DC/DC CONVERTER

2 Watt

2019

http://www.mmtmachrone.com

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 85%
- Unregulated Output Types
- Internal SMD Construction
- No External Component Required
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%TYP
12D-XXS05N2WNL	5	400	70
12D-XXS09N2WNL	9	222	75
12D-XXS12N2WNL	12	167	80
12D-XXS15N2WNL	15	133	80
12D-XXS24N2WNL	24	84	85
12D-XXD05N2WNL	±5	±200	70
12D-XXD09N2WNL	±9	±111	75
12D-XXD12N2WNL	±12	±84	80
12D-XXD15N2WNL	±15	±67	80
12D-XXD24N2WNL	±24	±42	85

Note :

1."XX" Is Input Voltage : 05=5Vdc,09=9Vdc,12=12Vdc,15=15Vdc,24=24Vdc.

2. The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±5	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V (10% To 100% F.L)			15	%
Load Regulation	9V,12V,15V,24V (10% To 100% F.L)			10	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
setting time	50% load step change		350		us

DC-DC Converter

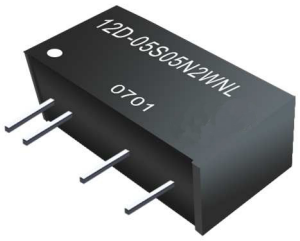
12D-2W SERIES

2Watt

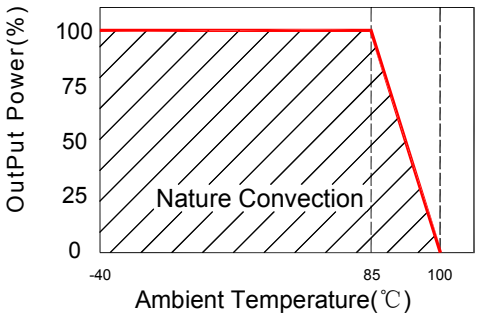
3KV Isolated

Single & Dual Output

SIP7



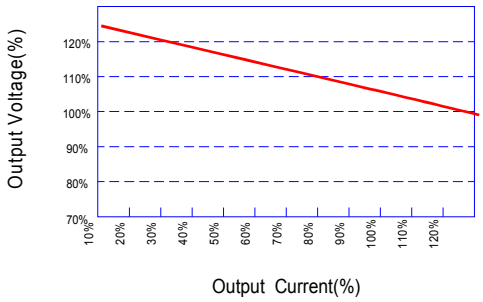
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.10x10.0		mm

Tolerance Envelope Graph

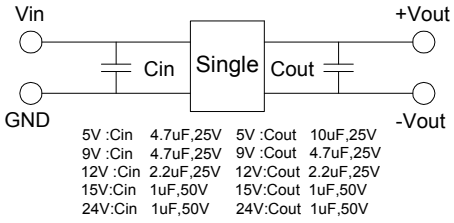


Part Number

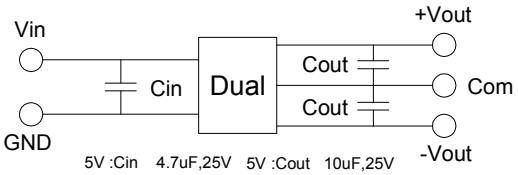
12D - 05 S 05 N 2W NL
A B C D E F G

A:Series
B:Input Voltage
C:Single(S) Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Output Power
G:RoHS Version

Recommended Test Circuit

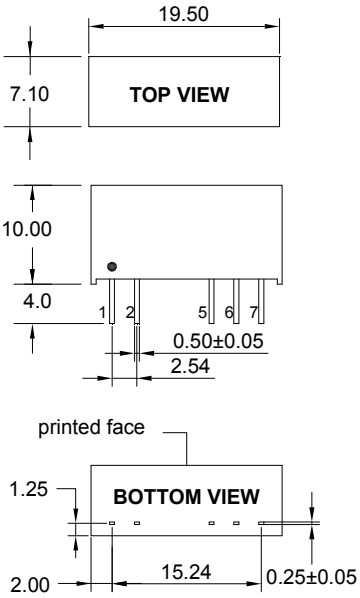


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V



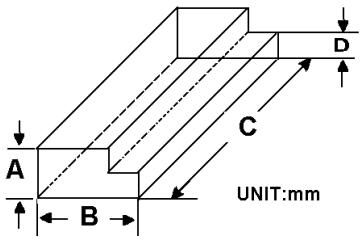
5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V

Markings and dimensions



Unit:mm Unless otherwise specified, all tolerances are ±0.25

Packaging



Size (mm)			
A	B	C	D
9.50	16.50	522	5.00

PIN Connection

PIN	1	2	5	6	7
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Common	+Vout

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 84%
- Reinforced insulation
- The patient leakage current: Max 2μA
- Unregulated Output Types
- Internal SMD Construction
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃
- Design refer to EN60601-1, ANSI/AAMI ES60601-1

12D1M-2W series meet reinforced insulation requirements. They are specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. They are widely used in medical, electricity, IGBT driver and so on. They are suitable for:

1. Where the voltage of the input power supply is stable (voltage variation: ±10% Vin)

2. Where isolation is necessary between input and output (isolation voltage ≤4200VAC or 6000VDC)

3. Where do not has high requirement of line regulation and the ripple & noise of the output voltage

Such as: Medical collection and isolation, High voltage collection circuit, IGBT-driven circuits, etc.

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency	Max. Capacitive Load(Note)
	Vdc	mA	%Min/Typ	uF
12D1M-05S05N2W	5	400	73/77	1000
12D1M-05S12N2W	12	167	75/79	470
12D1M-05S15N2W	15	133	75/79	470
12D1M-12S05N2W	5	400	73/77	1000
12D1M-12S12N2W	12	167	76/80	470
12D1M-12S15N2W	15	133	78/82	470
12D1M-24S05N2W	5	400	75/79	1000
12D1M-24S12N2W	12	167	78/82	470
12D1M-24S15N2W	15	133	80/84	470
12D1M-05D05N2W	±5	±200	74/78	470
12D1M-05D09N2W	±9	±111	74/78	470
12D1M-05D12N2W	±12	±84	74/78	220
12D1M-05D15N2W	±15	±67	76/80	220
12D1M-12D05N2W	±5	±200	74/78	470
12D1M-12D09N2W	±9	±111	78/82	470
12D1M-12D12N2W	±12	±84	78/82	220
12D1M-12D15N2W	±15	±67	76/80	220
12D1M-24D05N2W	±5	±200	75/79	470
12D1M-24D09N2W	±9	±111	77/81	470
12D1M-24D12N2W	±12	±84	78/82	220
12D1M-24D15N2W	±15	±67	77/81	220

Note: The capacitive loads of positive and negative outputs are identical.

DC-DC Converter

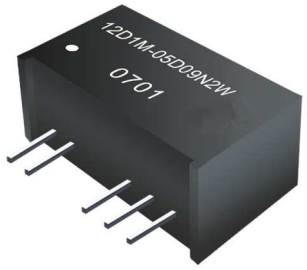
12D1M-2W SERIES

2Watt

4.2KVac or 6KVdc Isolated

Single & Dual Output

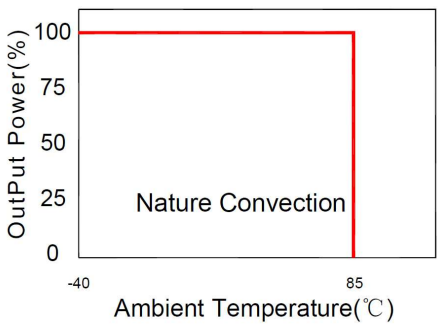
SIP7



RoHS COMPLIANT

3 YEARS WARRANTY

Temperature Derating Graph



Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types	Vo, Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V (10% To 100% F.L)			20	%
Load Regulation	9V(10% To 100% F.L)			15	%
Load Regulation	12V (10% To 100% F.L)			15	%
Load Regulation	15V(10% To 100% F.L)			15	%
Ripple & Noise	20MHz bandwidth		100	150	mVp-p
Output Short Circuit	(NOTE)			3	S

Note:
Supply voltage must be discontinued at the end of short circuit duration which less than 3s.

General Specifications

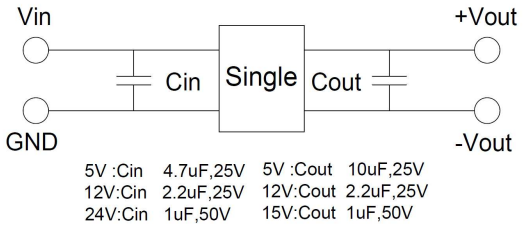
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		5		pF
Switching Frequency	Full load,nominal input		100		KHz
Operating Temperature		-40		+85	℃
Storage Temperature		-55		+125	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Transformer Creepage		5			mm
Transformer Clearance		5			mm
PCB Creepage & Clearance		5.5			mm
Case material	DAP				
MTBF	MIL-HDBK-217F@25℃	3500000			Hours
Weight			4.0		g
Dimensions			19.5x9.8x12.5		mm

Part Number

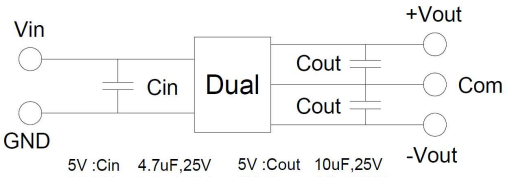
12D1M - 05 S 05 N 2W
A B C D E F

A: Series
B: Input Voltage
C: Single Output
D: Output Voltage
E: Unregulated (N)
F: Output Power

Recommended Test Circuit

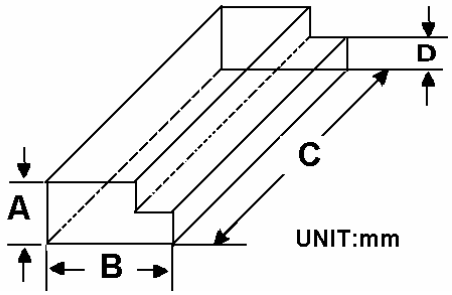


5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
12V:Cin 2.2uF,25V 12V:Cout 2.2uF,25V
24V:Cin 1uF,50V 15V:Cout 1uF,50V



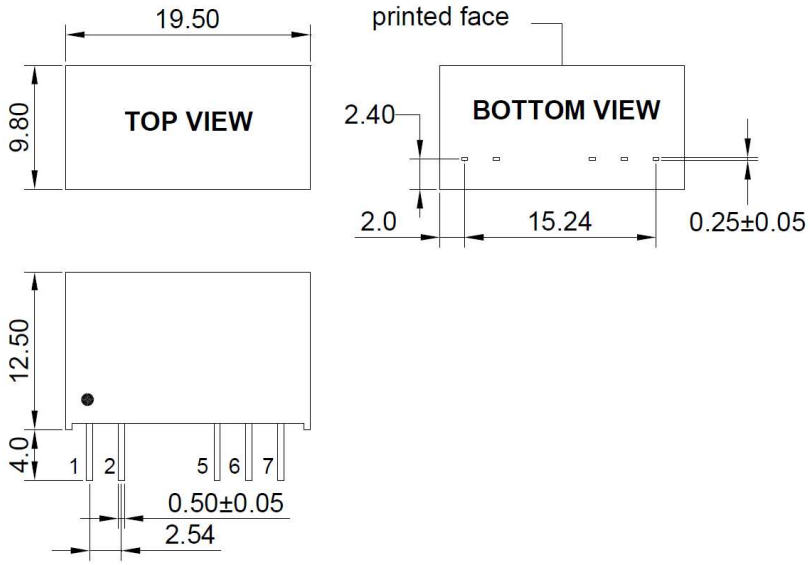
5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
12V:Cin 2.2uF,25V 9V :Cout 4.7uF,25V
24V:Cin 1uF,50V 12V:Cout 2.2uF,25V
15V:Cout 1uF,50V

Packaging



Size(mm)			
A	B	C	D
12.0	28.55	550	6.00

Markings and Dimensions



UNIT: mm Unless otherwise specified, all tolerances are±0.25

PIN Connection

Pin	1	2	5	6	7
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 88%
- Unregulated Output Types
- Internal SMD Construction
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Ripple & Noise		Efficiency
	Vdc	mA	Typ(mVp-p)	Max(mVp-p)	%TYP
12DA-05S05N2W	5	400	40	60	82
12DA-05S09N2W	9	222	40	60	86
12DA-05S12N2W	12	167	50	80	87
12DA-05S15N2W	15	133	50	80	86
12DA-12S05N2W	5	400	40	60	83
12DA-12S09N2W	9	222	40	60	87
12DA-12S12N2W	12	167	50	80	88
12DA-12S15N2W	15	133	50	80	87
12DA-15S05N2W	5	400	40	60	84
12DA-15S09N2W	9	222	40	60	86
12DA-15S12N2W	12	167	50	80	87
12DA-15S15N2W	15	133	50	80	88
12DA-24S05N2W	5	400	40	60	84
12DA-24S09N2W	9	222	40	60	87
12DA-24S12N2W	12	167	50	80	87
12DA-24S15N2W	15	133	50	80	88
12DA-05D05N2W	±5	±200	40	60	82
12DA-05D09N2W	±9	±111	40	60	85
12DA-05D12N2W	±12	±84	50	80	86
12DA-05D15N2W	±15	±67	50	80	86
12DA-12D05N2W	±5	±200	40	60	84
12DA-12D09N2W	±9	±111	40	60	87
12DA-12D12N2W	±12	±84	50	80	87
12DA-12D15N2W	±15	±67	50	80	87
12DA-15D05N2W	±5	±200	40	60	84
12DA-15D09N2W	±9	±111	40	60	86
12DA-15D12N2W	±12	±84	50	80	88
12DA-15D15N2W	±15	±67	50	80	88
12DA-24D05N2W	±5	±200	40	60	85
12DA-24D09N2W	±9	±111	40	60	87
12DA-24D12N2W	±12	±84	50	80	88
12DA-24D15N2W	±15	±67	50	80	88

