Kingbright

AAA3528QWDSYKS-AMT

3.5 x 2.8 mm Surface Mount LED Lamp

DESCRIPTIONS

- The source color devices are made with InGaN Light Emitting Diode
- The Super Bright Yellow device is made with AlGaInP (on GaAs substrate) light emitting diode chip
- Electrostatic discharge and power surge could damage the LEDs
- It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs
- All devices, equipments and machineries must be electrically grounded

FEATURES

- Suitable for all SMD assembly and solder process
- Available on tape and reel
- Package: 2000pcs / reel
- Moisture sensitivity level: 3
- RoHS compliant

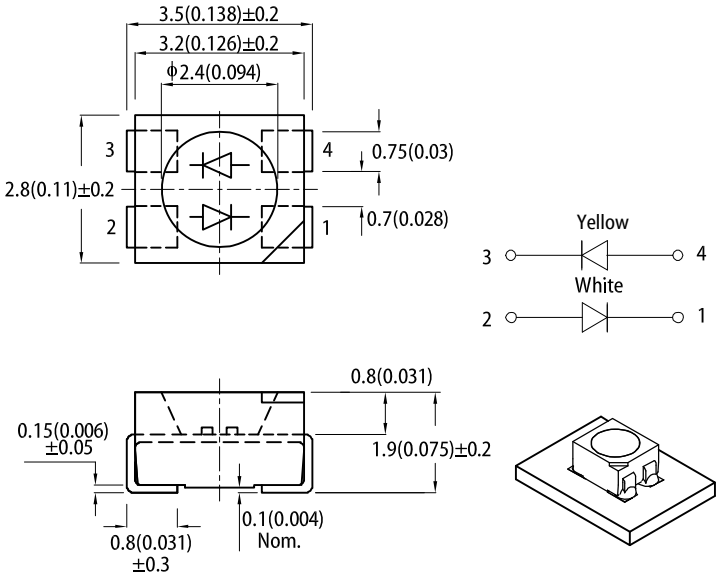
APPLICATIONS

- Traffic signaling
- Backlighting (illuminated advertising , general lighting)
- Interior and exterior automotive lighting
- Substitution of micro incandescent lamps
- Reading lamps
- Signal and symbol luminaire for orientation
- Marker lights (e.g. Steps, exit ways, etc)
- Decorative and entertainment lighting
- Indoor and outdoor commercial and residential architectural lighting

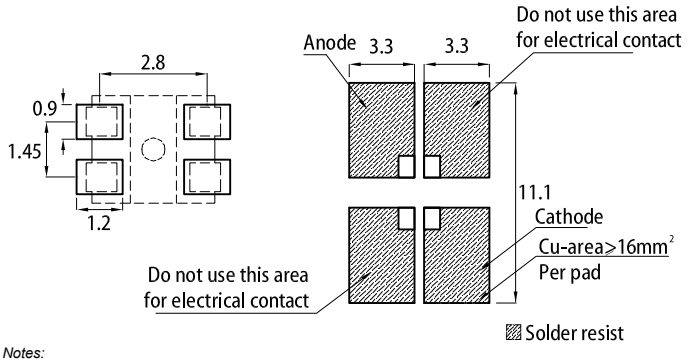
ATTENTION

Observe precautions for handling electrostatic discharge sensitive devices

PACKAGE DIMENSIONS



RECOMMENDED SOLDERING PATTERN



Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25(0.01") unless otherwise noted.
3. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
4. The device has a single mounting surface. The device must be mounted according to the specifications.

SELECTION GUIDE

Part Number	Emitting Color (Material)	Iv (mcd) @ 20mA [2]			Lens Type	Viewing Angle [1]
		Code.	Min.	Max.		2θ1/2
AAA3528QWDSYKS-AMT	White (InGaN)	Q	300	400	Yellow Fluorescent	120°
		R	400	500		
		S	500	700		
		T	700	1000		
	Super Bright Yellow (AlGaInP)	M	80	120		
		N	120	200		
		P	200	300		
		Q	300	400		

Notes:
1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 of the optical peak value.
2. Luminous intensity / luminous flux: +/-15%.
3. Luminous intensity value is traceable to CIE127-2007 standards.

ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C (WHITE)

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Chromaticity Coordinates x I_F = 20mA	x [1]	White	0.31		-
Chromaticity Coordinates y I_F = 20mA	y [1]	White	0.31	-	-
Capacitance	C	White	100	-	pF
Forward Voltage I_F = 20mA	V_F [2]	White	3.3	4.0	V
Reverse Current (V_R = 5V)	I_R	White	-	50	uA
Temperature Coefficient of x I_F = 20mA, -10°C ≤ T ≤ 100°C	TC_x	White	-0.15	-	10^{-3}/°C
Temperature Coefficient of y I_F = 20mA, -10°C ≤ T ≤ 100°C	TC_y	White	-0.20	-	10^{-3}/°C
Temperature Coefficient of V_F I_F = 20mA, -10°C ≤ T ≤ 100°C	TC_V	White	-2.9	-	mV/°C

Notes:
1. Measurement tolerance of the chromaticity coordinates is ±0.01.
2. Forward voltage: ±0.1V.
3. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C (YELLOW)

Parameter	Symbol	Emitting Color	Value				Unit
			Code.	Min.	Typ.	Max.	
Wavelength at Peak Emission I_F = 20mA	λ_{peak}	Super Bright Yellow	-	-	590	-	nm
Dominant Wavelength I_F = 20mA	λ_{dom} [1]	Super Bright Yellow	3	586	-	588	nm
			4	588	-	590	
			5	590	-	592	
			6	592	-	594	
Spectral Bandwidth at 50% Φ REL MAX I_F = 20mA	Δλ	Super Bright Yellow	-	-	20	-	nm
Capacitance	C	Super Bright Yellow	-	-	20	-	pF
Forward Voltage I_F = 20mA	V_F [2]	Super Bright Yellow	-	-	2.0	2.5	V
Reverse Current (V_R = 5V)	I_R	Super Bright Yellow	-	-	-	10	uA
Temperature Coefficient of λ_{peak} I_F = 20mA, -10°C ≤ T ≤ 100°C	$TC_{\lambda peak}$	Super Bright Yellow	-	-	0.12	-	nm/°C
Temperature Coefficient of λ_{dom} I_F = 20mA, -10°C ≤ T ≤ 100°C	$TC_{\lambda dom}$	Super Bright Yellow	-	-	0.08	-	nm/°C
Temperature Coefficient of V_F I_F = 20mA, -10°C ≤ T ≤ 100°C	TC_V	Super Bright Yellow	-	-	-1.9	-	mV/°C

Notes:
1. The dominant wavelength (λd) above is the setup value of the sorting machine. (Tolerance λd : ±1nm.)
2. Forward voltage: ±0.1V.
3. Wavelength value is traceable to CIE127-2007 standards.
4. Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

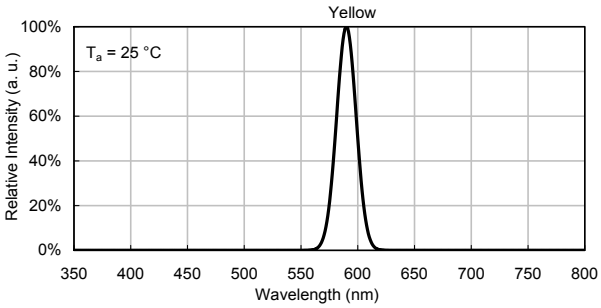
ABSOLUTE MAXIMUM RATINGS at T_A=25°C

Parameter	Symbol	Value		Unit
		White	Super Bright Yellow	
Power Dissipation	P_D	80	75	mW
Reverse Voltage	V_R	5	5	V
Junction Temperature	T_j	115	115	°C
Operating Temperature	T_{op}	-40 to +100		°C
Storage Temperature	T_{stg}	-40 to +110		°C
DC Forward Current	I_F	20	30	mA
Peak Forward Current	I_{FM} [1]	150	150	mA
Electrostatic Discharge Threshold (HBM)	-	3000	3000	V
Thermal Resistance (Junction / Ambient)	$R_{th\ JA}$ [2]	290	300	°C/W
Thermal Resistance (Junction / Solder point)	$R_{th\ JS}$ [2]	175	160	°C/W

