

# Transient Voltage Suppression Diodes: P6SMB Series

## SMD Type 600 W



### ■ Features

1. For surface mounted applications
2. RoHS compliant and halogen-free
3. Reliable low cost construction utilizing molded plastic technique
4. Glass passivated chip junction
5. Both bi-directional and uni-directional devices are available
6. Fast response time
7. Typical IR less than 1 $\mu$ A above 13V
8. Excellent clamping capacity
9. 600 W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetition rate (duty cycle): 0.01%



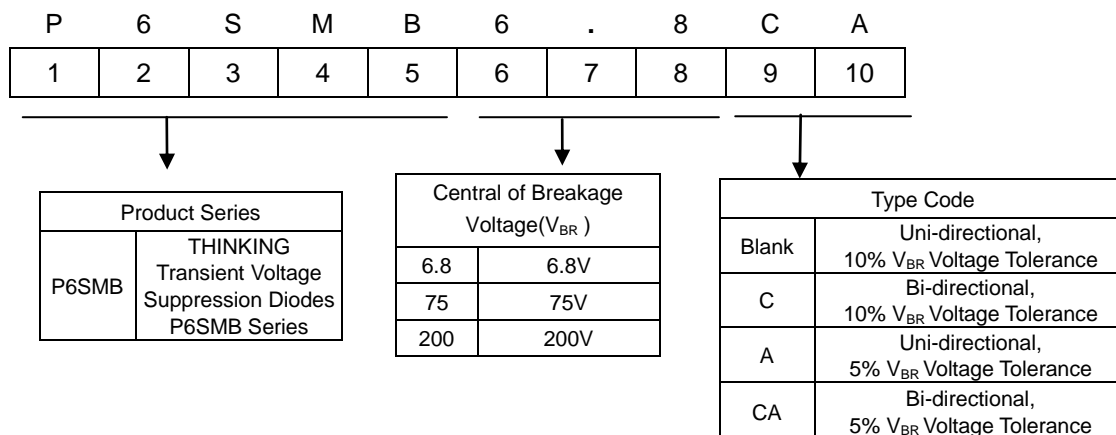
### ■ Recommended Applications

1. Telecommunication
2. Computer
3. Industrial device
4. Consumer electronic device

### ■ Mechanical Data

1. Case: DO-214AA (SMB), molded plastic meets UL flammability rating 94V-0
2. Terminal: Matte Tin-plated leads, solderable per MIL-STD-750, Method 2026.
3. Polarity: The band denotes cathode (Note: no polarity indicator for bi-directional devices)

### ■ Part Number Code



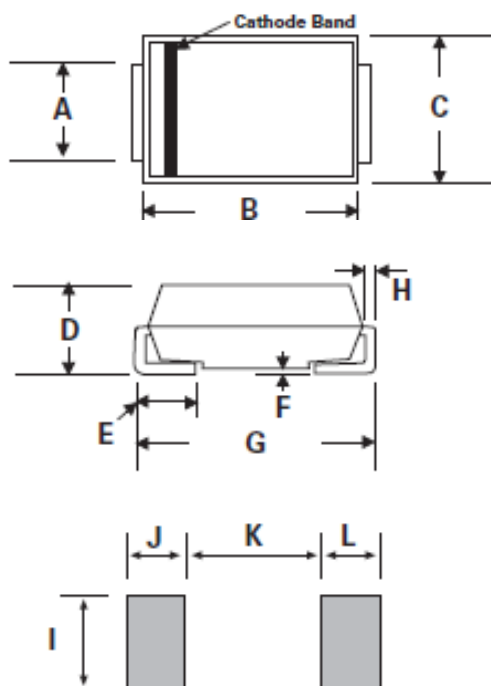
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### Structures and Dimensions

#### SMB/DO-214AA



Item	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.91	2.20	0.075	0.086
B	4.06	4.70	0.160	0.185
C	3.30	3.94	0.130	0.155
D	2.13	2.70	0.083	0.096
E	0.76	1.52	0.030	0.060
F	-	0.203	-	0.008
G	5.08	5.59	0.200	0.220
H	0.152	0.305	0.006	0.012
I	2.26	-	0.089	-
J/L	2.16	-	0.085	-
K	-	2.74	-	0.107

