Descriptions

20W isolated，DC/DC Converter



RoHS

3 Years Warranty

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- I/O isolation test voltage of 3000VDC & 1500VAC
- Operating ambient temperature range: -40℃ to +85℃
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Low ripple & noise
- Meets EN50121-3-2/CISPR32/EN55032 CLASS A, without extra components
- Meets IEC62368, UL62368, EN62368 standards
- Meets requirements of railway standard EN50155
- Industry standard pin-out

Applications

- Offered with various mounting options, it is ideally suiting electronic equipment and railway vehicle applications using 72V, 96V and 110V battery voltages

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency(%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DRWLD20-E1D12	110 (40-160)	170	±12	±833/0	83/85	680
	DRWLD20-E1D15			±15	±667/0	84/86	470
	DRWLD20-E1D24			±24	±417/0	84/86	220

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	Nominal input voltage		--	212/3	217/8	mA
	Reflected Ripple Current	Nominal input voltage		--	25	--	
	Surge Voltage (1sec. max.)			-0.7	--	180	VDC
	Start-up Voltage	100% load		--	--	40	
	Under-voltage Protection			28	33	--	
	Start-up Time	Nominal input & constant resistance load		--	10	--	ms
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
	Ctrl①	Module on		Ctrl pin open or pulled high (3.5-12VDC)			
		Module off		Ctrl pin pulled low to GND (0-1.2VDC)			
		Input current when off		--	2	7	mA
Output Specifications	Voltage Accuracy	0% -100% load	+Vo	--	±1	±2	%
			-Vo	--	±1	±3	
	Linear Regulation	Input voltage variation from low to high at full load	+Vo	--	±0.2	±0.5	
			-Vo	--	±0.5	±1	
	Load Regulation②	5% -100% load	+Vo	--	±0.5	±1	
			-Vo	--	±0.5	±1.5	
	Cross Regulation	Vo1 load at 50%, Vo2 load at range of 10%-100%		--	--	±5	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation			--	±3	±5	%
	Temperature Coefficient	Full load		--	±0.02	±0.03	%/℃
	Ripple & Noise③	20MHz bandwidth, 5% -100% load		--	50	100	mV p-p
	Over-voltage Protection	Input voltage range		110	--	160	%Vo
	Over-current Protection			120	--	210	%Io
	Short-circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.		3000	--	--	VDC
		Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	
		Input-output, Electric Strength Test for 1 minute with a leakage current of 5mA max.		1500	--	--	VAC
	Insulation Resistance	Input-output insulation at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	2200	--	pF
	Operating Temperature	See Fig. 1		-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH

General Specifications	Pin Soldering Resistance Temperature④	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	℃
		Wave soldering, maximum 10 seconds		255	260	265	
	Switching Frequency⑤	PWM mode		--	300	--	kHz
	Vibration			IEC61373 - Category 1, Grade B			
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours
Mechanical Specifications	Case Material	Aluminum alloy					
	Dimensions	Without heat sink	Horizontal package	50.80 *25.40*11.80 mm			
			E2S chassis mounting	76.00 *31.50*21.20 mm			
			D4S Din-rail mounting	76.00*31.50 *25.80 mm			
		With heat sink	Horizontal package	51.40 *26.20 *16.50 mm			
			E2S chassis mounting	76.00 *31.50 *25.30 mm			
			D4S Din-rail mounting	76.00 *31.50 *29.90 mm			
	Weight	Without heat sink	Horizontal package/E2S chassis mounting/D4S Din-rail mounting	26.0g/48.0g/68.0g(Typ.)			
		With heat sink	Horizontal package/E2S chassis mounting/D4S Din-rail mounting	34.0g/56.0g/76.0g(Typ.)			
	Cooling Method	Free air convection					

Note:
①The Ctrl pin voltage is referenced to input GND;
②Load regulation for 0%-100% load is ±5%;
③Ripple & Noise at ≤ 5% load is 5%Vo. Max. The "parallel cable" method is used for Ripple and Noise test;
④The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection;
⑤Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.
Notes for specific operation.

