

# HVS-3528DER



## 3528 PLCC4

## Products Series

压

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

- PPA
- 50% I<sub>v</sub> 120T
- 633nm
- AEC-Q102 & IEC 60810压

## Features



- Package Colorless clear resin in white PPA cup
- Viewing angle at 50% I<sub>v</sub>: 120T
- 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 <sub>v</sub> @ I <sub>f</sub> =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 ( $T_s = 25^\circ C$ , $I_f = 50$ mA)

Parameters	Symbol	Rating	Unit
Wavelength at Peak Emission	typ. $\lambda_{peak}$	645	nm
Dominant Wavelength	min. $\lambda_{dom}$	627	nm
	typ. $\lambda_{dom}$	633	nm
	max. $\lambda_{dom}$	639	nm
Spectral Bandwidth at 50% $I_{rel}$ max	typ.	16	nm
50 % $I_v$ Viewing Angle at 50 % $I_v$	typ.	120	T
 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	$\mu A$
	max. $I_r$	10	$\mu A$
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 ( $T_s$ $f = 50$ mA)

Grouping	Luminous Intensity $I_v$ min.	Luminous Intensity $I_v$ max.	Luminous Flux $\Phi_v$ 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 ( $T_s$ $f = 50$ 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 ( $T_s$ $f = 50$ mA)

Grouping	Dominant Wavelength $\lambda_{dom}$ min.	Dominant Wavelength $\lambda_{dom}$ max.
1	627 nm	639 nm

