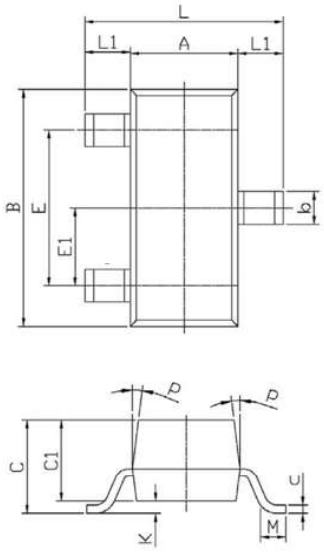
Asymmetrical TVS Diode

The ASM712 is designed for asymmetrical (12V to –7V) protection in multi-point data transmission application, The ASM712 replace four discrete components by inte-grating two 12V and two 7V TVS diodes in a single pack-age. The ASM712 complies with the IEC 61000-4-2 (ESD) standard with ±15kV air and ±8kV contact dis-charge. 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

- 400W peak pulse power (8/20us)
- 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
  - IEC61000-4-4 (EFT) 40A (5/50ns)
  - IEC61000-4-5 (Lightning) 17A(8/20us)
- RoHS Compliant

SOT-23



DIM	Unit : mm	
	MIN	MAX
A	1.15	1.50
B	2.70	3.10
b	0.35	0.55
C	-	1.30
C1	0.90	1.20
c	0.05	0.20
E	1.70	2.10
E1	0.85	1.05
K	0	0.10
L	2.20	2.70
L1	0.45	0.65
M	0.20	-
P	7°	

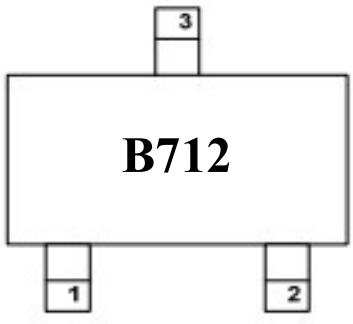
Mechanical Data

- Package : SOT-23
- Case Material : "Green" Molding Compound.
- Lead Finish : Matte Tin
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity : Level 3 per J-STD-020
- Terminal Connections : See Diagram Below
- Marking Information : See Below

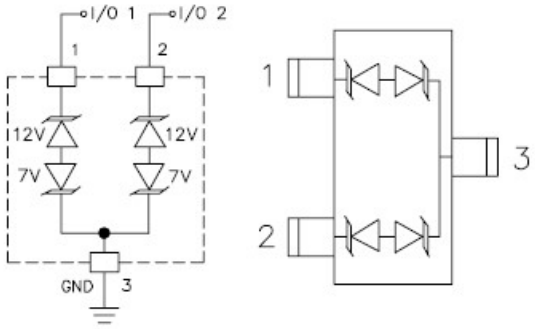
Applications

- Wireless System
- Networks
- Portable Instrumentation
- RS485 Ports

Marking



B712 = Device Marking Code



Circuit and Pin Schematic

Absolute Maximum Ratings (Ta= 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20us)	Ppk	400	W
Peak Pulse Current (8/20us)	Ipp	17	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±30 ±30	kV
Operating Junction Temperature Range	T_J	-55 to +125	℃
Storage Temperature Range	T_{STG}	-55 to +150	℃

