DIP Package ("T" Suffix)

Size: 0.95in x 0.57in x 0.40in (24.3mm x 14.4mm x 10.2mm)

SMD Package ("S" Suffix)

Size: 0.95in x 0.71in x 0.41in (24.3mm x 18.1mm x 10.5mm)

OPTIONS

- Package Type
  -DIP
  -SMD

FEATURES

- 2:1 Input Voltage Range
- Low Leakage Current
- Through Hole or Surface Mount Package
- 500VAC Reinforced Insulation
- Over Voltage and Short Circuit Protection
- Remote On/Off
- 2xMOPP
- IEC/EN/ANSI/AAMI ES 60601-1 and IEC/EN/UL 60950-1, 62368-1 Safety Approvals

APPLICATIONS

- Medical
- PV
- Automation
- Datacom
- Telecom
- IPC
- Industrial
- Measurement

DESCRIPTION

The DCMSD04 series of medical DC/DC converters offers up to 3.5 watts of output power in a compact DIP or SMD package. This series consists of both single and dual output models with a 2:1 input voltage range. Features of this series include low leakage current, remote on/off, and 500VAC reinforced insulation. The DCMSD04 series has protection against over voltage and short circuit conditions as well as IEC/EN/ANSI/AAMI ES 60601-1 and IEC/EN/UL 60950-1, 62368-1 safety approvals.

MODEL SELECTION TABLE
Single Output Model

Model Number[1]	Input Voltage Range	Output Voltage	Output Current @Full Load	Ripple & Noise	No Load Input Current	Efficiency	Maximum Capacitive Load	Output Power
DCMSD04-05S05x	5VDC (4.5~12VDC)	5VDC	700mA	50mVp-p	70mA	77%	1470µF	Up to 3.5 Watts
DCMSD04-05S09x		9VDC	389mA	50mVp-p	70mA	78%	680µF	
DCMSD04-05S12x		12VDC	292mA	50mVp-p	70mA	82%	470µF	
DCMSD04-05S15x		15VDC	234mA	50mVp-p	90mA	82%	330µF	
DCMSD04-05S24x		24VDC	146mA	75mVp-p	90mA	82%	170µF	
DCMSD04-12S05x	12VDC (9~18VDC)	5VDC	700mA	50mVp-p	40mA	79%	1470µF	Up to 3.5 Watts
DCMSD04-12S09x		9VDC	389mA	50mVp-p	40mA	79%	680µF	
DCMSD04-12S12x		12VDC	292mA	50mVp-p	45mA	82%	470µF	
DCMSD04-12S15x		15VDC	234mA	50mVp-p	45mA	82%	330µF	
DCMSD04-12S24x		24VDC	146mA	75mVp-p	50mA	82%	170µF	
DCMSD04-24S05x	24VDC (18~36VDC)	5VDC	700mA	50mVp-p	25mA	79%	1470µF	Up to 3.5 Watts
DCMSD04-24S09x		9VDC	389mA	50mVp-p	25mA	80%	680µF	
DCMSD04-24S12x		12VDC	292mA	50mVp-p	25mA	83%	470µF	
DCMSD04-24S15x		15VDC	234mA	50mVp-p	25mA	83%	330µF	
DCMSD04-24S24x		24VDC	146mA	75mVp-p	30mA	82%	170µF	
DCMSD04-48S05x	48VDC (36~75VDC)	5VDC	700mA	50mVp-p	12mA	79%	1470µF	Up to 3.5 Watts
DCMSD04-48S09x		9VDC	389mA	50mVp-p	12mA	80%	680µF	
DCMSD04-48S12x		12VDC	292mA	50mVp-p	13mA	82%	470µF	
DCMSD04-48S15x		15VDC	234mA	50mVp-p	13mA	82%	330µF	
DCMSD04-48S24x		24VDC	146mA	75mVp-p	13mA	82%	170µF	

MODEL SELECTION TABLE
Dual Output Models

Model Number	Input Voltage Range	Output Voltage	Output Current @Full Load	Ripple & Noise	No Load Input Current	Efficiency	Maximum Capacitive Load	Output Power
DCMSD04-05D12x	5VDC (4.5~12VDC)	±12VDC	±146mA	75mVp-p	90mA	82%	±220µF	Up to 3.5 Watts
DCMSD04-05D15x		±15VDC	±117mA	75mVp-p	95mA	81%	±160µF	
DCMSD04-12D12x	12VDC (9~18VDC)	±12VDC	±146mA	75mVp-p	50mA	82%	±220µF	Up to 3.5 Watts
DCMSD04-12D15x		±15VDC	±117mA	75mVp-p	50mA	82%	±160µF	
DCMSD04-24D12x	24VDC (18~36VDC)	±12VDC	±146mA	75mVp-p	30mA	82%	±220µF	Up to 3.5 Watts
DCMSD04-24D15x		±15VDC	±117mA	75mVp-p	30mA	82%	±160µF	
DCMSD04-48D12x	48VDC (36~75VDC)	±12VDC	±146mA	75mVp-p	13mA	82%	±220µF	Up to 3.5 Watts
DCMSD04-48D15x		±15VDC	±117mA	75mVp-p	13mA	82%	±160µF	

