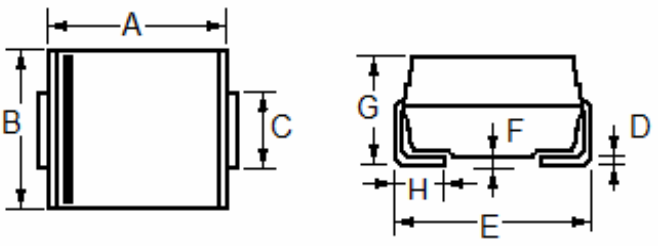
KWSMAJ5.0---KWSMAJ440CA

400W Surface Mount Transient Voltage Suppressors

Features

- ◆Working peak reverse voltage range – 5.0V to 440V.
- ◆Peak power dissipation 400W @10 x 1000 us Pulse
- ◆Low profile package.
- ◆Excellent clamping capability.
- ◆Glass passivated junction.
- ◆Fast response time: typically less than 1 ns for Uni-direction. Less than 5 ns for Bi-direction, from 0 Volts to BV min
- ◆Typical IR less than 1uA above 10V.
- ◆Plastic material has UL flammability classification 94V-O
- ◆RoHS compliant in lead-free versions Moisture Sensitivity: Level 1 per J-STD-020

DO-214AC(SMA)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	4.10	4.55	0.161	0.179
B	2.60	2.80	0.102	0.110
C	1.23	1.63	0.048	0.064
D	0.150	0.300	0.006	0.012
E	4.87	5.22	0.192	0.206
F	----	0.203	----	0.008
G	2.15	2.35	0.085	0.093
H	0.75	1.51	0.030	0.059

Mechanical Characteristics

- ◆CASE: Void-free, JEDEC DO-214AC Molded Plastic over glass passivated junction.
- ◆Mounting Position: Any
- ◆Polarity: by cathode band denotes uni-directional device, none cathode band denotes bi-directional device.
- ◆Terminal: Solder plated, solderable per MIL-STD-750, Method 2026

Maximum Ratings And Characteristics@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation on 10/1000 us Waveform (Note 1, 2, FIG.1)	P_{PPM}	Min 400	W
Peak Pulse Current of on 10/1000us Waveform (Note 1, FIG.3)	I_{PPM}	See Table 1	Amps
Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load, (JEDEC Method) (Note 2. 3)	I_{FSM}	60	Amps
Operating Junction Temperature Range	T_J	-55 to 125	°C
Storage Temperature Range	T_{STG}	-55 to 150	°C

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25°C per Fig.2.
2. Mounted on 5.0mm^2 (0.03mm thick) Copper Pads to each terminal.
3. 8.3 ms single half sine-wave, or equivalent square wave, Duty cycle=4 pluses per minute maximum

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Electrical Characteristics@ Tamb 25°C

Type Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I_T	Breakdown Voltage Max. @ I_T	Test Current	Maximum Clamping Voltage @I_{PP}	Peak Pulse Current	Reverse Leakage @V_{RMW}
(Uni)	(Bi)	(Uni)	(Bi)	V_{RWM}(V)	$V_{BR\ MIN}$(V)	$V_{BR\ MAX}$(V)	I_T (mA)	V_C(V)	I_{PP}(A)	I_R(uA)
KWSMAJ5.0	KWSMAJ5.0C	HD	TD	5.0	6.40	7.55	10.0	9.6	41.7	800.0
KWSMAJ5.0A	KWSMAJ5.0CA	HE	TE	5.0	6.40	7.25	10.0	9.2	43.5	800.0
KWSMAJ6.0	KWSMAJ6.0C	HF	TF	6.0	6.67	8.45	10.0	11.4	35.1	800.0
KWSMAJ6.0A	KWSMAJ6.0CA	HG	TG	6.0	6.67	7.67	10.0	10.3	38.8	800.0
KWSMAJ6.5	KWSMAJ6.5C	HH	TH	6.5	7.22	9.14	10.0	12.3	32.5	500.0
KWSMAJ6.5A	KWSMAJ6.5CA	HK	TK	6.5	7.22	8.30	10.0	11.2	35.7	500.0
KWSMAJ7.0	KWSMAJ7.0C	HL	TL	7.0	7.78	9.86	10.0	13.3	30.1	200.0
KWSMAJ7.0A	KWSMAJ7.0CA	HM	TM	7.0	7.78	8.95	10.0	12.0	33.3	200.0
KWSMAJ7.5	KWSMAJ7.5C	HN	TN	7.5	8.33	10.67	1.0	14.3	28.0	100.0
KWSMAJ7.5A	KWSMAJ7.5CA	HP	TP	7.5	8.33	9.58	1.0	12.9	31.0	100.0
KWSMAJ8.0	KWSMAJ8.0C	HQ	TQ	8.0	8.89	11.3	1.0	15.0	26.7	50.0
KWSMAJ8.0A	KWSMAJ8.0CA	HR	TR	8.0	8.89	10.23	1.0	13.6	29.4	50.0
KWSMAJ8.5	KWSMAJ8.5C	HS	TS	8.5	9.44	11.92	1.0	15.9	25.2	20.0
KWSMAJ8.5A	KWSMAJ8.5CA	HT	TT	8.5	9.44	10.82	1.0	14.4	27.8	20.0
KWSMAJ9.0	KWSMAJ9.0C	HU	TU	9.0	10.0	12.6	1.0	16.9	23.7	10.0
KWSMAJ9.0A	KWSMAJ9.0CA	HV	TV	9.0	10.0	11.5	1.0	15.4	26.0	10.0
KWSMAJ10	KWSMAJ10C	HW	TW	10	11.1	14.1	1.0	18.8	21.3	5.0
KWSMAJ10A	KWSMAJ10CA	HX	TX	10	11.1	12.8	1.0	17.0	23.5	5.0
KWSMAJ11	KWSMAJ11C	HY	TY	11	12.2	15.4	1.0	20.1	19.9	5.0
KWSMAJ11A	KWSMAJ11CA	HZ	TZ	11	12.2	14.0	1.0	18.2	22.0	5.0
KWSMAJ12	KWSMAJ12C	ID	UD	12	13.3	16.9	1.0	22.0	18.2	5.0
KWSMAJ12A	KWSMAJ12CA	IE	UE	12	13.3	15.3	1.0	19.9	20.1	5.0
KWSMAJ13	KWSMAJ13C	IF	UF	13	14.4	18.2	1.0	23.8	16.8	5.0
KWSMAJ13A	KWSMAJ13CA	IG	UG	13	14.4	16.5	1.0	21.5	18.6	5.0
KWSMAJ14	KWSMAJ14C	IH	UH	14	15.6	19.8	1.0	25.8	15.5	5.0
KWSMAJ14A	KWSMAJ14CA	IK	UK	14	15.6	17.9	1.0	23.2	17.2	5.0
KWSMAJ15	KWSMAJ15C	IL	UL	15	16.7	21.1	1.0	26.9	14.9	5.0
KWSMAJ15A	KWSMAJ15CA	IM	UM	15	16.7	19.2	1.0	24.4	16.4	5.0
KWSMAJ16	KWSMAJ16C	IN	UN	16	17.8	22.6	1.0	28.8	13.9	5.0
KWSMAJ16A	KWSMAJ16CA	IP	UP	16	17.8	20.5	1.0	26.0	15.4	5.0
KWSMAJ17	KWSMAJ17C	IQ	UQ	17	18.9	23.9	1.0	30.5	13.1	5.0
KWSMAJ17A	KWSMAJ17CA	IR	UR	17	18.9	21.7	1.0	27.6	14.5	5.0
KWSMAJ18	KWSMAJ18C	IS	US	18	20.0	25.3	1.0	32.2	12.4	5.0
KWSMAJ18A	KWSMAJ18CA	IT	UT	18	20.0	23.3	1.0	29.2	13.7	5.0
KWSMAJ20	KWSMAJ20C	IU	UU	20	22.2	28.1	1.0	35.8	11.2	5.0
KWSMAJ20A	KWSMAJ20CA	IV	UV	20	22.2	25.5	1.0	32.4	12.3	5.0

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double

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Type Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I_T	Breakdown Voltage Max. @ I_T	Test Current	Maximum Clamping Voltage @I_{PP}	Peak Pulse Current	Reverse Leakage @V_{RMW}
(Uni)	(Bi)	(Uni)	(Bi)	V_{RMW}(V)	$V_{BR\ MIN}$(V)	$V_{BR\ MAX}$(V)	I_T (mA)	V_C(V)	I_{PP}(A)	I_R(uA)
KWSMAJ22	KWSMAJ22C	IW	UW	22	24.4	30.9	1.0	39.4	10.2	5.0
KWSMAJ22A	KWSMAJ22CA	IX	UX	22	24.4	28.0	1.0	35.5	11.3	5.0
KWSMAJ24	KWSMAJ24C	IY	UY	24	26.7	33.8	1.0	43.0	9.3	5.0
KWSMAJ24A	KWSMAJ24CA	IZ	UZ	24	26.7	30.7	1.0	38.9	10.3	5.0
KWSMAJ26	KWSMAJ26C	JD	VD	26	28.9	36.6	1.0	46.6	8.6	5.0
KWSMAJ26A	KWSMAJ26CA	JE	VE	26	28.9	33.2	1.0	42.1	9.5	5.0
KWSMAJ28	KWSMAJ28C	JF	VF	28	31.1	39.4	1.0	50.0	8.0	5.0
KWSMAJ28A	KWSMAJ28CA	JG	VG	28	31.1	35.8	1.0	45.4	8.8	5.0
KWSMAJ30	KWSMAJ30C	JH	VH	30	33.3	42.2	1.0	53.5	7.5	5.0
KWSMAJ30A	KWSMAJ30CA	JK	VK	30	33.3	38.3	1.0	48.4	8.3	5.0
KWSMAJ33	KWSMAJ33C	JL	VL	33	36.7	46.5	1.0	59.0	6.8	5.0
KWSMAJ33A	KWSMAJ33CA	JM	VM	33	36.7	42.2	1.0	53.3	7.5	5.0
KWSMAJ36	KWSMAJ36C	JN	VN	36	40.0	50.7	1.0	64.3	6.2	5.0
KWSMAJ36A	KWSMAJ36CA	JP	VP	36	40.0	46.0	1.0	58.1	6.9	5.0
KWSMAJ40	KWSMAJ40C	JQ	VQ	40	44.4	56.3	1.0	71.4	5.6	5.0
KWSMAJ40A	KWSMAJ40CA	JR	VR	40	44.4	51.1	1.0	64.5	6.2	5.0
KWSMAJ43	KWSMAJ43C	JS	VS	43	47.8	60.5	1.0	76.7	5.2	5.0
KWSMAJ43A	KWSMAJ43CA	JT	VT	43	47.8	54.9	1.0	69.4	5.8	5.0
KWSMAJ45	KWSMAJ45C	JU	VU	45	50.0	63.3	1.0	80.3	5.0	5.0
KWSMAJ45A	KWSMAJ45CA	JV	VV	45	50.0	57.5	1.0	72.7	5.5	5.0
KWSMAJ48	KWSMAJ48C	JW	VW	48	53.3	67.5	1.0	85.5	4.7	5.0
KWSMAJ48A	KWSMAJ48CA	JX	VX	48	53.3	61.3	1.0	77.4	5.2	5.0
KWSMAJ51	KWSMAJ51C	JY	VY	51	56.7	71.8	1.0	91.1	4.4	5.0
KWSMAJ51A	KWSMAJ51CA	JZ	VZ	51	56.7	65.2	1.0	82.4	4.9	5.0
KWSMAJ54	KWSMAJ54C	RD	WD	54	60.0	76.0	1.0	96.3	4.2	5.0
KWSMAJ54A	KWSMAJ54CA	RE	WE	54	60.0	69.0	1.0	87.1	4.6	5.0
KWSMAJ58	KWSMAJ58C	RF	WF	58	64.4	81.6	1.0	103	3.9	5.0
KWSMAJ58A	KWSMAJ58CA	RG	WG	58	64.4	74.1	1.0	93.6	4.3	5.0
KWSMAJ60	KWSMAJ60C	RH	WH	60	66.7	84.5	1.0	107	3.7	5.0
KWSMAJ60A	KWSMAJ60CA	RK	WK	60	66.7	76.7	1.0	96.8	4.1	5.0
KWSMAJ64	KWSMAJ64C	RL	WL	64	71.1	90.1	1.0	114	3.5	5.0
KWSMAJ64A	KWSMAJ64CA	RM	WM	64	71.1	81.8	1.0	103	3.9	5.0
KWSMAJ70	KWSMAJ70C	RN	WN	70	77.8	98.6	1.0	125	3.2	5.0
KWSMAJ70A	KWSMAJ70CA	RP	WP	70	77.8	89.5	1.0	113	3.5	5.0
KWSMAJ75	KWSMAJ75C	RQ	WQ	75	83.0	105.7	1.0	134	3.0	5.0
KWSMAJ75A	KWSMAJ75CA	RR	WR	75	83.0	95.8	1.0	121	3.3	5.0
KWSMAJ78	KWSMAJ78C	RS	WS	78	86.0	109.8	1.0	139	2.9	5.0
KWSMAJ78A	KWSMAJ78CA	RT	WT	78	86.0	99.7	1.0	126	3.2	5.0

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Type Number		Marking		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I_T	Breakdown Voltage Max. @ I_T	Test Current	Maximum Clamping Voltage @I_{PP}	Peak Pulse Current	Reverse Leakage @V_{RMW}
(Uni)	(Bi)	(Uni)	(Bi)	V_{RMW}(V)	$V_{BR\ MIN}$(V)	$V_{BR\ MAX}$(V)	I_T (mA)	V_C(V)	I_{PP}(A)	I_R(uA)
KWSMAJ85	KWSMAJ85C	RU	WU	85	94.0	119.2	1.0	151	2.6	5.0
KWSMAJ85A	KWSMAJ85CA	RV	WV	85	94.0	108.2	1.0	137	2.9	5.0
KWSMAJ90	KWSMAJ90C	RW	WW	90	100	126.5	1.0	160	2.5	5.0
KWSMAJ90A	KWSMAJ90CA	RX	WX	90	100	115.5	1.0	146	2.7	5.0
KWSMAJ100	KWSMAJ100C	RY	WY	100	111	141.0	1.0	179	2.2	5.0
KWSMAJ100A	KWSMAJ100CA	RZ	WZ	100	111	128.0	1.0	162	2.5	5.0
KWSMAJ110	KWSMAJ110C	SD	XD	110	122	154.5	1.0	196	2.0	5.0
KWSMAJ110A	KWSMAJ110CA	SE	XE	110	122	140.5	1.0	177	2.3	5.0
KWSMAJ120	KWSMAJ120C	SF	XF	120	133	169.0	1.0	214	1.9	5.0
KWSMAJ120A	KWSMAJ120CA	SG	XG	120	133	153.0	1.0	193	2.1	5.0
KWSMAJ130	KWSMAJ130C	SH	XH	130	144	182.5	1.0	231	1.7	5.0
KWSMAJ130A	KWSMAJ130CA	SK	XK	130	144	165.5	1.0	209	1.9	5.0
KWSMAJ150	KWSMAJ150C	SL	XL	150	167	211.5	1.0	268	1.5	5.0
KWSMAJ150A	KWSMAJ150CA	SM	XM	150	167	192.5	1.0	243	1.6	5.0
KWSMAJ160	KWSMAJ160C	SN	XN	160	178	226.0	1.0	287	1.4	5.0
KWSMAJ160A	KWSMAJ160CA	SP	XP	160	178	205.0	1.0	259	1.5	5.0
KWSMAJ170	KWSMAJ170C	SQ	XQ	170	189	239.5	1.0	304	1.3	5.0
KWSMAJ170A	KWSMAJ170CA	SR	XR	170	189	217.5	1.0	275	1.5	5.0
KWSMAJ180	KWSMAJ180C	SS	XS	180	200	253.8	1.0	321	1.2	5.0
KWSMAJ180A	KWSMAJ180CA	ST	XT	180	200	230.4	1.0	290	1.4	5.0
KWSMAJ190	KWSMAJ190C	SU	XU	190	211	267.9	1.0	339	1.2	5.0
KWSMAJ190A	KWSMAJ190CA	SV	XV	190	211	243.2	1.0	306	1.3	5.0
KWSMAJ200	KWSMAJ200C	SW	XW	200	222	282.0	1.0	356	1.1	5.0
KWSMAJ200A	KWSMAJ200CA	SX	XX	200	222	256.0	1.0	322	1.2	5.0
KWSMAJ210	KWSMAJ210C	SY	XY	210	233	296.1	1.0	375	1.1	5.0
KWSMAJ210A	KWSMAJ210CA	SZ	XZ	210	233	268.8	1.0	339	1.2	5.0
KWSMAJ220	KWSMAJ220C	ZD	YD	220	244	310.2	1.0	392	1.0	5.0
KWSMAJ220A	KWSMAJ220CA	ZE	YE	220	244	281.6	1.0	355	1.1	5.0
KWSMAJ250	KWSMAJ250C	ZF	YF	250	278	342.5	1.0	447	0.9	5.0
KWSMAJ250A	KWSMAJ250CA	ZG	YG	250	278	309.0	1.0	403	1.0	5.0
KWSMAJ300	KWSMAJ300C	ZH	YH	300	333	411.0	1.0	535	0.7	5.0
KWSMAJ300A	KWSMAJ300CA	ZK	YK	300	333	371.0	1.0	484	0.8	5.0
KWSMAJ350	KWSMAJ350C	ZL	YL	350	389	479.5	1.0	624	0.6	5.0
KWSMAJ350A	KWSMAJ350CA	ZM	YM	350	389	432.0	1.0	565	0.7	5.0
KWSMAJ400	KWSMAJ400C	ZN	YN	400	444	548.0	1.0	687	0.6	5.0
KWSMAJ400A	KWSMAJ400CA	ZP	YP	400	444	494.0	1.0	645	0.6	5.0
KWSMAJ440	KWSMAJ440C	ZQ	YQ	440	489	602.8	1.0	786	0.5	5.0
KWSMAJ440A	KWSMAJ440CA	ZR	YR	440	489	543.0	1.0	710	0.6	5.0

※ For Bi-directional type having VRWM of 10 Volts and less, the IR limit is double

Ratings and Characteristic Curves T_A=25°C unless otherwise noted

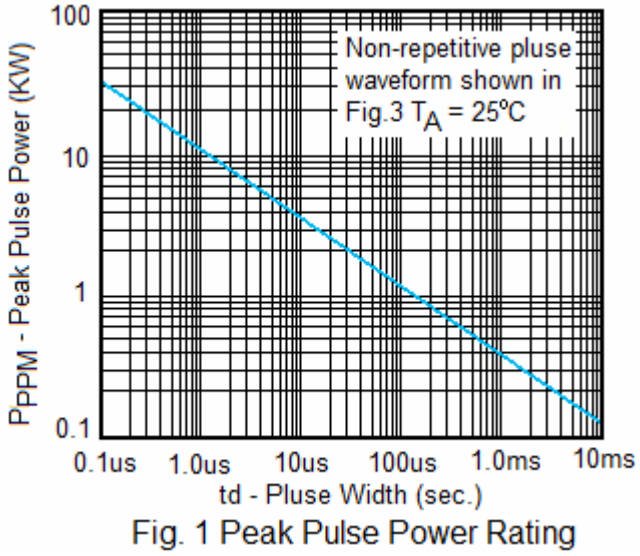


Fig. 1 Peak Pulse Power Rating

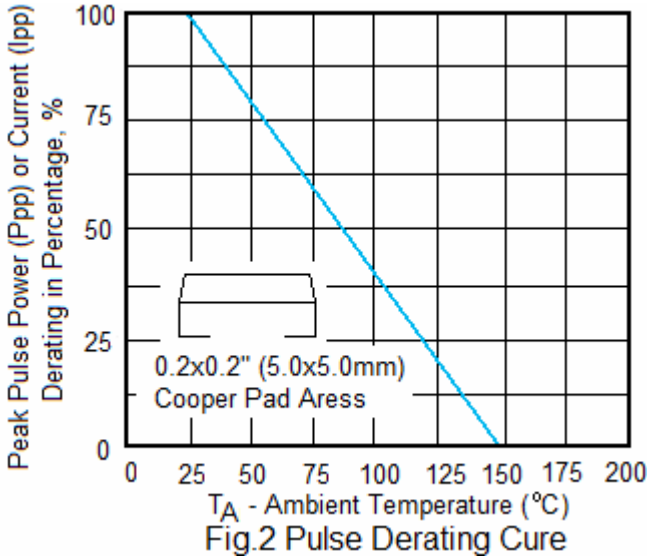


Fig.2 Pulse Derating Cure

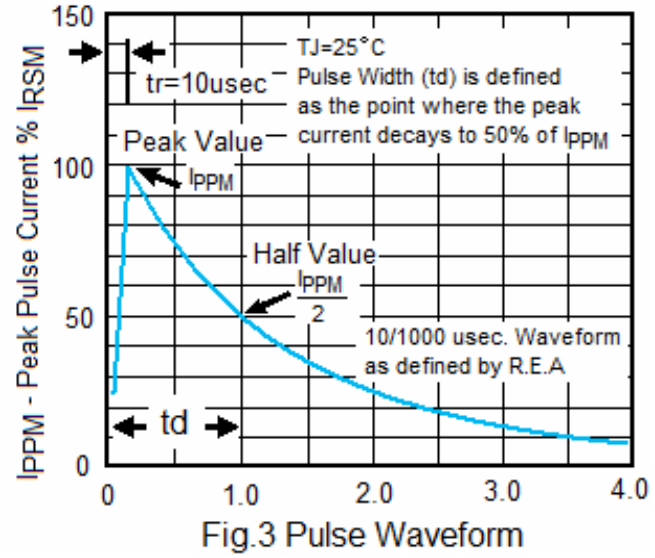


Fig.3 Pulse Waveform

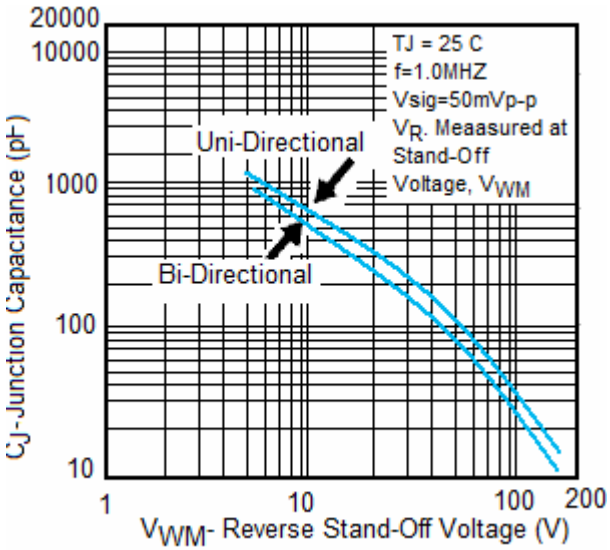
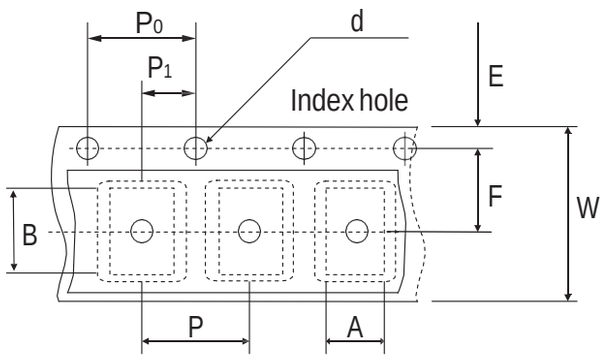
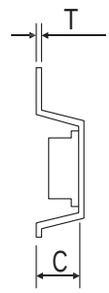
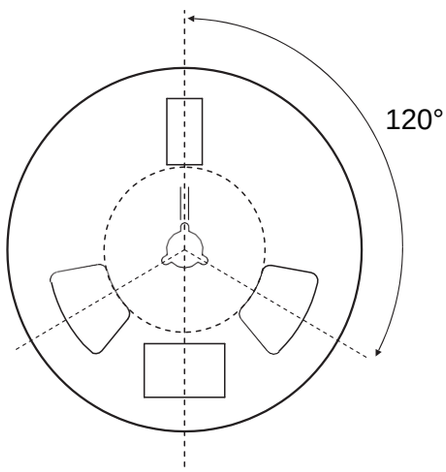


