



## 3D8W\_1.5RP series

3W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

### DC-DC Converter

3 Watt

- ⊕ Wide input range (2:1)
- ⊕ Ultra compact DIP package
- ⊕ 1.5kVDC isolation
- ⊕ High efficiency up to 82%
- ⊕ RoHS Compliance
- ⊕ Short circuit protection (SCP)
- ⊕ Operating temperature range: -40°C ~ +85°C
- ⊕ Industry standard pin-out
- ⊕ No external component required
- ⊕ EN62368, UL62368 approved

The 3D8W\_1.5RP series of isolated 3W DC-DC converter products with a 2:1 input voltage range. The product has a ultra-compact DIP/SMD package with efficiencies of up to 82%, operating temperature of -40°C to +85°C and continuous short circuit protection. The ultra-small dimension design makes the converters an ideal solution for communications, instrumentation and industrial electronics applications.



UL-62368-1 (E347551)

#### Common specifications

Short circuit protection:	Continuous
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C (See Fig. 1)
Storage temperature:	-55°C~+125°C
Storage humidity range:	< 95% non-condensing
Pin soldering resistance temperature:	300°C MAX, 1.5mm away from case for 10s.
Reflow soldering temperature:	Peak temperature ≤245°C, duration ≤60s max. over 217°C. see also IPC/JEDEC J-STD-020D.1.
Case material:	Black flame-retardant, heat-resistant plastic
MTBF (MIL-HDBK-217F@25°C):	>1,000,000 hours
Weight:	2.2g
Dimensions:	SD 14.00 × 14.00 × 9.00 mm ST 15.00 × 14.00 × 9.10 mm

#### Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load)	<b>Single output</b>	• 12VDC	314/30	338/50	mA
		• 24VDC	154/20	163/40	mA
	<b>Dual output</b>	• 12VDC	321/30	329/50	mA
		• 24VDC	156/20	165/40	mA
Reflected ripple current	• 12VDC		40		mA
	• 24VDC		55		mA
Surge voltage (1sec. max)	• 12VDC	-0.7		25	VDC
	• 24VDC	-0.7		50	VDC
Start-up voltage	• 12VDC			9	VDC
	• 24VDC			18	VDC
Input Filter	Capacitance filter				
Hot plug	unavailable				

#### Example:

##### 3D8W\_1205S1.5RP

3 = 3Watt; D8 = DIP8; W = Wide input; 12 = 12Vin; 05 = 5Vout; S = Single output; 1.5 = 1.5kVDC; R = Regulated output; P = Short circuit protection

#### Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output electric Strength test for 1 min. with a leakage current of 1mA max.	1500			VDC
Isolation resistance	500VDC	1000			MΩ
Isolation capacitance	100KHz/0.1V		100		pF

#### Output specifications

Item	Test condition	Min	Typ	Max	Units	
Voltage accuracy (5%-100% load, Vin range)	• Single output		±1	±3	%	
	• Dual output		±1	±3	%	
	Vo1 Vo2		±3	±5	%	
No load output voltage accuracy (Single output)	input voltage range					
	• 3.3VDC output • others output		±5 ±1.5	±7 ±5	%	
No load output voltage accuracy (Dual output)	input voltage range					
	• Vo1 • Vo2		±2 ±5	±5 ±8	%	
Line regulation	Input voltage from low to high @full load		±0.2	±0.5	%	
Load regulation	5%-100% load		±0.5	±1	%	
Temperature drift	full load			±0.03	%/°C	
Transient recovery time	25% load step change		1	3	ms	
Transient response deviation	25% load step change	• Single output		±2.5	±5	%
		• Dual output		±3	±5	%
Switching frequency	Full load, nominal input		300		KHz	

#### EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (See EMC recommended circuit, ②)
EMI	RE	CISPR32/EN55032 CLASS B (See EMC recommended circuit, ②)
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
EMS	RS	IEC/EN61000-4-3 10V/m perf. Criteria A
EMS	EFT	IEC/EN61000-4-4 ±2KV (External Circuit Refer to recommended circuit, ①) perf. Criteria B
EMS	Surge	IEC/EN61000-4-5 line to line ±2KV (External Circuit Refer to recommended circuit, ①) perf. Criteria B
EMS	CS	IEC/EN61000-4-6 3 Vr.m.s perf. Criteria A

#### Note:

1. Unless otherwise specified, data in this data sheet should be tested under the conditions of Ta = 25°C, nominal input voltage and rated output current;
2. The maximum capacitive load offered was tested at input voltage range and full load;
3. All index testing methods in this datasheet are based on our Company's corporate standards.
4. We can provide product customization service, please contact our technicians directly for specific information.

