



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
- ▶ DIP8 Gullwing 400mil
- ▶ High Speed Transistor
1Mbit/s

TD4502(M)-GV
 TD4503(M)-GV



Release Date: 06 September 2024 Version: A01



TD450X(M) Series



DESCRIPTION:

The TD450X(M) 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 Gullwing lead forming option. 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 5000 Vrms
- 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: LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TD4502 (M) - G V TD4503 (M) - G V	
TD4502 TD4503	Part Number
M	Lead Form Option: DIP8 Gullwing
G	Green Option
V	VDE Option

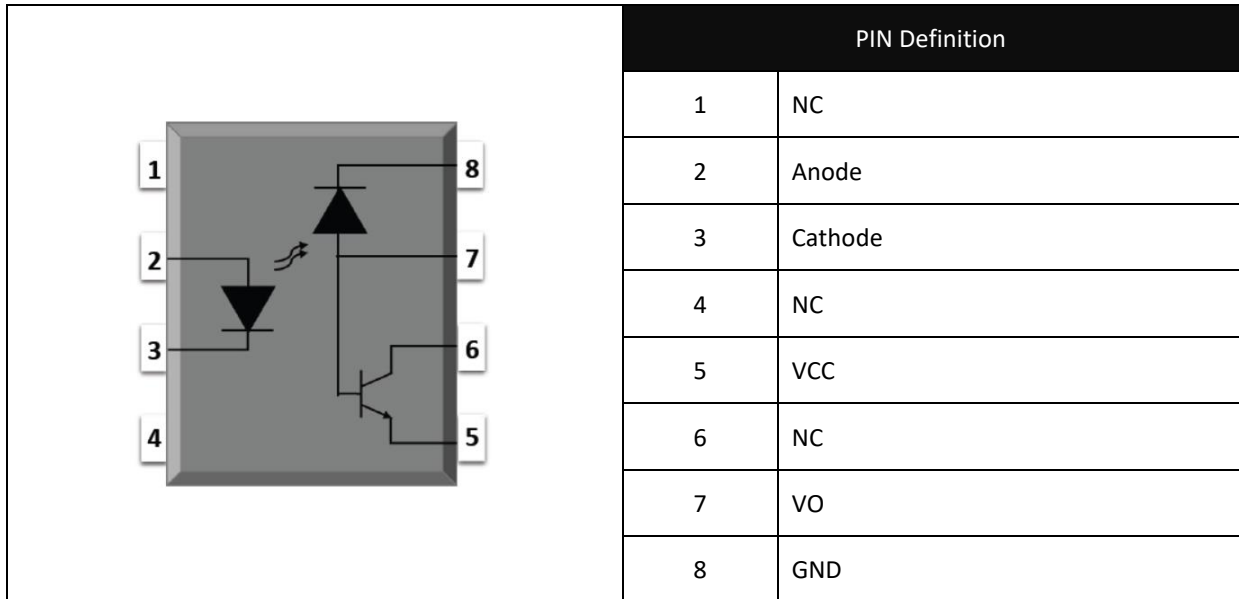
Ordering Information:

TD4502(M)-GV TD4503(M)-GV
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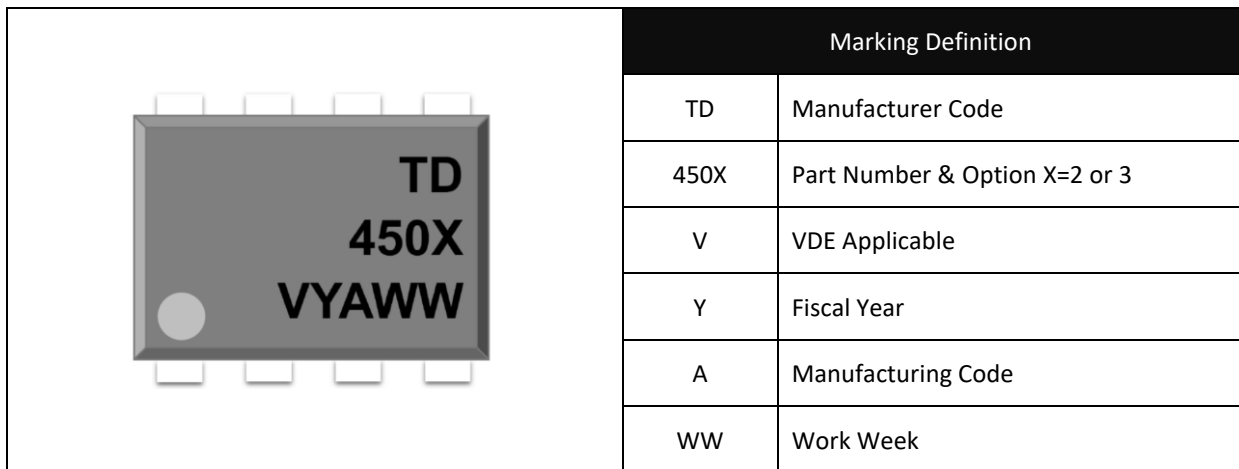
Version No.	Original Release Date
Rev: A01	09/09/2022

