

Features

- 600W peak pulse power capability at 10/1000 μ s waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical failure mode is a short circuit condition for current events exceeding component rating
- Plastic package is flammability rated V-0 per UL-94
- Meet MSL level1, per J-STD-020, lead-frame maximum peak of 260°C
- High reliability application and automotive grade AEC Q101 qualified

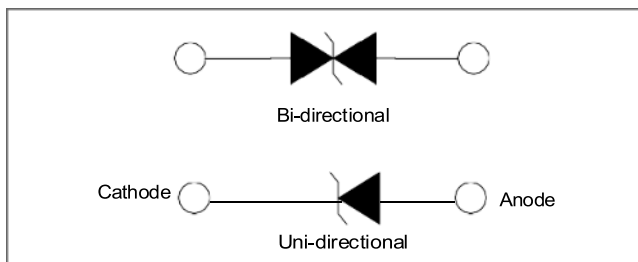
RoHS
Compliant



Applications

TVS components are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Automotive applications.

Function Diagram



Maximum Ratings and Thermal Characteristics (T _A =25°C unless otherwise noted)			
Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T _A =25°C by 10/1000 μ s Waveform (Fig.3)	P _{PPM}	600	W
Power Dissipation on Infinite Heat Sink at T _L =50°C	P _D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1)	I _{FSM}	100	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only	V _F	3.5	V
Operating Temperature Range	T _J	-65 to 175	°C
Storage Temperature Range	T _{STG}	-65 to 175	°C
Typical Thermal Resistance Junction to Lead	R _{θJL}	20	°C/W
Typical Thermal Resistance Junction to Ambient	R _{θJA}	100	°C/W

AGENCY	AGENCY FILE NUMBER
	Pending

Notes:

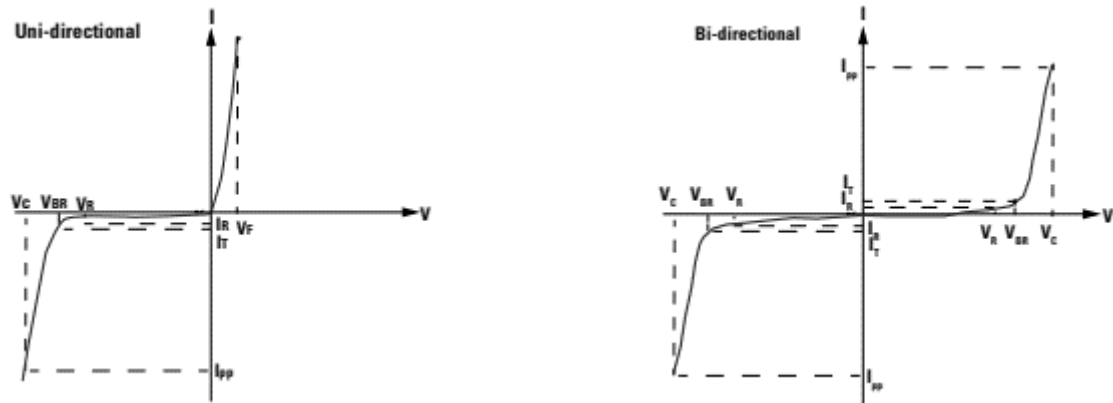
1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Characteristics (T = 25°C unless otherwise noted)