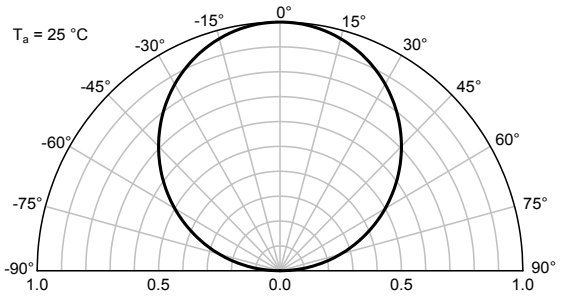
Notes:
1. 1/10 Duty Cycle, 0.1ms Pulse Width.
2. $R_{th\ JA}$,$R_{th\ JS}$ Results from mounting on PC board FR4 (pad size ≥ 16 mm^2 per pad).
3. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

TECHNICAL DATA

RELATIVE INTENSITY vs. WAVELENGTH

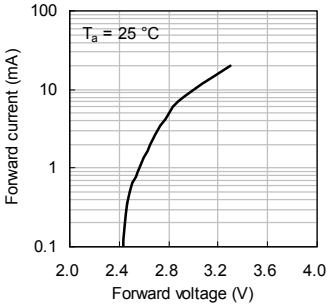


SPATIAL DISTRIBUTION

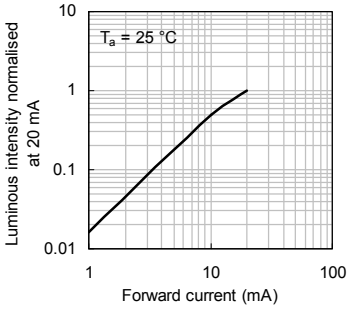


WHITE

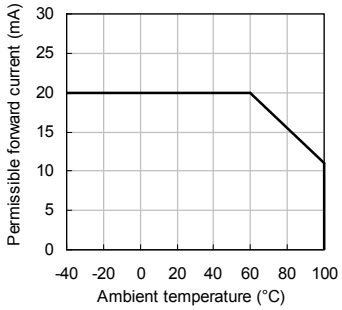
Forward Current vs. Forward Voltage



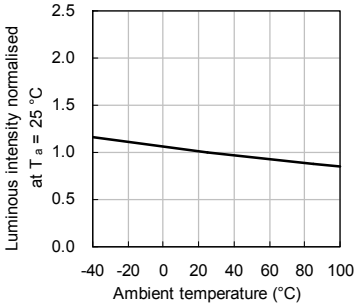
Luminous Intensity vs. Forward Current



Forward Current Derating Curve



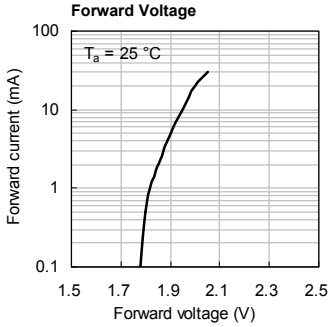
Luminous Intensity vs. Ambient Temperature



