

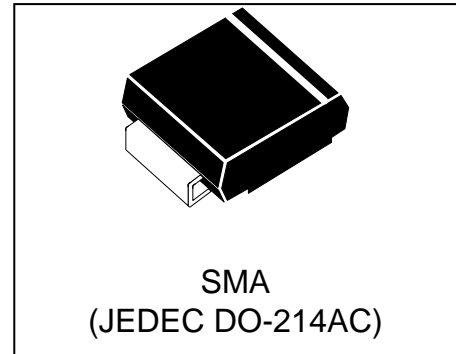


# WSxxP4SMA(-B)-AT

## Automotive Load Dump Protection TVS

### Features

- 400 watts Peak Pulse Power (10/1000 $\mu$ s)
- Unidirectional and Bidirectional Protection
- Fast Response Time: Typically < 1ns
- Excellent Clamping Capability
- Built-in Strain relief
- Low inductance
- Low profile package
- IEC 61000-4-2 (ESD)  $\pm$ 30kV(air),  $\pm$ 30kV(contact)
- MSL: Level 1
- AEC-Q101 compliant



### Mechanical Characteristics

- JEDEC DO-214AC package
- Molding compound flammability rating: UL 94V-0
- Marking: Marking Code
- Packaging: Tape and Reel per EIA 481
- RoHS Compliant

### Applications

- Auto power system
- Car audio and video
- Automotive instrument
- Car GPS
- Can-bus

Absolute Maximum Rating			
Rating	Symbol	Value	Units
Peak Pulse Power (tp =10/1000 $\mu$ s) (see Note1&2)	P <sub>PPM</sub>	400	Watts
Peak pulse current (10/1000 $\mu$ s) (see Note2)	I <sub>PPM</sub>	See Electrical Characteristics	A
Power dissipation on infinite heat sink T <sub>L</sub> = 50 °C (Fig.4)	P <sub>D</sub>	3.3	W
Operating junction temperature range	T <sub>J</sub>	-65 to + 150	°C
Storage temperature range	T <sub>STG</sub>	-65 to + 150	°C

**Note1:** Peak Pulse Power Rating as Pulse Width ,per Fig1.

**Note2:** Peak Pulse Power or Current Derated above T<sub>A</sub>=25°C Per Fig. 2 and Non-Repetitive Current Pulse, Per Fig.3.

