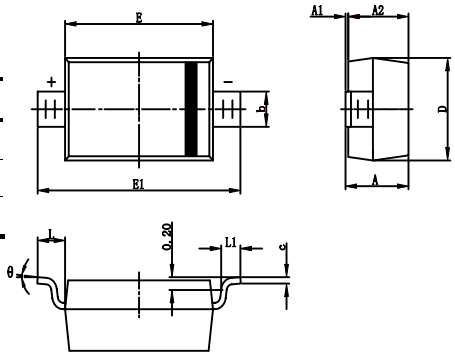
SEMICONDUCTOR

DATA SHEET

MMSZ52xxBW Series

500mW SOD-123 SURFACE MOUNT
Flat Lead Surface Mount Plastic Package
Zener Voltage Regulators

SOD123 Unit:inch(mm)



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
P_D	Power Dissipation	500	mW
T_{STG}	Storage Temperature Range	-55 to +150	°C
T_{OPR}	Operating Temperature Range	-55 to +150	°C

These ratings are limiting values above which the serviceability of the diode may be impaired.

Specification Features:

- Wide Zener Voltage Range Selection, 2.4V to 56V
- VZ Tolerance Selection of ±5%
- Flat Lead SOD-123 Plastic Package
- Surface Device Type Mounting
- Moisture Sensitivity Level 1
- Clip Bonding Construction, Good Thermal Capability
- Pb Free Version and RoHS Compliant
- Matte Tin(Sn) Lead Finish with Nickel(Ni) Underplate
- Band Indicates Cathode

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.450	0.650	0.018	0.026
c	0.080	0.150	0.003	0.006
D	1.500	1.700	0.059	0.067
E	2.600	2.800	0.102	0.110
E1	3.550	3.850	0.140	0.152
L	0.500 REF		0.020 REF	
L1	0.250	0.450	0.010	0.018
θ	0°	8°	0°	8°

ELECTRICAL SYMBOL

Electrical Characteristics T_A = 25°C unless otherwise noted

Device Type	Device Marking	V_Z @ I_{ZT} (Volts)			I_{ZT} (mA)	Z_{ZT} @ I_{ZT} (Ω) Max	Z_{ZK} @ I_{ZK} = 0.25mA (Ω) Max	I_R @ V_R (μA) Max	V_R (Volts)
		Min	Nom	Max					
MMSZ5221BW	Z2V4	2.28	2.4	2.52	20	30	1200	100	1
MMSZ5222BW	Z2V5	2.38	2.5	2.63	20	30	1250	100	1
MMSZ5223BW	Z2V7	2.57	2.7	2.84	20	30	1300	75	1
MMSZ5224BW	Z2V8	2.66	2.8	2.94	20	30	1400	75	1
MMSZ5225BW	Z3V0	2.85	3.0	3.15	20	29	1600	50	1
MMSZ5226BW	Z3V3	3.14	3.3	3.47	20	28	1600	25	1
MMSZ5227BW	Z3V6	3.42	3.6	3.78	20	24	1700	15	1
MMSZ5228BW	Z3V9	3.71	3.9	4.10	20	23	1900	10	1
MMSZ5229BW	Z4V3	4.09	4.3	4.52	20	22	2000	5	1
MMSZ5230BW	Z4V7	4.47	4.7	4.94	20	19	1900	5	2
MMSZ5231BW	Z5V1	4.85	5.1	5.36	20	17	1600	5	2
MMSZ5232BW	Z5V6	5.32	5.6	5.88	20	11	1600	5	3
MMSZ5233BW	Z6V0	5.70	6.0	6.30	20	7	1600	5	3.5
MMSZ5234BW	Z6V2	5.89	6.2	6.51	20	7	1000	5	4
MMSZ5235BW	Z6V8	6.46	6.8	7.14	20	5	750	3	5
MMSZ5236BW	Z7V5	7.13	7.5	7.88	20	6	500	3	6
MMSZ5237BW	Z8V2	7.79	8.2	8.61	20	8	500	3	6.5
MMSZ5238BW	Z8V7	8.27	8.7	9.14	20	8	600	3	6.5
MMSZ5239BW	Z9V1	8.65	9.1	9.56	20	10	600	3	7
MMSZ5240BW	Z10V	9.50	10	10.50	20	17	600	3	8
MMSZ5241BW	Z11V	10.45	11	11.55	20	22	600	2	8.4
MMSZ5242BW	Z12V	11.40	12	12.60	20	30	600	1	9.1
MMSZ5243BW	Z13V	12.35	13	13.65	9.5	13	600	0.5	9.9