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

DC-DC Converter

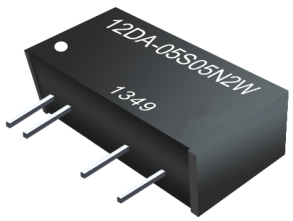
12DA-2W SERIES

2Watt

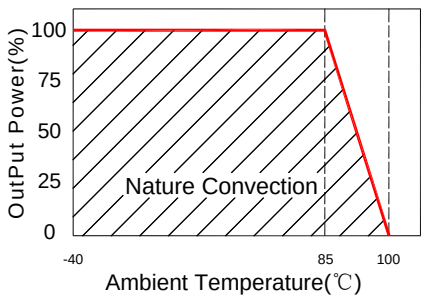
3KV Isolated

Single & Dual Output

SIP7



Temperature Derating Graph



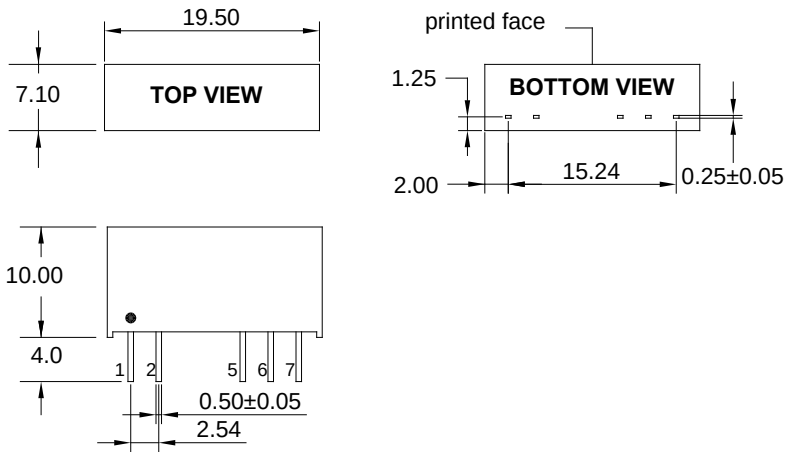
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V,9V (10% To 100% F.L)			10	%
Load Regulation	12V,15V (10% To 100% F.L)			7	%
Load Regulation	±5V,±9V (10% To 100% F.L)			9	%
Load Regulation	±12V,±15V (10% To 100% F.L)			6	%

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



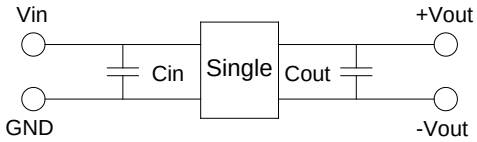
Unit:mm Unless otherwise specified, all tolerances are ±0.25

Part Number

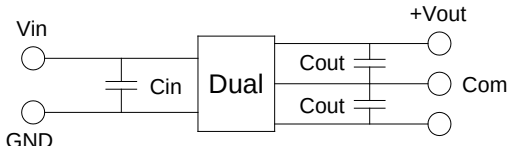
12DA - 05 S 05 N 2W
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Output Power

Recommended Test Circuit

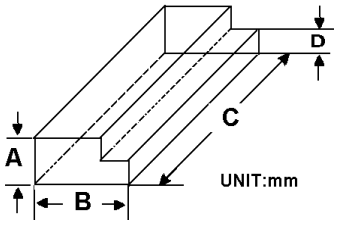


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V

Packaging



Size (mm)			
A	B	C	D
9.50	16.5	522	5.0

PIN Connection

PIN	1	2	5	6	7
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 85%
- Output Continuous Short Circuit Protection
- Unregulated Output Types
- Internal SMD Construction
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +105℃

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Ripple & Noise		Efficiency
	Vdc	mA	Typ (mVp-p)	Max (mVp-p)	%TYP
12DB-05S05N2W	5	400	60	100	80
12DB-05S09N2W	9	222	60	100	82
12DB-05S12N2W	12	167	60	100	82
12DB-05S15N2W	15	133	60	100	82
12DB-12S05N2W	5	400	60	100	82
12DB-12S09N2W	9	222	60	100	82
12DB-12S12N2W	12	167	60	100	84
12DB-12S15N2W	15	133	60	100	84
12DB-15S05N2W	5	400	60	100	80
12DB-15S09N2W	9	222	60	100	82
12DB-15S12N2W	12	167	60	100	83
12DB-15S15N2W	15	133	60	100	83
12DB-24S05N2W	5	400	60	100	82
12DB-24S09N2W	9	222	60	100	84
12DB-24S12N2W	12	167	60	100	84
12DB-24S15N2W	15	133	60	100	84
12DB-24S24N2W	24	84	60	100	85
12DB-05D05N2W	±5	±200	60	100	80
12DB-05D09N2W	±9	±111	60	100	82
12DB-05D12N2W	±12	±84	60	100	82
12DB-05D15N2W	±15	±67	60	100	82
12DB-12D05N2W	±5	±200	60	100	82
12DB-12D09N2W	±9	±111	60	100	84
12DB-12D12N2W	±12	±84	60	100	84
12DB-12D15N2W	±15	±67	60	100	84
12DB-15D05N2W	±5	±200	60	100	80
12DB-15D09N2W	±9	±111	60	100	82
12DB-15D12N2W	±12	±84	60	100	83
12DB-15D15N2W	±15	±67	60	100	83
12DB-24D05N2W	±5	±200	60	100	82
12DB-24D09N2W	±9	±111	60	100	78
12DB-24D12N2W	±12	±84	60	100	78
12DB-24D15N2W	±15	±67	60	100	80

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

DC-DC Converter

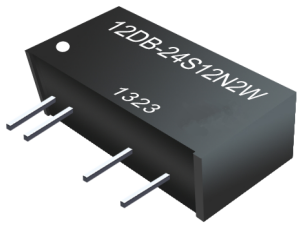
12DB-2W SERIES

2Watt

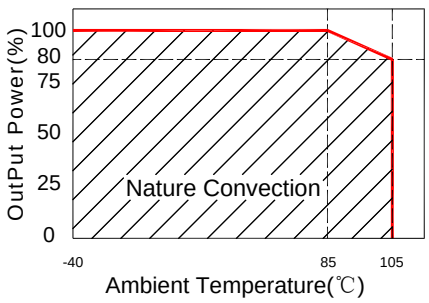
3KV Isolated

Single & Dual Output

SIP7



Temperature Derating Graph



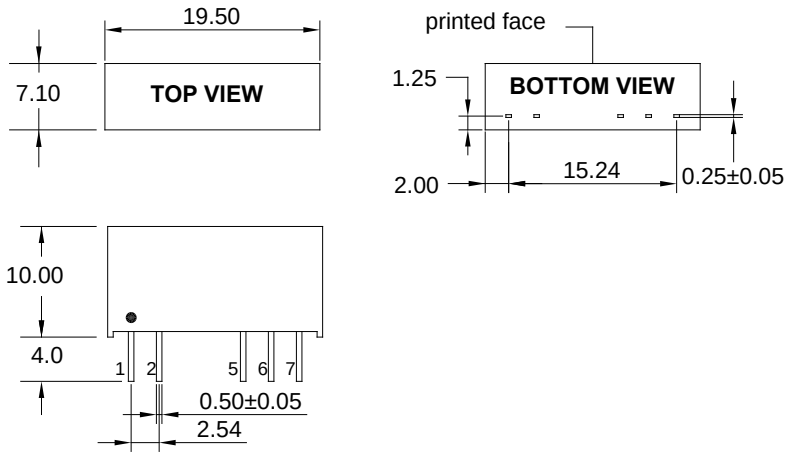
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Continuous				
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V,9V (10% To 100% F.L)			15	%
Load Regulation	12~24V (10% To 100% F.L)			10	%
Load Regulation	±5V,±9V (10% To 100% F.L)			15	%
Load Regulation	±12V~±24V (10% To 100% F.L)			10	%

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+105	℃
Storage Temperature		-55		+125	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



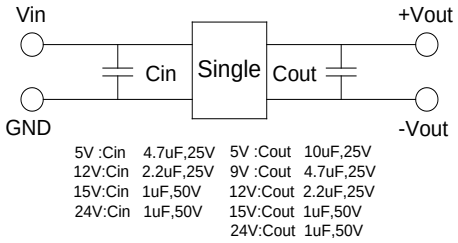
Unit:mm Unless otherwise specified, all tolerances are ±0.25

Part Number

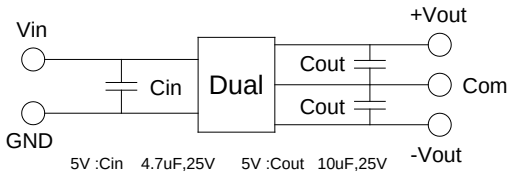
12DB - 05 S 05 N 2W
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Output Power

Recommended Test Circuit

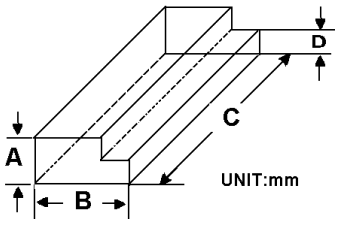


5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
12V:Cin 2.2uF,25V 9V :Cout 4.7uF,25V
15V:Cin 1uF,50V 12V:Cout 2.2uF,25V
24V:Cin 1uF,50V 15V:Cout 1uF,50V
24V:Cout 1uF,50V



5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
12V:Cin 2.2uF,25V 9V :Cout 4.7uF,25V
15V:Cin 1uF,50V 12V:Cout 2.2uF,25V
24V:Cin 1uF,50V 15V:Cout 1uF,50V

Packaging



Size (mm)			
A	B	C	D
9.50	16.5	522	5.0

PIN Connection

PIN	1	2	5	6	7
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

FEATURES :

- 2:1Wide Input Voltages Range
- 7PIN SIP Package
- High Efficiency up to 83%
- Regulated Output Types
- Internal SMD Construction
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Intput Voltage	Output Voltage	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
12DZ-05S05R2W	4.5-9	5	400	70
12DZ-05S09R2W	4.5-9	9	222	72
12DZ-05S12R2W	4.5-9	12	167	75
12DZ-05S15R2W	4.5-9	15	133	78
12DZ-05S24R2W	4.5-9	24	84	80
12DZ-12S05R2W	9-18	5	400	75
12DZ-12S09R2W	9-18	9	222	78
12DZ-12S12R2W	9-18	12	167	80
12DZ-12S15R2W	9-18	15	133	80
12DZ-12S24R2W	9-18	24	84	83
12DZ-24S05R2W	18-36	5	400	76
12DZ-24S09R2W	18-36	9	222	78
12DZ-24S12R2W	18-36	12	167	80
12DZ-24S15R2W	18-36	15	133	80
12DZ-24S24R2W	18-36	24	84	83

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types	Vo, Io Nom			2:1	
Filter	Capacitor				

DC-DC Converter

12DZ-2W SERIES

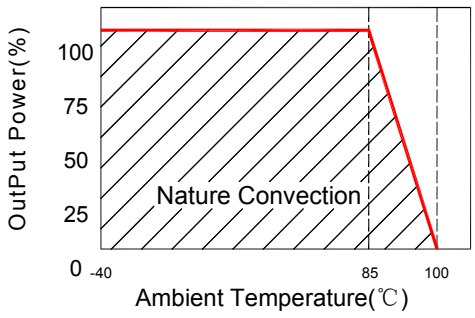
2Watt 3KV Isolated

2 : 1 Input Voltage Range

Single Output

SIP7

Temperature Derating Graph



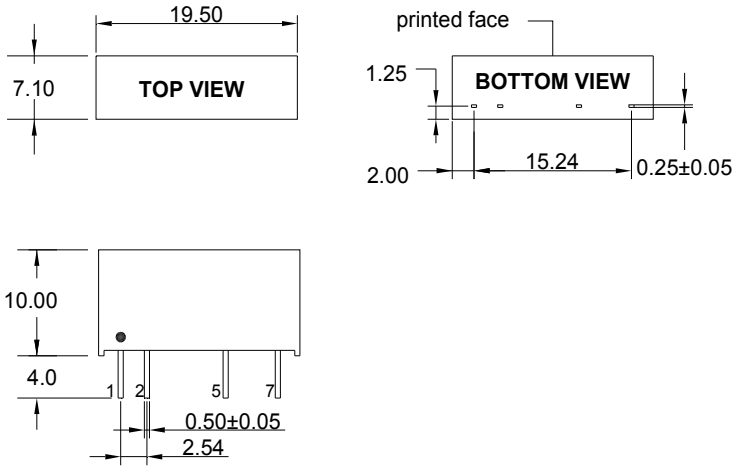
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±1.5	%
Ripple & Noise	Output:5V,9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz		1% of Vout		mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	1500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