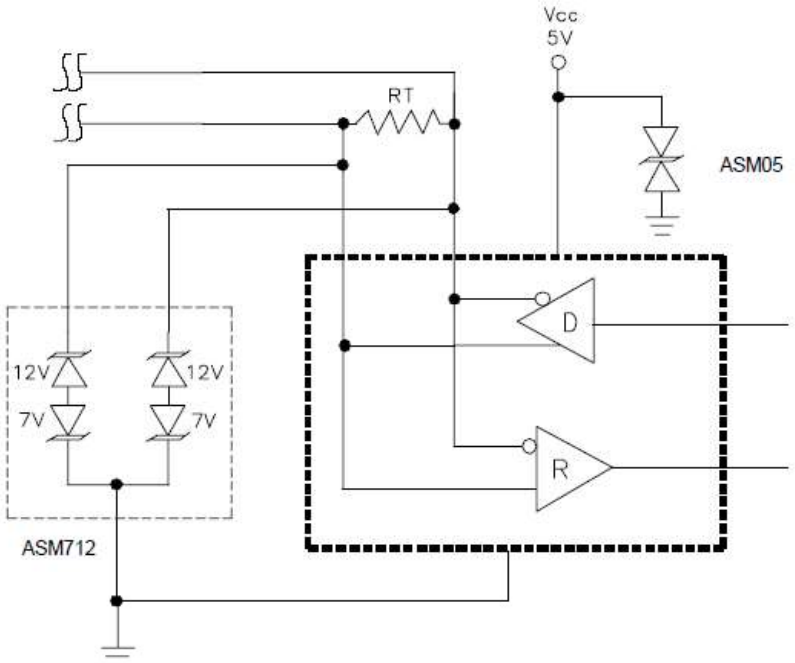
Electrical Charateristics (Ta= 25℃ unless otherwise specified)

Characteristic	Symbol	7V TVS (Pin 3 to 1 and 3 to 2)			Unit	Test Condition
		Min.	Typ.	Max.		
Reverse Working Voltage	V_{RWM}	-	-	7.0	V	
Breakdown Voltage	V_{BR}	7.5	-	-	V	I_T = 1mA,
Reverse Leakage Current	I_R	-	-	2.0	uA	$V_R=V_{RWM}$
Clamping Voltage	V_C	-	-	10	V	I_{PP}=5A(8×20us pulse)
		-	-	12	V	I_{PP}=17A(8×20us pulse)
Junction Capacitance	C_J	-	-	75	pF	f=1MHz, V_R=0V
		-	45	-	pF	f=1MHz, $V_R=V_{RWM}$

Characteristic	Symbol	12V TVS (Pin 1 to 3 and 2 to 3)			Unit	Test Condition
		Min.	Typ.	Max.		
Reverse Working Voltage	V_{RWM}	-	-	12.0	V	
Breakdown Voltage	V_{BR}	13.3	-	-	V	I_T = 1mA,
Reverse Leakage Current	I_R	-	-	0.05	uA	$V_R=V_{RWM}$
Clamping Voltage	V_C	-	-	20	V	I_{PP}=5A(8×20us pulse)
		-	-	26	V	I_{PP}=17A(8×20us pulse)
Junction Capacitance	C_J	-	-	75	pF	f=1MHz, V_R=0V
		-	45	-	pF	f=1MHz, $V_R=V_{RWM}$

ASM712 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 ASM712 is designed to protect two RS-485 data lines in extended common mode applications. The ASM712 may be used to protect devices from transient voltages resulting from ESD, EFT, and light ning. The device is designed with asymmetrical operating voltages for optimum protection. The TVS diodes at pins 1 and 2 have a working voltage of 12volts. These pins are connected to the differential data line pairs. The TVS diodes at pin 3 have a working voltage of 7volts. Pin 3 is connected to ground. The internal TVS diodes of the ASM712 will protect the transceiver input from positive transient voltage spikes greater than 12V and negative spikes greater than 7V.



Ratings and Characteristics Curves (Ta=25℃ unless otherwise noted)

