ESD Protection Diode

Description

The GSM712 is designed for asymmetrical (12V to -7V) protection in multi-point data transmission application. The GSM712 replace four discrete components by integrating two 12V and two 7V TVS diodes in a single package. The GSM712 complies with the IEC 61000-4-2 (ESD) standard with ±30kV air and ±30kV contact discharge. It is assembled into a lead-free SOT-23 package. It is designed to protect components which are connected to data and transmission lines from voltage surges.

Features

- 325W peak pulse power(8/20μs)
- Ultra low leakage：nA level
- Operating voltage：7V or 12V
- Low clamping voltage
- Complies with following standards:
  - IEC 61000-4-2 (ESD) immunity test Air discharge: ±30kV
    Contact discharge: ±30kV
  - IEC61000-4-5 (Lightning) 13A (8/20μs)
- RoHS Compliant
- AEC-Q101 qualified (Automotive grade with suffix " Q

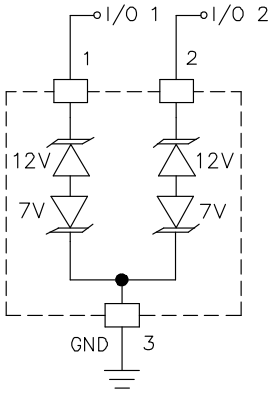
Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram Below
- Marking Information: See Below

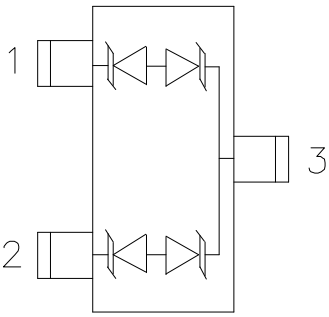
Applications

- Wireless System
- Networks
- Portable Instrumentation
- RS485 Ports

Dimensions and Pin Configuration

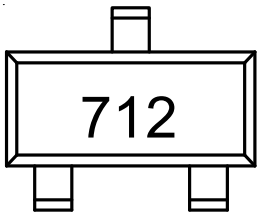


Circuit Schematic



Pin Schematic

Marking Information



Ordering Information

Part Number	Marking	Packaging	Reel Size
GSM712	712	3000/Tape & Reel	7 inch

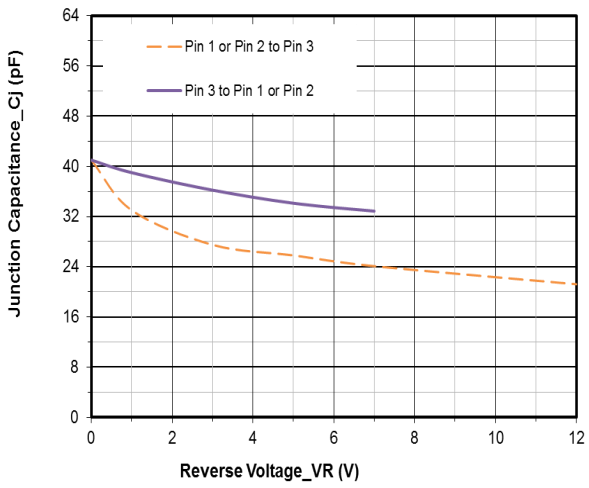
Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power(8/20μs)	Ppk	325	W
Peak Pulse Current(8/20μs)	I_{PP}	13	A
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	V_{ESD}	±30 ±30	kV
Operating Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

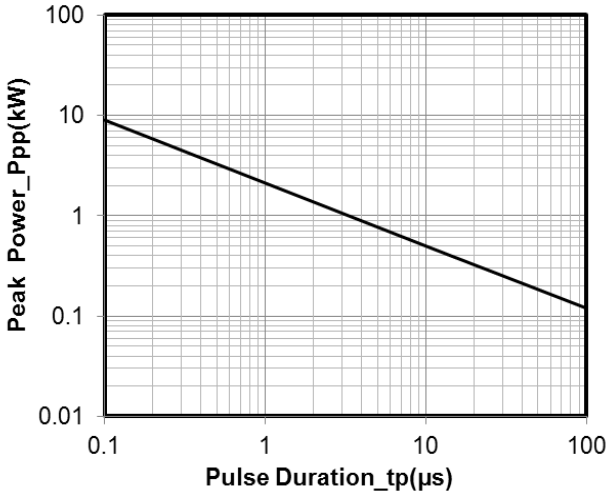
Electrical Characteristics (T_A=25°C unless otherwise specified)

