

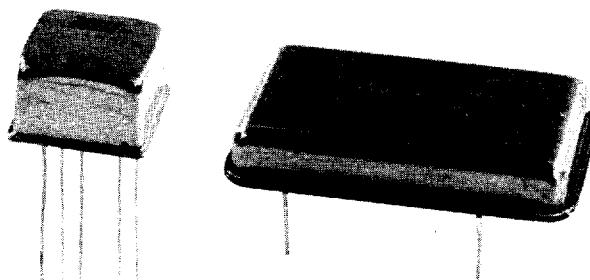
53000
53004 through 53010
SPST SOLID-STATE RELAYS



FEATURES

- Replacements for M85F, M86F, M90F, M91F
- SPST Normally Open
- Up to 1200 V RMS Optical Isolation
- CMOS or TTL Compatible Input
- Power FET Output
 - Low On-state Resistance
- Full Military Temperature Operation:
 - 55°C to +125°C
- Improved Thermal Characteristics
- Temperature Range

MILITARY SPST SOLID STATE RELAYS



GENERAL DESCRIPTION

The MII 53000 and 53004 through 53010 are military SPST 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.

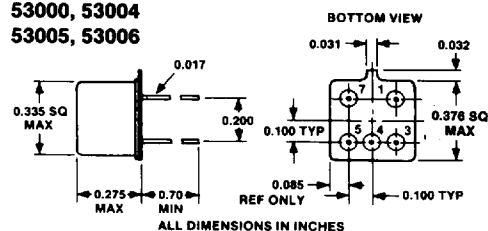
Optical coupling between the input and output stages provides effective isolation up to 1200 volts AC RMS. Power FET outputs eliminate bipolar offset, and minimize output voltage drop.

The control logic is TTL and CMOS compatible, and will accommodate bias supplies between 3.8 and 32 VDC. A built-in Schmitt trigger increases noise margin when using the device in the CMOS input mode.

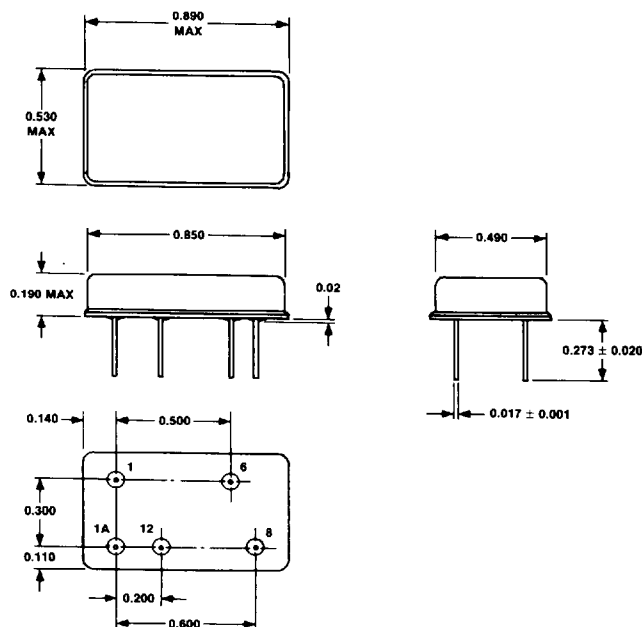
These solid-state relays are ideal for use in military systems, or wherever high reliability, low power actuation, and light weight are design considerations. Applications include general purpose signal switching and electronic load control.

PACKAGE DIMENSIONS

53000, 53004
53005, 53006



53007, 53008,
53009, 53010



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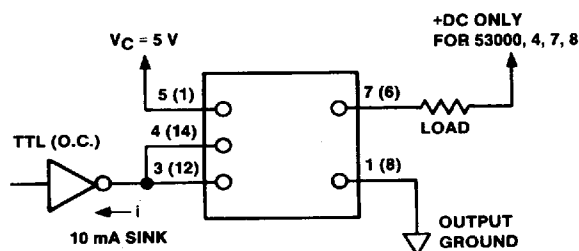
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53000
53004 through 53010
SPST SOLID-STATE RELAYS

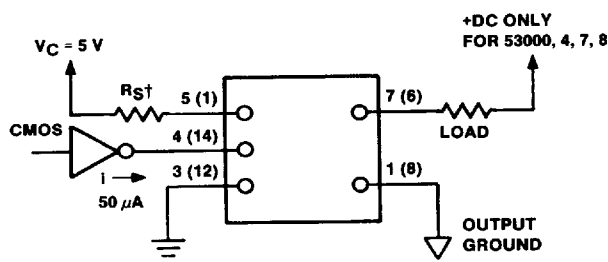
APPLICATION INFORMATION¹

(53007-53010 PIN NUMBERS IN PARENTHESIS)



