



# P-DUKE POWER

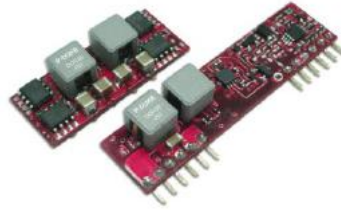
## DOS30 • DOH30 Series

DC-DC Converter  
Up to 30 Amps

**3**  
YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



NO Min. Load Required
CURRENT SHARE
REMOTE ON OFF
Output Voltage TRACKing
OCP
SCP
UVP

### PART NUMBER STRUCTURE

DOS30	-	05	T	-	P	S	L
Series Name		Input Voltage (VDC)	No Assembly		Remote On/Off Options	Load Share Options	Assembly Options
DOS30: SMD TYPE DOH30: SIP TYPE		05: 4.5~5.5 12: 6~14			□: Negative Logic P: Positive Logic	□: None S: Current Share	□: None E: Extra GND pin 2 extra GND pins only for SMD TYPE L: Long Pins 5.08mm±0.25mm only for SIP TYPE

**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), 3.3VDC @ No Load	Efficiency Vin(nom), 3.3V DC @ Full Load	Maximum Capacitor Load ESR $\geq 1\text{m}\Omega$ / ESR $\geq 10\text{m}\Omega$
	VDC	VDC	A	mA	%	$\mu\text{F}$
DOS30-05T	4.5 ~ 5.5 Vin(min.)=Vout(set)+1.5	0.8 ~ 3.63	30	180	93	2000 / 10000
DOH30-05T	4.5 ~ 5.5 Vin(min.)=Vout(set)+1.5	0.8 ~ 3.63	30	180	93	2000 / 10000
DOS30-12T	6 ~ 14 Vin(min.)=Vout(set)+2.4	0.8 $\leq$ Vout $\leq$ 2.75 2.75 < Vout $\leq$ 3.63	30 20	200	92	2000 / 10000
DOH30-12T	6 ~ 14 Vin(min.)=Vout(set)+2.4	0.8 $\leq$ Vout $\leq$ 2.75 2.75 < Vout $\leq$ 5.5	30 25	200	92	2000 / 10000

**INPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	5Vin(nom)	4.5	5	5.5	VDC
	12Vin(nom)	6	12	14	
Start up voltage	5Vin(nom)			4.5	VDC
	12Vin(nom)			6	
Shutdown voltage	5Vin(nom)	3	4	4.4	VDC
	12Vin(nom)	4	4.5	5.5	
Input filter	*To make sure the module is stable, input external capacitors is necessary that minimize input ripple voltage of the module.		Capacitor type		

**OUTPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Voltage accuracy	% of Vout(set)	-1.5		+1.5	%
Line regulation	Vin=Vin(min.) to Vin(max.) at Full Load	-0.1		+0.1	%
Load regulation	No Load to Full Load	-0.4		+0.4	%
Voltage adjustability	DOH30-12T	0.8		5.5	VDC
	Others	0.8		3.63	
Ripple and noise	Measured by 20MHz bandwidth, With a 1 $\mu\text{F}$ MLCC & a 10 $\mu\text{F}$ T/C		75		mVp-p
Temperature regulation	T <sub>A</sub> = -40°C to +85°C	-0.5		+0.5	%
Dynamic load response	With a 1 $\mu\text{F}$ MLCC & a 10 $\mu\text{F}$ T/C				
	$\Delta I_o / \Delta t = 5\text{A}/\mu\text{s}$ , Vin(nom) Peak deviation		350		mV
	50% load step change Setting time(Vout<10%peak deviation)		25		$\mu\text{s}$
Over load protection	With 2pcs of 150 $\mu\text{F}$ polymer capacitors				
	$\Delta I_o / \Delta t = 5\text{A}/\mu\text{s}$ , Vin(nom) Peak deviation		250		mV
	50% load step change Setting time(Vout<10%peak deviation)		40		$\mu\text{s}$
Short circuit protection	% of Iout rated		150		%
Output voltage overshoot-startup	Vin=Vin(min.) to Vin(max.) at Full Load				Continuous, automatics recovery
	% of Vout(set)			3.0	%

**GENERAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage			None		
Switching frequency		261	300	339	kHz
Safety meets					IEC/ EN/ UL62368-1
Weight	DOS30				6.0g (0.21oz)
	DOH30				7.0g (0.25oz)
MTBF	MIL-HDBK-217F, Full load				1.258 x 10 <sup>6</sup> hrs

## ENVIRONMENTAL SPECIFICATIONS

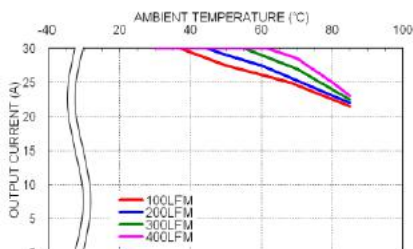
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+85	°C
Over temperature protection			125		°C
Storage temperature range		-55		+125	°C
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity(non-condensing)				5% to 95% RH	
Lead-free reflow 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
Sequencing delay time	Delay from Vin,min. to application of voltage on SEQ pin	10			ms
Tracking accuracy   VSEQ -Vout	Vin(min.) to Vin(max.), Iout(min.) to Iout(max.), VSEQ < Vout Power-up (2V/ms) Power-down (1V/ms)		100 200		mV mV
Active load share (option)	% of Iout rated Accuracy Number of units in parallel  *Selecting current share function that the regulations may not meet listed specification.		10	5	% pcs
Remote ON/OFF	Referred to GND pin Negative logic DC-DC ON (Standard) Positive logic DC-DC ON (Option) DC-DC OFF DC-DC OFF Input current of Ctrl pin Remote off input current			Open or -0.3 ~ 1.2VDC 3.0VDC ~ Vin(max.) Open or 3.0VDC ~ Vin(max.) -0.3 ~ 1.2VDC 0.2 3.3	mA mA
Remote sense range	If remote sense is not being used, +SENSE pin should connect to +Vout pin.			0.5	VDC
Rise time	Time for Vout to rise from 10% to 90%of Vout(set)			10	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))		2.5		ms

