

PRELIMINARY DATA SHEET

53253**RADIATION TOLERANT, 90V - 0.8A
DUAL POWER MOSFET OPTOCOUPERS****Mii**HYBRID MICROELECTRONICS
PRODUCTS DIVISION**Features:**

- Designed for 100 krad(Si) Total Dose
- 8-Pin Dual-In-Line Hermetic Package
- Performance over -55°C to $+125^{\circ}\text{C}$
- Compact Isolation Solid State Switches
- Continuous Output Current: 0.8 A ⁽¹⁾
- Optically Coupled between Input and Output
- Isolation Tested to 1000 VDC
- High Level of Transient Immunity
- 3 A Output Surge Current
- Shock and Vibration Resistant
- MIL-PRF-38534 screening optional

Applications:

- Satellite/Space systems
- Military/High Reliability Systems
- Standard 28 VDC and 48 VDC Load Driver
- Aircraft Controls
- Electromechanical and Solid State Relay Replacement
- I/O Modules
- Switching Heaters

DESCRIPTION

The 53253 is two power MOSFET optocouplers in a single 8-pin dual-in-line package suitable for applications where two independent switches and radiation tolerant performance are required. The popular hermetic eight-pin dual-in-line ceramic package combined with 1000 VDC isolation between input and output and between two isolated relays, makes this device ideal for solid-state relay applications. Performance is specified over the full military temperature range. This device is available as COTS, or screened to MIL-PRF-38534, Table C-IX, Class H or custom screening. Lead options support both through-hole and surface-mount assembly. Gold plated leads are standard, but other lead finishes per MIL-PRF-38534 are also available.

Functionally, the device operates as two SPST, normally open (2 Form A) solid-state relays. Each relay is actuated by an input current, which can be driven from a standard TTL device. The input current biases a light emitting diode that is optically coupled to an integrated photovoltaic diode array. The photovoltaic diode array energizes control circuitry that operates the output MOSFET.

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Micropac reserves the right to make changes at any time in order to improve design and to supply the best product possible.



ABSOLUTE MAXIMUM RATINGS:

(Per relay unless otherwise noted)

Storage Temperature Range	-65°C to +150°C
Operating Ambient Temperature - T_A	-55°C to +125°C
Junction Temperature - T_J	+150°C
Lead Solder Temperature for 10 seconds	+260°C
(1.6 mm below seating plane)	
Average Input Current - I_F	20 mA
Peak Repetitive Input Current - I_{Fpk}	40 mA
(pulse width < 100 ms; duty cycle < 50%)	
Peak Surge Input Current - I_{Fpk} surge	100 mA
(pulse width < 0.2 ms; duty cycle < 0.1%)	
Continuous Output Current per relay - I_O	0.8 A ⁽¹⁾
Single Shot Output Current per relay- I_{Opk} surge (pulse width < 10 ms)	3 A
Output Voltage - V_O	90 VDC

RECOMMENDED OPERATING CONDITIONS:

Parameter	Symbol	Min.	Max.	Units
Input Current (ON)	$I_{F(ON)}$	5	20	mA
Input Voltage (OFF)	$V_{F(OFF)}$	0	0.6	VDC
Operating Temperature	T_A	-55	+125	°C

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ELECTRICAL SPECIFICATIONS (Pre-Irradiation)

$T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Min.	Typ.*	Max.	Units	Test Conditions	Notes
Output Withstand Voltage	$V_{O(OFF)}$	90			V	$V_F = 0.6\text{ V}$ $I_O = 10\text{ }\mu\text{A}$	
Output On-Resistance	$R_{(ON)}$		0.6	1.2	Ω	$I_F = 10\text{ mA}$ $I_O = 0.8\text{ A}$ (pulse duration $\leq 30\text{ ms}$)	2
Output Leakage Current	$I_{O(OFF)}$			10	μA	$V_F = 0.6\text{ V}$ $V_O = 90\text{ V}$	
Input Forward Voltage	V_F	1.0	1.6	2.1	V	$I_F = 10\text{ mA}$	
Input Reverse Breakdown Voltage	V_R	5			V	$I_F = 10\text{ }\mu\text{A}$	
Input-Output Isolation	I_{I-O}			1	μA	$RH \leq 45\%$, $t = 5\text{ s}$ $V_{I-O} = 1000\text{ VDC}$ $T_A = 25^{\circ}\text{C}$	3
Channel-channel Isolation	I_{ISO}			1	μA	$RH \leq 45\%$, $t = 5\text{ s}$ $V_{ISO} = 1000\text{ VDC}$ $T_A = 25^{\circ}\text{C}$	3
Turn-On Time	t_{ON}			6	ms	$I_F = 10\text{ mA}$ $V_O = 28\text{ V}$ $I_O = 0.8\text{ A}$	
Turn-Off time	t_{OFF}			2	ms	$I_F = 10\text{ mA}$ $V_O = 28\text{ V}$ $I_O = 0.8\text{ A}$	

* All typical values are at $T_A = 25^{\circ}\text{C}$, $I_{F(ON)} = 10\text{ mA}$, $V_{F(OFF)} = 0.6\text{ V}$ unless otherwise specified.