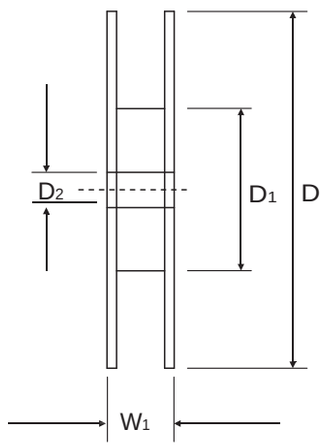
Fig. 4- Typical Junction Capacitance

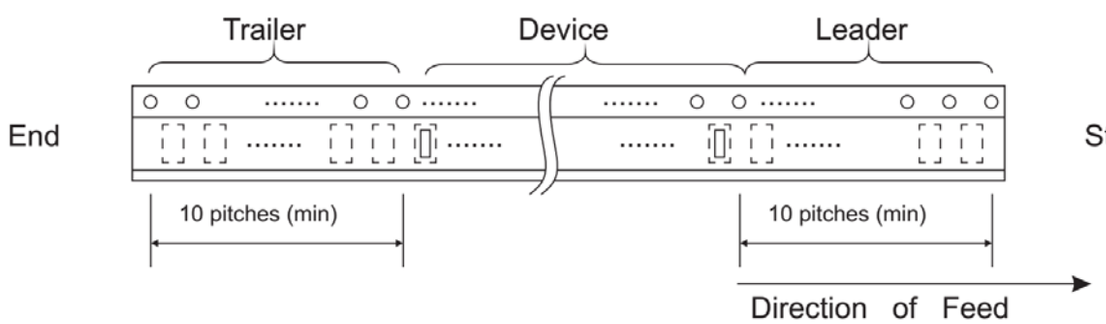
Reel Taping Specification







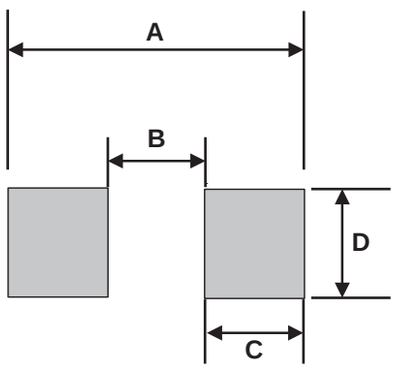




SMAJ	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	2.79 ± 0.10	5.33 ± 0.10	4.50 (max)	1.75 ± 0.10	330MAX	50.0 MIN.	13.0 ± 0.2
	(inch)	0.110 ± 0.004	0.210 ±0.004	0.177 (max)	0.069 ± 0.004	13.00MAX	1.969 MIN.	0.512 ± 0.008
	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	12.0 ± 0.30	18.4 MAX.
	(inch)	0.069 ± 0.004	0.216 ±0.002	0.157 ±0.004	0.157 ± 0.004	0.079 ± 0.002	0.472 ±0.012	0.724 MAX

Suggested PAD Layout

SIZE	(SMA)	
	(mm)	(inch)
A	6.3	0.248
B	2.3 MAX	0.091 MAX
C	2.0 MIN	0.079 MIN
D	1.8 MIN	0.071 MIN



Marking Code

Part Number
KWSMAJ5.0AThru. KWSMAJ440CA
Polarity Indicator: Cathode Band (Note: Bi-directional devices have no polarity indicator.) **HD: Marking Code**

Ordering Information

Part Number	Package	Weight	Base qty	Reel Size	Delivery mode
		grams(approx.)	(pcs)	(inch)	
KWSMAJ5.0A-KWSMAJ440CA	(SMA)	0.069	5000	13	Tape and reel