Electrical Characteristics

T_A = 25°C unless otherwise noted

Device Type	Device Marking	V_Z @ I_{ZT} (Volts)			I_{ZT} (mA)	Z_{ZT} @ I_{ZT} (Ω) Max	Z_{ZK} @ I_{ZK} = 0.25mA (Ω) Max	I_R @ V_R (μA) Max	V_R (Volts)
		Min	Nom	Max					
MMSZ5244BW	Z14V	13.30	14	14.70	9	15	600	0.1	10
MMSZ5245BW	Z15V	14.25	15	15.75	8.5	16	600	0.1	11
MMSZ5246BW	Z16V	15.20	16	16.80	7.8	17	600	0.1	12
MMSZ5247BW	Z17V	16.15	17	17.85	7.4	19	600	0.1	13
MMSZ5248BW	Z18V	17.10	18	18.90	7	21	600	0.1	14
MMSZ5249BW	Z19V	18.05	19	19.95	6.6	23	600	0.1	14
MMSZ5250BW	Z20V	19.00	20	21.00	6.2	25	600	0.1	15
MMSZ5251BW	Z22V	20.90	22	23.10	5.6	29	600	0.1	17
MMSZ5252BW	Z24V	22.80	24	25.20	5.2	33	600	0.1	18
MMSZ5253BW	Z25V	23.75	25	26.25	5	35	600	0.1	19
MMSZ5254BW	Z27V	25.65	27	28.35	4.6	41	600	0.1	21
MMSZ5255BW	Z28V	26.60	28	29.40	4.5	44	600	0.1	21
MMSZ5256BW	Z30V	28.50	30	31.50	4.2	49	600	0.1	23
MMSZ5257BW	Z33V	31.35	33	34.65	3.8	58	700	0.1	25
MMSZ5258BW	Z36V	34.20	36	37.80	3.4	70	700	0.1	27
MMSZ5259BW	Z39V	37.05	39	40.95	3.2	80	800	0.1	30
MMSZ5260BW	Z43V	40.85	43	45.15	3	93	900	0.1	33
MMSZ5261BW	Z47V	44.65	47	49.35	2.7	105	1000	0.1	36
MMSZ5262BW	Z51V	48.45	51	53.55	2.5	125	1100	0.1	39
MMSZ5263BW	Z56V	53.20	56	58.80	2.2	150	1300	0.1	43

V_F Forward Voltage = 900mV Maximum @ I_F = 10 mA for all types

Notes:

1. The zener voltage (V_Z) is tested under pulse condition of 15mS. The measured V_Z is guaranteed to be within specification with device junction in thermal equilibrium.
2. The device numbers listed have a standard tolerance on the nominal zener voltage of ±5%.
3. The zener impedance is derived from the 60-cycle ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current (I_{ZT} or I_{ZK}) is superimposed to I_{ZT} or I_{ZK}.
4. For detailed information on price, availability and delivery of nominal zener voltages between the voltages shown and tighter voltage tolerances, contact your nearest YEASHIN representative.

