



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 Input Photo Coupler
- ▶ Standard DIP8
- ▶ High Speed Transistor
1Mbit/s

TD4502-GV

TD4503-GV



Release Date: 07 June 2025 Version: A01



TD450X Series

DESCRIPTION:

The TD450X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon high speed photo transistor in a plastic DIP8 package with different lead forming options. A separate design between photodiode and transistor reduces the base-collector capacitance of the input transistor which improves the speed by several orders of magnitude over conventional phototransistor optocouplers.



FEATURES:

- High isolation 5000Vrms
- DC input with transistor output
- Operating temperature range -55°C to +100°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

APPLICATIONS:

- Line receivers
- Telecommunication equipment
- Out interface to CMOS-LSTTL-TTL
- Wide bandwidth analog coupling
- Pulse transformer replacement
- Computer-peripheral interface



Partner with: 



NAMING & ORDERING INFORMATION:

Naming Information:

TD4502 - G V TD4503 - G V	
TD4502 TD4503	Part Number
G	Green Option
V	VDE Option

Ordering Information:

TD4502-GV TD4503-GV

Version No.	Original Release Date
Rev: A01	09/09/2022

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:

PIN Definition	
1	NC
2	Anode
3	Cathode
4	NC
5	VCC
6	NC
7	VO
8	GND

Marking Information:

Marking Definition	
TD	Manufacturer Code
450X	Part Number & Option X=2 or 3
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

 BRIGHTTEK BRIGHTTEK (EUROPE) LIMITED  LIGHTNING 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

ABSOLUTE CHARACTERISTICS:

Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	I_F	25	mA
Peak Forward Current	I_{FP}	50 * ¹	mA
Peak Transient Current	$I_{F(trans)}$	1 * ²	A
Reverse Voltage	V_R	5	V
Input Power Dissipation	P_I	100	mW
OUTPUT			
Supply Voltage	V_{CC}	-0.5~30	V
Output Voltage	V_O	-0.5~20	V
Output Current	I_O	50	mA
Emitter-Base Reverse Voltage	V_{EBR}	5	V
Base Current	I_B	5	mA
Output Power Dissipation	P_O	100	mW
COMMON			
Total Power Dissipation	P_{tot}	200	mW
Isolation Voltage	V_{iso}	5000 * ³	Vrms
Operating Temperature	T_{opr}	-55~+100	°C
Storage Temperature	T_{stg}	-55~+150	°C
Soldering Temperature	T_{sol}	260 * ⁴	°C

*1. 50% duty, 1ms P.W

*2. $\leq 1\mu s$ P.W, 300pps

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

*4. for 10 seconds

ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

Parameter	Symbol	Values			Unit	Test Condition	
		Min.	Typ.	Max.			
INPUT (at T _a =0 to 70°C, unless specified otherwise)							
Forward Voltage	V _F	---	1.45	1.8	V	I _F =16mA	
Reverse Current	I _R	---	---	10	μA	V _R =5V	
Input Capacitance	C _{IN}	---	60	---	pF	V=0, f=1MHz	
OUTPUT (at T _a =0 to 70°C, unless specified otherwise)							
High Level Supply Current	I _{CCH}	---	0.01	1	μA	I _F =0mA, V _O =OPEN V _{CC} =15V, T _a =25°C	
		---	---	2	μA	I _F =0mA, V _O =OPEN V _{CC} =15V	
Low Level Supply Current	I _{CCL}	---	200	---	μA	I _F =16mA V _O =OPEN V _{CC} =15V	
Logic High Output Current	I _{OH}	---	0.001	0.5	μA	I _F =0mA, T _a =25°C V _O =V _{CC} =5.5V	
		---	0.01	1	μA	I _F =0mA, T _a =25°C V _O =V _{CC} =15V	
		---	---	50	μA	I _F =0mA V _O =V _{CC} =15V	
TRANSFER CHARACTERISTICS (at T _a =0 to 70°C, unless specified otherwise)							
Current Transfer Ratio	TD4502	CTR	19	---	50	μA	I _F =16mA, V _O =0.4V V _{CC} =4.5V, T _a =25°C
			15	---	---		I _F =16mA, V _O =0.5V V _{CC} =4.5V
	TD4503		19	---	50		I _F =16mA, V _O =0.4V V _{CC} =4.5V, T _a =25°C
			15	---	---		I _F =16mA, V _O =0.5V V _{CC} =4.5V
Logic Output Voltage	TD4502	V _{OL}	---	0.25	0.4	μA	I _F =16mA V _{CC} =4.5V I _O =3mA T _a =25°C
			---	---	0.5		I _F =16mA V _{CC} =4.5V I _O =2.4mA
	TD4503		---	0.25	0.4		I _F =16mA V _{CC} =4.5V I _O =3mA T _a =25°C
			---	---	0.5		I _F =16mA V _{CC} =4.5V I _O =2.4mA
Isolation Resistance	R _{iso}		10^12	10^14	---	Ω	DC=500V, 40 ~ 60% R.H.
Floating Capacitance	C _{IO}		---	0.3	1	pF	V=0, f=1MHz

