

Metal Oxide Varistors (MOV) Datasheet

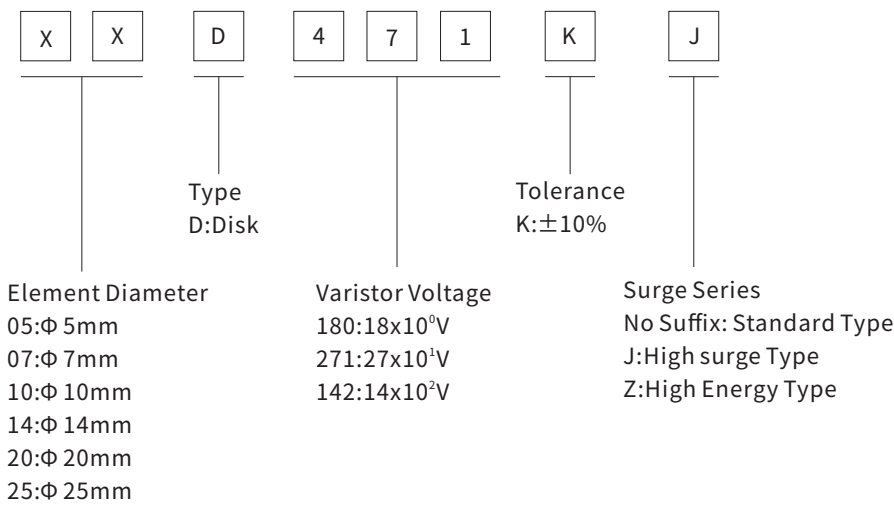
Features

- Wide operating voltage(V1mA)range from 18V to 1800V
- Fast responding to transient over-voltage.
- Large absorbing transient energy capability.
- Low clamping ratio and no following-on current.
- Coating (Epoxy Resin): Flame-Retardant to UL94 V-0
- Meets MSL level 1,per J-STD-020
- Operating Temperature: -40°C ~+105°C
- Storage Temperature: -40°C ~+125°C
- Safety Certification : UL/CUL , CQC

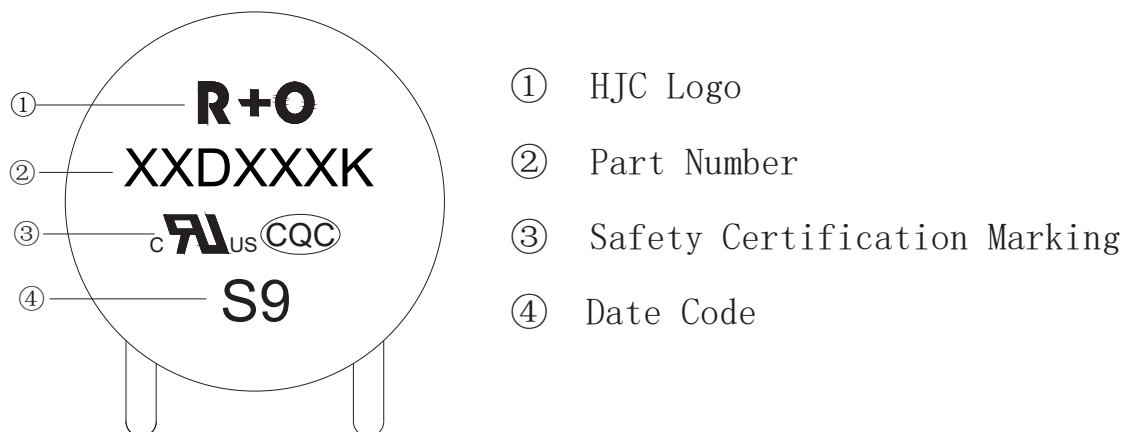
Applications

- Surge protection in electronic home appliances,gas and petroleum appliances
- Surge protection in industrial electronics
- Surge protection in consumer electronics
- Transistor,diode,IC,Thyristor or Triac semiconductor protection
- Relay and electromagnetic valve surge absorption

