

## Current Transfer Ratio

Classification	Current Transfer Ratio (%) ( $I_C/I_F$ )		Marking of Classification
	Min	Max	
(None)	10	—	Blank, O, Y
Rank O	19	—	O
Rank Y	35	—	Y

Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristic		Symbol	Rating	Unit
LED	Forward current (Note 1)	$I_F$	25	mA
	Pulse forward current (Note 2)	$I_{FP}$	50	mA
	Peak transient forward current (Note 3)	$I_{FPT}$	1	A
	Reverse voltage	$V_R$	5	V
	Diode power dissipation (Note 4)	$P_D$	45	mW
Detector	Output current	$I_O$	8	mA
	Peak output current	$I_{OP}$	16	mA
	Supply voltage	$V_{CC}$	-0.5 to 15	V
	Output voltage	$V_O$	-0.5 to 15	V
	Output power dissipation (Note 5)	$P_O$	100	mW
Operating temperature range		$T_{opr}$	-55 to 100	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 125	$^\circ\text{C}$
Lead solder temperature (10 s)		$T_{sol}$	260	$^\circ\text{C}$
Isolation voltage (AC, 60 s, R.H. $\leq 60\%$ ) (Note 6)		$BV_S$	2500	$V_{rms}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

(Note 1) Derate 0.8mA above  $70^\circ\text{C}$ .

(Note 2) 50 % duty cycle, 1 ms pulse width. Derate 1.6 mA /  $^\circ\text{C}$  above  $70^\circ\text{C}$ .

(Note 3) Pulse width 1  $\mu\text{s}$ , 300 pps.

(Note 4) Derate 0.9 mW /  $^\circ\text{C}$  above  $70^\circ\text{C}$ .

(Note 5) Derate 2 mW /  $^\circ\text{C}$  above  $70^\circ\text{C}$ .

(Note 6) Device considered two-terminal device: Pins 1, 2, 3 and 4 shorted together and pin 5, 6, 7 and 8 shorted together.

## Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	$V_F$	$I_F = 16 \text{ mA}$	1.45	1.65	1.85	V
	Forward voltage temperature coefficient	$\Delta V_F / \Delta T_a$	$I_F = 16 \text{ mA}$	—	-2	—	mV / °C
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance between terminal	$C_T$	$V_F = 0 \text{ V}, f = 1 \text{ MHz}$	—	60	—	pF
Detector	High level output current	$I_{OH} (1)$	$I_F = 0 \text{ mA}, V_{CC} = V_O = 5.5 \text{ V}$	—	3	500	nA
		$I_{OH} (2)$	$I_F = 0 \text{ mA}, V_{CC} = V_O = 15 \text{ V}$	—	—	5	$\mu\text{A}$
		$I_{OH}$	$I_F = 0 \text{ mA}, V_{CC} = 15 \text{ V}$ $V_O = 15 \text{ V}, T_a = 70^\circ\text{C}$	—	—	50	
	High level supply voltage	$I_{CCH}$	$I_F = 0 \text{ mA}, V_{CC} = 15 \text{ V}$	—	0.01	1	$\mu\text{A}$
	Supply voltage	$V_{CC}$	$I_{CC} = 0.01 \text{ mA}$	15	—	—	V
	Output voltage	$V_O$	$I_O = 0.5 \text{ mA}$	15	—	—	V

## Coupled Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	$I_O / I_F$	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}, V_O = 0.4 \text{ V}$	10	40	—	%
			Rank O	19	40	
		$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}, V_O = 0.4 \text{ V}, T_a = 0 \text{ to } 70^\circ\text{C}$	Rank Y	35	50	
			Rank O, Y	5	—	
Low level output voltage	$V_{OL}$	$I_F = 16 \text{ mA}, V_{CC} = 4.5 \text{ V}, I_O = 1.1 \text{ mA}$ (Rank O: $I_O = 2.4 \text{ mA}$ )	—	—	0.4	V

## Isolation Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input-output) (Note 7)	$C_S$	$V_S = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Resistance (input-output) (Note 7)	$R_S$	R.H. $\leq 60\%$ , $V_S = 1 \text{ kVDC}$	$5 \times 10^{10}$	$10^{14}$	—	$\Omega$
Isolation voltage (Note 7)	$BV_S$	AC, 60 s	2500	—	—	$V_{rms}$

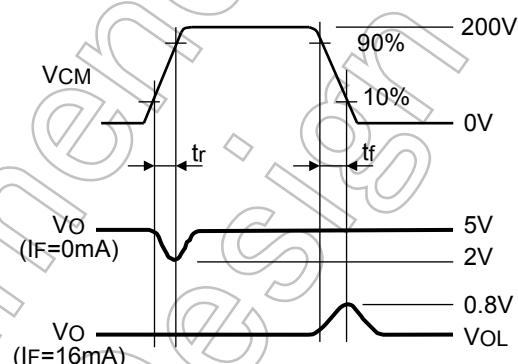
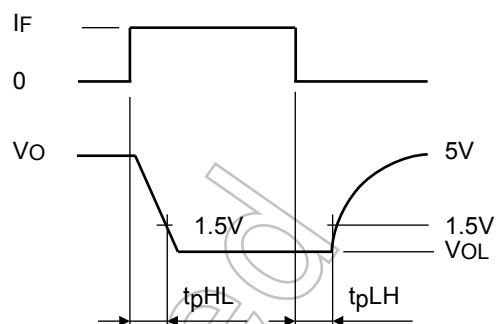
(Note 7) Device considered two-terminal device: Pins 1, 2, 3 and 4 shorted together and pin 5, 6, 7 and 8 shorted together.

