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1.DATA SHEET

ZMM5221B SERIES

SURFACE MOUNT ZENER DIODES

VOLTAGE 2.4 to 47 Volts

POWER 500 mWatts

MINI-MELF/LL-34

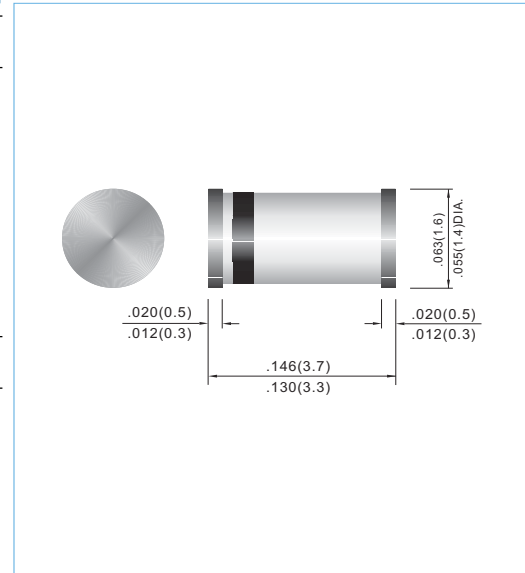
Unit : inch (mm)

FEATURES

- Planar Die construction
- 500mW Power Dissipation
- Ideally Suited for Automated Assembly Processes
- Pb free product are available : 99% Sn above can meet RoHS environment substance

MECHANICAL DATA

- Case: Molded Glass MINI-MELF
- Terminals: Solderable per MIL-STD-750, Method 2026
- Polarity: See Diagram Below
- Approx. Weight: 29.816mg
- Mounting Position: Any



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Value	Units
Power Dissipation at $T_{amb} = 25^{\circ}C$	P_{TOT}	500	mW
Junction Temperature	T_J	175	$^{\circ}C$
Storage Temperature Range	T_S	-65 to +175	$^{\circ}C$

Valid provided that leads at a distance of 10mm from case are kept at ambient temperature.

Parameter	Symbol	Min.	Typ.	Max.	Units
Thermal Resistance Junction to Ambient Air	R_{thA}	—	—	0.3	K/mW
Forward Voltage at $I_F = 200mA$	V_F	—	—	1.1	V

Valid provided that leads at a distance of 10mm from case are kept at ambient temperature.

