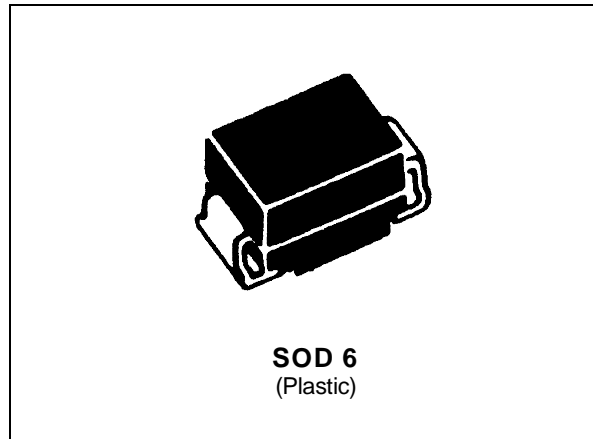


TRANSIL

FEATURES

- PEAK PULSE POWER= 400 W @ 1ms.
- BREAKDOWN VOLTAGE RANGE :  
From 6V8 to 220 V.
- UNI AND BIDIRECTIONAL TYPES.
- LOW CLAMPING FACTOR.
- FAST RESPONSE TIME:  
Tclamping : 1ps (0 V to VBR).
- JEDEC REGISTRED.



DESCRIPTION

Transil diodes provide high overvoltage protection by clamping action. Their instantaneous reponse to transients makes them particularly suited to protect voltage sensitive devices such as MOS Technology and low voltage supplied IC's.

MECHANICAL CHARACTERISTICS

- Body marked with : Logo, Date Code, Type Code and Cathode Band (for unidirectional types only).
- Full compatibility with both gluing and paste soldering technologies.
- Excellent on board stability.
- Tinned copper leads.
- High temperature resistant resin.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter	Value	Unit
P <sub>p</sub>	Peak pulse power dissipation See note 1 and derating curve Fig 1.	T <sub>amb</sub> = 25°C 400	W
P	Power dissipation on infinite heatsink See note 1 and derating curve Fig 1.	T <sub>lead</sub> = 50°C 5	W
I <sub>FSM</sub>	Non repetitive surge peak forward current. For unidirectional types.	T <sub>amb</sub> = 25°C t = 10 ms 50	A
T <sub>stg</sub> T <sub>j</sub>	Storage and junction temperature range	- 65 to + 175 150	°C °C
T <sub>L</sub>	Maximum lead temperature for soldering during 10 s.	260	°C

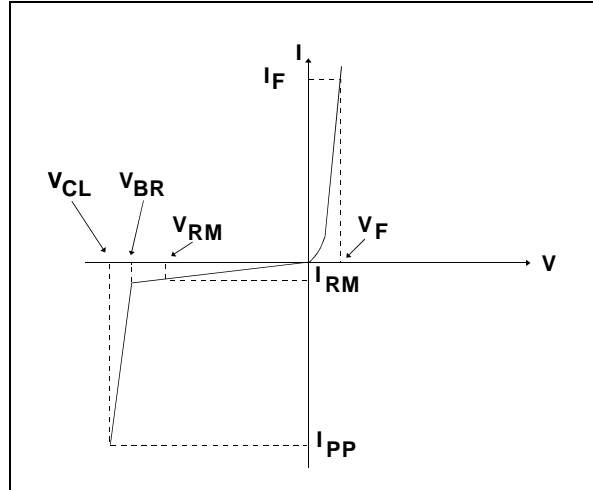
# SM4Txx

## THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
R <sub>th (j-l)</sub>	Junction-leads on infinite heatsink	20	°C/W
R <sub>th (j-a)</sub>	Junction to ambient. on printed circuit. With standard footprint dimensions.	100	°C/W

## ELECTRICAL CHARACTERISTICS

Symbol	Parameter
V <sub>RM</sub>	Stand-off voltage.
V <sub>BR</sub>	Breakdown voltage.
V <sub>CL</sub>	Clamping voltage.
I <sub>RM</sub>	Leakage current @ V <sub>RM</sub> .
I <sub>PP</sub>	Surge current.
α <sub>T</sub>	Voltage temperature coefficient.
V <sub>F</sub>	Forward Voltage drop V <sub>F</sub> < 3.5V @ I <sub>F</sub> = 25 A.



