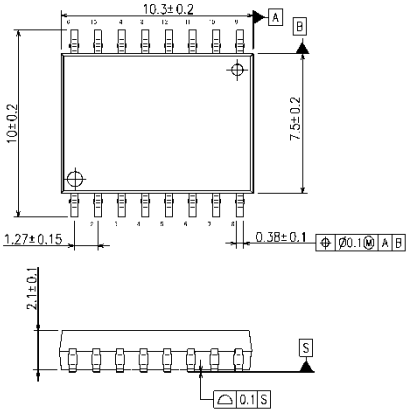
Photocouplers IRED & Photo IC

TLP5214

Isolated IGBT/Power MOSFET gate drive
AC and brushless DC motor drives
Industrial Inverters and Uninterruptible Power Supply (UPS)

Unit: mm



TOSHIBA 11-10M1

Weight: 0.37 g (typ.)

The TLP5214 is a highly integrated 4.0A output current IGBT gate drive photocoupler housed in a long creepage and clearance SO16L package.
The TLP5214, a smart gate driver photocoupler, includes functions of IGBT desaturation detection, isolated fault status feedback, soft IGBT turn-off, active Miller cramping and under voltage lockout (UVLO).
This photocoupler is suitable for driving IGBT and power MOSFET used in inverter applications.
The TLP5214 consists two infrared LEDs and two high-gain and high-speed ICs. They realize high current, high-speed output control and output fault status feedback.

- Peak output current: ±4.0 A (max)
- Guaranteed performance over temperature: −40°C to 110°C
- Supply current: 3.5 mA (max)
- Power supply voltage: 15 V to 30 V
- Threshold input current: I_{FLH} = 6 mA (max)
- Switching time (t_{pLH} / t_{pHL}) : 150 ns (max)
- Common-mode transient immunity: ±35 kV/μs (min)
- Isolation voltage: 5000 Vrms (min)
- UL-recognized: UL 1577, File No.E67349
- cUL-recognized: CSA Component Acceptance Service No.5A
  File No.E67349
- VDE-approved : EN 60747-5-5, EN 62368-1 (Note 1)
- CQC-approved: GB4943.1, GB8898 Japan Factory

- Construction mechanical rating

	SO16L
Height	2.3 mm (max)
Creepage Distance	8.0 mm (min)
Clearance	8.0 mm (min)
Insulation Thickness	0.4 mm (min)

Note 1 : When a VDE approved type is needed, please designate the **Option(D4)**.

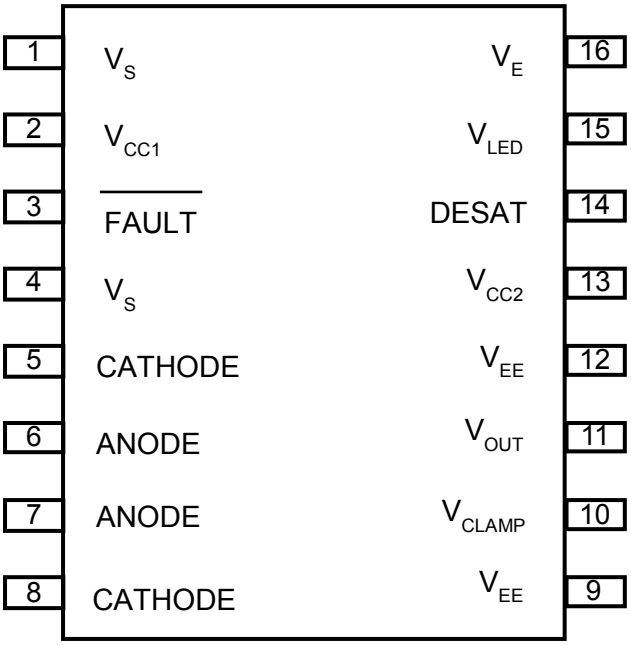
Truth Table

I_F	UVLO (V_{CC2}-V_E)	DESAT (14Pin DESAT Terminal Input)	FAULT (3Pin FAULT Terminal Output)	V_O
OFF	Not Active (> V_{UVLO}^+)	Not Active	High	Low
ON	Not Active (> V_{UVLO}^+)	Low (< $V_{DESATth}$)	High	High
ON	Not Active (> V_{UVLO}^+)	High (> $V_{DESATth}$)	Low (FAULT)	Low
ON	Active (< V_{UVLO}^-)	Not Active	High	Low
OFF	Active (< V_{UVLO}^-)	Not Active	High	Low

Start of commercial production
2014-05

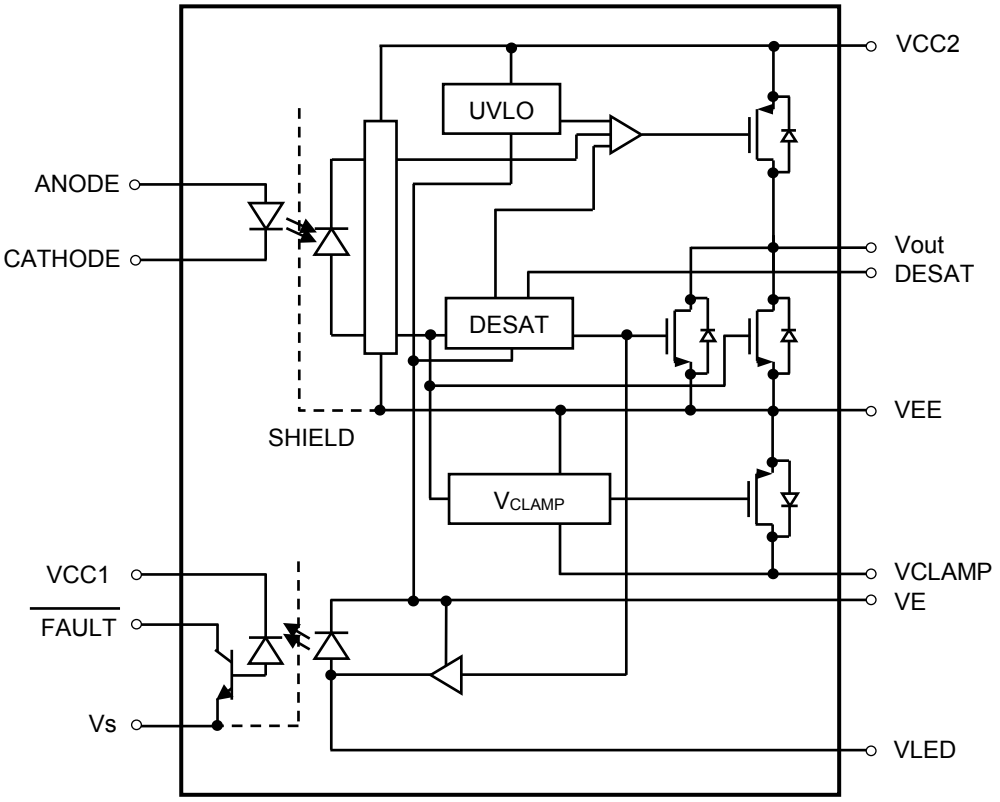
© 2019
Toshiba Electronic Devices & Storage Corporation

Pin Configuration (top view)



1 : V_S
2 : V_{CC1}
3 : $\overline{FAULT}$
4 : V_S
5 : CATHODE
6 : ANODE
7 : ANODE
8 : CATHODE
9 : V_{EE}
10 : V_{CLAMP}
11 : V_{OUT}
12 : V_{EE}
13 : V_{CC2}
14 : DESAT
15 : V_{LED}
16 : V_E

Internal Circuit



Note: A 1-μF bypass capacitor must be connected between pins 9 and 13, pins 13 and 16.

