

DC-DC CONVERTERS

REGULATED, 4:1 WIDE INPUT RANGE, 1 WATT

EXTRA SMALL 0.52" X 0.36" X 0.40" SMD OR DIP PACKAGE
DSB(H)1 SERIES



FEATURES

- 4:1 Wide Input Voltage Range
- Extra Small SMD or DIP Package: 0.52" × 0.36" × 0.40"
- No Minimum Load Required
- Continuous Short Circuit Protection
- 3000Vdc Input to Output Isolation Available
- Safety Meets UL60950-1, EN60950-1 & IEC60950-1
- CE Mark
- Compliant to RoHS II and Reach

SELECTION GUIDE (SINGLE) All specifications are typical at nominal input, full load and 25°C, unless otherwise noted.

DSB" prefix=SMD Type. For DIP type, use prefix "DSH" instead of "DSB"

Input Voltage Range Vdc	Output Voltage Vdc	Output Current at Full Load mA	Input Current at No Load mA	Efficiency %	Model Number	Maximum Capacitor Load μ F
4.5 - 18	3.3	300	15	77	DSB(H)1-12S33	1680
4.5 - 18	5	200	20	79	DSB(H)1-12S5	820
4.5 - 18	12	90	20	81	DSB(H)1-12S12	470
4.5 - 18	15	70	20	81	DSB(H)1-12S15	330
4.5 - 18	24	45	25	80	DSB(H)1-12S24	160
9 - 36	3.3	300	10	76	DSB(H)1-24S33	1680
9 - 36	5	200	10	78	DSB(H)1-24S5	820
9 - 36	12	90	10	81	DSB(H)1-24S12	470
9 - 36	15	70	10	81	DSB(H)1-24S15	330
9 - 36	24	45	10	80	DSB(H)1-24S24	160
18 - 75	3.3	300	5	75	DSB(H)1-48S33	1680
18 - 75	5	200	5	78	DSB(H)1-48S5	820
18 - 75	12	90	5	81	DSB(H)1-48S12	470
18 - 75	15	70	6	81	DSB(H)1-48S15	330
18 - 75	24	45	6	80	DSB(H)1-48S24	160
4.5 - 18	\pm 5	\pm 100	25	77	DSB(H)1-12-5	\pm 470
4.5 - 18	\pm 12	\pm 45	25	80	DSB(H)1-12-12	\pm 330
4.5 - 18	\pm 15	\pm 35	25	81	DSB(H)1-12-15	\pm 220
9 - 36	\pm 5	\pm 100	10	77	DSB(H)1-24-5	\pm 470
9 - 36	\pm 12	\pm 45	10	80	DSB(H)1-24-12	\pm 330
9 - 36	\pm 15	\pm 35	10	81	DSB(H)1-24-15	\pm 220
18 - 75	\pm 5	\pm 100	6	77	DSB(H)1-48-5	\pm 470
18 - 75	\pm 12	\pm 35	6	80	DSB(H)1-48-12	\pm 330
18 - 75	\pm 15	\pm 45	6	81	DSB(H)1-48-15	\pm 220

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Input Specifications			Output Specifications		
Operating input voltage range, Vdc	4.5 Min., 12 Typ., 18 Max.	12Vin(nom)	Voltage accuracy, %	±1.0	
	9 Min., 24 Typ., 36 Max.	24Vin(nom)	Line regulation, %		Low Line to High Line at Full Load
	18 Min., 48 Typ., 75 Max.	48Vin(nom)		±0.2	
Start up time, ms		Constant resistive load	Load regulation, %		No Load to Full Load
	5 Min., 10 Max.	Power up		±1.0	Single
	5 Min., 10 Max.	Remote ON/OFF		±1.0	Dual
Input surge voltage, Vdc		1 second, max.		10% Load to 90% Load	
	25 Max.	12Vin(nom)	±0.5	Single	
	50 Max.	24Vin(nom)	±0.8	Dual	
Input filter		Capacitor type			
Input Reflected Ripple Current ⁽¹⁾ , mAp-p	15 Typ.	12Vin(nom)	Cross regulation, %	±5	Asymmetrical load 25%/100%FL, Dual
	10 Typ.	24Vin(nom)	Ripple and noise, mVp-p	30 Typ.	Measured by 20MHz bandwidth
	5 Typ.	48Vin(nom)	Temperature coefficient, %/°C	±0.02 Max.	
Remote ON/OFF		Ctrl pin applied current via 1kΩ	Transient response recovery time, μs	500 Typ.	25% load step change
	Open or high impedance	DC-DC ON	Short circuit protection	Continuous, automatic recovery	
	2 Min., 3 Typ., 4 Max.	DC-DC OFF			
	2.5 Max.	Remote off input current			

General Specifications					
Isolation voltage, Vdc	1 minute	Standard	1600 Min.		
		Suffix "H"	3000 Min.		
Isolation resistance, GΩ	500Vdc		1 Min.		
Isolation capacitance, pF		Standard			50 Max.
		Suffix "H"			50 Max.
Switching frequency, kHz			100 Min.		
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1				

Environmental Specifications					
Operating ambient temperature, °C	Without derating		-40 Min.		+90 Max.
	With derating		+90 Min.		+105 Max.
Storage temperature range, °C			-55 Min.		+125 Max.
Thermal shock			MIL-STD-810F		
Vibration			MIL-STD-810F		
Relative humidity			5% to 95% RH		
Lead-free reflow solder process			IPC J-STD-020D		
Moisture sensitivity level (MSL)			IPC J-STD-033B Level 2		

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Physical Specifications	
Dimensions	0.52" × 0.36" × 0.40"
Case material	Non-conductive, black, plastic
Base material	Non-conductive, black, plastic
Potting material	Silicone (UL94 V-0)
Weight	2.7g (0.10oz)
MTBF	8.401 × 10 ⁶ hrs, MIL-HDBK-217F, Full load

