

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

Technology for people's ideas

1 Form A + 1 Form B (DPST) family relays with disable

A new generation relays offer design flexibility and enable to create a SPDT or DPST relay with a disable control

General Description:

The EDR82958 is a new generation of a Solid State Relay designed to provide the maximum flexibility in wide varieties of applications. A precise internal timing control between N.C. (normally closed) and N.O. (normally opened) is a true break-before-make termination. That provides an opportunity to connect both piers in SPDT configuration without worry of shoot-through current. Relays of that series control a high-power audio in PA systems and controls back-up power supplies. Shock tests insured it is suitable for space, aviation and defense

T1L30A6/x/xx



8 7 6 5 4 3 2 1

Features of p/n EDR82958:

- Small Footprint, 1.48”L x .3”W x .62”H
- TTL and CMOS compatible inputs
- Deliver up to 6A rms at 25 °C and 3.2 A at 70 °C
- Pulsed current 30A (PEAK), internal clamp diodes
- Three SPDT configuration allowed
- 2500V isolation between both terminals
- Low Rds (ON) typically, 0.010 Ohm per terminal
- Low-Power consumption --- in a stand-by (disable) mode, Idc < 0.1 μA
- +/-30VDC or 21AVC can applied
- V-Slope technique applied to control a dV/dT for lowering transient spicks
- Generates NO electro-magnetic interference
- Output capacitance only 290pF

General Information

A relay, of the family SPDT/DPST Solid State Relays with disable control, manufactured in any of our standard SIP-type packages. The selection of the package is dependent on a required current/voltage specification at the output terminals. Please inquire about a custom-package, such as DIP, panel mounting with screw-type terminals or any other type.

An internal circuitry controls a fixed, duration of the “dead-time” or time between activation of each terminal. The dead-time insures save commutation between terminals in a SPDT configuration. The length of the dead-time set by the factory depends on several factors, such as a maximum rated current and voltage. It could be as low as 0.7 μS for a low power relay and up to 10 mS for a high current, high voltage relay. The dead-time has no relation to turn-on and turn-off times (transitional slopes).

Please add letter “R” at the end of the part number (description) if you need right angle pins.

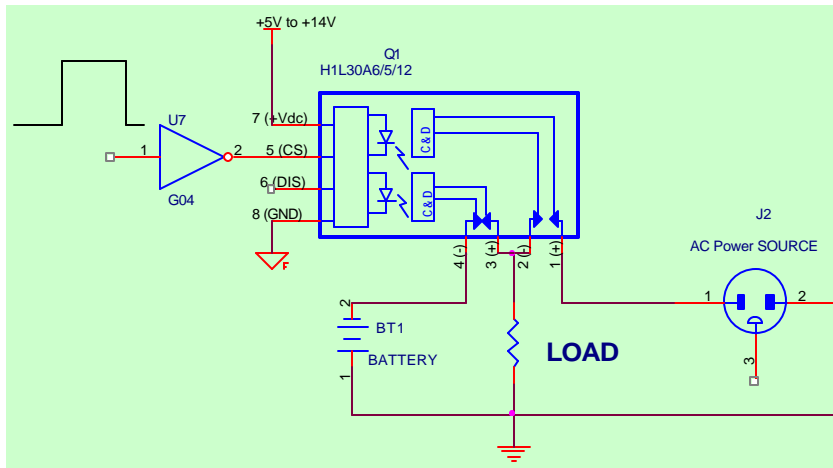
Pins Functions

Pin #	Symbol	Functional Description
1&2	NC	normally opened contacts
3& 4	NO	normally closed contacts
5	CS	Control Signal
6	DS	Disable terminal, normally it is “high” and its grounding turns-off both terminals and disables the control input.
7	+V	Power supply
8	GND	ground for +V and CS

A miniature package provides a chance to use two separate NC and NO pairs to control independent either DC or AC power.

