

MMI

DC/DC CONVERTER



TABLE OF CONTENTS

SERIES NO.	PAGE
10D/14D SERIES 1000VDC SINGLE & DUAL OUTPUT 1 WATT DC-DC CONVERTER	1
11D SERIES 1000VDC SINGLE OUTPUT 250m WATT DC-DC CONVERTER	2
12D SERIES 3000VDC SINGLE AND DUAL OUTPUT 1 WATT DC-DC CONVERTER	3
13D SERIES 1000VDC SINGLE OUTPUT 1 WATT DC-DC CONVERTER	4
13D-2W SERIES 1000VDC SINGLE OUTPUT 2 WATT DC-DC CONVERTER	5
13DS SERIES 1000VDC 1 WATT SINGLE OUTPUT SURFACE MOUNT DC-DC CONVERTER	7
13DS1 SERIES 3000VDC SINGLE & DUAL OUTPUT 1 WATT DC-DC CONVERTER	8
13DS2 SERIES 1000VDC DUAL OUTPUT 1 WATT DC-DC CONVERTER	9
13DS2-1 SERIES 1000VDC SINGLE & DUAL OUTPUT 1 WATT DC-DC CONVERTER	10
13DS3 SERIES 1000VDC 1 WATT SINGLE OUTPUT SURFACE MOUNT DC-DC CONVERTER	11
15D SERIES 1000VDC REGULATED SINGLE OUTPUT 1 WATT DC-DC CONVERTER	12
16D SERIES 1WATT, SIP 8PIN, SINGLE OUTPUT REGULATED ISOLATION 1000VDC DC-DC CONVERTER	14
17/25D SERIES 1000VDC TWIN OUTPUT 1 WATT DC-DC CONVERTER	15
19/24D SERIES 1000VDC DUAL OUTPUT 2 WATT DC-DC CONVERTER	16
22D SERIES 1000VDC DUAL OUTPUT 1 WATT DC-DC CONVERTER	17
26D SERIES 3 KVDC SINGLE & DUAL OUTPUT 1 WATT 14PIN DIL DC-DC CONVERTER	18
27D SERIES 2 WATT, SIP 8PIN, SINGLE OUTPUT REGULATED ISOLATION 1000VDCDC-DC CONVERTER	19
30D/40D/43D/50D/52D SERIES 1.8 WATT DC-DC CONVERTER	21

TABLE OF CONTENTS

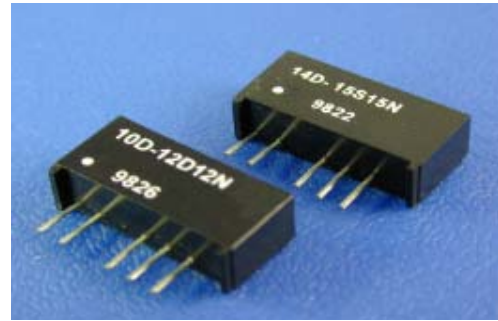
SERIES NO.	PAGE
41D SERIES 2000Vrms SINGLE & DUAL OUTPUT 1.8 WATT 24PIN DC-DC CONVERTER	23
42D SERIES 2 WATT 2000Vrms ISOLATION 16PIN SMD DC-DC CONVERTER	24
45D SERIES 3000Vrms SINGLE & DUAL OUTPUT 2 WATT 24PIN DIL DC-DC CONVERTER	25
46D SERIES 3000Vrms SINGLE & DUAL OUTPUT 3 WATT DC-DC CONVERTER	26
54D/60D/70D SERIES 3 WATT 24PIN DIL DC-DC CONVERTER	27
61D SERIES WIDE INPUT VOLTAGE RANGE 10 WATTS DC-DC CONVERTER	29
66D SERIES WIDE INPUT VOLTAGE RANGE 5 WATTS DC-DC CONVERTER	30
67D SERIES WIDE INPUT VOLTAGE RANGE 15 WATTS DC-DC CONVERTER	31
68D SERIES WIDE INPUT VOLTAGE RANGE 3 WATTS DC-DC CONVERTER	32
68D1 SERIES WIDE INPUT VOLTAGE RANGE 3 WATTS DC-DC CONVERTER	33
68D5 SERIES WIDE INPUT VOLTAGE RANGE 5-6 WATTS DC-DC CONVERTER	34
68D8 SERIES WIDE INPUT VOLTAGE RANGE 8 WATTS DC-DC CONVERTER	35
69D SERIES WIDE INPUT VOLTAGE RANGE 3 WATTS DC-DC CONVERTER	36
82D SERIES 6 WATTS REGULATED DC-DC CONVERTER	37
85D SERIES 5 WATTS REGULATED DC-DC CONVERTER	38
87D SERIES WIDE INPUT RANGE DC-DC CONVERTER MOSFET 15 WATT	39
87DS SERIES WIDE INPUT VOLTAGE RANGE 15 WATTS DC-DC CONVERTER	40
95DS SERIES WIDE INPUT VOLTAGE RANGE 20 WATTS DC-DC CONVERTER	41

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



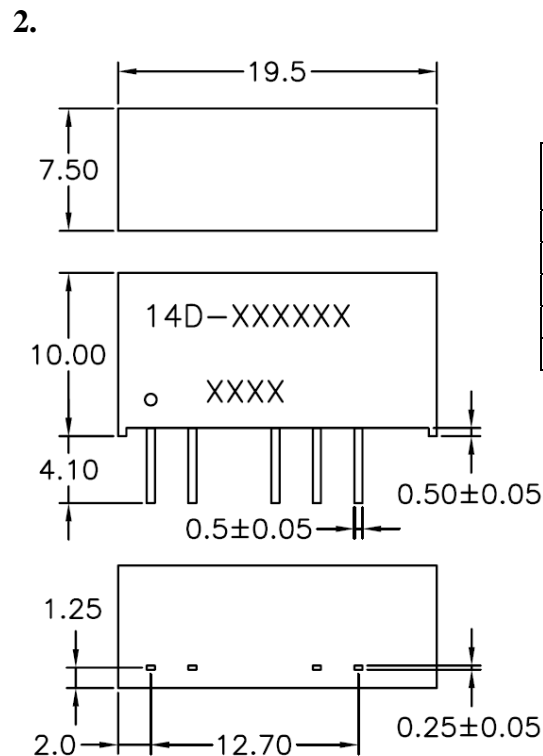
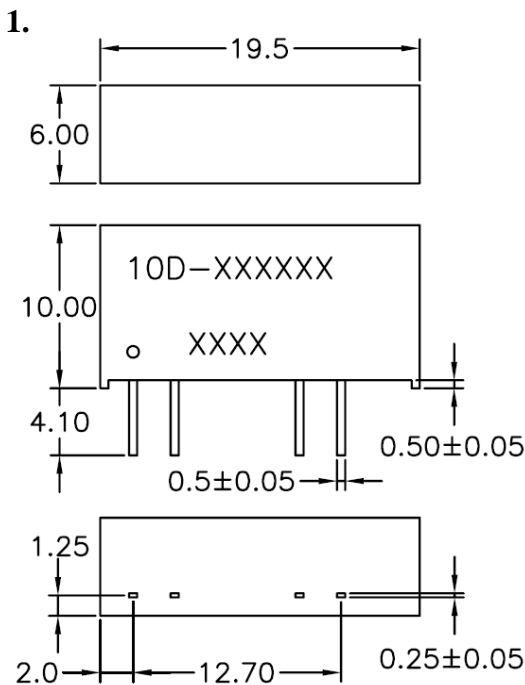
ELECTRICAL SPECIFICATIONS

- 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.) : 15% MAX
3.3V AND 5V OUTPUT TYPES
9V, 12V AND 15V OUTPUT TYPES

48V INPUT TYPES

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

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

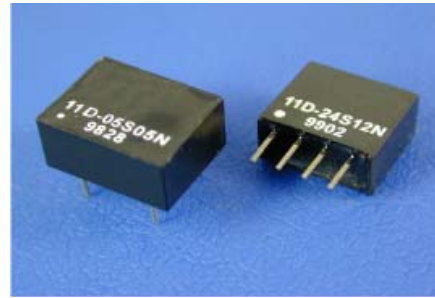
*NC PIN NOT PRESENTED ON SINGLE OUTPUT MODELS

Dimensions: inches/mm

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

FEATURES

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



GENERAL SPECIFICATIONS

- OUTPUT RIPPLE(20MHz Band limited)
INPUT 3.3V TYP. : 100mVp-p MAX
INPUT 5V AND 12V TYP. : 100mVp-p MAX
- ISOLATION RESISTANCE :100MΩ MIN @500VDC
- SWITCHING FREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY :70% TYP
- ISOLATION VOLTAGE :1000 VDC

ELECTRICAL SPECIFICATIONS

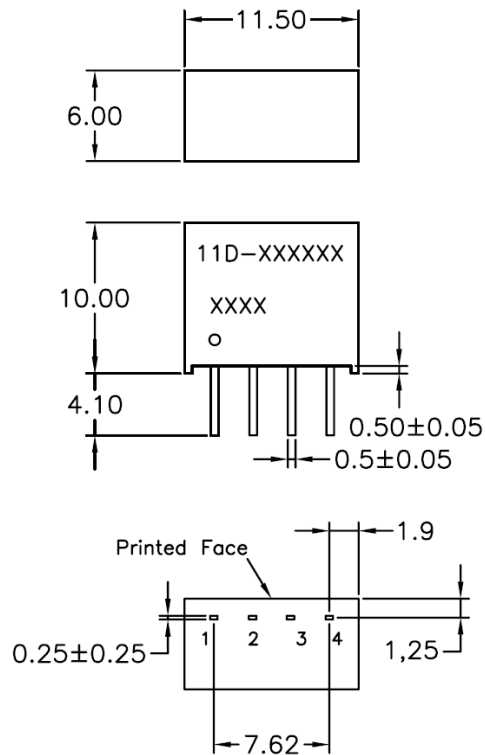
- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.)
3.3V AND 5V OUTPUT TYPES :15% MAX
9V,12V AND 15V OUTPUT TYPES :10% MAX

3.3v, 5v and 12v input types

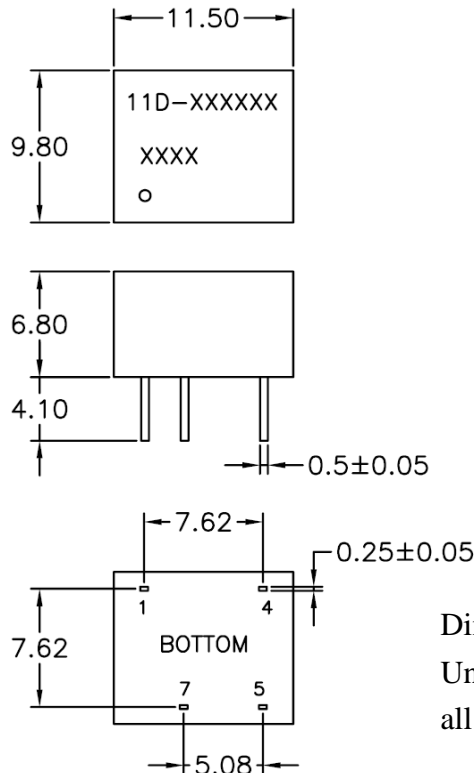
PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE	PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
11D-05S03N1	3.3	76	65	1	11D-05S03N2	3.3	76	65	2
11D-XXS05N1	5	50	65	1	11D-XXS05N2	5	50	65	2
11D-XXS09N1	9	28	70	1	11D-XXS09N2	9	28	70	2
11D-XXS12N1	12	21	70	1	11D-XXS12N2	12	21	70	2
11D-XXS15N1	15	16	70	1	11D-XXS15N2	15	16	70	2

MARKINGS AND DIMENSIONS

1.



2.



PIN CONNECTION

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

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

FEATURES

- 7 PIN SIP PACKAGE.
- 3000VDC 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
- 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

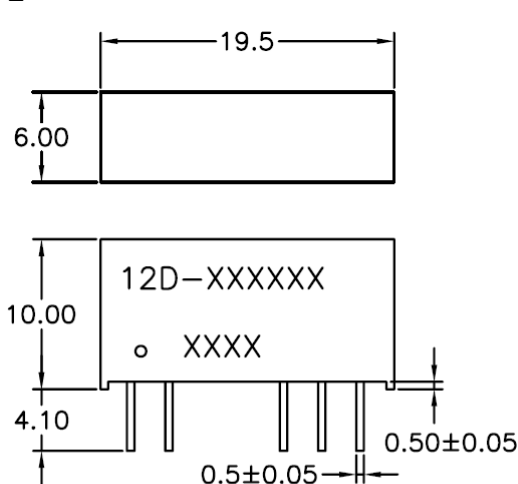
PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
12D-XXS05N	5	200	70	1
12D-XXS09N	9	112	75	1
12D-XXS12N	12	84	75	1
12D-XXS15N	15	67	75	1
12D-XXD05N	\pm 5	\pm 100	70	1
12D-XXD09N	\pm 9	\pm 56	75	1
12D-XXD12N	\pm 12	\pm 42	75	1
12D-XXD15N	\pm 15	\pm 34	75	1

48V INPUT TYPES

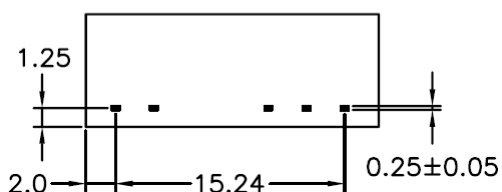
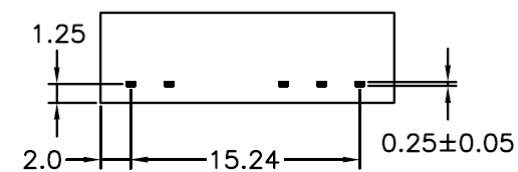
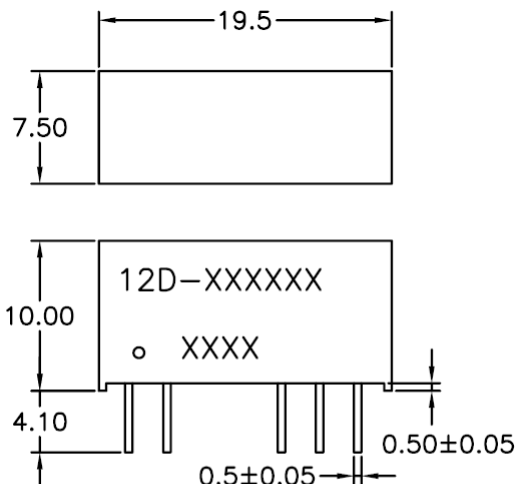
PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
12D-XXS05N2	5	200	70	2
12D-XXS09N2	9	112	75	2
12D-XXS12N2	12	84	75	2
12D-XXS15N2	15	67	75	2
12D-XXD05N2	\pm 5	\pm 100	70	2
12D-XXD09N2	\pm 9	\pm 56	75	2
12D-XXD12N2	\pm 12	\pm 42	75	2
12D-XXD15N2	\pm 15	\pm 34	75	2

MARKINGS AND DIMENSIONS

1



2



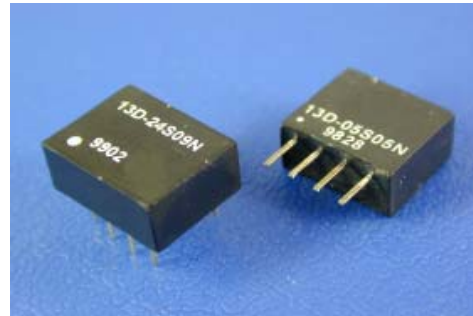
PIN CONNECTION

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

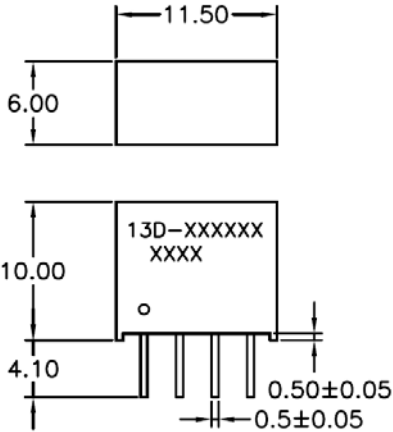
3.3v,5V,12V,24V,48V input types

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

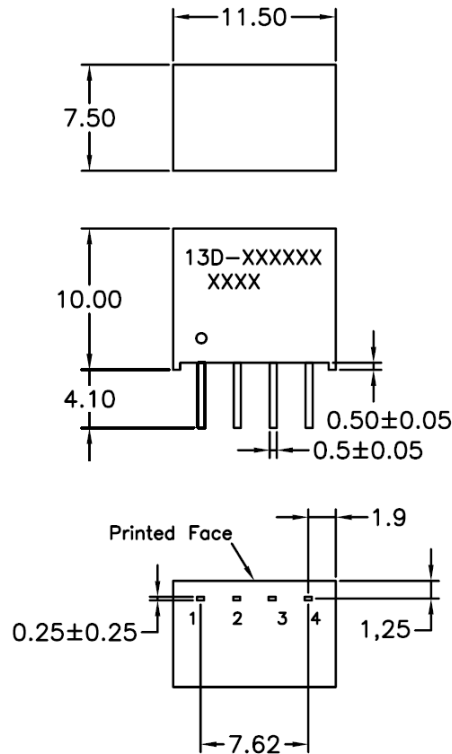
MARKINGS AND DIMENSIONS

PIN CONNECTION

1.