## Electrical Characteristics

Part Number		Marking		Reverse Stand off Voltage $V_{RWM}$ (Volts)	Breakdown Voltage $V_{BR@I_T}$ (Volts)		Test Current $I_T$ (mA)	Maximum Clamping Voltage $V_C@I_{PP}$ (Volts)	Maximum Peak Pulse Current $I_{PP}$ (Amps)	Maximum Reverse Leakage $I_R@V_{RWM}$ ( $\mu$ A)
UNI-POLAR	BI-POLAR	UNI-POLAR	BI-POLAR		MIN	MAX				
WS5.0P4SMA-AT	WS5.0P4SMA-B-AT	APUY	APVZ	5.0	6.40	7.07	10	9.2	43.5	800
WS6.0P4SMA-AT	WS6.0P4SMA-B-AT	AQUY	AQVZ	6.0	6.67	7.37	10	10.3	38.8	800
WS6.5P4SMA-AT	WS6.5P4SMA-B-AT	AQUP	AQVP	6.5	7.22	7.98	10	11.2	35.7	500
WS7.0P4SMA-AT	WS7.0P4SMA-B-AT	ARUY	ARVZ	7.0	7.78	8.60	10	12.0	33.3	200
WS7.5P4SMA-AT	WS7.5P4SMA-B-AT	ARUP	ARVP	7.5	8.33	9.21	1	12.9	31.0	100
WS8.0P4SMA-AT	WS8.0P4SMA-B-AT	ASUY	ASVZ	8.0	8.89	9.83	1	13.6	29.4	50
WS8.5P4SMA-AT	WS8.5P4SMA-B-AT	ASUP	ASVP	8.5	9.44	10.40	1	14.4	27.8	20
WS9.0P4SMA-AT	WS9.0P4SMA-B-AT	ATUY	ATVZ	9.0	10.00	11.10	1	15.4	26.0	10
WS10P4SMA-AT	WS10P4SMA-B-AT	AYLY	AZLZ	10	11.10	12.30	1	17.0	23.5	5
WS11P4SMA-AT	WS11P4SMA-B-AT	AYLL	AZLL	11	12.20	13.50	1	18.2	22.0	5
WS12P4SMA-AT	WS12P4SMA-B-AT	AYLM	AZLM	12	13.30	14.7	1	19.9	20.1	5
WS13P4SMA-AT	WS13P4SMA-B-AT	AYLN	AZLN	13	14.40	15.90	1	21.5	18.6	1
WS14P4SMA-AT	WS14P4SMA-B-AT	AYLO	AZLO	14	15.60	17.20	1	23.2	17.2	1
WS15P4SMA-AT	WS15P4SMA-B-AT	AYLP	AZLP	15	16.70	18.50	1	24.4	16.4	1
WS16P4SMA-AT	WS16P4SMA-B-AT	AYLQ	AZLQ	16	17.80	19.70	1	26.0	15.4	1
WS18P4SMA-AT	WS18P4SMA-B-AT	AYLS	AZLS	18	20.00	22.10	1	29.2	13.7	1
WS20P4SMA-AT	WS20P4SMA-B-AT	AYMY	AZMZ	20	22.20	24.50	1	32.4	12.3	1
WS22P4SMA-AT	WS22P4SMA-B-AT	AYMM	AZMM	22	24.40	26.90	1	35.5	11.3	1
WS24P4SMA-AT	WS24P4SMA-B-AT	AYMO	AZMO	24	26.70	29.50	1	38.9	10.3	1
WS26P4SMA-AT	WS26P4SMA-B-AT	AYMQ	AZMQ	26	28.90	31.90	1	42.1	9.5	1
WS28P4SMA-AT	WS28P4SMA-B-AT	AYMS	AZMS	28	31.10	34.40	1	45.4	8.8	1
WS30P4SMA-AT	WS30P4SMA-B-AT	AYNY	AZNZ	30	33.30	36.80	1	48.4	8.3	1
WS33P4SMA-AT	WS33P4SMA-B-AT	AYNN	AZNN	33	36.70	40.60	1	53.3	7.5	1
WS36P4SMA-AT	WS36P4SMA-B-AT	AYNQ	AZNQ	36	40.00	44.20	1	58.1	6.9	1
WS40P4SMA-AT	WS40P4SMA-B-AT	AYOY	AZOZ	40	44.40	49.10	1	64.5	6.2	1
WS43P4SMA-AT	WS43P4SMA-B-AT	AYON	AZON	43	47.80	52.80	1	69.4	5.8	1
WS45P4SMA-AT	WS45P4SMA-B-AT	AYOP	AZOP	45	50.00	55.30	1	72.7	5.5	1
WS48P4SMA-AT	WS48P4SMA-B-AT	AYOS	AZOS	48	53.30	58.90	1	77.4	5.2	1
WS51P4SMA-AT	WS51P4SMA-B-AT	AYPL	AZPL	51	56.70	62.70	1	82.4	4.9	1
WS54P4SMA-AT	WS54P4SMA-B-AT	AYPO	AZPO	54	60.00	66.30	1	87.1	4.6	1
WS58P4SMA-AT	WS58P4SMA-B-AT	AYPS	AZPS	58	64.40	71.20	1	93.6	4.3	1

WS64P4SMA-AT	WS64P4SMA-B-AT	AYQO	AZQO	64	71.10	78.60	1	103	3.9	1
WS70P4SMA-AT	WS70P4SMA-B-AT	AYRY	AZRZ	70	77.80	86.00	1	113	3.5	1
WS75P4SMA-AT	WS75P4SMA-B-AT	AYRP	AZRP	75	83.30	92.10	1	121	3.3	1
WS78P4SMA-AT	WS78P4SMA-B-AT	AYRS	AZRS	78	86.70	95.80	1	126	3.2	1
WS85P4SMA-AT	WS85P4SMA-B-AT	AYSP	AZSP	85	94.40	104	1	137	2.9	1
WS90P4SMA-AT	WS90P4SMA-B-AT	AYTY	AZTZ	90	100	111	1	146	2.7	1

