



**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 DIP4
- ▶ Photo Transistor

**TD816X1-GV**



Release Date: 31 August 2024 Version: A02



## TD816X1 Series



### DESCRIPTION:

The TD816X1 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, TD816X1 series provide the most stable isolation feature.

### FEATURES:

- High isolation 5000 Vrms
- DC input with transistor output
- Operating temperature range -55°C to +110°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:

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment



Partner with: LIGHTNING

## NAMING & ORDERING INFORMATION:

Naming Information:

<b>TD816 X 1 - G V</b>	
<b>TD816</b>	Part Number
<b>X</b>	Selection: CTR (X=A~F)
<b>1</b>	Version: Black Case
<b>G</b>	Green Option
<b>V</b>	VDE Option

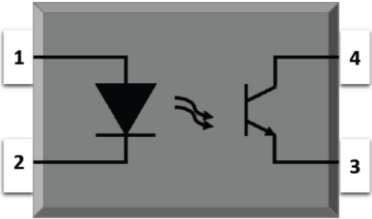
Ordering Information:

<b>TD816X1-GV</b>						
<u>X</u> = Selection: CTR (X=A~F)						
Part Number	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
TD816A1-GV	CTR	80	---	160	%	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V
TD816B1-GV		130	---	260		
TD816C1-GV		200	---	400		
TD816D1-GV		300	---	600		
TD816E1-GV		100	---	200		
TD816F1-GV		150	---	300		

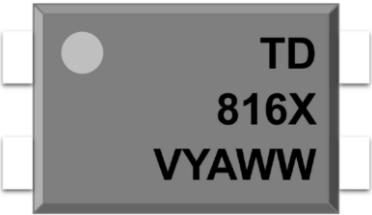
Version No.	Original Release Date
Rev: A02	07/05/2022

## SCHEMATIC DIAGRAM & MARKING:

### Schematic Diagram:

	PIN Definition	
	1	Anode
	2	Cathode
	3	Emitter
	4	Collector

### Marking Information:

	Marking Definition	
	TD	Manufacturer Code
	816X	Part Number & CTR Rank
	V	VDE Applicable
	Y	Fiscal Year
	A	Manufacturing Code
	WW	Work Week

### Labelling Information:

	<p>This product is manufactured, tested, and packed by</p> 
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## ABSOLUTE CHARACTERISTICS:

### Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	$I_F$	60	mA
Peak Forward Current	$I_{FP}$	1 * <sup>1</sup>	A
Reverse Voltage	$V_R$	6	V
Input Power Dissipation	$P_i$	100	mW
OUTPUT			
Collector - Emitter Voltage	$V_{CEO}$	80	V
Emitter - Collector Voltage	$V_{ECO}$	6	V
Collector Current	$I_c$	50	mA
Output Power Dissipation	$P_o$	150	mW
COMMON			
Total Power Dissipation	$P_{tot}$	200	mW
Isolation Voltage	$V_{iso}$	5000 * <sup>2</sup>	V <sub>rms</sub>
Operating Temperature	$T_{opr}$	-55~+110	°C
Storage Temperature	$T_{stg}$	-55~+125	°C
Soldering Temperature	$T_{sol}$	260 * <sup>3</sup>	°C

\*1. 100µs pulse, 100Hz frequency

\*2. AC for 1 minute, R.H.=40~60%

\*3. For 10 seconds max.

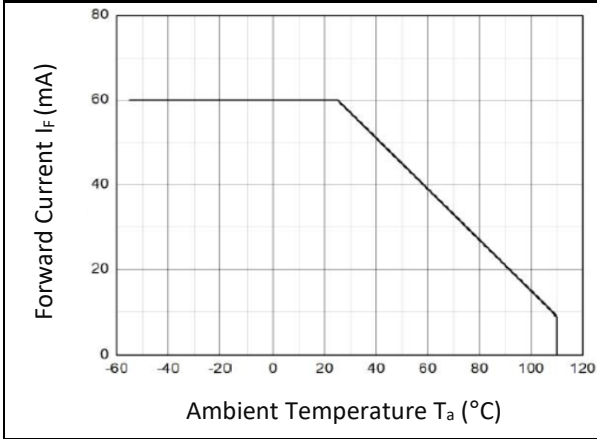
## ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics at Ta=25°C:

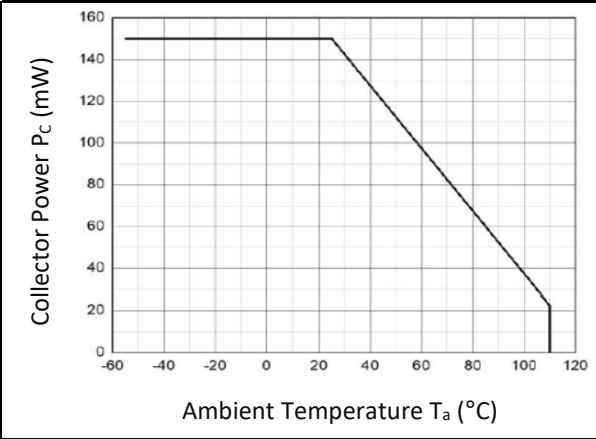
Parameter	Symbol	Values			Unit	Test Condition	
		Min.	Typ.	Max.			
<b>INPUT</b>							
Forward Voltage	V <sub>F</sub>	---	1.19	1.4	V	I <sub>F</sub> =10mA	
Reverse Current	I <sub>R</sub>	---	---	10	μA	V <sub>R</sub> =6V	
Input Capacitance	C <sub>IN</sub>	---	10	---	pF	V=0, f=1kHz	
<b>OUTPUT</b>							
Collector Dark Current	I <sub>CEO</sub>	---	---	100	nA	I <sub>F</sub> =0mA, V <sub>CE</sub> =20V	
Collector - Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	---	---	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0mA	
Emitter - Collector Breakdown Voltage	BV <sub>ECO</sub>	6	---	---	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0mA	
<b>TRANSFER CHARACTERISTICS</b>							
Turn On Threshold Current	TD816A1	CTR	80	---	160	%	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V
	TD816B1		130	---	260		
	TD816C1		200	---	400		
	TD816D1		300	---	600		
	TD816E1		100	---	200		
	TD816F1		150	---	300		
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	---	0.06	0.2	V	I <sub>F</sub> =20mA, I <sub>C</sub> =1mA	
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	---	Ω	DC=500V, 40 ~ 60% R.H.	
Floating Capacitance	C <sub>IO</sub>	---	0.4	1	pF	V=0, f=1MHz	
Response Time (Rise)	t <sub>r</sub>	---	3	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω	
Response Time (Fall)	t <sub>f</sub>	---	4	18	μs		
Cut-off Frequency	f <sub>c</sub>	---	80	---	kHz	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω, -3dB	

### CHARACTERISTIC CURVES:

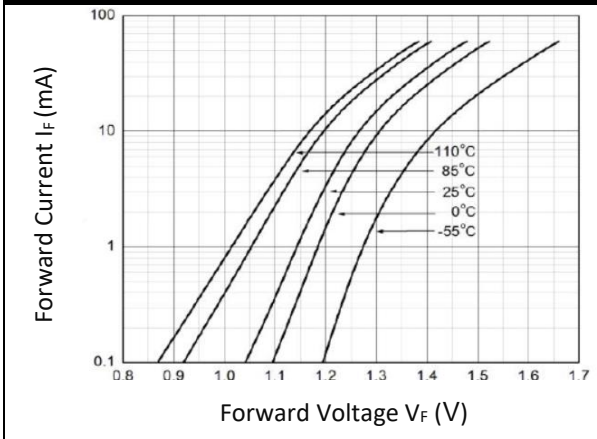
Forward Current v.s. Ambient Temperature



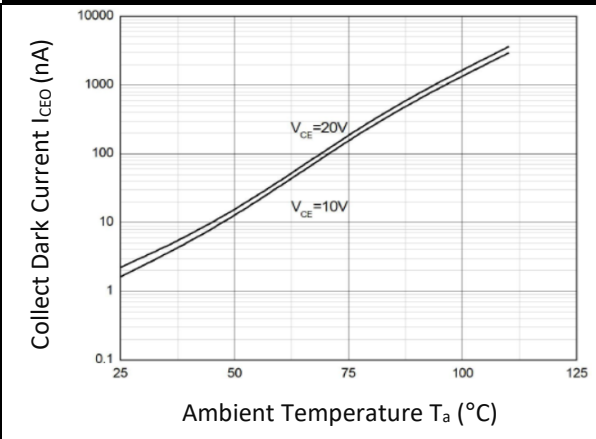
Collector Power Dissipation v.s. Ambient Temp.



