



TELEDYNE SOLID STATE

SERENDIP® SOLID STATE AC RELAY

OPTICALLY ISOLATED
VDE APPROVED
1.0 A rms

FEATURES

- 3.8 - 32 volt constant current input
- Zero voltage turn-on; zero current turn-off
- Optically isolated
- Back-to-back SCR output
- Very low leakage current
- Switches low and high voltage equally well (5 to 250 V)
- Virtually no switching transients
- Very low insertion factor, typically ± 1.5 V
- High noise immunity
- High dielectric strength
- Very low EMI noise
- UL Recognized, File #E55197
- CSA Certified File #31043
- Designed to meet VDE (645V-2H Approval Request Submitted)

DESCRIPTION

The 645 Series employs back-to-back photo SCRs and a patented zero crossing circuit with a tight zero switch window for reliable transient free switching of AC loads from 5 mA to 1A/250 Vrms. Internal circuitry is thick film hybrid, and a custom constant current input I.C. provides low and high level logic compatibility over a 3.8 to 32 volt input range. The 645V meets the creepage/clearance, input/output dielectric, and conducted emission limits of VDE.

PART NUMBERING

P/N	Output Voltage Rating	
	Continuous (RMS)	Transient (Peak)
645-1	140	200
645-2	250	400
645-2H, 645V-2H	250	550

ELECTRICAL SPECIFICATIONS

(25°C UNLESS OTHERWISE SPECIFIED)

INPUT (CONTROL) SPECIFICATIONS		MIN.	MAX.	UNITS	NOTES
Control Voltage Range		3.8	32	Vdc	See Fig. 1
Input Current at 5 Vdc	645		12	mA	See Fig. 1
	645V		15.5		
Input Current at 32 Vdc	645		15	mA	
	645V		18		
Turn-Off Voltage			1.3	Vdc	
Dielectric Strength (Input to Output)	645V	3750		Vrms	60 Hz Sine Wave
	645	2500			
Isolation (Input to Output)	645	10 ⁹		Ohms	@500 Vdc
	645V	10 ¹⁰			
Capacitance (Input to Output)			10	pF	
Reverse Voltage Protection			32	Vdc	
OUTPUT (LOAD) SPECIFICATIONS		MIN.	MAX.	UNITS	NOTES
Output Current (6V INPUT)		.01	1.0	A	See Fig. 2
Load Voltage Rating	645-1	5	140	Vrms	
	645-2, -2H	5	250		
Frequency Range		47	70	Hz	
On-State Voltage Drop at Rated Current			1.5	Vrms	
Zero Voltage Turn-On			15	V PEAK	
Surge Current Rating			8	A	Non-rep. 20 ms max. Note 1 Fig. 3
Off State Leakage at Rated Voltage at 100°C			1.0	mA rms	
Turn-On Time (60 Hz)			8.3	ms	
Turn-Off Time (60 Hz)			8.3	ms	
Over Voltage Rating (Transient Peak)	645-1		200	V PEAK	
	645-2		400		
	645-2H		550		
Off State dv/dt (without snubber)		200		V/ μ s	See Fig. 4
Fusing I ² T (1 ms)			5	A ² s	
Output SCR's Disip. Factor			1	WATTS/AMP	
Output SCR's Temp. (T _J Max.)			125	°C	
Thermal Resistance	θ_{JA}		60	°C/W	
	θ_{JC}		35		

PATENT #4,339,670

SERIES 645/645V

CHARACTERISTIC CURVES

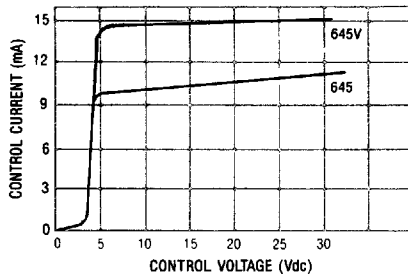


FIGURE 1 - CONTROL CURRENT VS. CONTROL VOLTAGE (TYPICAL)

