

*Engineers  
Application  
Handbook*

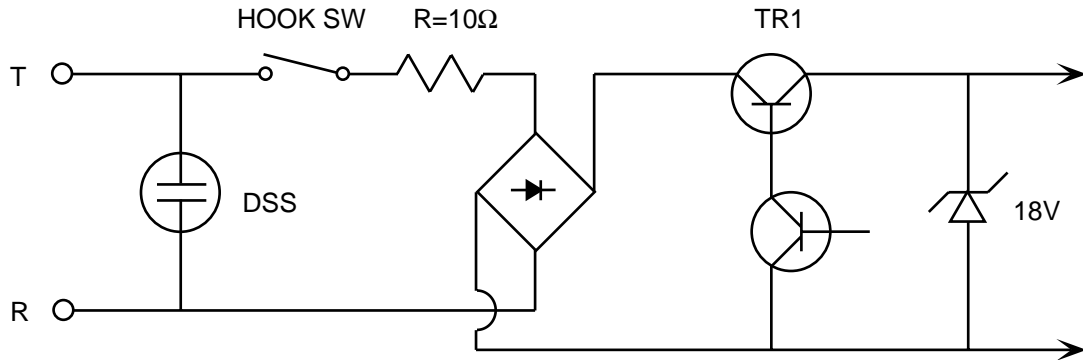
*for the  
DSA, DSS, and DSP*

# Contents

<b>Telecommunications .....</b>	<b>3</b>
Telephone .....	3
PBX, Keytelephone, Modem, and Facsimile .....	3
Facsimile, Keytelephone, PBX .....	4
Data line ( RS-232C etc. ) .....	4
Telephone ( for UL1459 and CSA ) example 1 .....	5
Telephone ( for UL1459 and CSA ) example 2 .....	5
Telephone ( for UL1459 and CSA ) example 3 .....	6
Telephone ( for UL1459 and CSA ) example 4 .....	6
<b>Automotive Electronics .....</b>	<b>7</b>
Car Stereo, Radio - Block Diagram .....	7
Car Stereo and Car Telephone example .....	7
<b>Television and CRT .....</b>	<b>8</b>
TV antenna ( cold chassis ) .....	8
CRT .....	8
CATV booster .....	9
Booster ( for satellite broadcasting and general TV equipment ) .....	9
<b>Power Supplies and AC lines .....</b>	<b>10</b>
Invertor and Switching Power Supply .....	10
Personal Computer, Printer, and Copying Machine .....	10
Microwave Oven example .....	11
Equipment Requiring AC Withstanding Voltage Test .....	11
Water Heater Control Unit .....	12
Equipment using a Three-Phase Power Supply .....	12
<b>Other Applications .....</b>	<b>13</b>
Sensor Line .....	13
Home Security System .....	13

