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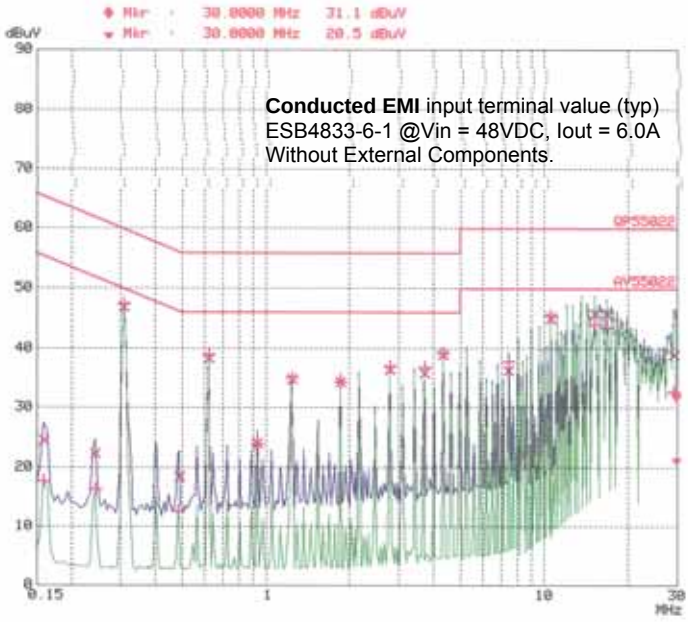
# ESB SERIES

Single Low Voltage SR Models
Data Sheets & Derating Curves




**Conducted EMI** input terminal value (typ)
ESB4833-6-1 @Vin = 48VDC, Iout = 6.0A
Without External Components.

High efficiency 88%@ 3.3V (SR topology)
Save up to 20% board space
Standard pin out; **Fully replaceable** with 2"x1" standard case
1500V **Basic Insulation** (input to output)
**Built-in EMC** filter meets **EN 55022 class B** and **FCC Level B** without external components
MTBF≥2,195,000 hours @50˚C GB (BellCore TR-332)

c US E220958

TÜV Rheinland Product Safety | BAUART GEPRÜFT | TYPE APPROVED

CE

## Model Selection Guide

Typical @ Ta=+25˚C under nominal line voltage and full load conditions unless noted.

| Model | Input | | | | Output | | | Efficiency @FL |
|---|---|---|---|---|---|---|---|---|
| | Voltage (Volts) | | Current (A) | | Voltage | Current | Power | |
| | Nominal | Range | No load | Full load | (Volts) | (A) | (W) | Typ. |
| **ESB4850-4-X** | 48 | 36-75 | 0.025 | 0.47 | 5.0 | 4 | 20 | 89% |
| **ESB4833-6-X** | 48 | 36-75 | 0.025 | 0.47 | 3.3 | 6 | 19.8 | 88% |
| **ESB4825-6-X** | 48 | 36-75 | 0.025 | 0.36 | 2.5 | 6 | 15 | 86% |
| **ESB4818-6-X** | 48 | 36-75 | 0.025 | 0.26 | 1.8 | 6 | 10.8 | 85% |
| **ESB2450-4-X** | 24 | 18-36 | 0.045 | 0.95 | 5.0 | 4 | 20 | 88% |
| **ESB2433-6-X** | 24 | 18-36 | 0.045 | 0.95 | 3.3 | 6 | 19.8 | 87% |
| **ESB2425-6-X** | 24 | 18-36 | 0.045 | 0.74 | 2.5 | 6 | 15 | 85% |
| **ESB2418-6-X** | 24 | 18-36 | 0.045 | 0.54 | 1.8 | 6 | 10.8 | 84% |
| **ESB4850-3-X** | 48 | 36-75 | 0.025 | 0.36 | 5.0 | 3 | 15 | 88% |
| **ESB4833-4-X** | 48 | 36-75 | 0.025 | 0.36 | 3.3 | 4.5 | 14.9 | 87% |
| **ESB4825-4-X** | 48 | 36-75 | 0.025 | 0.28 | 2.5 | 4.5 | 11.3 | 85% |
| **ESB2450-3-X** | 24 | 18-36 | 0.045 | 0.71 | 5.0 | 3 | 15 | 88% |
| **ESB2433-4-X** | 24 | 18-36 | 0.045 | 0.71 | 3.3 | 4.5 | 14.9 | 87% |
| **ESB2425-4-X** | 24 | 18-36 | 0.045 | 0.55 | 2.5 | 4.5 | 11.3 | 85% |
| **ESB1250-4-X** | 12 | 9-18 | 0.1 | 1.91 | 5.0 | 4 | 20 | 87% |
| **ESB1233-6-X** | 12 | 9-18 | 0.1 | 1.92 | 3.3 | 6 | 19.8 | 86% |

