

Two-Line ESD Protection

TGSOT05C- TGSOT24C

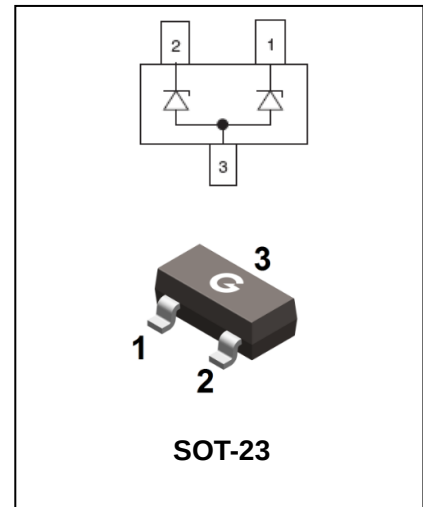
FEATURES

- ESD / transient protection of high speed data lines
 - IEC 61000-4-2 (ESD): ± 30 kV (air), ± 30 kV (contact)
- Two-line ESD-protection device
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

APPLICATIONS

- Cell Phone Handsets and Accessories
- Microprocessor based equipment



ORDERING INFORMATION

Type No.	Marking	Package Code
TGSOT05C	05C	SOT-23
TGSOT12C	12C	SOT-23
TGSOT24C	24C	SOT-23

MAXIMUM RATING @ Ta=25°C unless otherwise specified

TGSOT05C				
Parameter	Test Conditions	Symbol	Limits	Unit
Peak pulse power	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, tp = 8/20 μ s; single shot	P _{pp}	480	W
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, tp = 8/20 μ s; single shot		612	
Peak pulse current	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, tp = 8/20 μ s; single shot	I _{pp}	30	A
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, tp = 8/20 μ s; single shot		30	
ESD immunity	IEC 61000-4-2; ESD (Air)	V _{ESD-A}	± 30	kV
	IEC 61000-4-2; ESD (Contact)	V _{ESD-C}	± 30	kV
Operating temperature	Junction temperature	T _j	-55 to +150	°C
Storage temperature	/	T _{STG}	-55 to +150	°C

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TGSOT12C				
Parameter	Test Conditions	Symbol	Limits	Unit
Peak pulse power	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{pp}	312	W
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot		337	
Peak pulse current	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{pp}	12	A
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot		12	
ESD immunity	IEC 61000-4-2; ESD (Air)	V_{ESD-A}	± 30	kV
	IEC 61000-4-2; ESD (Contact)	V_{ESD-C}	± 30	kV
Operating temperature	Junction temperature	T_j	-55 to +150	$^{\circ}C$
Storage temperature	/	T_{STG}	-55 to +150	$^{\circ}C$

TGSOT24C				
Parameter	Test Conditions	Symbol	Limits	Unit
Peak pulse power	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	P_{pp}	235	W
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot		240	
Peak pulse current	Pin 1 to 3 or pin 2 to 3 acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot	I_{pp}	5	A
	Pin 1 to 2 or pin 2 to 1; pin 3 not connected acc. IEC 61000-4-5, $t_p = 8/20 \mu s$; single shot		5	
ESD immunity	IEC 61000-4-2; ESD (Air)	V_{ESD-A}	± 30	kV
	IEC 61000-4-2; ESD (Contact)	V_{ESD-C}	± 30	kV
Operating temperature	Junction temperature	T_j	-55 to +150	$^{\circ}C$
Storage temperature	/	T_{STG}	-55 to +150	$^{\circ}C$

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ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

TGSOT05C between pin 1 to pin 3 or pin 2 to pin 3						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N _{channel}			2	lines	Number of lines which can be protected
Reverse stand-off voltage	V _{RWM}			5	V	I _R =100uA
Reverse current	I _R			10	uA	V _R =5V
Reverse breakdown voltage	V _{BR}	6	6.8		V	I _R =1mA
Clamping voltage	V _C		7 12	8.7 16	V	I _{PP} =1A I _{PP} = I _{PPM} =30A
Forward clamping voltage	V _F		1 4.5	1.2	V	I _{PP} =1A I _{PP} = I _{PPM} =30A
Junction Capacitance	C _D		260 150	350	pF	V _R =0V,f=1MHz V _R =2.5V,f=1MHz

