

MMI

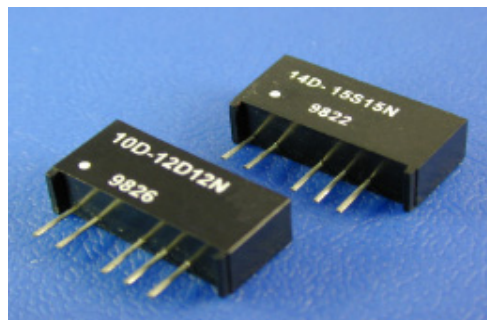
**DC/DC CONVERTER
1W**

FEATURES

- 7 PIN SIP PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.

GENERAL SPECIFICATIONS

- OUTPUT RIPPPL(20MHz Band limited)
INPUT 3.3V AND 48V TYP. : 150mVp-p MAX
INPUT 5V, 12V AND 24V TYP. : 100mVp-p MAX
- ISOLATION RESISTANCE : 1000M Ω MIN @500VDC
- SWITHING FREQUENCY : 100KHz TYP.
- OPERATING TEMPERATURE : 0 $^{\circ}$ C TO 70 $^{\circ}$ C
- EFFICIENCY : 70% TYP
- ISOLATION VOLTAGE : 1000 VDC



ELECTRICAL SPECIFICATIONS

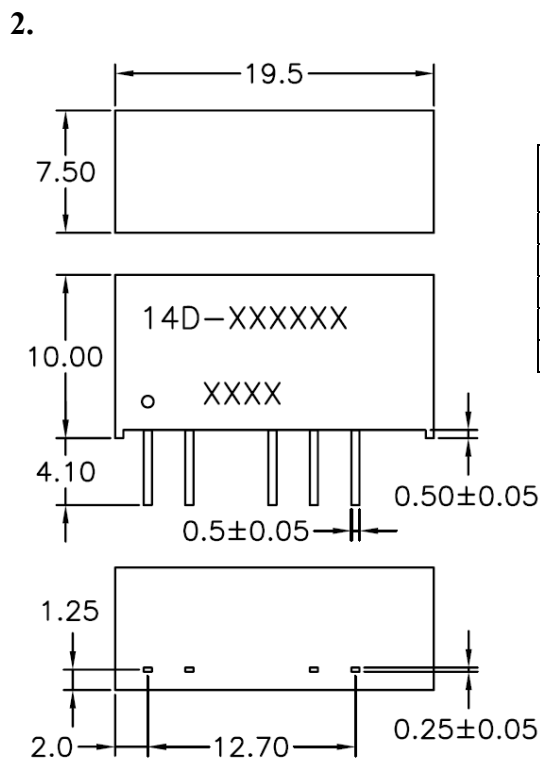
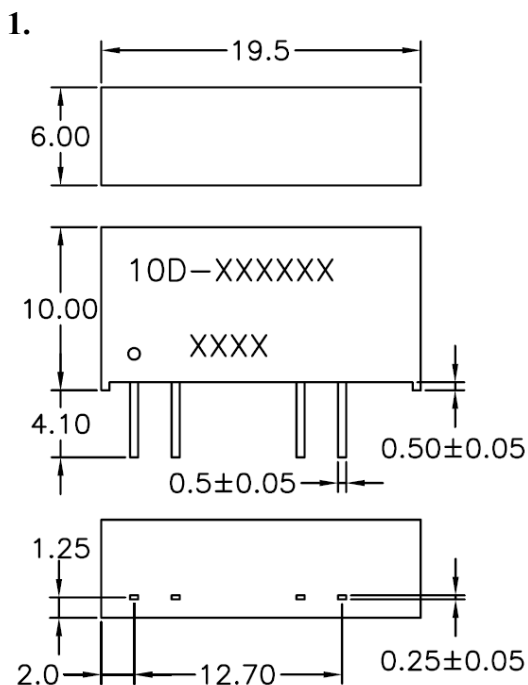
- INPUT VOLTAGE RANGE : $\pm 10\%$
- OUTPUT VOLTAGE TOLERANCE : $\pm 5\%$
- LINE REGULATION(10% TO 100% F.L.) : 1.2%/1% OF V_{in}
- LOAD REGULATION(10% TO 100% F.L.)
3.3V AND 5V OUTPUT TYPES : 15% MAX
9V, 12V AND 15V OUTPUT TYPES : 10% MAX

3.3V, 5V, 12V, 24V INPUT TYPES

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
10D-XXS05N	5	200	70	1	10D-48S05N2	5	200	70	2
10D-XXS09N	9	112	75	1	10D-48S09N2	9	112	75	2
10D-XXS12N	12	84	75	1	10D-48S12N2	12	84	75	2
10D-XXS15N	15	67	75	1	10D-48S15N2	15	67	75	2
14D-XXD05N	± 5	± 100	70	1	14D-48D05N2	± 5	± 100	70	2
14D-XXD09N	± 9	± 56	75	1	14D-48D09N2	± 9	± 56	75	2
14D-XXD12N	± 12	± 42	75	1	14D-48D12N2	± 12	± 42	75	2
14D-XXD15N	± 15	± 34	75	1	14D-48D15N2	± 15	± 34	75	2

48V INPUT TYPES

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE		DUAL OUTPUT
	10D	14D	
1	+IN	+IN	+INPUT
2	-IN	-IN	-INPUT
4	NC	-OUT	-OUTPUT
5	-OUT	NC	COMMON
6	+OUT	+OUT	+OUTPUT

*NC PIN NOT PRESENTED ON SINGLE OUTPUT MODELS

Dimensions: inches/mm

Unless otherwise specified, all tolerances are $\pm 0.005/\pm 0.13$

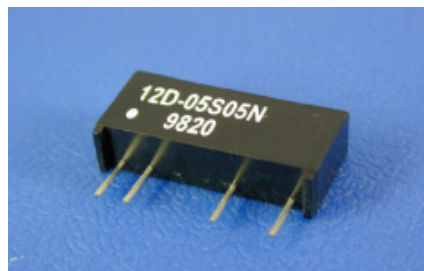


12D SERIES

3000VDC SINGLE AND DUAL OUTPUT 1 WATT DC-DC CONVERTER

FEATURES

- 7 PIN SIP PACKAGE.
- 3000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.



GENERAL SPECIFICATIONS

- OUTPUT RIPPLE(20MHz Band limited) : 150mVp-p MAX
- ISOLATION RESISTANCE :1000M Ω MIN @500VDC
- SWITCHING FREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 $^{\circ}$ C TO 70 $^{\circ}$ C
- EFFICIENCY :70% TYP
- ISOLATION VOLTAGE :3000 VDC

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : \pm 5%
- OUTPUT VOLTAGE TOLERANCE : \pm 5%
- LINE REGULATION(10% TO 100% F.L.) :1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.)
- 5V OUTPUT TYPES :15% MAX
- 9V,12V AND 15V OUTPUT TYPES :10% MAX