Electromagnetic Compatibility (EMC) (EN62368)

Emissions	CE	CISPR32/EN55032	CLASS A (without extra components) / CLASS B (see Fig.5 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without extra components) / CLASS B (see Fig.5 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	20V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV (see Fig.3 or Fig.4 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (2Ω 18uF see Fig.3 for recommended circuit) line to ground ±4KV (12Ω 9uF see Fig.3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

Electromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2 150kHz-500kHz 99dBuV (see Fig.5 for recommended circuit) EN55016-2-1 500kHz-30MHz 93dBuV
	RE	EN50121-3-2 30MHz-230MHz 40dBuV/m at 10m (see Fig.5 for recommended circuit) EN55016-2-1 230MHz-1GHz 47dBuV/m at 10m

Immunity	ESD	EN50121-3-2 Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	EN50121-3-2 20V/m	perf. Criteria A
	EFT	EN50121-3-2 ±2kV 5/50ns 5kHz (see Fig.3 or Fig.4 for recommended circuit)	perf. Criteria A
	Surge	EN50121-3-2 line to line ±1KV (42Ω 0.5uF see Fig.4 for recommended circuit)	perf. Criteria B
	CS	EN50121-3-2 0.15MHz-80MHz 10 Vr.m.s	perf. Criteria A

Characteristic Curve

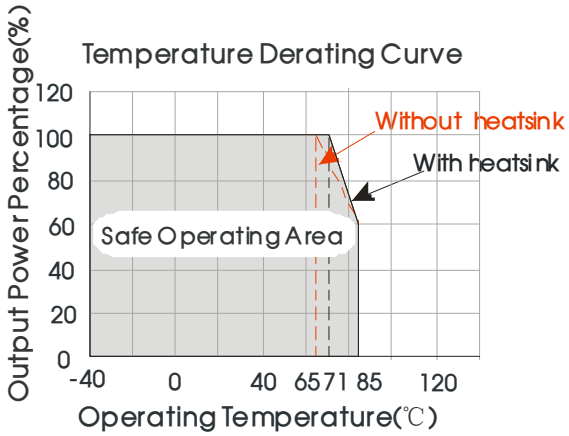
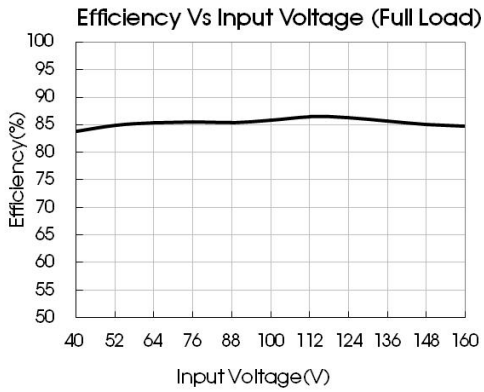
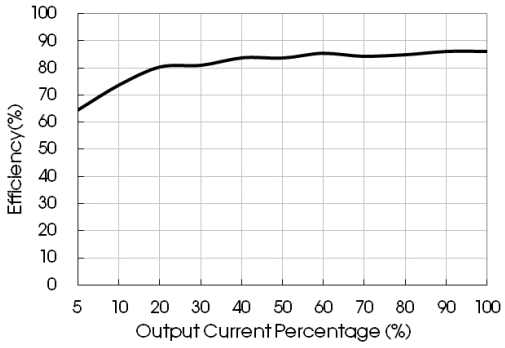


