Descriptions

40W isolated，DC/DC Converter





RoHS

CE Report EN 62368-1

UKCA Report BS EN 62368-1

Features

- Wide 2:1 input voltage range
- High efficiency up to 91%
- No-load power consumption as low as 0.3W
- I/O isolation test voltage: 1.5K VDC
- Output short-circuit, over-voltage, over-current protection
- Operating ambient temperature range: -40℃ to +85℃
- Six-sided metal shielded package
- Input reverse polarity protection available with chassis (E2S) or DIN-Rail mounting (D4S) version
- Industry standard pin-out

Applications

- Data transmission device
- Battery powered systems
- Telecommunication device
- Distributed power supply system
- Remote control system
- Industrial robot
- Hybrid modular/digital system

Selection Guide

Certification	Part No.①	Input Voltage (VDC)		Output		Full Load Efficiency③(%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max. ②	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DELD40-B2405	24 (18-36)	40	5	8000/0	86/88	10000
--	DELD40-B2405H						
	DELD40-B2405(E2S/D4S)						
EN/BS EN	DELD40-B2412(H)			12	3333/0	88/90	2700
--	DELD40-B2412(H)(E2S/D4S)						
--	DELD40-B2415(H)(E2S/D4S)			15	2667/0	90/91	1680
EN/BS EN	DELD40-B2415(H)						
EN/BS EN	DELD40-B2424(H)			24	1667/0	90/91	680
--	DELD40-B2424(H)(E2S/D4S)						
EN/BS EN	DELD40-B4812	48 (36-75)	80	12	3333/0	88/90	2700
--	DELD40-B4812H						
	DELD40-B4812(H)(E2S/D4S)						
EN/BS EN	DELD40-B4815			15	2667/0	90/91	1680
--	DELD40-B4815H						
	DELD40-B4815(H)(E2S/D4S)						

EN/BS EN	DELD40-B4824(H)			24	1667/0	90/91	680
--	DELD40-B4824(H)(E2S/D4S)						

Note:
①Use "H" suffix for heat sink mounting, with "H" products EN62368 approved, without "H" products meets EN62368 test standards;
②The minimum input voltage and starting voltage of E2S and D4S model are 1VDC higher than those of DIP package due to input reverse polarity protection function;
③Exceeding the maximum input voltage may cause permanent damage;
④Efficiency is measured In nominal input voltage and rated output load; efficiencies for E2S and D4S model is decreased by 2% due to the input reverse polarity protection circuit
⑤Product 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)	24VDC input	DELD40-B2405(H)(E2S/D4S)	--	1894/60	1938/100	mA
			Other outputs	--	1852/12	1894/25	
		48VDC input		--	926/12	947/25	
	Reflected Ripple Current	Nominal input voltage		--	30	--	
	Surge Voltage (1sec. max.)	24VDC input		-0.7	--	50	VDC
		48VDC input		-0.7	--	100	
	Input Under-voltage Protection	24VDC input		13	15.5	--	
		48VDC input		26	33	--	
	Start-up Voltage	24VDC input		--	--	18	
		48VDC input		--	--	36	
	Start-up Time	Nominal input voltage & constant resistance load		--	10	150	ms
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
	Ctrl ①	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		--	5	10	mA
Output Specifications	Voltage Accuracy	DELD40-B2405H (E2S/D4S)②	5%-100% load	--	±1	±3	%
		Other outputs	0%-100% load				
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation	DELD40-B2405H (E2S/D4S)③	5%-100% load	--	±0.5	±1	
		Other outputs	0%-100% load				
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation		DELD40-B2405(H(E2S/D4S)	--	±5	±8	%
			Other outputs	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, nominal input voltage, 100% load		--	50	100	mV p-p

	Trim		--	±10	--	%Vo
	Over-voltage Protection	Input voltage range	110	--	160	
	Over-current Protection		110	--	190	%Io
	Short-circuit Protection		Hiccup, continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2000	--	pF
	Operating Temperature	See Fig. 1	-40	--	+85	℃
	Storage Temperature		-55	--	+125	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Pin Soldering Resistance Temperature⑤	Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	+300	℃
		Wave soldering, maximum 10 seconds	255	260	265	
	Vibration		10-55Hz, 10G, 30 Min. along X, Y and Z			
	Switching Frequency⑥	PWM mode	--	300	--	kHz
	MTBF	MIL-HDBK-217F@25℃	500	--	--	k hours

