



**BRIGHTTEK**  
**BRIGHTTEK (EUROPE) LIMITED**

*Brighten up The World With LED!*



ISO/TS 16949:2009

BS-EN ISO 14001:2004

QC 900000 IECQ HSP98

## PRODUCT DATASHEET



- ▶ DC-In Solid State Relay
- ▶ DIP7 Gullwing 400mil
- ▶ Zero-Cross TRIAC Output

Release Date: 20 July 2025 Version: A00

# TDRX213(M)-GV



## TDRX213(M) Series



### DESCRIPTION:

The TDRX213(M) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo TRIAC to drive a power TRIAC in a plastic DIP7 package with Gullwing lead forming option.

### FEATURES:

- High isolation 5000Vrms
- DC input with TRIAC output
- Operating temperature range -40°C to +85°C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals:
  - UL - UL1577
  - VDE - EN60747-5-5 (VDE0884-5)
  - CQC - GB4943.1, GB8898
  - cUL - CSA Component Acceptance Service Notice 5A
- Packing: 45pcs/tube

### APPLICATIONS:

- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals



Partner with: LIGHTNING

## NAMING & ORDERING INFORMATION:

Naming Information:

<b>TDR X 213 (M) - G V</b>	
<b>TDRX213</b>	Part Number
<b>X</b>	Selection: On-State RMS Current (X=0~3)
<b>M</b>	Lead Form Option: DIP7 Gullwing
<b>G</b>	Green Option
<b>V</b>	VDE Option

Ordering Information:

<b>TDRX213(M)-GV</b>						
$\underline{X}$ = Selection: On-State RMS Current (X=0~3)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TDR0213(M)-GV	$I_{T(RMS)}$ *	---	---	0.3	A	$I_{TSM}=3A$ ** Pw=100μs, 120pps
TDR1213(M)-GV		---	---	0.6		$I_{TSM}=6A$ Pw=100μs, 120pps
TDR2213(M)-GV		---	---	0.9		$I_{TSM}=9A$ Pw=100μs, 120pps
TDR3213(M)-GV		---	---	1.2		$I_{TSM}=12A$ Pw=100μs, 120pps

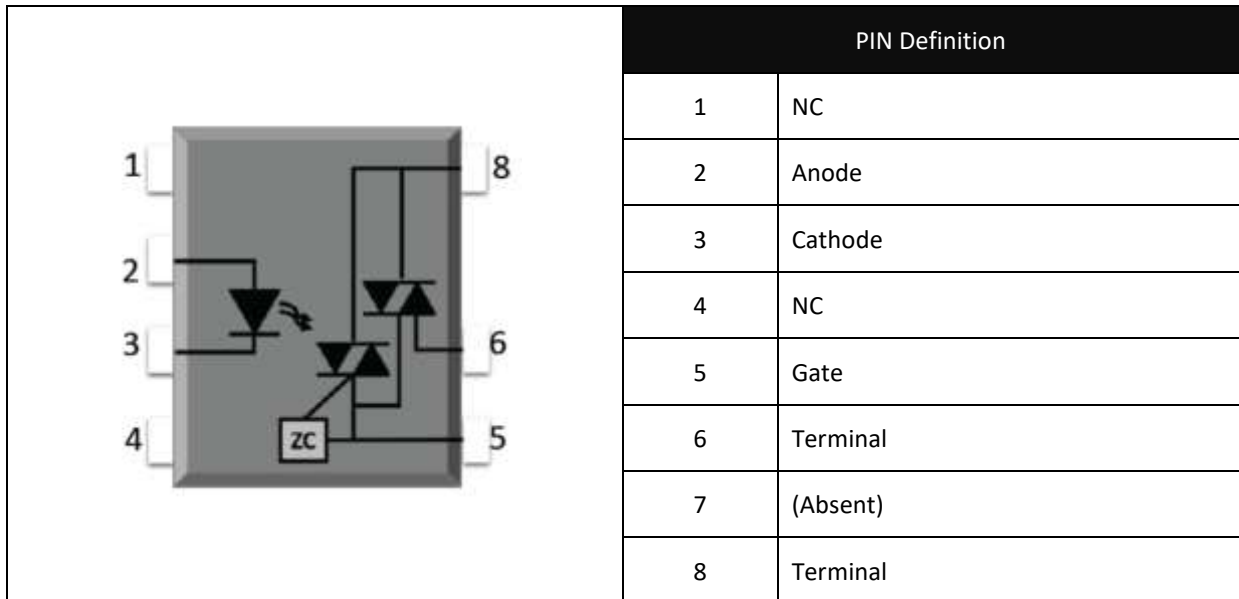
\*  $I_{T(RMS)}$  = On-State RMS Current

