



Electronic Design & Research
<http://www.vsholding.com>

Technology for people's ideas

Input Specifications:

Input DC Voltage see the Features
 Nominal Current 25mA

Typical Output Specifications (D4L30D22):

Operating DC voltage range 30 VDC
 Maximum continuous current 22 A
 Maximum surge current (IDM) - 2mS 700 A
 Continues current (ID) 200 A
 Maximum on-state resistance .003 Ohm
 Rising time 100 μS
 Delay-on time 275 μS
 Falling time 3 μS
 Delay-off time 17 μS
 Maximum switching frequency 250 Hz

* Test performed at the input current equal to 25 mA

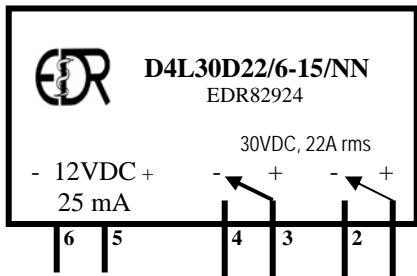
General Specifications:

Ambient operating temperature range -25° C to 85° C
 Ambient storage temperature range -55° C to 125° C
 Dielectric Strength input-to-output 2,500 VAC

Mechanical Specifications:

Weight(oz) .2
 Encapsulation ResTech 10207/053
 Dimensions for D4L package 1.11”H x 1.95”L x 0.775”W

Terminals/solder for SIP4m package control-0.40”, power-0.6”



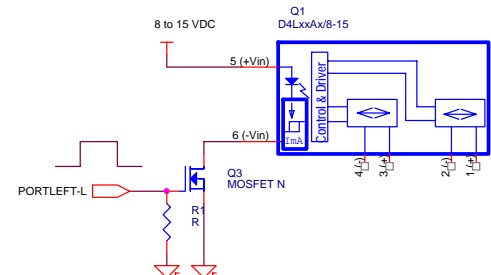
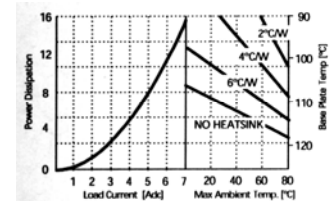
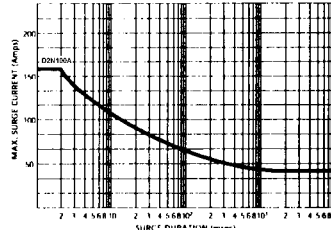
PIN1 +V for DC type and ~ for AC/DC type relay, 1st terminal
 PIN2 -V for DC type relay and ~ for AC/DC type relay, 1st terminal
 PIN3 +V for DC type relay and ~ for AC/DC type relay, 2nd terminal
 PIN4 -V for DC type relay and ~ for AC/DC type relay, 2nd terminal
 PIN5 +V control signal
 PIN6 -V (return) control signal

Transient Protection: All loads are inductive, even ones that are not so obvious or labeled. An inductive load produces a harmful transient voltage, which is much higher than the applied voltage, when it is turned on and off. A SSR built with a MOSFET output acts as an ideal switch and can produce a seemingly “non-inductive” load, which can cause damage if not suppressed. A transient voltage suppressor, which is bi-directional for an AC applied voltage and unidirectional for a DC applied voltage, should be used to clamp

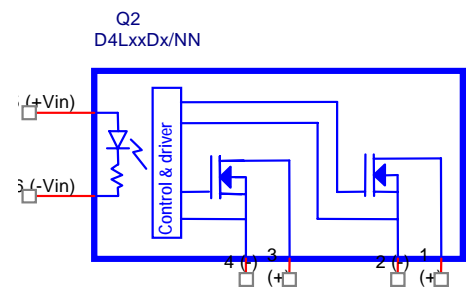
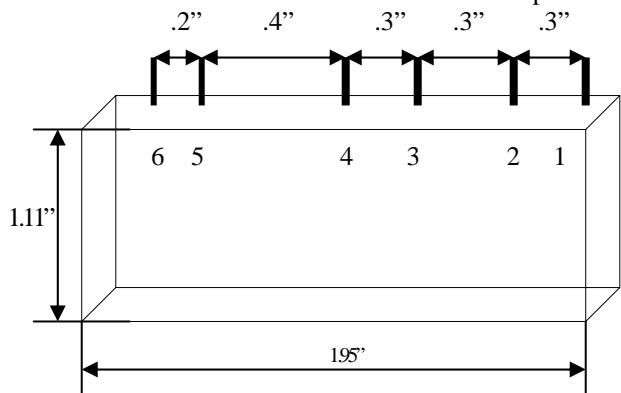
Low cost DPST (2 Form A) Relays

Up to 600VDC & +/-600 Solid State Relays

Features: Utilizes only 1.65 sq. in. of PCB area and only 1.1” tall
 A family of low cost Solid State Relays – designed for varieties of Industrial applications to control an average power.
 Relays offered with range of control (input) voltages and required only 25 mA to operate properly. There are several output voltages available: 30, 40, 55, 100, 200 and 600 VDC with a maximum current of up to 40A rms per terminal.



