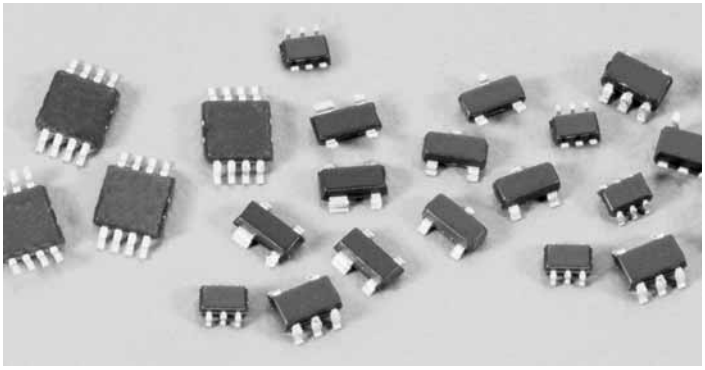
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

The surface mount family of arrays are designed to suppress ESD and other transient overvoltage events. These arrays are used to meet the International Electrotechnical Compatibility (IEC transient immunity standards IEC 61000-4-2 for Electrostatic Discharge Requirements). The series are used to help protect sensitive digital or analog input circuits on data, signal, or control lines with voltage levels up to 5VDC.

The monolithic silicon arrays are comprised of specially designed structures for transient voltage suppression(TVS). The size and shape of these structures have be tailored for transient protection. The low capacitance and clamp voltage are ideal for high speed signal line protection.

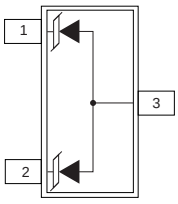


Ordering Information

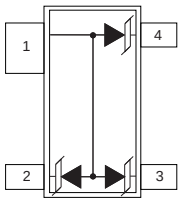
Part Number	CH	Package Type	Quantity Per Reel
SP0502BAHT	2	SOT23	3000
SP0503BAHT	3	SOT143	3000
SP0504BAHT	4	SOT23-5	3000
SP0505BAHT	5	SOT23-6	3000
SP0504BAAT	4	TSSOP-8	4000
SP0506BAAT	6	MSOP-8	4000
SP0502BAJT	2	SC70-3	3000
SP0504BAJT	4	SC70-5	3000
SP0505BAJT	5	SC70-6	3000

Pinout

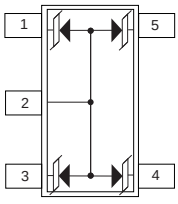
SP0502BAHT
SP0502BAJT



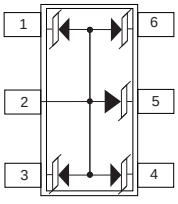
SP0503BAHT



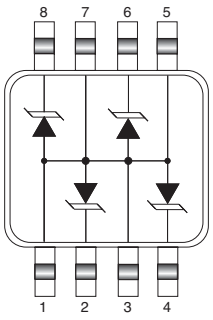
SP0504BAHT
SP0504BAJT



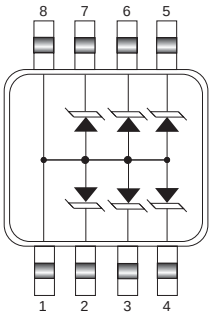
SP0505BAHT
SP0505BAJT



SP0504BAAT



SP0506BAAT



Features

- An Array of 2, 3, 4, 5 or 6 TVS Avalanche Diodes in a ultra small SC70, SOT-23, SOT-143, MSOP or TSSOP packages
- ESD Capability Standards
  - IEC 61000-4-2, Direct Discharge . . . . . 20kV (Level 4)
  - IEC 61000-4-2, Air Discharge . . . . . 30kV (Level 4)
  - MIL STD 883 3015.7 . . . . . 30kV
- Input Protection for Applications Up to 5VDC
- Fast Response Time . . . . . < 1ns
- Low Input Capacitance . . . . . 30pF Typical
- Operating Temperature Range. . . . . -40°C to 85°C

