



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-3H5

Customer: _____

Date: _____

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1. Features

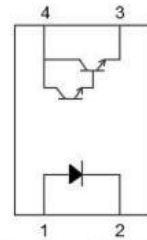
1. Current transfer ratio (CTR) : 600% Min. at $I_F = 1\text{mA}$, $V_{CE} = 2\text{V}$
2. High input-output isolation voltage. ($V_{ISO}=3,750\text{Vrms}$)
3. Employs double transfer mold technology
4. Operating temperature: -55°C to 100°C
5. Lead free, in compliance with RoHS standards



2. Instructions

The OR-3H5 series device contains an infrared emitting diodes, optically to a photo Darlington detector.

They are encapsulated in a 4-pin SSOP, free of halogens and Sb2O3



1 Anode 2 Cathode
3 Emitter 4 Collector

3. Application Range

- (1). Hybrid substrates that require high density mounting
- (2). Programmable controller

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

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I_F	50	mA
	Peak forward current($t=10\mu\text{s}$)	I_{FM}	1	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	100	mW
	Junction Temperature	T_J	125	$^\circ\text{C}$
Output	Collector and emitter Voltage	V_{CEO}	40	V
	Emitter and collector Voltage	V_{ECO}	7	
	Collector Current	I_C	90	mA
	Power Dissipation	P_C	150	mW
	Junction Temperature	T_J	125	$^\circ\text{C}$
*1 Insulation Voltage		V_{iso}	3750	Vrms
Operating Temperature		T_{opr}	-55 to +125	$^\circ\text{C}$
Storage Temperature		T_{stg}	-55 to +150	
*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(Normal Temperature=25°C)

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit
Input	Forward Current	V_F	$I_F=5mA$	---	1.1	1.4	V
	Reverse Current	I_R	$V_R=5V$	---	---	5	μA
	Terminal Capacitance	C_t	$V=0, f=1KHz$	---	30	250	pF
Output	Collector Dark Current	I_{CEO}	$V_{CE}=40V, I_F=0$	---	---	400	nA
	Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C=0.1mA$ $I_F=0$	40	---	---	V
	Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E=0.1mA$ $I_F=0$	7	---	---	V
Transforming Characteristics	1.Current Transfer Ratio	CTR	$I_F=1mA$ $V_{CE}=2V$	600	---	7500	%
	Collector Current	I_C		6	---	75	mA
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=1mA$ $I_C=2mA$	---	---	1	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(Rise)	t_r	$V_{CC}=5V,$ $I_C=2mA$ $R_L=100\Omega$	---	200	---	μs
	Descend Time(fall)	t_f		---	200	---	μs

- Current Conversion Ratio = $I_C / I_F \times 100\%$

6. Rank table of current transfer ratio CTR

MODEL NO.	CTR Rank	Min.	Max.	Unit	Condition
OR-3H5	NO mark	600	---	%	IF=1mA, V _{CE} =2V, Ta=25°C

- Current Conversion Ratio = $I_C / I_F \times 100\%$

7. Order Information

Part Number

OR-3H5-X-Y-Z

Note

X = Tape and reel option (TP or TP1).