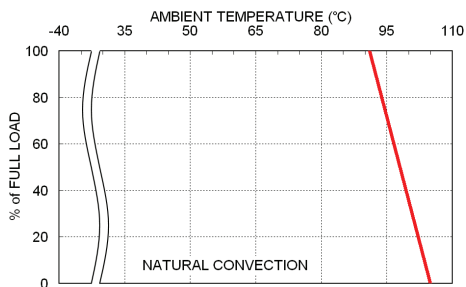
EMC Specifications			
Specifications	Conditions		Level
EMI ⁽¹⁾	EN55022		Class A
			Class B
ESD	EN61000-4-2	Air ±8kV and Contact ±6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10V/m	Perf. Criteria A
Fast transient ⁽²⁾	EN61000-4-4	±2kV	Perf. Criteria A
Surge ⁽²⁾	EN61000-4-5	±1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10Vr.m.s	Perf. Criteria A

Note:

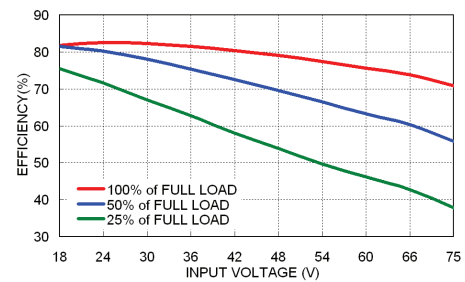
1. The standard modules meet IMA Class A or Class B and input reflected ripple current with external components. For further information, please contact Polytron Devices, Inc.
2. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor suggests: Nippon chemi-con KY series, 220 µF/100V.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

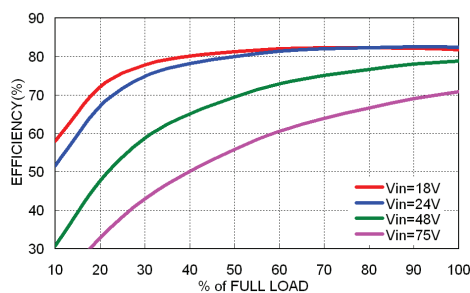
Characteristic Curve



DSB(H)1-48S5 Derating Curve



DSB(H)1-48S5 Efficiency vs. Input Voltage

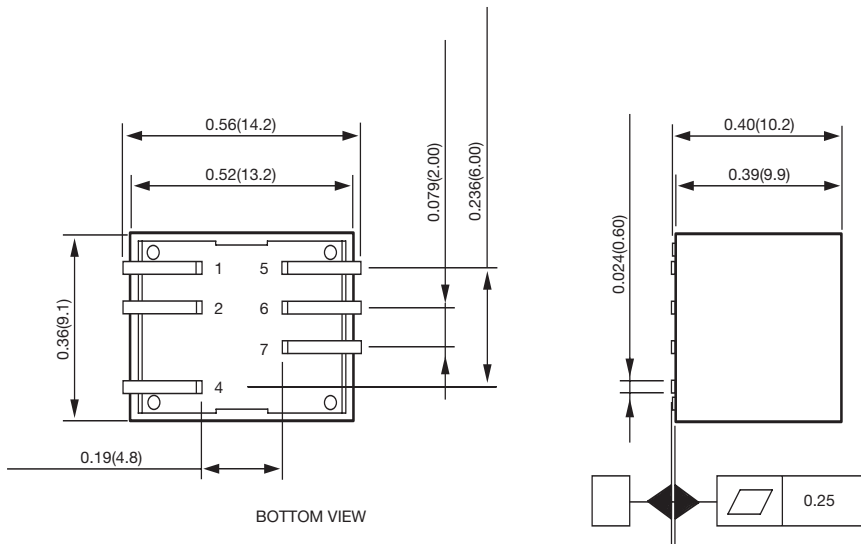


DSB(H)1-48S5 Efficiency vs. Output Current

DSB(H)1 SERIES

Mechanical Drawing

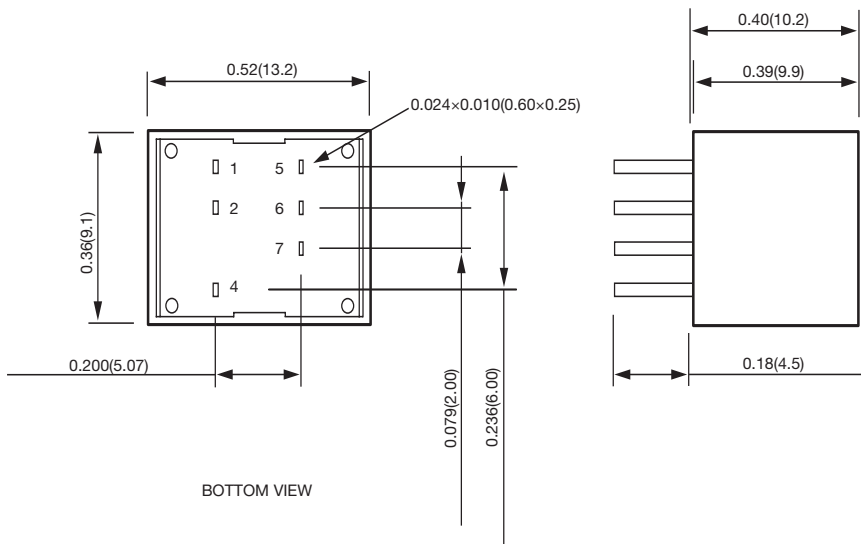
DSB1 SMD Type



PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	Ctrl	Ctrl
5	NC	-Vout
6	-Vout	Common
7	+Vout	+Vout

DHB1 DIP Type



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