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:



Marking Information:



Labelling Information:



福建天电光电有限公司
FUJIAN LIGHTNING OPTOELECTRONIC CO.,LTD

Part No.:XXXXXXXXX Bin Code: X

Lot No.: XXXXXXXXXXXX

Date Code: XXXX

QTY: XXX PCS

MSL: 1

Made in Quanzhou Fujian

This product is manufactured, tested, and packed by



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	

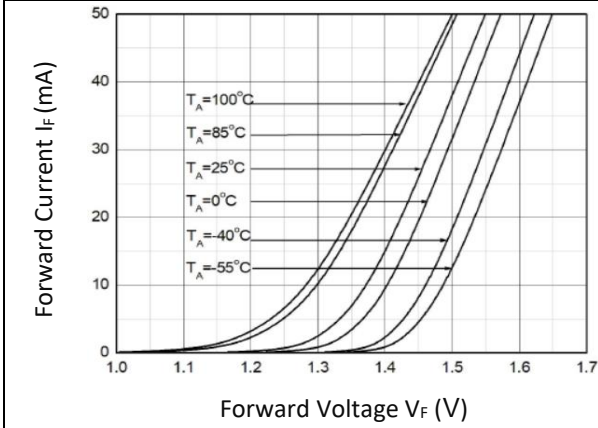
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

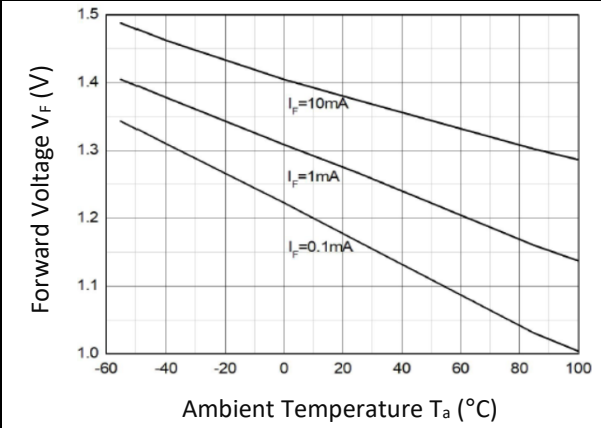
Parameter	Symbol	Values			Unit	Test Condition	
		Min.	Typ.	Max.			
SWITCHING CHARACTERISTICS (at $T_a=0$ to 70°C , $I_F=16\text{mA}$, $V_{CC}=5\text{V}$, unless specified otherwise)							
Propagation Delay Time to Logic Low	TD4502	TPHL	---	0.35	0.8	μs	$R_L=1.9\text{k}\Omega$ $T_a=25^\circ\text{C}$
			---	---	1.0		$R_L=1.9\text{k}\Omega$
	TD4503		---	0.35	0.8		$R_L=1.9\text{k}\Omega$ $T_a=25^\circ\text{C}$
			---	---	1.0		$R_L=1.9\text{k}\Omega$
Propagation Delay Time to Logic High	TD4502	TPLH	---	0.3	0.8	μs	$R_L=1.9\text{k}\Omega$ $T_a=25^\circ\text{C}$
			---	---	1.0		$R_L=1.9\text{k}\Omega$
	TD4503		---	0.3	0.8		$R_L=1.9\text{k}\Omega$ $T_a=25^\circ\text{C}$
			---	---	1.0		$R_L=1.9\text{k}\Omega$
Common Mode Transient Immunity at Logic High	TD4502	CM _H	1000	---	---	$\text{V}/\mu\text{s}$	$I_F=0\text{mA}$ $V_{CM}=10\text{V}_{pp}$ $R_L=1.9\text{k}\Omega$ $T_a=25^\circ\text{C}$
	TD4503		15000	20000	---		$I_F=0\text{mA}$ $R_L=1.9\text{k}\Omega$ $V_{CM}=1500\text{V}_{pp}$ $T_a=25^\circ\text{C}$
Common Mode Transient Immunity at Logic Low	TD4502	CM _L	1000	---	---	$\text{V}/\mu\text{s}$	$I_F=16\text{mA}$ $R_L=1.9\text{k}\Omega$ $V_{CM}=10\text{V}_{pp}$ $T=25^\circ\text{C}$
	TD4503		15000	20000	---		$I_F=16\text{mA}$ $R_L=1.9\text{k}\Omega$ $V_{CM}=1500\text{V}_{pp}$ $T_a=25^\circ\text{C}$