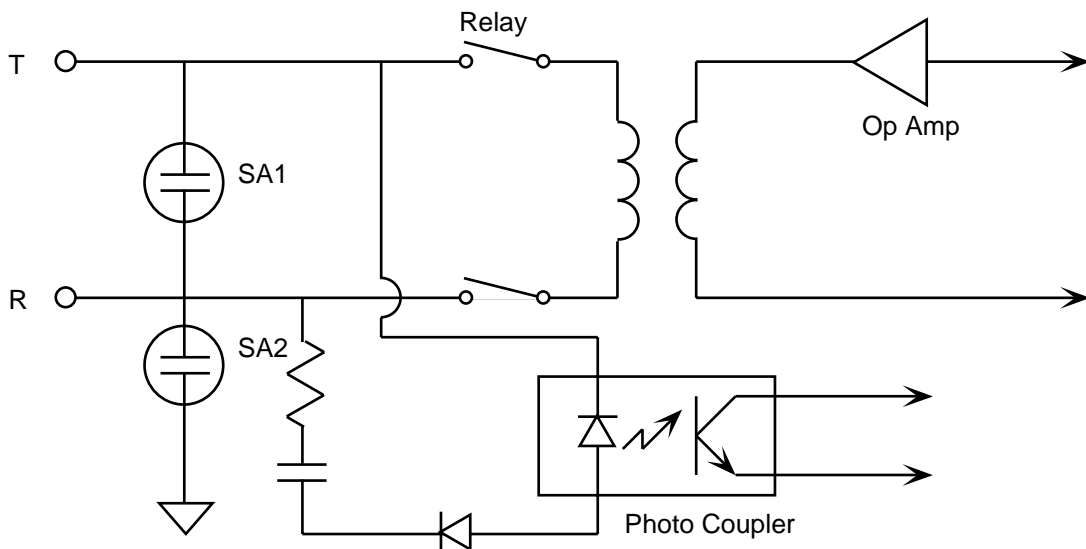
# Telecommunications

## Telephone



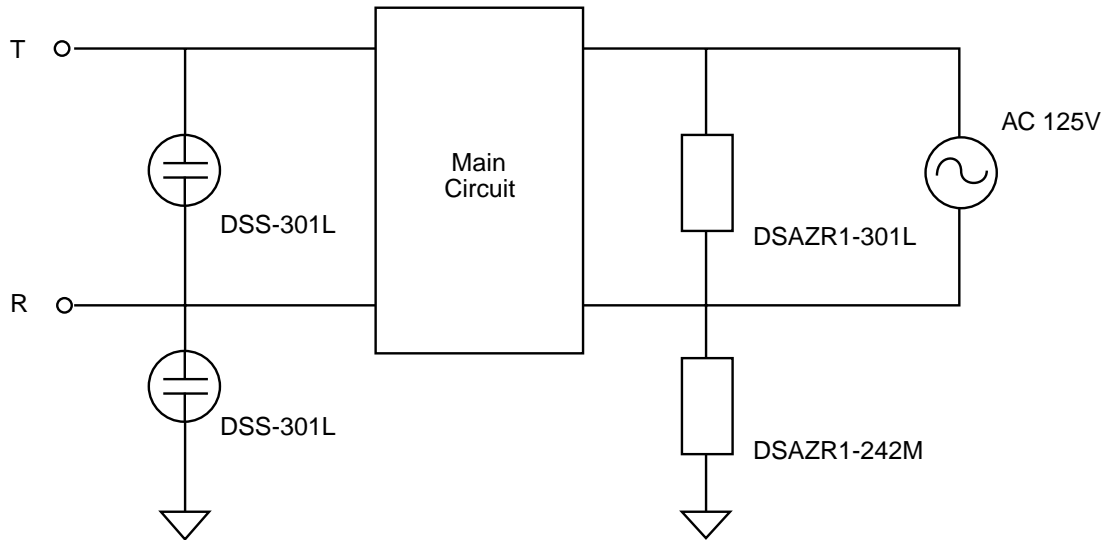
DSS: DSS-301L, 401M  
 TR1:  $V_{CBO}$  300~400V

## PBX, Keytelephone, Modem, and Facsimile



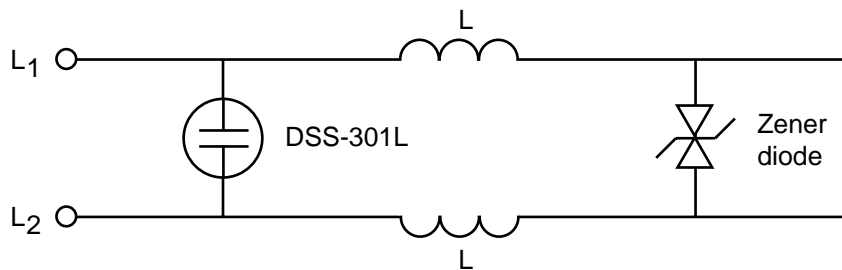
1) Normal: SA1, 2: DSS-301L, 401M  
 2) AC Withstanding Voltage: SA1: DSS-301L, 401M  
 SA2: DSA-242MA or DSA-302MA

■ Facsimile, Keytelephone, PBX

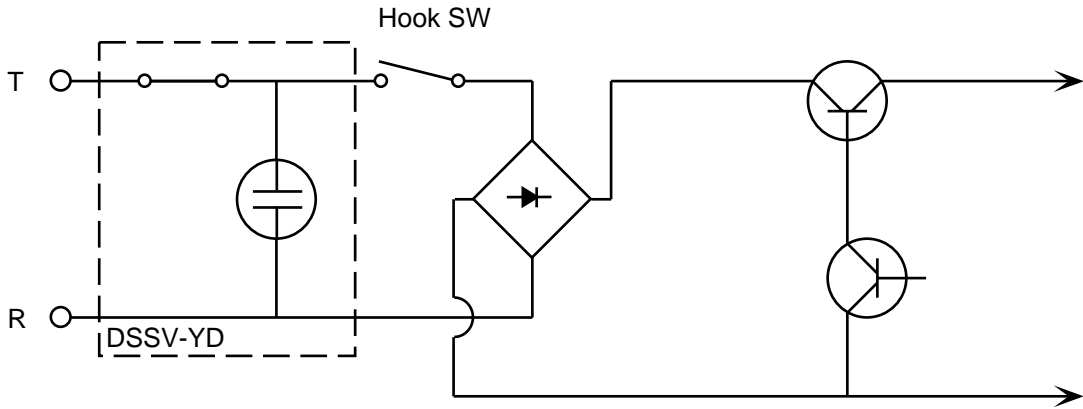


Example of an application where a AC1200V withstanding voltage test is required between T+R and GND.

