

**TELEDYNE SOLID STATE**

**SERENDIP®  
SOLID STATE DC RELAY  
TRANSFORMER ISOLATED  
100 to 600 mA**

**FEATURES**

- Solid State pin compatible replacement for DIP reed relays
- TTL compatible input
- Exceed current and voltage ratings of opto-isolators
- High switching speed
- Standard TO-116 DIP

**DESCRIPTION**

The 643 Series DC SSRs employ transformer coupling for high input/output isolation, high switching speed, and low off-state leakage. The output current and voltage ratings greatly exceed the capabilities of opto-isolators, with an equivalent current transfer ratio as high as 2500%. Thus, they serve as ideal solid state alternatives for opto-isolators and reed relays in applications such as isolated line drivers, lamp drivers, current loop switches, and general purpose DC switching where "relay" isolation is required. Internal construction employs thick film hybrid circuitry with a unique patented lead frame design for low cost. Molded in a standard TO-116 DIP.

**PART NUMBERING**

PART NUMBER	OUTPUT CURRENT RATING (mA <sub>dc</sub> )	OUTPUT VOLTAGE RATING (V <sub>dc</sub> )
643-1	400	60
643-2	100	250
643-3	600	130

**ELECTRICAL SPECIFICATIONS  
(25°C UNLESS OTHERWISE SPECIFIED)**

INPUT (CONTROL) SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES	
Control Voltage Range	3.8		10	V <sub>dc</sub>	See Fig. 2 & Note 1	
Input Current at 5VDC Control Voltage		9	15	mA	See Fig. 1	
Turn Off Voltage			0.4	V <sub>dc</sub>		
Dielectric Strength (Input to Output)	1500			V <sub>rms</sub>	60 Hz Sine Wave	
Isolation (Input to Output)	10 <sup>9</sup>			Ohms		
Capacitance (Input to Output)			5	pF		
Reverse Voltage Protection			3	V <sub>dc</sub>		
OUTPUT (LOAD) SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES	
Max. Allowable Output Current (10 Volt Input)	643-1	0	400	mA	See Fig. 2 And Note 1	
	643-2	0	100			
	643-3	0	600			
Max. Allowable Output Current (5 Volt Input)	643-1	0	200	mA	See Fig. 2 And Note 1	
	643-2	0	50			
	643-3	0	250			
Output Voltage	643-1	0	60	V <sub>dc</sub>		
	643-2	0	250			
	643-3	0	130			
On-State Voltage Drop		0.8	1.5	V <sub>dc</sub>	See Fig. 4	
Offstate Leakage Current	643-1	V <sub>O</sub> = 30 V <sub>dc</sub>		15	μA	See Fig. 3
		V <sub>O</sub> = 60 V <sub>dc</sub>		60		
	643-2	V <sub>O</sub> = 125 V <sub>dc</sub>		0.6		
		V <sub>O</sub> = 250 V <sub>dc</sub>		6.0		
	643-3	V <sub>O</sub> = 65 V <sub>dc</sub>		15		
		V <sub>O</sub> = 130 V <sub>dc</sub>		75		
Turn On Time (T <sub>DELAY</sub> + T <sub>RISE</sub> ) (See Fig. 5)	643-1	0.5	1.0	μs	Note 4	
	643-2	1.0	5.0			
	643-3		10			
Turn Off Time (T <sub>DELAY</sub> + T <sub>FALL</sub> )	643-1	3	5	μs		
	643-2	30	75			
	643-3		75			
Capacitance Across Output	643-1	10	15	pF		
	643-2	30	40			
	643-3		150			
Surge Current Rating			200	% Of Rating	See Fig. 6	

PATENT #3,791,025

CHARACTERISTIC CURVES

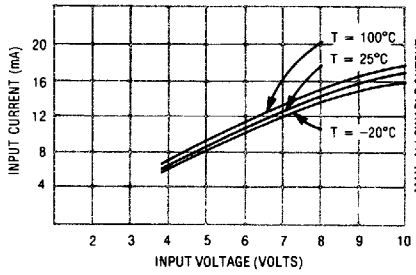


FIGURE 1 - INPUT CURRENT VS. INPUT VOLTAGE (TYPICAL)