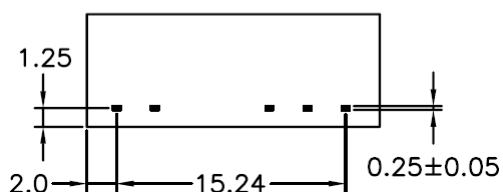
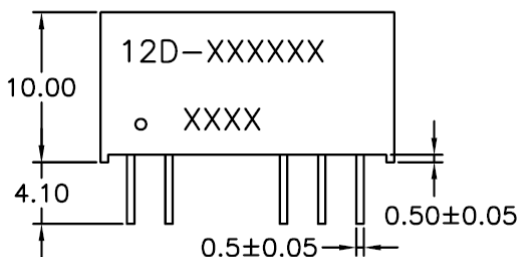
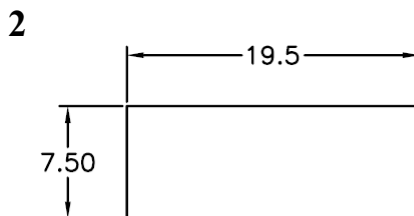
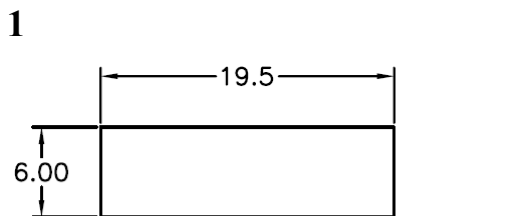
5V,12V AND 24V INPUT TYPES

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
12D-XXS05N	5	200	70	1
12D-XXS09N	9	112	75	1
12D-XXS12N	12	84	75	1
12D-XXS15N	15	67	75	1
12D-XXD05N	\pm 5	\pm 100	70	1
12D-XXD09N	\pm 9	\pm 56	75	1
12D-XXD12N	\pm 12	\pm 42	75	1
12D-XXD15N	\pm 15	\pm 34	75	1

48V INPUT TYPES

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
12D-XXS05N2	5	200	70	2
12D-XXS09N2	9	112	75	2
12D-XXS12N2	12	84	75	2
12D-XXS15N2	15	67	75	2
12D-XXD05N2	\pm 5	\pm 100	70	2
12D-XXD09N2	\pm 9	\pm 56	75	2
12D-XXD12N2	\pm 12	\pm 42	75	2
12D-XXD15N2	\pm 15	\pm 34	75	2

MARKINGS AND DIMENSIONS



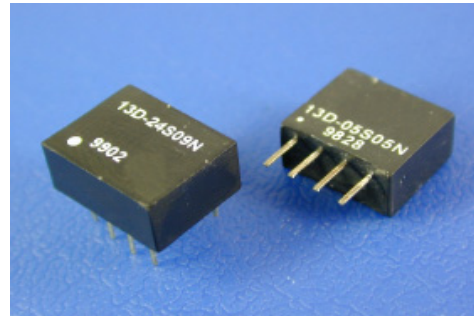
PIN CONNECTION

PIN	SINGLE	DUAL
1	+INPUT	+INPUT
2	-INPUT	-INPUT
5	-OUTPUT	-OUTPUT
6	NO PIN	COMMON
7	+OUTPUT	+OUTPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are \pm .005/ \pm 0.13

FEATURES

- 4 PIN SIP AND 8 PIN DIL PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.



GENERAL SPECIFICATIONS

- OUTPUT RIPPPL (20MHz Band limited) : 150mVp-p MAX
- ISOLATION RESISTANCE :1000M Ω MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 $^{\circ}$ C TO 70 $^{\circ}$ C
- ISOLATION VOLTAGE :1000 VDC

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : \pm 10%
- OUTPUT VOLTAGE TOLERANCE : \pm 5%
- LINE REGULATION(10% TO 100% F.L.) : \pm 1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.)
3.3V AND 5V OUTPUT TYPES :15% MAX
9V,12V AND 15V OUTPUT TYPES :10% MAX

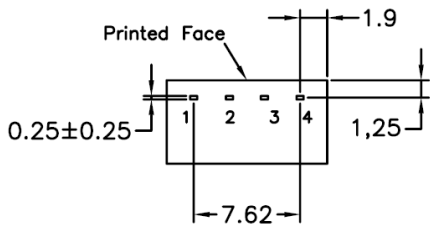
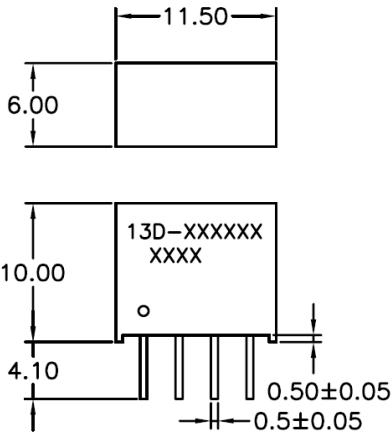
3.3v,5V,12V,24V,48V input types

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
13D-03S05N	5	100	70	1	13D-03S05N3	5	100	70	3
13D-03S09N	9	56	75	1	13D-03S09N3	9	56	75	3
13D-03S12N	12	42	75	1	13D-03S12N3	12	42	75	3
13D-03S15N	15	34	75	1	13D-03S15N3	15	34	75	3
13D-05S03N	3.3	154	70	1	13D-05S03N3	3.3	154	75	3
13D-XXS05N	5	200	70	1	13D-XXS05N3	5	200	70	3
13D-XXS09N	9	110	75	1	13D-XXS09N3	9	110	75	3
13D-XXS12N	12	84	75	1	13D-XXS12N3	12	84	75	3
13D-XXS15N	15	67	75	1	13D-XXS15N3	15	67	75	3
13D-48S05N2	5	200	70	2	13D-48S05N4	5	200	70	4
13D-48S09N2	9	110	75	2	13D-48S09N4	9	110	75	4
13D-48S12N2	12	84	75	2	13D-48S12N4	12	84	75	4
13D-48S15N2	15	67	75	2	13D-48S15N4	15	67	75	4

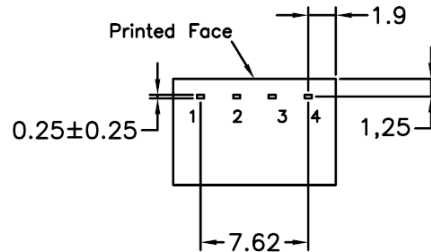
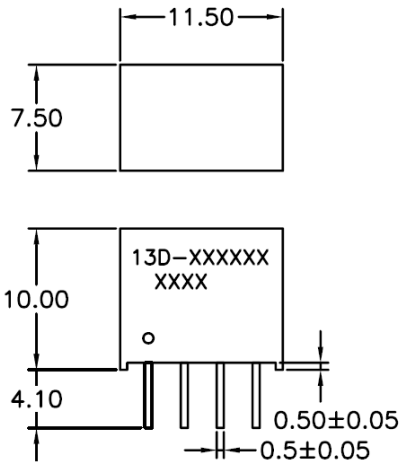
MARKINGS AND DIMENSIONS

PIN CONNECTION

1.

