



BRIGHTTEK
BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 080000 IECQ HSPM

PRODUCT DATASHEET



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

TDRX213-GV

Release Date: 24 June 2025 Version: A00



APPLICATIONS:

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

TDRX213 Series

DESCRIPTION:

The TDRX213 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 different lead forming options.



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



Partner with:  LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TDR X 213 - G V	
TDRX213	Part Number
X	Selection: On-State RMS Current (X=0~3)
G	Green Option
V	VDE Option

Ordering Information:

TDRX213-GV						
<u>X</u> = Selection: On-State RMS Current (X=0~3)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TDR0213-GV	IT _(RMS) *	---	---	0.3	A	ITSM=3A ** PW=100μs, 120pps
TDR1213-GV		---	---	0.6		ITSM=6A PW=100μs, 120pps
TDR2213-GV		---	---	0.9		ITSM=9A PW=100μs, 120pps
TDR3213-GV		---	---	1.2		ITSM=12A PW=100μs, 120pps

* IT_(RMS) = On-State RMS Current

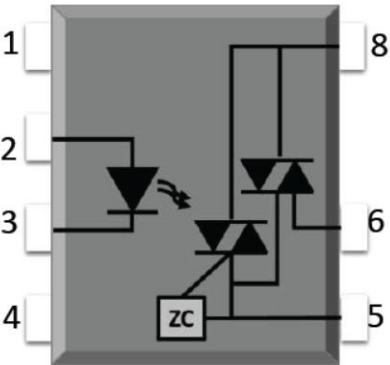
** ITSM = Non-repetitive Surge Current

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

SCHEMATIC DIAGRAM & MARKING:

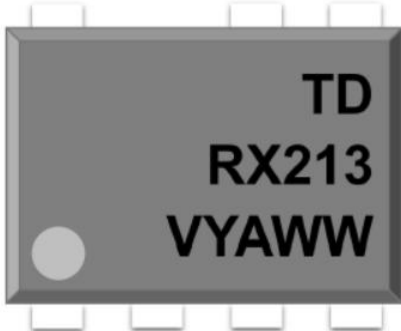
Schematic Diagram:

PIN Definition	
1	NC
2	Anode
3	Cathode
4	NC
5	Gate
6	Terminal
7	(Absent)
8	Terminal

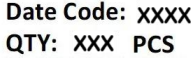


Marking Information:

Marking Definition	
TD	Manufacturer Code
RX213	Part Number
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week



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, tested, and packed by  for more details, please visit www.tdled.com
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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	$I_{T(RMS)}$	0.3	A
	TDR1213		0.6	
	TDR2213		0.9	
	TDR3213		1.2	
Non-repetitive Surge Current $P_w=100\mu s, 120pps$	TDR0213	I_{TSM}	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:

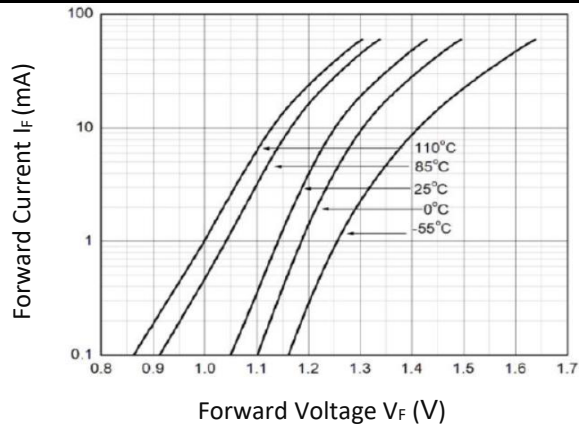
Electrical Optical Characteristics at $T_a=25^{\circ}\text{C}$:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT						
Forward Voltage	V _F	---	1.24	1.4	V	I _F =10mA
Reverse Current	I _R	---	---	10	μA	V _R =6V
Input Capacitance	C _{IN}	---	30	---	pF	V=0, f=1kHz
OUTPUT						
Peak Off-State Current Either Direction	I _{DRM}	---	---	100	μA	V _{DRM} =600V I _F =0
On-State Terminal Voltage	V _{TM}	---	1.7	2.5	V	I _{TM} =Rated I _{TM}
Critical Rate of Rise of Off-State Voltage - Breakdown Voltage	dV/dt	1000	---	---	V	V _{PEAK} =600V *1
TRANSFER CHARACTERISTICS						
LED Trigger Current	I _{FT}	---	---	10	mA	R _L =100Ω Terminal Voltage=6V
Holding Current	I _H	---	---	25	mA	---
Isolation Resistance	R _{ISO}	10^12	10^14	---	Ω	DC=500V, 40~60% R.H.
Floating Capacitance	C _{IO}	---	0.25	1	pF	V=0, f=1MHz
ZERO-CROSSING CHARACTERISTICS						
Inhibit Voltage	V _{INH}	---	---	20	V	I _F =10mA
Leakage in Inhibited State	I _{DRM2}	---	---	500	μA	I _F =10mA V _{DRM} =600V
Response Time (Rise)	T _{ON}	---	30	---	μs	V _D =6V, R _L =100Ω I _F =10mA

