

## 5000W, 10V- 100V Surface Mount Transient Voltage Suppressor

### FEATURES

- AEC-Q101 qualified
- Available in unidirectional and bidirectional
- Moisture sensitivity level: level 1, per J-STD-020
- Meets IEC 61000-4-2 (Level: 4) / ISO 10605 (Level: L4)
- Meets ISO 7637-2 (Pulse 1/2a/2b/3a/3b)
- RoHS Compliant
- Halogen-free

### APPLICATIONS

- Switching mode power supply (SMPS)
- Motor for BLDC
- Lighting application
- Battery Management System
- Automotive

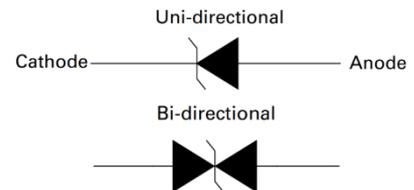
### MECHANICAL DATA

- Case: DO-214AB (SMC)
- Molding compound meets UL 94V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 0.24g (approximately)

KEY PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{WM}$	10 - 100	V
$V_{BR}$	11.4 - 123	V
$P_{PPM}$	5000	W
$T_{J\ MAX}$	175	°C
Package	DO-214AB (SMC)	



DO-214AB (SMC)



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Non-repetitive peak impulse power dissipation with 10/1000 $\mu\text{s}$ waveform <sup>(1)</sup>	$P_{PPM}$	5000	W
Steady state power dissipation at $T_L = 50^\circ\text{C}$ <sup>(2)</sup>	$P_D$	15.2	W
Peak forward surge current 8.3ms single half-sine wave only to unidirectional products with below $V_{WM} = 40\text{V}$	$I_{FSM}$	350	A
Junction temperature	$T_J$	-55 to +175	°C
Storage temperature	$T_{STG}$	-55 to +175	°C

#### Notes:

1. Non-repetitive current pulse per Fig.6 and derated above  $T_A = 25^\circ\text{C}$  per Fig.1
2. Units mounted on PCB (16mm x 16mm Cu pad test board)

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	TYP	UNIT
Junction-to-lead thermal resistance for unidirectional	$R_{\theta JL}$	8.2	°C/W
Junction-to-ambient thermal resistance for unidirectional	$R_{\theta JA}$	43.9	°C/W
Junction-to-case thermal resistance for unidirectional	$R_{\theta JC}$	9.4	°C/W