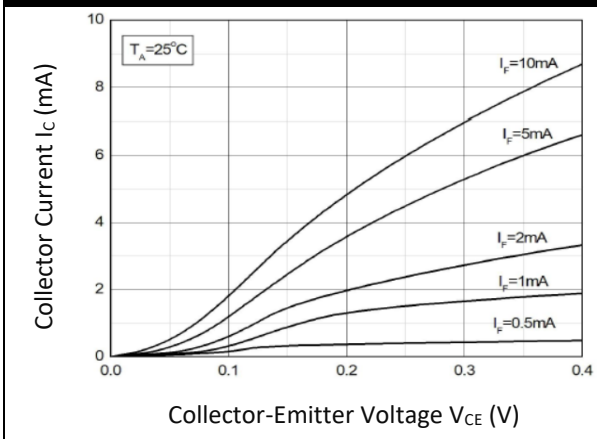
Forward Current v.s. Forward Voltage



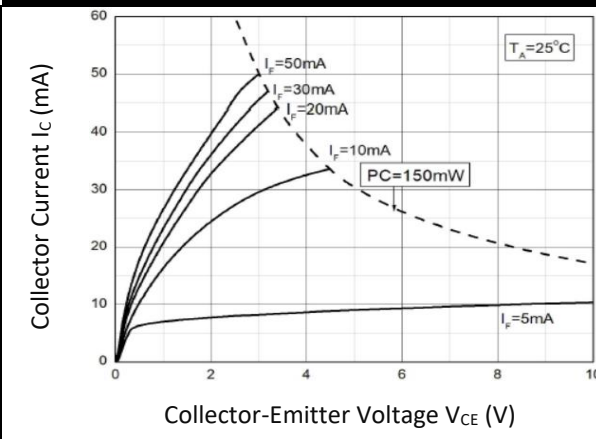
Collector Dark Current v.s. Ambient Temperature



