



# ORIENT

## Photocoupler

# Product Data Sheet

Name: OR-10XX

Customer: \_\_\_\_\_

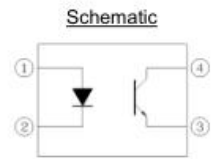
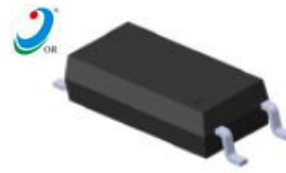
Date: \_\_\_\_\_

Add: Block A 3rd Floor No.4 Building Tian An Cyber Park Huang Ge Rd, Long Gang Dist, Shenzhen, Guangdong, 518172

Web: [www.orient-opto.com](http://www.orient-opto.com)

### 1. Features

- (1) Current transfer ratio  
 (CTR: 50~600% at IF = 5mA, VCE = 5V)  
 (CTR: 63~320% at IF = 10mA, VCE = 5V)
- (2) High input-output isolation voltage (Viso = 5,000Vrms)
- (3) High collector-emitter voltage (VCEO = 70V)
- (4) Temperature range -55 °C to 110 °C
- (5) Creepage distance > 8mm
- (6) Employs double transfer mold technology
- (7) Long Mini-flat package : 2.3mm profile :OR-10XX series



**Pin Configuration**  
 1. Anode  
 2. Cathode  
 3. Emitter  
 4. Collector

### 2. Description

The OR-10XX series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector. They are packaged in a 4-pin SOP package.

### 3.Applications

- (1) Programmable controllers
- (2) System appliances, measuring instruments
- (3) Telecommunication equipments
- (4) Home appliances, such as fan heaters, etc.
- (5) Signal transmission between circuits of different potentials and impedances

### 4. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	IF	60	mA
	Junction Temperature	TJ	125	°C
	Reverse Voltage	VR	6	V
	Consume Power	P	100	mW
Output	Collector and emitter Voltage	VCEO	80	V
	Emitter and collector Voltage	VECO	7	
	Collector Current	IC	50	mA
	Consume Power	PC	150	mW
Total Consume Power		Ptot	250	mW
*1	Insulation Voltage	Viso	5000	Vrms
Working Temperature		Topr	-55 to + 110	°C
Deposit Temperature		Tstg	-55 to + 125	
*2	Soldering Temperature	Tsol	260	