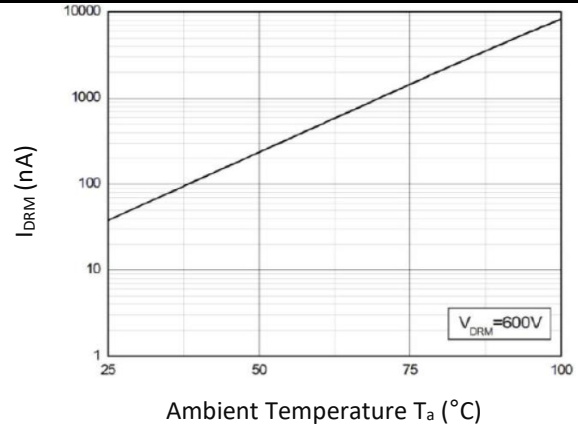
*1. Test voltage must be applied within dV/dt rating.

CHARACTERISTIC CURVES:

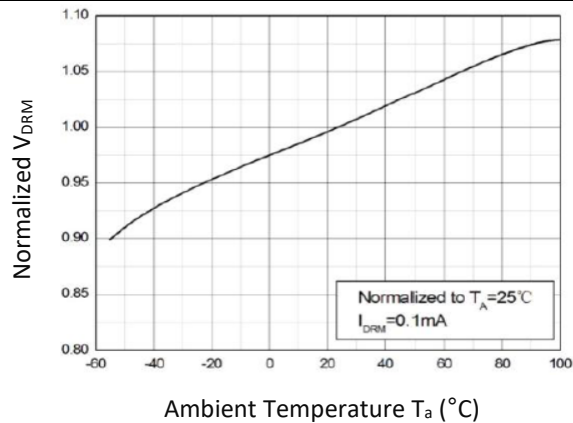
Forward Current v.s. Forward Voltage



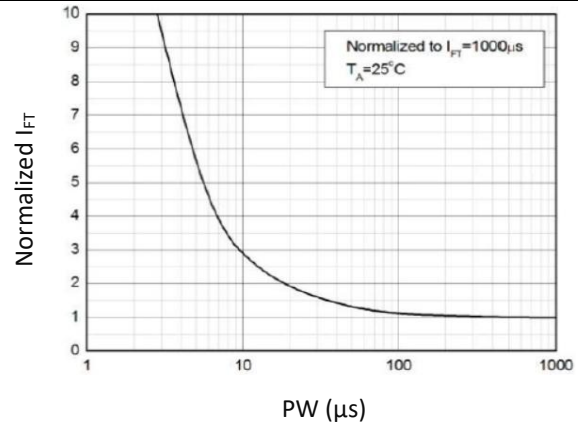
Off-State Terminal Current v.s. Ambient Temperature