The EDR82958 is the smallest package and made for high-density designs with a minimum heat generating even at maximum current. Each package is available in a lead free (Pb-free), PoHS-compliant version with a suffix ‘Pb’

Below is an example of just few applications possible with a 1 Form A + 1 Form B (DPST) SSR



It is very easy to design a power back-up system with EDR82958. Two following conditions should be met. First, a Vdc power (any from +5VDC to 14VDC) to the relay should be provided from the battery, and the second, a control signal to the relay should come from another power source, in this case from AC Power Source. As long as an AC power presents the load will be connected to the AC Power source. Once that power disappeared the relay will switch and power will come from a battery back up.

Figure 1

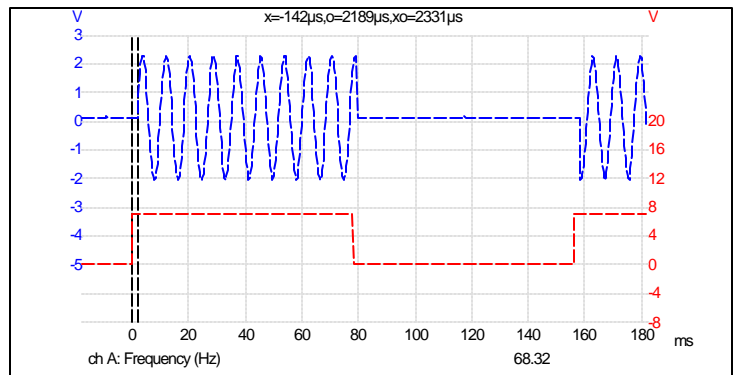
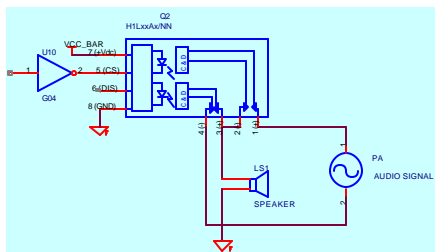


Figure 2.

A low-on resistance, or about 0.01 Ohm insures the best audio power delivery to a selected speaker.

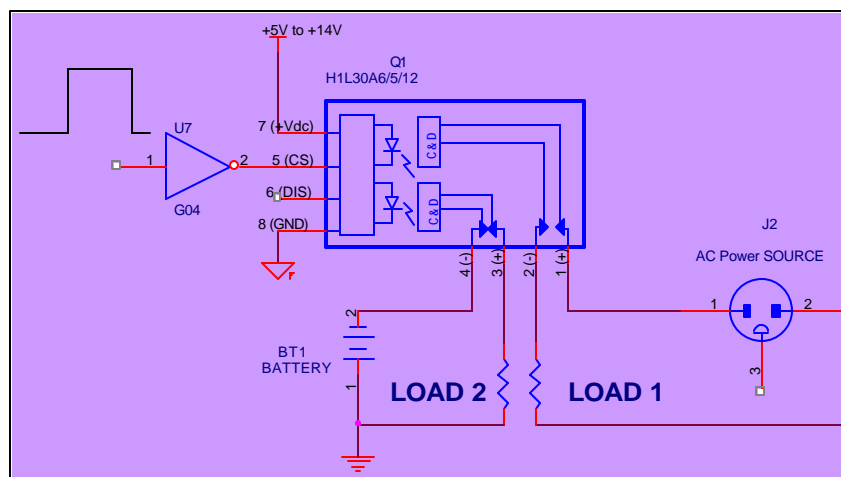


Figure 3.

A high isolation between both pair of terminals makes easy commutating a DC and AC power interference free.

Absolute Maximum Ratings, p/n EDR82958/2/3 (T1L30A6/5/12)

	Parameter	Max.	Units
Vdc	Power Supply (maximum)	16	V
Vdc	Power Supply (minimum)	4.9	V
Idc	Power Supply Current (enabled mode)	20	mA
Idc	Power Supply Current (disabled mode)	0.1	μA
Ics	Control signal (CMOS input)	1	μA
Disable input (DE)	Through a 100KOhm connected to Vdc	16	V
Vcs	Control signal	20	V
Pd@ Tc = 70 °C	Power Dissipation	0.5	W
Topr	Operating temperature	-40 to 80	°C
Tstg	Storage Temperature	-55 to 150	°C