Notes:

1. Maximum average current rating where the case temperature (T_C) is maintained below 120°C .
2. During the pulsed R_{ON} measurement (I_O duration $< 30\text{ ms}$), ambient (T_A) and case temperature (T_C) are equal.
3. This is a momentary withstand test, not a continuous operating condition.
4. Typical junction to case thermal resistance (θ_{JC}) for the device is 15°C/W , where case temperature (T_C) is measured at the center of the package bottom.

CAUTION:

Care should be taken not to exceed the maximum output power dissipation, maximum case temperature, and maximum junction temperature when repetitively switching loads.

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Terminal number	Terminal Symbol
1	+IN 1
2	- IN 1
3	- OUT 2
4	+OUT 2
5	+IN 2
6	- IN 2
7	- OUT 1
8	+OUT 1

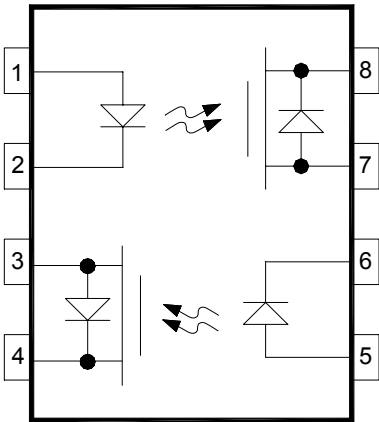


Figure 1 - Terminal Connections

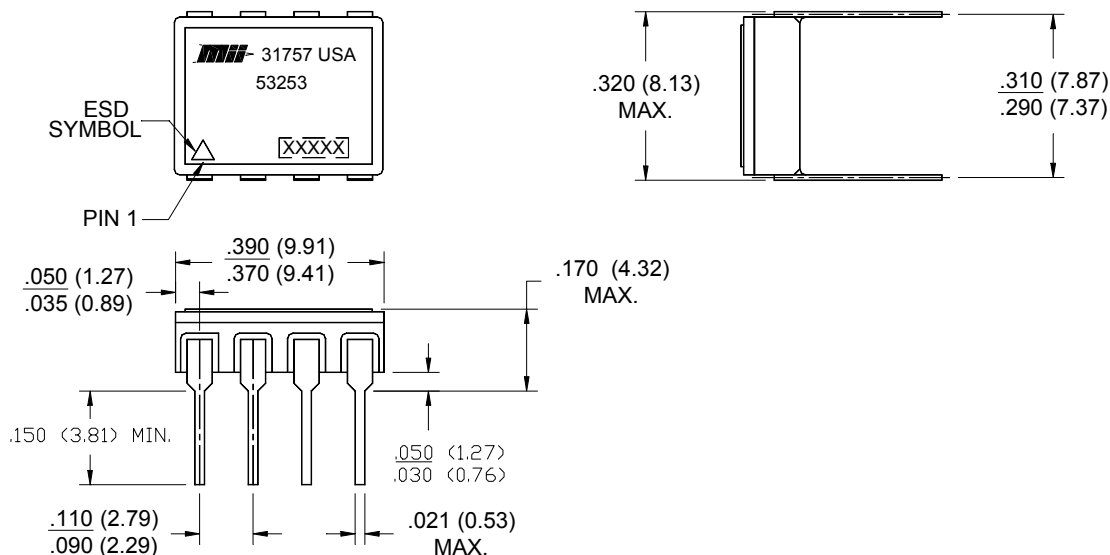
INPUT	OUTPUT
OFF	OFF
ON	ON

Figure 2 - Truth Table

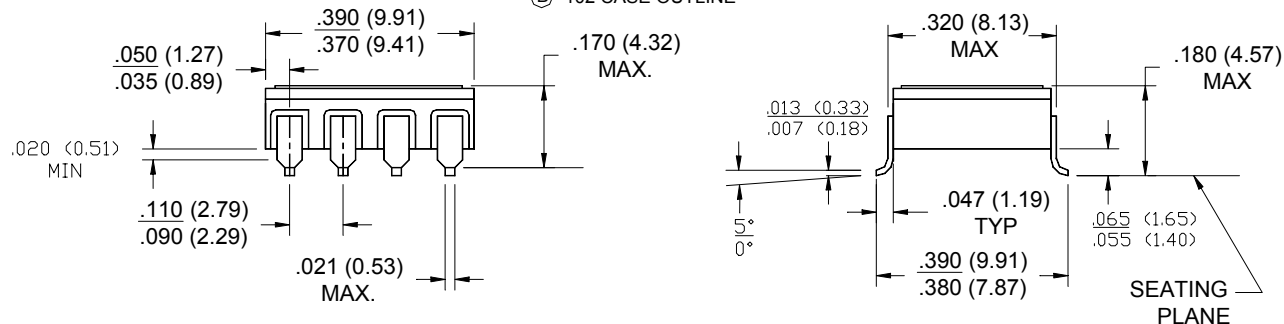
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Case Outlines

Ⓐ -101 CASE OUTLINE



Ⓑ -102 CASE OUTLINE



NOTES:

- PIN 1 IS INDICATED BY THE ESD TRIANGLE MARKED ON THE LID OF THE PACKAGE.
- DIMENSIONS ARE IN INCHES, (mm).
- METRIC EQUIVALENTS ARE GIVEN FOR GENERAL INFORMATION ONLY.
- UNLESS OTHERWISE SPECIFIED, TOLERANCE IS ± 0.005 (0.13mm).

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