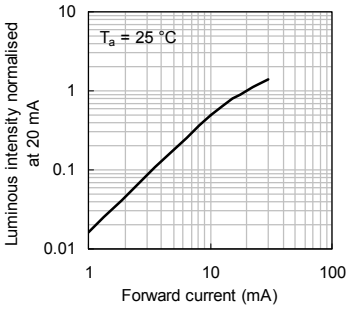
TECHNICAL DATA

SUPER BRIGHT YELLOW

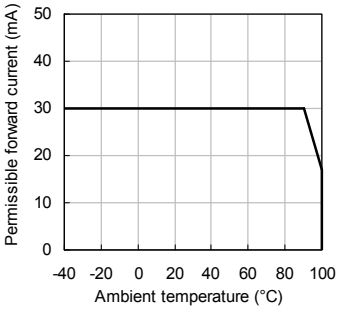
Forward Current vs. Forward Voltage



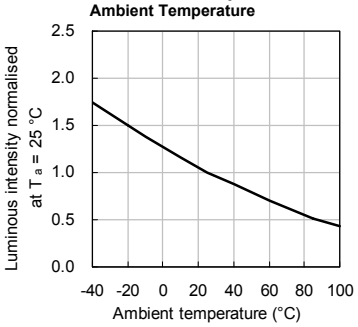
Luminous Intensity vs. Forward Current



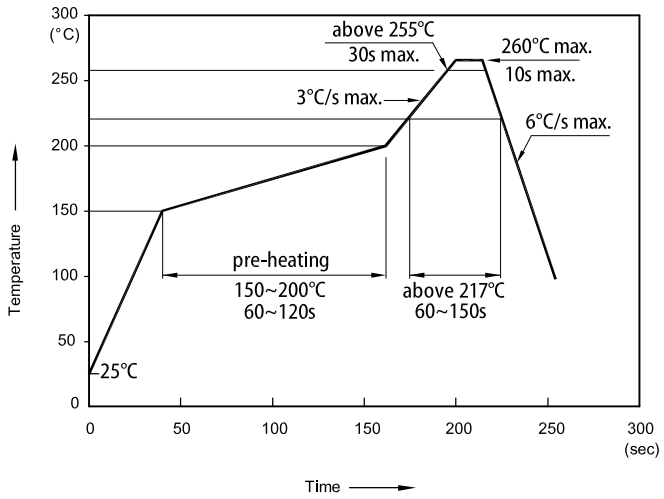
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature

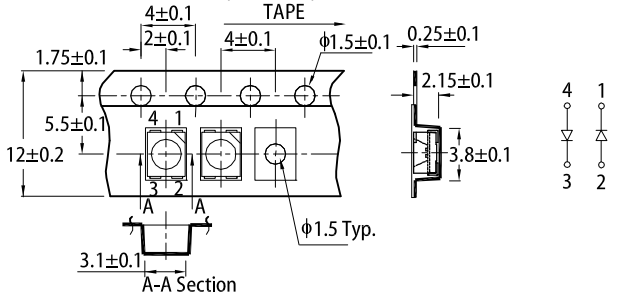


REFLOW SOLDERING PROFILE for LEAD-FREE SMD PROCESS

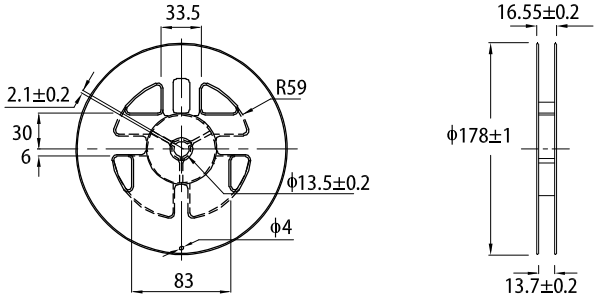


Notes:
1. Don't cause stress to the LEDs while it is exposed to high temperature.
2. The maximum number of reflow soldering passes is 2 times.
3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product.

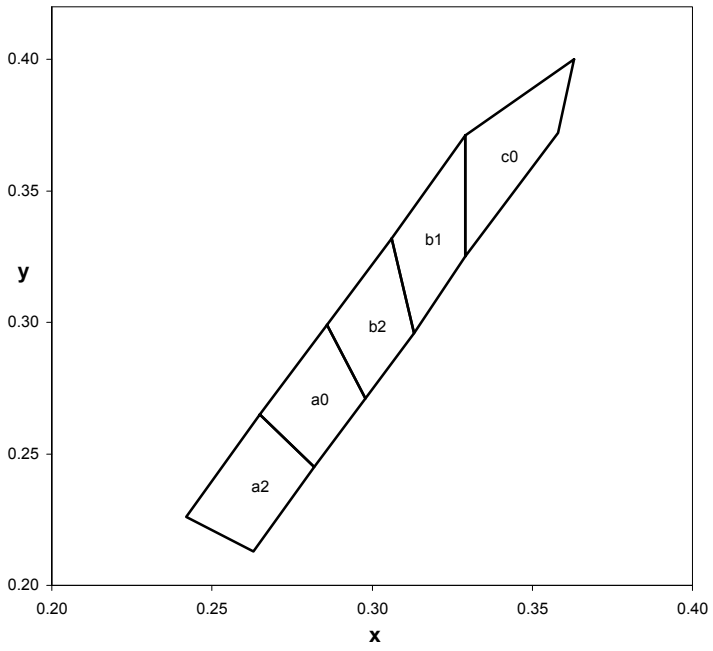
TAPE SPECIFICATIONS (units : mm)



REEL DIMENSION (units : mm)



CIE CHROMATICITY DIAGRAM



	x	y		x	y
a2	0.263	0.213	a0	0.282	0.245
	0.282	0.245		0.298	0.271
	0.265	0.265		0.286	0.299
	0.242	0.226		0.265	0.265
b2	0.298	0.271	b1	0.313	0.296
	0.313	0.296		0.329	0.325
	0.306	0.332		0.329	0.371
	0.286	0.299		0.306	0.332
c0	0.329	0.325			
	0.358	0.372			
	0.363	0.400			
	0.329	0.371			

Notes:
Shipment may contain more than one chromaticity regions.
Orders for single chromaticity region are generally not accepted.
Measurement tolerance of the chromaticity coordinates is ±0.01.

RELIABILITY TEST ITEMS AND CONDITIONS

The reliability of products shall be satisfied with items listed below

LOT TOLERANCE PERCENT DEFECTIVE (LTPD) : 10%

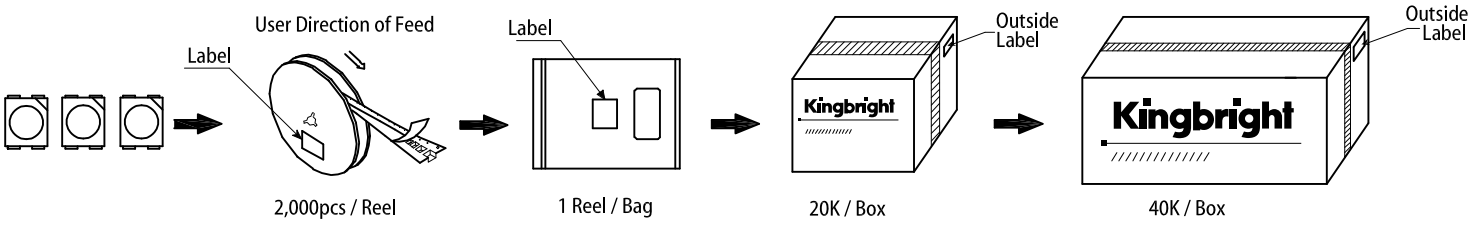
No.	Test Item	Standards	Test Condition	Test Times / Cycles	Number of Damaged
1	Continuous operating test	-	T_a = 25°C, I_F = maximum rated current *	1,000 h	0 / 22
2	High Temp. operating test	EIAJ ED-4701/100(101)	T_a = 100°C, I_F = maximum rated current *	1,000 h	0 / 22
3	Low Temp. operating test	-	T_a = -40°C, I_F = maximum rated current *	1,000 h	0 / 22
4	High temp. storage test	EIAJ ED-4701/100(201)	T_a = maximum rated storage temperature	1,000 h	0 / 22
5	Low temp. storage test	EIAJ ED-4701/100(202)	T_a = -40°C	1,000 h	0 / 22
6	High temp. & humidity storage test	-	T_a = 60°C, RH = 90%	500 h	0 / 22
7	High temp. & humidity operating test	-	T_a = 60°C, RH = 90% I_F = maximum rated current *	500 h	0 / 22
8	Soldering reliability test	EIAJ ED-4701/100(301)	Moisture soak: 30°C, 70% RH, 72h Preheat: 150~180°C (120s max.) Soldering temp: 260°C(10s)	2 times	0 / 18
9	Thermal shock operating test	-	T_a = -40°C(15min) ~ 100°C(15min) I_F = derated current at 100°C	1,000 cycles	0 / 22
10	Thermal shock test	-	T_a = -40°C(15min) ~ maximum rated storage temperature(15min)	1,000 cycles	0 / 22
11	Electric Static Discharge (ESD)	EIAJ ED-4701/100(304)	C = 100pF, R2 = 1.5KΩ V = 250V (White) V = 3000V (Yellow)	Once each Polarity	0 / 22
12	Vibration test	-	a = 196m/s², f = 100~2KHz, t = 48min for all xyz axes	4 times	0 / 22