Part Number (Uni)	Part Number (Bi)	Key Marking UNI BI		Typical IR @ 150°C (μA)	Reverse Stand off Voltage VR (Volts)	Breakdown Voltage VBR (Volts) @ IT		Test Current IT (mA)	Maximum Clamping Voltage VC @ INN (V)	Maximum Peak Pulse Current IPP (A)	Maximum Reverse Leakage IR @ VR (μA)	Maximum Temperature coefficient of VBR (%/°C)	Agency Approval 
						MIN	MAX						
TPSMB5.0A-VR	TPSMB5.0CA-VR	AB005	AB005	500	5.0	6.40	7.00	10	9.2	65.2	500	0.048	
TPSMB6.0A-VR	TPSMB6.0CA-VR	AB006	AB006	400	6.0	6.67	7.37	10	10.3	58.3	400	0.050	
TPSMB6.5A-VR	TPSMB6.5CA-VR	AB06F	AB06F	300	6.5	7.22	7.98	10	11.2	53.6	300	0.052	
TPSMB7.0A-VR	TPSMB7.0CA-VR	AB007	AB007	200	7.0	7.78	8.60	10	12.0	50.0	200	0.058	
TPSMB7.5A-VR	TPSMB7.5CA-VR	AB07F	AB07F	100	7.5	8.33	9.21	1	12.9	56.6	100	0.061	
TPSMB8.0A-VR	TPSMB8.0CA-VR	AB008	AB008	50	8.0	8.89	9.83	1	13.6	44.2	50	0.064	
TPSMB8.5A-VR	TPSMB8.5CA-VR	AB08F	AB08F	50	8.5	9.44	10.40	1	14.4	41.7	20	0.066	
TPSMB9.0A-VR	TPSMB9.0CA-VR	AB009	AB009	20	9.0	10.00	11.10	1	15.4	39.0	10	0.069	
TPSMB10A-VR	TPSMB10CA-VR	AB010	AB010	8	10.0	11.10	12.30	1	17.0	35.3	5	0.071	
TPSMB11A-VR	TPSMB11CA-VR	AB011	AB011	8	11.0	12.20	13.50	1	18.2	33.0	1	0.074	
TPSMB12A-VR	TPSMB12CA-VR	AB012	AB012	8	12.0	13.30	14.70	1	19.9	30.2	1	0.075	
TPSMB13A-VR	TPSMB13CA-VR	AB013	AB013	8	13.0	14.40	15.90	1	21.5	28.0	1	0.076	
TPSMB14A-VR	TPSMB14CA-VR	AB014	AB014	8	14.0	15.60	17.20	1	23.2	25.9	1	0.080	
TPSMB15A-VR	TPSMB15CA-VR	AB015	AB015	8	15.0	16.70	18.50	1	24.4	24.6	1	0.083	
TPSMB16A-VR	TPSMB16CA-VR	AB016	AB016	8	16.0	17.80	19.70	1	26.0	23.1	1	0.084	
TPSMB17A-VR	TPSMB17CA-VR	AB017	AB017	8	17.0	18.90	20.90	1	27.6	21.8	1	0.085	
TPSMB18A-VR	TPSMB18CA-VR	AB018	AB018	8	18.0	20.00	22.10	1	29.2	20.6	1	0.088	
TPSMB20A-VR	TPSMB20CA-VR	AB020	AB020	8	20.0	22.20	24.50	1	32.4	18.6	1	0.091	
TPSMB22A-VR	TPSMB22CA-VR	AB022	AB022	8	22.0	24.40	26.90	1	35.5	16.9	1	0.092	
TPSMB24A-VR	TPSMB24CA-VR	AB024	AB024	8	24.0	26.70	29.50	1	38.9	15.5	1	0.092	
TPSMB26A-VR	TPSMB26CA-VR	AB026	AB026	8	26.0	28.90	31.90	1	42.1	14.3	1	0.093	
TPSMB28A-VR	TPSMB28CA-VR	AB028	AB028	8	28.0	31.10	34.40	1	45.4	13.3	1	0.094	
TPSMB30A-VR	TPSMB30CA-VR	AB030	AB030	8	30.0	33.30	36.80	1	48.4	12.4	1	0.096	
TPSMB33A-VR	TPSMB33CA-VR	AB033	AB033	8	33.0	36.70	40.60	1	53.3	11.3	1	0.097	
TPSMB36A-VR	TPSMB36CA-VR	AB036	AB036	8	36.0	40.00	44.20	1	58.1	10.4	1	0.098	
TPSMB40A-VR	TPSMB40CA-VR	AB040	AB040	8	40.0	44.40	49.10	1	64.5	9.3	1	0.099	
TPSMB43A-VR	TPSMB43CA-VR	AB043	AB043	8	43.0	47.80	52.80	1	69.4	8.7	1	0.100	
TPSMB45A-VR	TPSMB45CA-VR	AB045	AB045	8	45.0	50.00	55.30	1	72.7	8.3	1	0.101	
TPSMB48A-VR	TPSMB48CA-VR	AB048	AB048	8	48.0	53.30	58.90	1	77.4	7.8	1	0.101	
TPSMB51A-VR	TPSMB51CA-VR	AB051	AB051	8	51.0	56.70	62.70	1	82.4	7.3	1	0.101	
TPSMB54A-VR	TPSMB54CA-VR	AB054	AB054	8	54.0	60.00	66.30	1	87.1	6.9	1	0.102	
TPSMB58A-VR	TPSMB58CA-VR	AB058	AB058	8	58.0	64.40	71.20	1	93.6	6.5	1	0.103	
TPSMB60A-VR	TPSMB60CA-VR	AB060	AB060	8	60.0	66.70	73.70	1	96.8	6.2	1	0.103	
TPSMB64A-VR	TPSMB64CA-VR	AB064	AB064	8	64.0	71.10	78.60	1	103.0	5.9	1	0.104	
TPSMB70A-VR	TPSMB70CA-VR	AB070	AB070	8	70.0	77.80	86.00	1	113.0	5.3	1	0.105	
TPSMB75A-VR	TPSMB75CA-VR	AB075	AB075	8	75.0	83.30	92.10	1	121.0	5.0	1	0.106	
TPSMB78A-VR	TPSMB78CA-VR	AB078	AB078	8	78.0	86.70	95.80	1	126.0	4.8	1	0.106	
TPSMB85A-VR	TPSMB85CA-VR	AB085	AB085	-	85.0	94.40	104.00	1	137.0	4.4	1	0.106	
TPSMB90A-VR	TPSMB90CA-VR	AB090	AB090	-	90.0	100.00	111.00	1	146.0	4.1	1	0.107	
TPSMB100A-VR	TPSMB100CA-VR	AB100	AB100	-	100.0	111.00	123.00	1	162.0	3.7	1	0.107	
TPSMB110A-VR	TPSMB110CA-VR	AB110	AB110	-	110.0	122.00	135.00	1	177.0	3.4	1	0.107	
TPSMB120A-VR	TPSMB120CA-VR	AB120	AB120	-	120.0	133.00	147.00	1	193.0	3.1	1	0.108	
TPSMB130A-VR	TPSMB130CA-VR	AB130	AB130	-	130.0	144.00	159.00	1	209.0	2.9	1	0.108	
TPSMB150A-VR	TPSMB150CA-VR	AB150	AB150	-	150.0	167.00	185.00	1	243.0	2.5	1	0.108	