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### Product Selection Guide

Part Number	Input Voltage [V, Vin (Range)]	Output Voltage [VDC]	Output current [mA, max/min]	Ripple & Noise [mVp-p; typ/max]	Efficiency [%; min/typ]	Capacitive load [ $\mu$ F]
3D8W_1203S1.5RP	12 (9-18)	3.3	758/38	50/100	73/75	2700
3D8W_1205S1.5RP	12 (9-18)	5	600/30	50/100	77/79	2200
3D8W_1212S1.5RP	12 (9-18)	12	250/13	50/100	80/82	680
3D8W_1215S1.5RP	12 (9-18)	15	200/10	50/100	81/83	470
3D8W_1224S1.5RP	12 (9-18)	24	125/6	50/100	79/81	330
3D8W_2403S1.5RP	24 (18-36)	3.3	758/38	50/100	72/74	2700
3D8W_2405S1.5RP	24 (18-36)	5	600/30	50/100	79/81	2200
3D8W_2412S1.5RP	24 (18-36)	12	250/13	50/100	81/83	680
3D8W_2415S1.5RP	24 (18-36)	15	200/10	50/100	81/83	470
3D8W_2424S1.5RP	24 (18-36)	15	125/6	50/100	81/83	330

Part Number	Input Voltage [V, Vin (Range) max.]	Output Voltage [VDC]	Output current [mA, max/min]	Ripple & Noise [mVp-p; typ/max]	Efficiency [%; min/typ]	Capacitive load [ $\mu$ F]
3D8W_1205D1.5RP	12 (9-18) 20	$\pm$ 5	$\pm$ 300/ $\pm$ 15	50/100	76/78	1000
3D8W_1209D1.5RP	12 (9-18) 20	$\pm$ 9	$\pm$ 167/ $\pm$ 9	50/100	76/78	680
3D8W_1212D1.5RP	12 (9-18) 20	$\pm$ 12	$\pm$ 125/ $\pm$ 7	50/100	77/79	470
3D8W_1215D1.5RP	12 (9-18) 20	$\pm$ 15	$\pm$ 100/ $\pm$ 5	50/100	77/79	330
3D8W_2405D1.5RP	24 (18-36) 40	$\pm$ 5	$\pm$ 300/ $\pm$ 15	50/100	76/78	1000
3D8W_2409D1.5RP	24 (18-36) 40	$\pm$ 9	$\pm$ 167/ $\pm$ 9	50/100	78/80	680
3D8W_2412D1.5RP	24 (18-36) 40	$\pm$ 12	$\pm$ 125/ $\pm$ 7	50/100	80/82	470
3D8W_2415D1.5RP	24 (18-36) 40	$\pm$ 15	$\pm$ 100/ $\pm$ 5	50/100	79/81	330

1. Exceeding the maximum input voltage may cause permanent damage;
2. Ripple & noise testing condition at nominal input voltage and 5%-100% load, the "tip and barrel" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.
3. The specified maximum capacitive load for positive and negative output is identical.

