# POWER MATE TECHNOLOGY CO., LTD.

DOS16-12T
DOH16-12T
DC-DC CONVERTER

UP TO 16 Amps
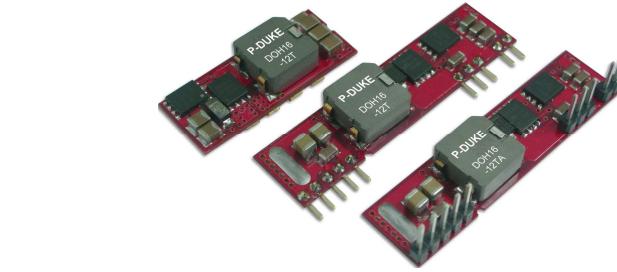
FEATURES

- **NO MINIMUM LOAD REQUIRED**
- **SMALL SIZE AND LOW PROFILE :**
  SMD TYPE:1.30 ✕ 0.53 ✕ 0.30 INCH , SIP TYPE:2.00 ✕ 0.50 ✕ 0.28 INCH
- **SMD PACKAGE QUALIFIED FOR LEADFREE REFLOW SOLDER**
  PROCESS ACCORDING IPC J-STD-020D
- **UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS**
- **CE MARKED**
- **COMPLIANT TO RoHS II & REACH**

REMOTE CONTROL	UVP	OCP	SCP

APPLICATIONS

- **WIRELESS NETWORK**
- **TELECOM/DATACOM**
- **INDUSTRY CONTROL SYSTEM**
- **DISTRIBUTED POWER ARCHITECTURES**
- **SEMICONDUCTOR EQUIPMENT**
- **MICROPROCESSOR POWER APPLICATIONS**

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ 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 (1) ESR≧1mΩ / ESR≧10mΩ
	VDC	VDC	A	mA	%	µF
DOS16-12T DOS16-12T-P DOH16-12T DOH16-12T-P DOH16-12TA DOH16-12TA-P	Vout(set)≦3.63 Vin = 8.3 ~ 14 Vout(set)＞3.63 Vin = 8.3 ~ 13.2	0.75 ~ 5	16	40 / 100	92	1000 / 5000

PART NUMBER STRUCTURE

DOS16	-	12	T	-	P

Series Name
DOS16: SMD TYPE
DOH16: SIP TYPE

Input Voltage (VDC)
12: 8.3~14

Package
SMD TYPE **T:** No Assembly
SIP TYPE **T:** Vertical Mounting SIP
TA: Horizontal Mounting SIP

Remote Control Option
☐: Negative Logic
P: Positive Logic

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	Vout(set)≦3.63VDC	8.3	12	14	VDC
	Vout(set)＞3.63VDC	8.3	12	13.2	
Maximum input current	Vin=8.3 to 14VDC, Io=Io(max.)			10	A
Input reflected ripple current	5~20MHz, 1µH source impedance			30	mAp-p
Start-up voltage				7.9	VDC
Shutdown voltage				7.8	VDC
Input filter (2)				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	% of Vout(set)	-0.3		+0.3	%
Load regulation	No Load to Full Load	% of Vout(set)	-0.4		+0.4	%
Voltage adjustability [3]			0.7525		3.63	VDC
Ripple and noise	Measured by 20MHz bandwidth,with a 1µF MLCC & a 10µF T/C					
					30	mVrms
					75	mVp-p
Temperature coefficient			-0.4		+0.4	%/℃
Dynamic load response	With a 1µF MLCC & a 10µF T/C					
	△Io/△t=2.5A/µs,Vin(nom)	Peak deviation			200	mV
	50% load step change	Setting time(Vout<10%peak deviation)			25	µs
Dynamic load response	With 2pcs of 150µF polymer capacitors					
	△Io/△t=2.5A/µs,Vin(nom)	Peak deviation			100	mV
	50% load step change	Setting time(Vout<10%peak deviation)			50	µs
Over load protection	% of Iout rated				180	%
Short circuit protection				Continuous, automatics recovery		
Output voltage overshoot-startup	Vin= Vin(min.) to Vin(max.) at Full Load	% of Vout(set)			1.0	%

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage					None
Switching frequency		270	300	330	kHz
Safety approvals				UL60950-1	
				EN60950-1	
				IEC60950-1	
Weight				6.0g (0.21oz)	
MTBF	MIL-HDBK-217F, Full load			3.416 x 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					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 [4]	Referred to −Vin pin	Negative logic	DC-DC ON	Open or 0 ~ 0.3VDC			
		(Standard)	DC-DC OFF	2.5VDC ~ Vin(max.)			
		Positive logic	DC-DC ON	Open or (Vin-4) ~ Vin(max.)			
		(Option)	DC-DC OFF	0 ~ 0.3VDC			
		Input current of Ctrl pin		0.01		1.0	mA
		Remote off input current			2.0		mA
Remote sense range						0.5	VDC
Rise time	Time for Vout to rise from 10% to 90%of Vout(set)					6	ms
Turn-on delay time	Case 1 [5], Case 2 [6]				3		ms

Note:

1. Test by minimum input and constant resistive load.
2. 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 6pcs of 47µF ceramic capacitors at least.
3. 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:

$$Rtrim = \left[\frac{10500}{Vout - 0.7525} - 1000 \right] \Omega$$

Trim Figure
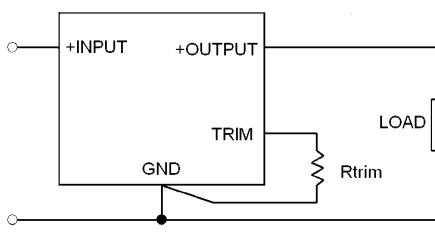
Trim Table

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

4. 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
5. 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))
6. 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))