		Pin 1 to 3 and 2 to 3 (12V TVS)			Pin 3 to 1 and 3 to 2 (7V TVS)				
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			12			7	V	
Breakdown Voltage	V_{BR}	13.3			7.5			V	I_T = 1mA
Reverse Leakage Current	I_R			0.5			0.5	μA	V_R = V_{RWM}
Clamping Voltage	V_C			20			14	V	I_{PP} = 5A (8 x 20μs pulse)
Clamping Voltage	V_C			25			16	V	I_{PP} = 13A (8 x 20μs pulse)
Junction Capacitance	C_J		40			40		pF	VR = 0V, f = 1MHz
Junction Capacitance	C_J		20			30		pF	VR = V_{RWM}, f = 1MHz

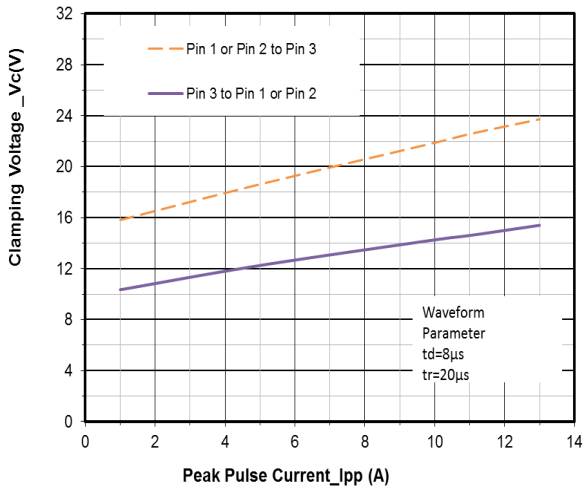
Typical Performance Characteristics (T_A=25℃ unless otherwise Specified)



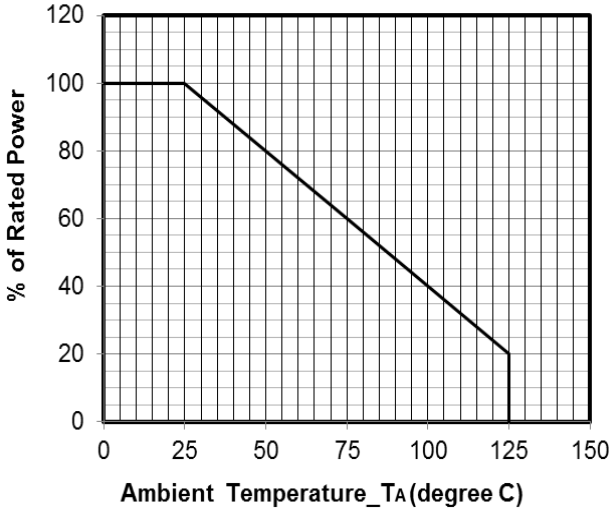
Junction Capacitance vs. Reverse Voltage