Mechanical Specifications	Case Material	Aluminum alloy		
	Dimensions	Without heat sink	Horizontal package	50.80 × 25.40 × 11.80 mm
			E2S wiring package	76.00 × 31.50 × 21.20 mm
			D4S rail package	76.00 × 31.50 × 25.80 mm
		With heat sink	Horizontal package	51.40 × 26.20 × 16.50 mm
			E2S wiring package	76.00 × 31.50 × 25.30 mm
			D4S rail package	76.00 × 31.50 × 29.90 mm
	Weight	Without heat sink	Horizontal package/E2S wiring package/D4S rail package	26.8g/49.8g/69.8g (Typ.)
		With heat sink	Horizontal package/E2S wiring package/D4S rail package	36.0g/59.0g/79.0g (Typ.)
	Cooling Method	Free air convection		

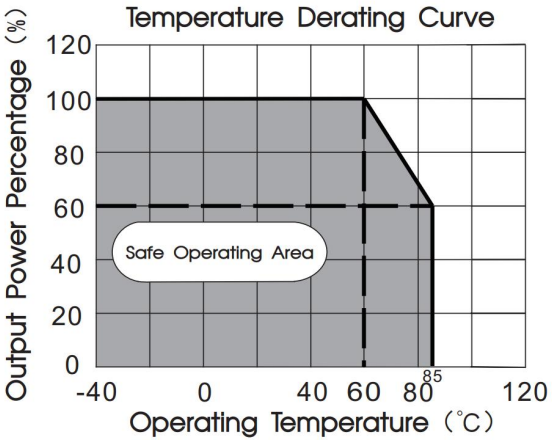
Note:
①The Ctrl pin voltage is referenced to input GND;
②DELD40-B2405(H)(E2S/D4S) 0%-100% output voltage accuracy 5% max;
③DELD40-B2405(H)(E2S/D4S) 0%-100% Load Regulation 5% max;
④The "parallel cable" method is used for Ripple and Noise test;
⑤The pin soldering temperature tolerance is not the actual 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
⑥Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

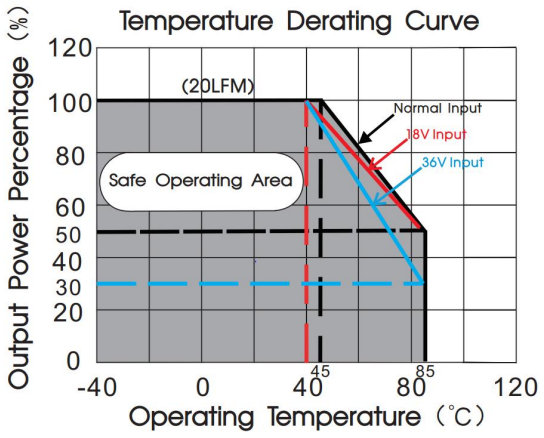
Emissions	CE	CISPR32/EN55032 CLASS B (see Fig.3-② for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig.3-② for recommended circuit)

Immunity	ESD	Other outputs	IEC/EN61000-4-2 Contact ±6KV	perf. Criteria A
		DELD40-B2405(H)	IEC/EN61000-4-2 Contact ±4KV	perf. Criteria B
	RS		IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	Other outputs	IEC/EN61000-4-4 ±2KV (see Fig.3-① for recommended circuit)	perf. Criteria A
		DELD40-B2405(H)	IEC/EN61000-4-4 ±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge	Other outputs	IEC/EN61000-4-5 line to line ± 2KV (see Fig.3- ① for recommended circuit)	perf. Criteria A
		DELD40-B2405(H)	IEC/EN61000-4-5 line to line ± 2KV (see Fig.3- ① for recommended circuit)	perf. Criteria B
	CS	Other outputs	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
		DELD40-B2405(H)	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A

