International
IOR Rectifier
ChipSwitch® SIP Relay

PD 1.032A

SPA Series
Microelectronic
Power IC Relay
0.9 Amp Load Current, 20 - 280 VAC_{RMS}

General Description

The SPA Series ChipSwitch uses exclusive International Rectifier S^3X power integrated circuit technology to form a fully functioning solid-state relay. The S^3X 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 SPA Series ChipSwitch consists of two identical power integrated circuits connected in inverse parallel (analogous to back-to-back SCRs) for AC control plus an isolated GaAIAs light emitting diode (LED) for actuation.

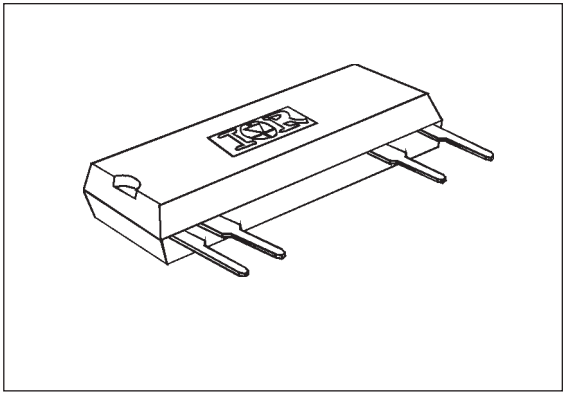
Extreme reliability is achieved by the reduction of component count from approximately 20 discrete components in a conventional SSR to 3 basic components in the ChipSwitch.

The SPA Series ChipSwitch is a single-pole, normally-open SSR capable of switching up to 0.9 ARMS low power factor load currents with precise zero-voltage turn-on and zero-current turn-off, thus reducing EMI emissions.

These 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 SPA Series ChipSwitch allows the in-house manufacturer to replace assemblies of triacs, triac drivers and associated components with a highly reliable, miniature, standard SSR.

SPA Series Features

- S^3X power IC chips
- 24 Amp surge
- 4,000 V_{RMS} I/O isolation
- 10 µA off-state leakage current
- Zero-voltage turn-on
- Operates without snubber
- 600 V/µs off-state dv/dt
- Solid-State reliability
- UL recognized and CSA certified



Part Identification

Part Number	Transient Overvoltage (V_{PEAK})	Operating Voltage (V_{RMS})
SPA4191	400	20-140
SPA6191	600	20-280

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Electrical Specifications (-30°C ≤ T_A ≤ +85°C unless otherwise specified)

INPUT CHARACTERISTICS	Limits	Units
Maximum Turn-On Current	10.0	mA
Minimum Turn-On Current	0.5	mA
Control Current Range (Caution: current limit input LED, see figure 3)	10 to 25	mA
Maximum Reverse Voltage	7.0	V

OUTPUT CHARACTERISTICS	Limits		Units
	SPA4191	SPA6191	
Operating Voltage Range (47 - 63 Hz)	20-140	20-280	V_{RMS}
Transient Overvoltage (non-repetitive)	400	600	V_{PEAK}
Maximum Load Current @ T_A=+40°C (see figure 1; Notes 3 and 4)	0.9		ARMS
Minimum Load Current	0.5		mA_{RMS}
Minimum Off-State dv/dt (see Note 1)	600		V/µS
Power Factor Range	0.2 to 1.0		—
Maximum On-State Voltage Drop @ 0.9 A_{RMS}	1.4		V_{PEAK}
Maximum Off-State Leakage Current (see Note 2)	10		μA_{RMS}
Maximum Turn-On Time (60 Hz)	8.3		ms
Maximum Turn-Off Time (60 Hz)	8.3		ms
Maximum Surge Current, Single-Cycle, Non-Repetitive 20 ms (see figure 2)	24		A_{PEAK}
Maximum Overcurrent, Non-Repetitive 1 second	7.5		A_{PEAK}
Maximum I^2T for Fusing (0.01 sec)	4.5		A^2s
Maximum Zero Voltage Turn-On	12		V_{PEAK}

GENERAL CHARACTERISTICS		Limits	Units
Minimum Dielectric Strength, Input-Output		4000	V_{RMS}
Minimum Insulation Resistance, Input-Output @T_A=+25°C, 50%RH, 500V_{DC}		10^{12}	Ω
Tracking Resistance (VDE Test)		KB 100/A	—
Maximum Capacitance, Input-Output		2.0	pF
Maximum Pin Soldering Temperature (10 seconds maximum)		+260	°C
Ambient Temperature Range:	Operating	-30 to +85	
	Storage	-40 to +100	

Notes:

1. Off-state dv/dt test method per EIA/NARM standard RS-443 with V_P equal to the instantaneous peak of the maximum operating voltage.
2. LED input currrent of zero mA and at maximum operating voltage.
3. Load current rating may be extended to 1.1 A_{RMS} (@T_{AMB}≤+40°C) by using an external snubber circuit: 0.033 µF +100Ω.
4. The UL508 motor control rating per Sec. 52 overload test conditions is 0.4A max., and general purpose and incandescent load control is 0.9A.