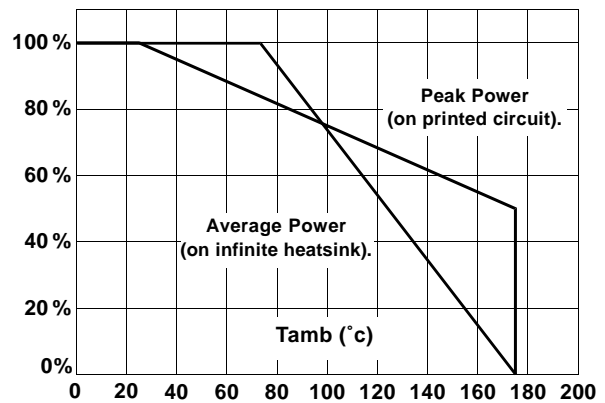
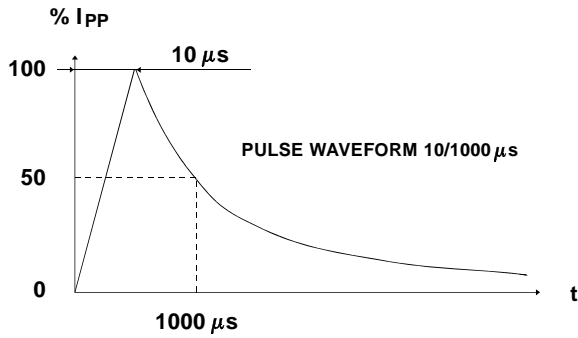
TYPES				I <sub>RM</sub> @ V <sub>RM</sub>		V <sub>BR</sub> @ I <sub>R</sub>				V <sub>CL</sub> @ I <sub>PP</sub>		V <sub>CL</sub> @ I <sub>PP</sub>		α <sub>T</sub>	C
				max		min nom max				max		max		max	typ
						note2				10/1000μs		8/20μs		note3	note4
Uni directional	*	Bi directional	*	μA	V	V	V	V	mA	V	A	V	A	10 <sup>-4</sup> /°C	(pF)
SM4T6V8	QD	SM4T6V8C	VD	1000	5.8	6.45	6.8	7.48	10	10.5	38	13.4	174	5.7	3500
SM4T6V8A	QE	SM4T6V8CA	VE	1000	5.8	6.45	6.8	7.14	10	10.5	38	13.4	174	5.7	3500
SM4T7V5	QF	SM4T7V5C	VF	500	6.4	7.13	7.5	8.25	10	11.3	35.4	14.5	160	6.1	3100
SM4T7V5A	QG	SM4T7V5CA	VG	500	6.4	7.13	7.5	7.88	10	11.3	35.4	14.5	160	6.1	3100
SM4T10	QN	SM4T10C	VN	10	8.55	9.5	10	11	1	14.5	27.6	18.6	124	7.3	2000
SM4T10A	QP	SM4T10CA	VP	10	8.55	9.5	10	10.5	1	14.5	27.6	18.6	124	7.3	2000
SM4T12	QS	SM4T12C	VS	5	10.2	11.4	12	13.2	1	16.7	24	21.7	106	7.8	1550
SM4T12A	QT	SM4T12CA	VT	5	10.2	11.4	12	12.6	1	16.7	24	21.7	106	7.8	1550
SM4T15	QW	SM4T15C	VW	5	12.8	14.3	15	16.5	1	21.2	19	27.2	85	8.4	1200
SM4T15A	QX	SM4T15CA	VX	5	12.8	14.3	15	15.8	1	21.2	19	27.2	85	8.4	1200
SM4T18	RD	SM4T18C	UD	5	15.3	17.1	18	19.8	1	25.2	16	32.5	71	8.8	975
SM4T18A	RE	SM4T18CA	UE	5	15.3	17.1	18	18.9	1	25.2	16	32.5	71	8.8	975
SM4T22	RH	SM4T22C	UH	5	18.8	20.9	22	24.2	1	30.6	13	39.3	59	9.2	800
SM4T22A	RK	SM4T22CA	UK	5	18.8	20.9	22	23.1	1	30.6	13	39.3	59	9.2	800
SM4T24	RL	SM4T24C	UL	5	20.5	22.8	24	26.4	1	33.2	12	42.8	54	9.4	725
SM4T24A	RM	SM4T24CA	UM	5	20.5	22.8	24	25.2	1	33.2	12	42.8	54	9.4	725
SM4T27	RN	SM4T27C	UN	5	23.1	25.7	27	29.7	1	37.5	10.7	48.3	48	9.6	625
SM4T27A	RP	SM4T27CA	UP	5	23.1	25.7	27	28.4	1	37.5	10.7	48.3	48	9.6	625
SM4T30	RQ	SM4T30C	UQ	5	25.6	28.5	30	33	1	41.5	9.6	53.5	43	9.7	575
SM4T30A	RR	SM4T30C4	UR	5	25.6	28.5	30	31.5	1	41.5	9.6	53.5	43	9.7	575
SM4T33	RS	SM4T33C	US	5	28.2	31.4	33	36.3	1	45.7	8.8	59.0	39	9.8	510
SM4T33A	RT	SM4T33CA	UT	5	28.2	31.4	33	34.7	1	45.7	8.8	59.0	39	9.8	510
SM4T36	RU	SM4T36C	UU	5	30.8	34.2	36	39.6	1	49.9	8	64.3	36	9.9	480
SM4T36A	RV	SM4T36CA	UV	5	30.8	34.2	36	37.8	1	49.9	8	64.3	36	9.9	480
SM4T39	RW	SM4T39C	UW	5	33.3	37.1	39	42.9	1	53.9	7.4	69.7	33	10.0	450
SM4T39	RX	SM4T39	UX	5	33.3	37.1	39	41.0	1	53.9	7.4	69.7	33	10.0	450