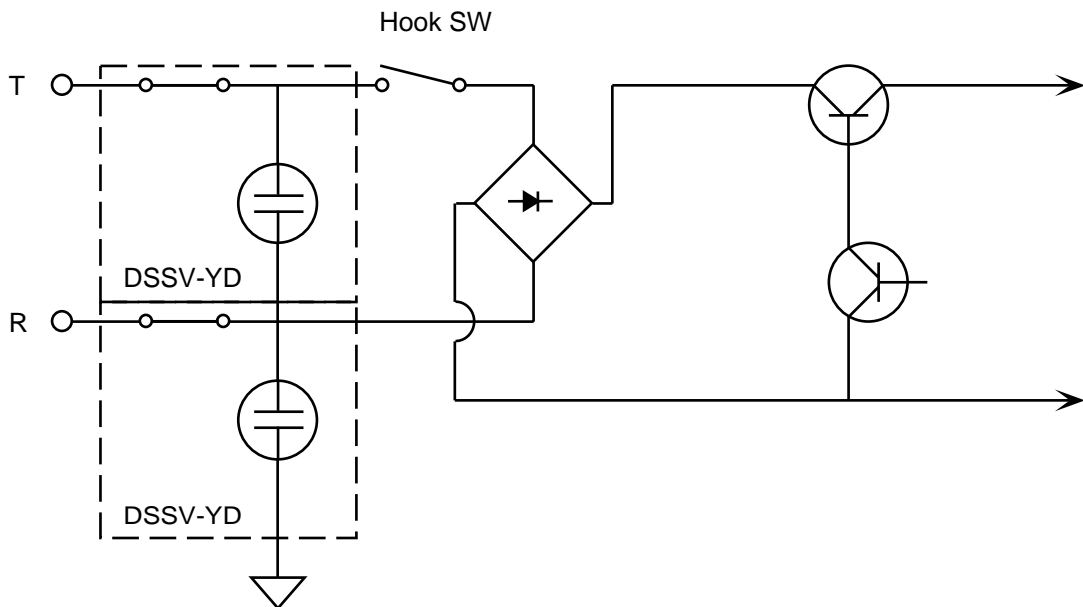
■ Data line ( RS-232C etc. )



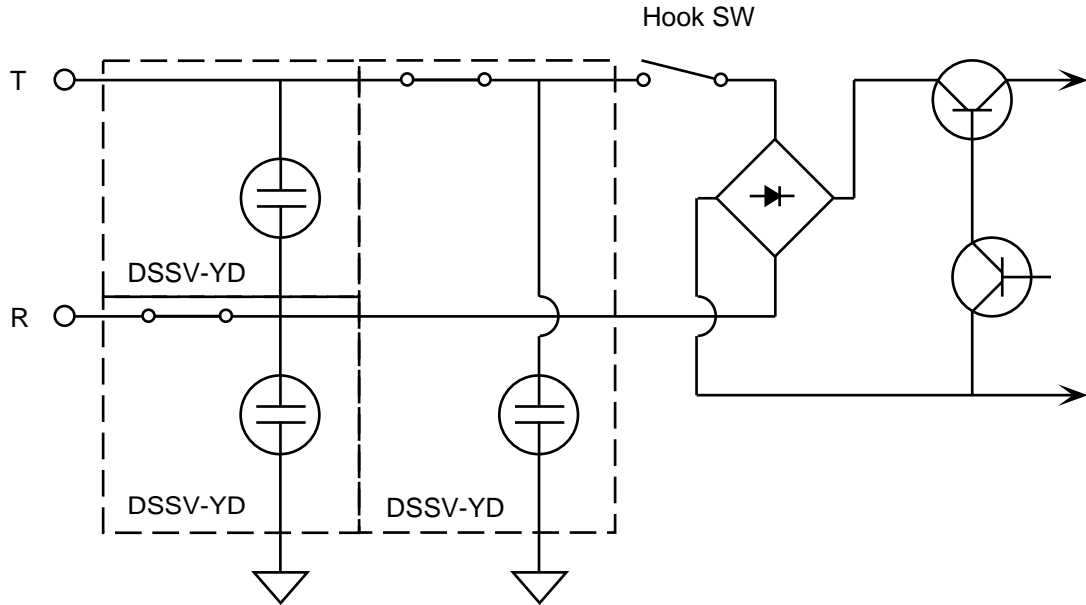
■ Telephone ( for UL1459 and CSA ) example 1



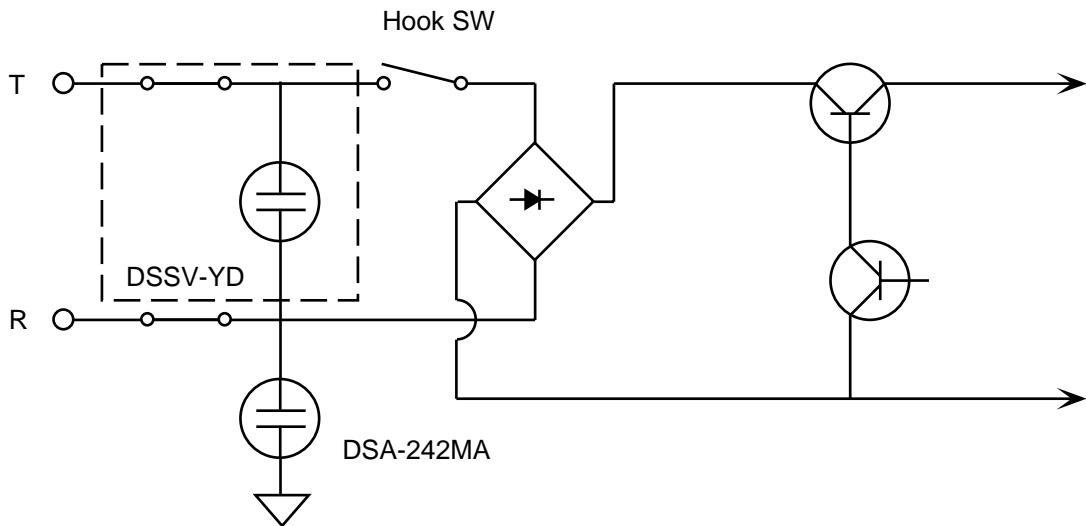
■ Telephone ( for UL1459 and CSA ) example 2



