

Data Sheet No. PD-1.017B

INTERNATIONAL RECTIFIER 

SERIES DP

Microelectronic Power IC Relay

1 Amp
20-280V AC

ChipSwitch™ DIP Relay

GENERAL DESCRIPTION

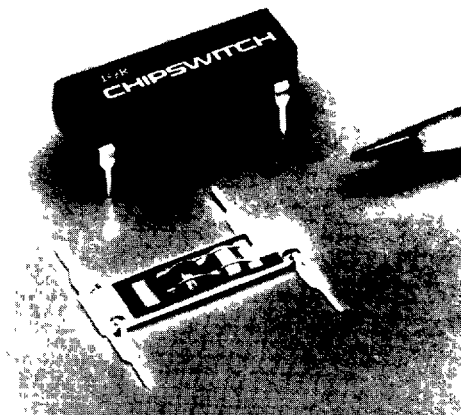
The ChipSwitch DIP uses the exclusive International Rectifier S²X power integrated circuit technology to form a fully functioning solid-state relay. The S²X technology combines MOS and bipolar processes, derived from IR's HEXFET power MOSFET designs, to eliminate the need for both discrete components and hybrid circuits. The basic ChipSwitch DIP consists simply of two identical power integrated circuits connected in inverse parallel (analogous to back-to-back SCRs) for AC control plus an isolated light emitting diode (LED) for actuation. Voltage controlled models with an internal resistor to limit the control current are also available.

Extreme reliability is achieved by the reduction of component count from approximately 20 discrete components in a conventional SSR to 3 basic components in the ChipSwitch. The power integrated circuits are fabricated in IR's advanced MOSFET fabrication plant which achieves standards of cleanliness, precision, and consistency unprecedented in the manufacture of power semiconductors.

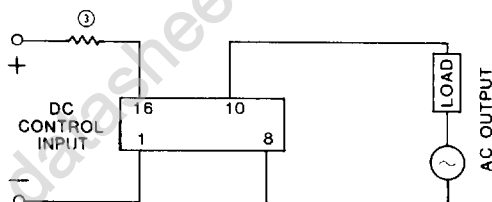
The ChipSwitch is a normally open SSR of 1.0 ampere rating with precise zero voltage turn-on and zero current turn-off. EMI emission conforms to the most severe FCC and VDE requirements.

The devices are ideally suited for interfacing microprocessors to AC loads such as small motors, lamps, solenoids, valves, and high power motor starters. The economy of the ChipSwitch allows the in-house manufacturer to replace assemblies of triacs, triac drivers and associated components with a highly reliable, miniature, standard SSR.

- S²X Power IC Chips
- 30 Amps Surge
- 4000V RMS Isolation
- Zero Voltage Turn-On
- EMI Meets FCC/VDE Limits
- Operates Without Snubber
- 600V/μsec dv/dt
- 10 Microamps Leakage
- TO-116 Pinout
- UL Recognized - File E50015
- CSA Certified File - LR32053
- VDE File - 53106



WIRING DIAGRAM



Part Identification

Part No.	Transient Overvoltage (Vpk)	Operating Voltage (VRMS)	DC Input Turn-On
DP1110	300	20-140	5 mA
DP1210			10 mA
DP1610			3.5 V
DP2110	450	20-280	5 mA
DP2210			10 mA
DP2610			3.5 V
DP6110	600	20-280	5 mA
DP6210			10 mA
DP6610			3.5 V

ChipSwitch DIP



GENERAL CHARACTERISTICS ELECTRICAL SPECIFICATIONS ($-30^{\circ}\text{C} \leq T_A \leq 85^{\circ}\text{C}$ unless otherwise specified)

Dielectric Strength — Input/Output		4000	V (RMS)
Insulation Resistance @ 500VDC — Input/Output		10^{12}	Ohms
Tracking Resistance (VDE Test)		KB 100/A	—
Max Capacitance — Input/Output		2.0	pF
Ambient Temperature Range	Operating	-30 to 85	$^{\circ}\text{C}$
	Storage	-40 to 100	$^{\circ}\text{C}$
Lead Temperature (1.6 mm below seating plane) for 10 sec.		260	$^{\circ}\text{C}$

INPUT CHARACTERISTICS	DP1110	DP1210	DP1610	DP2110	DP2210	DP2610	DP6110	DP6210	DP6610	Units
Control Current Range ② (see Fig. 3)	5-25	10-25	N/A	5-25	10-25	N/A	5-25	10-25	N/A	mA (DC)
Control Voltage Range (see Fig. 4)	N/A		3.5-7	N/A		3.5-7	N/A		3.5-7	V (DC)
Max Reverse Voltage	7.0									V (DC)
Max Turn-On Voltage	N/A		3.5	N/A		3.5	N/A		3.5	V (DC)
Min Turn-Off Voltage	N/A		0.8	N/A		0.8	N/A		0.8	V (DC)
Min Input Impedance	N/A		270	N/A		270	N/A		270	Ohms
Max Turn-On Current	5.0	10	N/A	5.0	10	N/A	5.0	10	N/A	mA (DC)
Min Turn-Off Current	0.5		N/A	0.5		N/A	0.5		N/A	mA (DC)
Max Turn-On Time (60 Hz)	8.3									mSec
Max Turn-Off Time (60 Hz)	8.3									mSec