**Enable Polarity** : "**-1**" for positive logic Built-In EMC Input Filter, "**-P**" for positive logic PI Input Filter
"**-0**" for negative logic Built-In EMC Input Filter, "**-N**" for negative logic PI Input Filter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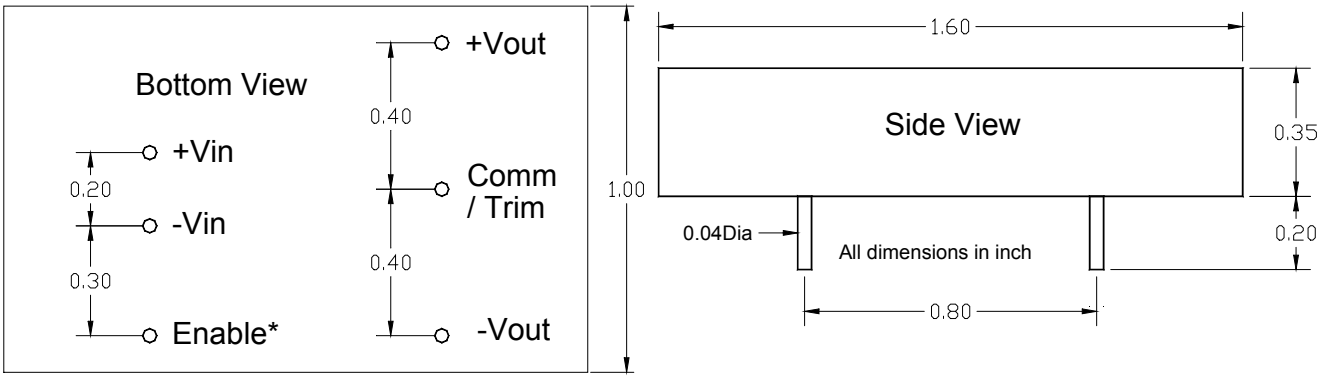


**Electrical Specifications** Typical @ Ta=+25˚C under nominal line voltage and full load conditions unless noted.

**Input**

| Parameter | Notes and Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|
| Operating Input Voltage ranges | ESB12 models<br>ESB24 models<br>ESB48 models | 9<br>18<br>36 | 12<br>24<br>48 | 18<br>36<br>75 | VDC<br>VDC<br>VDC |
| Under-Voltage Lockout Turn-ON Threshold | ESB12 models<br>ESB24 models<br>ESB48 models | 8.5<br>17.5<br>35 | | | VDC<br>VDC<br>VDC |
| Under-Voltage Lockout Turn-OFF Threshold | ESB12 models<br>ESB24 models<br>ESB48 models | | | 8<br>17<br>34 | VDC<br>VDC<br>VDC |
| Input Current | See model selection guide, Standby mode (**OFF, UVLO**) 5mA | | | | |
| High Input Level | Enable Function Input | 3 | | 5.5 | VDC |
| Low Input Level | | 0 | | 1.2 | VDC |
| Input Filter | All models | Pi Filter | | | |