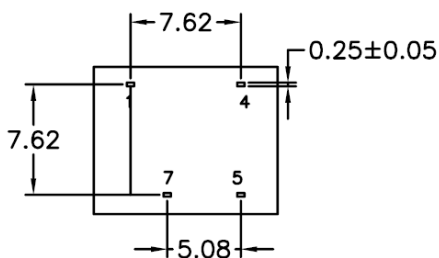
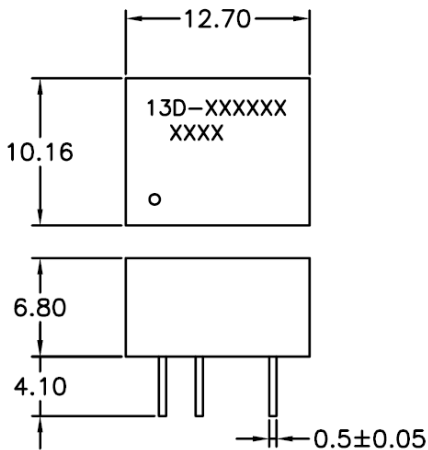


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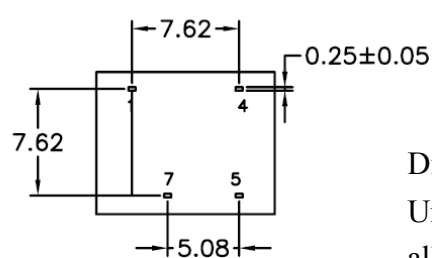
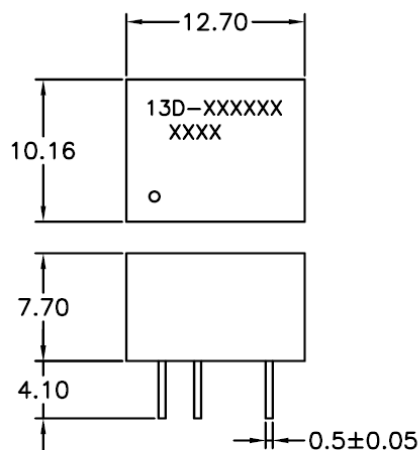


PIN	4 PIN
1	-INPUT
2	+INPUT
3	-OUTPUT
4	+OUTPUT

3.



4.



PIN	8 PIN
1	-INPUT
4	+INPUT
5	+OUTPUT
7	-OUTPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are ±.005/±0.13



13DS SERIES

1000VDC 1WATT SINGLE OUTPUT SURFACE MOUNT DC-DC CONVERTER

FEATURES

- 14 PIN SMD PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.



GENERAL SPECIFICATIONS

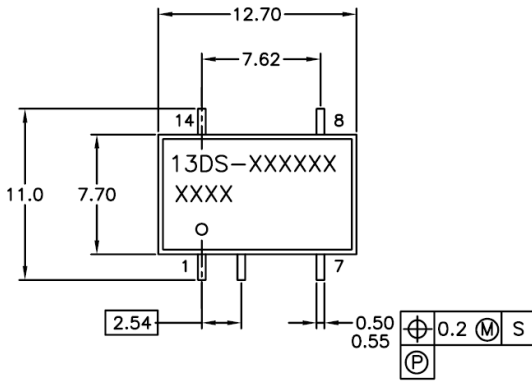
- OUTPUT RIPPLE(20MHz Band limited)
 - 5V OUTPUT TYPES : 100mVp-p MAX
 - 9V OUTPUT TYPES : 150mVp-p MAX
 - 12V OUTPUT TYPES : 180mVp-p MAX
 - 15V OUTPUT TYPES : 190mVp-p MAX
- ISOLATION RESISTANCE :1000M Ω MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 $^{\circ}$ C TO 70 $^{\circ}$ C
- EFFICIENCY :70% TYP

ELECTRICAL SPECIFICATIONS

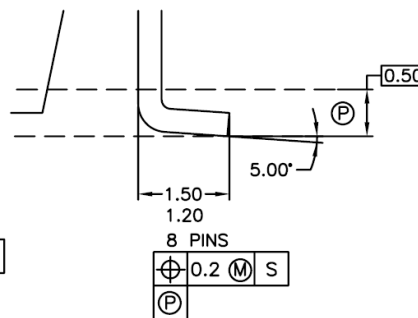
- INPUT VOLTAGE RANGE : \pm 5%
- OUTPUT VOLTAGE TOLERANCE : \pm 5%
- LOAD VOLTAGE REGULATION
 - 5V OUTPUT TYPES :12% TYPICAL 14% MAX
 - 9V,12V AND 15V OUTPUT TYPES : 8.5%MAX
- LINE VOLTAGE REGULATION (10% to 100% full load) :1.2%/1% of V_{IN} MAX

PART NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)
13DS-05S05N	5	5	200	70
13DS-05S09N	5	9	110	75
13DS-05S12N	5	12	84	75
13DS-05S15N	5	15	67	75
13DS-12S05N	12	5	200	70
13DS-12S09N	12	9	110	75
13DS-12S12N	12	12	84	75
13DS-12S15N	12	15	67	75

MARKINGS AND DIMENSIONS

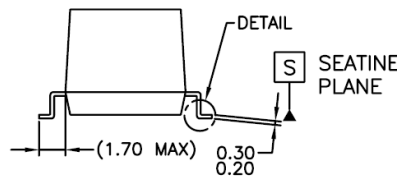
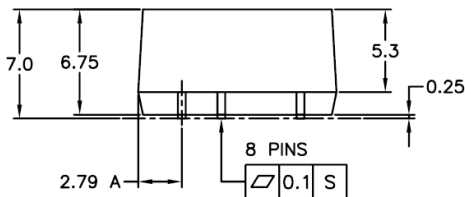


DETAIL A



PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
3	+INPUT
7	-OUTPUT
8	+OUTPUT
14	NC



Dimensions:inches/mm

Unless otherwise specified, all tolerances are \pm .005/ \pm 0.13



13DS1 SERIES

3000VDC SINGLE & DUAL OUTPUT 1 WATT DC-DC CONVERTER

FEATURES

- 22 PIN SMD PACKAGE.
- 3000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 1 WATT LOAD -40°C TO 85°C



GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE : 1000MΩ MIN @1000VDC
- SWITCHING FREQUENCY : 115KHz TYP.
- OPERATING TEMPERATURE : -40 °C TO 85°C
- ISOLATION VOLTAGE : 3000VDC MIN
- RIPPLE AND NOISE : 75mVp-p MAX

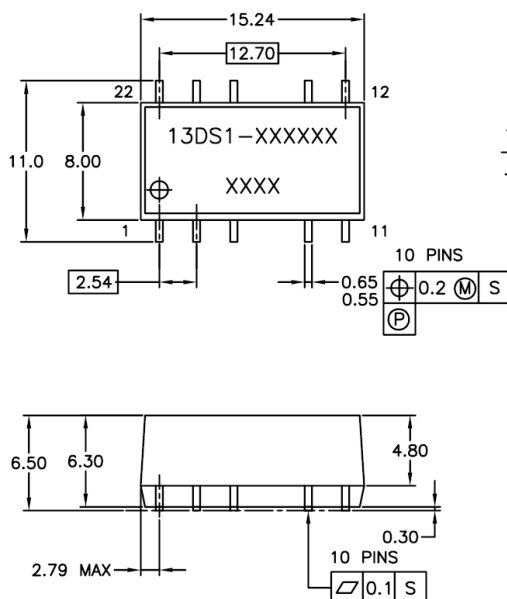
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (10% TO 100% F.L.) : ±1.2%/1% OF Vin
- LOAD REGULATION (10% TO 100% F.L.) : 12% & 8.0% MAX
5V & 9V OUTPUT TYPES
12V & 15V OUTPUT TYPES : 8.5% & 7.0% MAX

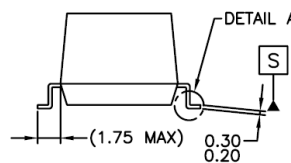
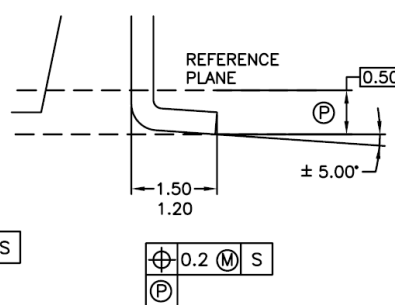
Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