Part Number Code

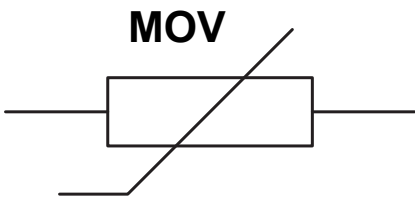


Marking Code



Varistors
Voltage
18V to 1800V

14D SERIES

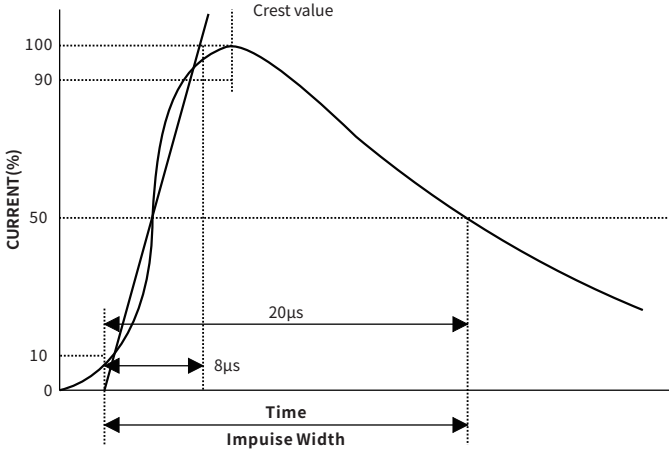


● **Electrical Characteristics** (Ta=25°C Unless otherwise specified)

Part Number		Max. Allowable Voltage		Varistor Voltage	Max. Clamping Voltage 8/20μs		Withstanding Surge Current 8/20μs		Max. Energy 10/1000μs		Rated Power	Typical Capacitance (Reference)
Standard	High Surge	V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	I _P (A)	V _C (V)	Standard (A)	High Surge(J)	Standard (J)	High Surge(J)	(W)	@1KHz(pF)
14D180K	14D180KJ	11	14	18(15-21.6)	10	36	1000	2000	4	7	0.1	15000
14D220K	14D220KJ	14	18	22(19.5-26)	10	43	1000	2000	5	8	0.1	12000
14D270K	14D270KJ	17	22	27(24-31)	10	53	1000	2000	6	10	0.1	9000
14D330K	14D330KJ	20	26	33(29.5-36.5)	10	65	1000	2000	7.5	12	0.1	7500
14D390K	14D390KJ	25	31	39(35-43)	10	77	1000	2000	8.6	13	0.1	6800
14D470K	14D470KJ	30	38	47(42-52)	10	93	1000	2000	10	17	0.1	5800
14D560K	14D560KJ	35	45	56(50-62)	10	110	1000	2000	11	20	0.1	5000
14D680K	14D680KJ	40	56	68(61-75)	10	135	1000	2000	14	24	0.1	3800
14D820K	14D820KJ	50	65	82(74-90)	50	135	4500	6000	22	27	0.6	3000
14D101K	14D101KJ	60	85	100(90-110)	50	165	4500	6000	28	33	0.6	2400
14D121K	14D121KJ	75	100	120(108-132)	50	200	4500	6000	32	40	0.6	2000
14D151K	14D151KJ	95	125	150(135-165)	50	250	4500	6000	40	53	0.6	1300
14D181K	14D181KJ	115	150	180(162-198)	50	300	4500	6000	50	60	0.6	1100
14D201K	14D201KJ	130	170	200(180-220)	50	340	4500	6000	57	70	0.6	1000
14D221K	14D221KJ	140	180	220(198-242)	50	360	4500	6000	60	78	0.6	900
14D241K	14D241KJ	150	200	240(216-264)	50	395	4500	6000	63	84	0.6	830
14D271K	14D271KJ	175	225	270(243-297)	50	455	4500	6000	70	99	0.6	740
14D301K	14D301KJ	190	250	300(270-330)	50	500	4500	6000	77	108	0.6	670
14D331K	14D331KJ	210	275	330(297-363)	50	550	4500	6000	85	115	0.6	610
14D361K	14D361KJ	230	300	360(324-396)	50	595	4500	6000	93	130	0.6	560
14D391K	14D391KJ	250	320	390(351-429)	50	650	4500	6000	100	140	0.6	510
14D431K	14D431KJ	275	350	430(387-473)	50	710	4500	6000	115	155	0.6	460
14D471K	14D471KJ	300	385	470(423-517)	50	775	4500	6000	118	175	0.6	430
14D511K	14D511KJ	320	415	510(459-561)	50	845	4500	6000	121	180	0.6	390
14D561K	14D561KJ	350	460	560(504-616)	50	925	4500	6000	125	185	0.6	360
14D621K	14D621KJ	385	505	620(558-682)	50	1025	4500	6000	128	190	0.6	320
14D681K	14D681KJ	420	560	680(612-748)	50	1120	4500	6000	130	200	0.6	290
14D751K	14D751KJ	460	615	750(675-825)	50	1240	4500	6000	143	210	0.6	270
14D781K	14D781KJ	485	640	780(702-858)	50	1290	4500	6000	148	220	0.6	260
14D821K	14D821KJ	510	670	820(738-902)	50	1355	4500	6000	157	235	0.6	240
14D911K	14D911KJ	550	745	910(819-1001)	50	1500	4500	6000	175	255	0.6	220
14D102K	14D102KJ	625	825	1000(900-1100)	50	1650	4500	6000	190	280	0.6	200
14D112K	14D112KJ	680	895	1100(990-1210)	50	1815	4500	6000	213	310	0.6	180
14D122K	14D122KJ	750	990	1200(1080-1320)	50	1980	4500	6000	232	324	0.6	160
14D142K	14D142KJ	880	1140	1400(1260-1540)	50	2310	4500	6000	238	327	0.6	150
14D152K	14D152KJ	900	1220	1500(1350-1650)	50	2475	4500	6000	240	329	0.6	145
14D182K	14D182KJ	1100	1465	1800(1620-1980)	50	2970	4500	6000	250	335	0.6	130

