Electronic Design & Research is a pioneer in developing and manufactures high-speed, high-power relays/switches. Since 1998, we have produced vast varieties of Solid-State Modules and Devices. Our products have being used in thousand defense related and industrial applications.

PIEZO DRIVERS
VIDEO SWITCHES
½ BRIDGE DRIVERS
Q-TYPE HIGH-PASS FILTERS
PRECISION F-TO-V CONVERTERS
SOFT-LANDING SOLENOID DRIVERS
50HZ/60HZ COMB NOTCH FILTERS
SUPER-HIGH POWER, FAST SWITCHES
H-BRIDGE OR FULL-BRIDGE DRIVERS
HIGH-POWER, HIGH-SPEED SWITCHES
UNIVERSAL ANALOG BUILDING MODULE
SIGNAL SWITCHING SEPARATING NETWORK
SOCKETS FOR RELAYS, SWITCHES AND DRIVERS
CHARGE-PUMP WIDE-BAND FM DETECTORS
LOW-NOISE, HIGH-VOLTAGE DC/DC CONVERTERS
DC-3PHASE AC RESONANCE MODE DRIVER FOR EV
DC-12PHASE AC RESONANCE MODE DRIVER FOR EV
PERPETUAL PULSE-WIDTH DISCRIMINATOR, US PATENT
½ AND H FUZZY LOGIC SOCKETS FOR VARIOUS RELAYS
FUZZY-LOGIC SPDT RELAYS, SWITCHES AND ½ DRIVERS
FULLY PROTECTED, SOLID-STATE DPST BRAKE, US PATENT
SINGLE POLE, SINGLE THROW RELAYS AND SWITCHES, (SPST)
POWER-DISTRIBUTING MODULE FOR MOTORCYCLES, US PATENT
SINGLE POLE, DOUBLE THROW RELAYS AND SWITCHES, (SPDT)
DOUBLE POLE, SINGLE THROW RELAYS AND SWITCHES, (DPST)
1-FORM B, SPST-NC (NORMALLY CLOSED) SOLID STATE RELAYS
CHARGE-AND-ADD, UP/DOWN DC/DC CONVERTERS, US PATENT
1-FORM B AND 1-FORM A, DPST-NC/NO SOLID STATE RELAYS
µ-POWER CONTROLLER FOR MAGNETIC LATCHING VALVES, US PATENT
HIGH VOLTAGE, NANA-SECONDS RISE/FALL TIME, PUSH-PULL DRIVERS
SUPER-LOW NOISE PREAMPLIFIERS FOR A LOW AND HIGH IMPEDANCE SOURCES
µ-CONTROL, HIGH-POWER SPST-NC, NORMALLY CLOSED RELAYS, US PATENT

We are working diligently to bring new devices to the market and to meet your requests. Above is a list of family of devices we developed and manufacturing. Most of them covered by propriety technologies and some of them so unique that we filed and receive patents. We stock an inventory of available products that exceeds several thousands in our warehouse. We keep a small number of popular devices in stock and ready to ship immediately. Our production capacities exceed 10,000 devices per months with two production robots programmed and working at a full speed.

For your unique applications that required a different voltage, current or speed, ordering instruction (on the last page) could be useful in the creation a new part and summarizing what you needed. Do not hesitate to send us an email: info@vsholding.com for any additional information, delivery schedule, and prices.

Thank you,

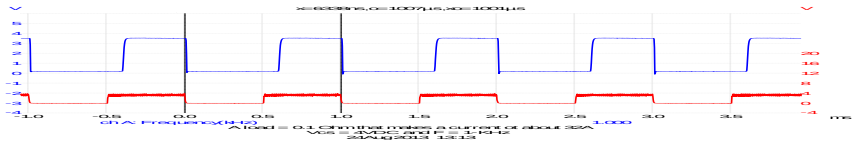
VS Holding LLC
Electronic Design & Research

VLADIMIR A. SHVARTSMAN, PH.D.