PART NUMBER	NOMINAL OUTPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT AT RATED LOAD	RIPPLE AND NOISE	EFFICIENCY (%)	ISOLATION CAPACITANCE (pF)
	(V)	(V)	(mA)	(mA)	(mVp-p)		
13DS1-05S05N	5	5	200	294	75	68	35
13DS1-05S12N	5	12	83	260	60	77	42
13DS1-05D05N	5	±5	±100	282	75	71	33
13DS1-05D09N	5	±9	±55	260	65	77	38
13DS1-05D12N	5	±12	±42	253	60	79	44
13DS1-05D15N	5	±15	±33	250	60	80	43
13DS1-12S05N	12	5	200	124	75	67	50
13DS1-12S12N	12	12	83	113	60	74	47
13DS1-12D05N	12	±5	±100	114	75	73	88
13DS1-12D09N	12	±9	±55	105	65	79	72
13DS1-12D12N	12	±12	±42	104	60	80	89
13DS1-12D15N	12	±15	±33	101	60	82	100

MARKINGS AND DIMENSIONS



DETAIL A



PIN CONNECTION

PIN	SINGLE	DUAL
1	-IN	-IN
3	+IN	+IN
5	NC	NC
9	-OUT	COM
11	NC	-OUT
12	NC	NC
14	+OUT	+OUT
18	NC	NC
20	NC	NC
22	NC	NC

Dimensions: mm

Unless otherwise specified, all tolerances are ±0.13



13DS2 SERIES

1000VDC DUAL OUTPUT 1 WATT DC-DC CONVERTER

FEATURES

- 18 PIN SMD PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 1 WATT LOAD -40°C TO 85°C



GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE :1000M Ω MIN @1000VDC
- SWITCHING FREQUENCY :115KHz TYP.
- OPERATING TEMPERATURE :-40 °C TO 85°C
- ISOLATION VOLTAGE :1000 VDC MIN
- RIPPLE AND NOISE :110 mVp-p MAX

ELECTRICAL SPECIFICATIONS

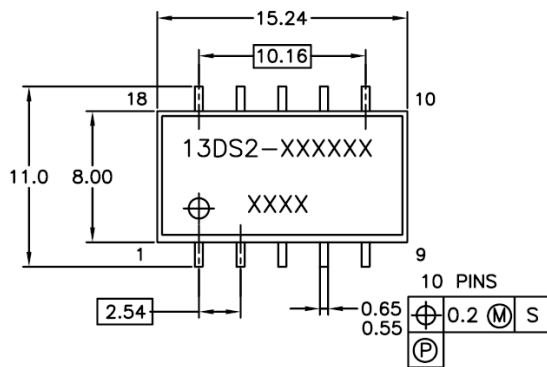
- INPUT VOLTAGE RANGE : $\pm 10\%$
- OUTPUT VOLTAGE TOLERANCE : $\pm 5\%$
- LINE REGULATION(10% TO 100% F.L.) : $\pm 1.2\%/1\%$ OF V_{in}
- LOAD REGULATION(10% TO 100% F.L.)
5V & 9V OUTPUT TYPES :12% & 8.0% MAX
12V & 15V OUTPUT TYPES :8.5% & 7.0% MAX

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

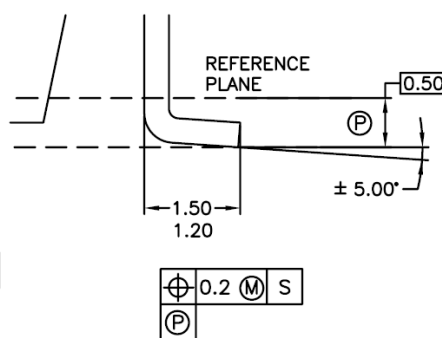
PART NUMBER	NOMINAL OUTPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT AT RATED LOAD	RIPPLE AND NOISE	EFFICIENCY	ISOLATION CAPACITANCE
	(V)	(V)	(mA)	(mA)	(mVp-p)	(%)	(pF)
13DS2-05D05N	5	5	± 100	290	100	69	33
13DS2-05D09N	5	9	± 55	267	80	75	38
13DS2-05D12N	5	12	± 42	260	110	77	44
13DS2-05D15N	5	15	± 33	256	110	78	43
13DS2-12D05N	12	5	± 100	121	100	69	50
13DS2-12D09N	12	9	± 55	113	80	74	72
13DS2-12D12N	12	12	± 42	111	110	75	89
13DS2-12D15N	12	15	± 33	110	110	76	100

MARKINGS AND DIMENSIONS

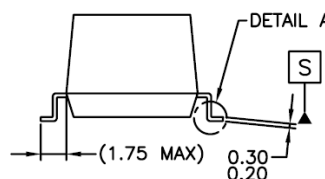
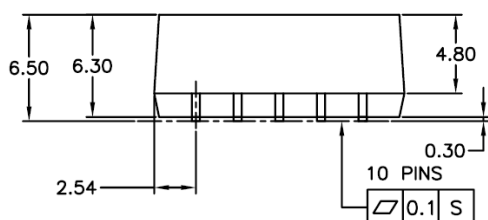
PIN CONNECTION



DETAIL A



PIN	DUAL OUTPUT
1	-INPUT
3	+INPUT
5	NC
7	COMMON
9	-OUTPUT
10	NC
12	+OUTPUT
14	NC
16	NC
18	NC



Dimensions: mm

Unless otherwise specified, all tolerances are ± 0.13



13DS2-1 SERIES

1000VDC SINGLE & DUAL OUTPUT 1 WATT DC-DC CONVERTER

FEATURES

- 22 PIN SMD PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 1 WATT LOAD -40°C TO 85°C



GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE : 1000MΩ MIN @1000VDC
- SWITCHING FREQUENCY : 115KHz TYP.
- OPERATING TEMPERATURE : -40 °C TO 85°C
- ISOLATION VOLTAGE : 1000VDC MIN
- RIPPLE AND NOISE : 110mVp-p MAX

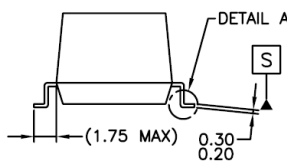
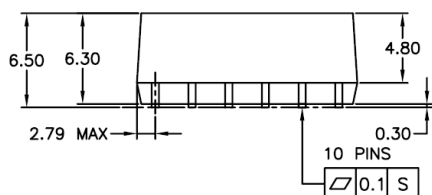
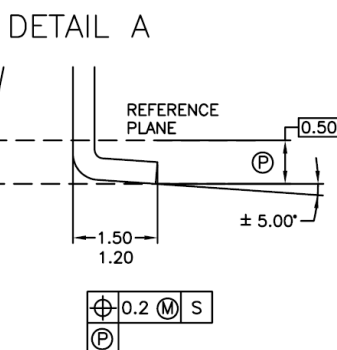
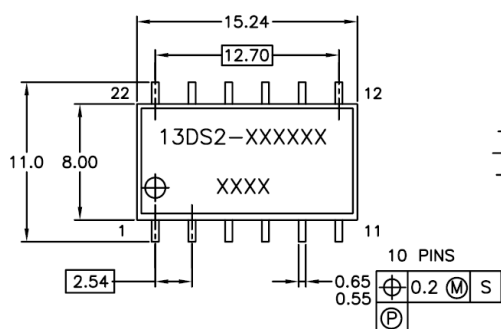
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (10% TO 100% F.L.) : ±1.2%/1% OF Vin
- LOAD REGULATION (10% TO 100% F.L.) : 5V & 9V OUTPUT TYPES : 12% & 8.0% MAX
12V & 15V OUTPUT TYPES : 8.5% & 7.0% MAX