### Maximum Rating ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak pulse power dissipation at $T_A=25^{\circ}\text{C}$ by 10/1000 $\mu\text{s}$ waveform (Note1, Fig.1).	$P_{\text{PPM}}$	600	W
Peak pulse current of on 10/1000us waveform.(Note1, Fig.3)	$I_{\text{PPM}}$	See Table	A
Peak forward surge current, 8.3ms single half sine wave on rated load (Note 2)	$I_{\text{FSM}}$	100	A
Steady state power dissipation at $T_A=50^{\circ}\text{C}$ (Fig.5).	$PM_{(\text{AV})}$	5.0	W
Operating junction and storage temperature range	$T_J, T_{\text{STG}}$	-55~+150	$^{\circ}\text{C}$

Note: 1. Please refer to Fig. 3 for non-repetitive current pulse, and Fig. 2 for derated above  $T_A = 25^{\circ}\text{C}$

2. 8.3ms single half sine-wave, or square wave that has a maximum of 4 pulses per minute.

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Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage $V_{BR}$ @ $I_T$		Test Current	Maximum Clamping Voltage $V_C$ @ $I_{pp}$	Maximum Peak Pulse Current	Maximum Reverse Leakage $I_R$ @ $V_{RWM}$	Marking Code	
		$V_{RWM}$ (V)	Min (V)	Max (V)	$I_T$ (mA)	$V_C$ (V)	$I_{pp}$ (A)	$I_R$ ( $\mu$ A)	UNI	BI
P6SMB6.8A	P6SMB6.8CA	5.8	6.46	7.14	10	10.5	57.14	1000	6V8A	6V8C
P6SMB7.5A	P6SMB7.5CA	6.4	7.13	7.88	10	11.3	53.10	500	7V5A	7V5C
P6SMB8.2A	P6SMB8.2CA	7.0	7.79	8.61	10	12.1	49.59	200	8V2A	8V2C
P6SMB9.1A	P6SMB9.1CA	7.8	8.65	9.56	1	13.4	44.78	50	9V1A	9V1C
P6SMB10A	P6SMB10CA	8.6	9.50	10.50	1	14.5	41.38	10	10A	10C
P6SMB11A	P6SMB11CA	9.4	10.45	11.55	1	15.6	38.46	5	11A	11C
P6SMB12A	P6SMB12CA	10.2	11.40	12.60	1	16.7	35.93	5	12A	12C
P6SMB13A	P6SMB13CA	11.1	12.35	13.65	1	18.2	32.97	1	13A	13C
P6SMB15A	P6SMB15CA	12.8	14.25	15.75	1	21.2	28.30	1	15A	15C
P6SMB16A	P6SMB16CA	13.6	15.20	16.80	1	22.5	26.67	1	16A	16C
P6SMB18A	P6SMB18CA	15.3	17.10	18.90	1	25.5	23.81	1	18A	18C
P6SMB20A	P6SMB20CA	17.1	19.00	21.00	1	27.7	21.66	1	20A	20C
P6SMB22A	P6SMB22CA	18.8	20.90	23.10	1	30.6	19.61	1	22A	22C
P6SMB24A	P6SMB24CA	20.5	22.80	25.20	1	33.2	18.07	1	24A	24C
P6SMB27A	P6SMB27CA	23.1	25.65	28.35	1	37.5	16.00	1	27A	27C
P6SMB30A	P6SMB30CA	25.6	28.50	31.50	1	41.4	14.49	1	30A	30C
P6SMB33A	P6SMB33CA	28.2	31.35	34.65	1	45.7	13.13	1	33A	33C
P6SMB36A	P6SMB36CA	30.8	34.20	37.80	1	49.9	12.02	1	36A	36C
P6SMB39A	P6SMB39CA	33.3	37.05	40.95	1	53.9	11.13	1	39A	39C
P6SMB43A	P6SMB43CA	36.8	40.85	45.15	1	59.3	10.12	1	43A	43C
P6SMB47A	P6SMB47CA	40.2	44.65	49.35	1	64.8	9.26	1	47A	47C
P6SMB51A	P6SMB51CA	43.6	48.45	53.55	1	70.1	8.56	1	51A	51C
P6SMB56A	P6SMB56CA	47.8	53.20	58.80	1	77.0	7.79	1	56A	56C
P6SMB62A	P6SMB62CA	53.0	58.90	65.10	1	85.0	7.06	1	62A	62C
P6SMB68A	P6SMB68CA	58.1	64.60	71.40	1	92.0	6.52	1	68A	68C
P6SMB75A	P6SMB75CA	64.1	71.25	78.75	1	103.0	5.83	1	75A	75C
P6SMB82A	P6SMB82CA	70.1	77.90	86.10	1	113.0	5.31	1	82A	82C
P6SMB91A	P6SMB91CA	77.8	86.45	95.55	1	125.0	4.80	1	91A	91C
P6SMB100A	P6SMB100CA	85.5	95.00	105.00	1	137.0	4.38	1	100A	100C

