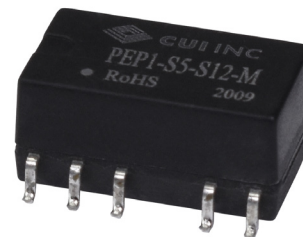


SERIES: PEP1-M | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

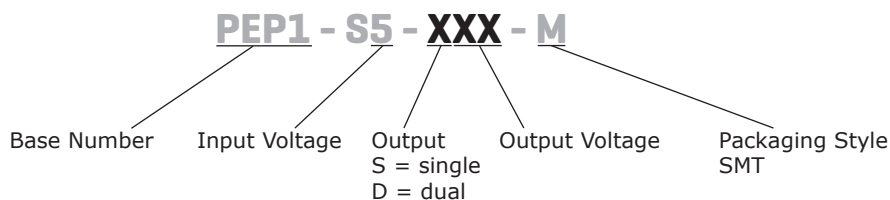
- 1W isolated output
- 3000 Vdc isolation
- compact SMD package
- continuous short circuit protection
- no-load input current as low as 5mA
- wide temperature range: -40°C to +105°C
- high efficiency up to 85%
- UL 62368, EN 62368, IEC 62368 Approval



| MODEL | input voltage | | output voltage (Vdc) | output current | | output power max (W) | output capacitance max (µF) | ripple and noise ¹ max (mVp-p) | efficiency typ (%) |
|---------------|---------------|----------------|-------------------------|----------------|-------------|----------------------------|-----------------------------------|---|--------------------------|
| | typ (Vdc) | range (Vdc) | | min (mA) | max (mA) | | | | |
| PEP1-S5-D3-M | 5 | 4.5~5.5 | ±3.3 | ±15 | ±151 | 1 | 1200 | 75 | 74 |
| PEP1-S5-D5-M | 5 | 4.5~5.5 | ±5 | ±10 | ±100 | 1 | 1200 | 75 | 82 |
| PEP1-S5-D9-M | 5 | 4.5~5.5 | ±9 | ±6 | ±56 | 1 | 470 | 75 | 83 |
| PEP1-S5-D12-M | 5 | 4.5~5.5 | ±12 | ±5 | ±42 | 1 | 220 | 75 | 83 |
| PEP1-S5-D15-M | 5 | 4.5~5.5 | ±15 | ±4 | ±34 | 1 | 220 | 75 | 83 |
| PEP1-S5-D24-M | 5 | 4.5~5.5 | ±24 | ±2 | ±21 | 1 | 100 | 100 | 85 |
| PEP1-S5-S3-M | 5 | 4.5~5.5 | 3.3 | 30 | 303 | 1 | 2400 | 75 | 74 |
| PEP1-S5-S5-M | 5 | 4.5~5.5 | 5 | 20 | 200 | 1 | 2400 | 75 | 82 |
| PEP1-S5-S9-M | 5 | 4.5~5.5 | 9 | 12 | 111 | 1 | 1000 | 75 | 83 |
| PEP1-S5-S12-M | 5 | 4.5~5.5 | 12 | 9 | 84 | 1 | 560 | 75 | 83 |
| PEP1-S5-S15-M | 5 | 4.5~5.5 | 15 | 7 | 67 | 1 | 560 | 75 | 83 |
| PEP1-S5-S24-M | 5 | 4.5~5.5 | 24 | 4 | 42 | 1 | 220 | 100 | 85 |

Notes: 1. Ripple & noise testing condition at nominal input voltage and 10%~100% load, 20 MHz bandwidth

PART NUMBER KEY



INPUT

| parameter | conditions/description | min | typ | max | units |
|---------------|--------------------------------------|------|--------|--------|-------|
| input voltage | | 4.5 | 5 | 5.5 | Vdc |
| surge voltage | 5 Vdc input, for maximum of 1 second | -0.7 | | 9 | Vdc |
| filter | capacitance filter | | | | |
| current | full load/no load | | | | |
| | 3.3/5 Vdc output | | 270/5 | 286/10 | mA |
| | 9/12 Vdc output | | 241/12 | 254/20 | mA |
| | 15/24 Vdc output | | 241/18 | 254/30 | mA |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|--------------------------|-----|-----|------------|-------|
| line regulation | Vin change $\pm 1\%$ | | | | |
| | 3.3 Vdc output | | | 1.5 | %/% |
| | other outputs | | | 1.2 | %/% |
| load regulation | 10% ~ 100% load | | | | |
| | 3.3 Vdc output | | 15 | 20 | % |
| | 5 Vdc output | | 10 | 15 | % |
| | 9 Vdc output | | 8 | 10 | % |
| | 12 Vdc output | | 7 | 10 | % |
| | 15 Vdc output | | 6 | 10 | % |
| 24 Vdc output | | 5 | 10 | % | |
| set-point accuracy | see regulation curve | | | | |
| switching frequency | full load, nominal input | | 270 | | kHz |
| temperature coefficient | full load | | | ± 0.02 | %/°C |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| short circuit protection | Continuous, self-recovery | | | | |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|-----------------------|---|------|-----|-----|--------|
| isolation voltage | input-output electric strength test for 1 minute | 3000 | | | Vdc |
| isolation resistance | input-output insulation at 500 Vdc | 1000 | | | MΩ |
| isolation capacitance | input-output capacitance at 100 KHz / 0.1 V | | 20 | | pF |
| safety approvals | UL62368/EN62368/IEC62368 | | | | |
| EMC | CISPR32/EN55032 Class B (see recommended circuit) | | | | |
| ESD | IEC/EN61000-4-2, Air ±8kV, Contact ±4kV, perf. Criteria B | | | | |
| RoHS | yes | | | | |
| MTBF | MIL-HDBK-217F @ 25°C | 3500 | | | kHours |

