Ultra Fast High PSRR

Low Noise CMOS Voltage Regulator

AF6212

■ INTRODUCTION

The AF6212 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, ultra low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The AF6212 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The AF6212 series consume less than 0.1μA in shutdown mode and have fast turn-on time less than 50μS.The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

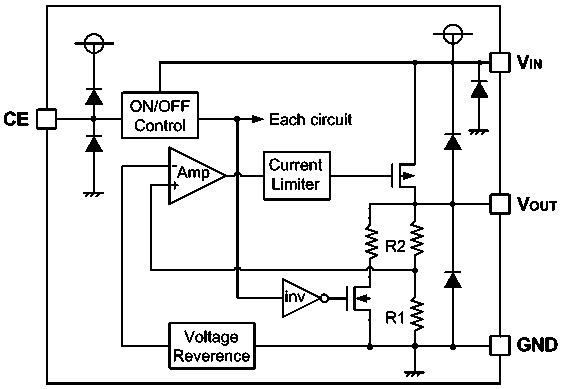
■ FEATURES

- Low Output Noise：40μV_{RMS} (10Hz~100kHz)
- Low Dropout Voltage：150mV@150mA
- Low Quiescent Current：50μA
- High Ripple Rejection：75dB@1kHz
- Excellent Line and Load Transient Response
- Operating Voltage Range：2.0V～6.0V
- Output Voltage Range：1.0V ~ 5.0V
- High Accuracy：±2％（Typ.）
- Built-in Current Limiter, Short-Circuit Protection
- TTL- Logic-Controlled Shutdown Input

■ APPLICATIONS

- Cellular and Smart Phones
- Laptop, Palmtops and PDA
- Digital Still and Video Cameras
- MP3, MP4 Player
- Radio control systems
- Battery-Powered Equipment

■ BLOCK DIAGRAM



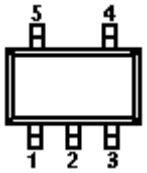
■ ORDER INFORMATION

AF6212_①_②

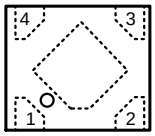
DESIGNATOR	SYMBOL	DESCRIPTION
①	**Integer**	**Output Voltage e.g.1.8V=18**
②	**Package:SOT23-5 ： C**	
	Package:DFN1×1-4 ： D	

■ PIN CONFIGURATION

SOT23-5



DFN1×1-4



SOT-23-5

PIN NUMBER	SYMBOL	FUNCTION
1	V_{IN}	Power Input Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	NC	No Connection
5	V_{OUT}	Output Pin

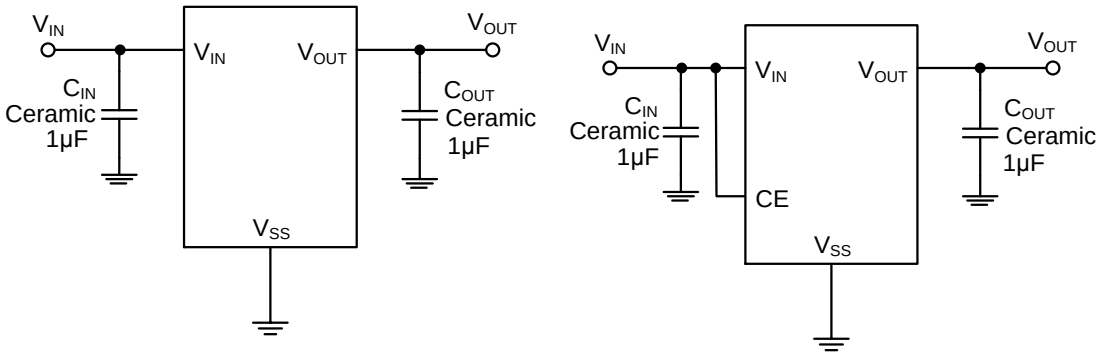
DFN1×1-4

PIN NUMBER	SYMBOL	FUNCTION
1	V_{OUT}	Output Pin
2	V_{SS}	Ground
3	CE	Chip Enable Pin
4	V_{IN}	Power Input Pin

