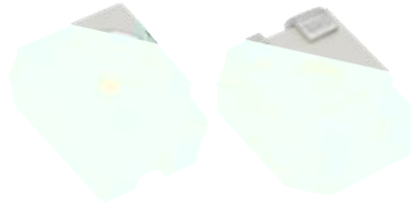


HVS-3528DER



3528 PLCC4 / Products Series

High luminous efficiency, consistency, stability and reliability, it is mainly used in automobile applications.

- PPA
- 50% I_v 120°
- 633nm
- AEC-Q102 & IEC 60810

Features

- Package Colorless clear resin in white PPA cup
- Viewing angle at 50% I_v: 120°
- Color: Super Red (633nm)
- Qualifications: Passed reliability test per AEC-Q102 & IEC 60810 requirement

Applications

- Signaling
- Interior and exterior lighting for automotive

/ Ordering Information

Type	Luminous Intensity I _v @ I _f =50mA	Ordering Code
HVS-3528DER - XXXX - X - XXXX Brightness Color Forward Voltage	1.40 – 2.80 cd	XXXXXX

■	HVS-3528DER- <u>ABBB</u> -1-XXXX	4 AB BA BB
■	4	
■	HVS-3528DER-XXXX-1- <u>3A4B</u>	4 3A 3B 4A 4B

Note

■ Brightness Grouping

Only one brightness group will be packed in each reel. Please refer to page #4 for details.
E.g.: HVS-3528DER-ABBB-1-XXXX, means only one bin of AB, BA or BB is in each reel.

■ Color Grouping

Please refer to page #4 for details.

■ Forward Voltage Groups

Only one forward voltage group will be packed in each reel. Please refer to page #4 for details.

E.g.: HVS-3528DER-XXXX-1-3A4B, means only one bin of 3A, 3B, 4A or 4B is in each reel.

/Maximum Ratings

Parameters	Symbol	Rating	Unit
/ Junction Temperature	T_j	125	
/ Forward Current ($T_s=25$)	I_f	70	mA
Peak Forward Current ($t \leq 10\mu s$ $D=0.005$ $T_s=25$)	I_{fp}	100	mA
/ Reverse Voltage ($T_s=25$)	V_r	12	V
Electrostatic Discharge (HBM)	V_{ESD}	2000	V
/ Operating Temperature	T_{opr}	-40 ~ +100	
/ Storage Temperature	T_{stg}	-40 ~ +100	

/Characteristics ($T_s = 25$; $I_f = 50$ mA)

Parameters	Symbol	Rating	Unit
/ Wavelength at Peak Emission	typ. λ_{peak}	645	nm
/ Dominant Wavelength	min. λ_{dom}	627	nm
	typ. λ_{dom}	633	nm
	max. λ_{dom}	639	nm
/ Spectral Bandwidth at 50% I_{rel} max	typ.	16	nm
50 % I_v / Viewing Angle at 50 % I_v	typ.	120	°
/ Forward Voltage	min. V_f	1.90	V
	typ. V_f	2.15	V
	max. V_f	2.50	V
/ Reverse Current ($V_R=12V$)	typ. I_r	0.2	uA
	max. I_r	10	uA
PN - / Real Thermal Resistance (Junction / Ambient)	max. $R_{th JA_{real}}$	300	K/W
PN - / Real Thermal Resistance (Junction / Solder Point)	max. $R_{th JS_{real}}$	130	K/W

/Brightness Grouping ($T_s = 25$; $I_f = 50$ mA)

Grouping	Luminous Intensity I_v min.	Luminous Intensity I_v max.	Luminous Flux Φ_v typ.
AB	1.40 cd	1.80 cd	4.80 lm
BA	1.80 cd	2.24 cd	6.10 lm
BB	2.24 cd	2.80 cd	7.60 lm

/Forward Voltage Grouping ($T_s = 25$; $I_f = 50$ mA)

Grouping	Forward Voltage V_f min.	Forward Voltage V_f max.
3A	1.90 V	2.05 V
3B	2.05 V	2.20 V
4A	2.20 V	2.35 V
4B	2.35 V	2.50 V

/Dominant Wavelength Grouping ($T_s = 25$; $I_f = 50$ mA)

Grouping	Dominant Wavelength λ_{dom} min.	Dominant Wavelength λ_{dom} max.
1	627 nm	639 nm