Part Number (Uni)	Part Number (Bi)	Key Marking		Typical IR @ 150°C (μA)	Reverse Stand off Voltage V _R (Volts)	Breakdown Voltage V _{BR} (Volts) @ I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @ I _{nn} (V)	Maximum Peak Pulse Current I _{pp} (A)	Maximum Reverse Leakage I _R @ V _R (μA)	Maximum Temperature coefficient of VBR (%/C)	Agency Approval 
		UNI	BI			MIN	MAX						
TPSMB160A-VR	TPSMB160CA-VR	AB160	AB160	-	160.0	178.00	197.00	1	259.0	2.3	1	0.108	
TPSMB170A-VR	TPSMB170CA-VR	AB170	AB170	-	170.0	189.00	209.00	1	275.0	2.2	1	0.108	
TPSMB180A-VR	TPSMB180CA-VR	AB180	AB180	-	180.0	201.00	222.00	1	292.0	2.1	1	0.108	
TPSMB188A-VR	TPSMB188CA-VR	AB188	AB188	-	188.0	209.00	231.00	1	304.0	2.0	1	0.110	
TPSMB200A-VR	TPSMB200CA-VR	AB200	AB200	-	200.0	224.00	247.00	1	324.0	1.9	1	0.110	
TPSMB220A-VR	TPSMB220CA-VR	AB220	AB220	-	220.0	246.00	272.00	1	356.0	1.7	1	0.110	
TPSMB250A-VR	TPSMB250CA-VR	AB250	AB250	-	250.0	279.00	309.00	1	405.0	1.5	1	0.110	
TPSMB300A-VR	TPSMB300CA-VR	AB300	AB300	-	300.0	335.00	371.00	1	486.0	1.3	1	0.112	
TPSMB350A-VR	TPSMB350CA-VR	AB350	AB350	-	350.0	391.00	432.00	1	567.0	1.1	1	0.112	
TPSMB400A-VR	TPSMB400CA-VR	AB400	AB400	-	400.0	447.00	494.00	1	648.0	0.9	1	0.112	
TPSMB440A-VR	TPSMB440CA-VR	AB440	AB440	-	440.0	492.00	543.00	1	713.0	0.9	1	0.112	

