

# ESD01S/D-PU SERIES

## 1W UNREGULATED



### FEATURES

- SINGLE IN LINE PACKAGE
- 1W UNREGULATED OUTPUT POWER
- 100% BURN IN
- HIGH EFFICIENCY
- INTERNAL SMD TECHNOLOGY
- NO HEATSINK REQUIRED
- UL 94V-0 PACKAGE MATERIAL
- CUSTOM SOLUTIONS AVAILABLE
- RoHS COMPLIANT
- 3 YEARS WARRANTY



### OUTPUT SPECIFICATIONS

Voltage Set-point Accuracy	+/-2% max
Temperature Coefficient	+/-0.05%/°C
Ripple & Noise(20MHz BW)	100mVp-p max
Line Regulation <sup>1</sup>	+/-1.2% max
Load Regulation <sup>2</sup>	+/-8% max
Minimum Load	20% of Full Load
Short Circuit Protection	Momentary

### INPUT SPECIFICATIONS

Input Voltage Range	+/-10% max
Input Filter	Capacitor Typ
Input Reflected Ripple Current	50mA-p-p max
Protection	Fuse Recommended

### GENERAL SPECIFICATIONS

Efficiency	70%-83%	
Isolation Voltage <sup>3</sup>		
Single/Dual	1500-3000 VDC min	
Twin	In to Out	1000 VDC min
	Out to Out	500 VDC min
Isolation Resistance	10 <sup>9</sup> ohms min	
Isolation Capacitance	80pF max	
Switching Frequency	100KHz min	
MTBF <sup>4</sup>	>2,000,000 Hours	
Weight	2.1g Typ	
Case Material	Non-Conductive Plastic	
Case Size	19.6mm*6.1mm*10.2mm	
	19.6mm*7.1mm*10.2mm	
Conducted Emissions	EN55022 Class A	
Radiated Emissions	EN55022 Class A	

### ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to +71°C
Storage Temperature	-55°C to +125°C
Humidity	95% max
Cooling	Free-Air Convection

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD AND 25°C UNLESS OTHERWISE NOTED.

<sup>1</sup> Line Regulation is for a 1.0% change in input Voltage.

<sup>2</sup> Load Regulation is for output load current change from 20% to 100%.

<sup>3</sup> 1500VDC for 10 seconds,3000VDC for 3 seconds.

<sup>4</sup> MIL-HDBK-217F @25°C , Ground Benign.

● **SELECTION GUIDE(1)**  
**1W 1500VDC ISOLATION**

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT <sup>5</sup> CURRENT(mA)		EFF (%) <sup>6</sup>	ISOLATION (VDC)	PACKAGE
				FULL LOAD	NO LOAD			
				ESD01S-PU0503.3(A or B)	5			
ESD01S-PU0505(A or B or E)	5	5	200	283	35	71	1500	A or B or E
ESD01S-PU0509(A or B or E)	5	9	111	257	34	78	1500	A or B or E
ESD01S-PU0512(A or B or E)	5	12	84	253	33	79	1500	A or B or E
ESD01S-PU0515(A or B or E)	5	15	67	253	34	79	1500	A or B or E
ESD01D-PU0505(A or B)	5	+/-5	+/-100	278	35	72	1500	A or B
ESD01D-PU0509(A or B)	5	+/-9	+/-56	260	34	77	1500	A or B
ESD01D-PU0512(A or B)	5	+/-12	+/-42	253	33	79	1500	A or B
ESD01D-PU0515(A or B)	5	+/-15	+/-34	260	34	77	1500	A or B
ESD01S-PU0909(A or B)	9	9	111	148	24	75	1500	A or B
ESD01S-PU1203.3(A or B)	12	3.3	300	112	14	74	1500	A or B
ESD01S-PU1205(A or B or E)	12	5	200	112	15	74	1500	A or B or E
ESD01S-PU1209(A or B or E)	12	9	111	107	14	78	1500	A or B or E
ESD01S-PU1212(A or B or E)	12	12	84	102	14	82	1500	A or B or E
ESD01S-PU1215(A or B or E)	12	15	67	102	14	82	1500	A or B or E
ESD01D-PU1205(A or B)	12	+/-5	+/-100	112	15	74	1500	A or B
ESD01D-PU1212(A or B)	12	+/-12	+/-42	105	14	79	1500	A or B
ESD01D-PU1215(A or B)	12	+/-15	+/-34	101	15	83	1500	A or B
ESD01S-PU2403.3C	24	3.3	300	57	9	73	1500	C
ESD01S-PU2405C	24	5	200	57	9	73	1500	C
ESD01S-PU2409C	24	9	111	56	9	75	1500	C
ESD01S-PU2412C	24	12	84	54	9	77	1500	C
ESD01S-PU2415C	24	15	67	52	10	80	1500	C
ESD01S-PU2424C	24	24	42	54	9	77	1500	C
ESD01D-PU2405C	24	+/-5	+/-100	57	10	73	1500	C
ESD01D-PU2412C	24	+/-12	+/-42	54	10	77	1500	C
ESD01D-PU2415C	24	+/-15	+/-34	52	9	80	1500	C