/ Information on Label

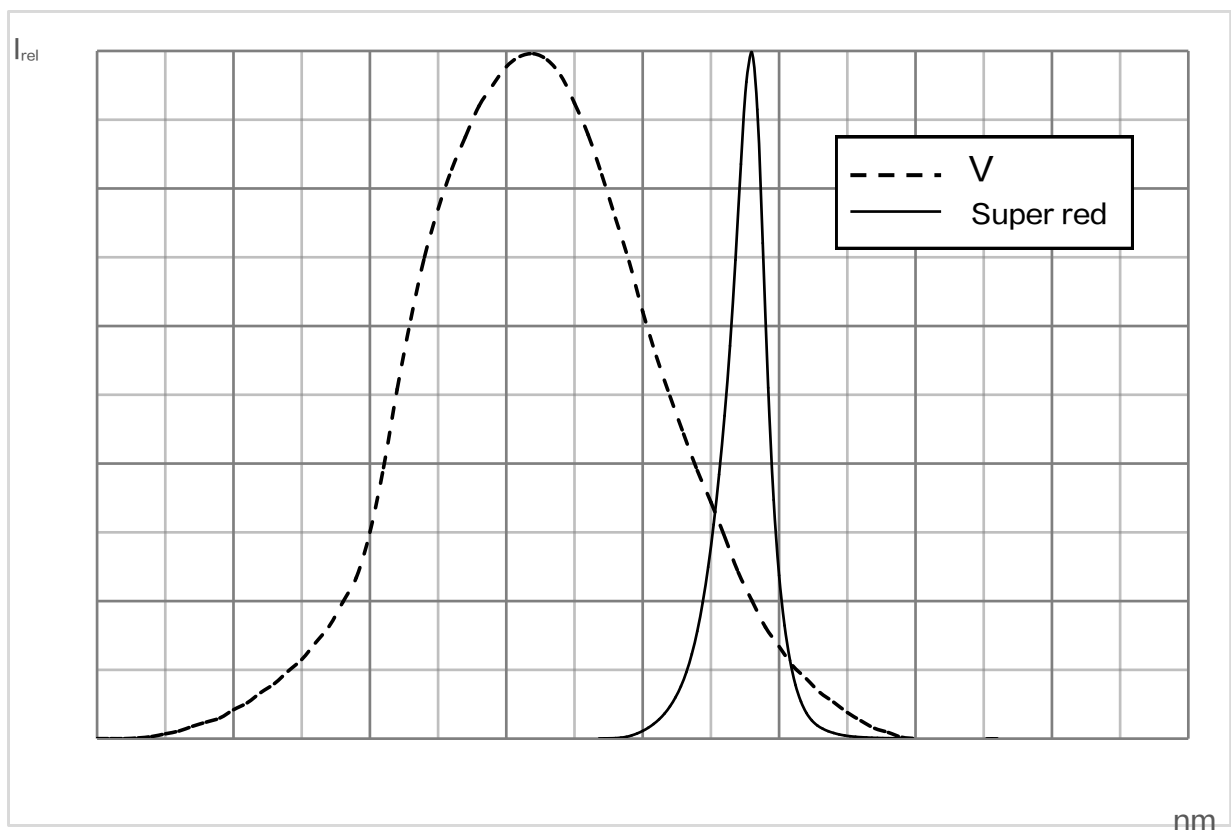
/E.g. BA-1-3A

/Brightness	/Color	/Forward Voltage
BA	1	3A

- $V(\lambda) =$

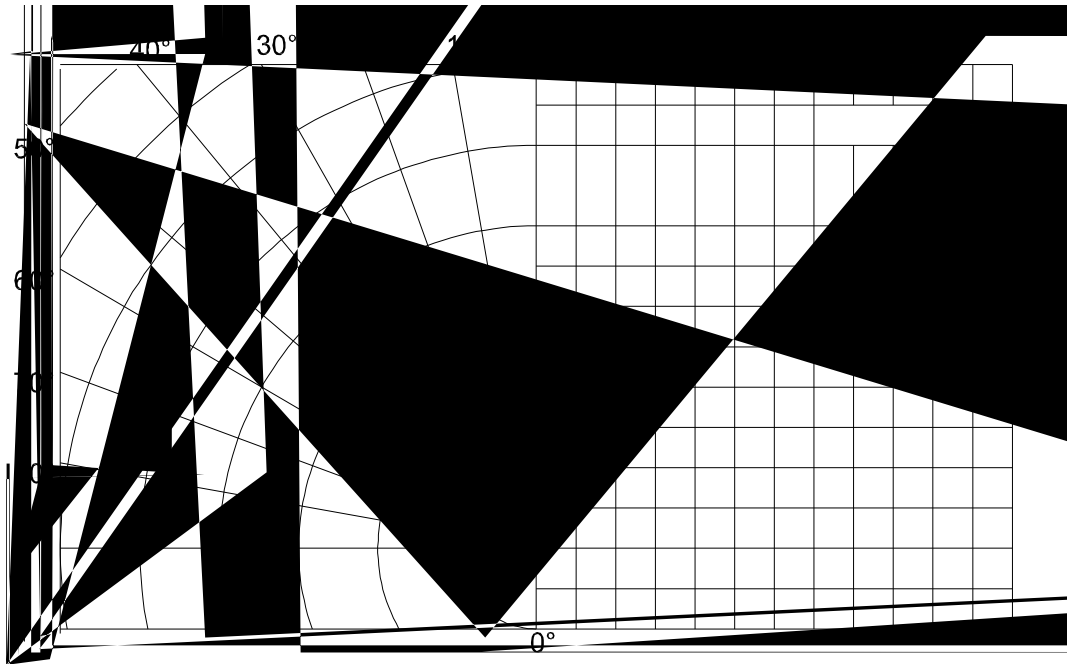
Relative Spectral Emission - $V(\lambda) =$ Standard Eye Response Curve