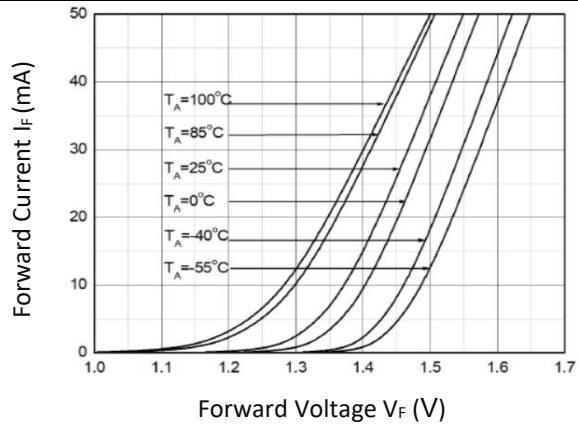
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

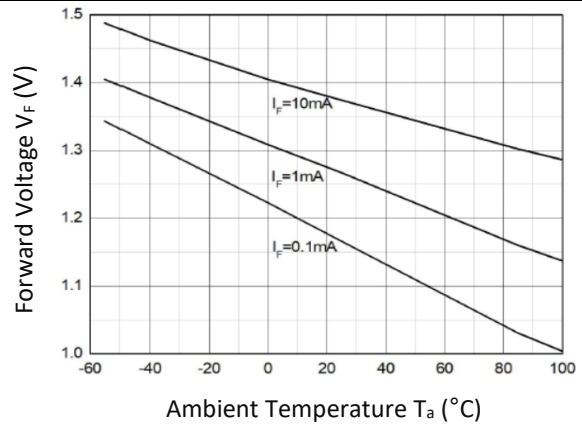
Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
SWITCHING CHARACTERISTICS (at T _a =0 to 70°C, I _F =16mA, V _{CC} =5V, unless specified otherwise)							
Propagation Delay Time to Logic Low	TD4502	TPHL	---	0.35	0.8	μs	R _L =1.9kΩ T _a =25°C
			---	---	1.0		R _L =1.9kΩ
	TD4503		---	0.35	0.8		R _L =1.9kΩ T _a =25°C
			---	---	1.0		R _L =1.9kΩ
Propagation Delay Time to Logic High	TD4502	TPLH	---	0.3	0.8	μs	R _L =1.9kΩ T _a =25°C
			---	---	1.0		R _L =1.9kΩ
	TD4503		---	0.3	0.8		R _L =1.9kΩ T _a =25°C
			---	---	1.0		R _L =1.9kΩ
Common Mode Transient Immunity at Logic High	TD4502	CM _H	1000	---	---	V/μs	I _F =0mA V _{CM} =10V _{pp} R _L =1.9kΩ T _a =25°C
	TD4503		15000	20000	---		I _F =0mA R _L =1.9kΩ V _{CM} =1500V _{pp} T _a =25°C
Common Mode Transient Immunity at Logic Low	TD4502	CM _L	1000	---	---	V/μs	I _F =16mA R _L =1.9kΩ V _{CM} =10V _{pp} T=25°C
	TD4503		15000	20000	---		I _F =16mA R _L =1.9kΩ V _{CM} =1500V _{pp} T _a =25°C