*Note: Other input to output voltages may be available. Please contact factory.*

**ORDERING INFORMATION:**

**FOR EXAMPLE: ESD01S-PU\*\*\*\*A(SINGLE OUTPUT A PACKAGE)**

**ESD01D-PU\*\*\*\*A(DUAL OUTPUT A PACKAGE)**

**ESD01S-PU\*\*\*\*B(SINGLE OUTPUT B PACKAGE)**

**ESD01D-PU\*\*\*\*B(DUAL OUTPUT B PACKAGE)**

<sup>5</sup> NOMINAL INPUT VOLTAGE.

<sup>6</sup> NOMINAL INPUT VOLTAGE, FULL LOAD.

● **SELECTION GUIDE(2)**  
**1W 1500VDC ISOLATION**

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT <sup>7</sup> CURRENT(mA)		EFF (%) <sup>8</sup>	ISOLATION (VDC)	PACKAGE
				FULL LOAD	NO LOAD			
				ESD01S-PU0503.3AY	5			
ESD01S-PU0505AY	5	5	200	283	34	71	1500	AY
ESD01S-PU0509AY	5	9	111	257	35	78	1500	AY
ESD01S-PU0512AY	5	12	84	253	34	79	1500	AY
ESD01S-PU0515AY	5	15	67	253	35	79	1500	AY
ESD01D-PU0505AY	5	+/-5	+/-100	278	35	72	1500	AY
ESD01D-PU0512AY	5	+/-12	+/-42	253	33	79	1500	AY
ESD01D-PU0515AY	5	+/-15	+/-34	260	34	77	1500	AY
ESD01S-PU0909AY	9	9	111	148	24	75	1500	AY
ESD01S-PU1203.3AY	12	3.3	300	112	14	74	1500	AY
ESD01S-PU1205AY	12	5	200	112	14	74	1500	AY
ESD01S-PU1209AY	12	9	111	107	15	78	1500	AY
ESD01S-PU1212AY	12	12	84	102	13	82	1500	AY
ESD01S-PU1215AY	12	15	67	102	14	82	1500	AY
ESD01D-PU1205AY	12	+/-5	+/-100	112	15	74	1500	AY
ESD01D-PU1212AY	12	+/-12	+/-42	105	14	79	1500	AY
ESD01D-PU1215AY	12	+/-15	+/-34	101	14	83	1500	AY
ESD01S-PU2403.3CY	24	3.3	300	57	10	73	1500	CY
ESD01S-PU2405CY	24	5	200	57	10	73	1500	CY
ESD01S-PU2409CY	24	9	111	56	9	75	1500	CY
ESD01S-PU2412CY	24	12	84	54	10	77	1500	CY
ESD01S-PU2415CY	24	15	67	52	9	80	1500	CY
ESD01S-PU2424CY	24	24	42	54	9	77	1500	CY
ESD01S-PU2405CY	24	+/-5	+/-100	57	10	73	1500	CY
ESD01S-PU2412CY	24	+/-12	+/-42	54	9	77	1500	CY
ESD01S-PU2415CY	24	+/-15	+/-34	52	9	80	1500	CY

*Note: Other input to output voltages may be available. Please contact factory.*

**ORDERING INFORMATION:**

**FOR EXAMPLE:**     **ESD01S-PU\*\*\*\*AY(SINGLE OUTPUT AY PACKAGE)**  
                           **ESD01D-PU\*\*\*\*AY(DUAL OUTPUT AY PACKAGE)**  
                           **ESD01S-PU\*\*\*\*CY(SINGLE OUTPUT CY PACKAGE)**  
                           **ESD01D-PU\*\*\*\*CY(DUAL OUTPUT CY PACKAGE)**

<sup>7</sup> NOMINAL INPUT VOLTAGE.

<sup>8</sup> NOMINAL INPUT VOLTAGE, FULL LOAD.

● **SELECTION GUIDE(3)**  
**1W DUAL SEPARATE OUTPUT**

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)		OUTPUT CURRENT (mA)		INPUT <sup>9</sup> CURRENT(mA)		EFF (%) <sup>10</sup>	ISOLATION (VDC)	PACKAGE
		OUT1	OUT2	OUT1	OUT2	FULL LOAD	NO LOAD			
ESD01D-PU050503.3	5	+5	+3.3	+100	+152	286	34	70	1500	F
ESD01D-PU050505	5	+5	+5	+100	+100	255	34	78	1500	F
ESD01D-PU050509	5	+5	+9	+100	+56	251	33	80	1500	F
ESD01D-PU050512	5	+5	+12	+100	+42	250	35	80	1500	F
ESD01D-PU050515	5	+5	+15	+100	+34	250	35	80	1500	F
ESD01D-PU120505	12	+5	+5	+100	+100	119	15	70	1500	F
ESD01D-PU120509	12	+5	+9	+100	+56	104	14	80	1500	F
ESD01D-PU120512	12	+5	+12	+100	+42	102	14	82	1500	F
ESD01D-PU120515	12	+5	+15	+100	+34	104	14	80	1500	F
ESD01D-PU2403.303.3	24	+3.3	+3.3	+152	+152	60	11	70	1500	F
ESD01D-PU240505	24	+5	+5	+100	+100	60	11	70	1500	F
ESD01D-PU241212	24	+12	+12	+41	+41	52	10	80	1500	F