Part Number	Nominal Zener Voltage			Max. Zener Impedance				Max Reverse Leakage Current		Marking code
	Vz @ IzT			ZzT @ IzT		Zzk @ Izk		IR @ VR		
	Nom. V	Min. V	Max. V	Ω	mA	Ω	mA	uA	V	
ZMM5221B	2.40	2.28	2.52	30	20.0	1200	0.25	100	1.0	5221
ZMM5222B	2.50	2.38	2.63	30	20.0	1250	0.25	100	1.0	5222
ZMM5223B	2.70	2.57	2.84	30	20.0	1300	0.25	75	1.0	5223
ZMM5224B	2.80	2.66	2.94	30	20.0	1400	0.25	75	1.0	5224
ZMM5225B	3.00	2.85	3.15	29	20.0	1600	0.25	50	1.0	5225
ZMM5226B	3.30	3.14	3.47	28	20.0	1600	0.25	25	1.0	5226
ZMM5227B	3.60	3.42	3.78	24	20.0	1700	0.25	15	1.0	5227
ZMM5228B	3.90	3.71	4.10	23	20.0	1900	0.25	10	1.0	5228
ZMM5229B	4.30	4.09	4.52	22	20.0	2000	0.25	5.0	1.0	5229
ZMM5230B	4.70	4.47	4.94	19	20.0	1900	0.25	5.0	2.0	5230
ZMM5231B	5.10	4.85	5.36	17	20.0	1600	0.25	5.0	2.0	5231
ZMM5232B	5.60	5.32	5.88	11	20.0	1600	0.25	5.0	3.0	5232
ZMM5233B	6.00	5.70	6.30	7	20.0	1600	0.25	5.0	3.5	5233
ZMM5234B	6.20	5.89	6.51	7	20.0	1000	0.25	5.0	4.0	5234
ZMM5235B	6.80	6.46	7.14	5	20.0	750	0.25	3.0	5.0	5235
ZMM5236B	7.50	7.13	7.88	6	20.0	500	0.25	3.0	6.0	5236
ZMM5237B	8.20	7.79	8.61	8	20.0	500	0.25	3.0	6.5	5237
ZMM5238B	8.70	8.27	9.14	8	20.0	600	0.25	3.0	6.5	5238
ZMM5239B	9.10	8.65	9.56	10	20.0	600	0.25	3.0	7.0	5239
ZMM5240B	10.00	9.50	10.50	17	20.0	600	0.25	3.0	8.0	5240
ZMM5241B	11.00	10.45	11.55	22	20.0	600	0.25	2.0	8.4	5241
ZMM5242B	12.00	11.40	12.60	30	20.0	600	0.25	1.0	9.1	5242
ZMM5243B	13.00	12.35	13.65	13	9.5	600	0.25	0.5	9.9	5243
ZMM5244B	14.00	13.30	14.70	15	9.0	600	0.25	0.1	10.0	5244
ZMM5245B	15.00	14.25	15.75	16	8.5	600	0.25	0.1	11.0	5245
ZMM5246B	16.00	15.20	16.80	17	7.8	600	0.25	0.1	12.0	5246
ZMM5247B	17.00	16.15	17.85	19	7.4	600	0.25	0.1	13.0	5247
ZMM5248B	18.00	17.10	18.90	21	7.0	600	0.25	0.1	14.0	5248
ZMM5249B	19.00	18.05	19.95	23	6.6	600	0.25	0.1	14.0	5249
ZMM5250B	20.00	19.00	21.00	25	6.2	600	0.25	0.1	15.0	5250
ZMM5251B	22.00	20.90	23.10	29	5.6	600	0.25	0.1	17.0	5251
ZMM5252B	24.00	22.80	25.20	33	5.2	600	0.25	0.1	18.0	5252
ZMM5253B	25.00	23.75	26.25	35	5.0	600	0.25	0.1	19.0	5253
ZMM5254B	27.00	25.65	28.35	41	4.6	600	0.25	0.1	21.0	5254
ZMM5255B	28.00	26.60	29.40	44	4.5	600	0.25	0.1	21.0	5255
ZMM5256B	30.00	28.50	31.50	49	4.2	600	0.25	0.1	23.0	5256
ZMM5257B	33.00	31.35	34.65	58	3.8	700	0.25	0.1	25.0	5257
ZMM5258B	36.00	34.20	37.80	70	3.4	700	0.25	0.1	27.0	5258
ZMM5259B	39.00	37.05	40.95	80	3.2	800	0.25	0.1	30.0	5259
ZMM5260B	43.00	40.85	45.15	93	3.0	900	0.25	0.1	33.0	5260
ZMM5261B	47.00	44.65	49.35	150	2.7	1000	0.25	0.1	36.0	5261

Notes.

- STANDARD VOLTAGE TOLERANCE IS + 5% AND :
- SUFFIX " A " FOR + 3%
- SUFFIX " B " FOR + 5%
- SUFFIX " C " FOR + 10%
- SUFFIX " D " FOR + 20%