Note: For bidirectional type having  $V_{RWM}$  of 10 volts and under, the  $I_R$  limit is doubled.

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Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage $V_{BR}$ @ $I_T$		Test Current	Maximum Clamping Voltage $V_C$ @ $I_{pp}$	Maximum Peak Pulse Current	Maximum Reverse Leakage $I_R$ @ $V_{RWM}$	Marking Code	
		$V_{RWM}$ (V)	Min(V)	Max(V)	$I_T$ (mA)	$V_C$ (V)	$I_{pp}$ (A)	$I_R$ ( $\mu$ A)	UNI	BI
P6SMB110A	P6SMB110CA	94.0	104.50	115.50	1	152.0	3.95	1	110A	110C
P6SMB120A	P6SMB120CA	102.0	114.00	126.00	1	165.0	3.64	1	120A	120C
P6SMB130A	P6SMB130CA	111.0	123.50	136.50	1	179.0	3.35	1	130A	130C
P6SMB150A	P6SMB150CA	128.0	142.50	157.50	1	207.0	2.90	1	150A	150C
P6SMB160A	P6SMB160CA	136.0	152.00	168.00	1	219.0	2.74	1	160A	160C
P6SMB170A	P6SMB170CA	145.0	161.50	178.50	1	234.0	2.56	1	170A	170C
P6SMB180A	P6SMB180CA	154.0	171.00	189.00	1	246.0	2.44	1	180A	180C
P6SMB200A	P6SMB200CA	171.0	190.00	210.00	1	274.0	2.19	1	200A	200C
P6SMB220A	P6SMB220CA	185.0	209.00	231.00	1	328.0	1.83	1	220A	220C
P6SMB250A	P6SMB250CA	214.0	237.50	262.50	1	344.0	1.74	1	250A	250C
P6SMB300A	P6SMB300CA	256.0	285.00	315.00	1	414.0	1.45	1	300A	300C
P6SMB350A	P6SMB350CA	299.3	332.50	367.50	1	482.0	1.24	1	350A	350C
P6SMB380A	P6SMB380CA	324.9	361.00	399.00	1	524.4	1.14	1	380A	380C
P6SMB400A	P6SMB400CA	342.0	380.00	420.00	1	548.0	1.09	1	400A	400C
P6SMB440A	P6SMB440CA	376.2	418.00	462.00	1	607.2	0.99	1	440A	440C
P6SMB500A	P6SMB500CA	427.5	475.00	525.00	1	690.0	0.87	1	500A	500C
P6SMB520A	P6SMB520CA	444.6	494.00	546.00	1	717.6	0.84	1	520A	520C
P6SMB550A	P6SMB550CA	470.3	522.50	577.50	1	759.0	0.79	1	550A	550C
P6SMB600A	P6SMB600CA	513.0	570.00	630.00	1	828.0	0.72	1	600A	600C

Note: For bidirectional type having  $V_{RWM}$  of 10 volts and under, the  $I_R$  limit is doubled.