CHARACTERISTIC CURVES:

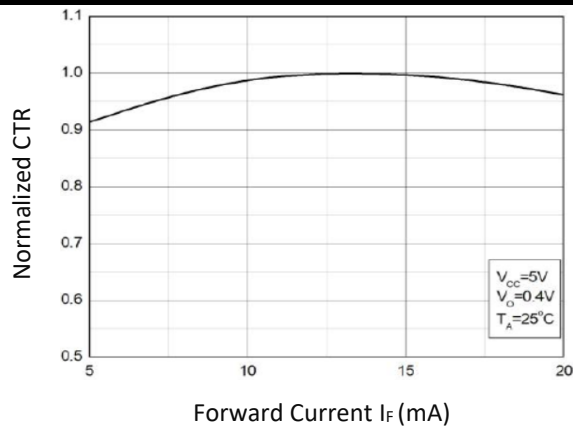
Forward Current v.s. Forward Voltage



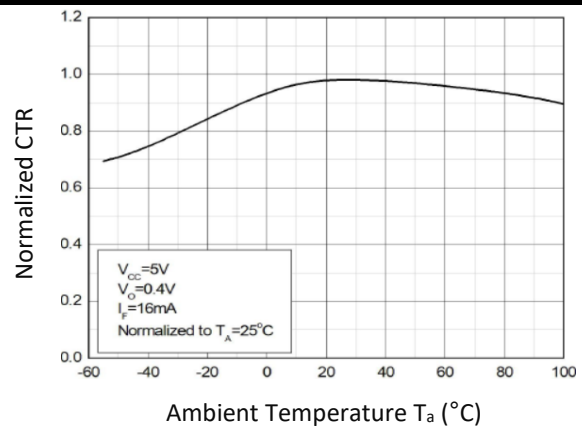
Forward Voltage v.s. Ambient Temp.



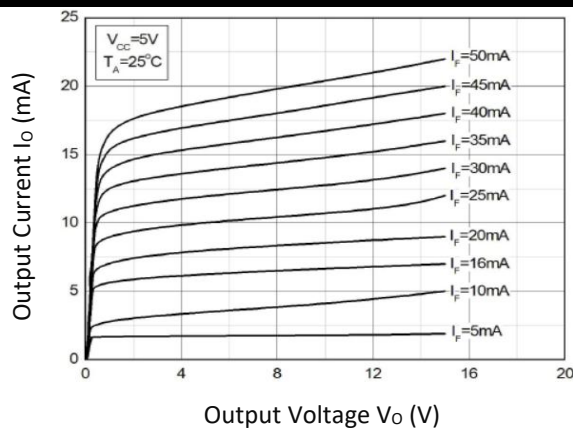
Normalized Current Transfer Ratio v.s. Forward Current



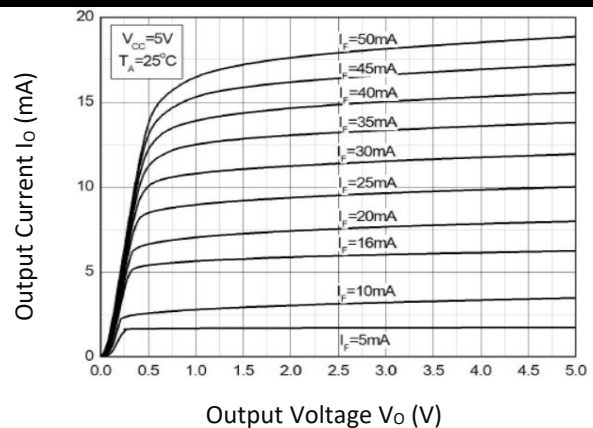
Normalized Current Transfer Ratio v.s. Ambient Temperature