I-V Curve Characteristics



P_{PPM} Peak Pulse Power Dissipation -- Max power dissipation

V_R Stand-off Voltage -- Maximum voltage that can be applied to the TVS without operation

V_{BR} Breakdown Voltage -- Maximum voltage that flows through the TVS at a specified test current (I_r)

V_c Clamping Voltage -- Peak voltage measured across the TVS at a specified I_{PPM} (peak impulse current)

I_r Reverse Leakage Current -- Current measured at V_R

V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T = 25°C unless otherwise noted)

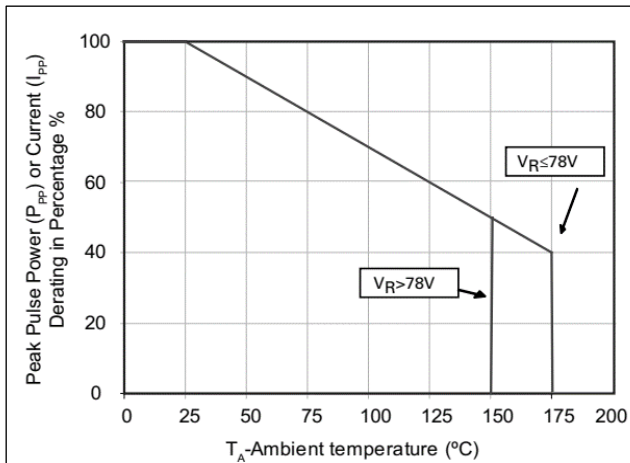


Figure 1. Peak pulse power derating curve