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

PART NUMBER	NOMINAL OUTPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT AT RATED LOAD	RIPPLE AND NOISE	EFFICIENCY (%)	ISOLATION CAPACITANCE (pF)
	(V)	(V)	(mA)	(mA)	(mVp-p)		
13DS2-05S05N	5	5	200	294	75	68	35
13DS2-05S12N	5	12	83	260	60	77	42
13DS2-05D05N	5	±5	±100	282	75	71	33
13DS2-05D09N	5	±9	±55	260	65	77	38
13DS2-05D12N	5	±12	±42	253	60	79	44
13DS2-05D15N	5	±15	±33	250	60	80	43
13DS2-12S05N	12	5	200	124	75	67	50
13DS2-12S12N	12	12	83	113	60	74	47
13DS2-12D05N	12	±5	±100	114	75	73	88
13DS2-12D09N	12	±9	±55	105	65	79	72
13DS2-12D12N	12	±12	±42	104	60	80	89
13DS2-12D15N	12	±15	±33	101	60	82	100

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
1	-IN	-IN
3	+IN	+IN
5	NC	NC
9	-OUT	COM
11	NC	-OUT
12	NC	NC
14	+OUT	+OUT
18	NC	NC
20	NC	NC
22	NC	NC

Dimensions: mm

Unless otherwise specified, all tolerances are ±0.13



13DS3 SERIES

1000VDC 1WATT SINGLE OUTPUT SURFACE MOUNT DC-DC CONVERTER

FEATURES

- 14 PIN SMD PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 1 WATT LOAD -40°C TO 85°C



GENERAL SPECIFICATIONS

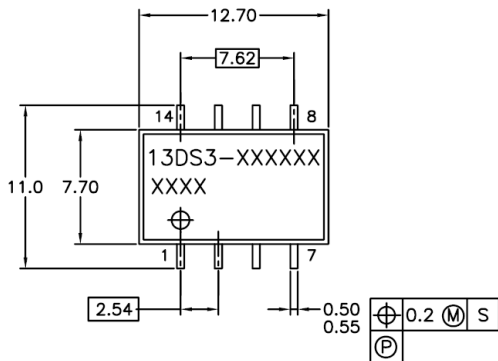
- OUTPUT RIPPLE(20MHz Band limited)
 - 5V OUTPUT TYPES : 85mVp-p MAX
 - 9V OUTPUT TYPES : 75mVp-p MAX
 - 12V OUTPUT TYPES : 65mVp-p MAX
 - 15V OUTPUT TYPES : 76mVp-p MAX
- ISOLATION RESISTANCE :1000VDC MIN
- SWITHINGFREQUENCY :110KHz TYP.
- OPERATING TEMPERATURE :-40°C TO 85°C
- EFFICIENCY :70% TYP

ELECTRICAL SPECIFICATIONS

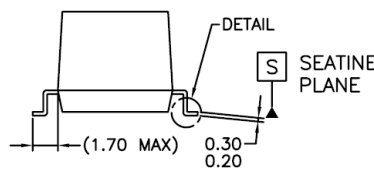
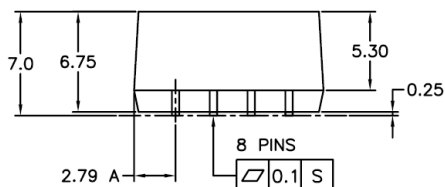
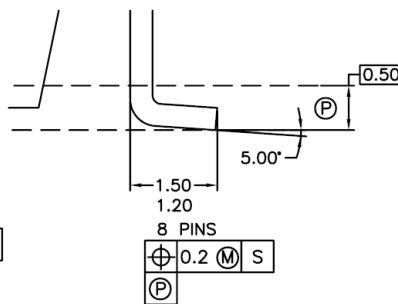
- INPUT VOLTAGE RANGE :±10%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LOAD REGULATION
 - 5V & 9V OUTPUT TYPES :15% & 9% MAX
 - 12V & 15V OUTPUT TYPES :7.5% & 7% MAX
- LINE VOLTAGE REGULATION (10% to 100% full load) :1.2%/1% of V_{IN} MAX

PART NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT CURRENT (mA)	EFFICIENCY (%)	ISOLATION CAPACITANCE (pF)
13DS3-05S05N	5	5	200	294	68	35
13DS3-05S09N	5	9	111	267	75	43
13DS3-05S12N	5	12	83	260	77	42
13DS3-05S15N	5	15	66	256	78	44
13DS3-12S05N	12	5	200	124	67	47
13DS3-12S09N	12	9	111	114	73	77
13DS3-12S12N	12	12	83	113	74	88
13DS3-12S15N	12	15	66	111	75	95

MARKINGS AND DIMENSIONS



DETAIL A



PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
3	+INPUT
7	-OUTPUT
8	+OUTPUT
14	NC

Dimensions: mm

Unless otherwise specified, all tolerances are ±0.13

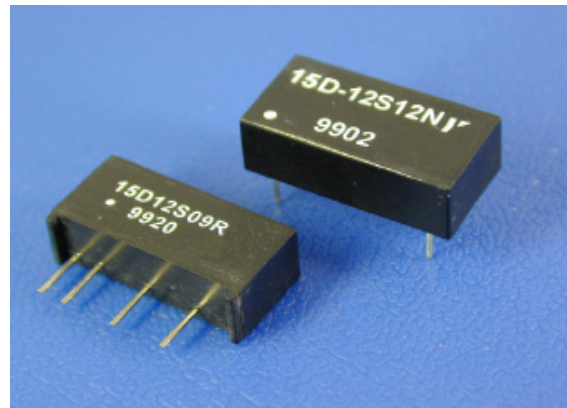
FEATURES

- 7 PIN SIP PACKAGE.
- 1000VDC ISOLATION.
- OUTPUT REGULATION < 1.5%.
- UL 94V-0 PACKAGE MATERIAL.

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE (20MHz Band limited) : 60mVp-p MAX

- ISOLATION RESISTANCE :100MΩ MIN @500VDC
- SWITHINGFREQUENCY :80KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY(5V) :50% TYP,45%MIN
- EFFICIENCY(9V,12V,15V) :62% TYP,55%MIN
- ISOLATION VOLTAGE :1000 VDC



ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :0.25%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) :0.9%TYP. 1.5%MAX

5v and 12v input types

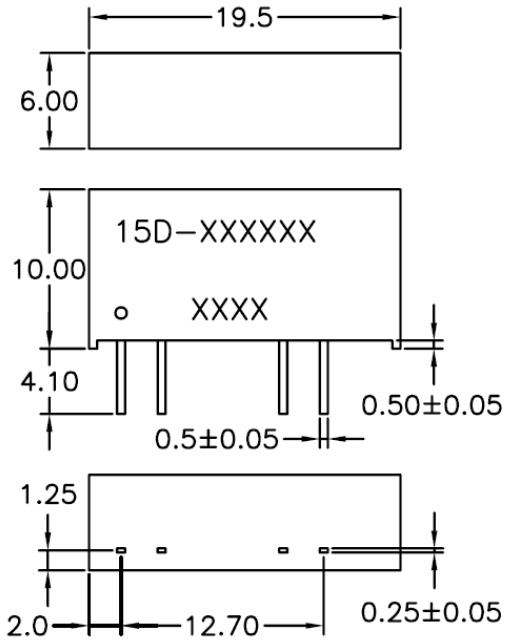
24V and 48V input types

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
15D-XXS05R	5	100	45	1	15D-XXS05R2	5	100	45	2
15D-XXS09R	9	100	55	1	15D-XXS09R2	9	100	55	2
15D-XXS12R	12	83	55	1	15D-XXS12R2	12	83	55	2
15D-XXS15R	15	67	55	1	15D-XXS15R2	15	67	55	2
15D-XXS05R3	5	100	45	3	15D-XXS05R4	5	100	45	4
15D-XXS09R3	9	100	55	3	15D-XXS09R4	9	100	55	4
15D-XXS12R3	12	83	55	3	15D-XXS12R4	12	83	55	4
15D-XXS15R3	15	67	55	3	15D-XXS15R4	15	67	55	4