Output Current v.s. Output Voltage

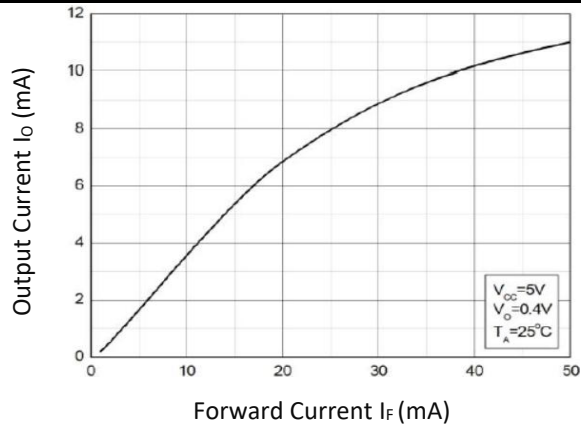


Output Current v.s. Output Voltage

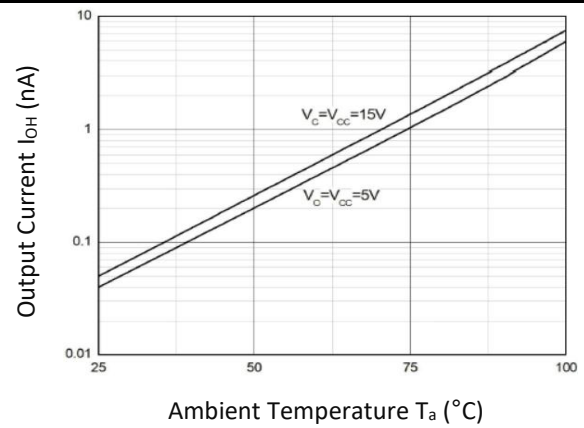


CHARACTERISTIC CURVES:

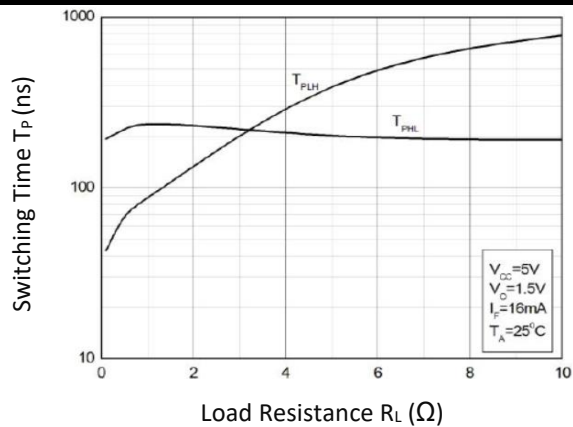
Output Current v.s. Forward Current



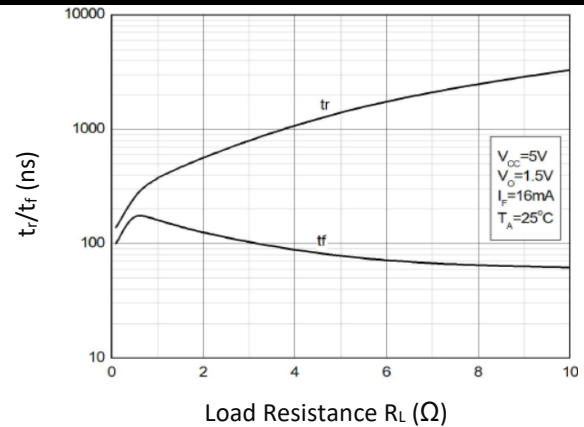
High Level Output Current v.s. Ambient Temperature