■ Marking information

MARKING		
	Package	
VOLTAGE(V)	DFN1X1	SOT23-5
1.2	1V2	LVBX
1.5	1V5	LVEX
1.8	1V8	LVKX
2.5	2V5	LVFX
2.8	2V8	LVXX
3.0	3V0	LVZX
3.3	3V3	LV2X

■ TYPICAL APPLICATION



ABSOLUTE MAXIMUM RATINGS(1)

(Unless otherwise specified, T_A=25°C)

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage(2)		V_{IN}	-0.3~ 7	V
Output Voltage(2)		V_{OUT}	-0.3~V_{IN}+0.3	V
Output Current		I_{OUT}	500	mA
Power Dissipation	SOT23-5	P_D	0.4	W
	DFN1X1-4		0.4	W
Operating free air temperature range		T_A	-40~85	°C
Operating Junction Temperature Range(3)		T_j	-40~125	°C
Storage Temperature		T_{stg}	-40~125	°C
Lead Temperature(Soldering, 10 sec)		T_{solder}	260	°C
Package Thermal Resistance（θ_{JA}）		SOT23-5	285	°C/ W
		DFN1X1-4	280	°C/ W
ESD rating(4)		Human Body Model -(HBM)	4	kV
		Machine Model- (MM)	200	V

(1) Stresses beyond those listed under *absolute maximum ratings may* cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *recommended operating conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods my affect device reliability.

(2) All voltages are with respect to network ground terminal.

(3) This IC includes over temperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

(4) ESD testing is performed according to the respective JESD22 JEDEC standard.

The human body model is a 100 pF capacitor discharged through a 1.5kΩ resistor into each pin. The machine model is a 200pF capacitor discharged directly into each pin.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	MIN.	NOM.	MAX.	UNITS
Supply voltage at V_{IN}	2		6	V
Operating junction temperature range, T_j	0		125	°C
Operating free air temperature range, T_A	0		85	°C

■ ELECTRICAL CHARACTERISTICS

AF6212 Series (V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF, T_A=25℃,unless otherwise specified)

PARAMETER		SYMBOL	CONDITIONS	MIN.	TYP. (6)	MAX.	UNITS
Output Voltage		V_{OUT}(E) (7)	I_{OUT}=1mA	V_{OUT}(8) *0.98	V_{OUT}(8)	V_{OUT}(8) *1.02	V
Supply Current		I_{SS}	I_{OUT}=0		50	100	μA
Standby Current		I_{STBY}	CE = V_{SS}			0.1	μA
Output Current		I_{OUT}	—	300			mA
Dropout Voltage		V_{DO}(9)	I_{OUT} =150mA V_{OUT}≥2.8V		150		mV
Load Regulation		ΔV_{OUT}	V_{IN}= V_{OUT} +1V, 1mA≤I_{OUT}≤100mA		10		mV
Line Regulation		$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	I_{OUT} =10mA V_{OUT} +1V≤V_{IN}≤6V		0.01	0.2	%/V
Output Voltage Temperature Characteristics		$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	I_{OUT} =10mA -40≤T≤+85		100		ppm
Short Current		I_{Short}	V_{OUT} =V_{SS}		100		mA
Input Voltage		V_{IN}	—	2.0		6.0	V
Power Supply Rejection Rate	217Hz	PSRR	I_{OUT}=50mA		80		dB
	1kHz				75		
	10kHz				70		
CE "High" Voltage		V_{CE}"H"		1.5		V_{IN}	V
CE "Low" Voltage		V_{CE}"L"				0.3	V
C_{OUT} Auto-Discharge Resistance		$R_{DISCHRG}$	V_{IN}=5V, V_{OUT}=3.0V, V_{CE}=V_{SS}		80		Ω

(6) Typical numbers are at 25°C and represent the most likely norm.