Characteristic Curve



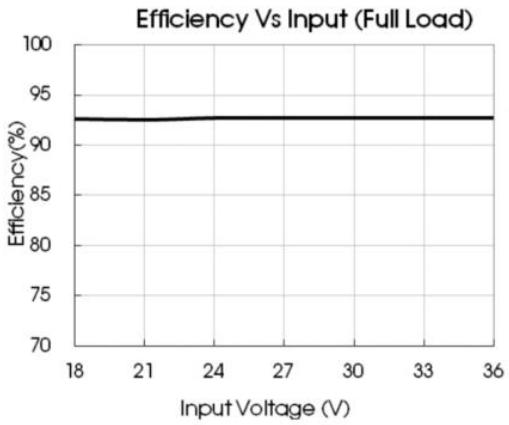
Other outputs(with heatsink)



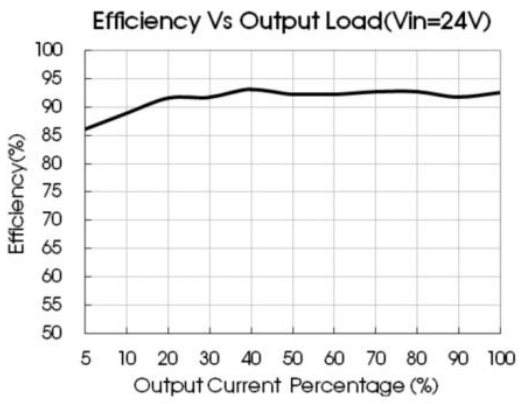
DELD40-B2405H(E2S/D4S)

Fig. 1

DELD40-B2424H



DELD40-B2424H



Design Reference

1. Typical application

①All 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 max. capacitive load value of the product.



Fig.2

output voltage (VDC)	Cout(μF)	Cin(μF)
5/12/15/24	100	100

2. EMC solution-recommended circuit

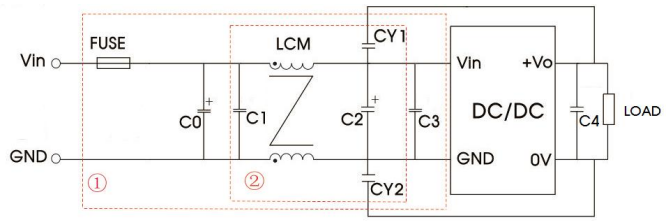


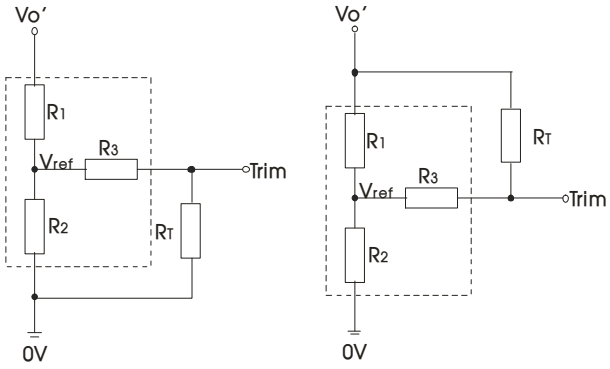
Fig. 3

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
C0	680μF/50V	680μF/100V
C1, C3	4.7μF/50V	4.7μF/100V
C2	330μF/50V	330μF/100V
C4	Refer to the Cout in Fig.2	
LCM	2.2mH	
CY1, CY2	2.2nF/2KV	

3. Trim function for output voltage adjustment (open if unused)



Calculation formula of Trim resistance:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

R_T = Trim Resistor value;

a = self-defined parameter

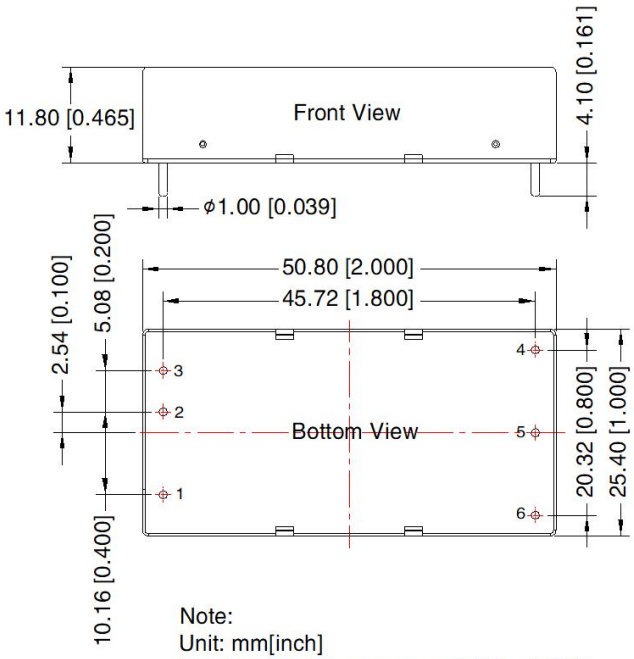
Vo' = desired output voltage

TRIM resistor connection (dashed line shows internal resistor network)