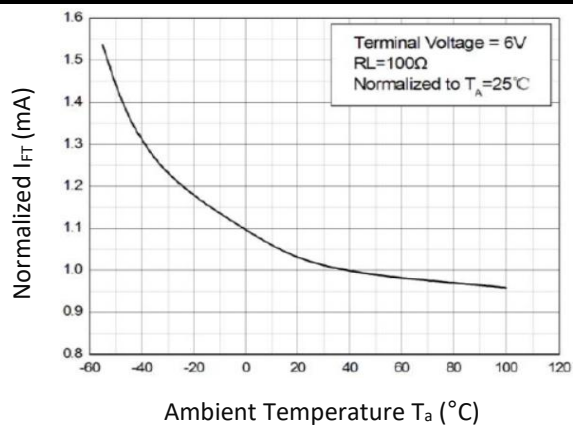
Normalized Off-State Terminal Voltage v.s. Ambient Temperature



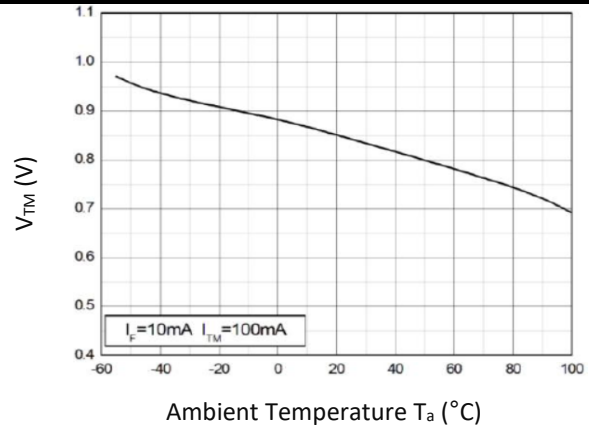
Normalized Trigger Current v.s. LED Trigger Pulse Width



Normalized Trigger Current v.s. Ambient Temperature

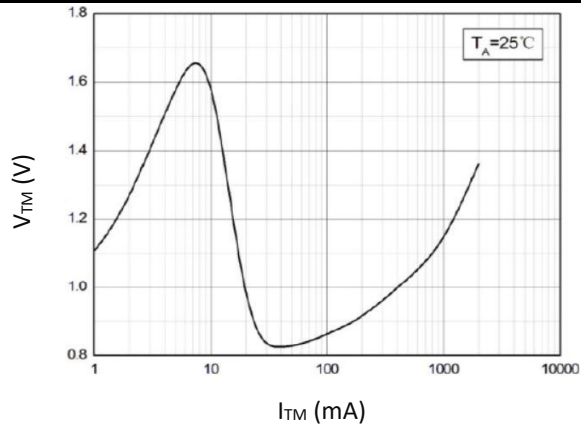


On-State Terminal Voltage v.s. Ambient Temperature

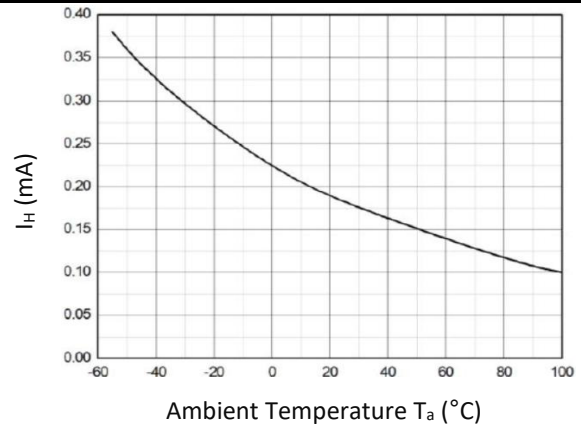


CHARACTERISTIC CURVES:

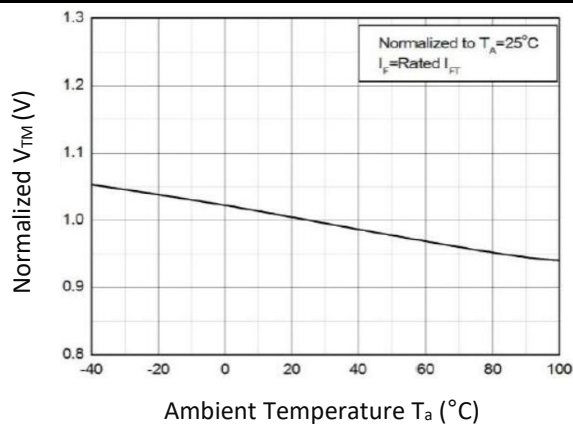
On-State Terminal Voltage v.s. On-State Terminal Current



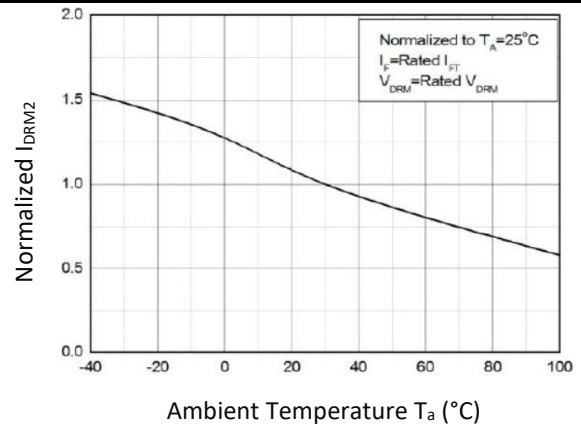
Holding Current v.s. Ambient Temperature



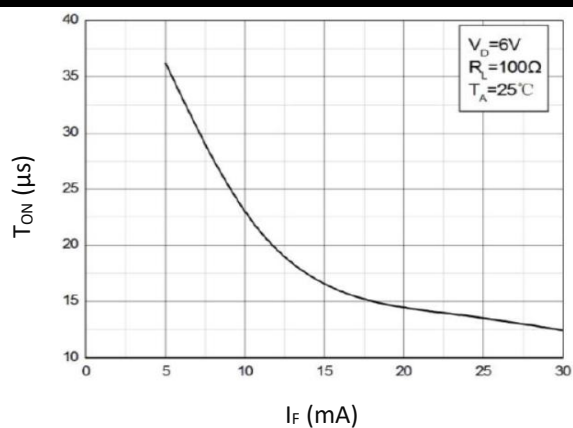
Normalized Inhibit Voltage v.s. Ambient Temperature



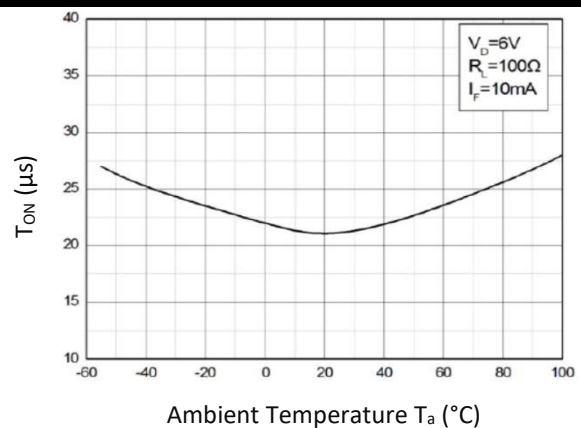
Normalized Leakage in Inhibit State v.s. Ambient Temperature



