SG3523/SG3423
SG3523A/SG3423A

OVER-VOLTAGE SENSING CIRCUIT

DESCRIPTION

This monolithic integrated circuit provides the control functions necessary to protect sensitive electronic circuitry from over-voltage transients or the effects of voltage regulator failure. It is designed for use with an external SCR "crowbar" for immediate shutdown of the power supply, but additionally provides logic level outputs for regulator turn-off and / or operator or system out-of-tolerance indication.

This device contains an accurate, stable 2.6V reference which allows the sensing threshold to be set predictably without the need for potentiometers. An external capacitor can be used to program an accurate time delay between fault occurence and crowbar triggering, but this delay may be bypassed by inputing at the Sense 2 terminal or by using the remote activation capability.

For additional circuit functions, see SG1542 and SG1543 data sheets.

FEATURES

- **Operation from 4.5V to 40V**
- **Highly accurate sensing threshold**
- **Built-in input hysteresis**
- **Programmable time delay**
- **SCR "Crowbar" drive of 200mA**
- **Remote activation capability**

HIGH RELIABILITY FEATURES
- SG3523/SG3523A

- **Available to MIL-STD-883B**
- **SG level "S" processing available**

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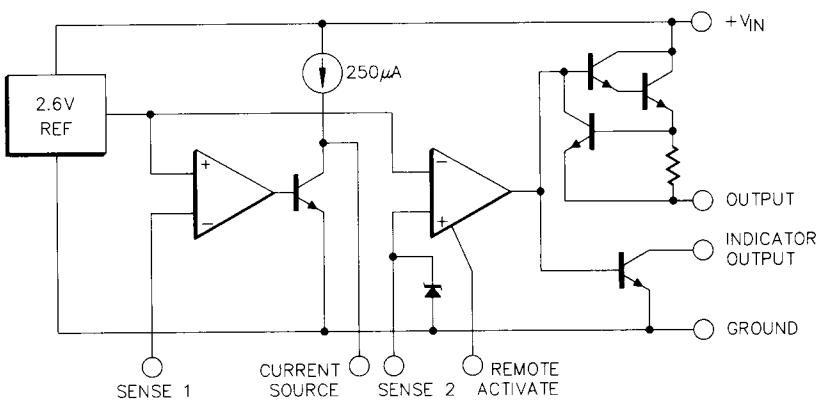
BLOCK DIAGRAM



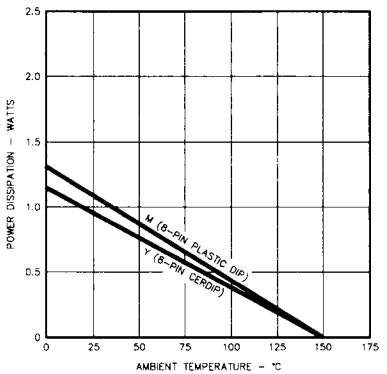
ABSOLUTE MAXIMUM RATINGS (Note 1)

Input Supply Voltage (V_{IN}) 40V
Sense Voltage (1) Input Range ..... V_{IN}
Sense Voltage (2) Input Range 6.5V
Reference Load Current 10mA
Indicator Output Voltage 40V

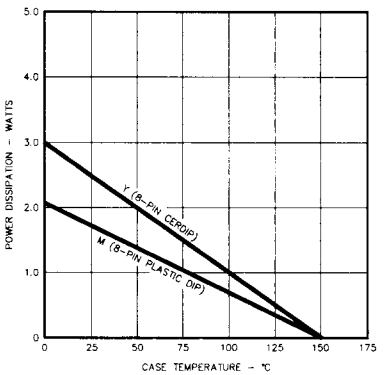
Note 1. Values beyond which damage may occur.

Indicator Output Current 50mA
Operating Junction Temperatures
Hermetic (Y-Packages) ..... 150°C
Plastic (M-Packages) ..... 150°C
Storage Temperature Range ..... -65°C to 150°C
Lead Temperature (Soldering, 10 seconds) ..... 300°C

THERMAL DERATING CURVES



MAXIMUM POWER DISSIPATION vs AMBIENT TEMPERATURE



MAXIMUM POWER DISSIPATION vs CASE TEMPERATURE

RECOMMENDED OPERATING CONDITIONS (Note 3)

Input Supply Voltage (V_{IN}) ..... 4.7V to 40V
Sense Voltage (1) Input Range ..... 0V to V_{IN} -3V
Sense Voltage (2) Input Range ..... 0V to 5.5V
Reference Load Current ..... 0mA to 10mA
Indicator Output Voltage ..... 4.7V to 40V

Indicator Output Current ..... 0mA to 10mA
Delay Timing Capacitor (Note 2) ..... 0µF to 1µF
Operating Ambient Temperature Range
SG3523/3523A ..... -55°C to 125°C
SG3423/3423A ..... 0°C to 70°C

Note 2. Larger value capacitor may be used with peak current limiting. See Figure 1.