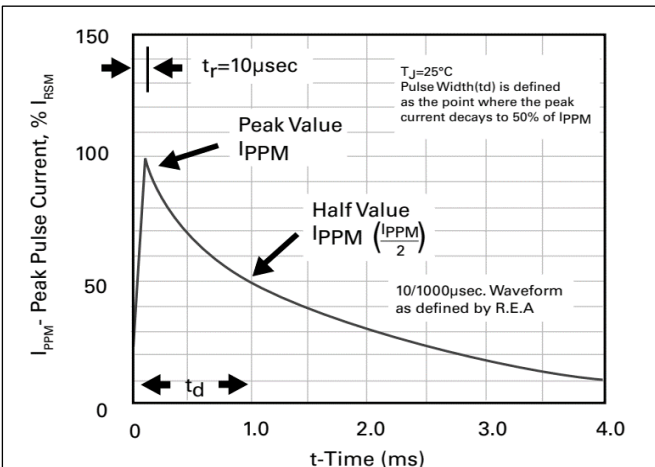


Figure 2. Pulse waveform

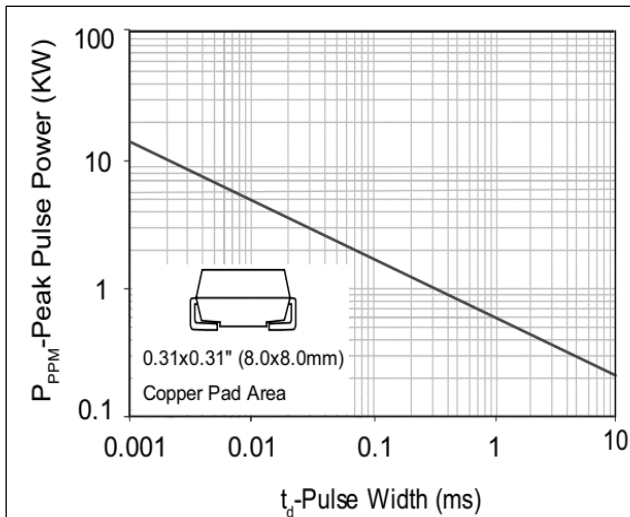


Figure 3. Peak pulse power rating curve

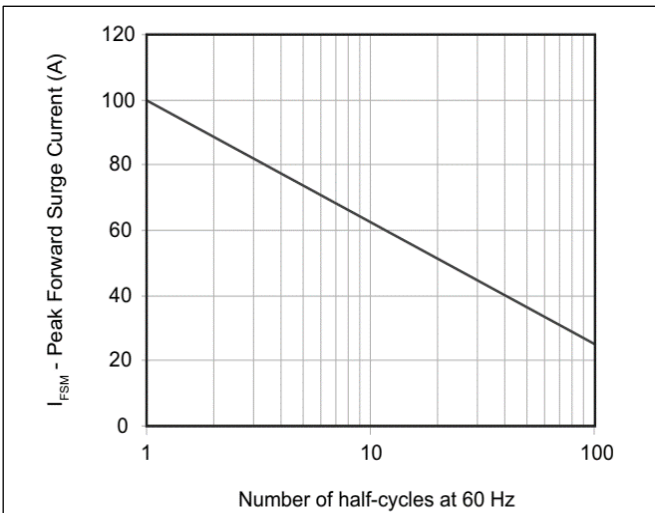
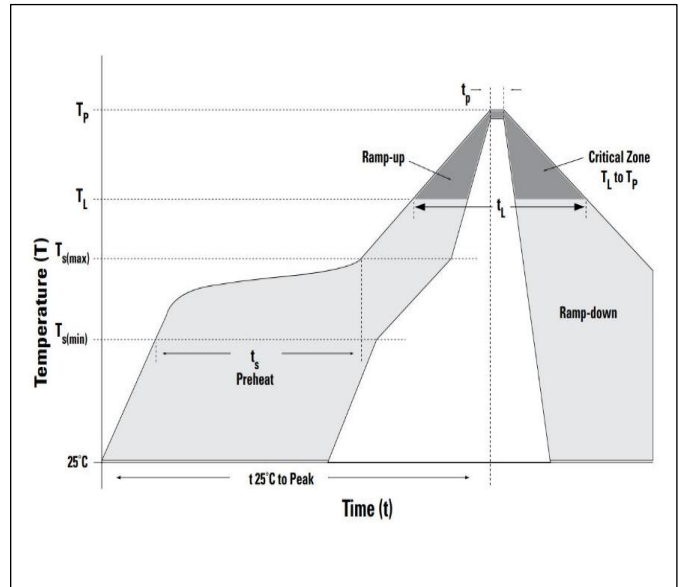


Figure 4. Maximum non-repetitive surge current

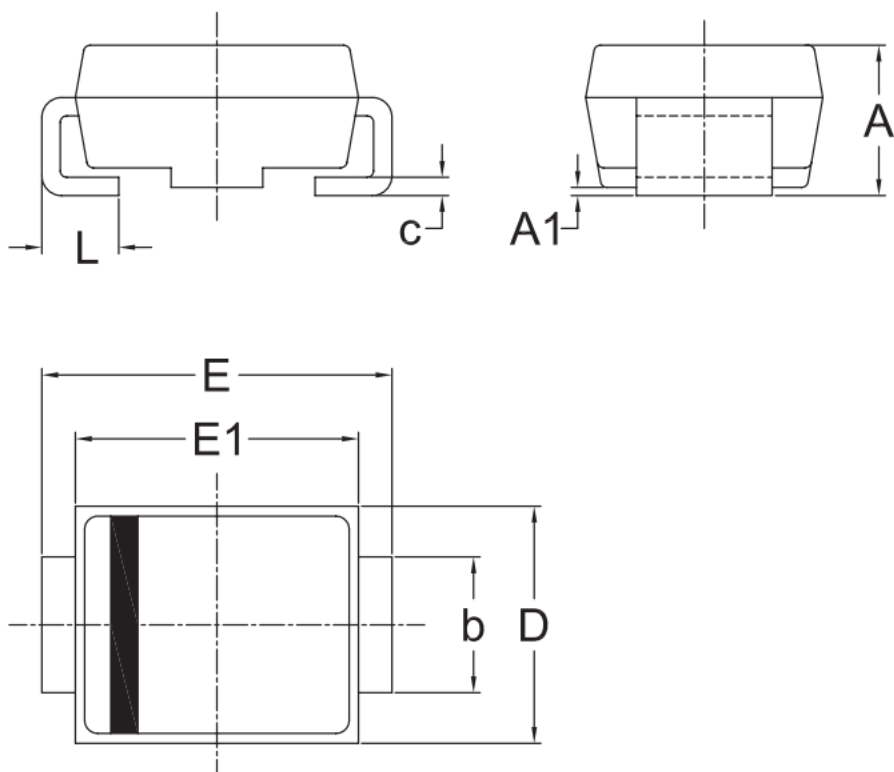
Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus Temp (T_A) to peak)		3°C/second max
$T_{s(max)}$ to T_A - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_A) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 $^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		260°C

