



## DESCRIPTION

This LEACH Solid State Power Controller (SSPC) employs the latest micro-controller and Power FET technology incorporated into a Printed Circuit Board (PCB). The EPM-109 features non-derated switching for all types of load, while protecting against overload and short circuit. It features an extensive Built-In-Test (BIT) that verifies all critical functions at start-up and during operation. It is designed for operation in 28 VDC systems with a full rating of 3 channels of 7.5 Amps and 2 channels of 12 Amps.

SIZE: 91 x 91 x 23 mm  
WEIGHT: 150 grams MAX

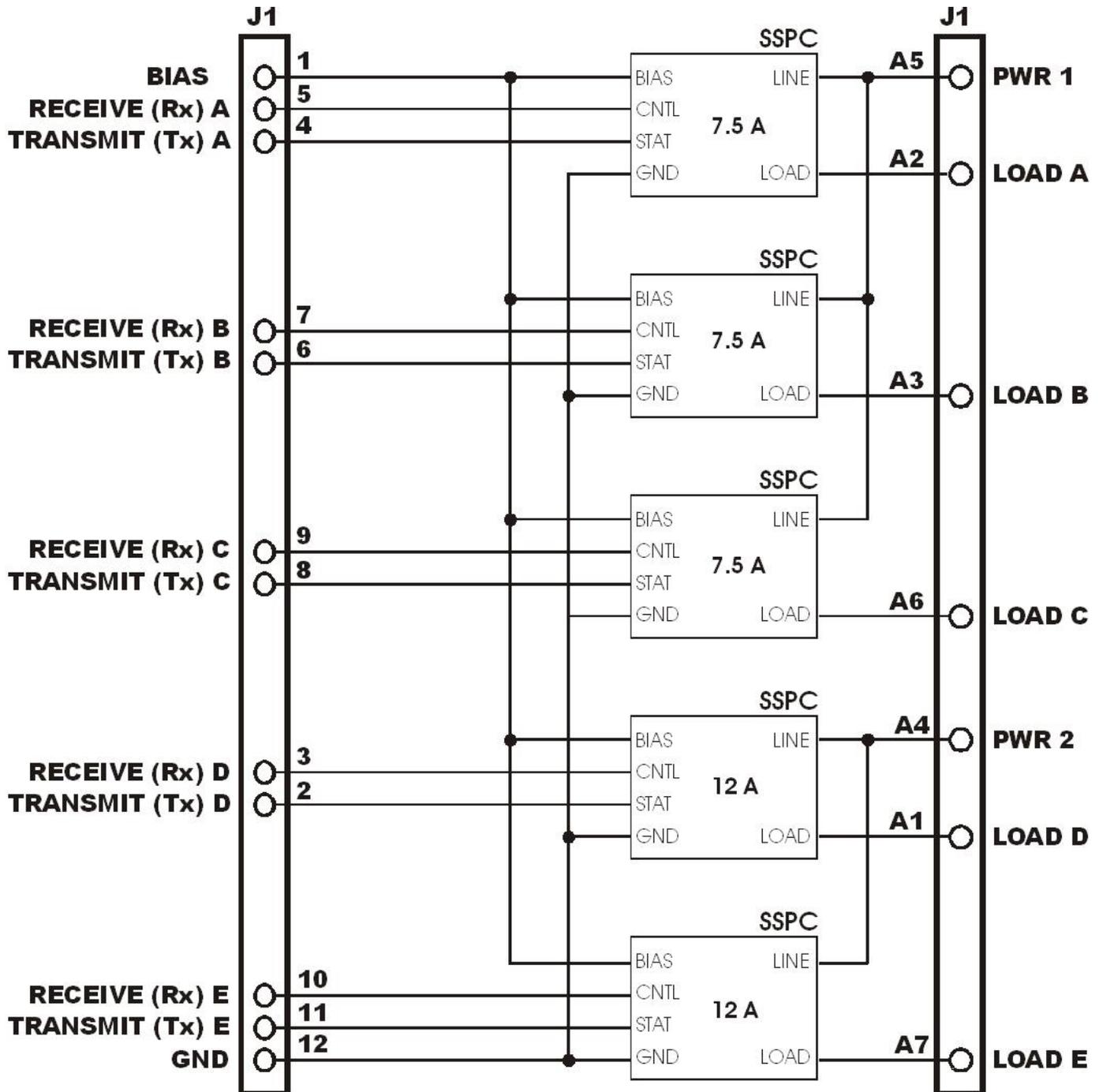
## FEATURES

- 3 channel rated at 7.5 Amps to 85°C
- 2 channel rated at 12 Amps to 85°C
- Power up and continuous BIT
- Serial data bus interface
- Programmable ratings (25%, 50%, and 75% of the rated value) and trip parameters
- Bounce free switching
- Fast acting
- Low voltage drop and power dissipation
- Software-based design for added configuration
- High voltage isolation
- No derating for lamp, motor and inductive loads

## APPLICATION CHARACTERISTICS

- Serial control and monitoring capability
- Replaces electro-mechanical relay
- Continuous BIT
- Load status reporting
- Bounce free
- Long life, high reliability
- Trip on overloads
- Programmable ratings

## BLOCK DIAGRAM



## ENVIRONMENTAL DATA

Parameter	Symbol	Min.	Max.	Unit	Notes
Operational Temp. Range	T <sub>OP</sub>	-40	+75	°C	1
Storage Temp. Range	T <sub>ST</sub>	-55	+125	°C	1
Vibration	20 g, 20-2000 Hz				2
Acceleration	500 g				3
Shock	500 g, 0.5 ms				4
MTBF	100,000			hr/CH	

### NOTES

1. See Thermal Derating Curve
2. MIL-STD-883, Method 2007, Test Condition A.
3. MIL-STD-883, Method 2001, Test Condition A.
4. MIL-STD-883, Method 2002, Test Condition B.

## ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Limits		Unit	Notes
			Min.	Max		
<b>INPUT SPECIFICATIONS</b>						
BIAS ON voltage	$V_{ib}$		4.5	5.5	V	(1, 2)
BIAS ON current	$I_{ib}$		-	75	mA	(3)
RECEIVE voltage high	$V_{ihr}$		2.4	-	V	
RECEIVE voltage low	$V_{ilir}$		-	0.8	V	
RECEIVE current high	$I_{ihr}$	$V_{ihr} = 2.4$ V	-	50	$\mu$ A	
RECEIVE current low	$I_{ilir}$	$V_{ilir} = 0.4$ V	-	-10	$\mu$ A	
Transient voltage	$V_t$	Pulse width = 12.5 msec max. per DO-160D	-	+50	V	(4)
Spikes	$V_s$	Pulse width = 10 msec max. per DO-160D	-600	+600	V	(4)
<b>OUTPUT SPECIFICATIONS</b>						
Load Current	$I_l$		0	100	%rated I	(5)
ON state voltage drop	$V_{id}$		-	200	mV	(6)
OFF state line voltage	$V_l$		-	70	V	(7)
Leakage current	$I_{ll}$		-	1	mA	(8)
Maximum let through current	$I_{tr}$		110	135	%rated I	
Dielectric withstanding voltage	$V_{dw}$		-	500	$V_{RMS}$	(9)
Insulation resistance	$R_{ins}$		100		$M_{ohm}$	(10)
TRANSMIT voltage high	$V_{oht}$	$I_{ot} = -4$ mA	$V_{ib} * 0.8$		V	
TRANSMIT voltage low	$V_{olt}$	$I_{ot} = 4$ mA		0.8	V	
TRANSMIT voltage rise time	$T_{ort}$	CL = 15 pf		3	ns	
TRANSMIT voltage fall time	$T_{oft}$	CL = 15 pf		3	ns	

### NOTES

- BIAS voltage must be a step function.
- No reverse polarity protection.
- BIAS voltage is +5.0Vdc.
- The requirement apply only to the 28Vdc power line.
- Load current is subject to thermal derating.
- At load current  $I_l = 100\%$  rated value.
- Reverse polarity is not blocked and may damage the SSPC.
- At  $V_l = 28$ Vdc, case temperature = 100°C.
- 60 Hz, electrification time 10s, tested between each isolated section in turn groups (1,2 and 3), at sea level, ambient temperature, with the other two isolated sections shorted together.
- 500Vdc,  $\pm 10$ .