Electrical Characteristics @ Tj = 25 °C (unless otherwise specified), p/n EDR82958/2/3

	Parameter	Min.	Typ.	Max	Units	Conditions
INPUT						
Vdc	Supply voltage to the control	4.9	any	14	V	
Idc	Supply current @ Vcc = 6V	10	12	20	mA	Disable is floating or +Vdc
Vcs	High level input voltage	3.15	3.8	4.2	V	At corresponded Vcc
Vcs	Low level input voltage	0.9	1.0	1.2	V	At corresponded Vcc
Ics	Input (control signal) current			.01	mA	
OUTPUT						
VDC	Breakdown Voltage			+/-30	VDC	
VAC	Breakdown Voltage			21	VAC	
Rds	Output Total resistance	0.017	0.020	0.030	Ohm	At 25 °C
Ill	Output leakage current			1.0	μA	Vdc=30V, 25 °C
Tplh	Propagation delay turn-on time		270		μS	
Tphl	Propagation delay turn-off time		170		μS	
F	Maximum switching frequency			200	Hz	Load resistive

All Dimensions are in inches

Input/Output pins

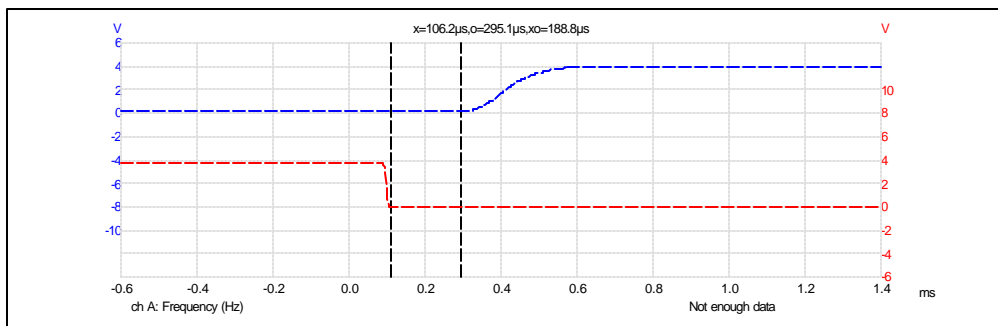
.025"x.025"

Weight: (typical)

.26 oz. (0.0073 Kg)

Encapsulation:

Thermally Conductive Epoxy

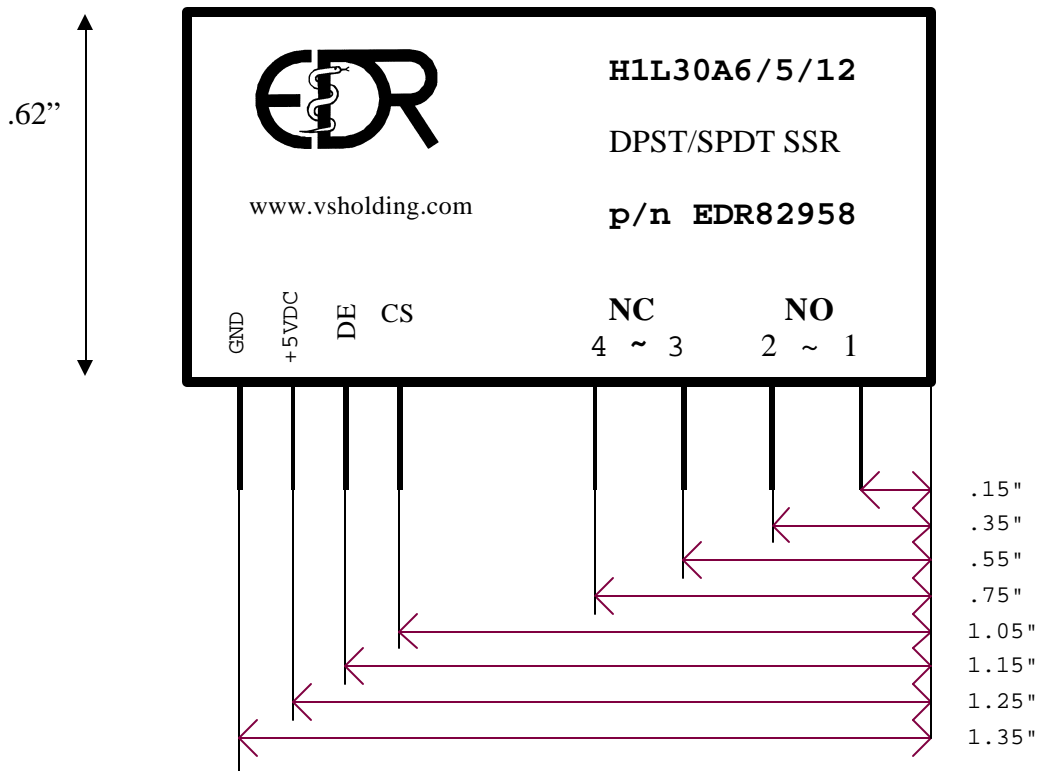


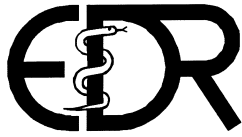
The relay alternates output terminals in about 200 μS. Time durations (slopes) are different due to showing charging (turn-on) and discharging (turn-off) conditions

NOTES:

- I: In cases when the EDR82958 designed to be controlled via a CPU insert an OFF/ON-TIME delay 300 μ S when the input signal is switched.
- II: Insert a 1 mS delay after inserting an enable signal.
- III: Do not apply a control signal prior to the disable signal applied.
- IV: The EDR82958 is an extremely low emission device. It can be located near by sensitive equipment. Controlling a slope rate and thus preventing transient spikes achieved that.

Mechanical Dimensions: in Inches





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Input Specifications:

Power supply DC Voltage	see order form
Nominal Current, at 10 Hz	12mA
Maximum Current, at 1 KHz	13 mA
Maximum Current, at 25 KHz	16 mA

Output Specifications:

Operating DC voltage range	+/- 200 VDC/140AVC
Maximum continuous current	2.2A rms
Maximum surge current (IDM)	70A @ 1.0ms
Continues current (ID)	17A @ 25 °C
Maximum on-state resistance	0.22 Ohm
Rising time	0.08 μS
Delay-on time	0.25 μS
Falling time	0.16 μS
Delay-off time	0.21 μS
Maximum switching frequency	100.0 KHz

General Specifications:

Ambient operating temperature range	-40° C to 85° C
Ambient storage temperature range	-55° C to 150° C
Dialectic Strength input-to-output	3000VAC
Dialectic Strength between terminals	3000VAC
Mechanical Specifications:	
Weight(oz)	.1
Encapsulation	ResTech 10207/053
Terminals; input/output	.040" diameter
Dimensions	1.3"Hx1.25"Lx.8"W

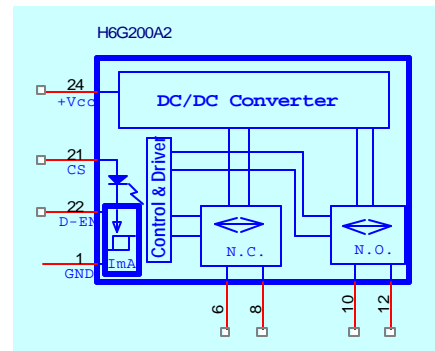
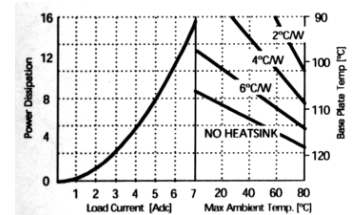
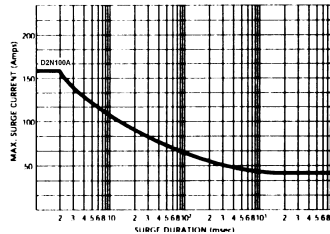
EDR83921 - +/-200VDC(140AVC), 2A Switch in a DIP24 package