*Note: Other input to output voltages may be available. Please contact factory.*

**ORDERING INFORMATION:**

**FOR EXAMPLE: ESD01D-PU\*\*\*\*\* (TWIN OUTPUT F PACKAGE)**

<sup>9</sup> NOMINAL INPUT VOLTAGE.

<sup>10</sup> NOMINAL INPUT VOLTAGE, FULL LOAD.

● **SELECTION GUIDE(4)**  
**1W 3000VDC ISOLATION**

MODEL NUMBER	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT <sup>11</sup> CURRENT(mA)		EFF (%) <sup>12</sup>	ISOLATION (VDC)	PACKAGE
				FULL LOAD	NO LOAD			
				ESD01S-PU03.305-3K	3.3			
ESD01S-PU0503.3-3K	5	3.3	300	274	35	73	3000	B
ESD01S-PU0505-3K	5	5	200	283	34	71	3000	B
ESD01S-PU0509-3K	5	9	111	257	34	78	3000	B
ESD01S-PU0512-3K	5	12	84	255	34	78	3000	B
ESD01S-PU0515-3K	5	15	67	253	35	79	3000	B
ESD01D-PU0505-3K	5	+/-5	+/-100	274	35	73	3000	B
ESD01D-PU0512-3K	5	+/-12	+/-42	253	35	79	3000	B
ESD01D-PU0515-3K	5	+/-15	+/-34	253	34	79	3000	B
ESD01S-PU1203.3-3K	12	3.3	300	112	14	74	3000	B
ESD01S-PU1205-3K	12	5	200	112	14	74	3000	B
ESD01S-PU1209-3K	12	9	111	107	15	78	3000	B
ESD01S-PU1212-3K	12	12	84	102	13	82	3000	B
ESD01S-PU1215-3K	12	15	67	103	14	81	3000	B
ESD01D-PU1205-3K	12	+/-5	+/-100	112	14	74	3000	B
ESD01D-PU1212-3K	12	+/-12	+/-42	101	15	83	3000	B
ESD01D-PU1215-3K	12	+/-15	+/-34	101	14	83	3000	B
ESD01S-PU2403.3-3K	24	3.3	300	57	10	73	3000	D
ESD01S-PU2405-3K	24	5	200	57	10	73	3000	D
ESD01S-PU2409-3K	24	9	111	56	10	75	3000	D
ESD01S-PU2412-3K	24	12	84	54	10	77	3000	D
ESD01S-PU2415-3K	24	15	67	52	9	80	3000	D
ESD01D-PU2405-3K	24	+/-5	+/-100	57	10	73	3000	D
ESD01D-PU2412-3K	24	+/-12	+/-42	54	9	77	3000	D
ESD01D-PU2415-3K	24	+/-15	+/-34	52	10	80	3000	D

**Note: Other input to output voltages may be available. Please contact factory.**

**ORDERING INFORMATION:**

**FOR EXAMPLE: ESD01S-PU\*\*\*\*-3K(SINGLE OUTPUT 3000V ISOLATION)**

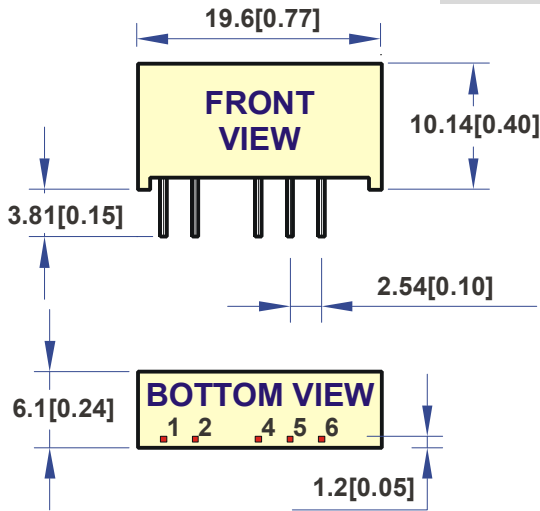
**ESD01D-PU\*\*\*\*-3K(DUAL OUTPUT 3000V ISOLATION)**

<sup>11</sup> NOMINAL INPUT VOLTAGE.

<sup>12</sup> NOMINAL INPUT VOLTAGE, FULL LOAD.

# MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS

## PACKAGE "A"



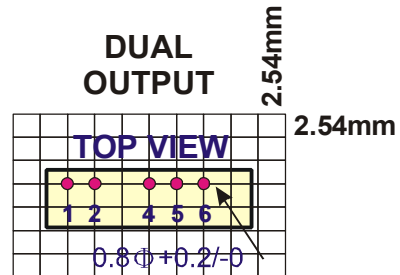
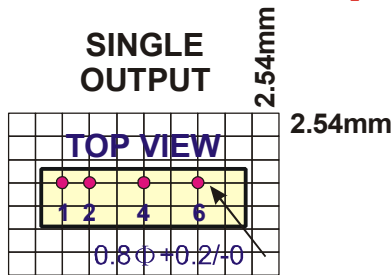
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	NP	COMMON
6	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

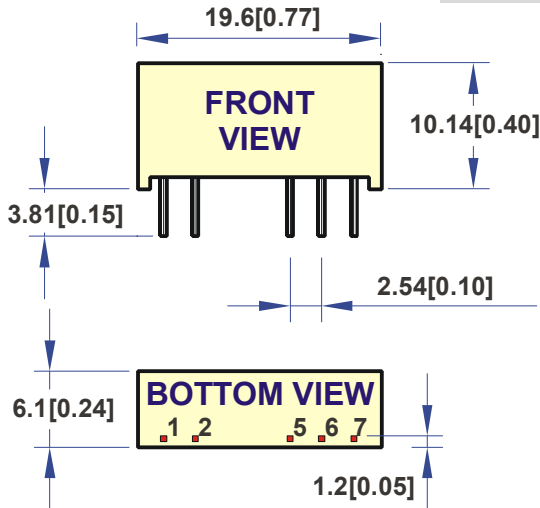
All Dimensions In mm(Inches)

Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



## PACKAGE "B"



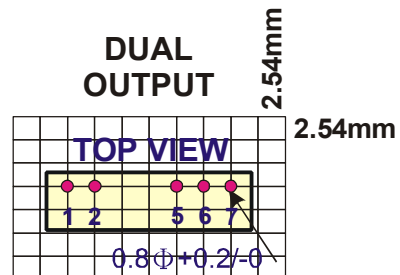
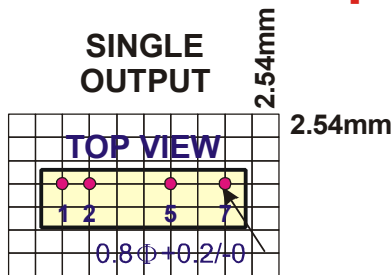
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	NP	COMMON
7	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

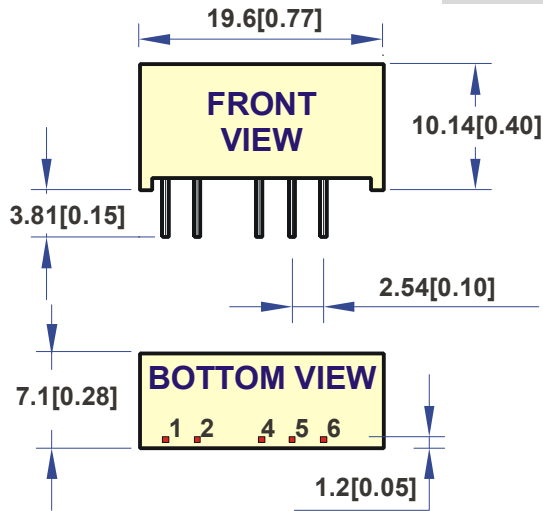
All Dimensions In mm(Inches)

Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



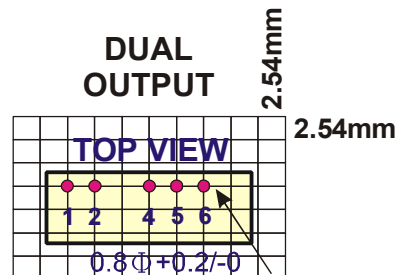
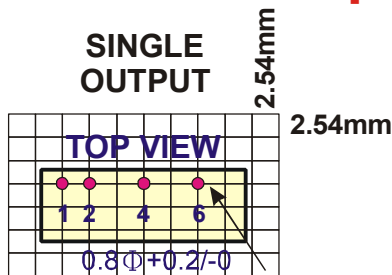
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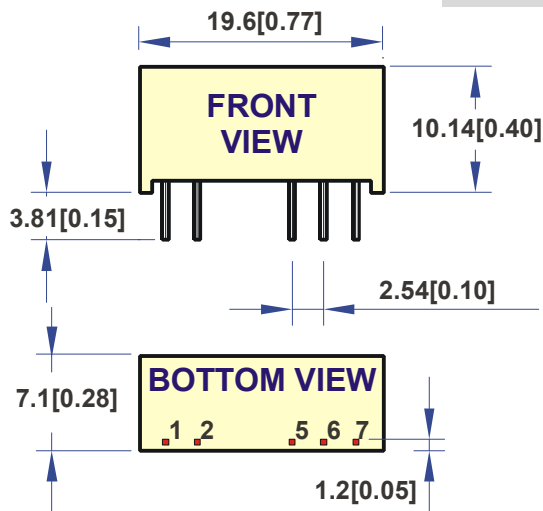
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	NP	COMMON
6	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$   
 All Dimensions In mm(Inches)  
 Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