Typical Characteristics

Figure 1: Peak Pulse Power Rating Curve

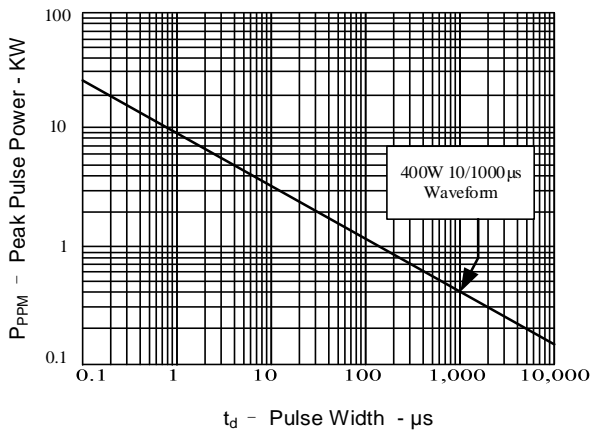


Figure 2: Pulse Derating Curve

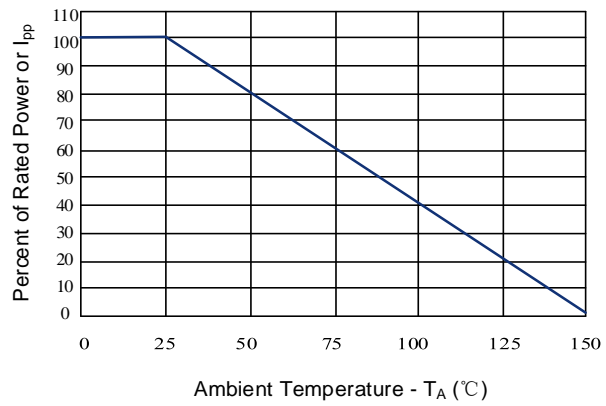


Figure 3: Pulse Waveform

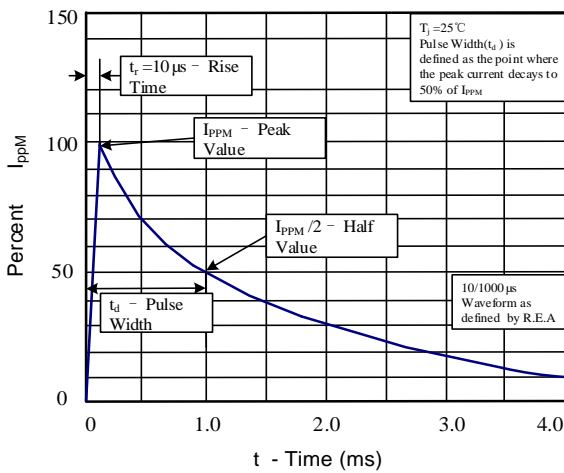
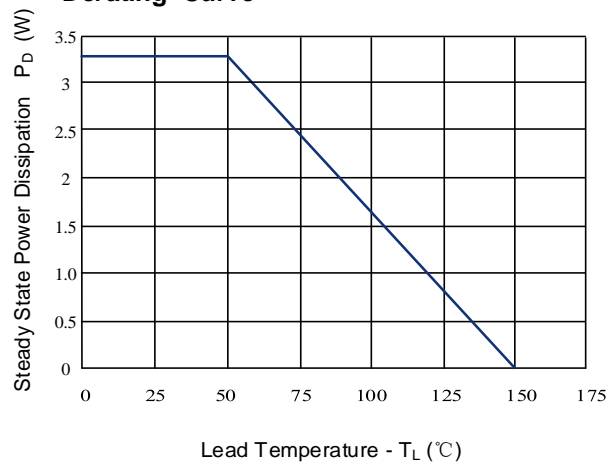