TYPES				IRM @ VRM		VBR @ IR			VCL @ IPP		VCL @ IPP		αT	C	
Uni directional	*	Bi directional	*	max		min	nom	max	mA	max	max		max	typ	
				μA	V	V	V	V		V	A	V	A		note3
													10 <sup>-4</sup> /°C	(pF)	
SM4T68	SN	SM4T68C	WN	5	58.1	64.6	68	74.8	1	92	4.3	121	19	10.4	270
SM4T68A	SP	SM4T68CA	WP	5	58.1	64.6	68	71.4	1	92	4.3	121	19	10.4	270
SM4T100	SW	SM4T100C	WW	5	85.5	95.0	100	110	1	137	2.9	178	13	10.6	200
SM4T100A	SX	SM4T100CA	WX	5	85.5	95.0	100	105	1	137	2.9	178	13	10.6	200
SM4T150	TH	SM4T150C	XH	5	128	143	150	165	1	207	2.0	265	9	10.8	145
SM4T150A	TK	SM4T150CA	XK	5	128	143	150	158	1	207	2.0	265	9	10.8	145
SM4T200	TS	SM4T200C	XS	5	171	190	200	220	1	274	1.5	353	6.5	10.8	120
SM4T200A	TT	SM4T200CA	XT	5	171	190	200	210	1	274	1.5	353	6.5	10.8	120
SM4T220	TU	SM4T220C	XU	5	188	209	220	242	1	328	1.4	388	6	10.8	110
SM4T220A	TV	SM4T220CA	XV	5	188	209	220	231	1	328	1.4	388	6	10.8	110

All parameters tested at 25 °C, except where indicated.

\* = Marking

Figure 1: Power dissipation derating versus ambient temperature



Note 1 : For surges greater than the maximum values, the diode will present a short-circuit Anode - Cathode.

Note 2 : Pulse test: TP < 50 ms.

Note 3 :  $\Delta V_{BR} = \alpha T \cdot (T_a - 25) \cdot V_{BR(25^\circ C)}$ .

Note 4 : VR = 0 V, F = 1 MHz. For bidirectional types, capacitance value is divided by 2.

Figure 2 : Peak pulse power versus exponential pulse duration.

