

3KP SERIES

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3KP SERIES

3000W Axial Leaded Transient Voltage Suppressors 5.0V-220V

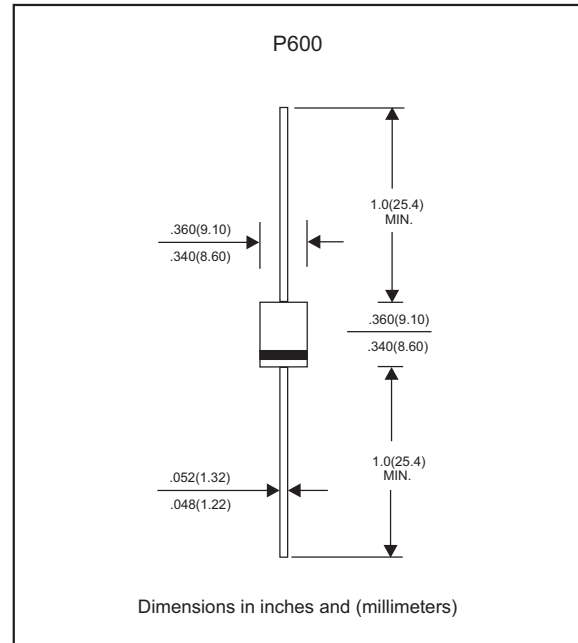
Features

- Axial lead type devices for through hole design
- 3kW peak pulse power capability with a 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability
- Low incremental surge resistance
- Fast response time from 0V to V_{BR}, typically less than 1 ps for uni-directional & 5 ns for bi-directional types
- Glass passivated chip junction
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex.3KP5.0A-H

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, P600
- Lead : Axial leads, solderable per MIL-STD-202, Method 208 guaranteed
- Polarity: Color band denotes cathode end
- Mounting Position : Any
- Weight : Approximated 2.10 gram

Package outline



Maximum ratings (AT T_A=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Value	Unit
Peak power dissipation	with a 10/1000 μ s waveform, Note 1 & Fig. 1	PPPM	3000	W
Peak pulse current	with a 10/1000 μ s waveform	I _{PPM}	See table 1	A
Steady state power dissipation	at T _L =75°C lead length 0.375" (9.5 mm)	P _{M(AV)}	6.5	W
Peak forward surge current	8.3ms single half sine-wave (JEDEC Method), Note 2	I _{FSM}	300	A
Maximum instantaneous forward voltage	at 100A for uni-directional types only, Note 3	V _F	3.5 / 5.0	V
Operating junction temperature range		T _J	-55 to +150	°C
Storage temperature range		T _{STG}	-55 to +150	°C

Notes 1. Non-repetitive current pulse, per Fig. 3 and derated above T_A=25°C per Fig. 2

2. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

3. V_F ≤ 3.5V. for devices of V_{BR} ≤ 220V, and V_F ≤ 5.0V. for devices of V_{BR} ≥ 201V

Electrical characteristics (at T_A=25°C unless otherwise noted)