$I_{rel} = f(\lambda)$; $T_s = 25^\circ\text{C}$; $I_f = 50\text{ mA}$



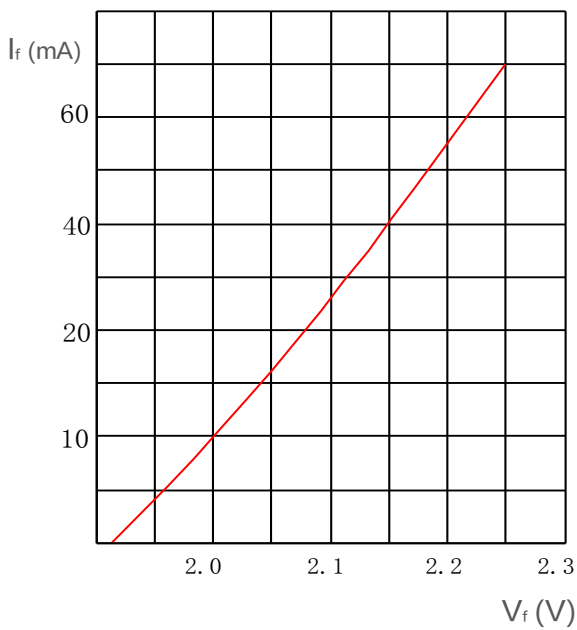
/Radiation Characteristics

$I_{rel} = f(\theta) \quad T_s = 25$



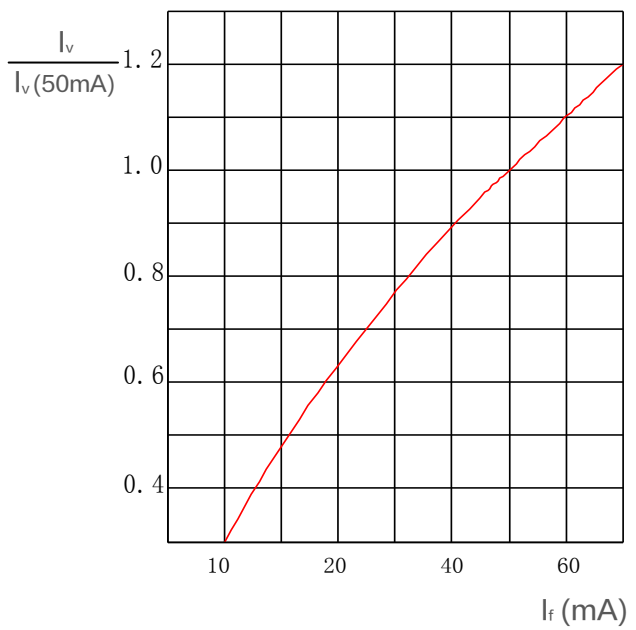
/Forward Current

$I_f = f(V_f); T_a = 25$