**Thermal Performance Note:** Units mounted on PCB (16mm x 16mm Cu pad test board)

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Part number (Uni-directional)	Marking code	$I_R$ max at $V_{WM}$		$V_{BR}$ at $I_T^{(1)}$				$V_C$ at $I_{PPM}$ 10 / 1000 $\mu\text{s}$		$R_d^{(3)}$ 10 / 1000 $\mu\text{s}$	$\alpha T^{(2)}$
				Min	Typ	Max	$I_T$	Max			Max
		$\mu\text{A}$	V	V		mA		V <sup>(3)</sup>	A <sup>(4)</sup>	$\Omega$	$10^{-4}/^\circ\text{C}$
5KSMC10AH	5K10A	5	10	11.4	12.0	12.6	1	17	294.1	0.015	7.8
5KSMC11AH	5K11A	2	11	12.3	13.0	13.7	1	18	275.0	0.016	8.1
5KSMC12AH	5K12A	2	12	13.3	14.0	14.7	1	19.9	252.0	0.021	8.3
5KSMC13AH	5K13A	1	13	14.3	15.0	15.8	1	21.5	232.6	0.025	8.4
5KSMC14AH	5K14A	1	14	15.7	16.5	17.3	1	23.1	216.0	0.027	8.6
5KSMC15AH	5K15A	1	15	16.7	17.6	18.5	1	24.4	204.9	0.029	8.8
5KSMC16AH	5K16A	1	16	17.8	18.7	19.6	1	26	192.3	0.033	8.8
5KSMC17AH	5K17A	1	17	18.9	19.9	20.9	1	27.6	181.0	0.037	9.0
5KSMC18AH	5K18A	1	18	20.0	21.1	22.2	1	29.2	171.2	0.041	9.2
5KSMC20AH	5K20A	1	20	22.2	23.4	24.6	1	32.4	154.3	0.051	9.4
5KSMC22AH	5K22A	1	22	24.4	25.7	27.0	1	35.5	140.8	0.060	9.6
5KSMC23AH	5K23A	1	23	25.7	27.0	28.4	1	37.8	135.0	0.070	9.6
5KSMC24AH	5K24A	1	24	26.7	28.1	29.5	1	38.9	128.5	0.073	9.6
5KSMC26AH	5K26A	1	26	28.9	30.4	31.9	1	42.1	118.8	0.086	9.7
5KSMC28AH	5K28A	1	28	31.1	32.7	34.3	1	45.4	110.1	0.101	9.8
5KSMC30AH	5K30A	1	30	33.3	35.1	36.9	1	48.4	103.3	0.111	9.9
5KSMC31AH	5K31A	1	31	34.2	36.0	37.8	1	50.2	100.0	0.124	9.9
5KSMC33AH	5K33A	1	33	36.7	38.6	40.5	1	53.3	93.8	0.136	10.0
5KSMC36AH	5K36A	1	36	40.0	42.1	44.2	1	58.1	86.0	0.162	10.0
5KSMC40AH	5K40A	1	40	44.4	46.7	49.0	1	64.5	77.5	0.200	10.1
5KSMC43AH	5K43A	1	43	47.8	50.3	52.8	1	69.4	72.1	0.230	10.5
5KSMC45AH	5K45A	1	45	50.0	52.7	55.3	1	72.7	68.8	0.253	10.6
5KSMC48AH	5K48A	1	48	53.3	56.1	58.9	1	77.4	64.7	0.286	10.6
5KSMC51AH	5K51A	1	51	56.7	59.7	62.7	1	82.4	60.7	0.325	10.7
5KSMC54AH	5K54A	1	54	60.0	63.2	66.3	1	87.1	57.5	0.362	10.7
5KSMC58AH	5K58A	1	58	64.4	67.8	71.2	1	93.6	53.5	0.419	10.7
5KSMC60AH	5K60A	1	60	66.7	70.2	73.7	1	96.8	51.7	0.447	10.8
5KSMC64AH	5K64A	1	64	71.1	74.9	78.6	1	103	48.6	0.502	10.8
5KSMC70AH	5K70A	1	70	77.8	81.9	86.0	1	113	44.3	0.609	10.8
5KSMC75AH	5K75A	1	75	83.3	87.7	92.1	1	121	41.4	0.698	10.8
5KSMC78AH	5K78A	1	78	86.7	91.3	95.8	1	126	39.7	0.761	10.8
5KSMC85AH	5K85A	1	85	94.4	99.2	104	1	137	36.5	0.904	11.0
5KSMC90AH	5K90A	1	90	100	105.5	111	1	146	34.3	1.020	12.0
5KSMC100AH	5K100A	1	100	111	117	123	1	162	30.9	1.262	13.0

**ELECTRICAL SPECIFICATIONS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Part number (Bi-directional)	Marking code	$I_R$ max at $V_{WM}$		$V_{BR}$ at $I_T^{(1)}$				$V_C$ at $I_{PPM}$ 10 / 1000 $\mu\text{s}$		$R_d^{(3)}$ 10 / 1000 $\mu\text{s}$	$\alpha T^{(2)}$
				Min	Typ	Max	$I_T$	Max			
		$\mu\text{A}$	V	V		mA		V	A	$\Omega$	$10^{-4}/^\circ\text{C}$
5KSMC10CAH	5K10A	5	10	11.4	12.0	12.6	1	17	294.1	0.015	7.8
5KSMC11CAH	5K11A	2	11	12.3	13.0	13.7	1	18	275.0	0.016	8.1
5KSMC12CAH	5K12A	2	12	13.3	14.0	14.7	1	19.9	252.0	0.021	8.3
5KSMC13CAH	5K13A	1	13	14.3	15.0	15.8	1	21.5	232.6	0.025	8.4
5KSMC14CAH	5K14A	1	14	15.7	16.5	17.3	1	23.1	216.0	0.027	8.6
5KSMC15CAH	5K15A	1	15	16.7	17.6	18.5	1	24.4	204.9	0.029	8.8
5KSMC16CAH	5K16A	1	16	17.8	18.7	19.6	1	26	192.3	0.033	8.8
5KSMC17CAH	5K17A	1	17	18.9	19.9	20.9	1	27.6	181.0	0.037	9.0
5KSMC18CAH	5K18A	1	18	20.0	21.1	22.2	1	29.2	171.2	0.041	9.2
5KSMC20CAH	5K20A	1	20	22.2	23.4	24.6	1	32.4	154.3	0.051	9.4
5KSMC22CAH	5K22A	1	22	24.4	25.7	27.0	1	35.5	140.8	0.060	9.6
5KSMC23CAH	5K23A	1	23	25.7	27.0	28.4	1	37.8	135.0	0.070	9.6
5KSMC24CAH	5K24A	1	24	26.7	28.1	29.5	1	38.9	128.5	0.073	9.6
5KSMC26CAH	5K26A	1	26	28.9	30.4	31.9	1	42.1	118.8	0.086	9.7
5KSMC28CAH	5K28A	1	28	31.1	32.7	34.3	1	45.4	110.1	0.101	9.8
5KSMC30CAH	5K30A	1	30	33.3	35.1	36.9	1	48.4	103.3	0.111	9.9
5KSMC31CAH	5K31A	1	31	34.2	36.0	37.8	1	50.2	100.0	0.124	9.9
5KSMC33CAH	5K33A	1	33	36.7	38.6	40.5	1	53.3	93.8	0.136	10.0
5KSMC36CAH	5K36A	1	36	40.0	42.1	44.2	1	58.1	86.0	0.162	10.0
5KSMC40CAH	5K40A	1	40	44.4	46.7	49.0	1	64.5	77.5	0.200	10.1
5KSMC43CAH	5K43A	1	43	47.8	50.3	52.8	1	69.4	72.1	0.230	10.5
5KSMC45CAH	5K45A	1	45	50.0	52.7	55.3	1	72.7	68.8	0.253	10.6
5KSMC48CAH	5K48A	1	48	53.3	56.1	58.9	1	77.4	64.7	0.286	10.6
5KSMC51CAH	5K51A	1	51	56.7	59.7	62.7	1	82.4	60.7	0.325	10.7
5KSMC54CAH	5K54A	1	54	60.0	63.2	66.3	1	87.1	57.5	0.362	10.7
5KSMC58CAH	5K58A	1	58	64.4	67.8	71.2	1	93.6	53.5	0.419	10.7
5KSMC60CAH	5K60A	1	60	66.7	70.2	73.7	1	96.8	51.7	0.447	10.8
5KSMC64CAH	5K64A	1	64	71.1	74.9	78.6	1	103	48.6	0.502	10.8
5KSMC70CAH	5K70A	1	70	77.8	81.9	86.0	1	113	44.3	0.609	10.8
5KSMC75CAH	5K75A	1	75	83.3	87.7	92.1	1	121	41.4	0.698	10.8
5KSMC78CAH	5K78A	1	78	86.7	91.3	95.8	1	126	39.7	0.761	10.8
5KSMC85CAH	5K85A	1	85	94.4	99.2	104	1	137	36.5	0.904	11.0
5KSMC90CAH	5K90A	1	90	100	105.5	111	1	146	34.3	1.020	12.0
5KSMC100CAH	5K100A	1	100	111	117	123	1	162	30.9	1.262	13.0

**Notes:**

1. Pulse test:  $t_p < 30\text{ms}$
2. To calculate  $V_{BR}$  or  $V_C$  versus junction temperature, use following formulas:  
 $V_{BR} \text{ at } T_J = V_{BR} \text{ at } 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$
3. To calculate maximum clamping voltage at other surge level, use the following formula:  
 $V_{C_{max}} = V_C - R_D \times (I_{PP} - I_{PP_{appli}})$  where  $I_{PP_{appli}}$  is the surge current in the application

**ORDERING INFORMATION**

<b>ORDERING CODE<sup>(1)</sup></b>	<b>PACKAGE</b>	<b>PACKING</b>
5KSMCxAH	DO-214AB (SMC)	3,000 / Tape & Reel