Table 1

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @I _T		Test Current	Maximum Clamping Voltage @I _{PP}		Maximum Reverse Leakage Current	Marking Code	
		V _{RWM}	V _{BR Min}	V _{BR Max}	I _T	V _C	I _{PP}	I _R @V _{RWM}	Uni	Bi
		Volts	Volts	Volts	mA	Volts	A	μA		
3KP5.0A	3KP5.0CA	5.0	6.40	7.00	50	9.2	326	5000	3KP5.0A	3KP5.0CA
3KP6.0A	3KP6.0CA	6.0	6.67	7.37	50	10.3	291.3	5000	3KP6.0A	3KP6.0CA
3KP6.5A	3KP6.5CA	6.5	7.22	7.98	50	11.2	267.9	2000	3KP6.5A	3KP6.5CA
3KP7.0A	3KP7.0CA	7.0	7.78	8.60	50	12.0	250	1000	3KP7.0A	3KP7.0CA
3KP7.5A	3KP7.5CA	7.5	8.33	9.21	5.0	12.9	232.6	250	3KP7.5A	3KP7.5CA
3KP8.0A	3KP8.0CA	8.0	8.89	9.83	5.0	13.6	220.6	150	3KP8.0A	3KP8.0CA
3KP8.5A	3KP8.5CA	8.5	9.44	10.4	5.0	14.4	208.3	50	3KP8.5A	3KP8.5CA
3KP9.0A	3KP9.0CA	9.0	10.0	11.1	5.0	15.4	194.8	20	3KP9.0A	3KP9.0CA
3KP10A	3KP10CA	10.0	11.1	12.3	5.0	17.0	176.4	10	3KP10A	3KP10CA
3KP11A	3KP11CA	11.0	12.2	13.5	5.0	18.2	164.8	10	3KP11A	3KP11CA
3KP12A	3KP12CA	12.0	13.3	14.7	5.0	19.9	150.6	10	3KP12A	3KP12CA
3KP13A	3KP13CA	13.0	14.4	15.9	5.0	21.5	139.4	10	3KP13A	3KP13CA
3KP14A	3KP14CA	14.0	15.6	17.2	5.0	23.2	129.4	10	3KP14A	3KP14CA
3KP15A	3KP15CA	15.0	16.7	18.5	5.0	24.4	123	10	3KP15A	3KP15CA
3KP16A	3KP16CA	16.0	17.8	19.7	5.0	26.0	115.4	10	3KP16A	3KP16CA
3KP17A	3KP17CA	17.0	18.9	20.9	5.0	27.6	108.7	10	3KP17A	3KP17CA
3KP18A	3KP18CA	18.0	20.0	22.1	5.0	29.2	102.8	10	3KP18A	3KP18CA
3KP20A	3KP20CA	20.0	22.2	24.5	5.0	32.4	92.6	10	3KP20A	3KP20CA
3KP22A	3KP22CA	22.0	24.4	26.9	5.0	35.5	84.4	10	3KP22A	3KP22CA
3KP24A	3KP24CA	24.0	26.7	29.5	5.0	38.9	77.2	10	3KP24A	3KP24CA
3KP26A	3KP26CA	26.0	28.9	31.9	5.0	42.1	71.2	10	3KP26A	3KP26CA
3KP28A	3KP28CA	28.0	31.1	34.4	5.0	45.4	66.0	10	3KP28A	3KP28CA
3KP30A	3KP30CA	30.0	33.3	36.8	5.0	48.4	62.0	10	3KP30A	3KP30CA
3KP33A	3KP33CA	33.0	36.7	40.6	5.0	53.3	56.2	10	3KP33A	3KP33CA
3KP36A	3KP36CA	36.0	40.0	44.2	5.0	58.1	51.6	10	3KP36A	3KP36CA
3KP40A	3KP40CA	40.0	44.4	49.1	5.0	64.5	46.4	10	3KP40A	3KP40CA
3KP43A	3KP43CA	43.0	47.8	52.8	5.0	69.4	43.2	10	3KP43A	3KP43CA
3KP45A	3KP45CA	45.0	50.0	55.3	5.0	72.7	41.3	10	3KP45A	3KP45CA
3KP48A	3KP48CA	48.0	53.3	58.9	5.0	77.4	38.8	10	3KP48A	3KP48CA
3KP51A	3KP51CA	51.0	56.7	62.7	5.0	82.4	36.4	10	3KP51A	3KP51CA
3KP54A	3KP54CA	54.0	60.0	66.3	5.0	87.1	34.4	10	3KP54A	3KP54CA
3KP58A	3KP58CA	58.0	64.4	71.2	5.0	93.6	32.1	10	3KP58A	3KP58CA
3KP60A	3KP60CA	60.0	66.7	73.7	5.0	96.8	31.0	10	3KP60A	3KP60CA
3KP64A	3KP64CA	64.0	71.1	78.6	5.0	103.0	29.1	10	3KP64A	3KP64CA
3KP70A	3KP70CA	70.0	77.8	86.0	5.0	113.0	26.5	10	3KP70A	3KP70CA
3KP75A	3KP75CA	75.0	83.3	92.1	5.0	121.0	24.8	10	3KP75A	3KP75CA
3KP78A	3KP78CA	78.0	86.7	95.8	5.0	126.0	23.8	10	3KP78A	3KP78CA
3KP85A	3KP85CA	85.0	94.4	104.0	5.0	137.0	21.9	10	3KP85A	3KP85CA
3KP90A	3KP90CA	90.0	100.0	111.0	5.0	146	20.5	10	3KP90A	3KP90CA
3KP100A	3KP100CA	100.0	111.0	123.0	5.0	162	18.5	10	3KP100A	3KP100CA
3KP110A	3KP110CA	110.0	122.0	135.0	5.0	177	16.9	10	3KP110A	3KP110CA
3KP120A	3KP120CA	120.0	133.0	147.0	5.0	193	15.5	10	3KP120A	3KP120CA