© 2019
Toshiba Electronic Devices & Storage Corporation

Absolute Maximum Ratings (Note) (Ta = 25°C ,Unless otherwise specified)

	Characteristics		Symbol	Rating	Unit
LED (Note 1)	Input forward current		I_F	25	mA
	Input forward current derating (Ta ≥ 95°C)		$\Delta I_F/\Delta Ta$	−1	mA/°C
	Peak transient input forward current	(Note 1)	I_{FPT}	1	A
	Peak transient input forward current derating (Ta ≥ 95°C)		$\Delta I_{FPT}/\Delta Ta$	−25	mA/°C
	Reverse Input Voltage		V_R	6	V
	Input power dissipation		P_D	145	mW
	Input power dissipation derating (Ta ≥ 95°C)		$\Delta P_D/\Delta Ta$	−5.0	mW/°C
Detector	Positive Input Supply Voltage		V_{CC1}	−0.5 to 7	V
	"H" peak output current	Ta = −40 to 110 °C (Note 2)	I_{OPH}	−4.0	A
	"L" peak output current		I_{OPL}	+4.0	A
	$\overline{FAULT}$ Output Current		$I_{\overline{FAULT}}$	8	mA
	$\overline{FAULT}$ Pin Voltage		$V_{\overline{FAULT}}$	−0.5 to V_{CC1}	V
	Total Output Supply Voltage		$(V_{CC2}–V_{EE})$	−0.5 to 35	V
	Negative Output Supply Voltage		$(V_E–V_{EE})$	-0.5 to 15	V
	Positive Output Supply Voltage		$(V_{CC2}–V_E)$	−0.5 to 35 − $(V_E–V_{EE})$	V
	Output voltage		V_O	−0.5 to V_{CC2}	V
	Peak Clamping Sinking Current		I_{Clamp}	1.7	A
	Miller Clamping Pin Voltage		V_{Clamp}	−0.5 to V_{CC2}	V
	DESAT Voltage		V_{DESAT}	V_E to V_E + 10	V
	Output power dissipation		P_O	410	mW
	Output power dissipation (Ta ≥ 95°C)		$\Delta P_O/\Delta Ta$	−14.0	mW/°C
Common	Operating temperature range		Topr	−40 to 110	°C
	Storage temperature range		Tstg	−55 to 125	°C
	Lead soldering temperature (10 s)	(Note 3)	Tsol	260	°C
	Isolation voltage (AC, 60 s, R.H. ≤ 60 %)	(Note 4)	BV_S	5000	Vrms

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: A ceramic capacitor (1 μF) should be connected between pins 9 and 13, pins 13 and 16 to stabilize the operation of the high gain linear amplifier.Furthermore, in case V_E-V_{EE} > 0 V, a bypass capacitor, which has good high frequency characteristic, a ceramic capacitor (1 μF) should be connected between pins 9 and 16. Failure to provide the bypassing may impair the switching property. The total lead length between capacitor and coupler should not exceed 1 cm.

Note 1: Pulse width P_W ≤ 1 μs, 300 pps

Note 2: Exponential waveform pulse width P_W ≤ 0.2 μs, f ≤ 15 kHz, V_{CC} = 15 V

Note 3: For the effective lead soldering area.

Note 4: This device considered a two-terminal device: All pins on the LED side are shorted together, and all pin on the photodetector side are shorted together.

© 2019
Toshiba Electronic Devices & Storage Corporation

Recommended Operating Conditions (Note)

Characteristics	Symbol	Min	Typ.	Max	Unit
Total Output Supply Voltage (Note 5)	(V_{CC2}–V_{EE})	15	-	30	V
Negative Output Supply Voltage	(V_E–V_{EE})	0	-	15	V
Positive Output Supply Voltage	(V_{CC2}–V_E)	15	-	30 − (V_E–V_{EE})	V
Input On-State Current (Note 6)	$I_{F(ON)}$	7.5	-	12	mA
Input Off-State Voltage	$V_{F(OFF)}$	0	-	0.8	V
Operating frequency (Note 7)	f	-	-	50	kHz

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Note 5: If the Vcc rise slope is sharp, an internal circuit might not operate with stability. Please design the V_{CC} rise slope under 3.0 V / μs.

Note 6: Input signal rise time (fall time) ≤ 0.5 μs.

Note 7: Exponential waveform. I_{OPH} ≥ -4.0 A (≤ 90 ns), I_{OPL} ≤ 4.0 A (≤ 90 ns), Ta = 110°C

Electrical Characteristics (Note) (Ta = −40 to 110 °C, unless otherwise specified)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.*	Max	Unit
Input Forward Voltage	V_F	—	I_F = 10 mA, Ta = 25°C	1.4	-	1.7	V
Input Reverse Current	I_R	—	V_R = 5 V	-	-	10	μA
Input Capacitance	C_t	—	V = 0 V, f = 1 MHz, Ta = 25 °C	-	95	-	pF
FAULT Low Level Output Voltage	V_{FAULTL}	—	I_{FAULT} = 1.1 mA, V_{CC}1 = 5.5 V	-	0.2	0.4	V
			I_{FAULT} = 1.1 mA, V_{CC}1 = 3.3 V	-	0.2	0.4	
FAULT High Level Output Current	I_{FAULTH}	—	V_{FAULT} = 5.5 V, V_{CC}1 = 5.5 V, Ta = 25°C	-	-	0.5	μA
			V_{FAULT} = 5.5 V, V_{CC}1 = 3.3 V, Ta = 25°C	-	-	0.3	
High Level Output Current (Note 8)	I_{OPH}	1	V_O = V_{CC}2 − 4 V	-	−4.0	−1.2	A
			V_O = V_{CC}2 − 7 V	-	−6.5	−3.0	
Low Level Output Current (Note 8)	I_{OPL}	2	V_O = V_{EE} + 2.5 V	1.2	3.5	-	
			V_O = V_{EE} + 7 V	3	5.5	-	
Low Level Output Current During Fault Condition	I_{OLF}	—	V_O − V_{EE} = 14 V	90	150	230	mA
High Level Output Voltage	V_{OH}	3	I_O = −100 mA	V_{CC}2−0.3	V_{CC}2−0.2	-	V
Low Level Output Voltage	V_{OL}	4	I_O = 100 mA	-	0.1	0.2	
Clamp Pin Threshold Voltage	V_{tClamp}	—	—	-	3.0	-	
Clamp Low Level Sinking Current	I_{CL}	—	V_O = V_{EE} + 2.5 V	0.56	1.8	-	A
High Level Supply Current	I_{CC2H}	5	I_O = 0 mA	-	2.4	3.5	mA
Low Level Supply Current	I_{CC2L}	6	I_O = 0 mA	-	2.3	3.5	
Blanking Capacitor Charging Current	I_{CHG}	7	V_{DESAT} = 2 V	−0.13	−0.24	−0.33	
Blanking Capacitor Discharge Current	I_{DSCHG}	8	V_{DESAT} = 7 V	10	49	-	
DESAT Threshold Voltage	V_{DESAT}	—	V_{CC}2-V_E>V_{UVLO-}	6	6.5	7.5	V
UVLO Threshold Voltage	V_{UVLO}^+	9	V_O>5 V	10.5	11.6	13.5	
	V_{UVLO}^-	9	V_O<5 V	9.2	10.3	11.1	
UVLO hysteresis	$UVLO_{HYS}$	—	—	-	1.3	-	

(*): All typical values are at Ta = 25°C

Note 8: I_O application time ≤ 50 μs, 1 pulse

© 2019
Toshiba Electronic Devices & Storage Corporation

Electrical Characteristics (Note) (Ta = −40 to 110 °C, unless otherwise specified)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.*	Max	Unit
Threshold Input Current(L/H)	I_{FLH}	10	V_{CC} = 30 V, V_O < 5 V	-	2.3	6	mA
Threshold Input Voltage (H/L)	V_{FHL}	—	V_{CC} = 30 V, V_O > 5 V	0.8	-	-	V

(*): All typical values are at Ta = 25°C

Note: This product is more sensitive than conventional products to electrostatic discharge (ESD) owing to its low power consumption design.
It is therefore all the more necessary to observe general precautions regarding ESD when handling this component.

Isolation Characteristics (Note) (Ta = 25 °C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C_S	Vs = 0 V, f = 1 MHz	-	1.0	-	pF
Isolation resistance	R_S	R.H. ≤ 60 %, V_S = 500 V	10^{12}	10^{14}	-	Ω
Isolation voltage	BV_S	AC, 60 s	5000	-	-	Vrms

Note: This device considered a two-terminal device: All pins on the LED side are shorted together, and all pin on the photodetector side are shorted together.