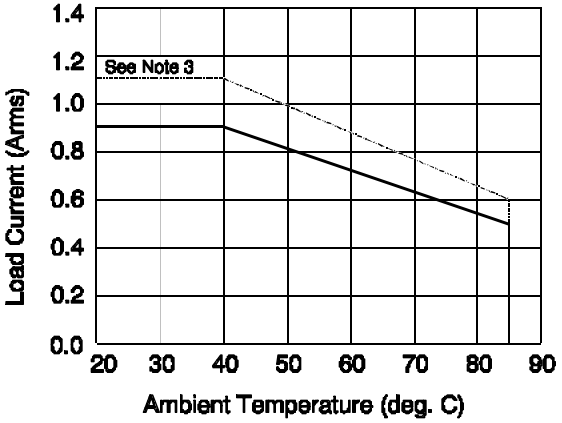


Figure 1. Derating Curve, Free Standing

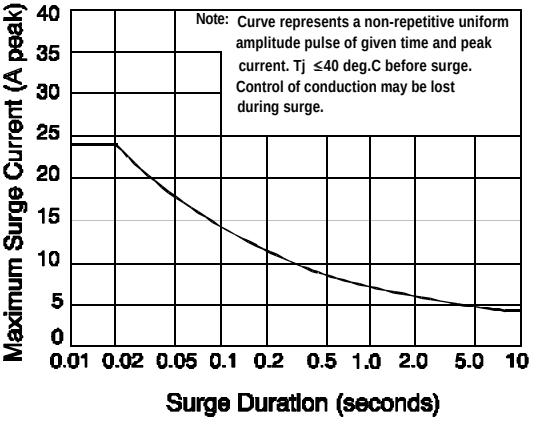


Figure 2. Maximum Allowable Surge

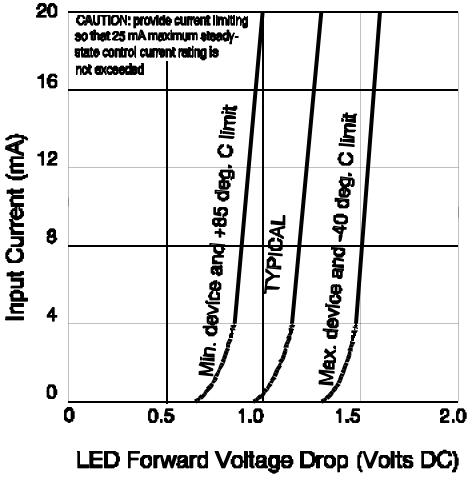
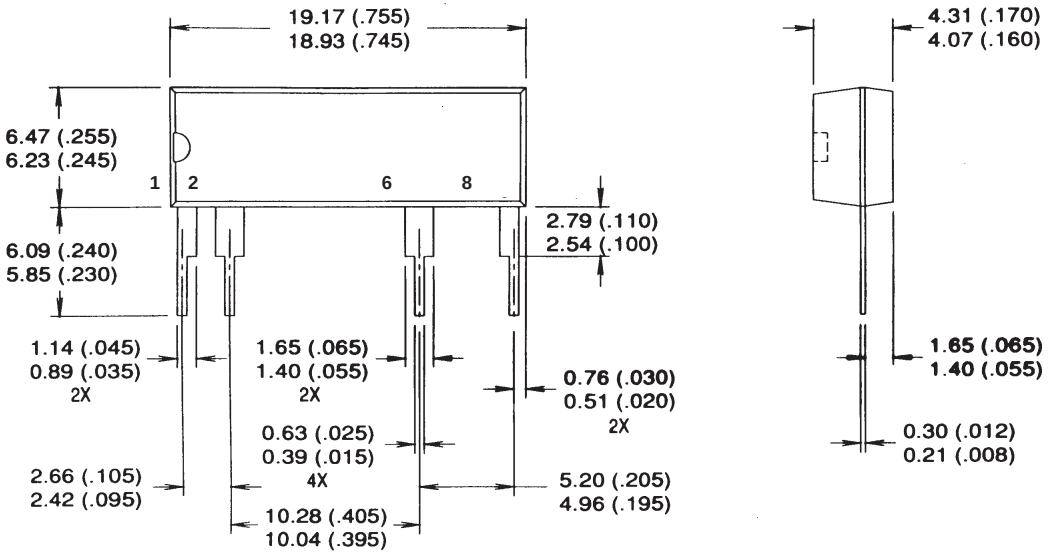


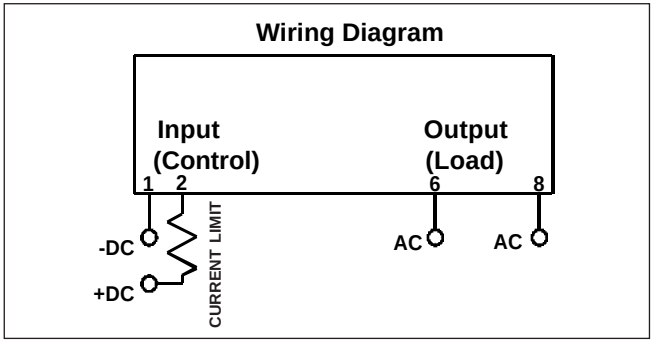
Figure 3. Input Characteristics (Current Controlled)

Case Outline

Dimensions in millimeters (inches)



NOTES:
1. CONTROLLING DIMENSION: INCH.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).



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