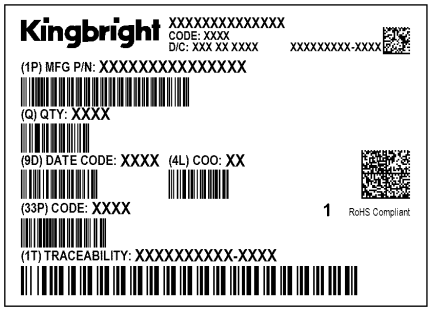
** : Refer to forward current vs. derating curve diagram*

CRITERIA FOR JUDGING DAMAGE

Items	Symbols	Conditions	Failure Criteria
luminous Intensity	I_V	I_F = 20mA	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	V_F	I_F = 20mA	Testing Max. Value ≥ Spec. Max. Value x 1.2
Reverse Current	I_R	V_R = Maximum Rated Reverse Voltage	Testing Max. Value ≥ Spec. Max. Value x 2.5
High temp. storage test	-	-	Occurrence of notable decoloration, deformation and cracking

PACKING & LABEL SPECIFICATIONS

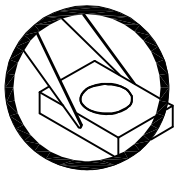




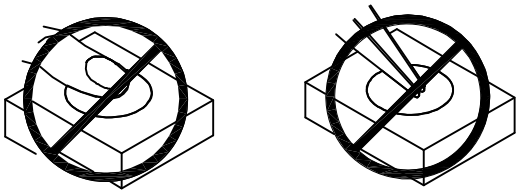
HANDLING PRECAUTIONS

Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force. As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

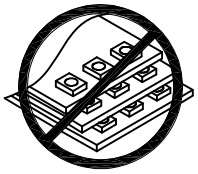
1. Handle the component along the side surfaces by using forceps or appropriate tools.



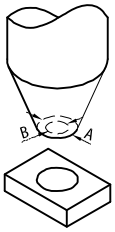
2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.



3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



4-1. The inner diameter of the SMD pickup nozzle should not exceed the size of the LED to prevent air leaks.
4-2. A pliable material is suggested for the nozzle tip to avoid scratching or damaging the LED surface during pickup.
4-3. The dimensions of the component must be accurately programmed in the pick-and-place machine to insure precise pickup and avoid damage during production.
5. As silicone encapsulation is permeable to gases, some corrosive substances such as H_2S might corrode silver plating of lead frame. Special care should be taken if an LED with silicone encapsulation is to be used near such substances.



PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
4. The information in this document applies to typical usage in consumer electronics applications. If customer's application has special reliability requirements or have life-threatening liabilities, such as automotive or medical usage, please consult with Kingbright representative for further assistance.
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