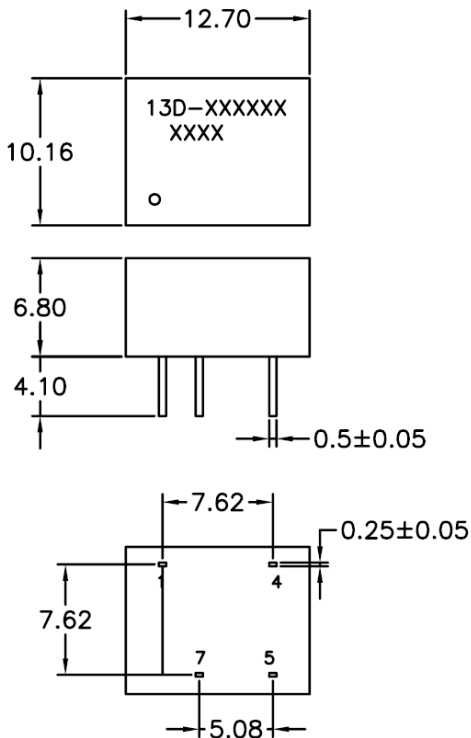


2.

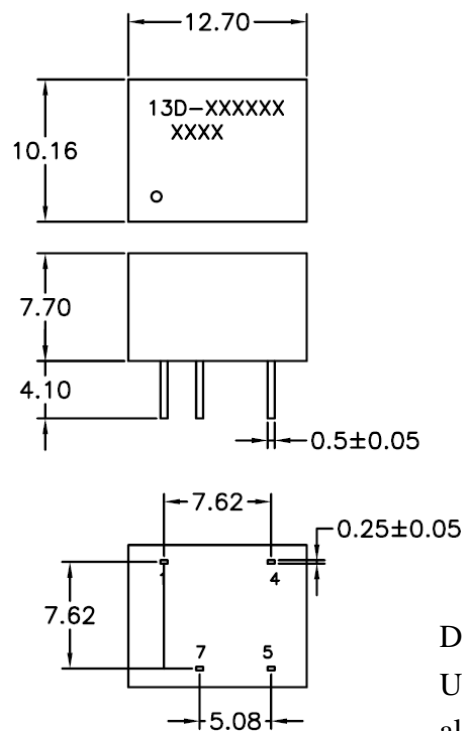


PIN	4 PIN
1	-INPUT
2	+INPUT
3	-OUTPUT
4	+OUTPUT

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

MMI 13D-2W SERIES

1000VDC SINGLE OUTPUT 2 WATT DC-DC CONVERTER

FEATURES

- 4 PIN SIP PACKAGE.
- 1000VDC ISOLATION.
- UNREGULATED OUTPUT TYPES.
- UL 94V-0 PACKAGE MATERIAL.
- WIND TEMPERATURE PERFORMANCE AT FULL 2 WATT LOAD, -40°C TO 85°C



GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE :1000M Ω MIN @500VDC
- SWITCHING FREQUENCY :90KHz TYP.
- OPERATING TEMPERATURE :-40 °C TO 85°C
- ISOLATION VOLTAGE :1000 VDC
- RIPPLE AND NOISE :200 mVp-p MAX

ELECTRICAL SPECIFICATIONS

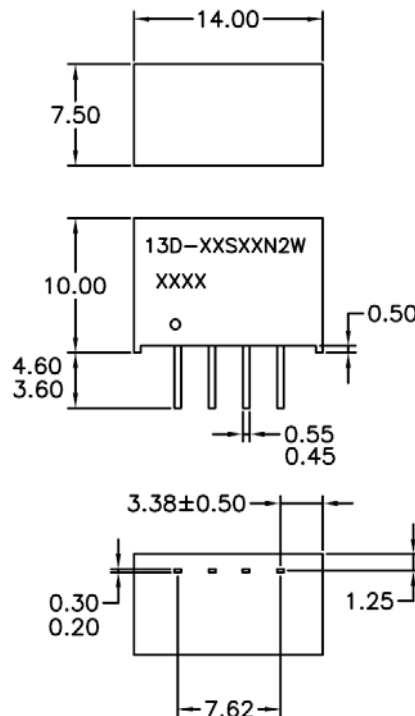
- INPUT VOLTAGE RANGE : \pm 10%
- OUTPUT VOLTAGE TOLERANCE : \pm 5%
- LINE REGULATION(10% TO 100% F.L.) : \pm 1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.)
5V AND 15V OUTPUT TYPES :15% MAX
9V AND 12V OUTPUT TYPES :10% MAX

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

PART NUMBER	NOMINAL INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE AND NOISE	INPUT CURRENT AT RATED LOAD	EFFICIENCY	ISOLATION CAPACITANCE
	(V)	(V)	(mA)	(mVp-p)	(mA)	(%)	(pF)
13D-05S05N2W	5	5	400	96	513	78	19
13D-05S09N2W	5	9	222	67	492	81	27
13D-05S12N2W	5	12	167	59	479	84	32
13D-05S15N2W	5	15	133	53	481	83	27
13D-12S05N2W	12	5	400	76	207	81	28
13D-12S09N2W	12	9	222	63	198	84	42
13D-12S12N2W	12	12	167	53	197	85	46
13D-12S15N2W	12	15	133	45	197	85	54

MARKINGS AND DIMENSIONS

PIN CONNECTION



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

Dimensions: inches/mm

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

FEATURES

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



GENERAL SPECIFICATIONS

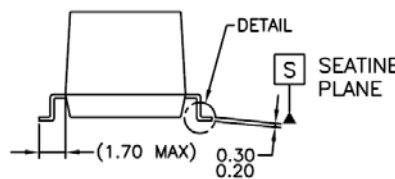
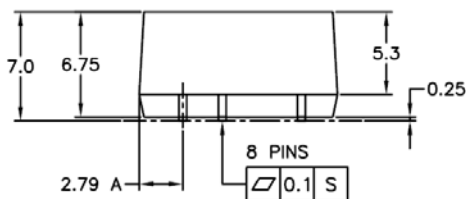
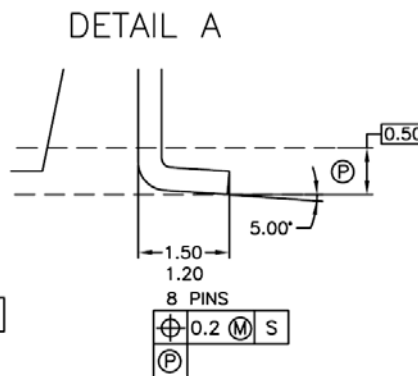
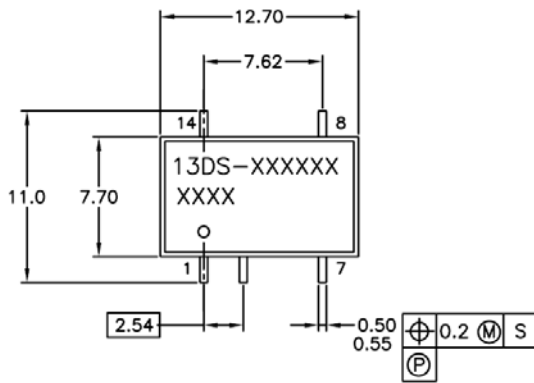
- OUTPUT RIPPLE(20MHz Band limited)
 - 5V OUTPUT TYPES : 100mVp-p MAX
 - 9V OUTPUT TYPES : 150mVp-p MAX
 - 12V OUTPUT TYPES : 180mVp-p MAX
 - 15V OUTPUT TYPES : 190mVp-p MAX
- ISOLATION RESISTANCE : 1000MΩ MIN @500VDC
- SWITHING FREQUENCY : 100KHz TYP.
- OPERATING TEMPERATURE : 0 °C TO 70°C
- EFFICIENCY : 70% TYP

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±5%
- OUTPUT VOLTAGE TOLERANCE : ±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



PIN CONNECTION

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

Dimensions: inches/mm

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

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

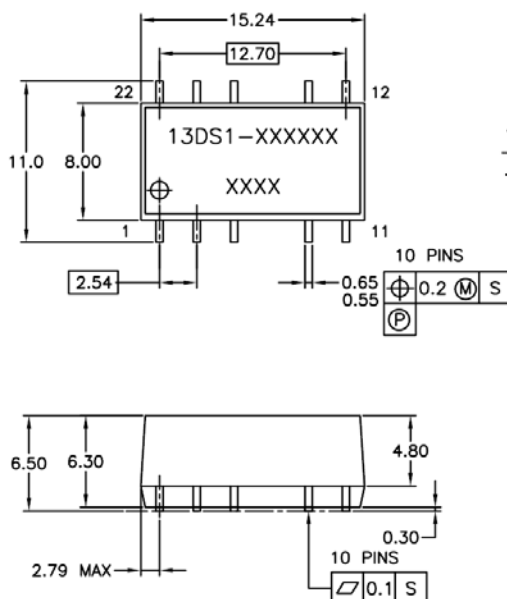
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : $\pm 10\%$
- 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.) : 12% & 8.0% MAX
5V & 9V OUTPUT TYPES
12V & 15V OUTPUT TYPES : 8.5% & 7.0% MAX

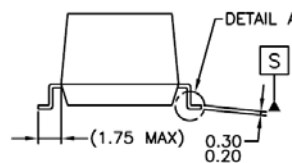
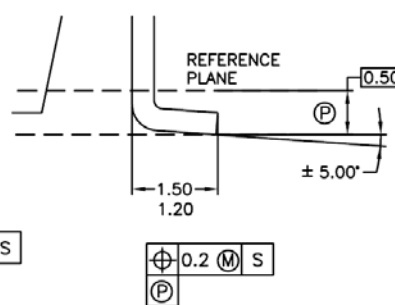
Specifications typical at $T_A=25^\circ\text{C}$, nominal input voltage and rated output current unless otherwise specified

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

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

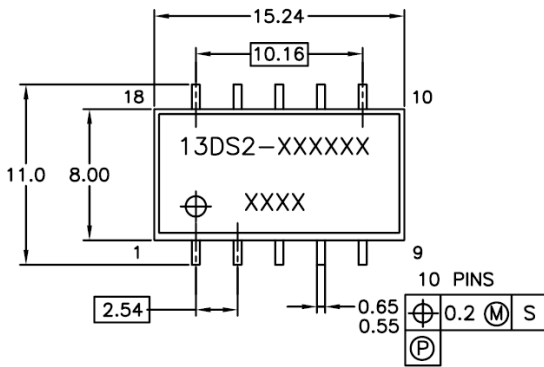
- INPUT VOLTAGE RANGE : $\pm 10\%$
- OUTPUT VOLTAGE TOLERANCE : $\pm 5\%$
- LINE REGULATION(10% TO 100% F.L.) : $\pm 1.2\%/1\%$ OF V_{in}
- LOAD REGULATION(10% TO 100% F.L.)
5V & 9V OUTPUT TYPES :12% & 8.0% MAX
12V & 15V OUTPUT TYPES :8.5% & 7.0% MAX

Specifications typical at $T_A=25^\circ\text{C}$, nominal input voltage and rated output current unless otherwise specified

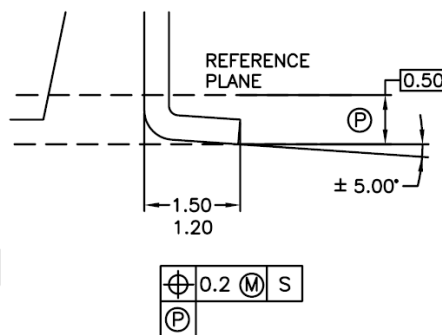
PART NUMBER	NOMINAL OUTPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT AT RATED LOAD	RIPPLE AND NOISE	EFFICIENCY	ISOLATION CAPACITANCE
	(V)	(V)	(mA)	(mA)	(mVp-p)	(%)	(pF)
13DS2-05D05N	5	5	± 100	290	100	69	33
13DS2-05D09N	5	9	± 55	267	80	75	38
13DS2-05D12N	5	12	± 42	260	110	77	44
13DS2-05D15N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

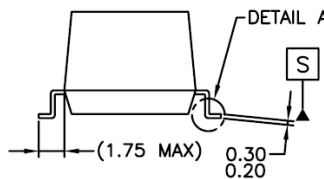
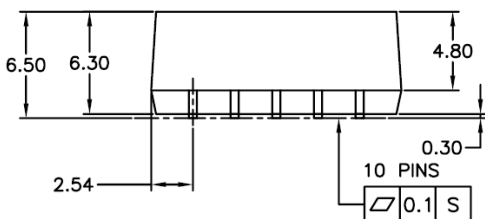
PIN CONNECTION



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

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

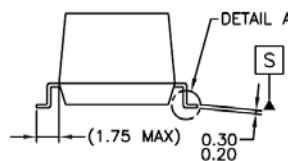
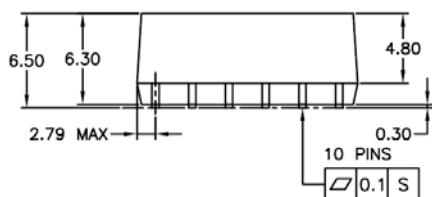
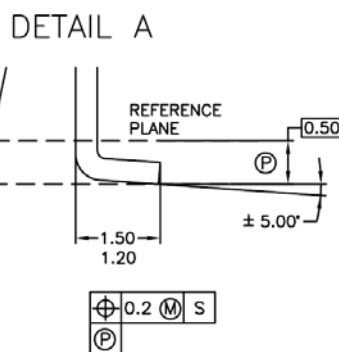
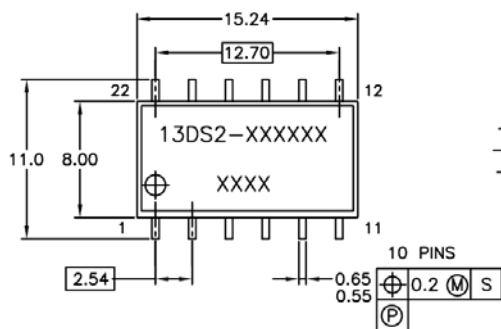
ELECTRICAL SPECIFICATIONS

- 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.) : 12% & 8.0% MAX
5V & 9V OUTPUT TYPES : 8.5% & 7.0% MAX
12V & 15V OUTPUT TYPES

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)
13DS2-05S05N	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

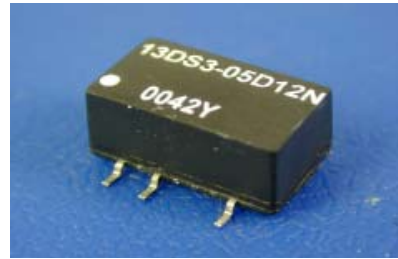


13DS3 SERIES

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

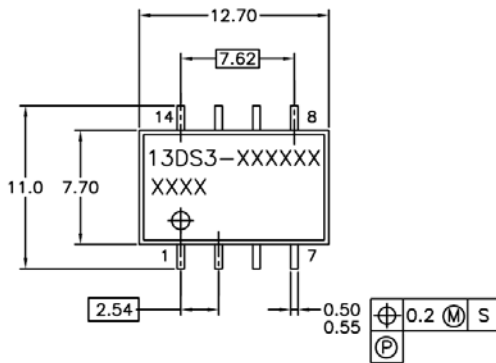
- OUTPUT RIPPLE(20MHz Band limited)
 - 5V OUTPUT TYPES : 85mVp-p MAX
 - 9V OUTPUT TYPES : 75mVp-p MAX
 - 12V OUTPUT TYPES : 65mVp-p MAX
 - 15V OUTPUT TYPES : 76mVp-p MAX
- ISOLATION RESISTANCE :1000VDC MIN
- SWITHINGFREQUENCY :110KHz TYP.
- OPERATING TEMPERATURE :-40°C TO 85°C
- EFFICIENCY :70% TYP

