P-DUKE POWER

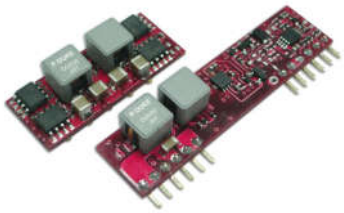
DOS30 • DOH30 Series

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

CE

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

PART NUMBER STRUCTURE

DOS30	-	05	T	-	P	R
Series Name		**Input Voltage (VDC)**	**No Assembly**		**Assembly Option**	**Conformal Coating Option**

DOS30: SMD TYPE
DOH30: SIP TYPE

05: 4.5~5.5
12: 6~14

□: Remote On/Off Negative Logic
P: Remote On/Off Positive Logic
S: Current Share
E: Extra GND pin 2 extra GND pins only for SMD TYPE
L: Long Pins 5.08mm±0.25mm only for SIP TYPE

□: None
R: Conformal Coating

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ 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≧1mΩ / ESR≧10mΩ
	VDC	VDC	A	mA	%	μF
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 ≦Vout≦ 2.75 2.75 <Vout≦ 3.63	30 20	200	92	2000 / 10000
DOH30-12T	6 ~ 14 Vin(min.)=Vout(set)+2.4	0.8 ≦Vout≦ 2.75 2.75 <Vout≦ 5.5	30 25	200	92	2000 / 10000

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	5Vin(nom) Vin(min.)=Vout(set)+1.5VDC 12Vin(nom) Vin(min.)=Vout(set)+2.4VDC	4.5 6	5 12	5.5 14	VDC
Start up voltage	5Vin(nom) 12Vin(nom)			4.5 6	VDC
Shutdown voltage	5Vin(nom) 12Vin(nom)	3 4	4 4.5	4.4 5.5	VDC
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 % of Vout(set)	-0.1		+0.1	%
Load regulation	No Load to Full Load % of Vout(set)	-0.4		+0.4	%
Voltage adjustability	DOH30-12T Others	0.8 0.8		5.5 3.63	VDC
Ripple and noise	Measured by 20MHz bandwidth, With a 1μF MLCC & a 10μF T/C		75		mVp-p
Temperature coefficient		-0.5		+0.5	%/℃
Dynamic load response	With a 1μF MLCC & a 10μF T/C △Io/△t=5A/μs ,Vin(nom) Peak deviation 50% load step change Setting time(Vout<10%peak deviation) With 2pcs of 150μF polymer capacitors △Io/△t=5A/μs ,Vin(nom) Peak deviation 50% load step change Setting time(Vout<10%peak deviation)		 350 25 250 40		 mV μs mV μs
Over load protection	% of Iout rated		150		%
Short circuit protection			Continuous, automatics recovery		
Output voltage overshoot-startup	Vin=Vin(min.) to Vin(max.) at Full Load % 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/ UL/ EN60950-1		
Weight	DOS30 DOH30			6.0g (0.21oz) 7.0g (0.25oz)	
MTBF	MIL-HDBK-217F, Full load			1.258×10^6 hrs	

ENVIRONMENTAL SPECIFICATIONS

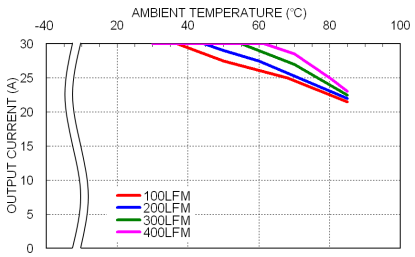
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating	-40		+85	℃
Over temperature protection			125		℃
Storage temperature range		-55		+125	℃
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity(non-condensing)				5% to 95% RH	
Lead-free reflow solder 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 | V_{SEQ} -Vout |	Vin(min.) to Vin(max.), Iout(min.) to Iout(max.), V_{SEQ} < 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 (Standard) DC-DC ON DC-DC OFF Positive logic (Option) DC-DC ON 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				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

FUSE CONSIDERATION

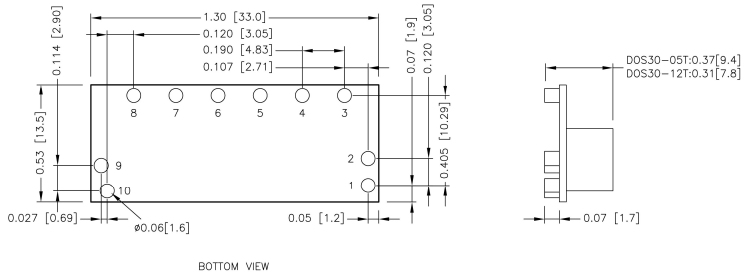
This power module is not internally fused. An input line fuse must always be used.
This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.
To maximum flexibility, internal fusing 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
DOS30-05T□□□、DOH30-05T□□□	35	Fast-Acting
DOS30-12T□□□、DOH30-12T□□□	30	Fast-Acting

