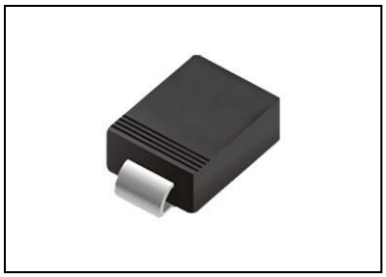
CAN CIRCLE SEMI

CSEXXXXSMC

SMC Series 1500W Transient Voltage Suppressor

Features

- 1500 Watts peak pulse power capability at 10x1000μS Waveforms
- Typical I_R less than 1μA above 12V V_R
- Low profile package with low inductance
- Excellent low clamping voltage
- Fast response time: typical less than 1ps from 0V to V_{BR} Min.
- High temperature to reflow soldering: 260°C/40s at terminals
- Surface mounted devices to optimize board space
- Working voltage: 5V-440V
- RoHS Compliant



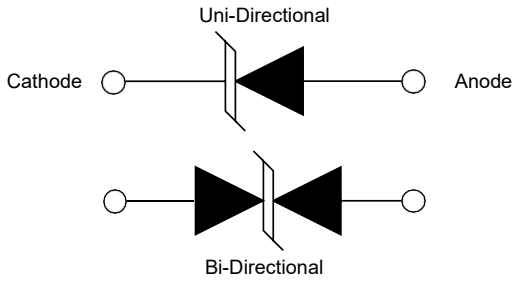
Applications

- Consumer electronic products
- Industries and Automotive
- Desktops, Servers and Notebooks
- Peripherals and Interfaces
- Switching Systems
- Power Management

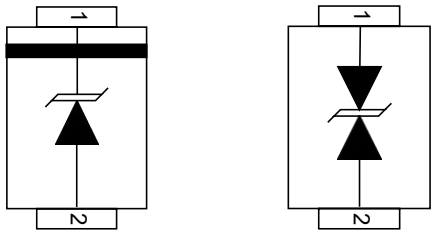
Mechanical Characteristics

- DO-214AB (SMB) package
- Flammability rating: UL 94V-0
- MSL-1 Level
- Marking: Part number, date code
- Packaging: Tape and reel

Circuit Diagram



Pin Configuration



Uni-Directional Bi-Directional

Ordering Information

Part Number	Working Voltage (V)	Unit Weight (g/pcs) Typ.	Quantity Per Reel (pcs)	Reel Size (Inch)	Quantity Per Carton (pcs)
CSEXXXXSMC	5-440	0.262	3,000	13	24,000

Absolute Maximum Rating (T_A=25°C, RH=45%-75%, unless otherwise noted)

Symbol	Parameter	Value	Units
P_{PP}	Peak pulse power dissipation on 10/1000μs waveform	1500	Watts
$P_{M(AV)}$	Steady state power dissipation at T_L=75°C	6.5	Watts
V_F	Maximum instantaneous forward voltage at 100A for unidirectional	5.0	V
I_{FSM}	Peak forward surge current, 8.3ms single half sine wave (Note 1)	200	A
$R_{\theta JL}$	Typical thermal resistance junction to lead	15	°C/W
$R_{\theta JA}$	Typical thermal resistance junction to ambient	75	°C/W
T_J/T_{STG}	Operating junction and storage temperature range	-55 to +150	°C

Notes:

1 Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

Electrical Characteristics (T_A=25°C)