Fig. 1

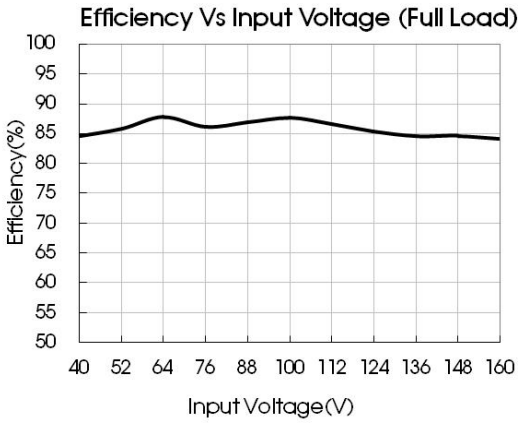
DRWLD20-E1D12



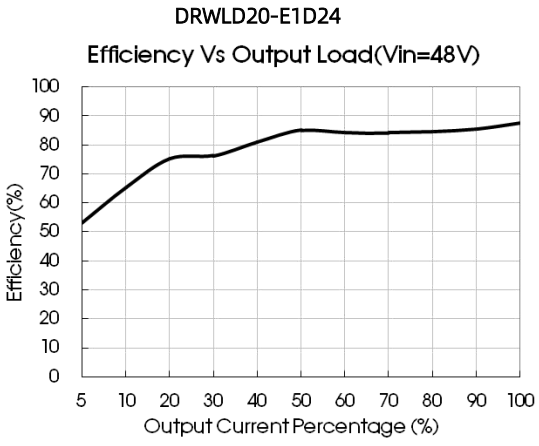
DRWLD20-E1D12



DRWLD20-E1D24



DRWLD20-E1D24



Design Reference

1. Typical application

①All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

②Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

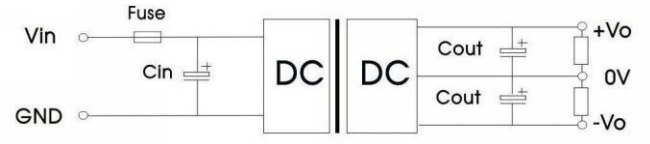


Fig. 2

Vout(VDC)	Fuse	Cin	Cout
±12/±15	2A, slow blow	10μF - 47μF	220μF/25V
±24			100μF/50V

2. EMC compliance circuit

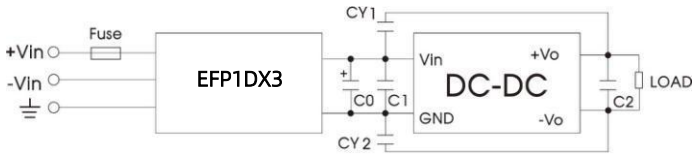


Fig. 3

Fig. 3 Parameter description

Output voltage	±12V	±15V	±24V
FUSE	Choose according to actual input current		
EFP1DX3	EFP1DX3 is the EMC auxiliary component of our company. Input voltage range: 40V-160V		
C0	100μF/200V		
C1	47μF/200V		
C2	220μF/25V		100μF/35V
CY1、CY2	1000pF/400VAC		

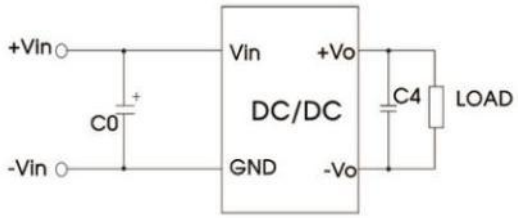


Fig. 4

Fig. 4/Fig. 5 Parameter description

Output voltage	±12V	±15V	±24V
C0	100μF/200V		
C1、C2	0.22μF/250V		
C3	47μF/200V		
LCM1、LCM2	30mH (common mode inductance)		
CY1、CY2、	1000pF/400VAC		
CY3、CY4	2200pF/400VAC		
C4	220μF/25V		100μF/35V