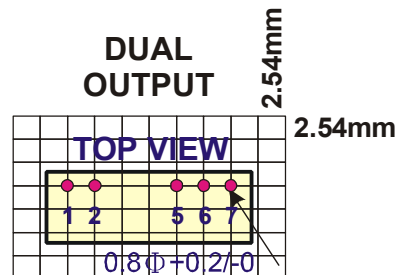
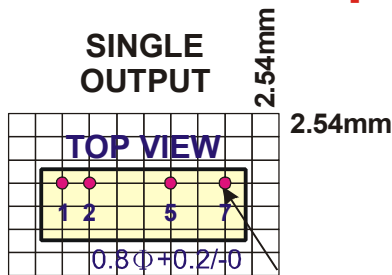
## PACKAGE "D"



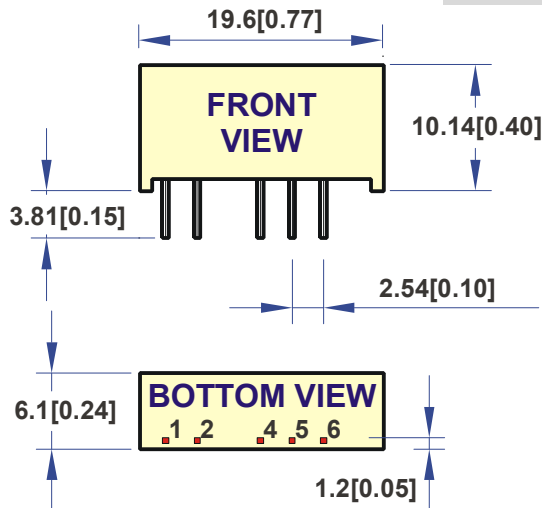
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	NP	COMMON
7	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$   
 All Dimensions In mm(Inches)  
 Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



## PACKAGE "E"



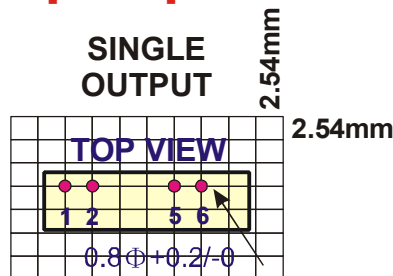
PIN	SINGLE
1	+Vin
2	-Vin
4	NP
5	-Vout
6	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

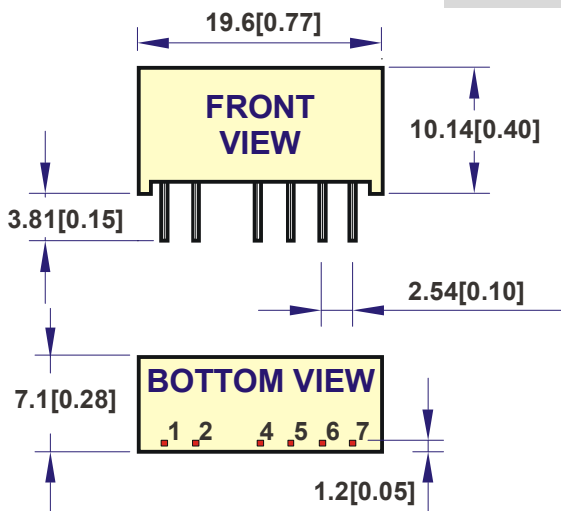
All Dimensions In mm(Inches)

Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



## PACKAGE "F"



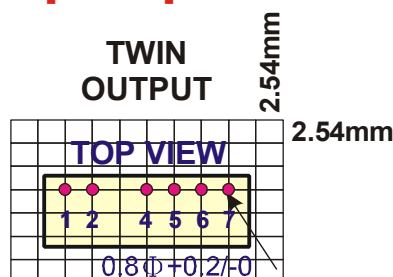
PIN	TWIN
1	+Vin
2	-Vin
4	+5V / Vout 1
5	- 5V / Vout 1
6	+ Vout 2
7	- Vout 2

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

All Dimensions In mm(Inches)