Part Number		V_{RWM}	$I_R@V_{RWM}$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	I_{PP} (1)
Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
CSE5.0UCSMC	CSE5.0BCSMC	5.0	300	6.40	7.00	10	9.2	163.0
CSE6.0UCSMC	CSE6.0BCSMC	6.0	250	6.67	7.37	10	10.3	145.6
CSE6.5UCSMC	CSE6.5BCSMC	6.5	150	7.22	7.98	10	11.2	134.0
CSE7.0UCSMC	CSE7.0BCSMC	7.0	100	7.78	8.60	10	12.0	120.0
CSE7.5UCSMC	CSE7.5BCSMC	7.5	50	8.33	9.21	1	12.9	116.3
CSE8.0UCSMC	CSE8.0BCSMC	8.0	30	8.89	9.83	1	13.6	110.3
CSE8.5UCSMC	CSE8.5BCSMC	8.5	20	9.44	10.40	1	14.4	104.2
CSE9.0UCSMC	CSE9.0BCSMC	9.0	10	10.00	11.10	1	15.4	97.4
CSE10UCSMC	CSE10BCSMC	10	5	11.10	12.30	1	17.0	88.2
CSE11UCSMC	CSE11BCSMC	11	2	12.20	13.50	1	18.2	82.4
CSE12UCSMC	CSE12BCSMC	12	1	13.30	14.70	1	19.9	75.4
CSE13UCSMC	CSE13BCSMC	13	1	14.40	15.90	1	21.5	69.8
CSE14UCSMC	SMBJ14BCSMC	14	1	15.60	17.20	1	23.2	64.7
CSE15UCSMC	SMBJ15BCSMC	15	1	16.70	18.50	1	24.4	61.5
CSE16UCSMC	SMBJ16BCSMC	16	1	17.80	19.70	1	26.0	57.7
CSE17UCSMC	SMBJ17BCSMC	17	1	18.90	20.90	1	27.6	54.4

Part Number		V_{RWM}	$I_R@V_{RWM}$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	$I_{PP}^{(1)}$
Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
CSE18UCSMC	SMBJ18BCSMC	18	1	20.00	22.10	1	29.2	51.4
CSE20UCSMC	SMBJ20BCSMC	20	1	22.20	24.50	1	32.4	46.3
CSE22UCSMC	SMBJ22BCSMC	22	1	24.40	26.90	1	35.5	42.3
CSE24UCSMC	SMBJ24BCSMC	24	1	26.70	29.50	1	38.9	38.6
CSE26UCSMC	SMBJ26BCSMC	26	1	28.90	31.90	1	42.1	35.6
CSE28UCSMC	SMBJ28BCSMC	28	1	31.10	34.40	1	45.4	33.1
CSE30UCSMC	SMBJ30BCSMC	30	1	33.30	36.80	1	48.4	31.0
CSE33UCSMC	SMBJ33BCSMC	33	1	36.70	40.60	1	53.3	28.2
CSE36UCSMC	SMBJ36BCSMC	36	1	40.00	44.20	1	58.1	25.8
CSE40UCSMC	SMBJ40BCSMC	40	1	44.40	49.10	1	64.5	23.3
CSE43UCSMC	SMBJ43BCSMC	43	1	47.80	52.80	1	69.4	21.6
CSE45UCSMC	SMBJ45BCSMC	45	1	50.00	55.30	1	72.7	20.6
CSE48UCSMC	SMBJ48BCSMC	48	1	53.30	58.90	1	77.4	19.4
CSE51UCSMC	SMBJ51BCSMC	51	1	56.70	62.70	1	82.4	18.2
CSE54UCSMC	SMBJ54BCSMC	54	1	60.00	66.30	1	87.1	17.2
CSE58UCSMC	SMBJ58BCSMC	58	1	64.40	71.20	1	93.6	16.1
CSE60UCSMC	SMBJ60BCSMC	60	1	66.70	73.70	1	96.8	15.5
CSE64UCSMC	SMBJ64BCSMC	64	1	71.10	78.60	1	103.0	14.6
CSE70UCSMC	CSE70BCSMC	70	1	77.80	86.00	1	113.0	13.3
CSE75UCSMC	CSE75BCSMC	75	1	83.30	92.10	1	121.0	12.4
CSE78UCSMC	CSE78BCSMC	78	1	86.70	95.80	1	126.0	11.9
CSE85UCSMC	CSE85BCSMC	85	1	94.40	104.0	1	137.0	11.0
CSE90UCSMC	CSE90BCSMC	90	1	100.0	111.0	1	146.0	10.3
CSE100UCSMC	CSE100BCSMC	100	1	111.0	123.0	1	162.0	9.3
CSE110UCSMC	CSE110BCSMC	110	1	122.0	135.0	1	177.0	8.5
CSE120UCSMC	CSE120BCSMC	120	1	133.0	147.0	1	193.0	7.8
CSE130UCSMC	CSE130BCSMC	130	1	144.0	159.0	1	209.0	7.2
CSE150UCSMC	CSE150BCSMC	150	1	167.0	185.0	1	243.0	6.2
CSE160BCSMC	CSE160BCSMC	160	1	178.0	197.0	1	259.0	5.8
CSE170BCSMC	CSE170BCSMC	170	1	189.0	209.0	1	275.0	5.5

