

### 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) 25μs
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) 50μs
Output current limit	200%
Output short-circuit current	Continuous, automatics recovery
External load capacitance	$ESR \geq 1m\Omega$ 1000μF,max $ESR \geq 10m\Omega$ 3000μF,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 <sup>6</sup> 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, 1μH source impedance 30mA <sub>p-p</sub>

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	10μA~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<sub>out</sub> = 1μF ceramic//10μF tantalum capacitors.
3. External with C<sub>out</sub> = 2pcs of 150μF polymer capacitors.
4. Output voltage programmable from 0.7525V to 5V by connecting a single resistor (shown as R<sub>trim</sub> in Table 1) between the TRIM and GND pins of the module. To calculate the value of the resistor **R<sub>trim</sub>** for a particular output voltage **V<sub>out</sub>**, 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<sub>in</sub> 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.

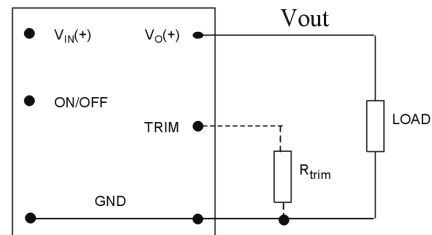
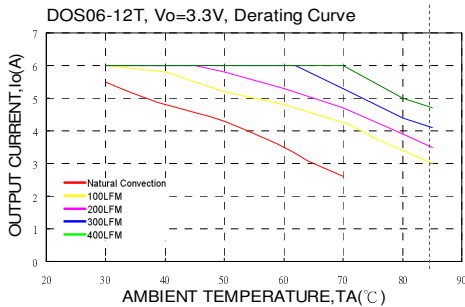
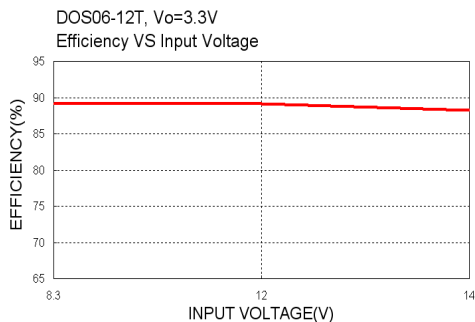
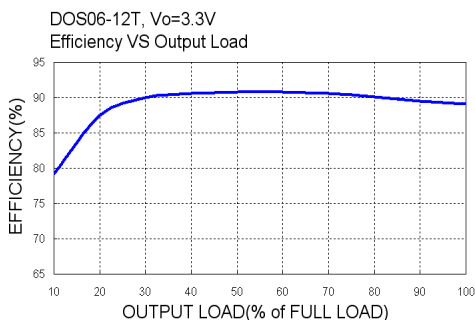


Fig. 1

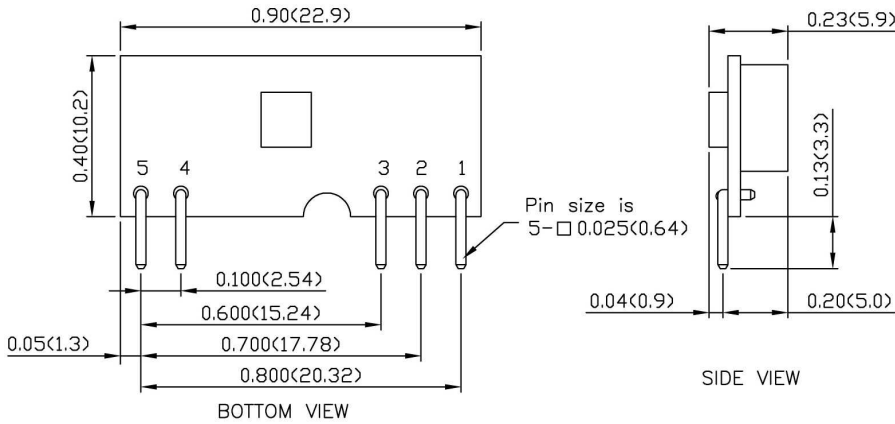


Vout(set) (V)	Rtrim (KΩ)
0.7525	Open
1.2	22.46
1.5	13.05
1.8	9.024
2.5	5.009
3.3	3.122
5	1.472



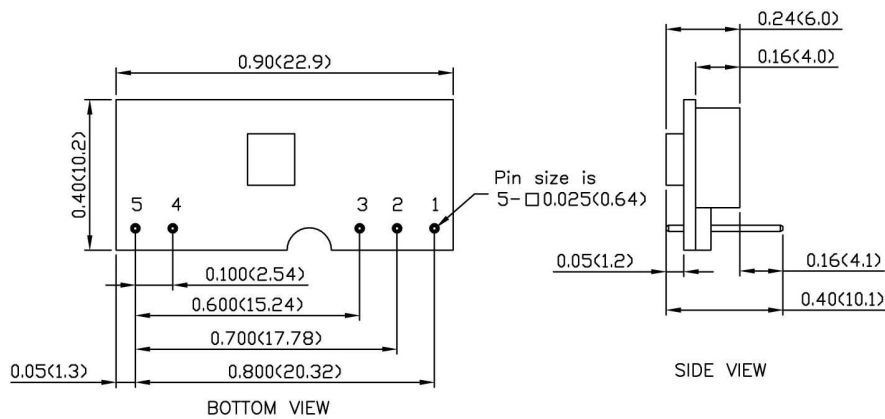
**MECHANICAL DRAWING :**

**DOH06-12T TYPE**



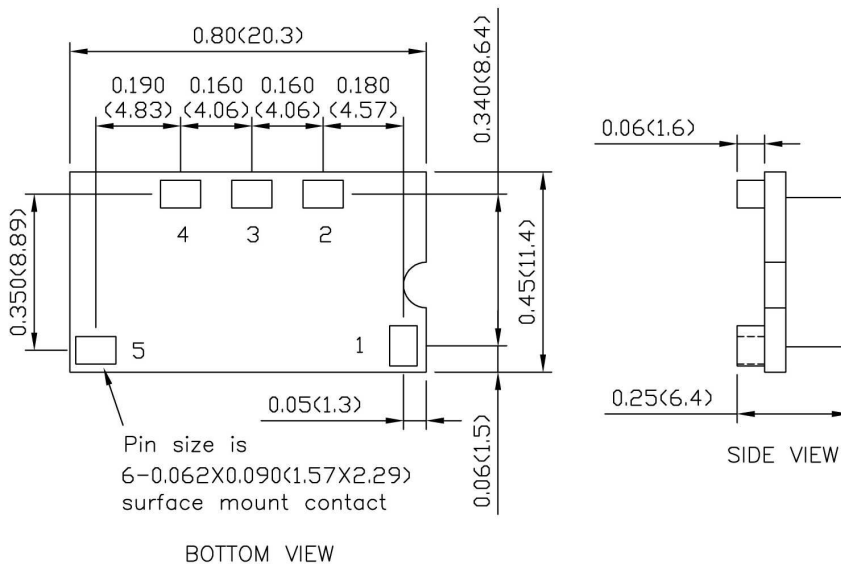
PIN CONNECTION	
PIN	DEFINE
1	+OUTPUT
2	TRIM
3	GND
4	+ INPUT
5	CTRL

**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)