ELECTRICAL SPECIFICATIONS

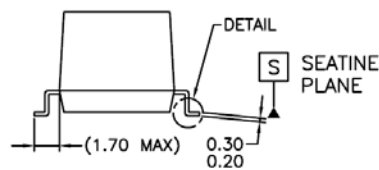
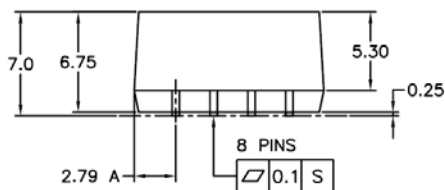
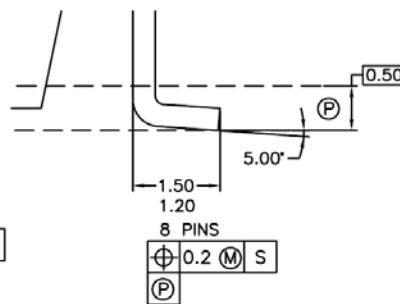
- INPUT VOLTAGE RANGE :±10%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LOAD REGULATION
 - 5V & 9V OUTPUT TYPES :15% & 9% MAX
 - 12V & 15V OUTPUT TYPES :7.5% & 7% MAX
- LINE VOLTAGE REGULATION (10% to 100% full load) :1.2%/1% of V_{IN} MAX

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

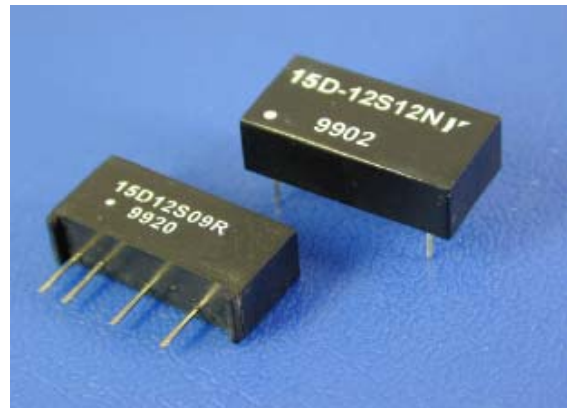
FEATURES

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

GENERAL SPECIFICATIONS

- OUTPUT RIPPPL (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

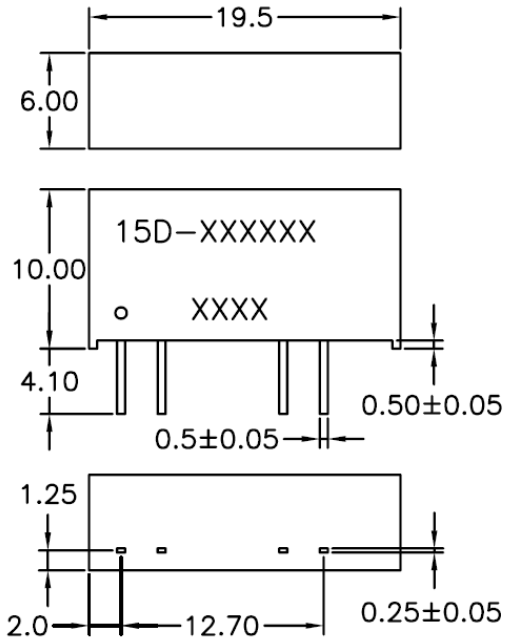
24V and 48V input types

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

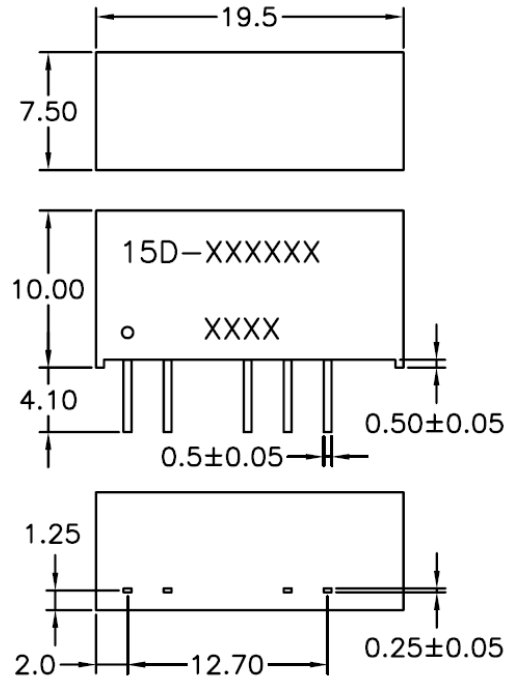
MARKINGS AND DIMENSIONS

PIN CONNECTION

1.



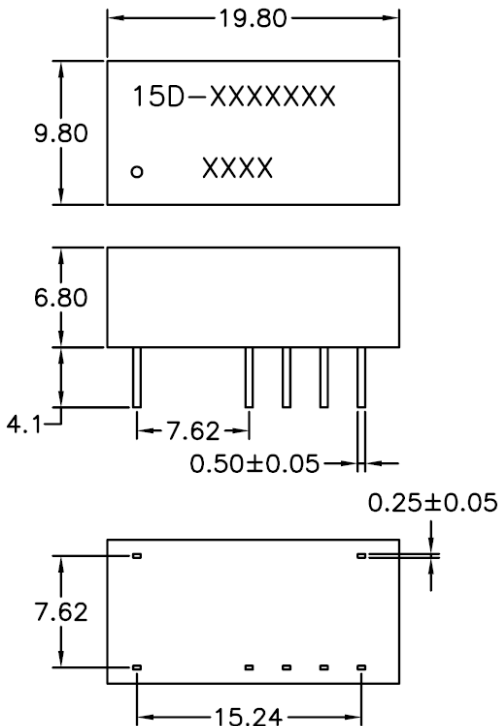
2.



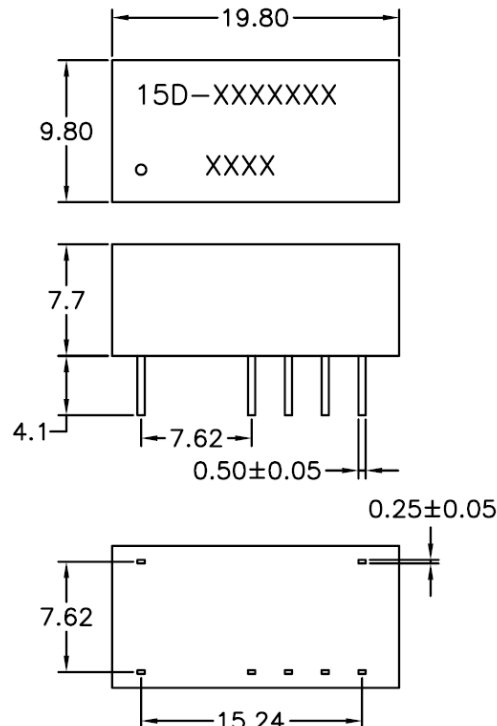
PIN	7 PIN
1	+INPUT
2	-INPUT
4	-OUTPUT
5	CTRL
6	+VOUTPUT

Dimensions: inches/mm
Unless otherwise specified,
all tolerances are
 $\pm 0.005/\pm 0.13$

3.



4.



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

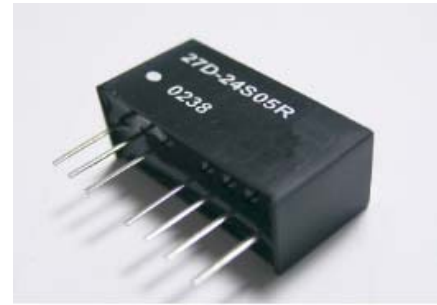
Dimensions: inches/mm
Unless otherwise specified,
all tolerances are
 $\pm 0.005/\pm 0.13$

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



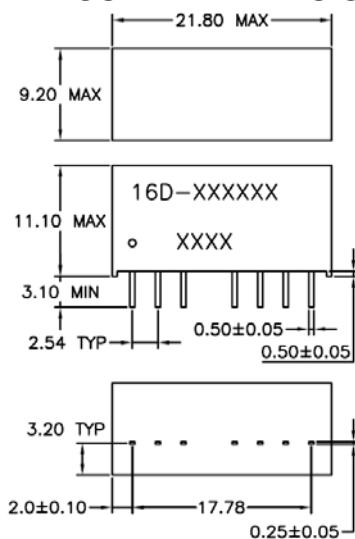
ELECTRICAL SPECIFICATIONS

- 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%

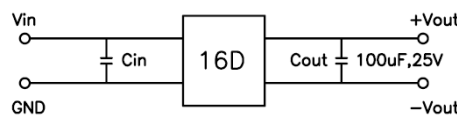
(Typical at nominal input, rated load and 25°C unless otherwise specified)

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

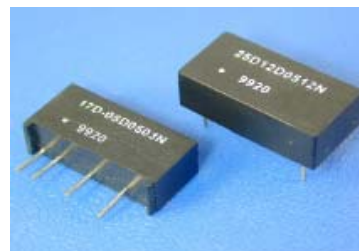
PIN	SINGLE OUTPUT
1	-INPUT
2	+INPUT
3	CTRL- Control input can (can be left open)
4	NO PIN
5	NE- No external connection allowed
6	+OUTPUT
7	-OUTPUT
8	CS Optional external capacitor

Dimensions: inches/mm

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

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

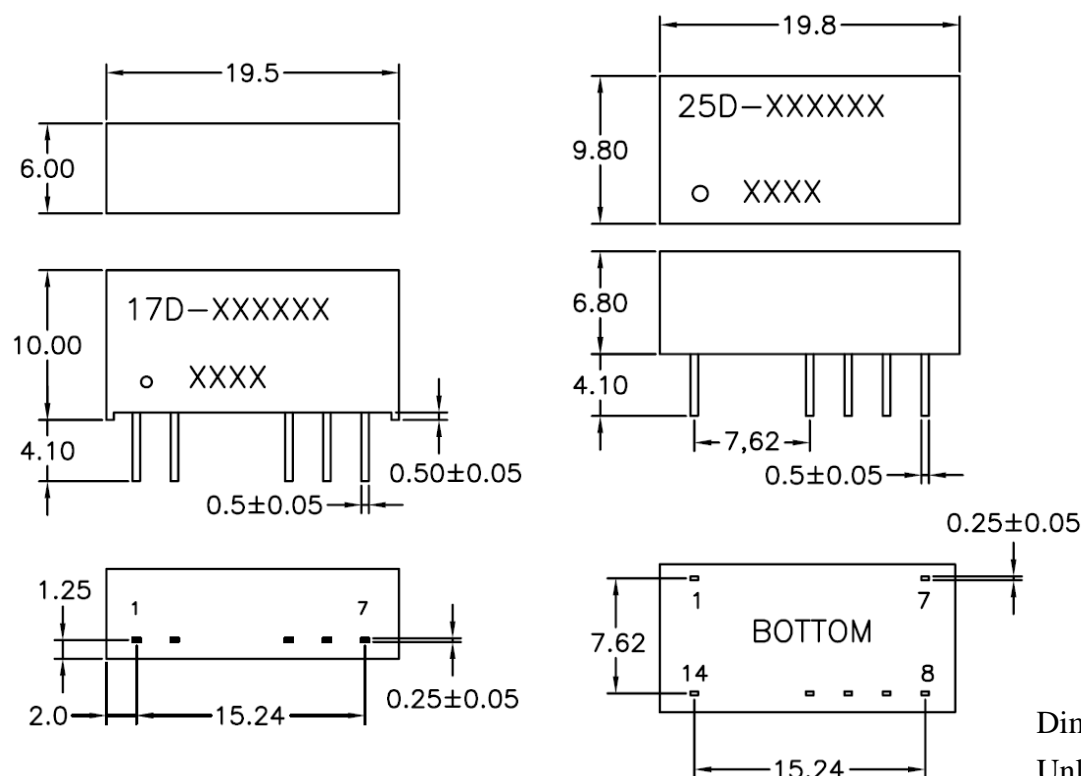
- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :1.2%/1% OF Vin
- LOAD REGULATION(10% TO 100% F.L.) :15% MAX
3.3V AND 5V OUTPUT TYPES
9V,12V AND 15V OUTPUT TYPES :10% MAX

5v, 12v input types

PART NUMBER	OUTPUT1		OUTPUT2		EFFICIENCY (% TYP.)	PART NUMBER	OUTPUT1		OUTPUT2		EFFICIENCY (% TYP.)
	VOLTAGE (VDC)	CURRENT (mA)	VOLTAGE (VDC)	CURRENT (mA)			VOLTAGE (VDC)	CURRENT (mA)	VOLTAGE (VDC)	CURRENT (mA)	
17D-05D0503N	5	100	3.3	152	70	25D-05D0503N	5	100	3.3	152	70
17D-XXD0505N	5	100	5	100	75	25D-XXD0505N	5	100	5	100	75
17D-XXD0509N	5	100	9	56	75	25D-XXD0509N	5	100	9	56	75
17D-XXD0512N	5	100	12	42	75	25D-XXD0512N	5	100	12	42	75
17D-XXD0515N	5	100	15	34	75	25D-XXD0515N	5	100	15	34	75

5v, 12v input types

MARKINGS AND DIMENSIONS



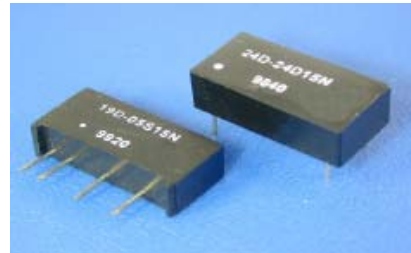
PIN CONNECTION

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

FEATURES

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



GENERAL SPECIFICATIONS

- OUTPUT RIPPPL & NOISE :150mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE :1000MΩ MIN @500VDC
- SWITHINGFREQUENCY :75KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- SHORT CIRCUIT PROTECTION :SHORT TERM
- ISOLATION VOLTAGE :1000 VDC

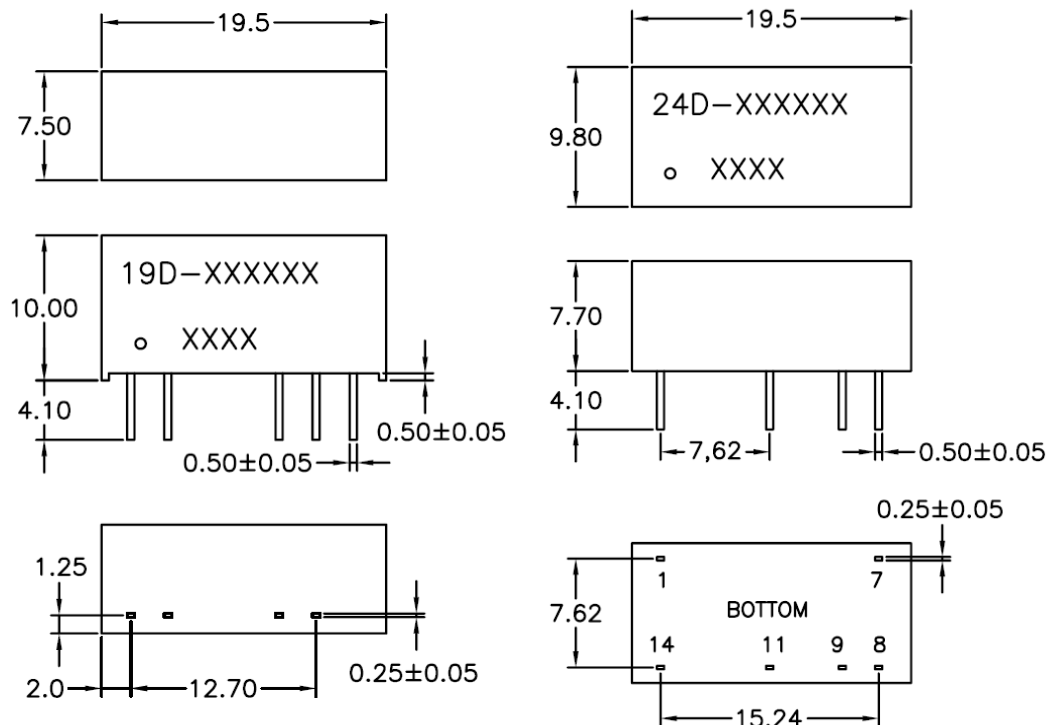
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±10%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :±1.2% 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 input types