Part Number		V_{RWM}	$I_R@V_{RWM}$	$V_{BR}@I_T$		I_T	$V_C@I_{PP}$	$I_{PP}^{(1)}$
Uni-Polar	Bi-Polar	V	μA	Min(V)	Max(V)	mA	Max(V)	A
CSE180BCSMC	CSE180BCSMC	180	1	201.0	222.0	1	292.0	5.2
CSE190BCSMC	CSE190BCSMC	190	1	211.0	234.0	1	307.0	4.9
CSE200BCSMC	CSE200BCSMC	200	1	224.0	247.0	1	324.0	4.7
CSE210BCSMC	CSE210BCSMC	210	1	233.0	258.0	1	337.0	4.5
CSE220BCSMC	CSE220BCSMC	220	1	246.0	272.0	1	356.0	4.2
CSE250BCSMC	CSE250BCSMC	250	1	279.0	309.0	1	405.0	3.7
CSE300BCSMC	CSE300BCSMC	300	1	335.0	371.0	1	486.0	3.1
CSE350BCSMC	CSE350BCSMC	350	1	391.0	432.0	1	567.0	2.7
CSE400BCSMC	CSE400BCSMC	400	1	447.0	494.0	1	648.0	2.3
CSE440BCSMC	CSE440BCSMC	440	1	492.0	543.0	1	713.0	2.1

(1) Surge waveform: 10/1000μs

V_{RWM}: Stand-off voltage – Maximum voltage that can be applied

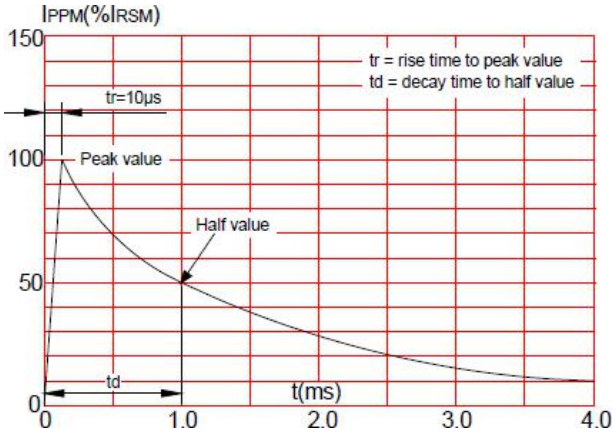
V_{BR}: Breakdown voltage

V_C: Clamping voltage – Peak voltage measured across the suppressor at a specified I_{PP}

