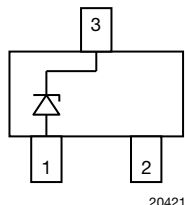
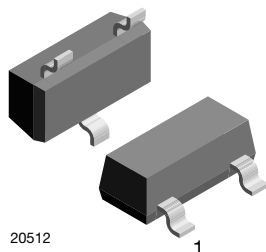


Single-Line ESD-Protection in SOT-23



FEATURES

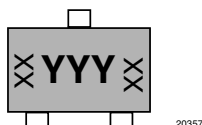
- Single-line ESD-protection device
- ESD-protection acc. IEC 61000-4-2
± 30 kV contact discharge
± 30 kV air discharge
- Space saving SOT-23 package
- AEC-Q101 qualified
- e3 - Sn
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



RoHS
COMPLIANT

GREEN
[5-2008]**
Available

MARKING (example only)



YYY = type code (see table below)

XX = date code

ORDERING INFORMATION

DEVICE NAME	ENVIRONMENTAL STATUS	ORDERING CODE	TAPED UNITS PER REEL (8 mm TAPE ON 7" REEL)	MINIMUM ORDER QUANTITY
GSOT03	Standard	GSOT03-GS08	3000	15 000
	Green	GSOT03-V-G-08		
GSOT04	Standard	GSOT04-GS08	3000	15 000
	Green	GSOT04-V-G-08		
GSOT05	Standard	GSOT05-GS08	3000	15 000
	Green	GSOT05-V-G-08		
GSOT08	Standard	GSOT08-GS08	3000	15 000
	Green	GSOT08-V-G-08		
GSOT12	Standard	GSOT12-GS08	3000	15 000
	Green	GSOT12-V-G-08		
GSOT15	Standard	GSOT15-GS08	3000	15 000
	Green	GSOT15-V-G-08		
GSOT24	Standard	GSOT24-GS08	3000	15 000
	Green	GSOT24-V-G-08		
GSOT36	Standard	GSOT36-GS08	3000	15 000
	Green	GSOT36-V-G-08		

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

PACKAGE DATA							
DEVICE NAME	PACKAGE NAME	TYPE CODE	ENVIRONMENTAL STATUS	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
GSOT03	SOT-23	03	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		03G	Green	8.1 mg			
GSOT04	SOT-23	04	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		04G	Green	8.1 mg			
GSOT05	SOT-23	05	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		05G	Green	8.1 mg			
GSOT08	SOT-23	08	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		08G	Green	8.1 mg			
GSOT12	SOT-23	12	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		12G	Green	8.1 mg			
GSOT15	SOT-23	15	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		15G	Green	8.1 mg			
GSOT24	SOT-23	24	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		24G	Green	8.1 mg			
GSOT36	SOT-23	36	Standard	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals
		36G	Green	8.1 mg			

ABSOLUTE MAXIMUM RATINGS GSOT03				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	369	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT04				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	429	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT05

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	480	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT08

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	18	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	345	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT12

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	12	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	312	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT15

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	8	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	230	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT24

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	5	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	235	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	°C
Storage temperature		T_{STG}	- 55 to + 150	°C

ABSOLUTE MAXIMUM RATINGS GSOT36				
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{PPM}	3.5	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{PP}	248	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	± 30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	- 40 to + 125	$^{\circ}C$
Storage temperature		T_{STG}	- 55 to + 150	$^{\circ}C$

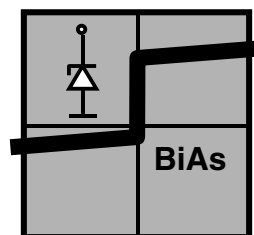
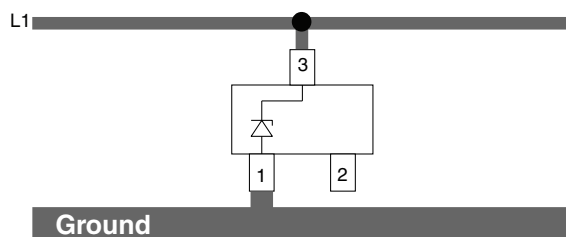
BiAs-MODE (1-line bidirectional asymmetrical protection mode)