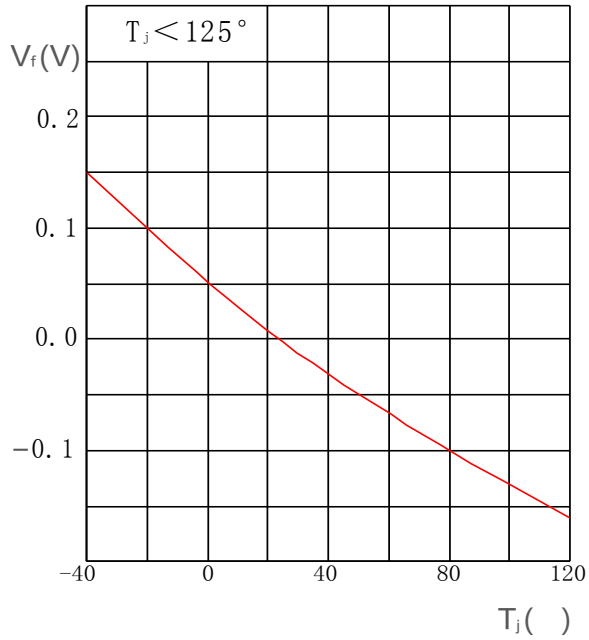


/Relative Luminous Intensity

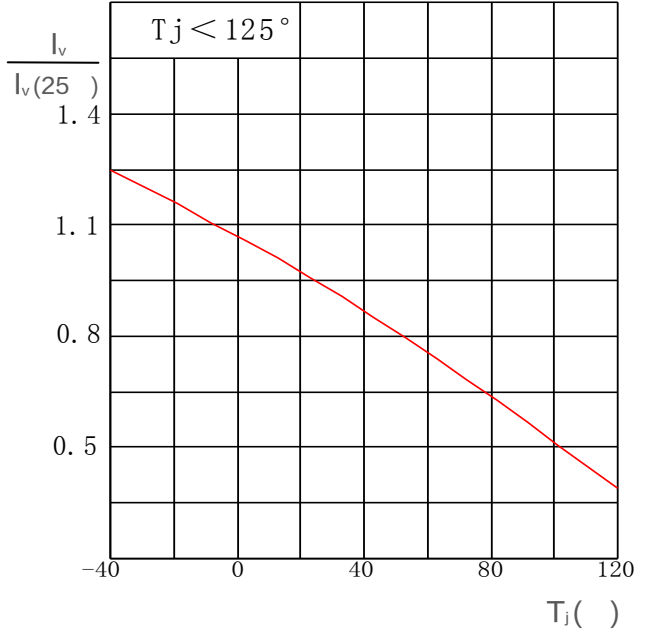
$I_v/I_v(50\text{mA}) = f(I_f); T_a = 25$



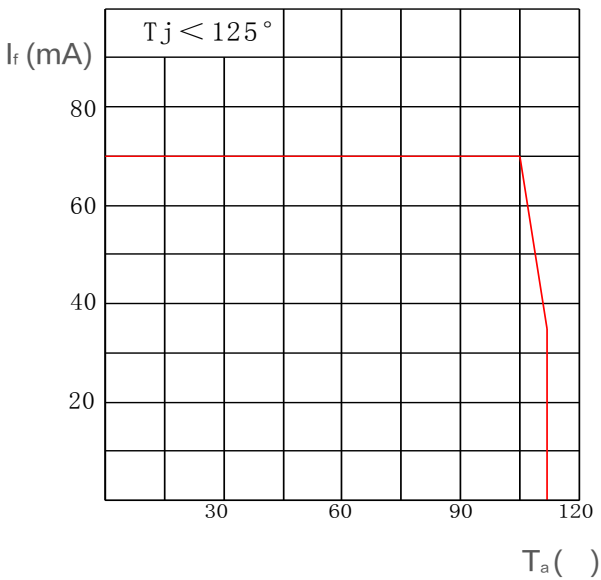
/Relative Forward Voltage
 $V_f = V_f - V_f(25^\circ) = f(T_j); I_f = 50 \text{ mA}$