Fast, isolated, a break-before-make switch

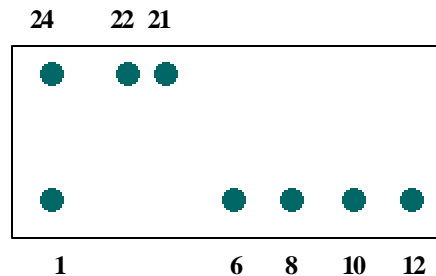
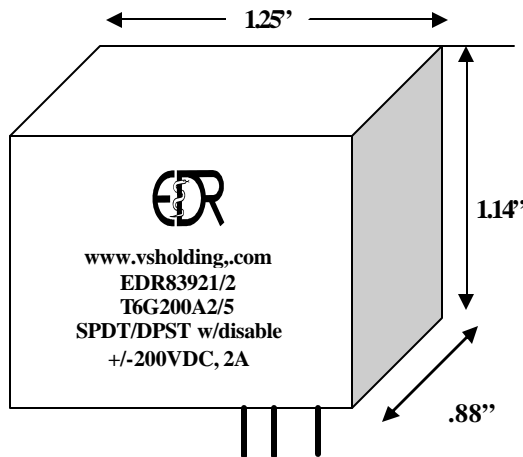
The EDR83921 (H3G200A2/5) belongs to a SPDT/DPST or a 1/2-bridge driver/switch family of devices that are offering flexibility that required in many industrial applications.

- Features:**
- Utilizes only 1.4 sq. in. of PCB area and only 1.15" tall
 - .8A continuously or up to 6.5 A pulse in a miniature package
 - High sensitivity, even at high switching frequencies
 - 14 A surge current and only 0.10 Ohms on-state resistance

Please specify power supply and control voltage



Simplified block-diagram of the relay



View from the top:

- 1 – GND (control)
- 22 - CS (control signal)
- 6&8 – N.C. pair
- 10&12 – N.O. Pair
- 21 - Disable
- 24 - +Vdc

All Dimensions are in inches (millimeters).
 Dimensions for SIP4 package
 Terminals/solder for SIP4 package

1.15"Hx1.75"Lx.08"W
 control-.040",power-.06"

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

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Absolute Maximum Ratings for a G-type SPDT/DPST relays

	Parameter	Max.	Units
Vdc	Power Supply (maximum)	Vdc	V
Vdc	Power Supply (minimum)	10%	V
Idc	Power Supply Current depend on Vdc	20/5VDC	mA
Ics	Control signal (CMOS input)	1	μA
Disable input (DE)	Through a 100KOhm connected to Vdc	Vdc	V
Vcs	Control signal (maximum)	Vdc	V
Topr	Operating temperature	-40 to 85	°C
Tstg	Storage Temperature	-55 to 150	°C

Electrical Spes. @ Tj = 25 °C (unless otherwise specified), p/n EDR83921/2 (H6G200A2/5)

	Parameter	Min.	Typ.	Max	Units	Conditions
	INPUT					
Vdc	Supply voltage	4.9	5	5.1	V	
Idc	Supply current @ Vdc = 5V	10	12	200	mA	Depend on the CS frequency
Vcs	High level input voltage	3.15	3.8	4.2	V	At corresponded Vcc
Vcs	Low level input voltage	0.9	1.0	1.2	V	At corresponded Vcc
Ics	Input (control signal) current			.01	mA	
Vinl	Disable (DE) (off)			0.6	V	Low-level input voltage
Vinh	Disable (DE) (on)	1.8			V	High-level input voltage
Ii	Disable (DE)		0.012	0.030	mA	Both inputs tide via 10K to Vcc
Tr	Response time			0.01	mS	
	OUTPUT					
VDC	Breakdown Voltage	-200		+200	VDC	
VAC	Breakdown Voltage		140	21	VAC	
Rds	Output Total resistance	0.017	0.020	0.030	Ohm	At 25 °C
Ill	Output leakage current			1.0	μA	Vdc=30V, 25 °C
Tplh	Propagation delay turn-on time		7.5		μS	
Tphl	Propagation delay turn-off time		21.2		μS	
F	Maximum switching frequency			25	KHz	Load resistive