Note: 1.The tolerance of varistor voltage between 18V and 27V is more than 10%.
2.Leakage Current @83%V_{1mA}: IR ≤ 50μA (180K~680K,); IR ≤ 25μA (820K~112K)

Electrical Ratings

Items	Test Condition/Description	Requirement								
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the specified value								
Maximum Allowable Voltage	The recommended maximum sine wave voltage(RMS)orthe Maximum DC voltage can be applied continuously.									
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform:8/20μs 									
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.									
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.									
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current(8/20μs)applied one time.									
Surge Life	The change of Vb shall be measured after the impulse listed below which is applied 10,000 times continuously with the interval of ten seconds at room temperature. <table><tr><td>Series</td><td>Varistor Voltage</td><td>Surge Current (8/20μs)</td></tr><tr><td rowspan="2">14D Series</td><td>180K to 680K</td><td>75A</td></tr><tr><td>820K to 182K</td><td>150A</td></tr></table>	Series	Varistor Voltage	Surge Current (8/20μs)	14D Series	180K to 680K	75A	820K to 182K	150A	$\frac{\Delta Vb}{Vb} \leq 10\%$
Series	Varistor Voltage	Surge Current (8/20μs)								
14D Series	180K to 680K	75A								
	820K to 182K	150A								

Electrical Ratings

Items	Test Condition/Methods	Specifications															
High Temperature Storage	Ambient Temp: 125±2℃ Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Low Temperature Storage	Ambient Temp: -40±2℃ Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Humidity	Ambient Temp: 40±2℃ , 90~95% R.H. Duration: 1000hrs	ΔV1mA/V1mA ≤ 5%															
Temperature Cycle	The conditions shown below shall be repeated 5 cycles <table><tr><th>Step</th><th>Temperature(℃)</th><th>Period(minutes)</th></tr><tr><td>1</td><td>-40±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>15±3</td></tr><tr><td>3</td><td>125±3</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>15±3</td></tr></table>	Step	Temperature(℃)	Period(minutes)	1	-40±3	30±3	2	Room temperature	15±3	3	125±3	30±3	4	Room temperature	15±3	No visible damage ΔV1mA/V1mA ≤ 5%
Step	Temperature(℃)	Period(minutes)															
1	-40±3	30±3															
2	Room temperature	15±3															
3	125±3	30±3															
4	Room temperature	15±3															
High Temperature Load	Ambient Temp: 125±2℃ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	ΔV1mA/V1mA ≤ 5%															
Damp Heat Load	Ambient Temp: 40±2℃ , 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage ΔV1mA/V1mA ≤ 5%															
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage															