RATING AND CHARACTERISTIC CURVES

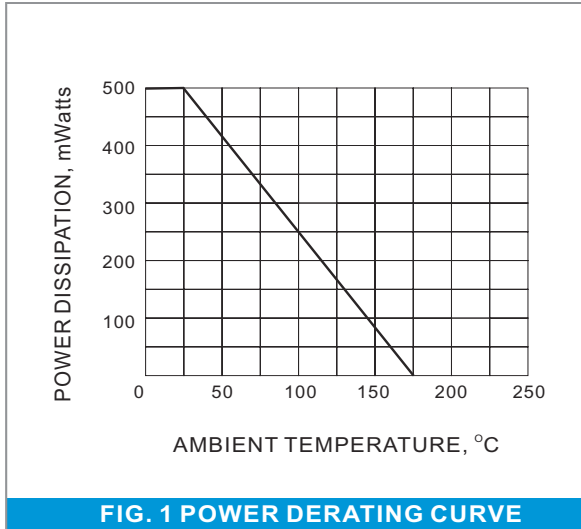


FIG. 1 POWER DERATING CURVE

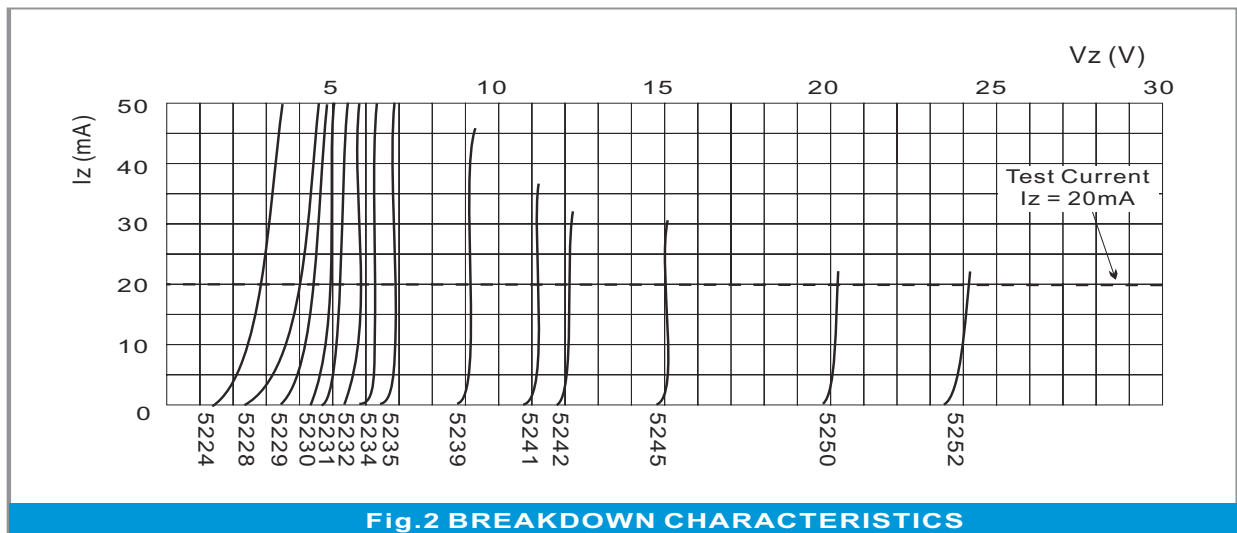
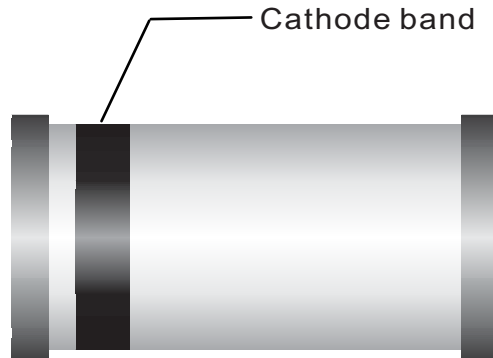
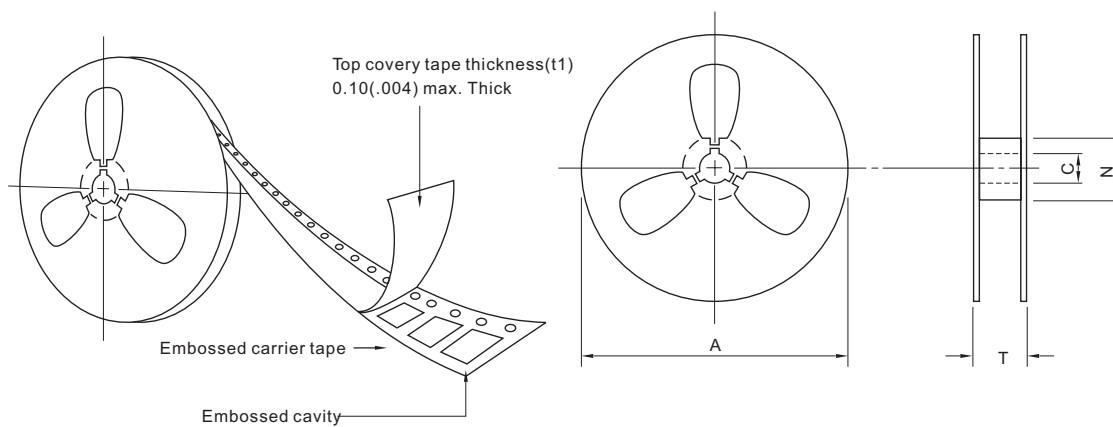
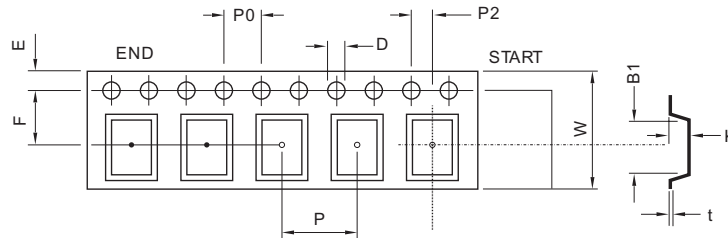


