



# 12 WATT Single & Dual Output

Regulated, 24 Pin DIP Package  
Isolated, 4:1 Input  
DC/DC Converters



## FEATURES

- **Ultra Wide (4:1) Input Voltage Range**
- **12 Watts in DIL Package**
- **SMD Package Optional (Suffix "S")**
- **Standard 1.25" X 0.80" X 0.40"**
- **88% Typical Efficiency**
- **1600 Vdc Min.**
- **Input/Output Isolation**
- **Five-Sided Continuous EMI Shield**
- **UL6095-1, EN 60950-1, IEC 60950-1**
- **Compliant to RoHS EU Directive**

TWB12 Series

## Specifications

### INPUT

Voltage Range	24VDC nominal input.....	9 -36VDC
	48VDC nominal input.....	18 -75VDC
Input filter	.....Pi Filter	
Input Surge Voltage	24VDC input.....	50VDC 100ms, max.
	48VDC input.....	100VDC 100ms, max.
Input Reflected Ripple Current	.....20mA <sub>p-p</sub>	

Start up Time	Normal input and constant resistive load	Power up.....	450ms
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Startup Voltage	24VDC input.....	9VDC, max.
	48VDC input.....	18VDC, max.

Shutdown Voltage	24VDC input	.....8VDC
	48VDC input	.....16VDC

Remote ON/OFF (Note 5)	DC-DC ON.....	Open or 3V < Vr < 12V
	DC-DC OFF.....	Short or 0V < Vr < 1.2V

Input Current of Remote Control Pin.	Nominal input.....	-0.5mA-0.5mA
Remote off state input current.....	Nominal input.....	2.5mA

### OUTPUT

Output Power.....	.....12 Watts max.
Voltage Accuracy	..... ±1.2%
Minimum Load....	.....0%
Line Regulation	.....LL to HL at Full Load..... ±0.2%

Load Regulation	.....No Load to Full Load.....	.....Single (DIP)..... ±0.5%
		.....Single (SMD)..... ±1.0%
		.....Dual (SMD, DIP)..... ±1.0%

Cross Regulation Asymmetrical Load 25% / 100% FL..	..... ±5%
Ripple and Noise.....	20MHz band width..... See table
Temperature Coefficient..	..... ±0.2% / °C, max.
Transient Response recovery Time	.....25% load step change..... 250µS

Over voltage protection	.....3.3 VDC output..	.....3.9VDC
(only single)	.....5.1VDC output.....	.....6.2VDC
	.....12VDC output.....	.....15VDC
	.....15VDC output.....	.....18VDC

Overload Protection.....	% of FL at nominal input.....	150%
Short Circuit Protection.....	Continuous, automatic recovery	

Additional specifications on next page.



**GENERAL**

Efficiency.....	See table
Isolation Voltage	Input to Output .....1600Vdc, min. 1 minute
	Input (Output) to Case.....DIP.....1600Vdc, min. 1 minute
	.....SMD.....1000Vdc, min. 1 minute
Isolation Resistance	.....500VDC.....10 <sup>9</sup> ohms, min.
Isolation Capacitance	.....1500pF, max.
Switching Frequency	.....400kHz±10%
Approvals and Standard	.....IEC60950-1, UL60950-1, EN60950-1
Case Material	.....Nickel Coated Copper
Base Material	.....Non-conductive black plastic
Potting Material	.....Epoxy (UL94-V0)
Dimensions	1.25 x 0.80 x 0.40 inches (31.8 x 20.3 x 10.2 mm)
Weight	.....18g (0.62 oz.)
MTBF (Note 1)	.....BELLCORE TR-NWT-000332.....2.350 x 10 <sup>6</sup> hrs
	.....MIL-HDBK-217F.....8.745 x 10 <sup>5</sup> hrs

**ENVIRONMENTAL**

Operating Ambient Temperature (Note 6)	Vo:5V, 12V, 15V	-40°C - +69°C (without derating)
	±12V, ±15V	+69°C - +105°C (with derating)
Maximum Case Temperature.....	Vo:3.3V, ±5V	-40°C - +61°C (without derating)
		+61°C - +105°C (with derating)
Storage Temperature Range.....		+105°C
Thermal Impedance (Note 8).....	Natural Convection.....	-55°C - +125°C
Thermal Shock.....		20°C/Watt
Vibration.....		MIL-STD-810F
Relative Humidity.....		MIL-STD-810F
		5% to 95% RH