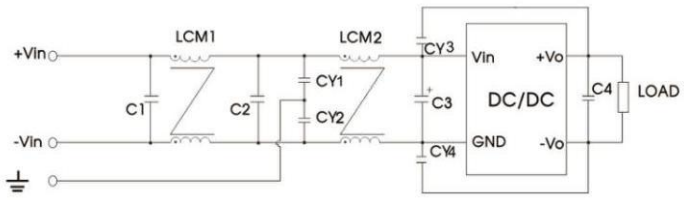
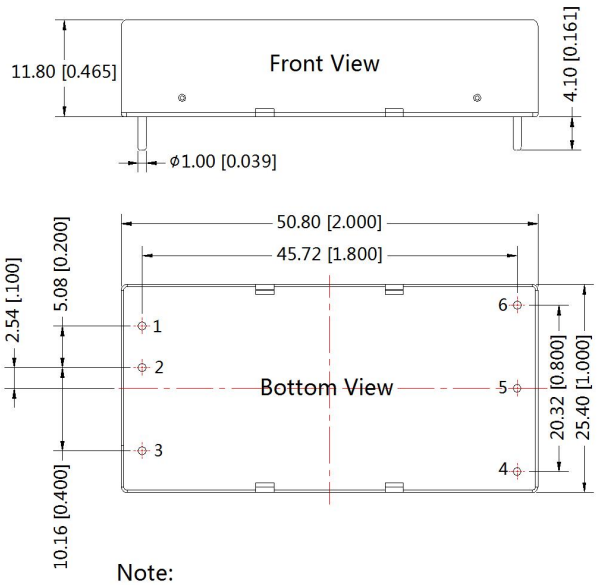


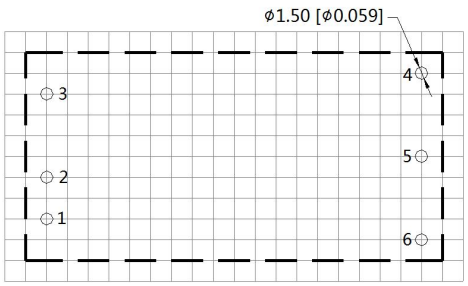
Fig. 5

3. The products do not support parallel connection of their output

Horizontal Package (without heat sink) Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





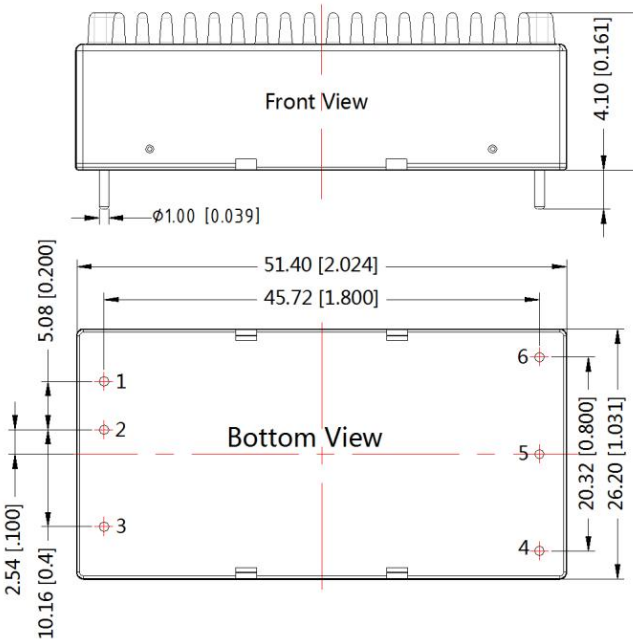
Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Dual
1	Vin
2	GND
3	Ctrl
4	-Vo
5	0V
6	+Vo