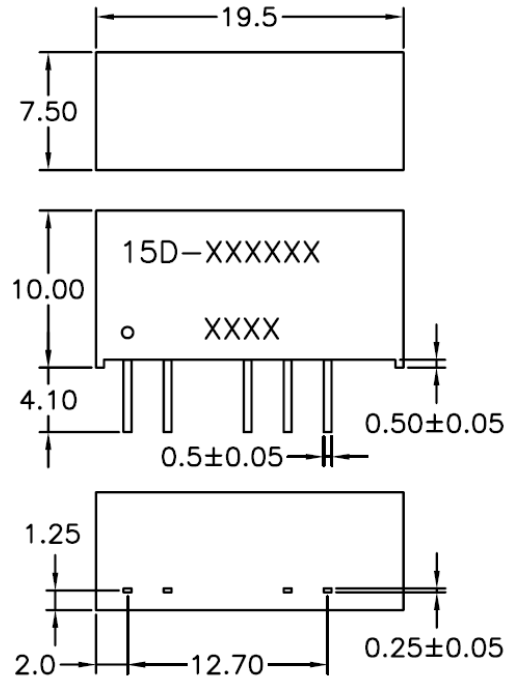
MARKINGS AND DIMENSIONS

PIN CONNECTION

1.



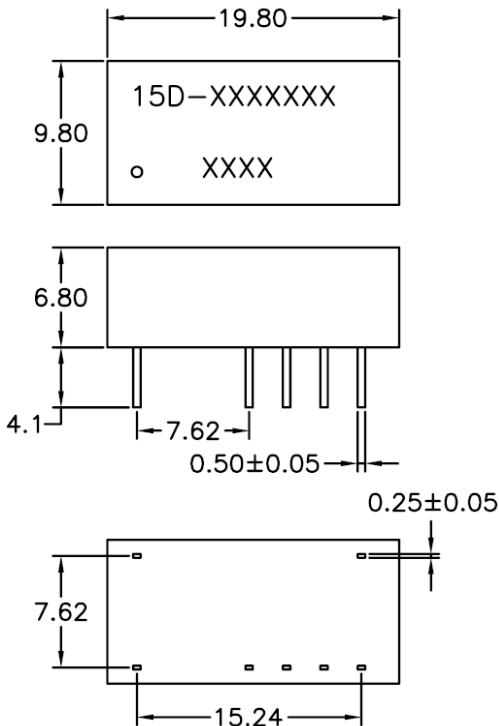
2.



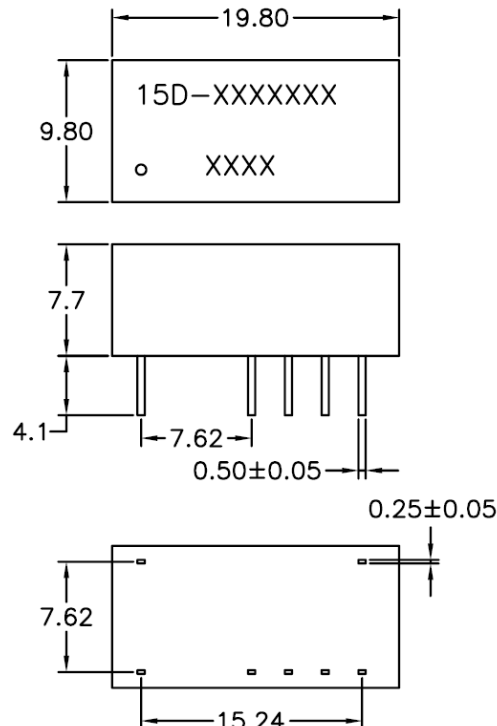
PIN	7 PIN
1	+INPUT
2	-INPUT
4	-OUTPUT
5	CTRL
6	+VOUTPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are
±.005/±0.13

3.



4.



PIN	14 PIN
1	-INPUT
9	+OUTPUT
10	CTRL
11	-OUTPUT
14	+INPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are
±.005/±0.13



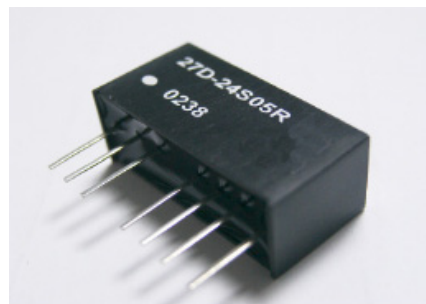
1 WATT, SIP 8PIN, SINGLE OUTPUT REGULATED 16D SERIES ISOLATION 1000VDC DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES RANGE
- EFFICIENCY TO 80%
- UL 94V-0 PACKAGE MATERIAL
- CONTINUOUS SHORT CIRCUIT PROTECTION WITH CURRENT FOLDBACK
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- RIPPLE & NOISE (VOUT = 5-9V TYPES) : 100mVp-p MAX (20MHz B.W.)
- RIPPLE & NOISE (VOUT = 12-15V TYPES) : 1% OF VOUT
- ISOLATION VOLTAGE : 1KVDC
- SWITCHING FREQUENCY : 50KHz MIN
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- OPERATING TEMPERATURE : -40°C TO 85°C
- STORAGE TEMPERATURE RANGE : -50°C TO 130°C



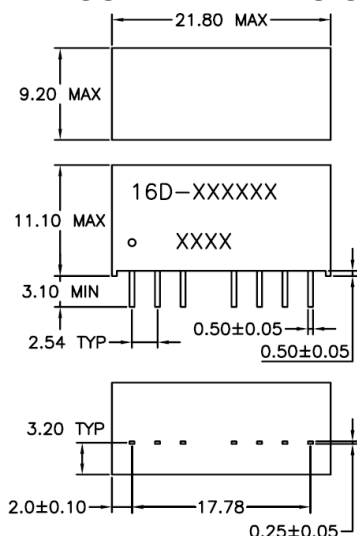
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 2 : 1
- OUTPUT VOLTAGE TOLERANCE : ±3%
- LINE REGULATION (REGULATED) : 0.5% MAX
- LOAD REGULATION (REGULATED) : 0.8% MAX
- EFFICIENCY : UP TO 81%

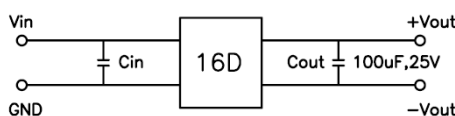
(Typical at nominal input, rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT	EFFICIENCY (%)	MTBF KHrs
16D-05S05R	5-9VDC	5VDC	200mA	63	>1000
16D-05S09R	5-9VDC	9VDC	111mA	68	
16D-05S12R	5-9VDC	12VDC	167mA	69	
16D-05S15R	5-9VDC	15VDC	83mA	71	
16D-12S05R	9-18VDC	5VDC	200mA	71	
16D-12S09R	9-18VDC	9VDC	111mA	76	
16D-12S12R	9-18VDC	12VDC	167mA	78	
16D-12S15R	9-18VDC	15VDC	83mA	79	
16D-24S05R	18-36VDC	5VDC	200mA	71	
16D-24S09R	18-36VDC	9VDC	111mA	78	
16D-24S12R	18-36VDC	12VDC	167mA	79	
16D-24S15R	18-36VDC	15VDC	83mA	81	
16D-48S05R	36-72VDC	5VDC	200mA	70	
16D-48S09R	36-72VDC	9VDC	111mA	77	
16D-48S12R	36-72VDC	12VDC	167mA	79	
16D-48S15R	36-72VDC	15VDC	83mA	80	

