SMTYxxA

Low forward voltage TVS: Transky™

Main applications

- Power rail ESD transient over-voltages and reverse voltages protection for 5 and 12 V supplied IC's

Description

The Transky is designed specifically for miniaturized electronic devices and equipment subject to ESD transient over-voltages. The Transky combines the performance of a Transil™ or TVS (Transient Voltage Suppressor) and low forward voltage Schottky diode in a monolithic structure.

It offers both an overshoot protection in the 6.4 V or 13.2 V clamping ranges and a negative spike protection in the -0.48 V clamping range compared to the -1 V with the standard Transil family on the 5 or 12 V power line.

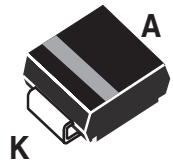
Its 600 W power capability offers high transient capability with SMA package.

Features

- Integration of a Transil with a Schottky diode
- JEDEC registred SMA package outline
- Low clamping factor V_{CL}/V_{BR}
- Fast response time
- RoHS compliant

Benefits

- Optimized PCB area: up to 62% space saving versus discrete solution
- High peak pulse power: up to 600 W
- Stand-off voltage:
  5 V for SMTY5.0A
  12 V for SMTY12A
- Low forward voltage: 0.48 V @ 1 A
- Very low leakage current:
  10 µA @ 5 V for SMTY5.0A
  20 µA @12 V for SMTY12A



SMA
(JEDEC DO-214AC)

Order code

Part number	Marking
SMTY5.0A	Y5.0
SMTY12A	Y12

Complies with following standard

IEC 61000-4-2 Level 4

Air discharge 15 kV
Contact discharge 8 kV

1 Characteristics

Table 1. Absolute ratings (limiting value)

Symbol	Parameter		Value	Unit
V_{pp}	IEC 61000-4-2 level 4 standard	Air discharge Contact discharge	15 8	kV
P	Power dissipation on infinite heatsink	T_{amb} = 25° C	4	W
P_{PP}	Peak pulse Power dissipation (1)	$T_{j\ initial} = T_{amb}$	600	W
I_{FSM}	Non repetitive surge peak forward current	t_p=10 ms $T_{j\ initial} = T_{amb}$	40	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature (2)		150	°C

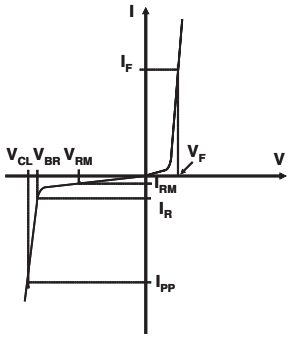
1. 10/1000µs pulse waveform
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ thermal runaway condition for a Transky

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient on printed circuit	120	°C/W
$R_{th(j-l)}$	Junction to lead	30	°C/W

Table 3. Electrical characteristics

Symbol	Parameter
I_{RM}	Leakage current @ V_{RM}
V_{RM}	Stand-off voltage
V_{BR}	Breakdown voltage
I_R	Reverse leakage current
V_{CL}	Clamping voltage
I_{PP}	Peak pulse current
V_F	Forward voltage drop



	$I_{RM\ max}$ @ V_{RM}		$I_{RM\ max}$ @ V_{RM} @ 85° C		$V_{BR\ min}$ @ I_R		V_{CL}max @ I_{PP} 10/1000 µs		V_F max @ 1A (1)	αT max
	µA	V	mA	V	V	mA	V	A	V	10^{-4}/°C
SMTY5.0A	10	5	0.5	5	6.4	10	9	43.5	0.48	10
SMTY12A	20	12	1.2	12	13.2	1	18.5	31	0.48	10

1. Pulse test t_p = 500 µs, δ < 2%

Figure 1. Pulse waveform (10/1000 µs)

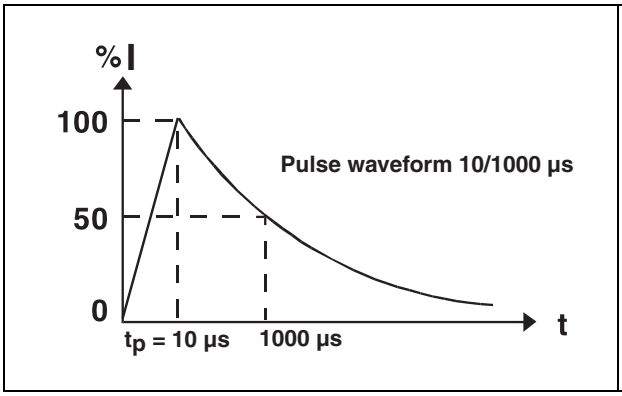


Figure 2. Peak pulse power versus exponential pulse duration (T_j initial = 25° C)