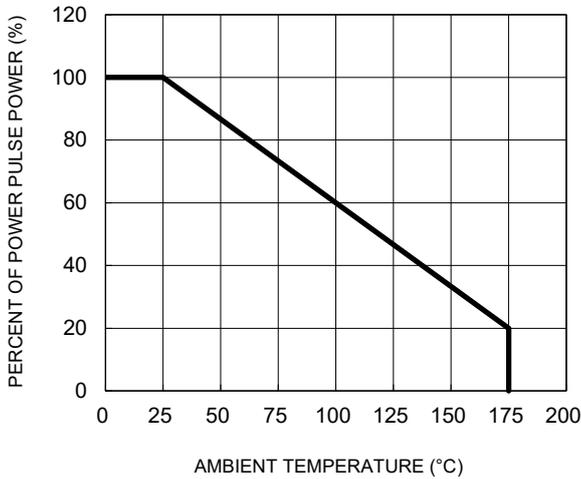
**Notes:**

1. "x" defines voltage from 10V (5KSMC10AH) to 100V (5KSMC100AH)  
 "x" defines voltage from 10V (5KSMC10CAH) to 100V (5KSMC100CAH)

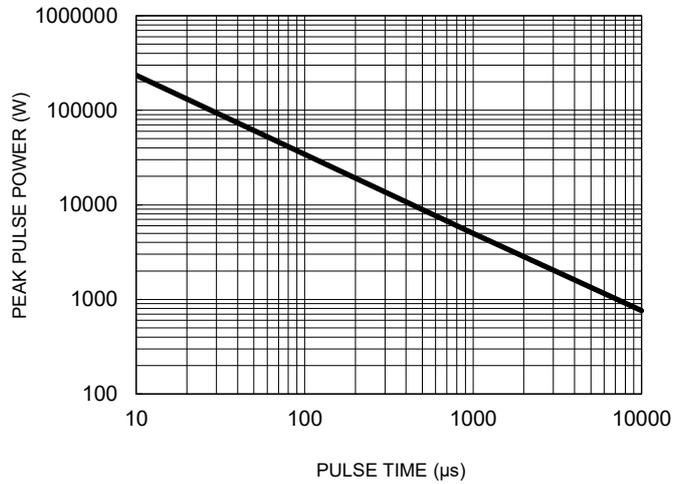
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

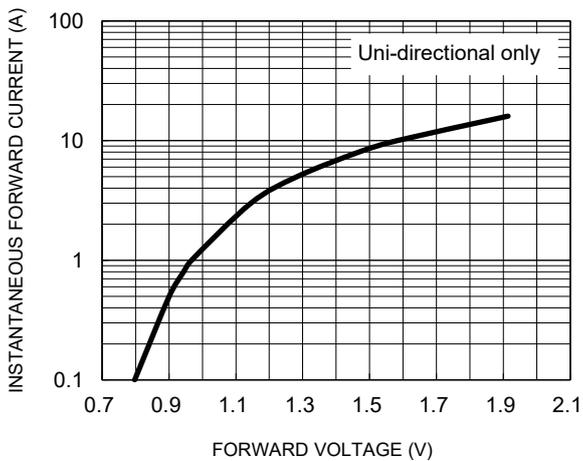
**Fig.1 Peak Pulse Power Derating Curve**



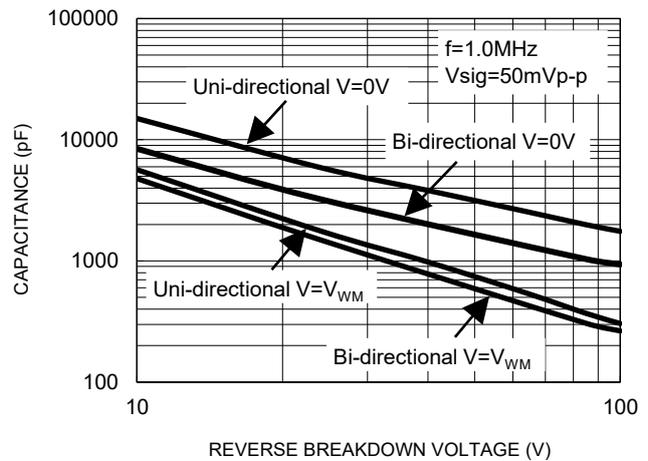
**Fig.2 Non-Repetitive Peak Pulse Power vs. Pulse Time**