- Notes 1. V_{BR} measured after I_T applied for 300us, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. All terms and symbols are consistent with ANSI/IEEE C62.35



3KP SERIES

Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)**Table 1**

Part No. (Uni)	Part No. (Bi)	Reverse Stand-off Voltage	Breakdown Voltage @ I_T		Test Current	Maximum Clamping Voltage @ I_{PP}		Maximum Reverse Leakage Current	Marking Code	
		V_{RWM}	$V_{BR Min}$	$V_{BR Max}$	I_T	$V_C @ I_{PP}$		$I_R @ V_{RWM}$		
		Volts	Volts	Volts	mA	Volts	I_{PP} (A)	I_R (μA)	Uni	Bi
3KP130A	3KP130CA	130	144	159	5.0	209	14.4	10	3KP130A	3KP130CA
3KP150A	3KP150CA	150	167	185	5.0	243	12.3	10	3KP150A	3KP150CA
3KP160A	3KP160CA	160	178	197	5.0	259	11.6	10	3KP160A	3KP160CA
3KP170A	3KP170CA	170	189	209	5.0	275	10.9	10	3KP170A	3KP170CA
3KP180A	3KP180CA	180	201	222	5.0	292	10.4	10	3KP180A	3KP180CA
3KP190A	3KP190CA	190	211	233	5.0	308	9.7	10	3KP190A	3KP190CA
3KP200A	3KP200CA	200	224	247	5.0	324	9.1	10	3KP200A	3KP200CA
3KP210A	3KP210CA	210	237	263	5.0	340	8.6	10	3KP210A	3KP210CA
3KP220A	3KP220CA	220	246	272	5.0	356	8.1	10	3KP220A	3KP220CA

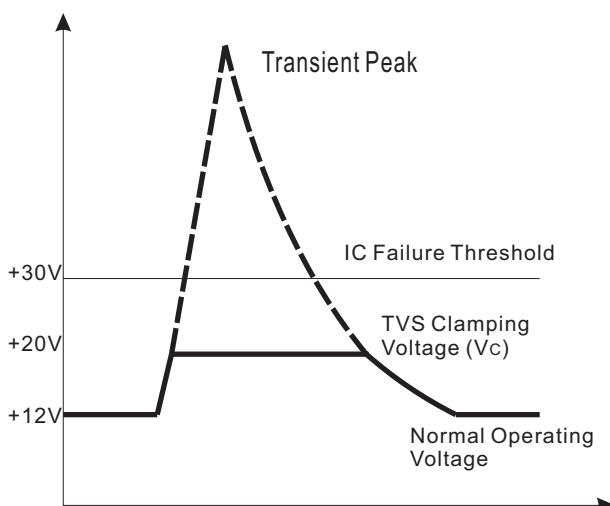
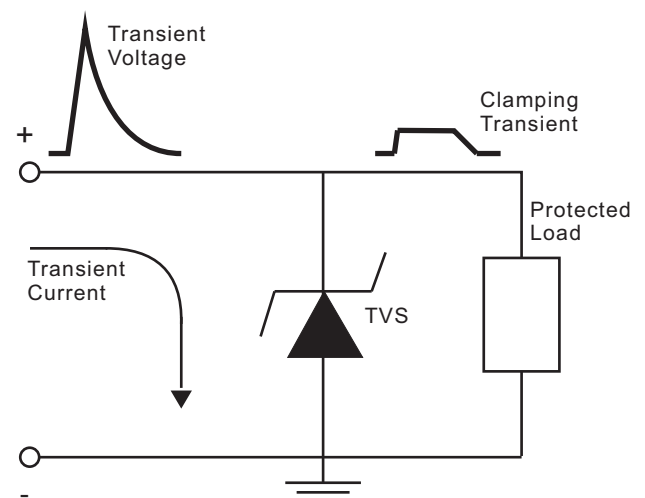
Notes 1. V_{BR} measured after I_T applied for 300us, I_T =square wave pulse or equivalent