### Typical characteristics

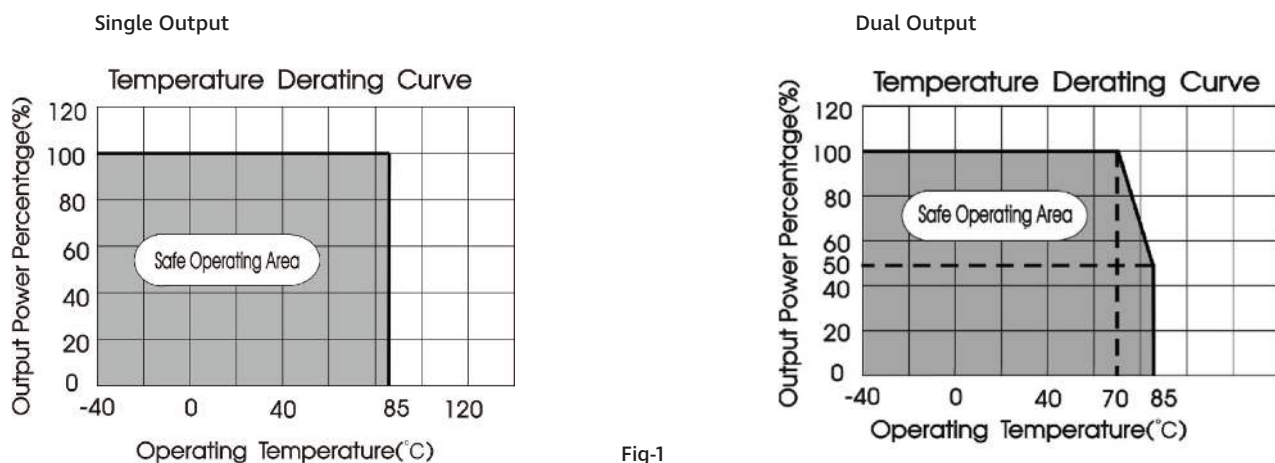


Fig-1

## 3D8W\_1.5RP series

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### Efficiency (Single)