OUTPUT CHARACTERISTICS

Operating Voltage Range (47-440 Hz)	20-140	20-280	20-280	V (RMS)
Transient Overvoltage (Non-Repetitive)	300	450	600	V (peak)
Min Off-State dv/dt (static) ① @ Max Rated Voltage (25 $^{\circ}\text{C}$)	600			V/ μs
Max Load Current (see Fig. 1)	10			A (RMS)
Min Load Current	0.5			mA (RMS)
Power Factor Range	0.2 to 1			—
Max Surge Current (Non-Rep) Single Cycle 20 ms (see Fig. 2)	30			A (peak)
Max Over Current (Non-Rep) 1 sec	7.5			A (peak)
Max On-State Voltage Drop @ Rated Current	1.5			V (peak)
Max I^2t for Fusing (.01 sec)	4.5			A ^2sec
Max Zero Voltage Turn-On	12			V (peak)
Max Peak Repetitive Turn-On Voltage @ 20mA Input	1.5			V (peak)
Max Off-State Leakage Current ③ @ Max. Operating Voltage, 25 $^{\circ}\text{C}$	10			μA (RMS)

GENERAL NOTES

Data and specifications subject to change without notice

① Off-state dv/dt test method per EIA/NARM standard RS-443 with V_{ds} equal to the instantaneous peak of the maximum operating voltage

② Current limiting resistor required for current controlled models.

③ LED input current of zero MA

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PERFORMANCE CHARACTERISTICS CURVES

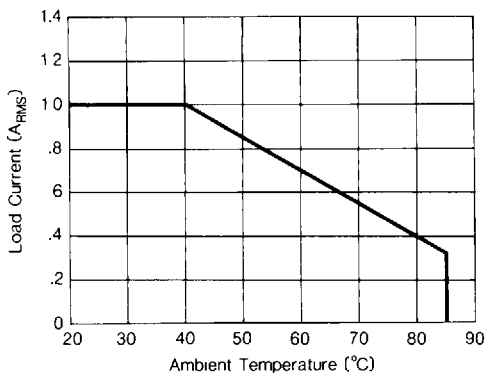


Figure 1. Derating Curve

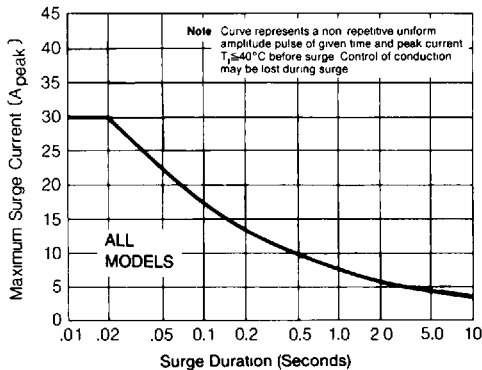


Figure 2. Max. Allowable Surge

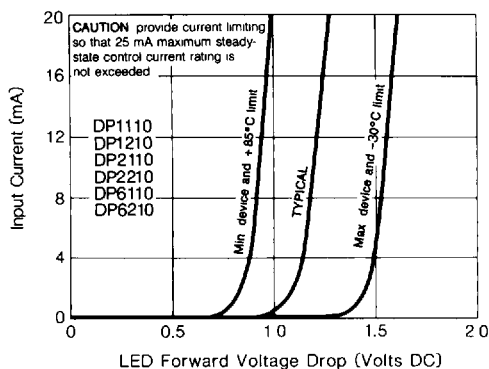


Figure 3. Input Characteristics (Current Controlled)

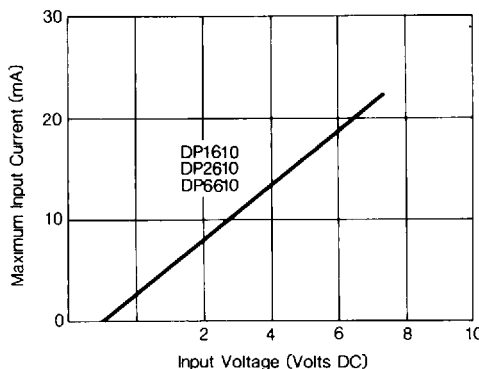


Figure 4. Input Characteristics (Voltage Controlled)

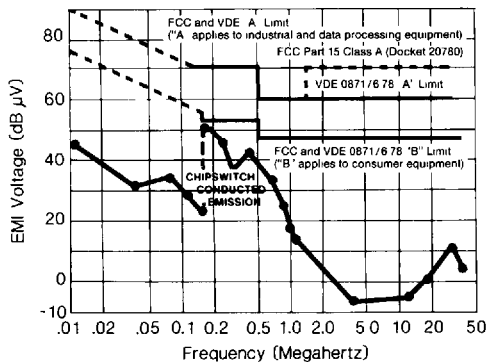


Figure 5. Conducted Electromagnetic Interference. (Measured With DP1XXX and DP2XXX Models)

