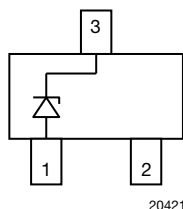
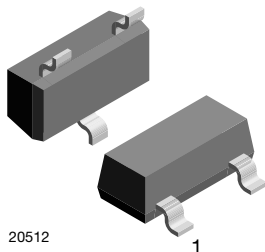


Single-Line ESD Protection Diode in SOT-23



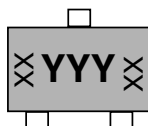
20421



20512

1

MARKING (example only)



20357

YYY = type code (see table below)

XX = date code

FEATURES

- Single-line unidirectional ESD protection diode
- ESD immunity acc. IEC 61000-4-2 and ISO 10605
± 30 kV contact discharge
± 30 kV air discharge
- ESD capability according to AEC-Q101:
human body model: class H3B: > 8 kV
- e3 - Sn
- AEC-Q101 qualified available
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE
Available

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES



3D Models

SPICE

Models

PRIMARY CHARACTERISTICS

V _{BR}	4 V to 47 V
V _{RWM}	3.3 V to 36 V
P _{PPM} (8/20μs)	400 W to 540 W
P _{PPM} (10 x 1000μs)	44 W
ESD immunity (330 pF / 330 Ω)	± 30 kV
T _J max.	150 °C
Polarity	Unidirectional
Package	SOT-23
Circuit configuration	Single

ORDERING INFORMATION

PART NUMBER (EXAMPLE)	ENVIRONMENTAL AND QUALITY CODE			REVISION	PACKAGING CODE		ORDERING CODE (EXAMPLE)
	AEC-Q101 QUALIFIED	RoHS-COMPLIANT + LEAD (Pb)-FREE TERMINATIONS	TIN PLATED		3K PER 7" REEL (8 mm TAPE), 15K/BOX = MOQ	10K PER 13" REEL (8 mm TAPE), 10K/BOX = MOQ	
VGSOT05-		G	3	-	08		VGSOT05-G3-08
VGSOT05-	H	G	3	-	08		VGSOT05-HG3-08
VGSOT05-		G	3	-		18	VGSOT05-G3-18
VGSOT05-	H	G	3	-		18	VGSOT05-HG3-18

**PACKAGE DATA**

DEVICE NAME	PACKAGE NAME	TYPE CODE	ENVIRONMENTAL STATUS	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
VGSOT03	SOT-23	03H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT04	SOT-23	04H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT05	SOT-23	05H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT08	SOT-23	08H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT12	SOT-23	12H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT15	SOT-23	15H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT22	SOT-23	22H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT24	SOT-23	24H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C
VGSOT36	SOT-23	36H	Green	9.2 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	Peak temperature max. 260 °C

ABSOLUTE MAXIMUM RATINGS VGSOT03 ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	44	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		6	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	540	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{STG}	-55 to +150	°C

ABSOLUTE MAXIMUM RATINGS VGSOT04 ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	40	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		5	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	540	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	°C
Storage temperature		T_{STG}	-55 to +150	°C

**ABSOLUTE MAXIMUM RATINGS VGSOT05** ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	36	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		4	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	500	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS VGSOT08 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	28	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		3	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	500	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS VGSOT12 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	18.5	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		2	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	480	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS VGSOT15 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	15.5	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		1.6	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	450	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

**ABSOLUTE MAXIMUM RATINGS VGSOT22** ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	9.4	A
Peak pulse current	$t_p = 10/1000\text{ }\mu\text{s}$; single shot	I_{PPM}	1.1	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	400	W
Peak pulse power	$t_p = 10/1000\text{ }\mu\text{s}$; single shot	P_{PP}	44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS VGSOT24 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	8.4	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		1	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	400	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

ABSOLUTE MAXIMUM RATINGS VGSOT36 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

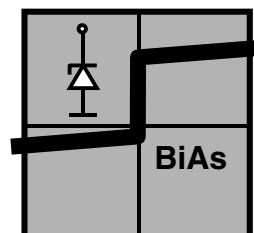
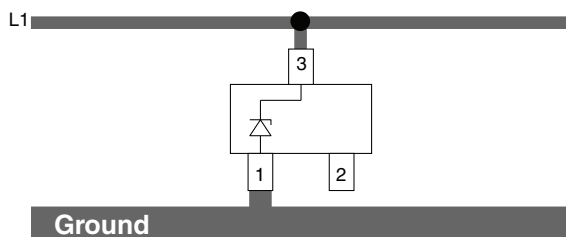
PARAMETER	TEST CONDITIONS	SYMBOL	VALUE	UNIT
Peak pulse current	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	I_{PPM}	5.6	A
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		0.7	A
Peak pulse power	$t_p = 8/20\text{ }\mu\text{s}$ acc. IEC 61000-4-5; single shot	P_{PP}	400	W
	$t_p = 10/1000\text{ }\mu\text{s}$; single shot		44	W
ESD immunity	Air and contact discharge acc. ISO 10605 (330 pF / 330 Ω); 10 pulses	V_{ESD}	± 30	kV
	Air and contact discharge acc. IEC 61000-4-2 (150 pF / 330 Ω); 10 pulses		± 30	kV
Operating temperature	Junction temperature	T_J	-55 to +150	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 to +150	$^{\circ}\text{C}$

BiAs-MODE (1-line Bidirectional Asymmetrical protection mode)

With the VGSOTxx 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 offers 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 breakdown 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 breakdown voltage (V_{BR}) level plus the voltage drop at the series impedance (resistance and inductance) of the protection diode.

Any negative transient signal will be clamped accordingly. The negative transient current is flowing in the forward direction through 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 VGSOTxx clamping behavior is Bidirectional and Asymmetrical (BiAs).



20422

ELECTRICAL CHARACTERISTICS VGSOT03 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	3.3	V
Reverse voltage	At $I_R = 100\text{ }\mu\text{A}$	V_R	3.3	-	-	V
Reverse current	At $V_R = 3.3\text{ V}$	I_R	-	-	100	μA
Reverse breakdown voltage	At $I_R = 1\text{ mA}$	V_{BR}	4	4.6	5.5	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	5.7	7.5	V
	At $I_{PP} = I_{PPM} = 44\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	9.2	12.3	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 44\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	4.5	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	460	600	pF
	At $V_R = 1.6\text{ V}$; $f = 1\text{ MHz}$		-	320	-	pF

ELECTRICAL CHARACTERISTICS VGSOT04 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	4	V
Reverse voltage	At $I_R = 20\text{ }\mu\text{A}$	V_R	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	7	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	6.5	8	V
	At $I_{PP} = I_{PPM} = 40\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	10.3	13.5	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 40\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	4.2	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	360	450	pF
	At $V_R = 2\text{ V}$; $f = 1\text{ MHz}$		-	225	-	pF



ELECTRICAL CHARACTERISTICS VGSOT05 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	5	V
Reverse voltage	At $I_R = 10\text{ }\mu\text{A}$	V_R	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	8	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	7.3	8.7	V
	At $I_{PP} = I_{PPM} = 36\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	11	14	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 36\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	3.9	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	279	350	pF
	At $V_R = 2.5\text{ V}$; $f = 1\text{ MHz}$		-	165	-	pF

ELECTRICAL CHARACTERISTICS VGSOT08 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	8	V
Reverse voltage	At $I_R = 5\text{ }\mu\text{A}$	V_R	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	11	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	10.7	13	V
	At $I_{PP} = I_{PPM} = 28\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	14.4	18	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 28\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	3.2	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	175	250	pF
	At $V_R = 4\text{ V}$; $f = 1\text{ MHz}$		-	30	-	pF

ELECTRICAL CHARACTERISTICS VGSOT12 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	12	V
Reverse voltage	At $I_R = 1\text{ }\mu\text{A}$	V_R	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	16.5	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	15.4	18.7	V
	At $I_{PP} = I_{PPM} = 18.5\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	20.2	26	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 18.5\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	2.5	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	115	150	pF
	At $V_R = 6\text{ V}$; $f = 1\text{ MHz}$		-	54	-	pF

**ELECTRICAL CHARACTERISTICS VGSOT15** ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	15	V
Reverse voltage	At $I_R = 1\text{ }\mu\text{A}$	V_R	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	20	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	18.5	22.5	V
	At $I_{PP} = I_{PPM} = 15.5\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	23.5	28.8	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 15.5\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	2.2	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	100	120	pF
	At $V_R = 7.5\text{ V}$; $f = 1\text{ MHz}$		-	43	-	pF

ELECTRICAL CHARACTERISTICS VGSOT22 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	2	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	22	V
Reverse voltage	At $I_R = 1\text{ }\mu\text{A}$	V_R	22	-	-	V
Reverse current	At $V_R = 22\text{ V}$	I_R	-	-	1	μA
Reverse breakdown voltage	At $I_R = 1\text{ mA}$	V_{BR}	25.1	27	28.8	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	28	32	V
	At $I_{PP} = I_{PPM} = 9.4\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	34.5	41	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 9.4\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	1.8	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	70	85	pF
	At $V_R = 11\text{ V}$; $f = 1\text{ MHz}$		-	27	-	pF

ELECTRICAL CHARACTERISTICS VGSOT24 ($T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	24	V
Reverse voltage	at $I_R = 1\text{ }\mu\text{A}$	V_R	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	33	V
Reverse clamping voltage	at $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	31	37	V
	at $I_{PP} = I_{PPM} = 8.4\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	37.5	46	V
Forward clamping voltage	at $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	at $I_{PP} = I_{PPM} = 8.4\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	1.7	-	V
Capacitance	at $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	65	80	pF
	at $V_R = 12\text{ V}$; $f = 1\text{ MHz}$		-	23	-	pF



ELECTRICAL CHARACTERISTICS VGSOT36 ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	TEST CONDITIONS / REMARKS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Protection paths	Number of lines which can be protected	$N_{channel}$	-	-	1	lines
Reverse stand-off voltage	Max. reverse working voltage	V_{RWM}	-	-	36	V
Reverse voltage	At $I_R = 1\text{ }\mu\text{A}$	V_R	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	47	V
Reverse clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_C	-	45	60	V
	At $I_{PP} = I_{PPM} = 5.6\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	52	71	V
Forward clamping voltage	At $I_{PP} = 1\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$	V_F	-	1	1.2	V
	At $I_{PP} = I_{PPM} = 5.6\text{ A}$, $t_p = 8/20\text{ }\mu\text{s}$		-	1.4	-	V
Capacitance	At $V_R = 0\text{ V}$; $f = 1\text{ MHz}$	C_D	-	45	65	pF
	At $V_R = 18\text{ V}$; $f = 1\text{ MHz}$		-	14	-	pF

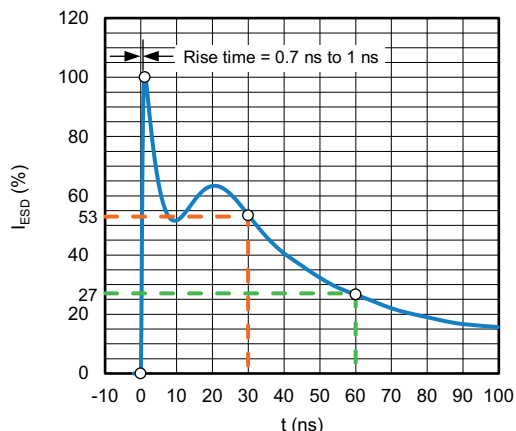


Fig. 1 - ESD Discharge Current Waveform
According to IEC 61000-4-2 (330 Ω / 150 pF)

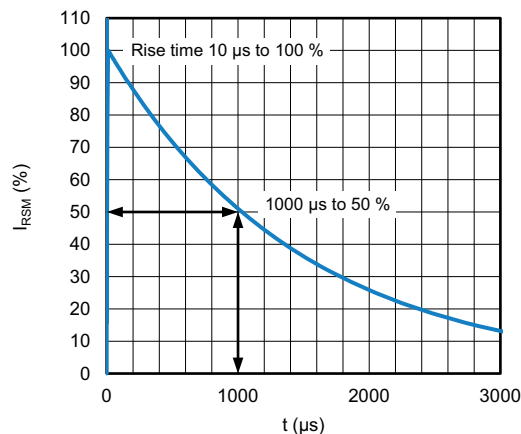


Fig. 3 - 10/1000 μs Peak Pulse Current Wave Form

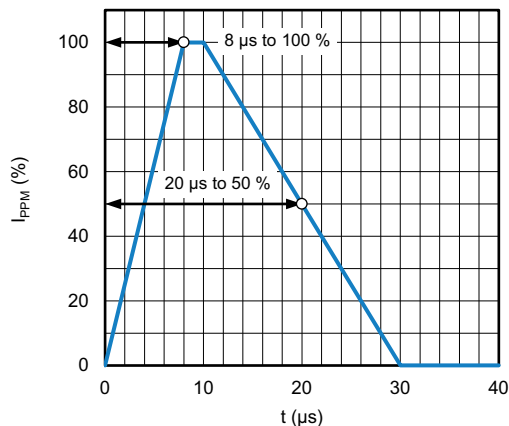


Fig. 2 - 8/20 μs Peak Pulse Current Waveform
According to IEC 61000-4-5

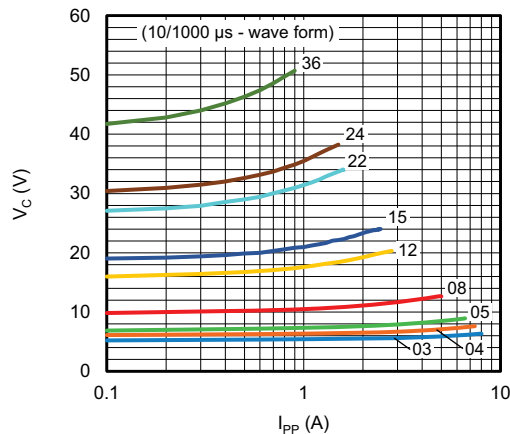


Fig. 4 - Typical Peak Clamping Voltage vs. Peak Pulse Current

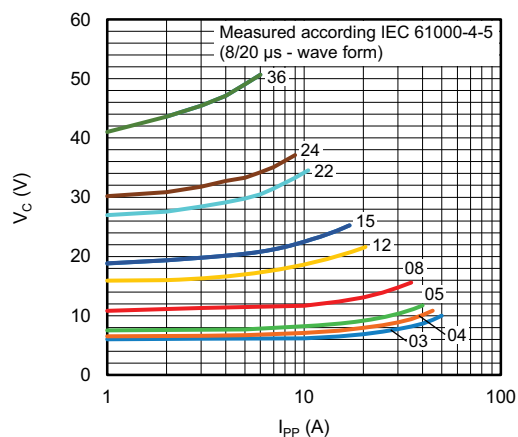


Fig. 5 - Typical Peak Clamping Voltage vs. Peak Pulse Current

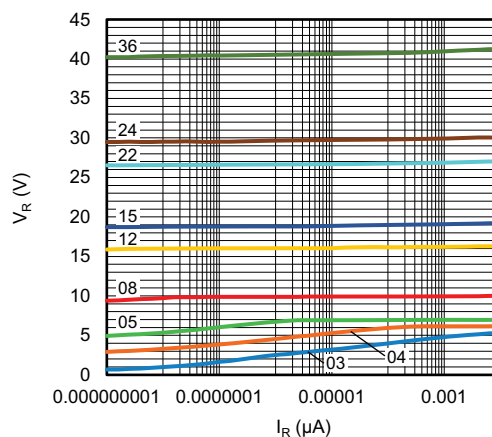


Fig. 8 - Typical Reverse Voltage vs. Reverse Current

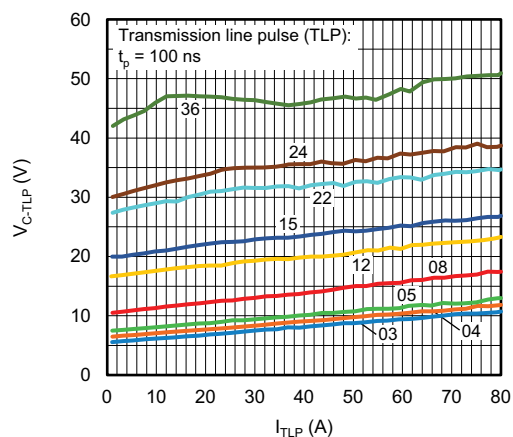


Fig. 6 - Typical Clamping Voltage vs. Peak Pulse Current

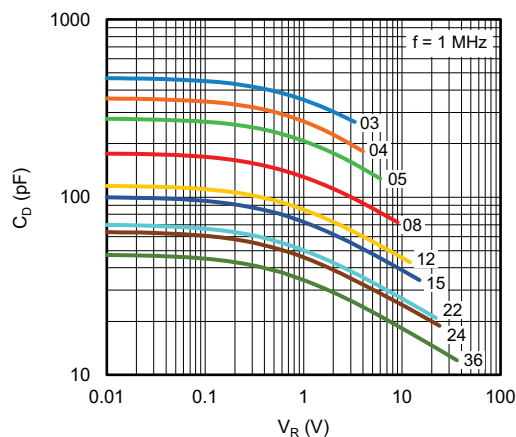


Fig. 9 - Typical Capacitance vs. Reverse Voltage

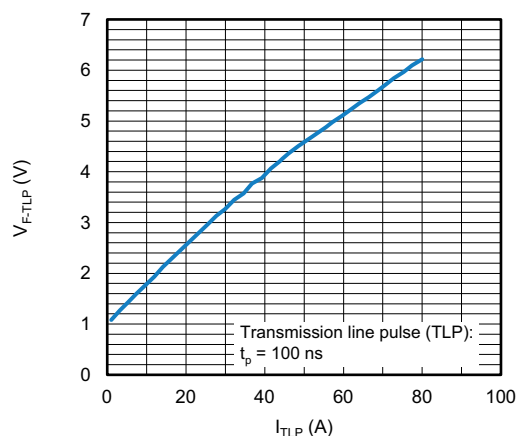


Fig. 7 - Typical Forward Voltage vs. Peak Pulse Current

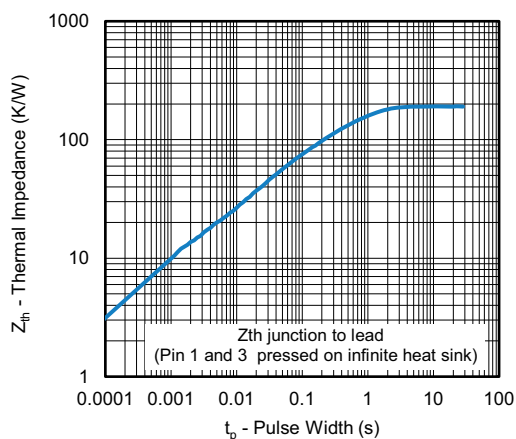
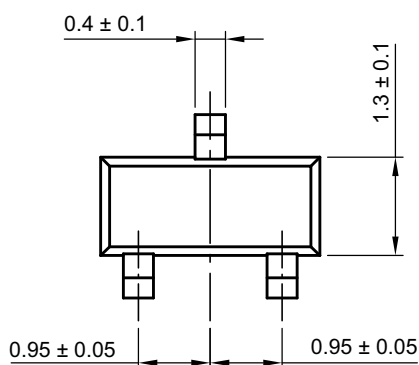
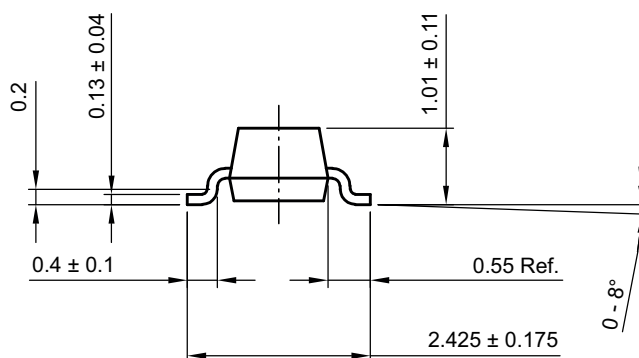
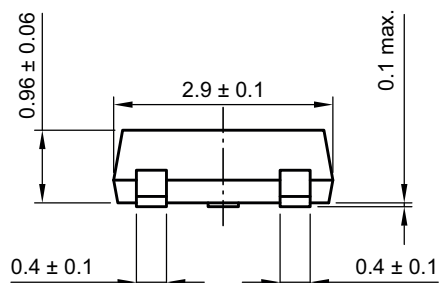


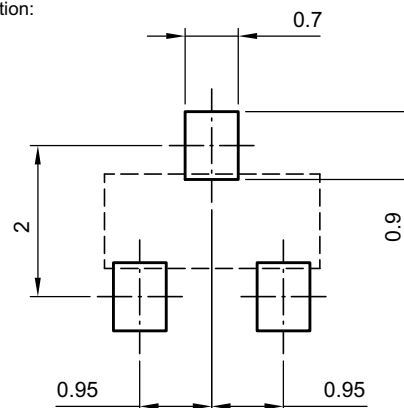
Fig. 10 - Thermal Impedance vs. Time



PACKAGE DIMENSIONS in millimeters (inches): **SOT-23**



footprint recommendation:



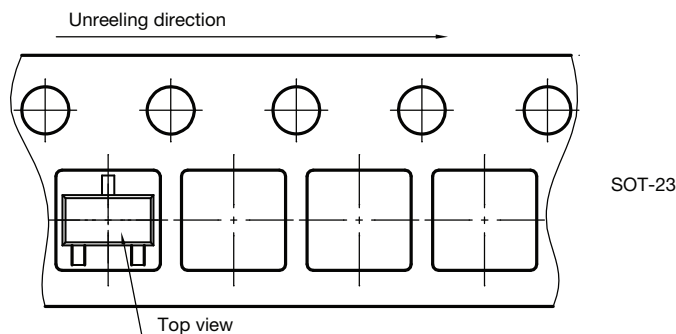
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Rev. 01 - Date: 18 Jan. 2022

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ORIENTATION IN CARRIER TAPE SOT-23



Orientation in carrier tape

SOT-23

S8-V-3929.01-006 (4)

04.02.2010

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