



**P-DUKE**  
**POWER**

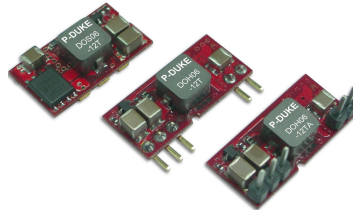
**DOS06-12T • DOH06-12T** Series

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

UL<sup>®</sup> us CB CE

**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 Option
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 VDC	Output Voltage VDC	Output Current @ Full Load A	Input Current Vin(nom) @ No Load		Efficiency Vin(nom), 3.3VDC @ Full Load %	Maximum Capacitor Load	
				0.75VDC / 5.0VDC	mA		ESR $\geq$ 1m $\Omega$ / ESR $\geq$ 10m $\Omega$	$\mu$ F
DOS06-12T	Vout(set) $\leq$ 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	8.3	12	14	VDC	
	Vout(set) > 3.63VDC	8.3	12	13.2		
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 <sub>in</sub> is 2pcs of 47 $\mu$ F 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 $\mu$ F MLCC & a 10 $\mu$ F T/C				20	mVrms
					50	mVp-p
Temperature coefficient		-0.4		+0.4	%/°C	
Dynamic load response	With a 1 $\mu$ F MLCC & a 10 $\mu$ F T/C $\Delta$ Io/ $\Delta$ t=2.5A/ $\mu$ s, Vin(nom)	Peak deviation		200	mV	
		50% load step change		Setting time(Vout<10%peak deviation)	25	$\mu$ s
	With 2pcs of 150 $\mu$ F polymer capacitors $\Delta$ Io/ $\Delta$ t=2.5A/ $\mu$ s, Vin(nom)	Peak deviation		50	mV	
		50% load step change		Setting time(Vout<10%peak deviation)	50	$\mu$ s
Over load protection	% of Iout rated	200			%	
Short circuit protection		Continuous, automatics recovery				
Output voltage overshoot-startup	Vin=Vin(min.) to Vin(max.) at Full Load	1.0			%	



# DOS06-12T DOH06-12T Series

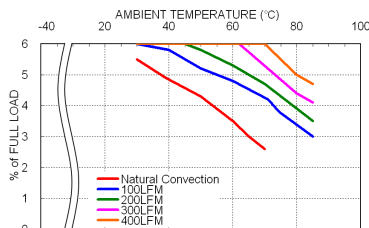
GENERAL SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Isolation voltage		None				
Switching frequency		270	300	330	kHz	
Safety approvals	IEC/ UL/ EN60950-1	UL:E193009 CB:UL(Demko)				
Weight		2.8g (0.1oz)				
MTBF	MIL-HDBK-217F, Full load	9.277 x 10 <sup>6</sup> hrs				

ENVIRONMENTAL SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Operating ambient temperature	With derating	-40		+85	°C	
Over temperature protection			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		IPC J-STD-020D				
Moisture sensitivity level(MSL)		IPC J-STD-033B Level 2a				

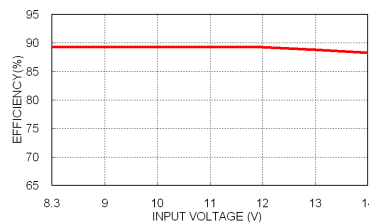
FEATURE SPECIFICATIONS						
Parameter	Conditions	Min.	Typ.	Max.	Unit	
Remote ON/OFF	Referred to GND pin Negative logic DC-DC ON (Standard) Positive logic DC-DC ON (Option) Input current of Ctrl pin Remote off input current				Open or 0 ~ 0.3VDC 2.5VDC ~ Vin(max.) Open or (Vin-4) ~ Vin(max.) 0 ~ 0.3VDC	
	*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	0.01		1.0	mA mA	
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 form 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.