## Switching Characteristics (Ta = 25°C, Vcc = 5V)

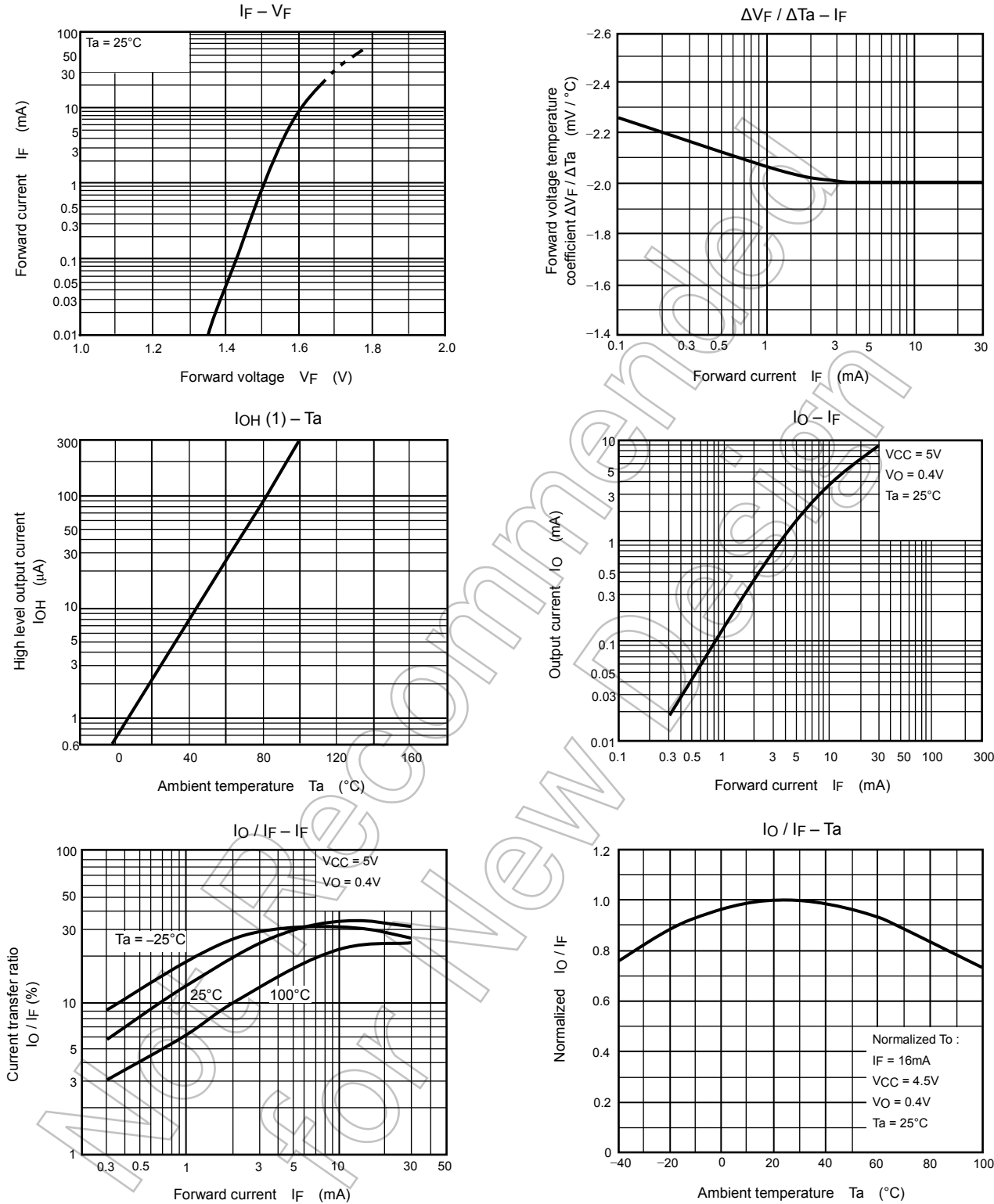
Characteristic	Symbol	Test Circuit.	Test Condition	Min	Typ.	Max	Unit
Propagation delay time (H→L)	t <sub>pHL</sub>	1	I <sub>F</sub> = 0→16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ	—	0.3	0.8	μs
			Rank O: R <sub>L</sub> = 1.9 kΩ	—	0.5	0.8	
Propagation delay time (L→H)	t <sub>pLH</sub>	1	I <sub>F</sub> = 16→0 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ	—	1	2	μs
			Rank O: R <sub>L</sub> = 1.9 kΩ	—	0.6	1.2	
Common mode transient immunity at high output level	CMH	2	I <sub>F</sub> = 0 mA, V <sub>CM</sub> = 200 V <sub>p-p</sub> R <sub>L</sub> = 4.1 kΩ (rank O: R <sub>L</sub> = 1.9 kΩ) (Note 8)	—	1500	—	V /μs
Common mode transient immunity at low output level	CML		I <sub>F</sub> = 16 mA, V <sub>CM</sub> = 200 V <sub>p-p</sub> R <sub>L</sub> = 4.1 kΩ (rank O: R <sub>L</sub> = 1.9 kΩ) (Note 8)	—	~1500	—	V /μs