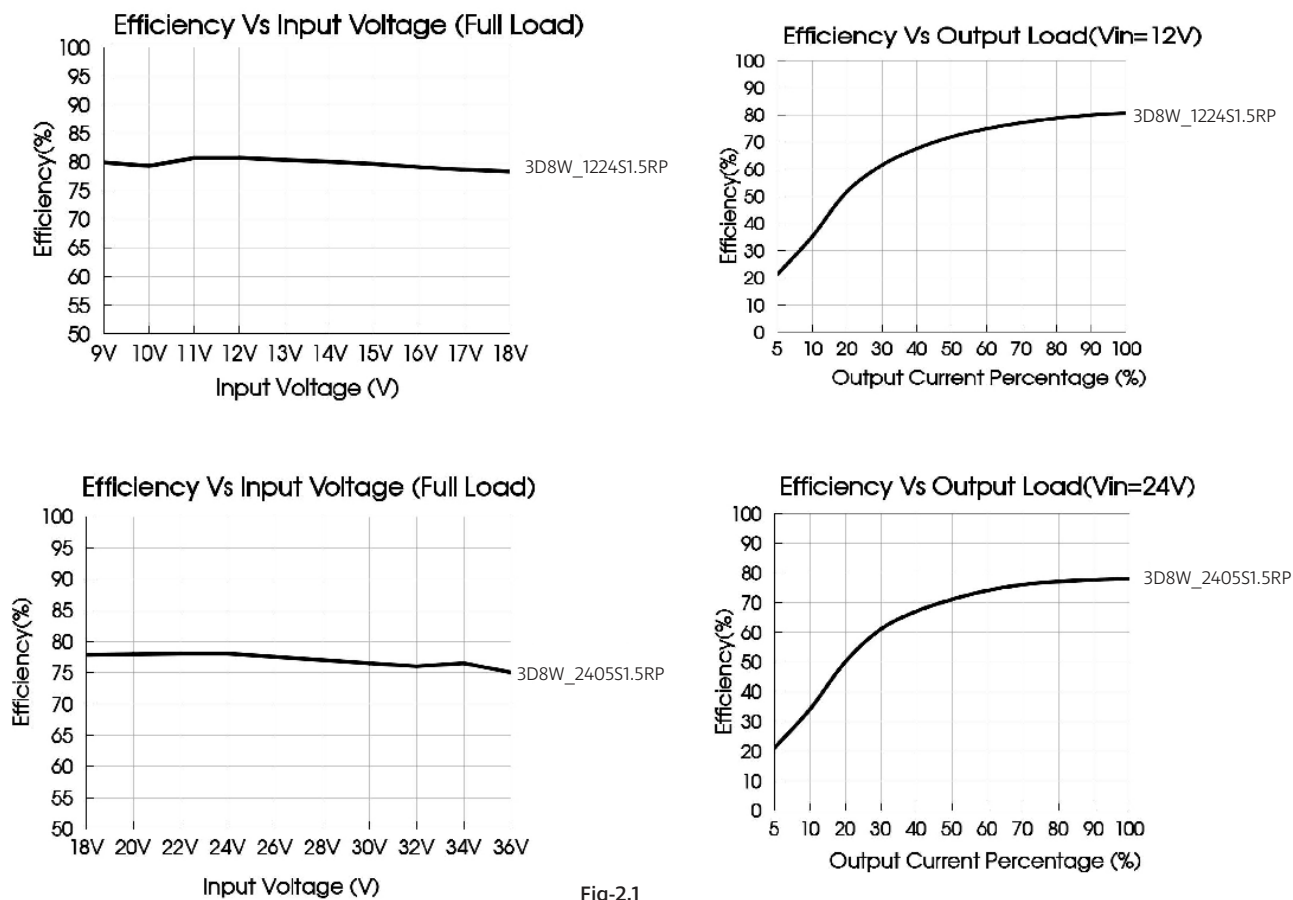


Fig-2.1

### Efficiency (Dual)

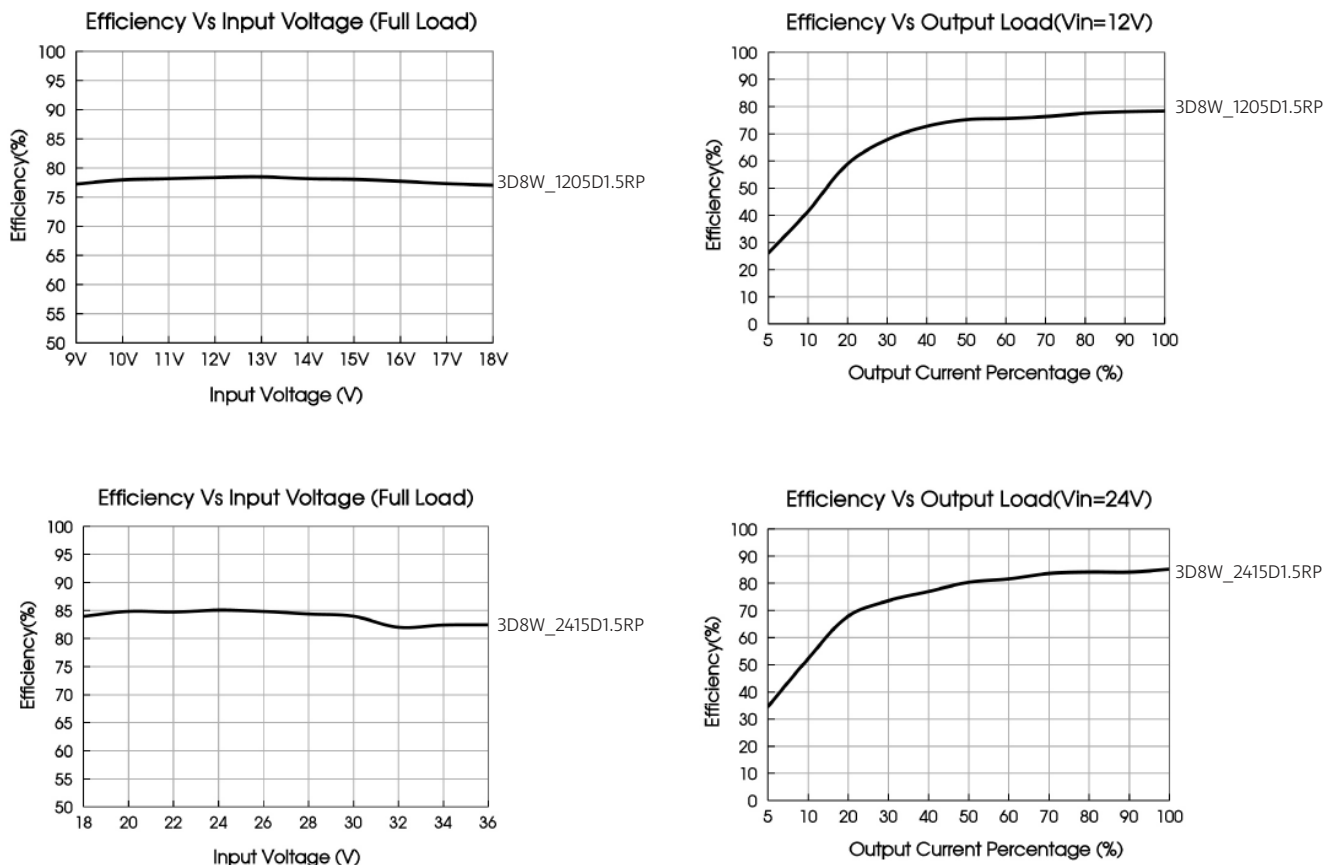


Fig-2.2

## 3D8W\_1.5RP series

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### Recommended circuit

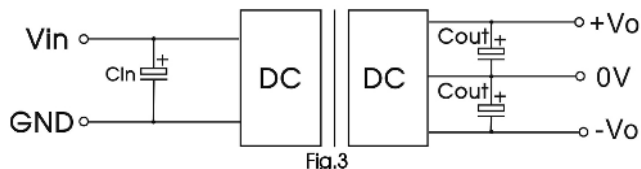
All the DC/DC converters of this series are tested before delivery using the recommended circuit shown below. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values  $C_{in}$  and  $C_{out}$ , connecting a "Y" capacitor between input "GND" and output "0V", and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

#### Single Output



Vin (VDC)	12VDC	24VDC
Cin	47 $\mu$ F/25V	47 $\mu$ F/50V
Vin (VDC)	5VDC, 9VDC	12VDC, 15VDC
Cin	100 $\mu$ F/6.3V	10 $\mu$ F/35V

#### Dual Output

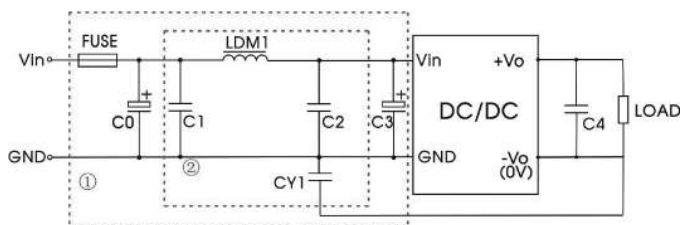


Vin (VDC)	12VDC	24VDC
Cin	47 $\mu$ F/50V	47 $\mu$ F/50V
Vin (VDC)	5VDC, 9VDC	12VDC, 15VDC
Cin	47 $\mu$ F/16V	10 $\mu$ F/25V