2. Surge current waveform per Fig. 5 and derated per Fig. 1

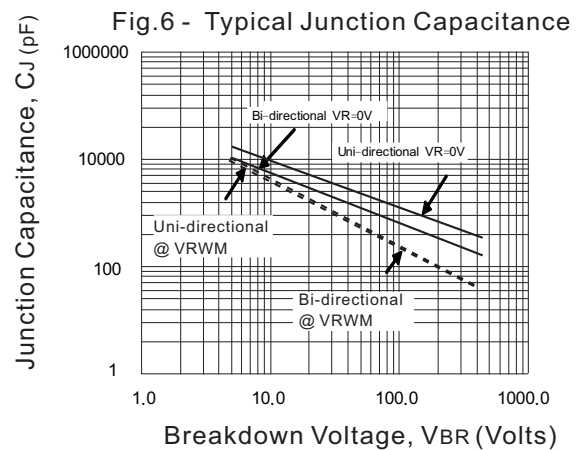
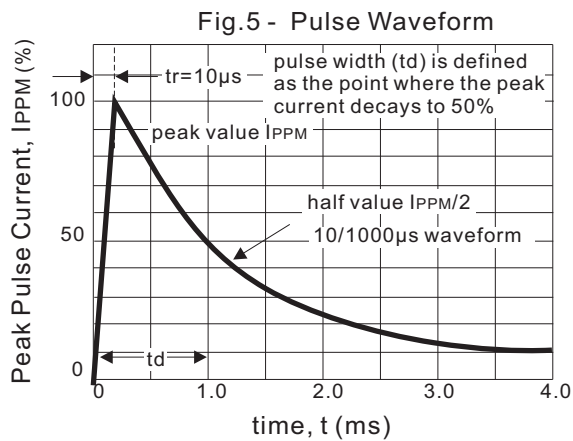
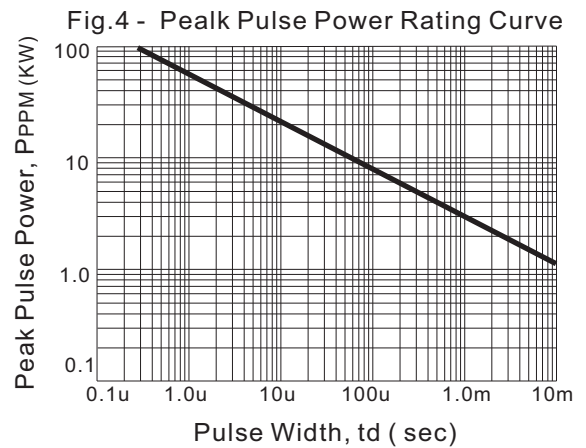
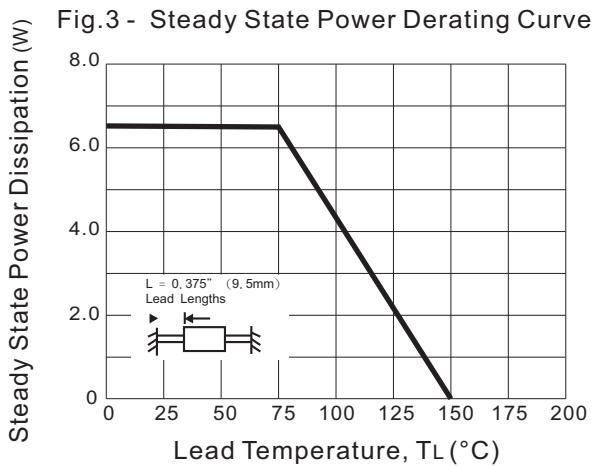
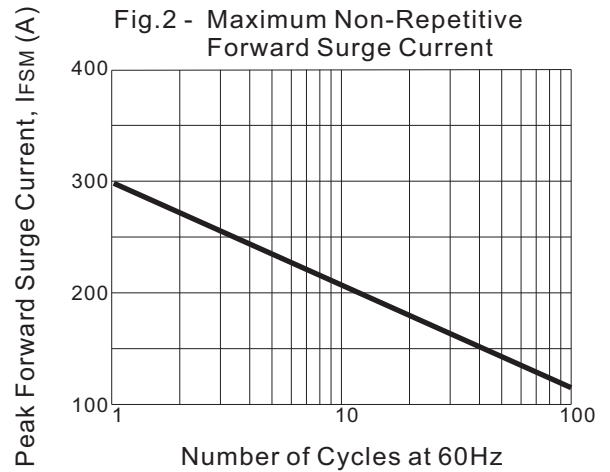
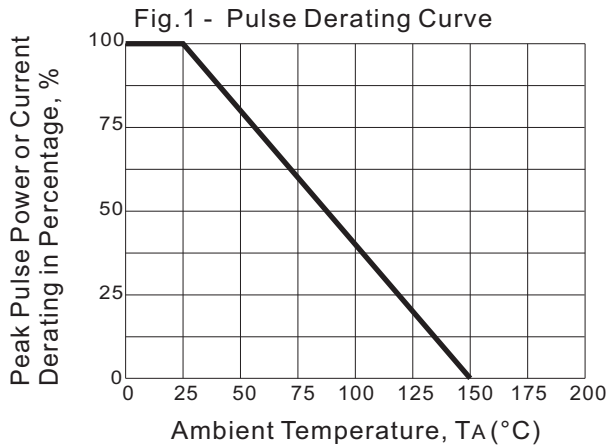
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled

4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.

5. All terms and symbols are consistent with ANS/IEEE C62.35

Fig. A - Transients of several thousand volts can be clamped to a safe level by the TVS**Fig. B -** Transient current is diverted to ground thru TVS; the voltage seen by the protected load is limited to the clamping voltage level

Rating and characteristic curves (3KP SERIES)

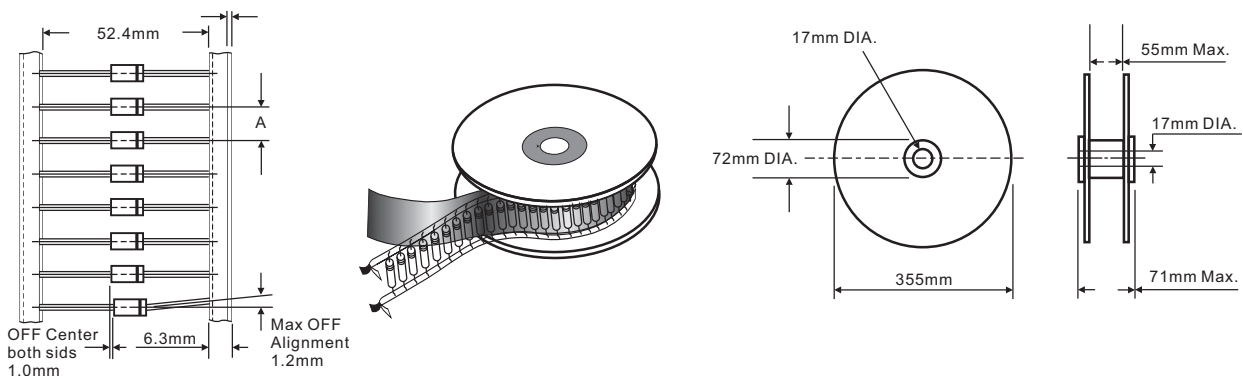


3KP SERIES

Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode		
Bi-Directional		

Taping & bulk specifications for AXIAL devices



REEL PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / REEL)	COMPONENT SPACING "A" in FIG. A	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	1000	10 mm	360 * 340 * 370	4,000	9.5