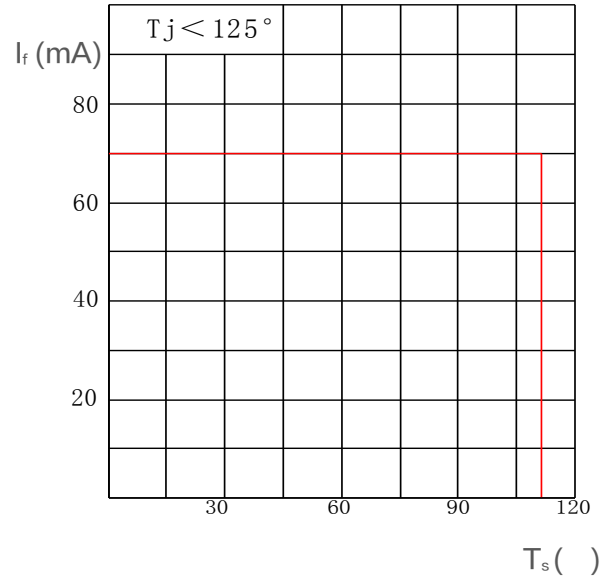
/Relative Luminous Intensity
 $I_v/I_v(25^\circ) = f(T_j); I_f = 50 \text{ mA}$



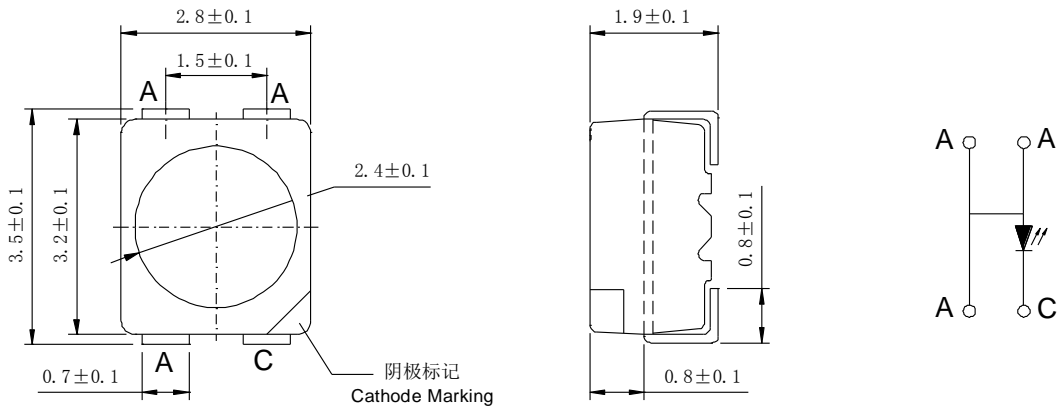
Ambient Temperature vs. Forward Current
 $I_f = f(T_a)$



/Solder Point Temperature vs. Forward Current
 $I_f = f(T_s)$



/Package Outline

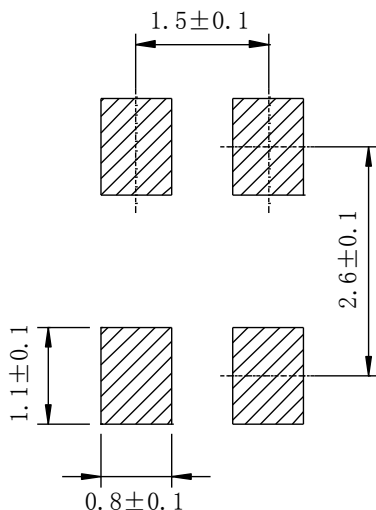


- 30mg
- Class 3B
- : 1) H₂S 40 /90% R.H, 15ppm, 336 (IEC 60068-2-43)
- 2) : 25 /75 % R.H, 500
- (IEC 60068-2-60 4: 10ppb H₂S, 200ppb SO₂, 200ppb NO₂, 10ppb Cl₂)