DEVICE CHARACTERISTICS

MMSZ52xxBW Series

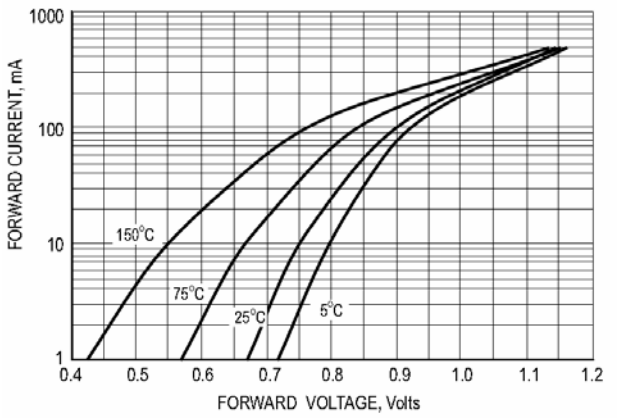


Fig.1 TYPICAL FORWARD VOLTAGE

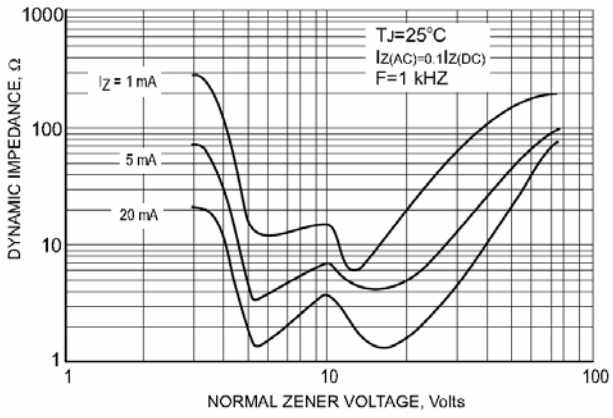


Fig.2 EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

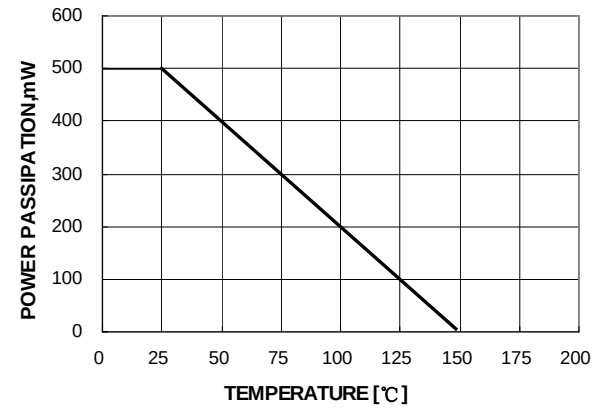


Fig.3 POWER DISSIPATION VS. AMBIENT TEMP.

