ORIENT

Photocoupler

Product Data Sheet

Part Number: OR-352

Customer: _____

Date: _____

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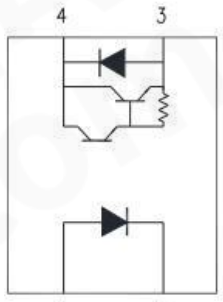
1. Features

- Current transfer ratio(CTR : MIN. 1000% at I_F = 1mA, V_{CE} = 2V)
- High input -output isolation voltage （V_{ISO}=3,750Vrms）
- High collector-emitter voltage （V_{CEO} =300V）
- SOP-4 package
- -55 ℃ to 110℃
- In compliance with RoHS, REACH standards
- MSL Class Ⅰ

2. Instructions

- The OR-352 series device consists of an infrared led, phototransistor detector. They are encapsulated in a 4 pin SOPencapsulation.
- Pin pitch of OR-352 is 2.54mm

Pin No. and Internal connection diagram



1. Anode 3. Emitter
2. Cathode 4. Collector

3. Application Range

- Hybrid substrates that require high density mounting.
- Programmable controllers
- System appliance, measuring instruments

4. Max Absolute rated Value (Normal Temperature=25℃)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	50	mA
	Junction Temperature	T_J	125	℃
	Reverse Voltage	V_R	6	V
	Consume Power	P	70	mW
Output	Collector and emitter Voltage	V_{CEO}	300	V
	Emitter and collector Voltage	V_{ECO}	0.1	
	Collector Current	I_C	150	mA
	Consume Power	P_C	150	mW
Total Consume Power		P_{tot}	170	mW
*1 Insulation Voltage		V_{iso}	3750	Vrms
Working Temperature		T_{opr}	-55 to + 110	℃
Deposit Temperature		T_{stg}	-55 to + 125	
*2 Soldering Temperature		T_{sol}	260	

*1. AC For 1 Minute, R.H. = 40 ~ 60%
Isolation voltage shall be measured using the following method.
(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
(2) The isolation voltage tester with zero-cross circuit shall be used.
(3) The waveform of applied voltage shall be a sine wave.
*2. soldering time is 10 seconds.

5. Opto-electronic Characteristics

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit
Input	Forward Current	V_F	I_F=10mA	---	1.2	1.4	V
	Reverse Voltage	I_R	V_R=4V	---	---	10	μA
	Collector capacitance	C_t	V=0, f=1KHz	---	30	250	pF
Output	Collector to emitter Current	I_{CEO}	V_{CE}=200V, I_F=0mA	---	---	200	nA
	Collector and Emitter attenuation Voltage	BV_{CEO}	I_C=0.1mA I_F=0mA	300	---	---	V
	Emitter and Collector attenuation Voltage	BV_{ECO}	I_E=0.01mA I_F=0mA	0.1	---	---	V
Transforming Characteristics	*1.Current conversion ratio	CTR	IF=1mA VCE=2V	1000	---	15000	%
	Collector Current	I_C		10	---	150	mA
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=20mA I_C=100mA	---	---	1.2	V
	Insulation Impedance	R_{iso}	DC500V 40~60%R.H.	5×10^{10}	1×10^{11}	---	Ω
	Floating Capacitance	C_f	V=0, f=1MHz	---	0.6	1	pF
	Response Time	t_r	V_{CC}=2V, I_C=20mA R_L=100Ω	---	100	300	μs
	Descend Time	t_f		---	20	100	μs