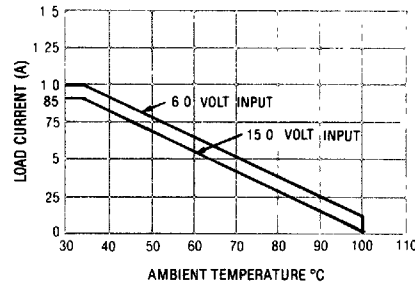


FIGURE 2 - MAXIMUM LOAD CURRENT VS. AMBIENT TEMPERATURE (SEE NOTE 3)

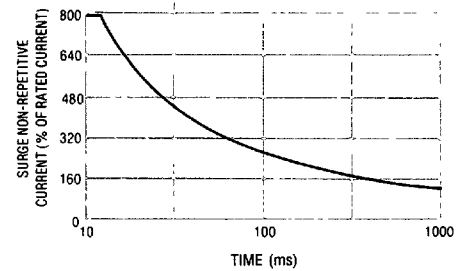
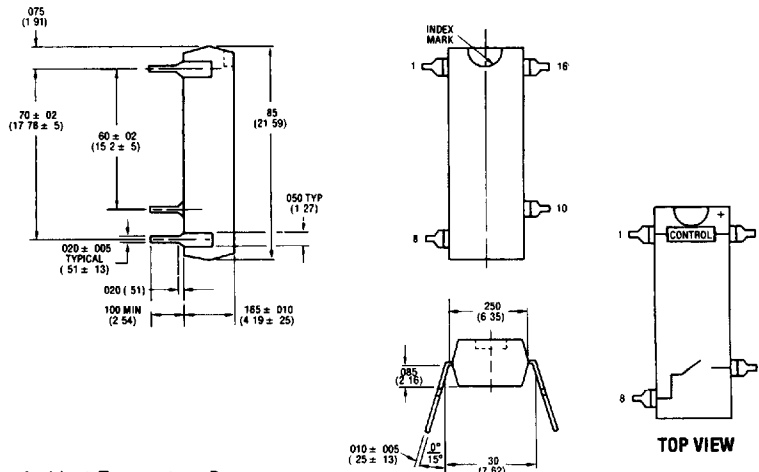


FIGURE 3 - PEAK SURGE CURRENT VS. SURGE CURRENT DURATION

MECHANICAL SPECIFICATIONS



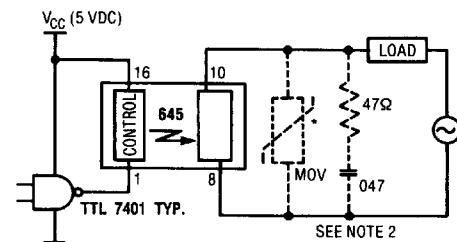
- Ambient Temperature Range: -20°C to 100°C Operating and Storage
- Life: 10⁶ operations full rated load, 25°C
- Vibration: 20g Level, 10 to 2,000 Hz
- Shock: Meets or exceeds MIL-STD-202
- Weight: 2.0 grams max.
- Case: 16 pin dual in line (T0-116)
- Case Material: Filled epoxy — self-extinguishing

DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

- Tolerances (unless otherwise specified) ±.015 (.38)

NOTES:

1. SCR may lose blocking capability during and after surge until T_J falls below 100°C maximum
2. RC snubber is recommended, but is not required
3. Minimum Load Power Factor = 0.2 (Capacitive or inductive). Lower power factors will damage relay

TYPICAL INTERFACE TO 5V LOGIC
(with suggested transient voltage and dv/dt suppression, if required)

*USE THE TABLE BELOW FOR SELECTION OF PROPER METAL OXIDE VARISTOR (MOV)

MAXIMUM CONTINUOUS LINE VOLTAGE RATING	TRANSIENT (PEAK) RATING OF RELAY	TELEDYNE MOV P/N
140 Vac	400	970-1
250 Vac	600	970-2

(SEE 970 SERIES DATA SHEET FOR FURTHER INFORMATION ON MOV'S)

FIGURE 4