**Output**

| Parameter | Notes and Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|
| Output Voltage Accuracy | 50% Load | | | ±1.5 | % |
| Line Regulation | Low line to High line | | | ±0.3 | % |
| Load Regulation | 10% to 100% load | | | ±0.5 | % |
| Ripple & Noise (20MHz bandwidth) | Over Line, Load & Temp. | | 80 | 150<br>30 | mV pk-pk<br>mV RMS |
| Temperature Coefficient | | | | ±0.04 | % /˚C |
| Transient Recovery Time | 25% load step change | | | 800 | µSec. |
| Transient Peck Deviation | 25% load step change | | | 2 | %Vo |
| Start-Up Time | | | 50 | 100 | mSec. |
| Output Power Protection | | 100 | 120 | 140 | % |

**General Specifications**

| Parameter | Notes and Conditions | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|
| Switching Frequency | | 270 | 300 | 330 | KHz |
| Storage Temperature range | All models | -55 | | 125 | ˚C |
| Operating Case Temperature | All models | -40 | | 100 | ˚C |
| Isolation Voltage | All models, 1 Minute | | | 1500 | VDC |
| Isolation Resistance | All models, 500VDC | 10 | | | MΩ |
| Isolation Capacitance | All models | | | 1000 | pF |
| Humidity | All models | | | 95 | % |
| Calculated **MTBF** | BellCore TR-332 @ 50˚C G.B. | | 2,195,000 | | Hours |
| Weight | | | | 22(0.8) | g (oz.) |
| Efficiency | See model selection guide | | | | |
| Dimensions | 1.6” x 1.0” x 0.35” (40.6 x 25.4 x 8.9mm) | | | | |
| Case Material | Aluminum | | | | |

**It is recommended to protect the input by fuses or other protection devices**.



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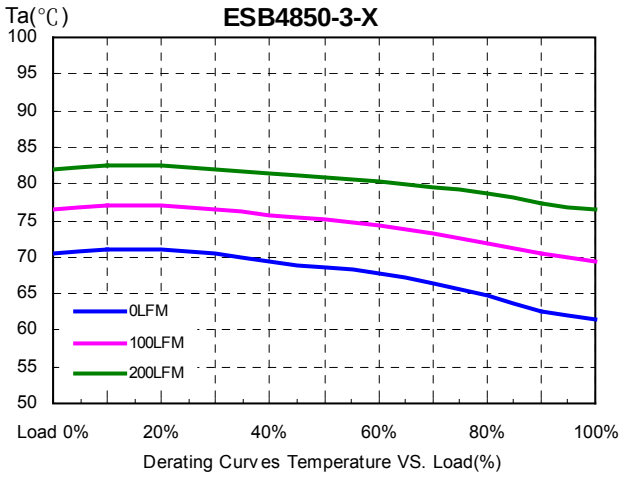