(7) V_{OUT}(E) : Effective Output Voltage (Ie. The output voltage when V_{IN} = (V_{OUT} +1.0V) and maintain a certain I_{OUT} Value).

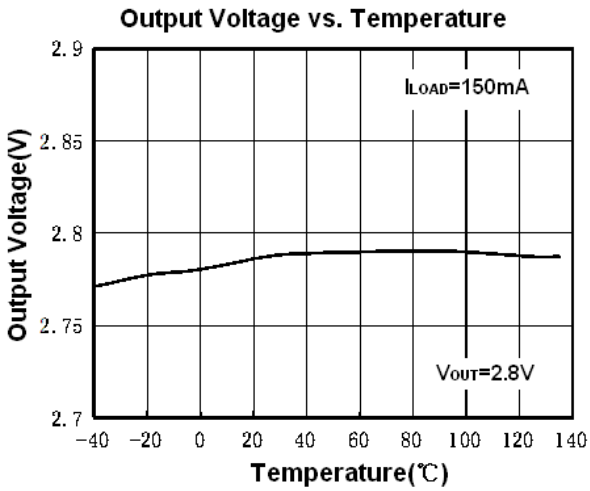
(8) V_{OUT} : Specified Output Voltage.

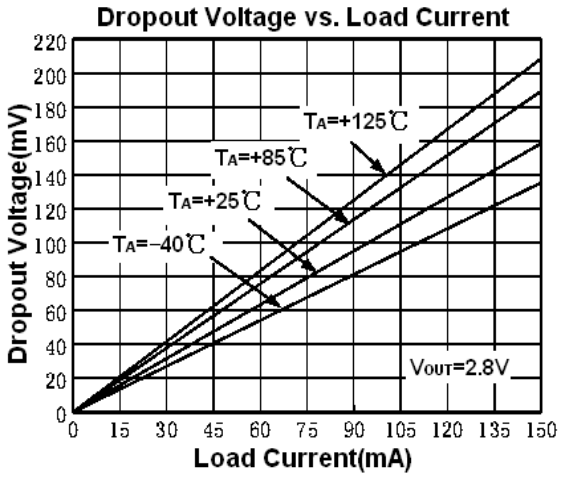
(9) V_{DO} : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of V_{OUT} (E).

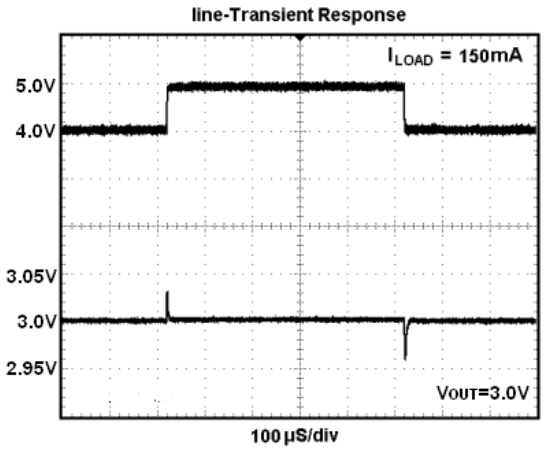
■ DROPOUT VOLTAGE CHART

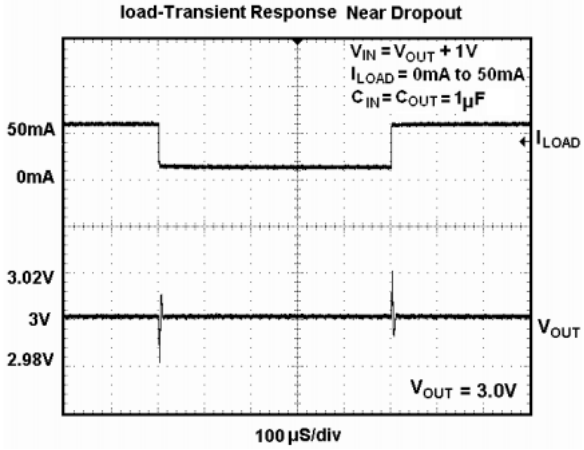
Setting Output Voltage	Dropout Voltage(mV)@ I_{OUT}=150mA	
V_{OUT}(V)	Typ.	Max.
1.2	380	600
1.5	270	600
1.8	230	600
2.5	180	400
2.8	160	220
3.0	155	220