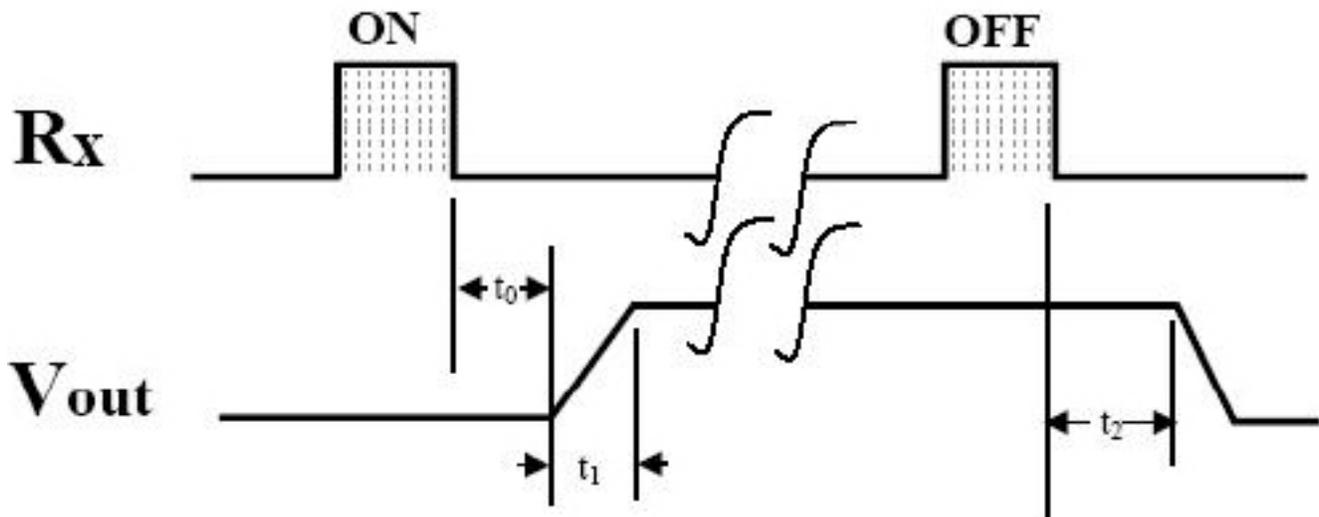
## ELECTRICAL CHARACTERISTICS

TIMING					
Parameter	Symbol	TYP	Max.	Units	Notes
RECEIVE to ON delay	$t_0$	500	2000	$\mu\text{sec}$	
Output voltage rise time	$t_1$	50	500	$\mu\text{sec}$	1
RECEIVE to OFF delay	$t_2$	500	2000	$\mu\text{sec}$	2

