



P-DUKE POWER

DOS06-12T · DOH06-12T Series

DC-DC Converter
Up to 6 Amps

3
YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



NO Min. Load Required
REMOTE ON OFF
OCP
SCP
UVP

PART NUMBER STRUCTURE

DOS06	-	12	-	T	-	P
Series Name		Input Voltage (VDC)		Package		Remote Control Options
DOS06: SMD TYPE DOH06: SIP TYPE		12: 8.3~14		SMD TYPE SIP TYPE T: No Assembly T: Vertical Mounting SIP TA: Horizontal Mounting SIP		□: Negative Logic P: Positive Logic

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

Model Number	Input Range	Output Voltage	Output Current @ Full Load	Input Current Vin(nom) @ No Load 0.75VDC / 5.0VDC	Efficiency Vin(nom), 3.3VDC @ Full Load	Maximum Capacitor Load ESR $\geq 1m\Omega$ / ESR $\geq 10m\Omega$
	VDC	VDC	A	mA	%	μF
DOS06-12T	Vout(set) ≤ 3.63 Vin = 8.3 ~ 14	0.75 ~ 5	6	17 / 100	89	1000 / 3000
DOS06-12T-P						
DOH06-12T	Vout(set) > 3.63 Vin = 8.3 ~ 13.2	0.75 ~ 5	6	17 / 100	89	1000 / 3000
DOH06-12T-P						
DOH06-12TA						
DOH06-12TA-P						

INPUT SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Operating input voltage range	Vout(set) $\leq 3.63VDC$ Vout(set) $> 3.63VDC$	8.3	12	14	VDC	
Maximum input current	Vin=Vin(min.), Io=Io(max.)	4.5			A	
Start up voltage		8.3			VDC	
Shutdown voltage		6.5	7.5	8.0	VDC	
Input filter	*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 47 μF ceramic capacitors at least.	Capacitor type				

OUTPUT SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Voltage accuracy	% of Vout(set)	-2.0		+2.0	%	
Line regulation	Vin=Vin(min.) to Vin(max.) at Full Load	-0.3		+0.3	%	
Load regulation	No Load to Full Load	-0.4		+0.4	%	
Voltage adjustability		0.7525		5	VDC	
Ripple and noise	Measured by 20MHz bandwidth with a 1 μF MLCC & a 10 μF T/C			20	mVrms	
				50	mVp-p	
Temperature regulation	T _A = -40°C to +85°C	-0.4		+0.4	%	
Dynamic load response	With a 1 μF MLCC & a 10 μF T/C $\Delta I_o / \Delta t = 2.5A/\mu s$, Vin(nom) 50% load step change		200		mV	
	Peak deviation		25		μs	
	Setting time(Vout<10%peak deviation)					
	With 2pcs of 150 μF polymer capacitors $\Delta I_o / \Delta t = 2.5A/\mu s$, Vin(nom) 50% load step change		50		mV	
	Peak deviation		50		μs	
	Setting time(Vout<10%peak deviation)					
Over load protection	% of I _{out} rated	200			%	
Short circuit protection		Continuous, automatic recovery				
Output voltage overshoot-startup	Vin=Vin(min.) to Vin(max.) at Full Load		1.0		%	

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage		None			
Switching frequency		270	300	330	kHz
Safety meets		IEC/ EN/ UL62368-1			
Weight		2.8g (0.1oz)			
MTBF	MIL-HDBK-217F, Full load	9.277 x 10 ⁶ hrs			

ENVIRONMENTAL SPECIFICATIONS

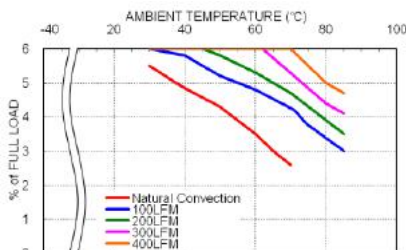
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+85	°C
Over temperature protection	Controller		140		°C
Storage temperature range		-55		+125	°C
Thermal shock		MIL-STD-810F			
Vibration		MIL-STD-810F			
Relative humidity(non-condensing)		5% to 95% RH			
Lead-free reflow solder process	Only for SMD type	IPC J-STD-020E			
Moisture sensitivity level(MSL)	Only for SMD type	IPC J-STD-033C Level 2a			

FEATURE SPECIFICATIONS

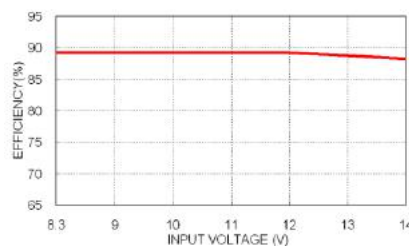
Parameter	Conditions	Min.	Typ.	Max.	Unit
Remote ON/OFF	Referred to GND pin Negative logic DC-DC ON (Standard) DC-DC OFF Positive logic DC-DC ON (Option) DC-DC OFF Input current of Ctrl pin Remote off input current	0.01	1.2	1.0	mA mA
	*Positive logic:ON/OFF is open collector/drain logic input Negative logic:ON/OFF pin is open collector/drain logic input with external pull –up resistor	Open or 0 ~ 0.3VDC 2.5VDC ~ Vin(max.) Open or (Vin-4) ~ Vin(max.) 0 ~ 0.3VDC			
Rise time	Time for Vout to rise from 10% to 90%of Vout(set)			6	ms
Turn-on delay time	Case 1, Case 2 *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)) *Case 2:Input power is applied for at least one second and then the ON/OFF input is set to logic low (delay from instant at which Von/off=0.3VDC until Vout=10% of Vout(set))		3		ms