Switching Characteristics (Note) (Ta = −40 to 110 °C, unless otherwise specified)

Characteristics		Symbol	Test Circuit	Test Condition		Min	Typ.*	Max	Unit
Propagation delay time (Note 9)	L → H	t_{pLH}	11	V_{CC2} = 30 V, R_g = 10 Ω, C_g = 25 nF, Duty = 50%	I_F = 0 → 10 mA	50	85	150	ns
	H → L	t_{pHL}			I_F = 10 → 0 mA	50	90	150	
Output rise time (10−90 %) (Note 9)		tr			I_F = 0 → 10 mA	-	32	-	
Output fall time (90−10 %) (Note 9)		tf			I_F = 10 → 0 mA	-	18	-	
Pulse with distortion (Note 9)		$\lvert t_{pHL} - t_{pLH} \rvert$			I_F = 0 ↔ 10 mA	-	-	50	
Propagation delay skew (Note 9) (device to device) (Note 10)		tpsk			I_F = 0 ↔ 10 mA	−80	-	80	
DESAT Sense to 90% Delay		$t_{DESAT(90\%)}$	12	C_{DESAT} = 100 pF, Rg = 10 Ω, Cg = 25 nF, V_{CC2} = 30 V, R_F = 2.1 kΩ		-	180	500	ns
DESAT Sense to 10% Delay		$t_{DESAT(10\%)}$				-	3.5	5	µs
DESAT Sense to Low Level FAULT Signal Delay		$t_{DESAT(FAULT)}$		C_{DESAT} = 100 pF, Rg = 10 Ω, Cg = 25 nF, V_{CC2} = 30 V, R_F = 2.1 kΩ, C_F = Open		-	300	500	ns
DESAT Sense to Low Propagation Delay		$t_{DESAT(LOW)}$				-	200	-	
DESAT Input Mute		$t_{DESAT(MUTE)}$				7	14	-	µs
RESET to High Level FAULT Signal Delay		$t_{RESET(FAULT)}$			V_{CC1} = 5.5 V	0.2	0.45	2	
High-level common-mode Transient Immunity		CM_H	13 to 16		I_F = 10 mA, $V_{O\ (min)}$ = 26 V	±35	-	-	kV/µs
Low-level common-mode Transient Immunity		CM_L			I_F = 0 mA, $V_{O\ (max)}$ = 1 V	±35	-	-	

(*): All typical values are at Ta = 25 °C.

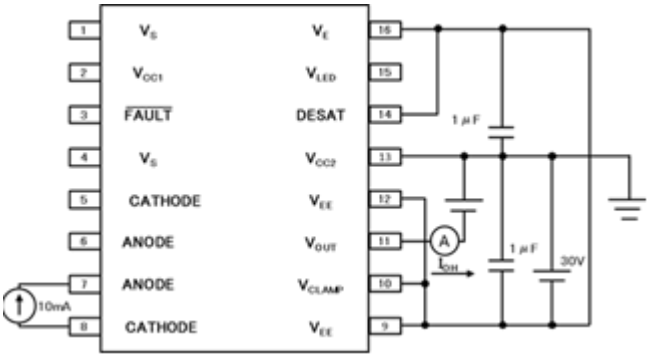
Note 9: Input signal (f = 10 kHz, duty = 50%, tr = tf = 5 ns or less)
CL is less than 15 pF which includes probe and stray wiring capacitance.

Note 10: The propagation delay skew, tpsk, is equal to the magnitude of the worst-case difference in t_{pHL} and/or t_{pLH} that will be seen between units at the same given conditions (supply voltage, input current, temperature, etc).