Applications

- Mobile phone handsets
- Personal Digital Assistants (PDA)
- Portable handheld equipment (Laptop, Palmtop computers)
- Computer port, keyboard (USB1.1)
- Digital still cameras
- Digital video cameras
- MP3 players

SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Electrical Specifications T_A = -25°C, Unless Otherwise Specified

PARAMETER	TEST CONDITIONS	MIN	TYPICAL	MAX	UNITS
Reverse Standoff Voltage	I = 10µA	5.5	-	-	V
Reverse Standoff Leakage Current	V = 5.0V		1	100	nA
Signal Clamp Voltage					
Positive	I = 10mA	5.6	6.8	8	V
Negative	I = 10mA	-1.2	-0.8	-0.4	V
Clamp Voltage during ESD					
MIL-STD-883 Method 3015 (HBM) test					
8kV			12		V
8kV			-8		V
ESD Test Level (1)					
IEC-61000-2, Contact discharge		20			kV
MIL-STD-883 Method 3015 (HBM)		30			kV
Capacitance	2.5V @ 1Mhz		30		pF
Turn on/off Time			<1		ns
Temperature Range					
Operating		-40		85	°C
Storage		-65		150	°C
Diode Dynamic Resistance					
Forward Conduction			1.0		Ω
Reverse Conduction			1.4		Ω

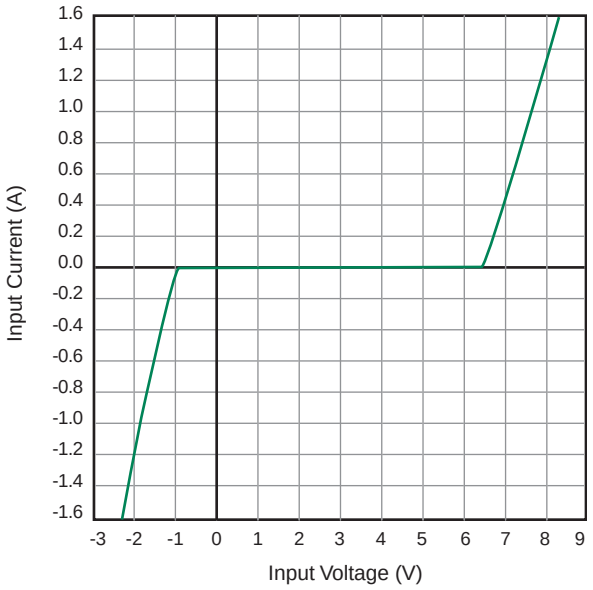
Note:
(1) ESD voltage applied between channel pins and ground, one pin at a time; all other channel pins are open; all ground pins are grounded.

Absolute Maximum Ratings		
Parameter	**Rating**	**Unit**
Storage Temperature Range	-65 to + 150	˚C
Package Power Dissipation		
SC70	0.2	W
SOT23-3, SOT23-5, SOT23-6, SOT143	0.225	W
TSSOP, MSOP	0.5	W

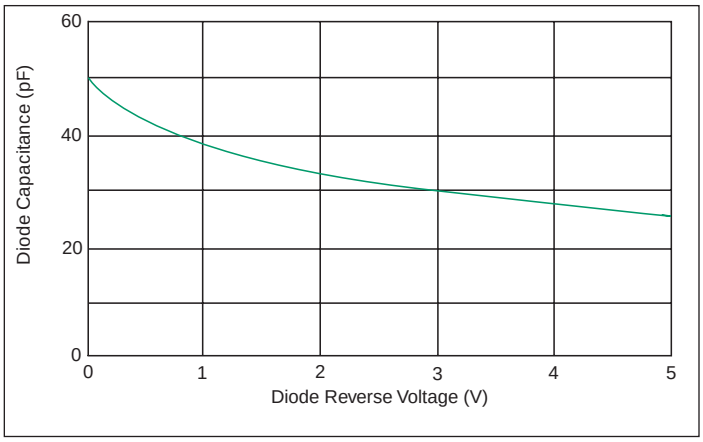
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Typical Input VI Characteristics