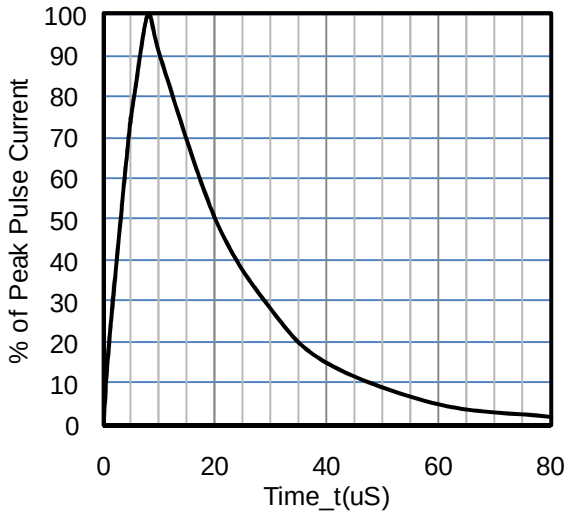
Peak Pulse Power vs. Pulse Time



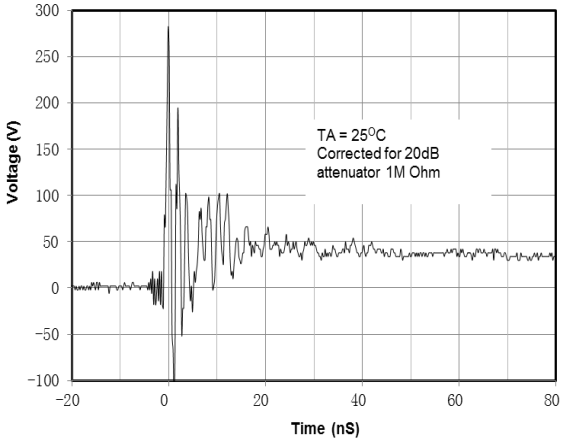
Clamping Voltage vs. Peak Pulse Current



Power Derating Curve



8X 20μs Pulse Waveform

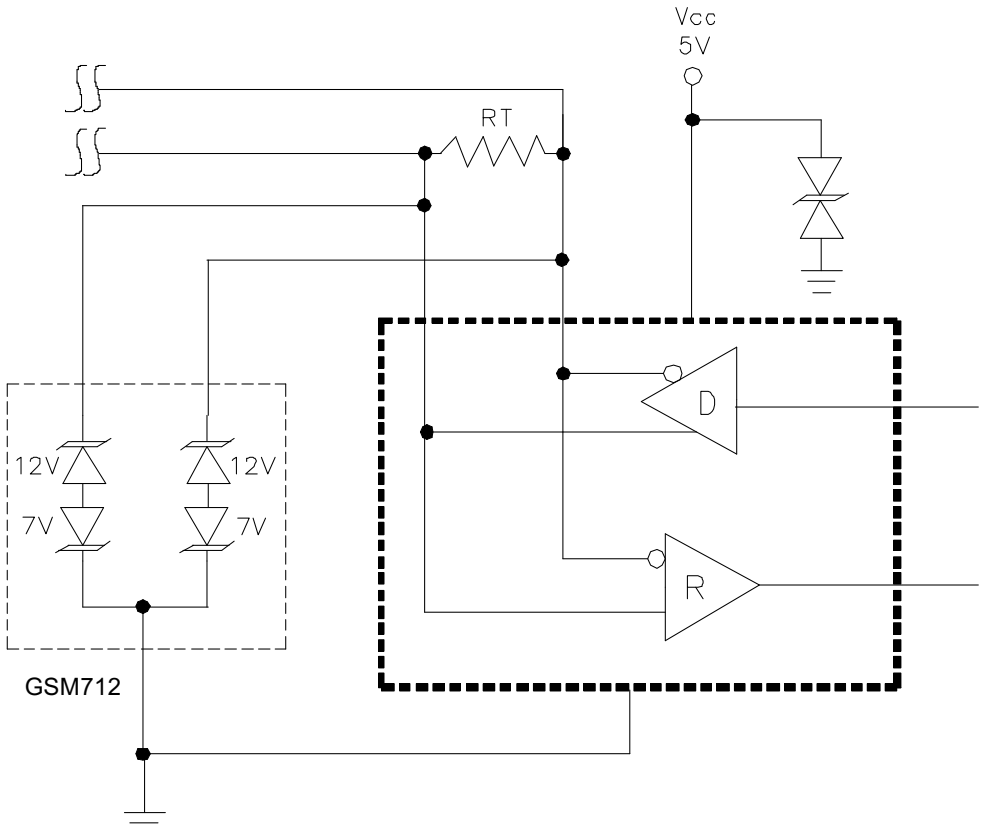


ESD Clamping Voltage

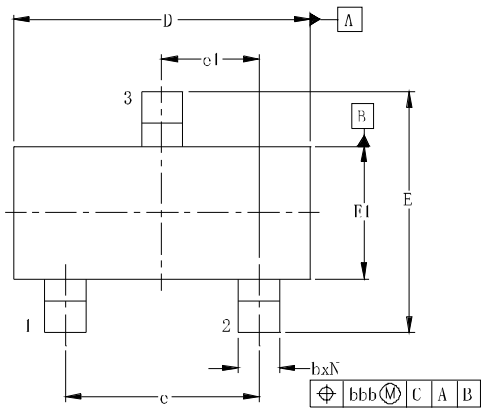
8 kV Contact per IEC61000−4−2

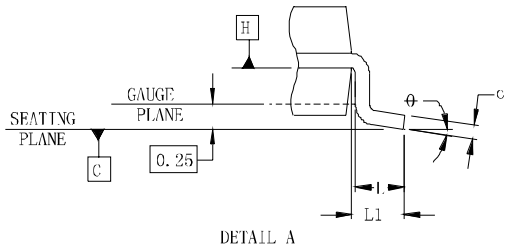
GSM712 on RS-485 Data Lines Application

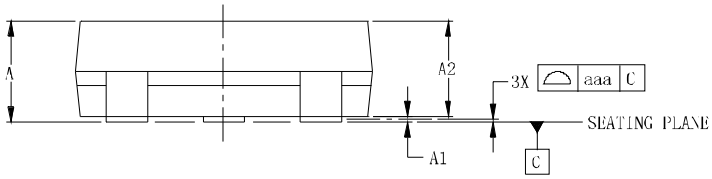
EIA RS-485 specifies a ±7V ground difference between devices on the bus. This permits the bus voltage to range from +12V (5V + 7V) to -7V (0 - 7V). The GSM712 is designed to protect two RS-485 data lines in extended common mode applications. The GSM712 may be used to protect devices from transient voltages resulting from ESD, EFT, and lightning. The device is designed with asymmetrical operating voltages for optimum protection. The TVS diodes at pins 1 and 2 have a working voltage of 12 volts. These pins are connected to the