

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

**Micropac Industries** cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement. **Micropac** reserves the right to make changes at any time in order to improve design and to supply the best product possible.

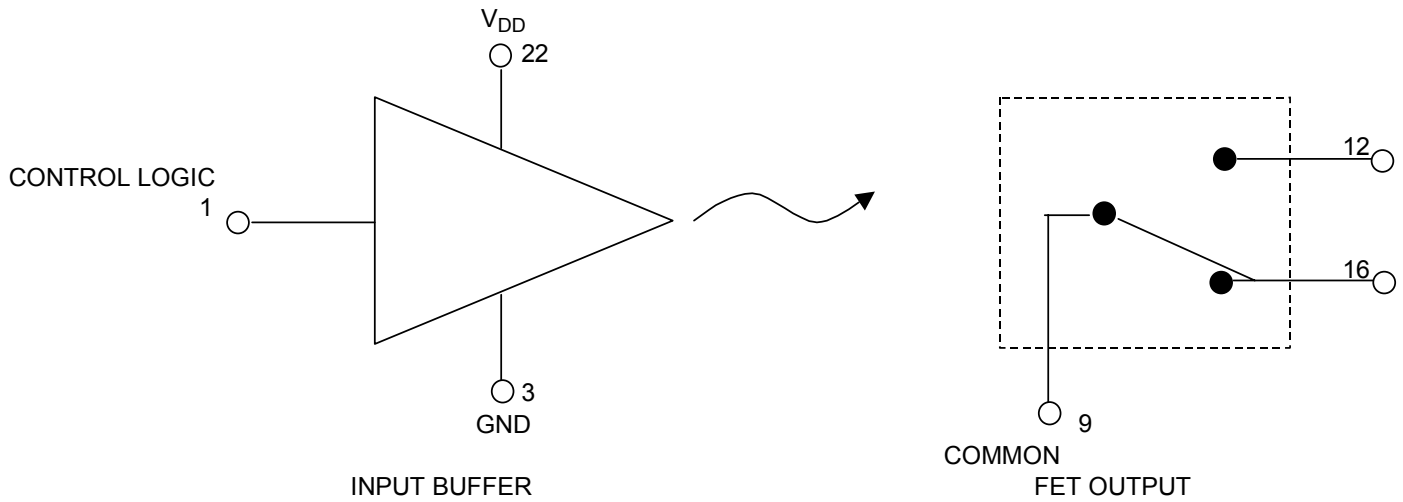
**53209, 53210, & 53211**  
**SPDT SOLID-STATE RELAYS**

**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				80	VAC Peak
53210				160	VAC Peak
53211				320	VAC Peak
Transient Output Voltage					
53209				80	VAC Peak
53210				180	VAC Peak
53211				380	VAC Peak
Load Current	2.0 °C/W Heat Sink				
53209				4.1	Amps RMS
53210				2.6	
53211				1.3	
On Resistance	$T_A = 25^\circ\text{C}$				
53209				0.6	Ohms
53210				1.5	Ohms
53211				6.0	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)	Load Voltage = 28 VDC			3.0	ms
$t_{on}$ (Turn-On-Time)	$R_L = 50\Omega$			4.0	ms
$t_f$ (fall Time)				50	$\mu\text{s}$
$t_{off}$ (Turn-Off Time)				250	$\mu\text{s}$
$t_d$ (Dwell Time)		0.5		1.5	ms
Thermal Resistance, $\theta_{JA}$			20		$^\circ\text{C/W}$
$\theta_{JC}$			4.2		$^\circ\text{C/W}$

**Micropac Industries** cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.  
**Micropac** reserves the right to make changes at any time in order to improve design and to supply the best product possible.

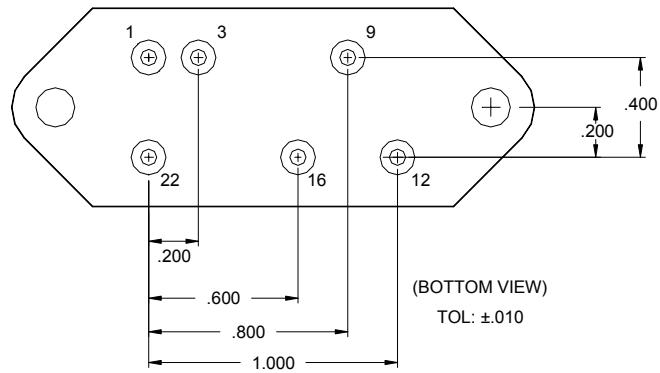
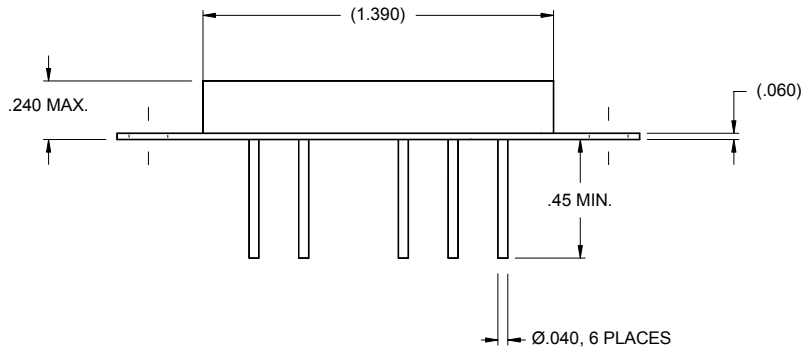
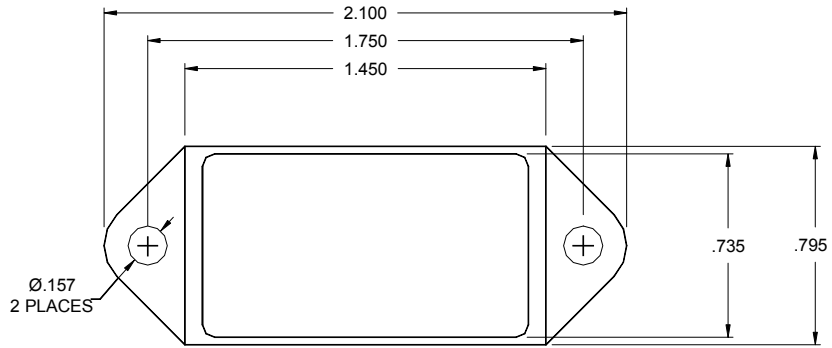


**Truth Table**

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

**Micropac Industries** cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.  
**Micropac** reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Package Dimensions



Micropac Industries cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.  
 Micropac reserves the right to make changes at any time in order to improve design and to supply the best product possible.