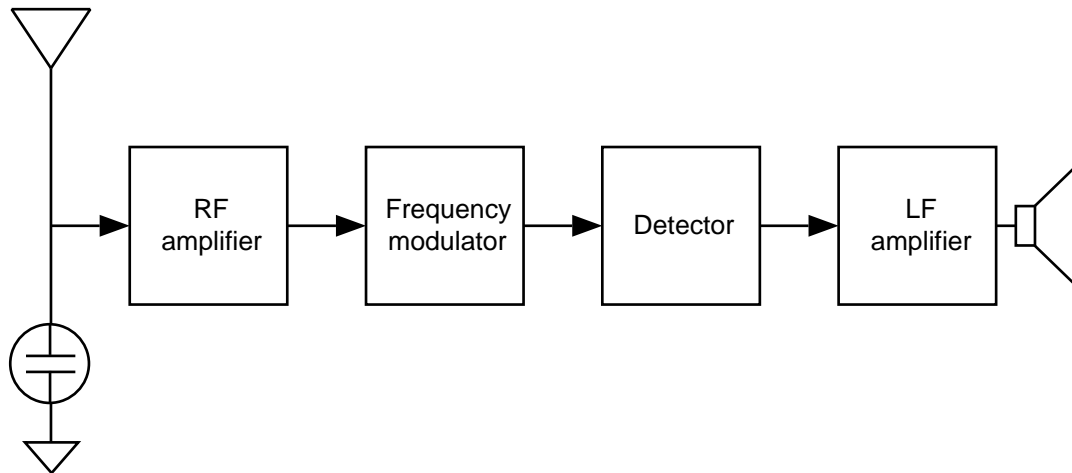
■ Telephone ( for UL1459 and CSA ) example 3



■ Telephone ( for UL1459 and CSA ) example 4

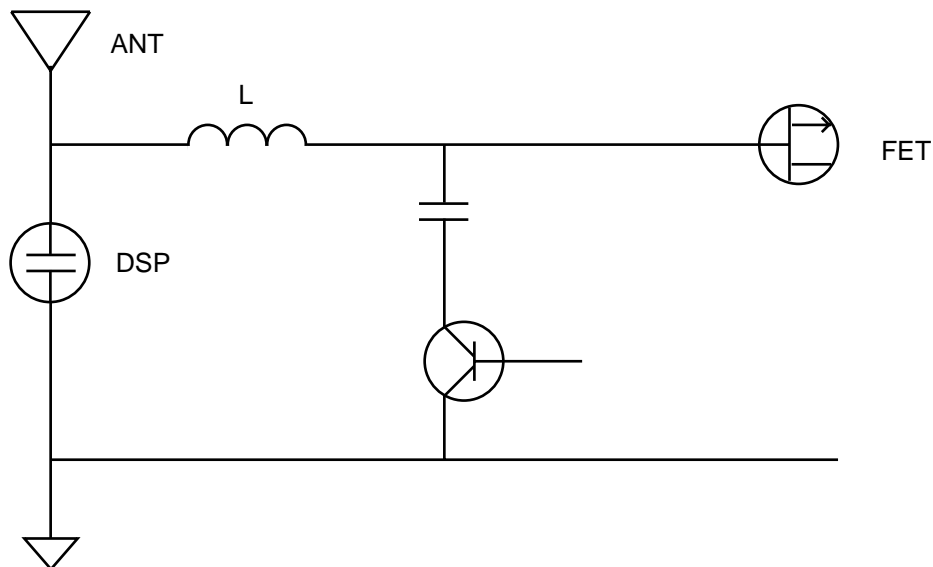


## Car Stereo, Radio - Block Diagram



Connected between the antenna and ground, a DSP will protect the semiconductor ( front-end IC or FET, etc. ) against failure due to static surges entering from the antenna. The high insulation resistance and low capacitance of the DSP prevents any attenuation of the circuit it is protecting.

