

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Distributed Power Architectures
Semiconductor Equipment
Microprocessor Power Applications

FEATURES

- OUTPUT CURRENT UP TO 6A
- SMALL SIZE AND LOW PROFILE :
0.80" X 0.45" X 0.25" (SMD) ; 0.90" X 0.40" X 0.24" (SIP)
- HIGH EFFICIENCY UP TO 89% @ 3.3V FULL LOAD
- INPUT RANGE FROM 8.3VDC TO 14.0VDC
- FIXED SWITCHING FREQUENCY (300kHz)
- SMD & SIP PACKAGES
- SMD PACKAGE QUALIFIED FOR LEADFREE REFLOW SOLDER PROCESS ACCORDING IPC J-STD-020D
- OUTPUT VOLTAGE PROGRAMMABLE FROM 0.75VDC TO 5.0VDC VIA EXTERNAL RESISTOR
- INPUT UNDER-VOLTAGE PROTECTION
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

OPTIONS

POSITIVE LOGIC REMOTE ON/OFF

DESCRIPTION

DOS06-12T (SMD type), DOH06-12T (for Vertical Mounting SIP type) and DOH06-12TA (for Horizontal Mounting SIP type) are non-isolated DC/DC converters that can deliver up to 6A of output current with full load efficiency of 89% at 3.3V output.

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

| OUTPUT SPECIFICATIONS | |
|-----------------------------------|---|
| Output current | 6A max |
| Voltage accuracy | ± 2%Vout(set) |
| Minimum load | 0% |
| Line regulation | $V_{in}=V_{in(min)}$ to $V_{in(max)}$ at Full Load ± 0.3%Vout(set) |
| Load regulation | No Load to Full Load ± 0.4%Vout(set) |
| Ripple and noise (Note2) | 20MHz bandwidth 20mVrms,max 50mVp-p,max |
| Temperature coefficient | ±0.4% |
| Dynamic load response (Note 2) | $\Delta I_o / \Delta t = 2.5A/\mu s, V_{in(nom)}$ Peak deviation 200mV Load change step (50% to 100% or 100% to 50% of $I_o(max)$) Setting time ($V_{out}<10\%$ peak deviation) 25 μs |
| Dynamic load response (Note 3) | $\Delta I_o / \Delta t = 2.5A/\mu s, V_{in(nom)}$ Peak deviation 50mV Load change step (50% to 100% or 100% to 50% of $I_o(max)$) Setting time ($V_{out}<10\%$ peak deviation) 50 μs |
| Output current limit | 200% |
| Output short-circuit current | Continuous, automatics recovery |
| External load capacitance | $ESR \geq 1m\Omega$ 1000 $\mu F,max$ $ESR \geq 10m\Omega$ 3000 $\mu F,max$ |
| Output voltage overshoot-startup | $V_{in}=V_{in(min)} \sim V_{in(max)}$; F.L. 1%Vout(set) |
| Voltage adjustability (see fig.1) | (Note 4) 0.7525V ~ 5.0V |
| GENERAL SPECIFICATIONS | |
| Efficiency | See table |
| Isolation voltage | None |
| Switching frequency | 300kHz±10% |
| Safety approvals | IEC60950-1, UL60950-1, & EN60950-1 |
| Dimensions | SMD 0.80 X 0.45 X 0.25 Inch (20.3 X 11.4 X 6.5 mm) SIP 0.90 X 0.40 X 0.24 Inch (22.9 X 10.2 X 6.0 mm) |
| Weight | 2.8g(0.1oz) |
| MTBF (Note 1) | MIL-HDBK-217F 9.277 x 10 ⁶ hrs |