Notes

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

\* 2 For 10 seconds

5. Electrical Optical Characteristics at Ta=25°C

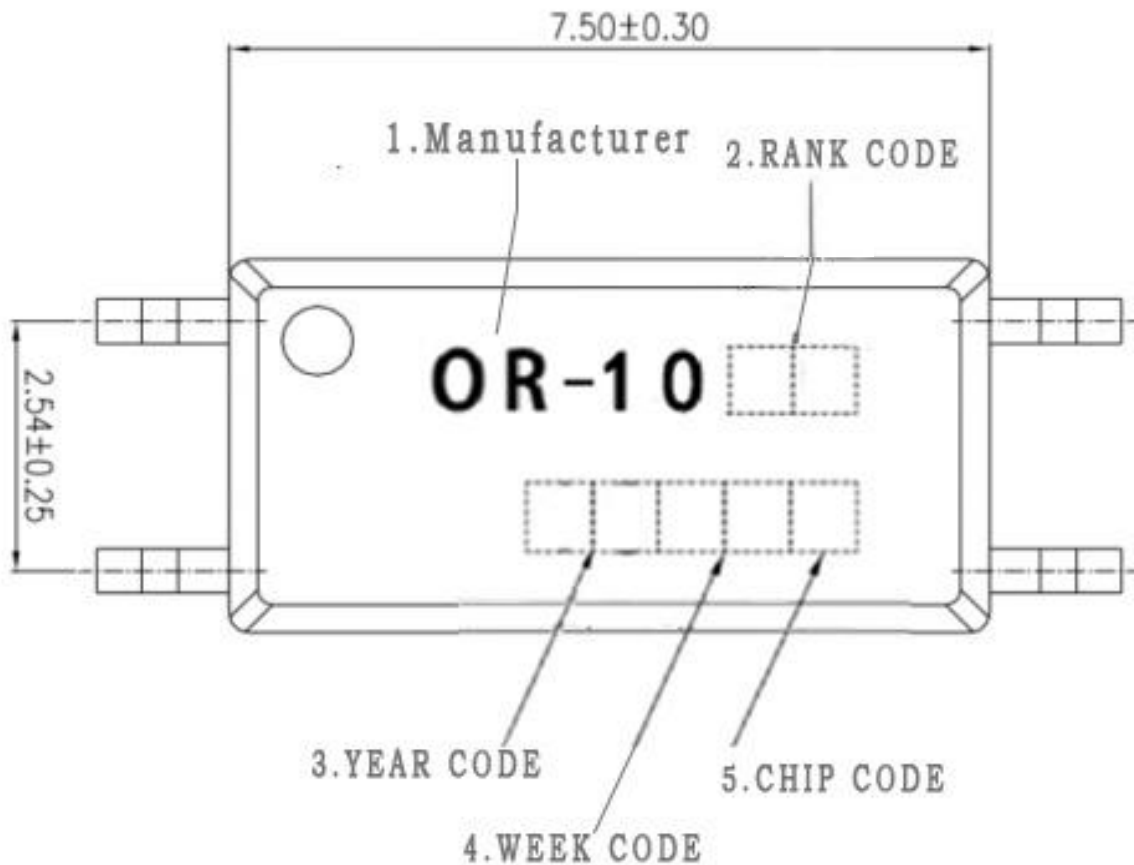
Parameter		Symbol	Condition	Min	Typ.*	Max	Unit
Input	Forward Current	$V_F$	$I_F=50mA$	---	1.25	1.6	V
	Reverse Voltage	$I_R$	$V_R=4V$	---	---	10	$\mu A$
	Collector capacitance	$C_t$	$V=0, f=1MHz$	---	50	---	pF
Output	Collector to emitter Current	$I_{CEO}$	$V_{CE}=20V,$ $I_F=0mA$	---	10	100	nA
	Collector and Emitter attenuation Voltage	$BV_{CEO}$	$I_C=1mA$ $I_F=0mA$	80	---	---	V
	Emitter and Collector attenuation Voltage	$BV_{ECO}$	$I_E=0.1mA$ $I_F=0mA$	7	---	---	V
Transforming Characteristics	*1 Current conversion ratio	CTR	$I_F=5mA$ $V_{CE}=5V$	50	---	600	%
	Collector Current	$I_C$		2.5	---	30	mA
	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=10mA$ $I_C=1mA$	---	---	0.3	V
	Insulation Impedance	$R_{iso}$	DC500V 40~60%R.H.	$10^{12}$	---	---	$\Omega$
	Floating Capacitance	$C_f$	$V=0, f=1MHz$	---	0.3	---	pF
	Response Time	$t_r$	$V_{CC}=5V,$ $I_C=2mA$ $R_L=100\Omega$	---	3	18	$\mu s$
	Descend Time	$t_f$		---	4.7	18	$\mu s$

\*1 Current Conversion Ratio =  $I_C / I_F \times 100\%$ , CTR Tolerance:  $\pm 3\%$ .

6. Rank Table of Current Transfer Ratio

CTR Rank	Min.	Typ.	Max.	Unit	Condition
OR-1000	50	—	600	%	IF=5mA, V <sub>CE</sub> =5V, Ta=25°C
OR-1001	100	—	160		
OR-1004	100	—	200		
OR-1005	50	—	150		
OR-1006	100	—	300		
OR-1007	80	—	160		
OR-1008	130	—	260		
OR-1009	200	—	400		
OR-1010	150	—	300		
OR-1019	250	—	500		
OR-1020	300	—	450		
OR-1002	22	—	—		
OR-1003	34	—	—		
OR-1014	56	—	—		
OR-1015	63	—	125		
OR-1018	100	—	200		
OR-1002	63	—	125	%	IF=10mA, V <sub>CE</sub> =5V, Ta=25°C
OR-1003	100	—	200		
OR-1014	160	—	320		