## Information on Label

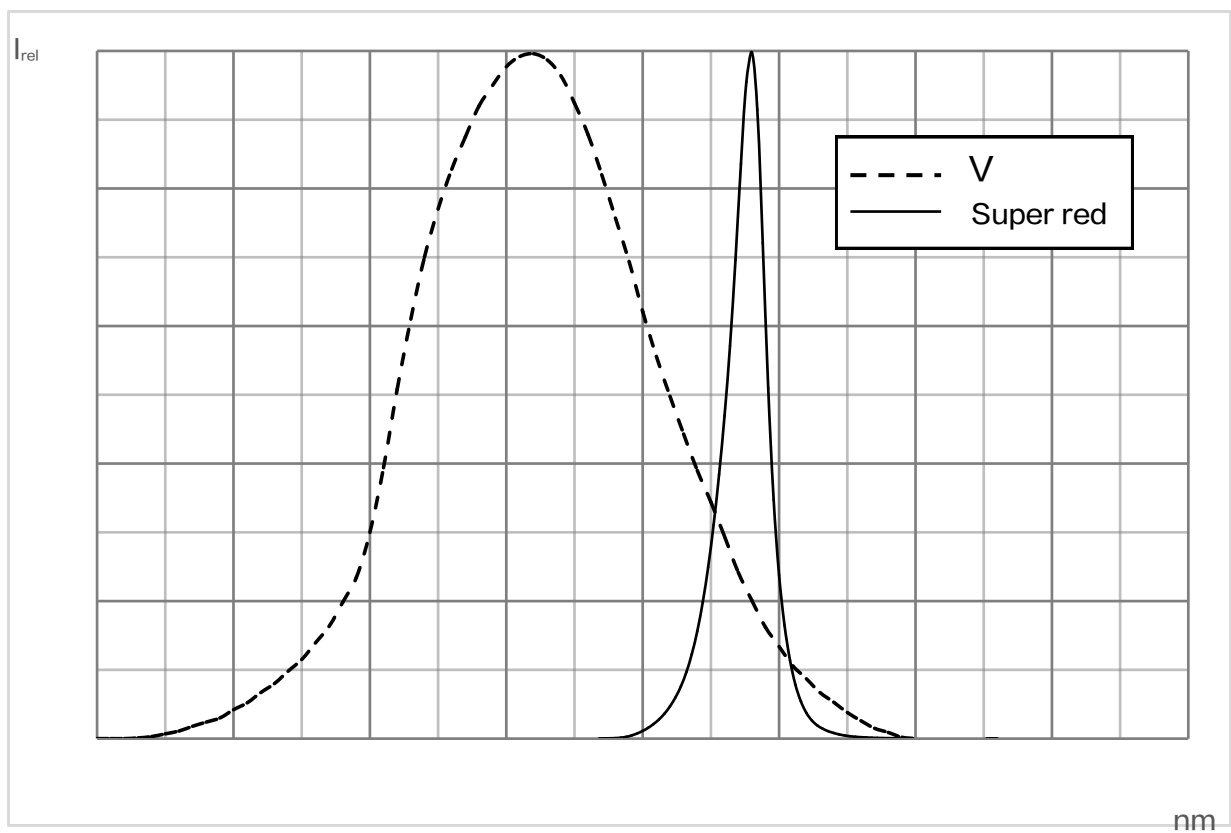
E.g. BA-1-3A

Brightness	Color	 Forward Voltage
BA	1	3A

$$- V(\lambda) =$$

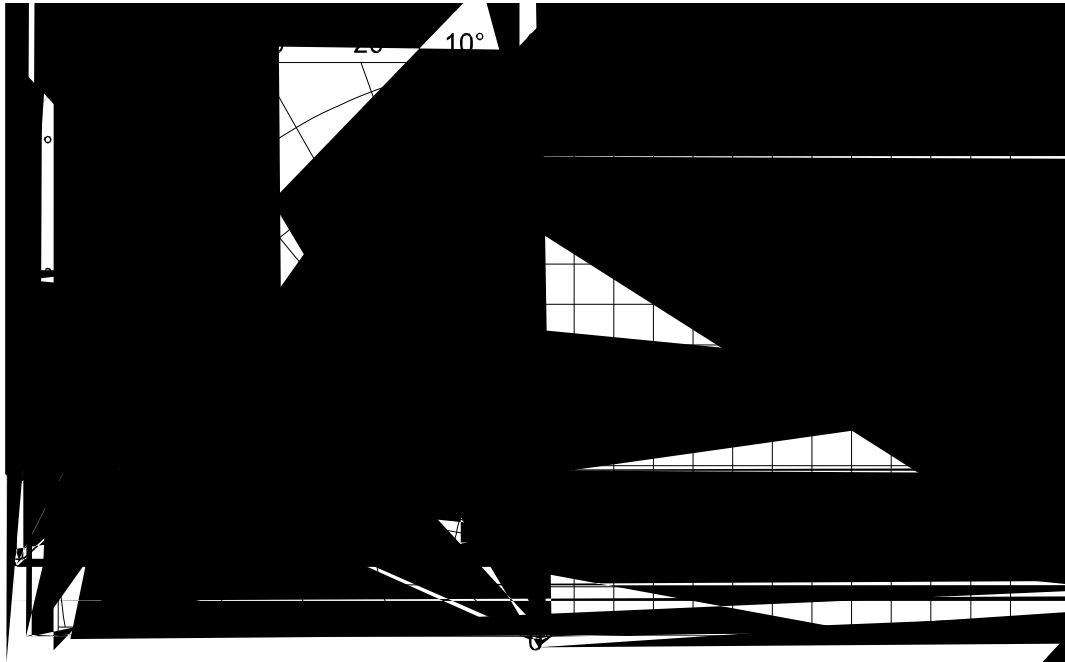
Relative Spectral Emission -  $V(\lambda)$  = Standard Eye Response Curve