NOTE

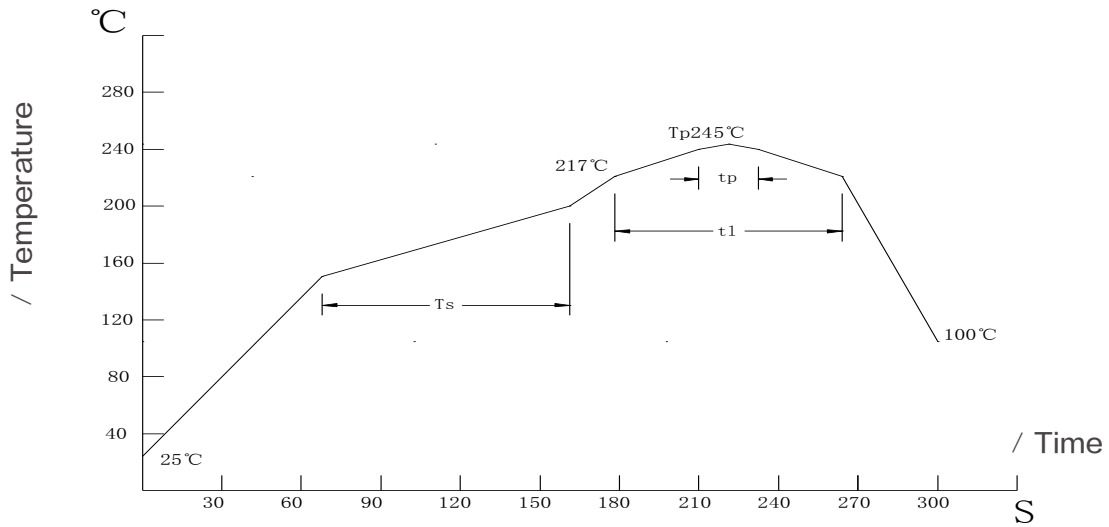
- Approximate Weight: 30mg
- Mark: Cathode
- Corrosion test: Class 3B
- Test conditions: 1) H₂S test 40 /90% R.H, 15ppm, 336hours
(Standards IEC 60068-2-43)
- 2) Flowing mixed gas test: 25 /75 % R.H, 500hours
(Standards IEC 60068-2-60 test method 4: 10ppb H₂S, 200ppb SO₂, 200ppb NO₂, 10ppb Cl₂)

/Recommended Solder Pad



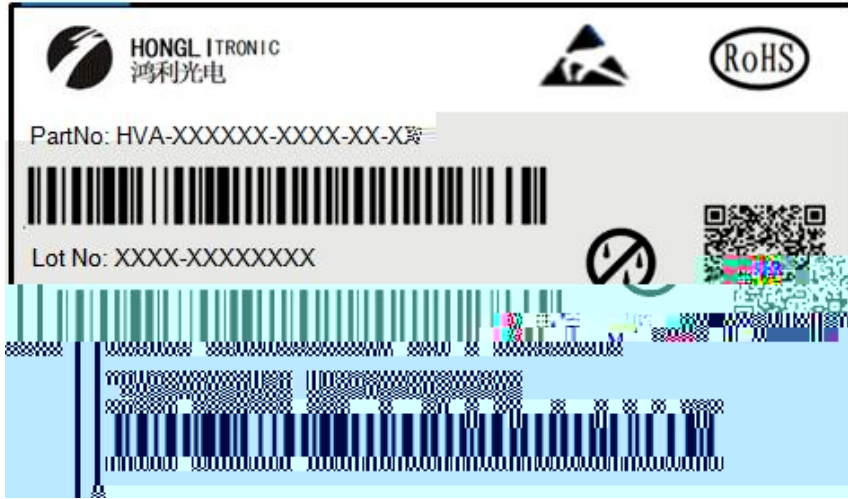
- NOTE
- Package not suitable for ultrasonic cleaning

