53225

SOLID-STATE POWER CONTROLLER (SSPC)

Mii

HYBRID MICROELECTRONICS PRODUCTS DIVISION

Features:

- I^2t output trip
- Output trip status
- 1000 VRMS Isolation
- Power FET Output Low On-state Resistance
- Full Military compliance
- Low control power consumption (3 mA @ 5 V typical)
- 125ºC screening available

Applications:

- Logic controlled circuit breakers
- Dynamic load switching
- Power distribution switch
- Supply source switching

DESCRIPTION

The 53225 is a military SPST solid-state relay. This light-weight device is mechanically resistant and electrically immune to contact-related problems inherent in mechanical relays.

An I^2t current let-through curve assures power supply, relay, and load protection from thermal stress yet provides large momentary currents to charge capacitive loads or start inductive loads. Any current versus time above the I^2t curve initiates a trip condition and a status output is generated.

Effective isolation of 1000 VRMS is provided from all inputs, case and outputs through magnetic coupling. Magnetic coupling contributes to very low control power, repeatable turn-on/turn-off times, and no output stage currents to provide status signals.

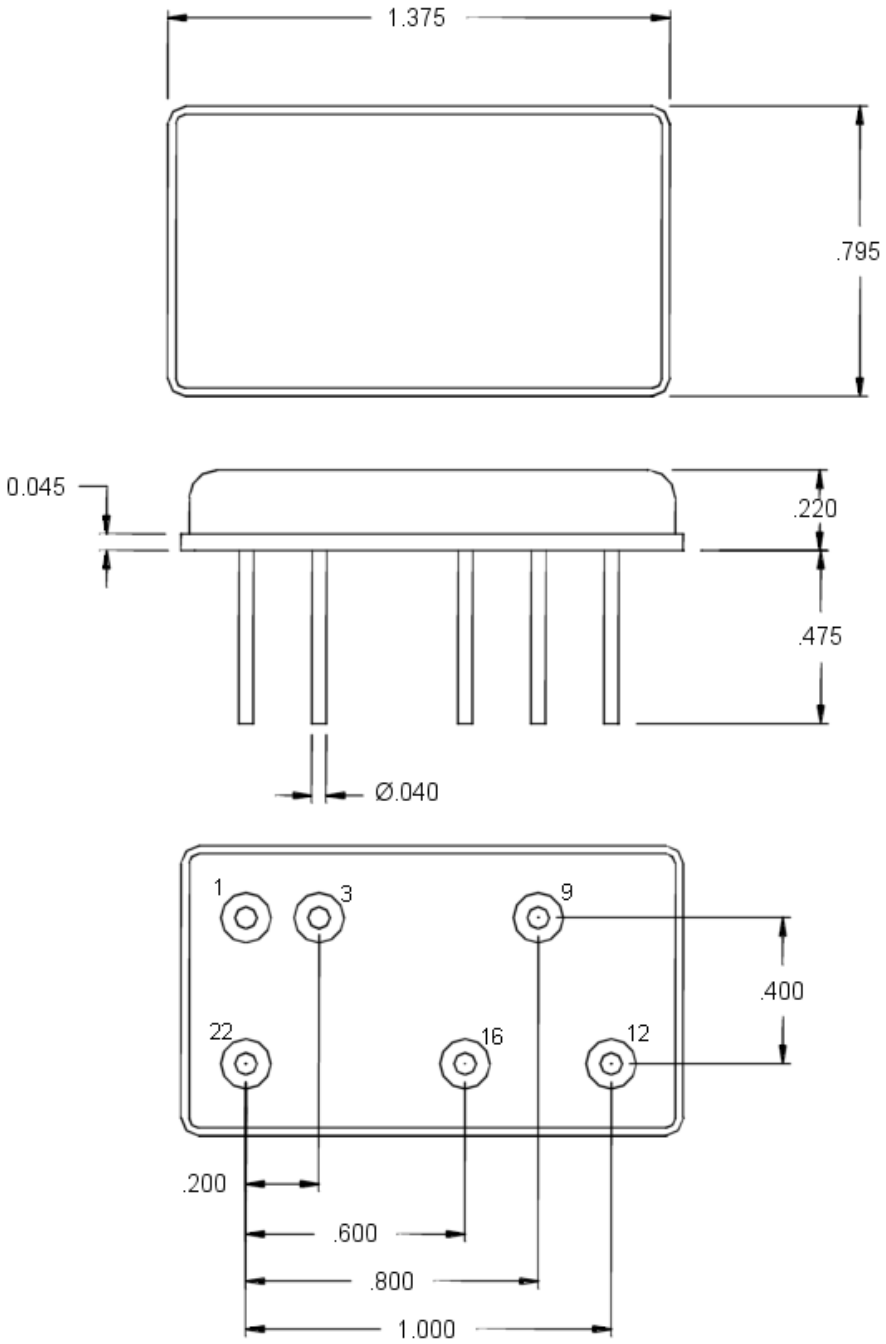
ELECTRICAL CHARACTERISTICS

(-55°C ≤ TA ≤ 85°C, V_{BIAS} = 5 V, V_{OUT} + = 28 V, I_{OUT} = 1.5 A unless otherwise noted)

CHARACTERISTIC	CONDITION	MIN	MAX	UNITS
2 Terminal Configuration (see Fig. 2) Input Current			5	MADC
Turn off voltage (V_{IN})			1.5	VDC
Turn on voltage (V_{IN})		3.8		VDC