- Current Conversion Ratio = I_C / I_F ×100%

6. Order Information

Part Number

OR-352-X-Y-Z

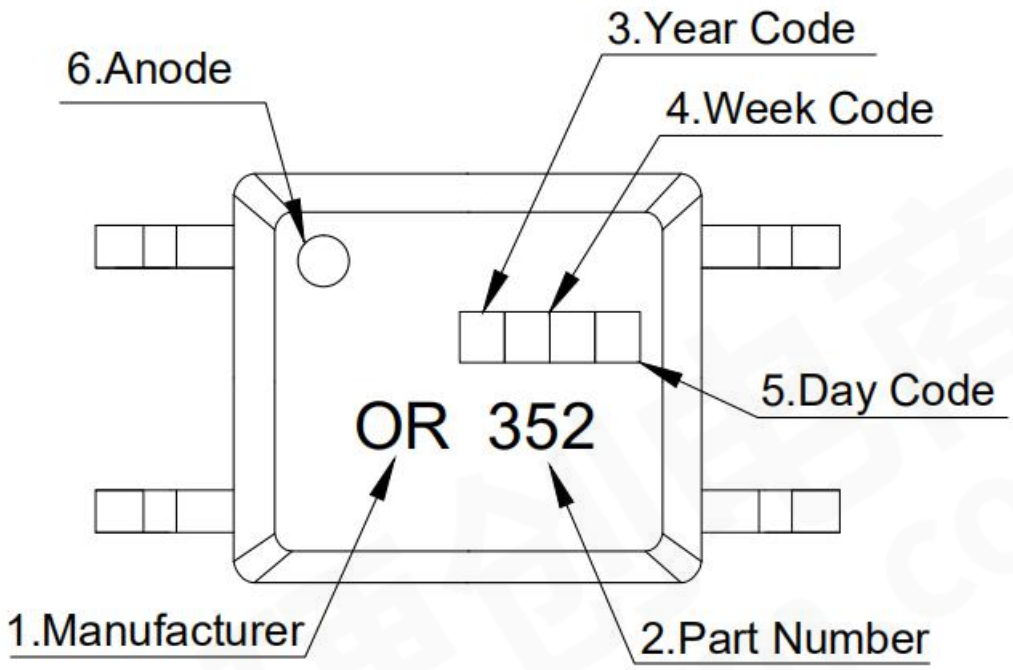
Note

X = Tape and reel option (TP or TP1).
Y = 'V' code for VDE safety (This options is not necessary).
Z = 'G' code for Halogen free.

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard SMD Option	100 units per tube
TP	Surface mount lead form (low profile) + TP tape & reel option	3000 units per reel
TP1	Surface mount lead form (low profile) + TP1 tape & reel option	3000 units per reel

7. Naming Rule



(1) ORIENT .

(2) 352 denotes Part Number.

(3) □ denotes Year Code.

(4) □□ denotes Week Code.

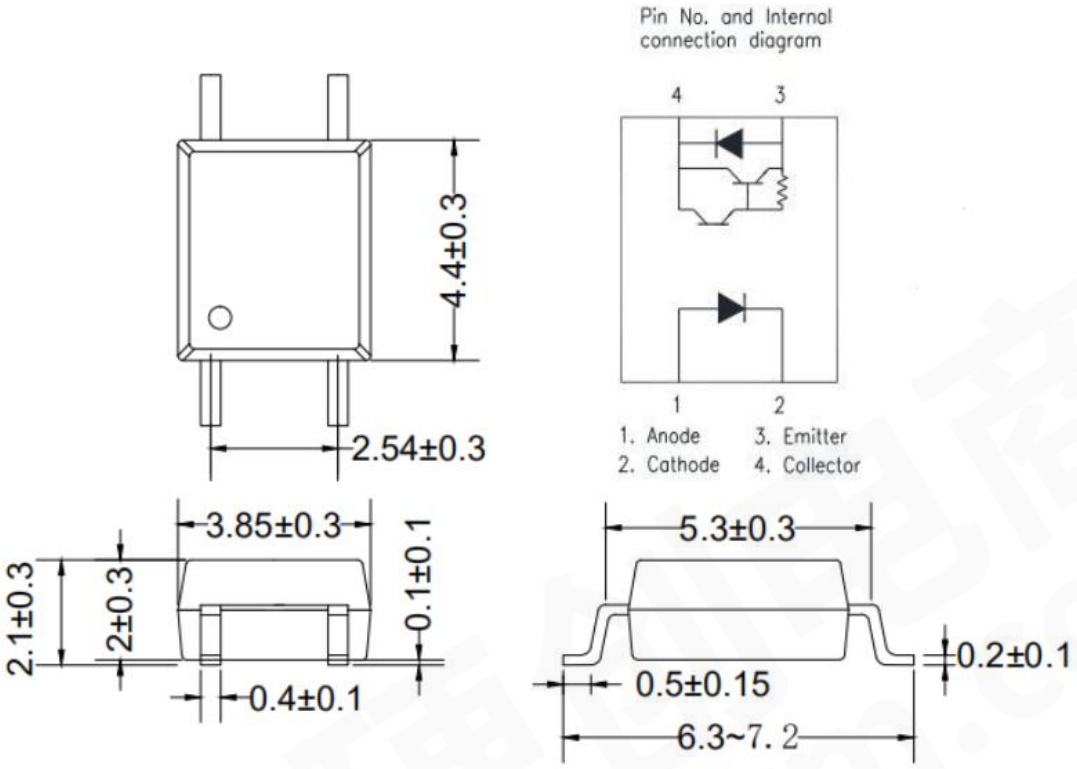
(5) □ denotes Day Code.