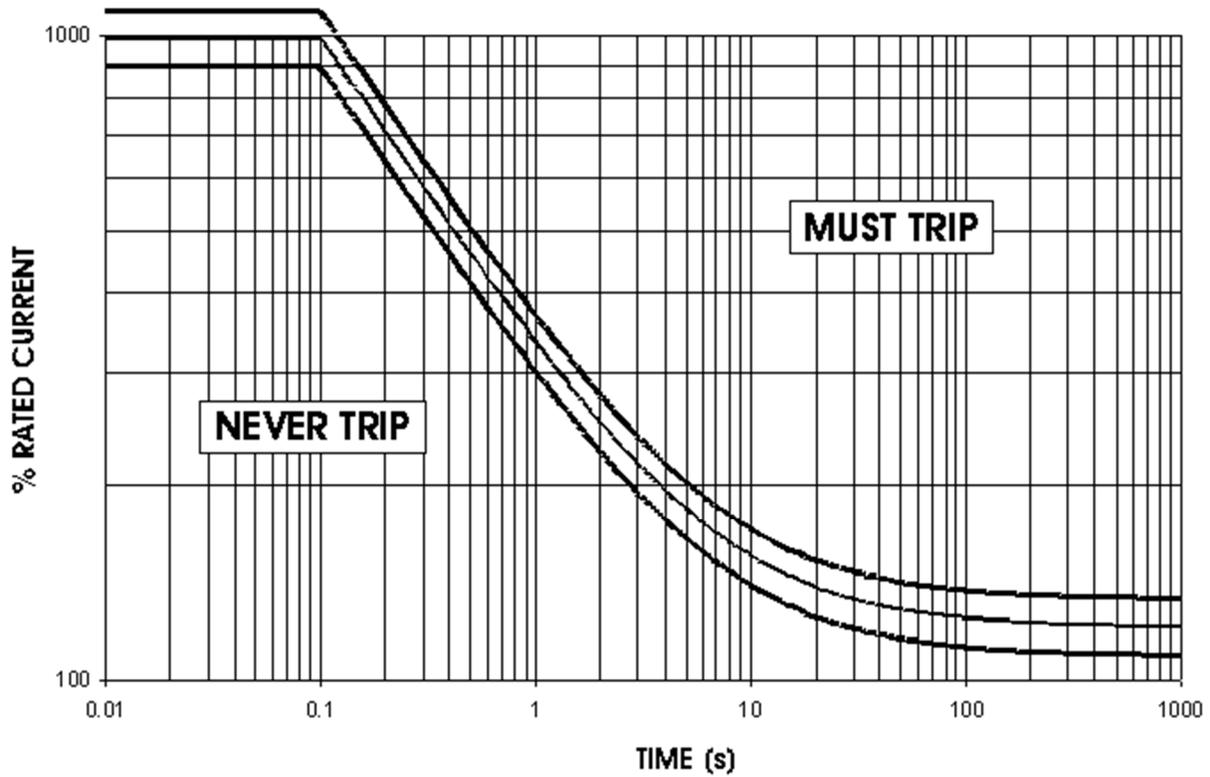
### NOTES

1. Timing measurements taken at 10% and 90% points into resistive rated load
2. Delay time from trip dependant on overload condition.

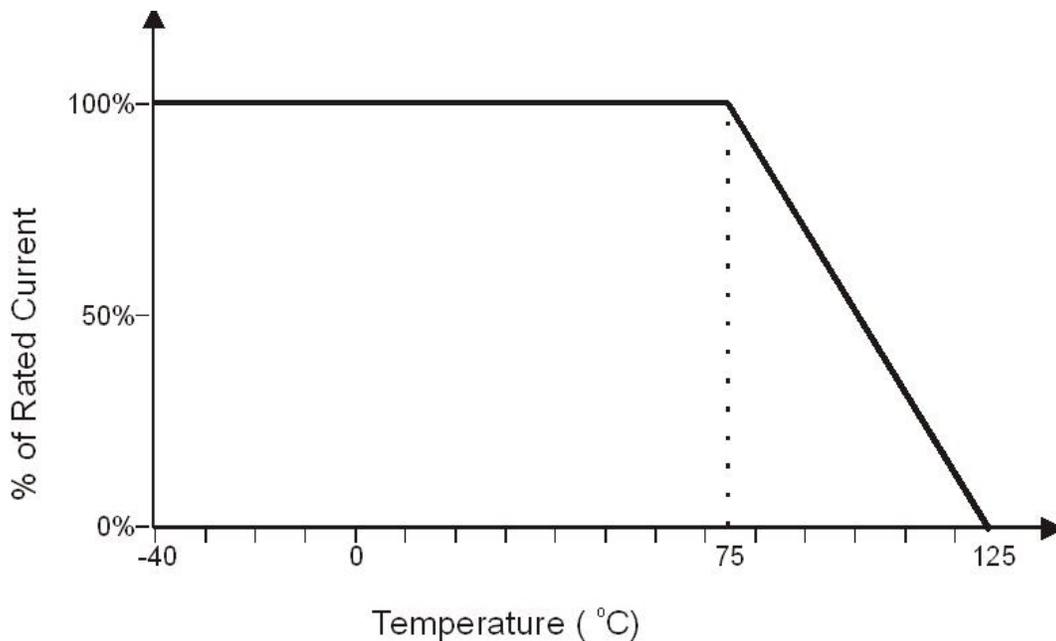
## TIMING DIAGRAM



## TRIP CHARACTERISTIC



## THERMAL DERATING



### PHYSICAL DATA (in mm)