A miniature SPDT/DPST relays with disable, SIP8 package

P/n	Vmax	I_{max}	description
EDR82966/E/I	0 – 30VDC	9A	T1L30D9/x/v
EDR82958/E/I	+/-30VDC(21VAC)	6A	T1L30A6/x/v
EDR82959/E/I	0 - 30VDC	12A	T1L30D12/x/v
EDR82960/E/I	0 - 75VDC	8A	T1L75D8/x/v
EDR82961/E/I	+/-75VDC (50AVC)	4A	T1L75A4/x/v
EDR82962/E/I	0 - 100VDC	8A	T1L100D8/x/v
EDR82963/E/I	+/-100VDC (70AVC)	4A	T1L100A4/x/v
EDR82964/E/I	0 - 300VDC	1A	T1L300D1/x/v
EDR82965/E/I	+/-300VDC (210AVC)	0.8A	T1L300A08/x/v

Fast SPDT/DPST relays with disable, DIP24 package

P/n	V max	I_{max}	description
EDR83920/E/I	0 - 200VDC	5A	T6G200D5/x/v
EDR83921/E/I	+/-200VDC (140AVC)	2.2A	T6G200A2/x/v
EDR83922/E/I	0-30VDC	12A	T6G30D12/x/v
EDR83923/E/I	0-75VDC	8A	T6G75D8/x/v
EDR83924/E/I	+/-75VDC (50AVC)	4A	T6G75A4/x/v
EDR83925/E/I	0-100VDC	8A	T6G100D8/x/v
EDR83926/E/I	+/-100VDC (70AVC)	4A	T6G100A4/x/v
EDR83927/E/I	0-300VDC	1A	T6G300D1/x/v
EDR83928/E/I	+/-300VDC (210AVC)	0.8A	T6G300A08/x/v

We make Solid State Relays with varieties of rated voltages and currents. Please inquire.
All relays can be made in a panel mount box (0.82”H x 2.7”L x 2.0”W), please replace “D1” or “D2” with “D7”

The speed and frequency properties of many D1N-types relays very much resembled the p/n EDR82958. There is some differences for varies relays and all depended on the output power. Please request a specific data sheet if that is important for your application.

In the same packages, we manufacture a family of miniature, low power Solid State Relays, built with MOSFETs. Those relays designed for an extremely small input control current. Only 3.0 mA @ 2.6 VDC required to operate. Please request a data sheet 7090 for p/n EDR82804. Relays were designed as a replacement of a SSR with a TRAIC or SCR output in applications where a low power consumption and low leakage current are must.

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.

We charge no production set-up fee for an order of 100 and above for any type (input and output specifications) Solid State Relay/Switch and Solid State Breaker.

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).

In the same package we make SPST-NC and SPST-NO relays. Both types made with n AC and DC input

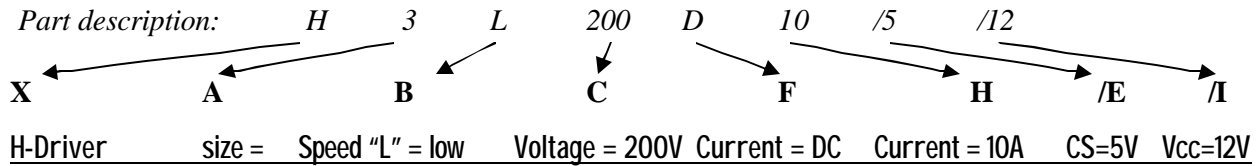
Transient Protection: All loads are inductive, even ones that are not so obvious or labeled. An inductive load produces a harmful transient voltage, which is much higher than the applied voltage, when it is turned on and off. A SSR built with a MOSFET output acts as an ideal switch and can produce a 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 excessive spikes.

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Selection and Ordering Instruction for EDR's made Solid State Modules such as Relays, Switches, Breakers, 1/2 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 EDRxxxx 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 1/2-bridge or a SPDT relay which can work as a 1/2 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, 1.82"H x 6.0"L x 3.3"W
- 8 DIN type enclosure, 2.36"H x 2.36" x 1.5"W, for 35mm DIN Rail
- 9 panel mount 3"H x 10"L x 8"W
- 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 - 25 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.

"T" 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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