(6) Anode.

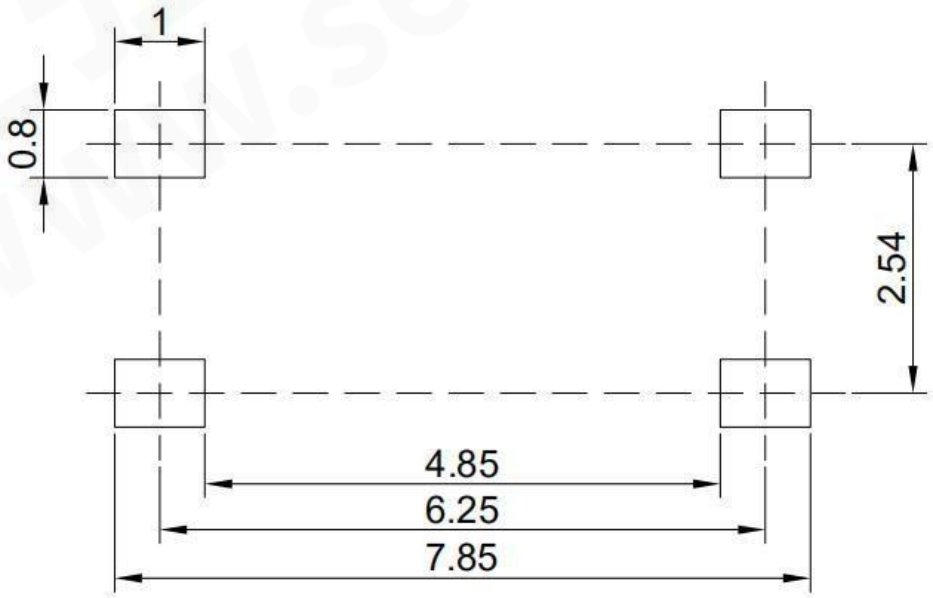
* Halogen Free Mark can be selected.

* VDE Mark can be selected.

8. Outer Dimension



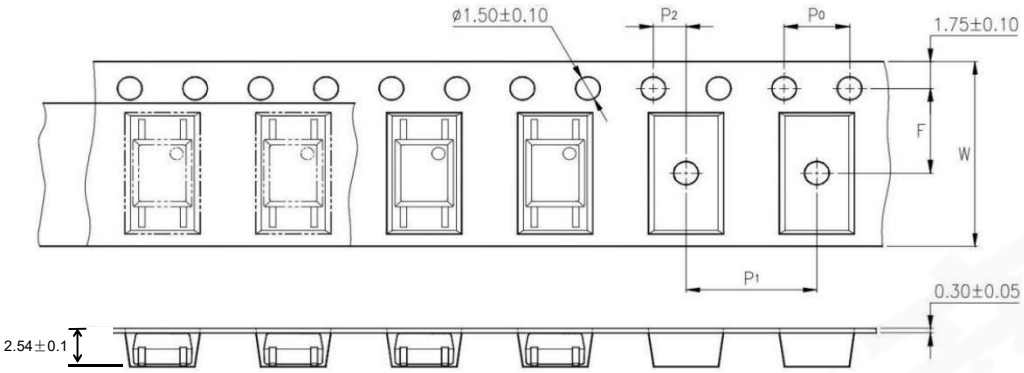
9. Recommended Foot Print Patterns (Mount Pad)