CHARACTERISTIC CURVES:

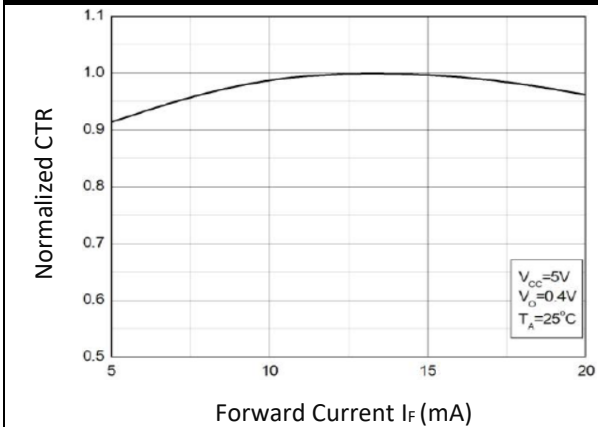
Forward Current v.s. Forward Voltage



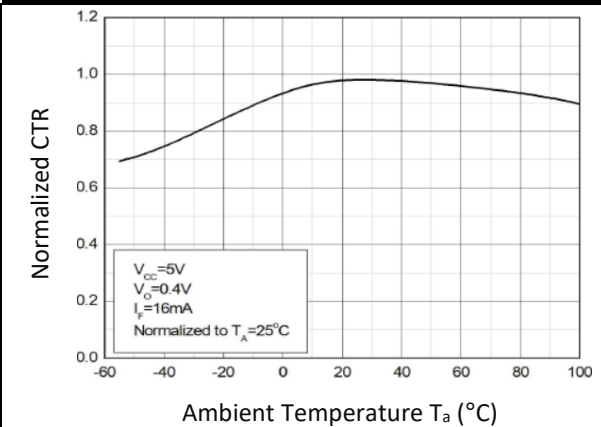
Forward Voltage v.s. Ambient Temp.



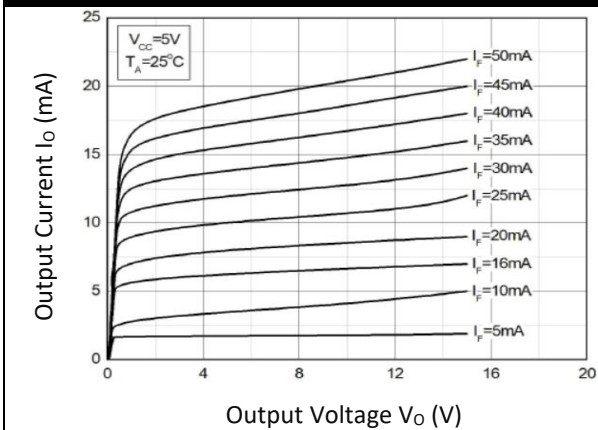
Normalized Current Transfer Ratio v.s. Forward Current