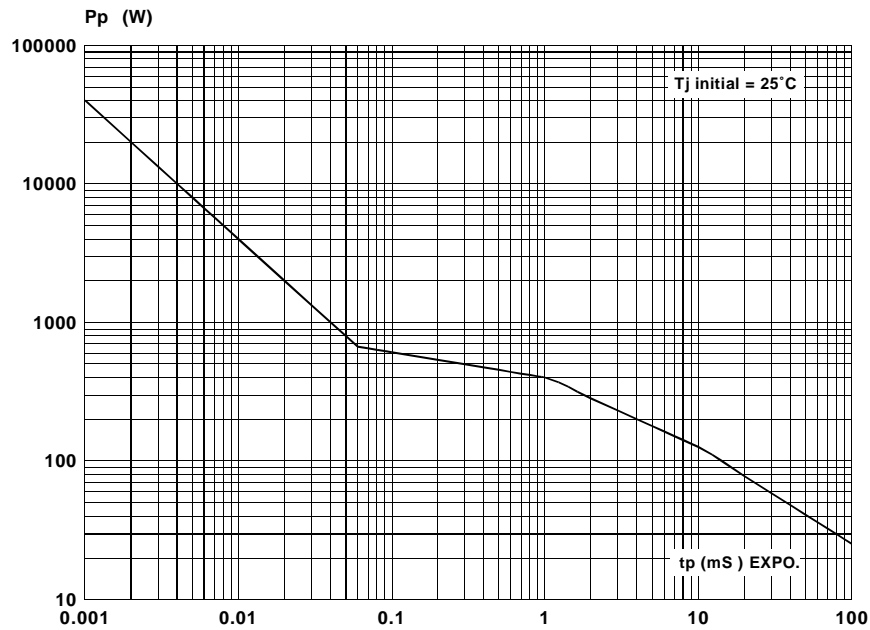
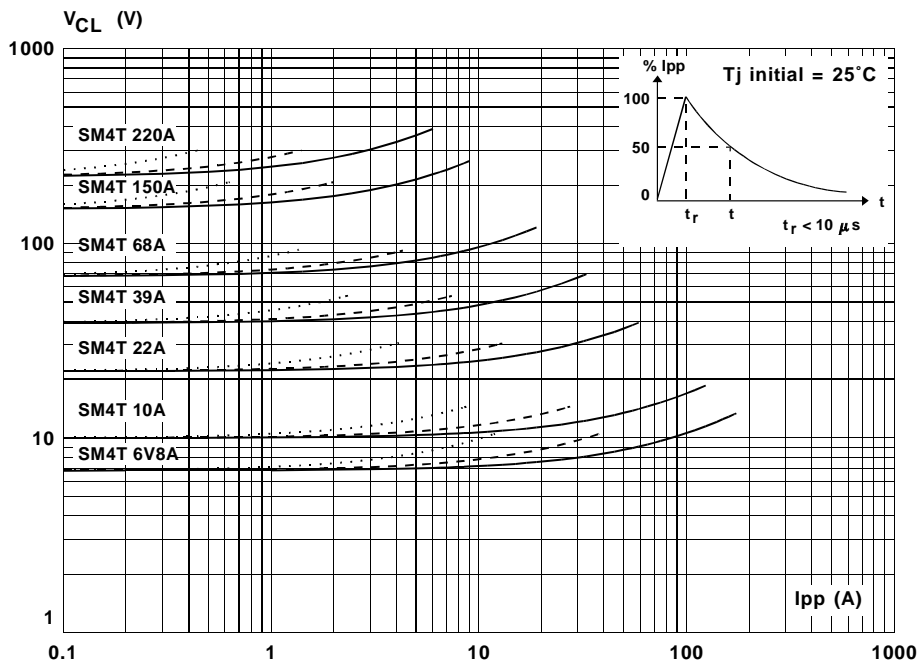