Recommended Soldering Conditions

Wave Lead Free Soldering Recommendation

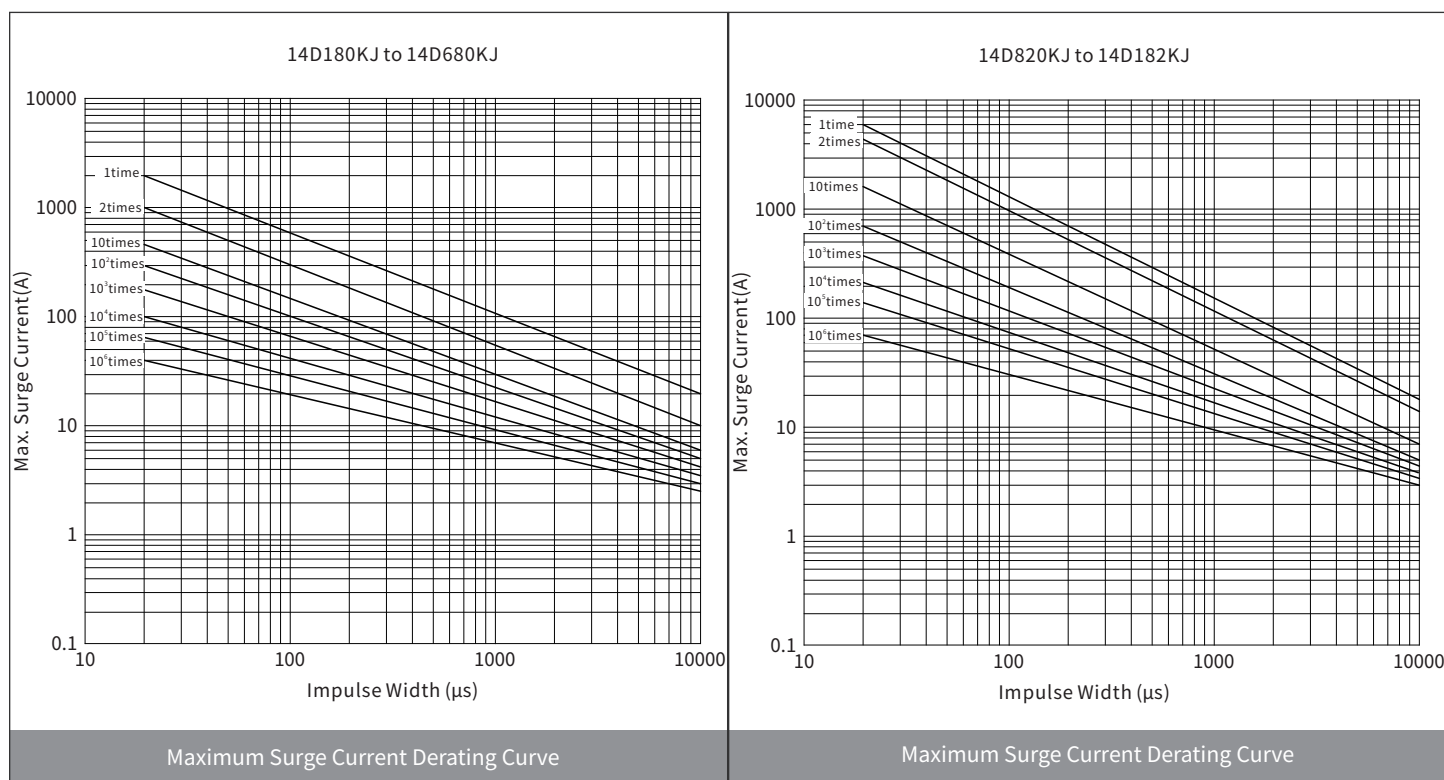
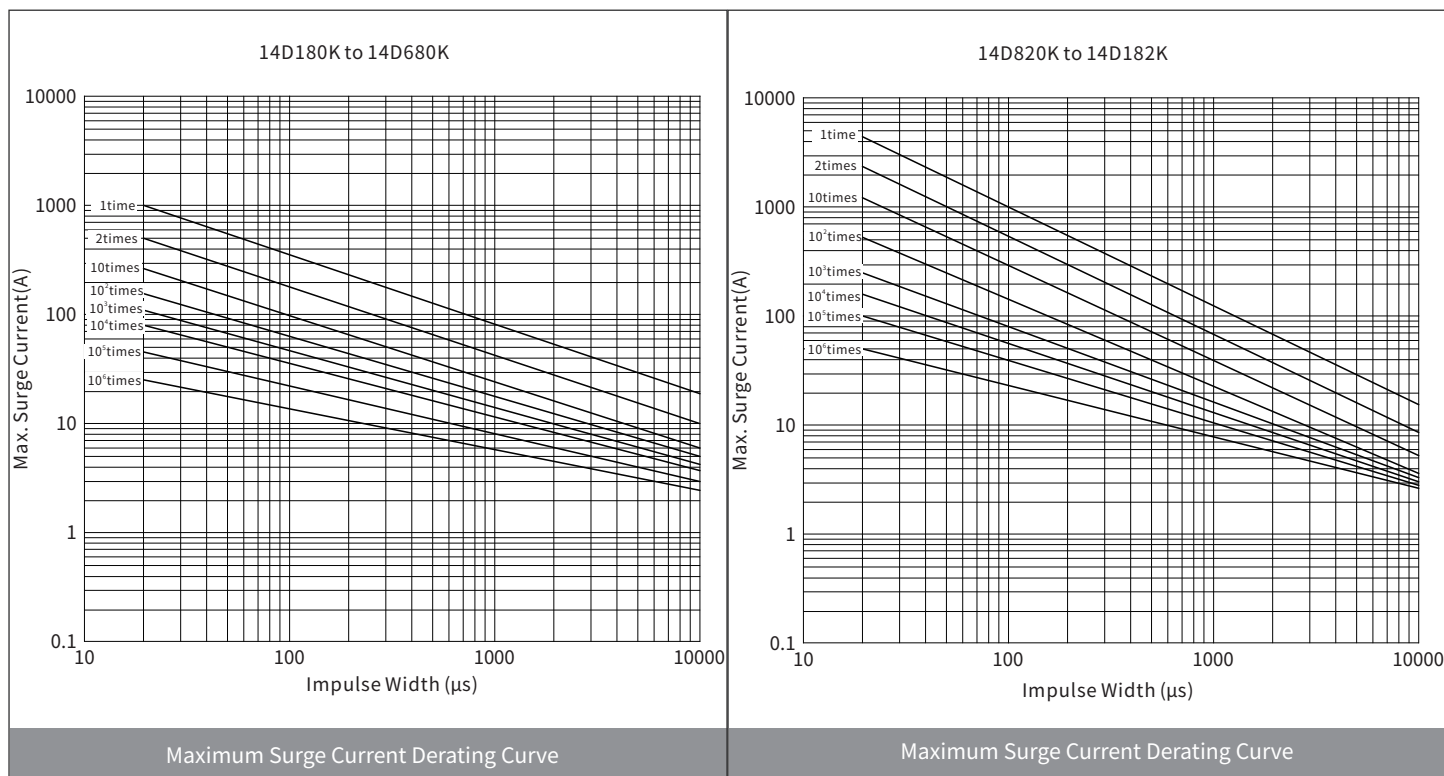
The graph shows the temperature profile for wave lead free soldering. The y-axis is Temperature(℃) from 0 to 300, and the x-axis is TIME(minutes) from 0 to 4. The profile includes a preheating phase (0-1 min), a dwell at 100℃ (1-2.5 min), a heating phase to 265℃ (2.5-3.2 min), a soldering dwell at 265℃ (3.2-3.5 min), and a cooling phase (3.5-4 min).

