INTERNATIONAL RECTIFIER IOR

SERIES CS60

Microelectronic Power IC Relay

300 mA
20-280V AC

ChipSwitch DIP Relay

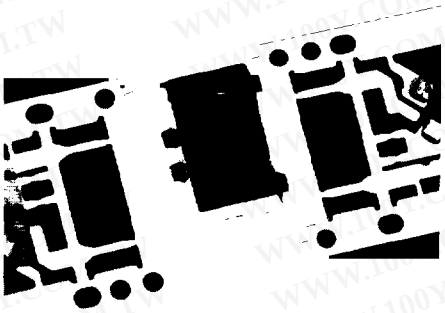
GENERAL DESCRIPTION

The innovative design of the Series CS60 ChipSwitch solid state relay utilizes the S'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.

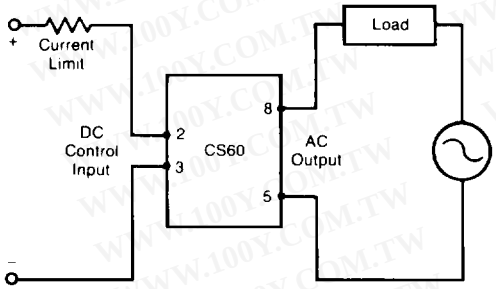
The Series CS60 power IC relays are a normally open configuration with precise zero voltage turn-on and zero current turn off. They conform to the most severe FCC and VDE EMI emission requirements. An active snubber network is integrated within the S'X chips and provides extremely high dv/dt ratings. 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'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 high power output stages.

- S'X Power IC Chips
- 5.0 Amp Surge
- 4000V RMS Isolation
- Zero Voltage Turn-On
- EMI Meets FCC/VDE Limits
- Operates Without Snubber
- 1200V/µsec dv/dt
- 10 Microamps Leakage
- UL Recognized
- CSA Certified



WIRING DIAGRAM



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

ELECTRICAL SPECIFICATIONS (-30°C < T_A ≤ 85°C unless otherwise specified)

GENERAL CHARACTERISTICS

Dielectric Strength — Input/Output		4000	V (RMS)
Insulation Resistance @ 500VDC — Input/Output		10^{12}	Ohms
Tracking Resistance (VDE Test)		KB100/A	—
Max Capacitance — Input/Output		1.0	pF
Ambient Temperature Range	Operating	-30 to 85	°C
	Storage	-40 to 100	°C
Lead Temperature (1.6 mm below seating plane) for 10 sec.		260	°C

ELECTRICAL SPECIFICATIONS (-30°C ≤ T_A ≤ 85°C unless otherwise specified)

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

OUTPUT CHARACTERISTICS

Operating Voltage Range (47-440 Hz)	20-280	20-280	V (RMS)
Transient Overvoltage (Non-Repetitive)	600	500	V (peak)
Min Off-State dv/dt (static)① 25°C (See Fig. 4)	1200		V/μs
Max Load Current (See Fig.1)②	300		mA (RMS)
Min Load Current	0.5		mA (RMS)
Power Factor Range	0.2 to 1.0		—
Max Surge Current (Non-Rep) 20 ms (See Fig. 2)	5.0		A (peak)
Max Over Current (Non-Rep) 1 sec	2.0		A (peak)
Max On-State Voltage Drop @ 0.5A	2.0		V (peak)
Max I^2T for Fusing (.01 sec)	0.2		A^2sec
Max Zero Voltage Turn-On	12		V (peak)
Max Peak Repetitive Turn-On Voltage @ 15 mA	1.5		V (peak)
Max Off-Stage Leakage Current ② @ Max. Operating Voltage, 25°C	10		μA (RMS)

Data and Specifications subject to change without notice.

GENERAL 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 current of zero mA.

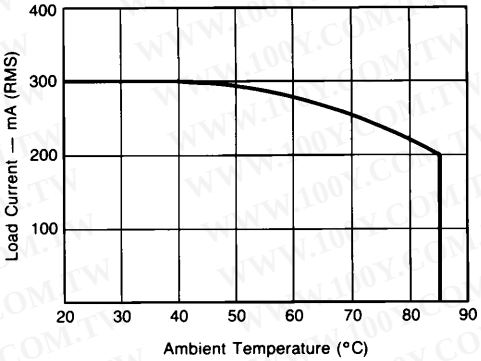


Figure 1. Derating Curve

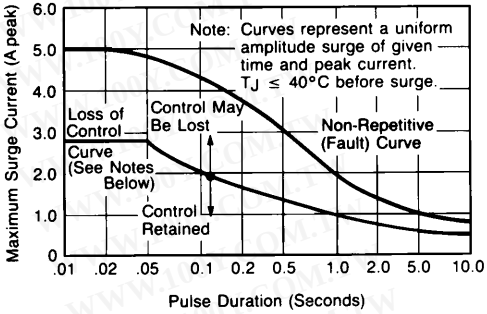


Figure 2. Maximum Allowable Surge (See Notes Below*)

*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.

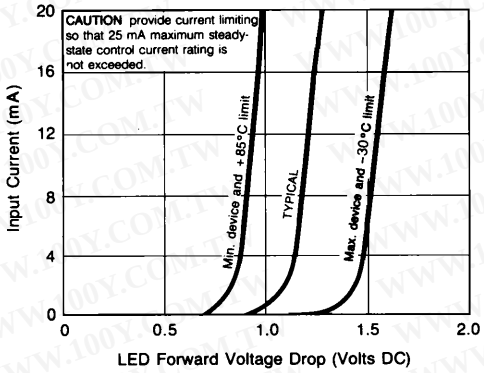


Figure 3. Input Characteristics (Current Controlled)

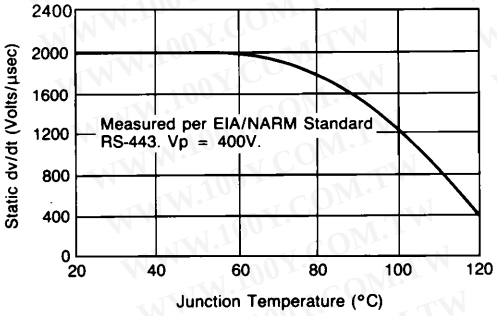
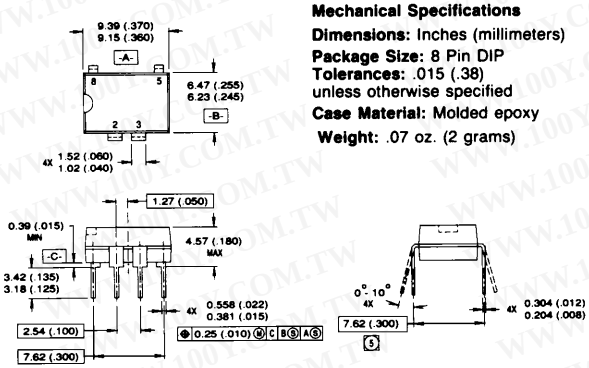


Figure 4. Typical Static dv/dt Performance



Mechanical Specifications

Dimensions: Inches (millimeters)
Package Size: 8 Pin DIP
Tolerances: .015 (.38) unless otherwise specified
Case Material: Molded epoxy
Weight: .07 oz. (2 grams)