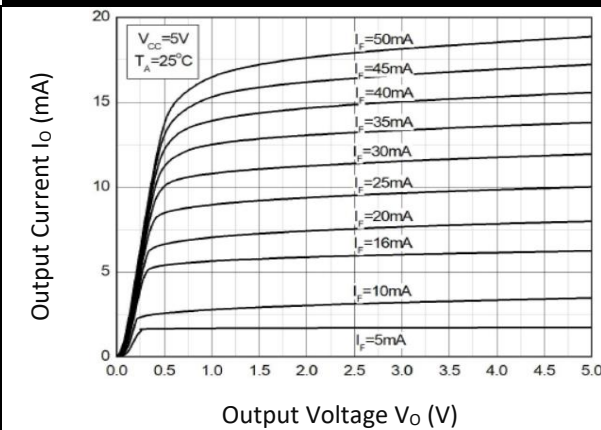
Normalized Current Transfer Ratio v.s. Ambient Temperature



Output Current v.s. Output Voltage

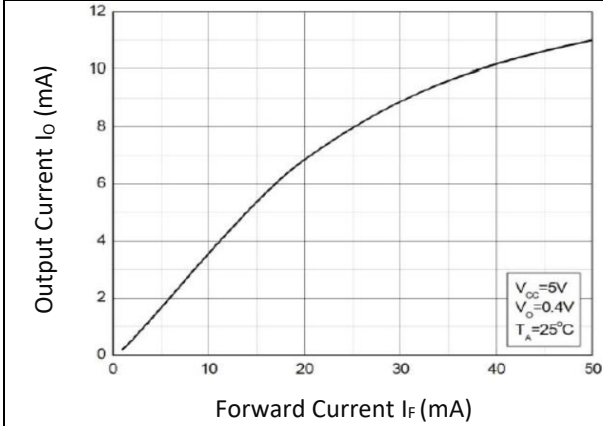


Output Current v.s. Output Voltage

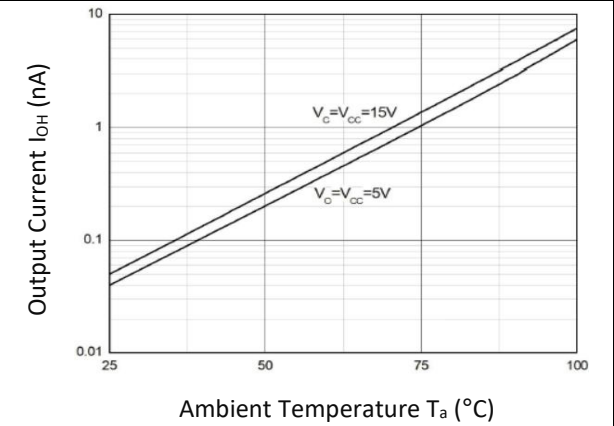


CHARACTERISTIC CURVES:

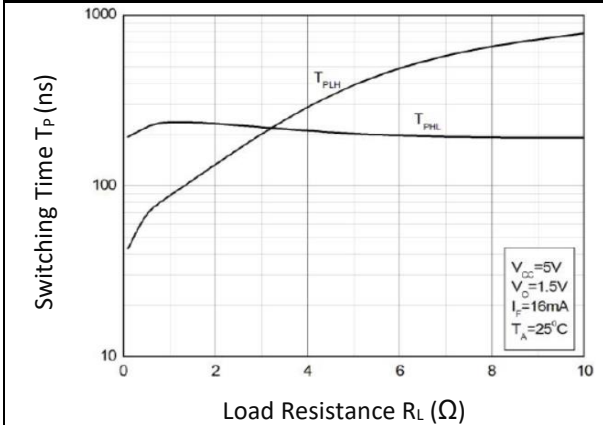
Output Current v.s. Forward Current



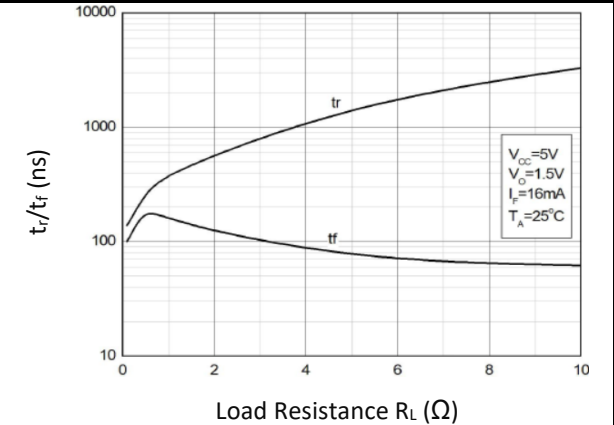
High Level Output Current v.s. Ambient Temperature