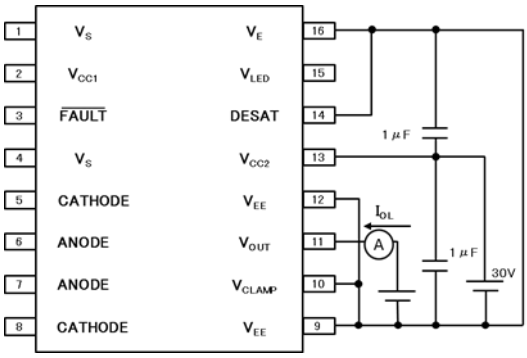
Test Circuit

© 2019
Toshiba Electronic Devices & Storage Corporation

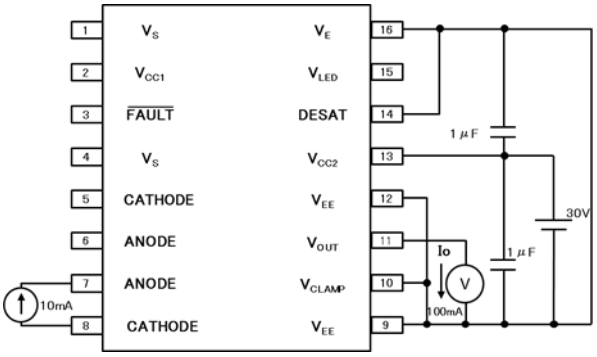
Test Circuit 1: I_{OPH}



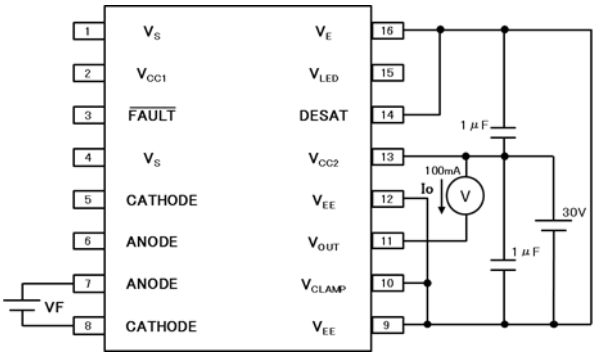
Test Circuit 2: I_{OPL}



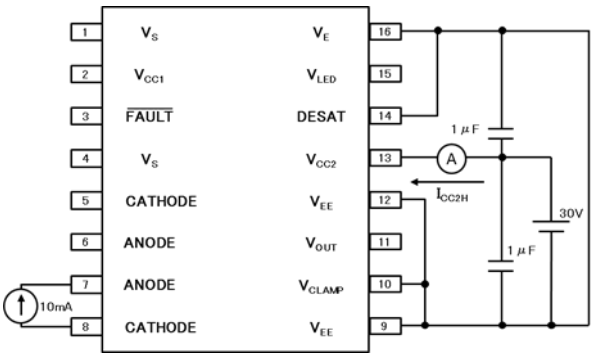
Test Circuit 3: V_{OH}



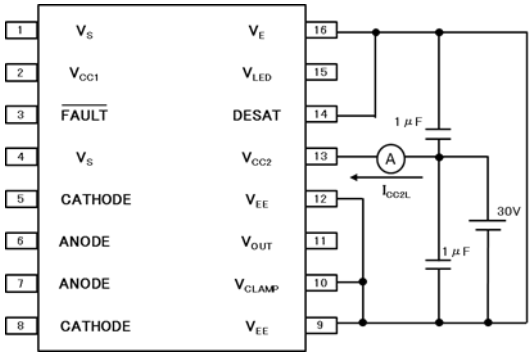
Test Circuit 4: V_{OL}



Test Circuit 5: I_{CC2H}

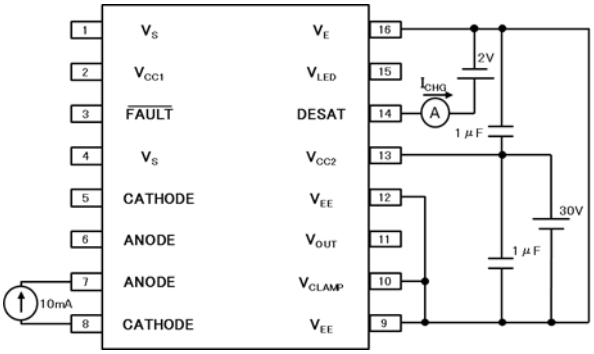


Test Circuit 6: I_{CC2L}

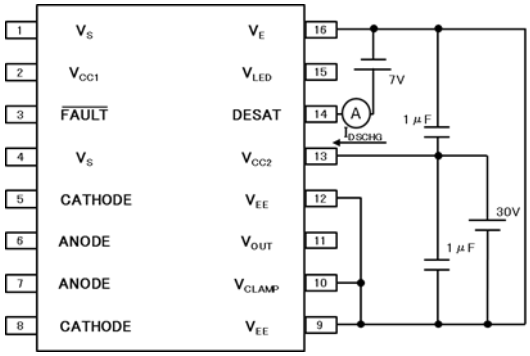


© 2019
Toshiba Electronic Devices & Storage Corporation

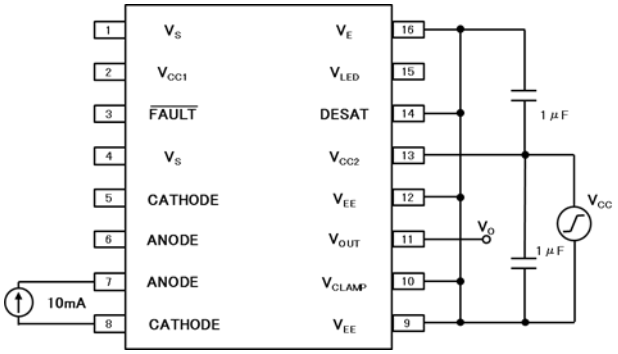
Test Circuit 7: I_{CHG}



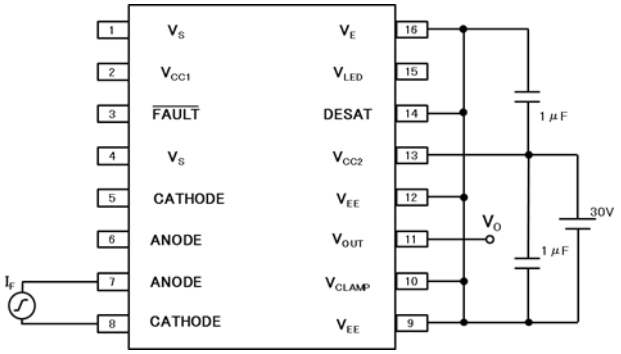
Test Circuit 8: I_{DSCHG}



Test Circuit 9: V_{UVLO}

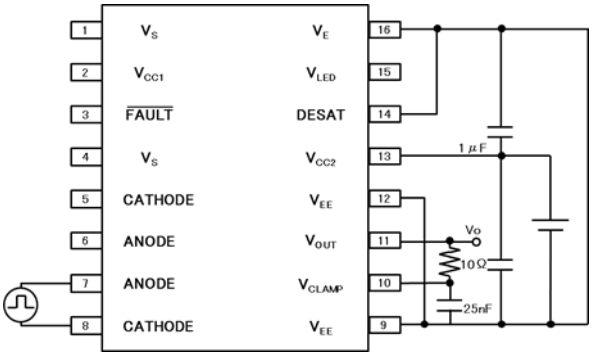


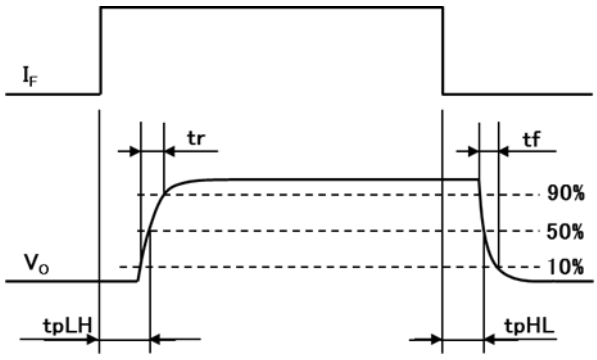
Test Circuit 10: I_{FLH}



Test Circuit 11: t_{pLH}, t_{pHL}, tr, tf, $|t_{pHL}-t_{pLH}|$

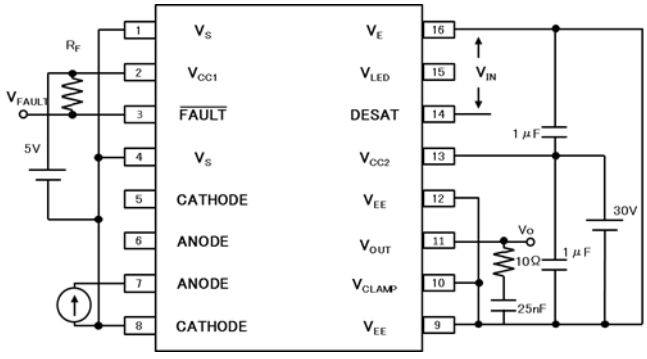
I_F = 10 mA (P.G.)
(f =10 kHz, duty = 50%, rise / fall time 5 ns or less)

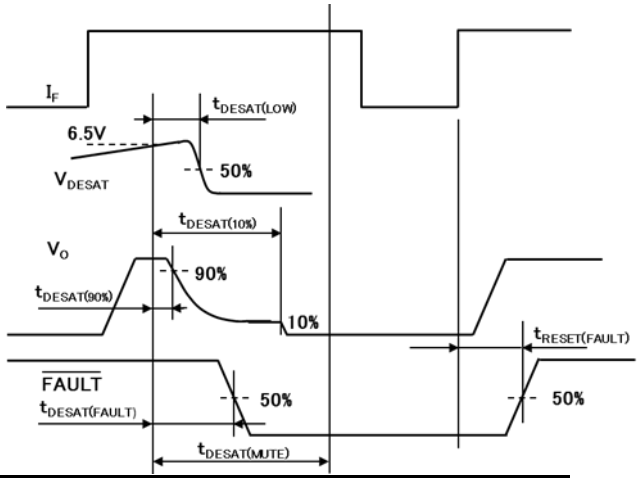




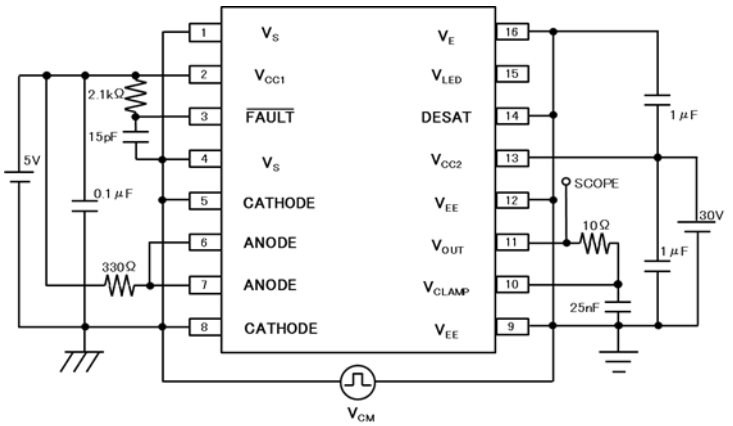
Test Circuit 12: $t_{DESAT(90\%)}$, $t_{DESAT(10\%)}$, $t_{DESAT(FAULT)}$, $t_{DESAT(Low)}$, $t_{DESAT(MUTE)}$, $t_{RESET(FAULT)}$

I_F = 10 mA (P.G.)
(f =10 kHz, duty = 50%, rise / fall time 5 ns or less)

