

1D8E_1U series

1W - Single Output - Fixed Input - Isolated & Unregulated
MINIATURE DIP PACKAGE

DC-DC Converter

1 Watt

- ⊕ Efficiency up to 83%
- ⊕ Small Footprint
- ⊕ Miniature DIP package
- ⊕ Single output voltage
- ⊕ 1kVDC Isolation
- ⊕ Temperature Range: -40°C~+85°C
- ⊕ Industry standard pinout
- ⊕ UL94-V0 package
- ⊕ RoHS compliance
- ⊕ EMI complies with EN55022 Class B
- ⊕ Low ripple and noise

The 1D8E_1U series are specially designed for applications where a single power supply is isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$);
- 2) Where isolation is necessary between input and output (isolation voltage = 1000VDC)
- 3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits and IGBT power device driven circuits, etc.



Common specifications

| | |
|------------------------------|---------------------------------------|
| Short circuit protection: | 1 second |
| Maximum case temperature: | 100°C |
| Cooling: | Nature convection |
| Operation temperature range: | -40°C~+85°C |
| Storage temperature range: | -40°C ~+125°C |
| Storage humidity range: | < 95% |
| Soldering temperature: | 260°C MAX, 1.5mm from case for 10 sec |
| Safety standard: | IEC 60950-1 |
| Case material: | Plastic [UL94-V0] |
| Pin material: | 0.5mm Alloy42 solder-coated |
| Potting material: | Epoxy [UL94-V0] |
| MTBF (MIL-HDBK-217-F): | >1.121 Mhours |
| Weight: | 1.5g |
| Dimensions: | 0.46x0.24x0.40 inch |

Input specifications

| Item | Test condition | Min | Typ | Max | Units |
|---------------------------|--|-----|-----|--------------------------------|--|
| Input voltage range | | | | ± 10 | % |
| Input surge voltage | <ul style="list-style-type: none"> • 3.3V models • 5V models • 12V models • 15V models • 24V models • 48V models | | | 6 7 15 18 28 54 | VDC VDC VDC VDC VDC VDC |
| Input filter | Capacitor | | | | |
| Reflected ripple current* | | | 20 | | mApk-pk |

* Measured with a simulated source inductance of 12μH.

Isolation specifications

| Item | Test condition | Min | Typ | Max | Units |
|-----------------------|---------------------|------|-----|------|-------|
| Isolation voltage | Tested for 1 minute | 1000 | | | VDC |
| Isolation capacitance | | | 60 | | pF |
| Isolation resistance | | | | 1000 | MΩ |

Output specifications

| Item | Test condition | Min | Typ | Max | Units |
|-------------------------|--------------------------|-----|-----|------------|-------|
| Output voltage accuracy | | | | ± 3 | % |
| Line regulation | For Vin change of 1% | | | 1.2 | % |
| Load regulation | 10% to 100% full load | | | 15 | % |
| Temperature drift | 100% full load | | | ± 0.02 | %/°C |
| Ripple & noise | 20MHz Bandwidth | | | 100 | mVp-p |
| Switching frequency | Full load, nominal input | | 80 | | KHz |

EMC specifications

| CE* | EN55032 | CLASS B |
|---------|---------------|--------------------|
| RE | EN55032 | CLASS B |
| ESD | IEC 61000-4-2 | Perfect criteria A |
| RS | IEC 61000-4-3 | Perfect criteria A |
| EFT** | IEC 61000-4-4 | Perfect criteria A |
| Surge** | IEC 61000-4-5 | Perfect criteria A |
| CS | IEC 61000-4-6 | Perfect criteria A |
| PFMF | IEC 61000-4-8 | Perfect criteria A |

* Input filter components are required to help meet conducted emissions Class B, which application refer to the EMI filter of design & feature configuration.

