Panel Mount, Relays/Switches for DC and DC/AC

DPG100D32/5 - Powerful, Fast Solid State Switch for DC

Designed to deliver 20kW of power in microseconds

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

Technology for people's ideas

Features:

- **Utilizes only 4 sq. in. of area and only .9" tall**
- **32A continuously or up to 200A-pulse in a miniature package**
- **High sensitivity, even at high switching frequencies**
- **1000A surge current and only 0.006 Ohms on-state resistance**
- **Please inquire for a higher-speed and shorter turn-on/off delays**

Please specify input control voltage and power supply

p/n EDR82898/2

Input Specifications:

Input Control Current/Voltage	5VDC/1mA
Power Supply Voltage/Current	5VDC/20mA

Output Specifications:

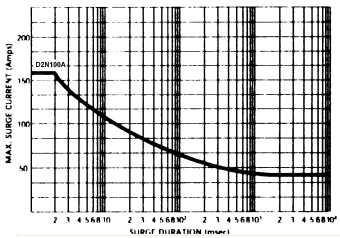
Operating DC voltage range	0 – 100 VDC
Maximum continuous current, Imc	32 A
Maximum Pulsing Current, Imp, 25°C	200 A
Maximum surge current, (Ims) - .1mS	1000 A
Maximum pulsing current, Impc, duty 1/50	300 A/10mS
Maximum on-state resistance	0.006 Ohm
Rising time	75 nS
Delay-on time	350 nS
Falling time (determined by a load)	
Delay-off time	320 nS
Maximum switching frequency	160.00 KHz
Maximum burst frequency (> 2 min)	250.00 KHz
Shortest pulse width	400 nS

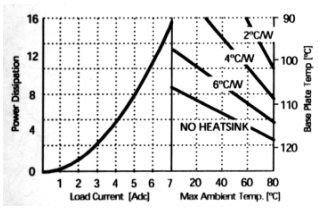
General Specifications:

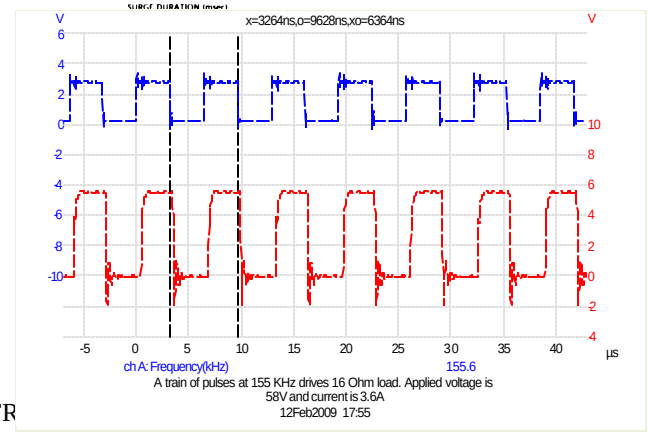
Ambient operating temperature range	-45° C to 85° C
Ambient storage temperature range	-55° C to 125° C
Dielectric Strength input-to-output	2,500Vrms(min)

Mechanical Specifications:

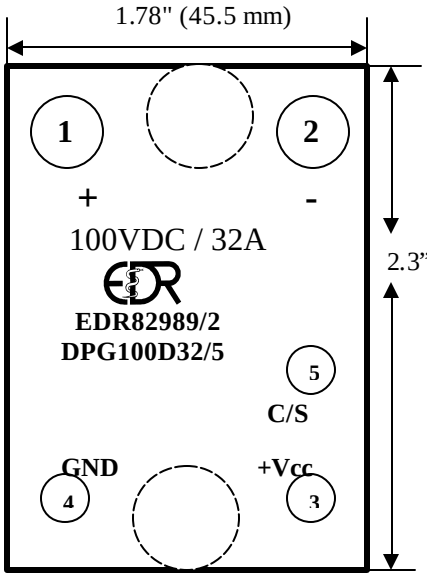
Weight (oz)		.2
Encapsulation	Epoxies Etc.	50-2366RFR / 50-2366CFR