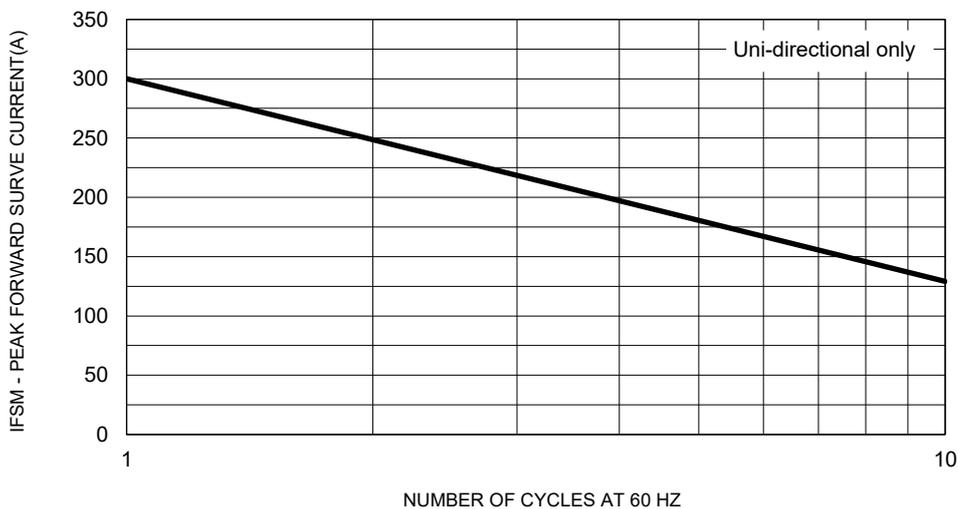
**Fig.3 Forward Voltage vs. Peak Forward Current**



**Fig.4 Typical Junction Capacitance**



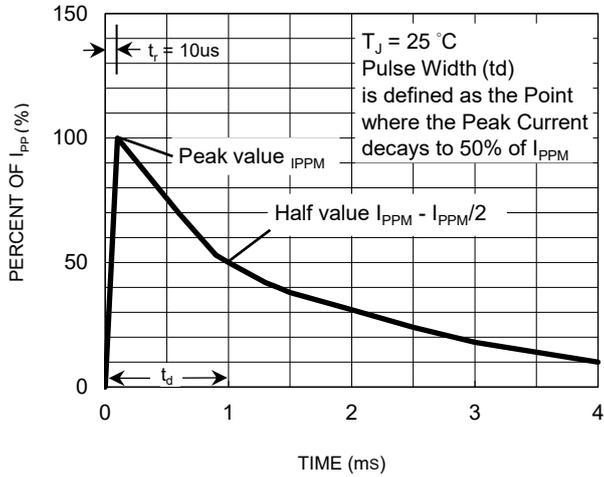
**Fig.5 Maximum Non-Repetitive Forward Surge Current**



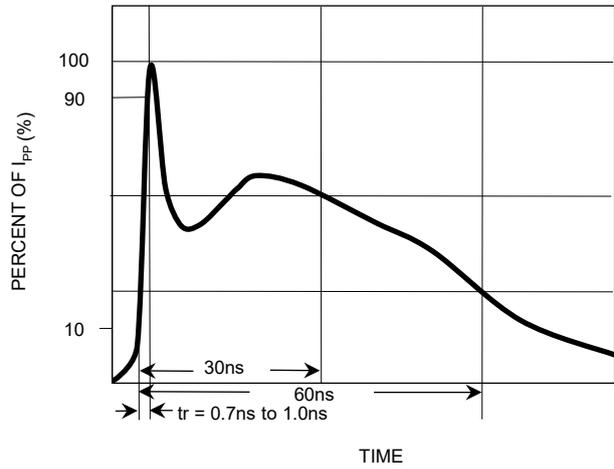
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig.6 10/1000 $\mu\text{s}$  pulse waveform**