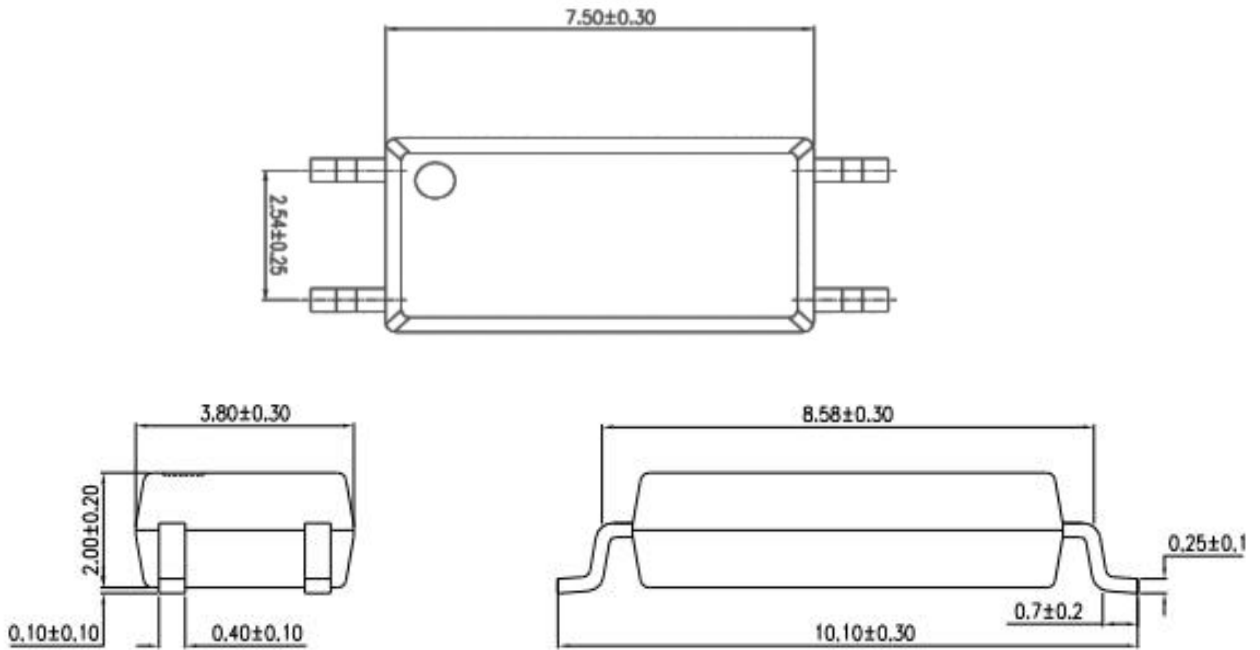
## 7.Naming Rule



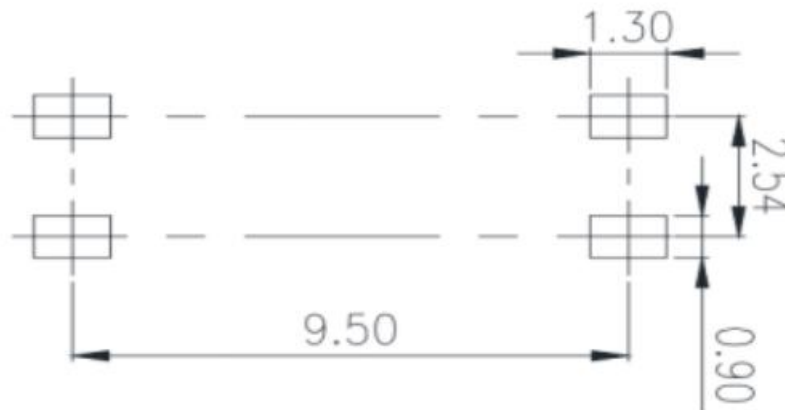
### 注:

- (1)OR denotes Shenzhen Orient Tech Ltd . Co ., Ltd.
- (2)  denotes Rank Code.
- (3)  denotes Year code.
- (4)  denotes Week code.
- (5)  denotes Chip Code
- (6) OR-10 denotes Device Part Number.
- (7) Unit:mm