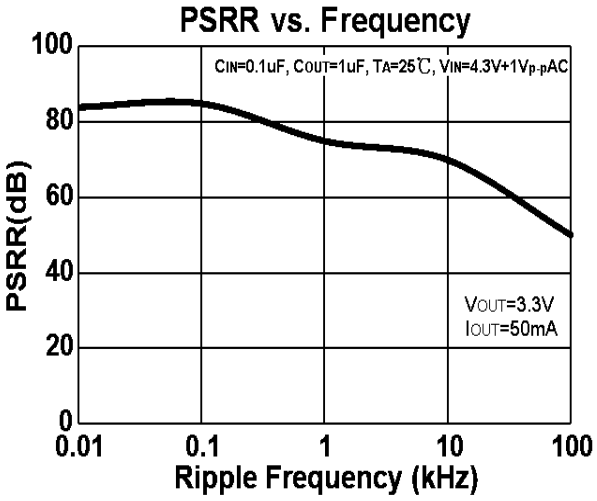
■ TYPICAL PERFORMANCE CHARACTERISTICS

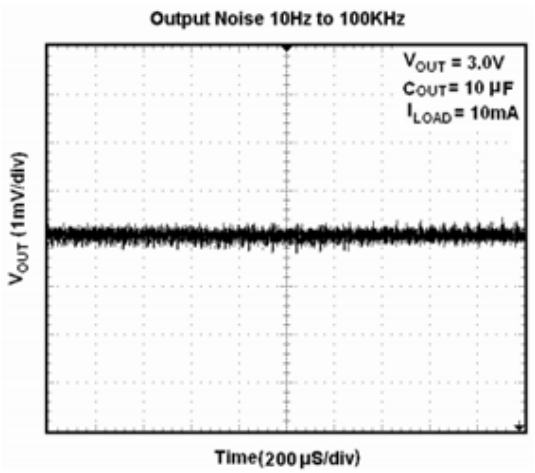


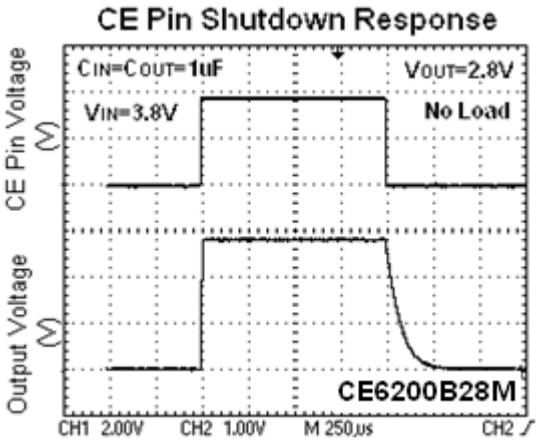


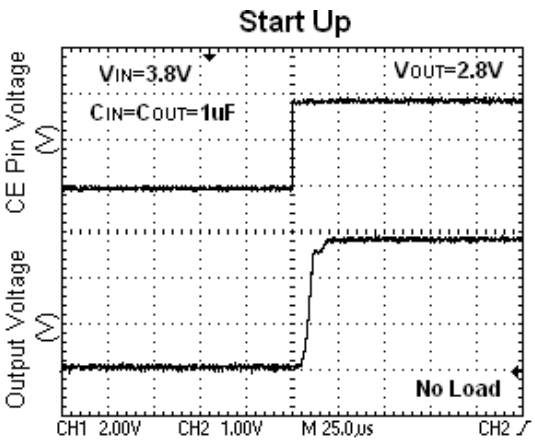












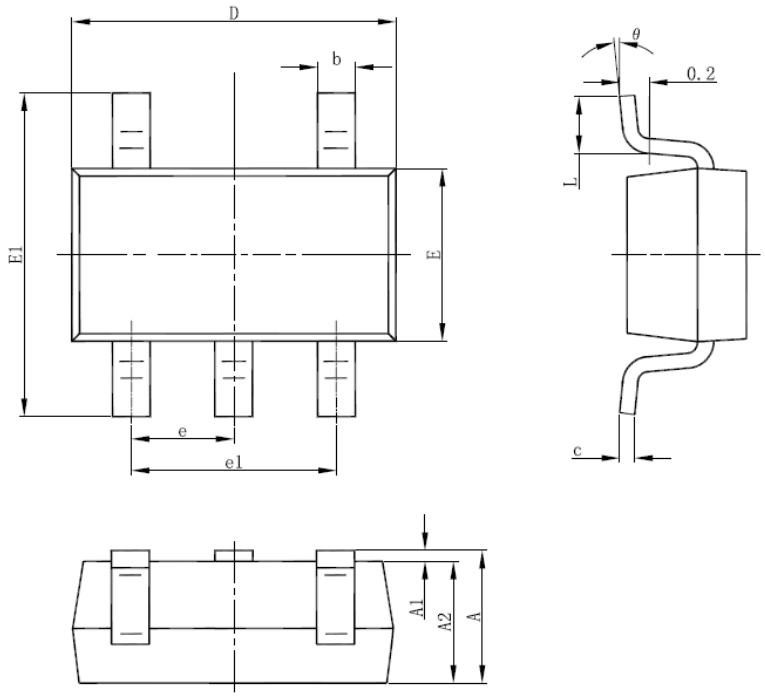
C_{OUT} Auto-Discharge Function

AF6212 with enable series can discharge the electric charge in the output capacitor (C_{OUT}), when a low signal to the CE pin, which enables a whole IC circuit turn off, is inputted via the N-channel transistor located between the V_{OUT} pin and the V_{SS} pin (cf. BLOCK DIAGRAM). The C_{OUT} auto-discharge resistance value is set at 80Ω (V_{OUT}=3.0V @ V_{IN}=5.0V at typical). The discharge time of the output capacitor (C_{OUT}) is set by the C_{OUT} auto-discharge resistance (R) and the output capacitor (C_{OUT}). By setting time constant of a C_{OUT} auto-discharge resistance value [$R_{DISCHRG}$] and an output capacitor value (C_{OUT}) as τ (τ=C x $R_{DISCHRG}$), the output voltage after discharge via the N-channel transistor is calculated by the following formulas.

$$V = V_{OUT(E)} \times e^{-t/\tau}, \text{ or } t=\tau ln (V / V_{OUT(E)})$$

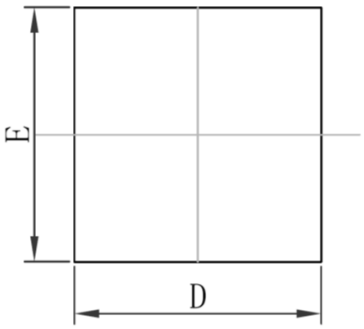
(V : Output voltage after discharge, $V_{OUT(E)}$: Output voltage, t: Discharge time, τ: C_{OUT} auto-discharge resistance $R_{DISCHRG}$×Output capacitor (C_{OUT}) value C)