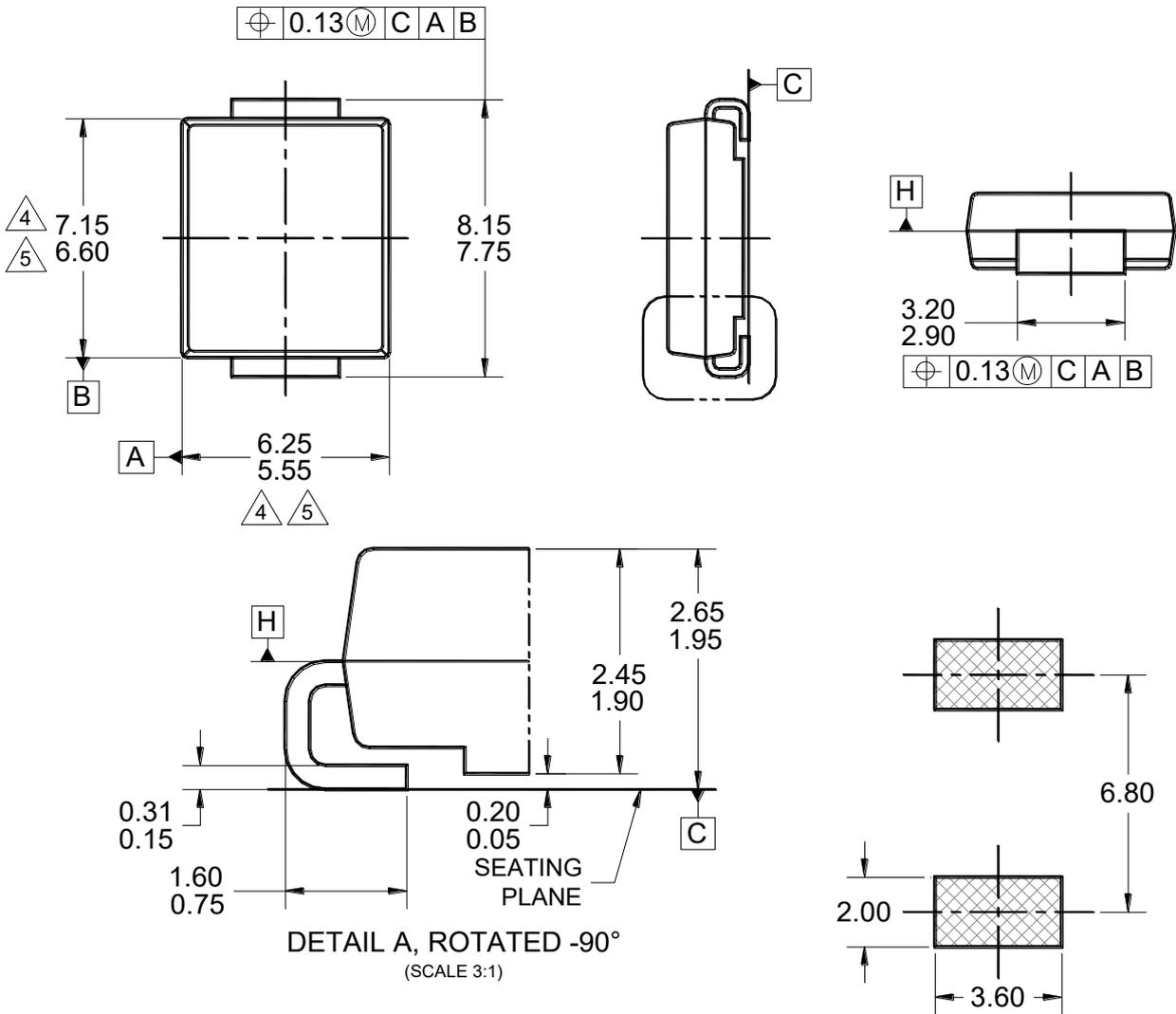


**Fig.7 ESD pulse waveform**

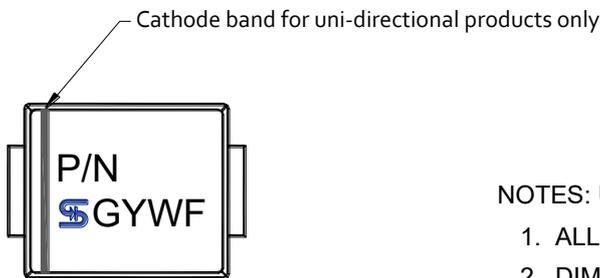


**PACKAGE OUTLINE DIMENSIONS**

**DO-214AB (SMC)**



**SUGGESTED PAD LAYOUT**



**MARKING DIAGRAM**

P/N = MARKING CODE  
 G = GREEN COMPOUND  
 YW = DATE CODE  
 F = FACTORY CODE

**NOTES: UNLESS OTHERWISE SPECIFIED**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: JEDEC DO-214, VARIATION AB, ISSUE D.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
5. MOLDED PLASTIC BODY LATERAL DIMENSIONS TO BE DETERMINED AT DATUM PLANE H.
6. DWG NO. REF: HQ2SD07-DO214SMC-036 REV A.

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