Surface Mount Transient Voltage Suppressors
Peak Pulse Power 1500W Working Voltage 5.0 to 440V

SMCJ5.0 thru SMCJ440CA

Features

- Glass passivated chip
- Low leakage
- Uni- and Bidirectional unit
- Excellent clamping capability
- Very-fast response time
- 1500W peak pulse power capability with a 10/1000μs waveform, repetition rate (duty cycle) : 0.01%
- RoHS compliant package

Outline

DO-214AB (SMC)



Mechanical Data

- Case : JEDEC DO-214AB(SMC) molded plastic body
- Epoxy : Plastic package has UL flammability classification 94V-0
- Terminals: Pure tin plated, solderable per MIL-STD-750 method 2026
- Polarity: Color band denotes cathode end except Bipolar
- Mounting position : Any

Devices for bidirectional applications

For bi-directional devices, use suffix CA (e.g. SMCJ10CA). Electrical characteristics apply in both directions.

Maximum Ratings and Characteristics (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000μs waveform	P_{PP}	1500 (Note 1)	W
Peak pulse current with a 10/1000μs waveform	I_{PP}	See next table (Note 1)	A
Peak forward surge current, 8.3ms single half sine wave unidirectional only (Note 2)	I_{FSM}	200	A
Maximum instantaneous forward voltage at 100A for unidirectional only (Note 3)	V_F	3.5/5.0	V
Power dissipation on infinite heatsink at T_L=75°C	P_D	6.5	W
Operating junction and storage temperature range	T_J ; T_{STG}	-55 ~ +150	°C

Notes: 1.Non-repetitive current pulse, per Fig. 5 and derated above T_A=25°C per Fig. 1.
2.Measured on 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
3.V_F<3.5V for devices of V_{BR}<200V and V_F<5V for devices of V_{BR}>201V.

Electrical Characteristics Ratings at 25℃ ambient temperature, unless otherwise noted.