\*\*  $I_{TSM}$  = Non-repetitive Surge Current

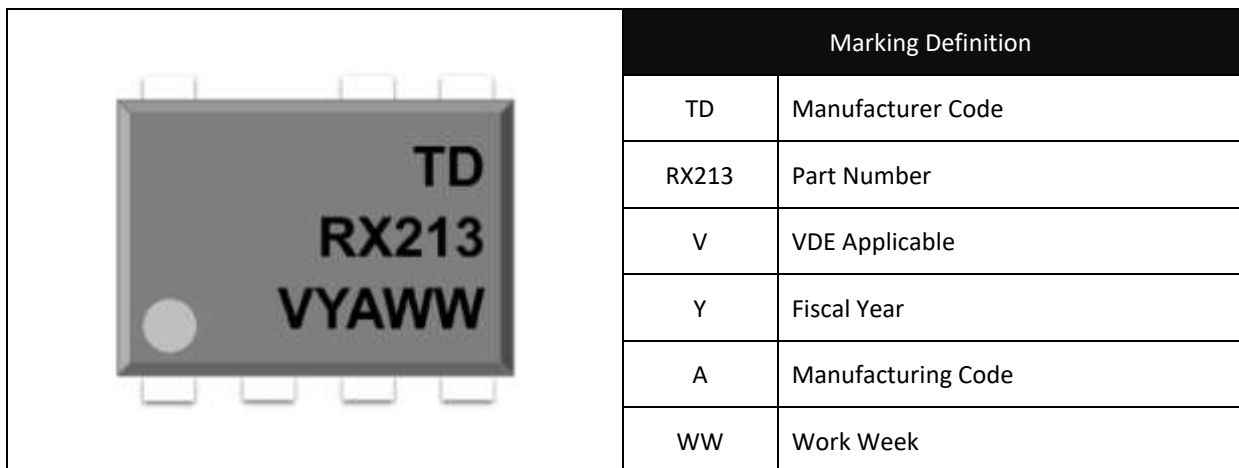
Version No.	Original Release Date
Rev: A00	29/08/2024

## SCHEMATIC DIAGRAM & MARKING:

### Schematic Diagram:



### Marking Information:



### Labelling Information:



Part No.: XXXXXXXXXXXX Bin Code: X  
 Lot No.: XXXXXXXX  
 Date Code: XXXX  
 QTY: XXX PCS  
 MSL: 1  
 Made in Quanzhou Fujian

This product is manufactured by



for Brighttek (Europe) Limited

## ABSOLUTE CHARACTERISTICS:

### Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	$I_F$	60	mA
Reverse Voltage	$V_R$	6	V
Junction Temperature	$T_j$	125	°C
Input Power Dissipation	$P_i$	100	mW
OUTPUT			
Off-State Output Terminal Voltage	$V_{DRM}$	600	V
On-State RMS Current	TDR0213	0.3	A
	TDR1213	0.6	
	TDR2213	0.9	
	TDR3213	1.2	
Non-repetitive Surge Current $P_w=100\mu s, 120pps$	TDR0213	3	A
	TDR1213	6	
	TDR2213	9	
	TDR3213	12	
Junction Temperature	$T_j$	125	°C
COMMON			
Total Power Dissipation	$P_{tot}$	400	mW
Isolation Voltage	$V_{iso}$	5000 *1	Vrms
Operating Temperature	$T_{opr}$	-40~+85	°C
Storage Temperature	$T_{stg}$	-40~+125	°C
Soldering Temperature	$T_{sol}$	260 *2	°C

\*1. AC for 1 minute, R.H.=40~60%.

\*2. For 10 seconds max.

## ELECTRICAL CHARACTERISTICS:

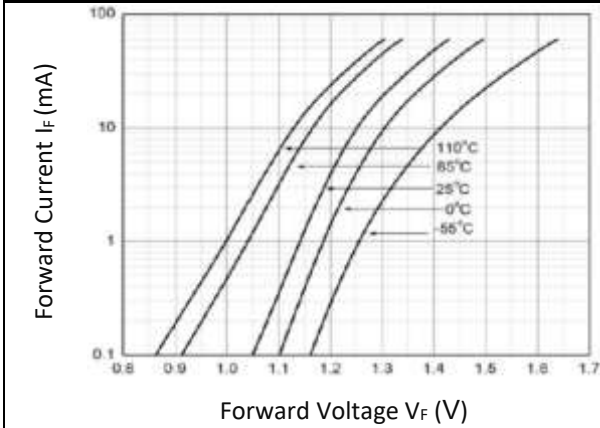
Electrical Optical Characteristics at  $T_a=25^{\circ}\text{C}$ :

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
<b>INPUT</b>						
Forward Voltage	$V_F$	---	1.24	1.4	V	$I_F=10\text{mA}$
Reverse Current	$I_R$	---	---	10	$\mu\text{A}$	$V_R=6\text{V}$
Input Capacitance	$C_{IN}$	---	30	---	pF	$V=0, f=1\text{kHz}$
<b>OUTPUT</b>						
Peak Off-State Current Either Direction	$I_{DRM}$	---	---	100	$\mu\text{A}$	$V_{DRM}=600\text{V}$ $I_F=0$
On-State Terminal Voltage	$V_{TM}$	---	1.7	2.5	V	$I_{TM}=\text{Rated } I_{TM}$
Critical Rate of Rise of Off-State Voltage - Breakdown Voltage	dV/dt	1000	---	---	V	$V_{PEAK}=600\text{V}^{*1}$
<b>TRANSFER CHARACTERISTICS</b>						
LED Trigger Current	$I_{FT}$	---	---	10	mA	$R_L=100\Omega$ Terminal Voltage=6V
Holding Current	$I_H$	---	---	25	mA	---
Isolation Resistance	$R_{ISO}$	$10^{12}$	$10^{14}$	---	$\Omega$	DC=500V, 40~60% R.H.
Floating Capacitance	$C_{IO}$	---	0.25	1	pF	$V=0, f=1\text{MHz}$
<b>ZERO-CROSSING CHARACTERISTICS</b>						
Inhibit Voltage	$V_{INH}$	---	---	20	V	$I_F=10\text{mA}$
Leakage in Inhibited State	$I_{DRM2}$	---	---	500	$\mu\text{A}$	$I_F=10\text{mA}$ $V_{DRM}=600\text{V}$
Response Time (Rise)	$T_{ON}$	---	30	---	$\mu\text{s}$	$V_D=6\text{V}, R_L=100\Omega$ $I_F=10\text{mA}$