Item	Conditions
Peak Temperature	265℃
Dipping Time	10 secs. Max
Soldering	1 time

Recommendation Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360℃ Max
Soldering Time	3 secs. Max
Distance from Varistor	2 mm Min

● **Maximum Surge Current Derating Curve** (Ta=25°C Unless otherwise specified)



● Dimensions

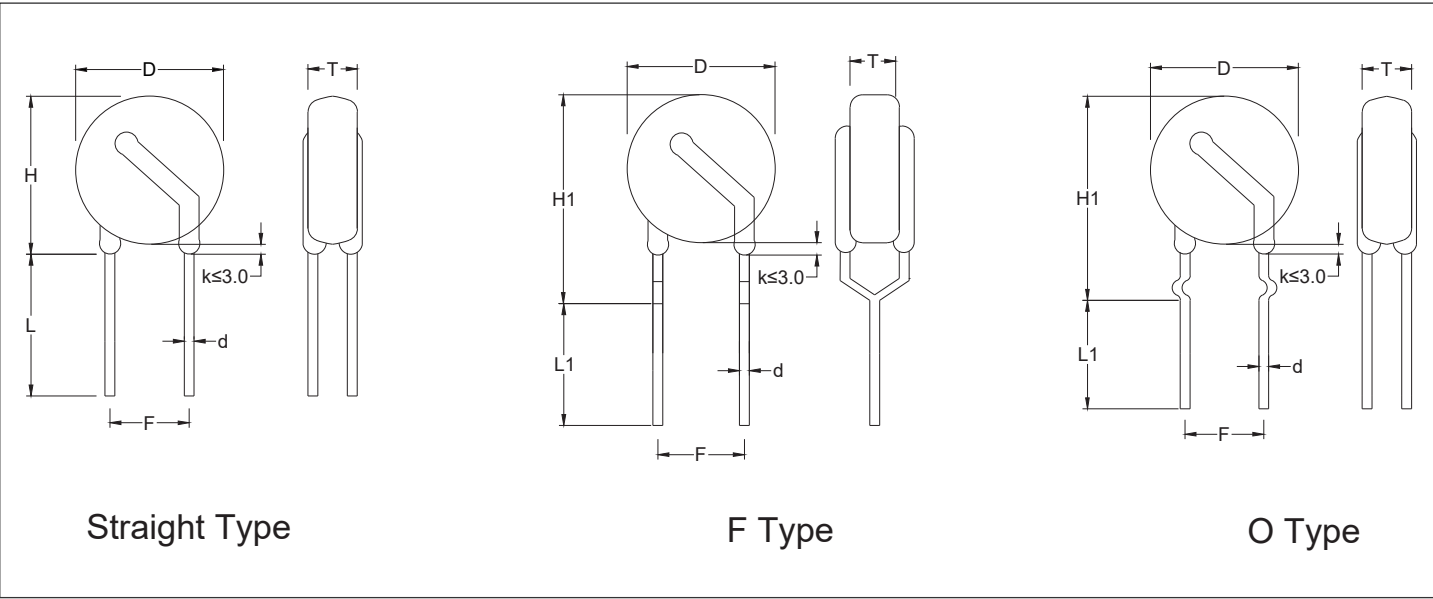


TABLE 1

Symbol	D(max.)	H(max.)	H1(max.)	L(min.)	L1(min.)	F	d	T (max.)
Dimension(mm)	16	19	21	15	15	7.5±1	0.8±0.1	refer to table 2
Dimension(In)	0.630	0.748	0.827	0.591	0.591	0.295±0.04	0.031±0.004	

TABLE 2 T(max.)

Voltage	180K~391K	431K~561K	621K~821K	911K~122K	142K~182K
Dimension(mm)	5.0	6.0	7.0	8.0	10.2
Dimension(In)	0.197	0.236	0.276	0.315	0.402

Note: 180K-112K default Straight Type, 122K-182K default F Type,

● Ordering Information

Series	Voltage	DELIVERY MODE	MPQ(PCS)
14D Series	180K~331K	Bulk	400
	361K~621K	Bulk	300
	681K~112K	Bulk	250
	122K~182K	Bulk	150