Bias supply voltage range		4	6	VDC
3 Terminal Configuration (see Fig. 1)				
Control input Current	V_{CONT} = 5 VDC		250	µADC
Control voltage range		0	6	VDC
Bias supply voltage range		0.5	6	VDC
Bias supply current			5	mADC
Turn off voltage ($V_{CONTROL}$)		3.9		VDC
Turn on voltage ($V_{CONTROL}$)			0.3	VDC
Noise Margin	$V_{OFF} – V_{ON}$	0.5		VDC
Continuous off leakage current (not tripped)	V_{OUT+} = 60 VDC V_{OUT-} = Ground		150	µADC
Output on voltage drop	I_L = 1.5 A		0.45	VDC
Continuous operating load voltage			60	VDC
Transient blocking voltage	@ 1.0 mA		80	VDC
On resistance $RDS_{(ON)}$	I_{LOAD} = 100 mADC		0.30	OHMS
Turn on time			3.0	MS
Turn off time			1.0	MS
Operating frequency			20	HZ
DV/DT		100		V/µM
Electrical system spike		±600		Peak
Output Capacitance	25 VDC, 100 kHz		1000	PF
Input to output capacitance			15	PF
Dielectric strength	@ 1.0 mA maximum leakage	1000		VAC
Insulation resistance	@ 500 VDC, TA – 25°C	10^3		OHMS
Surge Current (see Fig. 4)	Guaranteed no trip @ 10 A surge		70 Typ.	MS
Trip Reset Time	Remove short / overload & Cycle input	50		Ms
Status Output Specification Status Supply Voltage (open Collector)		5.0	32	VDC
Status off leakage current	VS = 15 VDC		4	µADC
Status on voltage	I_{STATUS} = 5 MA		0.4	VDC
High-To-Low Transition Time	I_{STATUS} = 5 MA		1.0	MS

Notes:
1. Input transition should be ≤ MSEC duration and input drive should be “bounceless contact” type.

Package Dimensions



PIN	FUNCTION
1	Control
3	Ground
9	$V_{OUT\ -}$
12	$V_{OUT\ +}$
16	Status
22	V_{BIAS}

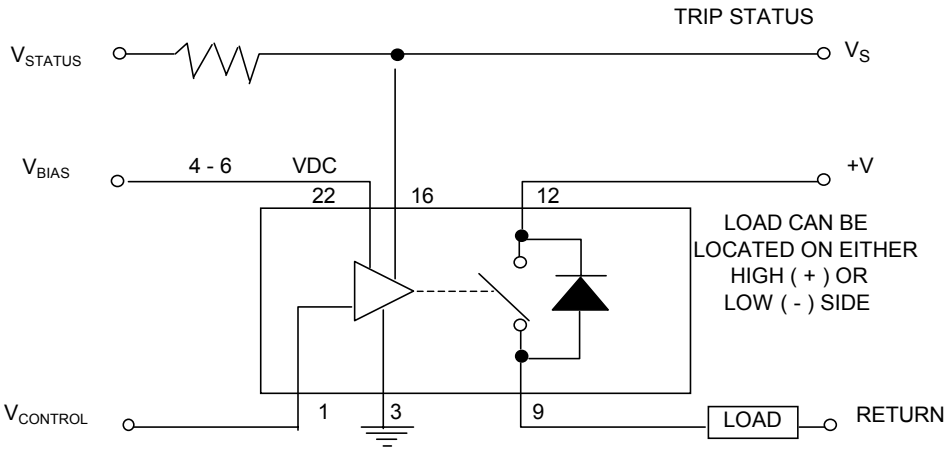


Figure 1
A - Three - Terminal Connection

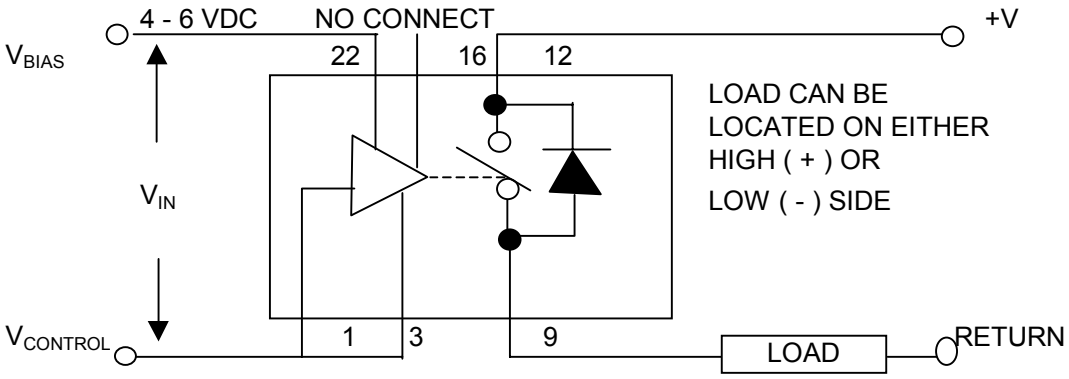


Figure 2
B - Two - Terminal Connection

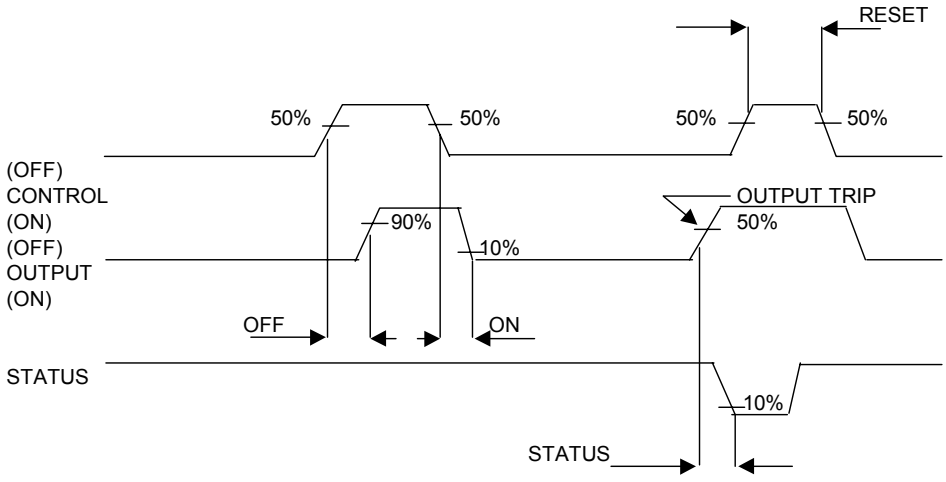


Figure 3
Timing Diagram (3 Terminal Connection)