TGSOT12C between pin 1 to pin 3 or pin 2 to pin 3						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N _{channel}			2	lines	Number of lines which can be protected
Reverse stand-off voltage	V _{RWM}			12	V	I _R =1uA
Reverse current	I _R			1	uA	V _R =12V
Reverse breakdown voltage	V _{BR}	13.5	15		V	I _R =1mA
Clamping voltage	V _C		15.4	18.7	V	I _{PP} =1A
Forward clamping voltage	V _F		1	1.2	V	I _{PP} =1A
Junction Capacitance	C _D		115 50	150	pF	V _R =0V,f=1MHz V _R =6V,f=1MHz

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TGSOT24C

between pin 1 to pin 3 or pin 2 to pin 3

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N_{channel}			2	lines	Number of lines which can be protected
Reverse stand-off voltage	V_{RWM}			24	V	$I_{\text{R}}=1\mu\text{A}$
Reverse current	I_{R}			1	μA	$V_{\text{R}}=24\text{V}$
Reverse breakdown voltage	V_{BR}	27	30		V	$I_{\text{R}}=1\text{mA}$
Clamping voltage	V_{C}		34 41	41 47	V	$I_{\text{PP}}=1\text{A}$ $I_{\text{PP}}=I_{\text{PPM}}=5\text{A}$
Forward clamping voltage	V_{F}		1 1.4	1.2	V	$I_{\text{PP}}=1\text{A}$ $I_{\text{PP}}=I_{\text{PPM}}=5\text{A}$
Junction Capacitance	C_{D}		65 20	80	pF	$V_{\text{R}}=0\text{V}, f=1\text{MHz}$ $V_{\text{R}}=12\text{V}, f=1\text{MHz}$

TGSOT05C

between pin 1 to pin 2 or pin 2 to pin1; pin 3 not connected

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N_{channel}			1	lines	Number of lines which can be protected
Reverse stand-off voltage	V_{RWM}			5.5	V	$I_{\text{R}}=10\mu\text{A}$
Reverse current	I_{R}			10	μA	$V_{\text{R}}=5.5\text{V}$
Reverse breakdown voltage	V_{BR}	6.5	7.5		V	$I_{\text{R}}=1\text{mA}$
Clamping voltage	V_{C}		8.1 17	9.7 20.4	V	$I_{\text{PP}}=1\text{A}$ $I_{\text{PP}}=I_{\text{PPM}}=18\text{A}$
Junction Capacitance	C_{D}		130 100	175	pF	$V_{\text{R}}=0\text{V}, f=1\text{MHz}$ $V_{\text{R}}=4\text{V}, f=1\text{MHz}$

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TGSOT12C						
between pin 1 to pin 2 or pin 2 to pin1; pin 3 not connected						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N_{channel}			1	lines	Number of lines which can be protected
Reverse stand-off voltage	V_{RWM}			12.5	V	$I_{\text{R}}=1\mu\text{A}$
Reverse current	I_{R}			1	μA	$V_{\text{R}}=12.5\text{V}$
Reverse breakdown voltage	V_{BR}	13.5	15.7		V	$I_{\text{R}}=1\text{mA}$
Clamping voltage	V_{C}		16.4 23.4	19.7 28.1	V	$I_{\text{PP}}=1\text{A}$ $I_{\text{PP}}=I_{\text{PPM}}=12\text{A}$
Junction Capacitance	C_{D}		58 36	75	pF	$V_{\text{R}}=0\text{V}, f=1\text{MHz}$ $V_{\text{R}}=7.5\text{V}, f=1\text{MHz}$