Fig.2 BREAKDOWN CHARACTERISTICS

2. MARKING



3. TAPING



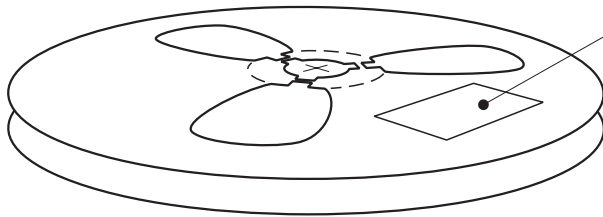
SYMBOL	mm(inch)
TYPE SIZE	8.00 (0.314)
B1	3.70 (0.146) max.
D	1.50 ± 0.10 (0.059 ± 0.004)
A	180.0 (7.0) max.
N	60.0 (2.362) min.
C	13.0 ± 0.5 (0.51 ± 0.02)
E	1.75 ± 0.10 (0.068 ± 0.003)
F	3.50 ± 0.05 (0.138 ± 0.002)
K	1.80 (0.017) max.
P	4.00 ± 0.10 (0.157 ± 0.003)
Po	4.00 ± 0.10 (0.157 ± 0.003)
P2	2.00 ± 0.10 (0.079 ± 0.003)
t	0.20 (0.008) max.
W	8.00 ± 0.30 (0.315 ± 0.012)
T	14.90 (0.587) max.

Note:

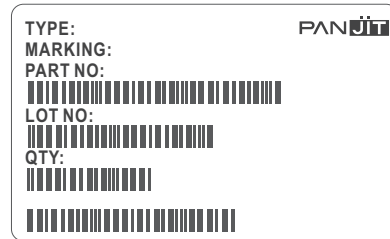
1. A_o, B_o, K_o are determined by component size. The clearance between the component and The component and the cavity must be with in 0.05mm (0.002") min. to 0.65mm (0.025") max. For 12mm tape, 0.05mm (0.002") min. To 0.90mm (0.035") max. For 16mm tape.
2. In addition, the components cannot rotate more than 20° within the determined cavity, see sketch a below.