A SSR with the constant current input



ASSR with a LED input

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

Input Electrical Characteristics (Ta = 25°C) for D4Lxxx\8 VDC model,

Characteristic	Test Condition	Min	Typ.	Max.	Unit
Forward Voltage	Input = 10 mA	6.8	8	12	V
Forward Current		23	25	30	mA
Reverse Current	Reverse Voltage = 4V			10	μA
Forward Current (max)				50	mA
Reverse voltage (max)				7	V

Input Electrical Characteristics (Ta = 25°C) for D4Lxxx\6-15VDC model

Forward Voltage		6	12	15	V
Forward Current		24	25	26	mA
Reverse Current	Reverse Voltage = 3V			10	μA
Reverse voltage (max)				7	V

I. Switching time test – Load - 10VDC & 10A, Control Signal – 8 VDC & current 25 mA

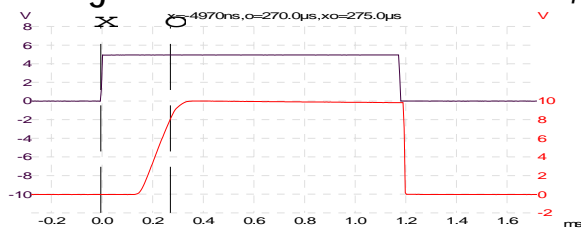


Figure 1. Turn-on delay is 275 μS

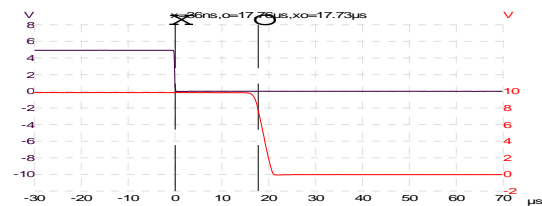


Figure 2. Turn-off delay is 17.73 μS

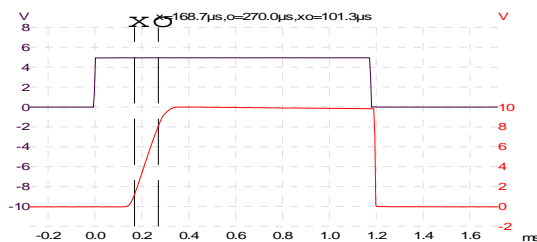


Figure 3. Rising Time is 101.3 μS

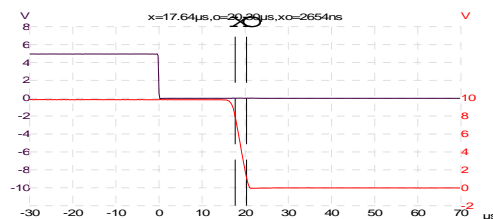


Figure 4. Fall Time is 2.654 μS

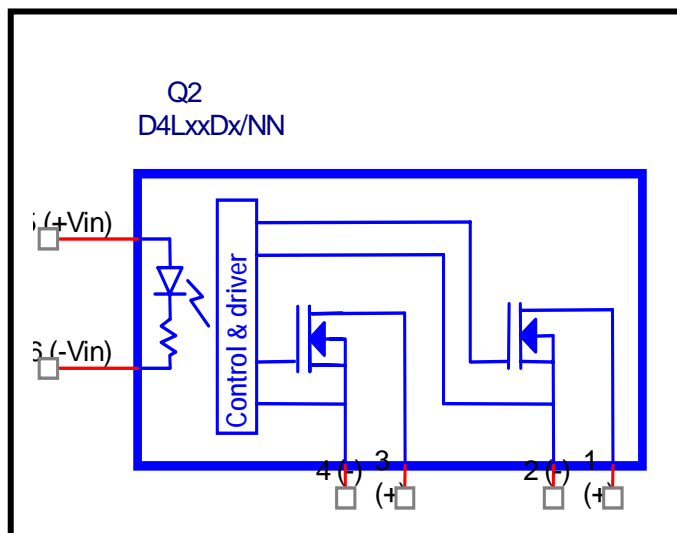


Figure 5. Simplified diagram of D4L-type

Choosing an external resistor with a D4Lxxx\8 VDC type SSRs.

