

## Protected Power Switch with Transient Suppression

February 1998

### Features

- $\pm 90\text{V}$  Transient Suppression
- 4V to 16V Operating Voltage
- 0.8A Current Load Capability
- Over-Voltage Shutdown Protected
- Short-Circuit Current Limiting
- Over-Temperature Protected Thermal Limiting at  $150^\circ\text{C}$  ( $T_J$ )
- $-40^\circ\text{C}$  to  $125^\circ\text{C}$  Operating Temperature Range

### Applications

- Electronic Circuit Breaker
- Transient Suppressor
- Over-Voltage Monitor

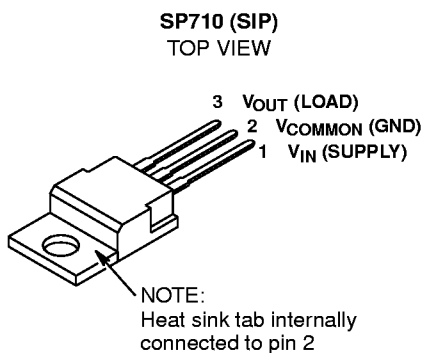
### Description

The SP710 is a Power Integrated Circuit designed to suppress potentially damaging over-voltage transients up to  $\pm 90\text{V}$  in amplitude. The device is designed to be operated in a pass-thru mode which allows the current to flow through the IC with minimal voltage drop. The protected load circuit is connected to the output of the SP710. As such, the protected power switch IC is designed to operate as a transient suppressor which is capable of driving resistive, inductive or lamp loads with minimum risk of damage under stress conditions of over-voltage or over current.

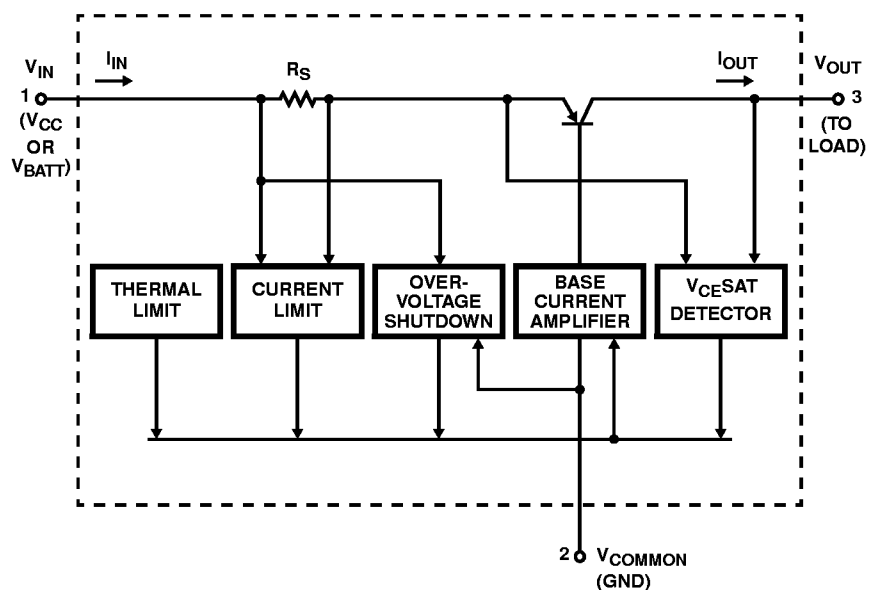
### Ordering Information

PART NUMBER	TEMP. RANGE ( $^\circ\text{C}$ )	PACKAGE	PKG. NO.
SP710AS	-40 to 125	3 Ld Plastic SIP (TO-220AB)	Z3.1C

### Pinout



### Functional Block Diagram



# SP710

## Absolute Maximum Ratings

Input/Supply Voltage,  $V_{IN}$  ..... 24V  
 Load Current,  $I_{OUT}$  ..... 800mA  
 Transient Max Voltage,  $V_{IN}$  (15ms) .....  $\pm 90V$

## Thermal Information

Thermal Resistance (Typical, Note 1)  $\theta_{JA}$  ( $^{\circ}C/W$ )  $\theta_{JC}$  ( $^{\circ}C/W$ )  
 Plastic SIP ..... 50 4  
 Maximum Junction Temperature,  $T_J$  (Note 2) ..... 150 $^{\circ}C$   
 Maximum Storage Temperature ..... -40 $^{\circ}C$  to 150 $^{\circ}C$   
 Maximum Lead Temperature (Soldering 10s) ..... 300 $^{\circ}C$   
 (Lead Tips Only)