Part Number (UNI)	Part Number (BI)	Device Marking Code		Breakdown Voltage $V_{(BR)}$ @I_T			Maximum reverse leakage I_R @ V_{RWM} (μA)	Working Peak reverse voltage V_{RWM} (V)	Maximum reverse surge Current I_{PP} (A)	Maximum clamping voltage V_C @I_{PP} (V)
		UNI	BI	Min (V)	Max (V)	I_T (mA)				
SMCJ5.0	SMCJ5.0C	GDD	BDD	6.40	7.30	10	1000	5.0	156.25	9.6
SMCJ5.0A	SMCJ5.0CA	GDE	BDE	6.40	7.00	10	1000	5.0	163.04	9.2
SMCJ6.0	SMCJ6.0C	GDF	BDF	6.67	8.15	10	1000	6.0	131.58	11.4
SMCJ6.0A	SMCJ6.0CA	GDG	BDG	6.67	7.37	10	1000	6.0	145.63	10.3
SMCJ6.5	SMCJ6.5C	GDH	BDH	7.22	8.82	10	500	6.5	121.95	12.3
SMCJ6.5A	SMCJ6.5CA	GDG	BDK	7.22	7.98	10	500	6.5	133.93	11.2
SMCJ7.0	SMCJ7.0C	GDL	BDL	7.78	9.51	10	200	7.0	112.78	13.3
SMCJ7.0A	SMCJ7.0CA	GDM	BDM	7.78	8.60	10	200	7.0	125.00	12.0
SMCJ7.5	SMCJ7.5C	GDN	BDN	8.33	10.20	1	100	7.5	104.90	14.3
SMCJ7.5A	SMCJ7.5CA	GDP	BDP	8.33	9.21	1	100	7.5	116.28	12.9
SMCJ8.0	SMCJ8.0C	GDQ	BDQ	8.89	10.90	1	50	8.0	100.00	15.0
SMCJ8.0A	SMCJ8.0CA	GDR	BDR	8.89	9.83	1	50	8.0	110.29	13.6
SMCJ8.5	SMCJ8.5C	GDS	BDS	9.44	11.50	1	20	8.5	94.34	15.9
SMCJ8.5A	SMCJ8.5K	GDT	BDT	9.44	10.40	1	20	8.5	104.17	14.4
SMCJ9.0	SMCJ9.0C	GDU	BDU	10.00	12.20	1	10	9.0	88.76	16.9
SMCJ9.0A	SMCJ9.0CA	GDV	BDV	10.00	11.10	1	10	9.0	97.40	15.4
SMCJ10	SMCJ10C	GDW	BDW	11.10	13.60	1	5	10.0	79.79	18.8
SMCJ10A	SMCJ10CA	GDX	BDX	11.10	12.30	1	5	10.0	88.24	17.0
SMCJ11	SMCJ11C	GDY	BDY	12.20	14.90	1	5	11.0	74.63	20.1
SMCJ11A	SMCJ11CA	GDZ	BDZ	12.20	13.50	1	5	11.0	82.42	18.2
SMCJ12	SMCJ12C	GED	BED	13.30	16.30	1	5	12.0	68.18	22.0
SMCJ12A	SMCJ12CA	GEE	BEE	13.30	14.70	1	5	12.0	75.38	19.9
SMCJ13	SMCJ13C	GEF	BEF	14.40	17.60	1	5	13.0	63.03	23.8
SMCJ13A	SMCJ13CA	GEG	BEG	14.40	15.90	1	5	13.0	69.77	21.5
SMCJ14	SMCJ14C	GEH	BEH	15.60	19.10	1	5	14.0	58.14	25.8
SMCJ14A	SMCJ14CA	GEK	BEK	15.60	17.20	1	5	14.0	64.66	23.2
SMCJ15	SMCJ15C	GEL	BEL	16.70	20.40	1	5	15.0	55.76	26.9
SMCJ15A	SMCJ15CA	GEM	BEM	16.70	18.50	1	5	15.0	61.48	24.4
SMCJ16	SMCJ16C	GEN	BEN	17.80	21.80	1	5	16.0	52.08	28.8
SMCJ16A	SMCJ16CA	GEP	BEP	17.80	19.70	1	5	16.0	57.69	26.0
SMCJ17	SMCJ17C	GEQ	BEQ	18.90	23.10	1	5	17.0	49.18	30.5
SMCJ17A	SMCJ17CA	GER	BER	18.90	20.90	1	5	17.0	54.35	27.6
SMCJ18	SMCJ18C	GES	BES	20.00	24.40	1	5	18.0	46.58	32.2
SMCJ18A	SMCJ18CA	GET	BET	20.00	22.10	1	5	18.0	51.37	29.2
SMCJ19	SMCJ19C	GEA	BEA	21.13	25.76	1	5	19.0	44.10	34.0
SMCJ19A	SMCJ19CA	GEB	BEB	21.10	23.30	1	5	19.0	48.73	30.8
SMCJ20	SMCJ20C	GEU	BEU	22.20	27.10	1	5	20.0	41.90	35.8
SMCJ20A	SMCJ20CA	GEV	BEV	22.20	24.50	1	5	20.0	46.30	32.4
SMCJ22	SMCJ22C	GEW	BEW	24.40	29.80	1	5	22.0	38.07	39.4

Electrical Characteristics(Cont.)