Fig.3

### EMC compliance circuit

#### Single Output



Vin	12VDC	24VDC
FUSE	slow blow, choose according to actual input current	
C0	1000 $\mu$ F/25V	680 $\mu$ F/50V
C1	4.7 $\mu$ F/50V	
LDM1	15 $\mu$ H	
C2	4.7 $\mu$ F/50V	
C3	330 $\mu$ F/50V	
CY1	1nF/2KV	
C4	Refer to the Cout in recommended circuit	

#### Dual Output

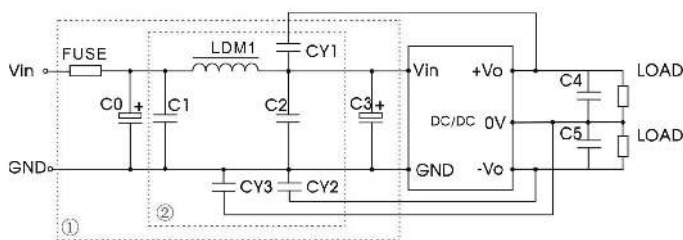


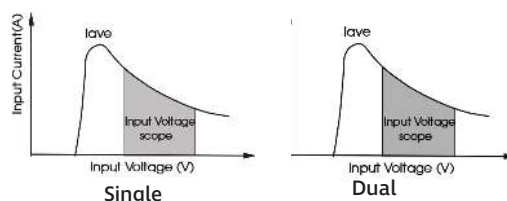
Fig.4

Vin	12VDC	24VDC
Vout	$\pm$ 5V, $\pm$ 9V, $\pm$ 12V	$\pm$ 15V, $\pm$ 5V, $\pm$ 9V, $\pm$ 12V, $\pm$ 15V
FUSE	slow blow, choose according to actual input current	
C0	1000 $\mu$ F/25V	680 $\mu$ F/50V
C1	4.7 $\mu$ F/50V	
LDM1	10 $\mu$ F	
C2	10 $\mu$ F/50V	
C3	330 $\mu$ F/50V	
CY1	1nF/2000V	470pF/2000V
CY2	1nF/2000V	470pF/2000V
CY3	1nF/2000V	470pF/2000V
C4, C5	Refer to the Cout Fig.3	

### Input current

When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of DC/DC module (see Fig. on the right).