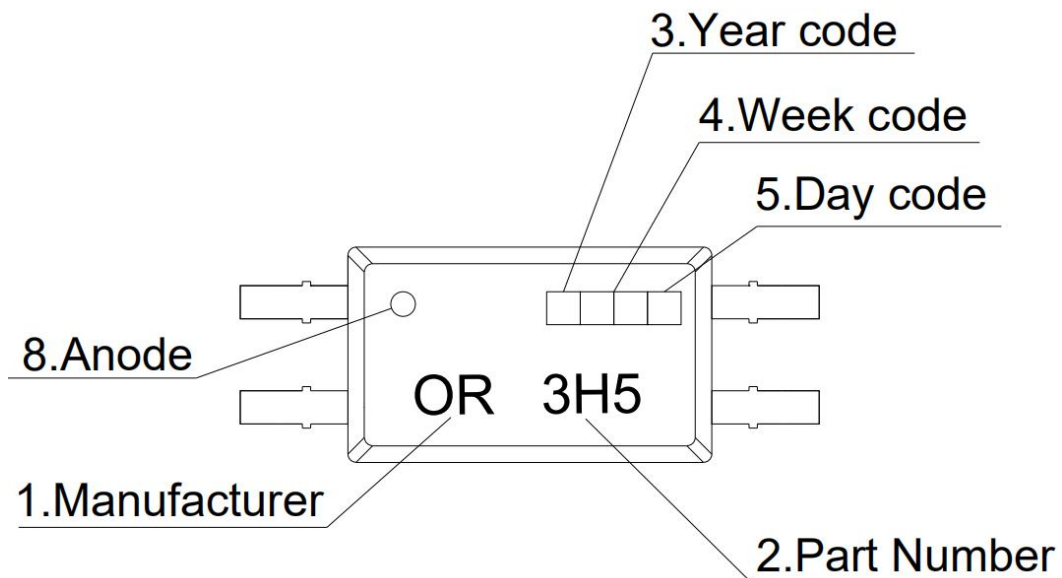
Y = 'V' code for VDE safety (This options is not necessary).

Z = 'G' code for Halogen free.

* VDE Code can be selected.

Option	Description	Packing quantity
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

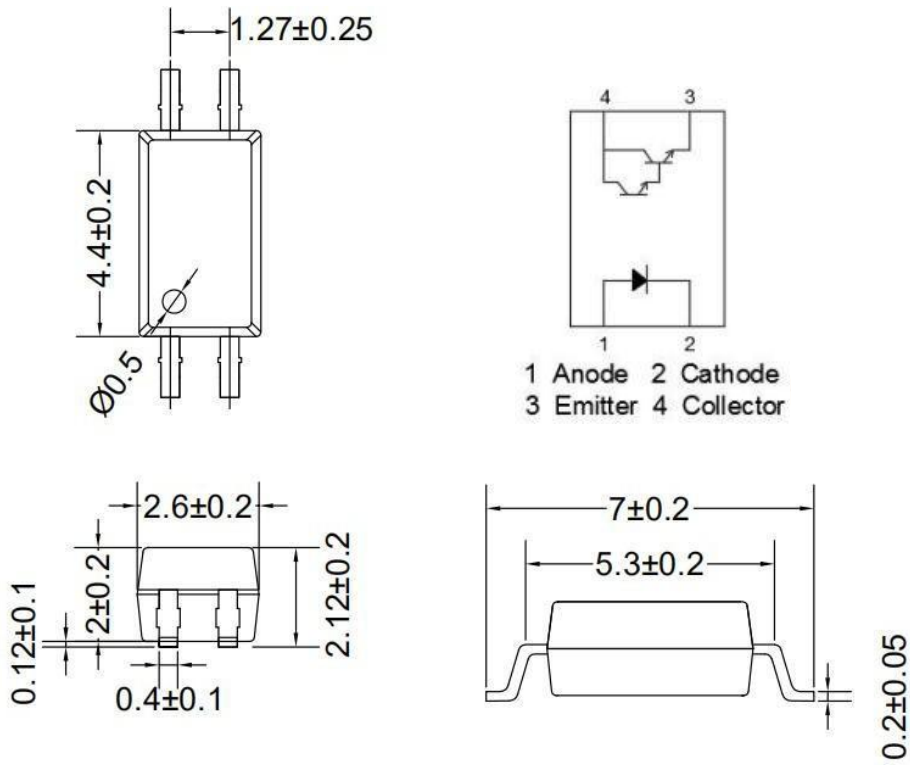


1. ORIENT
2. '3H5' denotes device type code.
3. Year Code: '9' means '2019' and so on.
4. Week Code: 01 represents the first week, 02 represents the second week, and so on.
5. Day Code: 'A to F' means 'Monday to Sunday'.
6. Anode.