Part Number (UNI)	Part Number (BI)	Device Marking Code		Breakdown Voltage $V_{(BR)}$ @I_T			Maximum reverse leakage I_R @ V_{RWM} (μA)	Working Peak reverse voltage V_{RWM} (V)	Maximum reverse surge Current I_{PP} (A)	Maximum clamping voltage V_C @I_{PP} (V)
		UNI	BI	Min (V)	Max (V)	I_T (mA)				
SMCJ22A	SMCJ22CA	GEX	BEX	24.40	26.90	1	5	22.0	42.25	35.5
SMCJ24	SMCJ24C	GEY	BEY	26.70	32.60	1	5	24.0	34.88	43.0
SMCJ24A	SMCJ24CA	GEZ	BEZ	26.70	29.50	1	5	24.0	38.56	38.9
SMCJ26	SMCJ26C	GFD	BFD	28.90	35.30	1	5	26.0	32.19	46.6
SMCJ26A	SMCJ26CA	GFE	BFE	28.90	31.90	1	5	26.0	35.63	42.1
SMCJ28	SMCJ28C	GFF	BFF	31.10	38.00	1	5	28.0	30.00	50.0
SMCJ28A	SMCJ28CA	GFG	BFG	31.10	34.40	1	5	28.0	33.04	45.4
SMCJ30	SMCJ30C	GFH	BFH	33.30	40.70	1	5	30.0	28.04	53.5
SMCJ30A	SMCJ30CA	GFK	BFK	33.30	36.80	1	5	30.0	30.99	48.4
SMCJ33	SMCJ33C	GFL	BFL	36.70	44.90	1	5	33.0	25.42	59.0
SMCJ33A	SMCJ33CA	GFM	BFM	36.70	40.60	1	5	33.0	28.14	53.3
SMCJ36	SMCJ36C	GFN	BFN	40.00	48.90	1	5	36.0	23.33	64.3
SMCJ36A	SMCJ36CA	GFP	BFP	40.00	44.20	1	5	36.0	25.82	58.1
SMCJ40	SMCJ40C	GFQ	BFQ	44.40	54.30	1	5	40.0	21.01	71.4
SMCJ40A	SMCJ40CA	GFR	BFR	44.40	49.10	1	5	40.0	23.26	64.5
SMCJ43	SMCJ43C	GFS	BFS	47.80	58.40	1	5	43.0	19.56	76.7
SMCJ43A	SMCJ43CA	GFT	BFT	47.80	52.80	1	5	43.0	21.61	69.4
SMCJ45	SMCJ45C	GFU	BFU	50.00	61.10	1	5	45.0	18.68	80.3
SMCJ45A	SMCJ45CA	GFV	BFV	50.00	55.30	1	5	45.0	20.63	72.7
SMCJ48	SMCJ48C	GFW	BFW	53.30	65.10	1	5	48.0	17.54	85.5
SMCJ48A	SMCJ48CA	GFX	BFX	53.30	58.90	1	5	48.0	19.38	77.4
SMCJ51	SMCJ51C	GFY	BFY	56.70	69.30	1	5	51.0	16.47	91.1
SMCJ51A	SMCJ51CA	GFZ	BFZ	56.70	62.70	1	5	51.0	18.20	82.4
SMCJ54	SMCJ54C	GGD	BGD	60.00	73.30	1	5	54.0	15.58	96.3
SMCJ54A	SMCJ54CA	GGE	BGE	60.00	66.30	1	5	54.0	17.22	87.1
SMCJ58	SMCJ58C	GGF	BGF	64.40	78.70	1	5	58.0	14.56	103.0
SMCJ58A	SMCJ58CA	GGG	BGG	64.40	71.20	1	5	58.0	16.03	93.6
SMCJ60	SMCJ60C	GGH	BGH	66.70	81.50	1	5	60.0	14.02	107.0
SMCJ60A	SMCJ60CA	GGK	BGK	66.70	73.70	1	5	60.0	15.50	96.8
SMCJ64	SMCJ64C	GGL	BGL	71.10	86.90	1	5	64.0	13.16	114.0
SMCJ64A	SMCJ64CA	GGM	BGM	71.10	78.60	1	5	64.0	14.56	103.0
SMCJ70	SMCJ70C	GGN	BGN	77.80	95.10	1	5	70.0	12.00	125.0
SMCJ70A	SMCJ70CA	GGP	BGP	77.80	86.00	1	5	70.0	13.27	113.0
SMCJ75	SMCJ75C	GGQ	BGQ	83.30	102.00	1	5	75.0	11.19	134.0
SMCJ75A	SMCJ75CA	GGR	BGR	83.30	92.10	1	5	75.0	12.40	121.0
SMCJ78	SMCJ78C	GGS	BGS	86.70	106.00	1	5	78.0	10.79	139.0
SMCJ78A	SMCJ78CA	GGT	BGT	86.70	95.80	1	5	78.0	11.90	126.0
SMCJ80	SMCJ80C	GGA	BGA	88.96	108.80	1	5	80.0	10.47	143.2
SMCJ80A	SMCJ80CA	GGB	BGB	88.80	97.60	1	5	80.0	11.57	129.6