** An external filter capacitor is required if the module has to meet IEC 61000-4-4 and IEC 61000-4-5.

Example:

1D8E_0505S1U
1 = 1Watt; D8 = DIP8; E = Pinning; 5Vin; 5Vout; S = Single Output;
1 = 1kVDC; U = Unregulated Output

Note:

1. All specifications measured at TA = 25°C, humidity < 75%, nominal input voltage and rated output load unless otherwise specified.
2. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
3. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

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| Part Number | Input Voltage [V] | Input current [mA] | | Output Voltage [VDC] | Output current [mA] | Efficiency [%, typ] | Capacitor load* [µF, max] |
|--------------|-------------------|--------------------|-----------------|----------------------|---------------------|---------------------|---------------------------|
| | | no load (max) | full load (typ) | | | | |
| 1D8E_0303S1U | 3.3 | 25 | 421 | 3.3 | 303 | 72 | 220 |
| 1D8E_0305S1U | 3.3 | 25 | 394 | 5 | 200 | 77 | 220 |
| 1D8E_0307S1U | 3.3 | 25 | 384 | 7.2 | 138.9 | 79 | 220 |
| 1D8E_0309S1U | 3.3 | 30 | 404 | 9 | 111.1 | 75 | 220 |
| 1D8E_0312S1U | 3.3 | 45 | 473 | 12 | 100 | 77 | 220 |
| 1D8E_0315S1U | 3.3 | 35 | 384 | 15 | 66.6 | 79 | 220 |
| 1D8E_0318S1U | 3.3 | 35 | 399 | 18 | 55.5 | 76 | 220 |
| 1D8E_0324S1U | 3.3 | 53 | 461 | 24 | 50 | 79 | 220 |
| 1D8E_0503S1U | 5 | 20 | 257 | 3.3 | 303 | 78 | 220 |
| 1D8E_0505S1U | 5 | 25 | 247 | 5 | 200 | 81 | 220 |
| 1D8E_0507S1U | 5 | 16 | 241 | 7.2 | 138.9 | 83 | 220 |
| 1D8E_0509S1U | 5 | 26 | 250 | 9 | 111.1 | 80 | 220 |
| 1D8E_0512S1U | 5 | 25 | 300 | 12 | 100 | 80 | 220 |
| 1D8E_0515S1U | 5 | 35 | 244 | 15 | 66.6 | 82 | 220 |
| 1D8E_0518S1U | 5 | 25 | 247 | 18 | 55.5 | 81 | 220 |
| 1D8E_0524S1U | 5 | 35 | 289 | 24 | 50 | 83 | 220 |
| 1D8E_1203S1U | 12 | 15 | 107 | 3.3 | 303 | 78 | 220 |
| 1D8E_1205S1U | 12 | 16 | 105 | 5 | 200 | 79 | 220 |
| 1D8E_1207S1U | 12 | 16 | 100 | 7.2 | 138.9 | 83 | 220 |
| 1D8E_1209S1U | 12 | 15 | 107 | 9 | 111.1 | 78 | 220 |
| 1D8E_1212S1U | 12 | 15 | 125 | 12 | 100 | 80 | 220 |
| 1D8E_1215S1U | 12 | 15 | 105 | 15 | 66.6 | 79 | 220 |
| 1D8E_1218S1U | 12 | 20 | 104 | 18 | 55.5 | 80 | 220 |
| 1D8E_1224S1U | 12 | 25 | 123 | 24 | 50 | 71 | 220 |
| 1D8E_1503S1U | 15 | 15 | 89 | 3.3 | 303 | 75 | 220 |
| 1D8E_1505S1U | 15 | 9 | 82 | 5 | 200 | 81 | 220 |
| 1D8E_1507S1U | 15 | 12 | 88 | 7.2 | 138.9 | 76 | 220 |
| 1D8E_1509S1U | 15 | 10 | 90 | 9 | 111.1 | 74 | 220 |
| 1D8E_1512S1U | 15 | 13 | 100 | 12 | 100 | 80 | 220 |
| 1D8E_1515S1U | 15 | 15 | 84 | 15 | 66.6 | 79 | 220 |
| 1D8E_1518S1U | 15 | 12 | 85 | 18 | 55.5 | 78 | 220 |
| 1D8E_1524S1U | 15 | 10 | 99 | 24 | 50 | 81 | 220 |
| 1D8E_2403S1U | 24 | 8 | 54 | 3.3 | 303 | 77 | 220 |
| 1D8E_2405S1U | 24 | 8 | 52 | 5 | 200 | 80 | 220 |
| 1D8E_2407S1U | 24 | 10 | 54 | 7.2 | 138.9 | 77 | 220 |
| 1D8E_2409S1U | 24 | 7 | 54 | 9 | 111.1 | 77 | 220 |
| 1D8E_2412S1U | 24 | 8 | 62 | 12 | 100 | 80 | 220 |
| 1D8E_2415S1U | 24 | 8 | 51 | 15 | 66.6 | 81 | 220 |
| 1D8E_2418S1U | 24 | 8 | 52 | 18 | 55.5 | 80 | 220 |
| 1D8E_2424S1U | 24 | 9 | 60 | 24 | 50 | 83 | 220 |
| 1S4E_4803S1U | 48 | 6 | 29 | 3.3 | 303 | 73 | 220 |
| 1S4E_4805S1U | 48 | 6 | 28 | 5 | 200 | 74 | 220 |
| 1D8E_4807S1U | 48 | 7 | 27 | 7.2 | 138.9 | 77 | 220 |
| 1D8E_4809S1U | 48 | 5 | 27 | 9 | 111.1 | 78 | 220 |
| 1D8E_4812S1U | 48 | 5 | 32 | 12 | 100 | 77 | 220 |
| 1D8E_4815S1U | 48 | 5 | 27 | 15 | 66.6 | 76 | 220 |
| 1D8E_4818S1U | 48 | 8 | 28 | 18 | 55.5 | 75 | 220 |
| 1D8E_4824S1U | 48 | 8 | 31 | 24 | 50 | 80 | 220 |