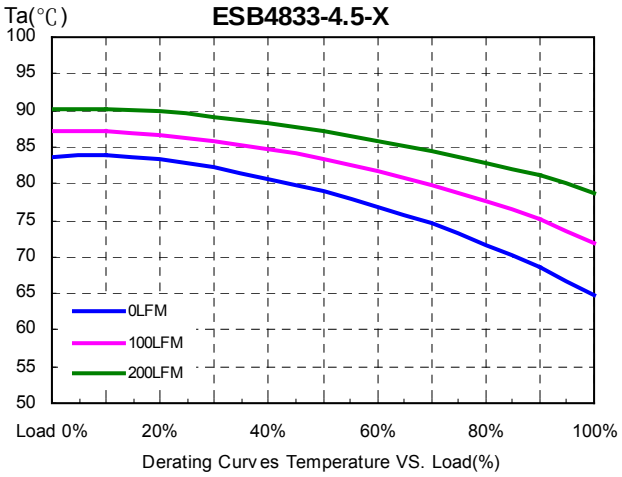


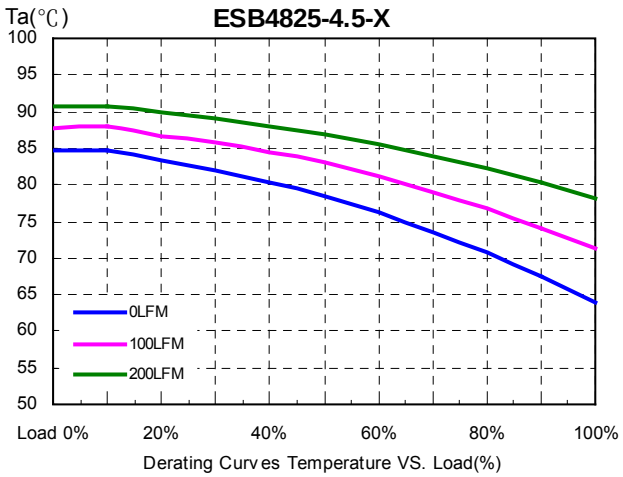


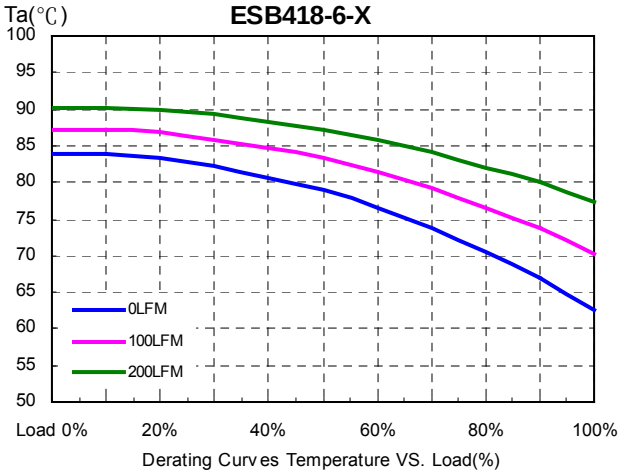


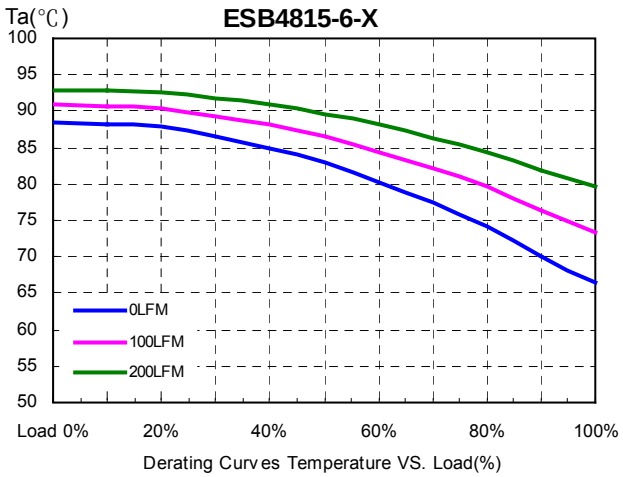


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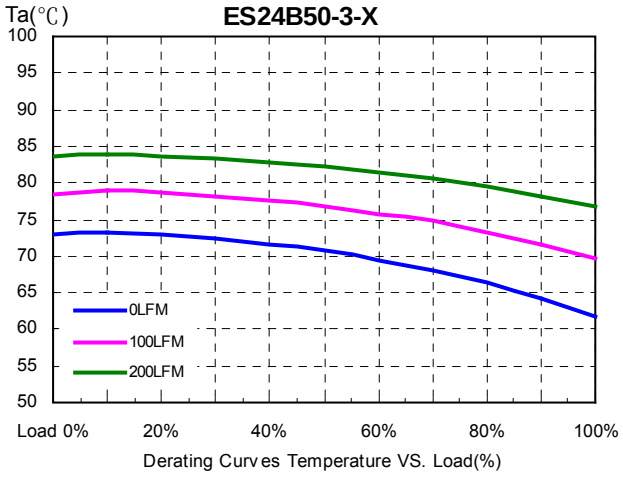