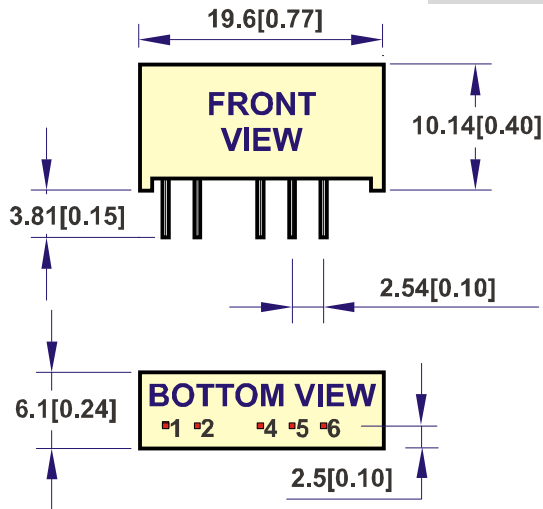
Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]





## PACKAGE "AY"



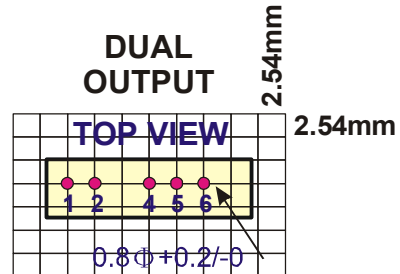
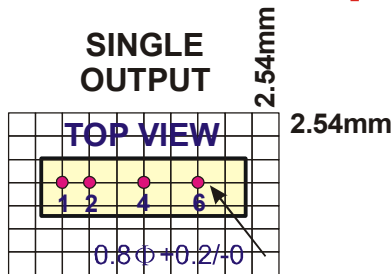
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	NP	COMMON
6	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

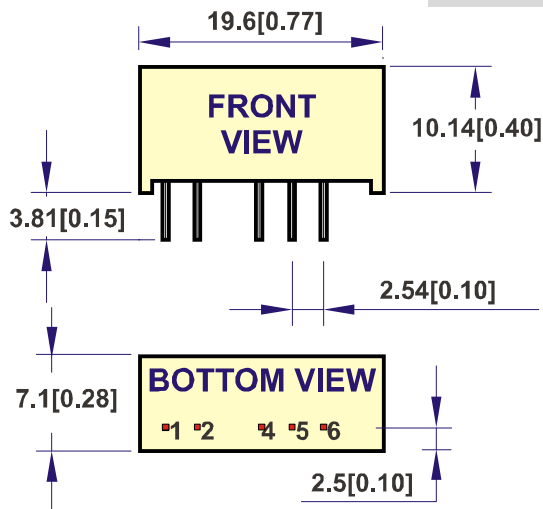
All Dimensions In mm(Inches)

Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]



## PACKAGE "CY"



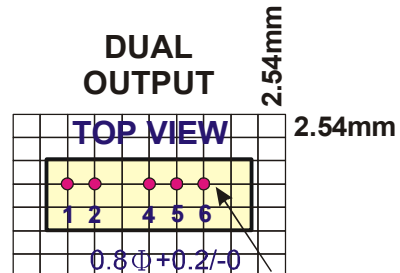
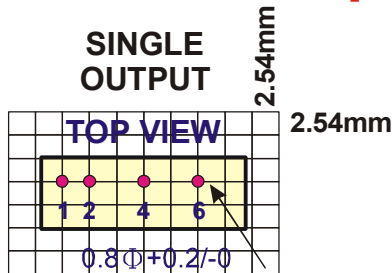
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	NP	COMMON
6	+Vout	+Vout

NOTE: Pin Size is Tolerance  $0.50\Phi \pm 0.05\text{mm}$

All Dimensions In mm(Inches)

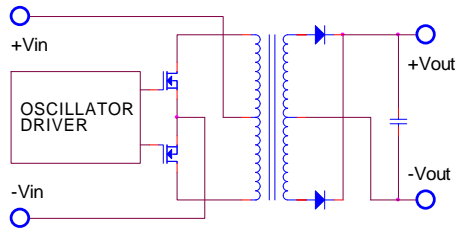
Tolerance .X or .XX=  $\pm 0.5\text{mm}$

All dimensions are in mm[inches]