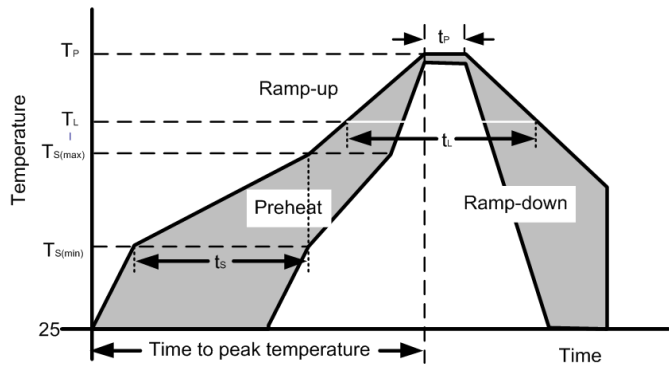
Figure 4: Steady State Power Dissipation Derating Curve



Note: The above typical parameters or typical characteristics are only indicative and do not make specific guarantees. If detailed values are required, additional communication and provision are required.

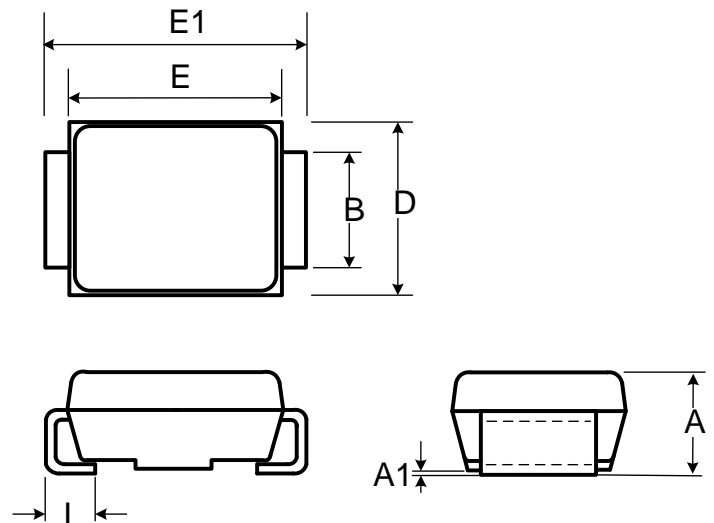
Soldering Parameters

Reflow Condition		
Pre Heat	Temperature min ( $T_{s(min)}$ )	150°C
	Temperature max ( $T_{s(max)}$ )	200°C
	Time (min to max) ( $t_s$ )	60-190 s
Average ramp up rate (Liquidus Temp) ( $T_L$ ) to peak		3°C/s max
Ts(max) to TL - Ramp-up Rate		3°C/s max
Reflow	Temperature( $T_L$ ) (Liquidus)	217°C
	Temperature ( $t_L$ )	60-150 s
Peak Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °C
Time within actual peak Temperature ( $t_p$ )		20-40 s
Ramp-down Rate		5°C/s max
Time 25°C to peak Temperature ( $T_P$ )		8 minutes max
Do not exceed		260°C

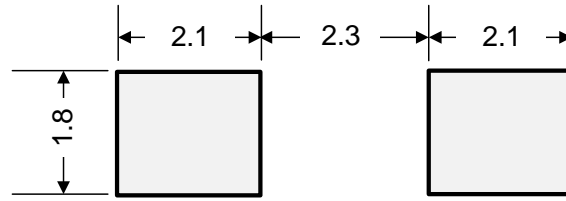


Outline Drawing – SMA(DO-214AC)

Ref. (mm)	Millimeters	
	Min.	Max.
A	1.980	2.290
A1	-	0.203
B	1.250	1.650
E	3.990	4.500
E1	4.930	5.280
D	2.540	2.790
L	0.780	1.520