Soldering profile

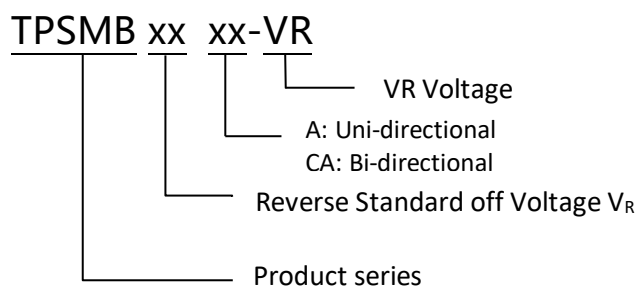


Dimensions

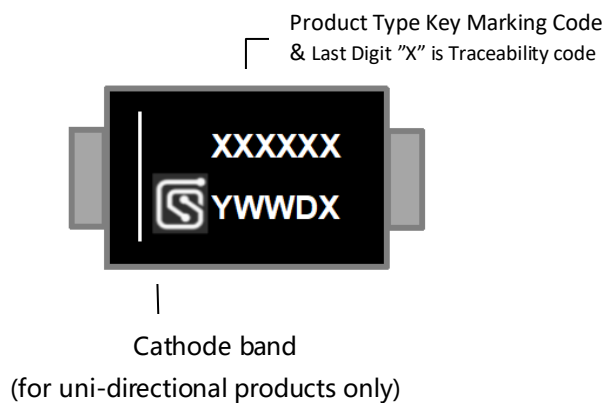


unit		A	A1	b	c	D	E	E1	L
max	mm	2.61	0.30	2.30	0.31	3.94	5.70	4.70	1.52
min		1.99	0	1.70	0.15	3.30	5.05	4.06	0.76

Part Numbering



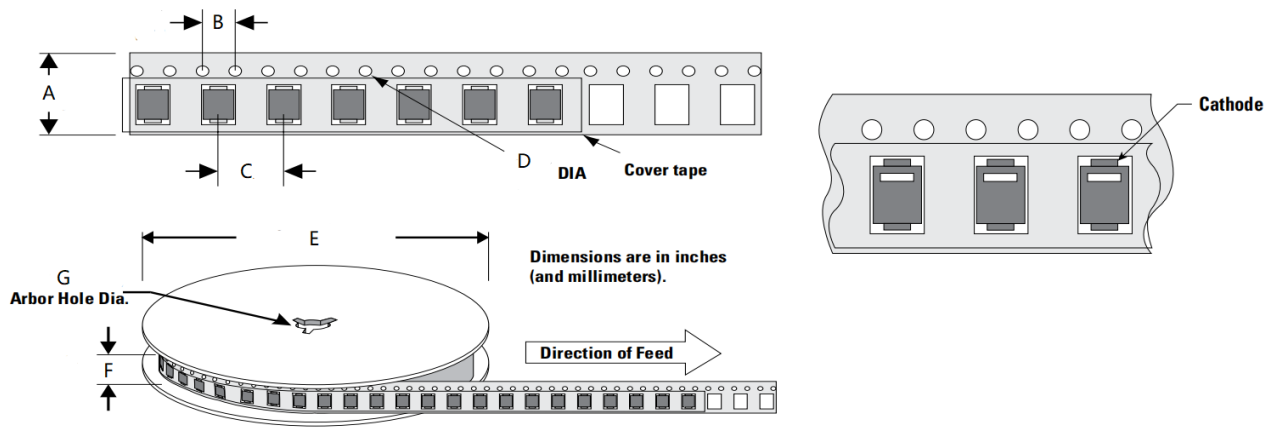
Part Marking



Packing

Part number	Package name	Small packing quantity	Packing method
TPSMBXXXX-VR	DO-214AA	3000	Tape & Reel

Tape and Reel Specification



Symbol	Millimeter
A	12.00±0.10
B	4.00±0.10
C	8.00±0.10
D	1.55±0.05
E	330.20±2.00
F	15.70±2.00
G	13.30±0.30

Revision history of Specification

Version	Change Items	Effective Date
1.0	Initial Release	13-Aug-2021
1.1	Add L-voltage models	26-Jun-2023
1.2	Update Marking Picture	10-Apr-2024