● SOT-23-5 PACKAGE OUTLINE DIMENSIONS

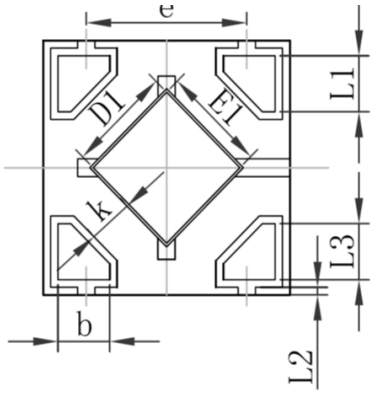


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

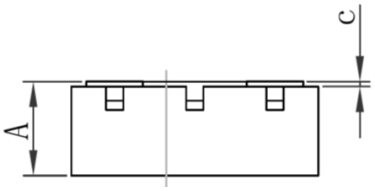
- **DFN1×1-4 PACKAGE OUTLINE DIMENSIONS**



TOP VIEW
[顶视图]

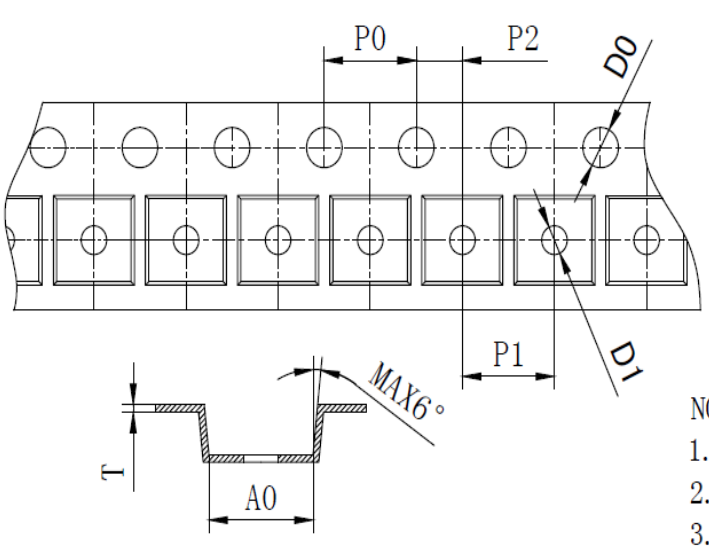


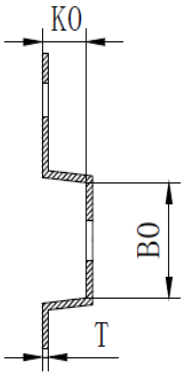
BOTTOM VIEW
[背视图]



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.335	0.405	0.013	0.016
D	0.950	1.050	0.037	0.041
E	0.950	1.050	0.037	0.041
D1	0.370	0.470	0.015	0.019
E1	0.370	0.470	0.015	0.019
k	0.17MIN.		0.007MIN.	
b	0.160	0.260	0.006	0.010
c	0.010	0.090	0.000	0.004
e	0.600	0.700	0.024	0.028
L1	0.185	0.255	0.007	0.010
L2	0.030 REF.		0.001 REF.	
L3	0.185	0.255	0.007	0.010