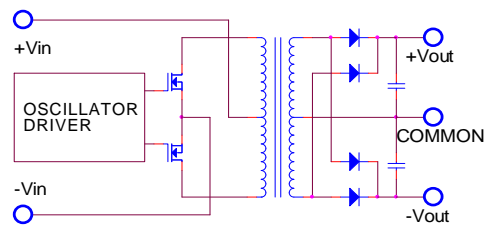


## ● SIMPLIFIED SCHEMATIC

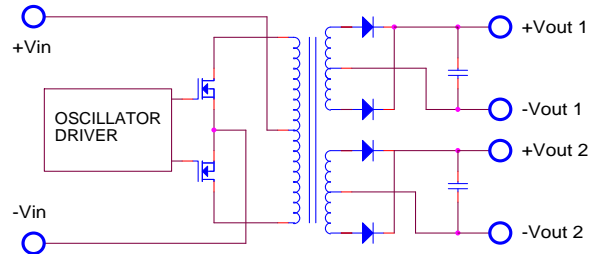
### SINGLE OUTPUT



### DUAL OUTPUT

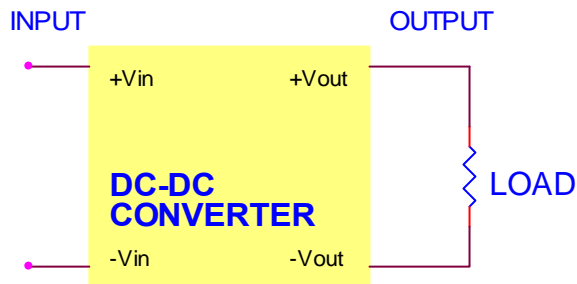


### TWIN OUTPUT

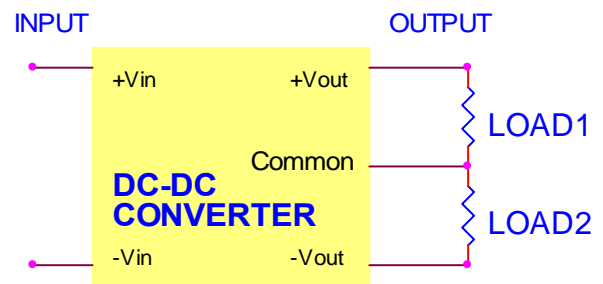


## ● TYPICAL APPLICATIONS

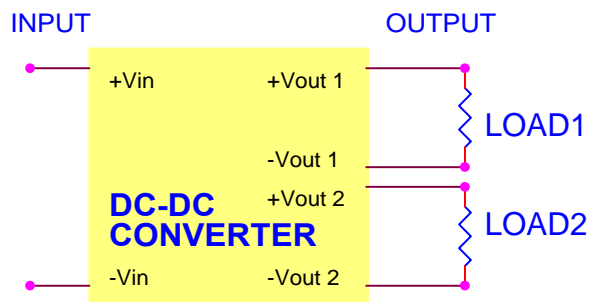
### SINGLE OUTPUT



### DUAL OUTPUT



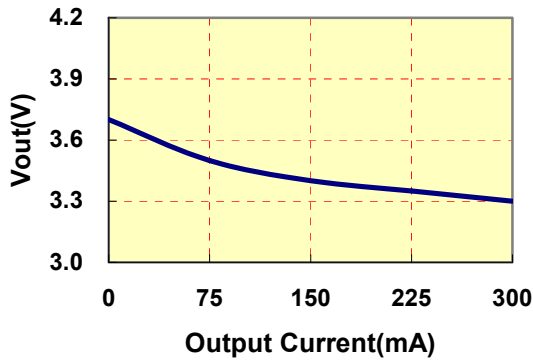
### TWIN OUTPUT



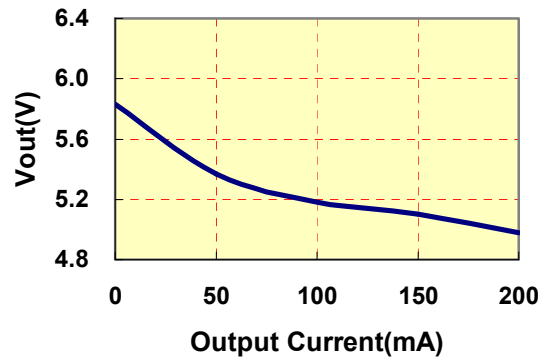
## ● TYPICAL PERFORMANCE CURVES

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

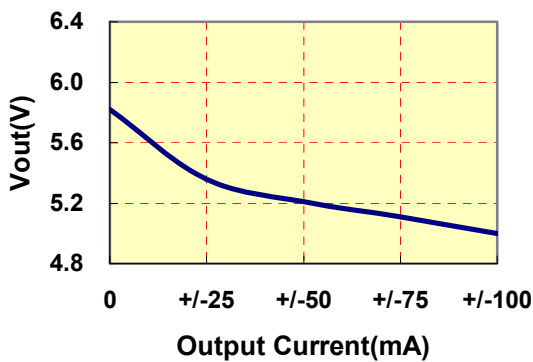
### VOUT VS LOAD(3.3Vout Models)



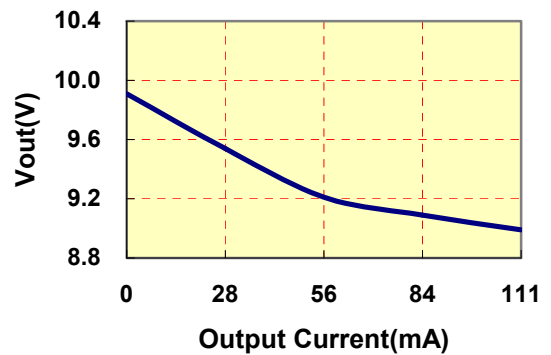
### VOUT VS LOAD(5Vout Models)