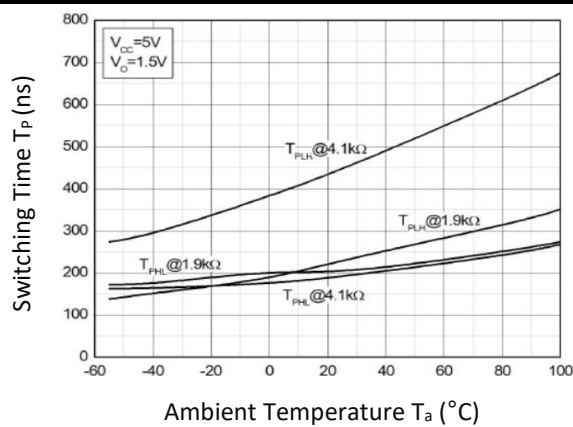
Switching Time v.s. Load Resistance



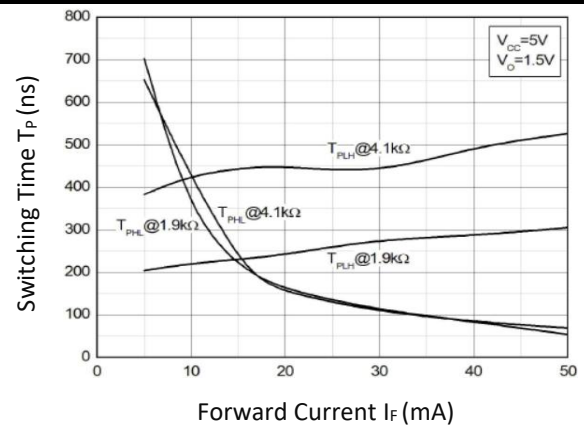
Switching Time v.s. Load Resistance



Switching Time v.s. Ambient Temperature

