



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-D2XX

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO ., LTD

Block A3rd Floor No.4 Building, Tian'an Cyber Park, Huangge Rd, LongGang Dist, Shenzhen, GD

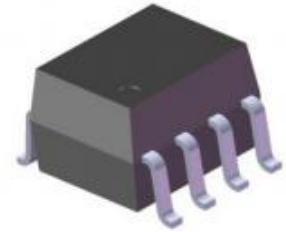
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www.orient-opto.com

1. Features

- (1) High isolation voltage between input and output ($V_{iso} = 3750 \text{ Vrms}$)
- (2) Operating temperature range of -55 to $+110^{\circ}\text{C}$
- (3) High BV_{ceo} of 80V
- (4) Standard SO-8 footprint package
- (5) Pb free and RoHS compliant.
- (6) Response time (t_r : TYP. $4\mu\text{s}$ at $V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$)
- (7) Safety approval
 - UL approved (No.E323844)
 - VDE approved (No.40029733)
 - CQC approved (No.CQC19001231254)
- (8) In compliance with RoHS, REACH standards
- (9) MSL Class I



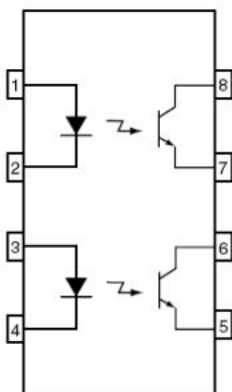
2. Description

- (1) OR-D2XX photo coupler consist of one piece of GaAs emitter and one piece of NPN transistor.
- (2) The devices are packaged in an 8-pin small outline package which conforms to the standard SO-8 footprint

3. Applications

- (1) Switching power supply
- (2) Feedback Control Circuits
- (3) Interfacing and coupling systems of different potentials and impedances
- (4) General Purpose Switching Circuits
- (5) Monitor and Detection Circuits

4. Functional Diagram



Pin Configuration

- 1. Anode
- 2. Cathode
- 3. Anode
- 4. Cathode
- 5. Emitter
- 6. Collector
- 7. Emitter
- 8. Collector

6. Absolute Maximum Ratings at Ta=25°C

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	60	mA
	Peak forward Current (100µs pulse, 100Hz frequency)	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Consume Power	P	70	mW
Output	Collector and emitter Voltage	V_{CEO}	80	V
	Emitter and collector Voltage	V_{ECO}	7	
	Collector Current	I_C	50	mA
	Consume Power	P_C	150	mW
Total Consume Power		P_{tot}	200	mW
*1 Insulation Voltage		V_{iso}	5,000	Vrms
Max Insulation Voltage (Insulating oil test)		V_{IOTM}	10,000	V
Rated Impulse Insulation Voltage		V_{IORM}	630	V
Working Temperature		T_{opr}	-55 to + 110	°C
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

7. Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Parameter		Symbol	Min	Typ.*	Max	Unit	Condition
Input	Forward Voltage	V_F	---	1.2	1.4	V	$I_F=20\text{mA}$
	Reverse Current	I_R	---	0.1	100	μA	$V_R=5\text{V}$
	Collector capacitance	C_t	---	30	250	pF	$V=0, f=1\text{KHz}$
Output	Collector to emitter Current	I_{CEO}	---	5	50	nA	$V_{CE}=10\text{V}, I_F=0\text{mA}$
	Collector and Emitter attenuation Voltage	BV_{CEO}	80	---	---	V	$I_C=0.1\text{mA}, I_F=0\text{mA}$
	Emitter and Collector attenuation Voltage	BV_{ECO}	7	---	---	V	$I_E=0.1\text{mA}, I_F=0\text{mA}$
Transforming Characteristics	Collector and Emitter Saturation Voltage	$V_{CE(sat)}$	---	0.1	0.2	V	$I_F=20\text{mA}, I_C=1\text{mA}$
	Insulation Impedance	R_{iso}	5×10^{10}	1×10^{12}	---	Ω	DC500V 40~60%R.H.
	Floating Capacitance	C_f	---	0.6	1.0	pF	$V=0, f=1\text{MHz}$
	Cut-off Frequency	f_c	---	80	---	kHz	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$
	Rise Time	t_r	---	4	18	μs	$V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$
	Descend Time	t_f	---	3	18	μs	

8. Current conversion ratio Rank (CTR)

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit
Current conversion ratio	OR-D205	CTR	$I_F=10\text{mA}, V_{CE}=5\text{V}$	40	---	80	%
	OR-D206			63	---	125	
	OR-D207			100	---	200	
	OR-D211			20	---	---	
	OR-D213			100	---	---	
Current conversion ratio	OR-D205	CTR	$I_F=1\text{mA}, V_{CE}=5\text{V}$	13	30	---	%
	OR-D206			22	45	---	
	OR-D207			34	70	---	
	OR-D217			100	120	---	



9. Order Information

Part Number

OR-D2XX-Y-Z

Note

D2XX = Part Number, D205, D206, D207, D211, D213 or D217.

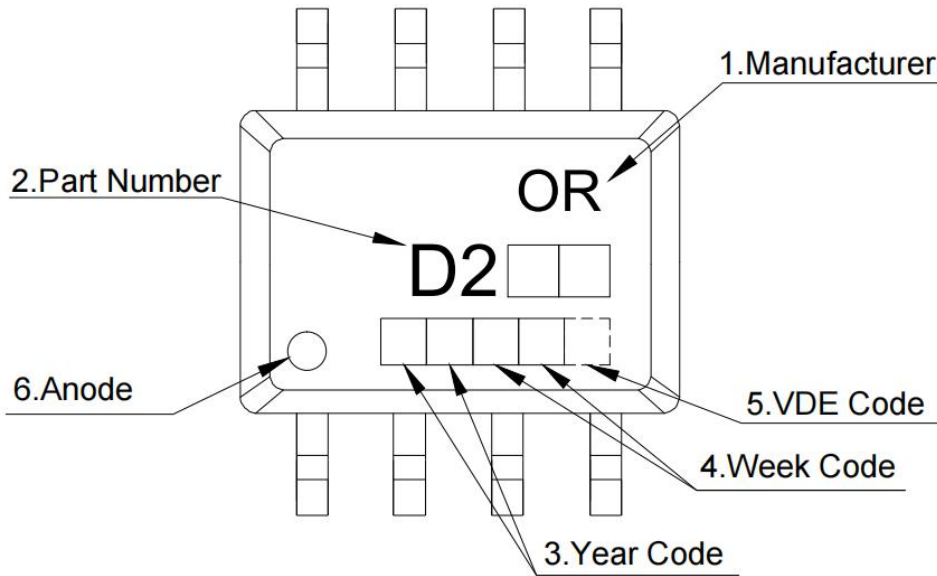
Y = Tape and reel option (TA,TA1 or none).

Z = 'V' code for VDE safety (This options is not necessary).

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S(TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S(TA1)	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

10. Naming Rule

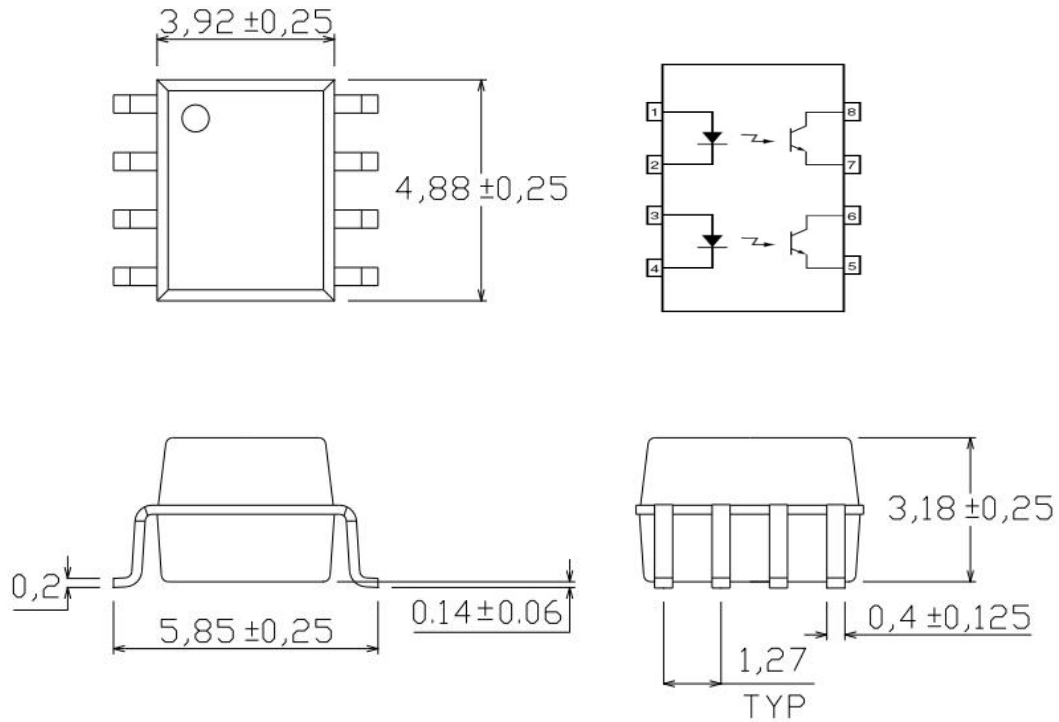


- 1. Manufacturer : ORIENT.
- 2. Part Number : D205, D206, D207, D211, D213 or D217.
- 3. Year Code : '21' means '2021' and so on.
- 4. Week Code : 01 means the first week, 02 means the second week and so on.
- 5. VDE Code . (Optional)
- 6. Anode.

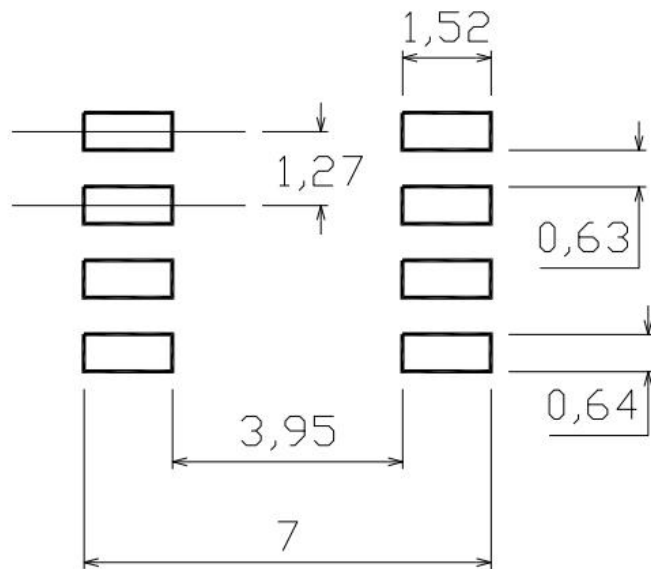
* VDE Mark can be selected.

11. Package Dimension

OR-D2XX



12. Recommended Foot Print Patterns (Mount Pad)

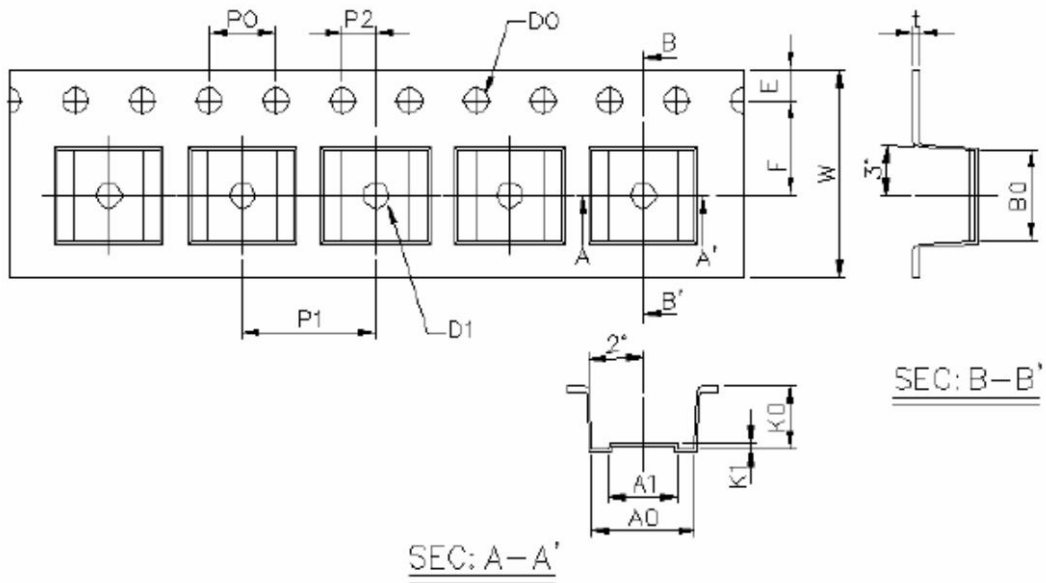
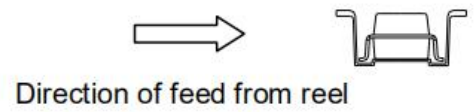
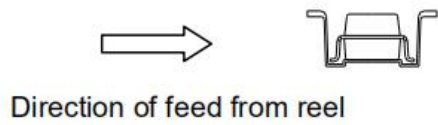
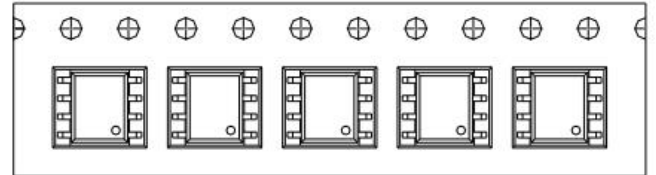
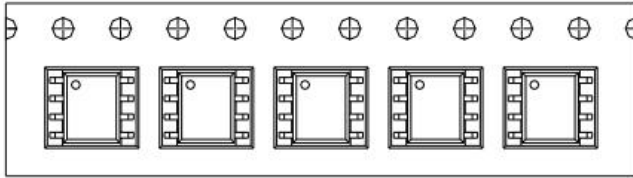


unit: mm

13. Taping Dimensions

(1)OR-D2XX-TA1

(2)OR-D2XX-TA



Dimension No.	A0	A1	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	4.1±0.1	5.28±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	Po	P1	P2	t	W	K0	K1
Dimension(mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.4±0.1	12.0+0.3/ -0.1	3.7±0.1	0.3±0.1

Encapsulation type	TA1/TA
amount (pcs)	2000

14. Package Dimension

(1) package dimension


Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	2,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	4,000pcs
Max qty per large box	40,000pcs

(2)Packing Label Sample




Material Code : 120PCXXXXXX

P/N : OR-XXXXXX

Lot No. : XXXXXX-XXXX-TX-X

D/C : XXXX

Qty : XXXX PCS



内箱码

外箱码

“XXXXXXXXXXXXXXXX” (一体机序列码)

Made in China

Note:

1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

15. Reliability Test

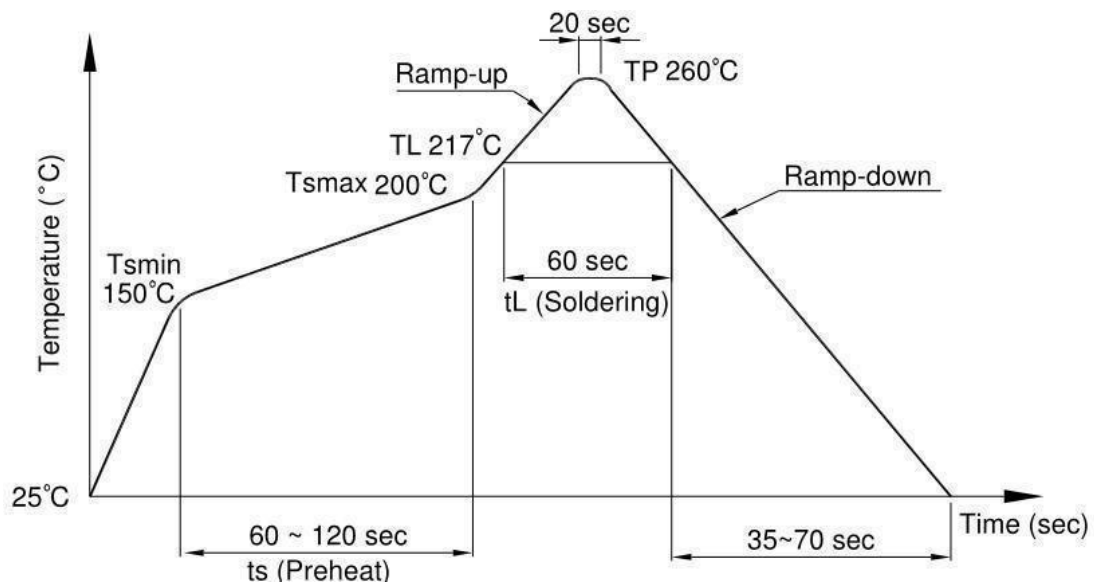
NO.	ITEMS	Reliability Testing				
		QTY. (Pcs)	Condition	Process	Device	Standard
1	RSH 耐焊接热	22	260±5℃	10s/3 次	锡炉	JESD22-A106
2	HTSL 高温存储	77	125℃	168 hrs	高温烤箱 测试仪	JESD22-A103
				500 hrs		
				1000 hrs		
3	LTSL 低温存储	77	-55℃	168 hrs	低温箱 测试仪	JESD22-A119
				500 hrs		
				1000 hrs		
4	TC 温度循环	77	H:125℃ 15min ∫ 5min L:-55℃ 15min	300 cycle	冷热冲击机	JESD22-A104
5	TS 温度冲击	77	H:100℃ 5min ∫ 15s L:-40℃ 5min	300 cycle	冷热冲击机	JESD22-A106
6	HTOL 高温操作	77	110℃ IF=10mA Vce=5V	168 hrs	高温烤箱 测试仪、老 化电路板	JESD22-A108
				500 hrs		
				1000 hrs		
7	ESD-HBM 人体模式	22	≥8KV 1Cycle	1次	ESD静电测 试仪	JESD22-A114
8	SD 可焊性	22	Pb-free 245±5℃	5S/1次	锡炉	JESD22-B102
9	HTRB 高温反向偏压	77	HTRB @125℃ Vce=80v	168 hrs	高温烤箱 , 测试仪	JESD22-A103
				500 hrs		
				1000 hrs		
10	H3TRB 温湿度反向偏 压, 寿命试验	77	H3TRB 85℃,85%RH Vce=80v	168 hrs	恒温恒湿 机, 测试仪	JESD22-A101
				500 hrs		
				1000 hrs		
11	Autoclave 压力锅	77	Ta=121 ℃,100%RH,2atm	96hrs	压力锅	JESD22-A102

16. 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.