| INPUT SPECIFICATIONS | |
|---|---|
| Input voltage range | $V_{out(set)} \leq 3.63V$ 8.3 ~ 14VDC $V_{out(set)} > 3.63V$ $V_{in(nom)} = 12V$ 8.3 ~ 13.2VDC |
| Maximum input current | $V_{in}=V_{in(min)}$; $I_o=I_o(max)$ 4.5A |
| Input filter (Note 5) | C filter |
| Input no load current ($V_{in}=12V, I_o=0$, module enabled) | $V_{out(set)} = 0.75VDC$ 17mA $V_{out(set)} = 5.0VDC$ 100mA |
| Input under voltage lockout | Start-up voltage 7.9VDC Shutdown voltage 7.8VDC |
| Input reflected ripple current | 5~20MHz, 1 μH source impedance 30mA _{p-p} |

| ENVIRONMENTAL SPECIFICATIONS | |
|-----------------------------------|------------------------------|
| Operating ambient temperature | -40°C ~ +85°C(with derating) |
| Storage temperature range | -55°C ~ +125°C |
| Thermal shock | MIL-STD-810F |
| Vibration | MIL-STD-810F |
| Relative humidity(non-condensing) | 5% ~ 95% RH |
| Lead-free reflow solder process | IPC J-STD-020D |
| Moisture sensitivity level(MSL) | IPC J-STD-033B Level 2a |
| Over temperature protection | 140°C |

| FEATURE SPECIFICATIONS | |
|-------------------------------------|--|
| Remote ON/OFF(Note 6) | |
| Negative logic(standard) | ON = Open or $0V < V_r < 0.3V$ $I_{IN}=10\mu A,max$ OFF = $2.5V < V_r < V_{in(max)}$ $I_{IN}=1mA,max$ |
| Positive logic(option) | ON = Open or $(V_{in}-4) < V_r < V_{in(max)}$ $I_{IN}=10\mu A,max$ OFF = $0V < V_r < 0.3V$ $I_{IN}=1mA,max$ |
| Input current of Remote control pin | 10 $\mu A \sim 1.0mA$ |
| Remote off state input current | Nominal Input 1.2mA |
| Rise time | Time for V_{out} to rise from 10% to 90%of $V_{out(set)}$ 6mS, max. |
| Turn-on delay time | Case 1 (Note 7) 3ms Case 2 (Note 8) 3ms |



| Model Name | ON/OFF Logic | Package | Input Voltage | Output Voltage | Output Current | | Efficiency (%) 12Vin, 3.3VDC@6A |
|--------------|--------------|----------------------------|--|----------------|----------------|-----------|------------------------------------|
| | | | | | Min. Load | Max. Load | |
| DOS06-12T | Negative | SMD | Vout(set) ≤ 3.63V Vin = 8.3-14VDC | 0.75 ~ 5.0VDC | 0A | 6A | 89% |
| DOS06-12T-P | Positive | | | | | | |
| DOH06-12T | Negative | Vertical Mounting SIP | Vout(set) > 3.63V Vin = 8.3-13.2VDC | 0.75 ~ 5.0VDC | 0A | 6A | 89% |
| DOH06-12T-P | Positive | | | | | | |
| DOH06-12TA | Negative | Horizontal Mounting SIP | Vout(set) > 3.63V Vin = 8.3-13.2VDC | 0.75 ~ 5.0VDC | 0A | 6A | 89% |
| DOH06-12TA-P | Positive | | | | | | |

Note

1. MIL-HDBK-217F @Ta=25 °C, Full load.
2. External with C_{out} = 1μF ceramic//10μF tantalum capacitors.
3. External with C_{out} = 2pcs of 150μF polymer capacitors.
4. Output voltage programmable from 0.7525V to 5V by connecting a single resistor (shown as R_{trim} in Table 1) between the TRIM and GND pins of the module. To calculate the value of the resistor **R_{trim}** for a particular output voltage **V_{out}**, use the following equation:

$$R_{trim} = \left[\frac{10500}{V_{out} - 0.7525} - 1000 \right] \Omega$$

5. It's necessary to equip the external input capacitors at the input of the module. The capacitors should connect as close as possible to the input terminals that ensuring module stability. The external C_{in} is 2pcs of 47μF ceramic capacitors at least.
6. Device code with suffix "P" – Positive logic(ON/OFF is open collector/drain logic input; Signal referenced to GND)
Device code with no suffix – Negative logic (ON/OFF pin is open collector/drain logic input with external pull –up resistor; signal referenced to GND)
7. Case 1 :On/Off input is set to logic low (module on) and then input power is applied (delay from instant at which Vin=Vin(min) until Vout=10% of Vout(set))
8. Case 2 :Input power is applied for at least one second and then the ON/OFF input is set to logic low (delay form instant at which Von/off=0.3V until Vout=10% of Vout(set))
- 9.