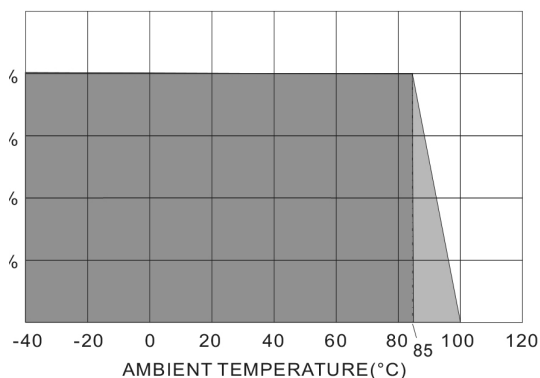
* Tested by minimal Vin and constant resistive load.

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Typical characteristics

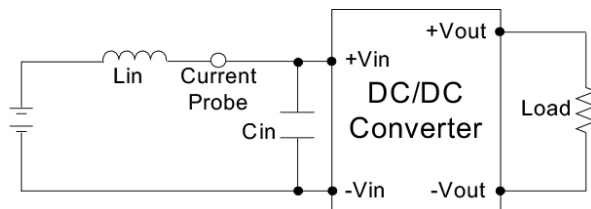
Derating Curve



Test configurations

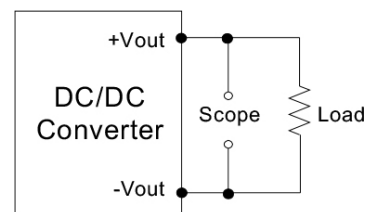
Input reflected ripple current test step

Input reflected ripple current is measured through a source inductor L_{in} ($12\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$) at 100KHz at nominal input and full load.



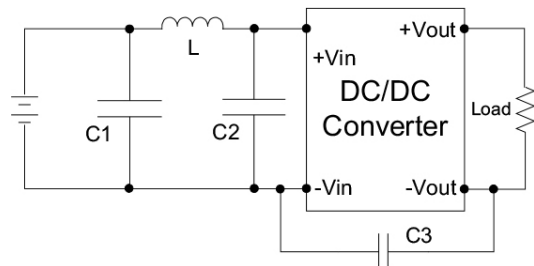
Output ripple & noise measurement test

The scope measurement bandwidth is 20MHz.



EMI filter

Input filter components ($C1$, L , $C2$, $C3$) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



| | C1 | L | C2 | C3 |
|---------------|--|------------|-------------------------|-----------------|
| 1D8E_03xx_S1U | 1210, 2.2 μF /100V | 18 μH | | |
| 1D8E_05xx_S1U | 1210, 2.2 μF /100V | 18 μH | | |
| 1D8E_12xx_S1U | 1210, 2.2 μF /100V | 18 μH | | |
| 1D8E_15xx_S1U | 1210, 2.2 μF /100V | 18 μH | | |
| 1D8E_24xx_S1U | 1210, 2.2 μF /100V | 18 μH | 1210, 2.2 μF /100V | 1206, 470pF/2KV |
| 1D8E_48xx_S1U | Electrolytic capacitor, 10 μF /100V | 18 μH | 1210, 2.2 μF /100V | 1206, 470pF/2KV |