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

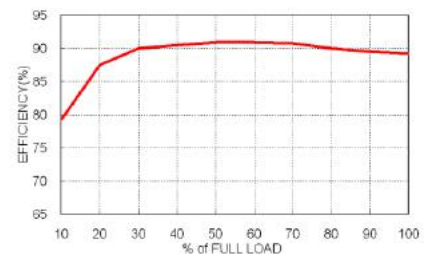
CHARACTERISTIC CURVE



DOS06-12T, Vout=3.3V
Derating Curve



DOS06-12T, Vout=3.3V
Efficiency vs. Input Voltage



DOS06-12T, Vout=3.3V
Efficiency vs. Output Load

FUSE CONSIDERATION

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

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

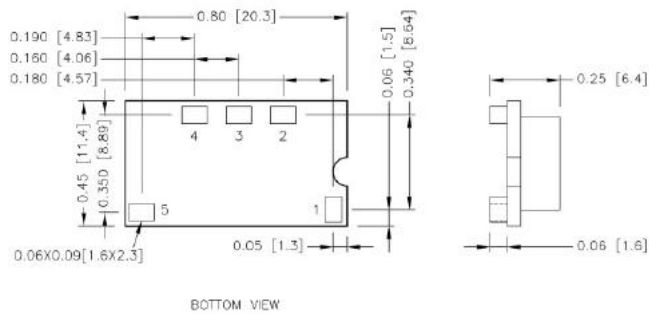
To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
DOS06-12T□□□□	6.3	Slow-Blow
DOH06-12T□□□□	6.3	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

MECHANICAL DRAWING

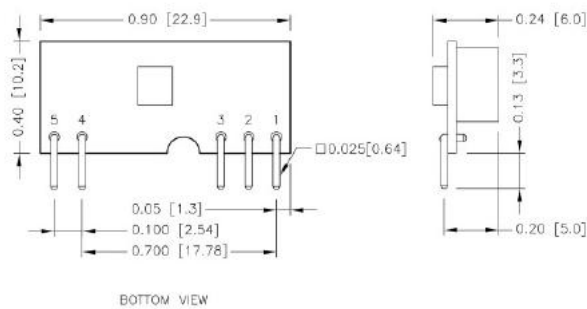
DOS06-12T



PIN CONNECTION

PIN	DEFINE
1	Ctrl
2	+Vout
3	Trim
4	GND
5	+Vin

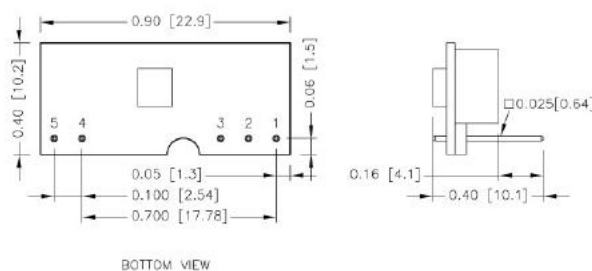
DOH06-12T



PIN CONNECTION

PIN	DEFINE
1	+Vout
2	Trim
3	GND
4	+Vin
5	Ctrl

DOH06-12TA



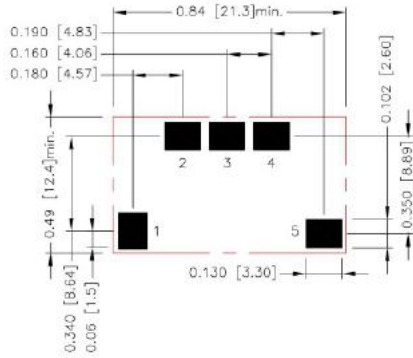
PIN CONNECTION

PIN	DEFINE
1	+Vout
2	Trim
3	GND
4	+Vin
5	Ctrl

- All dimensions in inch [mm]
- Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]
- Pin dimension tolerance ±0.004[0.10]

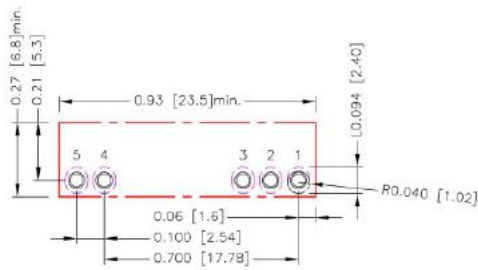
RECOMMENDED PAD LAYOUT

DOS06-12T



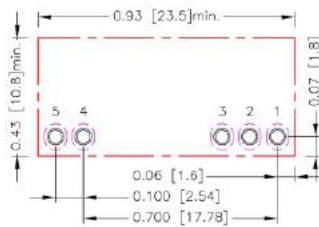
All dimensions in inch[mm]
 Pad size(lead free recommended)
 Top view pad 1.2.3.4.5: 0.130x0.102[3.30x2.60]