Switching at 155KHz on a 16 Ohm/3.6A load



PIN 1: + LOAD
PIN 2: - LOAD
PIN 3: + 5Vcc
PIN 4: GND
PIN 5: +C/S

Highest		1" (24.4mm)
Terminals Control (screw type)		M3 screw
Terminal Power (screw type)		**M5 screw**

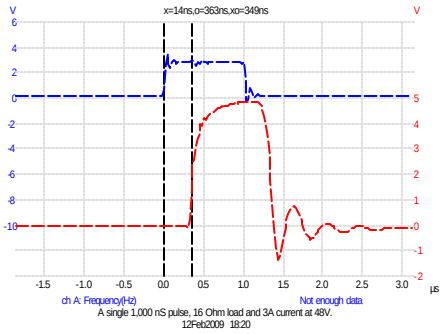
Please see the detail drawing of the case on page #

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 bidirectional for AC applied voltage and unidirectional for DC applied voltage, should be used to clamp excessive spikes.

Input Electrical Characteristics (Ta = 25^{0}C) for DPG100D32/5, p/n EDR82989/5

	Minimum	Nominal	Maximum	
Power Supply VDC, Pins 3-4, stand-by I=50mA	4.5	5.0	5.4	V
Power Supply Current at 5VDC	50/100Hz	100/50.0Khz	200/155Khz	mA
"OFF" state, Control Voltage, normally "HIGH"	0.8			V
"ON" state, Control Voltage, "LOW"			2.4	V
Input Current, no external resistor		.8		mA/4V

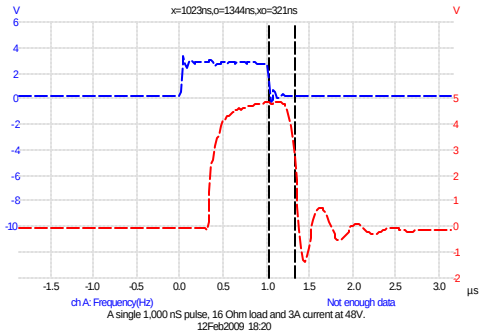
Switching time test – Load – 16 Ohm & 3A, a single 1.0 µS pulse width