Note 3. Range over which the device is functional.

ELECTRICAL SPECIFICATIONS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG3523/SG3523A with $-55°C \le T_A \le 125°C$, SG3423/SG3423A with $0°C \le T_A \le 70°C$, and V_{IN} = 10V. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Test Conditions	SG3523A			SG3423A			SG3423/SG3523			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Supply Voltage Range	**T_A = 25°C to T_{MAX}**	**4.5**		**40**	**4.5**		**40**	**4.5**		**40**	**V**
	$T_A = T_{MIN}$ to T_{MAX}	4,7		40	4.7		40	4.7		40	V
Supply Current			**5**	**7**		**5**	**7**		**5**	**10**	**mA**
Sense Threshold	T_J = 25°C	2.55	2.60	2.65	2.50	2.60	2.70	2.45	2.60	2.75	V
	$T_A = T_{MIN}$ to T_{MAX}	**2.50**		**2.70**	**2.45**		**2.75**	**2.35**		**2.85**	**V**
Input Hyteresis	Sense 1 only		25			25			25		mV
Input Bias Current	**Sense 1**		**-0.3**	**-1.0**		**-0.3**	**-1.0**		**-0.3**		**µA**
	Sense 2		+5	+10		+5	+10		+5		µA
Delay Current		**200**	**250**	**350**	**200**	**250**	**350**	**150**	**250**	**350**	**µA**
Remote Activation Input Current	$V_{PIN\,5}$ = 2.0V		5	40		5	40		5	40	µA
	$V_{PIN\,5}$ = 0.8V		**-120**	**-250**		**-120**	**-250**		**-120**	**-250**	**µA**
Output Voltage	I_O = 100mA	V_{IN}-2.5	V_{IN}-1.6		V_{IN}-2.5	V_{IN}-1.6		V_{IN}-2.5	V_{IN}-1.6		V
Peak Output Current	**V_{IN} = 5V, V_O = 0V**	**100**	**200**	**600**	**100**	**200**	**600**		**200**		**mA**
Output Off Voltage	V_{IN} = 40V		0	0.1		0	0.1		0		V
Indicator Saturation Voltage	**I_L = -1.6mA**		**0.1**			**0.1**			**0.1**		**V**
	I_L = -10mA		0.2	0.5		0.2	0.5		0.4		V
Indicator Leakage	**$V_{PIN\,6}$ = 40V**		**0.1**	**1.0**		**0.1**	**1.0**		**0.1**	**1.0**	**µA**
Propagation Delay to Output	T_J = 25°C, Sense 1		1.0			1.0			1.0		µs
	T_J = 25°C, Sense 2		**0.5**			**0.5**			**0.5**		**µs**
Output Current Rise Time	T_J = 25°C		400			400			400		mA/µs

APPLICATION INFORMATION

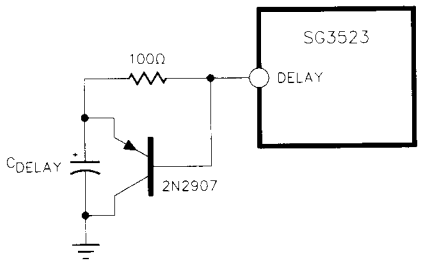


FIGURE 1 - SURGE LIMIT CIRCUIT FOR LARGE DELAY CAPACITORS

The 100Ω resistor limits the peak discharge current into the SG3523 while the external PNP transistor provides a high peak-current discharge path for the delay capacitor.

CONNECTION DIAGRAMS & ORDERING INFORMATION (See Notes Below)

Package	Part No.	Ambient Temperature Range	Connection Diagram
8-PIN CERAMIC DIP Y - PACKAGE	SG3523AY/883B	-55°C to 125°C	
	SG3523AY	-55°C to 125°C	
	SG3523Y/883B	-55°C to 125°C	
	SG3523Y	-55°C to 125°C	
	SG3423AY	0°C to 70°C	
	SG3423Y	0°C to 70°C	
8-PIN PLASTIC DIP M - PACKAGE	SG3423AM	0°C to 70°C	
	SG3423M	0°C to 70°C	

Note 1. All packages are viewed from the top.