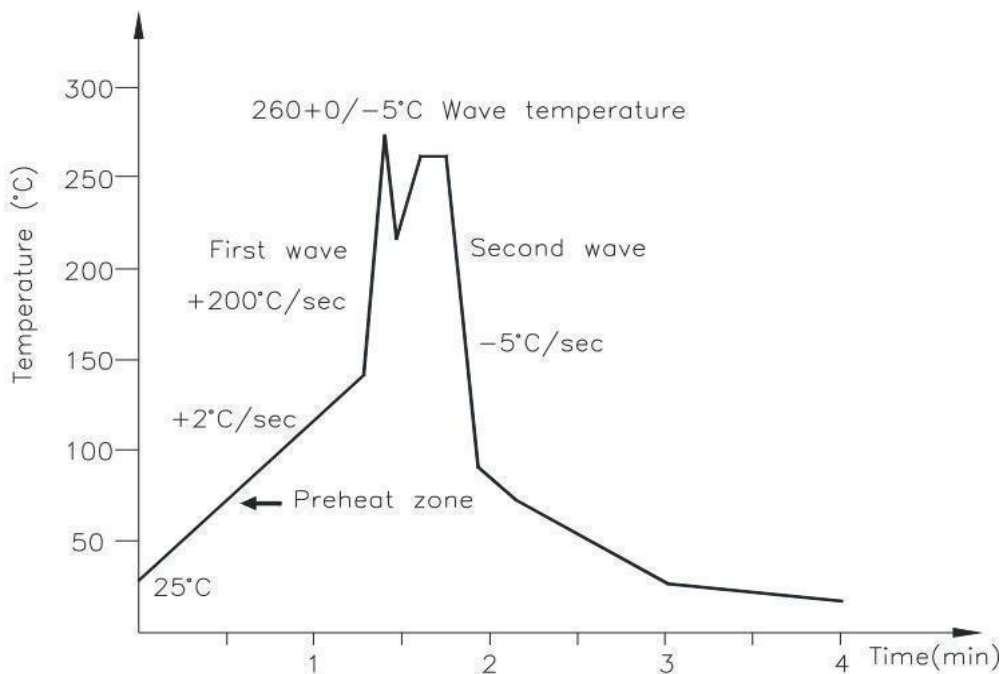
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature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



(2).Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature	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

17. Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

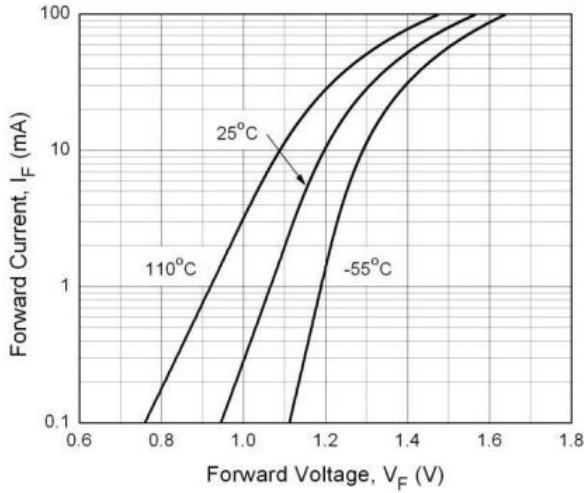


Figure 2. Normalized Collector Current vs. Forward Current

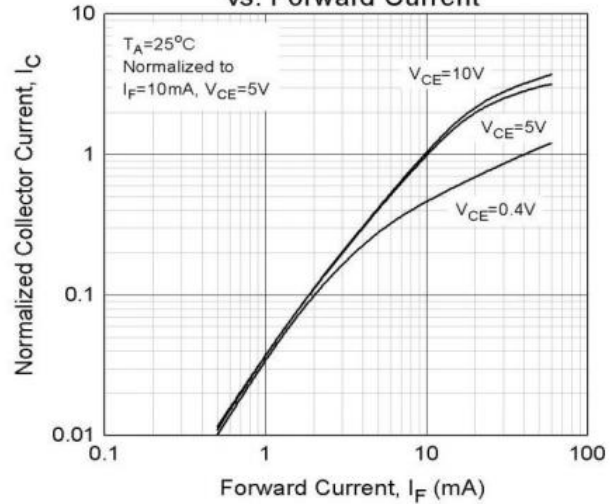


Figure 3. Normalized Collector Current vs Ambient Temperature

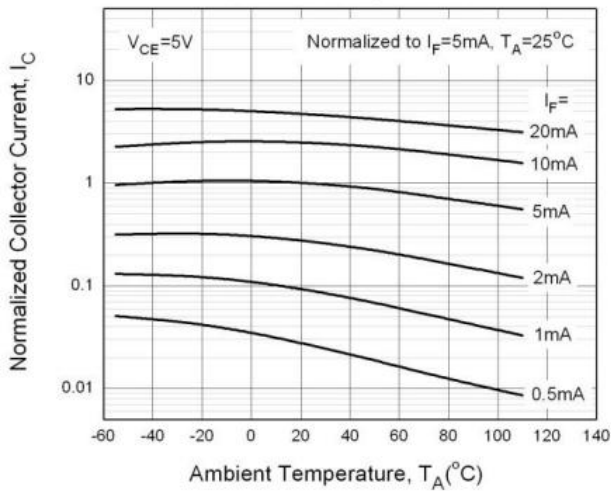


Figure 4. Collector Dark Current vs Ambient Temperature

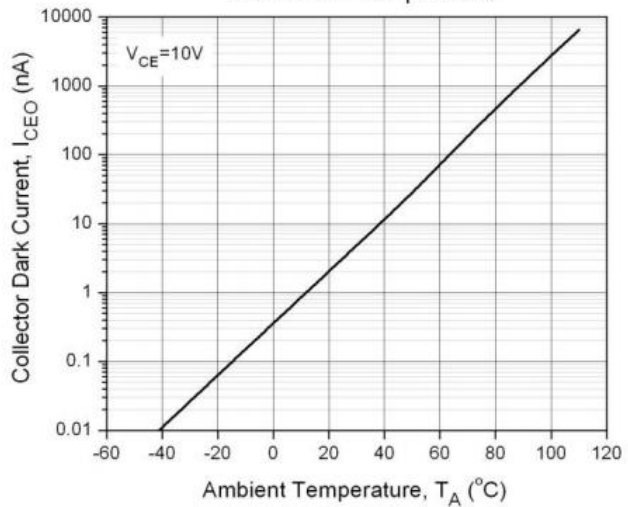


Figure 5. Collector Current vs Collector-Emitter Voltage

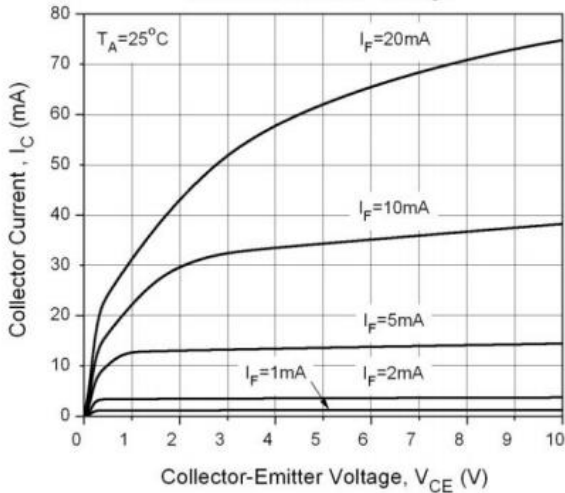
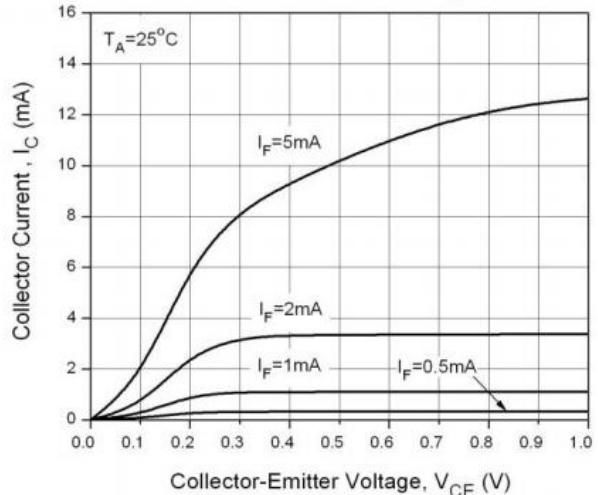