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

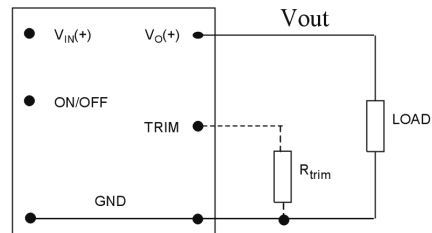
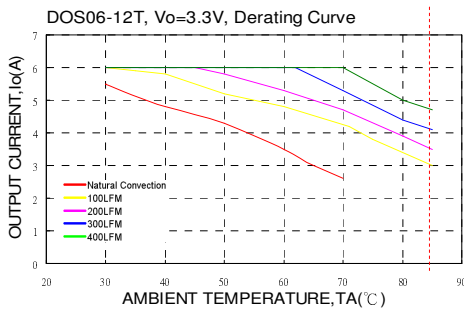
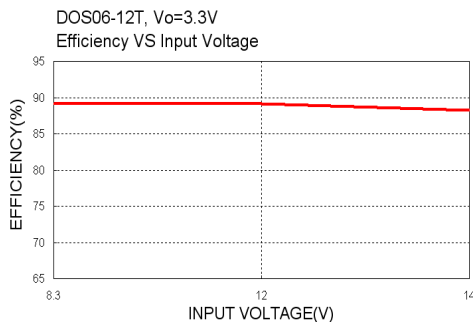
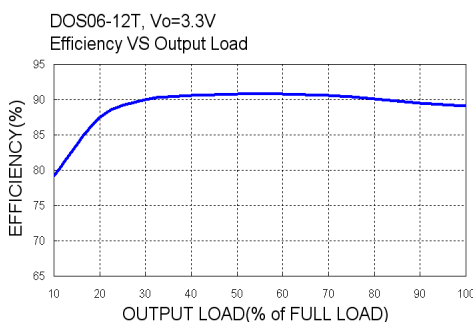


Fig. 1

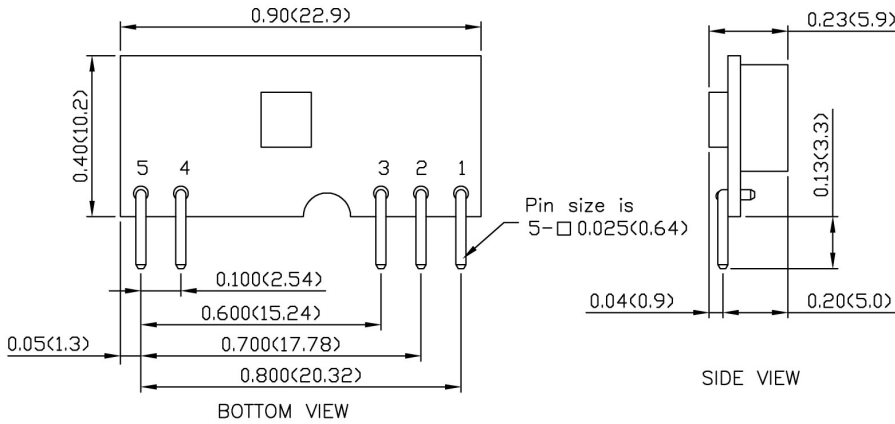


| Vout(set) (V) | Rtrim (KΩ) |
|---------------|------------|
| 0.7525 | Open |
| 1.2 | 22.46 |
| 1.5 | 13.05 |
| 1.8 | 9.024 |
| 2.5 | 5.009 |
| 3.3 | 3.122 |
| 5 | 1.472 |