- **Taping dimension**





NOTE:
1. 材料：黑色防静电材料；
2. 10个链孔的累积公差不能超过 ±0.2；
3. 尺寸符合EIA-481-E的要求。

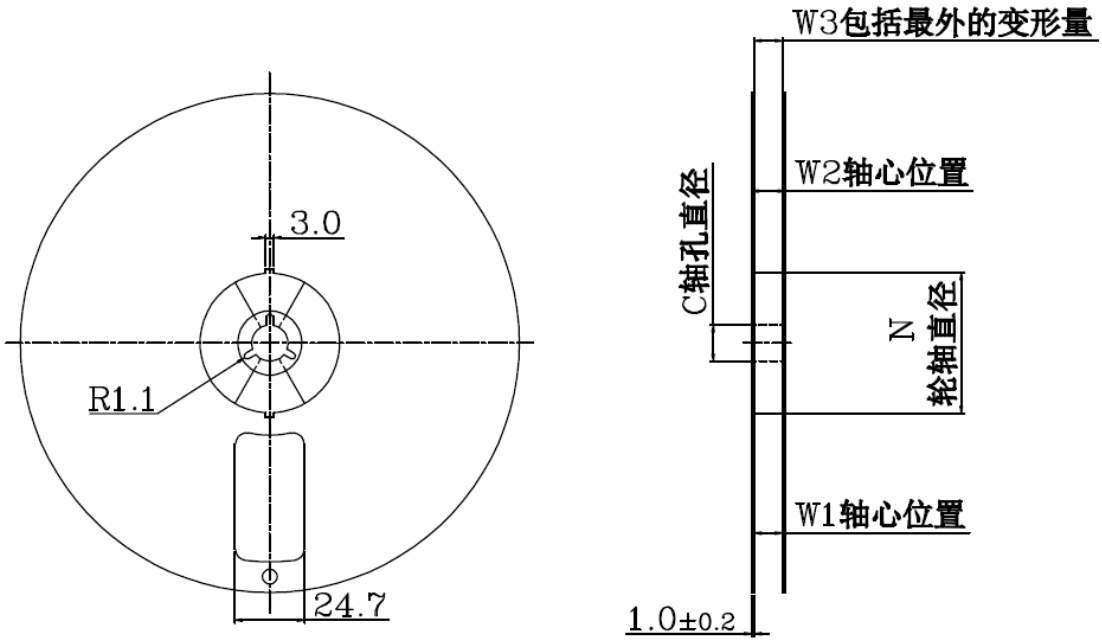
SYMBOL	A0	B0	K0	P0	P1	P2
SPEC	3.30±0.10	3.20±0.10	1.50±0.10	4.00±0.10	4.00±0.10	2.00±0.05
SYMBOL	T	E	F	D0	D1	W
SPEC	0.20±0.05	1.75±0.10	3.50±0.05	1.55±0.05	$1.10^{+0.10}_{-0}$	$8.00^{+0.2}_{-0.1}$

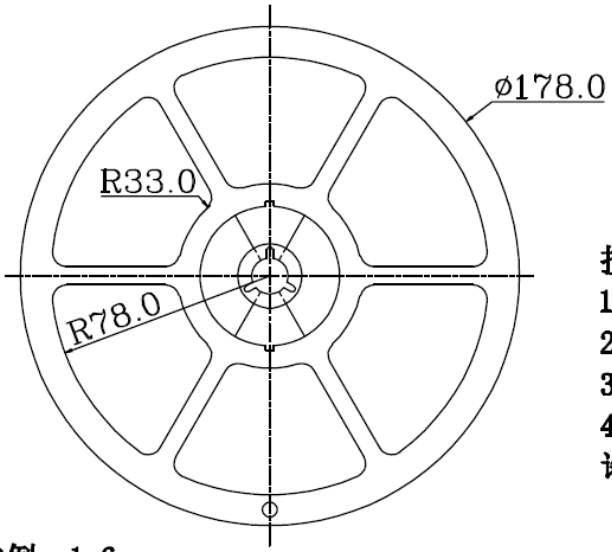
8mm&12mm 7' 英寸卷盘
8mm&12mm 7" carrier tape reel

规格:蓝色7寸*8mm

DWG NO.2014080501
TOOLLING NO.：____
DATE :20140805

Tape Size	A Max	B Min	C	D Min	N Min	W1	W2 Max	W3
8 mm	178	1.5	13.0±0.20	20.2	50	$8.4^{+1.5}_{-0.0}$	14.4	7.9Min 10.9Max
12 mm						$12.4^{+2.0}_{-0.0}$	18.4	7.9Min 10.9Max





技术要求：
1、标注尺寸单位为mm
2、材料为PS塑胶材料制作
3、其中一面板上应印有环保回收标志
4、除上图有标注误差要求外，其它允许误差为±0.5mm

比例：1:6

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