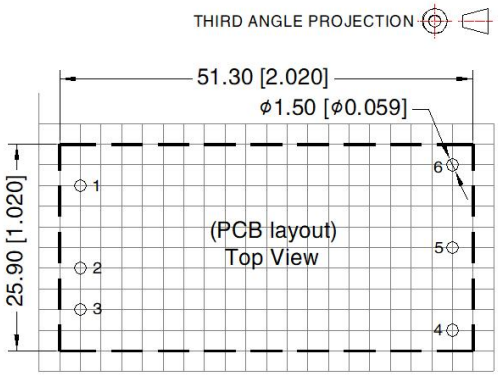
Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	2.880	2.87	10	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	15	2.5

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

DELD40-Bxxxx Dimensions and Recommended Layout



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

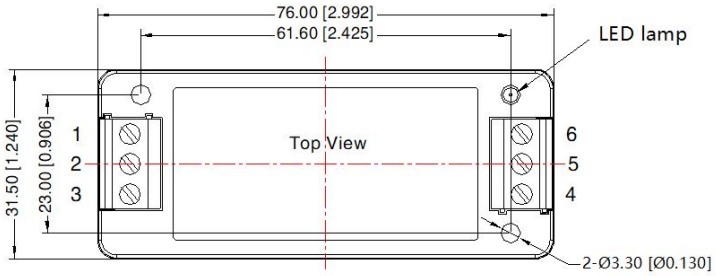


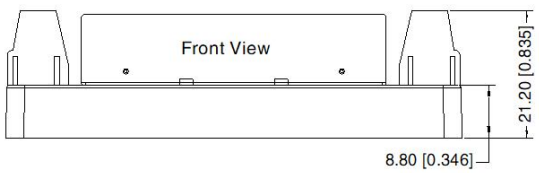
Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V
6	Trim