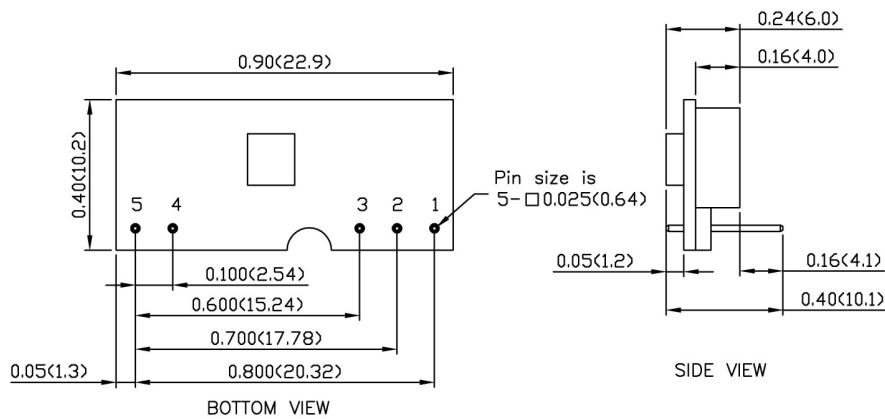
MECHANICAL DRAWING :

DOH06-12T TYPE



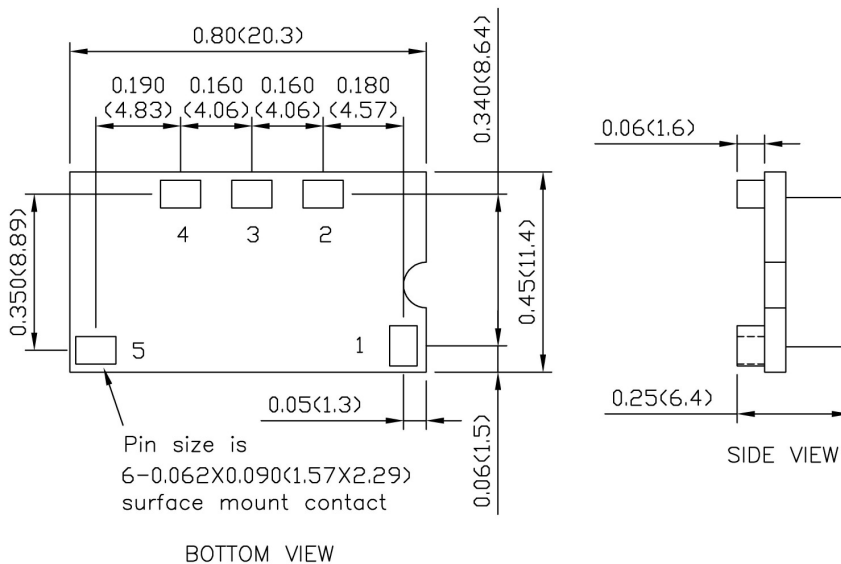
| PIN CONNECTION | |
|----------------|---------|
| PIN | DEFINE |
| 1 | +OUTPUT |
| 2 | TRIM |
| 3 | GND |
| 4 | + INPUT |
| 5 | CTRL |

DOH06-12TA TYPE



| PIN CONNECTION | |
|----------------|---------|
| PIN | DEFINE |
| 1 | +OUTPUT |
| 2 | TRIM |
| 3 | GND |
| 4 | + INPUT |
| 5 | CTRL |

DOS06-12T TYPE



| PIN CONNECTION | |
|----------------|---------|
| PIN | DEFINE |
| 1 | CTRL |
| 2 | +OUTPUT |
| 3 | TRIM |
| 4 | GND |
| 5 | + INPUT |

- All dimensions in Inch (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01 (0.25)
- Pin dimension tolerance ±0.004 (0.1)