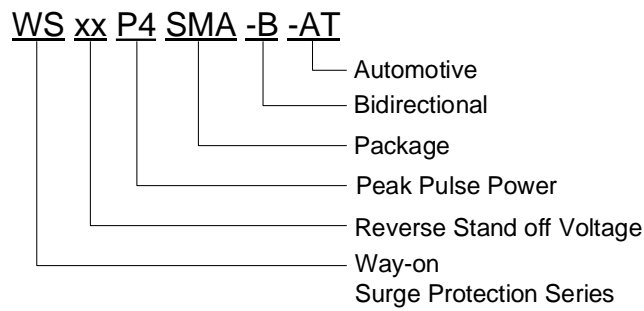


Recommended Solder Pad Layout

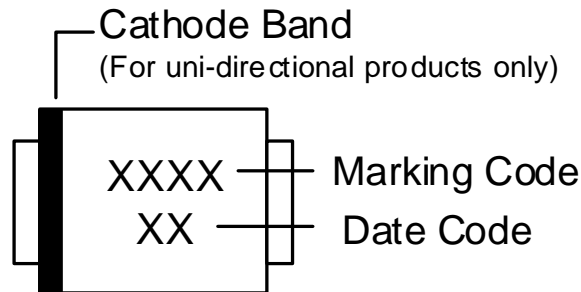


Dimensions in mm

Part Numbering System



Part Marking System

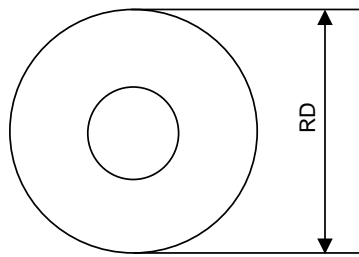


Package Information

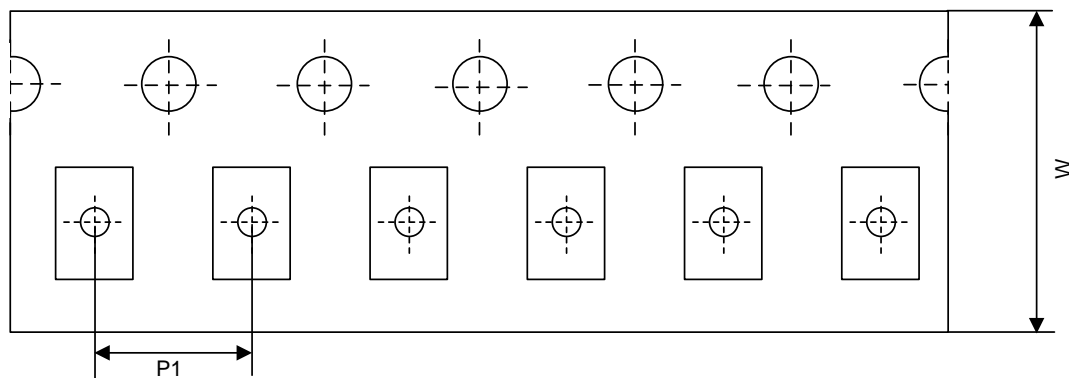
5000 Pcs/Reel

Tape and Reel Information

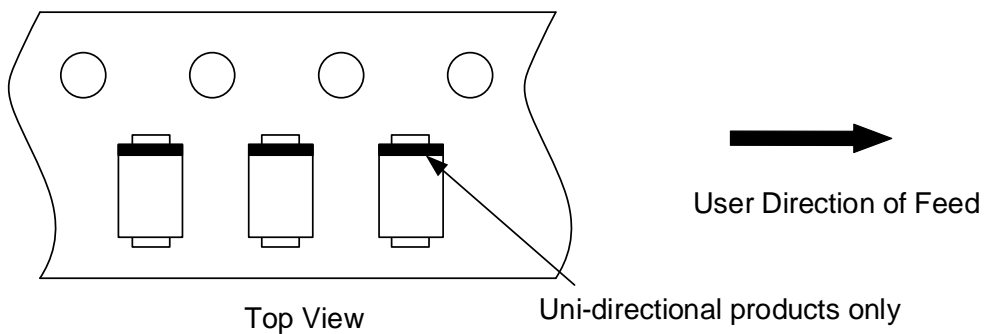
Reel Dimensions



Tape Dimensions



Quadrant Assignments for PIN1 Orientation in tape



RD	Reel Dimensions	13 inch
W	Overall width of the carrier tape	12 mm
P1	Pitch between successive cavity centers	4 mm

CONTACT INFORMATION

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