Generally: Vin=12V series  $I_{ave}$  = 205mA (Single Vout)  $I_{ave}$  = 600mA (Dual Vout)  
 Vin=24V series  $I_{ave}$  = 104mA (Single Vout)  $I_{ave}$  = 300mA (Dual Vout)



### Output load requirements

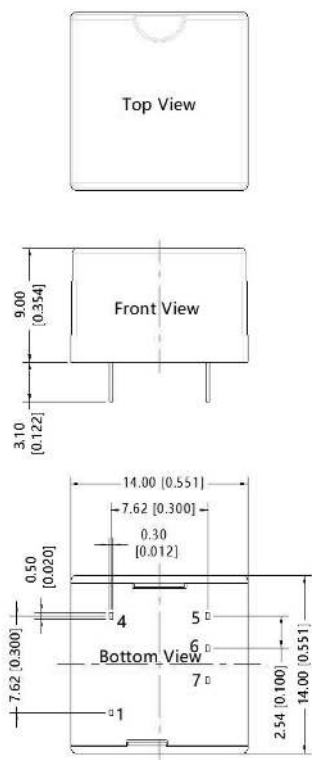
When using, the minimum load of the module output should not be less than 5% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 5% dummy load in parallel at the output end, the dummy load is generally a resistor, please note that the resistor needs to be used in derating.

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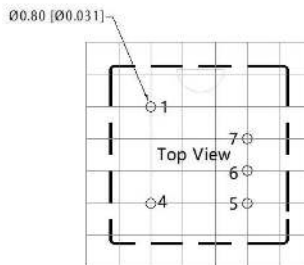
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## Mechanical dimensions

Through hole package



THIRD ANGLE PROJECTION

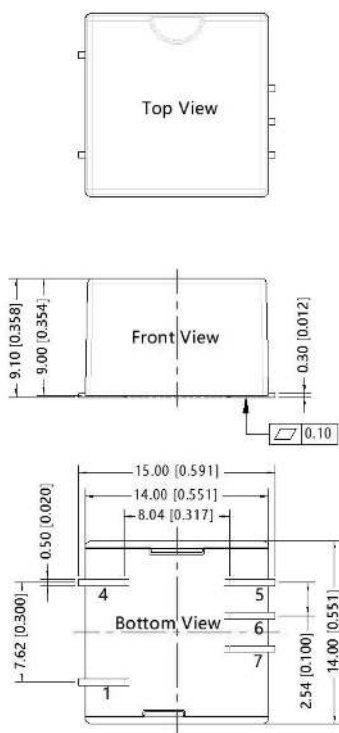


Note: Grid 2.54\*2.54mm

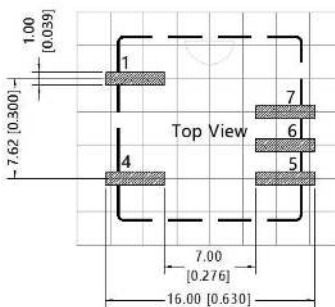
Pin-Out	
Pin	Function
1	GND
4	Vin
5	+Vo
6	0V
7	-Vo

Note:  
Unit: mm[inch]  
Pin diameter tolerances: ±0.10[±0.004]  
General tolerances: ±0.50[±0.020]

SMD package



THIRD ANGLE PROJECTION



Note: Grid 2.54\*2.54mm

Pin-Out	
Pin	Function
1	GND
4	Vin
5	+Vo
6	0V
7	-Vo

Note:  
Unit: mm[inch]  
Pin diameter tolerances: ±0.10[±0.004]  
General tolerances: ±0.50[±0.020]