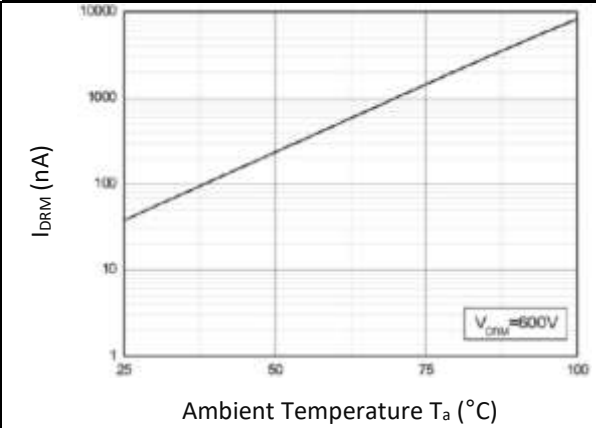
\*1. Test voltage must be applied within dV/dt rating.

## CHARACTERISTIC CURVES:

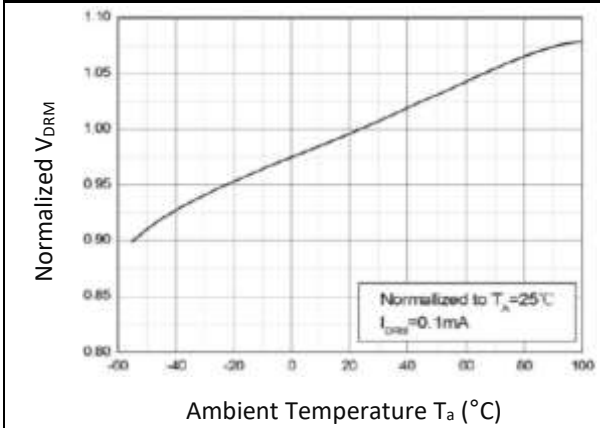
Forward Current v.s. Forward Voltage



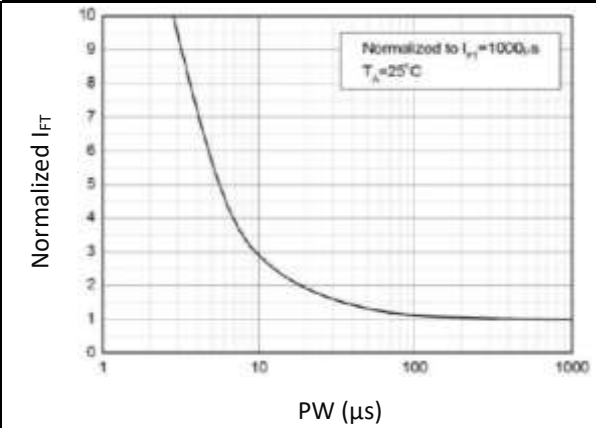
Off-State Terminal Current v.s. Ambient Temperature



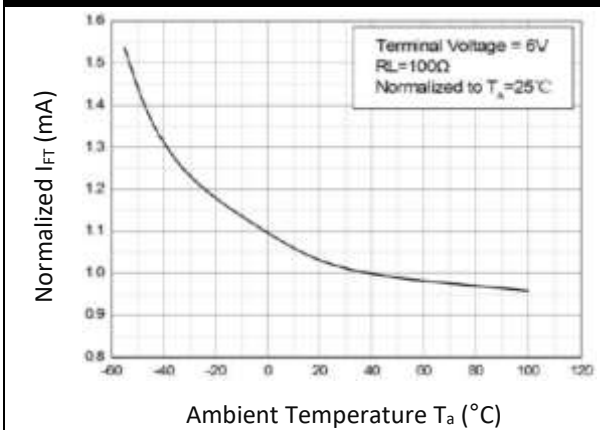
Normalized Off-State Terminal Voltage v.s. Ambient Temperature



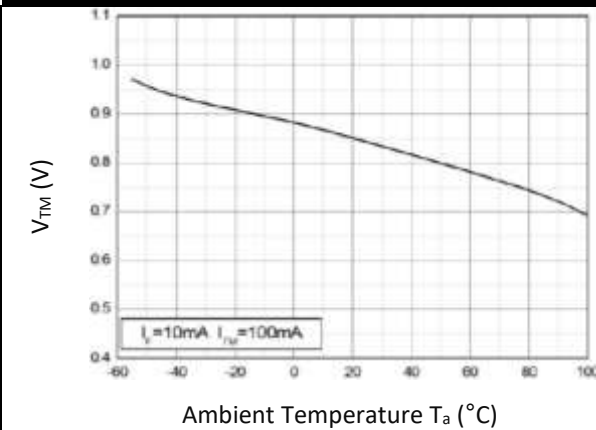
Normalized Trigger Current v.s. LED Trigger Pulse Width



