THE DATASHEET OF

SMAJ45

Transient Voltage Suppressors
DO-214AC/SMA Package

SMAJ Series

MERITEK

FEATURE

- Breakdown Voltage from 5.0 to 440V
- 400W peak power dissipation with a 10/1000μs waveform, repetitive rate (duty cycle): 0.01%
- Glass passivated chip
- Excellent clamping capability; Fast response time
- Terminal: Solderable per MIL-STD-750, Method 2026
- Epoxy: UL 94V-0 rate flame retardant
- UL/cUL safety approved: certification No: E223045

ELECTRICAL CHARACTERISTICS

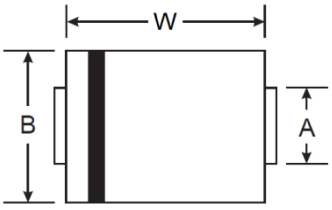
RoHS c UL us

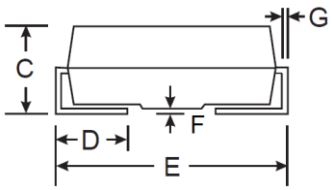
Parameter	Symbols	Value	Unit
Peak power dissipation with a 10/1000μs waveform(1)	P_{PP}	400	Watts
Peak pulse current with a 10/1000μs waveform(1)	I_{PP}	See Next Table	Amps
Power dissipation on infinite heatsink at TL = 75 °C	P_D	1.0	Watts
Peak forward surge current, 8.3 ms single half sine-wave unidirectional only. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum.	I_{FSM}	40	Amps
Maximum instantaneous forward voltage at 25 A for unidirectional only. VF <3.5V for devices of VBR <200V and VF <5.0V for devices of VBR >201V	V_F	3.5/5.0	Volts
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	°C

Rating at 25ºC, ambient temperature unless otherwise specified. Single phase, half wave, 60 Hz, resistive or inductive load.
For capacitive load, derate current by 20%.
1.Non-repetitive current pulse per Fig.5 and derated above TA=25℃ per Fig.1

DIMENSIONS

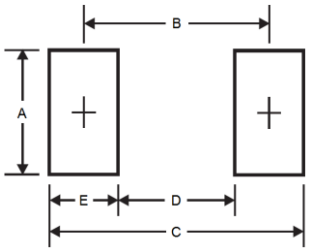
Item	DO-214AC(SMA) Milimeters	
	Min.	Max.
W	4.00	4.60
A	1.23	1.70
B	2.18	2.90
C	1.70	2.44
D	0.75	1.51
E	4.70	5.31
F	-	0.203
G	0.152	0.305

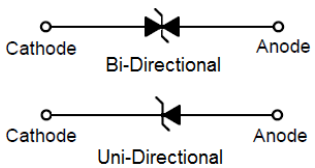




SOLDERING PAD LAYOUT

A	B	C	D	E
1.7	4.1	6.6	1.5	2.6





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ELECTRICAL CHARACTERISTICS

Device Type (Uni)	Device Type (Bi)	Marking Code Uni	Marking Code Bi	Breakdown Voltage VBR@IT Min(V)	Breakdown Voltage VBR@IT Max(V)	Breakdown Voltage VBR@IT IT(mA)	Working Peak Reverse Voltage VRWM(V)	Maximum Reverse Leakage IR @ VRWM(V)	Maximum Reverse Surge Current Ipp(A)	Maximum Clamping Voltage VC@Ipp
SMAJ5.0	SMAJ5.0C	AD	WD	6.40	7.30	10	5.0	800	41.67	9.6
SMAJ5.0A	SMAJ5.0CA	AE	WE	6.40	7.00	10	5.0	800	43.48	9.2
SMAJ6.0	SMAJ6.0C	AF	WF	6.67	8.15	10	6.0	800	35.09	11.4
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.67	7.37	10	6.0	800	38.83	10.3
SMAJ6.5	SMAJ6.5C	AH	WH	7.22	8.82	10	6.5	500	32.52	12.3
SMAJ6.5A	SMAJ6.5CA	AK	WK	7.22	7.98	10	6.5	500	35.71	11.2
SMAJ7.0	SMAJ7.0C	AL	WL	7.78	9.51	10	7.0	200	30.08	13.3
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.78	8.60	10	7.0	200	33.33	12.0
SMAJ7.5	SMAJ7.5C	AN	WN	8.33	10.20	1	7.5	100	27.97	14.3
SMAJ7.5A	SMAJ7.5CA	AP	WP	8.33	9.21	1	7.5	100	31.01	12.9
SMAJ8.0	SMAJ8.0C	AQ	WQ	8.89	10.90	1	8.0	50	26.67	15.0
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.89	9.83	1	8.0	50	29.41	13.6
SMAJ8.5	SMAJ8.5C	AS	WS	9.44	11.50	1	8.5	10	25.16	15.9
SMAJ8.5A	SMAJ8.5CA	AT	WT	9.44	10.40	1	8.5	10	27.78	14.4
SMAJ9.0	SMAJ9.0C	AU	WU	10.00	12.20	1	9.0	5	23.67	16.9
SMAJ9.0A	SMAJ9.0CA	AV	WV	10.00	11.10	1	9.0	5	25.97	15.4
SMAJ10	SMAJ10C	AW	WW	11.10	13.60	1	10.0	5	21.28	18.8
SMAJ10A	SMAJ10CA	AX	WX	11.10	12.30	1	10.0	5	23.53	17.0
SMAJ11	SMAJ11C	AY	WY	12.20	14.90	1	11.0	5	19.90	20.1
SMAJ11A	SMAJ11CA	AZ	WZ	12.20	13.50	1	11.0	5	21.98	18.2
SMAJ12	SMAJ12C	BD	XD	13.30	16.30	1	12.0	5	18.18	22.0
SMAJ12A	SMAJ12CA	BE	XE	13.30	14.70	1	12.0	5	20.10	19.9
SMAJ13	SMAJ13C	BF	XF	14.40	17.60	1	13.0	5	16.81	23.8
SMAJ13A	SMAJ13CA	BG	XG	14.40	15.90	1	13.0	5	18.60	21.5
SMAJ14	SMAJ14C	BH	XH	15.60	19.10	1	14.0	5	15.50	25.8
SMAJ14A	SMAJ14CA	BK	XK	15.60	17.20	1	14.0	5	17.24	23.3
SMAJ15	SMAJ15C	BL	XL	16.70	20.40	1	15.0	5	14.87	26.9
SMAJ15A	SMAJ15CA	BM	XM	16.70	18.50	1	15.0	5	16.39	24.4
SMAJ16	SMAJ16C	BN	XN	17.80	21.80	1	16.0	5	13.89	28.8
SMAJ16A	SMAJ16CA	BP	XP	17.80	19.70	1	16.0	5	15.38	26.0
SMAJ17	SMAJ17C	BQ	XQ	18.90	23.10	1	17.0	5	13.11	30.5
SMAJ17A	SMAJ17CA	BR	XR	18.90	20.90	1	17.0	5	14.49	27.6
SMAJ18	SMAJ18C	BS	XS	20.00	24.40	1	18.0	5	12.42	32.2
SMAJ18A	SMAJ18CA	BT	XT	20.00	22.10	1	18.0	5	13.70	29.2
SMAJ19	SMAJ19C	BA	XA	21.10	25.76	1	19.0	5	11.76	34.0
SMAJ19A	SMAJ19CA	BB	XB	21.10	23.30	1	19.0	5	13.00	30.8
SMAJ20	SMAJ20C	BU	XU	22.20	27.10	1	20.0	5	11.17	35.8
SMAJ20A	SMAJ20CA	BV	XV	22.20	24.50	1	20.0	5	12.35	32.4
SMAJ22	SMAJ22C	BW	XW	24.40	29.80	1	22.0	5	10.15	39.4
SMAJ22A	SMAJ22CA	BX	XX	24.40	26.90	1	22.0	5	11.27	35.5
SMAJ24	SMAJ24C	BY	XY	26.70	32.60	1	24.0	5	9.30	43.0
SMAJ24A	SMAJ24CA	BZ	XZ	26.70	29.50	1	24.0	5	10.28	38.9
SMAJ26	SMAJ26C	CD	YD	28.90	35.30	1	26.0	5	8.58	46.6
SMAJ26A	SMAJ26CA	CE	YE	28.90	31.90	1	26.0	5	9.50	42.1
SMAJ28	SMAJ28C	CF	YF	31.10	38.00	1	28.0	5	8.00	50.0
SMAJ28A	SMAJ28CA	CG	YG	31.10	34.40	1	28.0	5	8.81	45.4
SMAJ30	SMAJ30C	CH	YH	33.30	40.70	1	30.0	5	7.48	53.5
SMAJ30A	SMAJ30CA	CK	YK	33.30	36.80	1	30.0	5	8.26	48.4
SMAJ33	SMAJ33C	CL	YL	36.70	44.90	1	33.0	5	6.78	59.0

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Device Type (Uni)	Device Type	Marking Code		Breakdown Voltage VBR@IT			Working Peak Reverse Voltage VRWM(V)	Maximum Reverse Leakage IR @ VRWM(V)	Maximum Reverse Surge Current Ipp(A)	Maximum Clamping Voltage VC@Ipp
	(Bi)	Uni	Bi	Min(V)	Max(V)	IT(mA)				
SMAJ33A	SMAJ33CA	CM	YM	36.70	40.60	1	33.0	5	7.50	53.3
SMAJ36	SMAJ36C	CN	YN	40.00	48.90	1	36.0	5	6.22	64.3
SMAJ36A	SMAJ36CA	CP	YP	40.00	44.20	1	36.0	5	6.88	58.1
SMAJ40	SMAJ40C	CQ	YQ	44.40	54.30	1	40.0	5	5.60	71.4
SMAJ40A	SMAJ40CA	CR	YR	44.40	49.10	1	40.0	5	6.20	64.5
SMAJ43	SMAJ43C	CS	YS	47.80	58.40	1	43.0	5	5.22	76.7
SMAJ43A	SMAJ43CA	CT	YT	47.80	52.80	1	43.0	5	5.76	69.4
SMAJ45	SMAJ45C	CU	YU	50.00	61.10	1	45.0	5	4.98	80.3
SMAJ45A	SMAJ45CA	CV	YV	50.00	55.30	1	45.0	5	5.50	72.7
SMAJ48	SMAJ48C	CW	YW	53.30	65.10	1	48.0	5	4.68	85.5
SMAJ48A	SMAJ48CA	CX	YX	53.30	58.90	1	48.0	5	5.17	77.4
SMAJ51	SMAJ51C	CY	YY	56.70	69.30	1	51.0	5	4.39	91.1
SMAJ51A	SMAJ51CA	CZ	YZ	56.70	62.70	1	51.0	5	4.85	82.4
SMAJ54	SMAJ54C	RD	ZD	60.00	73.30	1	54.0	5	4.15	96.3
SMAJ54A	SMAJ54CA	RE	ZE	60.00	66.30	1	54.0	5	4.59	87.1
SMAJ58	SMAJ58C	RF	ZF	64.40	78.70	1	58.0	5	3.88	103.0
SMAJ58A	SMAJ58CA	RG	ZG	64.40	71.20	1	58.0	5	4.27	93.6
SMAJ60	SMAJ60C	RH	ZH	66.70	81.50	1	60.0	5	3.74	107.0
SMAJ60A	SMAJ60CA	RK	ZK	66.70	73.70	1	60.0	5	4.13	96.8
SMAJ64	SMAJ64C	RL	ZL	71.10	86.90	1	64.0	5	3.51	114.0
SMAJ64A	SMAJ64CA	RM	ZM	71.10	78.60	1	64.0	5	3.88	103.0
SMAJ70	SMAJ70C	RN	ZN	77.80	95.10	1	70.0	5	3.20	125.0
SMAJ70A	SMAJ70CA	RP	ZP	77.80	86.00	1	70.0	5	3.54	113.0
SMAJ75	SMAJ75C	RQ	ZQ	83.30	102.00	1	75.0	5	2.99	134.0
SMAJ75A	SMAJ75CA	RR	ZR	83.30	92.10	1	75.0	5	3.31	121.0
SMAJ78	SMAJ78C	RS	ZS	86.70	106.00	1	78.0	5	2.88	139.0
SMAJ78A	SMAJ78CA	RT	ZT	86.70	95.80	1	78.0	5	3.17	126.0
SMAJ80	SMAJ80C	RA	ZA	88.96	108.80	1	80.0	5	2.79	143.2
SMAJ80A	SMAJ80CA	RB	ZB	88.80	97.60	1	80.0	5	3.09	129.6
SMAJ85	SMAJ85C	RU	ZU	94.40	115.00	1	85.0	5	2.65	151.0
SMAJ85A	SMAJ85CA	RV	ZV	94.40	104.00	1	85.0	5	2.92	137.0
SMAJ90	SMAJ90C	RW	ZW	100.00	122.00	1	90.0	5	2.50	160.0
SMAJ90A	SMAJ90CA	RX	ZX	100.00	111.00	1	90.0	5	2.74	146.0
SMAJ100	SMAJ100C	RY	ZY	111.00	136.00	1	100.0	5	2.23	179.0
SMAJ100A	SMAJ100CA	RZ	ZZ	111.00	123.00	1	100.0	5	2.47	162.0
SMAJ110	SMAJ110C	SD	VD	122.00	149.00	1	110.0	5	2.04	196.0
SMAJ110A	SMAJ110CA	SE	VE	122.00	135.00	1	110.0	5	2.26	177.0
SMAJ120	SMAJ120C	SF	VF	133.00	163.00	1	120.0	5	1.87	214.0
SMAJ120A	SMAJ120CA	SG	VG	133.00	147.00	1	120.0	5	2.07	193.0
SMAJ130	SMAJ130C	SH	VH	144.00	176.00	1	130.0	5	1.73	231.0
SMAJ130A	SMAJ130CA	SK	VK	144.00	159.00	1	130.0	5	1.91	209.0
SMAJ140	SMAJ140C	SA	VA	155.68	190.40	1	140.0	5	1.60	250.6
SMAJ140A	SMAJ140CA	SB	VB	155.00	171.00	1	140.0	5	1.76	226.8
SMAJ150	SMAJ150C	SL	VL	167.00	204.00	1	150.0	5	1.49	268.0
SMAJ150A	SMAJ150CA	SM	VM	167.00	185.00	1	150.0	5	1.65	243.0
SMAJ160	SMAJ160C	SN	VN	178.00	218.00	1	160.0	5	1.39	287.0
SMAJ160A	SMAJ160CA	SP	VP	178.00	197.00	1	160.0	5	1.54	259.0
SMAJ170	SMAJ170C	SQ	VQ	189.00	231.00	1	170.0	5	1.32	304.0
SMAJ170A	SMAJ170CA	SR	VR	189.00	209.00	1	170.0	5	1.45	275.0

ELECTRICAL CHARACTERISTICS(Continued)

Device Type (Uni)	Device Type (Bi)	Marking Code		Breakdown Voltage VBR@IT			Working Peak Reverse Voltage VRWM(V)	Maximum Reverse Leakage IR @ VRWM(V)	Maximum Reverse Surge Current Ipp(A)	Maximum Clamping Voltage VC@Ipp
		Uni	Bi	Min(V)	Max(V)	IT(mA)				
SMAJ180	SMAJ180C	SS	VS	200.16	244.80	1	180.0	5	1.24	322.2
SMAJ180A	SMAJ180CA	ST	VT	200.00	220.00	1	180.0	5	1.37	291.6
SMAJ190	SMAJ190C	SU	VU	211.00	258.40	1	190.0	5	1.18	340.1
SMAJ190A	SMAJ190CA	SV	VV	211.00	232.00	1	190.0	5	1.30	307.8
SMAJ200A	SMAJ200CA	SW	VW	224.00	247.00	1	200.0	5	1.23	324.0
SMAJ220A	SMAJ220CA	SX	VX	246.00	272.00	1	220.0	5	1.12	356.0
SMAJ250A	SMAJ250CA	SZ	VZ	279.00	309.00	1	250.0	5	0.99	405.0
SMAJ300A	SMAJ300CA	DE	HE	335.00	371.00	1	300.0	5	0.82	486.0
SMAJ350A	SMAJ350CA	DG	HG	391.00	432.00	1	350.0	5	0.71	567.0
SMAJ400A	SMAJ400CA	DK	HK	447.00	494.00	1	400.0	5	0.62	648.0
SMAJ440A	SMAJ400CA	DM	HM	492.00	543.00	1	440.0	5	0.56	713.0

CHARACTERISTICS CURVES

Fig.1 Pulse Derating Curve

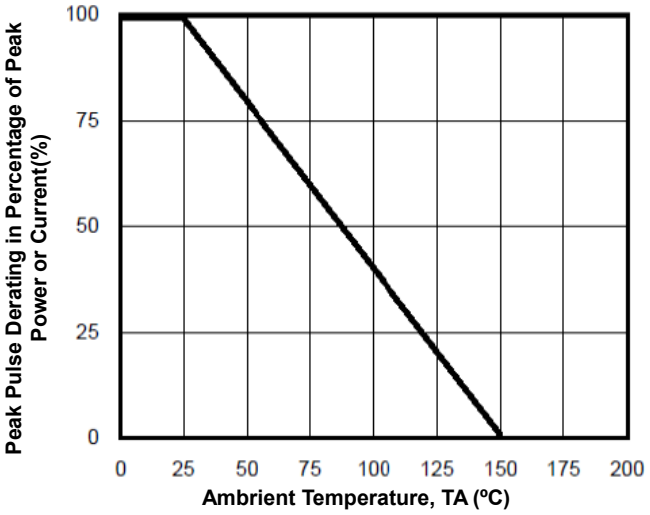


Fig 2. Maximum Non-Repetitive Surge Current

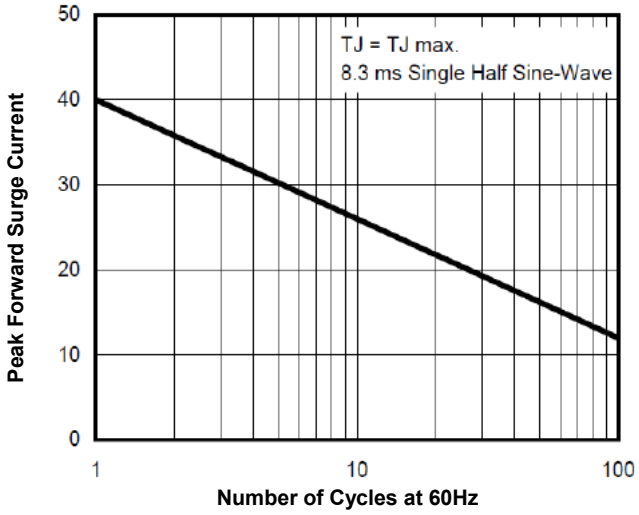


Fig 3. Steady State Power Derating Curve

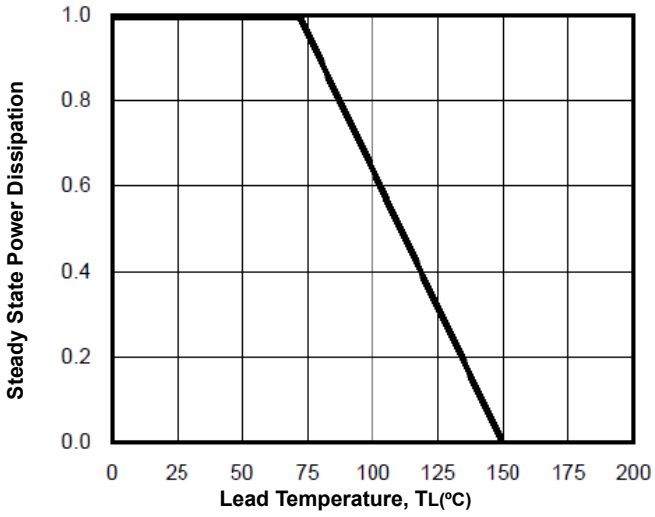
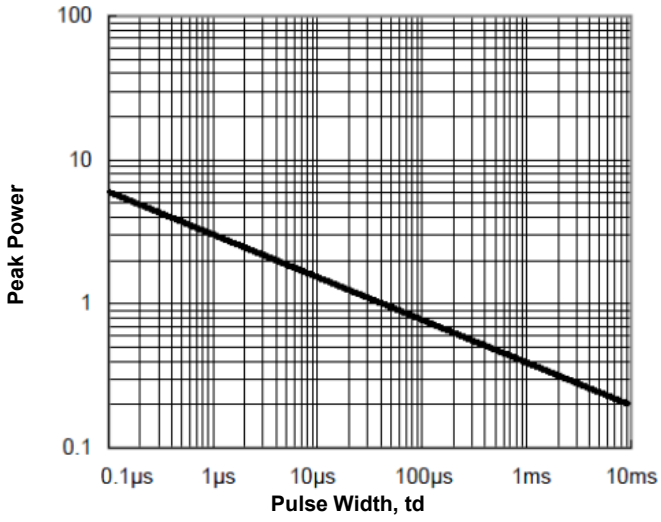