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

Horizontal Package (with heat sink) Dimensions

THIRD ANGLE PROJECTION

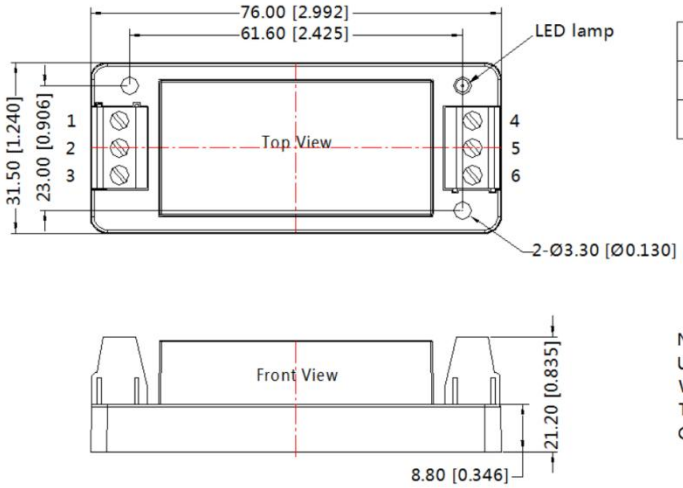


Pin-Out	
Pin	Dual
1	Vin
2	GND
3	Ctrl
4	-Vo
5	0V
6	+Vo

Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]

DRWLD20-E1DxxE2S (without heat sink) Dimensions

THIRD ANGLE PROJECTION

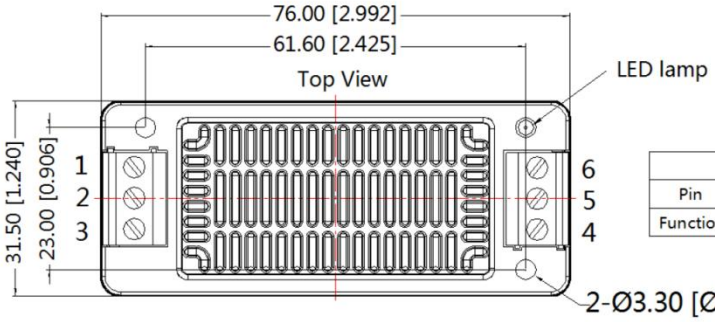


Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	-Vo	0V	+Vo

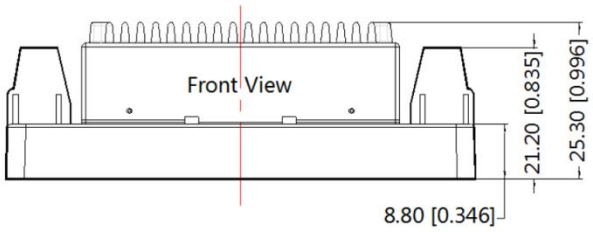
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