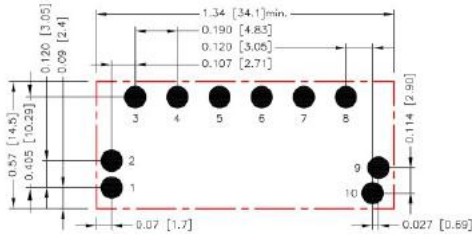
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

## CHARACTERISTIC CURVE

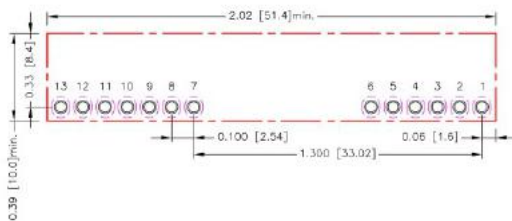


DOS30-05T, Vout=3.3V Derating Curve



**RECOMMENDED PAD LAYOUT**
**DOS30**


All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Top view pad 1.2.3.4.5.6.7.8.9.10:  $\Phi 0.097$  [2.47]

**DOH30**


All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.4.5.6.7.8.9.10.11.12.13:  $\Phi 0.047$  [1.20]  
 Top view pad 1.2.3.4.5.6.7.8.9.10.11.12.13:  $\Phi 0.059$  [1.50]  
 Bottom view pad 1.2.3.4.5.6.7.8.9.10.11.12.13:  
 Groove R0.040 [1.02] L-0.094 [2.40]

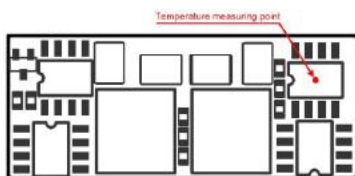
**THERMAL CONSIDERATIONS**

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.

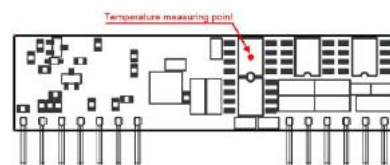
When operating, adequate cooling must be provided to maintain the test point temperature at or below 115°C.

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).

**DOS30**


TOP VIEW

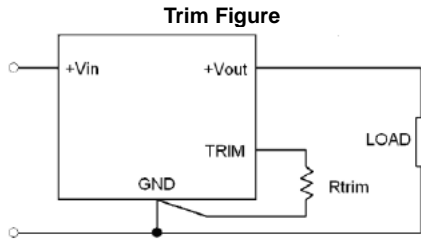
**DOH30**


BOTTOM VIEW

## OUTPUT VOLTAGE PROGRAMMING

Output voltage programmable from 0.8V to 5.0V 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:

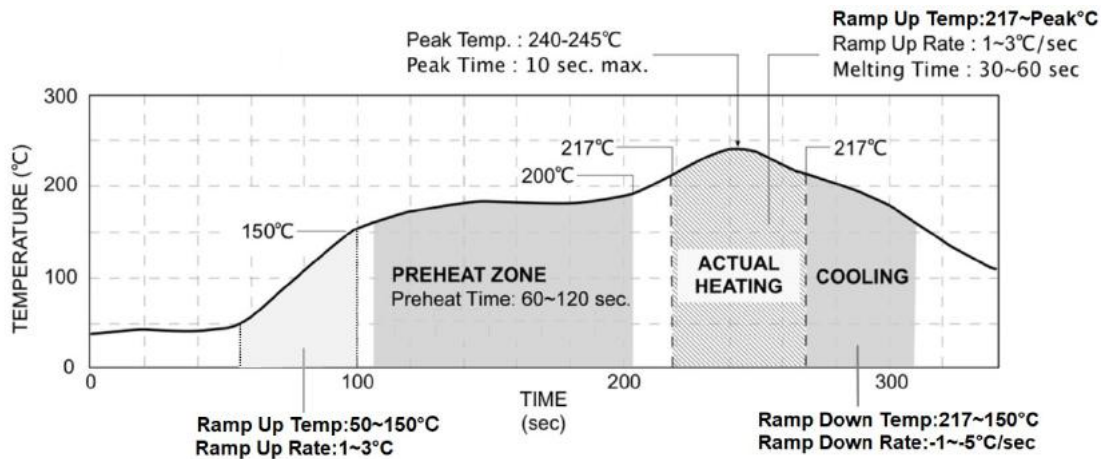
■ **Rtrim Equation :**  $R_{trim} = \left[ \frac{1200}{V_{out} - 0.80} - 100 \right] \Omega$



**Trim Table**

Vout(set) (VDC)	Rtrim (Ω)
0.8	Open
1.2	2900
1.5	1614
1.8	1100
2.5	605
3.3	380
5.0	185

## LEAD FREE REFLOW PROFILE For SMD Type



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