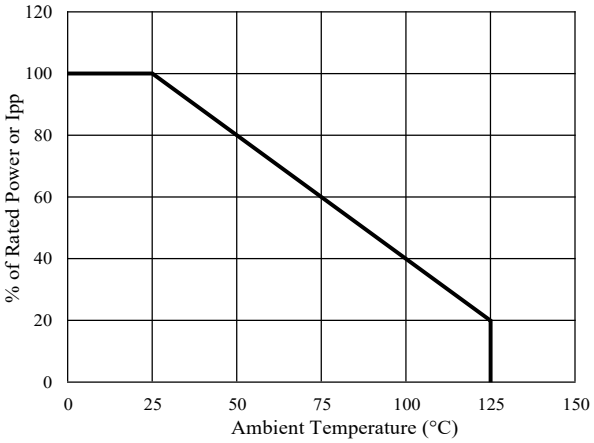
I_R: Reverse leakage current

Typical Characteristics

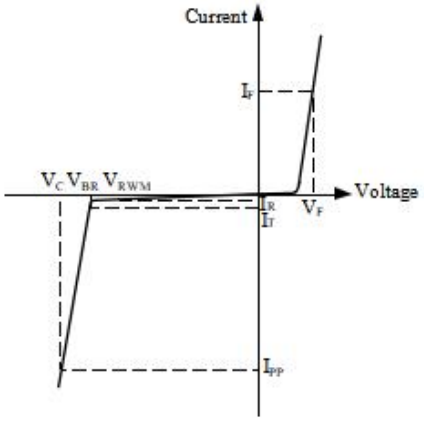
10/1000μs Pulse Waveform



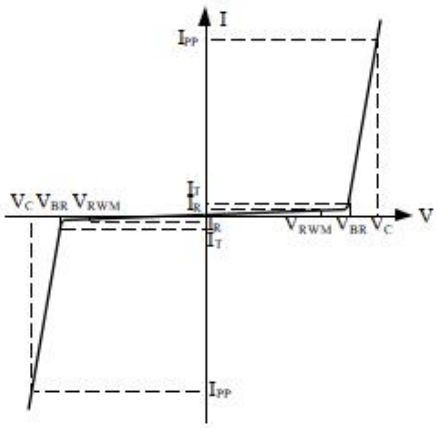
Power Derating Curve



V-I Curve Characteristics (Uni-directional)

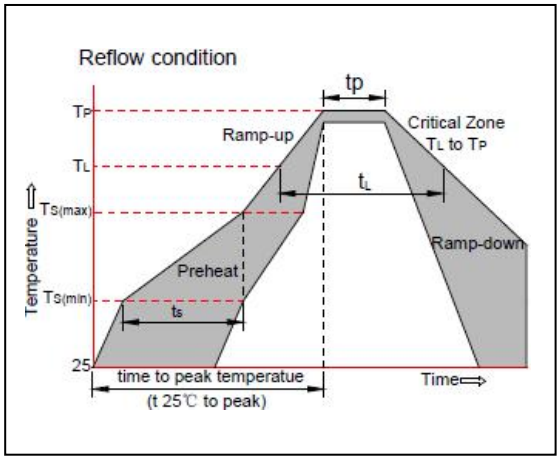


V-I Curve Characteristics (Bi-directional)



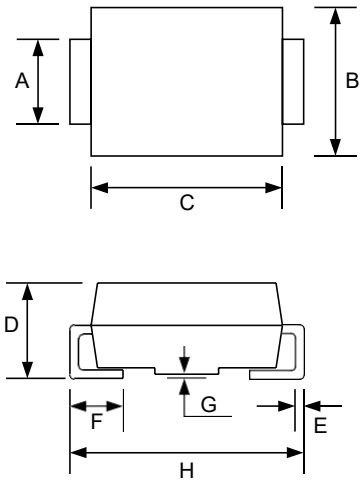
Soldering Parameters

Reflow Condition		Pb-Free Assembly (See figure at right)
Pre Heat	-Temperature Min ($T_{S(min)}$)	+150°C
	-Temperature Max ($T_{S(max)}$)	+200°C
	-Time (Min to Max) (t_S)	60-180 secs.
Average ramp up rate (Liquidus Temp T_L to peak)		3°C/sec. Max
$T_{S(max)}$ to T_L - Ramp up Rate		3°C/sec. Max
Reflow	-Temperature (T_L)(Liquidus)	+217°C
	-Time (t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5°C of actual Peak Temp (t_P)		20-40 secs.
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Package Outline

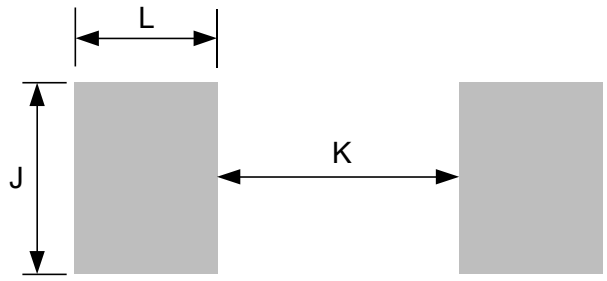
- ❑ DO-214AB (SMC) package
- ❑ 2 leads, small package
- ❑ MSL-1