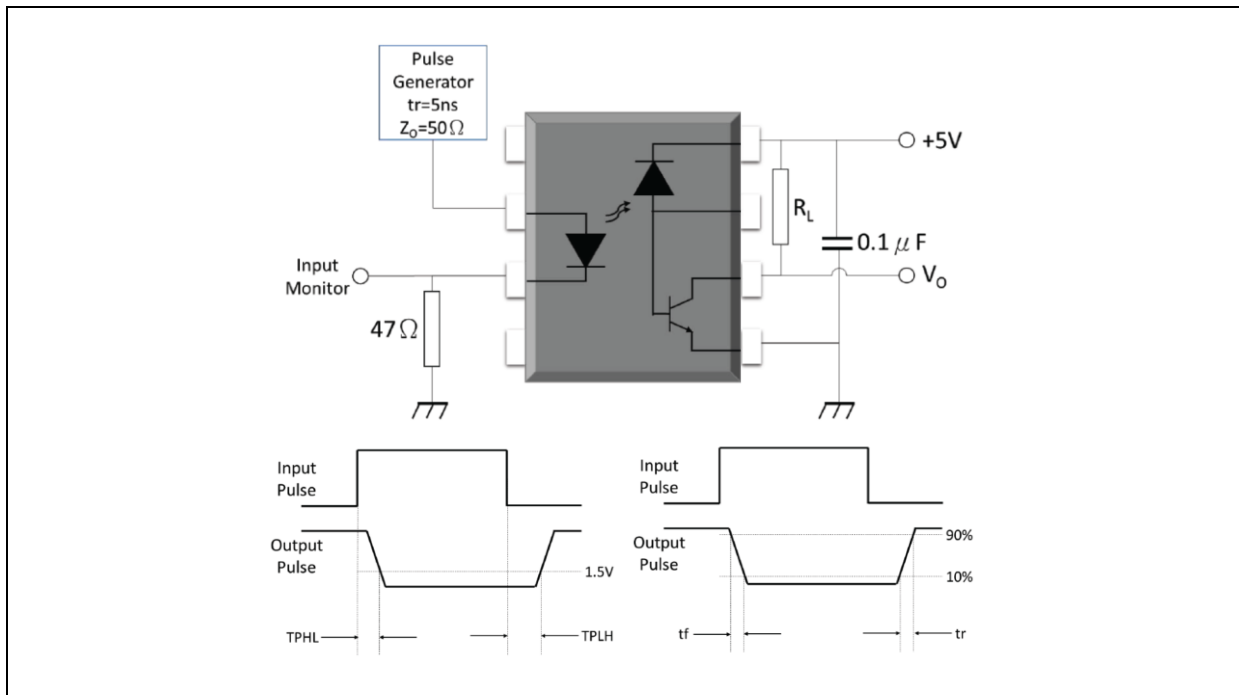


Switching Time v.s. Forward Current

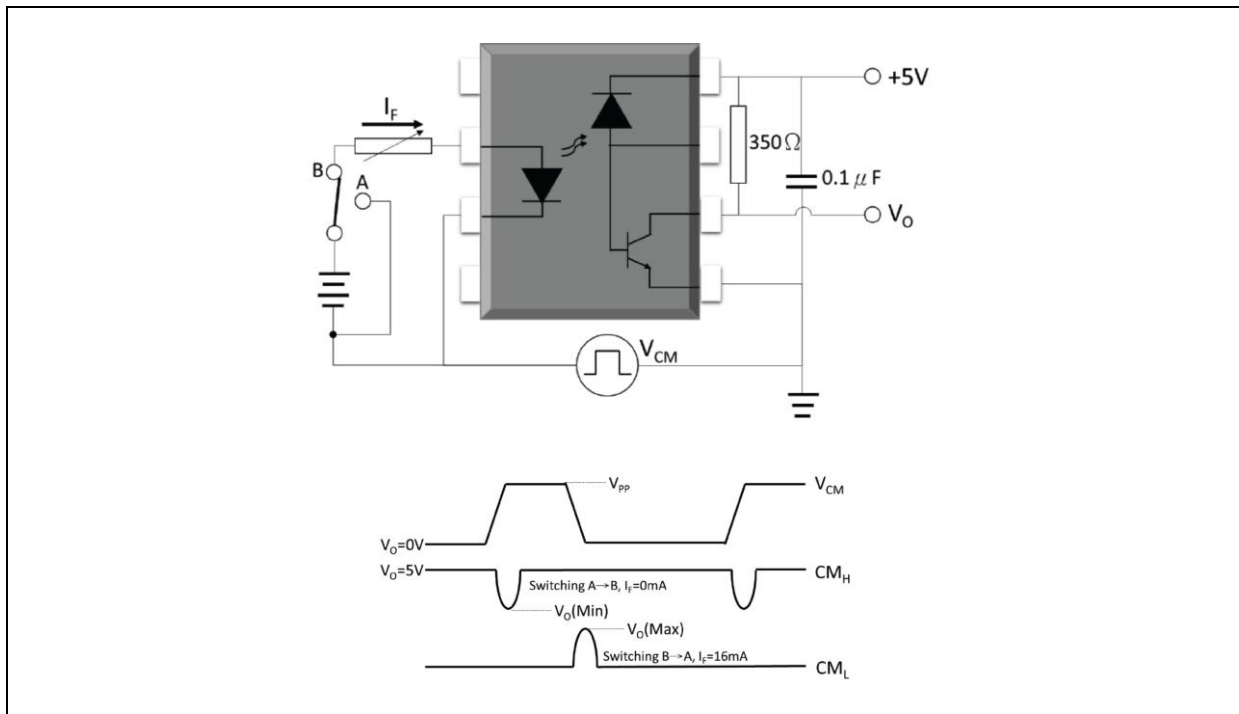


TEST CIRCUIT:

Test Circuit of TPHL, TPLH, tr, tf:

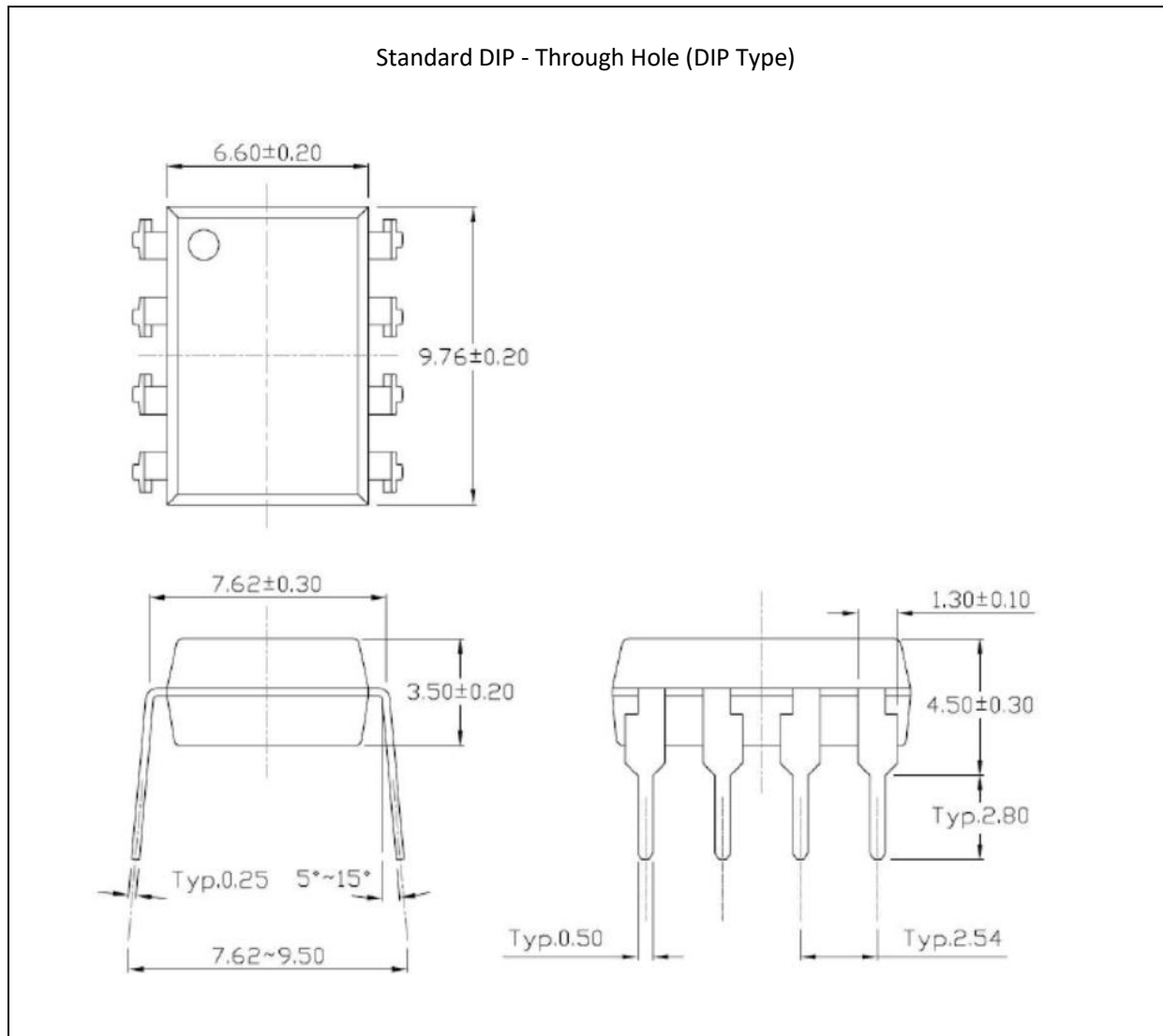


Test Circuit of Common Mode Transient Immunity:



OUTLINE DIMENSION:

Package Dimension:



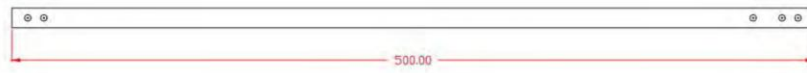
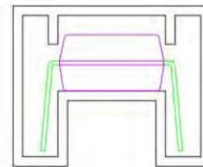
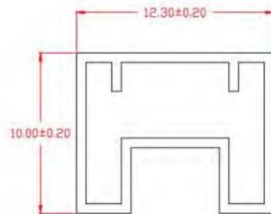
1. All dimensions are in millimetre (mm).