Turn On Time v.s. Forward Current

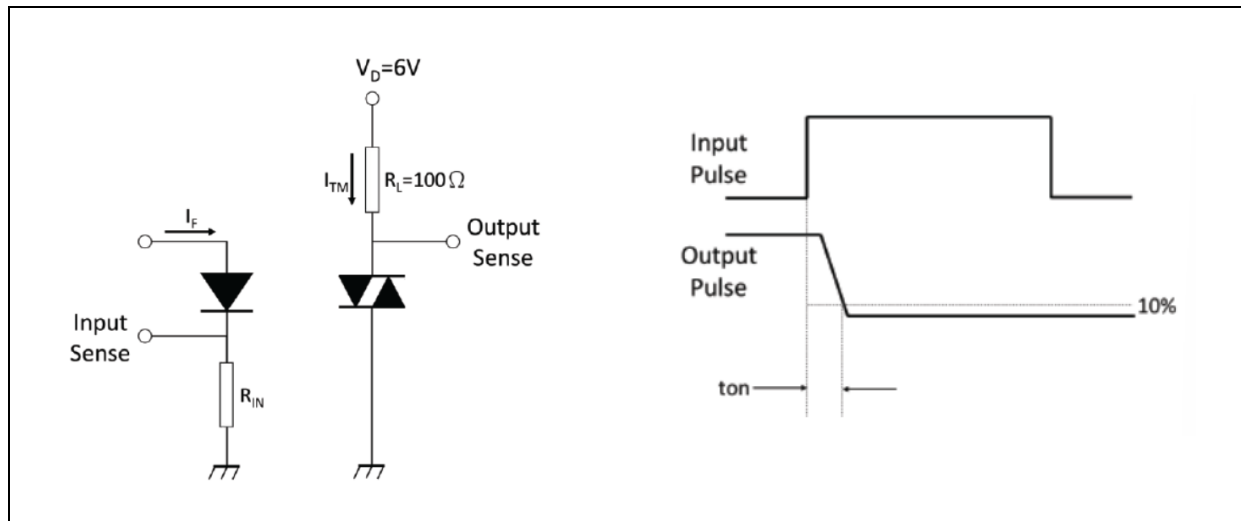


Turn On Time v.s. Ambient Temperature

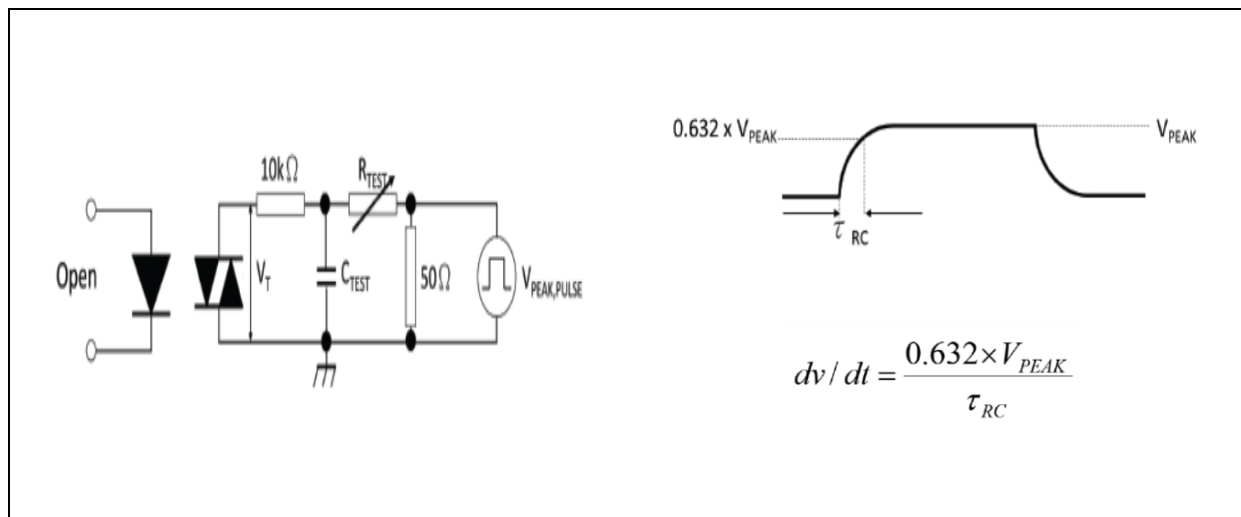


TEST CIRCUIT:

Test Circuit and Waveforms of Turn On Time:

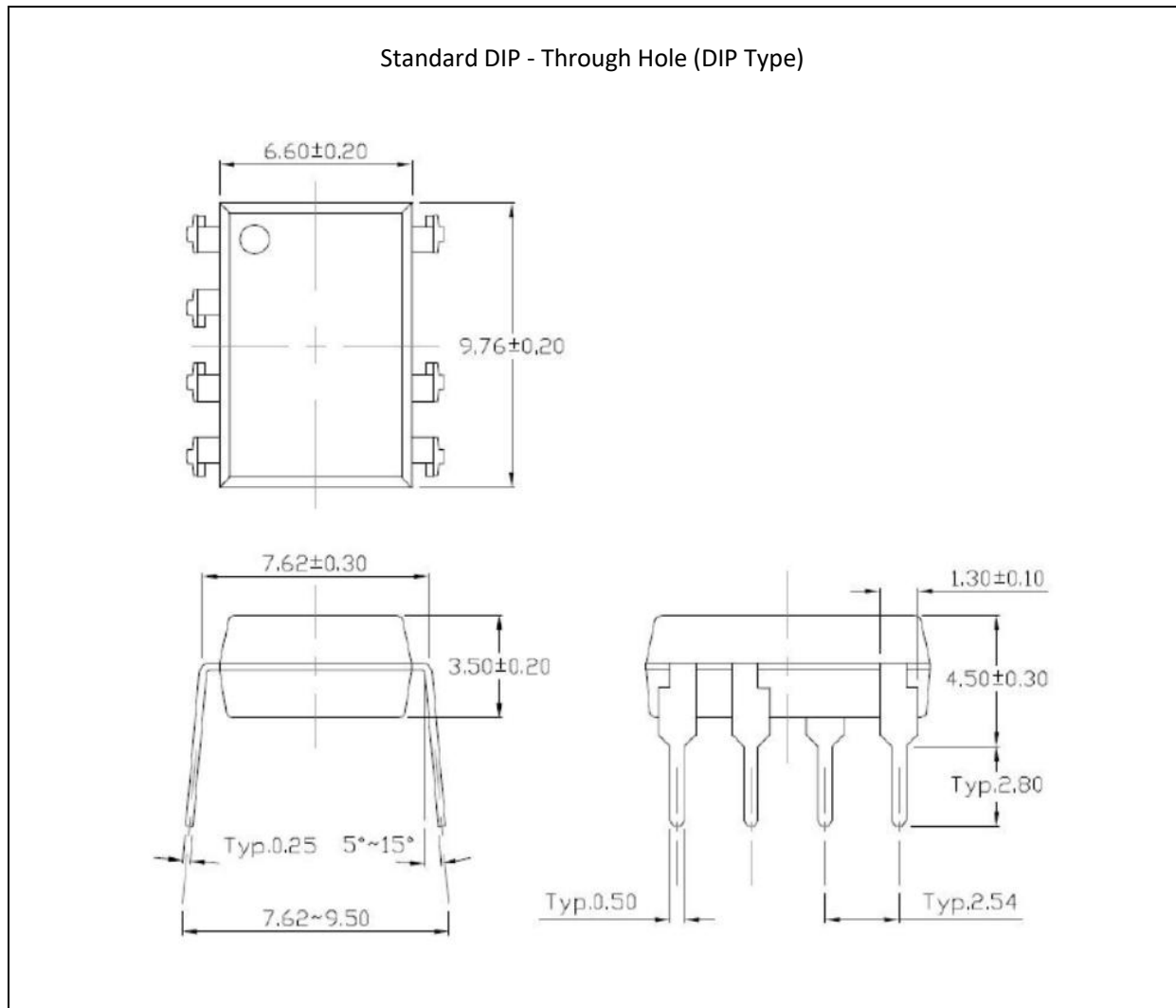


Test Circuit and Waveforms of dV/dt :



OUTLINE DIMENSION:

Package Dimension:

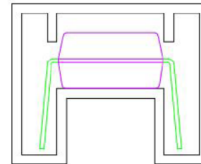
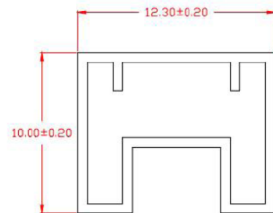