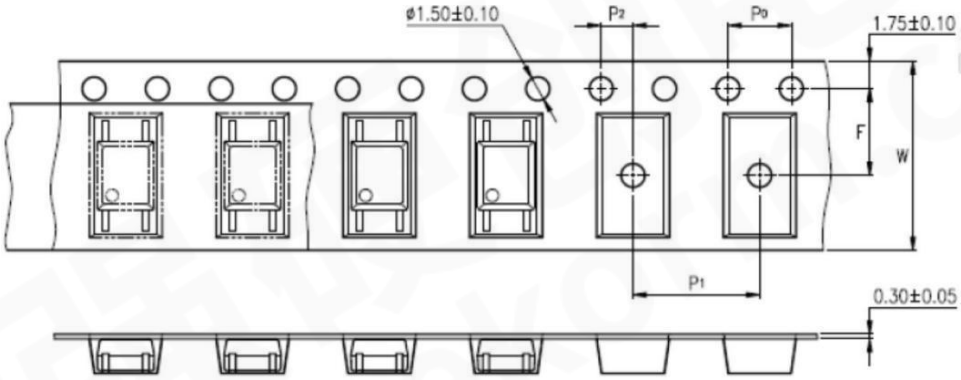
unit：mm

10. Taping Dimensions

（1）OR-352-TP



（2）OR-352-TP1



Description	Symbol	Dimension in mm(inch)
Tape wide	W	12±0.3（0.472）
Pitch of sprocket holes	P0	4±0.1（0.157）
Distance of compartment	F	5.5±0.1（0.217）
	P2	2±0.1（0.079）
Distance of compartment to compartment	P1	8±0.1（0.315）

Package Type	TP/TP1
Quantities(pcs)	3000

11. Package Dimension

(1) package dimension

Packing Information

Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	3,000
Small box (inner) Dimenaion	345*345*45mm
Max qty per small box	6,000
Large box (Outer) Dimenaion	480x360x360mm
Max qty per large box	60,000

(2)Packing Label Sample

1. MTL NO:Contents with "Order Information" in the specification.
2. LOT NO:The production cycle of the product.
3. BATCH:The CTR RANK of the product.
4. Quantity:Product packaging quantity.
5. Product Data: The data when product be made.

12. Reliability Test

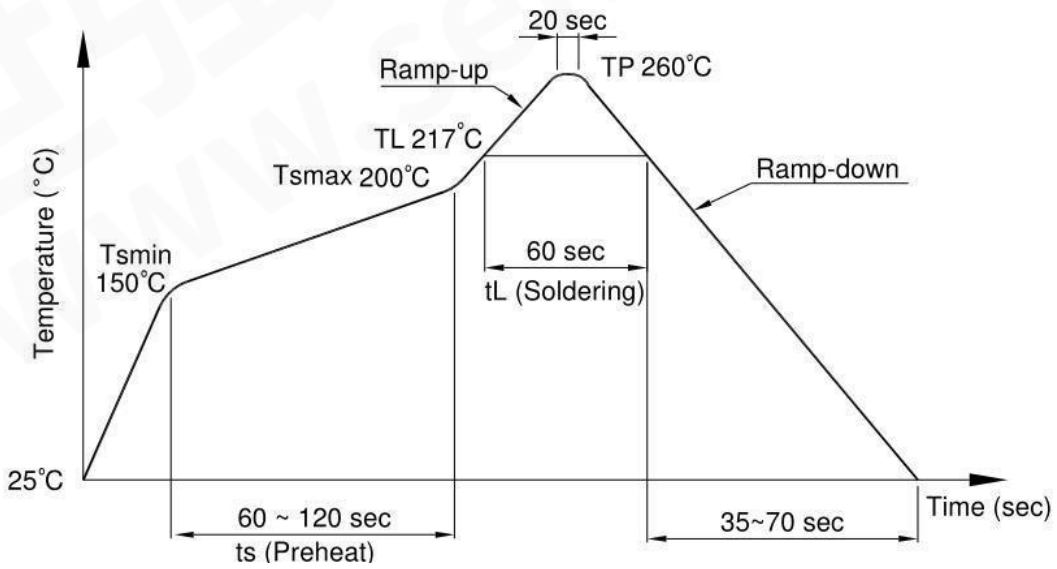
NO.	Item	Condition	Quantity	Cycle	Reference Standards
1	RSH, Resistance to Solder Heat	260±5°C,20s/cycle	22	3 cycles	JESC22A-106
2	SD, Solderability	260±5°C, 10s/cycle	22	1 cycle	JESD22-B102
3	TC, Temperature Cycle	H： 125°C 15min ∫ 5min L: -55°C 15min	77	300cycles	JESC22A-104
4	TS, Thermal Shock	H:100°C 5min ∫ 15s L:-10°C 5min	77	300cysles	JESC22A-106
5	LTSL, Low Temperature Storage	T:-55°C	77	1000h	JESD22-A119
6	HTSL, High Temperature Storage	T:125°C	77	1000h	JESC22A-103
7	THB, High Temperature High Humidity	T:85°C RH： 85%	77	1000h	JESC22A-101
8	HTOL DC Operating Life	T： 110°C IF=10mA VCC=5V	77	1000h	MIL-STD-750 Method 1037
9	ESD-HBM Human Body Model ESD	Ta=25° C, Reference JESD22-A114	6	1 cycle	JESD22-A114