MARKINGS AND DIMENSIONS



RECOMMENDED TEST CIRCUIT



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

PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
2	+INPUT
3	CTRL- Control input can (can be left open)
4	NO PIN
5	NE- No external connection allowed
6	+OUTPUT
7	-OUTPUT
8	CS Optional external capacitor

Dimensions: inches/mm

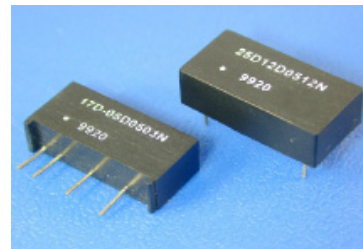
Unless otherwise specified, all tolerances are ±.005/±0.13



1000VDC TWIN OUTPUT 17D/25D SERIES 1 WATT DC-DC CONVERTER

FEATURES

- 7 PIN SIP AND 14 PIN DIL PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.



GENERAL SPECIFICATIONS

- OUTPUT RIPPPL(20MHz Band limited) : 100mVp-p MAX
- ISOLATION RESISTANCE :1000MΩ MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY(3.3V AND 5V) :70% TYP,65%MIN
- EFFICIENCY(9V,12V AND 15V) :80% TYP,70%MIN

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) :15% MAX
3.3V AND 5V OUTPUT TYPES
9V,12V AND 15V OUTPUT TYPES :10% MAX

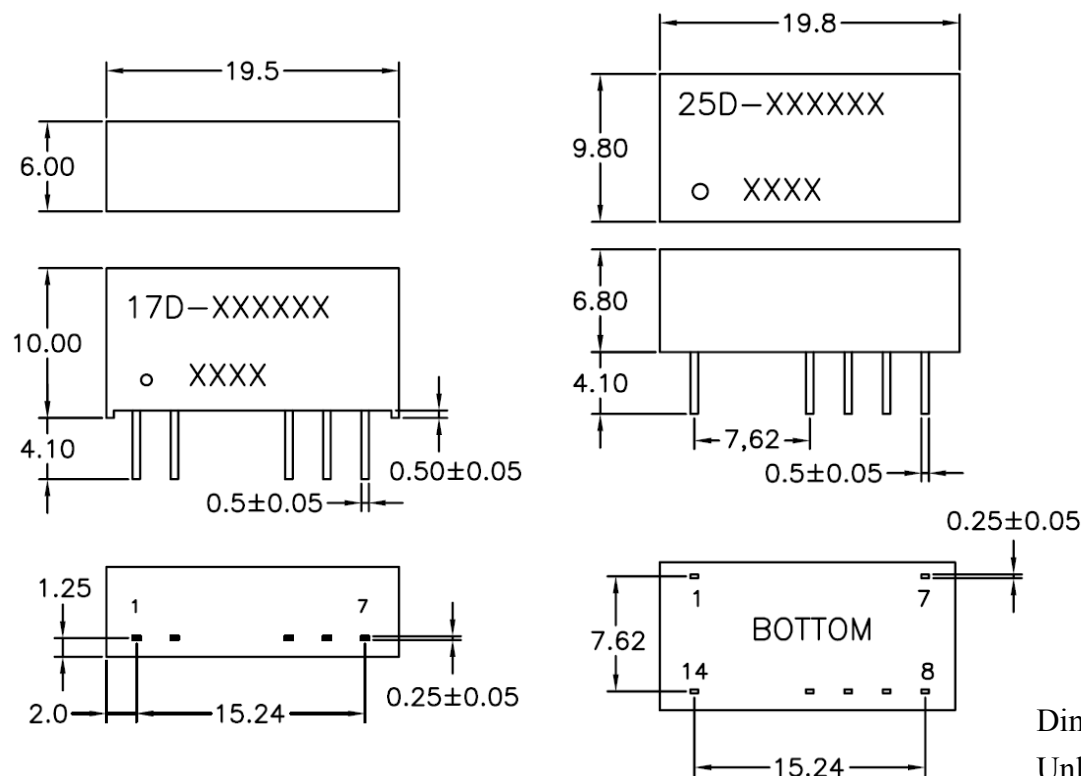
5v, 12v input types

PART NUMBER	OUTPUT1		OUTPUT2		EFFICIENCY (% TYP.)
	VOLTAGE (VDC)	CURRENT (mA)	VOLTAGE (VDC)	CURRENT (mA)	
17D-05D0503N	5	100	3.3	152	70
17D-XXD0505N	5	100	5	100	75
17D-XXD0509N	5	100	9	56	75
17D-XXD0512N	5	100	12	42	75
17D-XXD0515N	5	100	15	34	75

5v, 12v input types

PART NUMBER	OUTPUT1		OUTPUT2		EFFICIENCY (% TYP.)
	VOLTAGE (VDC)	CURRENT (mA)	VOLTAGE (VDC)	CURRENT (mA)	
25D-05D0503N	5	100	3.3	152	70
25D-XXD0505N	5	100	5	100	75
25D-XXD0509N	5	100	9	56	75
25D-XXD0512N	5	100	12	42	75
25D-XXD0515N	5	100	15	34	75

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	7 PIN
1	+INPUT
2	-INPUT
4	+OUTPUT1
5	-OUTPUT1
6	+OUTPUT2
7	-OUTPUT2
PIN	14PIN
1	-INPUT
7	NC
8	-OUTPUT2
9	+OUTPUT2
10	-OUTPUT1
11	+OUTPUT1
14	+INPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are ±.005/±0.13

MMT 22D SERIES

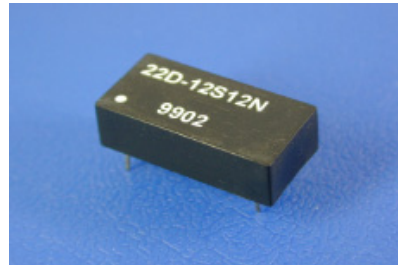
1000VDC DUAL OUTPUT 1WATT DC-DC CONVERTER

FEATURES

- 14 PIN DIL PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.

GENERAL SPECIFICATIONS

- OUTPUT RIPPPL(20MHz Band limited)
INPUT 3.3V AND 48V TYP. : 150mVp-p MAX
INPUT 5V,12V AND 24V TYP. : 100mVp-p MAX
- ISOLATION RESISTANCE : 1000MΩ MIN @500VDC
- SWITHINGFREQUENCY : 100KHz TYP.
- OPERATING TEMPERATURE : 0 °C TO 70°C
- EFFICIENCY : 70% TYP
- SHORT CIRCUIT PROTECTION : SHORT TERM