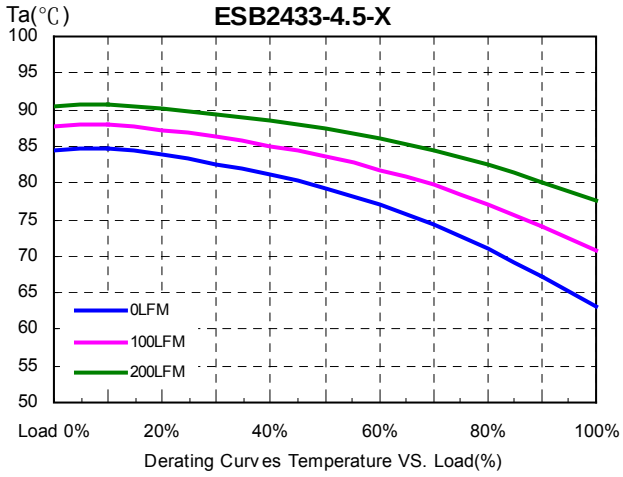


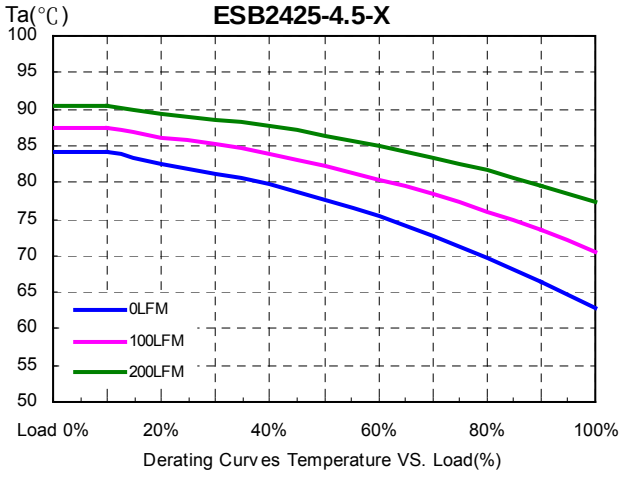


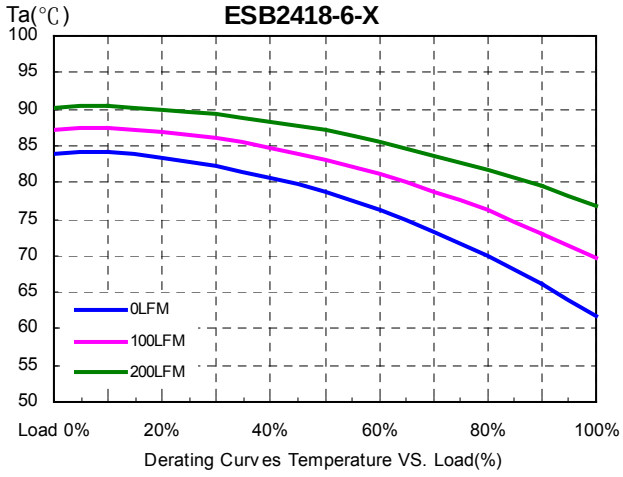


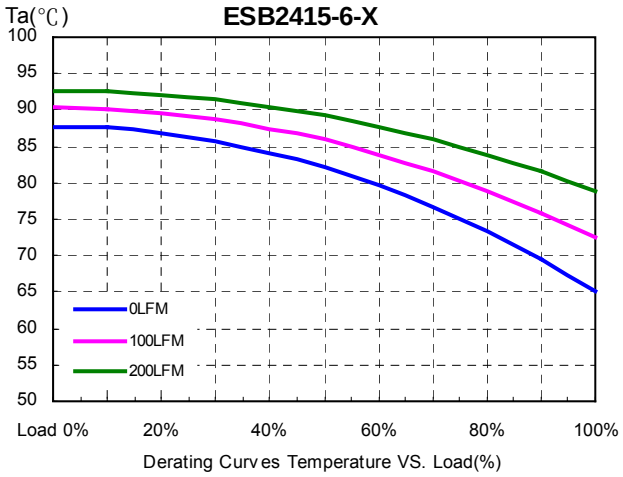


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