Control

Load

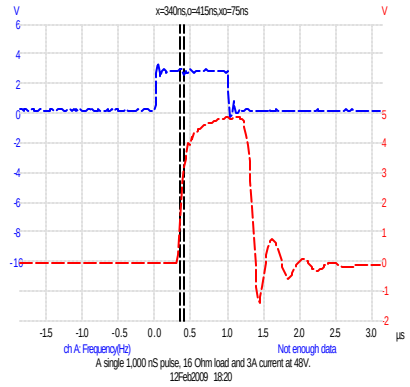
Figure 1. Turn-on delay is 350 nS



Control

Load

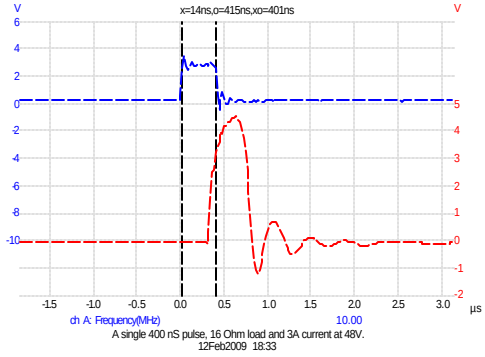
Figure 2. Turn-off delay is 320 nS



Control

Load

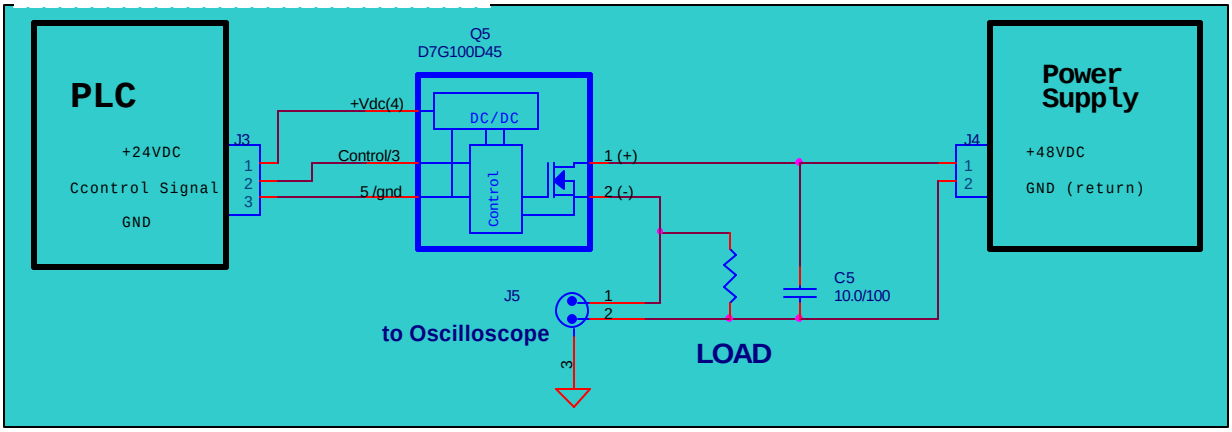
Figure 4. Rising time is 75 nS



Control

Load

Figure 3. A shortest pulse width is 400 nS



Switching Time Test Circuit

Panel Mount, Relays/Switches for DC and DC/AC

DPG500A5/5 - Powerful, Fast Solid State Switch for DC/AC

Designed to deliver 20kW of power in microseconds

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Technology for people's ideas

Features:
- **Utilizes only 4 sq. in. of area and only .9" tall**
- **5A continuously or up to 30A-pulse in a miniature package**
- **High sensitivity, even at high switching frequencies**
- **100A surge current and only 0.17 Ohms on-state resistance**
- **Please inquire for a higher-speed and shorter turn-on/off delays**

Please specify input control voltage and power supply

p/n EDR82864/2

Input Specifications:

Input Control Current/Voltage	5VDC/1mA
Power Supply Voltage/Current	5VDC/20mA

Output Specifications:

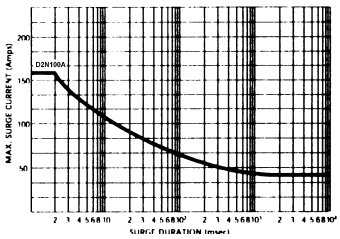
Operating DC voltage range	+/-500VDC (350VAC)
Maximum continuous current, Imc	5 A
Maximum Pulsing Current, Imp, 25ºC	30 A
Maximum surge current, (Ims) - .1mS	100 A
Maximum pulsing current, Impc, duty 1/50	40 A/10mS
Maximum on-state resistance	0.17 Ohm
Rising time	75 nS
Delay-on time	350 nS
Falling time	(determined by a load)
Delay-off time	320 nS
Maximum switching frequency	70.00 KHz
Maximum burst frequency (> 2 min)	100.00 KHz
Shortest pulse width	300 nS

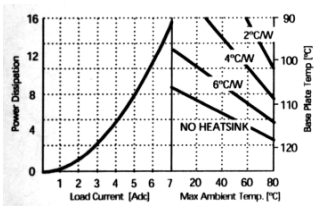
General Specifications:

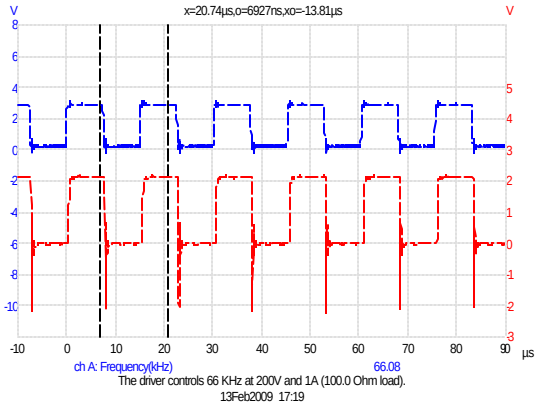
Ambient operating temperature range	-45^0 C to 85^0 C
Ambient storage temperature range	-55^0 C to 125^0 C
Dielectric Strength input-to-output	2,500Vrms(min)