SPECIFICATIONS

All specifications are typical at 25°C, Nominal Input, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	5Vin Nominal Input Models		4.5	5	12	VDC
	12Vin Nominal Input Models		9	12	18	
	24Vin Nominal Input Models		18	24	36	
	48Vin Nominal Input Models		36	48	75	
Start-Up Voltage	5Vin Nominal Input Models				4.5	VDC
	12Vin Nominal Input Models				9	
	24Vin Nominal Input Models				18	
	48Vin Nominal Input Models				36	
Shutdown Voltage	5Vin Nominal Input Models		2	3	4	VDC
	12Vin Nominal Input Models		6	7	8	
	24Vin Nominal Input Models		13	15	17	
	48Vin Nominal Input Models		29	32	35	
Input Surge Voltage	1 Second, max.	5Vin Nominal Input Models			15	VDC
		12Vin Nominal Input Models			25	
		24Vin Nominal Input Models			50	
		48Vin Nominal Input Models			100	
Input Filter			Capacitor Type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy			-1.0		+1.0	%
Line Regulation	Low Line to High Line at Full Load		-0.2		+0.2	%
Load Regulation	No Load to Full Load	Single	-1.0		+1.0	%
		Dual	-1.0		+1.0	
	10% Load to 90% Load	Single	-0.5		+0.5	
		Dual	-0.8		+0.8	
Cross Regulation	Asymmetrical Load 25%/100% FL, Dual		-5.0		+5.0	%
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load			See Table			
Ripple & Noise	20MHz bandwidth		See Table			
Transient Response Recovery Time	25% Load Step Change			500		µs
Start-Up Time	Constant Resistive Load	Power Up		10	20	ms
		Remote ON/OFF				
Temperature Coefficient			-0.02		+0.02	%/°C
REMOTE ON/OFF CONTROL[2]						
DC-DC ON			Open or High Impedance			
DC-DC OFF			2.0	3.0	4.0	mA
Remote Off Input Current				2.5		mA
PROTECTION						
Short Circuit Protection			Continuous, Automatic Recovery			
Over Voltage Protection	5Vout Models		6.0		8.0	VDC
	9Vout Models		10.0		14.0	
	12Vout Models		13.0		19.0	
	15Vout Models		16.0		22.0	
	24Vout Models		25.0		35.0	
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	With Derating		-40		+105	°C
Storage Temperature			-55		+125	°C
Maximum Case Temperature					+105	°C
Relative Humidity			5		95	%RH
Operating Altitude					5000	m
Shock			MIL-STD-810F			
Vibration			MIL-STD-810F			
Thermal Shock			MIL-STD-810F			
Lead-Free Reflow Solder Process	SMD Type Only (“S” Suffix)		IPC J-STD-020E			
Moisture Sensitivity Level (MSL)	SMD Type Only (“S” Suffix)		IPC J-STD-033C, Level 2			
MTBF	MIL-HDBK-217F, Full Load			5,041,000		Hours

SPECIFICATIONS

All specifications are typical at 25°C, Nominal Input, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
GENERAL SPECIFICATIONS						
Efficiency				See Table		
Switching Frequency			100			kHz
Isolation Voltage	1 minute, reinforced insulation for 250VAC working voltage		5000			VAC
Isolation Capacitance				16	20	pF
Leakage Current	240VAC, 60Hz				2	µA
Clearance/Creepage			8			mm
PHYSICAL SPECIFICATIONS						
Weight				0.24oz (7.0g)		
Dimensions (L x W x H)	DIP Package ("T" Suffix)			0.95in x 0.57in x 0.40in (24.3mm x 14.4mm x 10.2mm)		
	SMD Package ("S" Suffix)			0.95in x 0.71in x 0.41in (24.3mm x 18.1mm x 10.5mm)		
Case Material				Non-Conductive Black Plastic		
Base Material				Non-Conductive Black Plastic		
Potting Material				Silicon (UL94 V-0)		
SAFETY CHARACTERISTICS						
Safety Approvals[4]	IEC/EN/ANSI/AAMI ES 60601-1 IEC/EN/UL 60950-1, 62368-1					UL CB: UL (Demko)
EMI	EN55011, EN55032, and FCC Part 18 with external components					Class A, Class B
ESD	EN61000-4-2	Air ±15kV and Contact ±8kV				Perf. Criteria A
Radiated Immunity	EN61000-4-3	10 V/m				Perf. Criteria A
Fast Transient[3]	EN61000-4-4	±2kV				Perf. Criteria A
Surge	EN61000-4-5	±1kV				Perf. Criteria A
Conducted Immunity	EN61000-4-6	10 Vr.m.s				Perf. Criteria A
Power Frequency Magnetic Field	EN61000-4-8	100A/m continuous; 1000A/m 1 second				Perf. Criteria A