4. PACKING

REEL PACKING

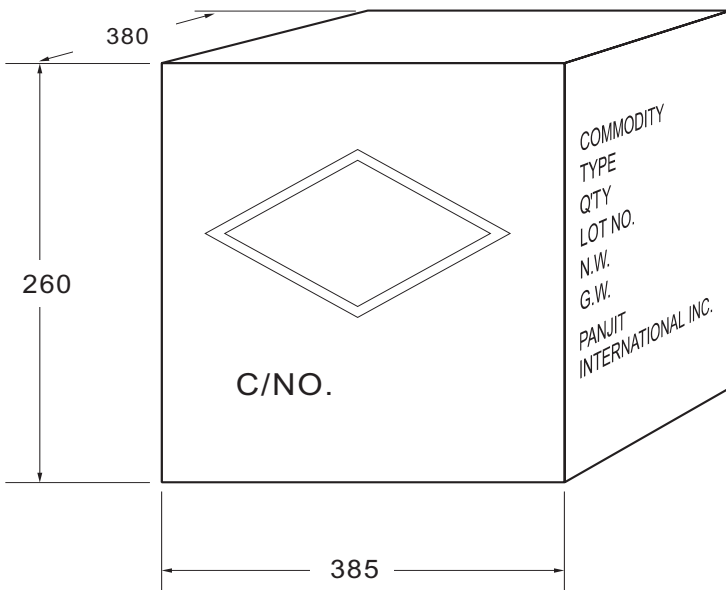


LABEL TYPE



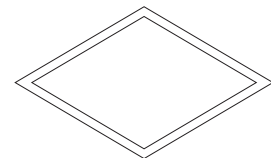
Quantity per Reel: 2,500 pcs

CARTON



Box Dimensions : mm
Quantity per Box: 120,000pcs

SHIPPING MARK



C/NO.
PRODUCT COUNTRY

SIDE MARK

COMMODITY:
TYPE:
Q'TY:
LOT NO.
N.W.
G.W.
PANJIT
INTERNATIONAL INC.

Bulk Packing

PACKAGE	INNER SIZE	BOX	CARTON SIZE	CARTON	APPROX. GROSS WEIGHT
	(m/m)	(EA)	(m/m)	(EA)	(Kg)
Bulk Packing					
A-405	198 x 84 x 20	10,000	459 x 214 x 256	50,000	18.2
AM	260 x 190 x 80	1,000	400 x 273 x 415	10,000	15
CM / W	195 x 195 x 40	50	460 x 215 x 260	500	18
CP-15 / 25 / 35	195 x 195 x 40	50	460 x 215 x 260	500	11
CP-3 / 6	260 x 190 x 80	400	400 x 273 x 415	4,000	8.5
CP-8 / 10	260 x 190 x 80	250	400 x 273 x 415	2,500	14
DIP	-	-	495 x 214 x 256	12,000	8.8
DO-15	200 x 85 x 25	1,000	459 x 214 x 256	40,000	17
DO-201AD	200 x 85 x 40	500	495 x 214 x 256	12,500	15.8
DO-201AE	200 x 85 x 40	500	495 x 214 x 256	12,500	15.8
DO-34	96 x 80 x 42	2,000	410 x 335 x 265	120,000	12
DO-35	96 x 80 x 42	2,000	410 x 335 x 265	120,000	13.8
DO-41	240 x 100 x 90	5,000	410 x 335 x 265	60,000	20
DO-41G	96 x 80 x 42	1,000	410 x 335 x 265	60,000	20
FI	208 x 90 x 83	500	490 x 225 x 380	10,000	20.4
FL	270 x 225 x 50	500	463 x 283 x 185	3,000	18.2
GBJ	352 x 337 x 44	800	375 x 360 x 213	3,200	25.4
GBL	350 x 337 x 44	960	375 x 360 x 213	3,840	13.1
GBP	350 x 337 x 44	1,120	375 x 360 x 213	4,480	10.7
GBPC	195 x 195 x 40	50	460 x 215 x 260	500	12
GBPCW	195 x 195 x 40	50	460 x 215 x 260	500	18
GBU	350 x 337 x 44	800	375 x 360 x 213	3,200	17
GL	195 x 195 x 40	80	460 x 215 x 260	800	11
GPJ	500 x 150 x 145	750	572 x 306 x 218	1,500	17
KBJ	219 x 177 x 44	200	367 x 232 x 250	2,000	16.3
KBPC / W	195 x 195 x 40	50	460 x 215 x 260	500	18
KBPM	490 x 150 x 110	1,200	510 x 335 x 240	4,800	19
KBU	270 x 225 x 50	200	463 x 283 x 185	1,200	10
MDI	350 x 337 x 44	6,000	375 x 360 x 390	48,000	14.4
P-600	208 x 90 x 83	500	495 x 214 x 256	5,000	11.9
R-1	198 x 84 x 20	1,000	495 x 214 x 256	50,000	18.2
SDIP	-	-	495 x 214 x 256	24,000	16.8
TO / ITO-220	555 x 145 x 95	2,000	572 x 306 x 218	8,000	19
TO-251AB	560 x 210 x 79	8,400	572 x 306 x 218	33,600	22
TO-247AD	-	-	536 x 243 x 100	1,500	13.2
RB/WOB	258x190x77	1,000	395x270x400	10,000	15.0/17.0
KBP	258x190x77	1,000	395x270x400	10,000	18.0
KBL	230x147x50	200	460x245x275	3,000	17.25
K3/K6	210x115x90	200	600x235x198	2,000	7.3/8.8
K8	210x115x90	200	600x235x198	2,000	13.8
K10/K15/K25/K35/K50M	193x193x46	50	405x210x265	500	17.0
K10/K15/K25/K35/K50P	193x193x46	50	405x210x265	500	12.0
K10/K15/K25/K35/K50W	193x193x46	50	405x210x265	500	17.0