TTL CONFIGURATION

[†]Limiting resistor (R_s) may be required. See Table 1.
¹Both circuits shown are logically inverting



CMOS CONFIGURATION

TABLE 1
LIMITING RESISTANCE (R_s) VALUES
(Without Heat Sink)

V (VDC)	3.8-6	6-10	10-14	14-18	22-26	26-32
R (Ω)		300	620	910	1500	2000
Rating (W)		1/4	1/4	1/2	1/2	1

ABSOLUTE MAXIMUM RATINGS

Isolation Voltage: 53000, 53004, 53005, 53006 1000 VAC RMS
 53007, 53008, 53009, 53010 1200 VAC RMS
 Operating Temperature -55°C to +125°C Case
 Storage Temperature -55°C to +125°C

ELECTRICAL CHARACTERISTICS*

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

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input (Control) Characteristics TTL Configuration					
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
Input (Control) Characteristics CMOS Configuration					
Input Current			25	50	μA
Control Voltage Range		2.5		18	VDC
Bias Supply - V_c	See Table 1 - Bias Resistance	3.8		32	VDC
Bias Current			13	16	mA
Turn-Off Voltage @ 5 V V_c			3.5		VDC
Turn-On Voltage		0.5			VDC
Total Schmitt Hysteresis			1.8		VDC

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53000**53004 through 53010****SPST SOLID-STATE RELAYS****ELECTRICAL CHARACTERISTICS*** $T_A = +25^{\circ}\text{C}$

PARAMETER	CONDITIONS	53005	53009	53006	53010	UNITS
Maximum Continuous Operating Output Voltage		60 Volts Peak				Volts
Maximum Load Current	25 °C	0.4	0.54	0.7	0.95	Amps DC or RMS
On Resistance - Typical - Maximum		1.2	1.2	0.60	0.60	Ohms
		1.6	1.6	0.70	0.70	Ohms
Maximum Output Capacitance	25 V, 1 MHz	80	80	200	200	pF
Maximum Input-Output Capacitance	25 V, 1 MHz	5	5	5	5	pF
Typical Thermal Resistance, θ_{JA} θ_{JC}		120	90	100	70	°C/W
		32	30	25	25	°C/W
Typical Rise Time, t_r	10% - 90% Load Voltage	300	300	600	600	μs
Typical Fall Time, t_f	90% - 10% Load Voltage	50	50	50	50	μs
Typical On Delay, t_{dON}	Min. Turn On Volts to 10% Load	150	150	200	200	μs
Typical Off Delay, t_{dOFF}	Max. Turn Off Volts to 90% Load	20	20	15	15	μs
Maximum Surge Voltage	2 Second Maximum	80	80	80	80	VDC or Peak
Typical Leakage Current	60 V	10	10	10	10	μA
Minimum Dielectric Strength		1000	1200	1000	1200	V RMS
Typical Isolation Resistance	Input to Case, 500 V	10 ⁹	10 ⁹	10 ⁹	10 ⁹	Ohms

NOTES: $t_{ON} = t_r + t_{dON}$
 $t_{OFF} = t_f + t_{dOFF}$

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

PARAMETER	CONDITIONS	53004	53007	53000	53008	UNITS
Maximum Continuous Operating Output Voltage		60 VDC				Volts
Maximum Load Current	25 °C	0.56	0.75	1.0	1.35	Amps DC
On Resistance - Typical - Maximum		0.60	0.60	0.30	0.30	Ohms
		0.90	0.90	0.35	0.35	Ohms
Maximum Output Capacitance	25 V, 1 MHz	160	160	400	400	pF
Maximum Input-Output Capacitance	25 V, 1 MHz	5	5	5	5	pF
Typical Thermal Resistance, θ_{JA} θ_{JC}		120	90	100	70	°C/W
		32	30	25	25	°C/W
Typical Rise Time, t_r	10% - 90% Load Voltage	300	300	600	600	μs
Typical Fall Time, t_f	90% - 10% Load Voltage	50	50	10	10	μs
Typical On Delay, t_{dON}	Min. Turn On Volts to 10% Load	250	250	200	200	μs
Typical Off Delay, t_{dOFF}	Max. Turn Off Volts to 90% Load	20	20	15	15	μs
Maximum Surge Voltage	2 Second Maximum	80	80	80	80	VDC or Peak
Typical Leakage Current	60 V	10	10	10	10	μA
Minimum Dielectric Strength		1000	1200	1000	1200	V RMS
Typical Isolation Resistance	Input to Case, 500 V	10 ⁹	10 ⁹	10 ⁹	10 ⁹	Ohms

NOTES: $t_{ON} = t_r + t_{dON}$
 $t_{OFF} = t_f + t_{dOFF}$

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