$$I_{rel} = f(\lambda); T_s \quad I_f = 50 \text{ mA}$$



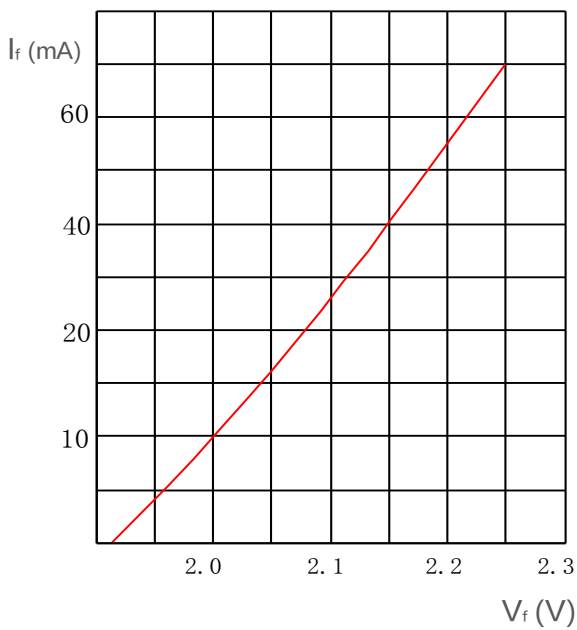
Radiation Characteristics

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



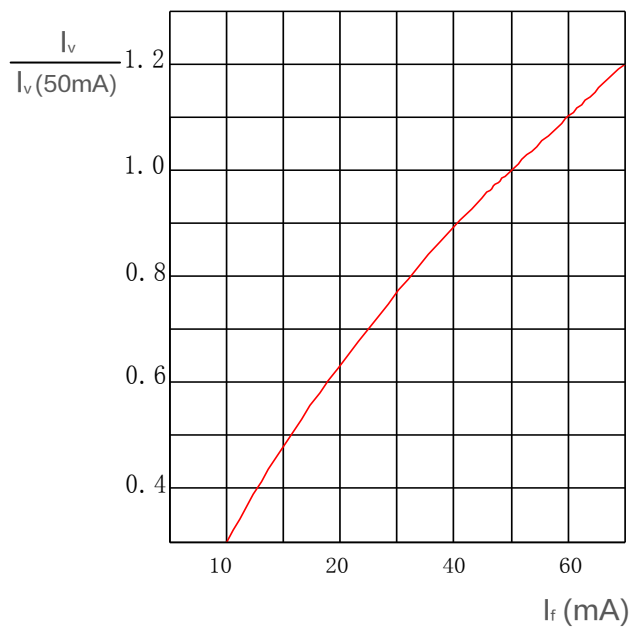
Forward Current

$I_f = f(V_f); T_a$



Relative Luminous Intensity

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

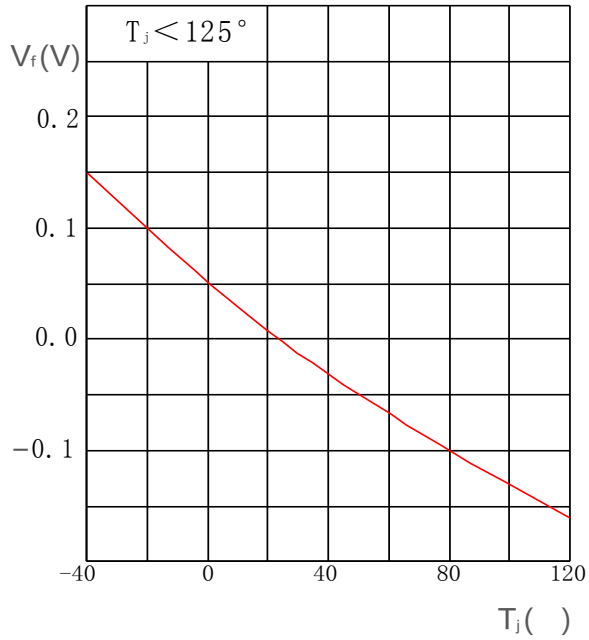




Relative Forward Voltage

$V_f = V_f - V_f$