Normalized Trigger Current v.s. Ambient Temperature

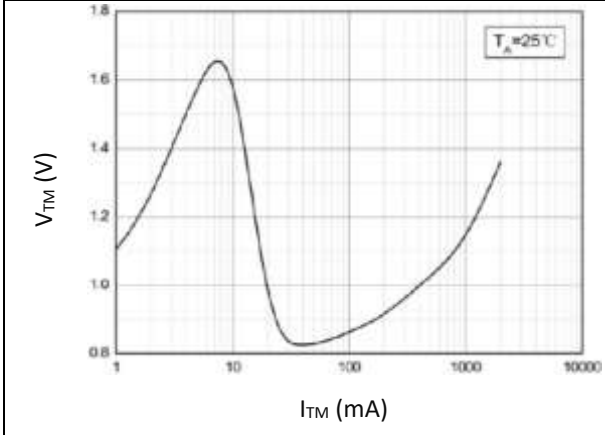


On-State Terminal Voltage v.s. Ambient Temperature

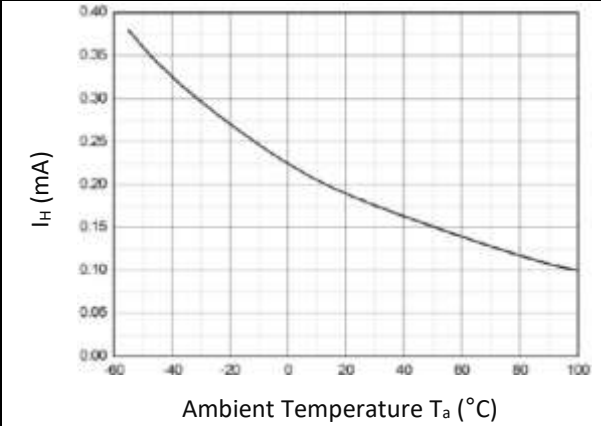


## CHARACTERISTIC CURVES:

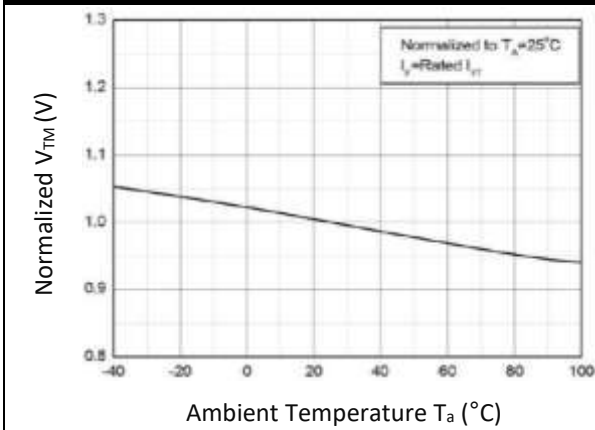
On-State Terminal Voltage v.s. On-State Terminal Current



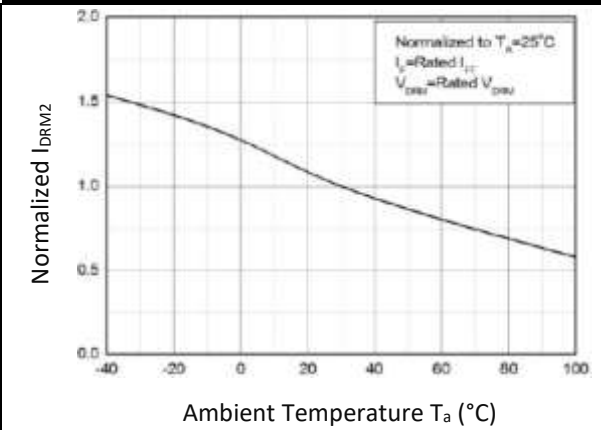
Holding Current v.s. Ambient Temperature



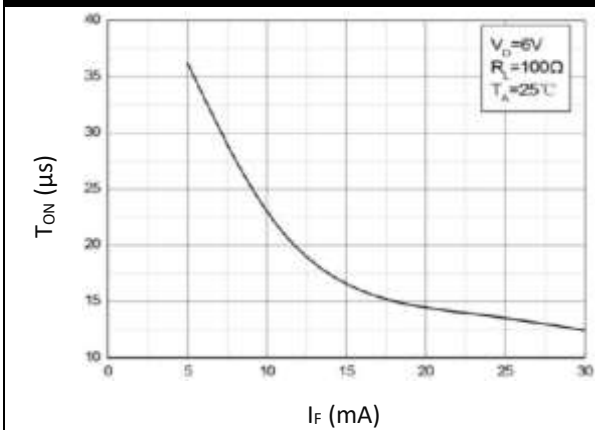
Normalized Inhibit Voltage v.s. Ambient Temperature