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### Rate and Characteristic Curve ( $T_A=25^\circ\text{C}$ unless otherwise noted)

FIG.1 - PULSE RATING CURVE

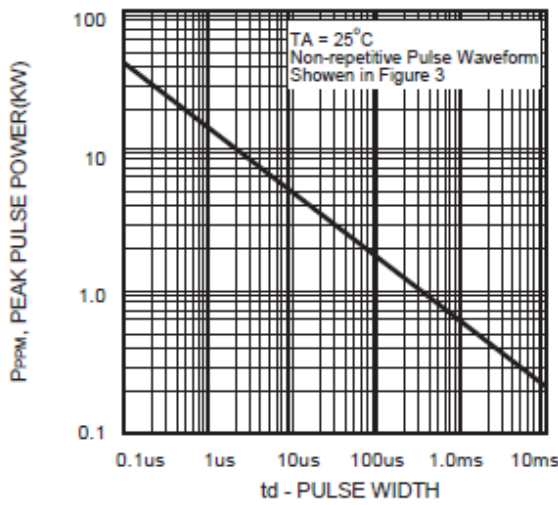


FIG.2 - PULSE DERATING CURVE

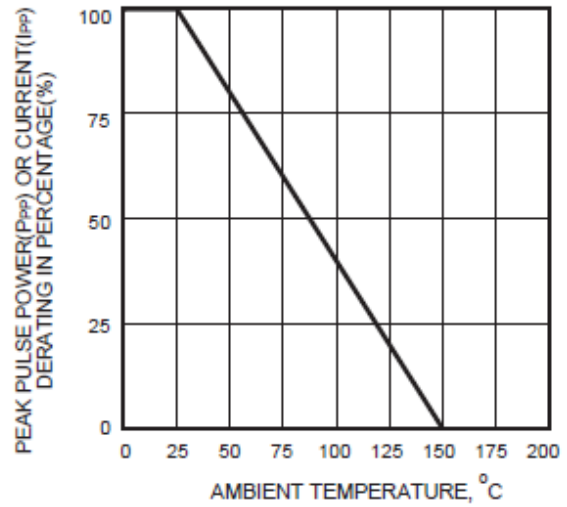


FIG.3 - PULSE WAVEFORM

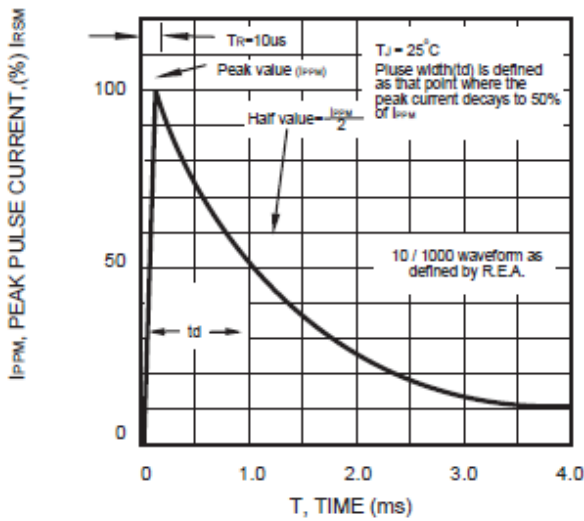


FIG.4 - TYPICAL JUNCTION CAPACITANCE

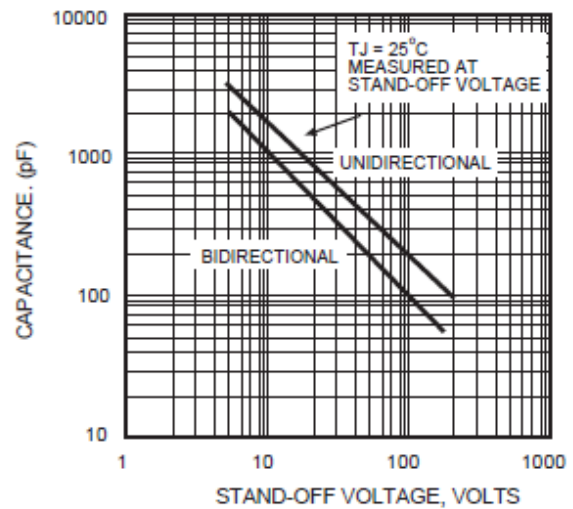
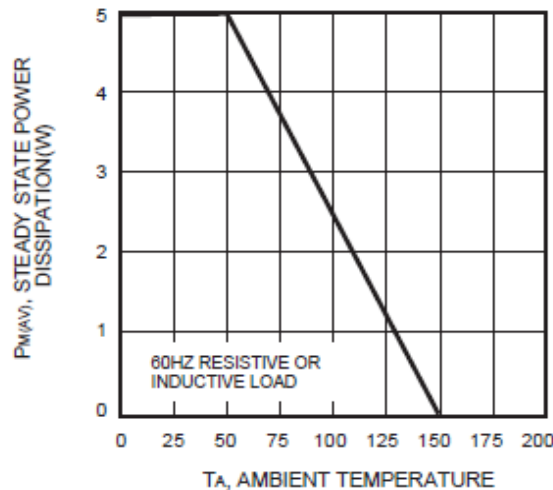