With the GSOTxx one signal- or data-lines (L1) can be protected against voltage transients. With pin 1 connected to ground and pin 3 connected to a signal- or data-line which has to be protected. As long as the voltage level on the data- or signal-line is between 0 V (ground level) and the specified maximum reverse working voltage (V_{RWM}) the protection diode between pin 1 and pin 3 offer a high isolation to the ground line. The protection device behaves like an open switch.

As soon as any positive transient voltage signal exceeds the break through voltage level of the protection diode, the diode becomes conductive and shorts the transient current to ground. Now the protection device behaves like a closed switch. The clamping voltage (V_C) is defined by the breakthrough voltage (V_{BR}) level plus the voltage drop at the series impedance (resistance and inductance) of the protection device.

Any negative transient signal will be clamped accordingly. The negative transient current is flowing in the forward direction of the protection diode. The low forward voltage (V_F) clamps the negative transient close to the ground level.

Due to the different clamping levels in forward and reverse direction the GSOTxx clamping behaviour is bidirectional and asymmetrical (BiAs).



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ELECTRICAL CHARACTERISTICS GSOT03						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse working voltage	at $I_R = 100 \mu A$	V_{RWM}	3.3	-	-	V
Reverse current	at $V_R = 3.3 V$	I_R	-	-	100	μA
Reverse breakdown voltage	at $I_R = 1 mA$	V_{BR}	4	4.6	-	V
Reverse clamping voltage	at $I_{PP} = 1 A$	V_C	-	5.7	7.5	V
	at $I_{PP} = I_{PPM} = 30 A$		-	10	12.3	V
Forward clamping voltage	at $I_{PP} = 1 A$	V_F	-	1	1.2	V
	at $I_{PP} = I_{PPM} = 30 A$		-	4.5	-	V
Capacitance	at $V_R = 0 V$; $f = 1 MHz$	C_D	-	420	600	pF
	at $V_R = 1.6 V$; $f = 1 MHz$		-	260	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT04						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 20 \mu\text{A}$	V_{RWM}	4	-	-	V
Reverse current	at $V_R = 4 \text{ V}$	I_R	-	-	20	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	5	6.1	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	7.5	9	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 30 \text{ A}$		-	11.2	14.3	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 30 \text{ A}$		-	4.5	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	310	450	pF
	at $V_R = 2 \text{ V}$; $f = 1 \text{ MHz}$		-	200	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT05						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 10 \mu\text{A}$	V_{RWM}	5	-	-	V
Reverse current	at $V_R = 5 \text{ V}$	I_R	-	-	10	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	6	6.8	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	7	8.7	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 30 \text{ A}$		-	12	16	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 30 \text{ A}$		-	4.5	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	260	350	pF
	at $V_R = 2.5 \text{ V}$; $f = 1 \text{ MHz}$		-	150	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT08						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 5 \mu\text{A}$	V_{RWM}	8	-	-	V
Reverse current	at $V_R = 8 \text{ V}$	I_R	-	-	5	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	9	10	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	10.7	13	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 18 \text{ A}$		-	15.2	19.2	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 18 \text{ A}$		-	3	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	160	250	pF
	at $V_R = 4 \text{ V}$; $f = 1 \text{ MHz}$		-	80	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT12

PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 1 \mu\text{A}$	V_{RWM}	12	-	-	V
Reverse current	at $V_R = 12 \text{ V}$	I_R	-	-	1	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	13.5	15	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	15.4	18.7	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 12 \text{ A}$		-	21.2	26	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 12 \text{ A}$		-	2.2	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	115	150	pF
	at $V_R = 6 \text{ V}$; $f = 1 \text{ MHz}$		-	50	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT15

PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 1 \mu\text{A}$	V_{RWM}	15	-	-	V
Reverse current	at $V_R = 15 \text{ V}$	I_R	-	-	1	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	16.5	18	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	19.4	23.5	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 8 \text{ A}$		-	24.8	28.8	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 8 \text{ A}$		-	1.8	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	90	120	pF
	at $V_R = 7.5 \text{ V}$; $f = 1 \text{ MHz}$		-	35	-	pF

Note

- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT24

PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 1 \mu\text{A}$	V_{RWM}	24	-	-	V
Reverse current	at $V_R = 24 \text{ V}$	I_R	-	-	1	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	27	30	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	34	41	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 5 \text{ A}$		-	41	47	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 5 \text{ A}$		-	1.4	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	65	80	pF
	at $V_R = 12 \text{ V}$; $f = 1 \text{ MHz}$		-	20	-	pF

Note

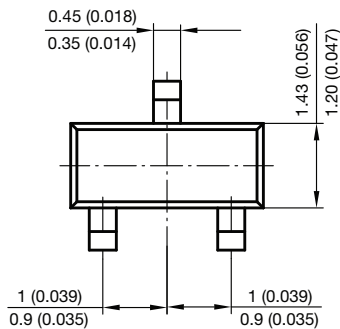
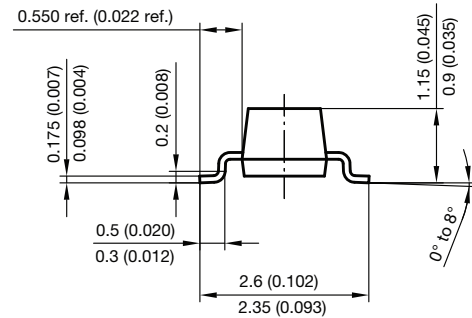
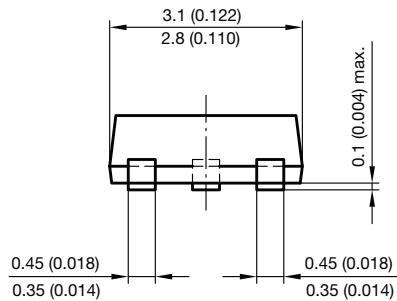
- BiAs mode (between pin 3 and pin 1)

ELECTRICAL CHARACTERISTICS GSOT36						
PARAMETER	TEST CONDITIONS/REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	N_{channel}	-	-	1	lines
Reverse working voltage	at $I_R = 1 \mu\text{A}$	V_{RWM}	36	-	-	V
Reverse current	at $V_R = 36 \text{ V}$	I_R	-	-	1	μA
Reverse breakdown voltage	at $I_R = 1 \text{ mA}$	V_{BR}	39	43	-	V
Reverse clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_C	-	49	60	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 3.5 \text{ A}$		-	59	71	V
Forward clamping voltage	at $I_{\text{PP}} = 1 \text{ A}$	V_F	-	1	1.2	V
	at $I_{\text{PP}} = I_{\text{PPM}} = 3.5 \text{ A}$		-	1.3	-	V
Capacitance	at $V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$	C_D	-	52	65	pF
	at $V_R = 18 \text{ V}$; $f = 1 \text{ MHz}$		-	12	-	pF

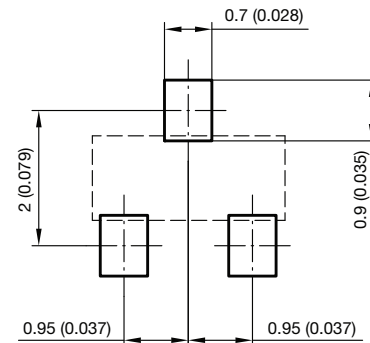
Note

- BiAs mode (between pin 3 and pin 1)

PACKAGE DIMENSIONS in millimeters (inches): SOT-23



Foot print recommendation:



Document no.: 6.541-5014.01-4

Rev. 8 - Date: 23.Sept.2009

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