Mechanical Specifications:

Weight (oz)		.2
Encapsulation	Epoxies Etc.	50-2366RFR / 50-2366CFR



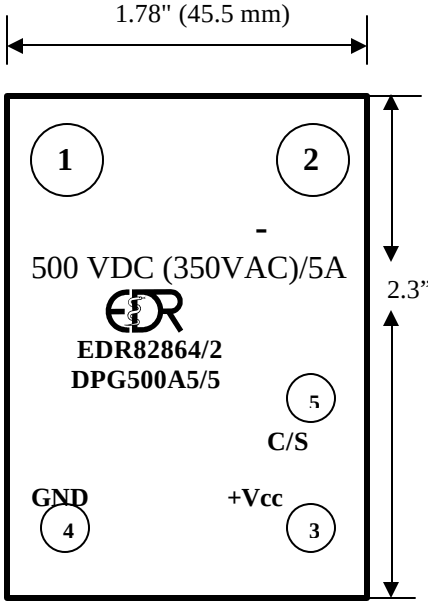




Control

Load

Switching at 66 KHz on a 100 Ohm/1.0A load



PIN 1: + LOAD
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PIN 4: GND
PIN 5: +C/S

Highest		1" (24.4mm)
Terminals Control (screw type)		M3 screw
Terminal Power (screw type)		**M5 screw**

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 bidirectional for AC applied voltage and unidirectional for DC applied voltage, should be used to damp excessive spikes.

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Input Electrical Characteristics (Ta = 25^{0}C) for DPG500A5/5, p/n EDR82864/2

	Min	Nom	Max	Unit
Power Supply VDC, Pins 3-4, stand-by I=50mA	4.5	5.0	5.4	V
Power Supply Current at 5VDC	50/100Hz	100/50.0Khz	200/155Khz	mA
"OFF" state, Control Voltage, normally "HIGH"	0.8			V
"ON" state, Control Voltage, "LOW"			2.4	V
Input Current, no external resistor		.8		mA/4V