13. Temperature Profile Of Soldering

（1） IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

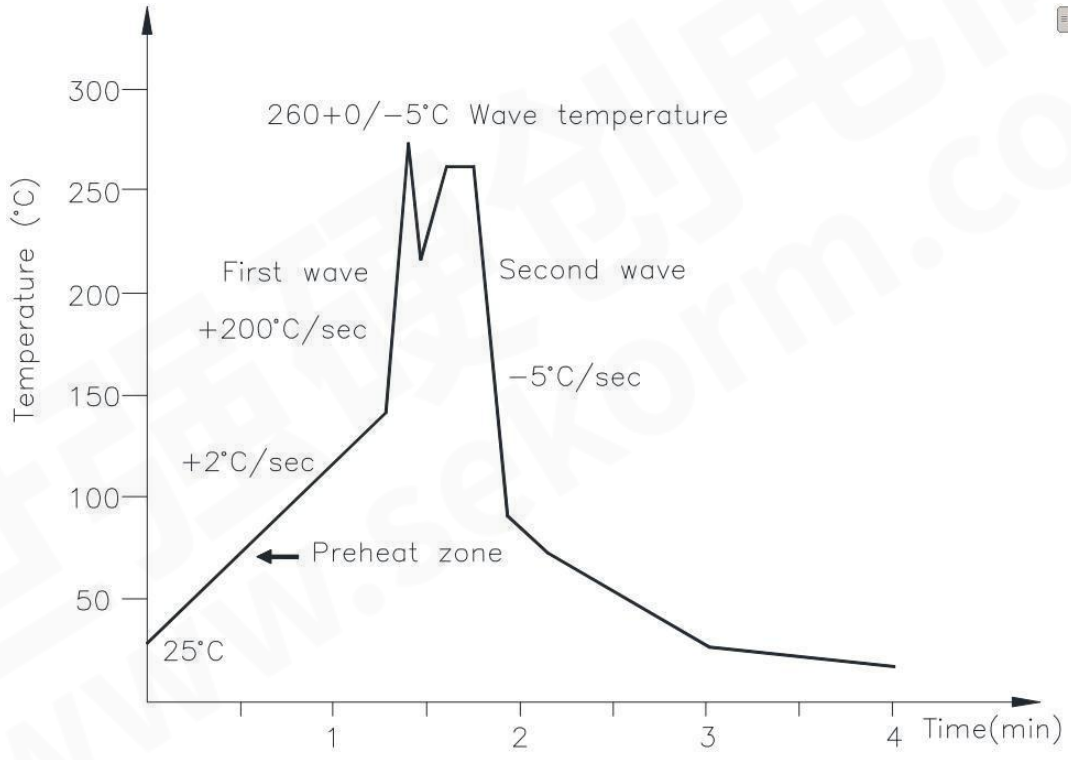
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature	3~6˚C / sec
Reflow times	⩽3



（2） Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature Time	260+0/-5˚C 10 sec
Preheat temperature Preheat time	5 to 140˚C 30 to 80 sec



（3） Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature Time	380+0/-5˚C 3 sec max