1. All dimensions are in millimetre (mm).

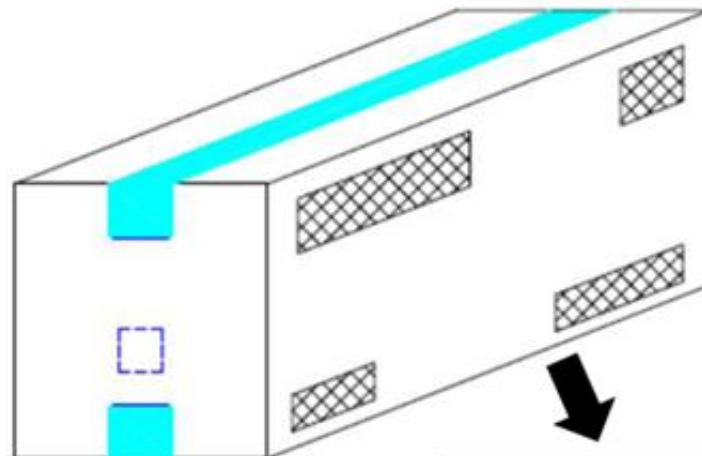
PACKING SPECIFICATION:

Tube Dimension:

45pcs/tube, 32 tube/inner box, 10 inner box (14.4Kpcs)/carton



● L x W x H = 52.5cm x 10.7cm x 4.7cm



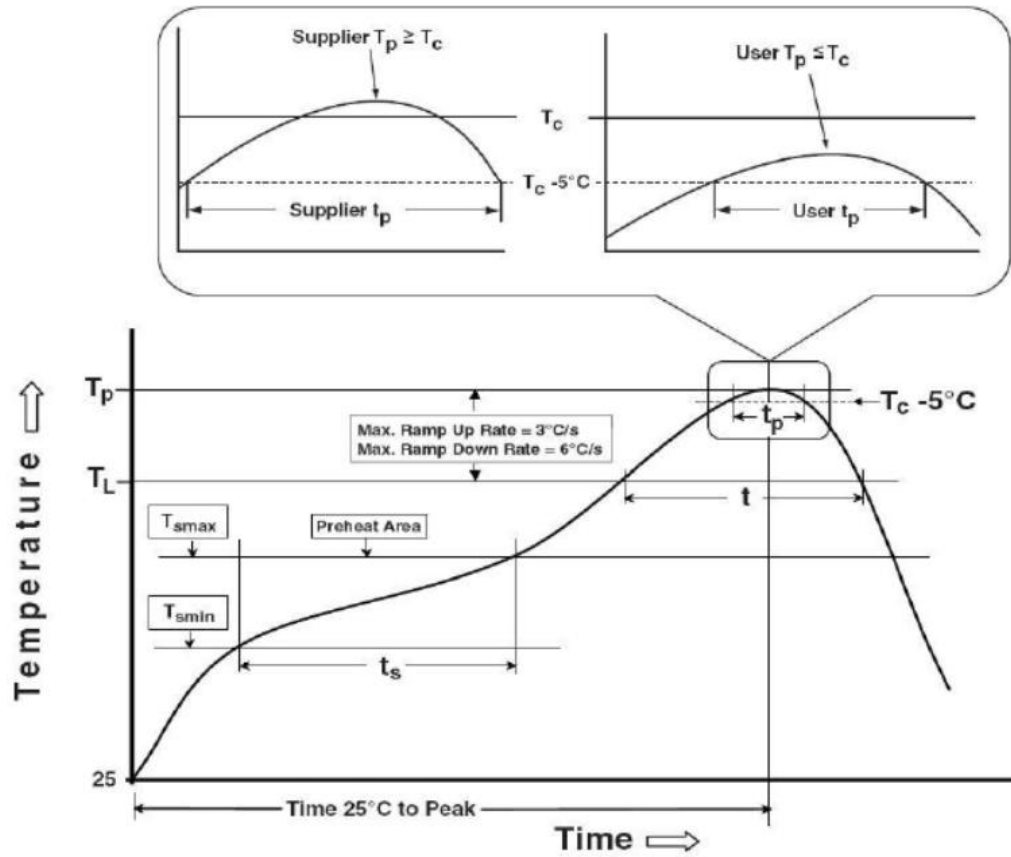
● L x W x H = 53.5cm x 23.5cm x 25.5cm





RECOMMENDED SOLDERING PROFILE:

Reflow Information:

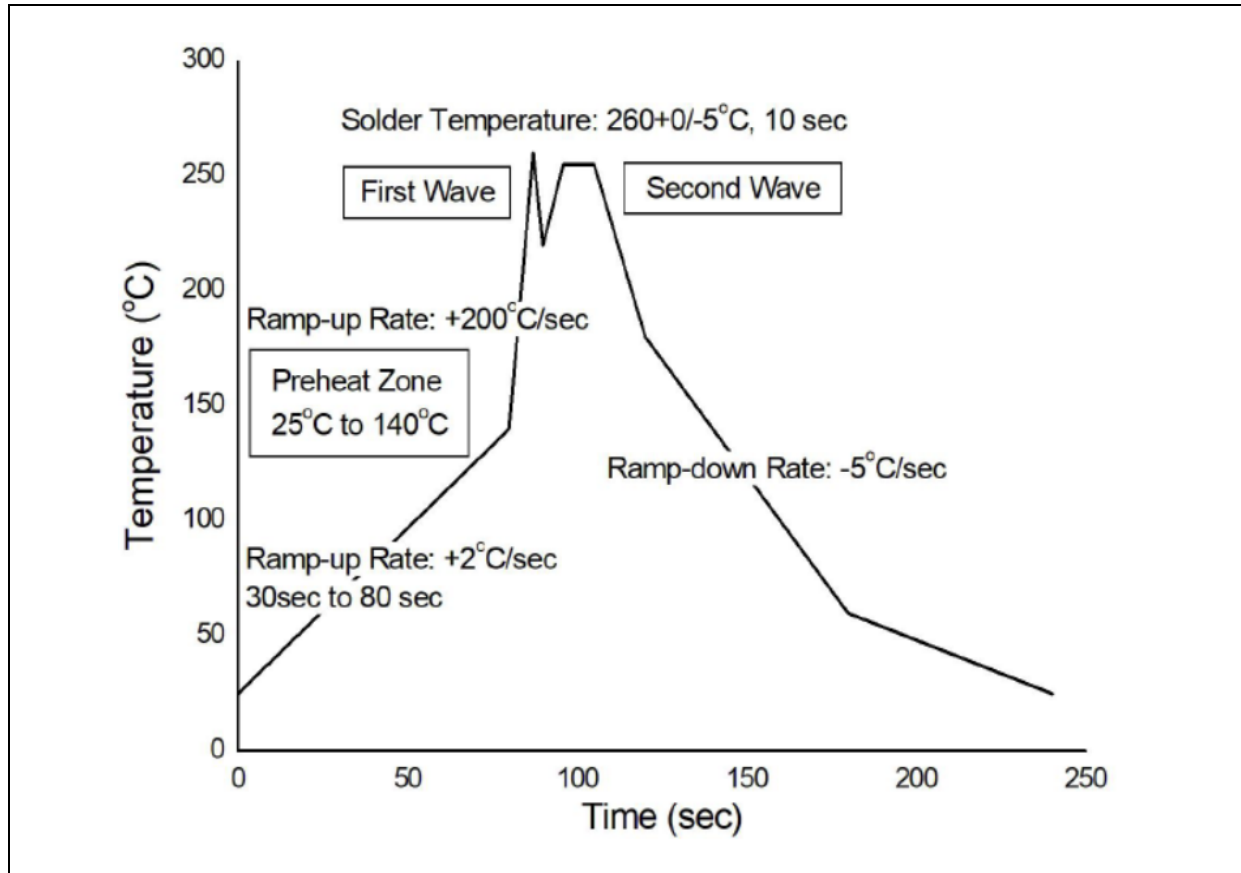


IPC-620D-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	100°C	150°C
Temperature Max. (T_{smax})	150°C	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) Maintained Above (T_L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

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.