* Halogen Free Mark can be selected.

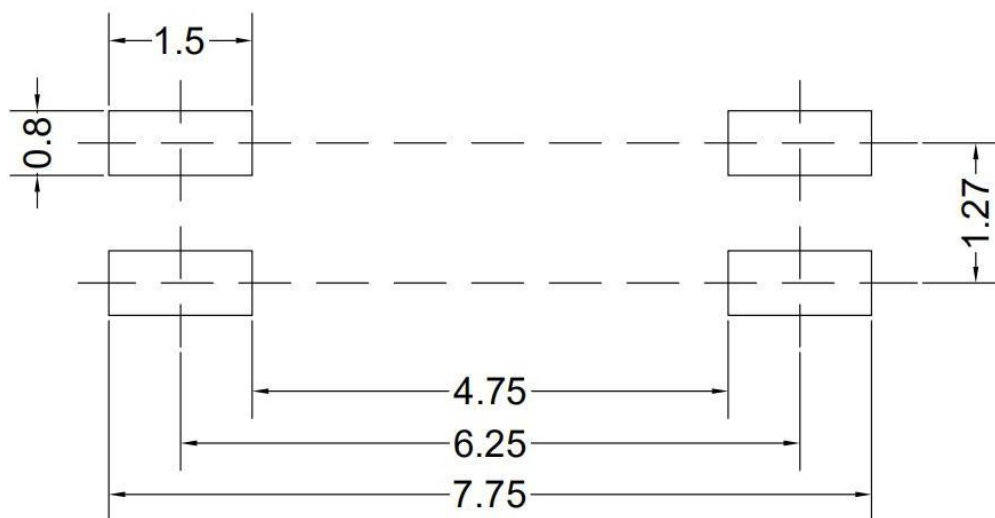
* VDE Mark can be selected.

8. Outer Dimension



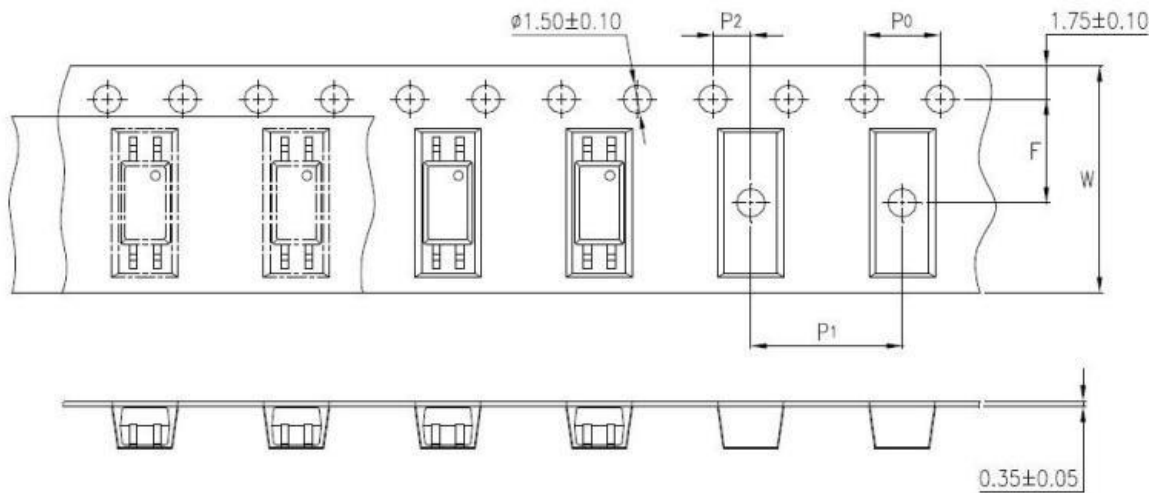
9. Recommended Foot Print Patterns (Mount Pad)

(unit : mm)

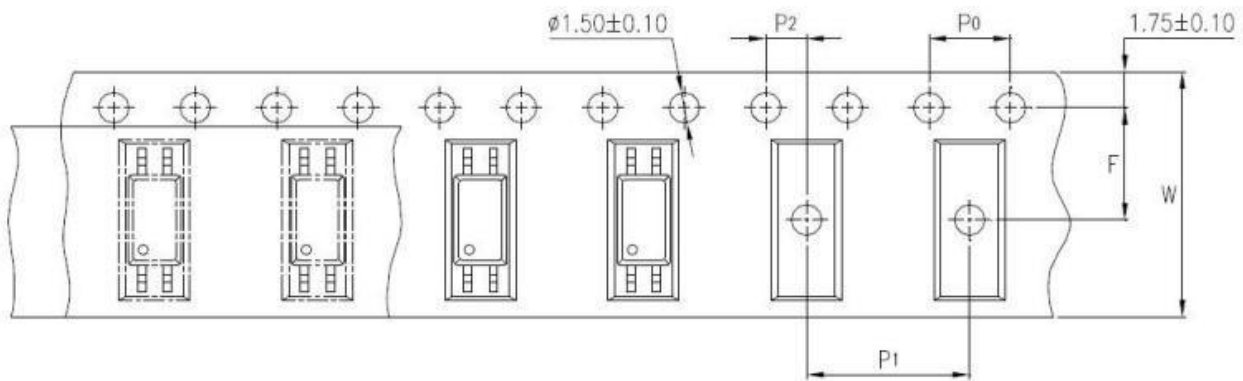


10. Taping Dimensions

(1) OR-3H5-TP



(2) OR-3H5-TP1



type	Symbol	Dimensions: mm (in.)
bandwidth	W	12 ± 0.3 (0.47)
pitch	P_0	4 ± 0.1 (0.15)
pitch	F	5.5 ± 0.1 (0.217)
	P_2	2 ± 0.1 (0.079)
interval	P_1	8 ± 0.1 (0.315)

Encapsulation type	TP/TP1
Quantity (pieces)	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

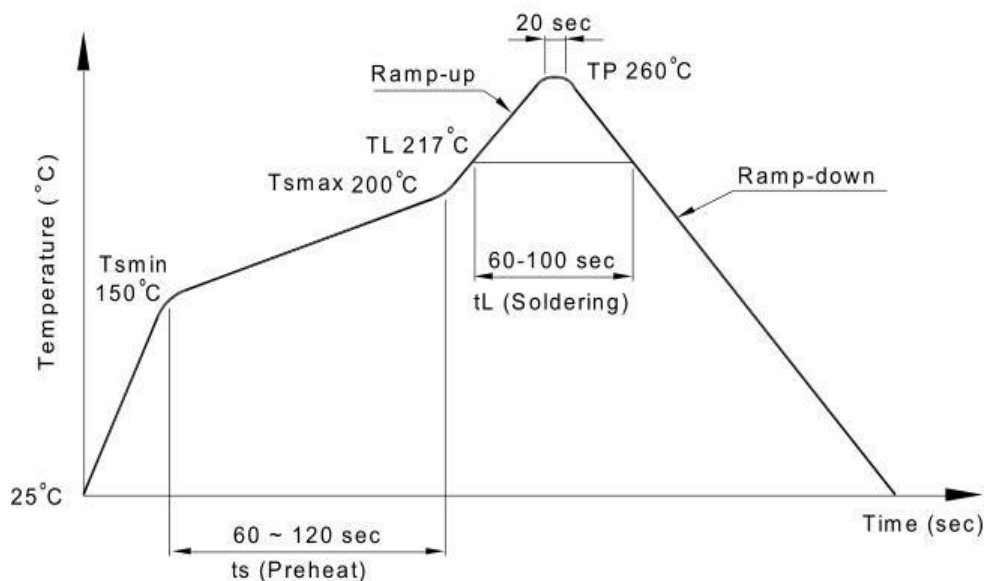
NO.	Item	Condition	Quantity	Cycle	Reference Standards
1	RSH, Resistance to Solder Heat	260±5°C,20s/cycle	22	3 cycles	JESC22A-106
2	SD, Solderability	260±5°C, 10s/cycle	22	1 cycle	JESD22-B102
3	TC, Temperature Cycle	H: 125°C 15min ∫ 5min L: -55°C 15min	77	300cycles	JESC22A-104
4	TS, Thermal Shock	H:100°C 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)