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

MECHANICAL DRAWING

DOS30

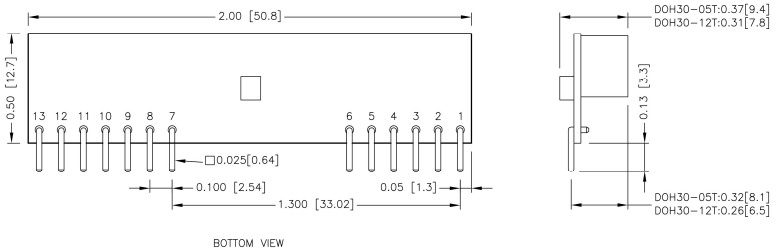


PIN CONNECTION

PIN	DEFINE
1	Ctrl
2	GND (option)
3	Share (option)
4	+Sense
5	Trim
6	+Vout
7	GND
8	Seq
9	GND (option)
10	+Vin

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

DOH30

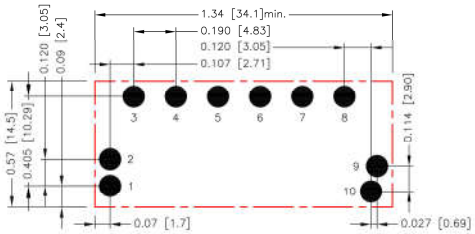


PIN CONNECTION

PIN	DEFINE
1	+Vout
2	+Vout
3	+Sense
4	+Vout
5	GND
6	GND
7	Share (option)
8	GND
9	+Vin
10	+Vin
11	Seq
12	Trim
13	Ctrl

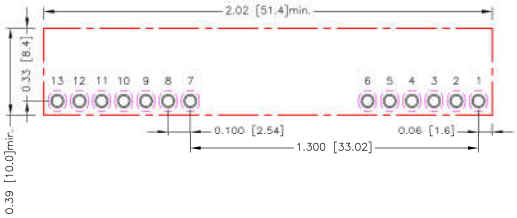
RECOMMENDED PAD LAYOUT

DOS30



All dimensions in inch[mm]
Pad size(lead free recommended)
Top view pad1.2.3.4.5.6.7.8.9.10: Φ0.097 [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: Φ0.047[1.20]
Top view pad 1.2.3.4.5.6.7.8.9.10.11.12.13: Φ0.059[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]

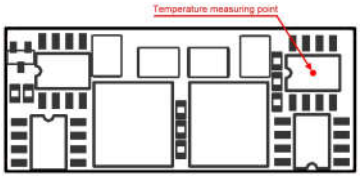
THERMAL CONSIDERATIONS

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

The unit will shutdown if the thermal reference point exceeds 125℃ (typical), but the thermal shutdown is not intended as a guarantee that the unit will survive temperature beyond its rating.
The module will automatically restart after it cools down.

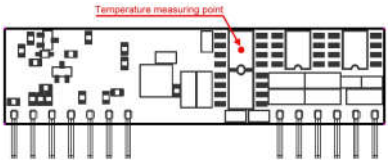
■ Thermal test condition with vertical direction by natural convection (20LFM).

DOS30



TOP VIEW

DOH30



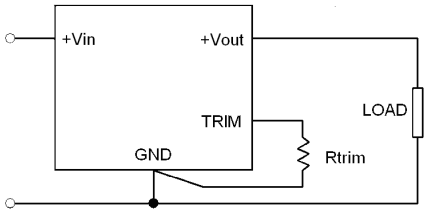
BOTTOM VIEW

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 :** $Rtrim = \left[\frac{1200}{Vout - 0.80} - 100\right]\Omega$

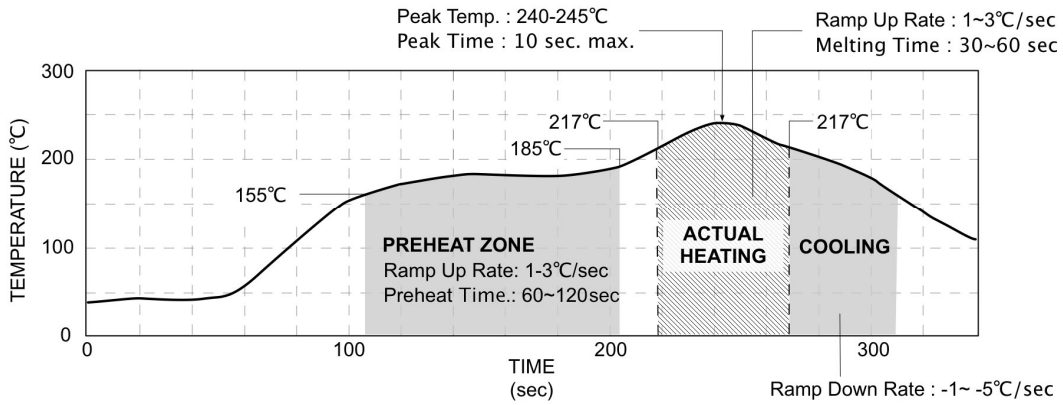
Trim Figure



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.

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