Electrical Characteristics(Cont.)

Part Number (UNI)	Part Number (BI)	Device Marking Code		Breakdown Voltage $V_{(BR)}$ @I_T			Maximum reverse leakage I_R @ V_{RWM} (μA)	Working Peak reverse voltage V_{RWM} (V)	Maximum reverse surge Current I_{PP} (A)	Maximum clamping voltage V_C @I_{PP} (V)
		UNI	BI	Min (V)	Max (V)	I_T (mA)				
SMCJ85	SMCJ85C	GGU	BGU	94.40	115.00	1	5	85.0	9.93	151.0
SMCJ85A	SMCJ85CA	GGV	BGV	94.40	104.00	1	5	85.0	10.95	137.0
SMCJ90	SMCJ90C	GGW	BGW	100.00	122.00	1	5	90.0	9.38	160.0
SMCJ90A	SMCJ90CA	GGX	BGX	100.00	111.00	1	5	90.0	10.27	146.0
SMCJ100	SMCJ100C	GGY	BGY	111.00	136.00	1	5	100.0	8.38	179.0
SMCJ100A	SMCJ100CA	GGZ	BGZ	111.00	123.00	1	5	100.0	9.26	162.0
SMCJ110	SMCJ110C	GHD	BHD	122.00	149.00	1	5	110.0	7.65	196.0
SMCJ110A	SMCJ110CA	GHE	BHE	122.00	135.00	1	5	110.0	8.47	177.0
SMCJ120	SMCJ120C	GHF	BHF	133.00	163.00	1	5	120.0	7.01	214.0
SMCJ120A	SMCJ120CA	GHG	BHG	133.00	147.00	1	5	120.0	7.77	193.0
SMCJ130	SMCJ130C	GHH	BHH	144.00	176.00	1	5	130.0	6.49	231.0
SMCJ130A	SMCJ130CA	GHK	BHK	144.00	159.00	1	5	130.0	7.18	209.0
SMCJ140	SMCJ140C	GHA	BHA	155.68	190.40	1	5	140.0	5.99	250.6
SMCJ140A	SMCJ140CA	GHB	BHB	155.00	171.00	1	5	140.0	6.61	226.8
SMCJ150	SMCJ150C	GHL	BHL	167.00	204.00	1	5	150.0	5.60	268.0
SMCJ150A	SMCJ150CA	GHM	BHM	167.00	185.00	1	5	150.0	6.17	243.0
SMCJ160	SMCJ160C	GHN	BHN	178.00	218.00	1	5	160.0	5.23	287.0
SMCJ160A	SMCJ160CA	GHP	BHP	178.00	197.00	1	5	160.0	5.79	259.0
SMCJ170	SMCJ170C	GHQ	BHQ	189.00	231.00	1	5	170.0	4.93	304.0
SMCJ170A	SMCJ170CA	GHR	BHR	189.00	209.00	1	5	170.0	5.45	275.0
SMCJ180	SMCJ180C	GHS	BHS	200.16	244.80	1	5	180.0	4.66	322.2
SMCJ180A	SMCJ180CA	GHT	BHT	200.00	220.00	1	5	180.0	5.14	291.6
SMCJ190	SMCJ190C	GHU	BHU	211.28	258.40	1	5	190.0	4.41	340.1
SMCJ190A	SMCJ190CA	GHV	BHV	211.00	232.00	1	5	190.0	4.87	307.8
SMCJ200A	SMCJ200CA	GHW	BHW	224.00	247.00	1	5	200.0	4.60	324.0
SMCJ220A	SMCJ220CA	GHX	BHX	246.00	272.00	1	5	220.0	4.20	356.0
SMCJ250A	SMCJ250CA	GHZ	BHZ	279.00	309.00	1	5	250.0	3.70	405.0
SMCJ300A	SMCJ300CA	GJE	BJE	335.00	371.00	1	5	300.0	3.10	486.0
SMCJ350A	SMCJ350CA	GJG	BJG	391.00	432.00	1	5	350.0	2.60	567.0
SMCJ400A	SMCJ400CA	GJK	BJK	447.00	494.00	1	5	400.0	2.30	648.0
SMCJ440A	SMCJ440CA	GJM	BJM	492.00	543.00	1	5	440.0	2.10	713.0