/Reflow Soldering Profile

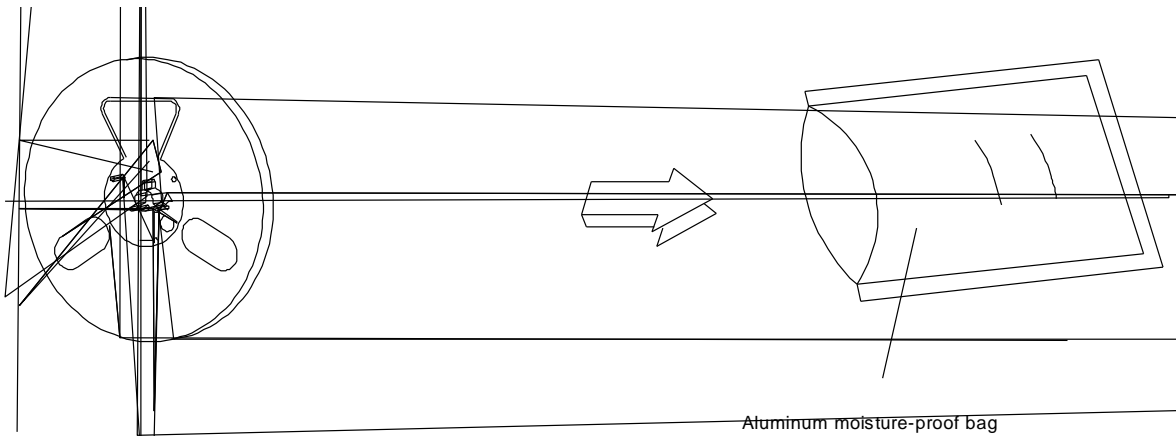


Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		min.	rec.	max.	
Ramp-up Rate to Preheat 25 -150	-	-	2	3	/s
/Time T _{smin} to T _{smax}	T _s	60	100	120	s
Ramp-up Rate to Peak T _{smax} to T _p	-	-	2	3	/s
Liquidus Temperature	T _l	-	217	-	
Time above Liquidus Temperature	t _l	-	80	100	s
/Peak Temperature ± 5	T _p	-	245	260	
Time within 5 of the Specified Peak Temperature	t _p	10	20	30	s
/Ramp-down Rate T _p to 100	-	-	3	6	/s
/Time 25 to T _p	-	-	-	480	s

/Barcode-Product-Label (BPL)



/Dry Packing Process and Materials

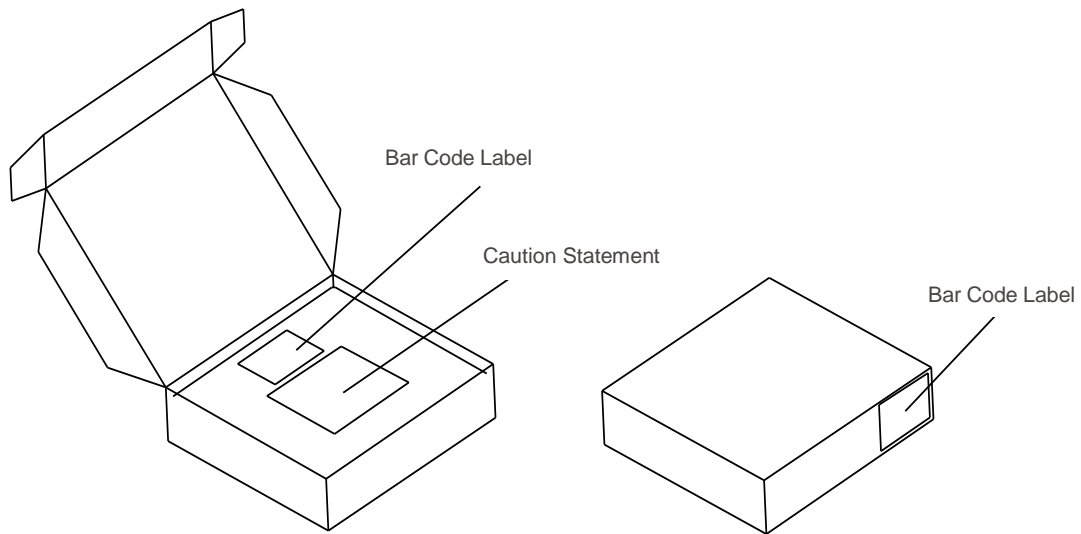


NOTE

JEDEC

Moisture-sensitive product is packed in a dry bag containing desiccant and HIC (humidity indicator card). Regarding dry pack you may find further information in the internet or JEDEC.

/Transportation Packing and Materials



/Dimensions of Transportation Box (mm)

/Width	/Length	/Height
256± 5	223± 5	62± 5
256± 5	223± 5	124± 5

:				
:		, ± 0.1 mm		
	8ms		± 0.05V	± 0.1V
	GUM K=3			
	25ms		± 0.5nm	± 1nm
	GUM K=3			
	25ms		± 8%	± 11%
	GUM K=3			

Glossary

Typical Values