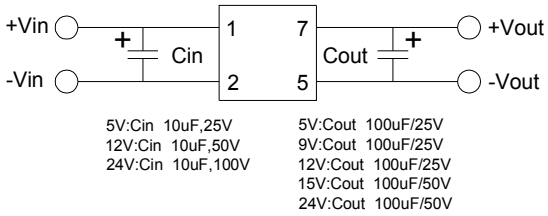
UNIT : mm Unless otherwise specified, all tolerances are ±0.25

Part Number

12DZ - 05 S 05 R 2W
A B C D E F

A:Series
B:Input Voltage
C:Single Output
D:Output Voltage
E:Regulated(R)
F:Output Power

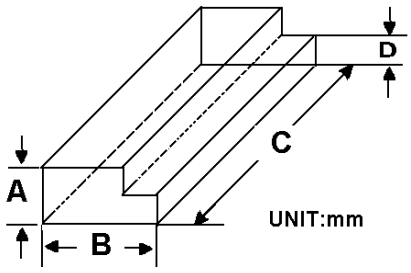
Recommended Test Circuit



5V:Cin 10uF,25V
12V:Cin 10uF,50V
24V:Cin 10uF,100V

5V:Cout 100uF/25V
9V:Cout 100uF/25V
12V:Cout 100uF/25V
15V:Cout 100uF/50V
24V:Cout 100uF/50V

Packaging



Size(mm)			
A	B	C	D
9.5	16.5	522	5.0

PIN Connection

Pin	1	2	5	7
Single	+Vin	-Vin	-Vout	+Vout

FEATURES :

- 4PIN SIP Package.
- High Efficiency up to 85%.
- Unregulated Output Types.
- Internal SMD Construction
- Operating Temperature:-40℃ TO +85℃
- No External Component Required
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%
13D-XXS05N2WNL	5	400	70
13D-XXS09N2WNL	9	222	75
13D-XXS12N2WNL	12	167	80
13D-XXS15N2WNL	15	133	80
13D-XXS24N2WNL	24	84	85

Note:

1."XX" Is Input Voltage : 05=5Vdc,09=9Vdc,12=12Vdc,15=15Vdc,24=24Vdc.

2.The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	3.3V,5V (10% To 100% F.L)			15	%
Load Regulation	9V,12V,15V,24V (10% To 100% F.L)			10	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

13D-2W SERIES

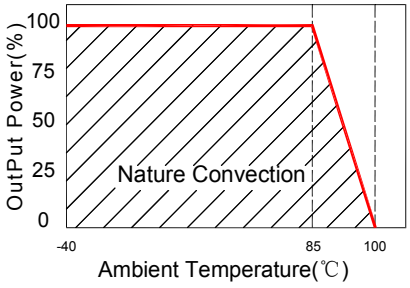
2Watt

1KV Isolated

Single Output

SIP4

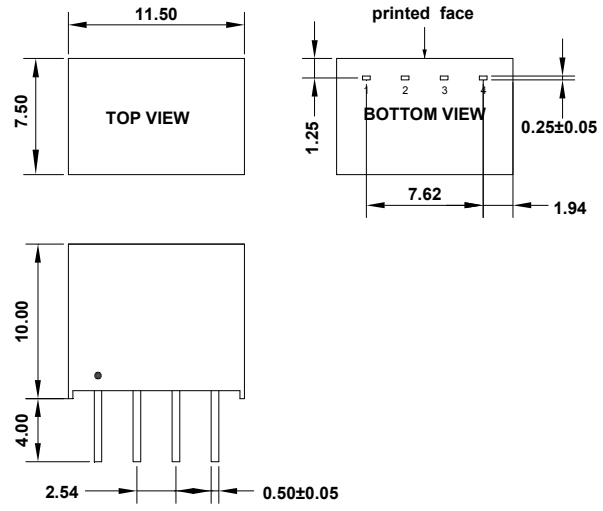
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			1.8		g
Dimensions			11.50x7.50x10.00		mm

Markings and Dimensions

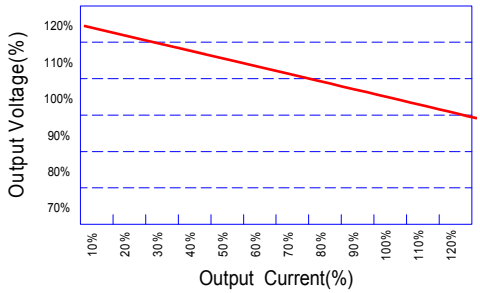


Unit:mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

PIN	1	2	3	4
Single	-Vin	+Vin	-Vout	+Vout

Tolerance Envelope Graph

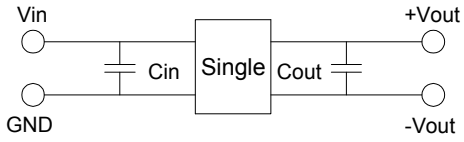


Part Number

13D - 05 S 05 N 2W NL
A B C D E F G

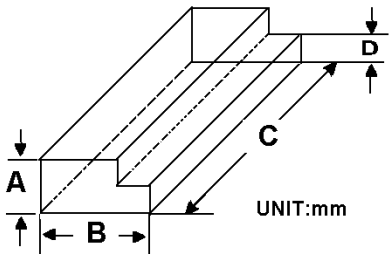
A:Series
B:Input Voltage
C:Single(S)
D:Output Voltage
E:Unregulated(N)
F:Output Power
G:RoHS Version

Recommended Test Circuit



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V:Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V

Packaging



Size(mm)			
A	B	C	D
9.50	16.50	522	5.00

FEATURES :

- Small Footprint
- 14PIN SMD Package
- High Efficiency up to 74%
- Unregulated Output Types
- High Power Density
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%TYP
13DS-03S03N2W	3.3	606	67
13DS-03S05N2W	5	400	72
13DS-03S09N2W	9	222	72
13DS-03S12N2W	12	167	72
13DS-05S03N2W	3.3	606	70
13DS-05S05N2W	5	400	72
13DS-05S09N2W	9	222	74
13DS-05S12N2W	12	167	74
13DS-09S03N2W	3.3	606	72
13DS-09S05N2W	5	400	74
13DS-09S09N2W	9	222	74
13DS-09S12N2W	12	167	74
13DS-12S03N2W	3.3	606	72
13DS-12S05N2W	5	400	72
13DS-12S09N2W	9	222	74
13DS-12S12N2W	12	167	74

DC-DC Converter

13DS-2W SERIES

2Watt

1KV Isolated

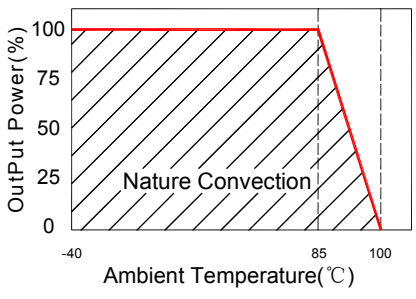
Single Output

SMD

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Temperature Derating Graph



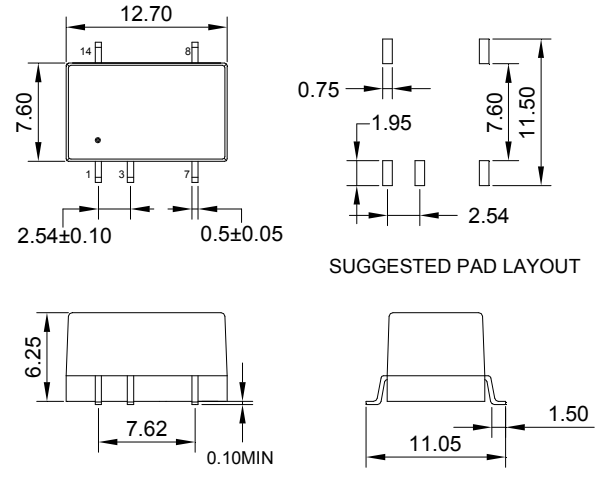
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	3.3V (10% To 100% F.L)		15		%
Load Regulation	5V,9V (10% To 100% F.L)			15&9.0	%
Load Regulation	12V (10% To 100% F.L)			7.5	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

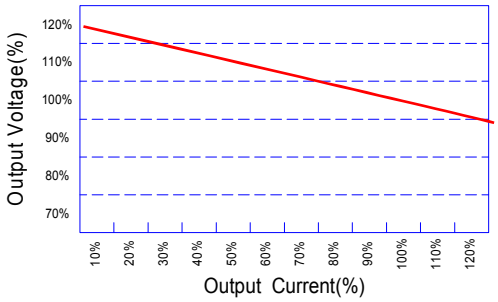
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			1.2		g
Dimensions			12.7x7.6x6.25		mm

Markings and dimensions



UNIT:mm Unless otherwise specified,all tolerances are ±0.25

Tolerance Envelope Graph

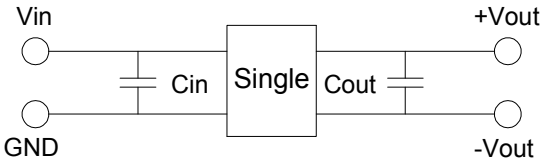


Part Number

13DS - 03 S 03 N 2W
A B C D E

A:Series
B:Input Voltage
C:Single Output
D:Output Voltage
E:Unregulated(N)

Recommended Test Circuit



3.3V:Cin	4.7uF,25V	3.3V :Cout	22uF,16V
5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V:Cin	2.2uF,25V	12V:Cout	2.2uF,25V

PIN Connection

Pin	1	3	7	8	14
Single	-Vin	+Vin	-Vout	+Vout	NC

FEATURES :

- Small Footprint
- 22PIN SMD Package
- High Efficiency up to 80%
- Unregulated Output Types
- High Power Density
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃
- No External Component Required

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%TYP
13DS1-XXS05N2W	5	400	70
13DS1-XXS09N2W	9	222	75
13DS1-XXS12N2W	12	167	80
13DS1-XXS15N2W	15	133	80
13DS1-XXD05N2W	±5	±200	70
13DS1-XXD09N2W	±9	±111	75
13DS1-XXD12N2W	±12	±84	80
13DS1-XXD15N2W	±15	±67	80

Note:

1."XX" Is Input Voltage:05=5Vdc,09=9Vdc,12=12Vdc, 15=15Vdc.

2.The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V&9V (10% To 100% F.L)			15	%
Load Regulation	12V&15V (10% To 100% F.L)			10	%
Ripple & Noise	BW=DC To 20MHz			75	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

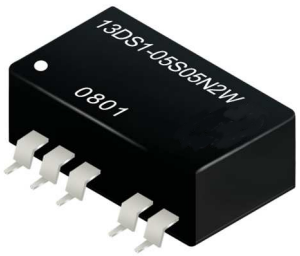
13DS1-2W SERIES

2Watt

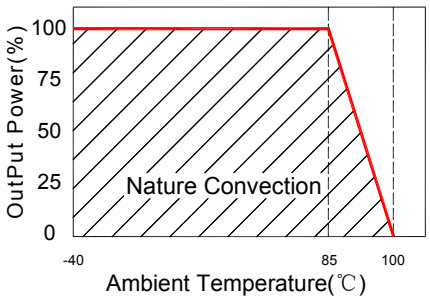
3KV Isolated

Single & Dual Output

SMD



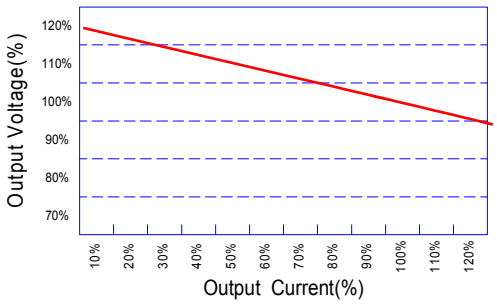
Temperature Derating Graph



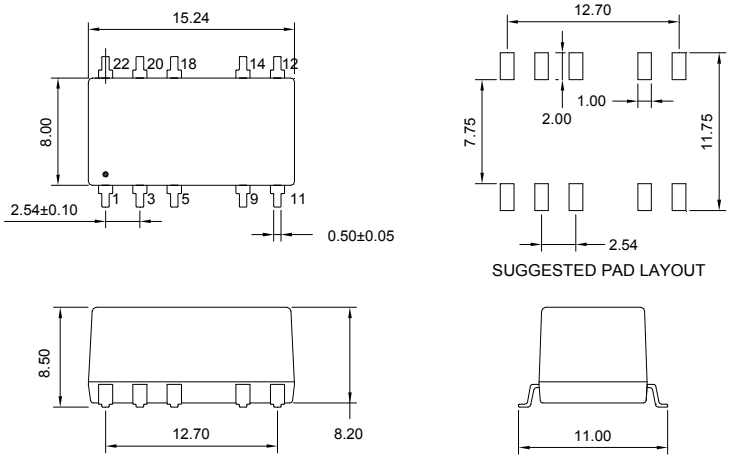
General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			1.5		g
Dimensions			15.24x8.0x8.5		mm