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

CHARACTERISTIC CURVE
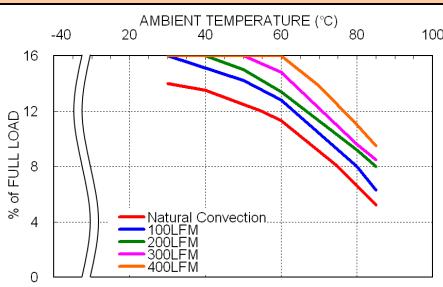
DOS16-12T, Vout=3.3V
Derating Curve
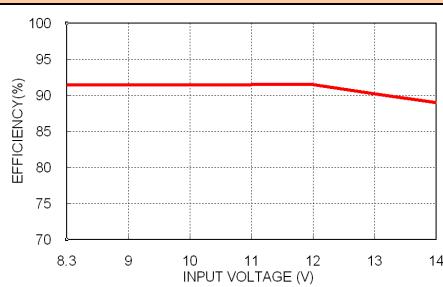
DOS16-12T, Vout=3.3V
Efficiency vs. Input Voltage
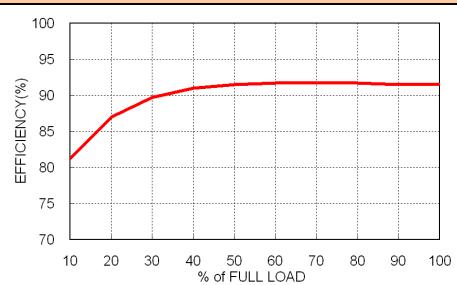
DOS16-12T, Vout=3.3V
Efficiency vs. Output Load

MECHANICAL DRAWING

DOS16-12T

BOTTOM VIEW
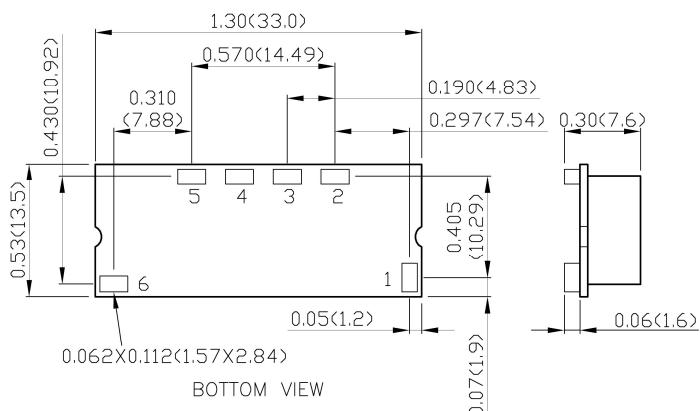
PIN CONNECTION

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

DOH16-12T

BOTTOM VIEW
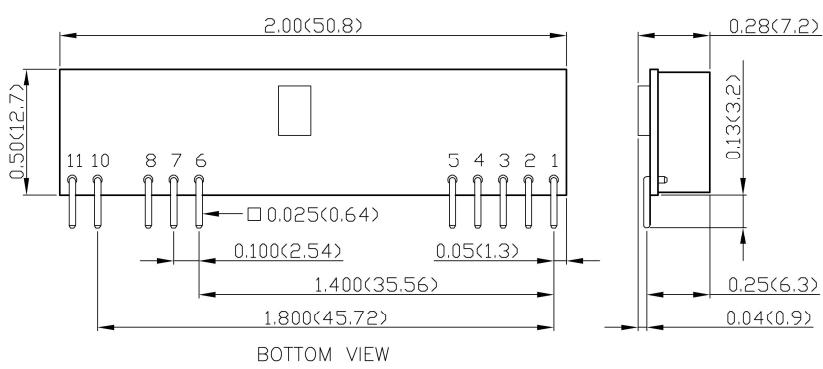
PIN CONNECTION

PIN	DEFINE
1	+Vout
2	+Vout
3	+Sense
4	+Vout
5	GND
6	GND
7	+Vin
8	+Vin
10	Trim
11	Ctrl

DOH16-12TA

BOTTOM VIEW
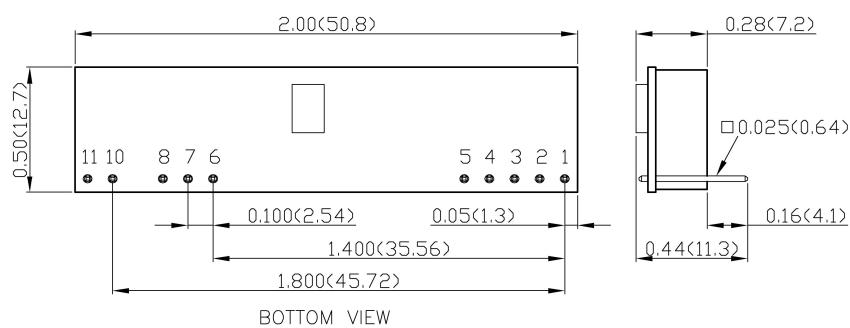
PIN CONNECTION

PIN	DEFINE
1	+Vout
2	+Vout
3	+Sense
4	+Vout
5	GND
6	GND
7	+Vin
8	+Vin
10	Trim
11	Ctrl

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 pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)