Switching time tests

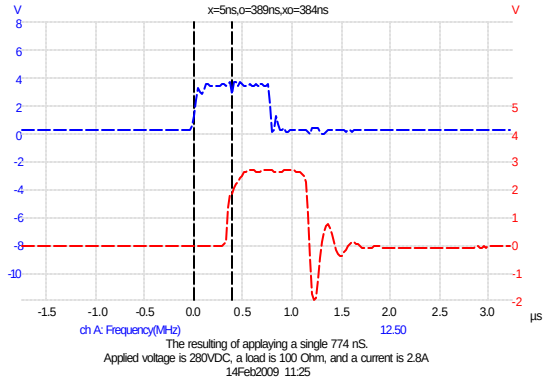


Figure 5. Turn-on delay is 384 nS

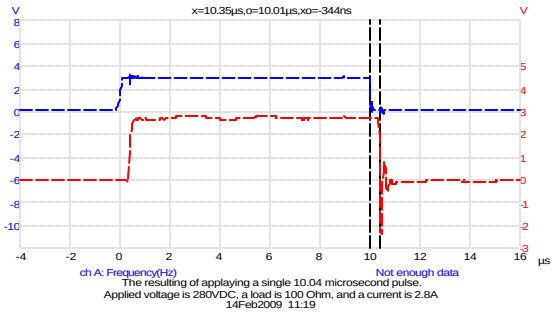


Figure 6. Turn-off delay is 344 nS

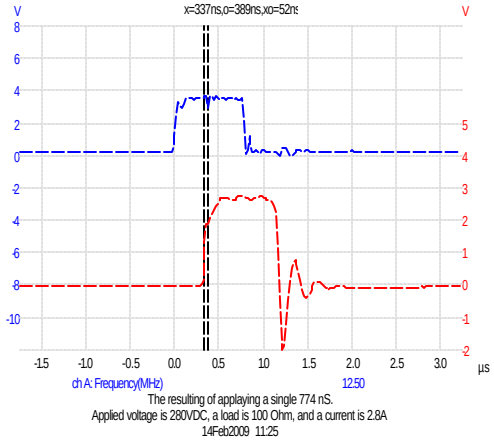
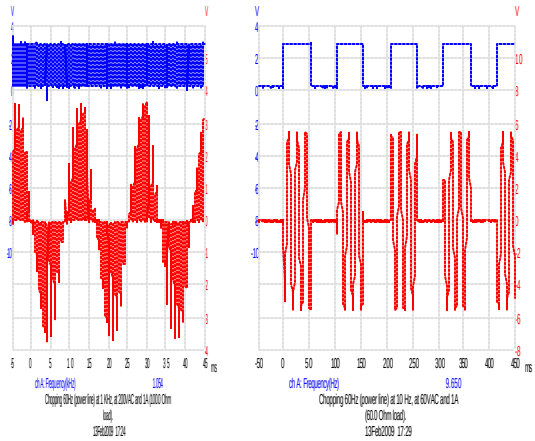


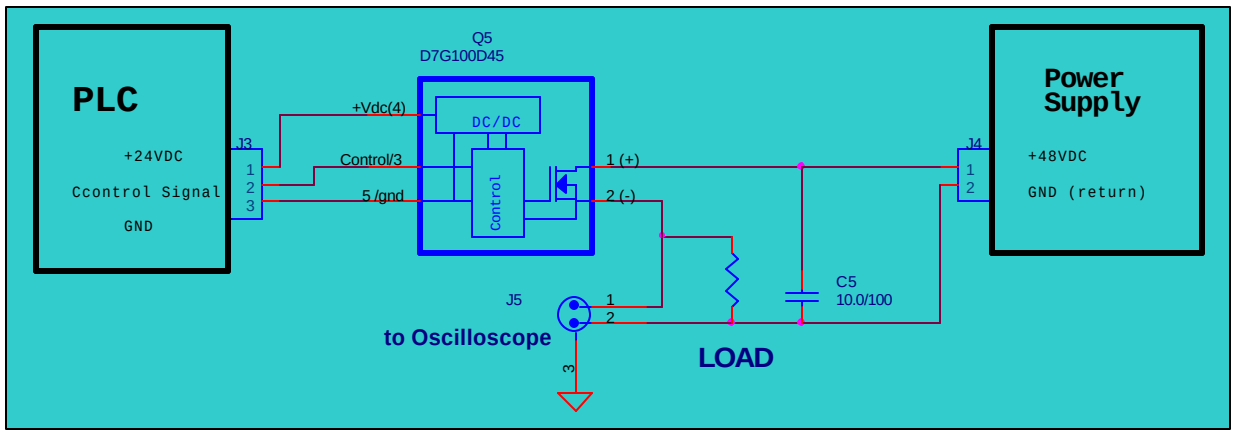
Figure 8. Rising time is 55 nS



Control

Load

Figure 7. Chopping 60Hz at 1KHz and10 Hz



Switching Time Test Circuit

OPTIONS:

The effort was made to accommodate our customers' requirements for varieties of input/output specifications. As the result of it, we offer the following supply voltages that are required for a proper operation of EDR's made relays/switches. The G-type fast relays/switches require an external power for proper operation of the internal control logic and powerful MOSFETs drivers.

The letter "E" in the part [DPG100D32/E/I] description must be replaced with one of available code.