V_SHVARTSMAN@VSHOLDING.COM

Panel Mount SSR
Micro-power "µDPL" SPST-NO SSRs
From 1A to 240A & from 24V to 1,700 V
1 Form A, SPST-NO Solid-State Relays

DC control (ask for an AC control)
MOSFETs output
Voltage ratings from 24 VDC (17VAC) to 1,700VDC (1,200VAC)
Current ratings from 1.0 A to 240 A
Requires no a heat sink at rated currents
Relays are easily paralleled for higher-current applications
Low control power of only 1.4mW at 2.8VDC
Low control voltage 2.8 – 5 VDC. Let us know if you might need a different voltage.
Maximum switching frequency 3 KHz



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Rating Currents	**100VDC/140A**	**~72VAC/40A**	**1,700VDC/2.8A**	**~1,200VAC/1.2A**
Device description	µPDL100D140/3	µPDL100A40/3	µPDL172D3/3	µPDL172A1/3
Part Number	EDR83114/1	EDR83142/1	EDR83138/1	EDR83147/1
Cost (USD) each per 100	**$145.91 ea/100**	**$159.68 ea/100**	**$134.91 ea/100**	**$153.60 ea/100**

Description	**OUTPUT SPECIFICATIONS**			
Operating Voltage [VDC and VDDC/AVC]	**0 to +100VDC**	**+/-100VDC (72VAC)**	**0 to +1,700VDC**	**+/-1,700VDC (1,200VAC)**
Max. OFF-State Leakage [µA] at V max	**30**	**20**	**15**	**15**
Max. ON-State Resistance [Ohms] at rated current	**0.0004**	**0.008**	**0.250**	**0.500**
Max. Load Current [Amps]	**140**	**40**	**2.8**	**1.2**
Minimum Load Current [µA]	**50**	**30**	**20**	**20**
Max. Surge Current [A DC] (1µs)	**500**	**750**	**1000**	**1300**
Max. ON-State Voltage Drop [V] at rated current	**0.45**	**0.525**	**0.75**	**0.75**

Description		**INPUT SPECIFICATIONS**			
Control Voltage			**from 2.8 to 5.2 VDC**		
Maximum Turn-ON Voltage			**2.4 VDC**		
Minimum Turn-OFF Voltage			**2.0 VDC**		
Maximum Input Current			**0.6 mA (2.8VDC), 10 mA (5.2 VDC)**		
Max. Turn-ON delay time	**[µsec]**	**115**	**110**	**100**	**100**
Max. Switching Frequency	**[Hz]**	**100**	**400**	**500**	**500**
Max. Turn-OFF delay time	**[µsec]**	**11**	**11**	**11**	**11**

Description	**GENERAL SPECIFICATIONS**			
Dielectric Strength, Input /Output/Base (50/60Hz)		**2500 Vrms**		
Min. Insulation Resistance at 500 VDC		**10^9 Ohm**		
Max. Capacitance, Input /Output		**50 pF**		
Ambient Operating Temperature Range		**-45 to 85 ºC**		
Ambient Storage Temperature Range		**-50 to 125 ºC**		
Wight (average)	**3.5 oz**	**3.0 oz**	**3.0 oz**	**3.0 oz**
Encapsulation		**Thermally conductive Epoxy**		
Terminals	**6-32 Screws – 10 in lbs. (control) 8-32 Screws and 10-32 – 20 in lbs. (power)**			

GENERAL NOTES

All parameters at 25 ºC and per section unless otherwise specified
Dielectric strength and isolation resistance are measured between input and output
Rated at other voltages/currents µPDL SPST-NO (normally opened) series relays are presented on the next page
In the same package, µPDL SPST-NC (normally closed) relays are available

1 Form A, SPST-NO Solid-State Relays to replace electromechanical relays

OUTPUT SPECIFICATIONS (We rate our devices at the maximum voltage/current no a heat sink is required)
(Here is a small list of available devices. Let us know if you need a device rated a different voltage or current).