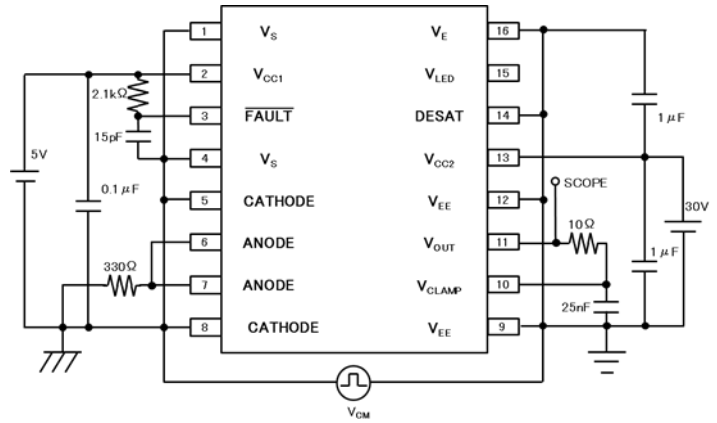




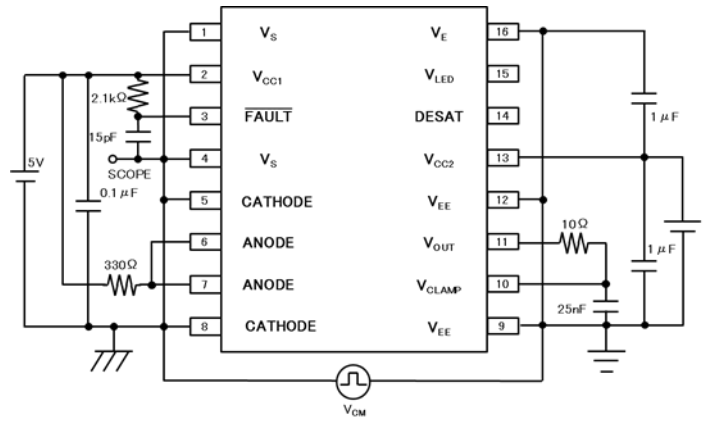
Test Circuit 13: CMR_LED1 ON



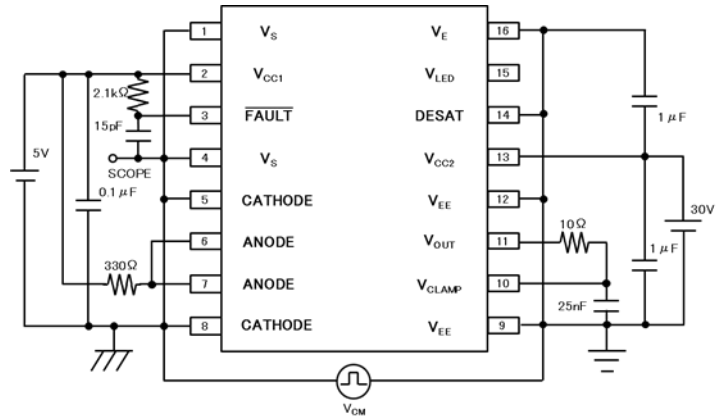
Test Circuit 14: CMR_LED1 OFF



Test Circuit 15: CMR_LED2 ON



Test Circuit 16: CMR_LED2 OFF

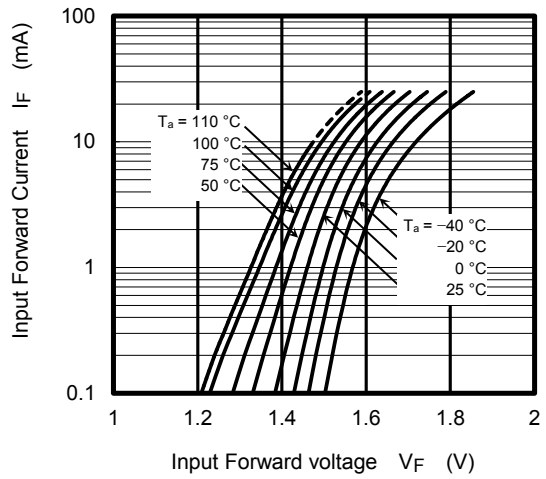


CM_L (CM_H) is the maximum rate of rise (fall) of the common mode voltage that can be sustained with the output voltage in the LOW (HIGH) state.

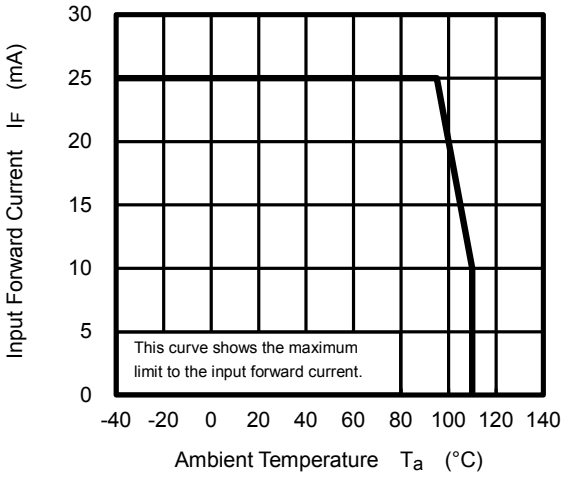
© 2019
Toshiba Electronic Devices & Storage Corporation