Collector Current v.s. Collector-Emitter Voltage

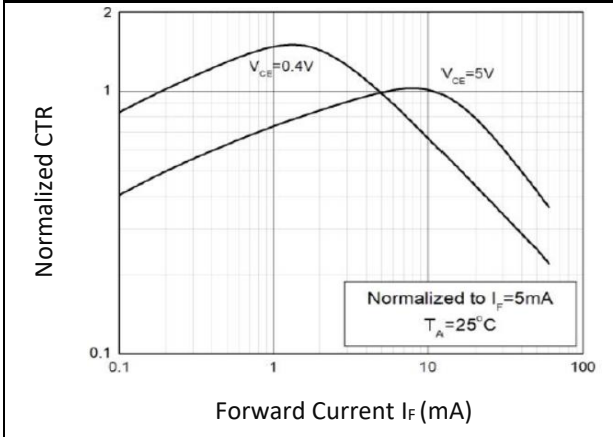


Collector Current v.s. Collector-Emitter Voltage

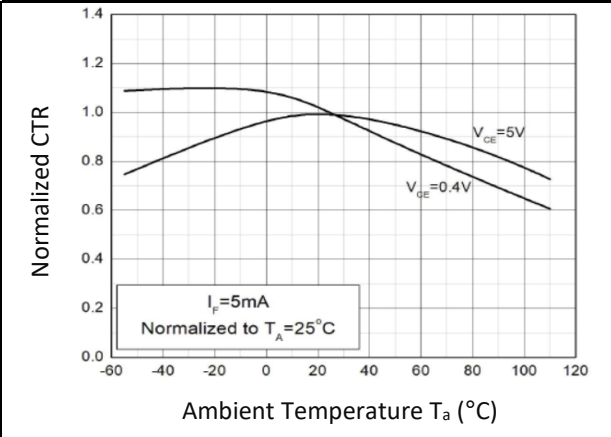


## CHARACTERISTIC CURVES:

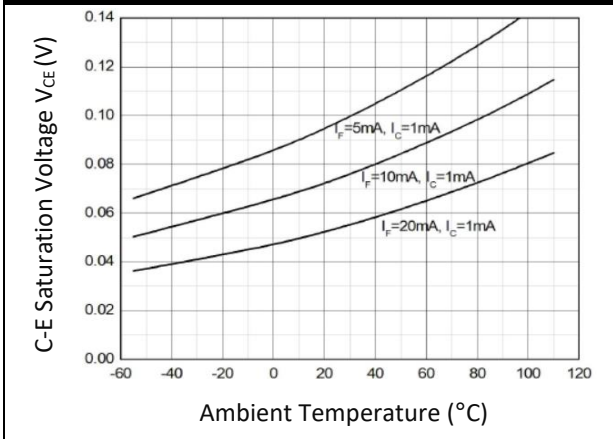
Normalized Current Transfer Ratio v.s. Forward Current



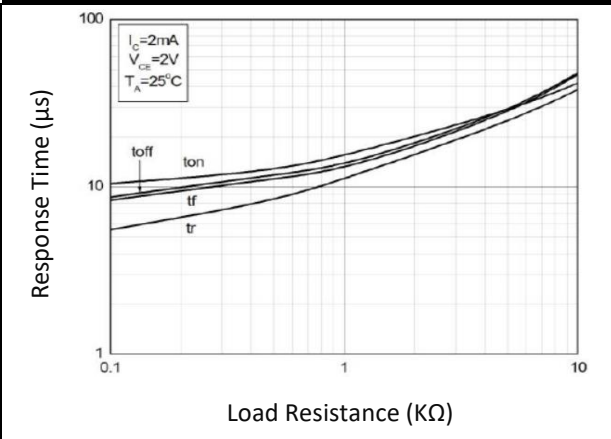
Normalized Current Transfer Ratio v.s. Ambient Temperature



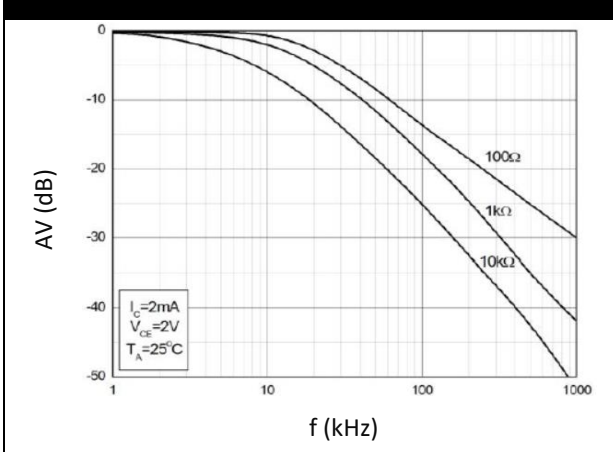
Collector-Emitter Saturation Voltage v.s. Ambient Temperature