## Operating Conditions

Ambient Temperature Range ..... -40 $^{\circ}C$  to 125 $^{\circ}C$

*CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.*

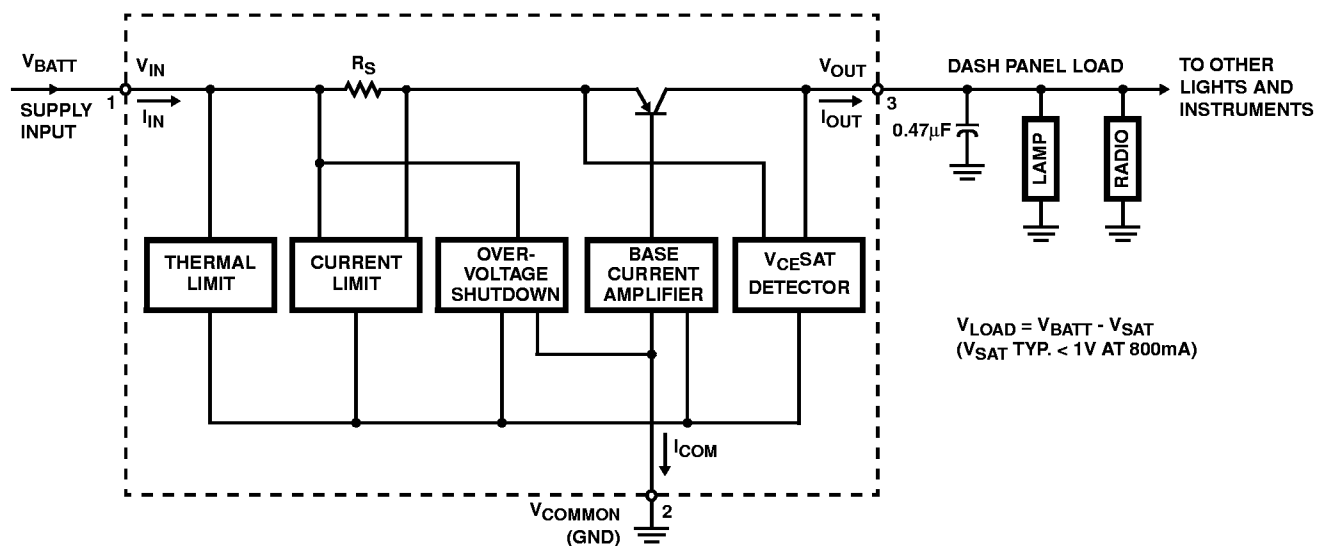
### NOTES:

- $\theta_{JA}$  is measured with the component mounted on an evaluation PC board in free air.
- The package dissipation,  $P_D = (V_{IN} - V_{OUT}) (I_{OUT}) + (V_{IN}) (I_{COM})$  and the Junction Temperature,  $T_J = T_A + (P_D) (\theta_{JA})$  where  $T_A$  is the ambient temperature and  $\theta_{JA}$  is the junction to ambient thermal resistance.

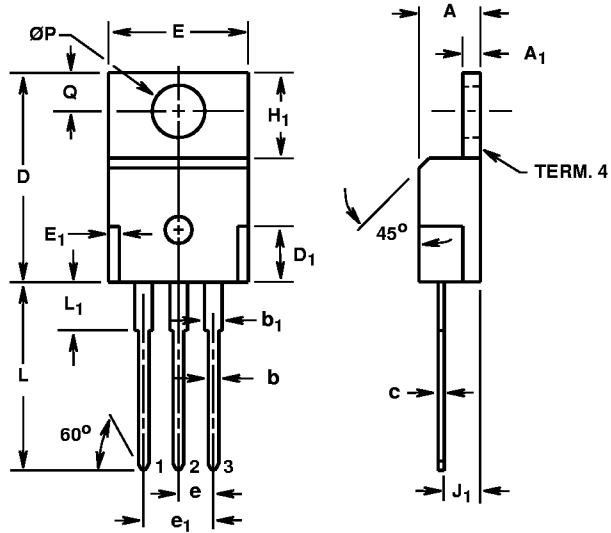
## Electrical Specifications $T_A = -40^{\circ}C$ to 125 $^{\circ}C$ , $V_{IN} = 4V$ to 16V, Unless Otherwise Specified

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Input Operating Voltage	$V_{IN}$		4	-	16	V
Shutdown Voltage	$V_{SHSD}$		16	-	18.5	V
Shutdown Temperature			-	150	-	$^{\circ}C$
Transient Pulse	$I_{OUT}$	$V_{IN} = \pm 90V$ for 15ms Pin 3 = 14V, Pin 2 = GND	-20	-	+20	mA
Short Circuit Current			1	-	2	A
$V_{SAT}$ (Input-to-Output)		$V_{IN} = 4V, I_{OUT} = 175mA$	-	-	0.25	V
		$V_{IN} = 9V, I_{OUT} = 500mA$	-	-	0.65	V
		$V_{IN} = 16V, I_{OUT} = 800mA$	-	-	1.05	V
Common Current	$I_{COM}$	$V_{IN} = 16V, I_{OUT} = 100mA$	-	-	25	mA
		$V_{IN} = 16V, I_{OUT} = 800mA$	-	-	50	mA

## Typical Application



**Single-In-Line Plastic Packages (SIP)**



**Z3.1C (JEDEC TO-220AB ISSUE J)**  
**3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE**

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	-
A <sub>1</sub>	0.048	0.052	1.22	1.32	-
b	0.030	0.034	0.77	0.86	3, 4
b <sub>1</sub>	0.045	0.055	1.15	1.39	2, 3
c	0.014	0.019	0.36	0.48	2, 3, 4
D	0.590	0.610	14.99	15.49	-
D <sub>1</sub>	-	0.160	-	4.06	-
E	0.395	0.410	10.04	10.41	-
E <sub>1</sub>	-	0.030	-	0.76	-
e	0.100 TYP		2.54 TYP		5
e <sub>1</sub>	0.200 BSC		5.08 BSC		5
H <sub>1</sub>	0.235	0.255	5.97	6.47	-
J <sub>1</sub>	0.100	0.110	2.54	2.79	6
L	0.530	0.550	13.47	13.97	-
L <sub>1</sub>	0.130	0.150	3.31	3.81	2
$\varnothing P$	0.149	0.153	3.79	3.88	-
Q	0.102	0.112	2.60	2.84	-

Rev. 0 2/95

**NOTES:**

1. These dimensions are within allowable dimensions of Issue J of JEDEC TO-220AB outline dated 3-24-87.
2. Lead dimension and finish uncontrolled in  $L_1$ .
3. Lead dimension (without solder).
4. Add typically 0.002 inches (0.05mm) for solder coating.
5. Position of lead to be measured 0.250 inches (6.35mm) from bottom of dimension D.
6. Position of lead to be measured 0.100 inches (2.54mm) from bottom of dimension D.
7. Controlling dimension: Inch.