**EMC CHARACTERISTICS**

EMI (Note 6).....	EN55022, EN55011	.....Class A, Class B
ESD.....	..EN61000-4-2	Air.....±8KV
		Contact.....±6KV
Radiated Immunity.....	EN61000-4-3	.....10 V/m
Fast Transient (Note 7).....	EN61000-4-4	.....±2KV
Surge (Note 7).....	EN61000-4-5	.....±1KV
Conducted Immunity.....	EN61000-4-6	.....10Vr.m.s.

\*For SMD package, use suffix "S" after model number.

**SELECTION GUIDE**

	Input Voltage Nominal (Range) (Vdc)	Output Voltage (Vdc)	Output Current (mA)	Output Ripple & Noise	Input Current		Efficiency (%) <sup>(3)</sup>	Model Number*	Capacitor Load max. <sup>(4)</sup>
					No load <sup>(2)</sup> (mA)	Full load (mA)			
<b>SINGLE OUTPUT VOLTAGE</b>	24 (9-36)	3.3	3500	85m Vp-p	55	602	84	TWB12-24S3.3	2000µF
	24 (9-36)	5.1	2400	85m Vp-p	55	614	87	TWB12-24S5	2000µF
	24 (9-36)	12	1000	85m Vp-p	13	602	87	TWB12-24S12	430µF
	24 (9-36)	15	800	85m Vp-p	11	602	87	TWB12-24S15	300µF
	48 (20-72)	3.3	3500	85m Vp-p	17	301	84	TWB12-48S3.3	2000µF
	48 (20-72)	5.1	2400	85m Vp-p	20	307	87	TWB12-48S5	2000µF
	48 (20-72)	12	1000	85m Vp-p	6	302	87	TWB12-48S12	430µF
	48 (20-72)	15	800	85m Vp-p	6	298	84	TWB12-48S15	300µF
<b>DUAL OUTPUT VOLTAGE</b>	24 (9-36)	±5	±1200	85m Vp-p	15	625	84	TWB12-24-5	+/-1250µF
	24 (9-36)	±12	±500	85m Vp-p	12	602	87	TWB12-24-12	+/-200µF
	24 (9-36)	±15	±400	85m Vp-p	20	602	88	TWB12-24-15	+/-120µF
	48 (20-72)	±5	±1200	85m Vp-p	7	309	85	TWB12-48-5	+/-1250µF
	48 (20-72)	±12	±500	85m Vp-p	7	301	87	TWB12-48-12	+/-200 µF
	48 (20-72)	±15	±400	85m Vp-p	7	301	87	TWB12-48-15	+/-120µF

**NOTES:**

- Bellcore TR-NWT-00032, Case: 1:50% Stress, Temperature at 40°C.  
MIL-STD-217F Notice 2 @ Ta = 25°C, Full load (Ground, Benign, controlled environment).
- Maximum value at normal input voltage and full load.
- Typical value at nominal input voltage and no load.
- Typical value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- The ON/OFF control pin voltage is referenced to -Vin.
- The TWB12 series can meet EN55022 Class A with parallel an external capacitor to the input pins.  
Recommend: 24 Vin : C1=1 µF/50V 1210 MLCC.  
48 Vin : C1=0.47 µF/100V 1812 MLCC.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.  
The filter capacitor Polytron Devices suggests: Nippon chemi-con KY series, 220µ F/100V, ESR0