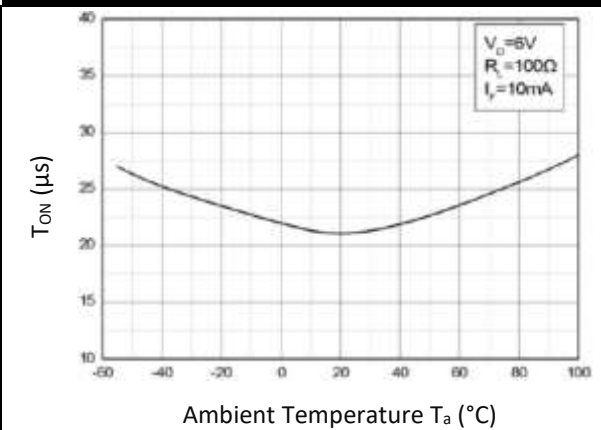
Normalized Leakage in Inhibit State v.s. Ambient Temperature



Turn On Time v.s. Forward Current

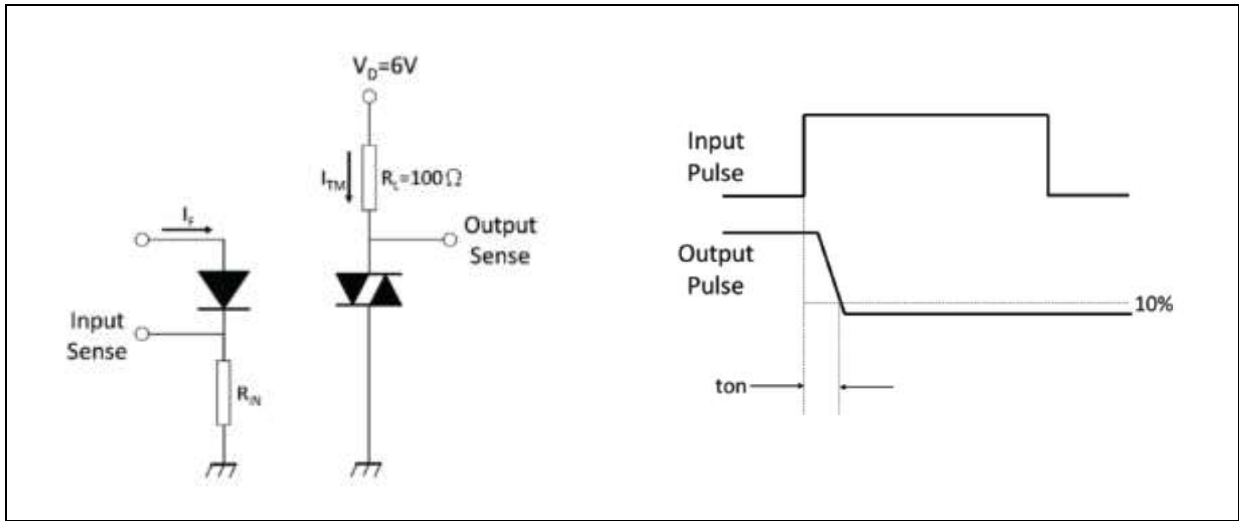


Turn On Time v.s. Ambient Temperature

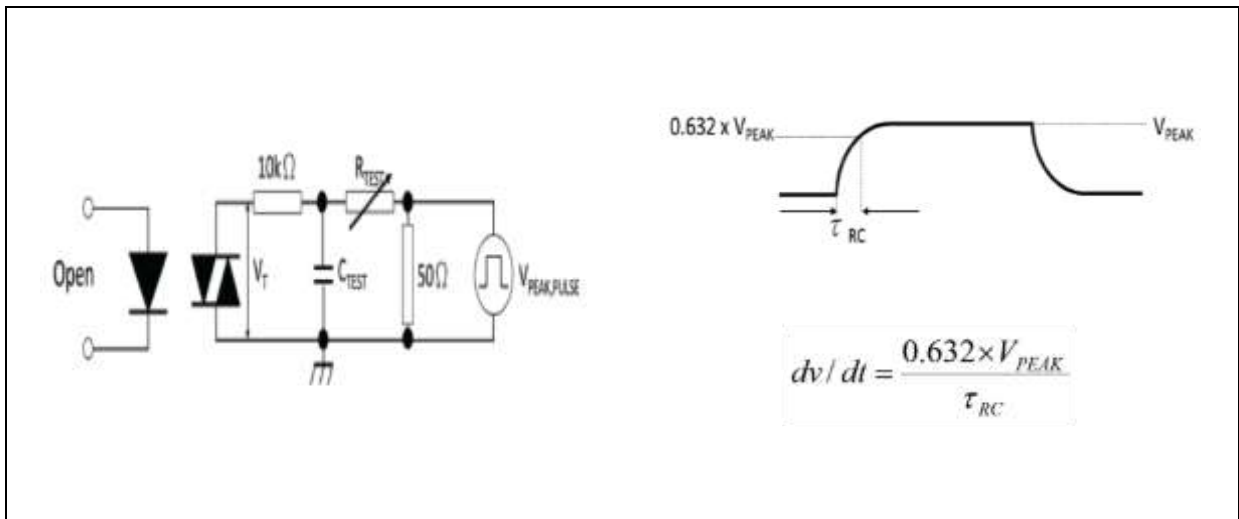


## TEST CIRCUIT:

Test Circuit and Waveforms of Turn On Time:

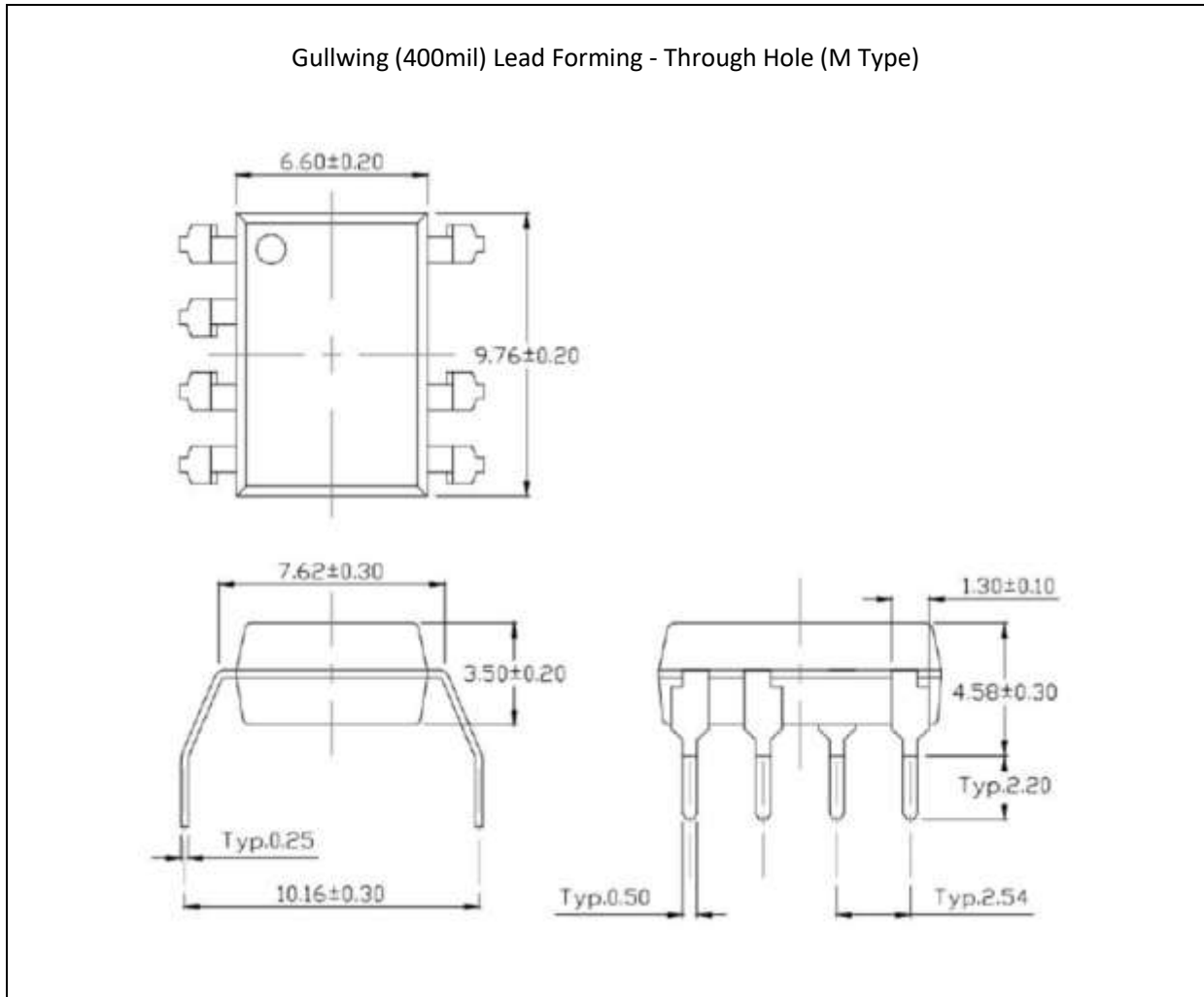


Test Circuit and Waveforms of  $dv/dt$ :