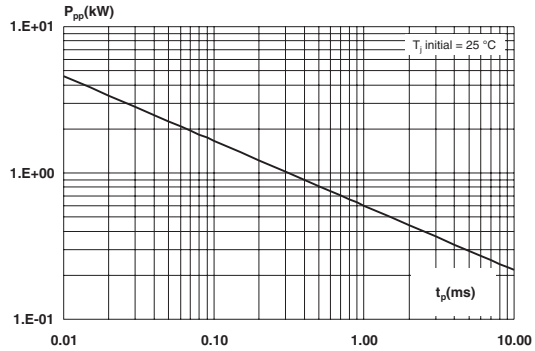


Figure 3. Relative variation of peak pulse power versus initial junction temperature

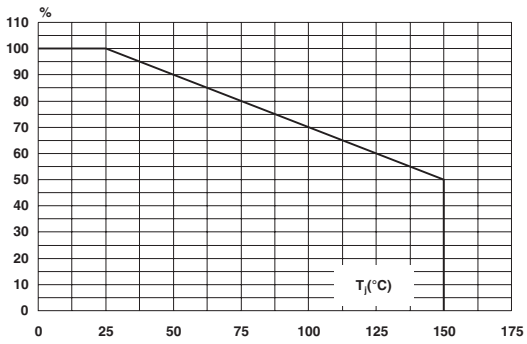


Figure 4. Average power dissipation versus ambient temperature

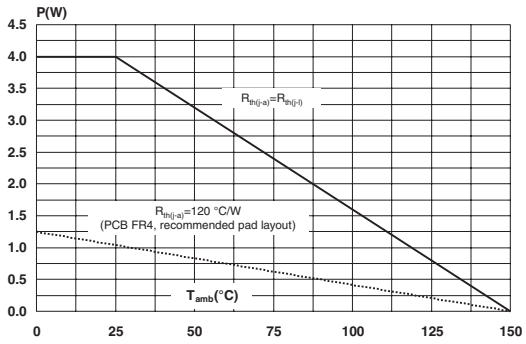


Figure 5. Variation of thermal impedance, junction to ambient, versus pulse duration (Epoxy, FR4, e_{Cu} = 35 µm)

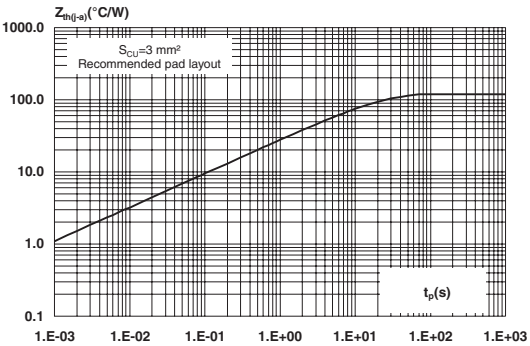


Figure 6. Thermal resistance, junction to ambient, versus copper surface under each lead (printed circuit board FR4, e_{Cu} = 35 µm)

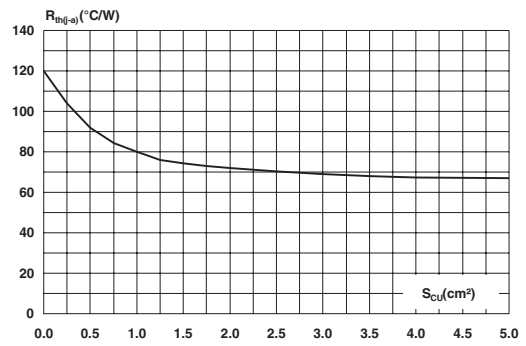


Figure 7. Forward voltage drop versus forward current (typical values)

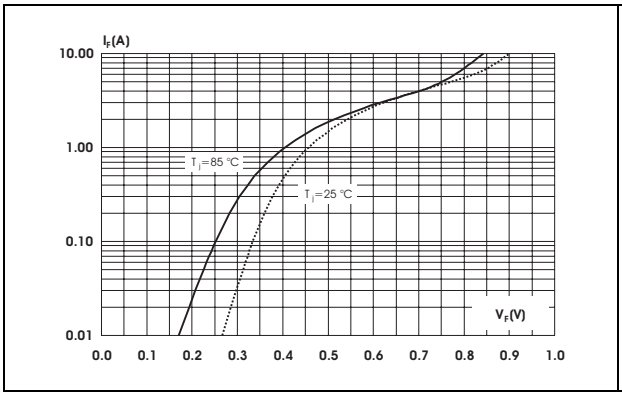


Figure 8. Reverse leakage current versus junction temperature (typical values)