DELD40-BxxxxE2S Dimensions and Recommended Layout





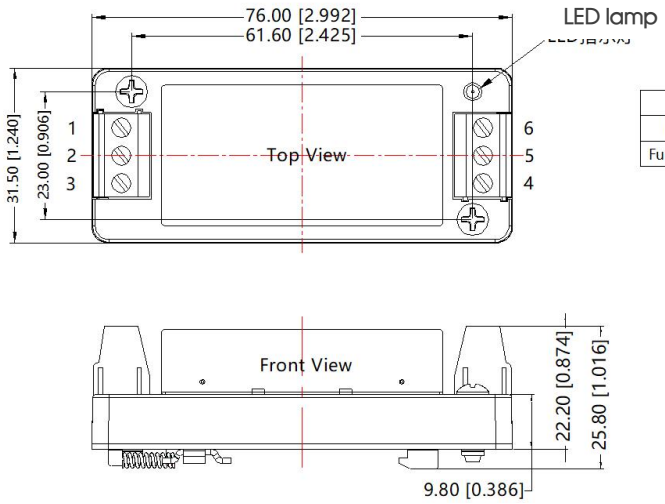


Pin–Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	+Vo	0V	Trim

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

DELD40-BxxxxD4S Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

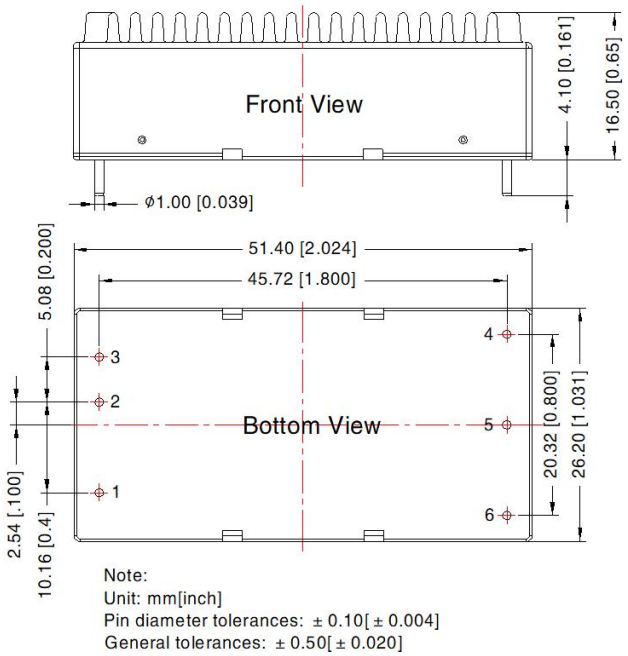


Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	+Vo	0V	Trim

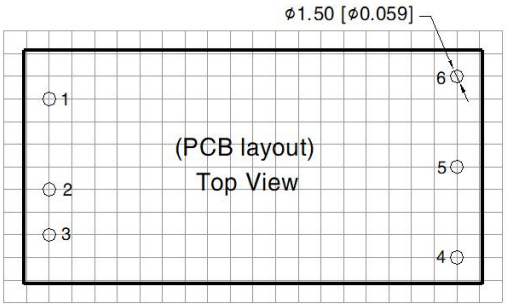
Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

DELD40-BxxxxH Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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

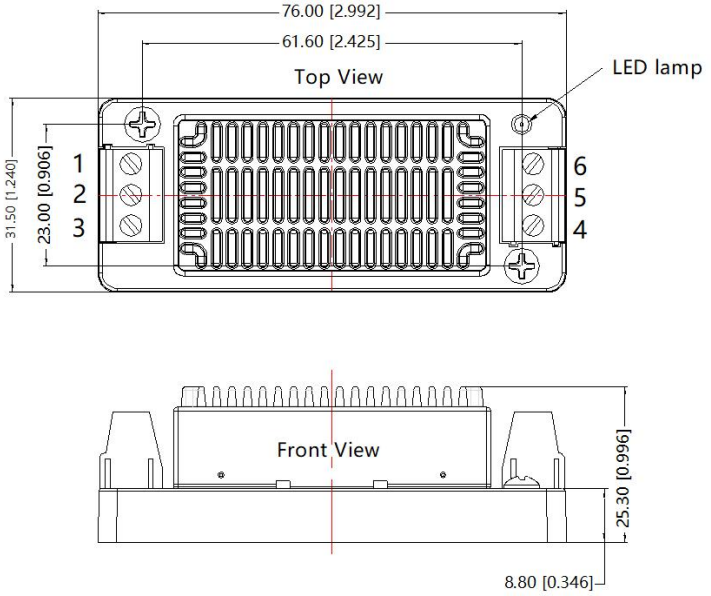


Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V
6	Trim

DELD40-BxxxxHE2S Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

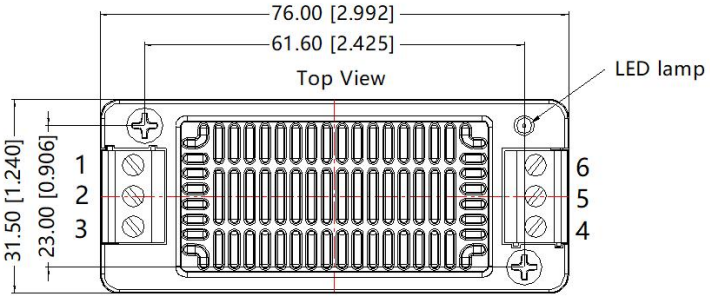


Pin-Out						
Pin	1	2	3	4	5	6
Function	Ctrl	GND	Vin	+Vo	0V	Trim

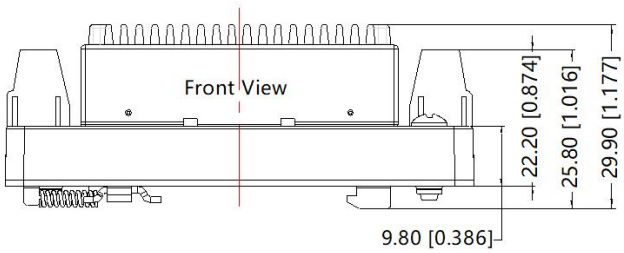
Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

DELD40-BxxxxHD4S Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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



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.