1.Features

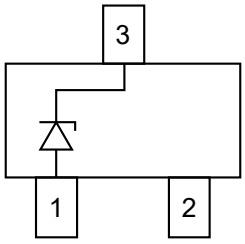
- ESD immunity acc. IEC 61000-4-2

  ± 30 kV contact discharge

  ± 30 kV air discharge

- Single-line ESD protection device

2.Pinning information



SOT-23

3.1Absolute Maximum Ratings GSOT03

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.2Absolute Maximum Ratings GSOT04

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.3Absolute Maximum Ratings GSOT05

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	30	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.4Absolute Maximum Ratings GSOT08

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	18	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.5 Absolute Maximum Ratings GSOT12

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	12	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.6Absolute Maximum Ratings GSOT15

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	8	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

3.7Absolute Maximum Ratings GSOT24

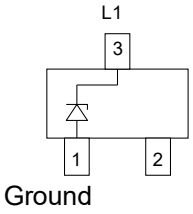
Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	5	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	P_{PP}	235	W
ESD immunity	Contact discharge acc. IEC 61000-4-2; 10 pulses	V_{ESD}	±30	kV
	Air discharge acc. IEC 61000-4-2; 10 pulses		±30	kV
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

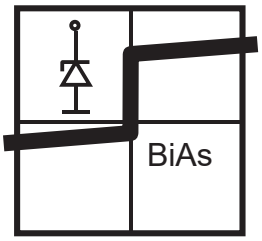
3.8Absolute Maximum Ratings GSOT36

Parameter	Symbol	Symbol	Value	Units
Peak pulse current	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; single shot	I_{PPM}	3.5	A
Peak pulse power	Pin 3 to 1 acc. IEC 61000-4-5, t_p=8/20μs; 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
Junction Temperature	Junction temperature	T_J	-40 to 125	°C
Storage temperature		T_{STG}	-55 to 150	°C

4.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 protect ed. 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 diod e 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 flowin g 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 GSOTxx clamping behavior is Bidirectional and Asymmetrical (BiAs).





5.1Electrical Characteristics GSOT03 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			3.3	V
Reverse voltage	V_R	at I_R=100μA	3.3			V
Reverse current	I_R	at V_R=3.3V			100	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	4	4.6	5.5	V
Reverse clamping voltage	V_C	at I_{PP}=1A		5.7	7.5	V
		at I_{PP}=I_{PPM}=30 A		10	12.3	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=30 A		4.5		V
Capacitance	C_D	at V_R=0V, f=1MHz		420	600	pF
		at V_R=1.6V, f=1MHz		260		pF

5.2Electrical Characteristics GSOT04 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			4	V
Reverse voltage	V_R	at I_R=20μA	4			V
Reverse current	I_R	at V_R=4V			20	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	5	6.1	7	V
Reverse clamping voltage	V_C	at I_{PP}=1A		7.5	9	V
		at I_{PP}=I_{PPM}=30 A		11.2	14.3	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=30 A		4.5		V
Capacitance	C_D	at V_R=0V, f=1MHz		310	450	pF
		at V_R=2V, f=1MHz		200		pF

5.3Electrical Characteristics GSOT05 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			5	V
Reverse voltage	V_R	at I_R=10μA	5			V
Reverse current	I_R	at V_R=5V			10	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	6	6.8	8	V
Reverse clamping voltage	V_C	at I_{PP}=1A		7	8.7	V
		at I_{PP}=I_{PPM}=30 A		12	16	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=30 A		4.5		V
Capacitance	C_D	at V_R=0V, f=1MHz		260	350	pF
		at V_R=2.5V, f=1MHz		150		pF

5.4Electrical Characteristics GSOT08 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			8	V
Reverse voltage	V_R	at I_R=5μA	8			V
Reverse current	I_R	at V_R=8V			5	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	9	10	11	V
Reverse clamping voltage	V_C	at I_{PP}=1A		10.7	13	V
		at I_{PP}=I_{PPM}=18A		15.2	19.2	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=18A		3		V
Capacitance	C_D	at V_R=0V, f=1MHz		160	250	pF
		at V_R=4V, f=1MHz		80		pF

5.5Electrical Characteristics GSOT12 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			12	V
Reverse voltage	V_R	at I_R=1μA	12			V
Reverse current	I_R	at V_R=12V			1	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	13.5	15	16.5	V
Reverse clamping voltage	V_C	at I_{PP}=1A		15.4	18.7	V
		at I_{PP}=I_{PPM}=12A		21.2	26	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=12A		2.2		V
Capacitance	C_D	at V_R=0V, f=1MHz		115	150	pF
		at V_R=6V, f=1MHz		50		pF

5.6Electrical Characteristics GSOT15 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			15	V
Reverse voltage	V_R	at I_R=1μA	15			V
Reverse current	I_R	at V_R=15V			1	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	16.5	18	20	V
Reverse clamping voltage	V_C	at I_{PP}=1A		19.4	23.5	V
		at I_{PP}=I_{PPM}=8A		24.8	28.8	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=8A		1.8		V
Capacitance	C_D	at V_R=0V, f=1MHz		90	120	pF
		at V_R=7.5V, f=1MHz		35		pF

5.7Electrical Characteristics GSOT24 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			24	V
Reverse voltage	V_R	at I_R=1μA	24			V
Reverse current	I_R	at V_R=24V			1	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	27	30	33	V
Reverse clamping voltage	V_C	at I_{PP}=1A		34	41	V
		at I_{PP}=I_{PPM}=5A		41	47	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=5A		1.4		V
Capacitance	C_D	at V_R=0V, f=1MHz		65	80	pF
		at V_R=12V, f=1MHz		20		pF

5.8Electrical Characteristics GSOT36 (T_{amb}=25 °C)

between pin 3 and pin 1

Parameter	Symbol	Test Conditions/Remarks	Min	Typ	Max	Units
Protection paths	$N_{channel}$	Number of lines which can be protected			1	lines
Reverse stand-off voltage	V_{RWM}	Max. reverse working voltage			36	V
Reverse voltage	V_R	at I_R=1μA	36			V
Reverse current	I_R	at V_R=36V			1	μA
Reverse breakdown voltage	V_{BR}	at I_R=1mA	39	43	47	V
Reverse clamping voltage	V_C	at I_{PP}=1A		49	60	V
		at I_{PP}=I_{PPM}=3.5A		59	71	V
Forward clamping voltage	V_F	at I_{PP}=1A		1	1.2	V
		at I_{PP}=I_{PPM}=3.5A		1.3		V
Capacitance	C_D	at V_R=0V, f=1MHz		52	65	pF
		at V_R=18V, f=1MHz		12		pF

6.1Typical characteristic

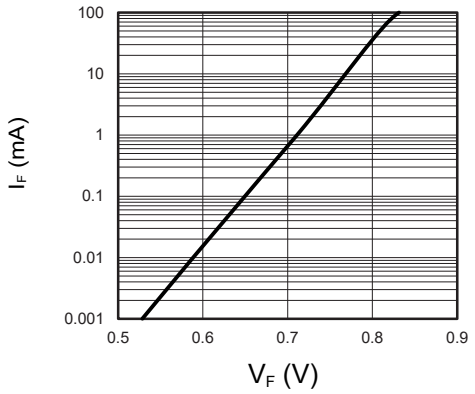


Figure 1: Typical Forward Current I_F vs. Forward Voltage V_F

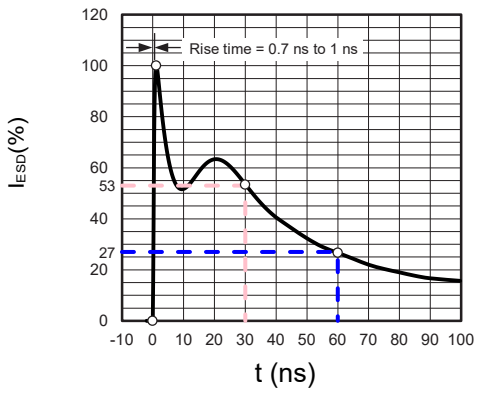


Figure 2: ESD Discharge Current Waveform According to IEC 61000-4-2 (330 Ω / 150 pF)

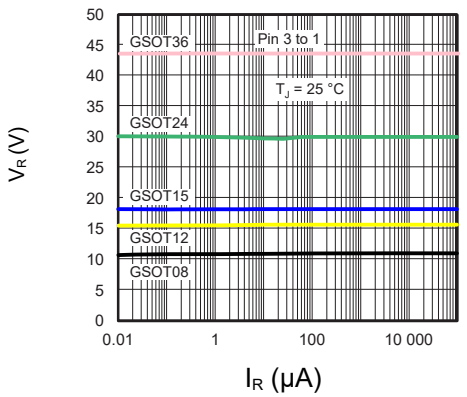


Figure 3: Typical Reverse Voltage V_R vs. Reverse Current I_R

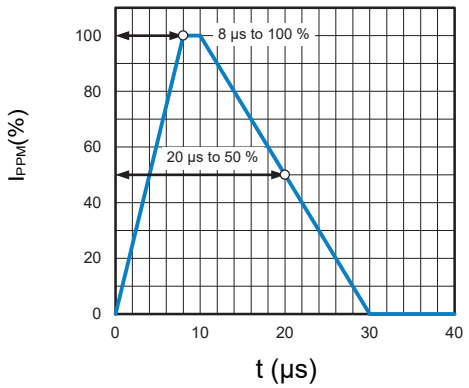


Figure 4: 8/20 µs Peak Pulse Current Waveform According to IEC 61000-4-5

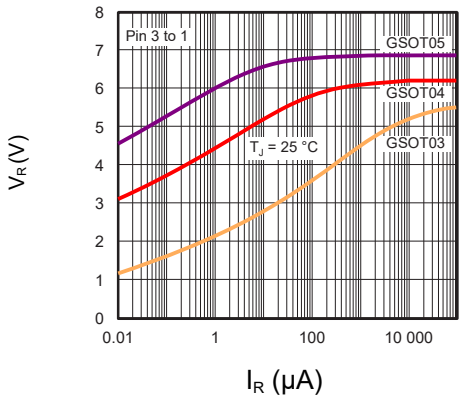


Figure 5: Typical Reverse Voltage V_R vs. Reverse Current I_R

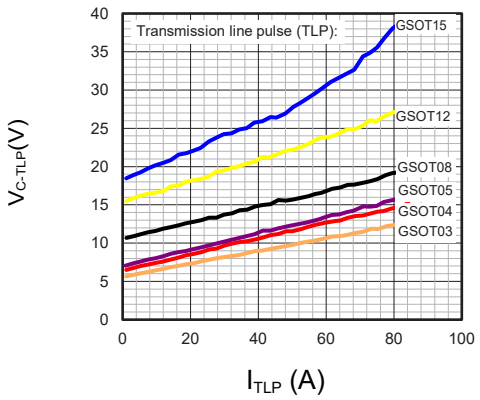


Figure 6: Typical Clamping Voltage vs. Peak Pulse Current

6.2Typical characteristic

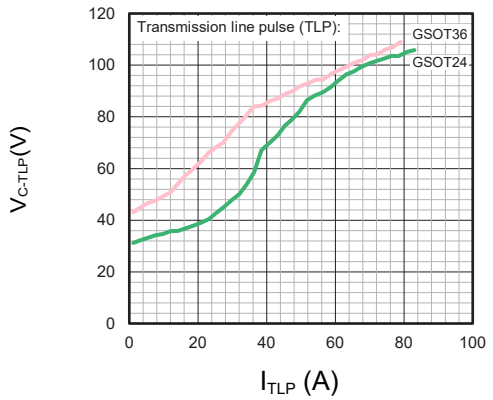


Figure 7: Typical Clamping Voltage vs. Peak Pulse Current

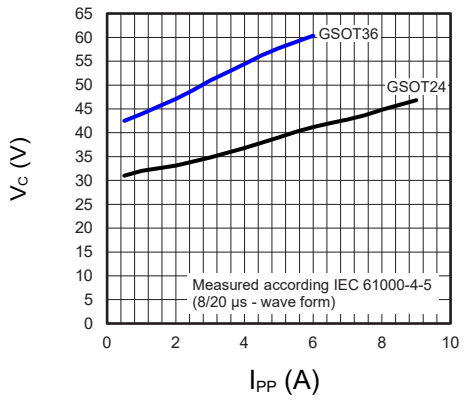


Figure 8: Typical Peak Clamping Voltage vs. Peak Pulse Current

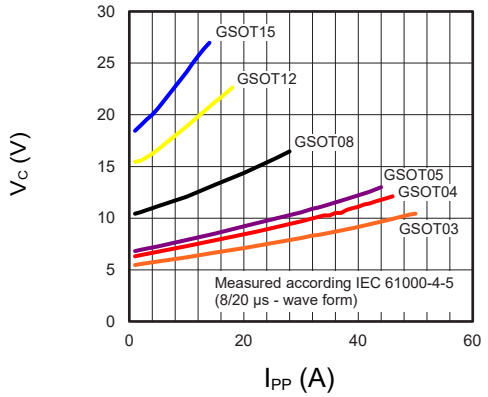


Figure 9: Typical Peak Clamping Voltage vs. Peak Pulse Current

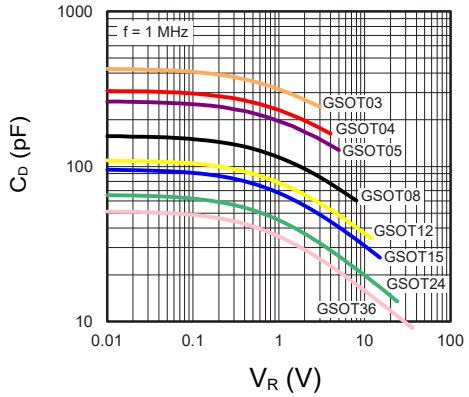
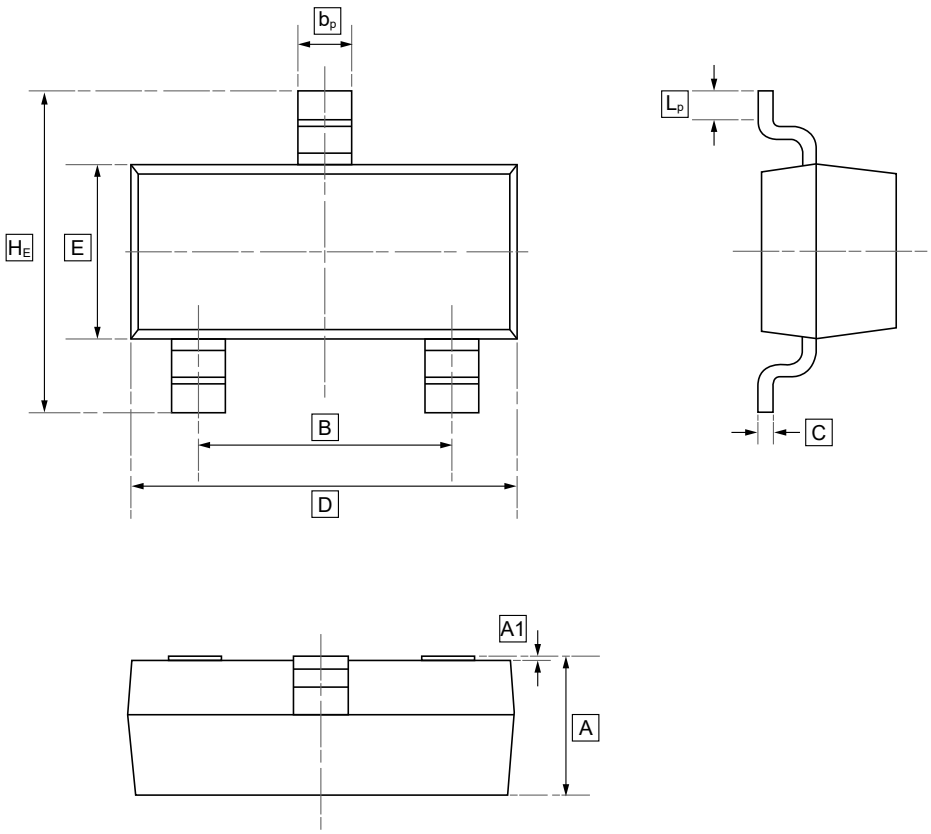


Figure 10: Typical Capacitance vs. Reverse Voltage

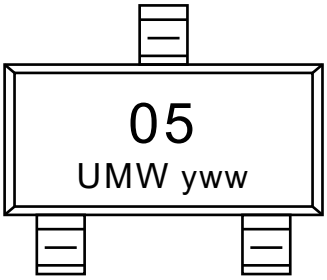
7.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	b_p	C	D	E	H_E	A1	L_p
Min	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20
Max	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50

8.Ordering information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW GSOT03-E3-08	03	SOT-23	3000	Tape and reel
UMW GSOT04-E3-08	04	SOT-23	3000	Tape and reel
UMW GSOT05-E3-08	05	SOT-23	3000	Tape and reel
UMW GSOT08-E3-08	08	SOT-23	3000	Tape and reel
UMW GSOT12-E3-08	12	SOT-23	3000	Tape and reel
UMW GSOT15-E3-08	15	SOT-23	3000	Tape and reel
UMW GSOT24-E3-08	24	SOT-23	3000	Tape and reel
UMW GSOT36-E3-08	36	SOT-23	3000	Tape and reel

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