PART NUMBER	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	EFFICIENCY (% TYP.)	PACKAGE STYLE
19D-XXD05N	±5	±200	65	1
19D-XXD09N	±9	±111	70	1
19D-XXD12N	±12	±83	70	1
19D-XXD15N	±15	±67	70	1
24D-XXD05N	±5	±200	65	2
24D-XXD09N	±9	±111	70	2
24D-XXD12N	±12	±83	70	2
24D-XXD15N	±15	±67	70	2

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	7PIN SIP		14PIN DIL
1	+INPUT	1	-INOUT
2	-INPUT	7	NC
4	-OUTPUT	8	COMMON
5	COMMON	9	+OUTPUT
6	+OUTPUT	11	-OUTPUT
		14	+INPUT

Dimensions:inches/mm

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

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



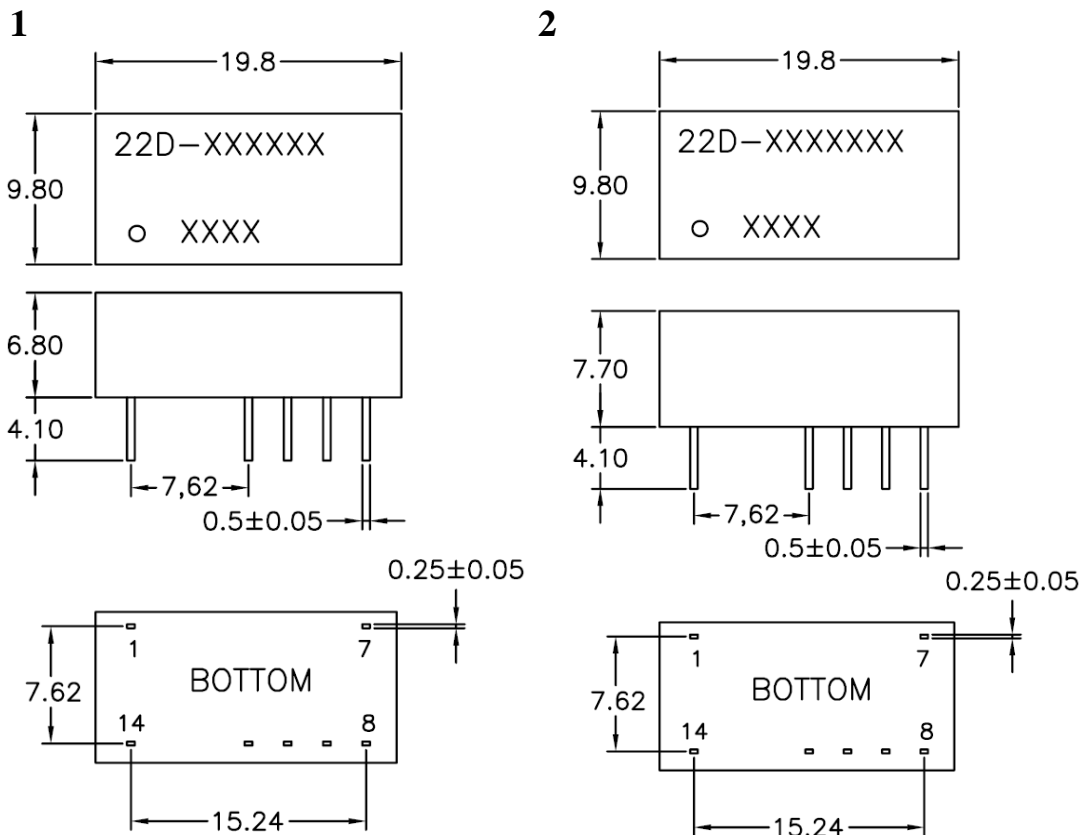
ELECTRICAL SPECIFICATIONS

- 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.)
5V OUTPUT TYPES :15% 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 :10% MAX

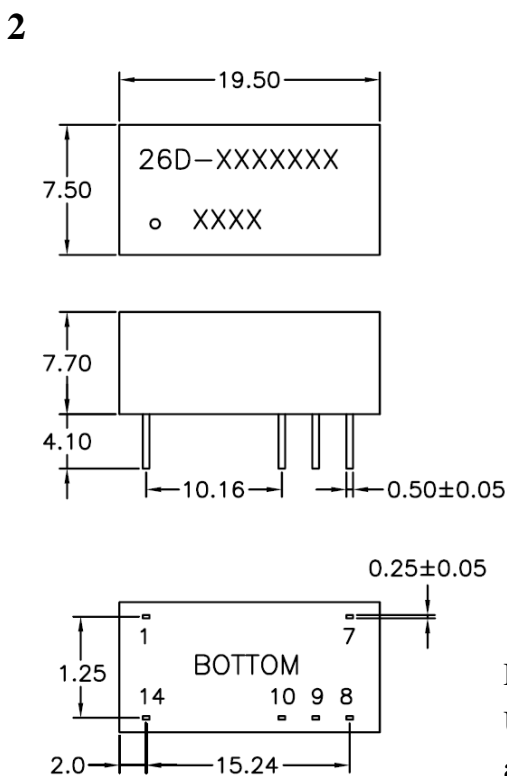
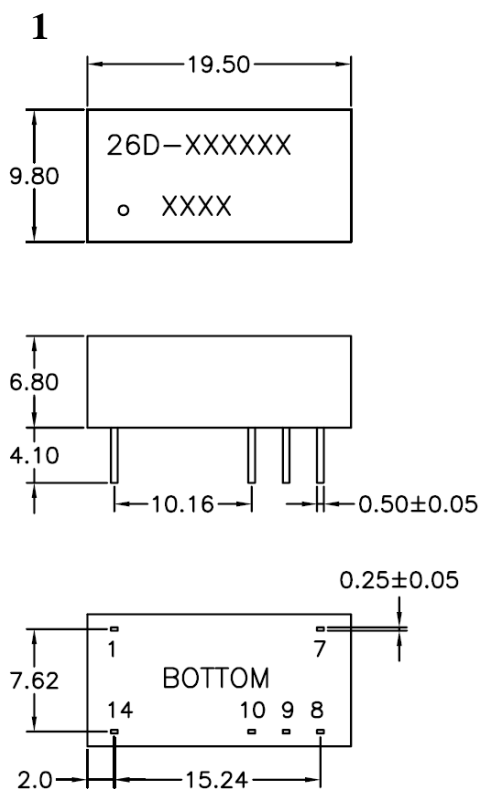
5V,12V AND 24V INPUT TYPES

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

48V INPUT TYPES

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

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

FEATURES

- 2:1 WIDE INPUT VOLTAGES RANGE
- EFFICIENCY TO 83%
- 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



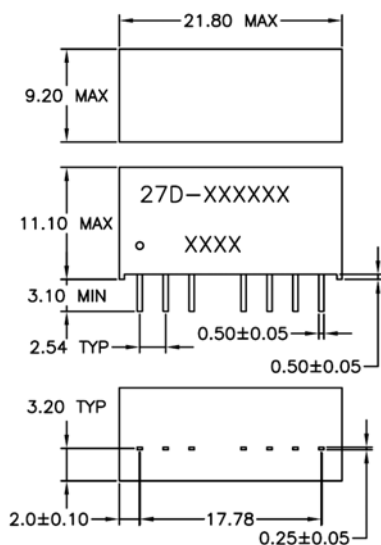
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 2 : 1
- OUTPUT VOLTAGE TOLERANCE : ±3%
- LINE REGULATION (REGULATED) : 0.5% MAX
- LOAD REGULATION (REGULATED) : 0.8% MAX
- EFFICIENCY : UP TO 83%

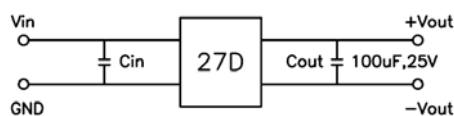
(Typical at nominal input, rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT	EFFICIENCY (%)	MTBF KHrs
27D-05S05R	5-9VDC	5VDC	400mA	66	>1000
27D-05S09R	5-9VDC	9VDC	222mA	71	
27D-05S12R	5-9VDC	12VDC	167mA	71	
27D-05S15R	5-9VDC	15VDC	133mA	73	
27D-12S05R	9-18VDC	5VDC	400mA	73	
27D-12S09R	9-18VDC	9VDC	222mA	79	
27D-12S12R	9-18VDC	12VDC	167mA	80	
27D-12S15R	9-18VDC	15VDC	133mA	81	
27D-24S05R	18-36VDC	5VDC	400mA	74	
27D-24S09R	18-36VDC	9VDC	222mA	81	
27D-24S12R	18-36VDC	12VDC	167mA	81	
27D-24S15R	18-36VDC	15VDC	133mA	83	
27D-48S05R	36-72VDC	5VDC	400mA	73	
27D-48S09R	36-72VDC	9VDC	222mA	80	
27D-48S12R	36-72VDC	12VDC	167mA	81	
27D-48S15R	36-72VDC	15VDC	133mA	82	

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

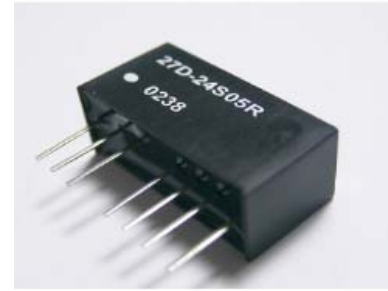
Unless otherwise specified, all tolerances are ±.005/±0.13

FEATURES

- 2:1 WIDE INPUT VOLTAGES RANGE
- EFFICIENCY TO 83%
- 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



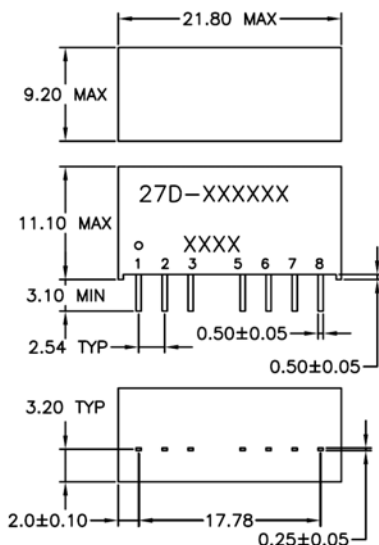
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 2:1
- OUTPUT VOLTAGE TOLERANCE : ±3%
- LINE REGULATION (REGULATED) : 0.5% MAX
- LOAD REGULATION (REGULATED) : 0.8% MAX
- EFFICIENCY : UP TO 83%

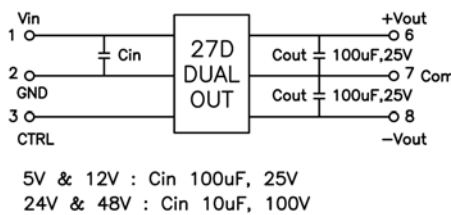
(Typical at nominal input, rated load and 25°C unless otherwise specified)

PART NO.	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	OUTPUT CURRENT	EFFICIENCY (%)	MTBF KHrs
27D-05D05R	5-9VDC	±5VDC	±200mA	66	>1000
27D-05D09R	5-9VDC	±9VDC	±111mA	71	
27D-05D12R	5-9VDC	±12VDC	±83mA	71	
27D-05D15R	5-9VDC	±15VDC	±66mA	73	
27D-12D05R	9-18VDC	±5VDC	±200mA	73	
27D-12D09R	9-18VDC	±9VDC	±111mA	79	
27D-12D12R	9-18VDC	±12VDC	±83mA	80	
27D-12D15R	9-18VDC	±15VDC	±66mA	81	
27D-24D05R	18-36VDC	±5VDC	±200mA	74	
27D-24D09R	18-36VDC	±9VDC	±111mA	81	
27D-24D12R	18-36VDC	±12VDC	±83mA	81	
27D-24D15R	18-36VDC	±15VDC	±66mA	83	
27D-48D05R	36-72VDC	±5VDC	±200mA	73	
27D-48D09R	36-72VDC	±9VDC	±111mA	80	
27D-48D12R	36-72VDC	±12VDC	±83mA	81	
27D-48D15R	36-72VDC	±15VDC	±66mA	82	

MARKINGS AND DIMENSIONS



RECOMMENDED TEST CIRCUIT



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	COMMON
8	-OUTPUT

Dimensions: inches/mm

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

FEATURES

- UP TO 1.8 WATTS OUTPUT POWER
- 12PIN SIP, 24PIN DIP/DIL/SMD PACKAGE
- 500VDC ISOLATION
- UNREGULATED & REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100MΩ MIN @500VDC
- SWITCHING FREQUENCY : 20KHz TYP.
- OPERATING TEMPERATURE : 0 °C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- EFFICIENCY(UNREGULATED) : 70% TYP
- (REGULATED) : 50% TYP
- SHORT CIRCUIT PROTECTION : CONTINUOUS



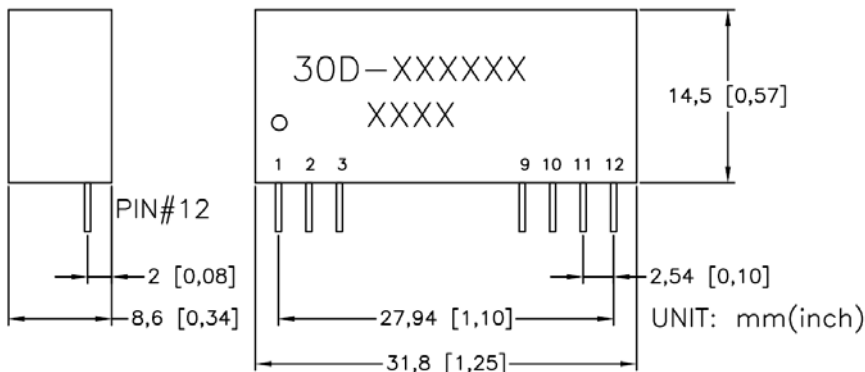
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (REGULATED) : ±0.3%
- UNREGULATED (PER 1% CHAGE IN INPUT VOLTAGE) : ±1.2%
- LOAD REGULATION (REGULATED) : ±0.5%
- UNREGULATED (FOR LOAD CHANGE FROM 100% TO 20%) : ±10%

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

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY(%TYP)
30D-05S05R	5VDC	5VDC	360mA	50
30D-05S09N	5VDC	9VDC	200mA	75
30D-05S12R	5VDC	12VDC	150mA	55
40D-05S15N	5VDC	15VDC	120mA	75
40D-05S12R	5VDC	12VDC	150mA	55
40D-05D15N	5VDC	±15VDC	±60mA	75
43D-12S05R	12VDC	5VDC	360mA	50
43D-12S12N	12VDC	12VDC	150mA	75
50D-12S15R	12VDC	15VDC	120mA	55
50D-12D12N	12VDC	±12VDC	±75mA	75
50D-12D15R	12VDC	±15VDC	±60mA	55
50D-24S05N	24VDC	5VDC	360mA	70
52D-24S12R	24VDC	12VDC	150mA	55
52D-24S15N	24VDC	15VDC	120mA	75
52D-24D12R	24VDC	±12VDC	±75mA	55
52D-24D15N	24VDC	±15VDC	±60mA	75