Figure 6. Collector Current vs Collector-Emitter Voltage



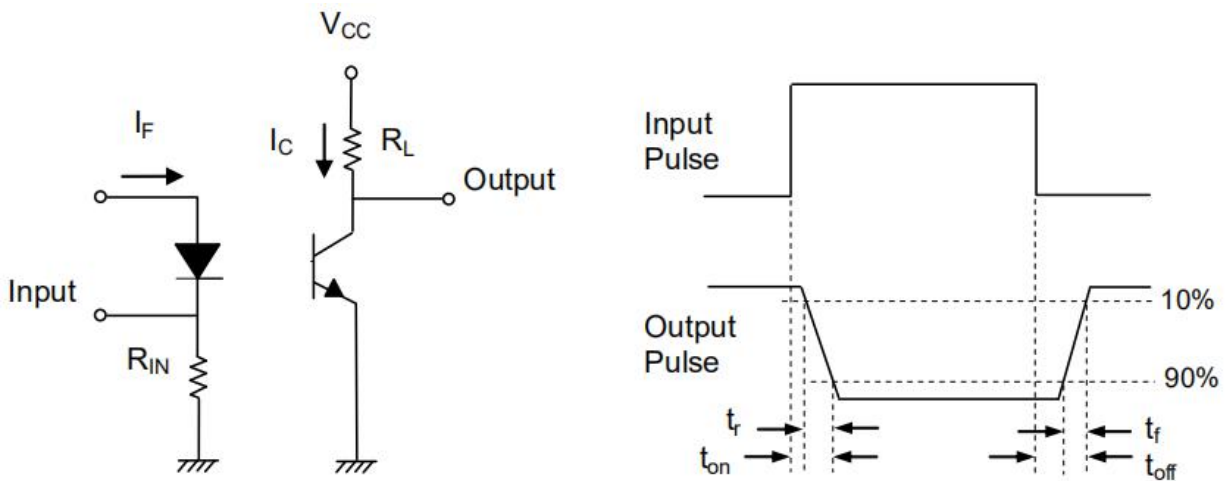
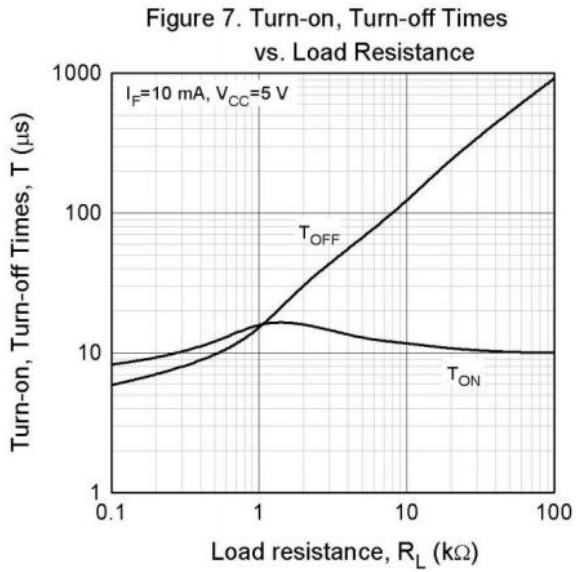


Figure 8. Switching Time Test Circuit & Waveforms