FIG.5 - STEADY STATE POWER DERATING CURVE

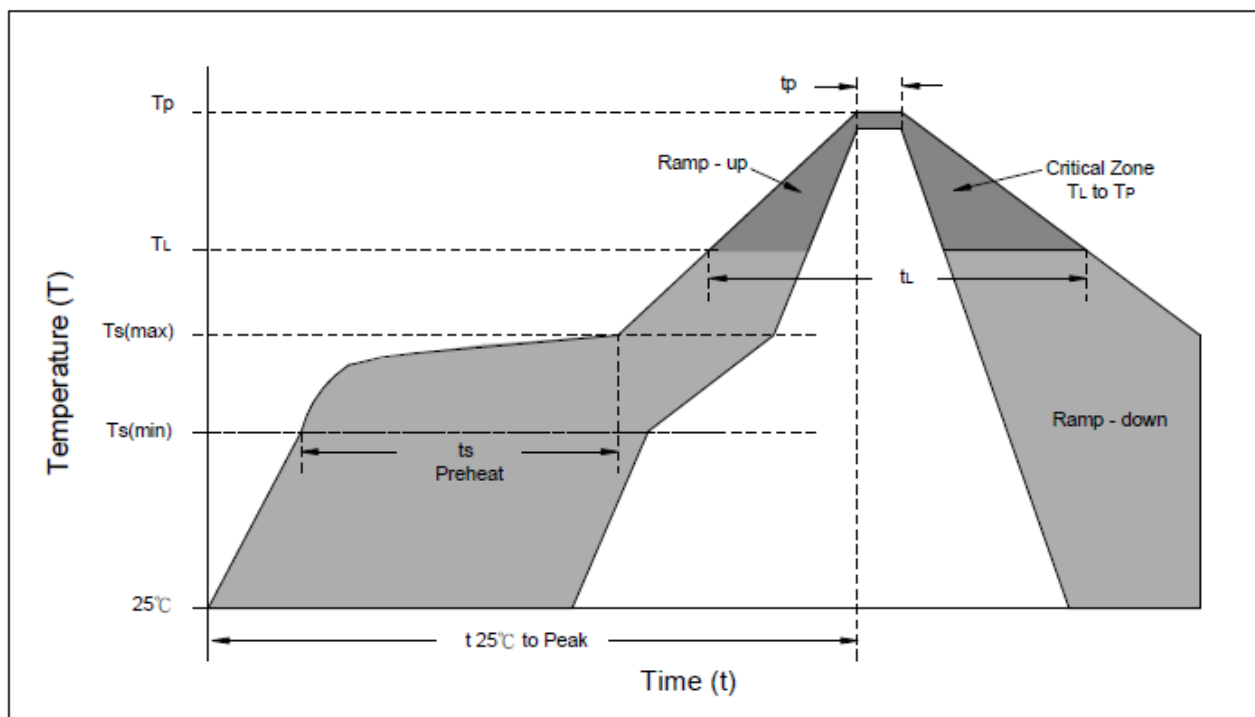


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### ■ Soldering Recommendation