MARKINGS AND DIMENSIONS



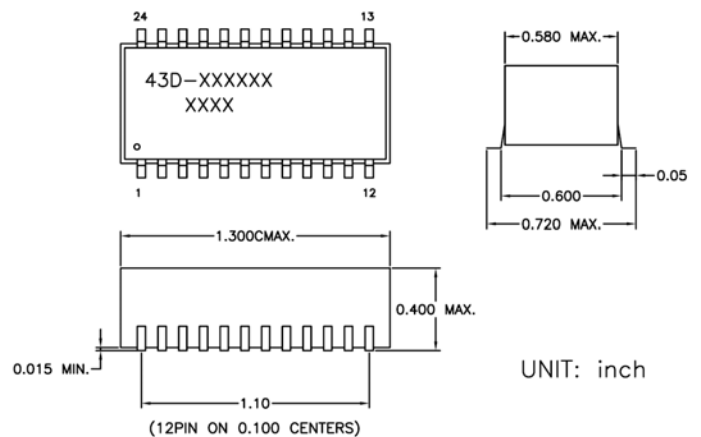
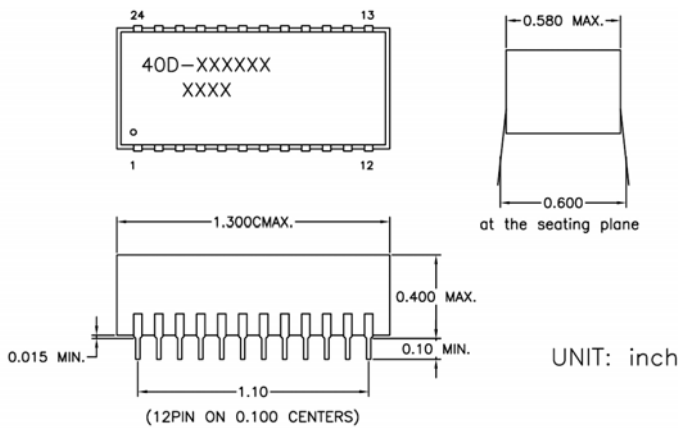
PIN CONNECTION

PIN	SINGLE	DUAL
1	+INPUT	+INPUT
2	NC	-OUTPUT
9	NC	NC
10	-OUTPUT	COM
11	+OUTPUT	+OUTPUT
12	-INPUT	-INPUT

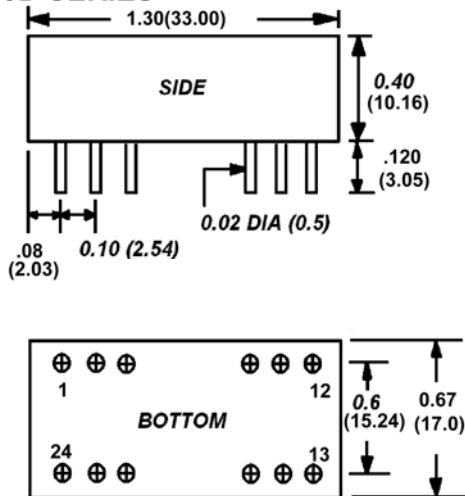
PIN CONNECTION

PIN	SINGLE OUTPUT	DUAL OUTPUT	PIN	SINGLE OUTPUT	DUAL OUTPUT
1	+INPUT	+INPUT	13	-INPUT	-INPUT
2	NC	-OUTPUT	14	+OUTPUT	+OUTPUT
3	NC	COMMON	15	-OUTPUT	COMMON
10	-OUTPUT	COMMON	22	NC	COMMON
11	+OUTPUT	+OUTPUT	23	NC	-OUTPUT
12	-INPUT	-INPUT	24	+INPUT	+INPUT

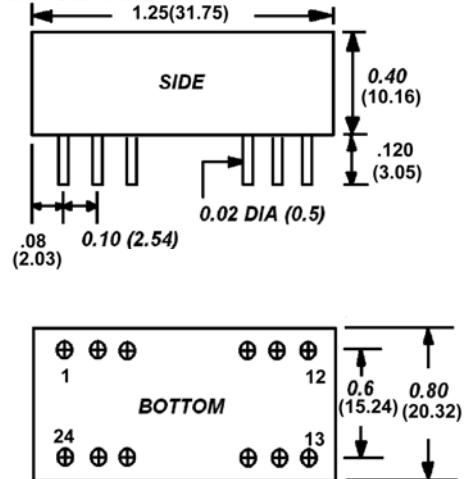
MARKINGS AND DIMENSION



50D SERIES



52D SERIES



FEATURES

- UP TO 1.8 WATTS OUTPUT POWER
- 24PIN DIP PACKAGE
- 2000Vrms ISOLATION
- UNREGULATED & REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100M Ω MIN @500VDC
- SWITHINGFREQUENCY : 20KHz TYP.
- OPERATING TEMPERATURE : 0 °C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- EFFICIENCY(UNREGULATED) : 70% TYP
- (REGULATED) : 50% TYP
- SHORT CIRCUIT PROTECTION : CONTINUOUS



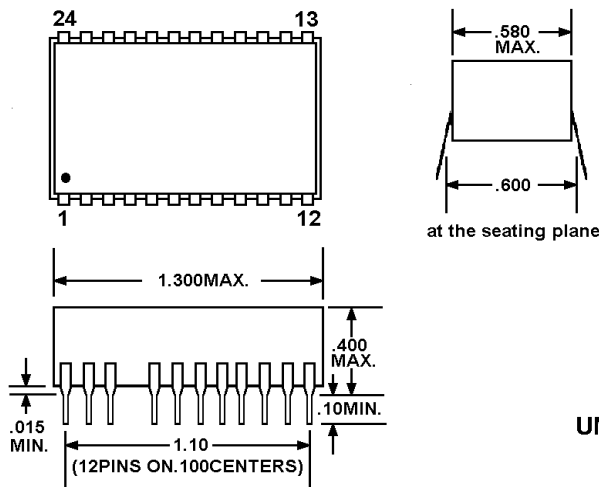
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : $\pm 10\%$
- OUTPUT VOLTAGE TOLERANCE : $\pm 5\%$
- LINE REGULATION (REGULATED) : $\pm 0.3\%$
- UNREGULATED (PER 1% CHAGE IN INPUT VOLTAGE) : $\pm 1.2\%$
- LOAD REGULATION (REGULATED) : $\pm 0.5\%$
- UNREGULATED (FOR LOAD CHANGE FROM 100% TO 20%) : $\pm 10\%$

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

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY(%)
41D-05S05R	5VDC	5VDC	360mA	50
41D-05S09N	5VDC	9VDC	200mA	75
41D-05S12R	5VDC	12VDC	150mA	55
41D-05S15N	5VDC	15VDC	120mA	75
41D-05D12N	5VDC	± 12 VDC	± 75 mA	75
41D-05D15R	5VDC	± 15 VDC	± 60 mA	55
41D-12S05N	12VDC	5VDC	360mA	75
41D-12S09R	12VDC	9VDC	200mA	55
41D-12S12N	12VDC	12VDC	150mA	75
41D-12D12R	12VDC	± 12 VDC	± 75 mA	55
41D-12D15N	12VDC	± 15 VDC	± 60 mA	75

MARKINGS AND DIMENSIONS



UNIT:inch

PIN CONNECTION

PIN	SINGLE OUTPUT	DUAL OUTPUT
1,2	+INPUT	+INPUT
9,10	-OUTPUT	COMMON
11,12	+OUTPUT	+OUTPUT
13,14	NC	COMMON
15,16	NC	-OUTPUT
23,24	-INPUT	-INPUT

FEATURES

- UP TO 1.8 WATTS OUTPUT POWER
- 16PIN SMD PACKAGE
- 2000Vrms ISOLATION
- UNREGULATED OUTPUT TYPES

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE :100mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE :100MΩ MIN @500VDC
- SWITHINGFREQUENCY :100KHz TYP.
- OPERATING TEMPERATURE :0 °C TO 70°C
- EFFICIENCY(UNREGULATED) :70% TYP
- SHORT CIRCUIT PROTECTION :SHORT TERM



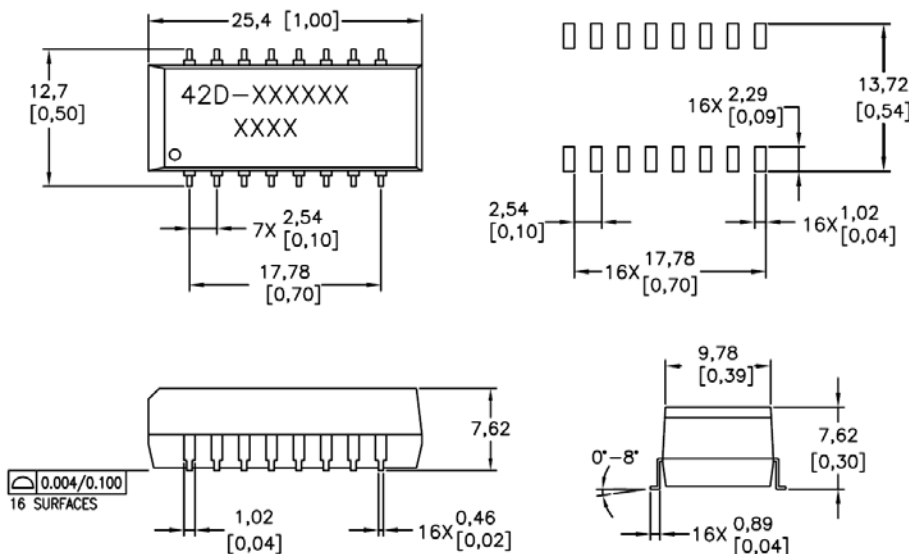
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :±5%
- OUTPUT VOLTAGE TOLERANCE :±5%
- LINE REGULATION(10% TO 100% F.L.) :±1.2%
- LOAD REGULATION(10% TO 100% F.L.) :±10%

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

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY(%)
42D-05S05N	5VDC	5VDC	360mA	70
42D-05S09N	5VDC	9VDC	200mA	75
42D-05S12N	5VDC	12VDC	150mA	75
42D-05S15N	5VDC	15VDC	120mA	75
42D-12S05N	12VDC	5VDC	360mA	70
42D-12S09N	12VDC	9VDC	200mA	75
42D-12S12N	12VDC	12VDC	150mA	75
42D-12S15N	12VDC	15VDC	120mA	75

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE OUTPUT
1	-INPUT
2	N.C
3	+INPUT
7	+OUTPUT
8	-OUTPUT
OTHER	N.C

FEATURES

- UP TO 2 WATTS OUTPUT POWER
- 24PIN DIL PACKAGE
- 3000Vrms ISOLATION
- REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100MΩ MIN.
- SWITCHING FREQUENCY : 125KHz TYP.
- OPERATING TEMPERATURE : 0°C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 125°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- SHORT CIRCUIT RESTART : AUTOMATIC



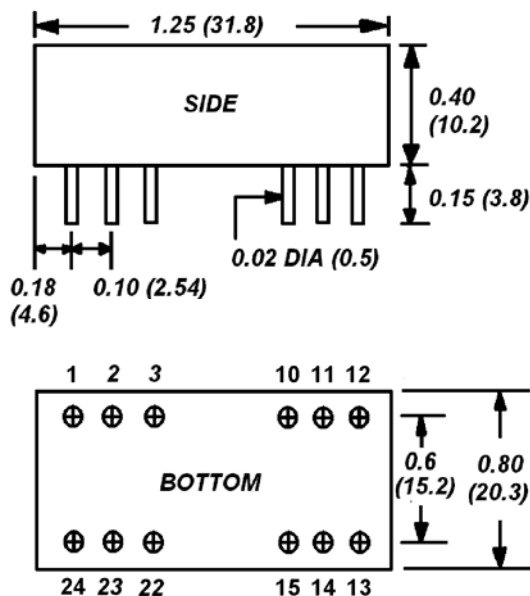
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (REGULATED) : ±0.3%
- LOAD REGULATION (REGULATED) : ±0.5%
- EFFICIENCY (REGULATED) : 60% TYP

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

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
45D-05S05R	5VDC	5VDC	400mA	45D-24S15R	24	15VDC	133mA
45D-05S12R	5VDC	12VDC	165mA	45D-24D12R	24	±12VDC	±83mA
45D-05S15R	5VDC	15VDC	133mA	45D-24D15R	24	±15VDC	±66mA
45D-05D12R	5VDC	±12VDC	±83mA	45D-28S05R	28	5VDC	400mA
45D-05D15R	5VDC	±15VDC	±66mA	45D-28S12R	28	12VDC	165mA
45D-12S05R	12VDC	5VDC	400mA	45D-28S15R	28	15VDC	133mA
45D-12S12R	12VDC	15VDC	166mA	45D-28D12R	28	±12VDC	±83mA
45D-12S15R	12VDC	15VDC	133mA	45D-28D15R	28	±15VDC	±66mA
45D-12D12R	12VDC	±12VDC	±83mA	45D-48S05R	48	5VDC	400mA
45D-12D15R	12VDC	±15VDC	±66mA	45D-48S12R	48	12VDC	165mA
45D-24S05R	24VDC	5VDC	400mA	45D-48S15R	48	15VDC	133mA
45D-24S12R	24VDC	12VDC	165mA	45D-48D12R	48	±12VDC	±83mA

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE OUTPUT	DUAL OUTPUT
1,2,3	+INPUT	+INPUT
10,11	NC	COMMON
12	-OUTPUT	NC
13	+OUTPUT	-OUTPUT
15	NC	+OUTPUT
22,23,24	-INPUT	-INPUT

FEATURES

- UP TO 3WATTS OUTPUT POWER
- 24PIN DIL PACKAGE
- 3000Vrms ISOLATION
- REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100MΩ MIN.
- SWITCHING FREQUENCY : 125KHz TYP.
- OPERATING TEMPERATURE : 0°C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 125°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- SHORT CIRCUIT RESTART : AUTOMATIC



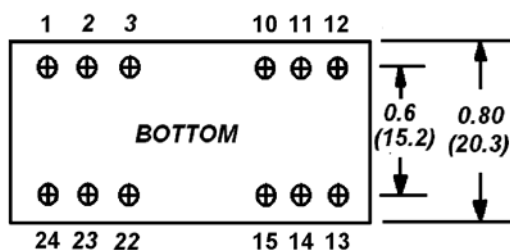
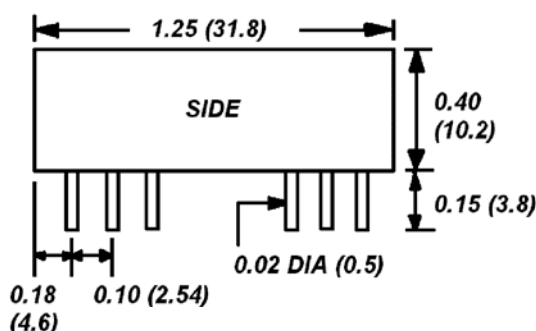
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE TOLERANCE : ±5%
- LINE REGULATION (REGULATED) : ±0.3%
- LOAD REGULATION (REGULATED) : ±0.5%
- EFFICIENCY (REGULATED) : 60% TYP

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

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT
46D-05S05R	5VDC	5VDC	600mA	46D-24S15R	24	15VDC	200mA
46D-05S12R	5VDC	12VDC	250mA	46D-24D12R	24	±12VDC	±125mA
46D-05S15R	5VDC	15VDC	200mA	46D-24D15R	24	±15VDC	±100mA
46D-05D12R	5VDC	±12VDC	±125mA	46D-28S05R	28	5VDC	600mA
46D-05D15R	5VDC	±15VDC	±100mA	46D-28S12R	28	12VDC	250mA
46D-12S05R	12VDC	5VDC	600mA	46D-28S15R	28	15VDC	200mA
46D-12S12R	12VDC	15VDC	250mA	46D-28D12R	28	±12VDC	±125mA
46D-12S15R	12VDC	15VDC	200mA	46D-28D15R	28	±15VDC	±100mA
46D-12D12R	12VDC	±12VDC	±125mA	46D-48S05R	48	5VDC	600mA
46D-12D15R	12VDC	±15VDC	±100mA	46D-48S12R	48	12VDC	250mA
46D-24S05R	24VDC	5VDC	600mA	46D-48S15R	48	15VDC	200mA
46D-24S12R	24VDC	12VDC	250mA	46D-48D12R	48	±12VDC	±125mA

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE OUTPUT	DUAL OUTPUT
1,2,3	+INPUT	+INPUT
10,11	NC	COMMON
12	-OUTPUT	NC
13	+OUTPUT	-OUTPUT
15	NC	+OUTPUT
22,23,24	-INPUT	-INPUT