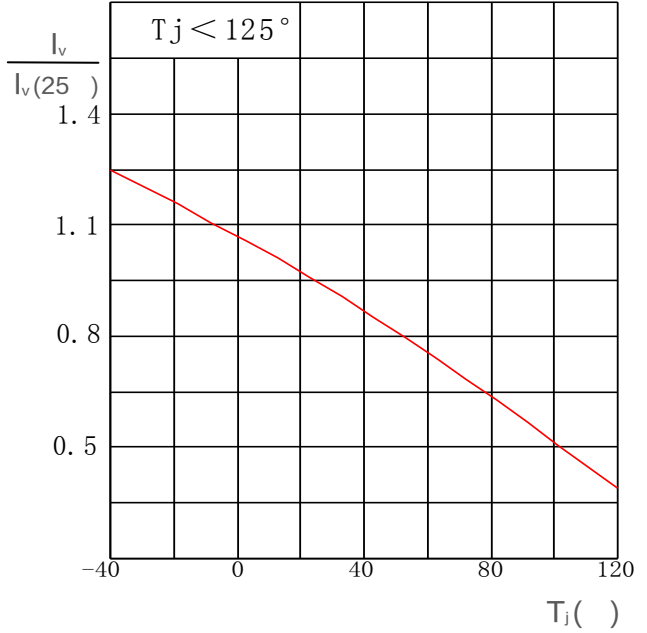
8 j); I<sub>f</sub> = 50 mA



Relative Luminous Intensity

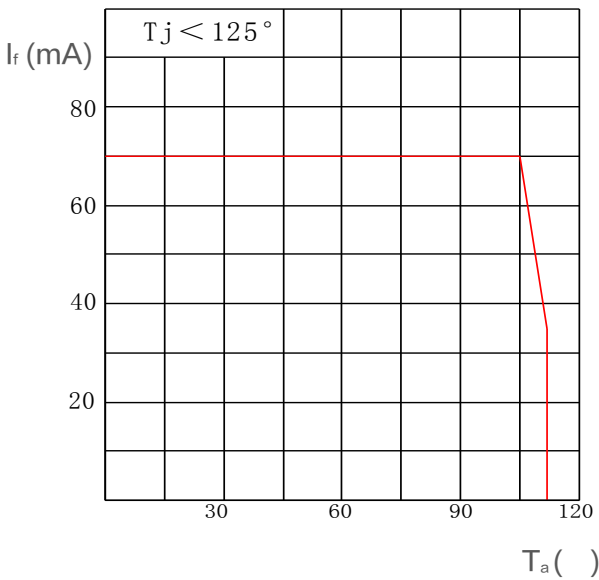
I<sub>v</sub>/I<sub>v</sub>

8 j); I<sub>f</sub> = 50 mA



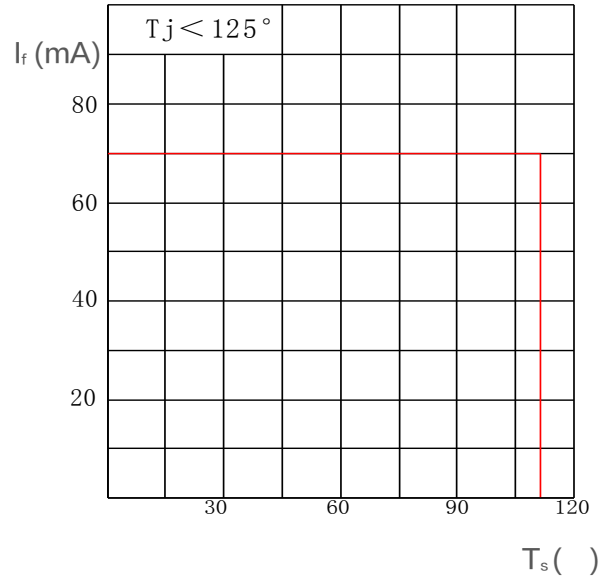
Ambient Temperature vs. Forward Current

I<sub>f</sub> = f(T<sub>a</sub>)

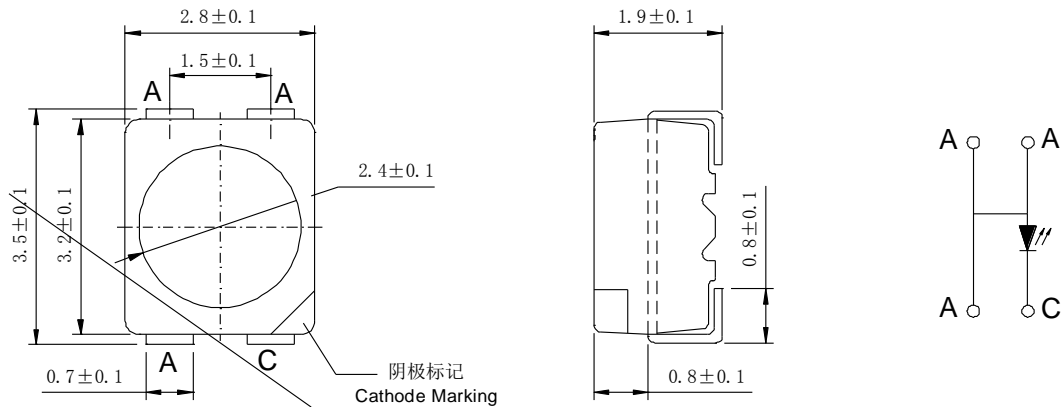


Solder Point Temperature vs. Forward Current

I<sub>f</sub> = f(T<sub>s</sub>)