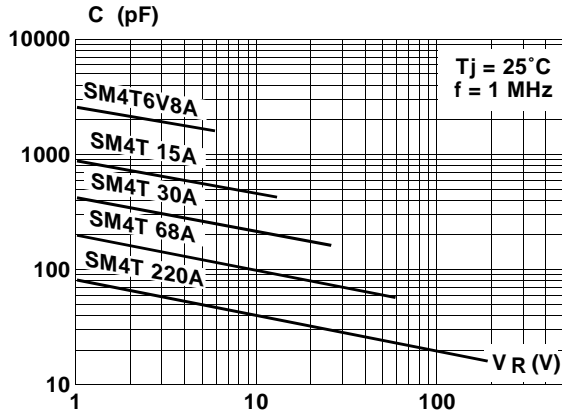
Figure 3 : Clamping voltage versus peak pulse current.

exponential waveform  $t = 20 \mu\text{s}$  \_\_\_\_\_  
 $t = 1 \text{ ms}$  \_\_\_\_\_  
 $t = 10 \text{ ms}$  .....

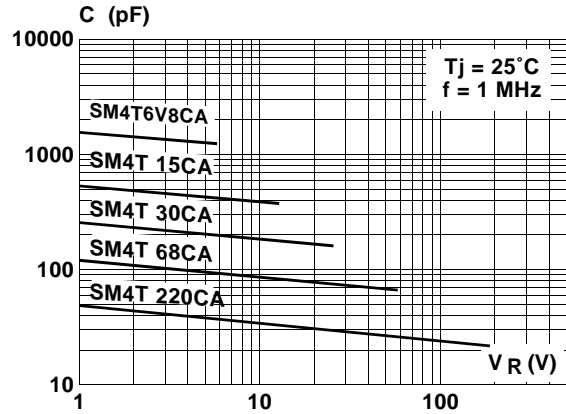


**Note :** The curves of the figure 3 are specified for a junction temperature of 25 °C before surge.  
 The given results may be extrapolated for other junction temperatures by using the following formula :  
 $\Delta V (BR) = \alpha T (V(BR)) * [T_a - 25] * V (BR)$ .  
 For intermediate voltages, extrapolate the given results.

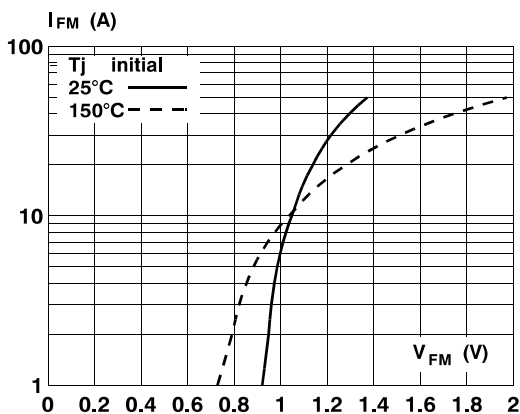
**Figure 4a :** Capacitance versus reverse applied voltage for unidirectional types (typical values).



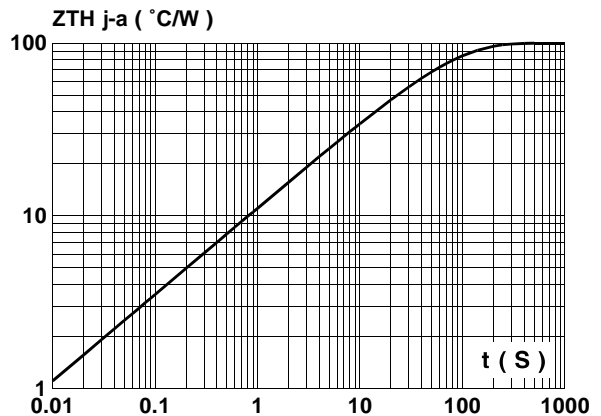
**Figure 4b :** Capacitance versus reverse applied voltage for bidirectional types (typical values).