MMT 54D/60D/70D SERIES

3WATT 24PIN DIL DC-DC CONVERTER

FEATURES

- UP TO 3 WATTS OUTPUT POWER
- 54D 24PIN DIL (1.25x0.8x0.4 INCHES) PACKAGE
- 60D 2x1x0.4 INCHES PACKAGE
- 70D 1.3x1.3x0.4 INCHES PACKAGE
- 500VDC ISOLATION
- PI INPUT FILTER
- UNREGULATED & REGULATED OUTPUT TYPES
- LOW RIPPLE AND NOISE

GENERAL SPECIFICATIONS

- OUTPUT RIPPLE & NOISE : 50mVp-p(20MHz B.W.)
- ISOLATION RESISTANCE : 100MΩ MIN @500VDC
- SWITCHING FREQUENCY : 20KHz TYP.
- OPERATING TEMPERATURE : 0 °C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- EFFICIENCY(UNREGULATED) : 70% TYP
- (REGULATED) : 50% TYP
- SHORT CIRCUIT PROTECTION : CONTINUOUS

ELECTRICAL SPECIFICATIONS

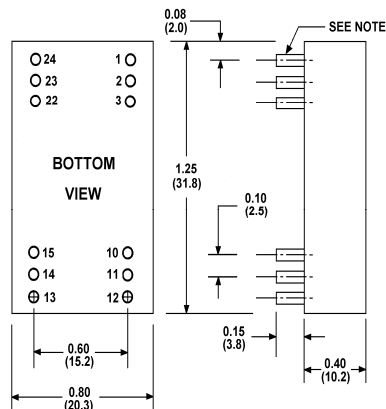
- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE ACCURACY : ±5%
- LINE REGULATION (REGULATED) : ±0.3%
- UNREGULATED (PER 1% CHAGE IN INPUT VOLTAGE) : ±1.2%
- LOAD REGULATION (REGULATED) : ±0.5%
- UNREGULATED (FOR LOAD CHANGE FROM 100% TO 20%) : ±10%

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



PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
54D/60D/70D-05S05R	5VDC	5VDC	600mA	60
54D/60D/70D-05S12R	5VDC	12VDC	250mA	65
54D/60D/70D-05D12R	5VDC	±12VDC	±125mA	65
54D/60D/70D-12S12R	12VDC	12VDC	250mA	65
54D/60D/70D-12S15R	12VDC	15VDC	200mA	65
54D/60D/70D-12D15R	12VDC	±15VDC	±100mA	65
54D/60D/70D-24S05R	24VDC	5VDC	600mA	60
54D/60D/70D-24D12R	24VDC	±12VDC	±125mA	65
54D/60D/70D-24D15R	24VDC	±15VDC	±100mA	65
54D/60D/70D-48S12R	48VDC	12VDC	250mA	65
54D/60D/70D-48D12R	48VDC	±12VDC	±125mA	65
54D/60D/70D-48D15R	48VDC	±15VDC	±100mA	65

MARKINGS AND DIMENSIONS

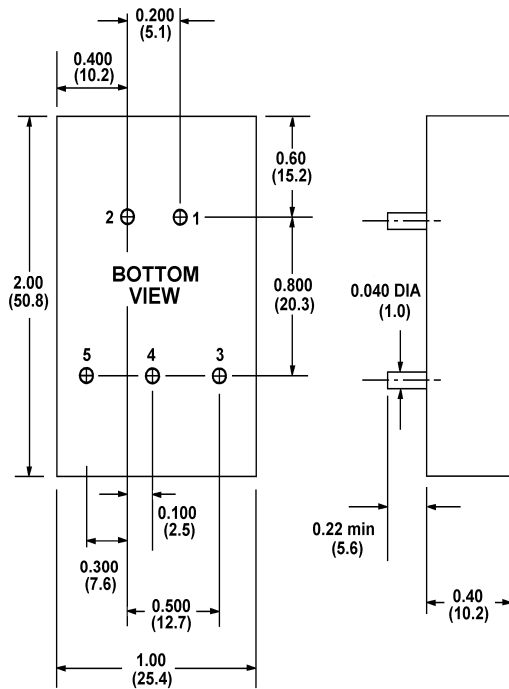


PIN CONNECTION

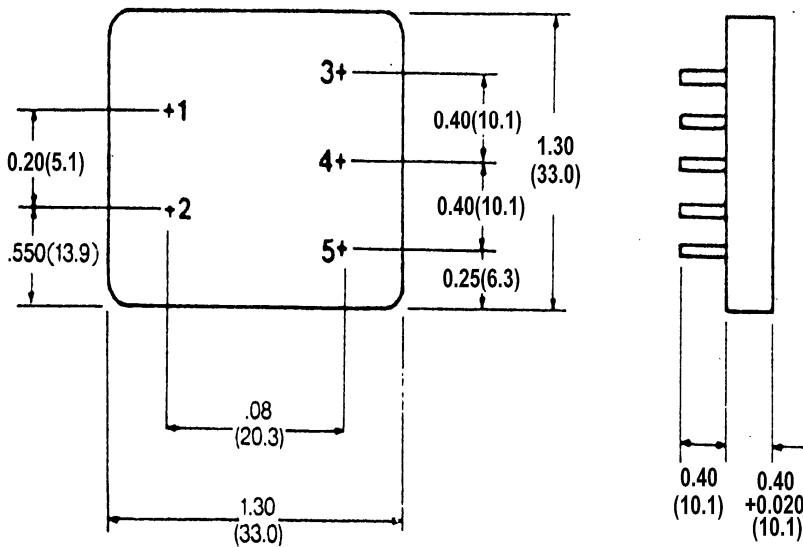
Pin	SINGLE OUTPUT	DUAL OUTPUT
1	+INPUT	+INPUT
2	NC	-OUTPUT
3	NC	COMMON
10	-OUTPUT	COMMON
11	+OUTPUT	+OUTPUT
12	-INPUT	-INPUT
13	-INPUT	-INPUT
14	+OUTPUT	+OUTPUT
15	-OUTPUT	COMMON
22	NC	COMMON
23	NC	-OUTPUT
24	+INPUT	+INPUT

MARKINGS AND DIMENSION

PIN CONNECTION



Pin	SINGLE OUTPUT	DUAL OUTPUT
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	+OUTPUT	+OUTPUT
4	NO PIN	COMMON
5	-OUTPUT	-OUTPUT



Pin	SINGLE OUTPUT
1	+INPUT
2	-INPUT
3	NO PIN
4	+OUTPUT
5	-OUTPUT

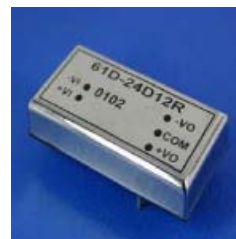
Pin	DUAL OUTPUT
1	+INPUT
2	-INPUT
3	+OUTPUT
4	COMMON
5	-OUTPUT

Dimensions: inches/mm

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

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 10 WATTS (2x1x0.4inches) PACKAGE
- EFFICIENCY TO 80%
- P1 INPUT FILTER



GENERAL SPECIFICATIONS

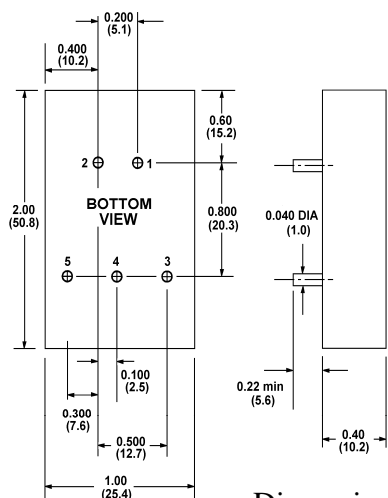
- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 12V nominal ...9-18V
: 24V nominal ...18-36V
: 48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY : $\pm 2\%$
- LINE REGULATION : $\pm 0.5\%$
- LOAD REGULATION(SINGLE) : $\pm 0.5\%$
- LOAD REGULATION(DUAL) : $\pm 2\%$
- EFFICIENCY : see table
- EMI/RFI : six-sided continuous shield

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
61D-12S05R	9-18VDC	5VDC	2000mA	79
61D-12S12R	9-18VDC	12VDC	830mA	82
61D-12S15R	9-18VDC	15VDC	670mA	82
61D-12D12R	9-18VDC	± 12 VDC	± 416 mA	81
61D-12D15R	9-18VDC	± 15 VDC	± 333 mA	81
61D-24S05R	18-36VDC	5VDC	2000mA	81
61D-24S12R	18-36VDC	12VDC	830mA	84
61D-24S15R	18-36VDC	15VDC	670mA	84
61D-24D12R	18-36VDC	± 12 VDC	± 416 mA	82
61D-24D15R	18-36VDC	± 15 VDC	± 333 mA	82
61D-48S05R	36-72VDC	5VDC	2000mA	82
61D-48S12R	36-72VDC	12VDC	830mA	86
61D-48S15R	36-72VDC	15VDC	670mA	86
61D-48D12R	36-72VDC	± 12 VDC	± 416 mA	84
61D-48D15R	36-72VDC	± 15 VDC	± 333 mA	84

MARKINGS AND DIMENSIONS



Dimensions:inches/mm

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

PIN CONNECTION

PIN#	SINGLE	DUAL
1	+VIN	+VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	No Pin	Common
5	-VOUT	-VOUT

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 5 WATTS 2x2x0.4inches PACKAGE
- EFFICIENCY TO 80%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

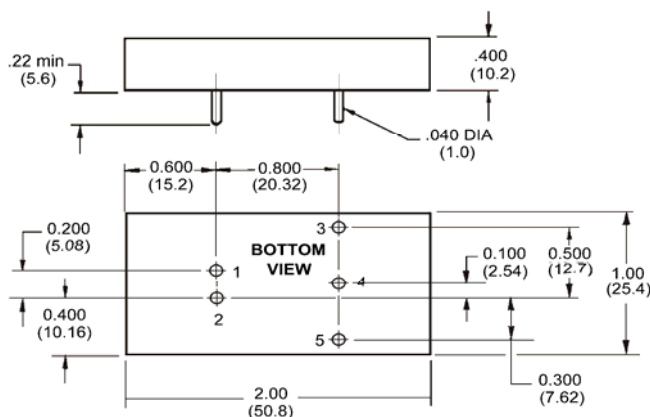
- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 12V nominal ...9-18V
: 24V nominal ...18-36V
: 48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY : $\pm 2\%$
- LINE REGULATION : $\pm 0.5\%$
- LOAD REGULATION(SINGLE) : $\pm 0.5\%$
- LOAD REGULATION(DUAL) : $\pm 2\%$
- EFFICIENCY : see table
- EMI/RFI : six-sided continuous shield

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
66D-12S05R	9-18VDC	5VDC	1000mA	73
66D-12S12R	9-18VDC	12VDC	470mA	80
66D-12S15R	9-18VDC	15VDC	400mA	80
66D-12D12R	9-18VDC	± 12 VDC	± 230 mA	80
66D-12D15R	9-18VDC	± 15 VDC	± 190 mA	80
66D-24S05R	18-36VDC	5VDC	1000mA	74
66D-24S12R	18-36VDC	12VDC	470mA	82
66D-24S15R	18-36VDC	15VDC	400mA	82
66D-24D12R	18-36VDC	± 12 VDC	± 230 mA	82
66D-24D15R	18-36VDC	± 15 VDC	± 190 mA	82
66D-48S05R	36-72VDC	5VDC	1000mA	78
66D-48S12R	36-72VDC	12VDC	470mA	81
66D-48S15R	36-72VDC	15VDC	400mA	81
66D-48D12R	36-72VDC	± 12 VDC	± 230 mA	81
66D-48D15R	36-72VDC	± 15 VDC	± 190 mA	81

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
1	+VIN	+VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	NO PIN	Common
5	-VOUT	-VOUT

Dimensions:inches/mm

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

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 15 WATTS (2x1x0.4inches) PACKAGE
- EFFICIENCY TO 80%
- P1 INPUT FILTER



GENERAL SPECIFICATIONS

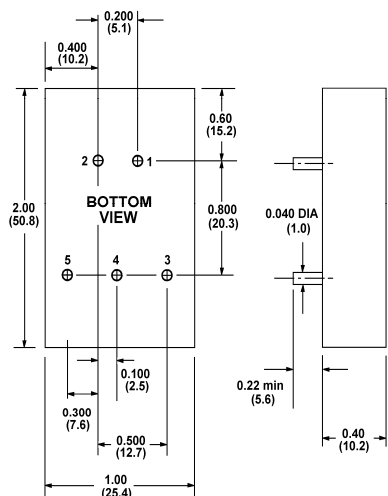
- SWITCHING FREQUENCY : 300KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 12V nominal ...9-18V
: 24V nominal ...18-36V
: 48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY : $\pm 2\%$
- LINE REGULATION : $\pm 1.0\%$ (HL-LL)
- LOAD REGULATION(SINGLE) : $\pm 1.0\%$ (100% to 10%)
- LOAD REGULATION(DUAL) : $\pm 2\%$ (100% to 10%)
- EFFICIENCY : see table
- EMI/RFI : six-sided continuous shield

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
67D-12S05R	9-18VDC	5VDC	3000mA	81
67D-12S12R	9-18VDC	12VDC	1250mA	83
67D-12S15R	9-18VDC	15VDC	1000mA	83
67D-12D12R	9-18VDC	± 12 VDC	± 625 mA	83
67D-12D15R	9-18VDC	± 15 VDC	± 500 mA	83
67D-24S05R	18-36VDC	5VDC	3000mA	82
67D-24S12R	18-36VDC	12VDC	1250mA	84
67D-24S15R	18-36VDC	15VDC	1000mA	84
67D-24D12R	18-36VDC	± 12 VDC	± 625 mA	84
67D-24D15R	18-36VDC	± 15 VDC	± 500 mA	84
67D-48S05R	36-72VDC	5VDC	3000mA	83
67D-48S12R	36-72VDC	12VDC	1250mA	84
67D-48S15R	36-72VDC	15VDC	1000mA	84
67D-48D12R	36-72VDC	± 12 VDC	± 625 mA	84
67D-48D15R	36-72VDC	± 15 VDC	± 500 mA	84

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN#	SINGLE	DUAL
1	+VIN	+VIN
2	-VIN	-VIN
3	+VOUT	+VOUT
4	No Pin	Common
5	-VOUT	-VOUT

Dimensions:inches/mm

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

68D SERIES 3 WATTS DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 3 WATTS 24PIN DIL(1.25x0.8x0.4inches) PACKAGE
- EFFICIENCY TO 80%
- PI INPUT FILTER

GENERAL SPECIFICATIONS

- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

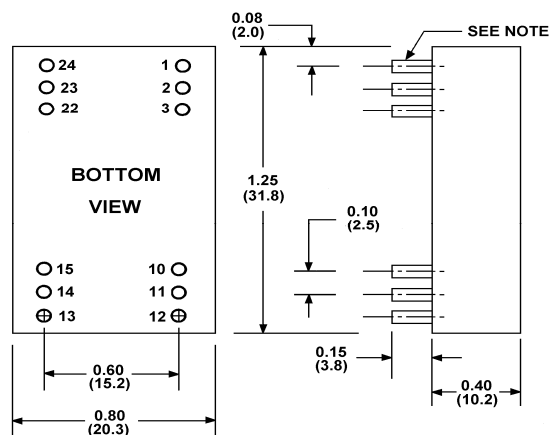


ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :12V nominal ...9-18V
:24V nominal ...18-36V
:48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY :±2%
- LINE REGULATION :±0.5%
- LOAD REGULATION(SINGLE) :±0.5%
- LOAD REGULATION(DUAL) :±2%
- EFFICIENCY :see table

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
68D-12S05R	9-18VDC	5VDC	500mA	74
68D-12S12R	9-18VDC	12VDC	250mA	79
68D-12S15R	9-18VDC	15VDC	200mA	79
68D-12D05R	9-18VDC	±5VDC	±250mA	74
68D-12D12R	9-18VDC	±12VDC	±125mA	76
68D-12D15R	9-18VDC	±15VDC	±100mA	76
68D-24S05R	18-36VDC	5VDC	500mA	74
68D-24S12R	18-36VDC	12VDC	250mA	79
68D-24S15R	18-36VDC	15VDC	200mA	79
68D-24D05R	18-36VDC	±5VDC	±250mA	74
68D-24D12R	18-36VDC	±12VDC	±125mA	79
68D-24D15R	18-36VDC	±15VDC	±100mA	79
68D-48S05R	36-72VDC	5VDC	500mA	74
68D-48S12R	36-72VDC	12VDC	250mA	79
68D-48S15R	36-72VDC	15VDC	200mA	78
68D-48D05R	36-72VDC	±5VDC	±250mA	74
68D-48D12R	36-72VDC	±12VDC	±125mA	79
68D-48D15R	36-72VDC	±15VDC	±100mA	79