14. Characteristics Curve

Fig.1 Forward Current vs. Ambient Temperature

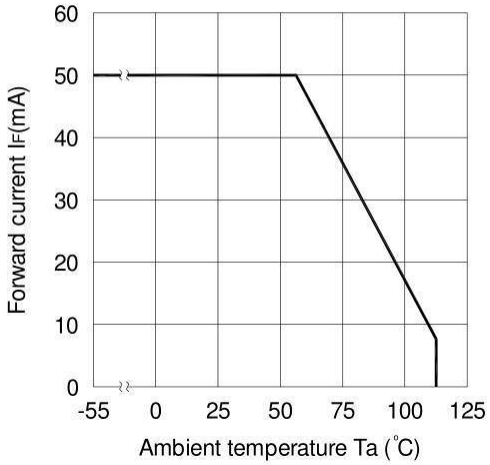


Fig.2 Collector Power Dissipation vs. Ambient Temperature

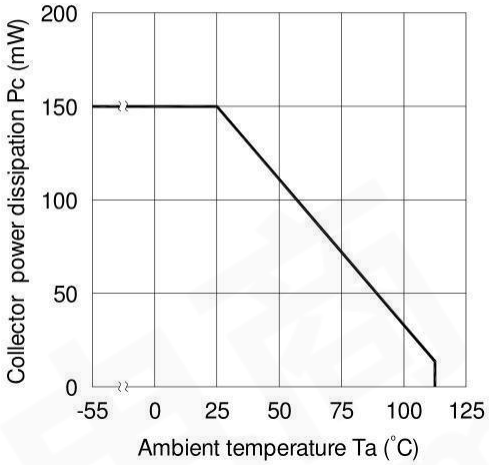


Fig.3 Collector-emitter saturation Voltage vs. Forward current

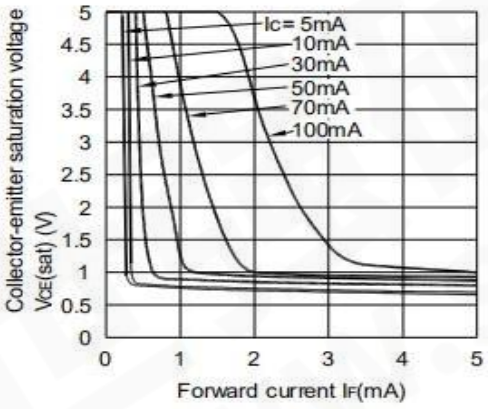


Fig.4 Forward Current vs. Forward Voltage

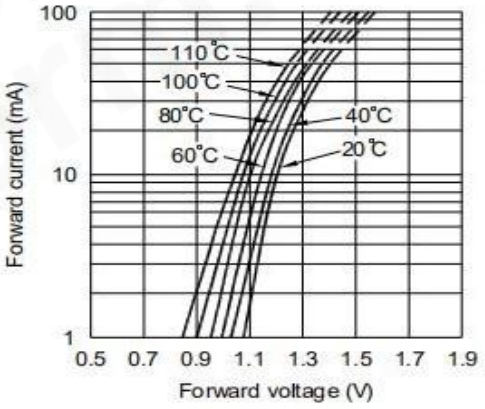


Fig.5 Current Transfer Ratio vs. Forward Current

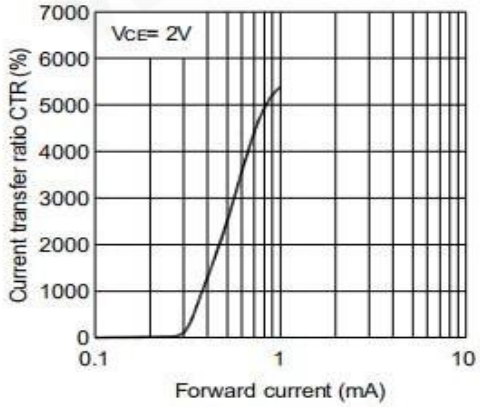


Fig.6 Collector Current vs. Collector-emitter Voltage