NOTES

1. "X" in model number stands for case type. "X" can either be "T" for DIP package, or "S" for SMD package.
2. Referred to –Vin and Ctrl pin applied current.

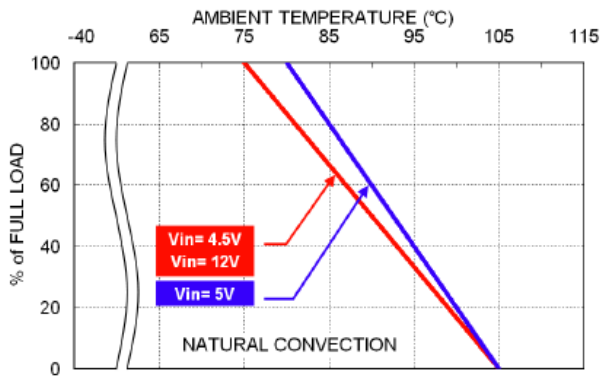
3. 5Vin Nominal Input Models: With an aluminum electrolytic capacitor (Nippon chemi-con KY series, 1000µF/25V) and a TVS (SMAJ18A, 18V, 400 Watt peak pulse power) in parallel.
   12Vin & 24Vin Nominal Input Models: With an external input filter capacitor (Nippon chemi-con KY series, 470µF/50V)
   48Vin Nominal Input Models: With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)
4. This product is Listed to applicable standards and requirements by UL.

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

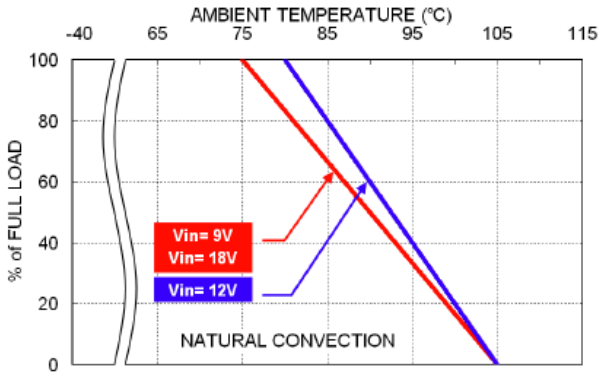
**Due to advances in technology, specifications subject to change without notice.*

DERATING CURVES

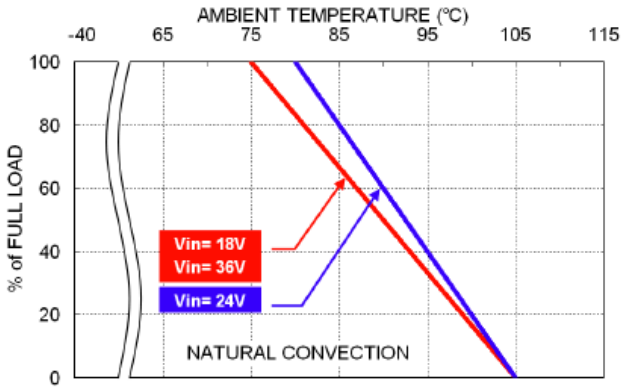
5Vin Nominal Input Models Derating Curve



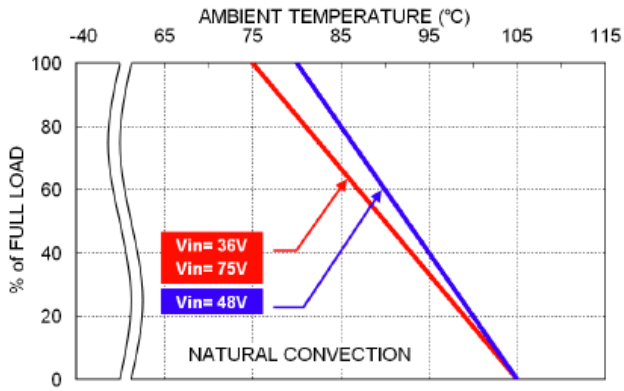
12Vin Nominal Input Models Derating Curve