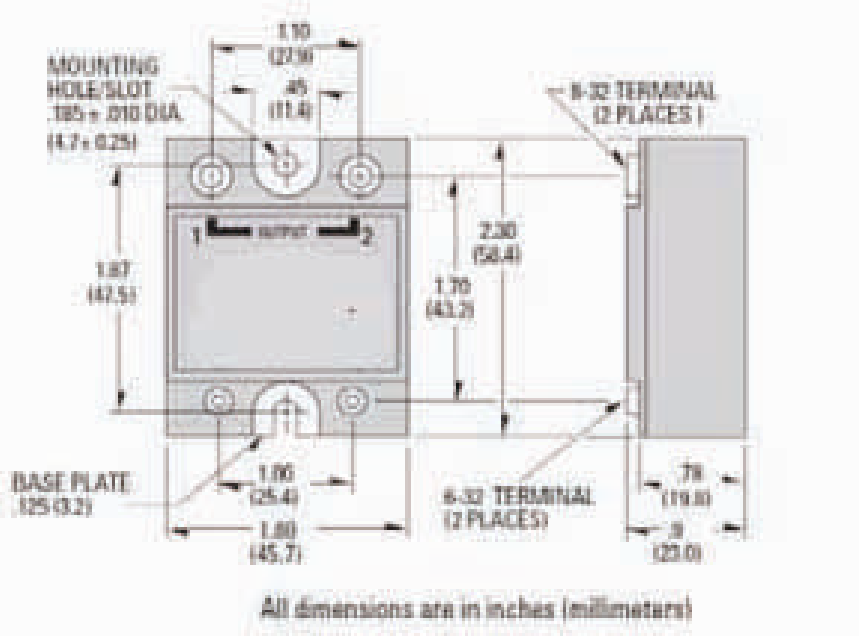
Coding for "E"	Input voltage range	Iino/up to 5 KHz signal	Iinm/160Khz signal
/5	5 VDC, +/- 6%	50	200 mA
/12	12 VDC, +/-10%	26	150 mA
/24	24 VDC, +/-10%	11	106 mA
/48	48 VDC, +/- 10%	6	53 mA

Where: Iino – is a minimum consumption current, at a stand-by or low frequency switching.
Iinm – It is a maximum allowed current, which could reach at the maximum frequency.

Same way the control signal is coded. Please refer to the last page of this document for available various control voltages and their corresponded coding.

We are welcome your requirement for any other input/output specifications.

Mechanical dimensions



DPG series - relays/switches with MOSFET of similar specifications

Below is just a sample of few relays/switches from our standard devices rated for various voltage/current. Please send us inquire for a other voltage/current and a speed. A data sheet and part number will be offered, alone with the cost and delivery.

Model Number	Oper. Voltage Range	I (A) rms	Id (A)	Ron (Ohm)/I off	F max(KHz)	Shortest Pulse	p/n
DPG100D32/e/i	0 to 100 VDC	32	1000	.007/1µAdc	160	400 ns	EDR82678/x/y
DPG100A15/e/i	+/-100 VDC (70VAC)	15	480	.016/1µA dc	160	400 nS	EDR82674/x/y
DPG200D30/e/i	0 to 200 VDC	30	400	.010/25µAdc	140	350 nS	EDR82675/x/y
DPG200A15/e/i	+/-200 VDC (140VAC)	15	220	.02/25µAdc	140	350 nS	EDR82676/x/y
DPG300D26/e/i	0 to 300 VDC	26	500	.011/25µAdc	60	350 nS	EDR82677/x/y
DPG300A13/e/i	+/-300 VDC (210VAC)	13	280	.050/25µAdc	60	350 nS	EDR82679/x/y
DPG500D10/e/i	0 to 500 VDC	10	210	.09/25µAdc	60	300 nS	EDR82865/x/y
DPG500A5/e/i	+/-500 VDC (350VAC)	5	100	.17/25µAdc	60	300 nS	EDR82864/x/y
DPG500D17/e/i	0 to 500 VDC	17	600	.038µAdc	50	400 nS	EDR82680/x/y
DPG500A8/e/i	+/-500 VDC (350VAC)	8	270	.066µAdc	50	400 nS	EDR82681/x/y
DPG600D17/e/i	0 to 600 VDC	17	350	.035/25µAdc	40	400 nS	EDR82682/x/y
DPG600A8/e/i	+/-600 VDC (420VAC)	8	170	.080/25µAdc	40	400 nS	EDR82683/x/y
DPG800D5/e/i	0 to 800 VDC	5	80	.2/25µAdc	160	300 nS	EDR82684/x/y
DPG800A2/e/i	+/-800 VDC (560VAC)	2.4	49	.4/25µAdc	160	300 nS	EDR82685/x/y
DPG103D4/e/i	0 to 1000 VDC	4	80	.6/25µAdc	160	300 nS	EDR82686/x/y
DPG103A2/e/i	+/-1000 VDC (700VAC)	2	45	1.2/25µAdc	160	300 nS	EDR82687/x/y
DPG252D02/e/i	0 to 2500VDC	.2	5	40/25µAdc	160	280nS	EDR82688/x/y
DPG252A01/e/i	+/-2500 VDC (1700VAC)	.1	2	80/25µAdc	160	280 nS	EDR82689/x/y