DRWLD20-E1DxxHE2S (with heat sink) Dimensions

THIRD ANGLE PROJECTION

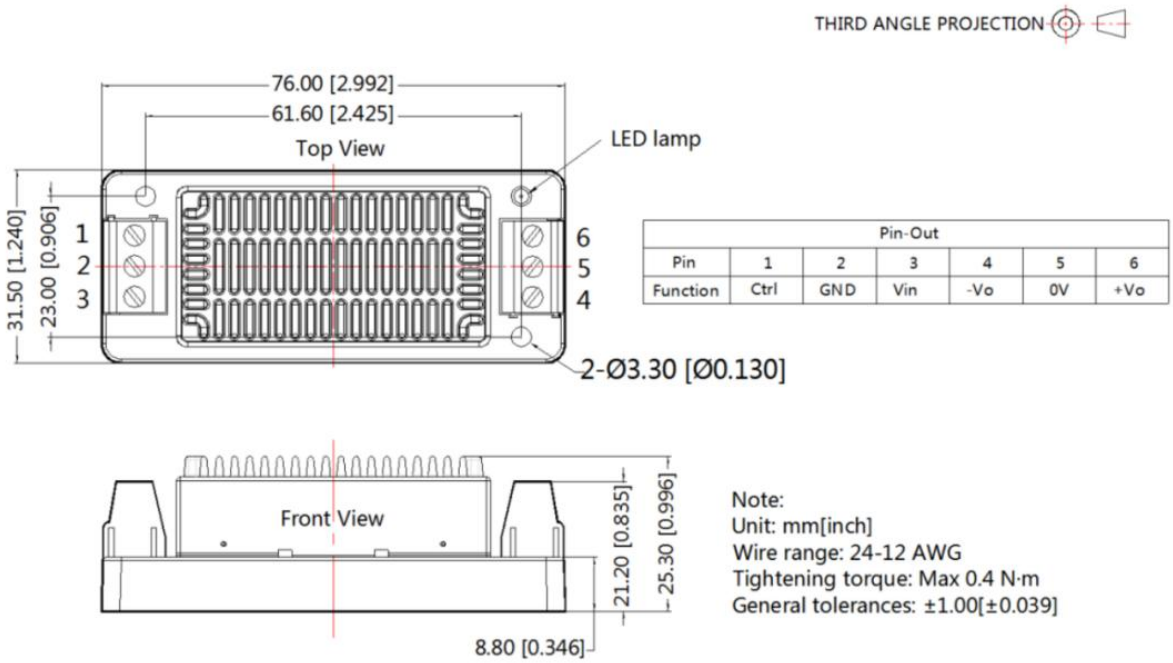


Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	-Vo	0V	+Vo



Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

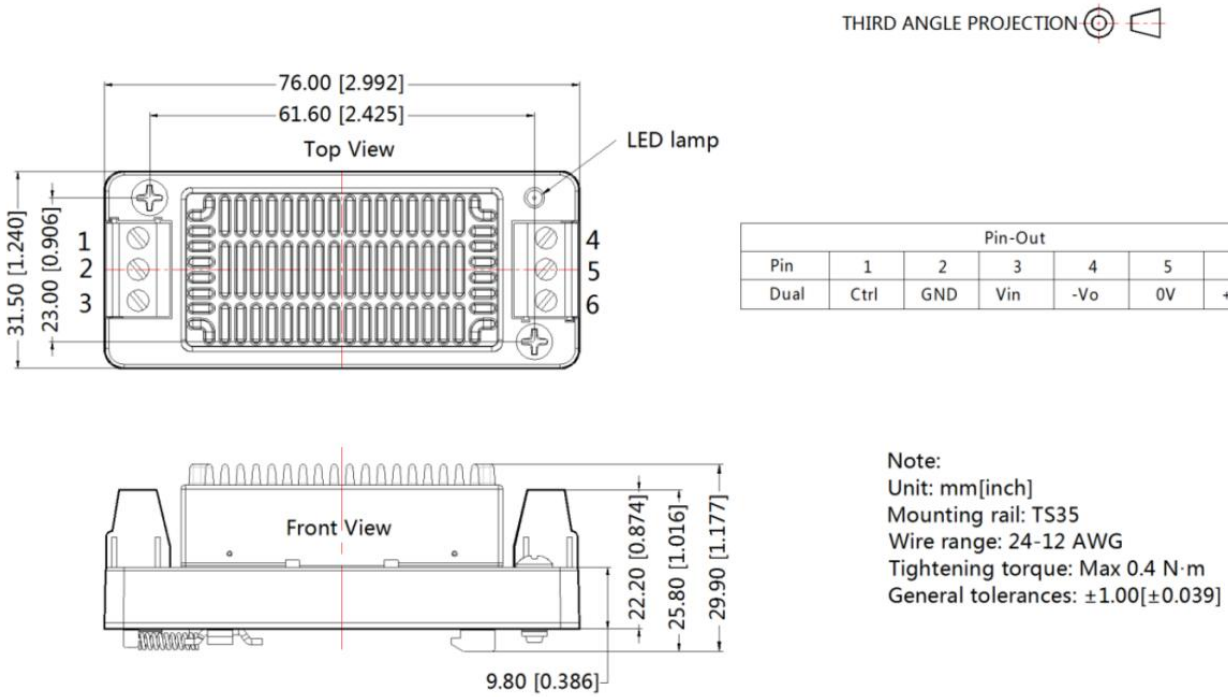
DRWLD20-E1DxxD4S (without heat sink) Dimensions



Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	-Vo	0V	+Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

DRWLD20-E1DxxHD4S (with heat sink) Dimensions



Pin-Out						
Pin	1	2	3	4	5	6
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo

Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Note:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.