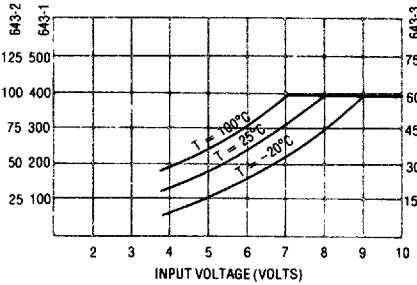


FIGURE 2 - MAXIMUM ALLOWABLE OUTPUT CURRENT VS. INPUT CONTROL VOLTAGE

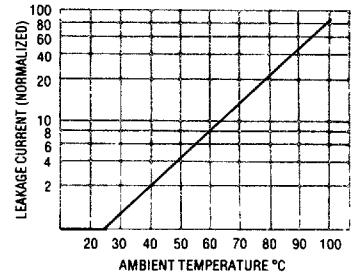


FIGURE 3 - TYPICAL LEAKAGE CURRENT VS. AMBIENT TEMPERATURE (NORMALIZED TO 25°C)

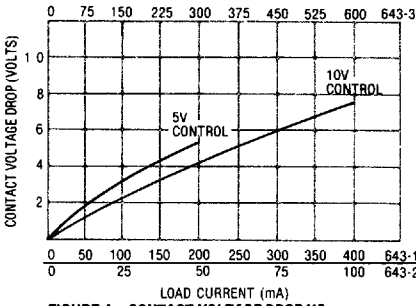


FIGURE 4 - CONTACT VOLTAGE DROP VS. LOAD CURRENT (TYPICAL)

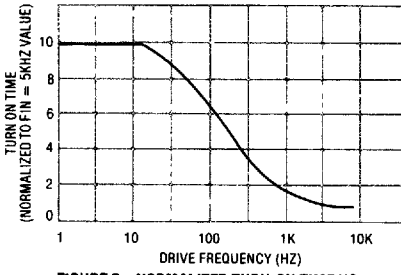


FIGURE 5 - NORMALIZED TURN-ON TIME VS. DRIVE FREQUENCY (TYPICAL)

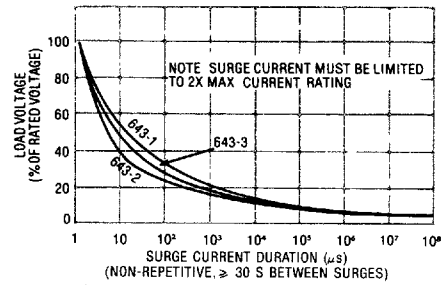
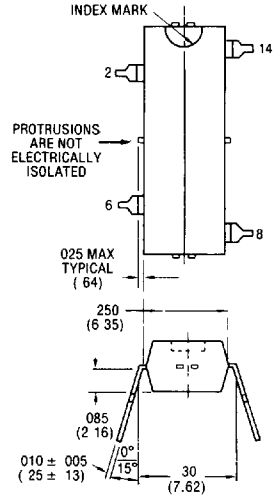
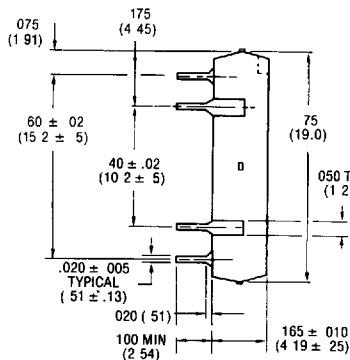


FIGURE 6 - SUPPLY VOLTAGE VS. SURGE CURRENT DURATION

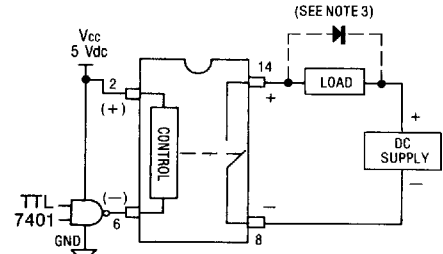
MECHANICAL SPECIFICATIONS



DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)  
 • Tolerances (unless otherwise specified) ±.015 (.38)

- Ambient Temperature Range: -20°C to 100°C Operating & Storage
- Vibration: 30g level, 10 to 2,000 Hz
- Shock: Meets or exceeds MIL-STD-202
- Weight: 2.0 grams max.
- Enclosure: 14 pin dual in line T0-116
- Case Material: Filled epoxy, self extinguishing

WIRING DIAGRAM



NOTES:

1. For any control voltage, the maximum load current value shown in Figure 2 must not be exceeded. (Attempting to draw currents in excess of these curves can cause permanent damage.)
2. Pin 14 must be positive with respect to Pin 8 or damage may result.
3. Inductive loads must be diode suppressed.
4. Test Conditions:  $V_{IN} = 5V$ ,  $f_{IN} = 5kHz$ ,  $V_L = 20V$ ,  $R_L = 100\Omega$  (643-1, 643-3),  $R_L = 1000\Omega$  (643-2).

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 TELEDYNE SOLID STATE  
 A Division of Teledyne Relays  
 12525 Daphne Avenue  
 Hawthorne, California 90250  
 (213) 777-0077