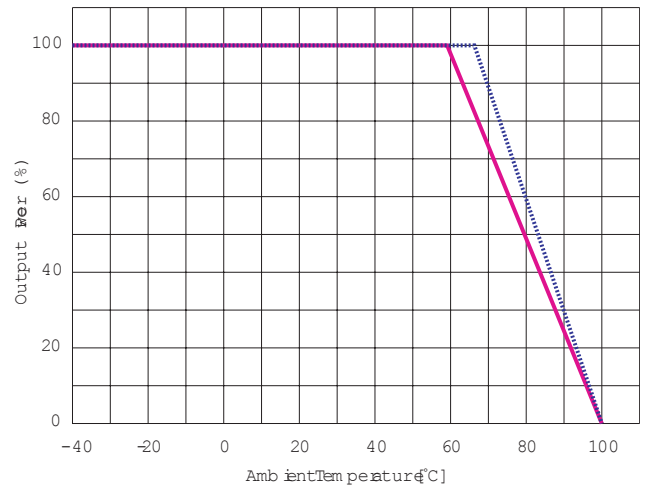


Power De-rating

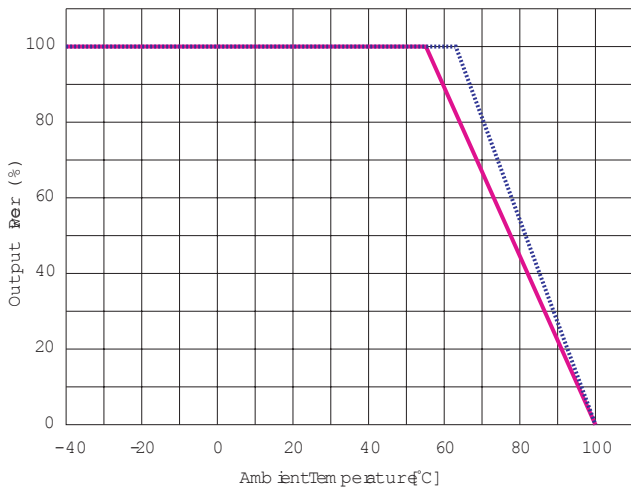
TEN 30-~~10~~10WI



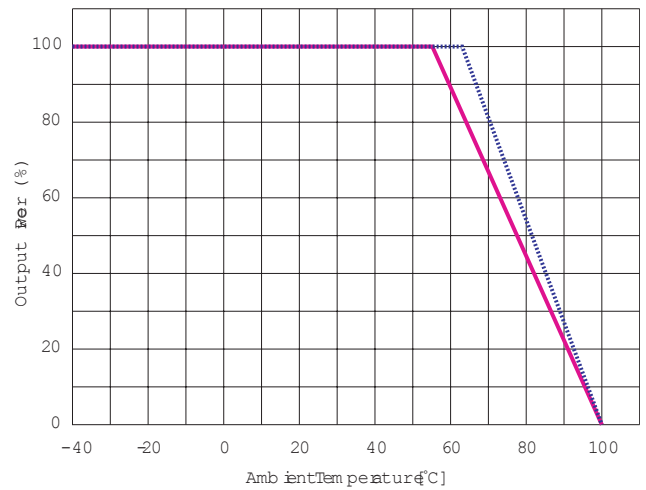
TEN 30-~~11~~11WI



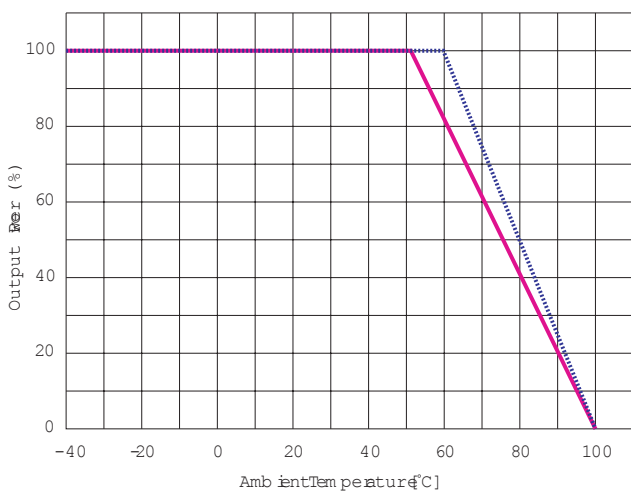
TEN 30-~~12~~12WI



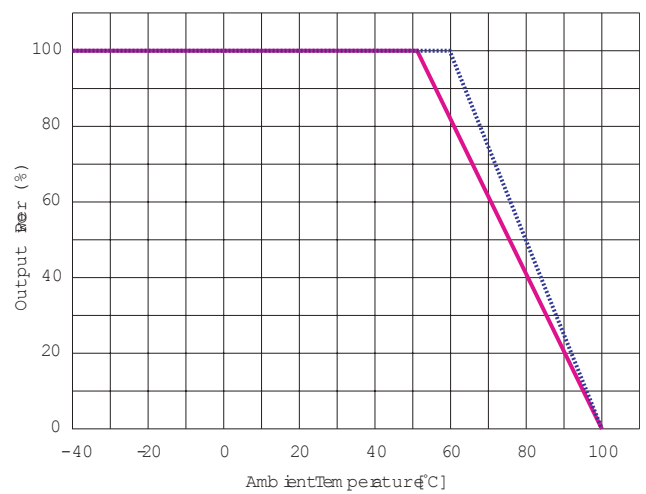
TEN 30-~~12~~12WI



TEN 30-~~22~~22WI



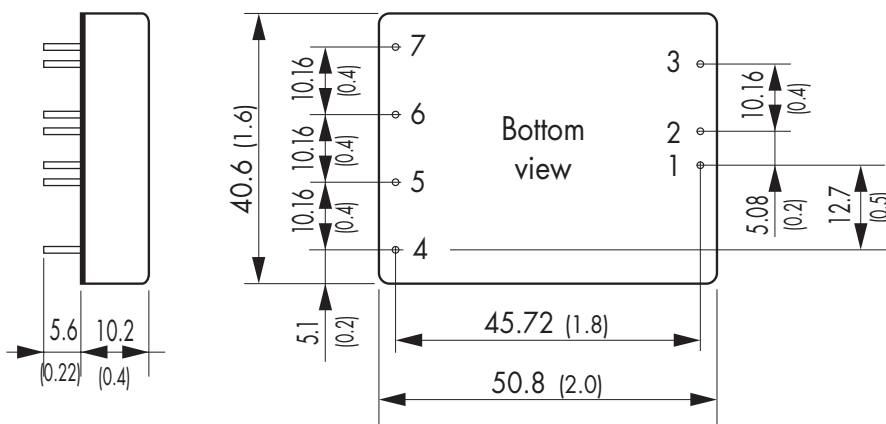
TEN 30-~~22~~22WI



Physical Specifications

Casing material	copper, nickel plated
Baseplate material	none conductive FR4
Potting material	epoxy (UL 94V-0 -rated)
Weight	48 g (1.69 oz)
Soldering temperature	max. 265°C / 10 sec.
Lead-free reflow solder process	as per J-STD-020D.01 (to find at: www.jedec.org - free registration required)
Moisture sensitivity level (MSL)	level 2 as per J-STD-033B.01 (to find at: www.jedec.org - free registration required)
Washing process	www.tracopower.com/products/smd-wash.pdf