DOH06-12T



All dimensions in inch[mm]
 Pad size(lead free recommended)
 Through hole 1.2.3.4.5: $\Phi 0.047$ [1.20]
 Top view pad 1.2.3.4.5: $\Phi 0.059$ [1.50]
 Bottom view pad 1.2.3.4.5:
 Groove R0.040[1.02]L-0.094[2.40]

DOH06-12TA



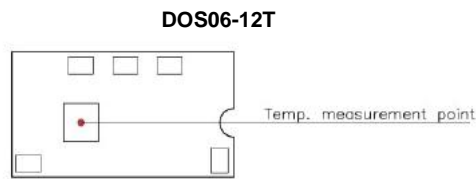
All dimensions in inch[mm]
 Pad size(lead free recommended)
 Through hole 1.2.3.4.5: $\Phi 0.047$ [1.20]
 Top view pad 1.2.3.4.5: $\Phi 0.059$ [1.50]
 Bottom view pad 1.2.3.4.5:
 Groove R0.040[1.02]L-0.094[2.40]

THERMAL CONSIDERATIONS

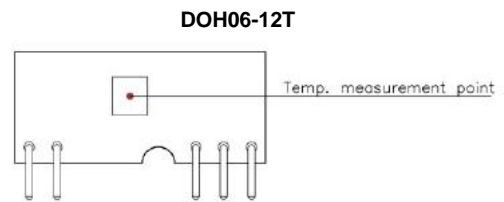
The power module operates in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed 115°C.

When operating, adequate cooling must be provided to maintain the test point temperature at or below 115°C. Although the maximum point temperature of the power modules is 115°C, you can limit this Temperature to a lower value for extremely high reliability.

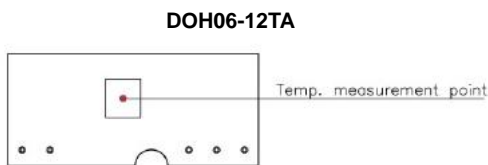
- Thermal test condition with vertical direction by natural convection (20LFM).



BOTTOM VIEW



BOTTOM VIEW

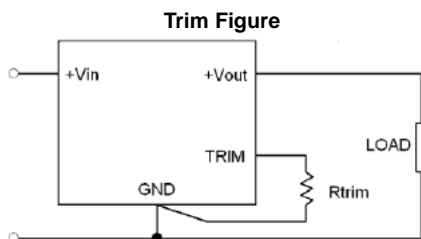


BOTTOM VIEW

OUTPUT VOLTAGE PROGRAMMING

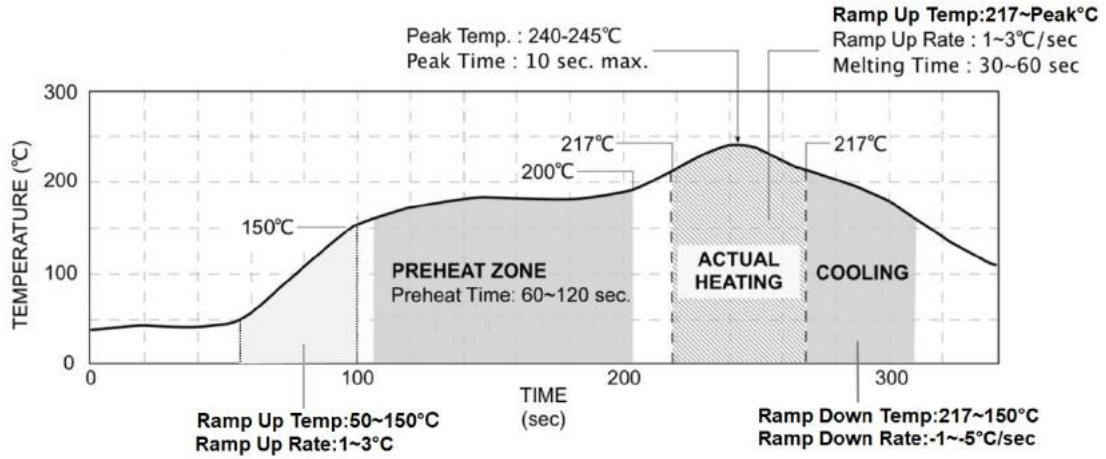
Output voltage programmable from 0.7525V to 5V by connecting a single resistor (shown as Trim Table) between the Trim and GND pins of the module. To calculate the value of the resistor Rtrim for a particular output voltage Vout, use the following equation:

■ **Rtrim Equation :** $R_{trim} = \left[\frac{10500}{V_{out} - 0.7525} - 1000 \right] \Omega$



Trim Table	
Vout(set) (VDC)	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

LEAD FREE REFLOW PROFILE For SMD Type



*The curves define the maximum peak reflow temperature permissible measured on pin1 or Vin pin.