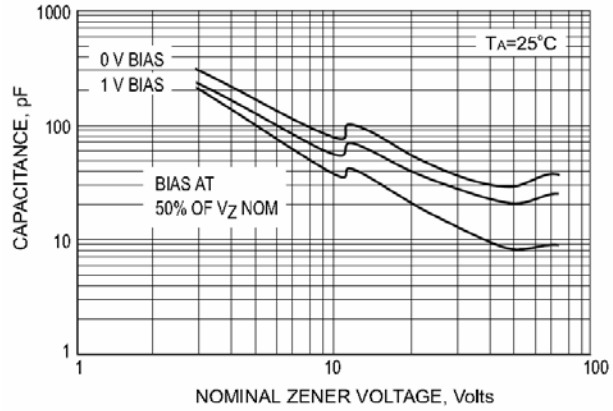


Fig.4 TYPICAL CAPACITANCE

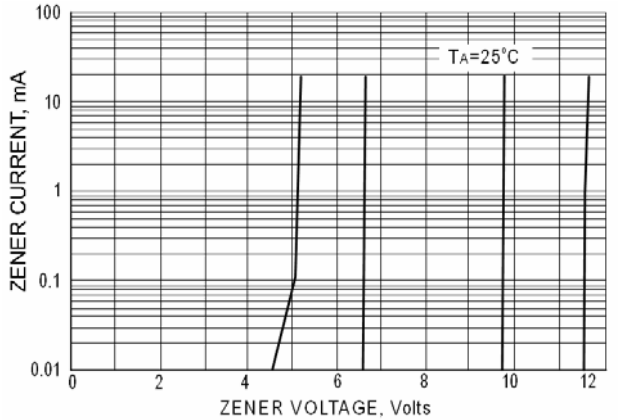


Fig.5 ZENER BREAKDOWN CHARACTERISTICS

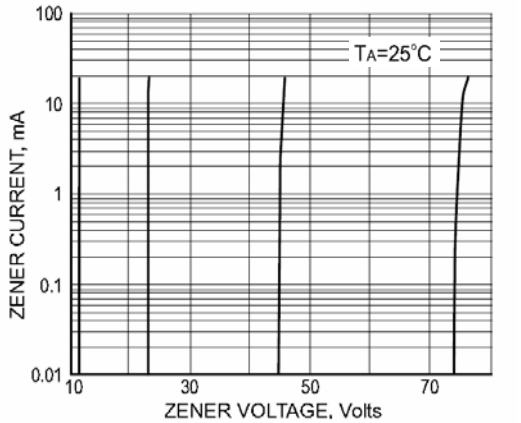


Fig.6 ZENER BREAKDOWN CHARACTERISTICS

PACKAGE OUTLINE & DIMENSIONS

MMSZ52xxBW Series

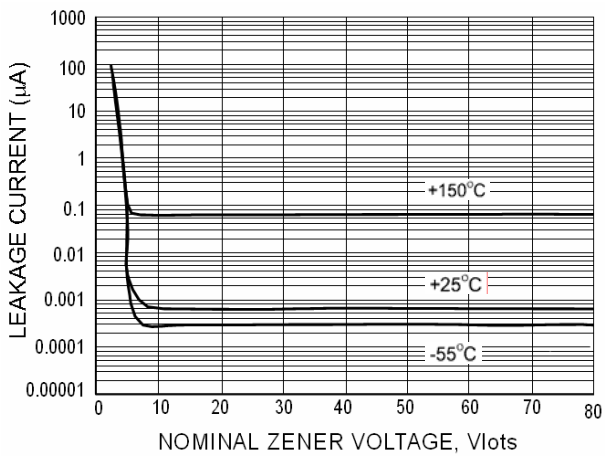


Fig.7 TYPICAL LEAKGE CURRENT

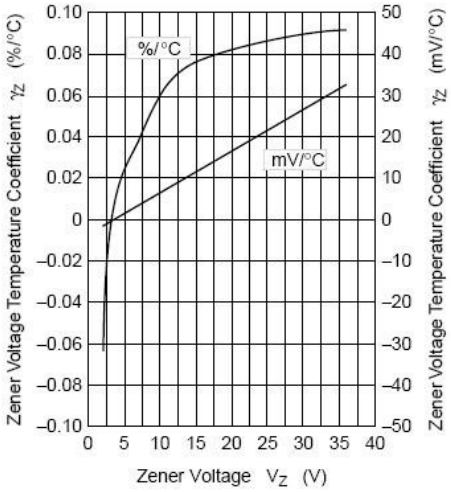
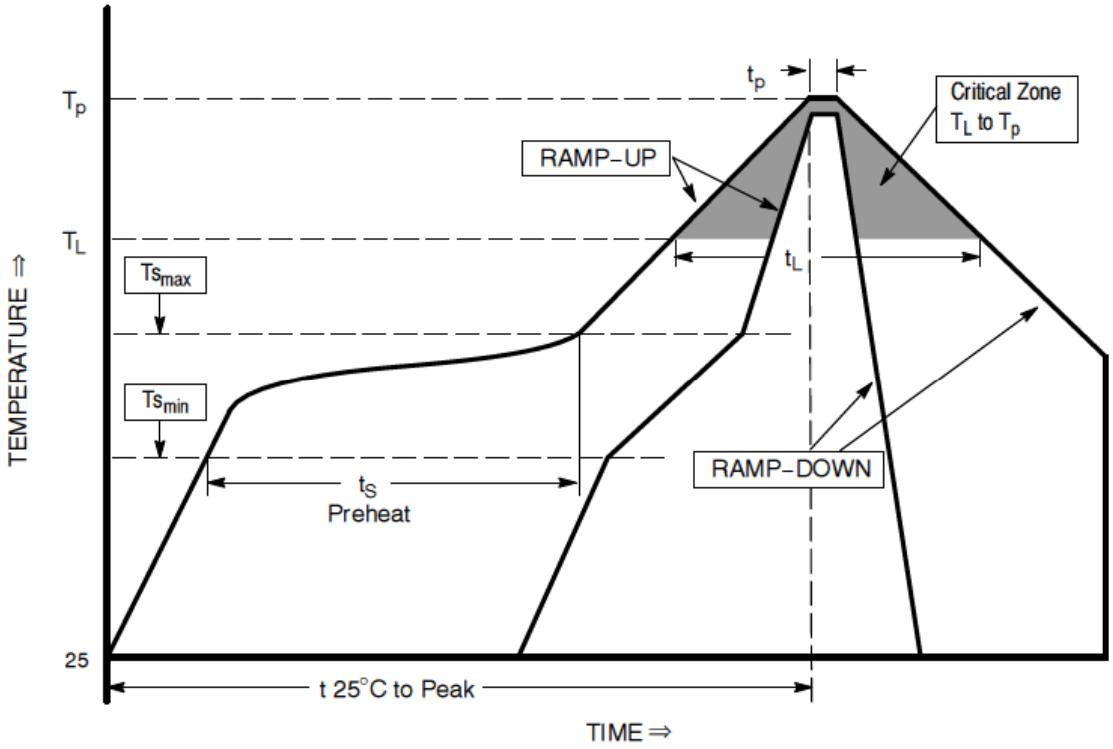


Fig. 8 Temperature Coefficient vs. Zener voltage



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to Tp)	3°C/second max
Preheat Temperature Min (Ts_{min}) Temperature Max (Ts_{max}) Time (ts_{min} to ts_{max})	 150°C 200°C 60–180 seconds
Time maintained above Temperature (T_T) Time (t_T)	 217°C 60–150 seconds
Peak Classification Temperature (Tp)	260°C +5/–0
Time within 5°C of actual Peak Temperature (tp)	20–40 seconds
Ramp-Down Rate	6°C/second max
Time 25°C to Peak Temperature	8 minutes max

Note : According to J-STD-020D.