Note: 1.Suffix 'A' denotes 5% tolerance device. Without 'A' denotes 10% tolerance device.
2.Add suffix 'C' or 'CA' after part number to specify Bi-directional devices.
3.For bidirectional types having V_R of 10 volts and less, the I_R limit is doubled.

Ratings and Characteristics Curves (T_A=25℃ unless otherwise noted)

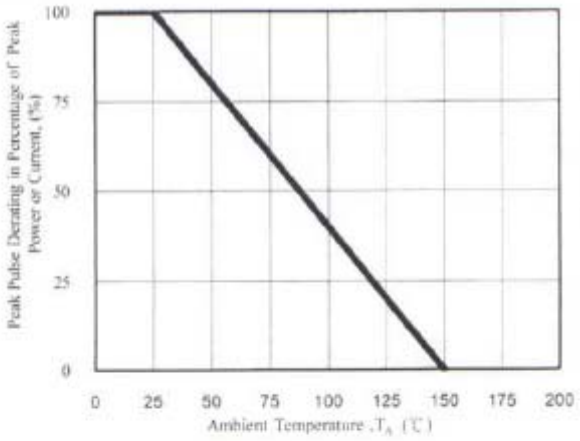


Fig. 1 - Pulse Derating Curve

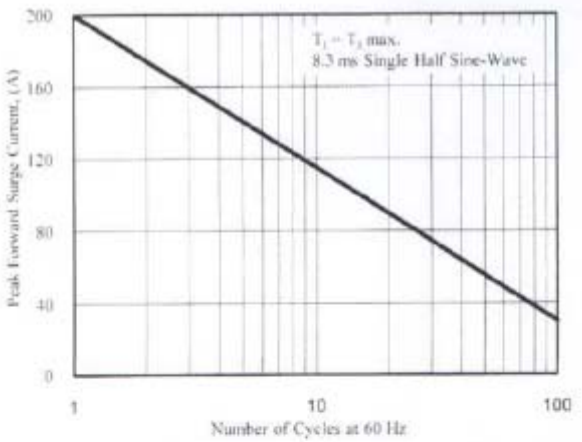


Fig. 2 - Maximum Non-Repetitive Surge Current

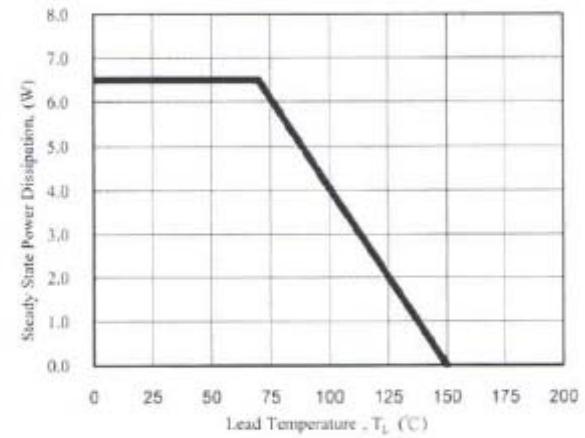


Fig. 3 - Steady State Power Derating Curve

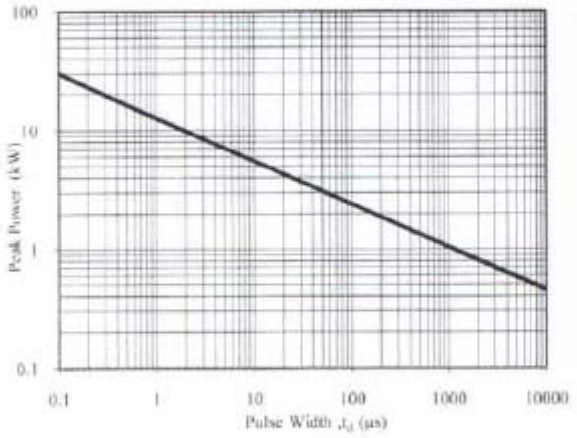


Fig. 4 - Peak Pulse Power Rating Curve

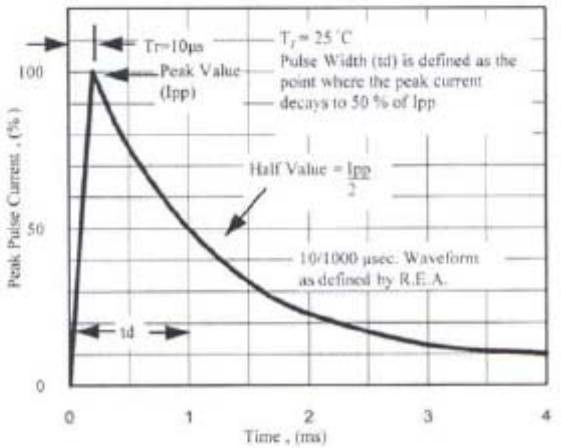


Fig. 5 - Pulse Waveform

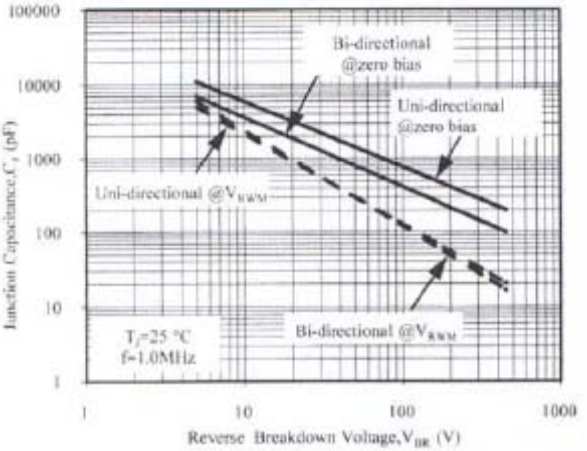
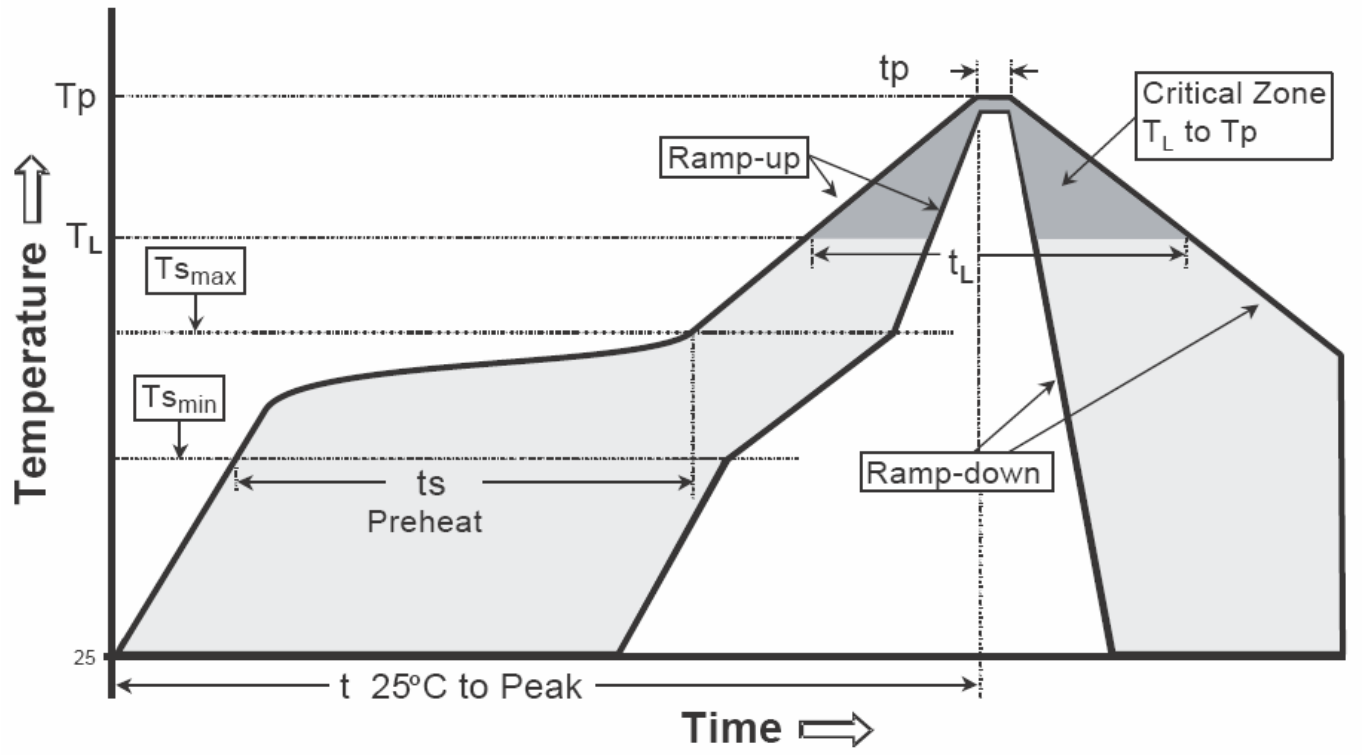