## OUTLINE DIMENSION:

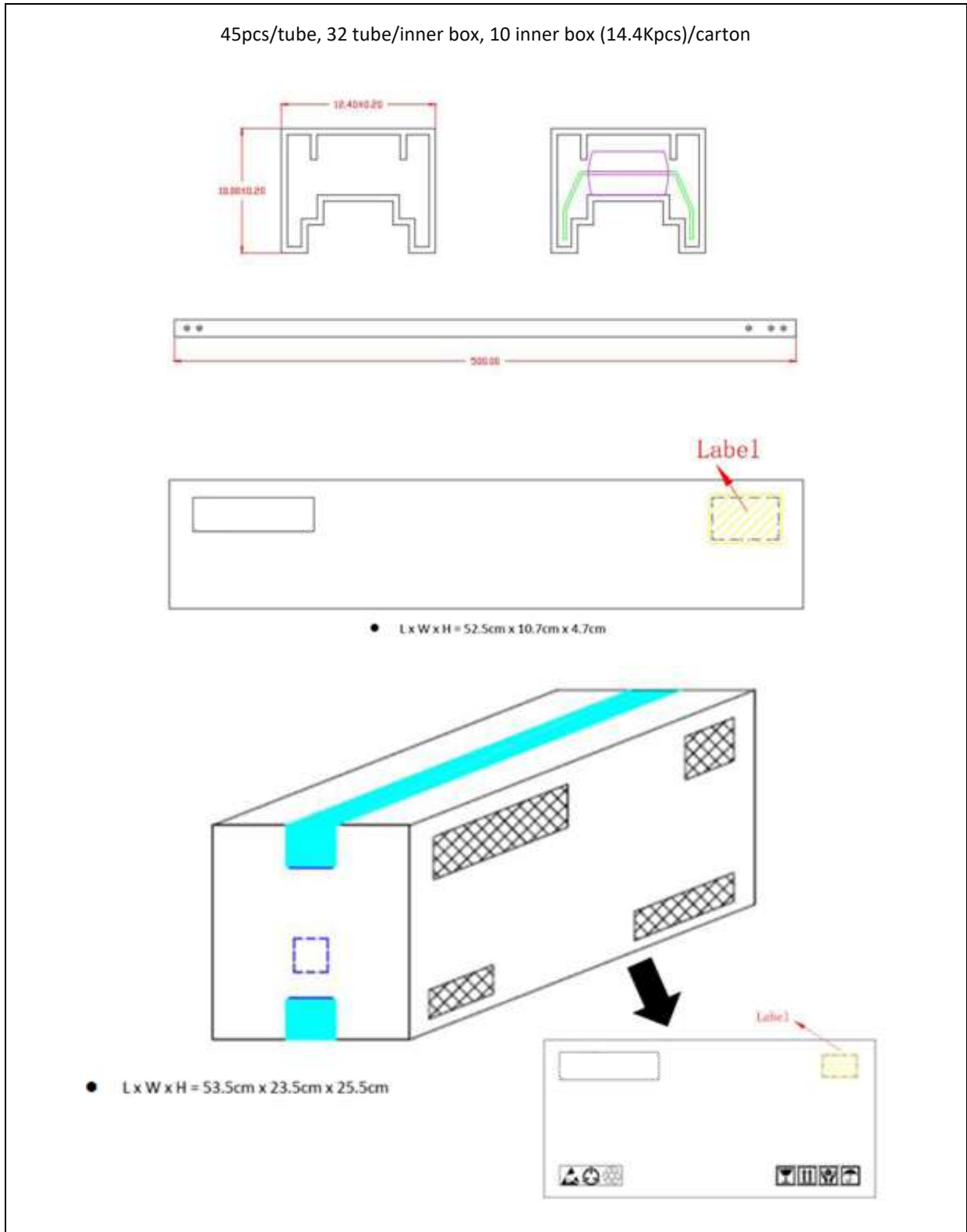
Package Dimension:



1. All dimensions are in millimetre (mm).

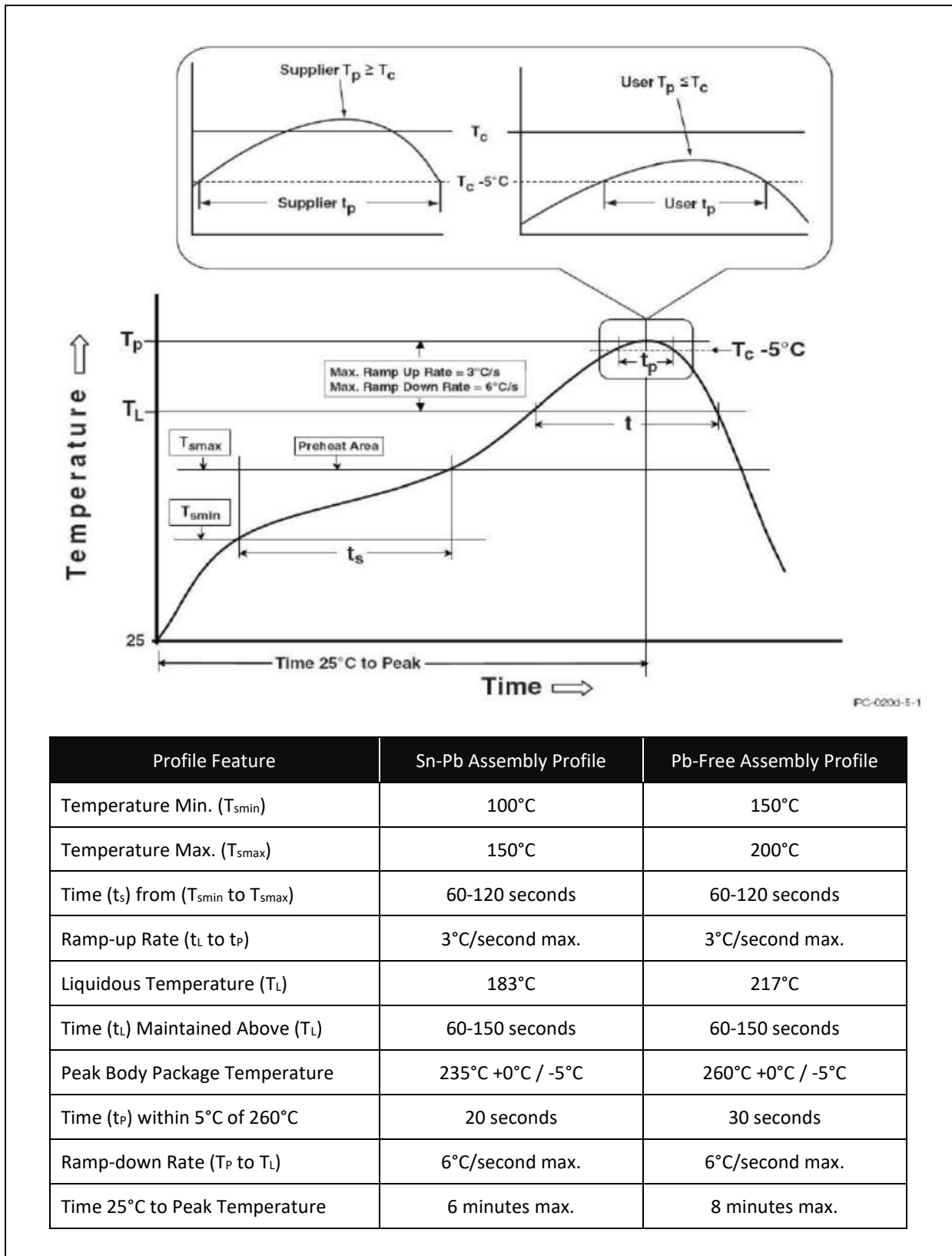
**PACKING SPECIFICATION:**

Tube Dimension:



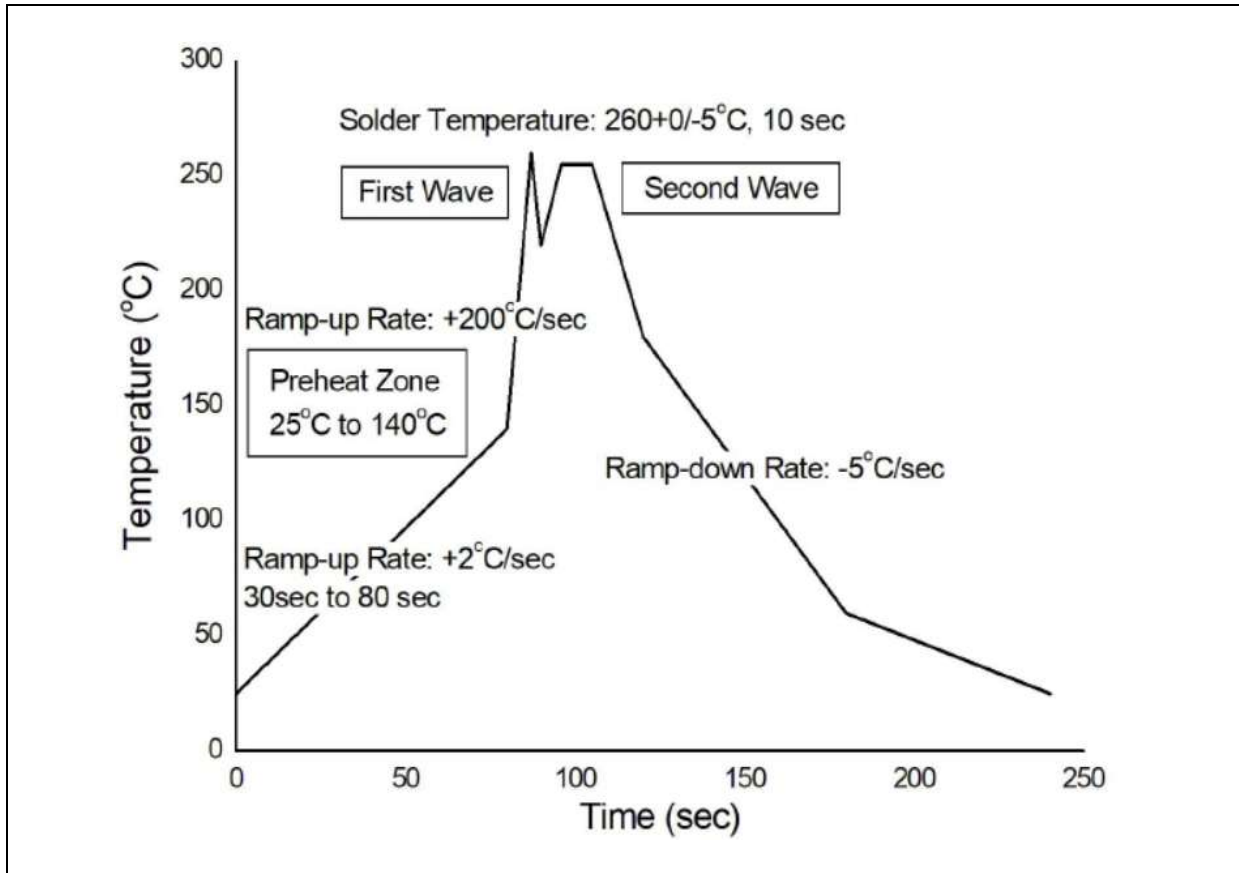
## RECOMMENDED SOLDERING PROFILE:

Reflow Information:



## RECOMMENDED SOLDERING PROFILE:

Wave Soldering (JESD22-A111 Compliant):



Hand Soldering:

Soldering Temperature	380±5°C
Soldering Time	3 sec max.

Note:

- One time soldering is recommended for all soldering methods.
- Do not solder more than three times for IR reflow soldering.