1、Solder Composition：

Composition	Sn	Pb	Ag	Sb	Cu	Bi	Zn	Fe	Al	As	Cd
96.5Sn3.0Ag0.5Cu	rest	<0.1	3.0 ±0.2	<0.12	0.5 ±0.05	<0.1	<0.002	<0.02	<0.002	<0.03	<0.002

2、Solder Stick Parameter：

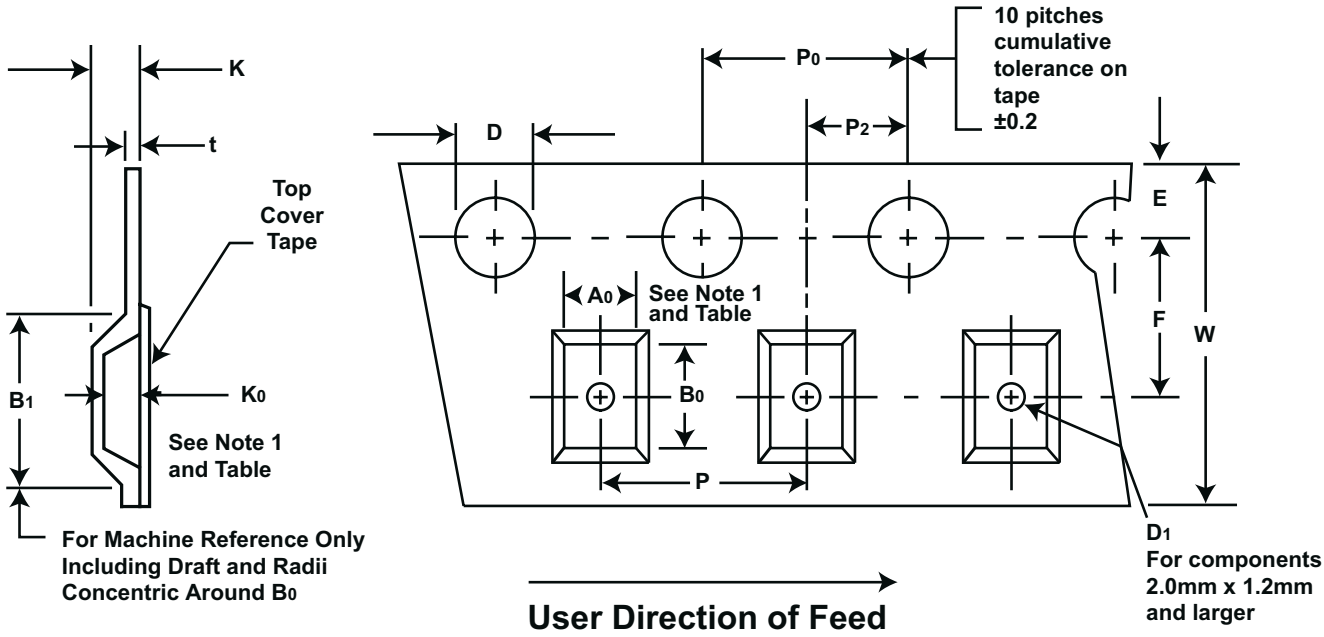
Liquid phase temp (℃)	221
Solid phase temp (℃)	216

Extension strength (kgf/mm^2)	3.7
Elongation	33

3、Solder Paste Parameter：

Item		Property		Testing Method
Liquid resistivity (Ω． m)		１×１０^{3}以上		JIS Z 3197 8.1.1 (1999)
Flux content (wt %)		10.5±0.03		JIS Z 3197 8.1.2(1999)
Halogen content (wt %)		0.07±0.02		JIS Z 3197 8.1.4.2.1(1999)
Copper mirror corrosion test		Accept		JIS Z 3197 8.1.4.2.3(1999)
Powder（u m）		GQ	G K	JIS Z 3284 Attach file 1
		Ball shape 10-38	Ball shape 20-45	
Melt point (℃)		216-221		DSC
Flux fluoride content		None		JIS Z 3284 Attach file 2
Insulate resistivity Ω	40℃ 90%	>1×10^{12}		JIS Z 3284 Attach file 3
	85℃ 85%	>5×10^8		
Flux residuum corrosion test		No corrosion		JIS Z 3284 Attach file 4
Printing test		GQ	GK	JIS Z 3284 Attach file 5
		0.4mm pitch	0.5mm pitch	
Visicosity (Pa.s)		180±20		JIS Z 3284 Attach file 6
Printing cave		None 0.2mm solder bridge		JIS Z 3284 Attach file 7
Heating cave		None 0.2mm solder bridge		JIS Z 3284 Attach file 8
Adhesive	Beginning	１． ＞０ Ｎ		JIS Z 3284 Attach file 9
	After 24 hrs.	１． ＞０ Ｎ		
Dewetting		2 grade（copper plate）		JIS Z 3284 Attach file 10
Solder ball test	Beginning	１－３ grade		JIS Z 3284 Attach file 11
	After 24 hrs.	１－３ grade		
Residuum adhesive after soldering		None		JIS Z 3284 Attach file 12
Transfer test		None		JIS Z 3284 Attach file 13

SURFACE MOUNT PACKAGING



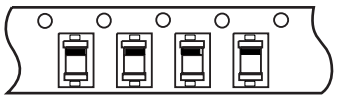
EMBOSSED TAPE

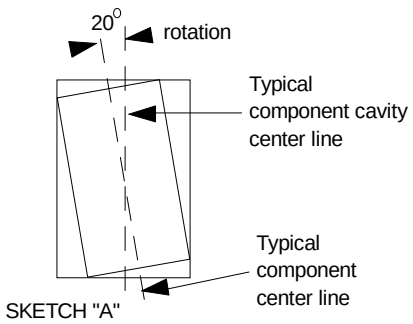
ALL DIMENSION IN MILLIMETERS

Tape Size	D	E	Po	t(Max)	Ao Bo Ko	Constant Dimensions
8, 12 , 16 mm	1.55+0.1 −0.0	1.75±0.10	4.0±0.10	0.400	See Note 1	

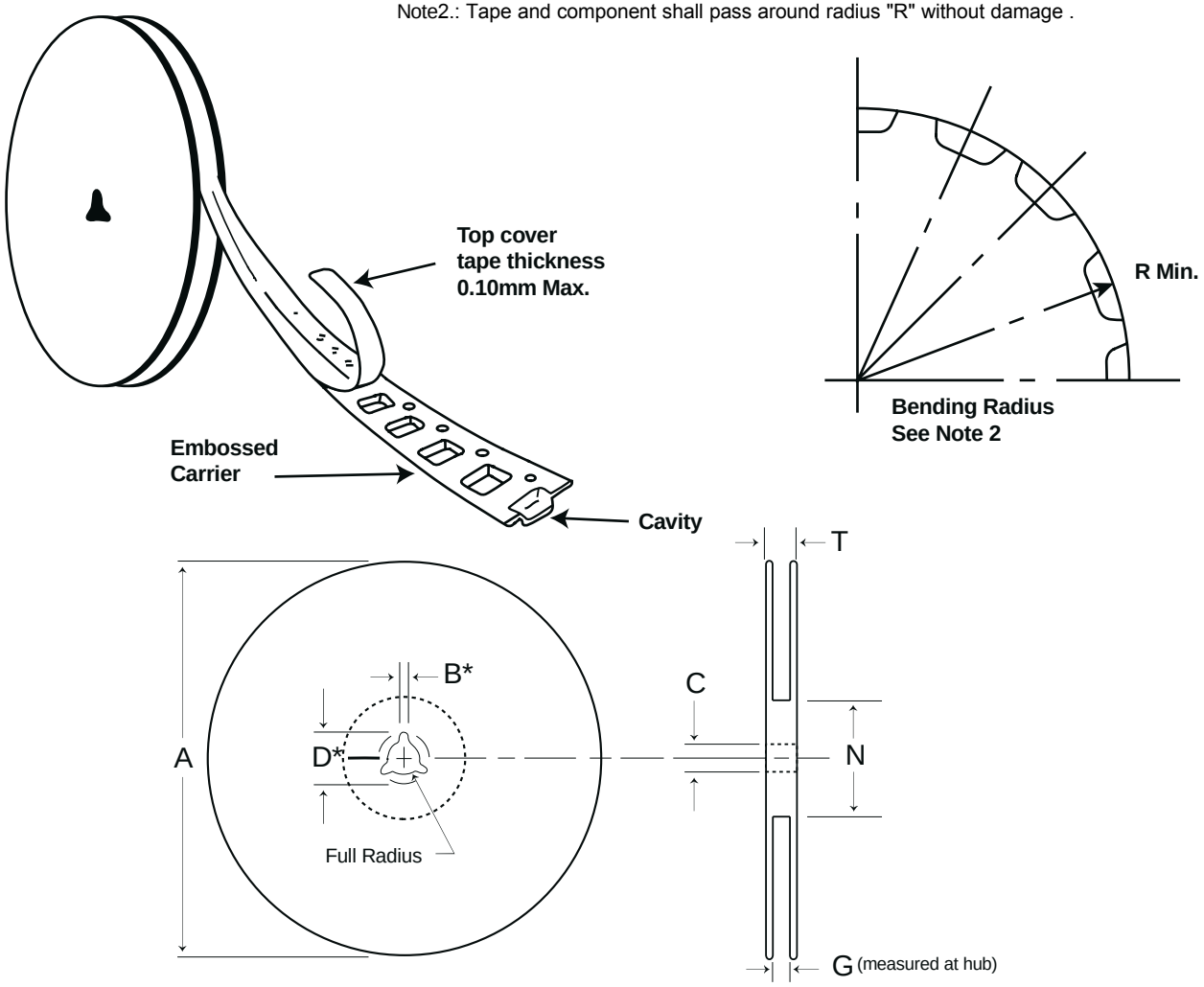
Product Type	Tape Size	B1 Max.	D1 Min.	F	K Max.	P2	R	W	P
SOT-23/323/363 SOD-123/323	8mm	4.5	1.0	3.5±0.05	2.4	2.0±0.05	25	8.0±0.3	4.0±0.1
SMA SMF	12mm	8.2	1.5	5.5±0.05	4.5	2.0±0.05	30	12.0±0.3	8.0±0.1
SMB MINI DIP									
SMC	16mm	12.1		7.5±0.1	3.29	2.0±0.1	40	16.0±0.3	8.0±0.1
DFS					3.70	4.0±0.1	50		12.0±0.1