differential data line pairs. The TVS diodes at pin 3 have a working voltage of 7 volts. Pin 3 is connected to ground. The internal TVS diodes of the GSM712 will protect the transceiver input from positive transient voltage spikes greater than 12V and negative spikes greater than 7V.



SOT-23 Package Outline Drawing

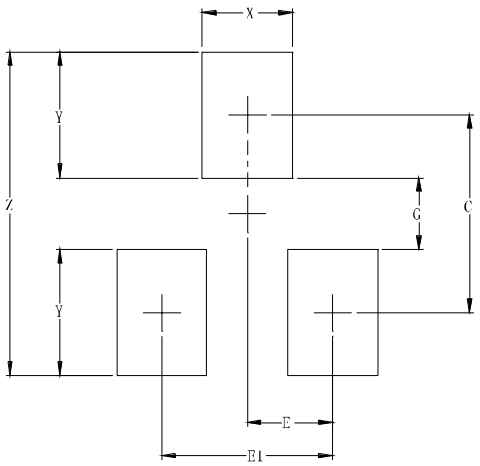






DIMENSIONS						
SYM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.035	-	0.044	0.89	-	1.12
A1	0.000	-	0.004	0.01	-	0.10
A2	0.035	0.037	0.040	0.88	0.95	1.02
b	0.012	-	0.020	0.30	-	0.51
c	0.003	-	0.007	0.08	-	0.18
D	0.110	0.114	0.120	2.80	2.90	3.04
E	0.082	0.093	0.104	2.10	2.37	2.64
E1	0.047	0.051	0.055	1.20	1.30	1.40
e	0.075			1.90BSC		
e1	0.037			0.95BSC		
L	0.015	0.020	0.024	0.40	0.50	0.60
L1	0.022			0.55		
N	3			3		
θ	0°	-	8°	0°	-	8°
aaa	0.004			0.10		
bbb	0.008			0.20		

Suggested Land Pattern



DIMENSIONS		
SYM	INCHES	MILLIMETERS
C	0.087	2.20
E	0.037	0.95
E1	0.075	1.90
G	0.031	0.80
X	0.039	1.00
Y	0.055	1.40
Z	0.141	3.60