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		20mAp-p
Start up Time	Normal input and constant resistive load	Power up 450ms
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 (only single)	3.3 VDC output	3.9VDC
	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.

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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.....10^9ohms, 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 10^6 hrs
.....MIL-HDBK-217F.....8.745 x 10^5 hrs

ENVIRONMENTAL

Operating Ambient Temperature (Note 6)
Vo:5V, 12V, 15V ±12V, ±15V: -40°C - +69°C (without derati +69°C - +105°C (with derati
Vo:3.3V, ±5V: -40°C - +61°C (without derati +61°C - +105°C (with derati
Maximum Case Temperature..... .....+10
Storage Temperature Range..... .....-55°C - +12
Thermal Impedance (Note 8) .....Natural Convection..... .....20°C/W
Thermal Shock..... .....MIL-STD-81
Vibration..... .....MIL-STD-81
Relative Humidity..... .....5% to 95%

EMC CHARACTERISTICS

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

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

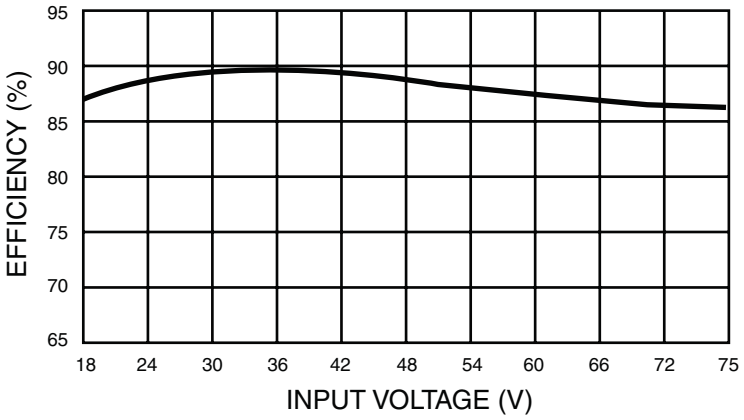
SELECTION GUIDE

	Input Voltage Nominal (Range) (Vdc)	Output Voltage (Vdc)	Output Current (mA)	Output Ripple & Noise	Input Current		Efficiency (%)(3)	Model Number*	Capacitor Load max.(4)
					No load(2) (mA)	Full load (mA)			
SINGLE OUTPUT VOLTAGE	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
DUAL OUTPUT VOLTAGE	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

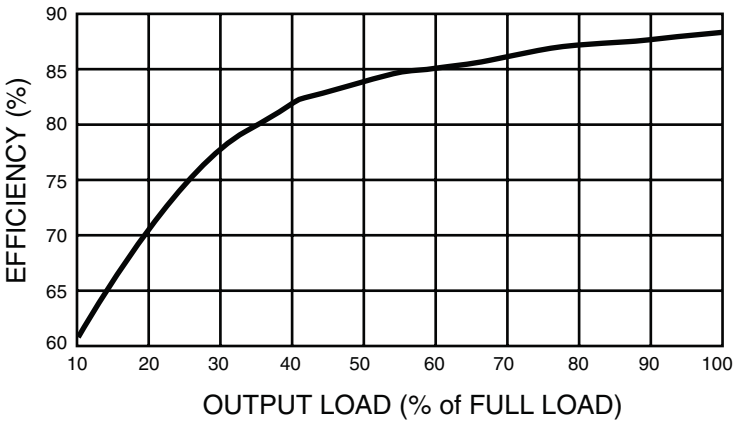
NOTES:

1. 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).
2. Maximum value at normal input voltage and full load.
3. Typical value at nominal input voltage and no load.
4. Typical value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The ON/OFF control pin voltage is referenced to -Vin.
7. 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.
8. 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-icon KY series, 220μ F/100V, ESRO

Efficiency VS Input Voltage

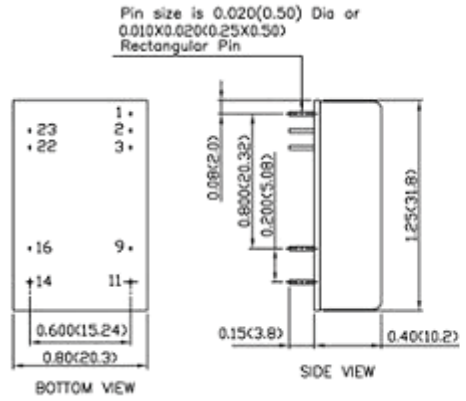


Efficiency VS Output Load

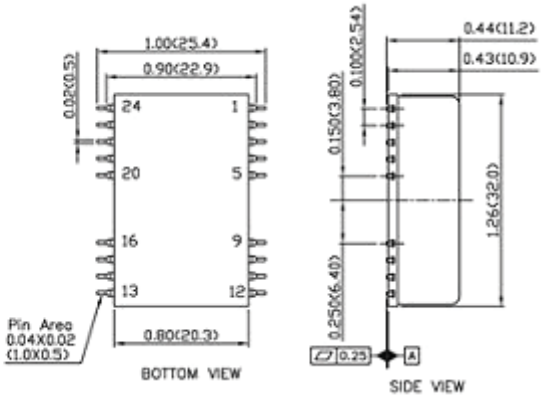


Mechanical Drawings

DIP



SMD



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