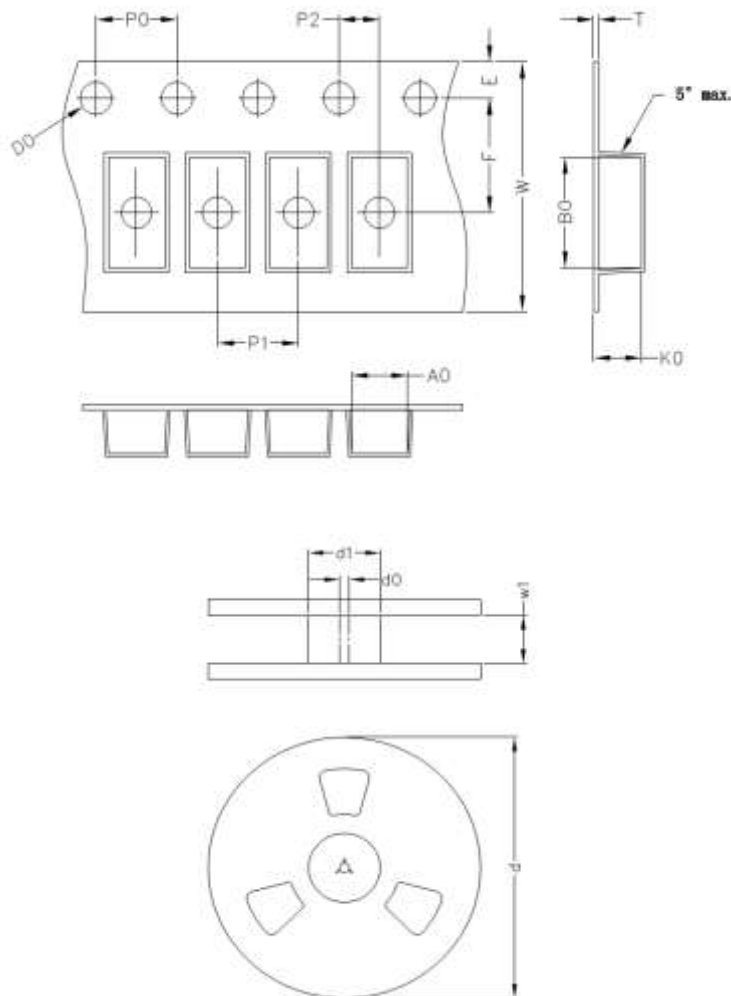
Reflow Condition	Lead-free assembly
<b>Preheat</b> -Temperature Min(Ts min) -Temperature Min(Ts max) -Time (min to max) (ts)	150°C 200°C 60 – 180 seconds
<b>Average ramp up rate</b> -Temperature Liquidus (TL) to peak	3°C/second max
<b>Ts(max) to TL</b> -Ramp-up Rate	3°C/second max.
<b>Reflow</b> -Temperature Liquidus (TL) -Time (tL)	217°C 60 – 150 seconds
<b>Peak Temperature (TP)</b>	260°C
<b>Time within 5°C of actual peak Temperature(TP)</b>	20 – 40 seconds
<b>Ramp-down Rate</b>	6°C/second max.
<b>Time 25°C to peak Temperature(TP)</b>	8 minutes max.
<b>Do not exceed</b>	260°C

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### ■ Packaging



Item	Symbol	DO-214AA (SMB) Unit: mm
Carrier width	A0	3.65±0.1
Carrier length	B0	5.6±0.1
Carrier depth	K0	2.57±0.1
Sprocket hole	D0	1.55
Sprocket hole position	E	1.75
Punch hole position	F	5.50
Sprocket hole pitch	P0	4.00
Carrier pitch	P1	8.00
Embossment center	P2	2.00
Tape thickness	T	0.25
Tape width	W	12.00
Reel outside diameter	d (13")	330.00
Reel inner diameter	d1	75
Feed hole diameter	d0	13.50
Reel inner width	w1	13.50

Note: The tolerance of carrier tape and top cover is  $\pm 0.1$ mm, and the tolerance of reel is  $\pm 2$ mm.

### ■ Quantity

Package Type	Reel Size	Reel	Inner Box
	inch	Kpcs	Kpcs
DO-214AA	13	3	6

### ■ Warehouse Storage Conditions of product

- Storage Condition:
  - Storage Temperature:  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
  - Relative Humidity:  $\leq 75\% \text{RH}$
  - Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.