

**53200**  
**53203**  
**53204**

**SPDT SOLID-STATE RELAYS**

**Mii**

**MICROCIRCUITS PRODUCTS  
 DIVISION**

**Features:**

- Replacements for M31-1, M31-1A, M31-2 A
- SPDT, Break-Before-Make
- Up to 1500 V RMS Optical Isolation
- Output current up to 8.2 Amps (53203)
- Power FET Output Low On-state Resistance
- Full Military Temperature Operation:  
 -55°C to +125°C
- Military Environmental Screening Available

**Applications:**

- Heater Load Switching
- Sensor Activation
- Remote Signal Activation
- Servo and synchro control
- High power switching

**DESCRIPTION**

The MII 53200, 53203, and 53204 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 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> .....	1000 VAC RMS
Continuous Operating Output Voltage <sup>3</sup> : 53200 .....	80 VDC
53203 .....	80 VDC
53204 .....	160 VDC
Load Current <sup>2</sup> : 53200 .....	4.8 Amps DC
53203 .....	8.2 Amps DC
53204 .....	5.2 Amps DC
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      <sup>3</sup> Reversing polarity on the output may cause permanent damage.

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[www.micropac.com](http://www.micropac.com) E-MAIL: [hybridsales@micropac.com](mailto:hybridsales@micropac.com) 8/12/02

## ELECTRICAL CHARACTERISTICS

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

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Isolation Voltage, I/O	60 Hz Sine Wave	1500			VAC RMS
Isolation Resistance	Input to Case, at 50V		$10^9$		Ohms
Continuous Operating Output Voltage					
53200				80	VDC
53203				80	VDC
53204				160	VDC
Transient Output Voltage					
53200				80	VDC
53203				80	VDC
53204				180	VDC
Load Current:	2.0 °C/W Heat Sink				
53200				4.8	Amps DC
53203				8.2	Amps DC
53204				5.2	Amps DC
On Resistance:					
53200				0.3	Ohms
53203				0.15	Ohms
53204				0.38	Ohms
Capacitance, I/O	25 V, 1 MHz			5	PF
Leakage Current:	Load Voltage = Maximum				
53200				20	$\mu\text{A}$
53203				40	$\mu\text{A}$
53204				40	$\mu\text{A}$
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 VDD			VDC
Control Logic Level – Low		0		0.15 $V_{DD}$	VDC
$t_r$ (Rise Time):	Load Voltage = 25 VDC $R_L = 50\Omega$				
53200				2.0	ms
53203				3.0	ms
53204				3.0	ms
$t_{on}$ (Turn-On-Time):					
53200				3.0	ms
53203				4.0	ms
53204				4.0	ms
$t_f$ (Fall Time)				50	$\mu\text{s}$
$t_{off}$ (Turn-Off-Time):					
53200				200	$\mu\text{s}$
53203				250	$\mu\text{s}$
53204				250	$\mu\text{s}$
$t_d$ (Dwell Time)		0.5		1.5	ms
Thermal Resistance, $\theta_{JA}$ :					
53200			23		°C/W
53203			20		°C/W
53204			20		°C/W
Thermal Resistance, $\theta_{JC}$ :					
53200			7.0		°C/W
53203			4.2		°C/W
53204			4.2		°C/W

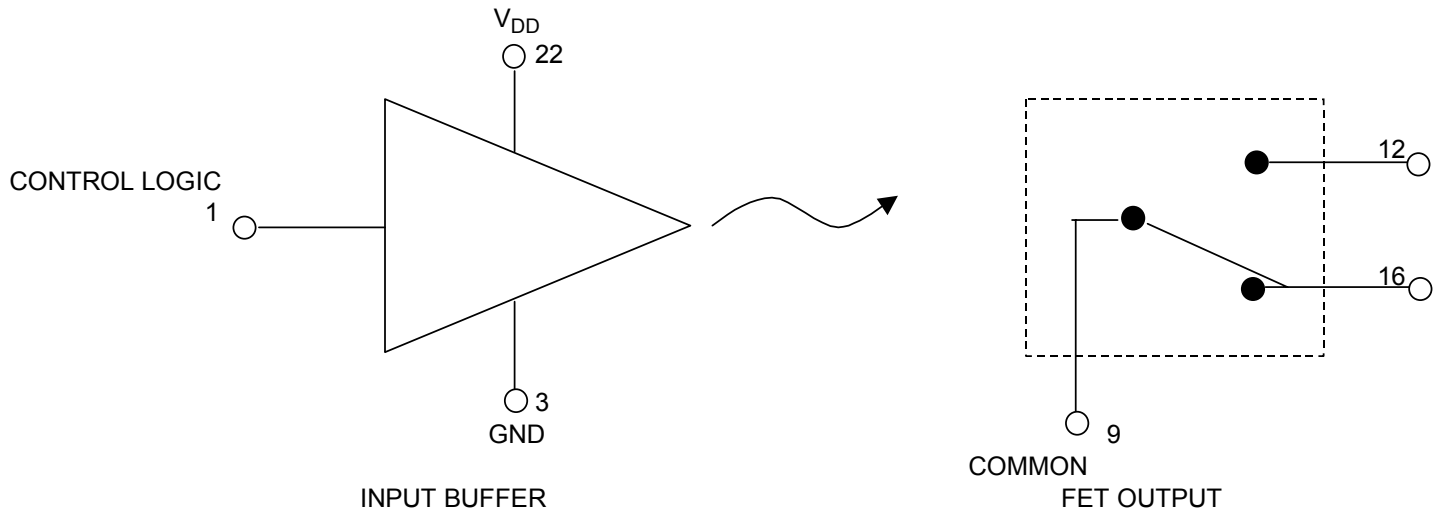
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**Truth Table**