Tolerance Envelope Graph



Markings and dimensions



Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

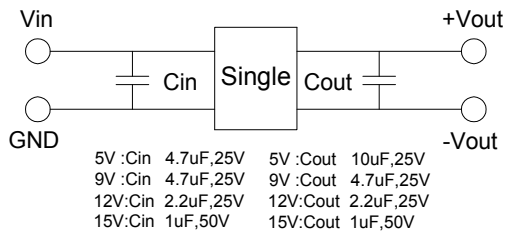
PIN	1	3	5	9	11	12	14	18	20	22
Single	-Vin	+Vin	NC	-Vout	NC	NC	+Vout	NC	NC	NC
Dual	-Vin	+Vin	NC	Com	-Vout	NC	+Vout	NC	NC	NC

Part Number

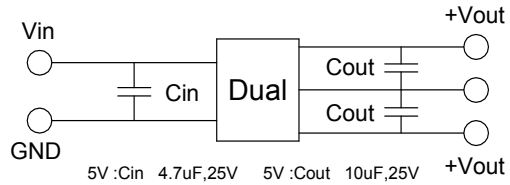
13DS1	-	05	S	05	N	2W
A		B	C	D	E	F

A:Series
B:Input Voltage
C:Single(S) Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Output Power

Recommended Test Circuit



5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
9V :Cin 4.7uF,25V 9V :Cout 4.7uF,25V
12V:Cin 2.2uF,25V 12V:Cout 2.2uF,25V
15V:Cin 1uF,50V 15V:Cout 1uF,50V



5V :Cin 4.7uF,25V 5V :Cout 10uF,25V
9V :Cin 4.7uF,25V 9V :Cout 4.7uF,25V
12V:Cin 2.2uF,25V 12V:Cout 2.2uF,25V
15V:Cin 1uF,50V 15V:Cout 1uF,50V

FEATURES :

- Small Footprint
- 18PIN SMD Package
- High Efficiency up to 80%
- Unregulated Output Types
- High Power Density
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃
- No External Component Required

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%TYP
13DS2-XXS05N42W	5	400	70
13DS2-XXS09N42W	9	222	75
13DS2-XXS12N42W	12	167	80
13DS2-XXS15N42W	15	133	80
13DS2-XXD05N42W	±5	±200	70
13DS2-XXD09N42W	±9	±111	75
13DS2-XXD12N42W	±12	±84	80
13DS2-XXD15N42W	±15	±67	80

Note:

1."XX" Is Input Voltage:05=5Vdc,09=9Vdc,12=12Vdc, 15=15Vdc, 24=24Vdc.

2.The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V & 9V (10% To 100% F.L)			15	%
Load Regulation	12V & 15V (10% To 100% F.L.)			10	%
Ripple & Noise	BW=DC To 20MHz			75	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

13DS2-N42W SERIES

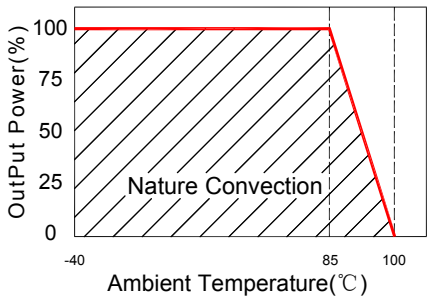
2Watt

1KV Isolated

Single & Dual Output

SMD

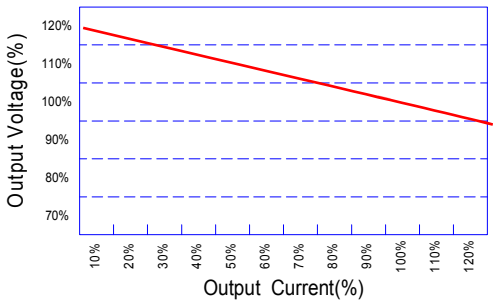
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			1.5		g
Dimensions			15.24x8.0x8.5		mm

Tolerance Envelope Graph

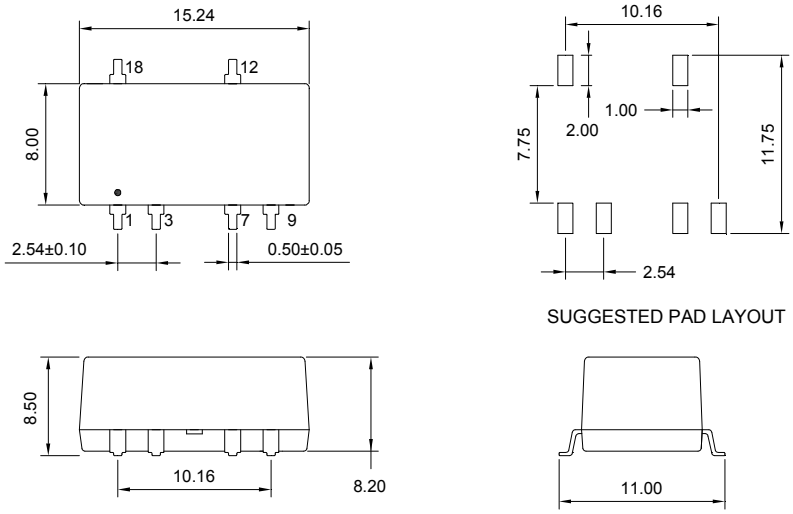


Part Number

13DS2 - 05 S 05 N 4 2W
A B C D E F G

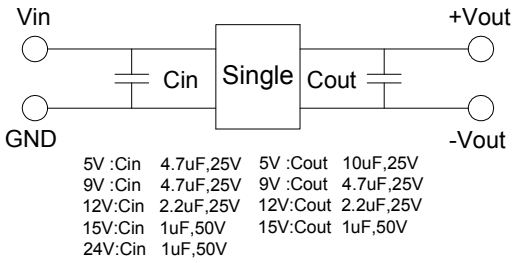
A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Package
G:Output Power

Markings and dimensions

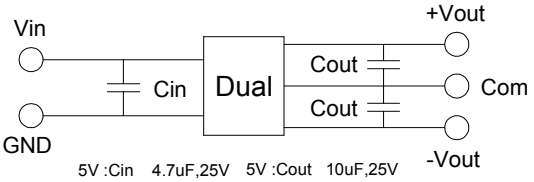


Unit : mm Unless otherwise specified, all tolerances are ±0.25

Recommended Test Circuit



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V:Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V		



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V:Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V		

PIN Connection

PIN	1	3	7	9	12	18
Single	-Vin	+Vin	-Vout	-Vout	+Vout	NC
Dual	-Vin	+Vin	Com	-Vout	+Vout	NC

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 85%
- Output Continuous Short Circuit Protection
- Unregulated Output Types
- Internal SMD Construction
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +105℃

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Ripple & Noise		Efficiency
	Vdc	mA	Typ (mVp-p)	Max (mVp-p)	%Typ
14DB-05S05N2W	5	400	60	100	80
14DB-05S09N2W	9	222	60	100	82
14DB-05S12N2W	12	167	60	100	82
14DB-05S15N2W	15	133	60	100	82
14DB-12S05N2W	5	400	60	100	82
14DB-12S09N2W	9	222	60	100	82
14DB-12S12N2W	12	167	60	100	84
14DB-12S15N2W	15	133	60	100	84
14DB-15S05N2W	5	400	60	100	80
14DB-15S09N2W	9	222	60	100	82
14DB-15S12N2W	12	167	60	100	83
14DB-15S15N2W	15	133	60	100	83
14DB-24S05N2W	5	400	60	100	82
14DB-24S09N2W	9	222	60	100	84
14DB-24S12N2W	12	167	60	100	84
14DB-24S15N2W	15	133	60	100	84
14DB-24S24N2W	24	84	60	100	85
14DB-05D05N2W	±5	±200	60	120	80
14DB-05D09N2W	±9	±111	60	120	82
14DB-05D12N2W	±12	±84	60	120	82
14DB-05D15N2W	±15	±67	60	120	82
14DB-12D05N2W	±5	±200	60	120	82
14DB-12D09N2W	±9	±111	60	120	84
14DB-12D12N2W	±12	±84	60	120	84
14DB-12D15N2W	±15	±67	60	120	84
14DB-15D05N2W	±5	±200	60	120	80
14DB-15D09N2W	±9	±111	60	120	82
14DB-15D12N2W	±12	±84	60	120	83
14DB-15D15N2W	±15	±67	60	120	83
14DB-24D05N2W	±5	±200	60	120	82
14DB-24D09N2W	±9	±111	60	120	78
14DB-24D12N2W	±12	±84	60	120	78
14DB-24D15N2W	±15	±67	60	120	80

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

DC-DC Converter

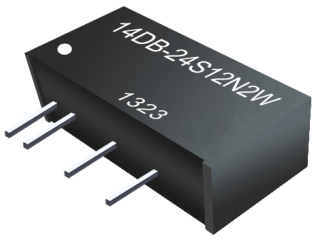
14DB-2W SERIES

2Watt

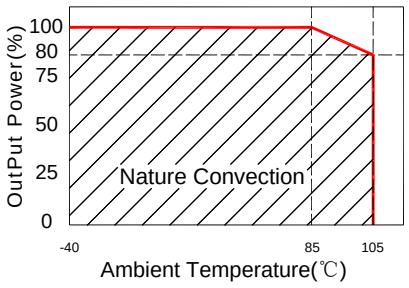
1KV Isolated

Single & Dual Output

SIP7



Temperature Derating Graph



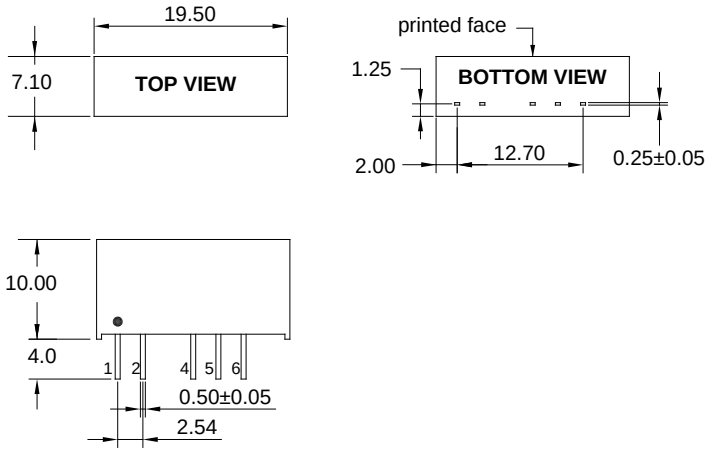
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Continuous				
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V,9V (10% To 100% F.L)			15	%
Load Regulation	12~24V (10% To 100% F.L)			10	%
Load Regulation	±5V,±9V (10% To 100% F.L)			15	%
Load Regulation	±12~±24V (10% To 100% F.L)			10	%

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+105	℃
Storage Temperature		-55		+125	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



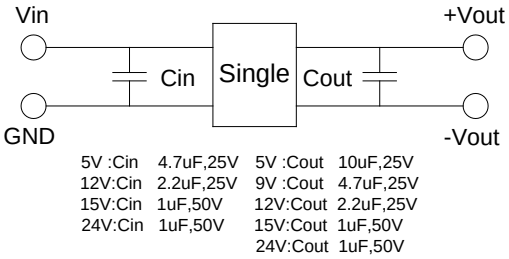
Unit : mm Unless otherwise specified, all tolerances are ±0.25

Part Number

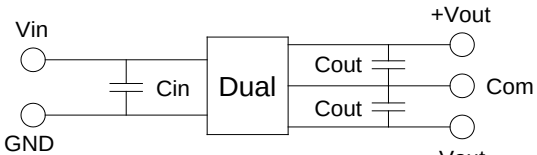
14DB - 05 S 05 N 2W
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:Output Power

Recommended Test Circuit

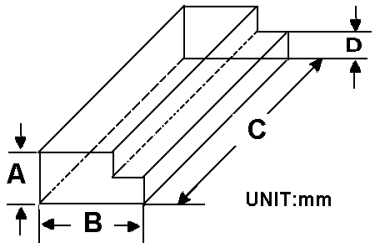


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V
		24V:Cout	1uF,50V



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V

Packaging



Size(mm)			
A	B	C	D
9.50	16.50	522	5.00

PIN Connection

PIN	1	2	4	5	6
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

FEATURES :

- 2:1Wide Input Voltages Range
- 7PIN SIP Package
- High Efficiency up to 83%
- Regulated Output Types
- Internal SMD Construction
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Intput Voltage	Output Voltage	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
14DZ-05S05R2W	4.5-9	5	400	70
14DZ-05S09R2W	4.5-9	9	222	72
14DZ-05S12R2W	4.5-9	12	167	75
14DZ-05S15R2W	4.5-9	15	133	78
14DZ-05S24R2W	4.5-9	24	84	80
14DZ-12S05R2W	9-18	5	400	75
14DZ-12S09R2W	9-18	9	222	78
14DZ-12S12R2W	9-18	12	167	80
14DZ-12S15R2W	9-18	15	133	80
14DZ-12S24R2W	9-18	24	84	83
14DZ-24S05R2W	18-36	5	400	76
14DZ-24S09R2W	18-36	9	222	78
14DZ-24S12R2W	18-36	12	167	80
14DZ-24S15R2W	18-36	15	133	80
14DZ-24S24R2W	18-36	24	84	83