(Pulse-mode measurements, pulse width = 0.7 mS nominal)



Typical Diode Capacitance vs. Reverse Voltage



Package Information

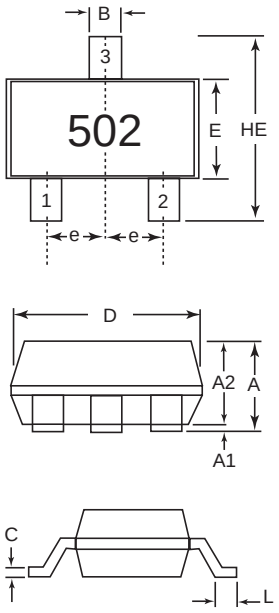
Mechanical Specifications	
Lead Plating	Tin-Lead
Lead Material	Copper Alloy
Lead Coplanarity	0.004 inches (0.102mm)
Subsitute Material	Silicon
Body Material	Molded Epoxy
Flammability	UL94-V-0

Notes:
1. All dimensions are in millimeters.
2. Dimensions include solder plating.
3. Dimensions are exclusive of mold flash & metal burr.
4. All specifications comply to JEDEC SPEC MO-203 ISSUE A.
5. Blo is facing up for mold and facing down for trim/form, i.e. reverse trim/form.
6. Package surface matte finish VDI 11-13.

SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

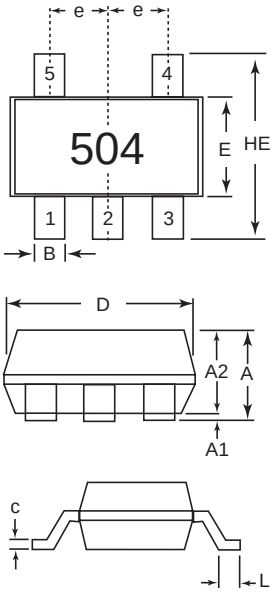
Outline Drawings

SP0502BAJT - SC70-3



Package	SC70-3			
Pins	3			
JEDEC	MO-203 Issue A			
	mm		inches	
	min	max	min	max
A	0.80	1.10	0.031	0.043
A1	0.00	0.10	0.00	0.004
A2	0.70	1.00	0.028	0.039
B	0.15	0.30	0.006	0.012
c	0.08	0.25	0.003	0.010
D	1.85	2.25	0.073	0.089
E	1.15	1.35	0.045	0.053
e	0.66 BSC		0.026 BSC	
HE	2.00	2.40	0.079	0.094
L	0.26	0.46	0.010	0.018

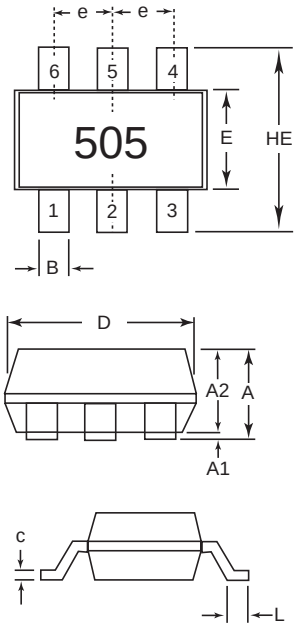
SP0504BAJT - SC70-5



Package	SC70-5			
Pins	5			
JEDEC	MO-203 Issue A			
	mm		inches	
	min	max	min	max
A	0.80	1.10	0.03	0.043
A1	0.00	0.10	0.00	0.004
A2	0.70	1.00	0.028	0.039
B	0.15	0.30	0.006	0.012
c	0.08	0.25	0.003	0.010
D	1.85	2.25	0.073	0.089
E	1.15	1.35	0.045	0.053
e	0.65 BSC		0.026 BSC	
HE	2.00	2.40	0.079	0.094
L	0.26	0.46	0.010	0.018