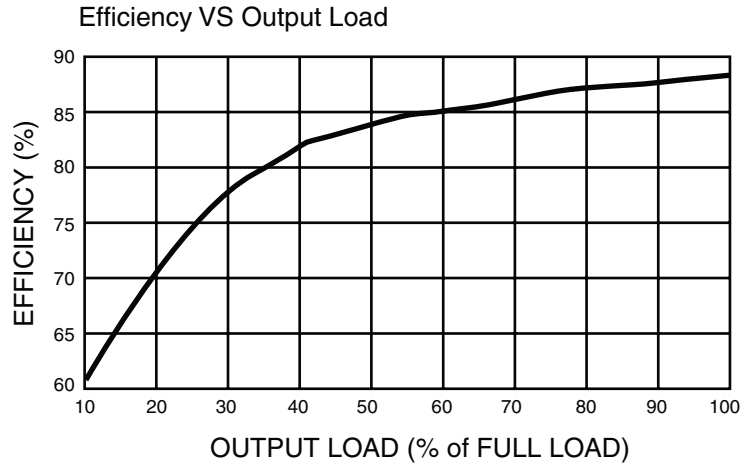
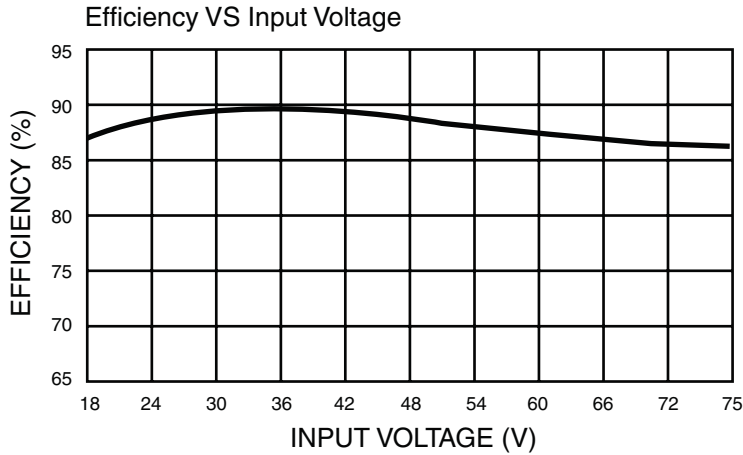
See next page for Mechanical Specifications.



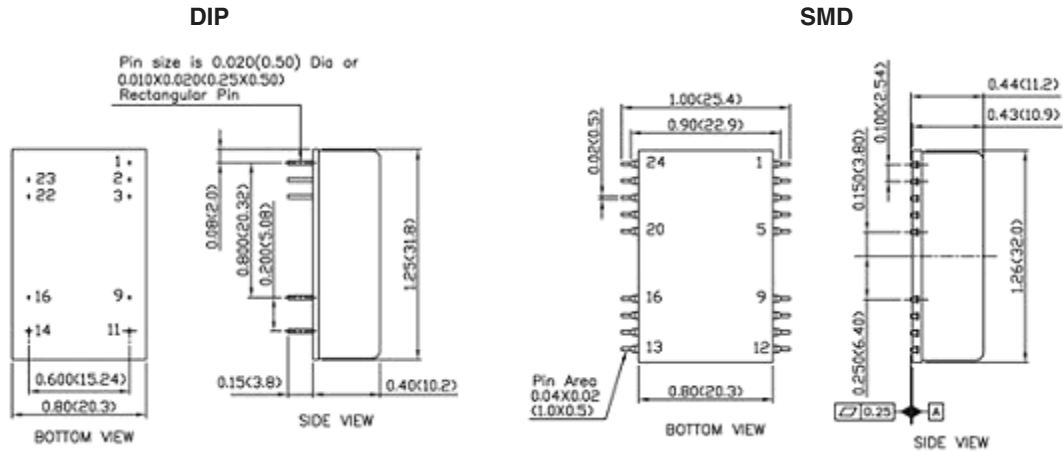
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### Mechanical Drawings



1. All dimensions in inches (mm)  
Tolerance: x.xx±0.02(x.x±0.5)  
x.xxx±0.01(x.xx±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004(0.1)

PIN CONNECTION - DIP		
PIN	SINGLE	DUAL
1	CTRL	CTRL
2	-INPUT	-INPUT
3	-INPUT	-INPUT
9	NC	COMMON
11	NC	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22	+INPUT	+INPUT
23	+INPUT	+INPUT

PIN CONNECTION - SMD		
PIN	SINGLE	DUAL
1	CTRL	CTRL
2	-INPUT	-INPUT
3	-INPUT	-INPUT
9	NC	COMMON
11	NC	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22	+INPUT	+INPUT
23	+INPUT	+INPUT
Others	NC	NC



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