Characteristics Curve

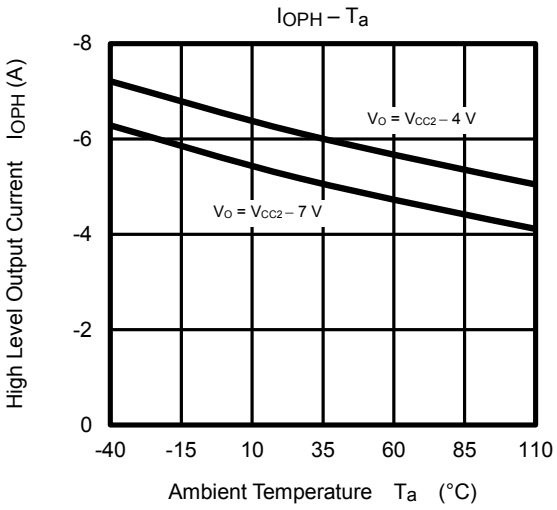
$I_F - V_F$



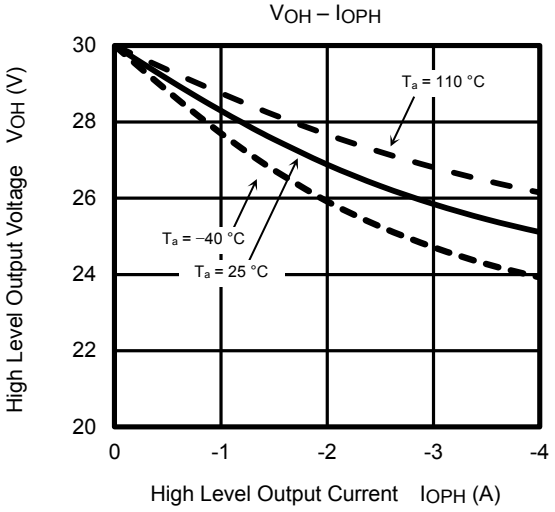
$I_F - T_a$



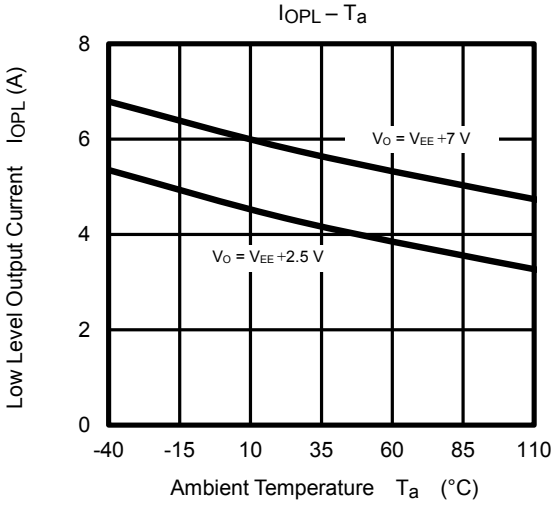
$I_{OPH} - T_a$



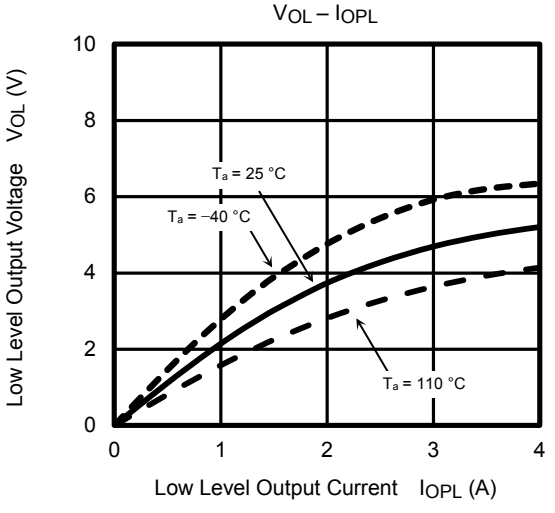
$V_{OH} - I_{OPH}$



$I_{OPL} - T_a$

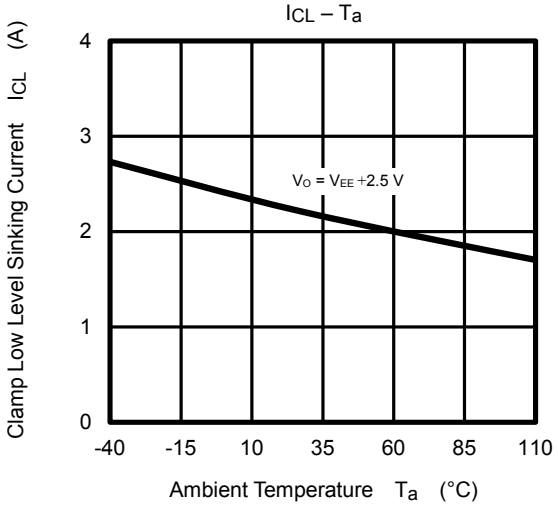


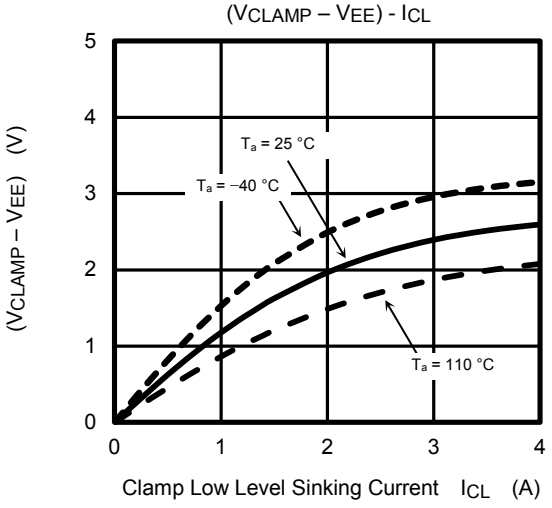
$V_{OL} - I_{OPL}$

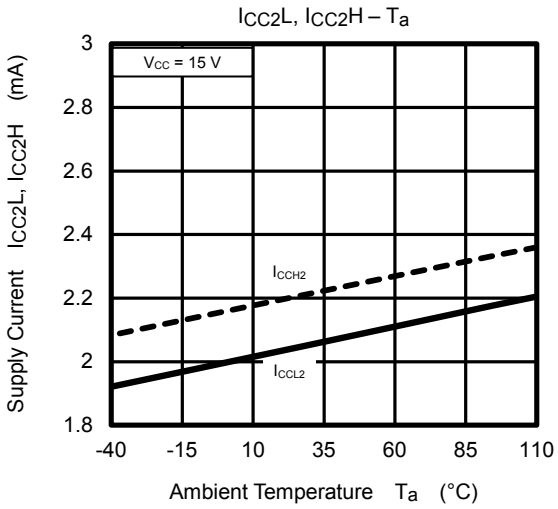


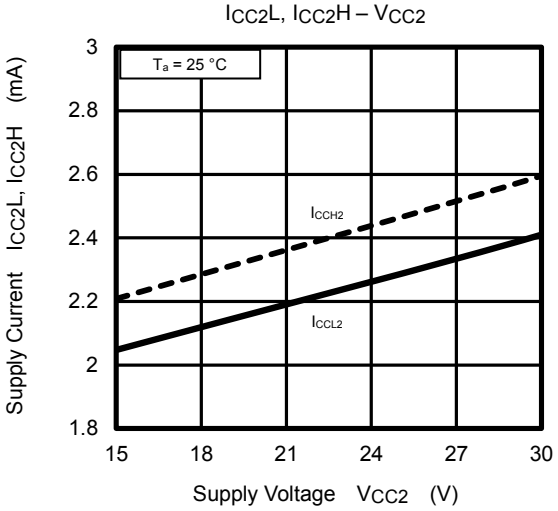
NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

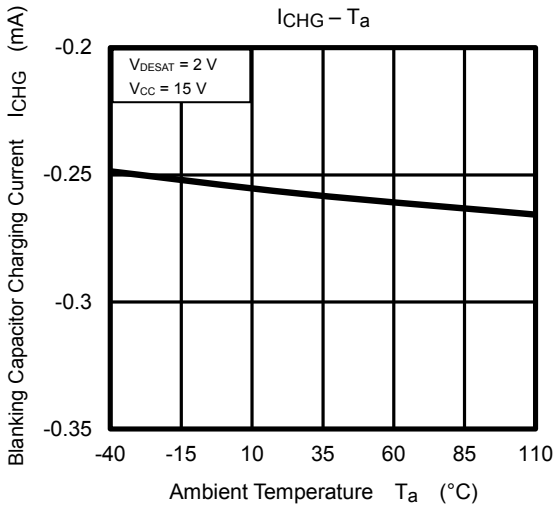
© 2019
Toshiba Electronic Devices & Storage Corporation

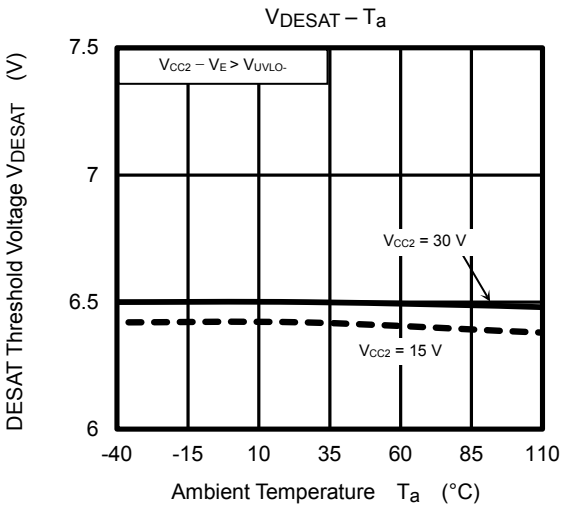








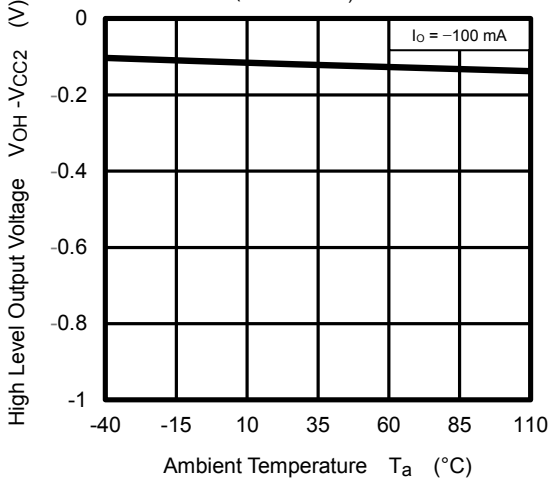




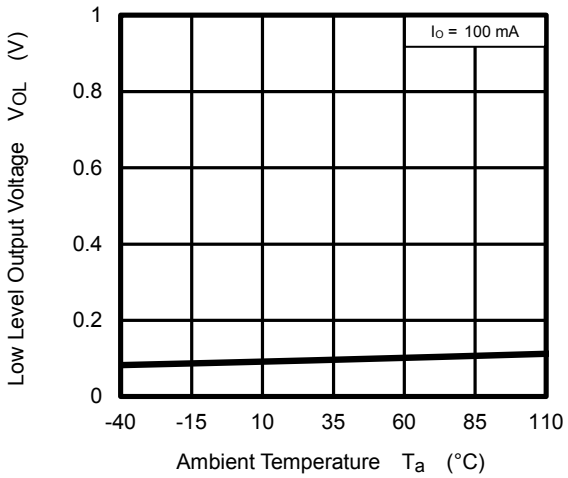
NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