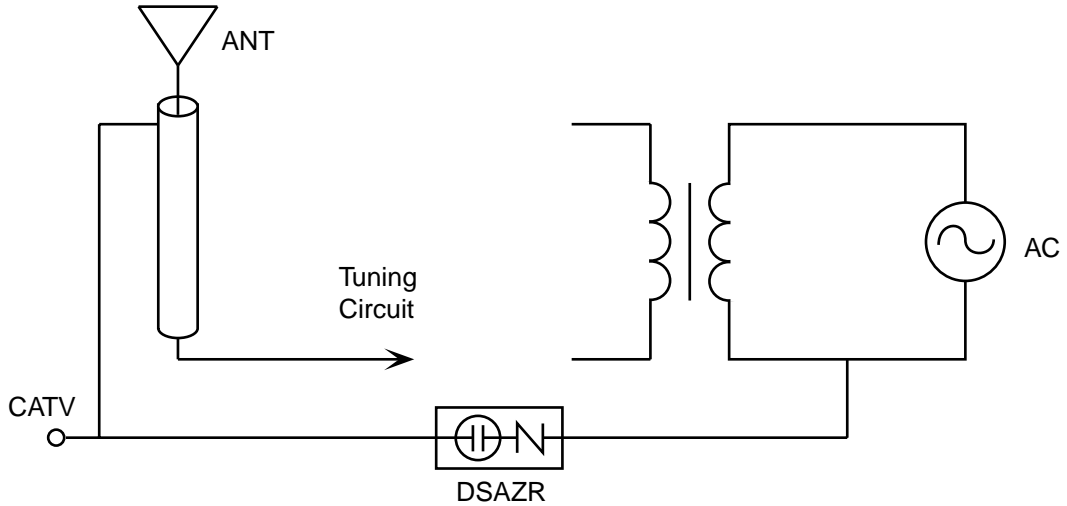
## Car Stereo and Car Telephone example



**DSP:** DSP-141N, 201M, 301N

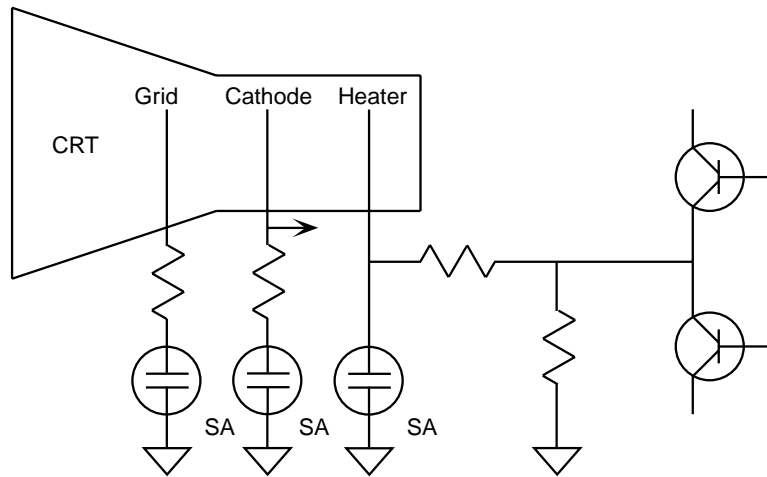
# Television and CRT

## TV antenna ( cold chassis )



**DSAZR:** DSAZR1-242M, DSAZR1-302M (AC125V) or DSA-242MA + MOV270V  
 DSAZR2-302M, DSAZR2-362M (AC250V) or DA53-782M + MOV470V

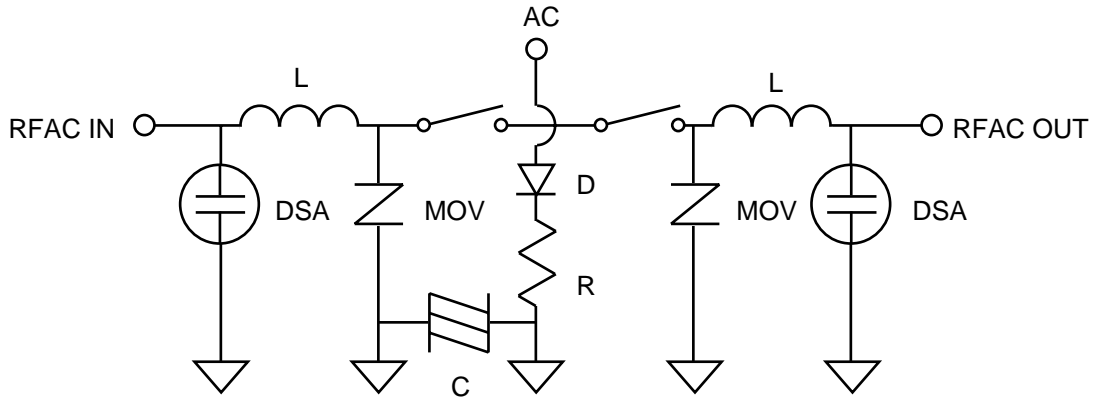
## CRT



Inserted between the ground and cathode, a DSP will protect the display driver IC's and transistors from damage due to static surges generated by the display or other source. It can also be used on the heater or grid depending on the circuit. Unlike open air gap devices, the DSP is not affected by altitude or humidity allowing reliable operation in any location.

CRT SIZE	Line Voltage	DSP / DSA
15" Cathod, Heater	60V >	DSP-141N
	120V >	DSP-201M
	160V >	DSP-301N
15" <		DSA-301N
Grid	800V >	DSP-152M