### 8. Package Dimension



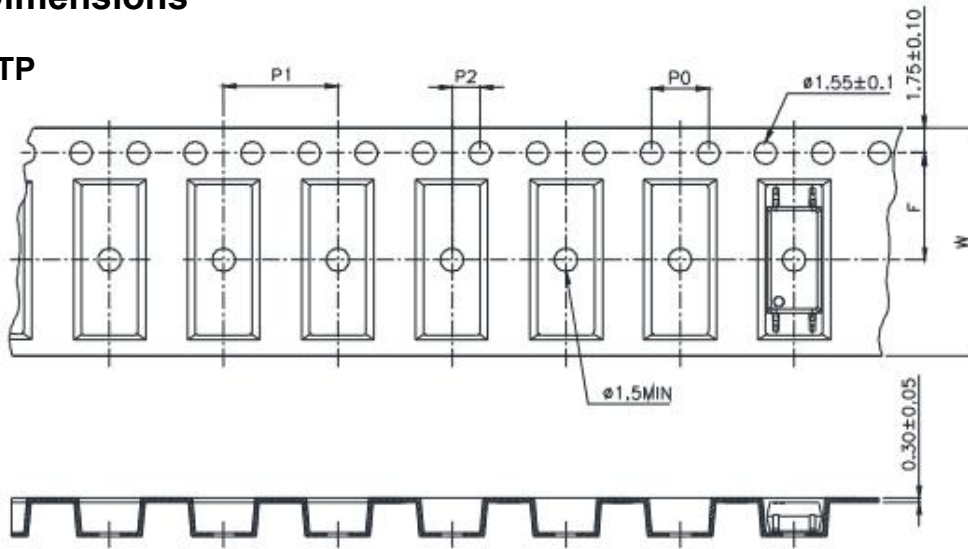
### 9. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



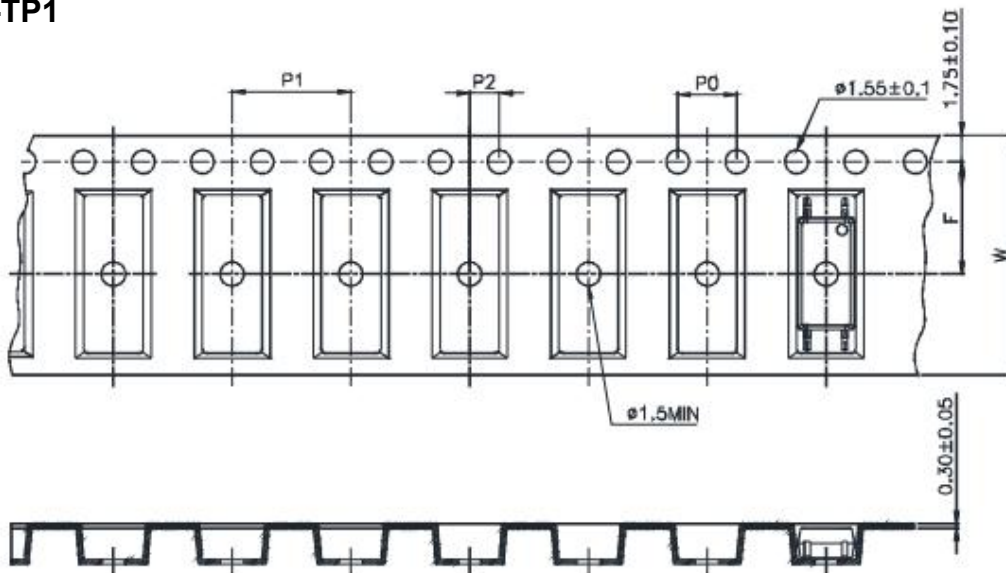
Unit:mm

## 10. Taping Dimensions

### (1) OR-10XX-TP



### (2) OR-10XX-TP1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P <sub>0</sub>	4±0.3 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P <sub>2</sub>	2±0.1 (0.079)
Distance of compartment to compartment	P <sub>1</sub>	8±0.1 (0.315)