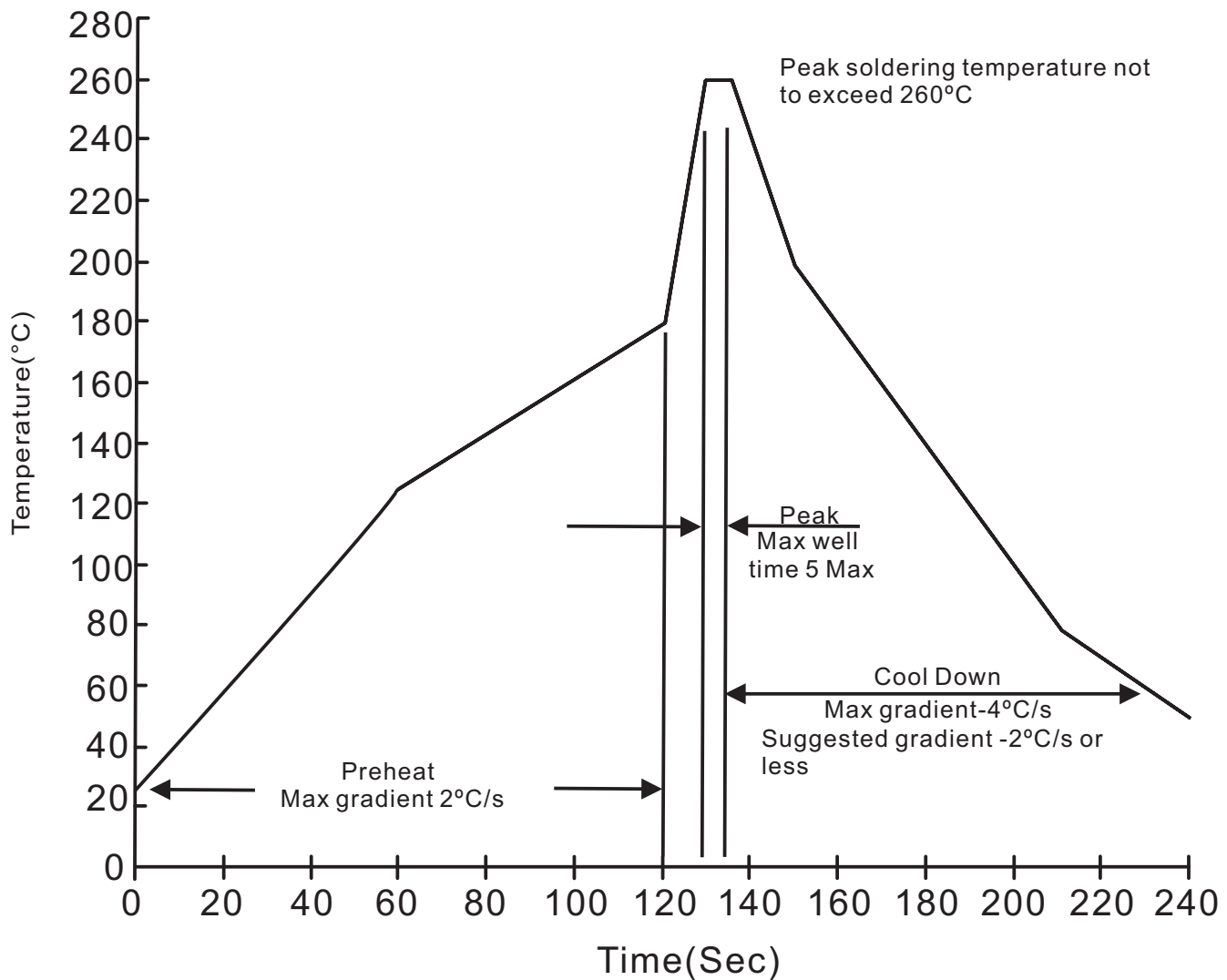
AMMO PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	300	250 * 80 * 120	339 * 276 * 330	2,400	6.9
P600	400	255 * 75 * 150	339 * 276 * 330	3,200	9.2

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BULK PACKING

DEVICE CASE TYPE	Q'TY 1 (PCS / BOX)	INNER BOX SIZE (m/m)	CARTON SIZE (m/m)	Q'TY 2 (PCS / CARTON)	APPROX. CROSS WEIGHT(kg)
P600	250	194 * 84 * 20	355 * 320 * 280	6,000	14.5

Suggested thermal profiles for soldering processes**1. Lead free temperature profile wave-soldering**

3KP SERIES

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm 5^{\circ}\text{C}$ for $10\pm 2\text{sec.}$ immerse body into solder $1/16''\pm 1/32''$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. Pull Test	2.0kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036
4. Bend Lead	2.0kg weight applied to each lead bending arc $90^{\circ}\pm 5^{\circ}$ for 3 times.	MIL-STD-750D METHOD-2036
5. High Temperature Reverse Bias	$V_{\text{RWM}}=80\%$ rate at $T_{\text{J}}=150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
6. Pressure Cooker	$15P_{\text{SIG}}$ at $T_{\text{A}}=121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Humidity	at $T_{\text{A}}=85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
9. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031