

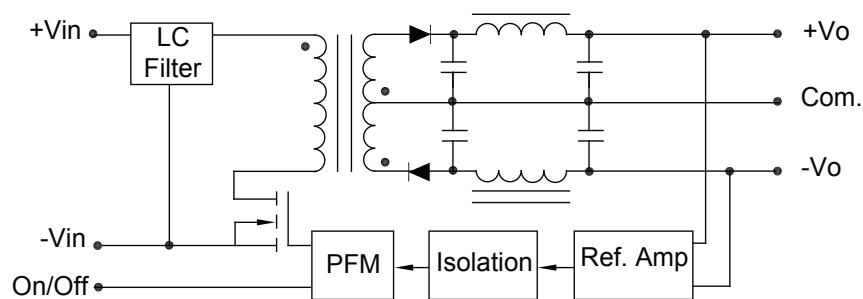
# 5 WATT SMT DUAL



## Features

- SMT Technology
- 2:1 Input Range
- Efficiency up to 85%
- I/O Isolation 1500VDC
- Remote on/off Control
- Short Circuit Protection
- MTBF > 1,000,000 Hours
- RoHS Compliant
- MSL2 (Moisture Sensitivity Level) per IPC/JEDEC J-STD-020D

| Selection Chart |             |        |      |
|-----------------|-------------|--------|------|
| Model           | Input Range | Output |      |
|                 |             | VDC    | mA   |
| 12D5.500SMT     | 9.0 - 18.0  | ±5     | ±500 |
| 12D12.208SMT    | 9.0 - 18.0  | ±12    | ±208 |
| 12D15.167SMT    | 9.0 - 18.0  | ±15    | ±167 |
| 24D5.500SMT     | 18.0 - 36.0 | ±5     | ±500 |
| 24D12.208SMT    | 18.0 - 36.0 | ±12    | ±208 |
| 24D15.167SMT    | 18.0 - 36.0 | ±15    | ±167 |
| 48D5.500SMT     | 36.0 - 75.0 | ±5     | ±500 |
| 48D12.208SMT    | 36.0 - 75.0 | ±12    | ±208 |
| 48D15.167SMT    | 36.0 - 75.0 | ±15    | ±167 |



Block Diagram



# 5 WATT SMT DUAL

| Input Parameters                 |                                    |                          |              |              |       |
|----------------------------------|------------------------------------|--------------------------|--------------|--------------|-------|
| Model                            |                                    | 12D5.500SMT              | 12D12.208SMT | 12D15.167SMT | Units |
| Voltage Range                    | MIN<br>TYP<br>MAX                  | 9.0<br>12.0<br>18.0      |              |              | VDC   |
| Input Current                    | No Load<br>Full Load<br>TYP<br>TYP | 45<br>521                | 45<br>501    | 45<br>503    | mA    |
| Under Voltage Shutdown           | MAX                                | 8                        |              |              | VDC   |
| Reverse Polarity Input Current   | MAX                                | 1                        |              |              | A     |
| Input Filter                     |                                    | Pi Filter                |              |              |       |
| Efficiency                       | TYP                                | 80                       | 83           | 83           | %     |
| Switching Frequency              | TYP                                | 260                      |              |              | kHz   |
| Input Surge Voltage<br>(1000 ms) | MIN<br>MAX                         | -0.7<br>25               |              |              | VDC   |
| Recommended Fuse                 |                                    | 1500 mA Slow - Blow Type |              |              | mA    |
| Model                            |                                    | 24D5.500SMT              | 24D12.208SMT | 24D15.167SMT | Units |
| Voltage Range                    | MIN<br>TYP<br>MAX                  | 18.0<br>24.0<br>36.0     |              |              | VDC   |
| Input Current                    | No Load<br>Full Load<br>TYP<br>TYP | 15<br>254                | 15<br>245    | 15<br>246    | mA    |
| Under Voltage Shutdown           | MAX                                | 17                       |              |              | VDC   |
| Reverse Polarity Input Current   | MAX                                | 1                        |              |              | A     |
| Input Filter                     |                                    | Pi Filter                |              |              |       |
| Efficiency                       | TYP                                | 82                       | 85           | 85           | %     |
| Switching Frequency              | TYP                                | 260                      |              |              | kHz   |
| Input Surge Voltage<br>(1000 ms) | MIN<br>MAX                         | -0.7<br>50               |              |              | VDC   |
| Recommended Fuse                 |                                    | 700 mA Slow - Blow Type  |              |              | mA    |
| Model                            |                                    | 48D5.500SMT              | 48D12.208SMT | 48D15.167SMT | Units |
| Voltage Range                    | MIN<br>TYP<br>MAX                  | 36.0<br>48.0<br>75.0     |              |              | VDC   |
| Input Current                    | No Load<br>Full Load<br>TYP<br>TYP | 6<br>127                 | 6<br>122     | 6<br>123     | mA    |
| Under Voltage Shutdown           | MAX                                | 34                       |              |              | VDC   |
| Reverse Polarity Input Current   | MAX                                | 1                        |              |              | A     |
| Input Filter                     |                                    | Pi Filter                |              |              |       |
| Efficiency                       | TYP                                | 82                       | 85           | 85           | %     |
| Switching Frequency              | TYP                                | 260                      |              |              | kHz   |
| Input Surge Voltage<br>(1000 ms) | MIN<br>MAX                         | -0.7<br>100              |              |              | VDC   |
| Recommended Fuse                 |                                    | 350 mA Slow - Blow Type  |              |              | mA    |



