

# Effective Use of Space Saving TVSArrays™



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With the continual downsizing of electronic apparatus for improving and expanding performance, Microsemi-Scottsdale has kept pace by expanding its offering of surface mount TVSArray Transient Voltage Suppressor (TVS) devices. Twenty separate families of TVSArrays are available in three package types including the SOT-143, SO-8 and SO-16. These include TVSs for unidirectional and bidirectional protection which are intended for protecting from electrostatic discharge and low levels of induced lightning.

## DEVICE DESCRIPTION

Most TVSArrays are rated for 300W & 8/20 μs with a maximum pulse repetition rate of 0.01%. Operating voltages are available for 3.3V, 5V, 12V, 15V, and 24V, which are most in demand. With few exceptions low capacitance devices are designated with an "LC" in the part number and bidirectional devices are identified with a "C" suffix.

Summarizing the significant electrical and mechanical characteristics, the table below has been compiled for quick identification and selection of TVSArrays for your application. For complete data on each part, plug into our web site at [www.microsemi.com](http://www.microsemi.com).

## ELECTRICAL PERFORMANCE

A large selection of TVSArray product is available to the user for choosing a variety of circuit protection options. Up to seven lines can be protected from ESD inductive load switching or low levels of induced lightning with a single SO-8 package. The SO-8 protects two high speed data lines or up to seven lines for bidirectional signals. The USB04XXC in the SOT-143 is ideal for protection across a high data rate single wire such as a coax cable. The SO-16 packages will protect up to eight lines offering unidirectional or bidirectional protection. For protection across fast data rate lines, LoCap TVSArrays in the SO-16 accommodate up to four wires.

SO-8 and SO-16 TVSArrays are intended for high density packaging in present and future designs. This series has been built to withstand transient surges as defined in IEC 1000-4-2 for ESD and electrical fast transients per IEC 1000-4-4. Electronic apparatus must meet the surge requirements of these specs to be certified for the European Community market. The SMDB series is rated for 10A of induced lightning @ 8/20μs and the SMDB series is rated for 5A, 8/20μs. An exception to the power rating is the SMP6LC6.5, rated for 600W @ 10/1000μs, which is designed for use in more severe telecom environments.

## APPLICATIONS

In addition to general use in meeting the IEC specifications listed above, Microsemi's TVSArrays protect from transient voltages encountered in all hand held equipment including data logging systems, palm top and laptop computers, computer peripherals, modems and RF amplifiers. One user is protecting CATV line extenders with USB0805C TVSArrays.

Unidirectional TVSs are designed to operate with positive going signals and voltages only, while bidirectional devices, having a "C" suffix, are bilaterally

symmetrical for positive and negative voltage excursions.

A word of caution! ESD can easily radiate through unshielded or poorly shielded enclosures and interconnecting wiring often causing upset such as data corruption. A TVS cannot provide protection from radiated ESD that can bypass the protector element. Relatively low voltages, between one and three kilovolts are the most troublesome because their rise-times are exceedingly fast, as low as 100ps. The writer has had many experiences in which radiation of low-level ESD was ultimately found to be responsible for system upset. Adequate shielding restored normal performance.

For dimensions, lead configurations, mechanical outlines and specific electrical parameters, please refer to the individual data sheets on our web site at [www.microsemi.com](http://www.microsemi.com). To convert the generic types listed in the table above to a specific part, substitute the device operating voltage, e.g. SMDBA05 for the "XX", to designate a component having a 5V operating voltage, or SMDBA12 for twelve volt operating, etc.

For additional assistance in designing with Microsemi's TVSArrays, please contact:  
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## TVSArrays Selection Guide

Device Family	Package	Power (W)	Lines Protected	Unidirectional	Bidirectional	Capacitance (pF)
SMDAXX	SO-8	300	4	X		--
SMDBXX	SO-8	500	4	X		--
SMDAXXC	SO-8	300	4		X	--
SMDBXXC	SO-8	500	4		X	--
SMDAXXC-4	SO-8	300	4		X	--
SMDAXXC-4-2	SO-8	300	4		X	--
SMDAXXC-5	SO-8	300	5		X	--
SMDAXX-6	SO-8	300	6	X		--
SMDAXXC-7	SO-8	300	7		X	--
SM8LCXX	SO-8	500	2		X	25
USB04XXC	SOT-143	300	1		X	5
USB08XXC	SO-8	300	2		X	5
SMDAXXC-8	SO-14	300	8		X	--
SM16XX	SO-16	300	8	X		--
SM16XXC	SO-16	300	8		X	--
SM16LCXXC	SO-16	300	8		X	25
SM16LCXXC-6	SO-16	300	6		X	25
SM16LCXX	SO-16	300	6	X		--
SMP6LC6.5	SO-16	600	2		X	30