## Package Outline

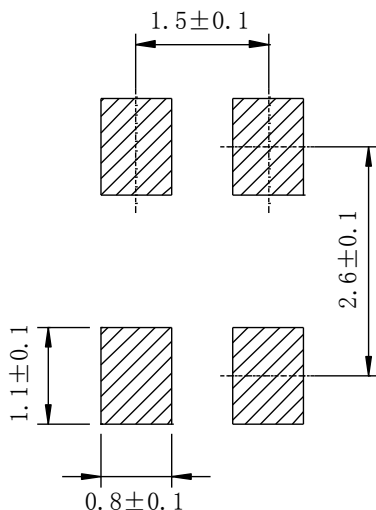


- 30mg
- Class 3B
- : 1) H<sub>2</sub>S , 336 IEC 60068-2-43)
- 2) IEC 60068-2-60 4: 10ppb H<sub>2</sub>S, 200ppb SO<sub>2</sub>, 200ppb NO<sub>2</sub>, 10ppb Cl<sub>2</sub>)

### NOTE

- Approximate Weight: 30mg
- Mark: Cathode
- Corrosion test: Class 3B
- Test conditions: 1) H<sub>2</sub>S test , 15ppm, 336hours (Standards IEC 60068-2-43)
- 2) Flowing ; 7 9 7 : G (Standards IEC 60068-2-60 test method 4: 10ppb H<sub>2</sub>S, 200ppb SO<sub>2</sub>, 200ppb NO<sub>2</sub>, 10ppb Cl<sub>2</sub>)