# 5 WATT SMT DUAL

| Output Parameters                                        |            |                                           |                                              |                                              |        |
|----------------------------------------------------------|------------|-------------------------------------------|----------------------------------------------|----------------------------------------------|--------|
| Models                                                   |            | 12D5.500SMT<br>24D5.500SMT<br>48D5.500SMT | 12D12.208SMT<br>24D12.208SMT<br>48D12.208SMT | 12D15.167SMT<br>24D15.167SMT<br>48D15.167SMT | Units  |
| Output Voltage                                           |            | ±5                                        | ±12                                          | ±15                                          | VDC    |
| Output Current                                           | MIN<br>MAX | ±50<br>±500                               | ±20.8<br>±208                                | ±16.7<br>±167                                | mA     |
| Output Voltage Accuracy                                  | TYP<br>MAX | ±0.5<br>±1.0                              |                                              |                                              | %      |
| Load Regulation<br>Io = 20% to 100%                      | TYP<br>MAX | ±0.3<br>±1.0                              |                                              |                                              | %      |
| Line Regulation<br>Vin = Min. to Max.                    | TYP<br>MAX | ±0.1<br>±0.3                              |                                              |                                              | %      |
| Ripple & Noise (20MHz)                                   | TYP<br>MAX | 50<br>85                                  |                                              |                                              | mV P-P |
| Ripple & Noise (20MHz)<br>Over Line, Load & Temp         | MAX        | 100                                       |                                              |                                              | mV P-P |
| Ripple & Noise (20MHz)                                   | MAX        | 15                                        |                                              |                                              | mV RMS |
| Capacitive Load                                          | MAX        | 100                                       |                                              |                                              | µF     |
| Transient Recovery Time,<br>25% Load Step Change         | TYP<br>MAX | 250<br>500                                |                                              |                                              | µs     |
| Transient Response<br>Deviation,<br>25% Load Step Change | TYP<br>MAX | ±2<br>±6                                  |                                              |                                              | %      |
| Temperature Coefficient                                  | TYP<br>MAX | ±0.01<br>±0.02                            |                                              |                                              | % / °C |
| Short Circuit Protection                                 |            | Continuous                                |                                              |                                              |        |

| Remote On/Off Control        |                                |       |      |      |
|------------------------------|--------------------------------|-------|------|------|
| Parameter                    | Conditions                     | Min.  | Max. | Unit |
| Supply On                    | 2.5 to 5.5 VDC or Open Circuit |       |      |      |
| Supply Off                   |                                | -0.7  | 0.8  | VDC  |
| Device Standby Input Current |                                | ----- | 10.0 | mA   |
| Control Input Current (on)   | Vin = Min. to Max.             | ----- | -200 | µA   |
| Control Input Current (off)  | Vin = Min. to Max.             | ----- | -300 | µA   |
| Control Common               | Referenced to Negative Input   |       |      |      |

## Notes:

- All parameters measured at Tc=+25°C, resistive load, nominal input voltage, full rated output current unless otherwise noted.
- Transient recovery time is measured to within 1% error band for a step change in output load 75% to 100%
- The 5 Watt Dual series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. For optimum performance we recommend 100µF maximum capacitive load.
- When measuring output ripple & noise, an external 0.1µF ceramic capacitor is recommended to be placed from +Vout to -Vout.
- When measuring peak-to-peak output noise, use a Cout 0.47µF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50mm and 75mm from the DC/DC converter.
- Specifications subject to change without notice
- Water Washability - Calnex DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.
- RoHS Compliance means conformity to EU Directive 2002/95/EC of 27 January 2003, on the restriction of the use of certain hazardous substances in electrical and electronic equipment, lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls, and polybrominated diphenyl ethers are not present in quantities exceeding the following maximum concentrations in any homogeneous material, except for applicable exemptions.  
0.1% (by weight of homogeneous material) lead, mercury, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers, or 0.01% (by weight of homogeneous material) cadmium. The RoHS marking is as follows.