Packaging	www.tracopower.com/products/ten30wi-pack.pdf

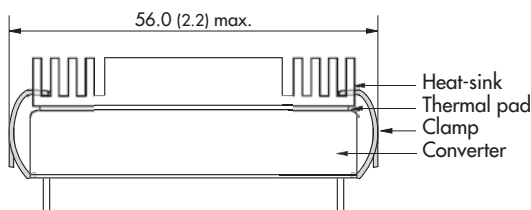
Outline Dimensions



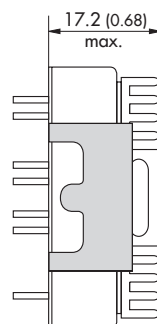
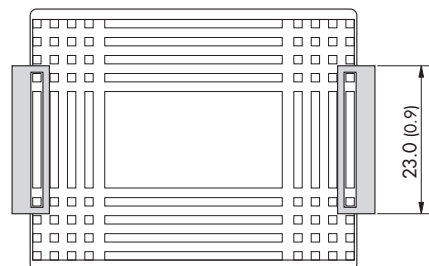
Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	
4	No pin	+Vout
5	+Vout	Common
6	-Vout	-Vout
7	Trim	

Dimensions in [mm], () = Inch
 Pin diameter: 1.0 ±0.05 (0.02 ±0.002)
 Pin pitch tolerances: ±0.35 (±0.014)
 Case tolerances: ±0.5 (±0.02)

Heat-sink TEN-HS2



Order code: TEN-HS2
 (cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 19 g (0.67oz) (without converter)



Note:

The product label on converter has to be removed before mounting the heat-sink. For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation. Separate heat-sinks are only available for prototypes and small quantity orders.

Specifications can be changed any time without notice