Switching Time v.s. Load Resistance

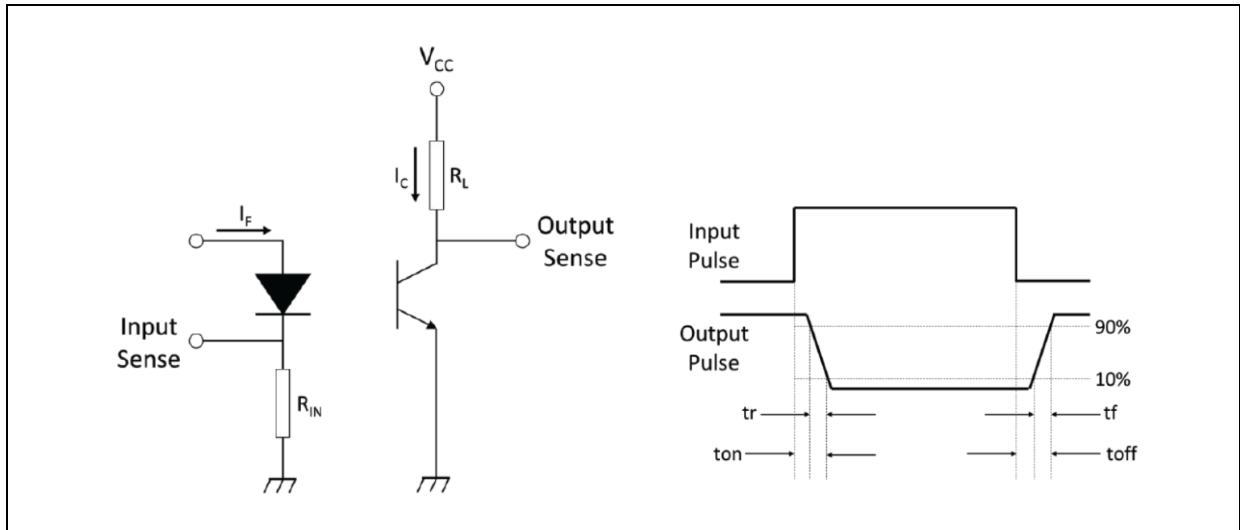


Frequency Response

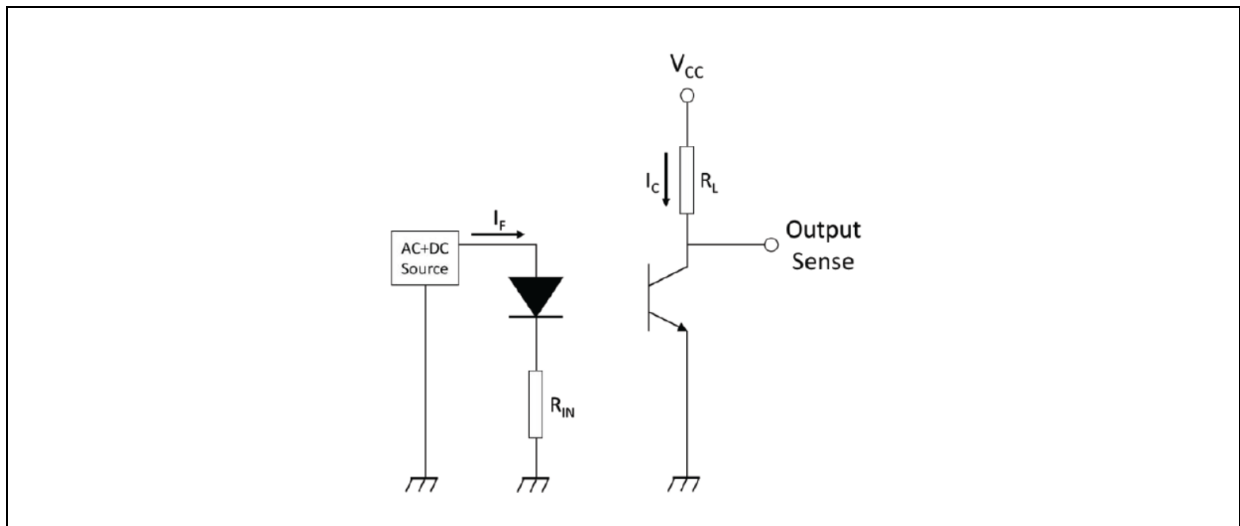


## TEST CIRCUIT:

### Test Circuit of Response Time:



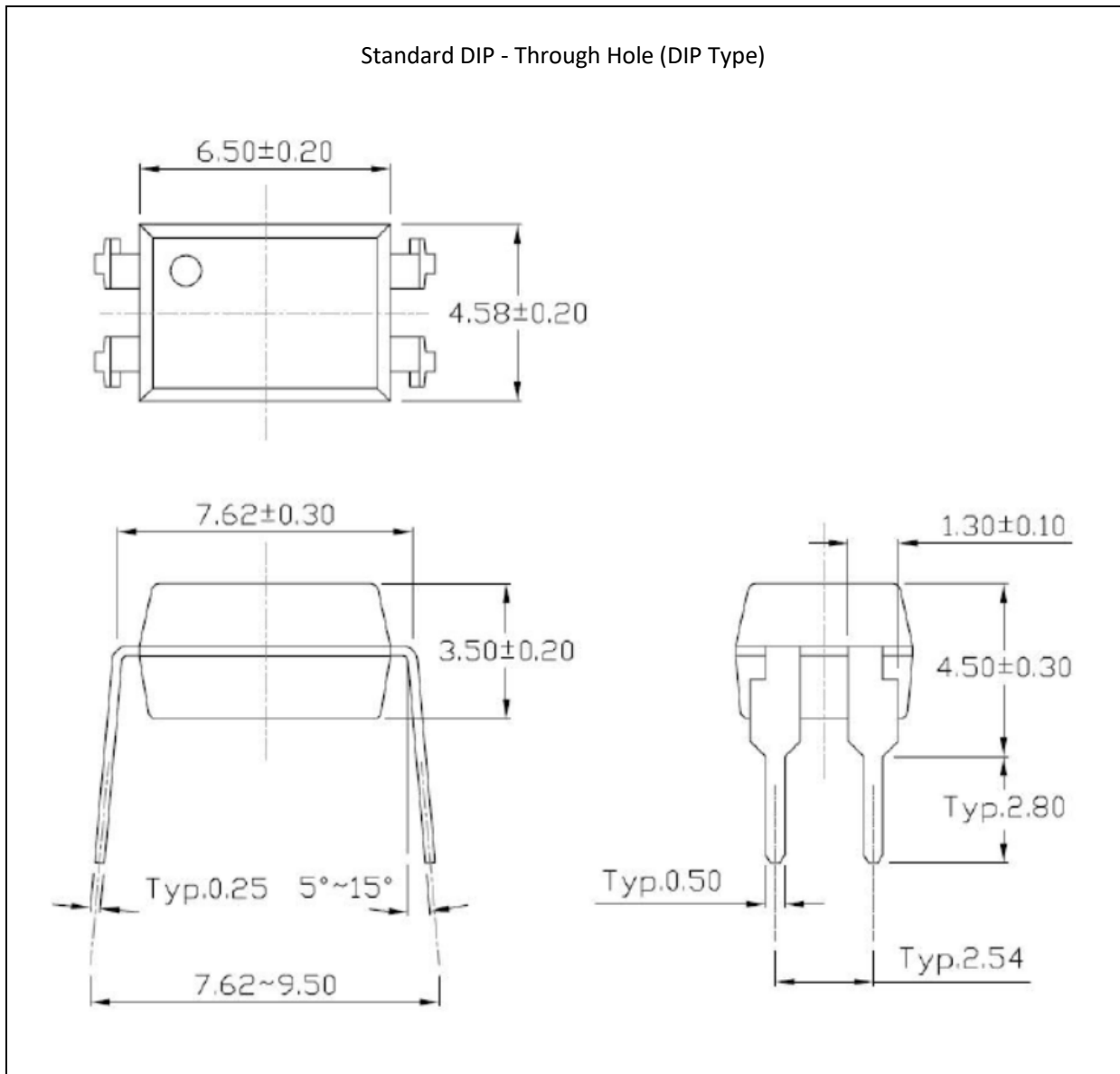
### Test Circuit of Frequency Response:





## OUTLINE DIMENSION:

Package Dimension:

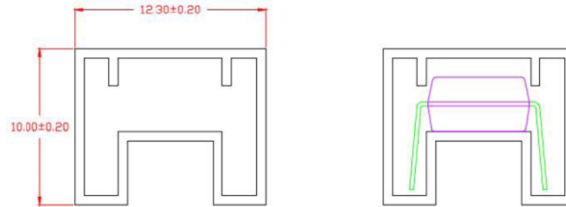


1. All dimensions are in millimetre (mm).

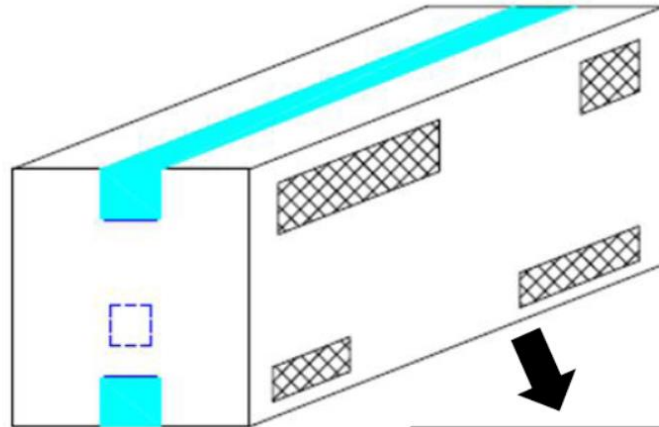
**PACKING SPECIFICATION:**

Tube Dimension:

100pcs/tube, 32 tube/inner box, 10 inner box (32Kpcs)/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:

