

53209  
53210  
53211

**SPDT SOLID-STATE RELAYS**  
**High Power AC/DC Switching**



**Features:**

- Replacements for M30-1, M30-3, M30-4
- SPDT, Break-Before-Make
- Up to 1500 V RMS optical isolation
- Output voltage up to  $\pm 320$  VDC (53211)
- Power FET output low on-state resistance
- Full military temperature operation:  
-55°C to +125°C
- Military environmental screening available

**Applications:**

- High power switching
- Line drivers
- Servo control
- Harsh environment
- Load control
- General purpose switching

**DESCRIPTION**

The 53209, 53210, and 53211 are military SPDT high power, solid-state relays. These light-weight devices are resistant to damage from shock and vibration, and are immune to contact-related problems (contamination, arcing) associated with mechanical equivalents.

Optical coupling between the input and output stages provides effective isolation up to 1500 volts AC RMS. Power FET outputs eliminate bipolar offset, and minimize output voltage drop for high current capability.

The control logic is CMOS compatible, and will accommodate bias supplies ranging between 4 and 16 VDC. A TTL input driver with pull-up resistor may also be used.

These solid-state relays are ideal for use in military systems, or wherever high reliability, low power actuation, and light weight are design considerations. Applications include general purpose signal switching and electronic load control.

**ABSOLUTE MAXIMUM RATINGS**

Isolation Voltage <sup>1</sup> .....	1500 VAC RMS
Continuous Operating Output Voltage: 53209 .....	$\pm 80$ Peak
53210 .....	$\pm 160$ Peak
53211 .....	$\pm 320$ Peak
Load Current <sup>2</sup> : 53209 .....	4.1 A RMS
53210 .....	2.6 A RMS
53211 .....	1.3 A RMS
Bias Supply Voltage, V <sub>DD</sub> .....	16 VDC
Control Logic Input Voltage .....	16 VDC
Operating Temperature .....	-55°C to +125°C Case
Storage Temperature .....	-55°C to +125°C

**Notes:** <sup>1</sup> 60 Hz sine wave    <sup>2</sup> at 25°C with 2.0° C/W heat sink max

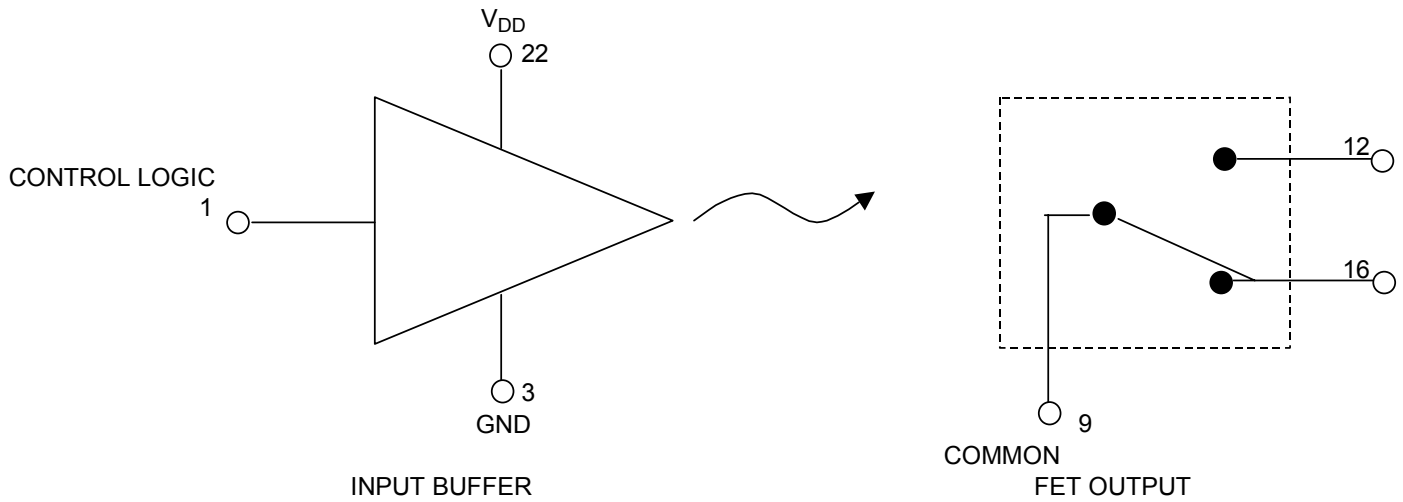
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**ELECTRICAL CHARACTERISTICS**

$T_A = +25^\circ \text{C}$

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Isolation Voltage, I/O	60 Hz Sine Wave	1500			VAC RMS
Isolation Resistance	at 500 V		$10^9$		Ohms
Continuous Operating Output Voltage 53209 53210 53211				80 160 320	VAC Peak VAC Peak VAC Peak
Transient Output Voltage 53209 53210 53211				80 180 380	VAC Peak VAC Peak VAC Peak
Load Current 53209 53210 53211	2.0 °C/W Heat Sink			4.1 2.6 1.3	Amps RMS
On Resistance 53209 53210 53211	$T_A = 25^\circ\text{C}$			0.6 1.5 6.0	Ohms Ohms Ohms
Capacitance, I/O	25 V, 1 MHz			5	pF
Leakage Current	Load Voltage = Maximum			20	$\mu\text{A}$
Bias Supply Voltage, $V_{DD}$		4		16	VDC
Bias Current			13	16	mA
Control Logic Voltage				16	VDC
Control Logic Current				2	$\mu\text{A}$
Control Logic Level – High		0.75 $V_{DD}$		$V_{DD}$	VDC
Control Logic Level – Low		0		0.15 $V_{DD}$	VDC
$t_r$ (Rise Time) $t_{on}$ (Turn-On-Time) $t_f$ (fall Time) $t_{off}$ (Turn-Off Time) $t_d$ (Dwell Time)	Load Voltage = 28 VDC $R_L = 50\Omega$			3.0 4.0 50 250 1.5	ms ms $\mu\text{s}$ $\mu\text{s}$ ms
Thermal Resistance, $\theta_{JA}$ $\theta_{JC}$			20 4.2		$^\circ\text{C/W}$ $^\circ\text{C/W}$

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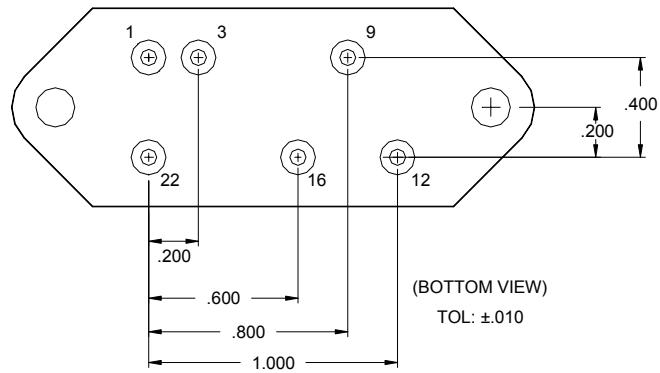
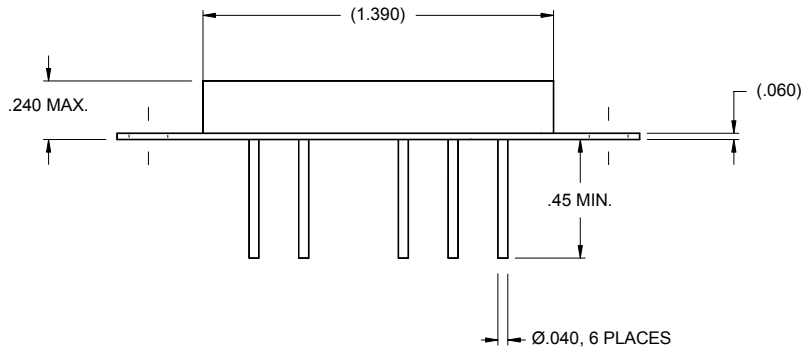
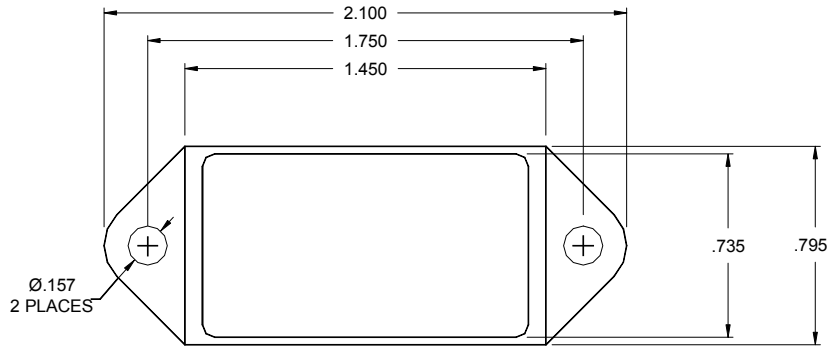


**Truth Table**

INPUT (Pin 1)	Pin 12	Pin 16
High	Closed	Open
Low	Open	Closed

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Package Dimensions



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