Fig 4. Peak Pulse Power Rating Curve



CHARACTERISTICS CURVES(Continued)

Fig 5. Pulse Waveform

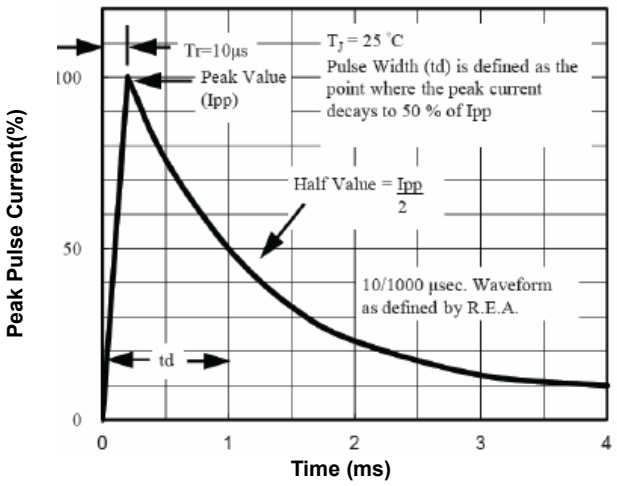
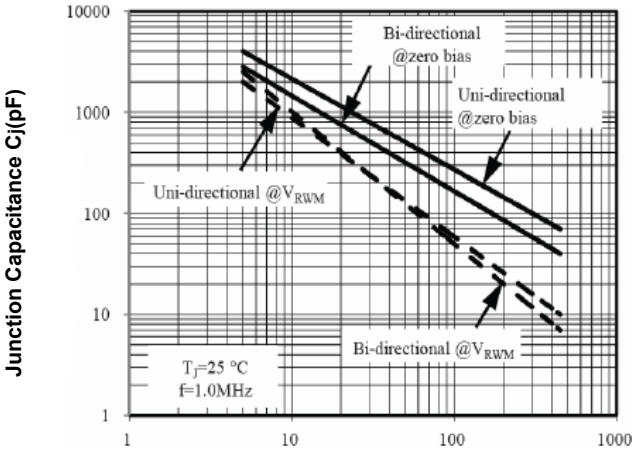
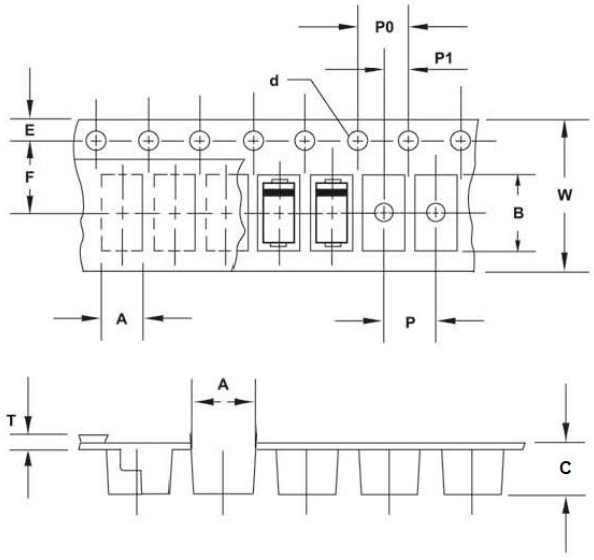