Note1.: A0B0K0 are determined by component size. The clearance between the component and the cavity must be within 0.05(.002) min. to 0.50 (.020) max. for 8 mm tape. 0.05(.002) min. to 0.65 (.025) max. for 12mm tape. 0.15 (0.006) min. to 0.90 (.035) max. for 16mm tape and 0.05(0.002) min. to 1.00 (.039) max. for 24 mm tape and larger. the component cannot rotate more than 20° within the determined cavity,see sketch "A" below





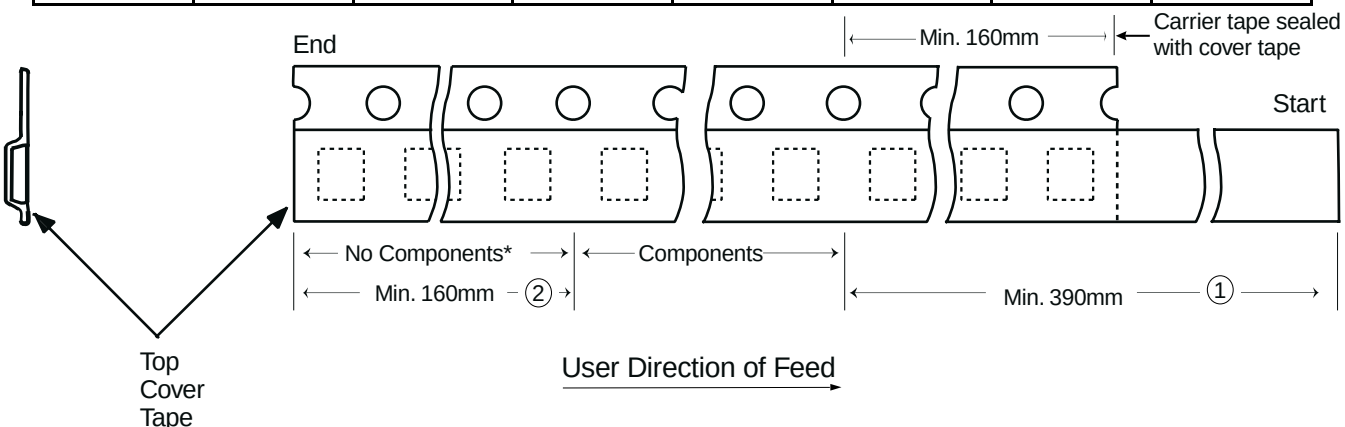
Note2.: Tape and component shall pass around radius "R" without damage .



* Drive spokes optional. If used, dimensions with asterisks apply.

ALL DIMENSION IN MILLMETERS

Tape Size	A Max.	B* Max.	C	D* Max.	N Min.	G	T Max.
8mm	178	1.5	13.0±0.2	20.2	50	8.4 +1.5 -0.0	14.4
12mm	330	1.5	13.0±0.2	20.2	50	12.4 +2.0 -0.0	18.4
16mm	330	1.5	13.0±0.2	20.2	50	16.4 +2.0 -0.1	22.4



Notes:
1. There shall be a leader of 230mm [9.05] minimum which may consist of carrier and/or cover tape or a start tape followed by a minimum of 160mm [6.30] of empty carrier tape sealed with cover tape.
2. There shall be a trailer of 160mm [6.30] minimum of empty carrier tape sealed with cover tape. The entire carrier tape must release from the reel hub as the last portion of the tape unwinds from the reel without damage to the carrier tape and the remaining components in the cavities.