Note: one solder backflow is recommended under the conditions described below in the temperature and time profile. Do not weld more than three times.

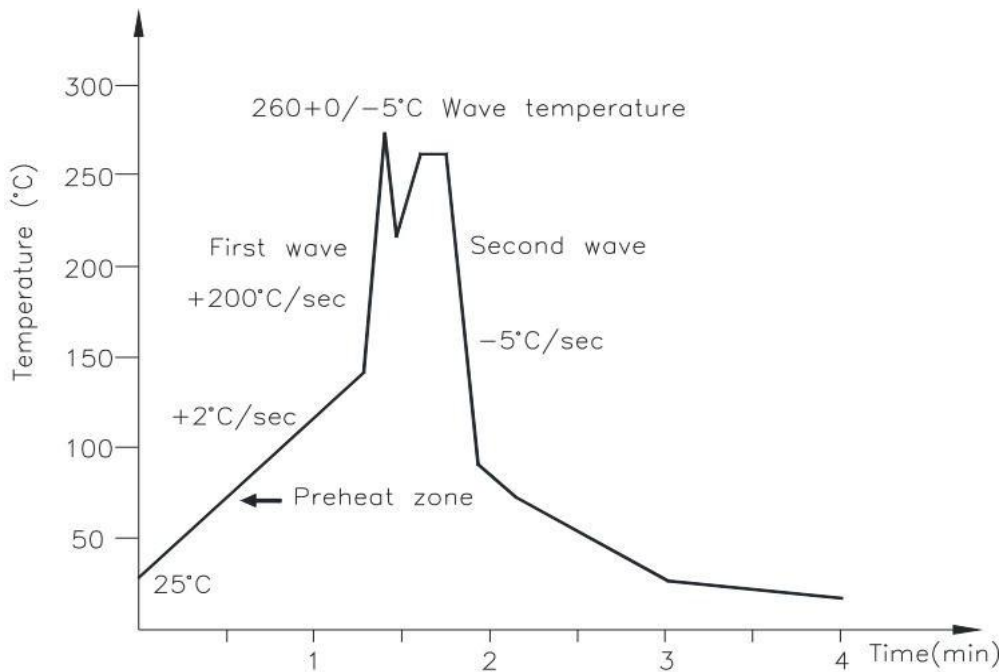
Profile item	Conditions
Preheat	
- Temperature Min (T Smin)	150°C
- Temperature Max (T Smax)	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL)	217°C
- Time (t L)	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature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



(2) Wave soldering (JEDEC22A111 compliant)

One-time welding is recommended under the temperature condition.

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



(3) Hand soldering by soldering iron

Single lead welding is allowed in each process and one-time welding is recommended.

