

**Series CS60**  
Microelectronic  
Power IC Relay  
300mA  
20-280V AC

## CHIPSWITCH® DIP RELAY

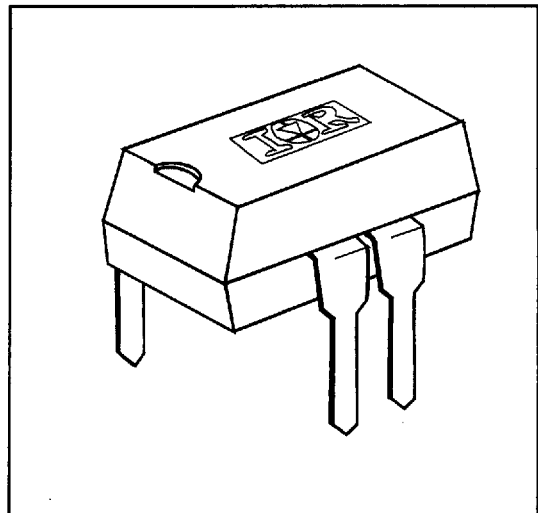
### GENERAL DESCRIPTION

The innovative design of the Series CS60 ChipSwitch solid state relay utilizes the S<sup>2</sup>X power integrated circuit chip developed by International Rectifier. Two optically activated power ICs are connected in inverse parallel (analogous to back-to-back SCRs) and energized by an isolated light emitting diode (LED). The use of only three components achieves both extreme reliability and miniaturization.

The Series CS60 power IC relays are a normally open configuration with precise zero voltage turn-on and zero current turn off. They conform to the most severe FCC and VDE EMI emission requirements. An active snubber network is integrated within the S<sup>2</sup>X chips and provides extremely high dv/dt ratings. Therefore, bulky and costly external RC networks are not needed for even low power factor inductive loads. The elimination of external snubber leakages, leaving only the extremely low S<sup>2</sup>X chip internal leakages, allows perfect operation from very low current loads up to full rating.

These devices are ideally suited for interfacing small AC power loads to microprocessor outputs. Solenoids, lamps, power contactors, small motors, and valves are thereby easily controlled by logic level signals. The Series CS60 units also make excellent high performance drivers for SCR and triac load high power output stages.

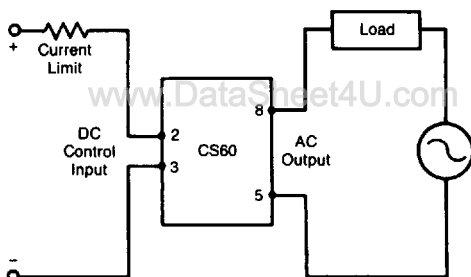
- S<sup>2</sup>X Power IC Chips
- 5.0 Amp Surge
- 4000V RMS Isolation
- Zero Voltage Turn-On
- EMI Meets FCC/VDE Limits
- Operates Without Snubber
- 1200V/ $\mu$ sec dv/dt
- 10 Microamps Leakage
- $\mu$  UL Recognized
- e CSA Certified



### Part Identification

Part No.	Transient Overvoltage	DC Input Turn-On (mA)
CS6005	600	5.0
CS6010	600	10.0
CS5005	500	5.0
CS5010	500	10.0

### WIRING DIAGRAM



# ChipSwitch DIP

**Electrical Specifications** ( $-40^{\circ}\text{C} \leq T_A \leq +85^{\circ}\text{C}$  unless otherwise specified)

<b>INPUT CHARACTERISTICS</b>	<b>CS6005</b>	<b>CS6010</b>	<b>CS5005</b>	<b>CS5010</b>	<b>Units</b>
Control Current range (Caution: Current limit input LED. See figure 3)	5 - 25	10 - 25	5 - 25	10 - 25	mA (DC)
Max. Turn-On Current	5.0	10	5.0	10	V (DC)
Min. Turn-Off Current	0.25				mA (DC)
Max. Reverse Voltage	7.0				V
Max. Turn-On Time (47 - 440 Hz)	0.5				Cycle
Max. Turn-Off Time (47 - 440 Hz)	0.5				Cycle

<b>OUTPUT CHARACTERISTICS</b>	<b>CS6005</b>	<b>CS6010</b>	<b>CS5005</b>	<b>CS5010</b>	<b>Units</b>
Operating Voltage Range (47 - 440 Hz)	20 to $\pm 280$				V(RMS)
Transient Overvoltage (Non-Repetitive)	600		500		V (peak)
Min. Off-State dv/dt (static) <sup>①</sup> 25°C (see figure 4)	1200				V $\mu$ s
Max. Load Current <sup>②</sup> (see figure 1)	300				mA (RMS)
Min. Load Current	0.5				mA (RMS)
Power Factor Range	02. - 1.0				—
Max. Surge Current (Non-repetitive) 20 ms (see figure 2)	5.0				A (peak)
Max. Over Current (Non-repetitive) 1 s	2.0				A (peak)
Max. On-State Voltage Drop @ 0.5A	2.0				V (peak)
Max 1 <sup>2</sup> T for Fusing (.01 sec)	0.2				A <sup>2</sup> sec
Max. Zero Voltage Turn-On	12				V (peak)
Max. Peak Repetitive Turn-On Voltage @ 15mA	1.5				V (peak)
Max. Off-State Leakage Current <sup>②</sup> @ Max. Operating Voltage 25°C	10				$\mu$ A(RMS)

<b>GENERAL CHARACTERISTICS</b>	<b>Limits</b>	<b>Units</b>
Dielectric Strength, Input-Output	4000	V <sub>RMS</sub>
Insulation Resistance, Input-Output @ 500V <sub>DC</sub>	10 <sup>12</sup>	$\Omega$
Tracking Resistance (VDE Test)	KB100/A	—
Max. Capacitance, Input-Output	1.0	pF
Max. Pin Soldering Temperature (1.6 mm below seating plane, 10 sec. max)	+260	°C
Ambient Temperature Range: Operating	-30 to +85	
Storage	-40 to +100	

**NOTES:** <sup>①</sup> Off-state dv/dt test method per EIA/NARM standard RS -443 with V<sub>p</sub> equal to the instantaneous peak of the maximum operating voltage.

<sup>②</sup> LED input current of zero mA

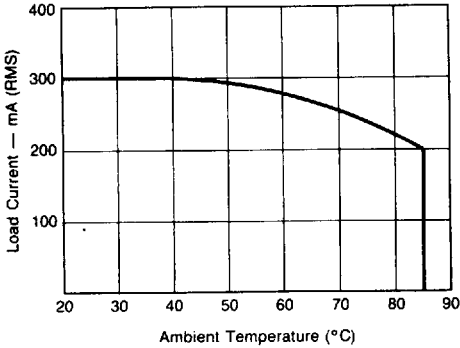


Figure 1. Derating Curve

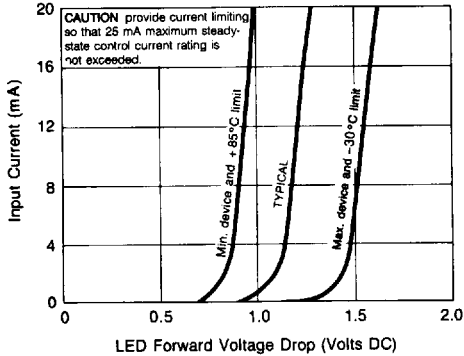


Figure 3. Input Characteristics (Current Controlled)

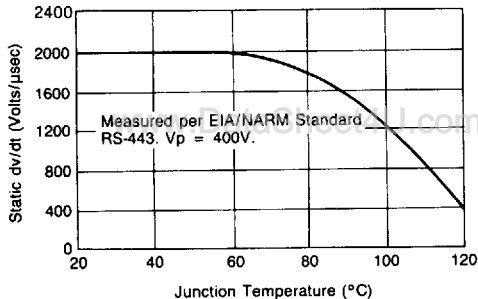


Figure 4. Typical Static dv/dt Performance

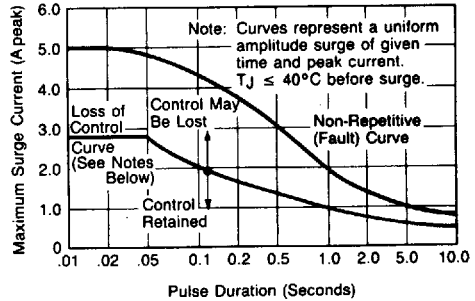
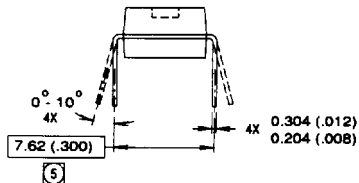
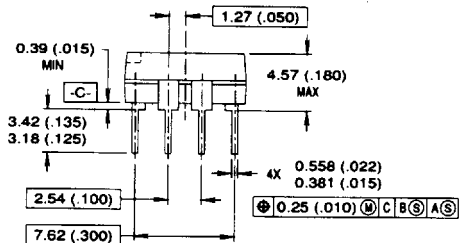
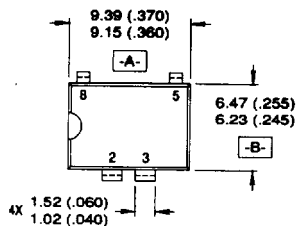


Figure 2. Maximum Allowable Surge (See Notes Below\*)

\* A surge exceeding the upper (Non-Repetitive Fault) curve can cause catastrophic failure. This limit is an absolute maximum rating and should be used in determining current limit or fusing protection techniques. Repetitions should not exceed 100 times during the normal operating life.

Exceeding the limit of the lower (Loss of Control) curve can cause momentary, but non-catastrophic, inability to instantaneously turn-off the load. Good application practice holds the normal, repetitive load inrush currents below this limit.



### Mechanical Specifications

Dimensions: Millimeters (Inches)

Package Size: 8-pin DIP

Tolerances: .015 (.38) unless otherwise specified

Case Material: Molded epoxy

Weight: .07 oz. (2 grams)