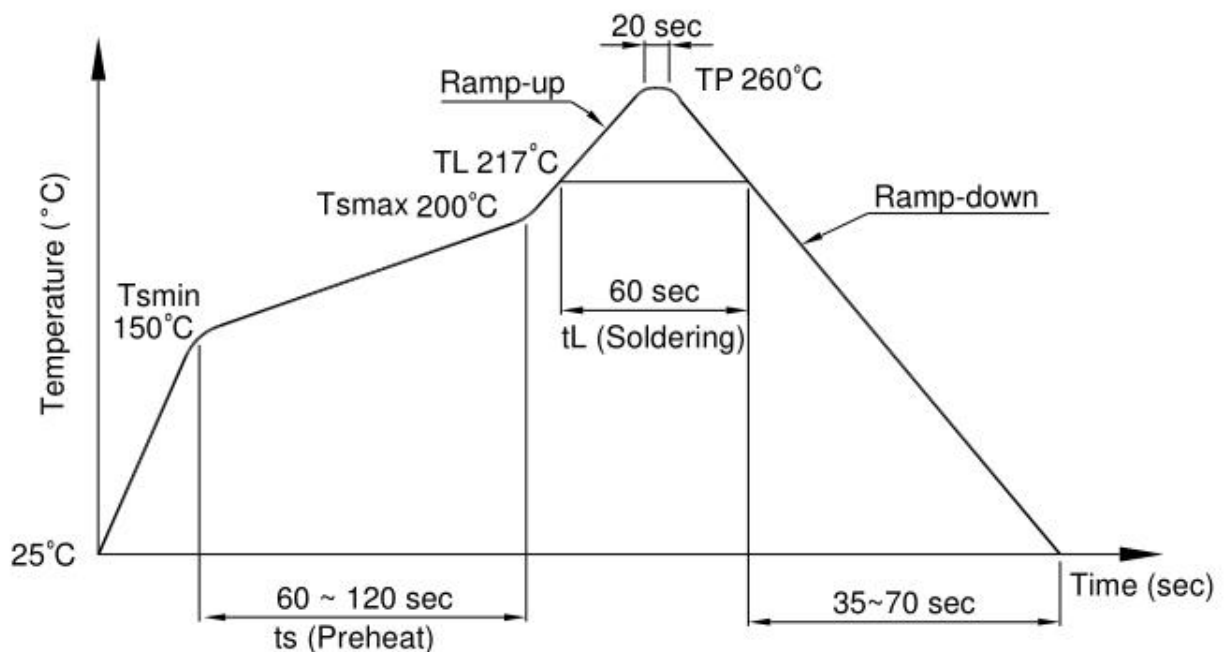
Package Type	OR-10XX series(TP/TP1)
Quantities(pcs)	3000

## 11. 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 ( $T_{Smin}$ )	150°C
- Temperature Max ( $T_{Smax}$ )	200°C
- Time (min to max) ( $t_s$ )	90±30 sec
Soldering zone	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 sec
Peak Temperature( $T_P$ )	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec

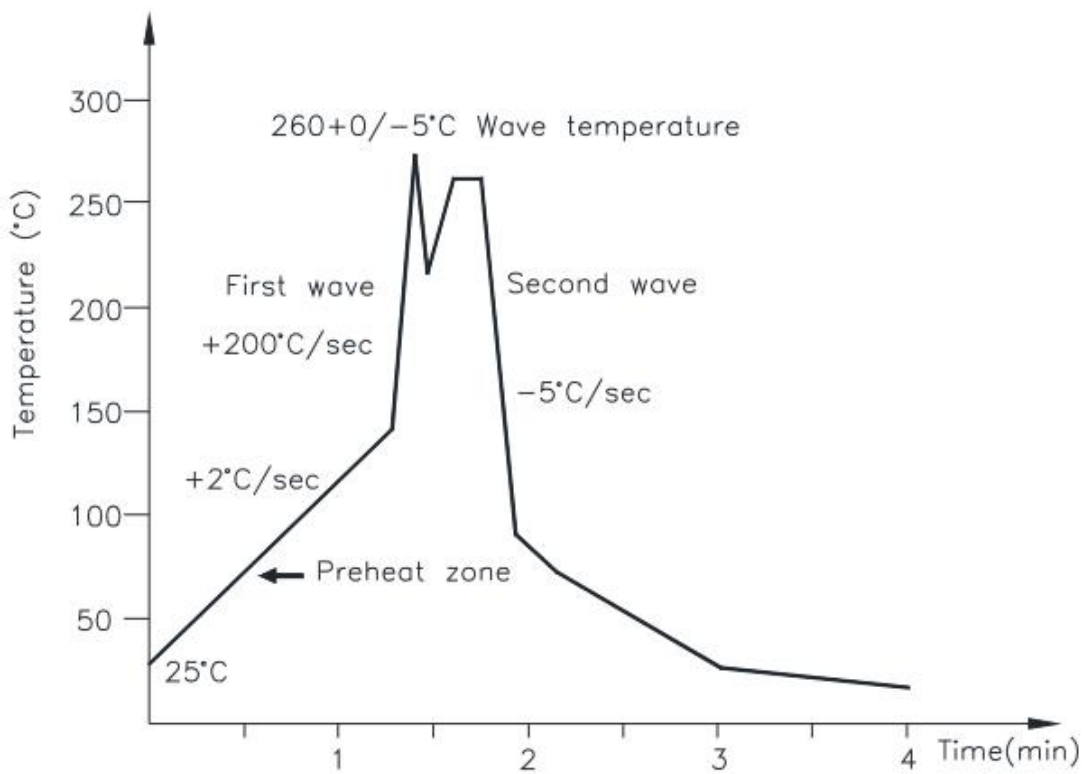




**(2).Wave soldering (JEDEC22A111 compliant)**

One time soldering is recommended within the condition of temperature.

Temperature	260+0/-5°C
Time	10 sec
Preheat temperature	25 to 140°C
Preheat time	30 to 80 sec