Temperature	380+0/-5°C
Time	3 sec max

14. Characteristics Curve

Figure 1. Diode Power Dissipation vs. Ambient Temperature

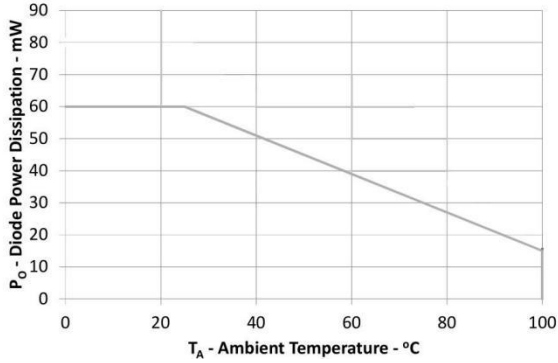


Figure 2. Transistor Power Dissipation vs. Ambient Temperature

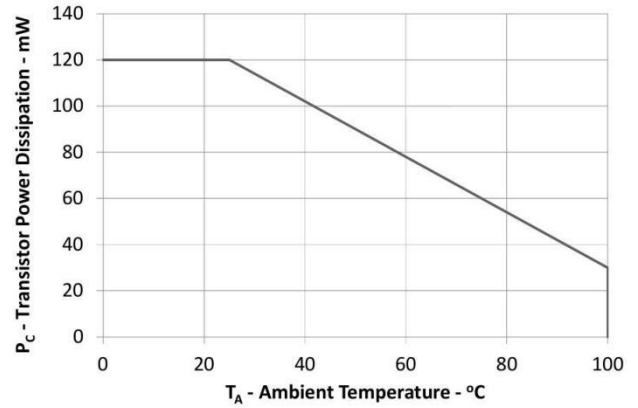


Figure 3. Forward Current vs. Forward Voltage

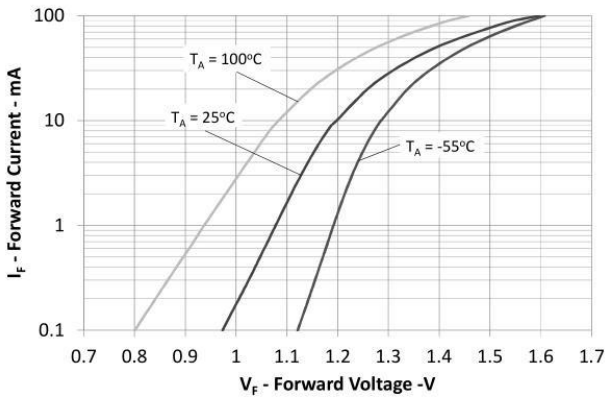


Figure 4. Collector Current vs. Non-Saturated Collector to Emitter Voltage

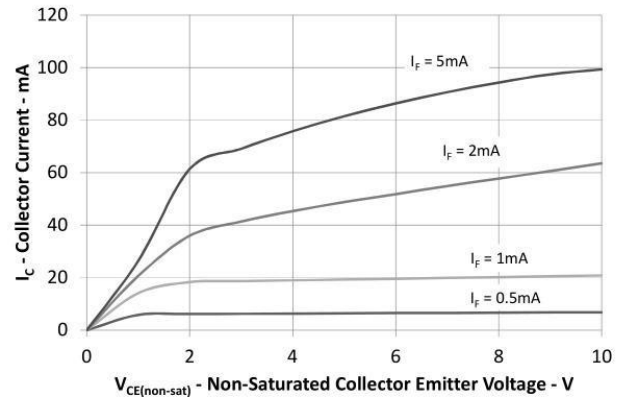


Figure 5. Collector to Emitter Dark Current vs. Ambient Temperature