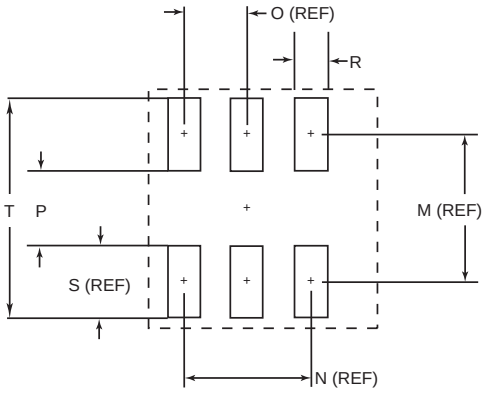
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Outline Drawings

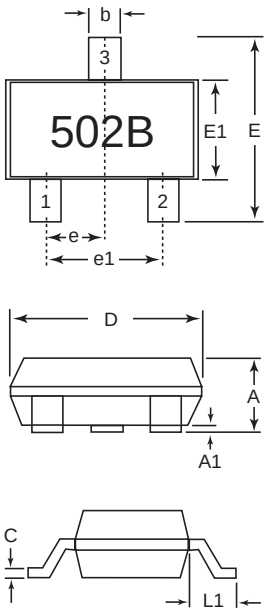


SP0505BAJT - SC70-6

Recommended Pad Layout

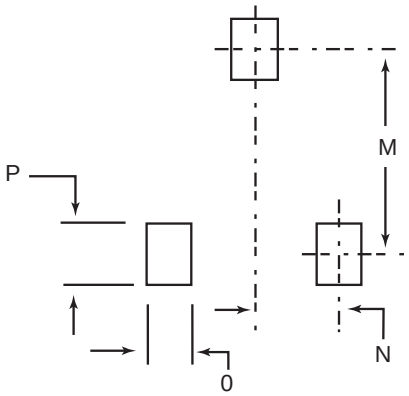


Package	SC70-6			
Pins	5			
JEDEC	MO-203 Issue A			
	mm		inches	
	min	max	min	max
A	0.80	1.10	0.031	0.043
A1	0.00	0.10	0.00	0.004
A2	0.70	1.00	0.028	0.039
B	0.15	0.30	0.006	0.012
c	0.08	0.25	0.003	0.010
D	1.85	2.25	0.073	0.089
E	1.15	1.35	0.045	0.053
e	0.65 BSC		0.026 BSC	
HE	2.00	2.40	0.079	0.094
L	0.26	0.46	0.010	0.018
M	-	1.60	-	0.063
N	-	1.30	-	0.052
O	-	0.65	-	0.026
P	-	0.70	-	0.058
R	-	0.35	-	0.014
S	-	0.90	-	0.035
T	-	2.50	-	0.098



SP0502BAHT - SOT23

Recommended Pad Layout

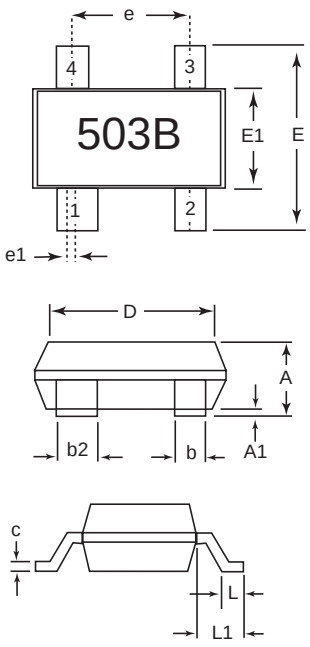


Package	SOT23			
Pins	3			
JEDEC	TO-236			
	mm		inches	
	min	max	min	max
A	0.89	1.12	0.035	0.044
A1	0.01	0.1	0.0004	0.004
b	0.3	0.5	0.012	0.020
c	0.08	0.2	0.003	0.008
D	2.8	3.04	0.110	0.120
E	2.1	2.64	0.083	0.104
E1	1.2	1.4	0.047	0.055
e	0.95 BSC		0.95 BSC	
e1	1.90 BSC		1.90 BSC	
L1	0.54 REF		0.54 REF	
M		2.29		.090
N		0.95		.0375
O		0.78		.030TYP
P		0.78		.030TYP