**Figure 5 :** Peak forward voltage drop versus peak forward current (typical values for unidirectional types).

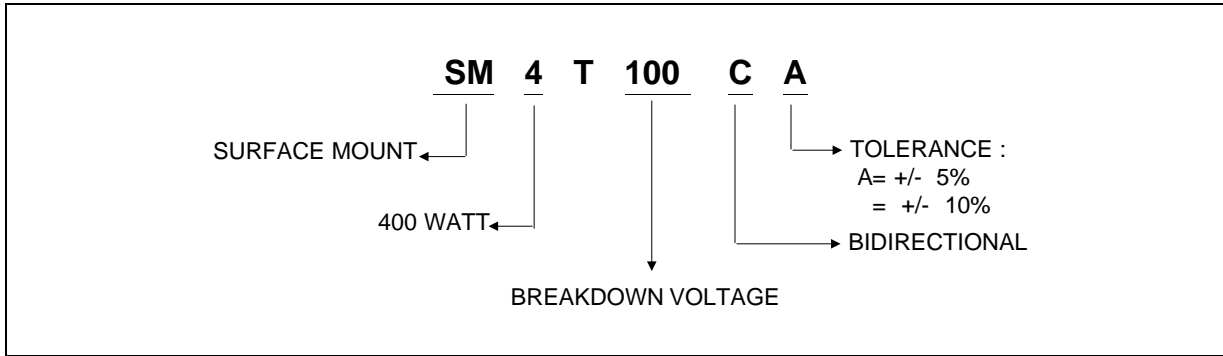


**Figure 6 :** Transient thermal impedance junction-ambient versus pulse duration. For a mounting on PC Board with standard footprint dimensions.



# SM4Txx

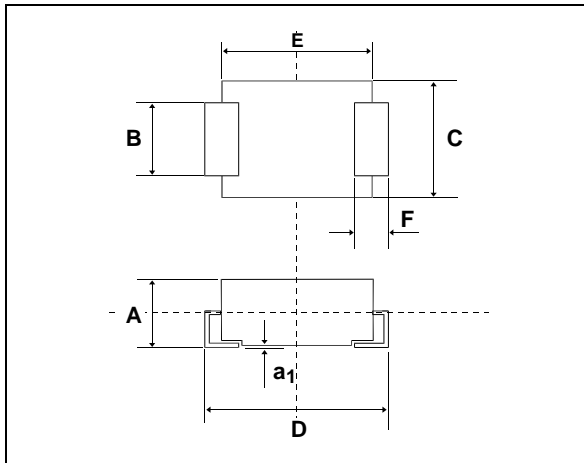
## ORDER CODE



**MARKING** : Logo, Date Code, Type Code, Cathode Band (for unidirectional types only).

## PACKAGE MECHANICAL DATA

SOD 6 (Plastic).

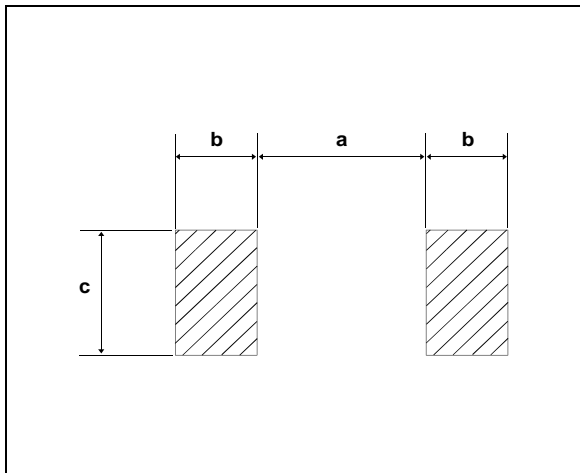


Ref	Millimeters		Inches	
	min	max	min	max
A	2.48	2.61	0.096	0.103
a1	0.10	0.20	0.004	0.008
B	1.96	2.11	0.077	0.083
C	3.65	3.93	0.143	0.155
D	5.39	5.59	0.212	0.220
E	4.15	4.30	0.163	0.170
F	1.00	1.27	0.039	0.050

Weight = 0.12 g.

## FOOTPRINT DIMENSIONS (Millimeter).

SOD 6 Plastic.



Ref	Millimeters
a	2.75
b	1.52
c	2.30

**Packaging** : standard packaging is in film.

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

Purchase of I<sup>2</sup>C Components by SGS-THOMSON Microelectronics, conveys a licence under the Philips I<sup>2</sup>C Patent. Rights to use these components in an I<sup>2</sup>C system, is granted provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Philips.

SGS-THOMSON Microelectronics GROUP OF COMPANIES  
Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -  
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A