**(3).Hand soldering by soldering iron**

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

Temperature	380+0/-5°C
Time	3 sec max

## 12.Characteristics Curves

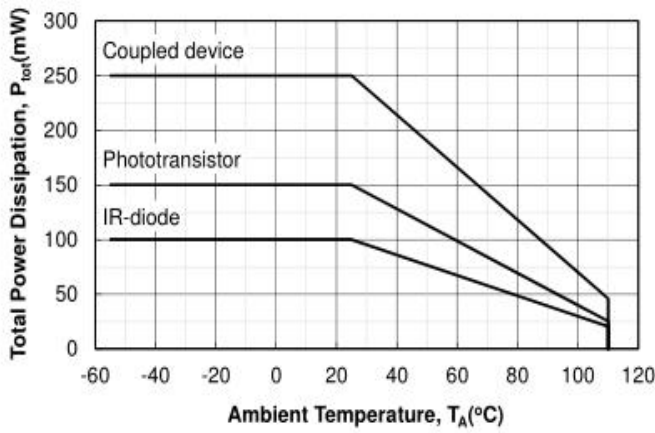


Figure 1.  $P_{tot}$  vs.  $T_A$

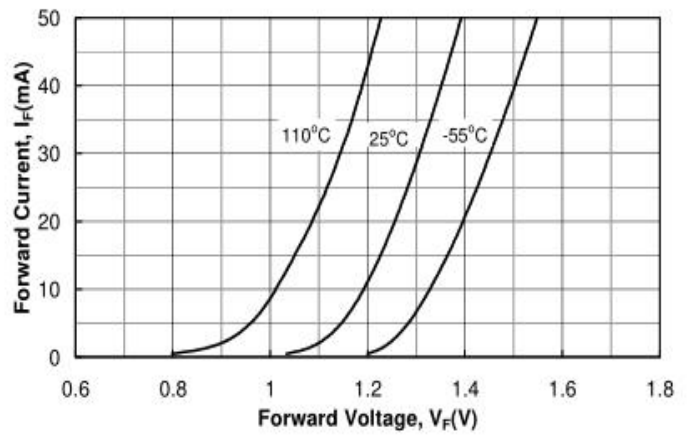


Figure 4.  $I_F$  vs.  $V_F$

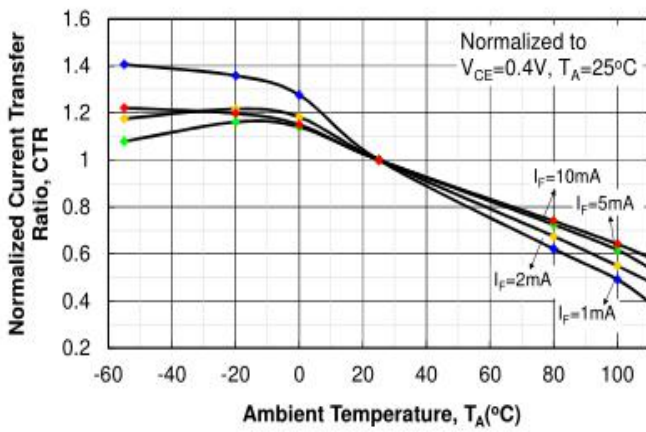


Figure 2. Saturated Normalized CTR vs.  $T_A$

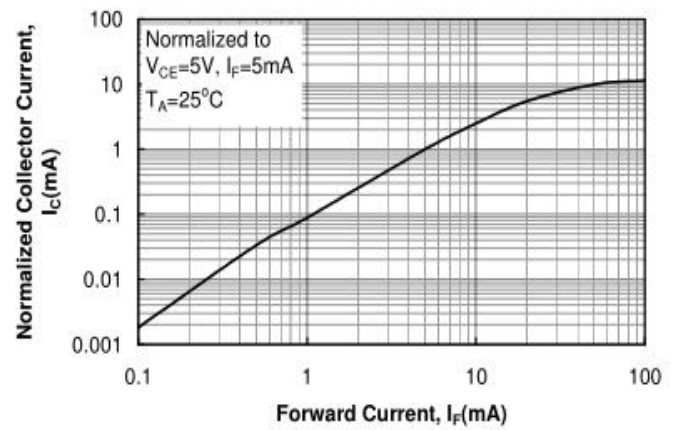


Figure 5. Normalized  $I_C$  vs.  $I_F$

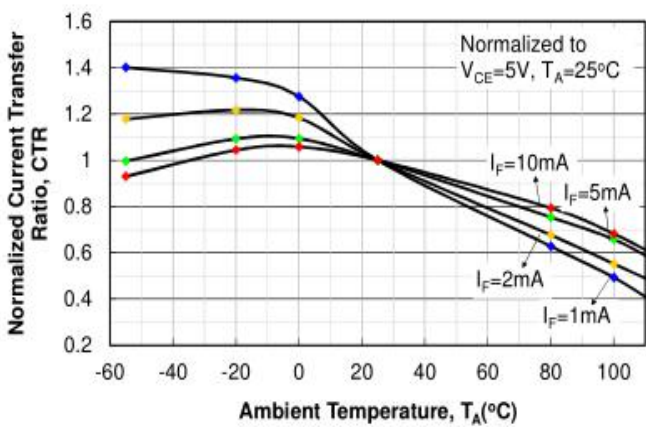


Figure 3. Non-saturated Normalized CTR vs.  $T_A$