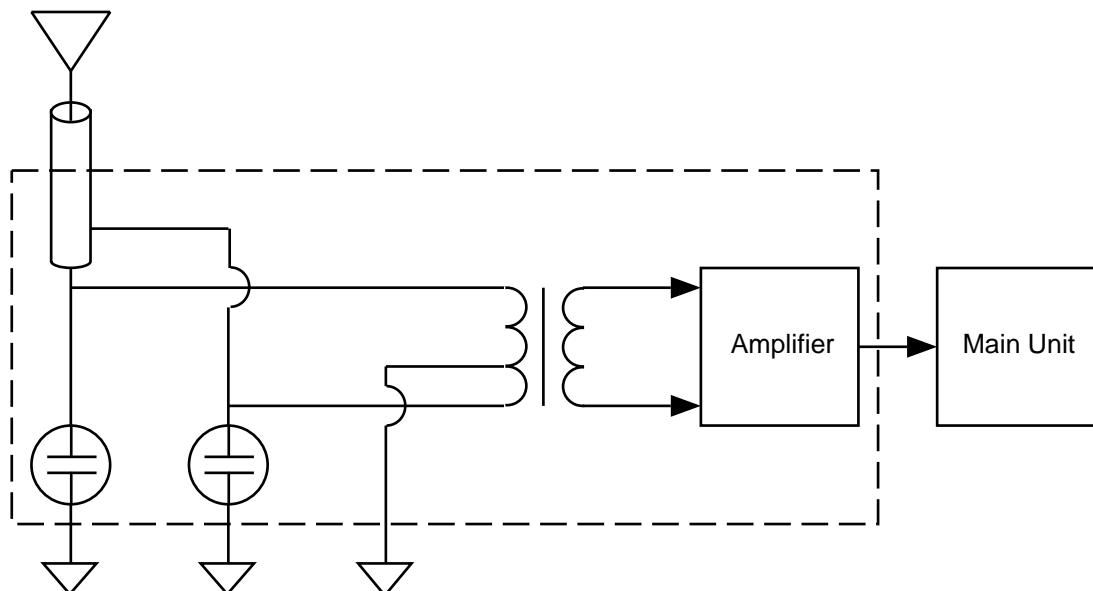
■ **CATV booster**



This is a  $\pi$  circuit which protects against induced lightning surges. It suppresses the induced lightning surge with a combination of DSA's and a solid element (MOV, Zener diode, etc.). The solid element is used to quickly clamp the surge, while the DSA will then suppress the majority of the surge energy. This protects solid elements, which generally have a low surge current capacity, while keeping the surge voltage low.

**DSA:** DSA-301LA, DSA-301LS, etc.

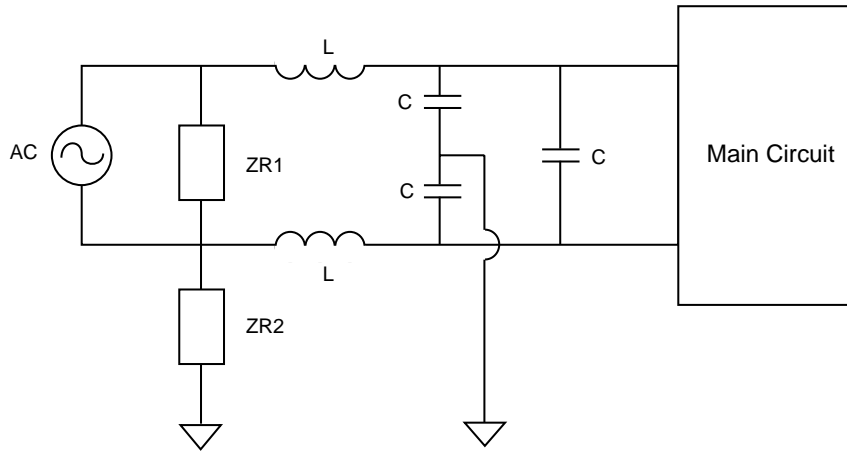
■ **Booster ( for satellite broadcasting and general TV equipment )**



In this application DSP's can be used to protect semiconductors against small surge energies from the vicinity of the antenna or against static electricity due to human contact. The recent increasing use of high sensitivity FET's has led to a stronger requirement for surge protection.