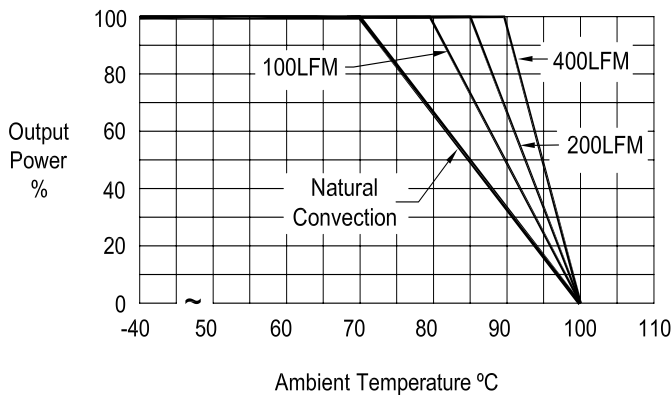


RoHS

# 5 WATT SMT DUAL

| General Specifications                  |            |                                                    |         |
|-----------------------------------------|------------|----------------------------------------------------|---------|
| All Models                              |            |                                                    | Units   |
| Isolation                               |            |                                                    |         |
| Isolation Voltage, 60 seconds           | MIN        | 1500                                               | VDC     |
| Isolation Resistance, 500VDC            | MIN        | 1000                                               | Mohms   |
| Isolation Capacitance, 100kHz, 1V       | TYP<br>MAX | 650<br>750                                         | pF      |
| Environmental                           |            |                                                    |         |
| Operating Temperature Case              | MIN<br>MAX | -40<br>+90                                         | °C      |
| Storage Temperature                     | MIN<br>MAX | -50<br>+125                                        | °C      |
| Humidity                                | MAX        | 95                                                 | %       |
| MTBF MIL-HDBK-217F @25°C, Ground Benign | MIN        | 1000                                               | K Hours |
| Cooling                                 |            | Free-Air Convection                                |         |
| General                                 |            |                                                    |         |
| Case Size                               |            | 1.31 x 0.81 x 0.40 inches<br>33.4 x 20.6 x 10.2 mm |         |
| Case Material                           |            | Non Conductive Black Plastic                       |         |
| Weight                                  |            | 14g                                                |         |

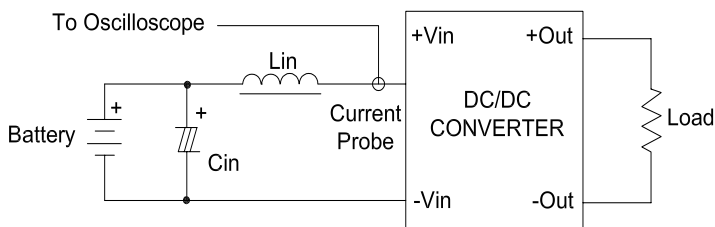
## Derating Curve



## Testing

Input reflected-ripple current is measured with an inductor  $L_{in}$  (4.7 $\mu$ H) and  $C_{in}$  (220 $\mu$ F, ESR < 1.0 $\Omega$  at 100kHz) to simulate source impedance.

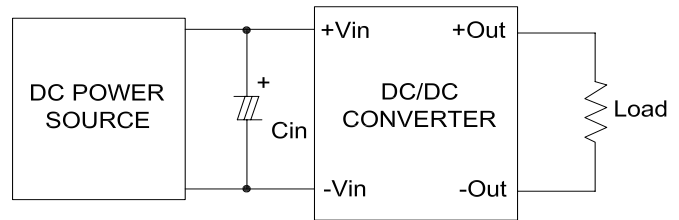
Capacitor  $C_{in}$  offsets possible battery impedance. Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500kHz.



## Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

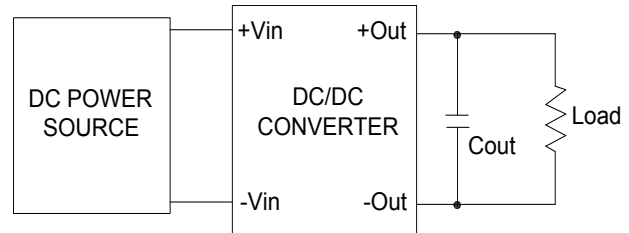
Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0 $\Omega$  at 100kHz) capacitor of a 3.3 $\mu$ F for the 12V input devices and a 2.2 $\mu$ F for the 24V and 48V units.



## Output Ripple Reduction

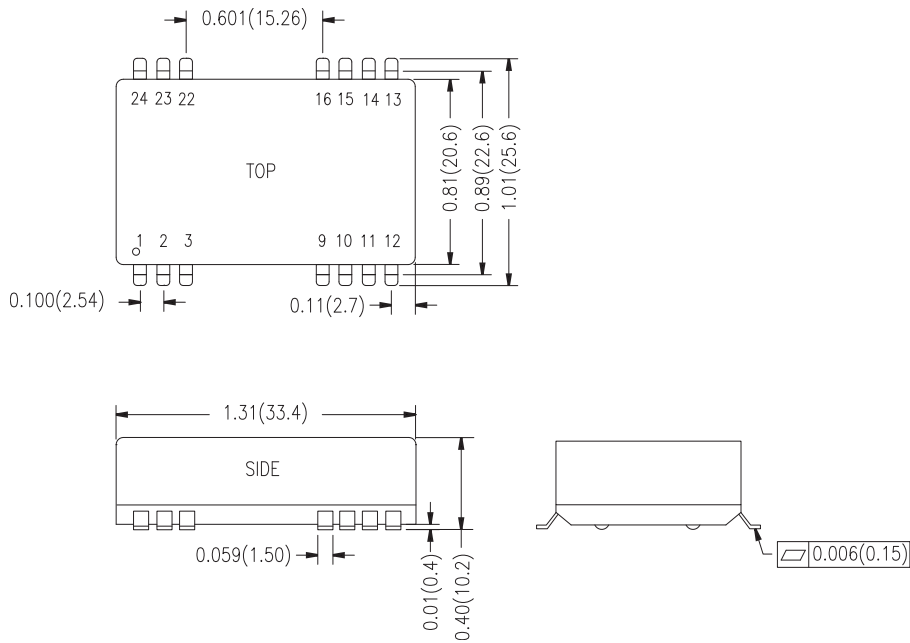
A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance.

To reduce output ripple, it is recommended to use 3.3 $\mu$ F capacitors at the output.



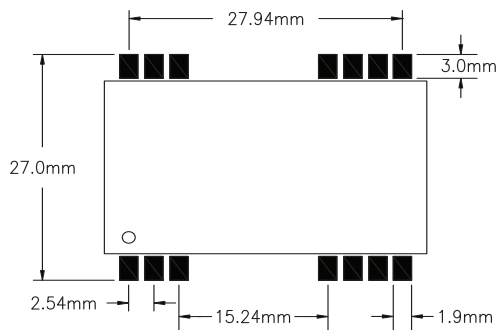
# 5 WATT SMT DUAL

## Case Mechanical Dimensions inches (mm)



| Pin | Name          |
|-----|---------------|
| 1   | Remote On/Off |
| 2   | -Vin          |
| 3   | -Vin          |
| 9   | Common        |
| 10  | NC            |
| 11  | -Vout         |
| 12  | NC            |
| 13  | NC            |
| 14  | +Vout         |
| 15  | NC            |
| 16  | Common        |
| 22  | +Vin          |
| 23  | +Vin          |
| 24  | NC            |

| TOLERANCE: ALL DIMENSIONS<br>ARE TYPICAL IN INCHES (mm)<br>UNLESS OTHERWISE NOTED: |               |
|------------------------------------------------------------------------------------|---------------|
| X.X                                                                                | ±0.01 (0.25)  |
| X.XX                                                                               | ±0.005 (0.13) |
| PINS                                                                               | ±0.002 (0.05) |



## Connecting Pin Pattern Dimensions are mm (±0.05)



ES France - Département Composants & Modules  
127 rue de Buzenval BP 26 - 92380 Garches



Tél. 01 47 95 99 89  
Fax. 01 47 01 16 22



e-mail : comp@es-france.com  
Site Web : www.es-france.com