Fig. 6 - Typical Junction Capacitance

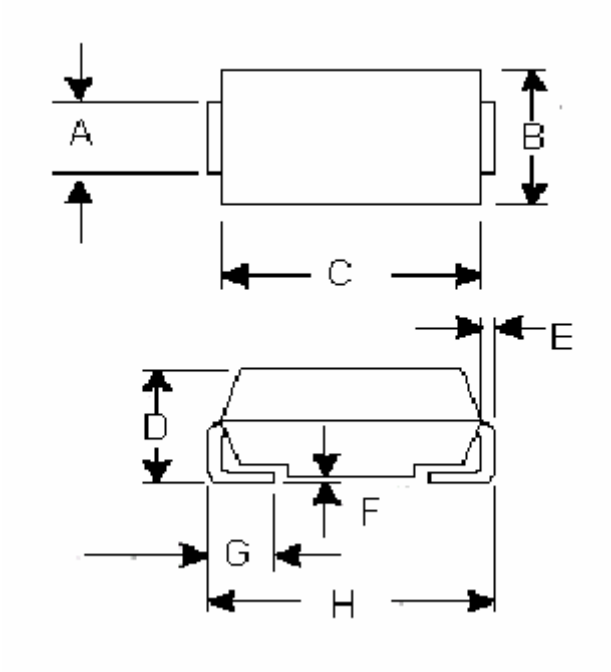
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

DO-214AB/SMC Dimension



*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.114	0.126	2.86	3.20	E	0.006	0.012	0.15	0.31
B	0.220	0.245	5.52	6.22	F	0.000	0.008	0.00	0.20
C	0.260	0.280	6.52	7.11	G	0.030	0.060	0.76	1.52
D	0.078	0.103	1.98	2.62	H	0.305	0.320	7.75	8.13

Notes : 1.Controlling dimension : millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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