It is easy to select a proper value of an external resistor if only voltage above the recommended range is available. In most cases, similar to an electromechanical relay, the switching cycle occurs no more than 100 Hz and a current of 23 mA is sufficient to control the relay. The current must be increased if the delay or rising slope must be improved. The following equation should be used to calculate the required control current:

$$R1 = (V_{cc} - 10) / 0.025$$

Where is R1 – required resistor; Vcc – an available control voltage

For example, 24 VDC is available hence an external resistor is $(24 - 10) / .025 = 480 \text{ Ohm}$.

Solid State Relay to replace an electromechanical relay

OUTPUT SPECIFICATIONS

(We rated our SSR's for the maximum current without a heat sink)

Model Number	Package	Operating Voltage	Id (A) cont.	Idm (A)	p/n
D4L30D12/xx	SIP6	0 – 30 VDC	12 A rms	120	EDR82923x
D4L30D22/xx	SIP6	0 – 30 VDC	22 A rms	200	EDR82924/x
D4L30D40/xx	SIP6	0 – 30 VDC	40 A rms	400	EDR82921/x
D4L30A11/xx	SIP6	+/- 30 VDC (21 VAC)	11 A rms	110	EDR82922/x
D4L30A20/xx	SIP6	+/- 30 VDC (21 VAC)	20 A rms	180	EDR82925/x
D4L40D14/xx	SIP6	0 – 40 VDC	14 A rms	130	EDR82926/x
D4L40D23/xx	SIP6	0 – 40 VDC	23 A rms	220	EDR82927/x
D4L40D40/xx	SIP6	0 - 40 VDC	40 A rms	460	EDR82928/x
D4L40A13/xx	SIP6	+/- 40 VDC (28 VAC)	13 A rms	120	EDR82949/x
D4L40A18/xx	SIP6	+/- 40 VDC (28 VAC)	18 A rms	200	EDR82950/x
D4L55D10/xx	SIP6	0 – 55 VDC	10 A rms	80	EDR82929/x
D4L55D18/xx	SIP6	0 – 55 VDC	18 A rms	150	EDR82930/x
D4L55D32/xx	SIP6	0 – 55 VDC	32 A rms	300	EDR82931/x
D4L55A9/xx	SIP6	+/- 55 VDC (38 VAC)	9 A rms	70	EDR82932/x
D4L55A16/xx	SIP6	+/- 55 VDC (38 VAC)	16 A rms	120	EDR82933/x
D4L100D5/xx	SIP6	0 – 100 VDC	5 A rms	40	EDR82934/x
D4L100D9/xx	SIP6	0 – 100 VDC	9 A rms	70	EDR82935/x
D4L100D19/xx	SIP6	0 – 100 VDC	19 A rms	50	EDR82936/x
D4L100A4/xx	SIP6	+/- 100 VDC (70 VAC)	4 A rms	35	EDR82937/x
D4L100A8/xx	SIP6	+/- 100 VDC (70 VAC)	8 A rms	60	EDR82938/x
D4L200D2/xx	SIP6	0 – 200 VDC	2 A rms	15	EDR82939/x
D4L200D4/xx	SIP6	0 – 200 VDC	4 A rms	28	EDR82940/x
D4L200D7/xx	SIP6	0 – 200 VDC	7 A rms	60	EDR82941/x
D4L200A2/xx	SIP6	+/- 200 VDC (140 VAC)	2 A rms	12	EDR82942/x
D4L200A6/xx	SIP6	+/- 200 VDC (140 VAC)	6 A rms	26	EDR82943/x
D4L600D1/xx	SIP6	0 – 600 VDC	1.2 A rms	9	EDR82944/x
D4L600D3/xx	SIP6	0 – 600 VDC	2.8 A rms	17	EDR82945/x
D4L600D4/xx	SIP6	0 – 600 VDC	4.1 A rms	32	EDR82946/x
D4L600A1/xx	SIP6	+/- 600 VDC (420 VAC)	1 A rms	8	EDR82947/x
D4L600A3/xx	SIP6	+/- 600 VDC (420 VAC)	2.7 A rms	16	EDR82948/x

A typical speed and frequency properties are shown on figures 1, 2, 3 and 4. There are some insignificant differences between relays and all depended on the output power. Please request a specific data sheet if that is important for your application.