© 2019
Toshiba Electronic Devices & Storage Corporation

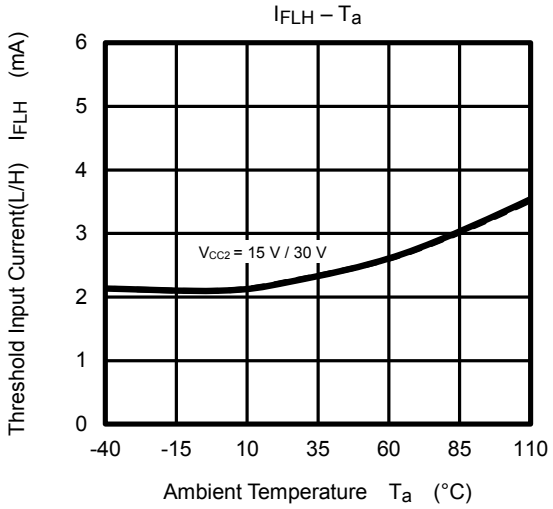
$(V_{OH} - V_{CC2})$ – T_a



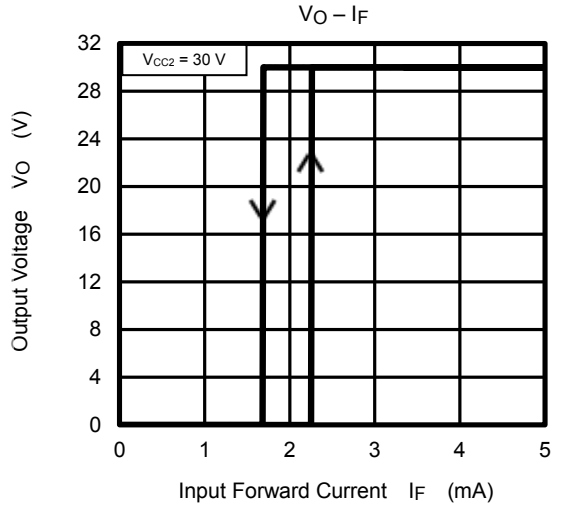
V_{OL} – T_a



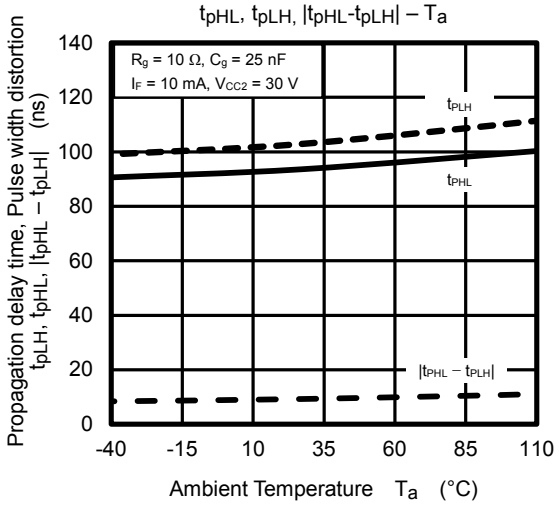
I_{FLH} – T_a



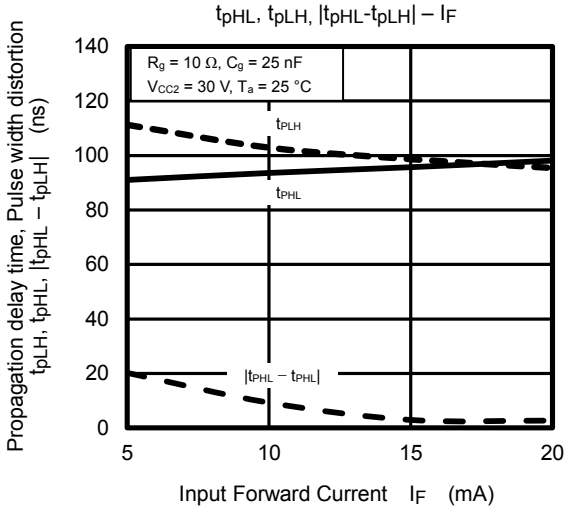
V_O – I_F



t_{pHL}, t_{pLH}, $|t_{pHL}-t_{pLH}|$ – T_a



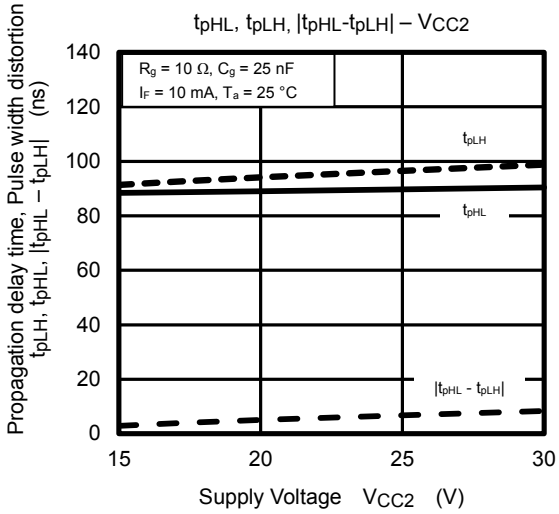
t_{pHL}, t_{pLH}, $|t_{pHL}-t_{pLH}|$ – I_F



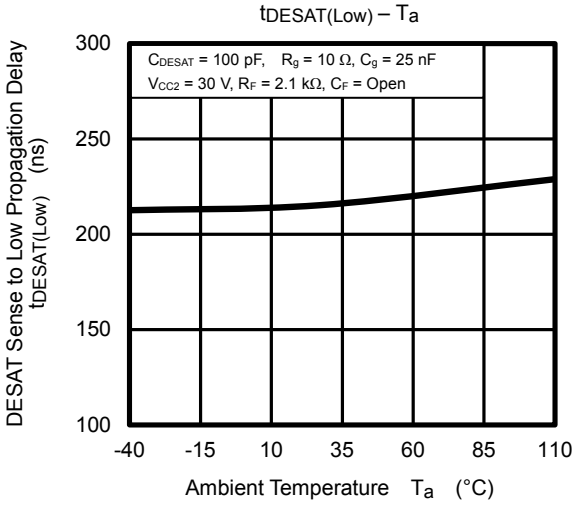
NOTE: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

© 2019
Toshiba Electronic Devices & Storage Corporation

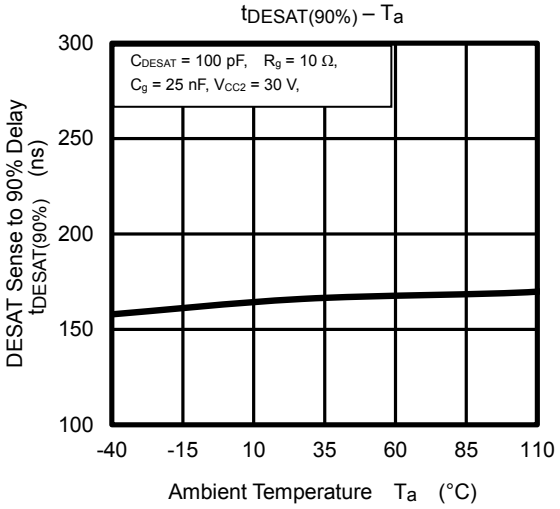
t_{pHL}, t_{pLH}, $|t_{pHL}-t_{pLH}|$ – V_{CC2}