Reel Packing

PACKAGE	REEL	COMPONENT SPACE	TAPE SPACE	REEL DIA	CARTON SIZE	CARTON	APPROX. GROSS WEIGHT
	(pcs)	(m/m)	(m/m)	(m/m)	(m/m)	(EA)	(Kg)
Reel Packing							
A-405	5,000	5.0	52	330	340 x 340 x 410	25,000	11.3
TO-263	2,500	8.0	24	330	375 x360 x 390	35,000	18
DO-15	4,000	5.0	52	330	340 x 340 x 410	20,000	11
DO-201AD	1,250	10.0	52	330	340 x 340 x 410	6,250	9.2
DO-201AE	1,250	10.0	52	330	340 x 340 x 410	6,250	9.2
DO-34	10,000	5.0	52	360	360 x 360 x 395	50,000	9.5
DO-35	10,000	5.0	52	360	360 x 360 x 395	50,000	12
DO-41	5,000	5.0	52	330	360 x 360 x 395	25,000	13
DO-41G	5,000	5.0	52	360	360 x 360 x 395	25,000	13
TO-252	800	16.0	16	330	350 x 337 x 44	6,400	15
MDI	3,000	8.0	12	330	375 x360 x 390	48,000	14.4
MELF/DL-41	5,000	4.0	-	330	350 x 350 x 300	100,000	14
MICRO-MELF	2,500	4.0	-	178	385 x 380 x 260	200,000	13.5
MINI-MELF	10,000 / 2,500	4.0	-	330 / 178	360 x 360 x 395 / 385 x 380 x 260	200,000 / 120,000	14.0 / 13.5
P-600	800	10.0	52	330	340 x 340 x 410	4,000	11
QFN 1.6 x 1.6	4,000	4.0	8	178	390 x 240 x 420	200,000	7.8
R-1	5,000	5.0	52	330	340 x 340 x 410	25,000	6.3
SDIP	1,500	12.0	16	330	375 x360 x 390	21,000	16.3
SMA	7,500 / 1,800	4.0	12	330 / 178	375 x360 x 390 / 390 x 240 x 420	120,000 / 72,000	17.5 / 10
SMB	3,000 / 500	4.0	12	330 / 178	375 x360 x 390 / 390 x 240 x 420	48,000 / 20,000	13.6 / 7.5
SMC	3,000 / 500	12.0	16	330 / 178	375 x360 x 390 / 390 x 240 x 420	42,000 / 15,000	6.2 / 7.3
SOD-123	10,000 / 3,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	120,000 / 150,000	6.4
SOD-123FL	10,000 / 3,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	120,000 / 150,000	6.4
SOD-323	12,000 / 5,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	144,000 / 250,000	10
SOT-23	10,000 / 3,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	144,000 / 150,000	6.4
SOT-323	10,000 / 3,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	144,000 / 150,000	6.4
SOT-363	10,000 / 3,000	4.0	8	330 / 178	735 x 365 x 292 / 390 x 240 x 420	300,000 / 150,000	15.66 / 7.0
SOT-353	10,000 / 3,000	4.0	8	330 / 178	735 x 365 x 292 / 390 x 240 x 420	300,000 / 150,000	15.66 / 7.0
TO-92	2,000	-	-	335	390 x 390 x 280	8,000	6.067
SOD-523	12,000 / 5,000	4.0	8	330 / 178	375 x 360 x 213 / 390 x 240 x 420	144,000 / 250,000	10
QFN 2.0 x 2.0	5,000 / 3,000 / 1,000	4.0	8	330 / 178 / 178	553 x 365 x 358 / 333 x 240 x 257 / 333 x 240 x 257	45,000 / 39,000 / 13,000	4.5 / 3.0 / 2.5
SOT23-6L	3,000 / 2,500 / 1,000	4.0	8	330 / 178 / 178	553 x 365 x 358 / 333 x 240 x 257 / 333 x 240 x 257	39,000 / 32,500 / 13,000	3.0 / 3.0 / 2.5
SOIC-08	3,000 / 1,500 / 1,000	4.0	8	330 / 330 / 178	553 x 365 x 358 / 553 x 365 x 358 / 333 x 240 x 257	39,000 / 13,500 / 13,000	6.5 / 5.0 / 3.5