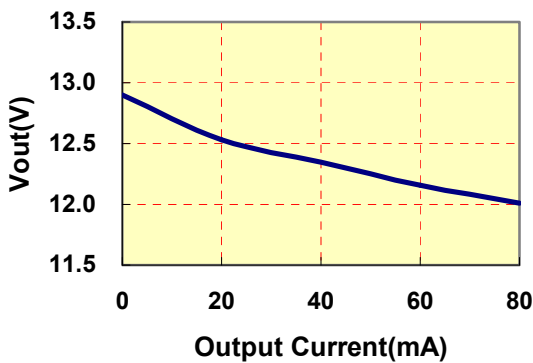
### VOUT VS LOAD(+/-5Vout Models)



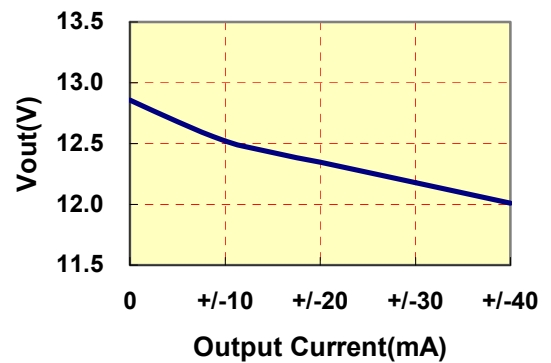
### VOUT VS LOAD(9Vout Models)



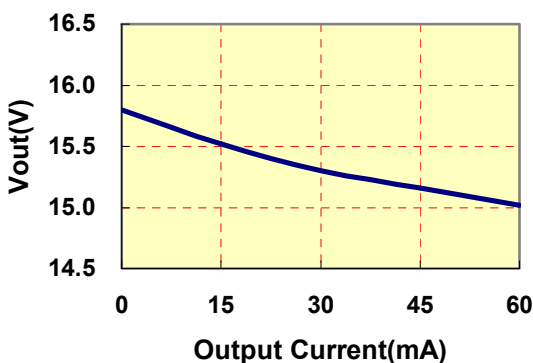
### VOUT VS LOAD(12Vout Models)



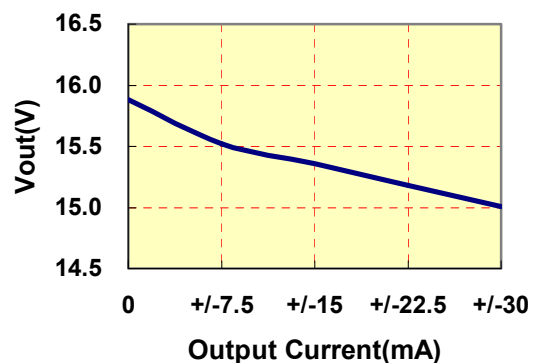
### VOUT VS LOAD(+/- 12Vout Models)



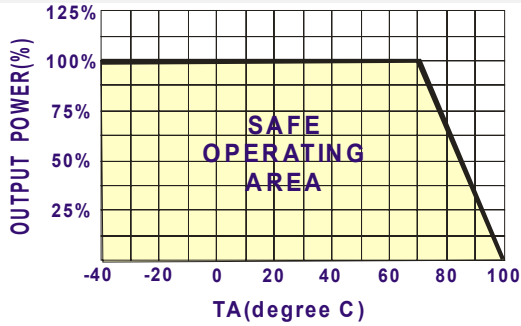
### VOUT VS LOAD(15Vout Models)



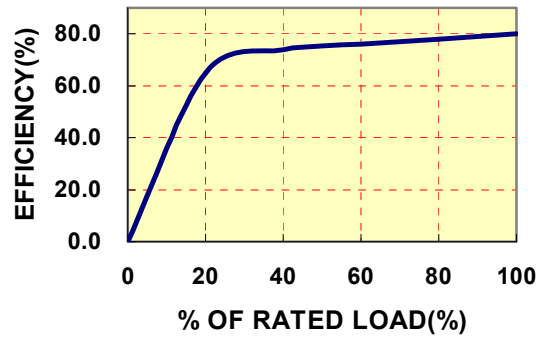
### VOUT VS LOAD(+/- 15Vout Models)



## DERATING CURVE



## EFFICIENCY VS LOAD



## ● INPUT FUSE SELECTION GUIDE

4.5-5.5V INPUT VOLTAGE(VDC)	10.8-13.2V INPUT VOLTAGE(VDC)	21.6-26.4V INPUT VOLTAGE(VDC)
800mA Slow-Blow Type	300mA Slow-Blow Type	150mA Slow-Blow Type

**Note:** Certain applications may require the installation of external fuse in front of the input.

## ESD-01S/D-PU SERIES APPLICATION NOTES:

### EXTERNAL CAPACITANCE REQUIREMENTS:

Output filtering is required for operation. A minimum of 10uF is needed. Output capacitance may be increased for additional filtering, not to exceed 220uF.

To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5ohm from DC to 250KHz is required.

We Can Offer EMC-Filter According To EN55011/22 Class B.

### Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

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## FOR MORE INFORMATION CALL:

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