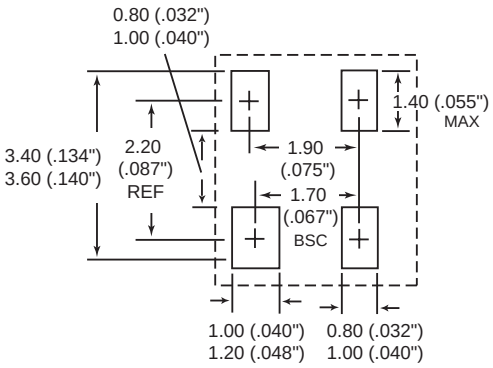
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Outline Drawings

SP0503BAHT - SOT143

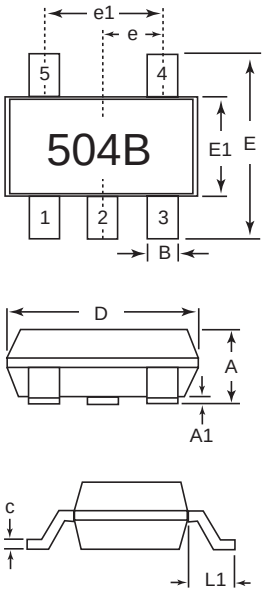


Recommended Pad Layout

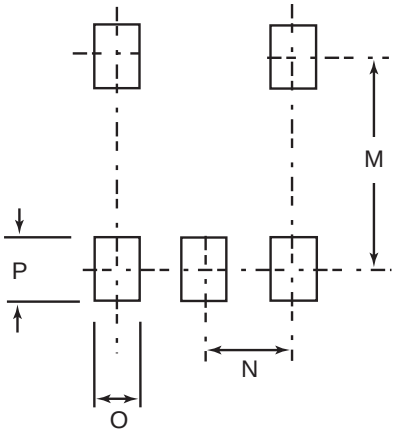


Package	SOT143			
Pins	4			
JEDEC	TO-253			
	mm		inches	
	min	max	min	max
A	0.08	1.22	0.031	0.048
A1	0.05	0.15	0.002	0.006
b	0.30	0.50	0.012	0.019
b2	0.76	0.89	0.030	0.035
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.119
E	2.10	2.64	0.082	0.103
E1	1.20	1.40	0.047	0.055
e	1.92 BSC		0.076 BSC	
e1	0.20 BSC		0.008 BSC	
L	0.4	0.6	0.016	0.024
L1	0.550 REF		0.022 REF	

SP0504BAHT - SOT23-5



Recommended Pad Layout

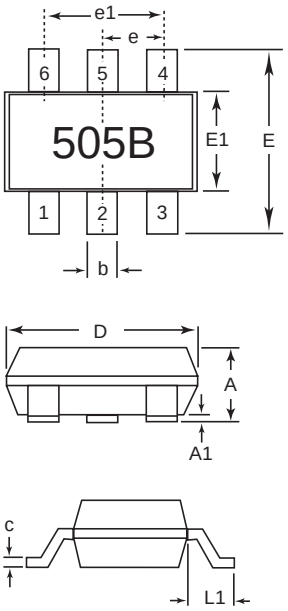


Package	SOT23-5			
Pins	5			
JEDEC	MO-178			
	mm		inches	
	min	max	min	max
A	-	1.45	-	0.057
A1	0	0.15	0	0.006
b	0.3	0.5	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.75	3.05	0.108	0.120
E	2.6	3.0	0.102	0.118
E1	1.45	1.75	0.057	0.069
e	0.95 BSC		0.95 BSC	
e1	1.90 BSC		1.90 BSC	
L1	0.60 REF		0.60 REF	
M		2.59		.102
N		0.95		.038
O		0.69		.027TYP
P		0.99		.039TYP