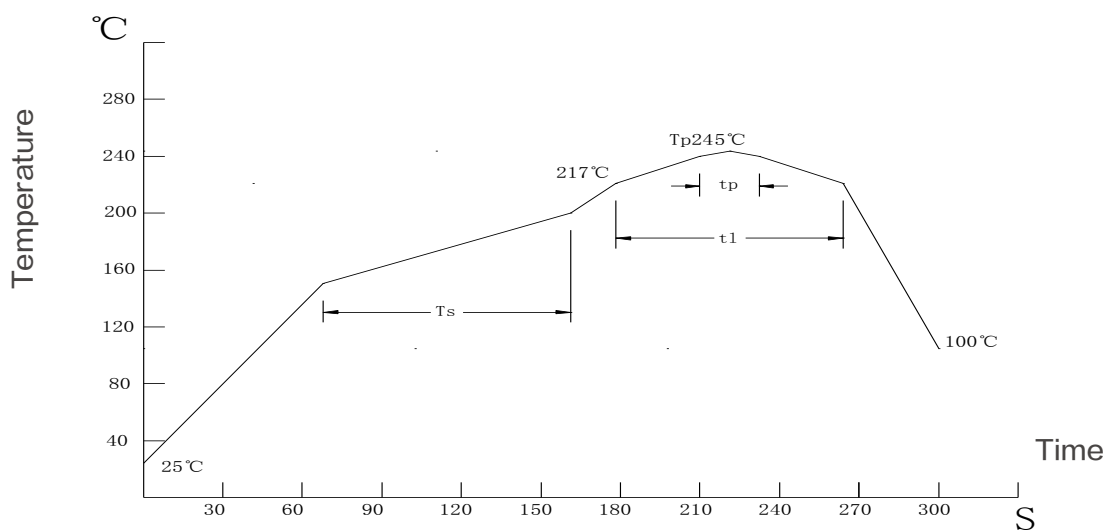
## Recommended Solder Pad



- NOTE
- Package not suitable for ultrasonic cleaning



## Reflow Soldering Profile



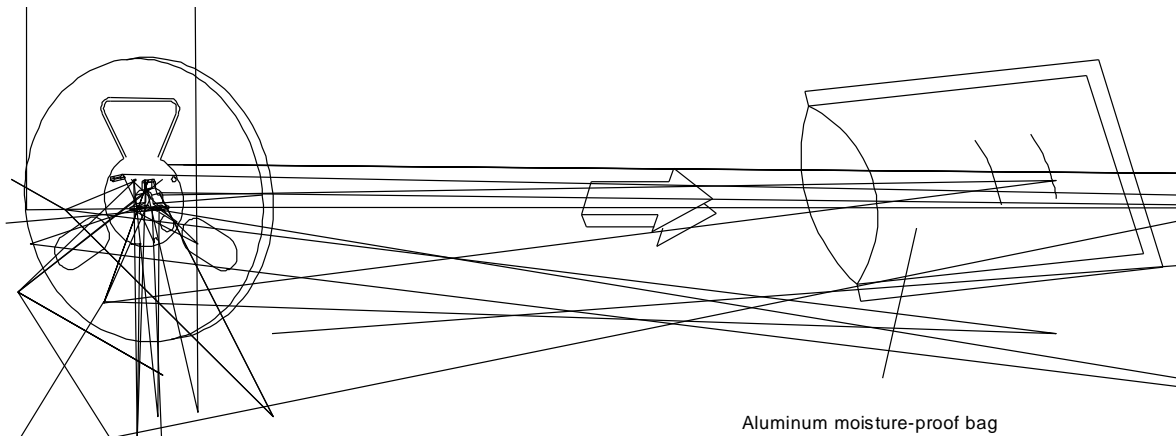
Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		min.	rec.	max.	
Ramp-up Rate to Preheat 25 -150	-	-	2	3	/s
Time $T_{smin}$ to $T_{smax}$	$T_s$	60	100	120	s
Ramp-up Rate to Peak $T_{smax}$ to $T_p$	-	-	2	3	s
Liquidus Temperature	$T_l$	-	217	-	-
Time above Liquidus Temperature	$t_l$	-	80	100	s
Peak Temperature	$T_p$	-	245	260	-
U5 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)



### 卡 Dry Packing Process and Materials

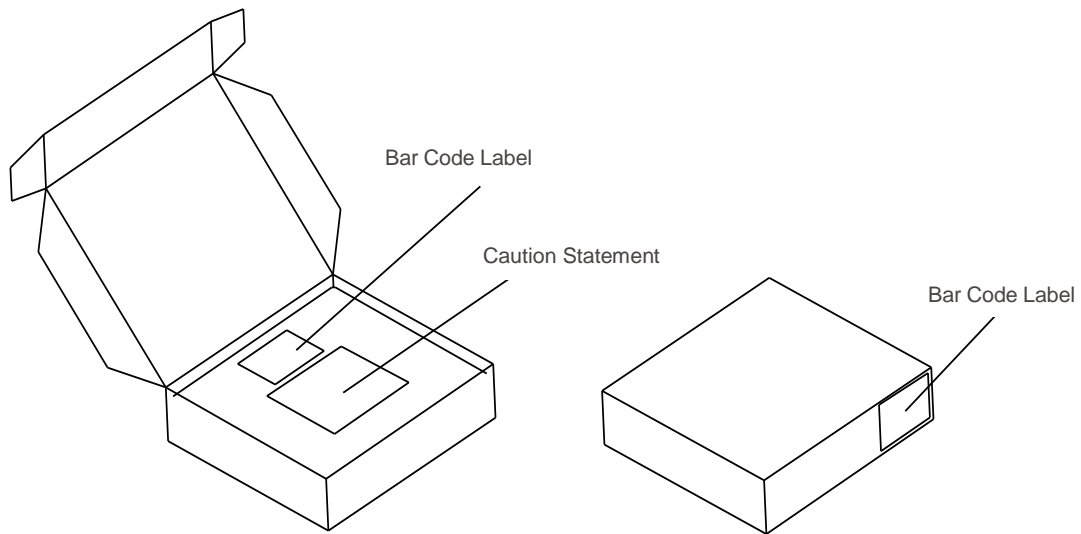


### NOTE

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.

压 JEDEC

## ✦ Transportation Packing and Materials



### Dimensions of Transportation Box (mm)

Width	Length	Height
256 U5	223 U5	62 U5
256 U5	223 U5	124 U5

: 压  
:  
8ms U U0.05V U0.1V  
GUM K=3  
25ms U0.5nm U1nm  
GUM K=3  
25ms U8% U11%  
GUM K=3

## Glossary

### Typical Values