The "N"- type SPST-NO (1 Form A) relays/switches with a direct driver input

(4 terminals in total, two for the input and to for the output)

Model Number	Oper. Voltage Range	I (A) rms	Id (A)	Ron (Ohm)/I off	F max(KHz)	Shortest Pulse	p/n
DPN100D32/e/i	0 to 100 VDC	30	800	.007/1µAdc	24	400 ns	EDR82690/x/y
DPN100A15/e/i	+/-100 VDC (70VAC)	14	410	.016/1µA dc	24	400 nS	EDR82691/x/y
DPN200D30/e/I	0 to 200 VDC	28	350	.010/25µAdc	24	350 nS	EDR82692/x/y
DPN200A15/e/i	+/-200 VDC (140VAC)	13	190	.02/25µAdc	20	350 nS	EDR82693/x/y
DPN300D26/e/i	0 to 300 VDC	24	400	.011/25µAdc	20	350 nS	EDR82694/x/y
DPN300A13/e/i	+/-300 VDC (210VAC)	12	200	.050/25µAdc	20	350 nS	EDR82695/x/y
DPN500D10/e/i	0 to 500 VDC	19	180	.09/25µAdc	20	300 nS	EDR82896/x/y
DPN500A5/e/i	+/-500 VDC (350VAC)	5	80	.17/25µAdc	20	300 nS	EDR82897/x/y
DPN500D17/e/i	0 to 500 VDC	16	400	.038µAdc	20	400 nS	EDR82698/x/y
DPN500A8/e/i	+/-500 VDC (350VAC)	8	190	.066µAdc	20	400 nS	EDR82699/x/y
DPN600D17/e/i	0 to 600 VDC	16	90	.035/25µAdc	20	400 nS	EDR82826/x/y
DPN600A8/e/i	+/-600 VDC (420VAC)	8	150	.080/25µAdc	20	400 nS	EDR82829/x/y
DPN800D5/e/i	0 to 800 VDC	5	80	.2/25µAdc	24	300 nS	EDR82830/x/y
DPN800A2/e/i	+/-800 VDC (560VAC)	2.4	49	.4/25µAdc	24	300 nS	EDR82831/x/y
DPN103D4/e/i	0 to 1000 VDC	4	80	.6/25µAdc	24	300 nS	EDR82832/x/y
DPN103A2/e/i	+/-1000 VDC (700VAC)	2	45	1.2/25µAdc	24	300 nS	EDR82833/x/y
DPN252D02/e/i	0 to 2500VDC	.2	5	40/25µAdc	24	280nS	EDR82834/x/y
DPN252A01/e/i	+/-2500 VDC (1700VAC)	.1	2	80/25µAdc	24	280 nS	EDR82835/x/y