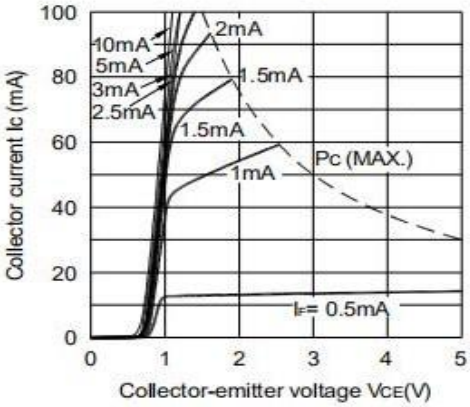


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

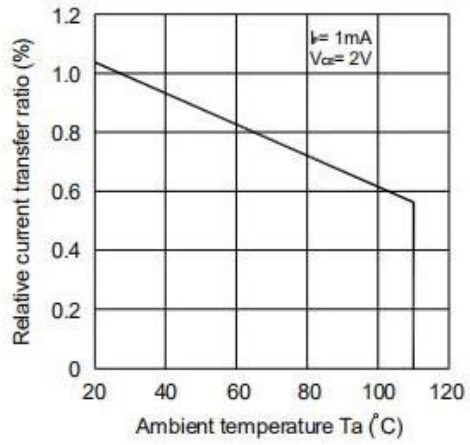


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

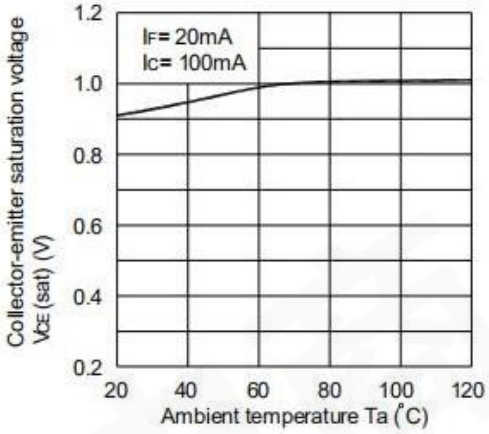


Fig.9 Collector Dark Current vs. Temperature

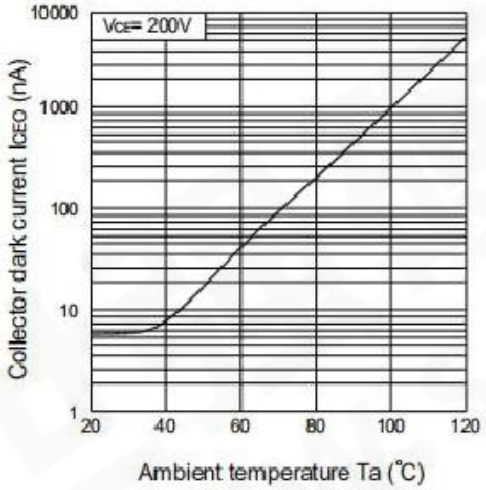


Fig.10 Response Time vs. Load Resistance

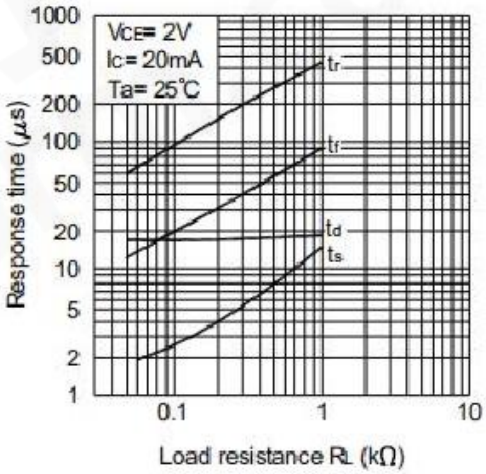
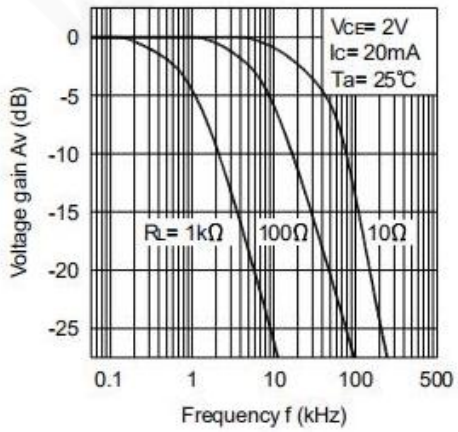
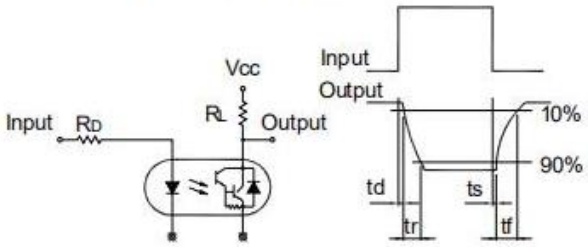


Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response