ENVIRONMENTAL

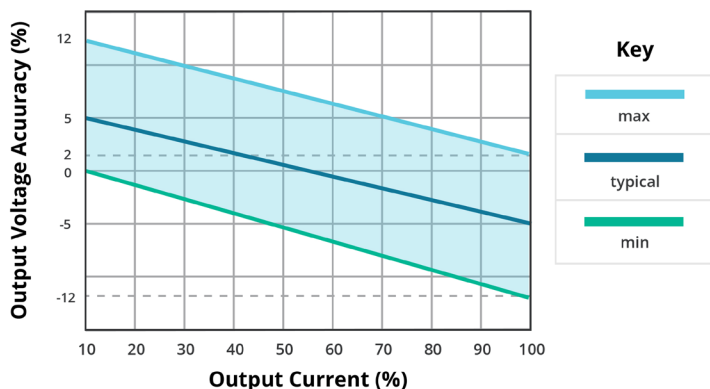
| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | | -40 | | 105 | °C |
| storage temperature | | -55 | | 125 | °C |
| humidity | non-condensing | 5 | | 95 | % |

SOLDERABILITY

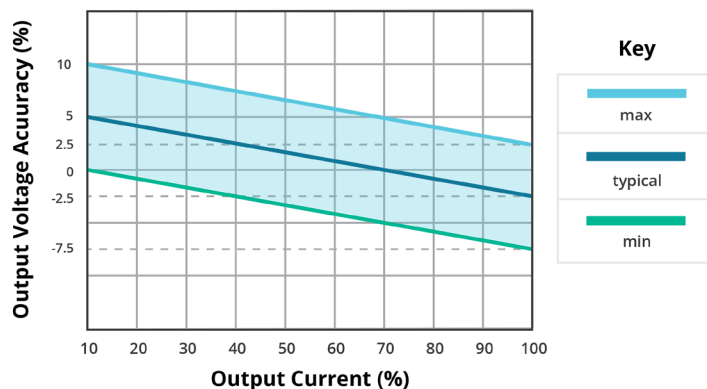
| parameter | conditions/description | min | typ | max | units |
|------------------|------------------------|-----|-----|-----|-------|
| reflow soldering | 60 s max over 217°C | | | 245 | °C |

DERATING CURVE

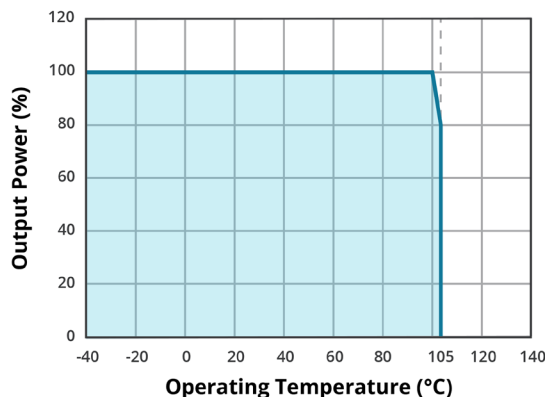
OUTPUT REGULATION CURVE
3.3 Vdc output model
(nominal input)



OUTPUT REGULATION CURVE
all other output models
(nominal input)