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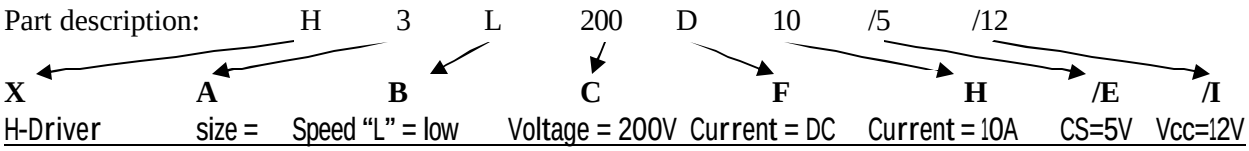
Any of our "L" (low frequency) series SPST-NO relays/switches can be assembled in a panel-mounting package). Please send us your inquiry – info@vsholding.com or fax to (502) 933-3422. On the next page there is our part generating form and it can be use as guidance. Due to package size limitation some requirements, like a maximum current might be unrealistic to make with a today available components, but it very well possible tomorrow.

In any case, we will help you.

Selection and Ordering Instruction for EDR's made Solid State Modules such as Relays, Switches, Breakers, ½ and Full-bridge Drivers, etc.

Notes: During past ten years rapid development of new and additional [products gave us no choice but to expend, modify and unify part descriptions. Below represent the third modification. Our modules description will be marked according to the specifications below but p/n EDRxxxxx will stay the same for already items in circulation (already sold).



"X" module type

D	Solid State Relay, SPST-NO and SPST-NC switches
T	Driver, such as ½-bridge or a SPDT relay which can work as a ½ driver
M	Driver, such as a switch with built-in PWM controller
H	Full-bridge (H-bridge) Driver
C	Relay with built-in de-bouncing or a turn-on/off delay
B	Solid State Breaker and brakes control modules

"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
8	DIN type enclosure, 2.36"H x 2.36" x 1.5"W, for 35mm DIN Rail
9	10" x 8"
P	panel mount, 2.275" x 1.75" x .8"

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

L	a low speed relay/switch, rated DC - 200 Hz, direct driving control
A	a low speed relay/switch, AC input relays
N	a medium speed relay/switch, rated DC - 25 KHz, direct driving control
G	a medium speed relay/switch, rated DC - 160 KHz, low current control and power
F	a fast relay/switch, rated up to DC - 350 KHz, low current control and power
S	a super-fast relay/switch, rated DC - 1.4 MHz, low current control and power
U	a super-fast relay/switch, rated DC – 1.2 MHz, direct driving control
V	Fast, High Voltage Solid-State Switches with Nanoseconds rise time

"C" Output Voltage - A maximum allowed voltage between output terminals, up to 100kV

It must be replace with required voltage and we offer the closest and highest value available.
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

"F" A relay can be use to control either AC, DC or AC/DC power

A	- a relay/switch designed to switch/chop an AC/DC power
D	- a relay/switch designed to switch/chop a DC power
"none"	- relay with a SCR or TRIAC on the output to control only AC power

"H" A maximum allowed RMS CURRENT (Ampere) without a heat sink

A maximum current limited to a size of the enclosure (box). We can produce a device for any required current in a customer enclosure.

"I" Some of our products use an internal DC/DC converter no provide a power to the internal electronics.

Varieties voltages are available: 5VDC+/-5%, 12VDC+/-5%, 24VDC+/-5% and 48VDC+/-5%. For a wider input power voltage swing, please add "W" after the voltage. For an example, 24W is for 24V +/-12V.

"E" 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;

Control Voltage	Representation	Control Voltage	Representation	Control Voltage	Representation
3VDC	1	5VDC	2	12VDC	3
24VDC	4	48VDC	5	26VDC	6
3-20VDC	7	18-38VDC	8	90-120VAC	9

"Z" A relay/switch built with following standard isolations

"L" or "none"	type relay is 2500 V
"N"	type relay is 3000V, 4000VDC ("H4") and 5200 ("H5") VDC.

"T" Turn-on delays; "S" for seconds, "M" for milliseconds, "U" for microseconds, M102 – 100 mS turn-off delay, 102M mS – turn-on delay

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