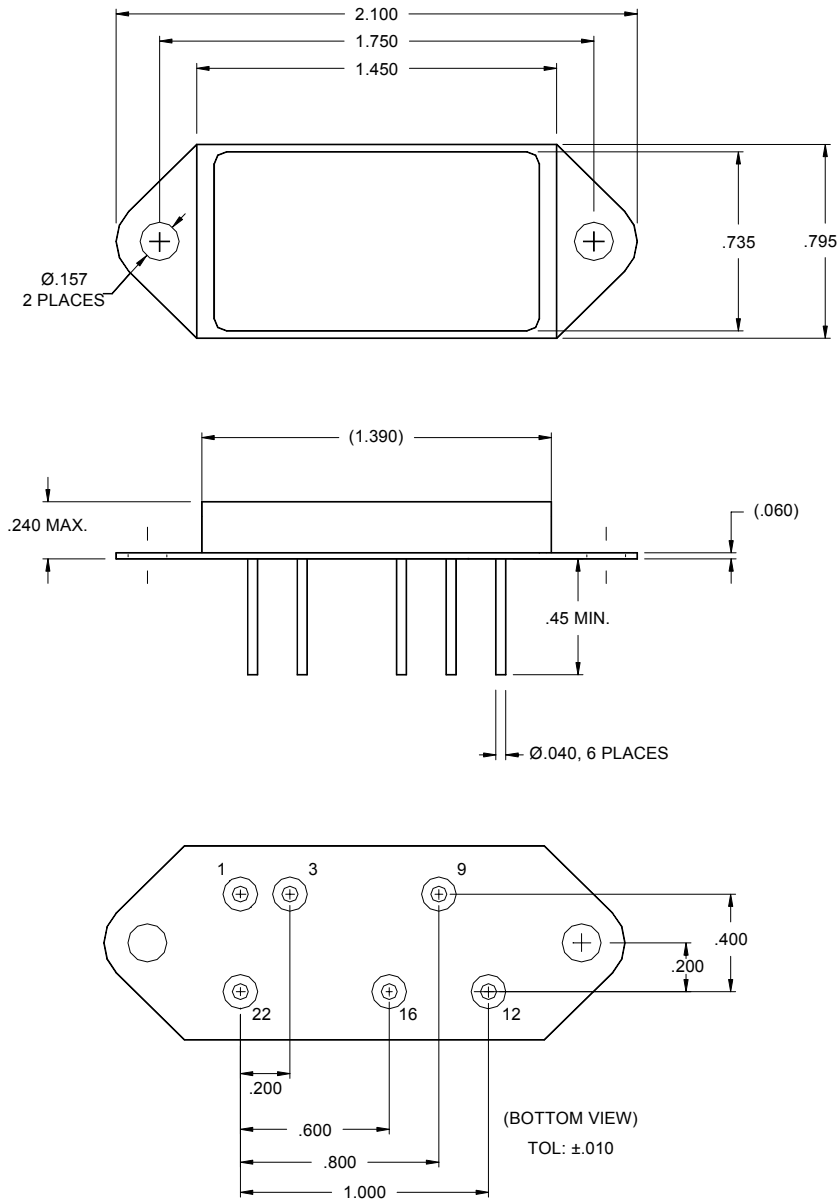
INPUT (PIN 1)	PIN 12	PIN 16
High	Closed	Open
Low	Open	Closed

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Package Dimensions



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