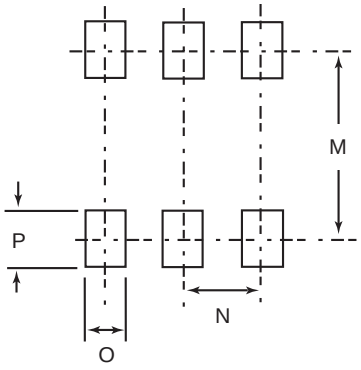
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Outline Drawings

SP0505BAHT - SOT23-6

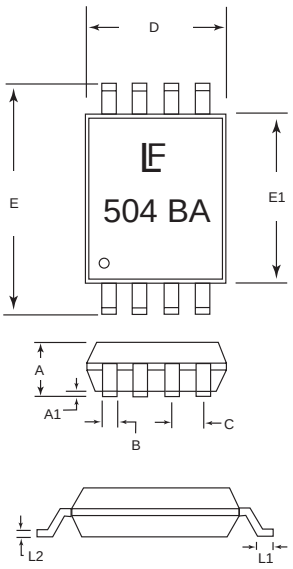


Recommended Pad Layout



Package	SOT23-6			
Pins	6			
JEDEC	MO-178			
	mm		inches	
	min	max	min	max
A	-	1.45	-	0.057
A1	0	0.15	0	0.006
b	0.3	0.5	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.75	3.05	0.108	0.120
E	2.6	3.0	0.102	0.118
E1	1.45	1.75	0.057	0.069
e	0.95 BSC		0.95 BSC	
e1	1.90 BSC		1.90 BSC	
L1	0.60 REF		0.60 REF	
M		2.59		.102
N		0.95		0.038
O		0.69		.027TYP
P		0.99		.039TYP
P_D@70°C	.225W			

SP0504BAAT - TSSOP-8

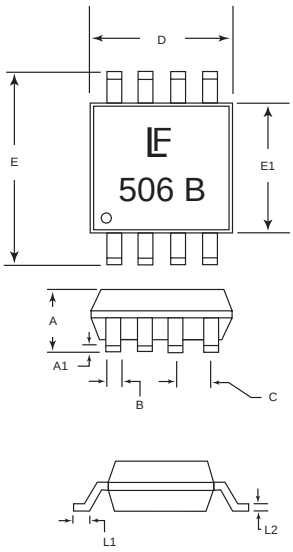


Package	TSSOP-8			
	mm		inches	
	min	max	min	max
D	2.90	3.10	.144	.122
E	6.40 REF		.252 REF	
E1	4.29	4.50	.17	.18
A	1.194 REF		.047 REF	
A1	0.051	0.152	.002	0.006
B	-	0.30	-	.12TYP
C	-	0.66	-	.26TYP
L1	0.51	0.76	.020	.030
L2	0.102	0.203	.004	.008

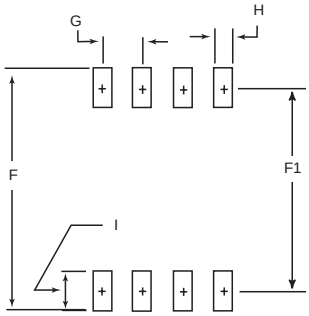
SP0502BA, SP0503BA, SP0504BA, SP0505BA, SP0506BA

Outline Drawings

SP0506BAAT - MSOP-8



Recommended Pad Layout



Package	MSOP-8			
	mm		inches	
	min	max	min	max
D	2.90	3.10	.144	.122
E	4.78	4.98	.188	.196
E1	2.90	3.10	.114	.122
A	0.87	1.17	.034	.046
A1	0.05	0.25	.002	0.10
B	-	0.30TYP	-	.12TYP
C	-	0.65TYP	-	.25TYP
L1	0.52	0.54	.017	.025
L2	-	0.18TYP	-	.007TYP
F	-	5.28	-	.208
F1	-	4.24	-	.167
G	-	0.65	-	.0256
H	-	0.38	-	.015
I	-	1.04	-	.041