TEMPERATURE DERATING CURVE

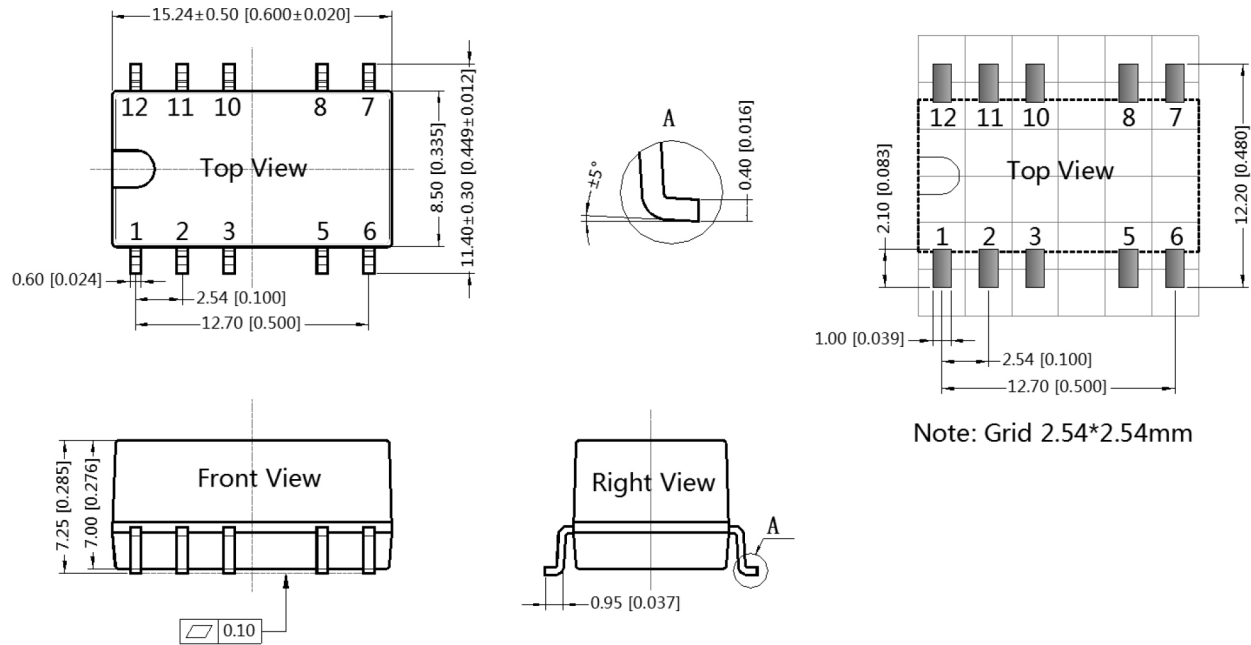


MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|---|-----|-----|-----|-------|
| dimensions | 15.24 x 11.40 x 7.25 | | | | mm |
| case material | Black plastic; flame-retardant and heat-resistant (UL94-V0) | | | | |
| weight | | | 1.3 | | g |

MECHANICAL DRAWING

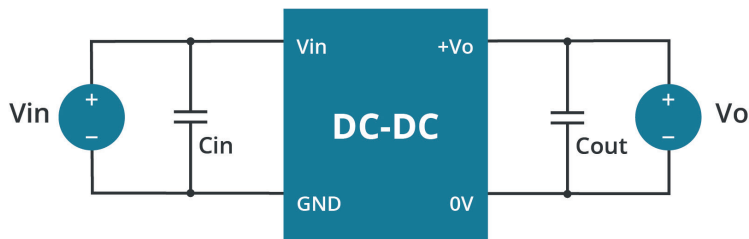
units: mm [inches]
 tolerance: ± 0.25 [± 0.010]



| PIN CONNECTIONS | | |
|-----------------|--------|------|
| PIN | Single | Dual |
| 1 | GND | GND |
| 2 | Vin | Vin |
| 5 | 0V | 0V |
| 6 | NC | -Vo |
| 8 | +Vo | +Vo |
| other | NC | NC |

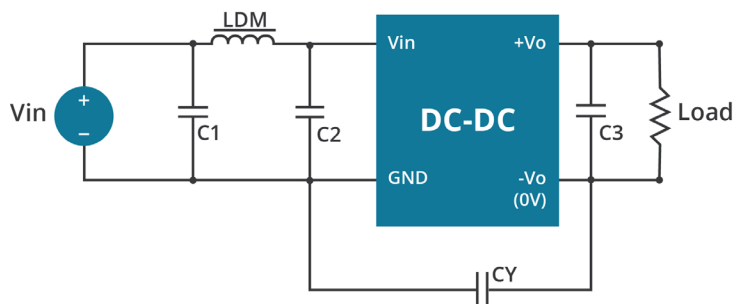
Note: NC pin to be isolated from other circuitry

RECOMMENDED CIRCUITS



| Parameter Description | | | |
|-----------------------|----------|----------|-----------|
| Vin (Vdc) | Cin (μF) | Vo (Vdc) | Cout (μF) |
| 5 | 4.7 | 3.3/5 | 10 |
| | | 9 | 4.7 |
| | | 12 | 2.2 |
| | | 15 | 1 |
| | | 24 | 0.47 |

EMC COMPLIANCE CIRCUITS



| Recommended EMC Filter Values | | | |
|-------------------------------|-------|------------------------------|--|
| Output Voltage (Vdc) | | 3.3/5/9 | 12/15/24 |
| EMI | C1/C2 | 47μF / 25V | 47μF / 25V |
| | CY | - - | 1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA |
| | C3 | refer to the Cout in table 1 | |
| | LDM | 6.8μH | 6.8μH |

Note: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

REVISION HISTORY

| rev. | description | date |
|------|---|------------|
| 1.0 | initial release | 03/28/2020 |
| 1.01 | units updated in mechanical drawing section | 01/20/2021 |
| 1.02 | derating curves and circuit figures updated | 07/06/2021 |

The revision history provided is for informational purposes only and is believed to be accurate.



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