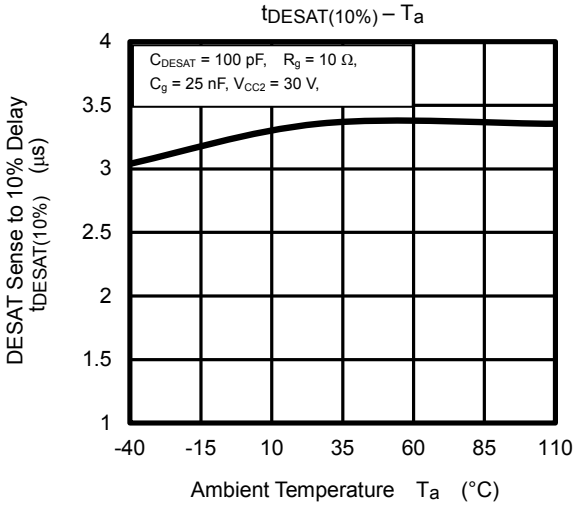
$t_{DESAT(Low)}$ – T_a



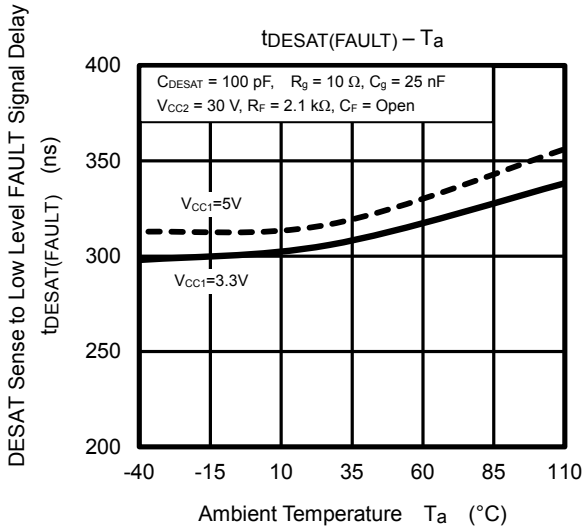
$t_{DESAT(90\%)}$ – T_a



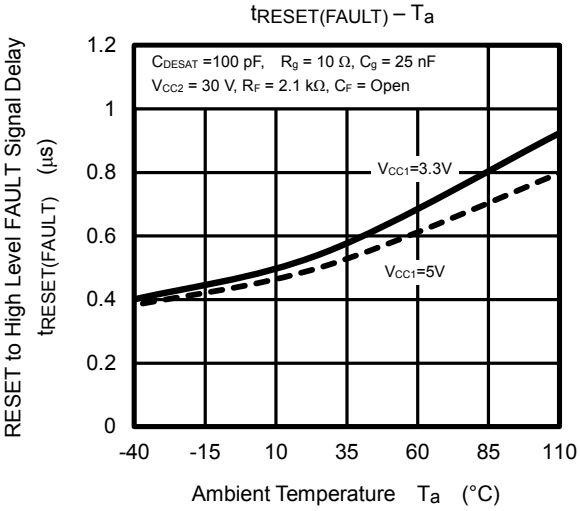
$t_{DESAT(10\%)}$ – T_a



$t_{DESAT(FAULT)}$ – T_a



$t_{RESET(FAULT)}$ – T_a



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

© 2019
Toshiba Electronic Devices & Storage Corporation

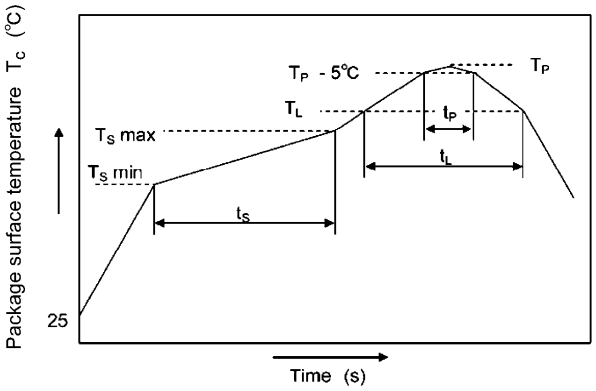
PRECAUTIONS OF SURFACE MOUNTING TYPE PHOTOCOUPLER SOLDERING & GENERAL STORAGE

(1) Precautions for Soldering

The soldering temperature should be controlled as closely as possible to the conditions shown below, irrespective of whether a soldering iron or a reflow soldering method is used.

1) When Using Soldering Reflow

An example of a temperature profile when lead(Pb)-free solder is use



	Symbol	Min	Max	Unit
Preheat temperature	T_S	150	200	°C
Preheat time	t_S	60	120	s
Ramp-up rate (T_L to T_P)			3	°C/s
Liquidus temperature	T_L	217		°C
Time above T_L	t_L	60	150	s
Peak temperature	T_P		260	°C
Time during which T_c is between (T_P – 5) and T_P	t_P		30	s
Ramp-down rate (T_P to T_L)			6	°C/s

An Example of a Temperature Profile When Lead(Pb)-Free Solder Is Used

- Reflow soldering must be performed once or twice.
- The mounting should be completed with the interval from the first to the last mountings being 2 weeks.

2) When using soldering Flow

- Apply preheating of 150 °C for 60 to 120 seconds.
- Mounting condition of 260 °C or less within 10 seconds is recommended.
- Flow soldering must be performed once

3) When using soldering Iron

- Complete soldering within 10 seconds for lead temperature not exceeding 260 °C or within 3 seconds not exceeding 350 °C.
- Heating by soldering iron must be only once per 1 lead

© 2019
Toshiba Electronic Devices & Storage Corporation

(2) Precautions for General Storage

1) Do not store devices at any place where they will be exposed to moisture or direct sunlight.

2) When transportation or storage of devices, follow the cautions indicated on the carton box.

3) The storage area temperature should be kept within a temperature range of 5 degree C to 35 degree C, and relative humidity should be maintained at between 45% and 75%.

4) Do not store devices in the presence of harmful (especially corrosive)gases, or in dusty conditions.

5) Use storage areas where there is minimal temperature fluctuation. Because rapid temperature changes can cause condensation to occur on stored devices, resulting in lead oxidation or corrosion, as a result, the solderability of the leads will be degraded.

6) When repacking devices, use anti-static containers.

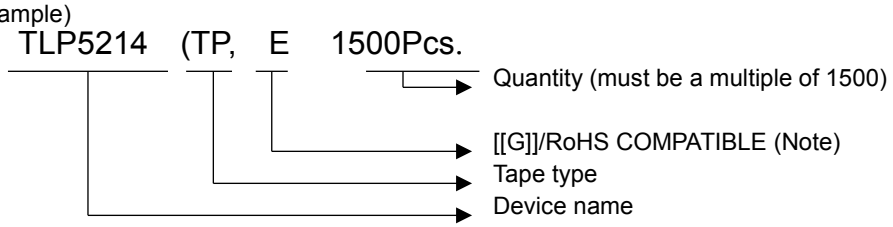
7) Do not apply any external force or load directly to devices while they are in storage.

8) If devices have been stored for more than two years, even though the above conditions have been followed, it is recommended that solderability of them should be tested before they are used.

Ordering Method

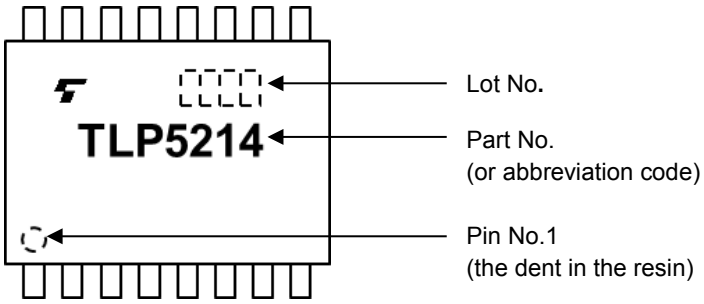
When placing an order, please specify the product number, the CTR rank, the tape and the quantity as shown in the following example.

(Example)



Note : Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronics equipment.

Marking



© 2019
Toshiba Electronic Devices & Storage Corporation

RESTRICTIONS ON PRODUCT USE

Toshiba Corporation and its subsidiaries and affiliates are collectively referred to as “TOSHIBA”.
Hardware, software and systems described in this document are collectively referred to as “Product”.

- TOSHIBA reserves the right to make changes to the information in this document and related Product without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, lifesaving and/or life supporting medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, and devices related to power plant. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- GaAs (Gallium Arsenide) is used in Product. GaAs is harmful to humans if consumed or absorbed, whether in the form of dust or vapor. Handle with care and do not break, cut, crush, grind, dissolve chemically or otherwise expose GaAs in Product.
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**

© 2019
Toshiba Electronic Devices & Storage Corporation

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Toshiba:

TLP5214(D4,E TLP5214(TP,E TLP5214(D4-TP,E TLP5214(E