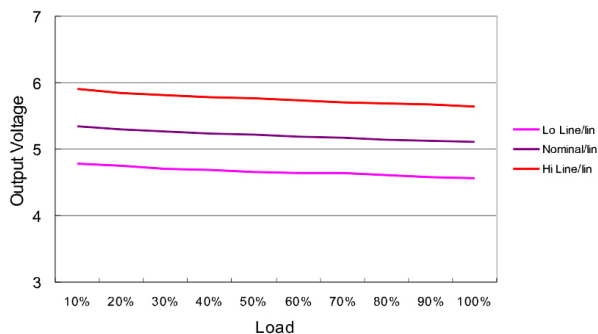
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Loading vs. input

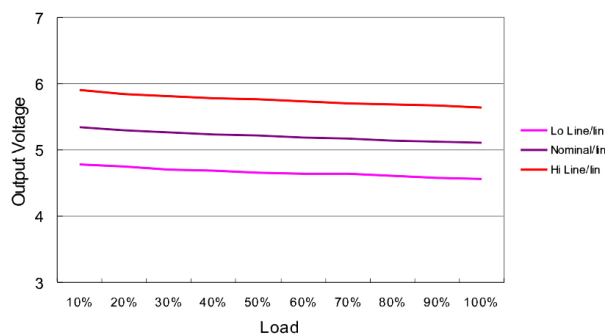
05 models

LOADING VS OUTPUT VOLTAGE



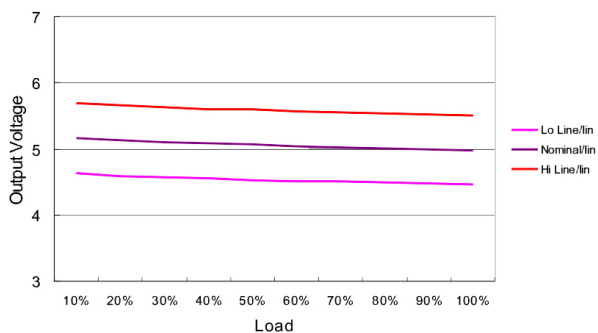
12 models

LOADING VS OUTPUT VOLTAGE



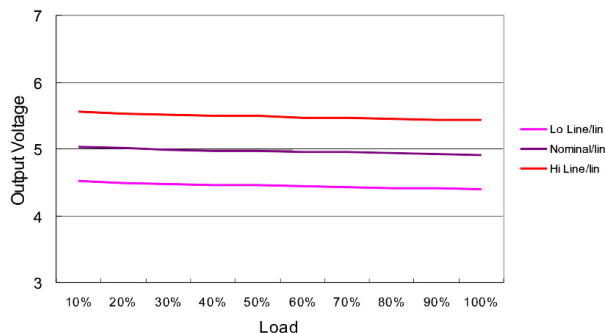
24 models

LOADING VS OUTPUT VOLTAGE

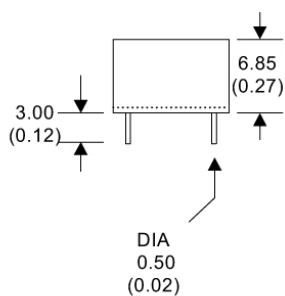
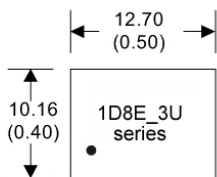


48 models

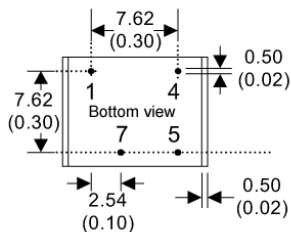
LOADING VS OUTPUT VOLTAGE



Mechanical dimensions



| Pin connections | |
|-----------------|--------|
| PIN | SINGLE |
| 1 | -Vin |
| 4 | +Vin |
| 5 | +Vout |
| 7 | -Vout |



Note:
The thickness of 48V input voltage model is 7.50mm (0.29inch)

Unit: mm[inch]
Pin diameter: 0.5mm ± 0.35mm [0.02inch ± 0.002inch]
Pin pitch and length tolerance: ± 0.35mm [± 0.014inch]
Case tolerances: ± 0.5mm [± 0.02inch]