MARKINGS AND DIMENSIONS



Dimensions:inches/mm

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

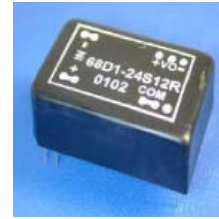
PIN CONNECTION

PIN	SINGLE	DUAL
1,2	+INPUT	+INPUT
10,11	NC	COMMON
12	-OUTPUT	NC
13	+OUTPUT	-OUTPUT
15	NC	+OUTPUT
23,24	-INPUT	-INPUT

68D1 SERIES 3 WATTS DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 3 WATTS 24PIN DIL(1.25x0.8x0.4inches) PACKAGE
- EFFICIENCY TO 80%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

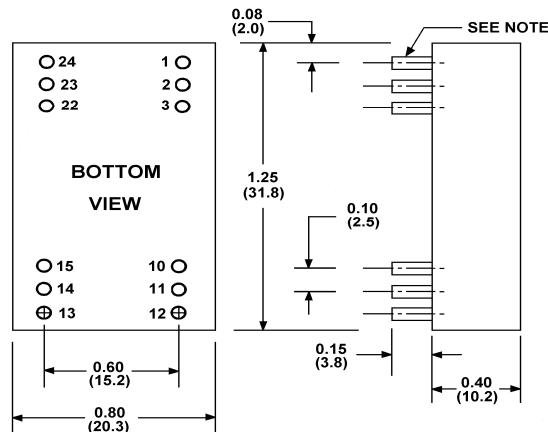
- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE :-40°C TO 100°C
- OPERATING TEMPERATURE RANGE :-25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :12V nominal ...9-18V
:24V nominal ...18-36V
:48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY :±2%
- LINE REGULATION :±0.5%
- LOAD REGULATION(SINGLE) :±0.5%
- LOAD REGULATION(DUAL) :±2%
- EFFICIENCY :see table

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
68D1-12S05R	9-18VDC	5VDC	500mA	74
68D1-12S12R	9-18VDC	12VDC	250mA	79
68D1-12S15R	9-18VDC	15VDC	200mA	79
68D1-12D05R	9-18VDC	±5VDC	±250mA	74
68D1-12D12R	9-18VDC	±12VDC	±125mA	76
68D1-12D15R	9-18VDC	±15VDC	±100mA	76
68D1-24S05R	18-36VDC	5VDC	500mA	74
68D1-24S12R	18-36VDC	12VDC	250mA	79
68D1-24S15R	18-36VDC	15VDC	200mA	79
68D1-24D05R	18-36VDC	±5VDC	±250mA	74
68D1-24D12R	18-36VDC	±12VDC	±125mA	79
68D1-24D15R	18-36VDC	±15VDC	±100mA	79
68D1-48S05R	36-72VDC	5VDC	500mA	74
68D1-48S12R	36-72VDC	12VDC	250mA	79
68D1-48S15R	36-72VDC	15VDC	200mA	78
68D1-48D05R	36-72VDC	±5VDC	±250mA	74
68D1-48D12R	36-72VDC	±12VDC	±125mA	79
68D1-48D15R	36-72VDC	±15VDC	±100mA	79

MARKINGS AND DIMENSIONS



Dimensions:inches/mm

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

PIN CONNECTION

PIN	SINGLE	DUAL
2,3	-INPUT	-INPUT
9	NC	COMMON
11	NC	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22,23	+INPUT	+INPUT

68D5 SERIES 5-6 WATTS DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 5-6 WATTS 24PIN DIL(1.25x0.8x0.4inches) PACKAGE
- EFFICIENCY TO 82%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

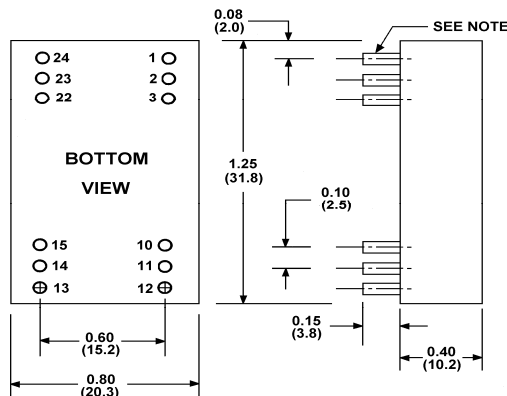
- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 12V nominal ...9-18V
: 24V nominal ...18-36V
: 48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY : $\pm 2\%$
- LINE REGULATION : $\pm 0.5\%$
- LOAD REGULATION(SINGLE) : $\pm 0.5\%$ (F.L. to 10% Load)
- LOAD REGULATION(DUAL) : $\pm 1.0\%$ (F.L. to 1 / 4 Load)
- EFFICIENCY : see table

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		EFFICIENCY (%)
				NO LOAD	FULL LOAD	
68D5-12S03R	9-18VDC	3.3VDC	1000mA	7.5mA	405mA	68
68D5-12S05R	9-18VDC	5VDC	1000mA	7.5mA	545mA	76
68D5-12S12R	9-18VDC	12VDC	470mA	7.5mA	585mA	80
68D5-12S15R	9-18VDC	15VDC	400mA	7.5mA	625mA	80
68D5-12D05R	9-18VDC	± 5 VDC	± 500 mA	12 A	545mA	76
68D5-12D12R	9-18VDC	± 12 VDC	± 230 mA	12 A	575mA	80
68D5-12D15R	9-18VDC	± 15 VDC	± 190 mA	12 A	590mA	80
68D5-24S03R	18-36VDC	3.3VDC	1000mA	5mA	195mA	70
68D5-24S05R	18-36VDC	5VDC	1000mA	5mA	265mA	78
68D5-24S12R	18-36VDC	12VDC	470mA	5mA	285mA	82
68D5-24S15R	18-36VDC	15VDC	400mA	5mA	305mA	82
68D5-24D05R	18-36VDC	± 5 VDC	± 500 mA	7.5mA	265mA	78
68D5-24D12R	18-36VDC	± 12 VDC	± 230 mA	7.5mA	285mA	81
68D5-24D15R	18-36VDC	± 15 VDC	± 190 mA	7.5mA	295mA	81
68D5-48S03R	36-72VDC	3.3VDC	1000mA	2mA	98mA	70
68D5-48S05R	36-72VDC	5VDC	1000mA	2mA	133mA	78
68D5-48S12R	36-72VDC	12VDC	470mA	2mA	145mA	81
68D5-48S15R	36-72VDC	15VDC	400mA	2mA	154mA	81
68D5-48D05R	36-72VDC	± 5 VDC	± 500 mA	3mA	265mA	78
68D5-48D12R	36-72VDC	± 12 VDC	± 230 mA	3mA	142mA	81

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
2,3	-INPUT	-INPUT
9	NC	COMMON
11	NC	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22,23	+INPUT	+INPUT

68D8 SERIES 8 WATTS DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES:9-18V,18-36V,36-72V
- 8 WATTS 24PIN DIL(1.25x0.8x0.4inches) PACKAGE
- EFFICIENCY TO 82%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

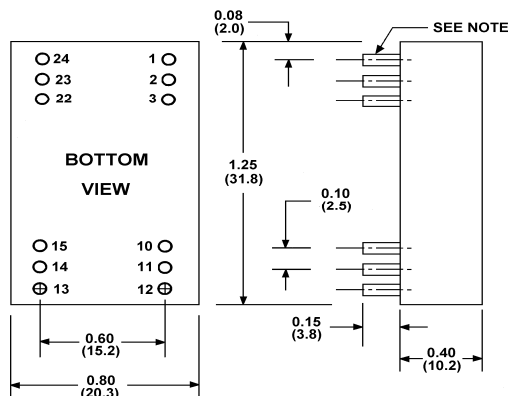
- SWITCHING FREQUENCY : 300KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1600VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : 12V nominal ...9-18V
: 24V nominal ...18-36V
: 48V nominal ...36-72V
- OUTPUT VOLTAGE ACCURACY : $\pm 2\%$
- LINE REGULATION : $\pm 0.5\%$
- LOAD REGULATION(SINGLE) : $\pm 0.5\%$ (F.L. to 10% Load)
- LOAD REGULATION(DUAL) : $\pm 1.0\%$ (F.L. to 1 / 4 Load)
- EFFICIENCY : see table

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	INPUT CURRENT		EFFICIENCY (%)
				NO LOAD	FULL LOAD	
68D8-12S03R	9-18VDC	3.3VDC	2000mA	-	679mA	81
68D8-12S05R	9-18VDC	5VDC	1500mA	-	762mA	82
68D8-12S12R	9-18VDC	12VDC	666mA	-	774mA	86
68D8-12S15R	9-18VDC	15VDC	533mA	-	803mA	83
68D8-12D05R	9-18VDC	± 5 VDC	± 800 mA	-	803mA	83
68D8-12D12R	9-18VDC	± 12 VDC	± 333 mA	-	793mA	84
68D8-12D15R	9-18VDC	± 15 VDC	± 267 mA	-	795mA	84
68D8-24S03R	18-36VDC	3.3VDC	2000mA	-	344mA	80
68D8-24S05R	18-36VDC	5VDC	1500mA	-	372mA	84
68D8-24S12R	18-36VDC	12VDC	666mA	-	401mA	83
68D8-24S15R	18-36VDC	15VDC	533mA	-	401mA	83
68D8-24D05R	18-36VDC	± 5 VDC	± 800 mA	-	402mA	83
68D8-24D12R	18-36VDC	± 12 VDC	± 333 mA	-	392mA	85
68D8-24D15R	18-36VDC	± 15 VDC	± 267 mA	-	393mA	85
68D8-48S03R	36-72VDC	3.3VDC	2000mA	-	172mA	80
68D8-48S05R	36-72VDC	5VDC	1500mA	-	188mA	83
68D8-48S12R	36-72VDC	12VDC	666mA	-	198mA	84
68D8-48S15R	36-72VDC	15VDC	533mA	-	198mA	84
68D8-48D05R	36-72VDC	± 5 VDC	± 800 mA	-	198mA	84
68D8-48D12R	36-72VDC	± 12 VDC	± 333 mA	-	196mA	85

MARKINGS AND DIMENSIONS



Dimensions:inches/mm

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

PIN CONNECTIONS

PIN	SINGLE	DUAL
2,3	-INPUT	-INPUT
9	NC	COMMON
11	NC	-OUTPUT
14	+OUTPUT	+OUTPUT
16	-OUTPUT	COMMON
22,23	+INPUT	+INPUT

69D SERIES 3 WATTS DC-DC CONVERTER

FEATURES

- 4:1 WIDE INPUT VOLTAGES:10-33VDC,18-72VDC
- 3 WATTS 24PIN DIL(1.25x0.8x0.4inches) PACKAGE
- EFFICIENCY TO 80%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

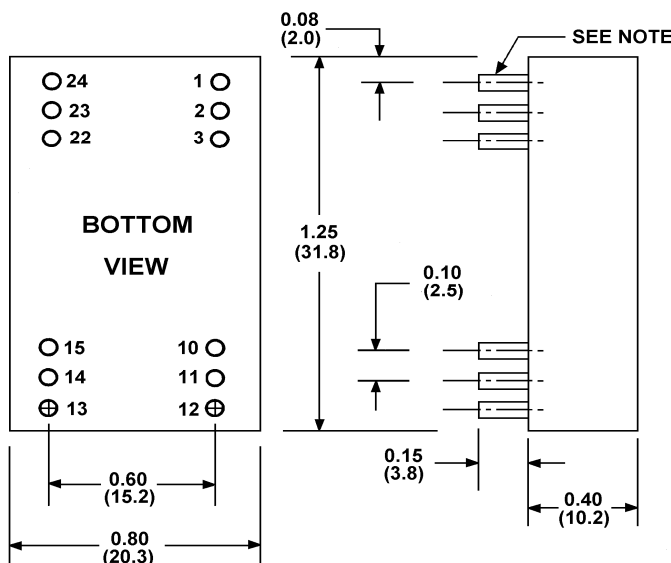
- SWITCHING FREQUENCY : 100KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :24V nominal ...10-33V
:48V nominal ...18-72V
- OUTPUT VOLTAGE ACCURACY :±2%
- LINE REGULATION :±0.5%
- LOAD REGULATION(SINGLE) :±0.5%
- LOAD REGULATION(DUAL) :±2%
- EFFICIENCY :see table

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
69D-24S05R	10-33VDC	5VDC	500mA	74
69D-24S12R	10-33VDC	12VDC	250mA	77
69D-24S15R	10-33VDC	15VDC	200mA	77
69D-24D05R	10-33VDC	±5VDC	±250mA	74
69D-24D12R	10-33VDC	±12VDC	±125mA	77
69D-24D15R	10-33VDC	±15VDC	±100mA	77
69D-48S05R	18-72VDC	5VDC	500mA	74
69D-48S12R	18-72VDC	12VDC	250mA	77
69D-48S15R	18-72VDC	15VDC	200mA	77
69D-48D05R	18-72VDC	±5VDC	±250mA	74
69D-48D12R	18-72VDC	±12VDC	±125mA	76
69D-48D15R	18-72VDC	±15VDC	±100mA	76

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE	DUAL
1,2	+INPUT	+INPUT
10,11	NC	COMMON
12	-OUTPUT	NC
13	+OUTPUT	-OUTPUT
15	NC	+OUTPUT
16	NC	NC
20	NC	NC
23,24	-INPUT	-INPUT

Dimensions:inches/mm

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

FEATURES

- UP TO 6 WATTS OUTPUT POWER
- 2"x2"x0.4 INCHES PACKAGE
- PI INPUT FILT
- LOW RIPPLE AND NOISE
- REGULATED OUTPUT TYPES



GENERAL SPECIFICATIONS

- ISOLATION RESISTANCE : 500VDC MIN.
- ISOLATION RESISTANCE : 100mΩ MIN@500VDC
- SWITHING FREQUENCY : 50KHz TYP.
- OPERATING TEMPERATURE RANGE :-25°C TO 85°C
- STORAGE TEMPERATURE RANGE :-40°C TO +100°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

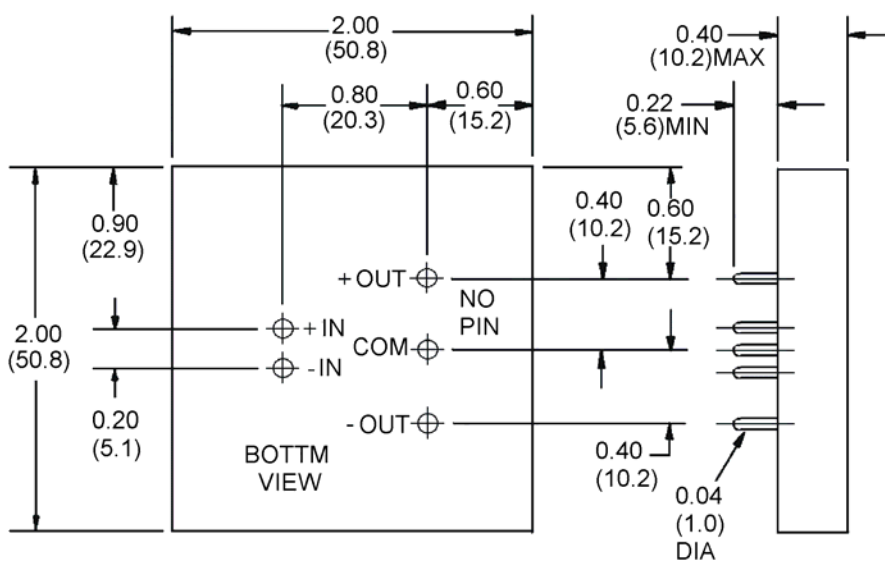
ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE ACCURACY : ±5%
- LINE REGULATION : ±0.3%
- LOAD REGULATION : ±0.5%
- OUTPUT RIPPLE AND NOISE : 50mVp-p(20MHz B.W.)
- EFFICIENCY : 60%