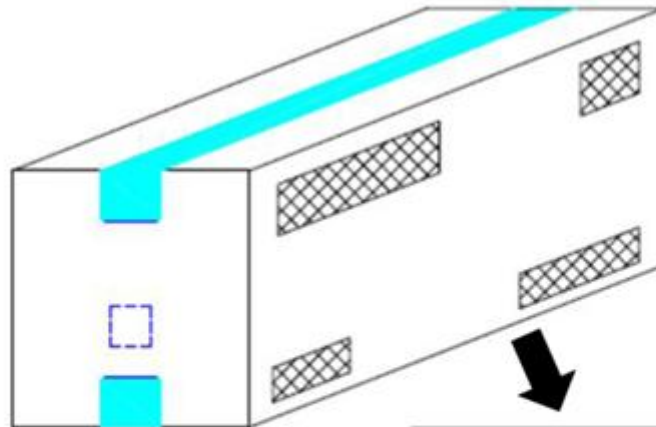
PACKING SPECIFICATION:

Tube Dimension:

50pcs/tube, 32 tube/inner box, 10 inner box (16Kpcs)/carton



● L x W x H = 52.5cm x 10.7cm x 4.7cm



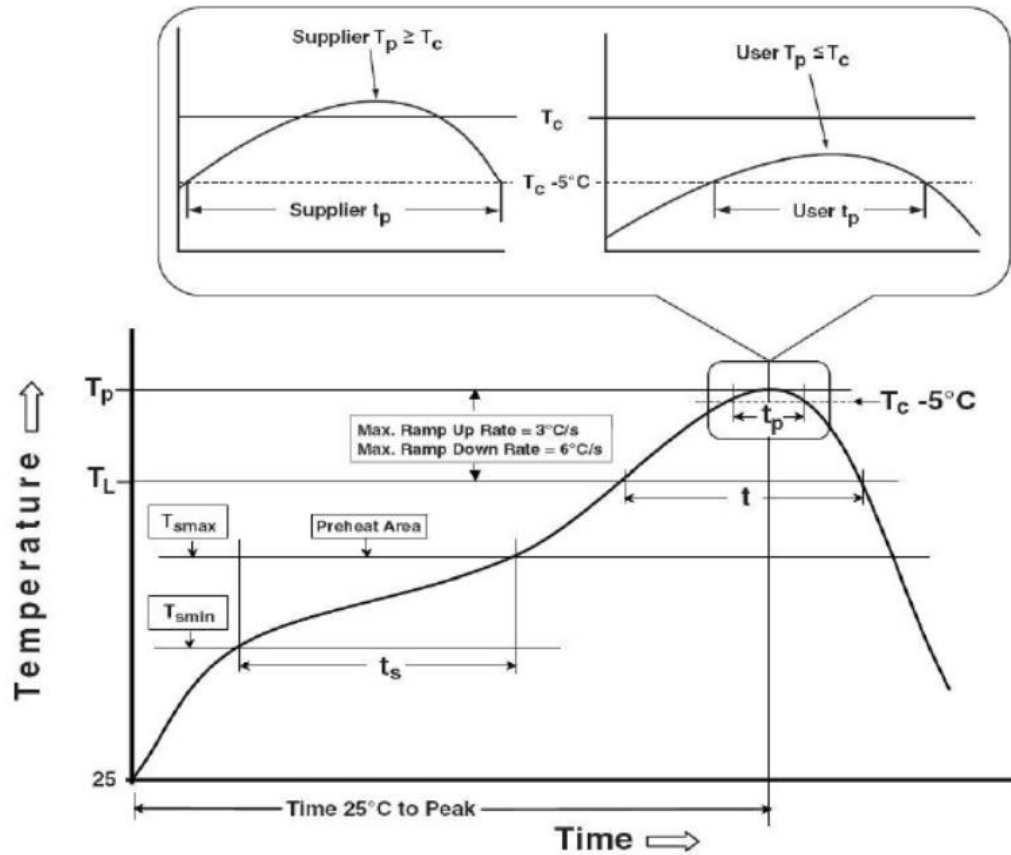
● L x W x H = 53.5cm x 23.5cm x 25.5cm





RECOMMENDED SOLDERING PROFILE:

Reflow Information:



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.