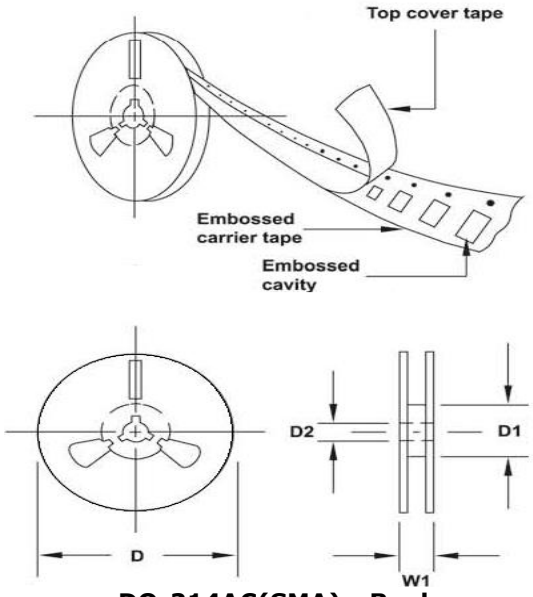
Fig 6. Typical Junction Capacitance



PACKAGING SPECIFICATION- DO214AC (SMA) - Tape Carrier and Reel



DO-214AC(SMA) - Tape carrier



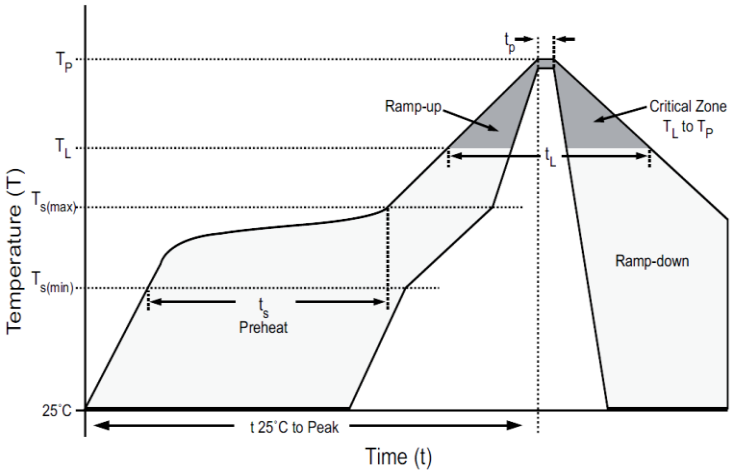
DO-214AC(SMA) - Reel

Item	Symbol	DO-214AC (SMA)	Item	Symbol	DO-214AC (SMA)
Carrier width	A	3.00 ± 0.10	**Punch hole position**	F	5.65 ± 0.05
Carrier length	B	5.40 ± 0.10	**Punch hole pitch**	P	4.00 ± 0.10
Carrier depth	C	2.40 ± 0.10	**Sprocket hole pitch**	P0	4.00 ± 0.10
Sprocket hole	d	1.50 ± 0.10	**Embossment center**	P1	2.00 ± 0.10
Reel outside diameter	D	330.0 ± 2.0	**Overall tape thickness**	T	0.30 ± 0.05
Reel inner diameter	D1	50 min.	**Tape width**	W	12.00 ± 0.20
Feed hole diameter	D2	13.00 ± 0.50	**Reel width**	W1	16.80 ± 2.00
Sprocket hole position	E	1.50 ± 0.10			

Unit: mm

RECOMMENDED SOLDERING PROFILES

Reflow Condition		
Average Ramp-up Rate T_L to T_P		3°C/second max.
Pre Heat	**Temp. Min $T_{s(min)}$**	150°C
	Tempe. Max $T_{s(max)}$	200°C
	Time (min. to max.) (t_s)	60-120 seconds
Ramp-up Rate $T_{s(max)}$ to T_L		3°C/second max.
Reflow	**Temp. (T_L)**	217°C
	Time (t_L)	60-260 seconds
Peak Temperature (T_P)		$255^{-0/+5}$ °C
Time within 5°C of actual peak Temperature (t_p)		10-30 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to peak Temp. (T_P)		6 minutes max.



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