(Note 8) CML is the maximum rate of fall of the common mode voltage that can be sustained with the output voltage in the logic low state (V<sub>O</sub> < 0.8 V).

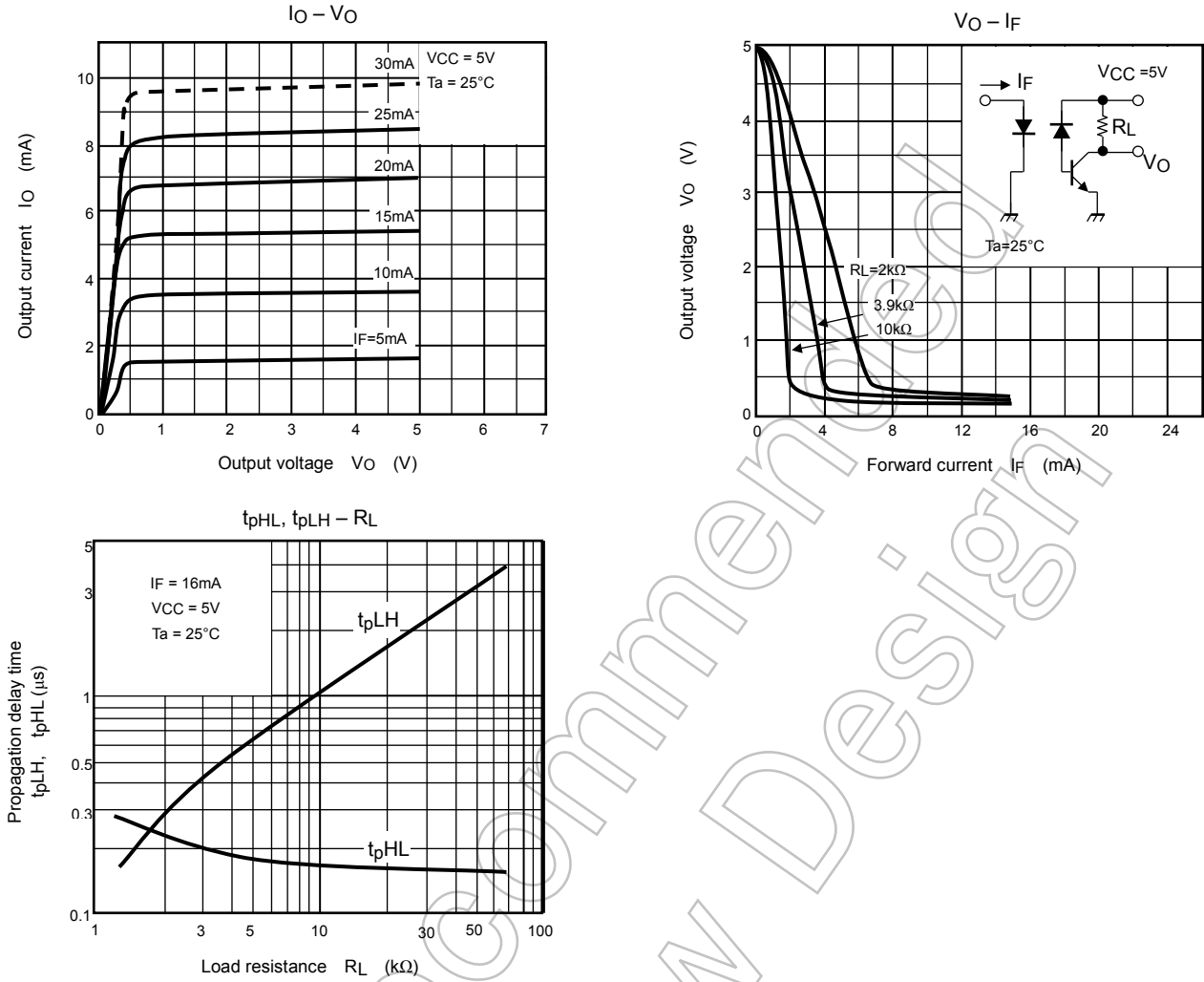
CMH is the maximum rate of rise of the common mode voltage that can be sustained with the output voltage in the logic high state (V<sub>O</sub> > 2.0 V).



$$CM_H = \frac{160(V)}{t_r(\mu s)}, CM_L = \frac{160(V)}{t_f(\mu s)}$$



NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



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