TGSOT24C						
between pin 1 to pin 2 or pin 2 to pin1; pin 3 not connected						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Protection paths	N_{channel}			1	lines	Number of lines which can be protected
Reverse stand-off voltage	V_{RWM}			24.5	V	$I_{\text{R}}=1\mu\text{A}$
Reverse current	I_{R}			1	μA	$V_{\text{R}}=24.5\text{V}$
Reverse breakdown voltage	V_{BR}	27.5	30.7		V	$I_{\text{R}}=1\text{mA}$
Clamping voltage	V_{C}		34 40	41 48	V	$I_{\text{PP}}=1\text{A}$ $I_{\text{PP}}=I_{\text{PPM}}=5\text{A}$
Junction Capacitance	C_{D}		33 18	40	pF	$V_{\text{R}}=0\text{V}, f=1\text{MHz}$ $V_{\text{R}}=12\text{V}, f=1\text{MHz}$

Two-Line ESD Protection

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TYPICAL CHARACTERISTICS @ $T_a=25^\circ\text{C}$ unless otherwise specified

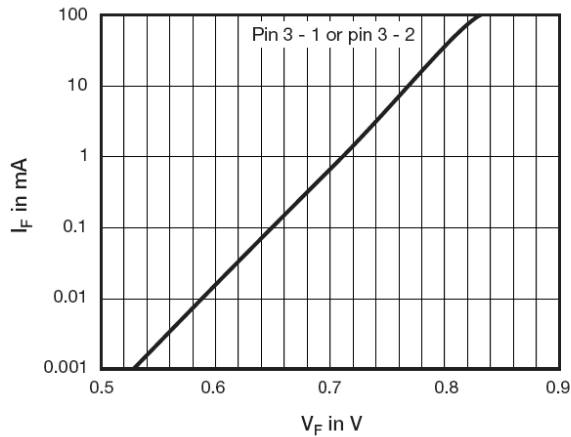


Fig. 1 - Typical Forward Current I_F vs. Forward Voltage V_F

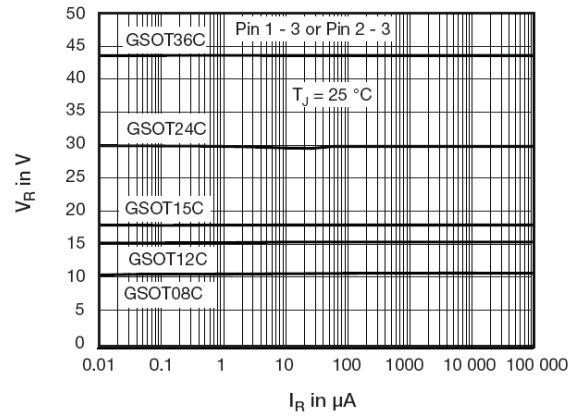


Fig. 2 - Typical Reverse Voltage V_R vs. Reverse Current I_R

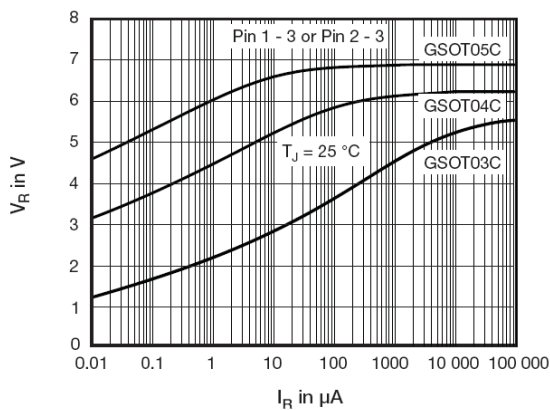


Fig. 3 - Typical Reverse Voltage V_R vs. Reverse Current I_R

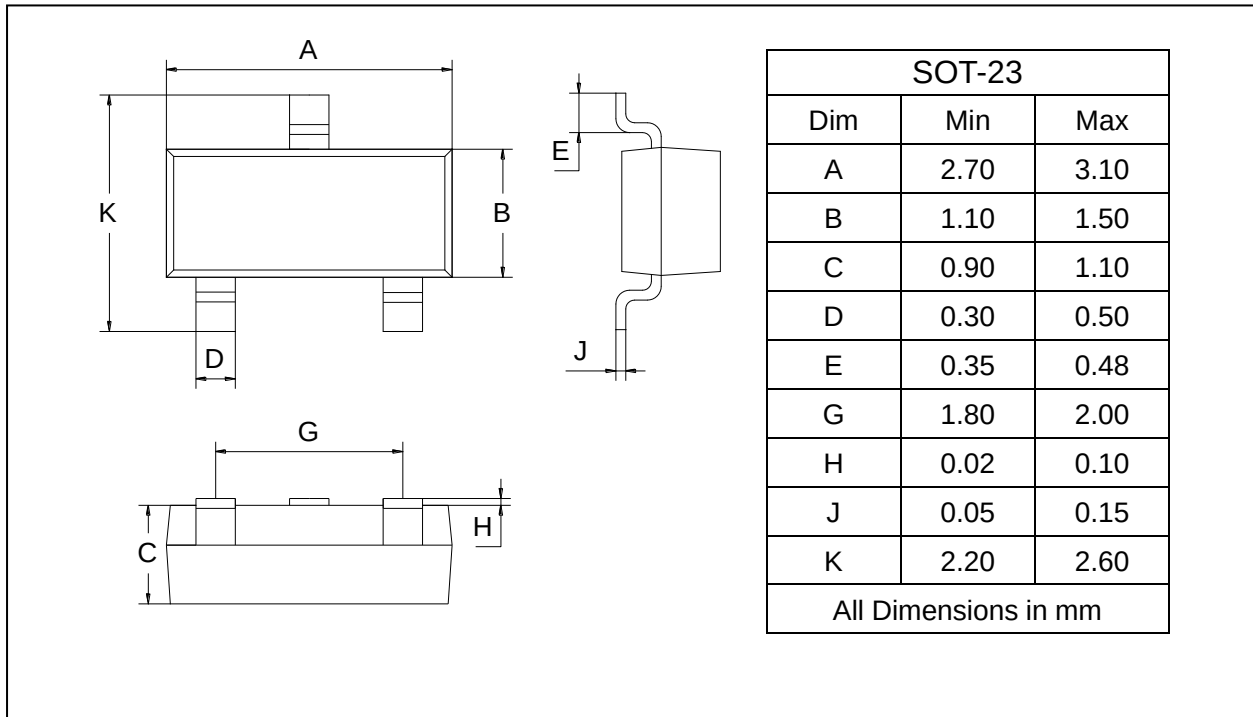
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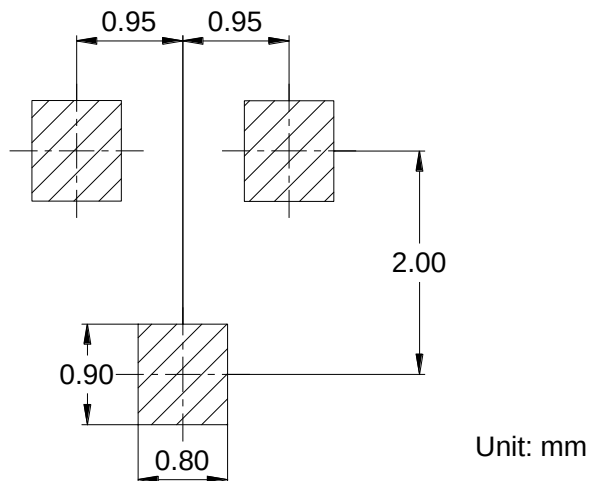
PACKAGE OUTLINE

Plastic surface mounted package

SOT-23



SOLDERING FOOTPRINT



PACKAGE INFORMATION

Device	Package	Shipping
TGSOT05C-TGSOT24C	SOT-23	3000 pcs / Tape & Reel