PACKAGING

BOX SIZE:

PRODUCTS OUTLINE	DIMENSION (mm)			Q'TY PER BOX (PER REEL)
	A	B	C	
SOT-23/323/363 **SOD-123/323**	187	187	70	12000 (3000)
SMA/SMF	340	340	40	15000
SMB **MINI DIP** **SMC**				6000 (3000)
DFS				3000 (1500)

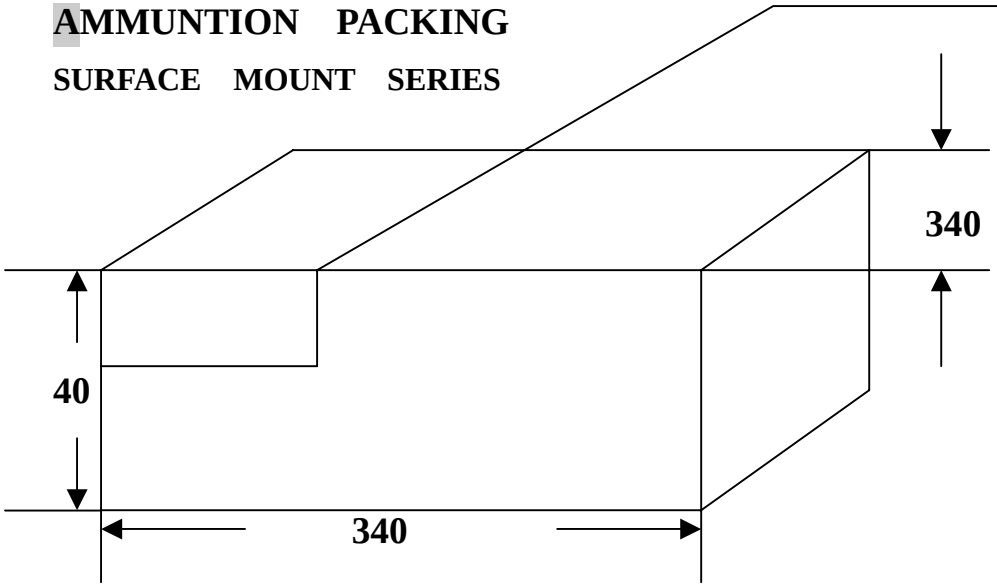
TUBE SIZE:

PRODUCTS OUTLINE	PACKAGEING SIZE (mm)		Q'TY PER BOX (PER TUBE)
	TUBE	BOX	
DFS	444*15*5.9	490*155*145	9000 (50)

LABEL TYPE

AMMUNTION PACKING

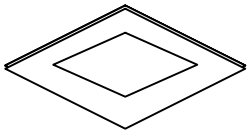
SURFACE MOUNT SERIES

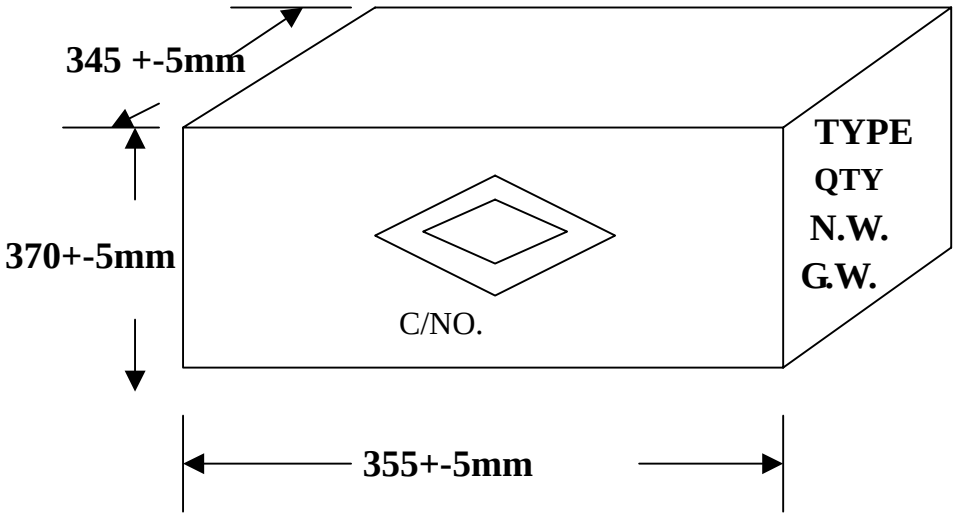


Box Dimensions :mm
Quantity per Box :7.5Kpcs/Roll,2Rolls/Box,15Kpcs/Box

CARTON

SHIPPING MARK





SIDEMARK

TYPE:
QTY:
N.W.:
G.W.:

Box dimensions: mm
Quantity per Box:15kpcs/Box. 8Box/carton,120kpcs/carton