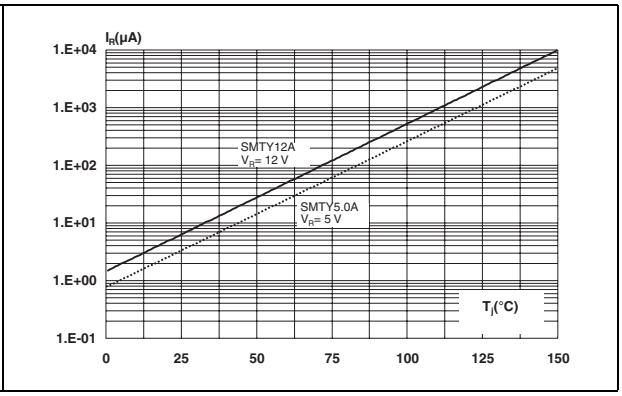


Figure 9. SMTY5.0A Clamping voltage versus peak pulse current (typical values)

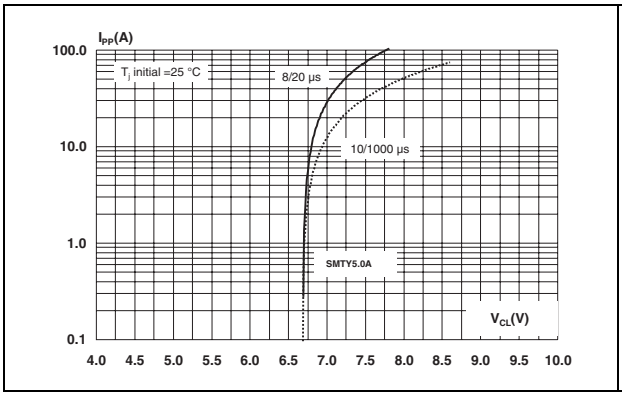
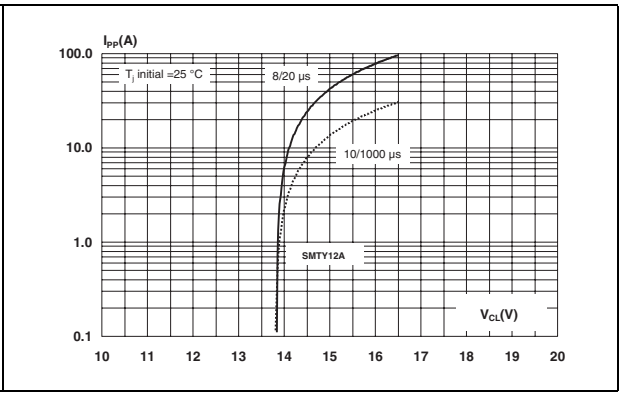


Figure 10. SMTY12A Clamping voltage versus peak pulse current (typical values)



2 Ordering information scheme

SMTY xx A

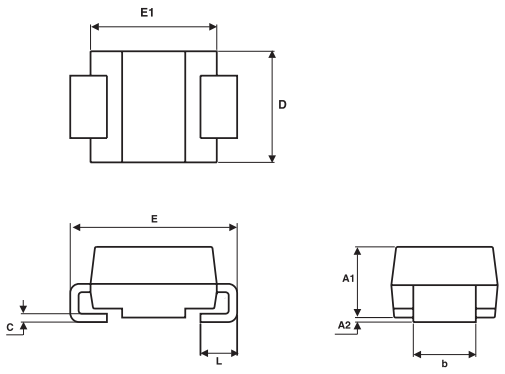
Transky

Stand off voltage
5.0 = 5 V
12 = 12 V

Package
A = SMA package

3 Package information

Table 4. SMA (plastic) dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.03	0.075	0.080
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

Figure 11. Footprint dimensions (millimeter)

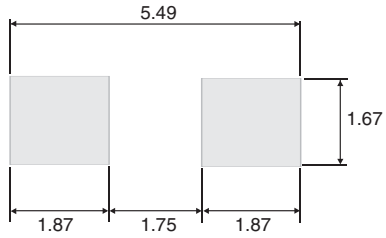
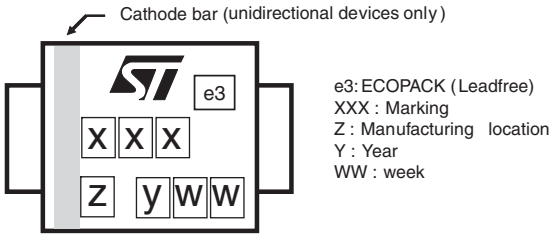


Figure 12. Marking information scheme



In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

4 Ordering information

Ordering type	Marking	Package	Weight	Base quantity	Delivery mode
SMTY5.0A	Y5.0	SMA	0.068g	5000	Tape and Reel
SMTY12A	Y12	SMA	0.068g	5000	Tape and Reel

5 Revision history

Date	Revision	Changes
24-Apr-2006	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZE REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com