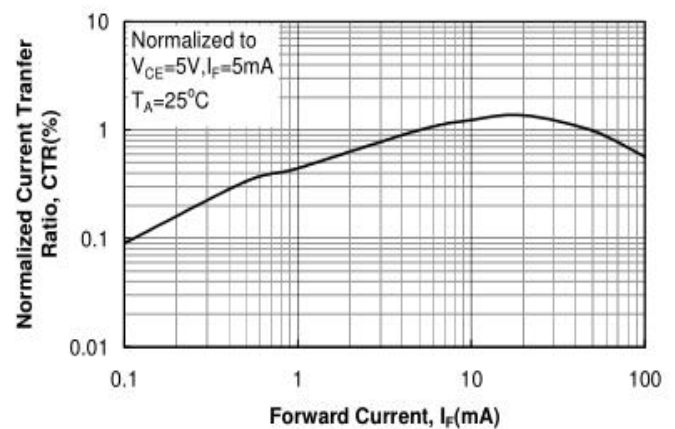


Figure 6. Normalized CTR vs.  $I_F$

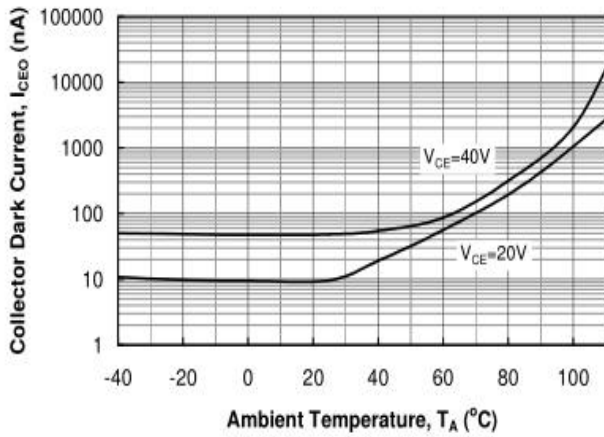


Figure 7.  $I_{CEO}$  vs.  $T_A$

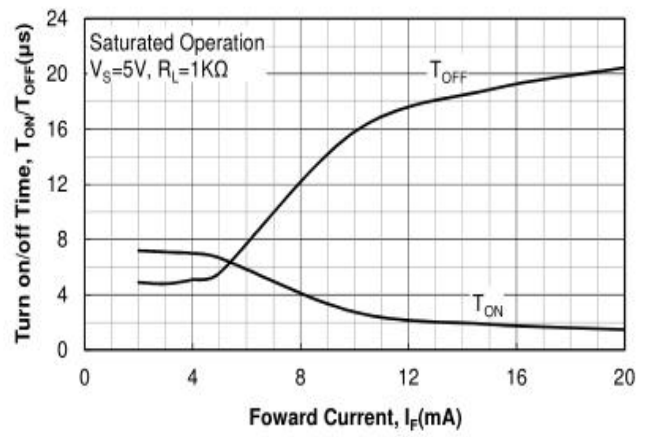


Figure 10.  $T_{ON} / T_{OFF}$  vs.  $I_F$

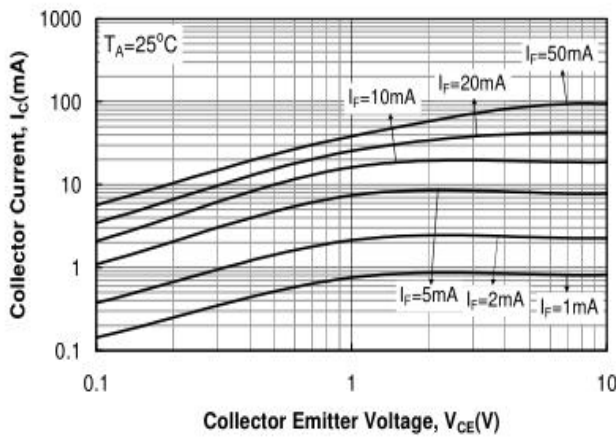


Figure 8.  $I_C$  vs.  $V_{CE}$

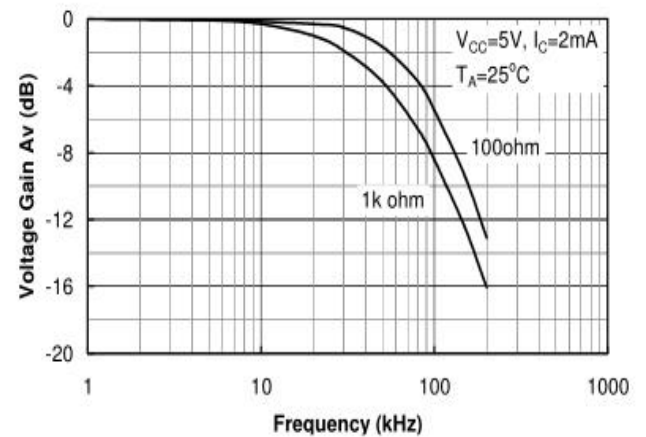


Figure 11. Frequency Response

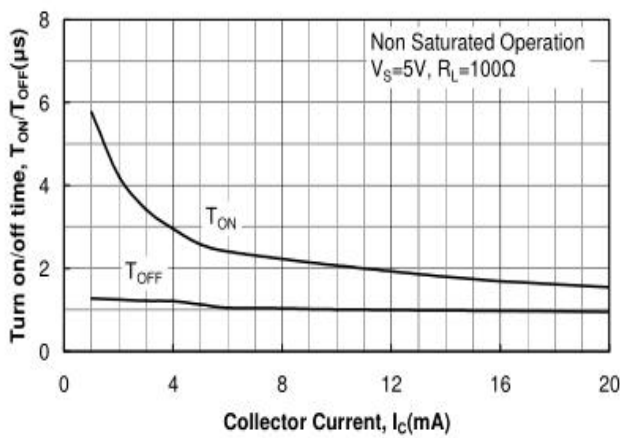


Figure 9.  $T_{ON} / T_{OFF}$  vs.  $I_C$



► **Notes:**

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