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types	Vo, Io Nom			2:1	
Filter	Capacitor				

DC-DC Converter

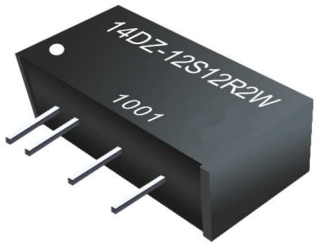
14DZ-2W SERIES

2Watt 3KV Isolated

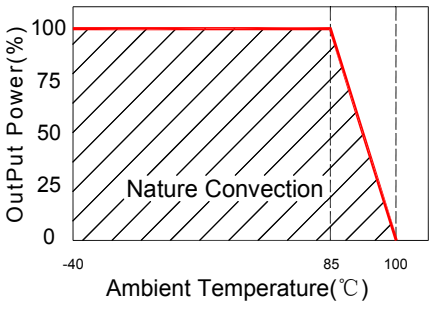
2 : 1 Input Voltage Range

Single Output

SIP7



Temperature Derating Graph



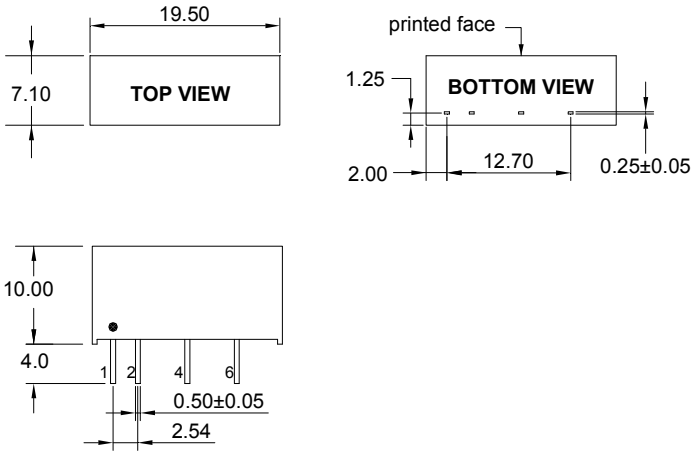
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±1.5	%
Ripple & Noise	Output:5V,9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz		1% of Vout		mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	1500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



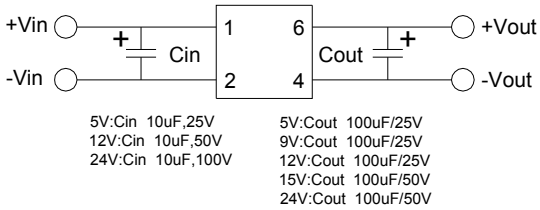
UNIT : mm Unless otherwise specified, all tolerances are ±0.25

Part Number

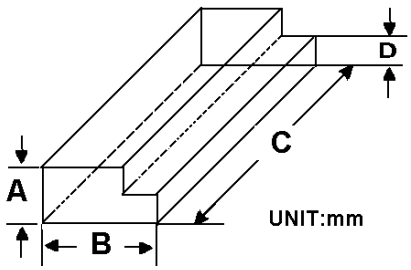
14DZ - 05 S 05 R 2W
A B C D E F

A:Series
B:Input Voltage
C:Single Output
D:Output Voltage
E:Regulated(R)
F:Output Power

Recommended Test Circuit



Packaging



Size(mm)			
A	B	C	D
9.5	16.5	522	5.0

PIN Connection

Pin	1	2	4	6
Single	+Vin	-Vin	-Vout	+Vout

FEATURES :

- 7PIN SIP PACKAGE
- High Efficiency up to 85%
- Single Output 5/9/12/15V/24V Approved By UL60950-1
- Unregulated Output Types
- Internal SMD Construction
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%Typ
★19D-XXS05NNL	5	400	70
★19D-XXS09NNL	9	222	75
★19D-XXS12NNL	12	167	80
★19D-XXS15NNL	15	133	80
★19D-XXS24NNL	24	84	85
19D-XXD05NNL	±5	±200	70
19D-XXD09NNL	±9	±111	75
19D-XXD12NNL	±12	±84	80
19D-XXD15NNL	±15	±67	80
19D-XXD24NNL	±24	±42	85

Note:

1"XX" Is Input Voltage:05=5Vdc, 09=9Vdc ,12=12Vdc,15=15Vdc,24=24Vdc.
2.The input voltage increases, there will be an increase in efficiency.
3." ★" marked as recognized by UL 60950-1.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V (10% To 100% F.L)			15	%
Load Regulation	9V,12V,15V,24V (10% To 100% F.L.)			10	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

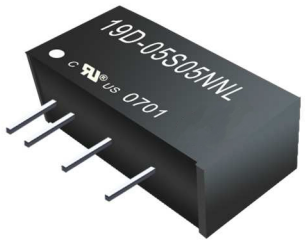
19D SERIES

2Watt

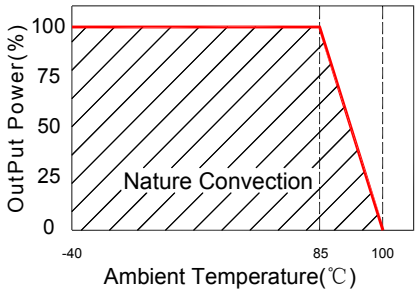
1KV Isolated

Single & Dual Output

SIP7



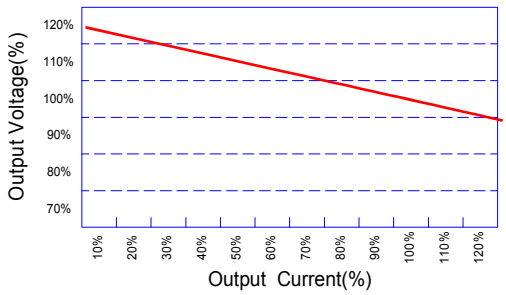
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		75		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Tolerance Envelope Graph

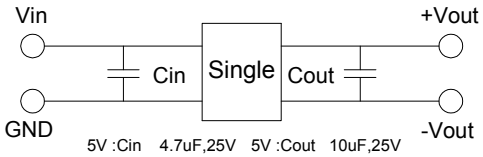


Part Number

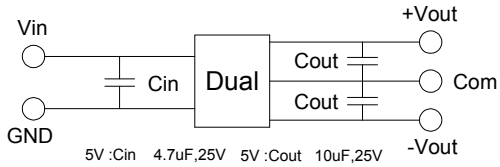
19D - 05 S 05 N NL
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:RoHS Version

Recommended Test Circuit

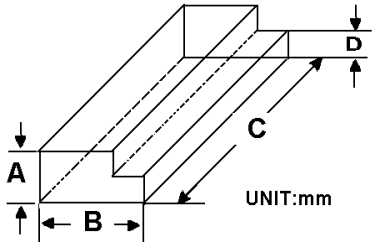


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V



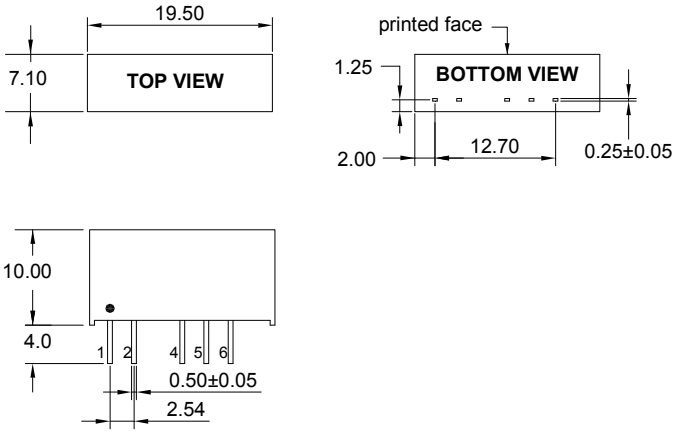
5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V

Packaging



Size(mm)			
A	B	C	D
9.50	16.50	522	5.00

Markings and dimensions



Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

PIN	1	2	4	5	6
Single	+Vin	-Vin	-Vout	NO PIN	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

FEATURES :

- 7PIN SIP Package
- High Efficiency up to 88%
- Unregulated Output Types
- Internal SMD Construction
- Industry Standard Pinout
- Operating Temperature:-40℃ TO +85℃

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Ripple & Noise		Efficiency
	Vdc	mA	Typ (mVp-p)	Max (mVp-p)	%Typ
19DA-05S05N	5	400	40	60	82
19DA-05S09N	9	222	40	60	86
19DA-05S12N	12	167	50	80	87
19DA-05S15N	15	133	50	80	86
19DA-12S05N	5	400	40	60	83
19DA-12S09N	9	222	40	60	87
19DA-12S12N	12	167	50	80	88
19DA-12S15N	15	133	50	80	87
19DA-15S05N	5	400	40	60	84
19DA-15S09N	9	222	40	60	86
19DA-15S12N	12	167	50	80	87
19DA-15S15N	15	133	50	80	88
19DA-24S05N	5	400	40	60	84
19DA-24S09N	9	222	40	60	87
19DA-24S12N	12	167	50	80	87
19DA-24S15N	15	133	50	80	88
19DA-05D05N	±5	±200	50	80	82
19DA-05D09N	±9	±111	50	80	85
19DA-05D12N	±12	±84	50	80	86
19DA-05D15N	±15	±67	50	80	86
19DA-12D05N	±5	±200	50	80	84
19DA-12D09N	±9	±111	50	80	87
19DA-12D12N	±12	±84	50	80	87
19DA-12D15N	±15	±67	50	80	87
19DA-15D05N	±5	±200	50	80	84
19DA-15D09N	±9	±111	50	80	86
19DA-15D12N	±12	±84	50	80	88
19DA-15D15N	±15	±67	50	80	88
19DA-24D05N	±5	±200	50	80	85
19DA-24D09N	±9	±111	50	80	87
19DA-24D12N	±12	±84	50	80	88
19DA-24D15N	±15	±67	50	80	88

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

DC-DC Converter

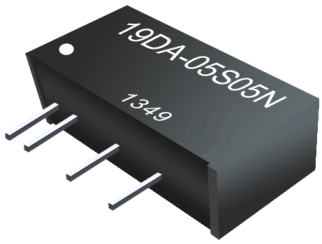
19DA SERIES

2Watt

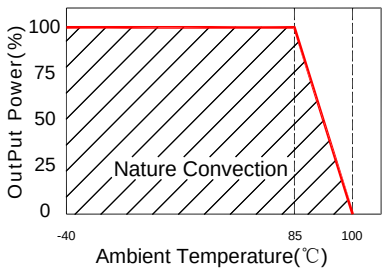
1KV Isolated

Single & Dual Output

SIP7



Temperature Derating Graph



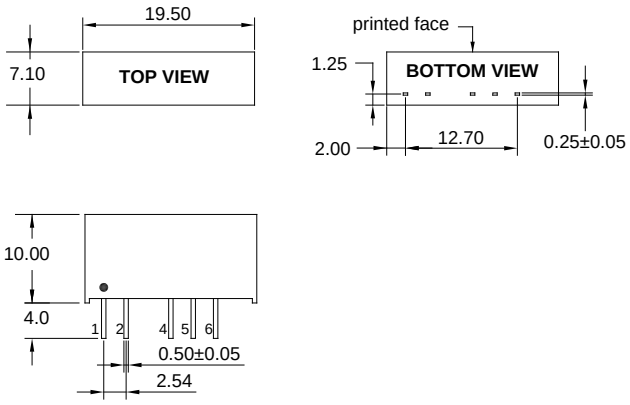
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V,9V (10% To 100% F.L)			10	%
Load Regulation	12V,15V (10% To 100% F.L.)			7	%
Load Regulation	±5V,±9V (10% To 100% F.L)			9	%
Load Regulation	±12V,±15V (10% To 100% F.L)			6	%

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		75		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.7		g
Dimensions			19.5x7.1x10.0		mm

Markings and dimensions



Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

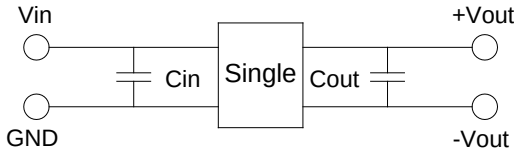
PIN	1	2	4	5	6
Single	+Vin	-Vin	-Vout	No Pin	+Vout
Dual	+Vin	-Vin	-Vout	Com	+Vout

Part Number

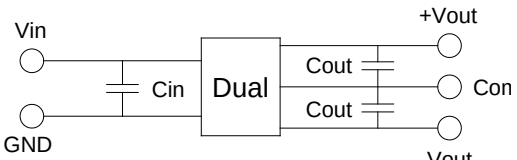
19DA - 05 S 05 N
A B C D E

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)

Recommended Test Circuit

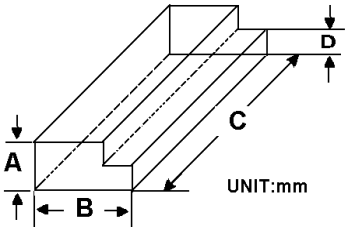


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
12V:Cin	2.2uF,25V	9V :Cout	4.7uF,25V
15V:Cin	1uF,50V	12V:Cout	2.2uF,25V
24V:Cin	1uF,50V	15V:Cout	1uF,50V

Packaging



Size(mm)			
A	B	C	D
9.50	16.50	522	5.00

FEATURES :

- 14PIN DIL Package
- High Efficiency up to 85%
- Internal SMD Construction
- Unregulated Output Types
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency	Recognized By UL 60950-1
	Vdc	mA	%Typ	
24D-XXS05NNL	5	400	70	24D-05D05NNL 24D-05D12NNL 24D-05D15NNL 24D-05D24NNL 24D-12D12NNL 24D-12D15NNL 24D-24D05NNL 24D-24D09NNL 24D-24D15NNL 24D-24D24NNL
24D-XXS09NNL	9	222	75	
24D-XXS12NNL	12	167	80	
24D-XXS15NNL	15	133	80	
24D-XXS24NNL	24	84	85	
24D-XXD05NNL	±5	±200	70	
24D-XXD09NNL	±9	±111	75	
24D-XXD12NNL	±12	±84	80	
24D-XXD15NNL	±15	±67	80	
24D-XXD24NNL	±24	±42	85	

Note:
1."XX" Is Input Voltage:03 = 3.3Vdc, 05=5Vdc, 09=9Vdc,12=12Vdc,15=15Vdc 24=24Vdc.
2. The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	5V (10% To 100% F.L)			15	%
Load Regulation	9V,12V,15V,24V (10% To 100% F.L.)			10	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

24D SERIES

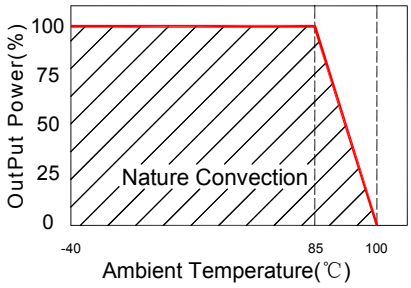
2Watt

1KV Isolated

Single & Dual Output

DIL14

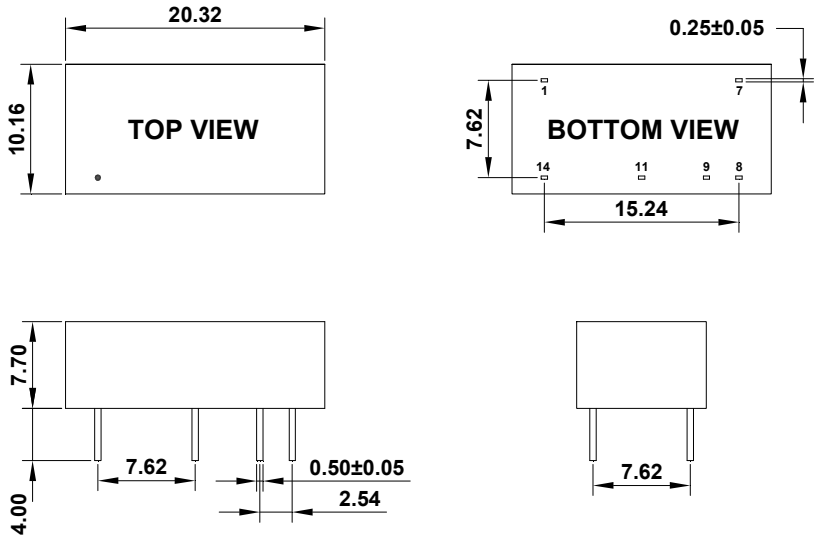
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		75		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	3500000			Hours
Weight			2.8		g
Dimensions			20.32x10.16x7.70		mm

Markings and dimensions

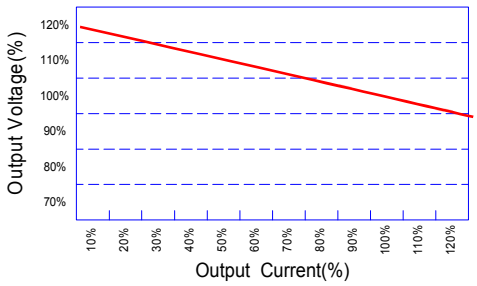


Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

PIN	1	7	8	9	11	14
Single	-Vin	NC	-Vout	+Vout	No Pin	+Vin
Dual	-Vin	NC	COM	+Vout	-Vout	+Vin

Tolerance Envelope Graph

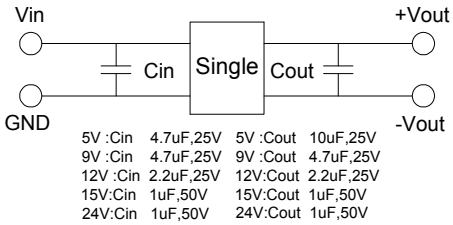


Part Number

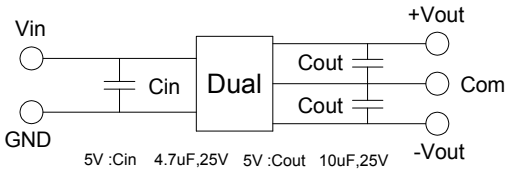
24D - 05 D 05 N NL
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Unregulated(N)
F:RoHS Version

Recommended Test Circuit

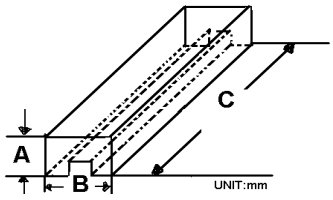


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V



5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V

Packaging



Size(mm)		
A	B	C
13.23	12.30	530

FEATURES :

- 2:1Wide Input Voltages Range
- High Efficiency up to 85%
- Regulated Output Types
- Low Ripple And Noise
- Internal SMD Construction
- 1KVDC & 3KVDC Isolation
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout
- Continuous Short Circuit Protection With Current Foldback

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Intput Voltage	Output Voltage	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
27D-05S05R (NL/3KV)	5-9	5	400	65
27D-05S09R (NL/3KV)	5-9	9	222	70
27D-05S12R (NL/3KV)	5-9	12	167	70
27D-05S15R (NL/3KV)	5-9	15	133	70
27D-05S24R (NL/3KV)	5-9	24	84	70
27D-12S05R (NL/3KV)	9-18	5	400	70
27D-12S09R (NL/3KV)	9-18	9	222	80
27D-12S12R (NL/3KV)	9-18	12	167	80
27D-12S15R (NL/3KV)	9-18	15	133	80
27D-12S24R (NL/3KV)	9-18	24	84	80
27D-24S05R (NL/3KV)	18-36	5	400	75
27D-24S09R (NL/3KV)	18-36	9	222	80
27D-24S12R (NL/3KV)	18-36	12	167	80
27D-24S15R (NL/3KV)	18-36	15	133	80
27D-24S24R (NL/3KV)	18-36	24	84	80
27D-48S05R (NL/3KV)	36-72	5	400	70
27D-48S09R (NL/3KV)	36-72	9	222	80
27D-48S12R (NL/3KV)	36-72	12	167	80
27D-48S15R (NL/3KV)	36-72	15	133	80
27D-48S24R (NL/3KV)	36-72	24	84	80

NOTE :
No suffix is standard isolation (1KVDC) e.g, 27D-12S05RNL ,
*add suffix /3KV for 3KVDC isolation, e.g, 27D-12S05R3KV

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types	Vo, Io Nom			2:1	
Filter	Capacitor				

DC-DC Converter

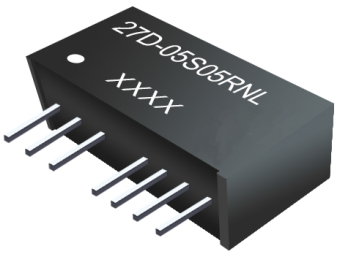
27D-Single SERIES

2Watt 1KV & 3KV Isolated

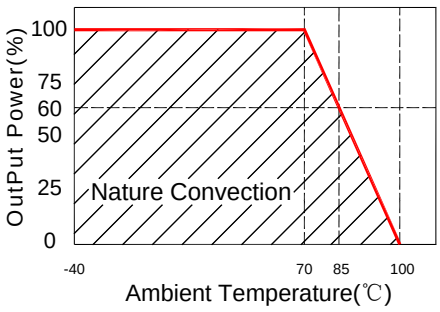
2 : 1 Input Voltage Range

Single Output

SIP7



Temperature Derating Graph



Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±3	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±0.8	%
Ripple & Noise	Output:5V-9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz		1% of Vout		mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	1500000			Hours
Weight			4.5		g
Dimensions			21.8x9.2x11.1		mm

Part Number

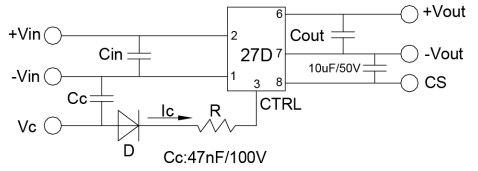
27D - 05 S 05 R NL
A B C D E F

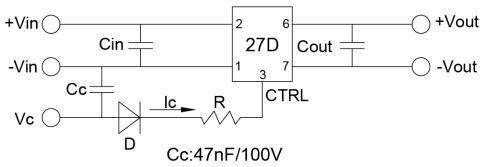
A:Series
B:Input Voltage
C:Single(S)
D:Output Voltage
E:Regulated(R)
F:RoHS Version

27D - 05 S 05 R 3KV
A B C D E F

A:Series
B:Input Voltage
C:Single Output
D:Output Voltage
E:Regulated(R)
F:Isolation Voltage

Recommended Test Circuit

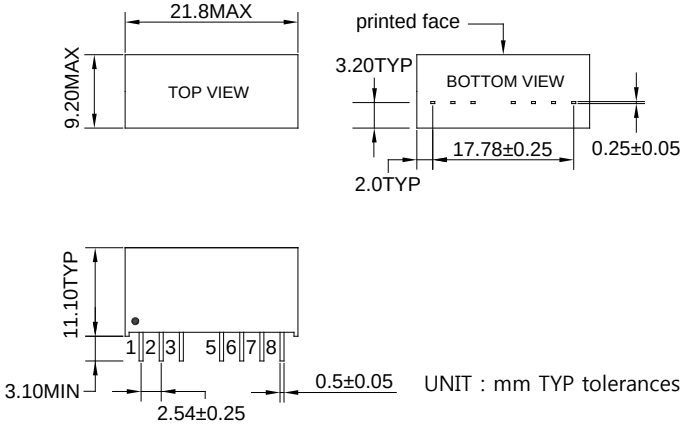




5V:Cin 10uF,25V	5V :Cout 100uF/25V
12V:Cin 10uF,50V	9V :Cout 100uF/25V
24V:Cin 10uF,100V	12V:Cout 100uF/25V
48V:Cin 10uF,100V	15V:Cout 100uF/50V
	24V:Cout 100uF/50V

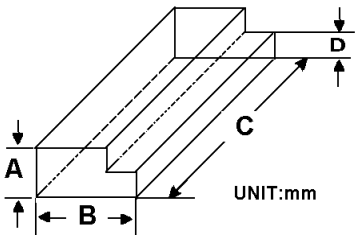
1. When open or high impedance, the converter works well; when this pin is 'high', the converter shut down. It should be note that the input current should be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter.
2. To make sure the product work at perfect operation status with full loading external capacitor is necessary and it is recommended to use high frequency low resistance electrolytic capacitor.

Markings and dimensions



UNIT : mm TYP tolerances are ±0.5

Packaging



Size(mm)			
A	B	C	D
12.0	28.55	550	6.00

PIN Connection

Pin	1	2	3	5	6	7	8
1KV	-Vin	+Vin	Ctrl-Control input can (can be left open)	NE-No external connection allowed	+Vout	-Vout	CS Optional External capacitor
3KV	-Vin	+Vin	Ctrl-Control input can (can be left open)	No Pin	+Vout	-Vout	NC

FEATURES :

- 4:1Wide Input Voltages Range
- High Efficiency up to 80%
- Regulated Output Types
- Low Ripple And Noise
- Internal SMD Construction
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout
- Continuous Short Circuit Protection With Current Fold back

DC-DC Converter

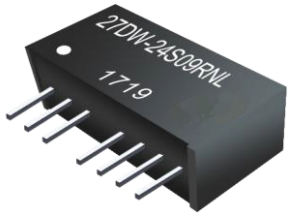
27DW-Single SERIES

2Watt 1KV Isolated

4 : 1 Input Voltage Range

Single Output

SIP8



Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Input Voltage Range	Output Voltage Range	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
27DW-24S05RNL	9-36	5	400	75
27DW-24S09RNL	9-36	9	222	80
27DW-24S12RNL	9-36	12	167	80
27DW-24S15RNL	9-36	15	133	80
27DW-24S24RNL	9-36	24	84	80
27DW-48S05RNL	18-75	5	400	70
27DW-48S09RNL	18-75	9	222	80
27DW-48S12RNL	18-75	12	167	80
27DW-48S15RNL	18-75	15	133	80
27DW-48S24RNL	18-75	24	84	80

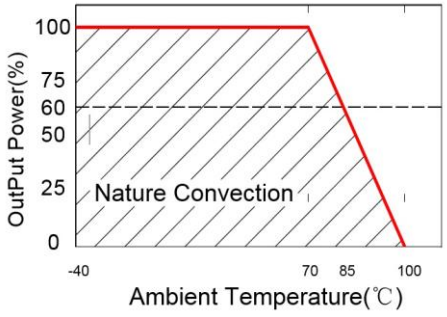
Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo, Io Nom			4:1	
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±3	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±0.8	%
Ripple & Noise	Output:5-9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz			1% of Vout	mVp-p
Transient response setting time	50% load step change		350		us

Temperature Derating Graph



General Specifications

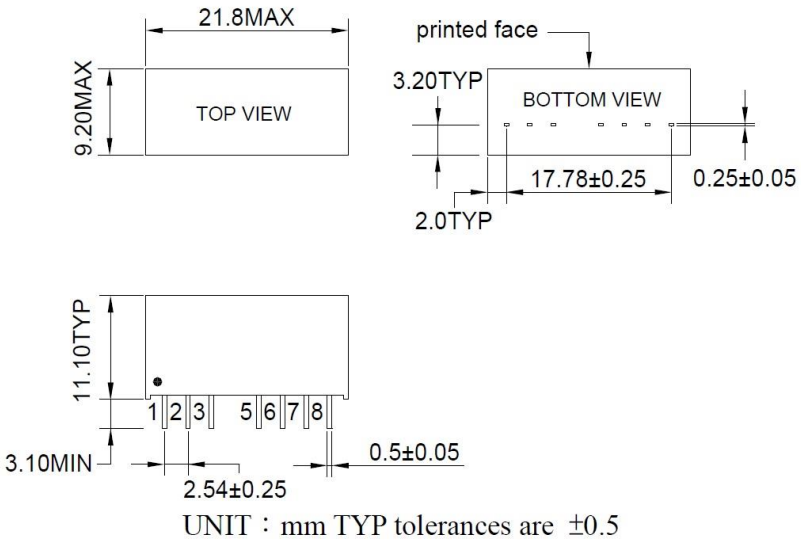
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F@25℃	1500000			Hours
Weight			4.5		g
Dimensions			21.8X9.2X11.1		mm

Part Number

27DW	-	24	S	05	R	NL
A		B	C	D	E	F

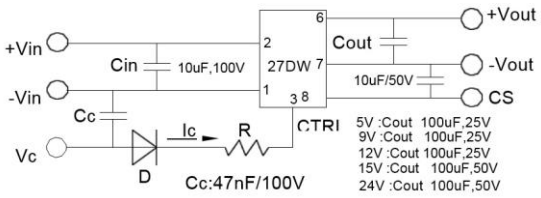
A : Series
B : Input Voltage
C : Single Output
D : Output Voltage
E : Regulated(R)
F : RoHS Version

Markings and dimensions



UNIT：mm TYP tolerances are ±0.5

Recommended Test Circuit



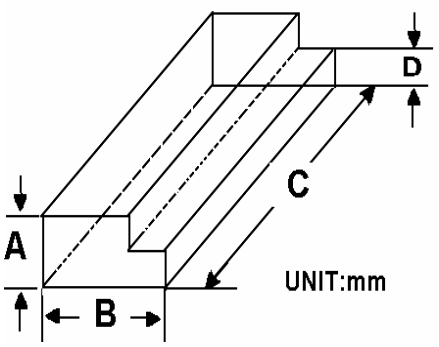
1. When open or high impedance, the converter works well; when this pin is 'high', the converter shut down. It should be note that the input current should be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter.

2. To make sure the product work at perfect operation status with full loading external capacitor is necessary and it is recommended to use high frequency low resistance electrolytic capacitor.

PIN Connection

Pin	1	2	3	5	6	7	8
Single	-Vin	+Vin	Ctrl-Control input can (can be left open)	NE-No external connection allowed	+Vout	-Vout	CS Optional External capacitor

Packaging



Size(mm)			
A	B	C	D
12.0	28.55	550	6.00

FEATURES :

- 2:1Wide Input Voltages Range
- High Efficiency up to 85%
- Regulated Output Types
- Low Ripple And Noise
- Internal SMD Construction
- 1KVDC & 3KVDC Isolation
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout
- Continuous Short Circuit Protection With Current Foldback

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Intput Voltage	Output Voltage	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
27D-05D05R (NL/3KV)	5-9	±5	±200	65
27D-05D09R (NL/3KV)	5-9	±9	±111	70
27D-05D12R (NL/3KV)	5-9	±12	±84	70
27D-05D15R (NL/3KV)	5-9	±15	±67	70
27D-05D24R (NL/3KV)	5-9	±24	±42	80
27D-12D05R (NL/3KV)	9-18	±5	±200	70
27D-12D09R (NL/3KV)	9-18	±9	±111	80
27D-12D12R (NL/3KV)	9-18	±12	±84	80
27D-12D15R (NL/3KV)	9-18	±15	±67	80
27D-12D24R (NL/3KV)	9-18	±24	±42	80
27D-24D05R (NL/3KV)	18-36	±5	±200	75
27D-24D09R (NL/3KV)	18-36	±9	±111	80
27D-24D12R (NL/3KV)	18-36	±12	±84	80
27D-24D15R (NL/3KV)	18-36	±15	±67	80
27D-24D24R (NL/3KV)	18-36	±24	±42	80
27D-48D05R (NL/3KV)	36-72	±5	±200	70
27D-48D09R (NL/3KV)	36-72	±9	±111	80
27D-48D12R (NL/3KV)	36-72	±12	±84	80
27D-48D15R (NL/3KV)	36-72	±15	±67	80
27D-48D24R (NL/3KV)	36-72	±24	±42	80

NOTE:
No suffix is standard isolation (1KVDC) e.g, 27D-12D05RNL ,
*add suffix /3KV for 3KVDC isolation, e.g, 27D-12D05R3KV

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Types	Vo, Io Nom			2:1	
Filter	Capacitor				

DC-DC Converter

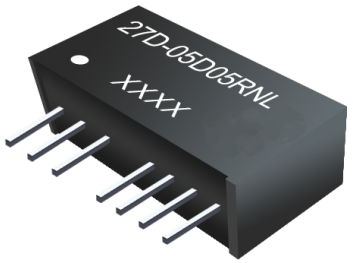
27D-Dual SERIES

2Watt 1KV & 3KV Isolated

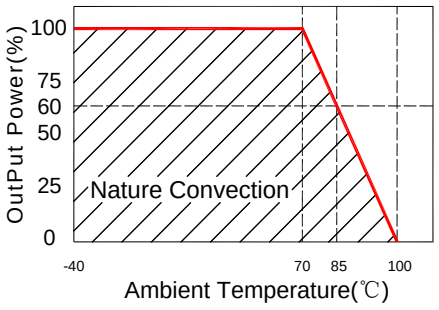
2 : 1 Input Voltage Range

Dual Output

SIP7



Temperature Derating Graph



Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±3	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±0.8	%
Ripple & Noise	Output:5V-9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz		1% of Vout		mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25℃	1500000			Hours
Weight			4.5		g
Dimensions			21.8x9.2x11.1		mm

Part Number

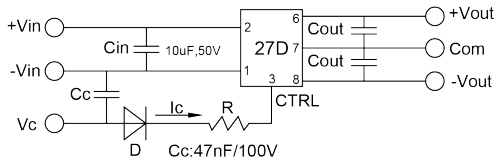
27D - 05 D 05 R NL
A B C D E F

A:Series
B:Input Voltage
C:Dual(D)
D:Output Voltage
E:Regulated(R)
F:RoHS Version

27D - 05 D 05 R 3KV
A B C D E F

A:Series
B:Input Voltage
C:Dual Output
D:Output Voltage
E:Regulated(R)
F:Isolation Voltage

Recommended Test Circuit

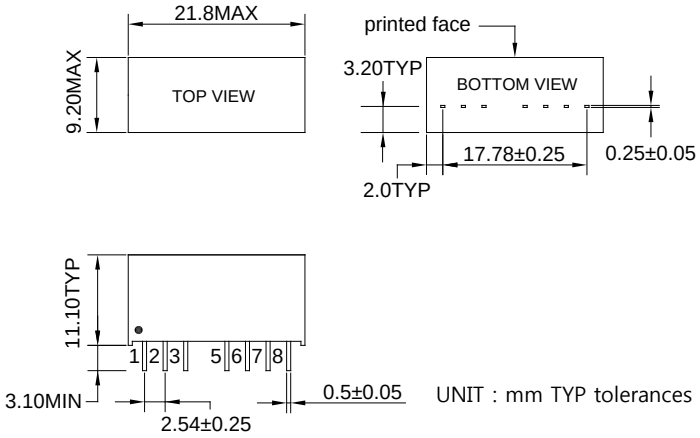


5V:Cin 10uF,25V
12V:Cin 10uF,50V
24V:Cin 10uF,100V
48V:Cin 10uF,100V

5V :Cout 100uF/25V
9V :Cout 100uF/25V
12V:Cout 100uF/25V
15V:Cout 100uF/50V
24V:Cout 100uF/50V

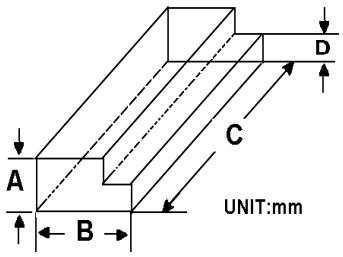
1. When open or high impedance, the converter works well; when this pin is 'high', the converter shut down. It should be note that the input current should be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter.
2. To make sure the product work at perfect operation status with full loading external capacitor is necessary and it is recommended to use high frequency low resistance electrolytic capacitor.

Markings and dimensions



UNIT : mm TYP tolerances are ±0.5

Packaging



Size(mm)			
A	B	C	D
12.0	28.55	550	6.00

PIN Connection

Pin	1	2	3	5	6	7	8
1KV	-Vin	+Vin	Ctrl-Control input can (can be left open)	NE-No external connection allowed	+Vout	COM	-Vout
3KV	-Vin	+Vin	Ctrl-Control input can (can be left open)	No Pin	+Vout	COM	-Vout

FEATURES :

- 4:1Wide Input Voltages Range
- High Efficiency up to 80%
- Regulated Output Types
- Low Ripple And Noise
- Internal SMD Construction
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout
- Continuous Short Circuit Protection With Current Fold back

DC-DC Converter

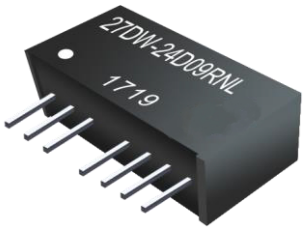
27DW-Dual SERIES

2Watt 1KV Isolated

4 : 1 Input Voltage Range

Dual Output

SIP8



Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Input Voltage Range	Output Voltage Range	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
27DW-24D05RNL	9-36	±5	±200	75
27DW-24D09RNL	9-36	±9	±111	80
27DW-24D12RNL	9-36	±12	±84	80
27DW-24D15RNL	9-36	±15	±67	80
27DW-24D24RNL	9-36	±24	±42	80
27DW-48D05RNL	18-75	±5	±200	70
27DW-48D09RNL	18-75	±9	±111	80
27DW-48D12RNL	18-75	±12	±84	80
27DW-48D15RNL	18-75	±15	±67	80
27DW-48D24RNL	18-75	±24	±42	80

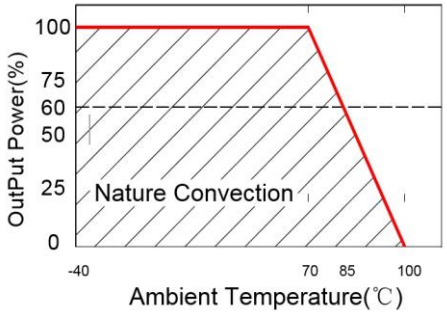
Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo, Io Nom			4:1	
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±3	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±0.8	%
Ripple & Noise	Output:5-9V TYPES BW=DC To 20MHz			100	mVp-p
Ripple & Noise	Output:12-24V TYPES BW=DC To 20MHz			1% of Vout	mVp-p
Transient response setting time	50% load step change		350		us

Temperature Derating Graph



General Specifications

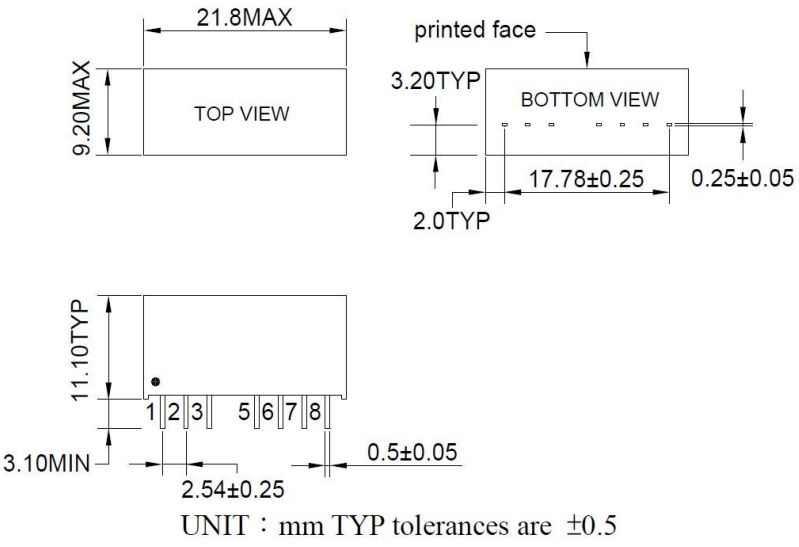
Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F@25℃	1500000			Hours
Weight			4.5		g
Dimensions			21.8X9.2X11.1		mm

Part Number

27DW	-	24	D	05	R	NL
A		B	C	D	E	F

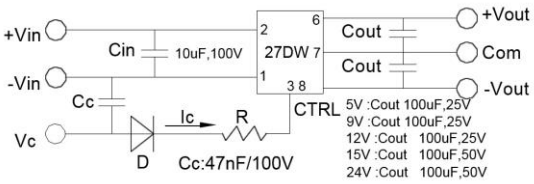
A : Series
B : Input Voltage
C : Dual Output
D : Output Voltage
E : Regulated(R)
F : RoHS Version

Markings and dimensions



UNIT：mm TYP tolerances are ±0.5

Recommended Test Circuit



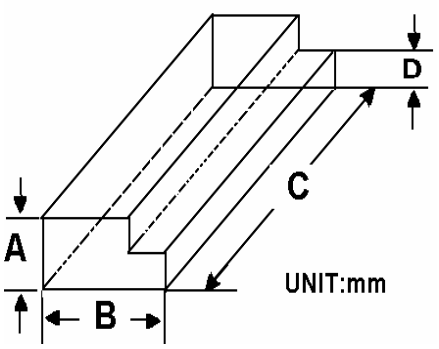
1. When open or high impedance, the converter works well; when this pin is 'high', the converter shut down. It should be note that the input current should be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter.