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
82D-05S05R	5VDC	5VDC	1200mA	60
82D-05S12R	5VDC	12VDC	500mA	65
82D-05D15R	5VDC	±15VDC	±200mA	65
82D-12S12R	12VDC	12VDC	500mA	65
82D-12S15R	12VDC	15VDC	400mA	65
82D-12D12R	12VDC	±12VDC	±250mA	65
82D-24S05R	24VDC	5VDC	1200mA	60
82D-24S15R	24VDC	15VDC	500mA	65
82D-24D12R	24VDC	±12VDC	±250mA	65
82D-48D15R	48VDC	15VDC	400mA	65
82D-48D12R	48VDC	±12VDC	±250mA	65
82D-48D15R	48VDC	±15VDC	±200mA	65

MARKINGS AND DIMENSIONS

PIN CONNECTION

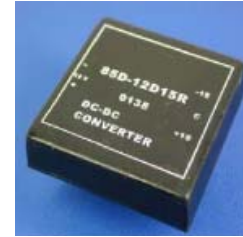


PIN	SINGLE OUTPUT
1	+INPUT
2	-INPUT
3	+OUTPUT
4	NC
5	-OUTPUT

PIN	DUAL OUTPUT
1	+INPUT
2	-INPUT
3	+OUTPUT
4	COMMON
5	-OUTPUT

FEATURES

- UP TO 5 WATTS OUTPUT POWER
- 2"x2"x0.4 INCHES PACKAGE
- PI INPUT FILT
- LOW RIPPLE AND NOISE
- REGULATED OUTPUT TYPES



GENERAL SPECIFICATIONS

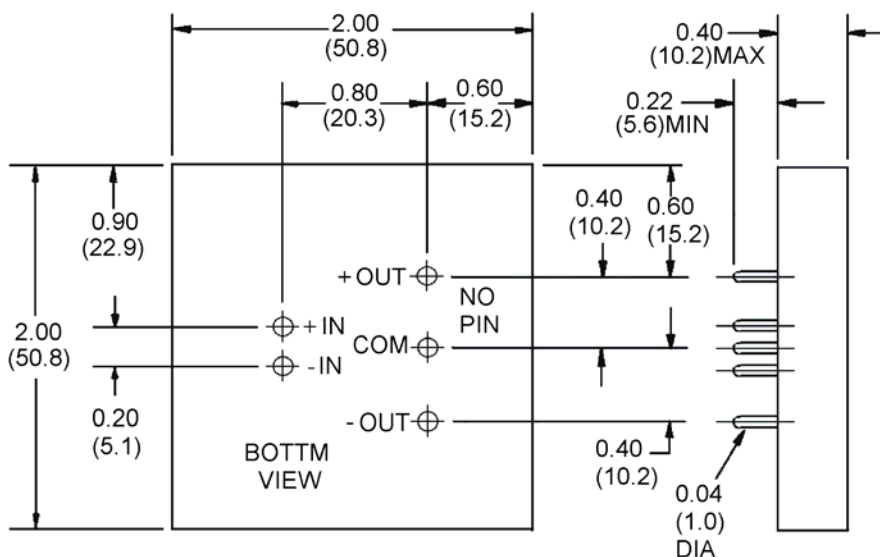
- ISOLATION RESISTANCE : 500VDC MIN.
- ISOLATION RESISTANCE : 100mΩ MIN@500VDC
- SWITHING FREQUENCY : 20KHz TYP.
- OPERATING TEMPERATURE RANGE : 0°C TO 70°C
- STORAGE TEMPERATURE RANGE : -40°C TO +100°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE : ±10%
- OUTPUT VOLTAGE ACCURACY : ±5%
- LINE REGULATION : ±0.3%
- LOAD REGULATION : ±0.5%
- OUTPUT RIPPLE AND NOISE : 50mVp-p(20MHz B.W.)
- EFFICIENCY : 60%

PART NO.	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
85D-05S05R	5VDC	5VDC	1000mA	60
85D-05S12R	5VDC	12VDC	470mA	65
85D-05D15R	5VDC	±15VDC	±190mA	65
85D-12S12R	12VDC	12VDC	470mA	65
85D-12S15R	12VDC	15VDC	400mA	65
85D-12D12R	12VDC	±12VDC	±230mA	65
85D-24S05R	24VDC	5VDC	1000mA	60
85D-24S15R	24VDC	15VDC	400mA	65
85D-24D12R	24VDC	±12VDC	±230mA	65
85D-48D15R	48VDC	15VDC	400mA	65
85D-48D12R	48VDC	±12VDC	±230mA	65
85D-48D15R	48VDC	±15VDC	±190mA	65

MARKINGS AND DIMENSIONS



PIN CONNECTION

PIN	SINGLE OUTPUT
1	+INPUT
2	-INPUT
3	+OUTPUT
4	NC
5	-OUTPUT

PIN	DUAL OUTPUT
1	+INPUT
2	-INPUT
3	+OUTPUT
4	COMMON
5	-OUTPUT

FEATURES

- 15WATTS ISOLATED OUTPUT
- SINGLES, DUAL AND TRIPLES
- REMOTE ON/OFF CONTROL
- EFFICIENCY 80%
- 2x2x0.52 INCHES PACKAGE
- SIX-SIDED SHIELDING
- WIDE 4:1 INPUT RANGE



ELECTRICAL SPECIFICATIONS

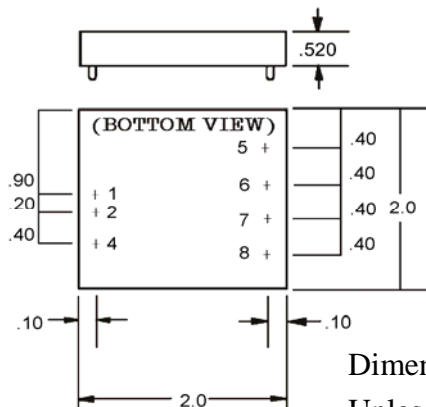
- INPUT VOLTAGE RANGE :24V nominal ...9-36V
:48V nominal ...20-72V
- INPUT FILTER :Pi Type
- OUTPUT VOLTAGE ACCURACY :±1% MAX.
- SINGLE OUTPUT ACCURACY :±1% MAX.
- DUAL +OUTPUT ACCURACY :±3% MAX.
- DUAL -OUTPUT ACCURACY :±1% MAX.
- TRIPLE 5V :±5% MAX.
12V/15V :±2% MAX.
-5V :±1% MAX.
- OUTPUT RIPPLE AND NOISE :100mVp-p MAX(20MHz B.W.)
- LINE REGULATING SINGLE/DUAL (H.L TO L.L)TRIPLE :±0.2% MAX.
:±1% MAX.
- LOAD REGULATING SINGLE/DUAL (F.L. TO 1/4 L.) TRIPLE :±1% MAX.
:±0.2% MAX.
- SHORT CIRCUIT PROTECTION :CONTINUOUS

GENERAL SPECIFICATIONS

- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10⁹ ohms
- SWITCHING FREQUENCY : 100KHz TYP.
- OPERATING TEMPERATURE RANGE :-25°C TO +71°C
- STORAGE TEMPERATURE RANGE :-55°C TO +105°C
- EMI/RFI : SIX-SIDED CONTINUOUS SHIELD
- CASE MATERIAL : BLACK COATED COPPER WITH NON-CONDUCTIVE BASE

PART NO.	INPUT VOLTAGE	OUTPUT 1 VOLTAGE	OUTPUT 2 VOLTAGE	OUTPUT 3 VOLTAGE
87D-24S05R	9-36V	5V@3A		
87D-24S12R	9-36V	12V@1.25A		
87D-24S15R	9-36V	15V@1A		
87D-24D12R	9-36V		12V@0.625A	-12V@0.625A
87D-24D15R	9-36V		15V@0.5A	-15V@0.5A
87D-24S05RT12R	9-36V	5V@1.5A	12V@0.31A	-12V@0.31A
87D-24S05RT15R	9-36V	5V@1.5A	15V@0.25A	-15V@0.25A
87D-48S05R	20-72V	5V@3A		
87D-48S12R	20-72V	12V@1.25A		
87D-48S15R	20-72V	15V@1A		
87D-48D12R	20-72V		12V@0.625A	-12V@0.625A
87D-48D15R	20-72V		15V@0.5A	-15V@0.5A
87D-48S05RT12R	20-72V	5V@1.5A	12V@0.31A	-12V@0.31A
87D-48S05RT15R	20-72V	5V@1.5A	15V@0.25A	-15V@0.25A

MARKINGS AND DIMENSION



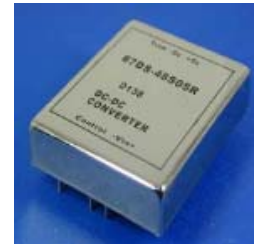
PIN CONNECTION

Pin	Single Output	Dual Output	Triple Output
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
3	No Pin	No Pin	No Pin
4	Control(Enable)	Control(Enable)	Control(Enable)
5	N O Pin	Output 2	Output 2
6	Output 1	Com (O/P Common)	Output 1
7	-Output 1	Output 3	Com (O/P Common)
8	Trim	Trim	Output 3

87DS SERIES 15 WATTS DC-DC CONVERTER

FEATURES

- 4:1 WIDE INPUT VOLTAGES:9-36V,20-72V
- 15 WATTS (2x1.6x0.52inches) PACKAGE
- EFFICIENCY TO 82%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

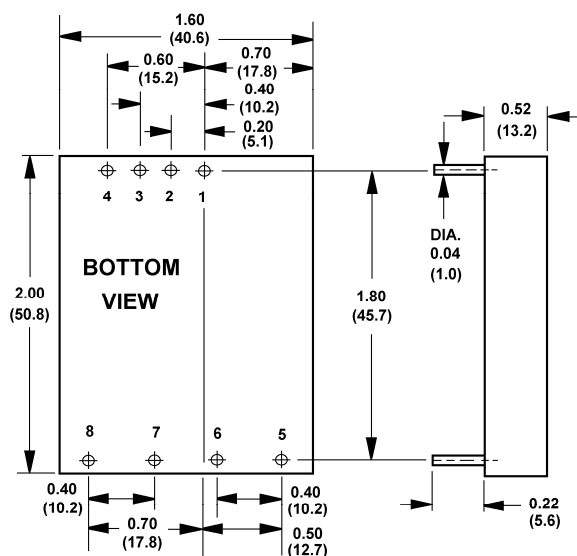
- SWITCHING FREQUENCY : 300KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED METAL WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :24V nominal ...9-36V
:48V nominal ...20-72
- OUTPUT VOLTAGE ACCURACY :±2%
- LINE REGULATION :±1.0%(HL-LL)
- LOAD REGULATION(SINGLE) :±1.0%(FL-NL)
- LOAD REGULATION(DUAL) :±5%(FL-NL)
- LOAD REGULATION(DUAL) :±1%(FL-1/2FL)
- EFFICIENCY :see table
- EMI/RFI :six-sided continuous shield

PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
87DS-24S05R	9-36VDC	5VDC	3000mA	80
87DS-24S12R	9-36VDC	12VDC	1250mA	82
87DS-24S15R	9-36VDC	15VDC	1000mA	82
87DS-24D05R	9-36VDC	±5VDC	±1500mA	80
87DS-24D12R	9-36VDC	±12VDC	±625mA	82
87DS-24D15R	9-36VDC	±15VDC	±500mA	82
87DS-48S05R	20-72VDC	5VDC	3000mA	80
87DS-48S12R	20-72VDC	12VDC	1250mA	82
87DS-48S15R	20-72VDC	15VDC	1000mA	82
87DS-48D05R	20-72VDC	±5VDC	±1500mA	80
87DS-48D12R	20-72VDC	±12VDC	±625mA	82
87DS-48D15R	20-72VDC	±15VDC	±500mA	82

MARKINGS AND DIMENSIONS



ALL DIMENSIONS IN INCHES(mm)

PIN CONNECTION

PIN#	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	N/C	N/C
4	Ctrl	Ctrl
5	No Pin	+Vout
6	+VOUT	Common
7	Common	-Vout
8	Trim	Trim

*Ctrl: Remote on/off Control

Dimensions:inches/mm Unless otherwise specified, all tolerances are $\pm 0.005/\pm 0.13$

95D SERIES 20 WATTS DC-DC CONVERTER

FEATURES

- 2:1 WIDE INPUT VOLTAGES:18-36V,36-72V
- 20 WATTS (2x1.6x0.5 & 2x2x0.5 inches) PACKAGE
- EFFICIENCY TO 80%
- PI INPUT FILTER



GENERAL SPECIFICATIONS

- SWITCHING FREQUENCY : 500KHz TYP.
- OUTPUT RIPPLE & NOISE : 100mVp-p(20MHz B.W.)
- ISOLATION VOLTAGE : 1500VDC
- ISOLATION RESISTANCE : 10^9 ohms
- STORAGE TEMPERATURE RANGE : -40°C TO 100°C
- OPERATING TEMPERATURE RANGE : -25°C TO +71°C
- SHORT CIRCUIT PROTECTION : CONTINUOUS
- CASE MATERIAL : BLACK COATED METAL WITH NON-CONDUCTIVE BASE

ELECTRICAL SPECIFICATIONS

- INPUT VOLTAGE RANGE :24V nominal ...18-36V
:48V nominal ...36-72V
 - OUTPUT VOLTAGE ACCURACY :±2%
 - LINE REGULATION(FULL LINE) :±0.1%
 - LOAD REGULATION(SINGLE) :±1.0%(FL-NL)
 - LOAD REGULATION(DUAL) :±3%(FN-NL)
 - EFFICIENCY :see table
 - EMI/RFI :six-sided continuous shield
 - TEMPERATURE PROTECTION :when case temp. at 95°C ± 5°C
- Power turn off

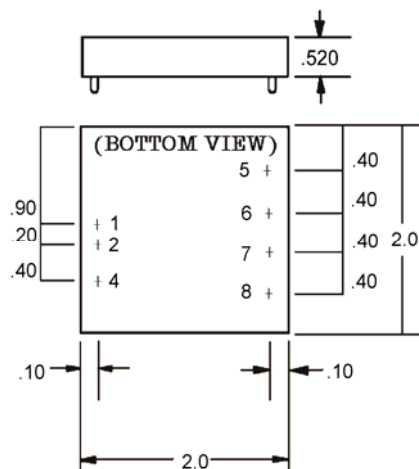
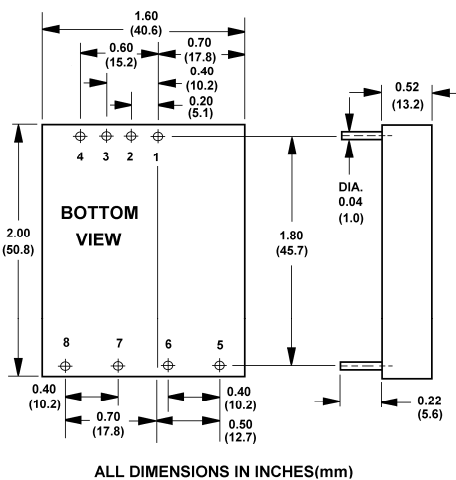
PART NO.	INPUT RANGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFFICIENCY (%)
95D-24S05R2	18-36VDC	5VDC	4000mA	81
95D-24S12R	18-36VDC	12VDC	1670mA	83
95D-24S15R12	18-36VDC	15VDC	1330mA	83
95D-24D12R	18-36VDC	±12VDC	±833mA	83
95D-24D15R2	18-36VDC	±15VDC	±666mA	84
95D-48S05R	36-72VDC	5VDC	4000mA	82
95D-48S12R2	36-72VDC	12VDC	1670mA	84
95D-48S15R	36-72VDC	15VDC	1330mA	84
95D-48D12R2	36-72VDC	±12VDC	±833mA	85
95D-48D15R	36-72VDC	±15VDC	±666mA	85

MARKINGS AND DIMENSIONS

PIN CONNECTION

1.

2.



PIN#	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	No Pin	No Pin
4	Ctrl	Ctrl
5	No Pin	+Vout
6	+VOUT	Commo
7	-Vout	-Vout
8	Trim	Trim

*Ctrl: Remote on/off Control

Dimensions:inches/mm

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