Fig.1 Power Derating Curve

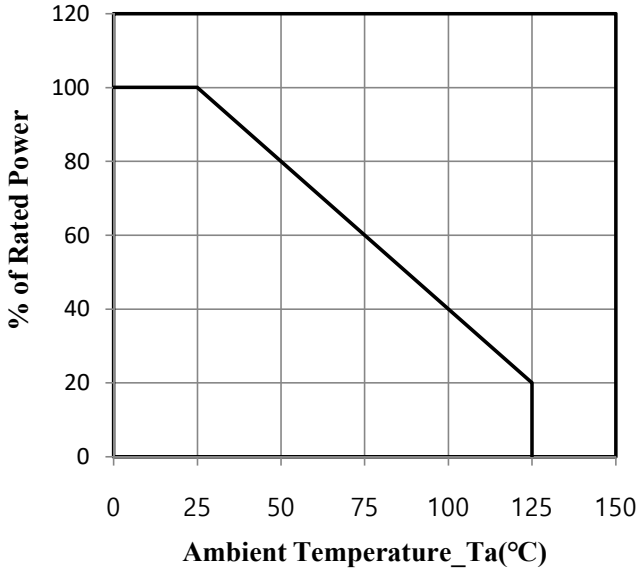


Fig.2 Peak Pulse Power vs. Pulse Time

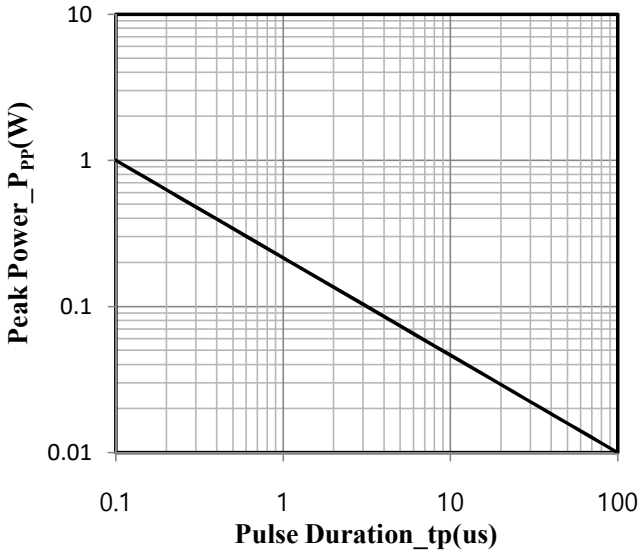


Fig.3 8 × 20us Pulse Waveform

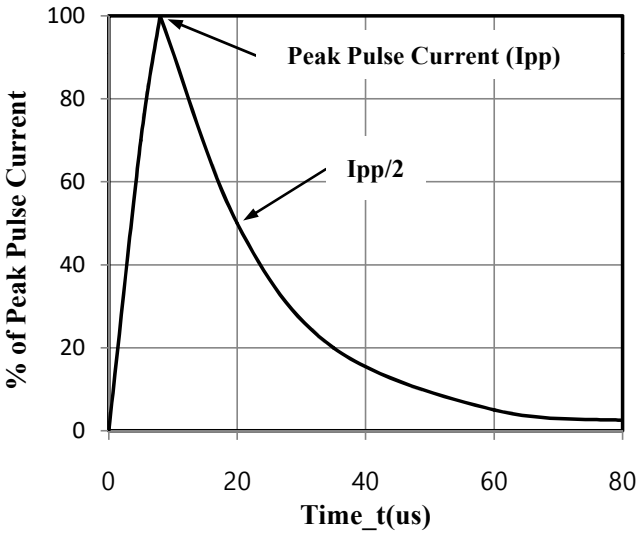


Fig.4 Junction Capacitance vs. Reverse Voltage

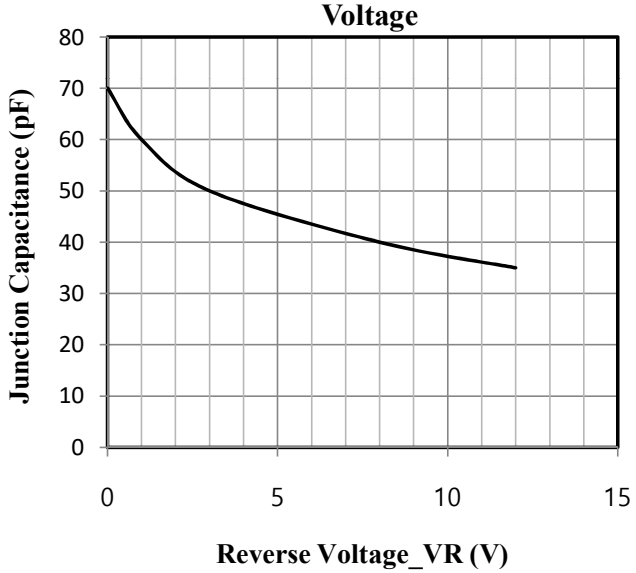


Fig.5 Clamping Voltage vs. Peak Pulse Current (tp=8/20us)