# Power Supplies and AC lines

## Invertor and Switching Power Supply



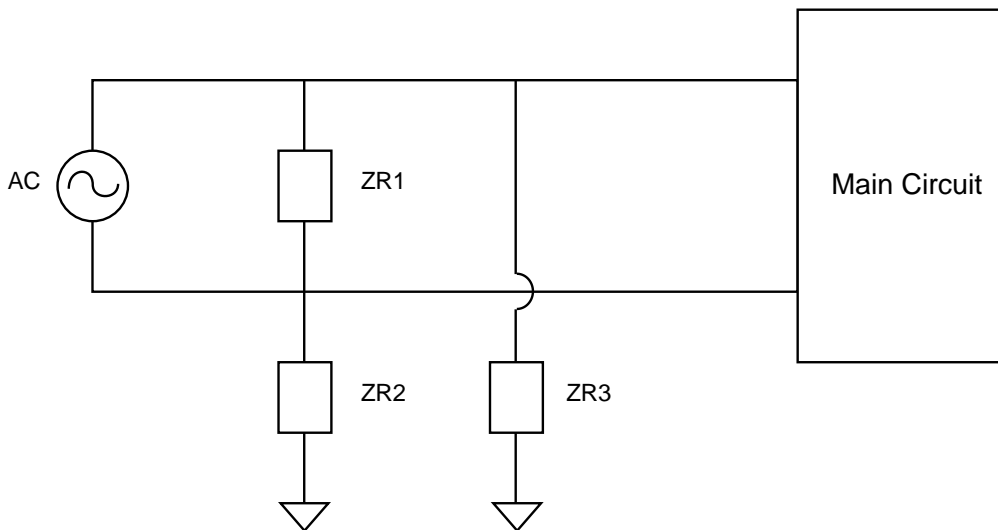
**AC125V**

**ZR1:** DSAZR1-301L  
**ZR2:** DSAZR1-242M or  
 DA38-272M+MOV270V

**AC250V**

**ZR1:** DSAZR2-501M  
**ZR2:** DSAZR2-362M or  
 DA38-362M+MOV470V

## Personal Computer, Printer, and Copying Machine



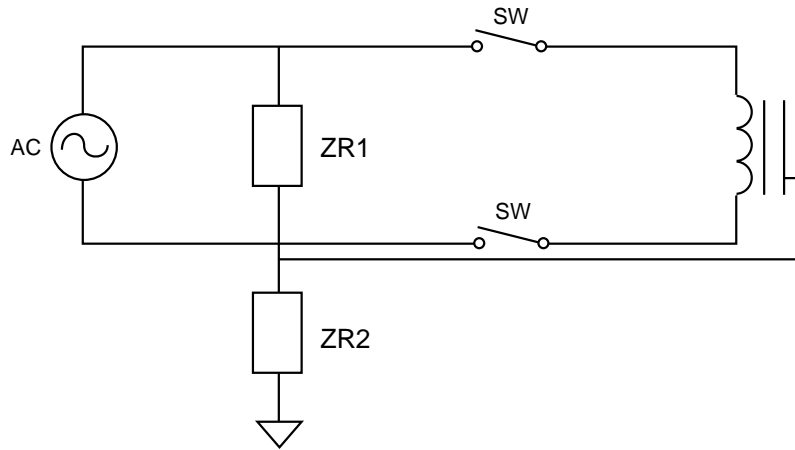
**AC125V**

**ZR1, 2, 3 :** DSAZR1-301L  
 or  
**ZR1 :** DSAZR1-301L  
**ZR2, 3 :** DSAZR1-242M or  
 DA38-272M+MOV270V

**AC250V**

**ZR1, 2, 3 :** DSAZR2-501M  
 or  
**ZR1 :** DSAZR2-501M  
**ZR2, 3 :** DSAZR2-362M or  
 DA38-362M+MOV470V

### ■ Microwave Oven example



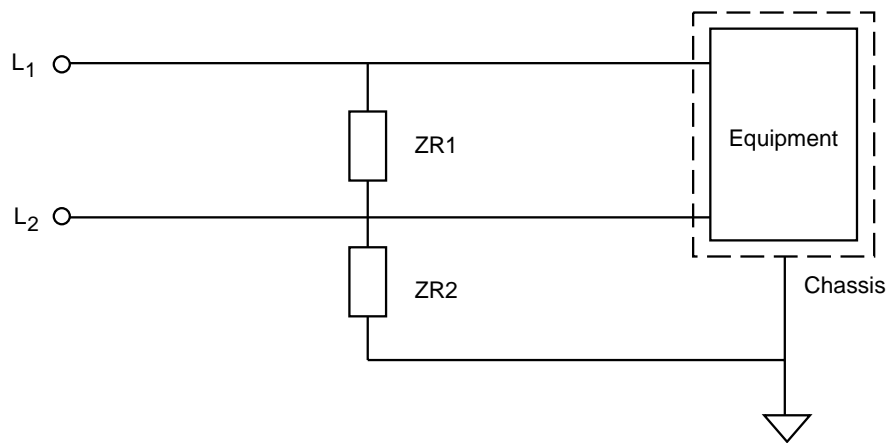
**AC125V**

**ZR1:** DSAZR1-301L  
**ZR1:** DSAZR1-242M or  
 DA38-272M+MOV270V

**AC250V**

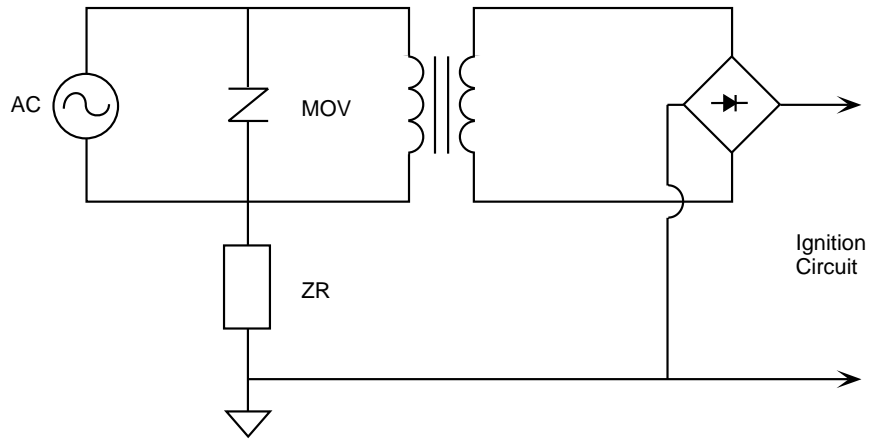
**ZR1:** DSAZR2-501M  
**ZR2:** DSAZR2-362M or  
 DA38-362M+MOV470V