24Vin Nominal Input Models Derating Curve

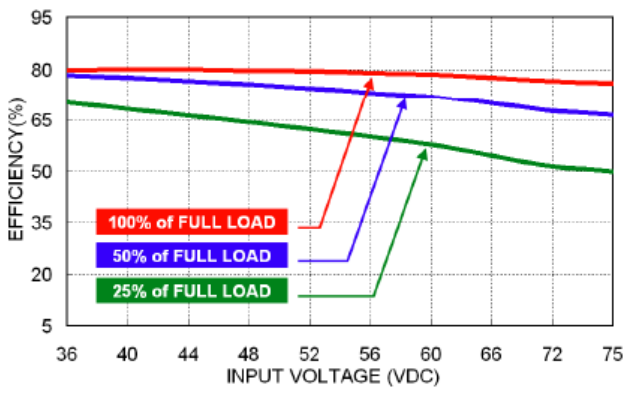


48Vin Nominal Input Models Derating Curve

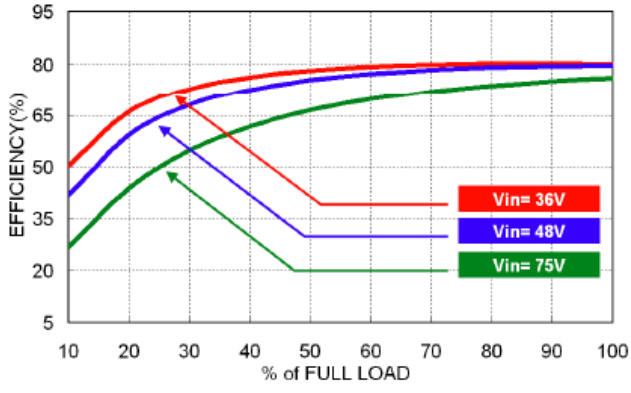


EFFICIENCY GRAPHS

DCMSD04-48S05x Efficiency vs. Input Voltage

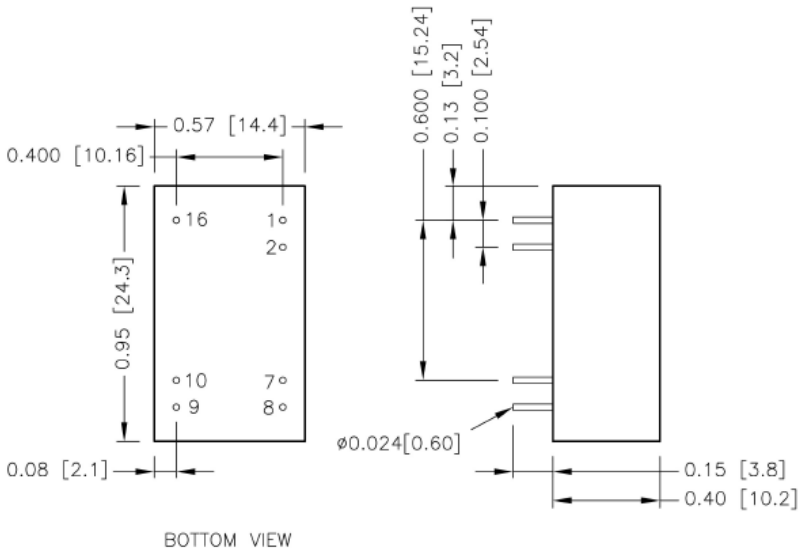


DCMSD04-48S05x Efficiency vs. Output Current

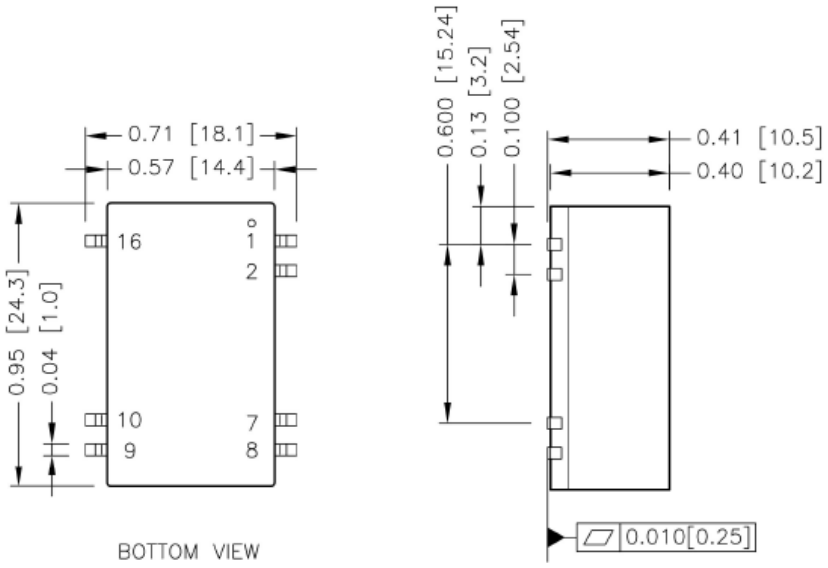


MECHANICAL DRAWINGS

DIP Package (“T” Suffix)



SMD Package (“S” Suffix)



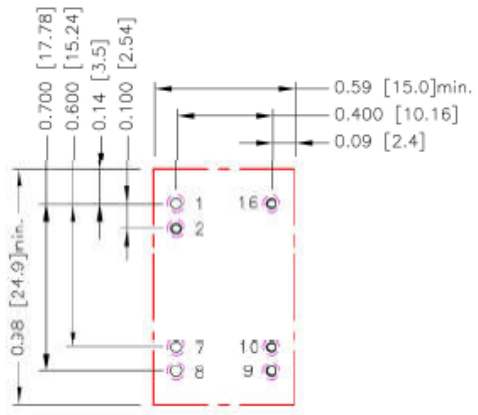
Pin Connections

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	Ctrl	Ctrl
7	NC	NC
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

Notes:
1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
   x.xxx±0.010 [x.xx±0.25]
3. Pin pitch tolerance ±0.010 [0.25]
4. Pin dimension tolerance ±0.004 [0.10]

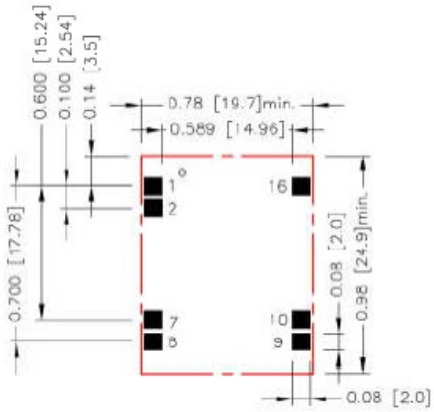
RECOMMENDED PAD LAYOUT

DIP Package (“T” Suffix)



Note:
All dimensions in inch [mm]
Pad size (lead free recommended)
Through hole 1.2.7.8.9.10.16: Ø0.035 [0.90]
Top view pad 1.2.7.8.9.10.16: Ø0.044 [1.13]
Bottom view pad 1.2.7.8.9.10.16: Ø0.071 [1.80]

SMD Package (“S” Suffix)

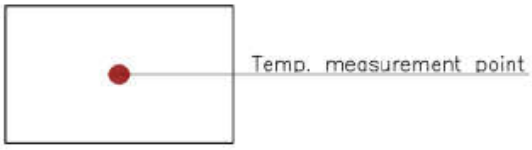


Note:
All dimensions in inch [mm]
Pad size (lead free recommended)
Top view pad: 0.080x0.080 [2.00x2.00]

*There should be at least 8mm distance between primary and secondary circuit.
**For further information, contact factory.

TERMINAL BLOCK OPTIONS

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 “Maximum case temperature”.
When operating, adequate cooling must be provided to maintain the test point temperature at or below “Maximum case temperature”
You can limit this temperature to a lower value for extremely high reliability.



TOP VIEW

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-along 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 suggested input line is below:

Model	Fuse Rating (A)	Fuse Type
5Vin Nominal Input Models	1.6	Slow-Blow
12Vin Nominal Input Models	0.8	Slow-Blow
24Vin Nominal Input Models	0.5	Slow-Blow
48Vin Nominal Input Models	0.315	Slow-Blow

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

MODEL NUMBER SETUP

DCMSD	04	-	05	S	05	T
Series Name	Output Power		Input Voltage	Output Quantity	Ouptut Voltage	Remote On/Off & Pin Length
			05: 4.5~12VDC	**S:** Single	**05:** 5VDC	**T:** DIP Package
			12: 9~18VDC		**09:** 9VDC	**S:** SMD Package
			24: 18~36VDC		**12:** 12VDC	
			48: 36~75VDC		**15:** 15VDC	
					24: 24VDC	
				D: Dual	**12:** ±12VDC	
					15: ±15VDC	

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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