Please specify the input control voltage. For example, on the part description D4L30D12/x/NN replace the “x” with 8 or with 6-15. Respectful control voltage represented at the end of part number in the following way, for an example EDR82922/10 and EDR82922/11. Both relays are almost the same and difference is only an applied control voltage, “10” if for 8VDC and “11” is for 6-15VDC;

A cost of a Solid State Relay is very much tied to an ordered volume, in most cases a relay costs in low teens in order of 1000 or more.

How to order EDR's Solid State Relay

A part description will be marked according to the description below but p/n EDRxxxxx will stay the same for already items in circulation (already sold).

D a b c e f /h /i /k /z /0 /v

“D” is for our standard packages.

(a) Package dimensions

1	0.615”H x 1.48”L x 0.290”W
2	1.15”H x 1.75”L x 0.4”W
3	1.15”H x 1.75”L x 0.8”W
4	1.15”H x 2.0”L x 0.92”W
5	1.15”H x 2.8”L x 1.15”W
6	DIP24, 0.375”H x 0.925”L x 0.53”W
7	panel mount, 0.82”H x 2.7”L x 2.0”W

(b) Speed - A device's ability to turn ON/OFF output terminal(s) per second

L	a low speed relay/switch, rated DC - 400 Hz, direct driving control
N	a medium speed relay/switch, rated DC - 25 KHz, direct driving control, SIP4
G	a medium speed relay/switch, rated DC - 25 KHz, low current control and power, SIP5
F	a fast relay/switch, rated DC - 150 KHz, low current control and power, SIP5
S	a super-fast relay/switch, rated DC - 1.4 MHz, low current control and power, SIP5
U	a super-fast relay/switch, rated DC - 1.2 MHz, direct driving control, SIP4

(c) Voltage - A maximum allowed voltage between output terminals

It must be replace with any of offered voltage, 30VDC, 45VDC, 75VDC, 100VDC, 200VDC, 500VDC, 650VDC, 800VDC, 900VDC, 1000VDC and 1100VDC, 1400VDC and 1700VDC.

Note: In an “AC” -relay a voltage specified a peak-to-peak maximum voltage and the maximum VAC can be calculated by multiplying a maximum allowed voltage by factor of 0.7.

(e) A relay can be use to control DC or AC/DC power

A	- a relay/switch designed to switch/chop an AC power
C	- a relay/switch with a normal close contacts
D	- a relay/switch designed to switch/chop a DC power

(f) A maximum allowed RMS CURRENT (Ampere) without a heat sink.

(h) We offer several standard control voltages 5VDC, 12VDC, 24VDC, 48VDC, 3-20VDC and 18-38VDC. Please specify the input control voltage, as for example D1L30D12/xx. Replace xx with a 3, 5, 12, 24, 48, 3-20 and 18-38 that is for 3VDC, 5VDC, 12VDC, 24VDC, 48VDC, 3-20VDC and 18-38VDC. Respectful control voltage represented at the end of part number in the following way, for an example EDR82653/1 and EDR82653/8. Both relays are almost the same and difference is only an applied control voltage, “1” if for 3VDC and “8” is for 18-38VDC;

<u>Control Voltage</u>	<u>Representation</u>	<u>Control Voltage</u>	<u>Representation</u>	<u>Control Voltage</u>	<u>Representation</u>
3VDC	1	5VDC	2	12VDC	3
24VDC	4	48VDC	5	26VDC	6
3-20VDC	7	18-38VDC	8	90-120VAC	9
8 VDC	10	6 – 15 VDC	11		

(i) A power supply required for a relay with an internal DC/DC converter. We offer several standard voltages 5VDC, 12VDC, 24VDC and 48VDC.

(k) Output terminals configurations

“N” or nothing	SPST or 1 Form A output terminals
“NN”	DPST or 2 Form A output terminals
“NNN”	3PST or 3 Form A output terminals
“T”	TOTEM output, break-before-make termination or NO-NO
“CN”	SPDT

(z) A relay/switch built with following standard isolations

“L” type relay is 2500 V
“N” type relay is 3000V, 4000VDC (“H4”) and 5200 (“H5”) VDC.

(0) Screening option, (NONE) for industrial, B for Class B, and S for Class S

(v) a Veri-Slope option.

Examples:

D3F1000D3/4-32/5 - a fast relay/switch designed to work with up to 1000 VDC and capable of 3 Ampere of rms. A control voltage can be any from 4VDC until 32VDC and required 5VDC to operate properly, SIP5 package.

D3N500A10/12/12 - a medium speed relay/switch designed to withstand 500VDC peak-to-peak or 350VAC and 10 Ampere of rms. A control voltage is 12VDC and the power supply is 12VDC, SIP4 package.