Model	V range (VDC)	I rms	Idm	Rds [ON]	I surge	p/n
µDPL24D240	0 TO +24	240	800	.0002	1500	EDR83122
µDPL24A48	+/-24(15VAC)	48	220	.0004	400	EDR83139
µDPL40D50	0 TO +40	50	250	.0017	800	EDR83128
µDPL40D120	0 TO +40	120	440	.0008	1100	EDR83129
µDPL40A100	+/-40(28VAC)	100	360	.0008	1100	EDR83140
µDPL40D150	0 TO +40	150	600	.00035	1400	EDR83130
µDPL55D50	0 TO +55	50	200	.0017	800	EDR83131
µDPL55D100	0 TO +55	100	400	.0008	1100	EDR83132
µDPL55A90	+/-55(37VAC)	90	340	.0008	1100	EDR83141
µDPL55D150	0 TO +55	150	600	.00036	1400	EDR83133
µDPL75D50	0 TO +75	50	250	.0023	800	EDR83134
µDPL75D100	0 TO +75	100	400	.0013	1000	EDR83135
µDPL75D150	0 TO +75	150	600	.0007	1200	EDR83136
µDPL100D50	0 TO +100	50	250	.004	500	EDR83116
µDPL100D85	0 TO +100	85	250	.003	750	EDR83115
µDPL100D110	0 TO +100	110	450	.0012	1000	EDR83113
µDPL100A40	+/- 100(72VAC)	40	150	.004	500	EDR83142
µDPL100D140	0 TO +100	140	420	.0008	1300	EDR83114
µDPL150D80	0 TO +150	80	350	.002	800	EDR83117
µDPL150D55	0 TO +150	55	250	.0028	600	EDR83118
µDPL150A20	+/- 55(48VAC)	20	90	.0008	80	EDR83143
µDPL200D50	0 TO +200	50	200	.0037	600	EDR83119
µDPL300D35	0 TO +300	35	120	.009	140	EDR83120
µDPL500D30	0 TO +500	30	110	.019	420	EDR83121
µDPL900D14	0 TO +900	14	68	.075	260	EDR83126
µDPL900D20	0 TO +900	20	80	.060	280	EDR83127
µDPL900A3	+/-900(630VAC)	3	15	.564	75	EDR83144
µDPL900A5	+/-900(72VAC)	5	25	.280	114	EDR83145
µDPL900A7	+/-900(72VAC)	7	35	.150	130	EDR83146
µDPL122D2	0 TO +1,200	2	8	.500	30	EDR83124
µDPL122D10	0 TO +1,200	10	40	.110	200	EDR83123
µDPL122D20	0 TO +1,200	20	90	.110	380	EDR83137
µDPL122A3	+/-1200(840VAC)	3	9	.500	36	EDR83147
µDPL122A7	+/-1200(840VAC)	7	20	.500	80	EDR83148
µDPL172D3	0 TO +1,700	2.8	8	1000	40	EDR83138
µDPL172A1	+/-1700(1240VAC)	1	3	.500	12	EDR83149

NOTE:

1 We recommend applying 20% less voltage and current down from rated for maintaining safety margins and extending life-expectancy beyond 10 years.
2 V range a range of voltages that can be applied to the output terminals
3 I rms a maximum allowed average current (amperes) through the output terminals
4 I dm a maximum allowed pulsing current (amperes) maintaining a 1.0% duty cycle or less.
5 Rds (ON) a maximum resistance between output terminals while the control signal is applied
6 I surge a maximum allowed surge current for pulses shorter than 25□s 1000% duty cycle.

There are some differences between devices such as a maximum switching frequency, turn-on delay and slope, consumption control current, etc. that somewhat depends on the output rating. Please request a specific data sheet if that is important for your application.

We manufacture large varieties of Solid-State Modules included but limited to; relays [SPST, SPDT and DPST], switches, ½ drivers, H-drivers, High-voltage relays and switches, Super-High current switching systems, etc.

There is no production set-up fee for an order of 400 and above for any type of previously developed Solid State Relay/Switch and Solid State Breaker.