Package Dimensions

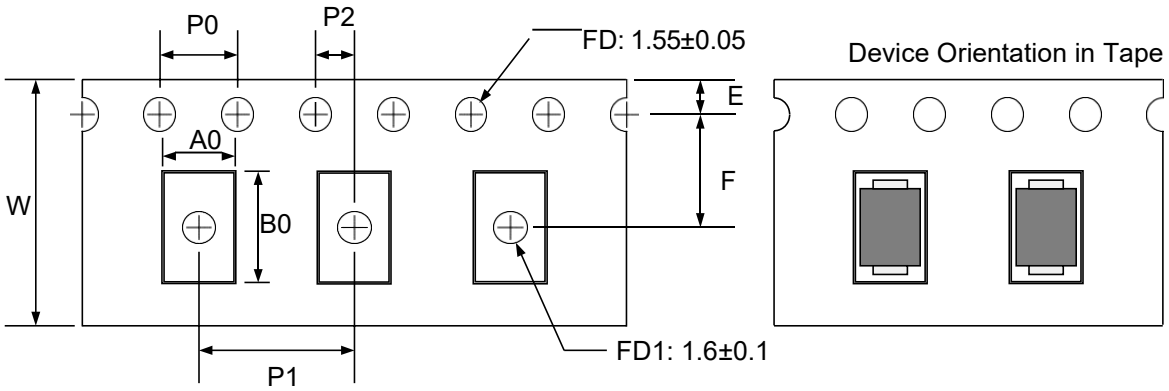
Ref.	Millimeters	Inches
A	2.75-3.25	0.108-0.128
B	5.75-6.25	0.226-0.246
C	6.90-7.40	0.272-0.291
D	2.15-2.62	0.085-0.103
E	0.15-0.31	0.006-0.012
F	0.95-1.52	0.037-0.060
G	0.05-0.20	0.002-0.008
H	7.70-8.20	0.303-0.323

Recommended Soldering Pad

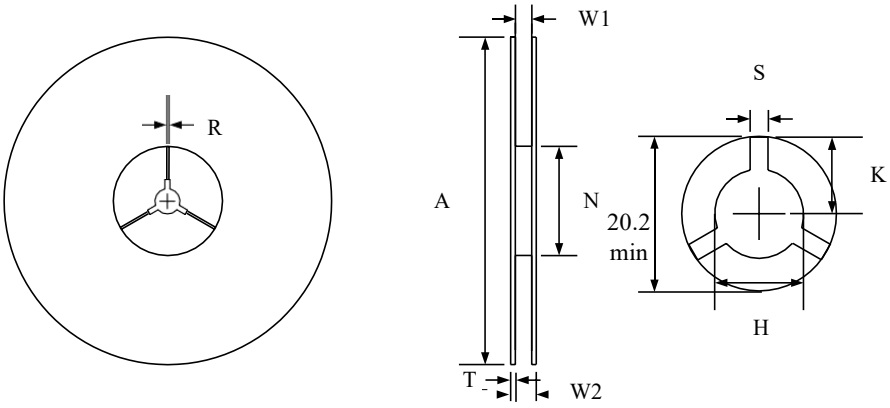


Ref.	Millimeters	Inches
J	3.3 min.	0.130 min.
K	4.2 max.	0.165 max.
L	2.4 min.	0.094 min.

Tape and Reel Specification



Symbol	W	A0	B0	E	F	P1	P0	P2
Dimensions (mm)	16.00±0.2	6.05±0.3	8.31±0.3	1.75±0.2	7.50±0.2	8.00±0.2	4.0±0.2	2.0±0.2



Symbol	A	N	W2	W1	H	T	S	K	R
Dimensions (mm)	330.0±2.0	72.0±2.0	20±2.0	16±2.0	13±1.0	2.0±0.2	1.5 min	10.1 min	2.5 min

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