

<p><b>53012</b></p> <p style="text-align: center;"><b>SPST SOLID-STATE RELAY</b></p>	 <p><b>Mii</b></p> <p>HYBRID MICROELECTRONICS PRODUCTS DIVISION</p>
--	--

<p><b>Features:</b></p> <ul style="list-style-type: none"> <li>• Replacement for M90FS-2</li> <li>• SPST, Normally Open</li> <li>• Integral Short Circuit Protection</li> <li>• Power FET Output Low On-state Resistance</li> <li>• Full Military Temperature Operation: -55°C to +125°C</li> <li>• Military Environmental Screening Available</li> <li>• Improved Thermal Characteristics</li> <li>• Built in accordance with 85006-001</li> </ul>	<p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Low Level Power Control</li> <li>• Current Loop Switches</li> <li>• Isolated Line Driver Selection</li> <li>• Servo and Synchro Resolver Control</li> <li>• Military/Aerospace General Purpose Switching</li> </ul>
---	--

**DESCRIPTION**

The 53012 is a military SPST solid-state relay. This light-weight device is resistant to damage from shock and vibration, and is immune to contact-related problems (contamination, arcing) associated with mechanical equivalents.

Optical coupling between the input and output stages provides effective isolation up to 1000 volts AC RMS. Power FET outputs eliminate bipolar offset, and minimize output voltage drop.

The control logic is TTL compatible, and will accommodate bias supplies between 3.8 and 32 VDC.

Integral short-circuit protection is provided in the 53012. This unit senses excessive current flow while under load or while switching, and respond by opening the output. The output will remain blocked indefinitely until the short is removed, and the unit reset. This feature prevents damage to the unit, and also averts further system failures that may be caused by the short-circuit. Resetting the unit can be accomplished by cycling the input control.

This solid-state relay is 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: 53012 .....	1000 VAC RMS
Operating Temperature .....	-55°C to +125°C Case
Storage Temperature .....	-55°C to +125°C

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.



## SPST SOLID-STATE RELAY

## ELECTRICAL CHARACTERISTICS\*

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

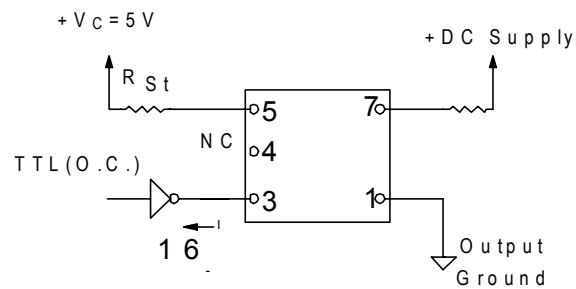
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Current			13	16	MA
Control Voltage Range	See Table 1 – Bias Resistance	3.8		32	VDC
Turn-Off Voltage				1.5	VDC
Turn-On Voltage		3.8			VDC
Continuous Operating Output Voltage				60	VDC
Load Current	25°C			1.0	Amps
On Resistance			0.2	0.3	Ohms
Output Capacitance	25V, 1MHz			400	pF
Thermal Resistance $\Theta_{JA}$			100		°C/W
Thermal Resistance $\Theta_{JC}$			25		°C/W
Rise Time, $t_r$	10% - 90% Load Voltage			1000	μs
Fall Time, $t_f$	90% - 10% Load Voltage			100	μs
On Delay, $t_{dON}$	Min Turn On Volts To 10% Load V			800	μs
Off Delay, $t_{dOFF}$	Max Turn Off Volts To 90% Load V			500	μs
Surge Voltage	5 Second Maximum			80	Volts
Leakage Current	Max Cont. Operating Output V		10		μA
Dielectric Strength	I-0, 60 Hz Sine Wave			1000	VAC RMS
Isolation Resistance	Input to Case, 500 V		$10^9$		Ohms
Current Surge	100 ms		2		Amps DC
Overload Trip Current	40 ms Pulse		8.5		Amps DC

## NOTES:

- Limiting resistor may be required for  $V_C > 6V$ . See Table 1
- Input transitions should be  $< 1\text{ ms}$
- Maximum input frequency: 50Hz (Normal load). For shorted load, use:  
 $f_{SC} = 50 - (1.17 \times V_{OUT})$
- $t_{ON} = t_r + t_{dON}$ ,  $t_{OFF} = t_f + t_{dOFF}$

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.

## APPLICATION INFORMATION



\*Limiting Resistor ( $R_S$ ) May Be Required. See Table 1.

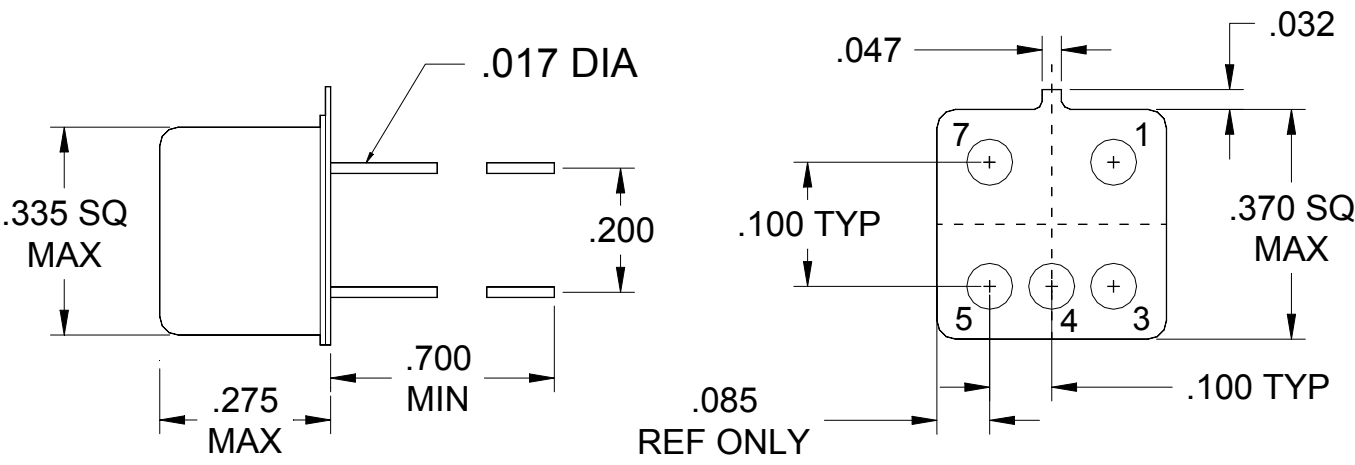
**TABLE 1**  
**LIMITING RESISTANCE ( $R_S$ ) VALUES**  
**(Without Heat Sink)**

$V_C$ (VDC)	3.8-6	6 - 10	10 - 14	14 - 18	22 - 26	26 - 32
$R_S$ ( $\Omega$ )		300	620	910	1500	2000
Rating		1/4	1/4	1/2	1/2	1

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.

**53012**  
**SPST SOLID-STATE RELAY**

**Package Dimensions**



PIN	FUNCTION
1	- Output
3	Ground
4	NC
5	V <sub>CC</sub>
7	+ Output

**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.