2. To make sure the product work at perfect operation status with full loading external capacitor is necessary and it is recommended to use high frequency low resistance electrolytic capacitor.

PIN Connection

Pin	1	2	3	5	6	7	8
Dual	-Vin	+Vin	Ctrl-Control input can (can be left open)	NE-No external connection allowed	+Vout	Com	-Vout

Packaging



Size(mm)			
A	B	C	D
12.0	28.55	550	6.00

FEATURES :

- 2:1 Wide Input Voltages Range
- 16PIN SMD Package
- High Efficiency up to 85%
- Regulated Output Types
- Internal SMD Construction
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Input Voltage Range	Output Voltage	Output Current	Efficiency
	Vdc	Vdc	mA	%TYP
28D-05S03R	4.5-9	3.3	500	70
28D-05S05R	4.5-9	5	400	73
28D-05S12R	4.5-9	12	167	75
28D-05S15R	4.5-9	15	133	73
28D-05D05R	4.5-9	±5	±200	70
28D-05D12R	4.5-9	±12	±84	72
28D-05D15R	4.5-9	±15	±67	73
28D-12S03R	9-18	3.3	500	73
28D-12S05R	9-18	5	400	77
28D-12S12R	9-18	12	167	80
28D-12S15R	9-18	15	133	80
28D-12D05R	9-18	±5	±200	73
28D-12D12R	9-18	±12	±84	80
28D-12D15R	9-18	±15	±67	78
28D-24S03R	18-36	3.3	500	73
28D-24S05R	18-36	5	400	80
28D-24S12R	18-36	12	167	84
28D-24S15R	18-36	15	133	85
28D-24D05R	18-36	±5	±200	76
28D-24D12R	18-36	±12	±84	80
28D-24D15R	18-36	±15	±67	82
28D-48S03R	36-75	3.3	500	71
28D-48S05R	36-75	5	400	76
28D-48S12R	36-75	12	167	81
28D-48S15R	36-75	15	133	81
28D-48D05R	36-75	±5	±200	76
28D-48D12R	36-75	±12	±84	79
28D-48D15R	36-75	±15	±67	80

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo, Io Nom			2:1	
Filter	Capacitor				

DC-DC Converter

28D SERIES

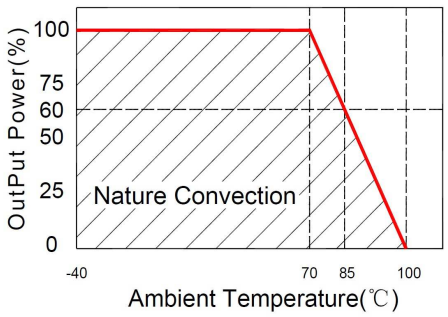
2Watt 1.5KV Isolated

2 : 1 Input Voltage Range

Single & Dual Output

SMD

Temperature Derating Graph



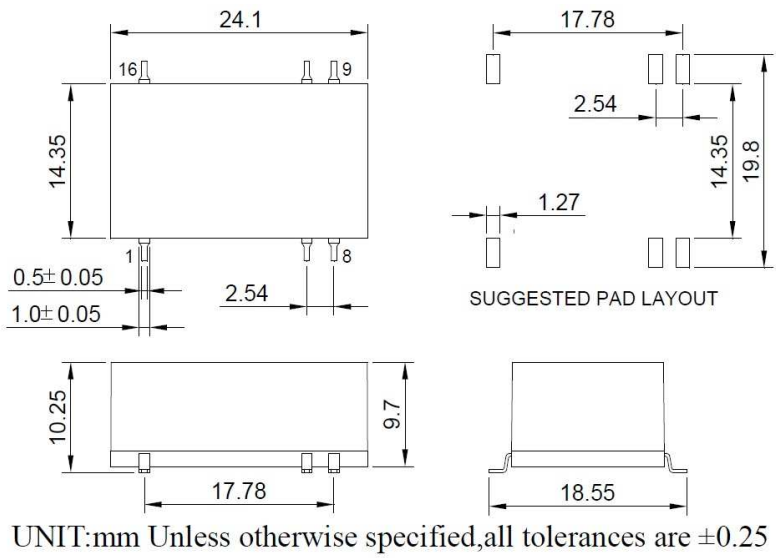
Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±2	%
Short Circuit Protection	Continuous				
Line Regulation	Regulated			±0.5	%
Load Regulation	Regulated			±0.8	%
Ripple & Noise	BW=DC To 20MHz			100	mVp-p
Transient response setting time	50% load step change		350		us

General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F@25℃	1000000			Hours
Weight			3.9		g
Dimensions			24.1x14.35x10.25		mm

Markings and dimensions



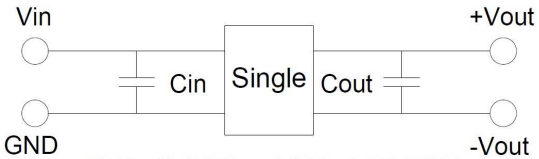
UNIT:mm Unless otherwise specified,all tolerances are ±0.25

Part Number

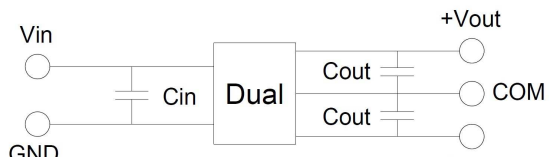
28D	-	05	S	05	R
A		B	C	D	E

A : Series
B : Input Voltage
C : Single(S);Dual(D)
D : Output Voltage
E : Regulated(R)

Recommended Test Circuit



5V:Cin 10uF,25V
12V:Cin 10uF,50V
24V:Cin 10uF,100V
48V:Cin 10uF,100V
3.3V:Cout 100uF/25V
5V:Cout 100uF/25V
12V:Cout 100uF/25V
15V:Cout 100uF/50V



5V:Cin 10uF,25V
12V:Cin 10uF,50V
24V:Cin 10uF,100V
48V:Cin 10uF,100V
5V:Cout 100uF/25V
12V:Cout 100uF/25V
15V:Cout 100uF/50V

PIN Assignment

Pin	1	7	8	9	10	16
Single	-Vin	NC	NC	+Vout	-Vout	+Vin
Dual	-Vin	NC	Com	+Vout	-Vout	+Vin

FEATURES :

- 24PIN DIL PACKAGE
- High Efficiency up to 70%
- Regulated Output Types
- Low Ripple And Noise
- Internal SMD Construction
- No External Component Required
- Operating Temperature:-40℃ TO +85℃
- Industry Standard Pinout

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency
	Vdc	mA	%Typ
45D-XXS05RNL	5	400	60
45D-XXS09RNL	9	222	60
45D-XXS12RNL	12	167	60
45D-XXS15RNL	15	133	60
45D-XXS24RNL	24	84	60
45D-XXD12RNL	±12	±84	60
45D-XXD15RNL	±15	±67	60
45D-XXD24RNL	±24	±42	60

Note:

1."XX" Is Input Voltage :05=5Vdc,09=9Vdc,12=12Vdc,15=15Vdc,24=24Vdc,36=36Vdc, 48=48Vdc.

2.The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Continuous				
Short Circuit Protection	Automatic				
Line Regulation	Regulated			±0.3	%
Load Regulation	Regulated			±0.5	%
Ripple & Noise	BW=DC To 20MHz			50	mVp-p
Transient response setting time	50% load step change		350		us

DC-DC Converter

45D SERIES

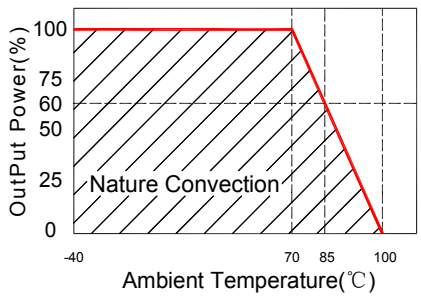
2Watt

3KVrms Isolated

Single & Dual Output

DIL24

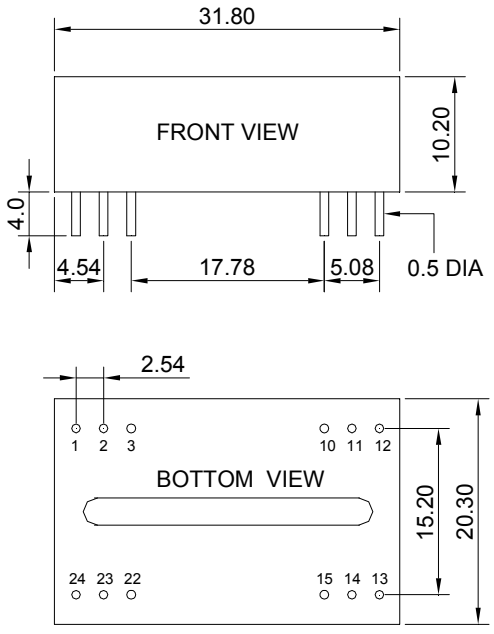
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		125		KHz
Operating Temperature		-40		+85	℃
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F@25℃	1500000			Hours
Weight			12.8		g
Dimensions			31.80x20.30x10.20		mm

Markings and dimensions



Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

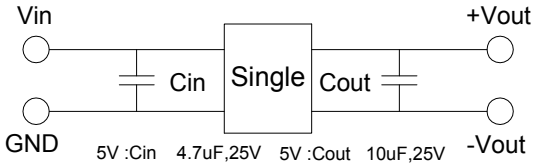
PIN	1.2.3	10.11	12	13	14	15	22.23.24
SINGLE	+Vin	NC	-Vout	+Vout	NC	NC	-Vin
DUAL	+Vin	COM	NC	-Vout	NC	+Vout	-Vin

Part Number

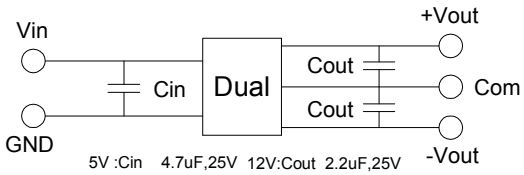
45D - 05 S 05 R NL
A B C D E F

A:Series
B:Input Voltage
C:Single(S)Dual(D)
D:Output Voltage
E:Regulated(R)
F:RoHS Version

Recommended Test Circuit

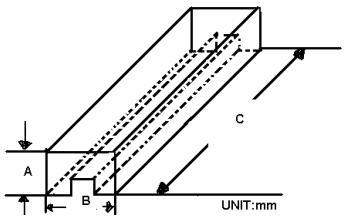


5V :Cin	4.7uF,25V	5V :Cout	10uF,25V
9V :Cin	4.7uF,25V	9V :Cout	4.7uF,25V
12V :Cin	2.2uF,25V	12V:Cout	2.2uF,25V
15V:Cin	1uF,50V	15V:Cout	1uF,50V
24V:Cin	1uF,50V	24V:Cout	1uF,50V
36V:Cin	1uF,100V		
48V:Cin	1uF,100V		



5V :Cin	4.7uF,25V	12V:Cout	2.2uF,25V
9V :Cin	4.7uF,25V	15V:Cout	1uF,50V
12V :Cin	2.2uF,25V	24V:Cout	1uF,50V
15V:Cin	1uF,50V		
24V:Cin	1uF,50V		
36V:Cin	1uF,100V		
48V:Cin	1uF,100V		

Packaging



Size(mm)		
A	B	C
18.71	23.00	522