

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 occurrence and crowbar triggering, but this delay may be bypassed by inputting at the Sense 2 terminal or by using the remote activation capability.

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

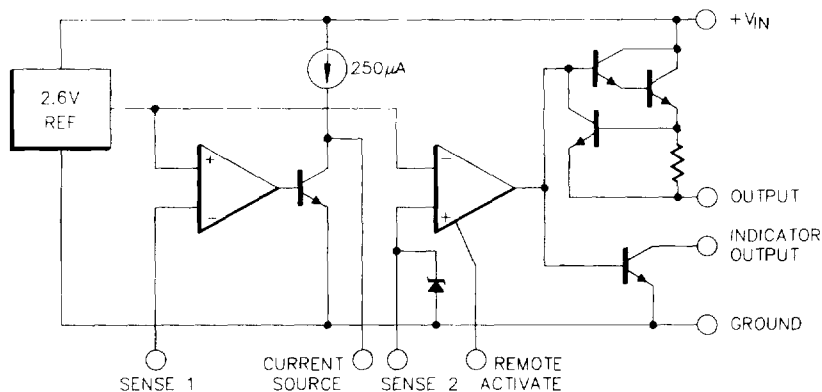
FEATURES

- 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

BLOCK DIAGRAM

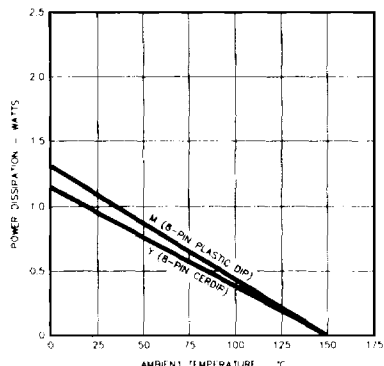


ABSOLUTE MAXIMUM RATINGS (Note 1)

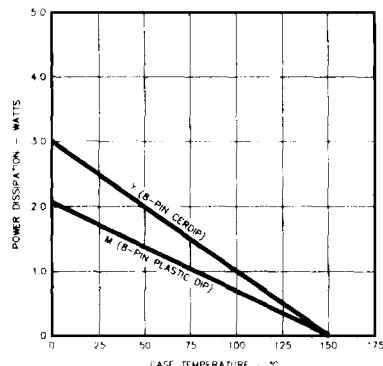
Input Supply Voltage (V_{IN})	40V
Sense Voltage (1) Input Range	V_{IN}
Sense Voltage (2) Input Range	6.5V
Reference Load Current	10mA
Indicator Output Voltage	40V

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.

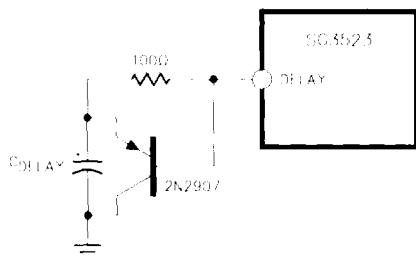
Note 3. Range over which the device is functional.

ELECTRICAL SPECIFICATIONS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG3523/SG3523A with $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$, SG3423/SG3423A with $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$, and $V_{IN} = 10\text{V}$. 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	$T_A = 25^{\circ}\text{C}$ to T_{MAX} $T_A = T_{MIN}$ to T_{MAX}	4.5		40	4.5		40	4.5		40	V
Supply Current		4.7		40	4.7		40	4.7		40	V
Sense Threshold	$T_J = 25^{\circ}\text{C}$ $T_A = T_{MIN}$ to T_{MAX}	2.55	2.60	2.65	2.50	2.60	2.70	2.45	2.60	2.75	V
Input Hysteresis	Sense 1 only	2.50		2.70	2.45		2.75	2.35		2.85	V
Input Bias Current	Sense 1		25			25			25		mV
	Sense 2		-0.3	-1.0		-0.3	-1.0		-0.3		μA
			+5	+10		+5	+10		+5		μA
Delay Current		200	250	350	200	250	350	150	250	350	μA
Remote Activation Input Current	$V_{PIN5} = 2.0\text{V}$ $V_{PIN6} = 0.8\text{V}$ $I_O = 100\text{mA}$		5	40		5	40		5	40	μA
			-120	-250		-120	-250		-120	-250	μA
Output Voltage	$V_{IN} = 5\text{V}$, $V_O = 0\text{V}$	$V_{IN} = 2.5$	$V_{IN} = 1.6$		$V_{IN} = 2.5$	$V_{IN} = 1.6$		$V_{IN} = 2.5$	$V_{IN} = 1.6$		V
Peak Output Current		100	200	600	100	200	600		200		mA
Output Off Voltage	$V_{IN} = 40\text{V}$		0	0.1		0	0.1		0		V
Indicator Saturation Voltage	$I_L = -1.8\text{mA}$ $I_L = -10\text{mA}$		0.1			0.1			0.1		V
			0.2	0.5		0.2	0.5		0.4		V
Indicator Leakage	$V_{PIN6} = 40\text{V}$		0.1	1.0		0.1	1.0		0.1	1.0	μA
Propagation Delay to Output	$T_J = 25^{\circ}\text{C}$, Sense 1		1.0			1.0			1.0		μs
	$T_J = 25^{\circ}\text{C}$, Sense 2		0.5			0.5			0.5		μs
Output Current Rise Time	$T_J = 25^{\circ}\text{C}$		400			400			400		mA/μs

APPLICATION INFORMATION



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.

FIGURE 1 - SURGE LIMIT CIRCUIT FOR LARGE DELAY CAPACITORS

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	
8-PIN PLASTIC DIP M - PACKAGE	SG3423Y	0°C to 70°C	
	SG3423AM	0°C to 70°C	
	SG3423M	0°C to 70°C	

Note 1. All packages are viewed from the top.