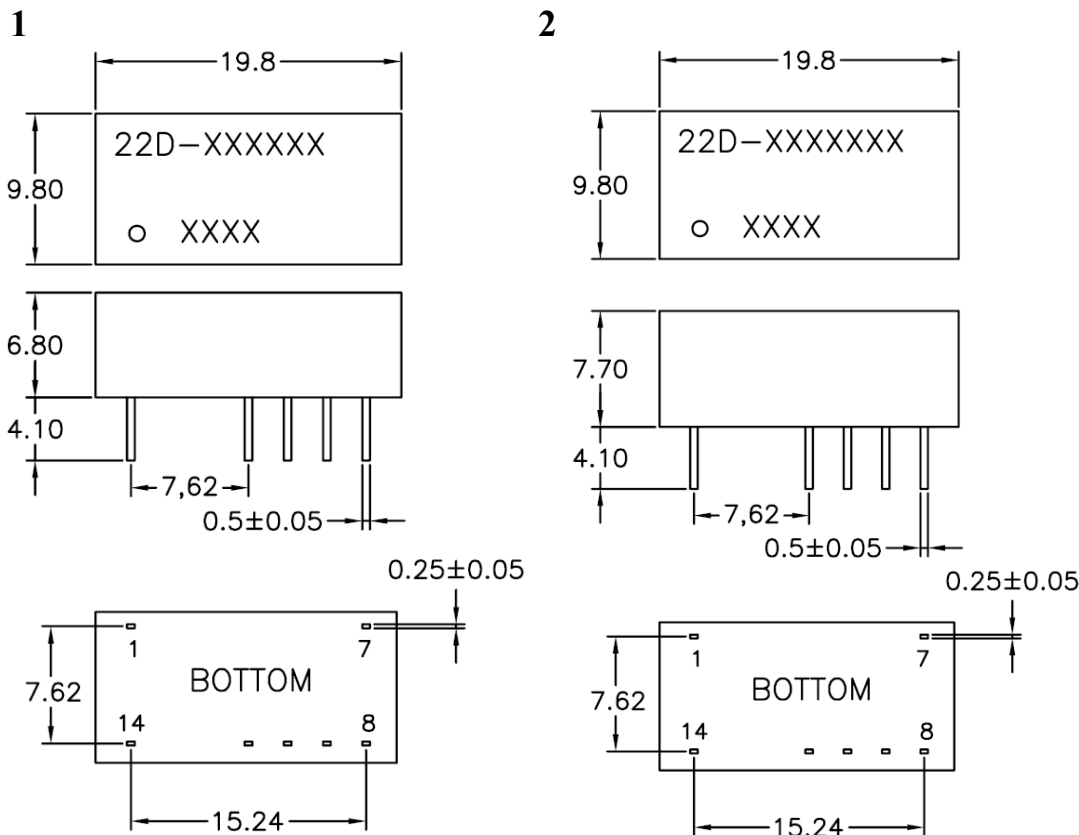
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION(10% TO 100% F.L.) : 1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) : 15% MAX
5V OUTPUT TYPES : 10% MAX
9V,12V AND 15V OUTPUT TYPES : 10% MAX

5V,12V,24V AND 48V INPUT TYPES

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
22D-XXD05N	±5	±100	70	1	22D-48D05N2	±5	±100	70	2
22D-XXD09N	±9	±56	75	1	22D-48D09N2	±9	±56	75	2
22D-XXD12N	±12	±42	75	1	22D-48D12N2	±12	±42	75	2
22D-XXD15N	±15	±34	75	1	22D-48D15N2	±15	±34	75	2

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
1	-INPUT	-INPUT
7	NC	NC
8	-OUTPUT	COMMON
9	+OUTPUT	+OUTPUT
11	NC	-OUTPUT
14	+INPUT	+INPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are
±.005/±0.13

FEATURES

- 14 PIN DIL PACKAGE.
- 3000VDC ISOLATION.
- UNREGULATED TYPES.
- UL 94V-0 PACKAGE MATERIAL.

GENERAL SPECIFICATIONS

- INPUT REFLECTED NOISE(20MHz B.W.): 100mVp-p MAX
- OUTPUT RIPPLE(20MHz B.W.) : 150mVp-p MAX
- ISOLATION RESISTANCE :1000MΩ MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY :70% TYP
- SHORT CIRCUIT PROTECTION :1 SEC



ELECTRICAL SPECIFICATIONS

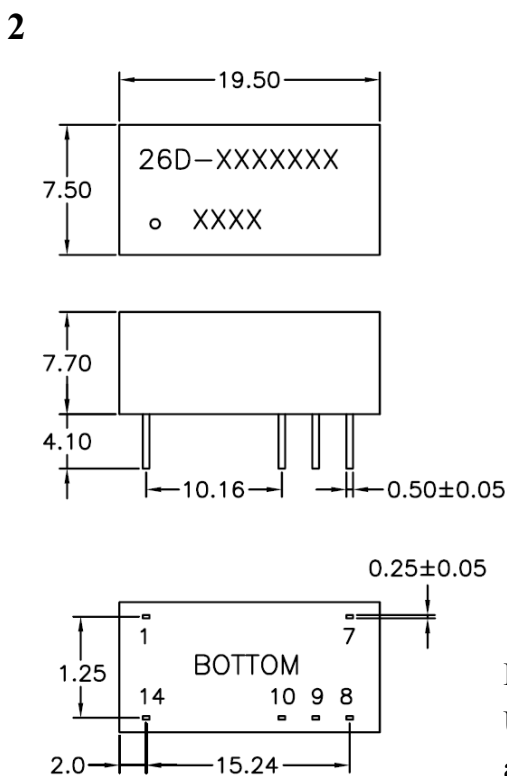
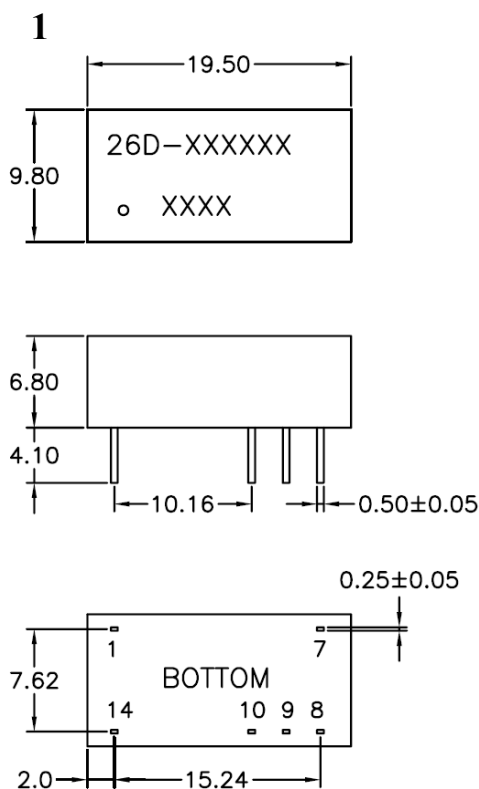
- INPUT VOLTAGE RANGE :±10%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) :15% MAX
5V OUTPUT TYPES :10% MAX
9V,12V AND 15V OUTPUT TYPES

5V,12V AND 24V INPUT TYPES

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
26D-XXS05N	5	200	70	1	26D-48S05N2	5	200	70	2
26D-XXS09N	9	112	75	1	26D-48S09N2	9	112	75	2
26D-XXS12N	12	84	75	1	26D-48S12N2	12	84	75	2
26D-XXS15N	15	67	75	1	26D-48S15N2	15	67	75	2
26D-XXD05N	±5	±100	70	1	26D-48D05N2	±5	±100	70	2
26D-XXD09N	±9	±56	75	1	26D-48D09N2	±9	±56	75	2
26D-XXD12N	±12	±42	75	1	26D-48D12N2	±12	±42	75	2
26D-XXD15N	±15	±34	75	1	26D-48D15N2	±15	±34	75	2

48V INPUT TYPES

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
1	-INPUT	-INPUT
7	NC	NC
8	+OUTPUT	+OUTPUT
9	NO PIN	COMMON
10	-OUTPUT	-OUTPUT
14	+INPUT	+INPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are ±.005/±0.13