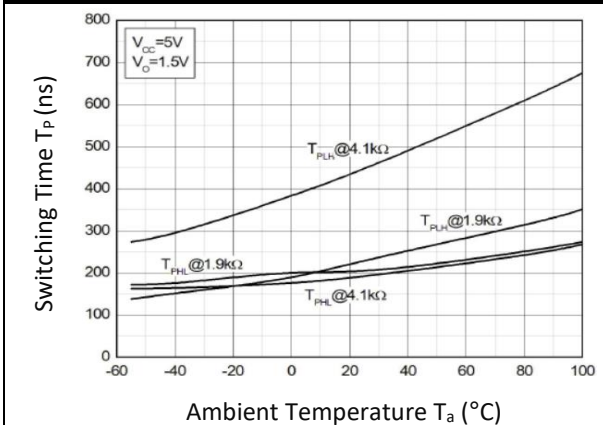
Switching Time v.s. Load Resistance



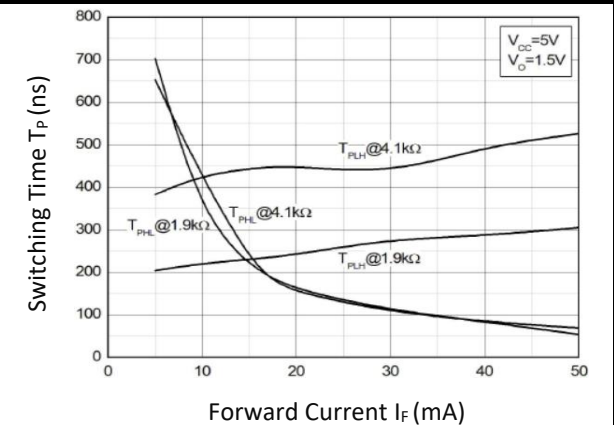
Switching Time v.s. Load Resistance



Switching Time v.s. Ambient Temperature

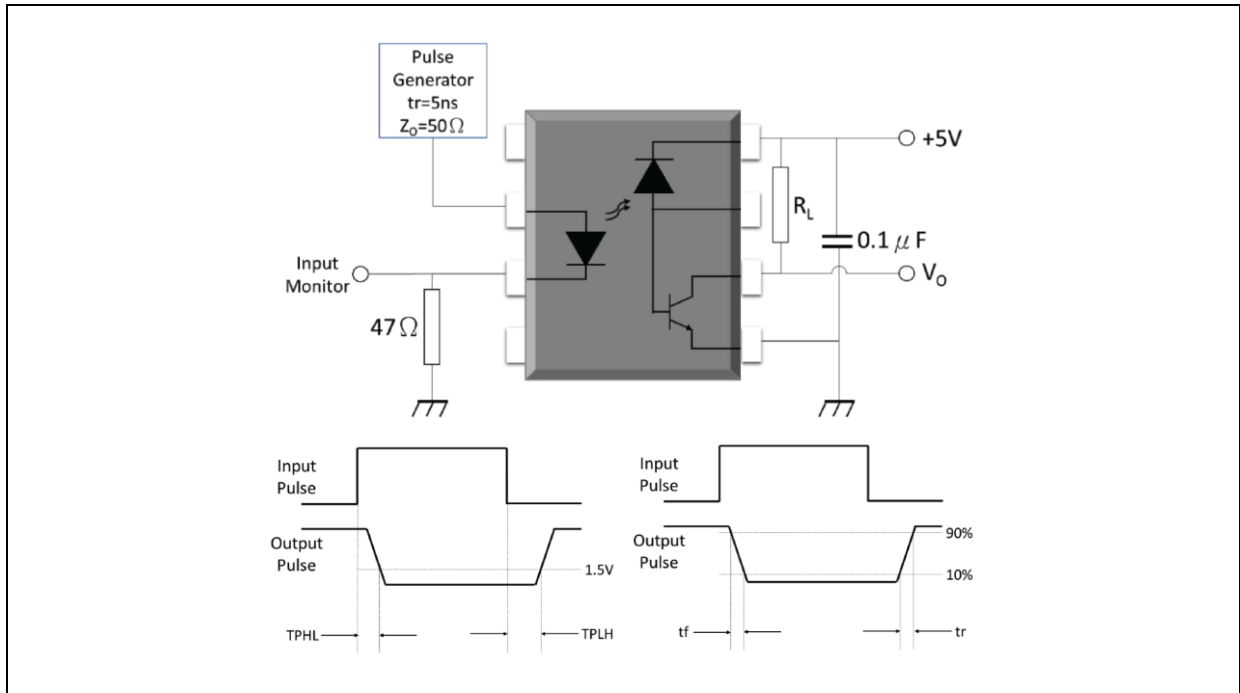


Switching Time v.s. Forward Current

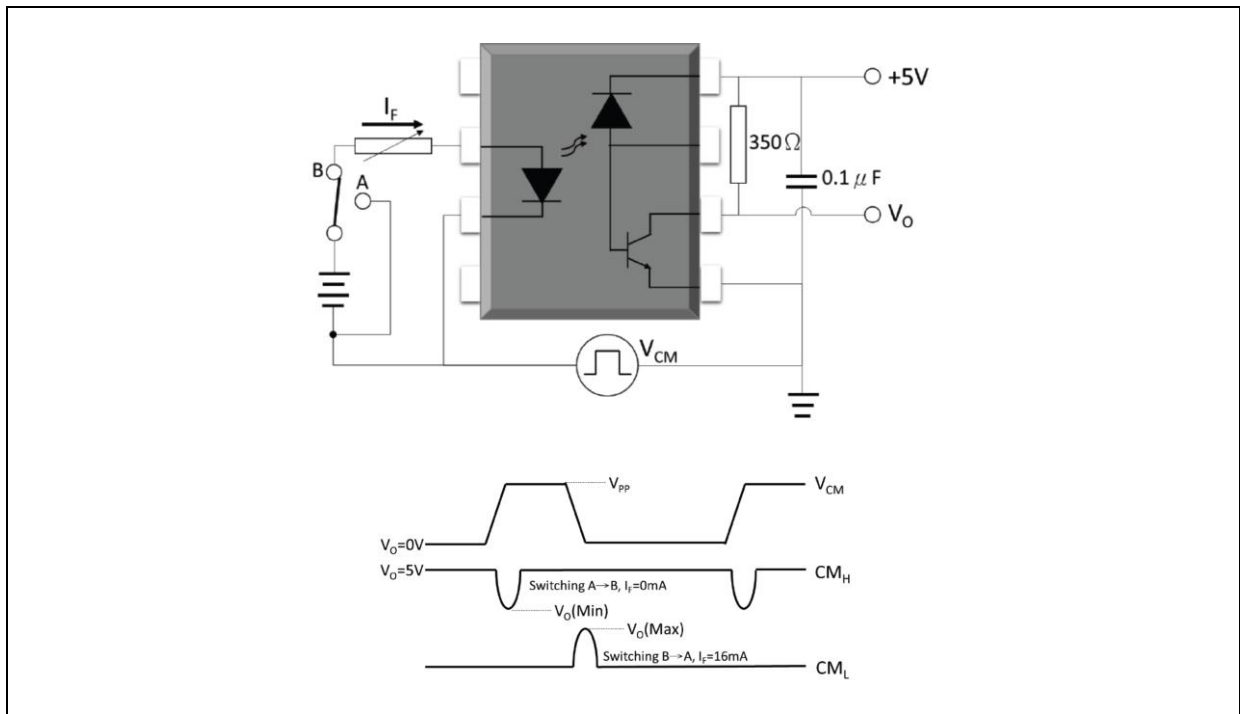


TEST CIRCUIT:

Test Circuit of TPHL, TPLH, t_r , t_f :

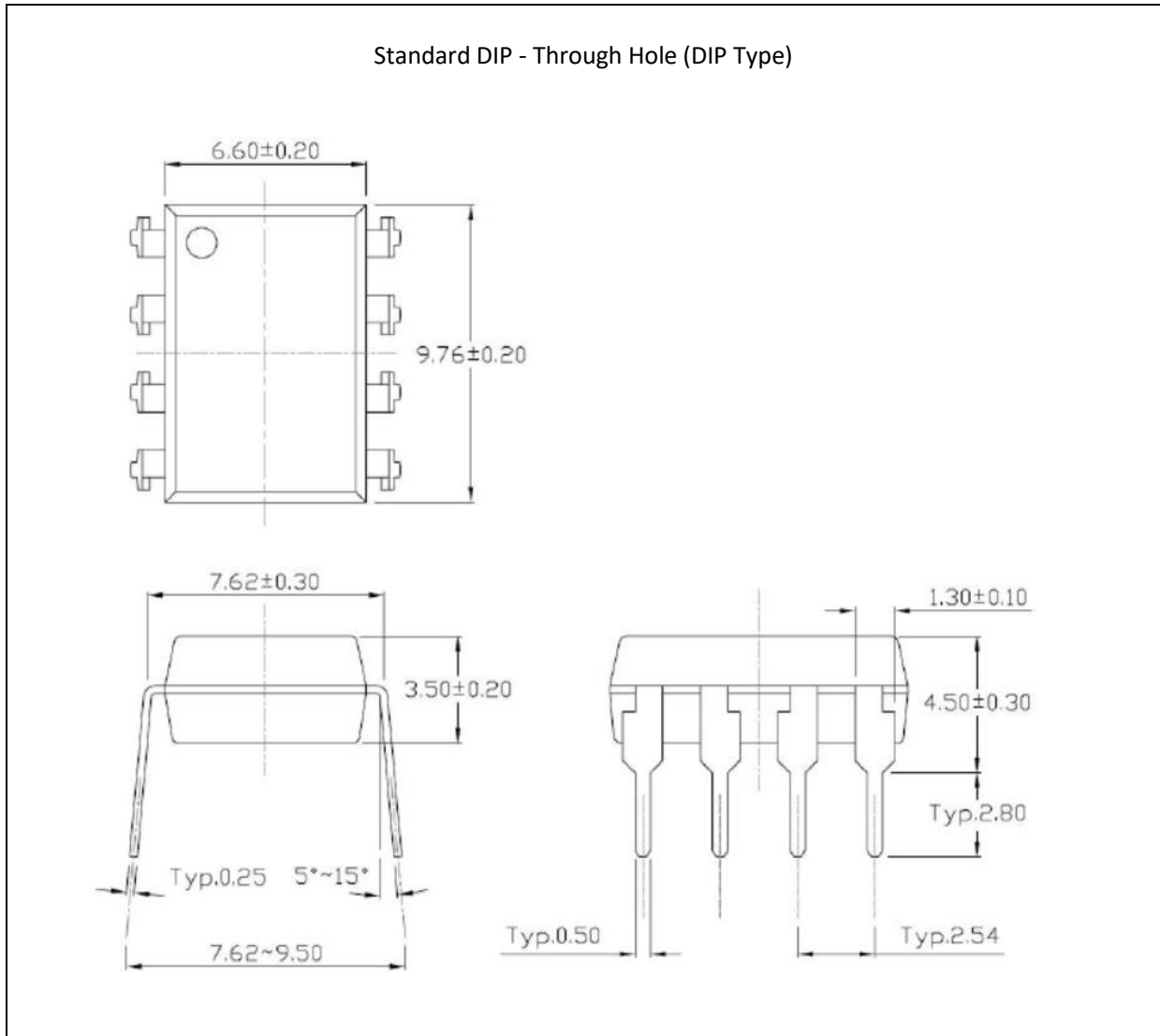


Test Circuit of Common Mode Transient Immunity:



OUTLINE DIMENSION:

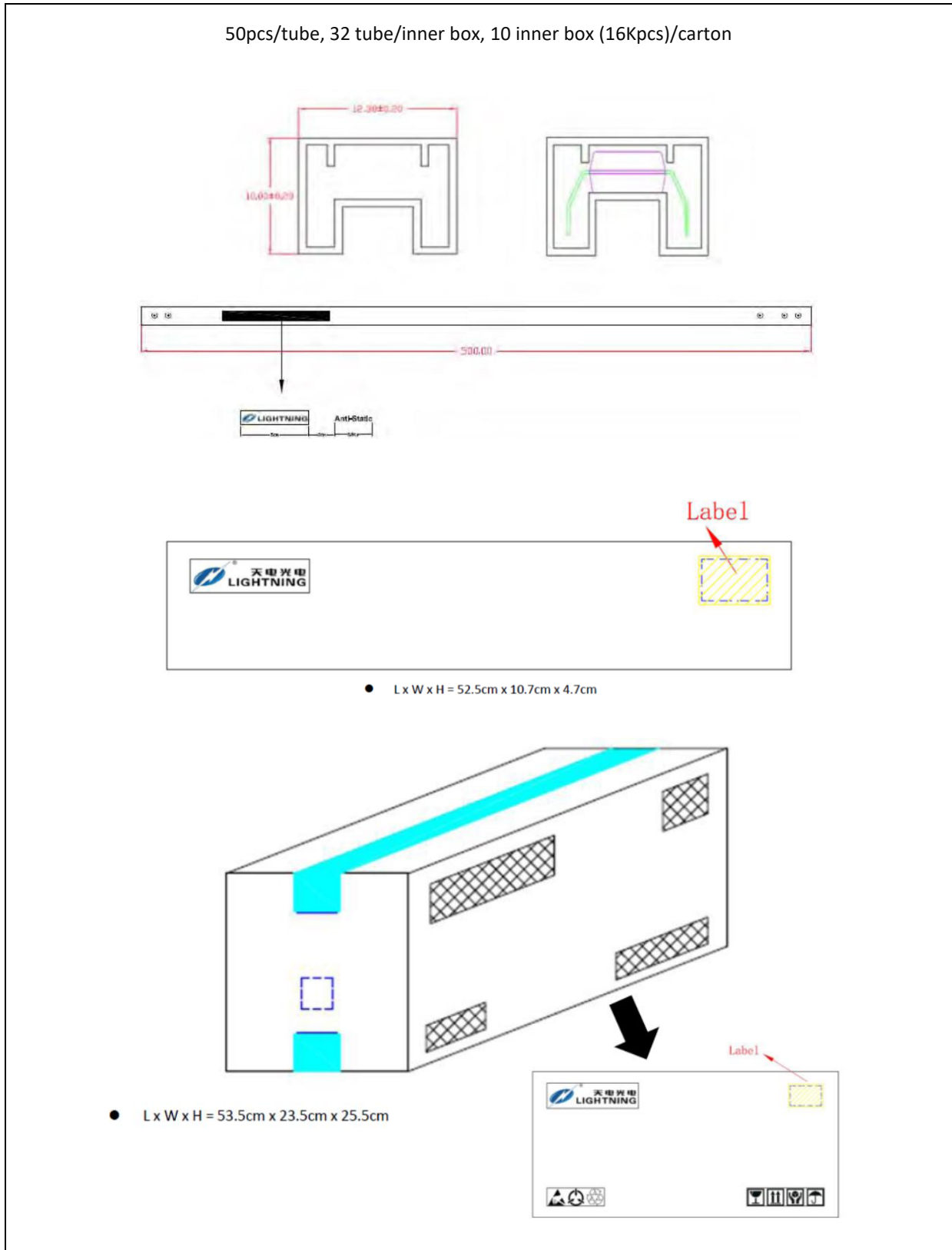
Package Dimension:



1. All dimensions are in millimetre (mm).

PACKING SPECIFICATION:

Tube Dimension:



RECOMMENDED SOLDERING PROFILE:

Reflow Information:

