

TELEDYNE
SOLID STATE PRODUCTS
MILITARY SOLID STATE
POWER SWITCHING MODULE
20, 25, 35 AMP MODELS
DARLINGTON TRANSISTOR (-1) OR
POWER FET OUTPUTS (-4, -5) AVAILABLE

SERIES
653

SPST/NO

FEATURES

- Optical Isolation between control and load circuits
- TTL Logic compatible input current level
- Snap action switching (653-1)
- Designed to meet MIL-R-28750
- Power MOSFET output (653-4 and 653-5)
- Available to MIL-STD-883B

DESCRIPTION

The 653 is a military style DC power SSR packaged in a thermally efficient hermetically sealed aluminum case. Circuit components are exclusively military grade (hermetically sealed) with the circuit board assembly encapsulated to assure resistance to military shock and vibration levels.

653-1:

Output switching is accomplished by means of a Darlington Power Transistor which, together with advanced drive circuit techniques, provide reliable operation over the full output range. Input drive circuitry is logic compatible, thereby eliminating the need for additional relay driver stages. Snap action switching precludes damage from slowly ramped inputs. Unit is OPTO coupled.

653-4 and 653-5:

Output switching is accomplished by means of a power MOSFET which provides a reduced output voltage drop. This allows the switching of high currents at higher temperatures than those allowable with bipolar devices. Unit is transformer coupled.

PART NUMBERING

INPUT CONTROL VOLTAGE RANGE	OUTPUT VOLTAGE RATING (VDC)	OUTPUT CURRENT RATING	PART NUMBER
3-16 VDC	50	25	653-1
24-32 VDC	100	20	653-4
16-32 VDC	50	35	653-5

ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature	653-1		Operating Storage	-55 to 110°C
	Operating	Storage		
Shock	653-4		Operating	-55 to 125°C
	653-5		Storage	-55 to 125°C
Vibration	200g for 6mSEC			
Acceleration	50g Level 10 to 3000 Hz			
Altitude	5000g			
	Sea Level to 100,000 ft.			

ELECTRICAL SPECIFICATIONS
 (25°C UNLESS OTHERWISE SPECIFIED)

INPUT (CONTROL) SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES	
Control Voltage Range (-55°C to +110°C)	-1	3	16	VDC	See Note 5	
	-4	24	32	VDC		
	-5	16	32	VDC		
Input Current at: (-55°C to +110°C)	-1	5 VDC	10	15	mA	See Fig. 1
		16 VDC	15	20	mA	
	-4	24 VDC		15	mA	See Note 6
		16 VDC		10	mA	
Turn-On Voltage (-55°C to +110°C)	-1	3		VDC		
	-4	24				
	-5	16				
Turn-Off Voltage (-55°C to +110°C)	-1		1.0	VDC		
	-4		4.0			
	-5		3.0			
Isolation (Input to Output, Input & Output to Case)	10'			Ohms		
Capacitance (Input to Output)			15	pf		
Dielectric Strength (Input to Output, Input & Output to Case)	500			VAC (RMS) 60 Hz		
OUTPUT (LOAD) SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES	
Output Current Rating Resistive (See Figures 3 and 4)	-1	01	25	Amps		
	-4	0	20			
	-5	0	35			
Load Voltage Rating (-55°C to +110°C)	-1	5	50	VDC		
	-4		100	VDC		
	-5	0	50			
Surge Current Rating @ 25°C for .1 sec. (See Figure 5)	-1		40	Amps		
	-4		50	Amps		
	-5		60			
Output Voltage Drop @ (See Figure 2)	25 Amps	-1	2.7	VDC		
	20 Amps	-4	1.2	VDC		
	30 Amps	-5	0.9			
Turn-On Time (-55°C to +110°C)	-1		20	μSEC		
	-4,-5		60			
Turn-Off Time (-55°C to +110°C)	-1		175	μSEC	See Note 3	
	-4,-5		100			
Off-State Leakage @ 50 VDC	-1	25°C	3	mA		
		110°C	10	μA		
	-4	25°C	10	μA		
Power Switch Junction Temperature (Tj Max.)	-1		200	°C		
	-4		150	°C		
	-5					
On State Resistance @ 25°C	-4		.06	Ohms		
-5		.03				
Thermal Resistance Junction to HS (θjS) (Includes θcs) (See Note 2)			1.3	°C/Watt		
Thermal Resistance Junction to Ambient (θjA) (No Heat Sink)			10.3	°C/Watt		

SERIES 653

CHARACTERISTIC CURVES

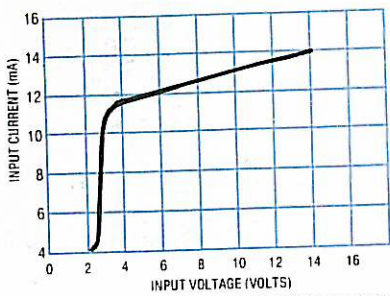


FIGURE 1 - INPUT CURRENT VS. INPUT VOLTAGE (TYPICAL) 653-1

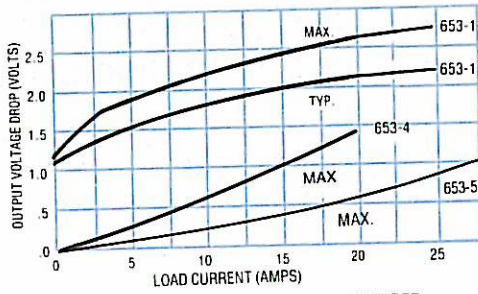


FIGURE 2 - LOAD CURRENT VS. OUTPUT VOLTAGE DROP

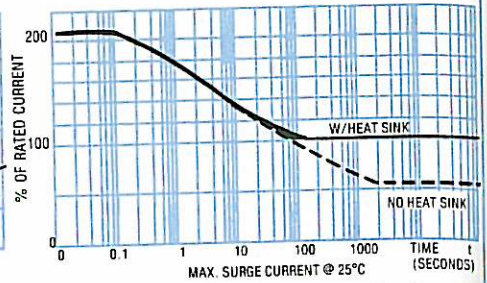


FIGURE 3 - MAX. SURGE CURRENT @ 25°C 653-1, 653-4

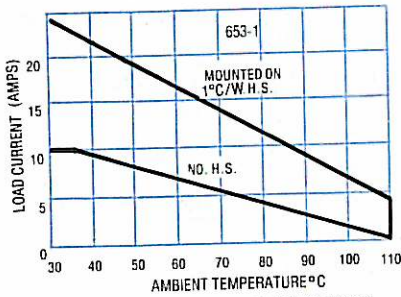


FIGURE 4 - MAX. LOAD CURRENT VS. AMBIENT TEMPERATURE 653-1

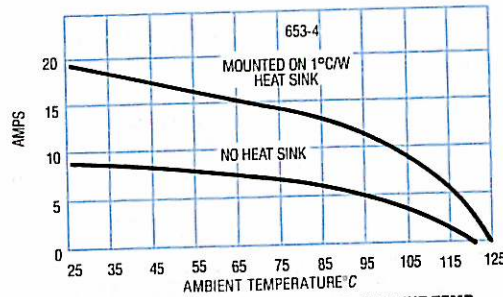


FIGURE 5 - MAX. LOAD CURRENT VS. AMBIENT TEMP. 653-4

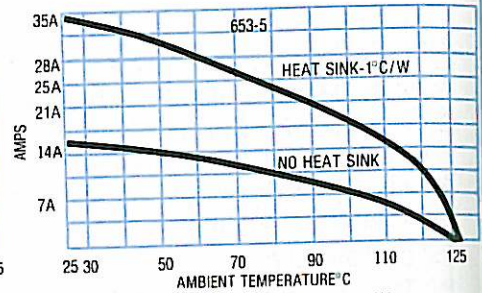
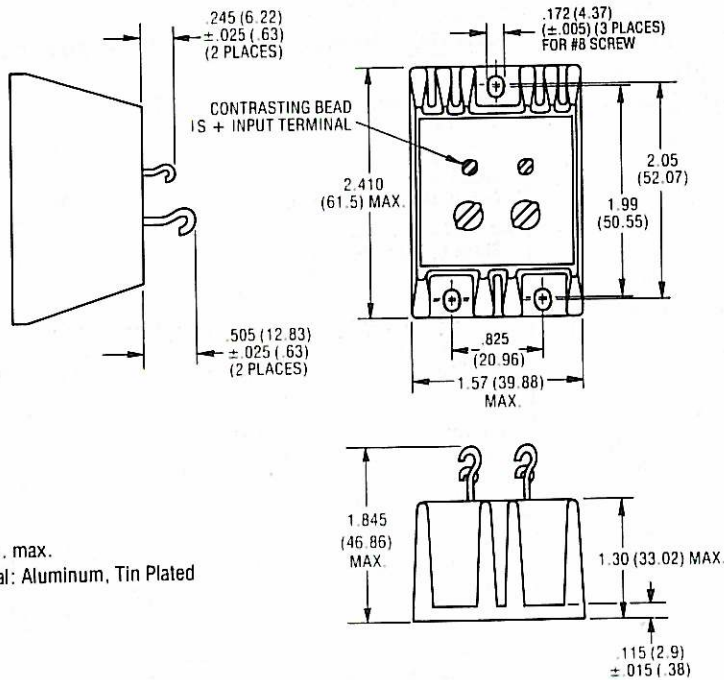


FIGURE 6 - MAX. LOAD CURRENT VS. AMBIENT TEMPERATURE 653-5

(PRELIMINARY)

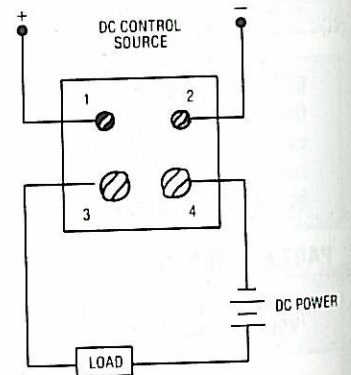
MECHANICAL SPECIFICATIONS



- Weight: 6 oz. max.
- Case Material: Aluminum, Tin Plated

DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

WIRING DIAGRAM



NOTES:

1. Reversing polarity of input or output may cause permanent damage.
2. Case temperature measurement is center of mounting surface.
3. Measured at $V_L = 50 \text{ VDC}$, $R_L = 10 \Omega$.
4. Rise and fall times of input signal must be $\leq 10 \mu\text{sec}$, or damage to output stage may result.

5. 3.8-32 volt input will be available.
6. 653-4 is transformer coupled.

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