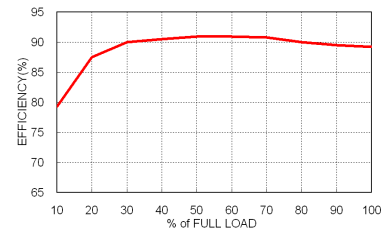
## CHARACTERISTIC CURVE



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



# DOS06-12T DOH06-12T Series

## FUSE CONSIDERATION

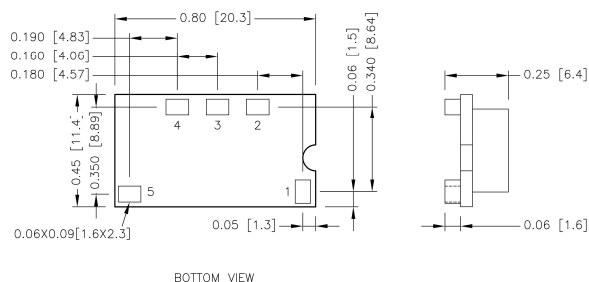
This power module is not internally fused. An input line fuse must always be used. This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing 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

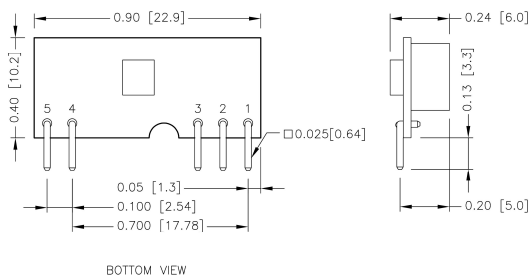
### DOS06-12T



### PIN CONNECTION

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

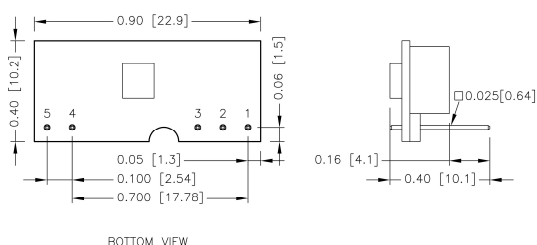
### DOH06-12T



### PIN CONNECTION

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

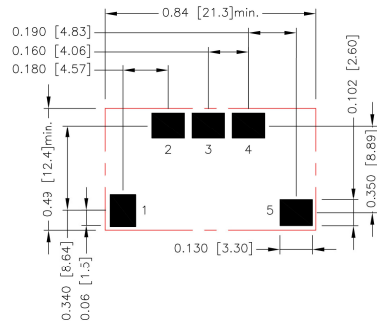
### DOH06-12TA



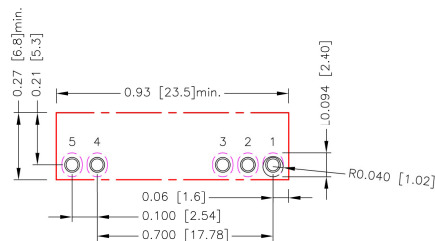
### PIN CONNECTION

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

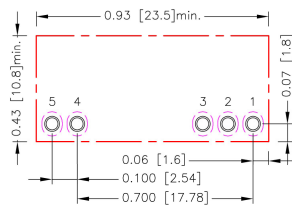
- All dimensions in inch [mm]
- Tolerance :x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
- Pin pitch tolerance ±0.01 [0.25]
- Pin dimension tolerance ±0.004 [0.10]

**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]



# DOS06-12T DOH06-12T Series

## 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.

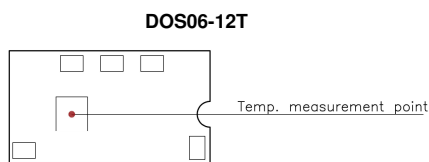
When Operating, adequate cooling must be provided to maintain the test point temperature at or below 115°C.

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.

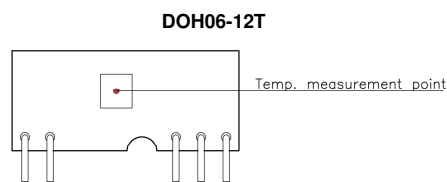
The unit will shutdown if the thermal reference point exceeds 125°C (typical), but the thermal shutdown is not intended as a guarantee that the unit will survive temperature beyond its rating.

The module will automatically restarts after it cools down.

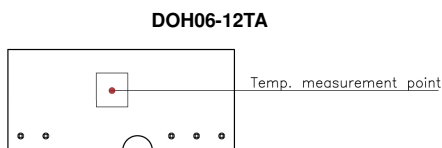
- Thermal test condition with vertical direction by natural convection (20LFM).



BOTTOM VIEW



BOTTOM VIEW

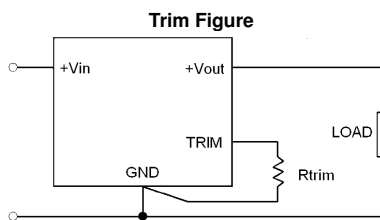


BOTTOM VIEW

## 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



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