### ■ Equipment Requiring AC Withstanding Voltage Test



Conditions		100~125VAC	200~250VAC
L1 to L2		DSAZR1-301L	DSAZR2-501M
L1 or L2 to GND			
Dielectric Withstanding Voltage Test Withstanding Voltage Test	1000VAC	DSAZR1-242M or DA38-272M+MOV270V	-
	1200VAC		-
	1500VAC	DSAZR1-302M or DA38-302M+MOV270V	DSAZR2-302M or DA38-302M+MOV470V
	1800VAC	DSAZR1-362M or DA38-362M+MOV270V	DSAZR2-362M or DA38-362M+MOV470V

## Water Heater Control Unit



**AC125V**

**ZR:** DSAZR1-242M or  
DA38-272M+MOV270V

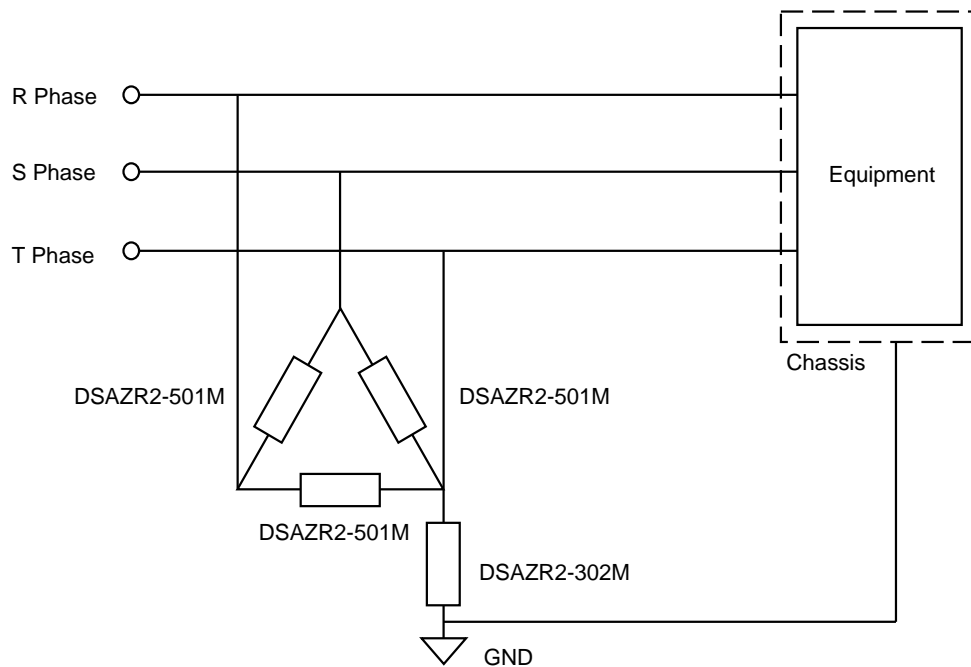
**MOV:** 220V

**AC250V**

**ZR:** DSAZR2-362M

**MOV:** 470V

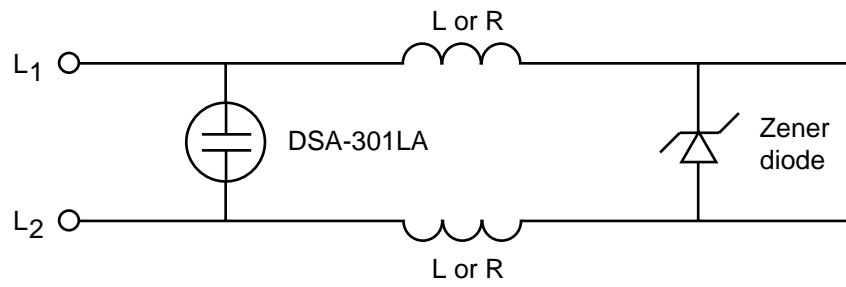
## Equipment using a Three-Phase Power Supply



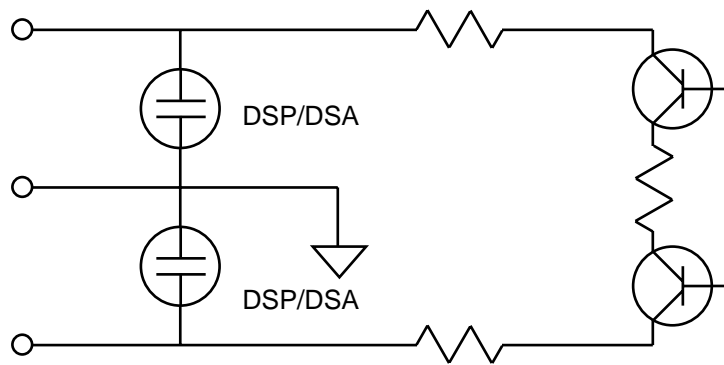
Example is for an AC200V~AC240V 3-phase power system such as found in air-conditioning systems, power tools, etc. The dielectric withstanding voltage test for the above example is carried out at 1500VAC between the RST phases and ground.

# Other Applications

## Sensor Line



## Home Security System



**INDOOR USE**  
DSP: DSP-141N, 201M, 301N

**OUTDOOR USE**  
DSA: DSA-301LA