Electronic Design & Research Inc. ** 7331 Intermodal Dr. ** Louisville ** KY 40258
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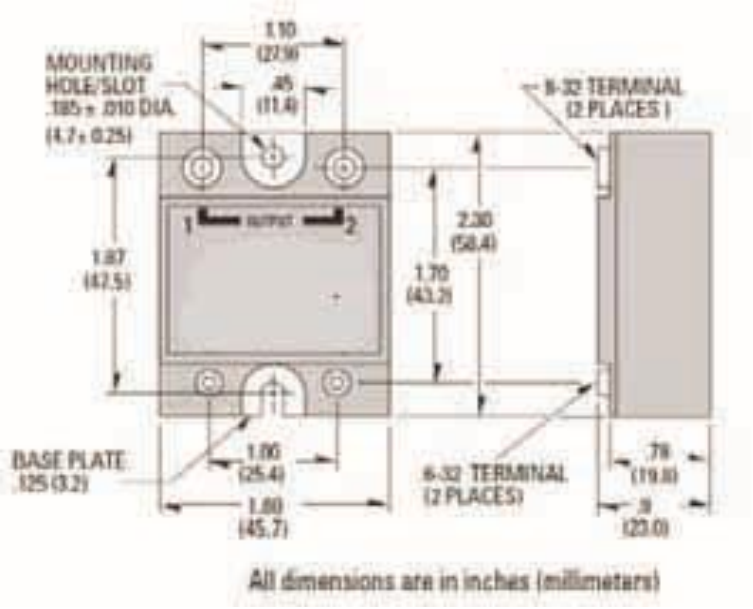
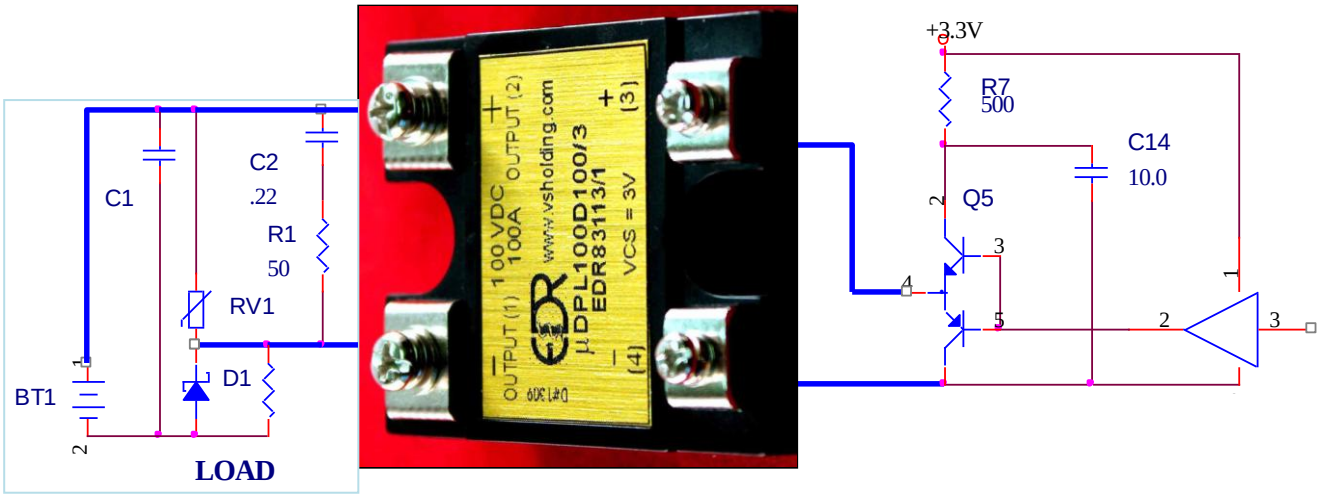
MECHANICAL DIMENSIONS



Application Note



1. The hook-up diagram presented above is applicable to both the µDPL and µRPM families of devices, because the input schematics functionally are rather similar. A stability and accuracy of the turn-on and turn-off relays depends on the sharpness of control signal rising and falling slopes. For that reason, integrating a push-pull driver (Q5) in your design for driving the relay is paramount important. Many commercially available IC chips built with a push-pull output.
2. A relay requires less than 1mA rms for maintaining the ON state, but the control current could be ten times higher during the turn-on phase. The R-C integrated network consisting of R7 and C14 helps averaging consumption input current thus making it possible to apply micro power for controlling kilowatts.
3. Semiconductors can provide a trouble-free unlimited life span of operation taking voltages, currents would not exceed rated, and of course, an ambient temperature and environment are serviceable. A simple protections install on the output would insure its survivability. Power devices built with MOSFETs, in general, are much easily withstanding 500% output current surge during a short time than 20% of excessive applied voltage. There are three simple and effective protections must be integrated for preventing a disaster. One of them is a high frequency, high-current schottky diode (D1) installed in parallel to a load. It is also called a flyback/clamp diode. A connective cable must be considered as a part of the load; hence, it is wise connecting the diode's cathode to the output terminal. Other protection is combination of a snubbing network including a capacitor and a resistor (C2 + R1) connected in series with a Transient Voltage Surge [TVS] diode (RV1) connected in parallel to it. Some designers use only the snubbing network, others do only TVS, and others use only the flyback diode. We recommend installing all three protections. The snubbing network along wouldn't provide sufficient protection against a high-power transient voltage surge.