Ammunition Packing

PACKAGE	AMMO	COMPONENT SPACE	TAPE SPACE	BOX SIZE	CARTON SIZE	CARTON	APPROX. GROSS WEIGHT
	(pcs)	(m/m)	(m/m)	(m/m)	(m/m)	(EA)	(Kg)
Ammunition Packing							
A-405	5,000	5	26	255 x 50 x 150	399 x 276 x 330	60,000	16.0
A-405	5,000	5	52	255 x 75 x 150	399 x 276 x 330	40,000	16.0
DO-15	3,000	5	52	255 x 75 x 150	399 x 276 x 330	24,000	11.9
DO-201AD	1,250	10	52	255 x 75 x 150	399 x 276 x 330	10,000	14.0
DO-201AE	1,250	10	52	255 x 75 x 150	399 x 276 x 330	10,000	14.0
DO-34	5,000	5	26	248 x 80 x 48	410 x 335 x 265	150,000	15.5
DO-34	5,000	5	52	248 x 80 x 75	410 x 335 x 265	100,000	14.1
DO-35	5,000	5	26	248 x 80 x 48	410 x 335 x 265	150,000	20.0
DO-35	5,000	5	52	248 x 80 x 75	410 x 335 x 265	100,000	15.7
DO-41	5,000	5	52	255 x 75 x 150	399 x 276 x 330	40,000	19.1
DO-41G	2,500	5	26	248 x 80 x 48	410 x 335 x 265	75,000	21.5
DO-41G	2,500	5	52	248 x 80 x 75	410 x 335 x 265	50,000	19.0
P-600	400	10	52	255 x 75 x 150	399 x 276 x 330	3,200	9.0
R-1	5,000	5	26	255 x 50 x 150	399 x 276 x 330	40,000	16.0
R-1	5,000	5	52	255 x 75 x 150	399 x 276 x 330	40,000	16.0