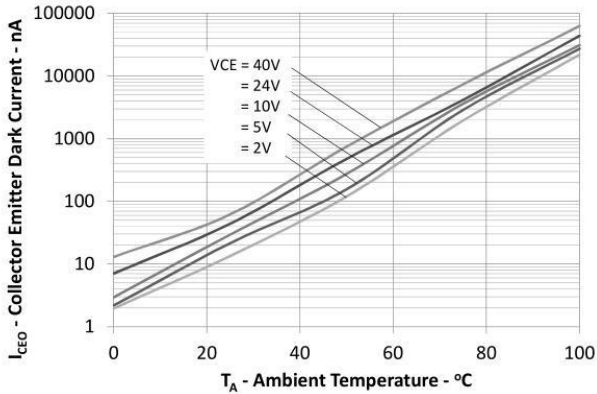


Figure 6. Collector Current vs. Saturated Collector to Emitter Voltage

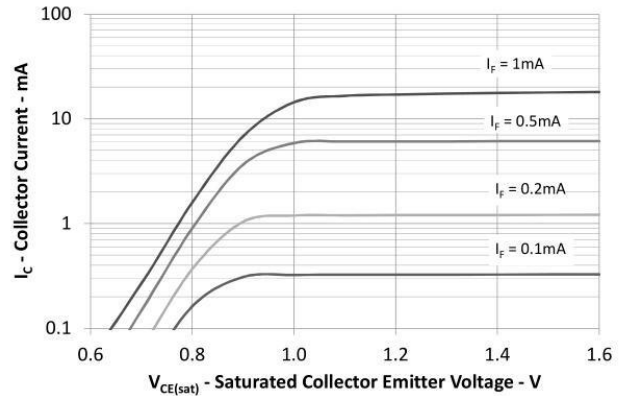


Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

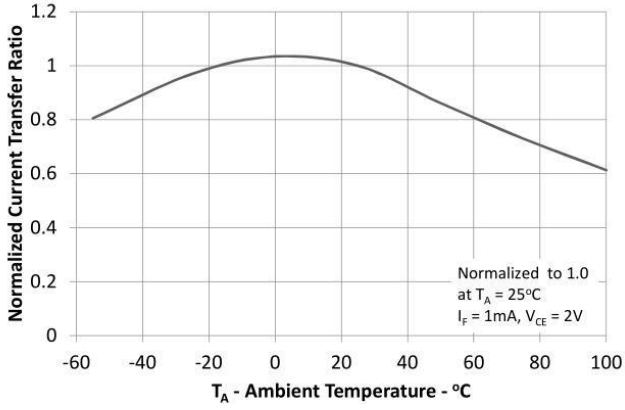


Figure 8. Current Transfer Ratio vs. Forward Current

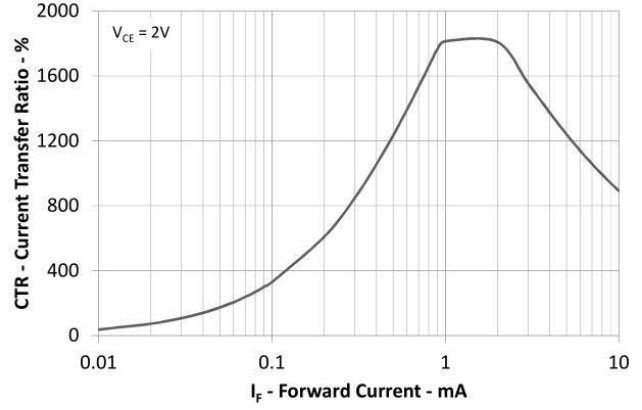


Figure 9. Switching Time vs. Load Resistance

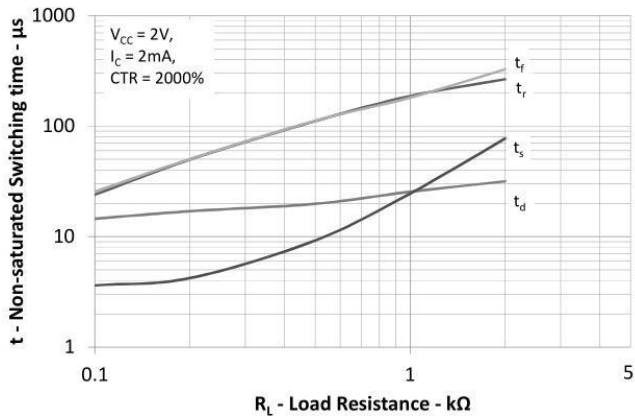


Figure 10. Switching Time vs. Load Resistance

