Photocouplers Infrared LED & Photo Transistor

TLP628M,TLP628MF

1. Applications

- Programmable Logic Controllers (PLCs)
- Home Electric Appliances

2. General

TLP628M is a photocoupler that consists of a photo transistor optically coupled to an infrared emitting diode in a 4pin DIP.

TLP628M is guaranteed high temperature operation (125 ℃ max), with the high Collector-emitter voltage (V_{CEO}) 350 V, it's suitable for use in programmable logic controllers (PLCs), and home appliance, include air conditioners.

TLP628MF is a lead forming type for the long creepage mounting of TLP628M.

3. Features

(1) Collector-emitter voltage: 350 V (min)

(2) Current transfer ratio: 50 % (min) (@I_F = 5 mA, V_{CE} = 5 V)
GB Rank: 100 % (min) (@I_F = 5 mA, V_{CE} = 5 V)

(3) Isolation voltage: 5000 Vrms (min)

(4) Operating temperature: -55 to 125 ℃

(5) Safety standards
UL-recognized: UL 1577, File No.E67349
cUL-recognized: CSA Component Acceptance Service No.5A File No.E67349
VDE-approved: EN IEC 60747-5-5, EN IEC 62368-1 **(Note 1)**
CQC-approved: GB4943.1 Japan Factory

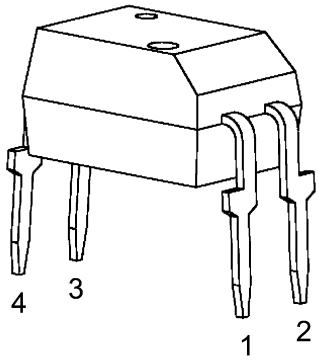
Note 1: When a VDE approved type is needed, please designate the **Option (D4)**.

Start of commercial production
2018-12

©2018-2026
Toshiba Electronic Devices & Storage Corporation

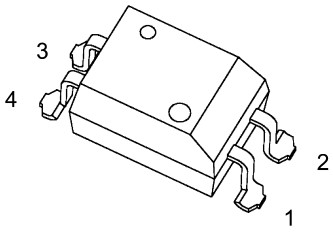
4. Packaging (Note)

TLP628M



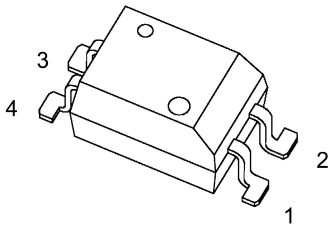
11-5B2S

TLP628M(LF1,TP1)



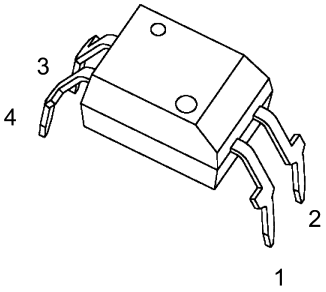
11-5B201S

TLP628M(LF5,TP5)



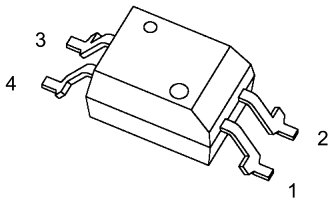
11-5B205S

TLP628MF



11-5B202S

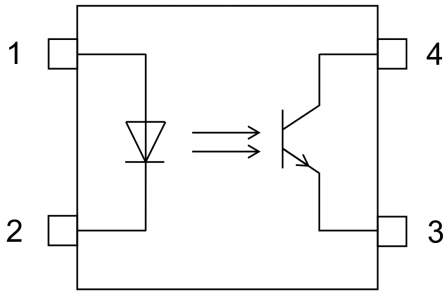
TLP628MF(LF4,TP4)



11-5B204S

Note: Through-hole type: TLP628M, TLP628MF
Lead forming option: (LF1), (LF4), (LF5)
Taping option: (TP1), (TP4), (TP5)

5. Pin Assignment



1: Anode
2: Cathode
3: Emitter
4: Collector

6. Mechanical Parameters

Characteristics	7.62 mm pitch TLP628M type (Min)	10.16 mm pitch TLP628MF type (Min)	Unit
Creepage distances	7.0	8.0	mm
Clearance	7.0	8.0	
Internal isolation thickness	0.4	0.4	

©2018-2026
Toshiba Electronic Devices & Storage Corporation

7. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

	Characteristics		Symbol	Note	Rating	Unit
LED	Input forward current		I_F		50	mA
	Input forward current derating	($T_a \geq$ 90 °C)	$\Delta I_F/\Delta T_a$		-1.11	mA/°C
	Input forward current (pulsed)		I_{FP}	(Note 1)	1	A
	Input reverse voltage		V_R		5	V
	Input power dissipation		P_D		100	mW
	Input power dissipation derating	($T_a \geq$ 90 °C)	$\Delta P_D/\Delta T_a$		-2.22	mW/°C
	Junction temperature		T_j		135	°C
Detector	Collector-emitter voltage		V_{CEO}		350	V
	Emitter-collector voltage		V_{ECO}		7	V
	Collector current		I_C		50	mA
	Collector power dissipation		P_C		150	mW
	Collector power dissipation derating	($T_a \geq$ 25 °C)	$\Delta P_C/\Delta T_a$		-1.36	mW/°C
	Junction temperature		T_j		135	°C
Common	Operating temperature		T_{opr}		-55 to 125	°C
	Storage temperature		T_{stg}		-55 to 125	°C
	Lead soldering temperature	(10 s)	T_{sol}		260	°C
	Total power dissipation		P_T		250	mW
	Total power dissipation derating	($T_a \geq$ 25 °C)	$\Delta P_T/\Delta T_a$		-2.27	mW/°C
	Isolation voltage	(AC, 60 s, R.H. ≤ 60 %)	BV_S	(Note 2)	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 1: Pulse width (PW) ≤ 0.1 ms, f = 100 Hz

Note 2: This device is considered as a two-terminal device: Pins 1 and 2 are shorted together, and pins 3 and 4 are shorted together.

8. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C)

	Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
LED	Input forward voltage	V_F		I_F = 10 mA	1.1	1.25	1.4	V
	Input reverse current	I_R		V_R = 5 V	—	—	10	μA
	Input capacitance	C_t		V = 0 V, f = 1 MHz	—	30	—	pF
Detector	Collector-emitter breakdown voltage	$V_{(BR)CEO}$		I_C = 0.1 mA	350	—	—	V
	Emitter-collector breakdown voltage	$V_{(BR)ECO}$		I_E = 0.1 mA	7	—	—	V
	Dark Current	I_{DARK}		V_{CE} = 300 V	—	0.001	0.2	μA
				V_{CE} = 300 V, T_a = 85 °C	—	—	200	
	Collector-emitter capacitance	C_{CE}		V = 0 V, f = 1 MHz	—	20	—	pF

©2018-2026
Toshiba Electronic Devices & Storage Corporation

9. Coupled Electrical Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	I_C/I_F	(Note 1)	I_F = 5 mA, V_{CE} = 5 V	50	—	600	%
			I_F = 5 mA, V_{CE} = 5 V, GB Rank	100	—	600	
Saturated current transfer ratio	$I_C/I_{F(sat)}$		I_F = 1 mA, V_{CE} = 0.4 V	—	60	—	%
			I_F = 1 mA, V_{CE} = 0.4 V, GB Rank	30	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$		I_C = 2.4 mA, I_F = 8 mA	—	—	0.4	V
			I_C = 0.2 mA, I_F = 1 mA	—	0.2	—	
			I_C = 0.2 mA, I_F = 1 mA, GB Rank	—	—	0.4	V
OFF-state collector current	$I_{C(off)}$		V_F = 0.7 V, V_{CE} = 350 V	—	—	200	μA

Note 1: See Table 9.1 for current transfer ratio.

Table 9.1 Current Transfer Ratio (CTR) Rank (Note) (Unless otherwise specified, T_a = 25 °C)

Rank	Note	Test Condition	Current transfer ratio I_C/I_F (min)	Current transfer ratio I_C/I_F (max)	Marking of classification	Unit
Blank	—	I_F = 5 mA, V_{CE} = 5 V	50	600	Blank, GB	%
GB		I_F = 5 mA, V_{CE} = 5 V	100	600	GB	

Note: Specify both the part number and a rank in this format when ordering.
Example: TLP628M(GB,E
For safety standard certification, however, specify the part number alone.
Example: TLP628M(GB,E → TLP628M

10. Isolation Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Total capacitance (input to output)	C_S	(Note 1)	V_S = 0 V, f = 1 MHz	—	0.6	—	pF
Isolation resistance	R_S	(Note 1)	V_S = 500 V, R.H. ≤ 60 %	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	(Note 1)	AC, 60 s	5000	—	—	Vrms

Note 1: This device is considered as a two-terminal device: Pins 1 and 2 are shorted together, and pins 3 and 4 are shorted together.

11. Switching Characteristics (Unless otherwise specified,T_a = 25 °C)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Rise time	t_r		V_{CC} = 10 V, I_C = 2 mA, R_L = 100 Ω	—	5.5	—	μs
Fall time	t_f			—	10	—	
Turn-on time	t_{on}			—	10	—	
Turn-off time	t_{off}			—	10	—	
Turn-on time	t_{on}		See Fig. 11.1. R_L = 1.9 kΩ, V_{CC} = 5 V, I_F = 16 mA	—	1.3	—	
Storage time	t_s			—	55	—	
Turn-off time	t_{off}			—	68	—	

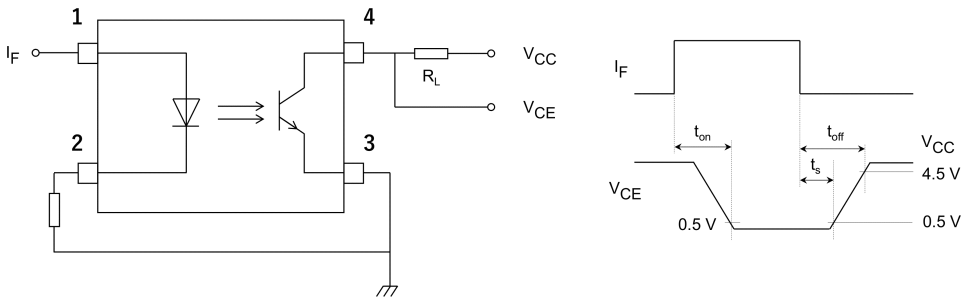


Fig. 11.1 Switching Time Test Circuit and Waveform

©2018-2026
Toshiba Electronic Devices & Storage Corporation

12. Characteristics Curves (Note)

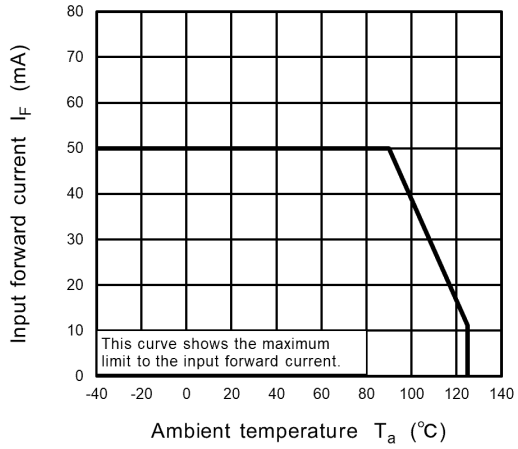


Fig. 12.1 I_F - T_a

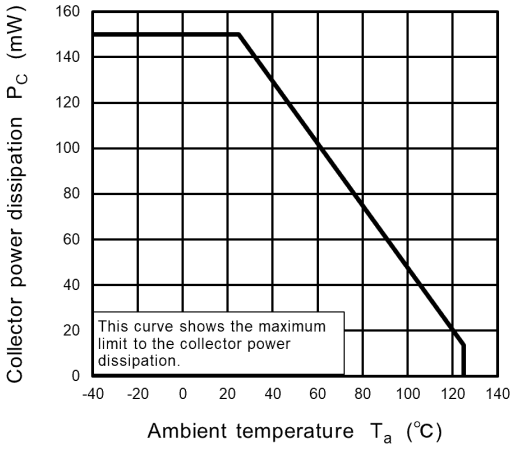


Fig. 12.2 P_C - T_a

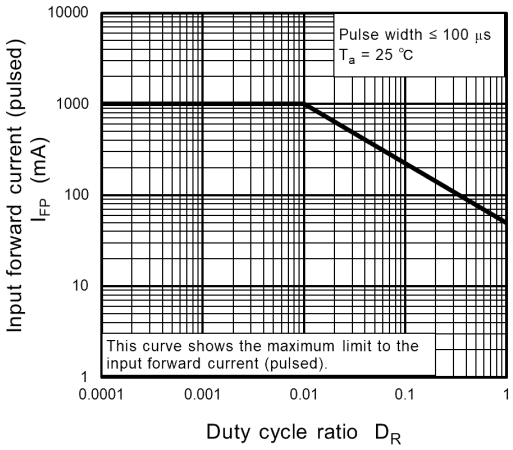


Fig. 12.3 I_{FP} - D_R

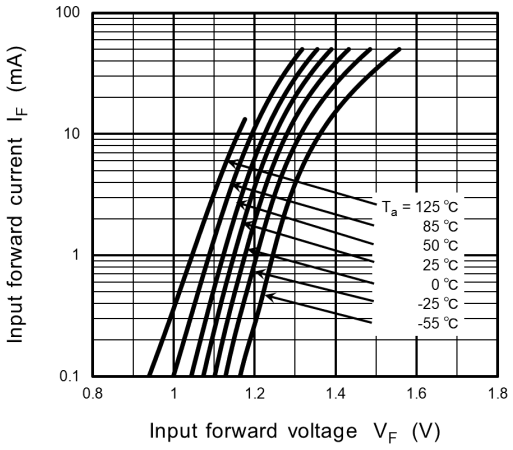


Fig. 12.4 I_F - V_F

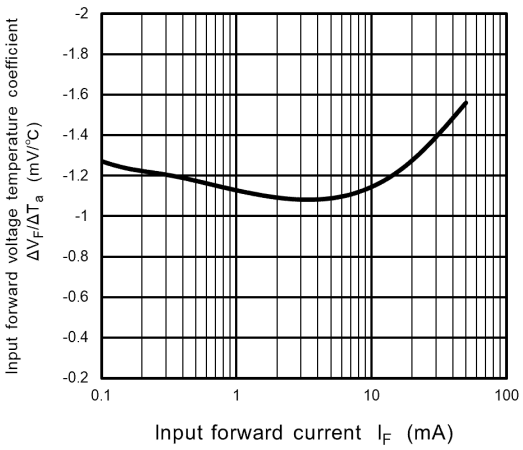


Fig. 12.5 $\Delta V_F/\Delta T_a$ - I_F

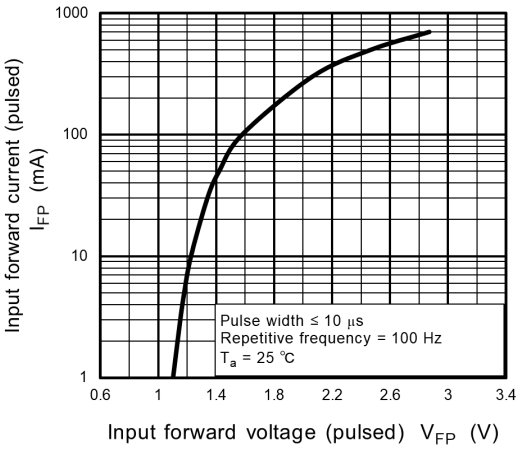


Fig. 12.6 I_{FP} - V_{FP}

©2018-2026
Toshiba Electronic Devices & Storage Corporation

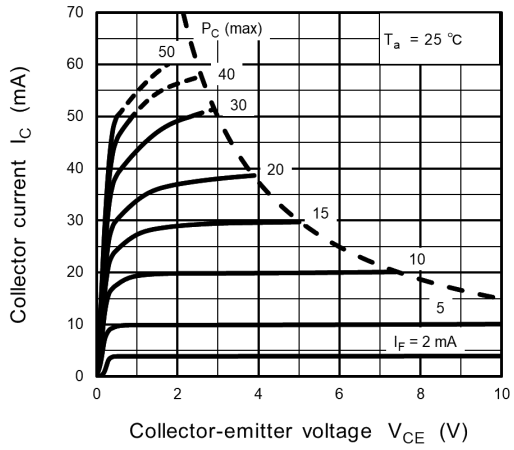


Fig. 12.7 I_C - V_{CE}

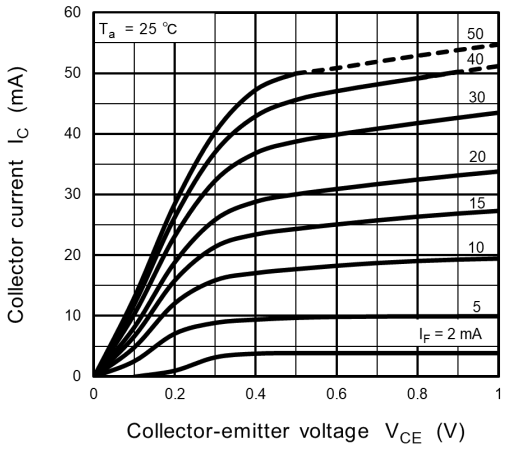


Fig. 12.8 I_C - V_{CE}

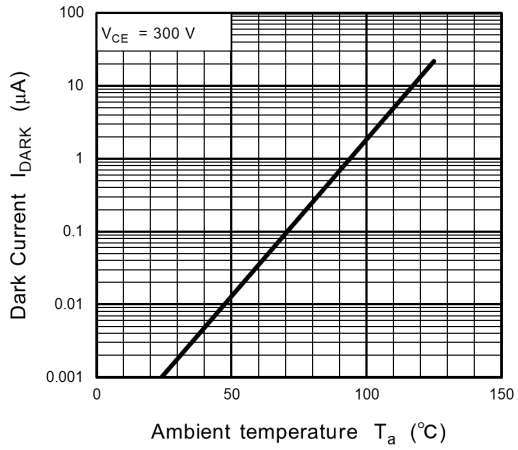


Fig. 12.9 I_{DARK} - T_a

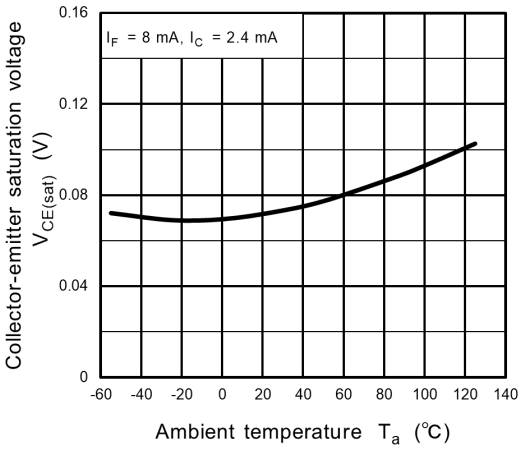


Fig. 12.10 $V_{CE(sat)}$ - T_a

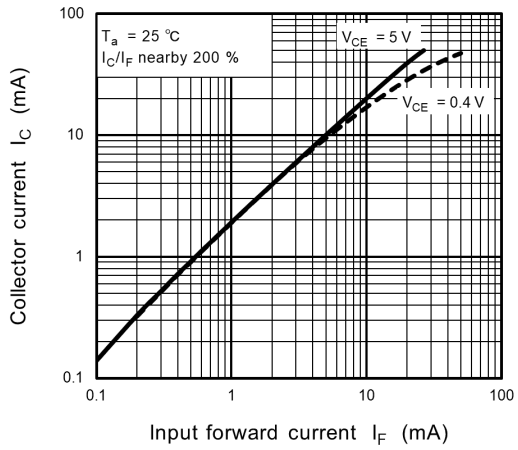


Fig. 12.11 I_C - I_F

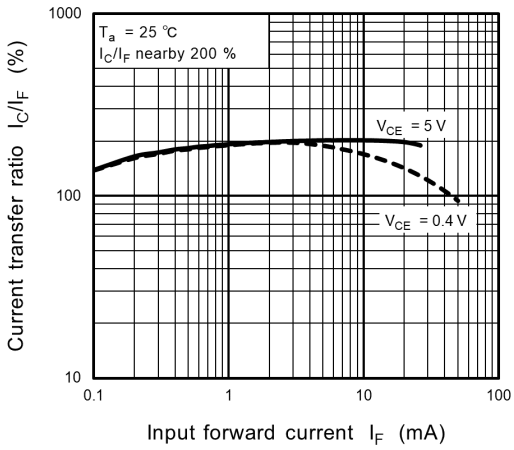


Fig. 12.12 I_C/I_F - I_F

©2018-2026
Toshiba Electronic Devices & Storage Corporation

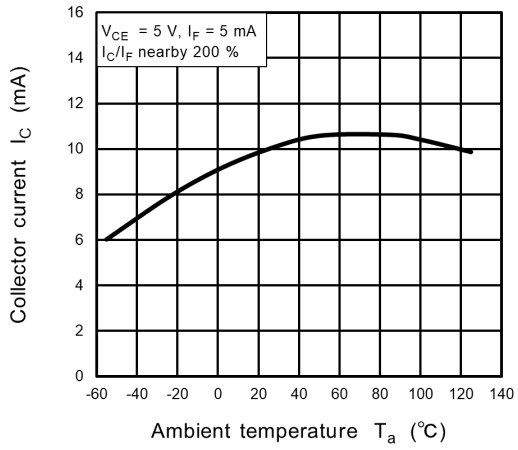


Fig. 12.13 I_C - T_a

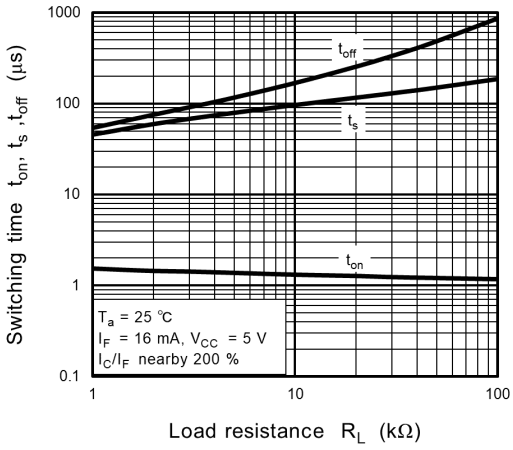


Fig. 12.14 Switching Time - R_L

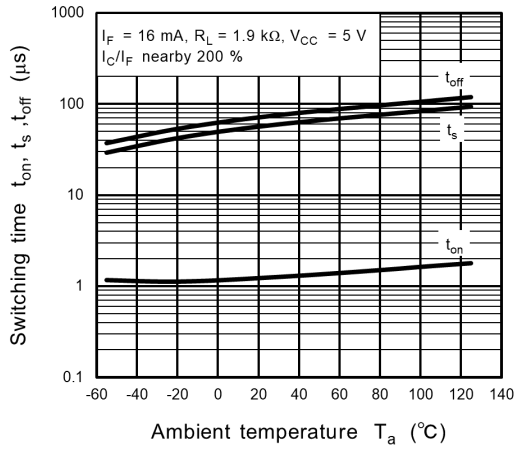


Fig. 12.15 Switching Time - T_a

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

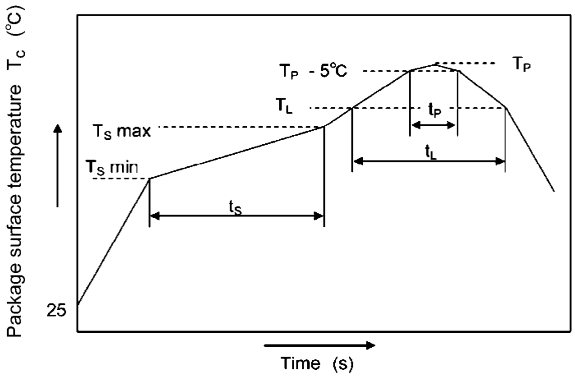
©2018-2026
Toshiba Electronic Devices & Storage Corporation

13. Soldering and Storage

13.1. 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.

- When using soldering reflow.
  The soldering temperature profile is based on the package surface temperature.
  (See the figure shown below, which is based on the package surface temperature.)
  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.



	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

Fig. 13.1.1 An Example of a Temperature Profile When Lead(Pb)-Free Solder Is Used

- When using soldering flow
  Preheat the device at a temperature of 150 °C (package surface temperature) for 60 to 120 seconds.
  Mounting condition of 260 °C within 10 seconds is recommended.
  Flow soldering must be performed once.
- 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 done only once per lead.

13.2. Precautions for General Storage

- Avoid storage locations where devices may be exposed to moisture or direct sunlight.
- Follow the precautions printed on the packing label of the device for transportation and storage.
- Keep the storage location temperature and humidity within a range of 5 °C to 35 °C and 45 % to 75 %, respectively.
- Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
- Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
- When restoring devices after removal from their packing, use anti-static containers.
- Do not allow loads to be applied directly to devices while they are in storage.

©2018-2026
Toshiba Electronic Devices & Storage Corporation

14. Marking (Note)

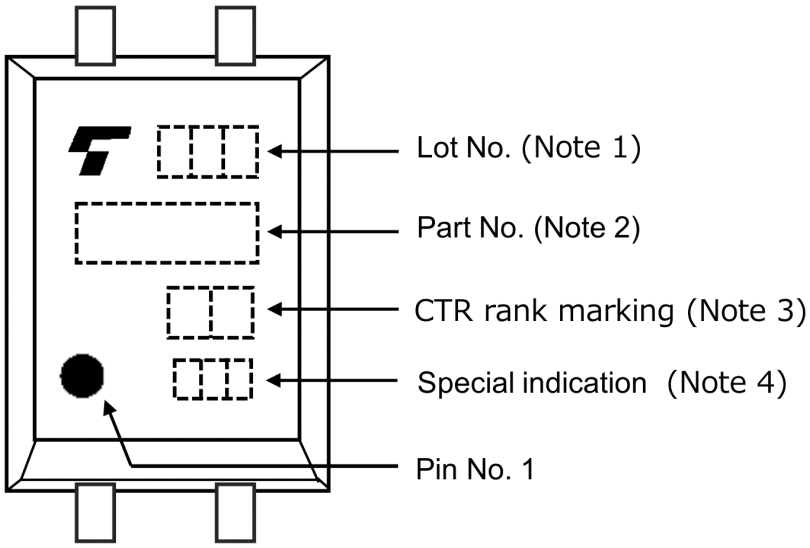


Fig. 14.1 Marking example

Note 1: If the lot number is expressed with three characters, it indicates "manufacturing year (1 character) + manufacturing week (2 characters)".
For example, if the lot number shown on the product is "841", it means the product was manufactured in the 41st week of a year ending in 8.

Note 2: P628M (Abbreviation code), P628MF (Abbreviation code)

Note 3: For the CTR rank mark, please refer to the marking of classification in table 9.1 CTR rank table.

Note 4: Special indication is put for the traceability enhancement.
Information of special indication
e.g. A01
A: Factory administration number
01: A counting of the number is started on every week from 01.
and reset when Lot No or weekly code is changed.

©2018-2026
Toshiba Electronic Devices & Storage Corporation

15. EN IEC 60747-5-5 Option (D4) Specification

- Part number: TLP628M,TLP628MF **(Note 1)**
- The following part naming conventions are used for the devices that have been qualified according to option (D4) of EN IEC 60747.

  Example: TLP628M(D4GBT1,E

  D4: EN IEC 60747 option
  CB: CTR rank
  T1: Tape type (TP1)
  E: [[G]]/RoHS COMPATIBLE **(Note 2)**

Note 1: Use TOSHIBA standard type number for safety standard application.
e.g., TLP628M(D4GBT1,E → TLP628M

Note 2: Please contact your Toshiba sales representative for details on environmental information such as the product's RoHS compatibility.
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 electronic equipment.

Description		Symbol	Rating	Unit
Application classification for rated mains voltage ≤ 600 Vrms for rated mains voltage ≤ 1000 Vrms			 I-IV I-III	—
Climatic classification			55 / 125 / 21	—
Pollution degree			2	—
Maximum operating insulation voltage	TLPxxxx type	V_{IORM}	890	Vpeak
	TLPxxxxF type		1140	
Input to output test voltage, Method A V_{pr} = 1.6 × V_{IORM}, type and sample test t_p = 10 s, partial discharge < 5 pC	TLPxxxx type	V_{pr}	1424	Vpeak
	TLPxxxxF type		1824	
Input to output test voltage, Method B V_{pr} = 1.875 × V_{IORM}, 100 % production test t_p = 1 s, partial discharge < 5 pC	TLPxxxx type	V_{pr}	1670	Vpeak
	TLPxxxxF type		2140	
Highest permissible overvoltage (transient overvoltage, t_{pr} = 60 s)		V_{TR}	8000	Vpeak
Safety limiting values (max. permissible ratings in case of fault, also refer to thermal derating curve) current (input current I_F, P_{so} = 0) power (output or total power dissipation) temperature		 I_{si} P_{so} T_s	 400 700 150	 mA mW °C
Insulation resistance	V_{IO} = 500 V, T_a = 25 °C	R_{si}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_a = 100 °C		$\geq 10^{11}$	
	V_{IO} = 500 V, T_a = T_s		$\geq 10^{9}$	

Fig. 15.1 EN IEC 60747 Insulation Characteristics

©2018-2026
Toshiba Electronic Devices & Storage Corporation

		7.62 mm pitch TLPxxx type	10.16 mm pitch TLPxxxF type
Minimum creepage distance	Cr	7.0 mm	8.0 mm
Minimum clearance	Cl	7.0 mm	8.0 mm
Minimum insulation thickness	ti	0.4 mm	
Comparative tracking index	CTI	500	

Fig. 15.2 Insulation Related Specifications (Note)

Note: If a printed circuit is incorporated, the creepage distance and clearance may be reduced below this value. (e.g., at a standard distance between soldering eye centers of 7.5 mm). If this is not permissible, the user shall take suitable measures.

Note: This photocoupler is suitable for **safe electrical isolation** only within the safety limit data. Maintenance of the safety data shall be ensured by means of protective circuits.

Fig. 15.3 Marking on packing for EN IEC 60747

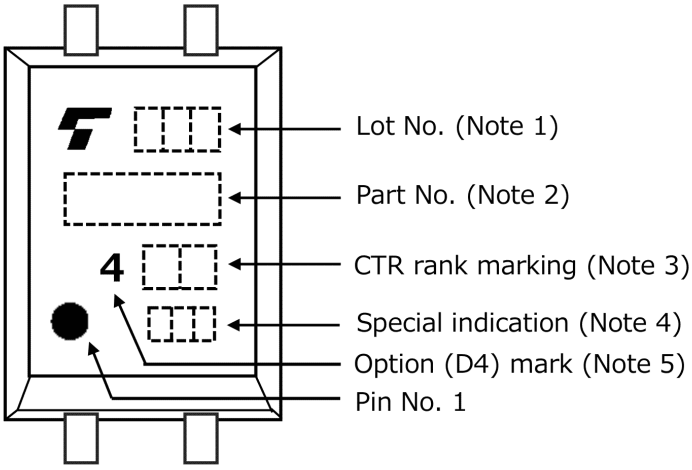


Fig. 15.4 Marking Example

Note 1: If the lot number is expressed with three characters, it indicates "manufacturing year (1 character) + manufacturing week (2 characters)".
For example, if the lot number shown on the product is "841", it means the product was manufactured in the 41st week of a year ending in 8.

Note 2: P628M (Abbreviation code), P628MF (Abbreviation code)

Note 3: For the CTR rank mark, please refer to the marking of classification in table 9.1 CTR rank table.

Note 4: Special indication is put for the traceability enhancement.
Information of special indication
e.g. A01
A: Factory administration number
01: A counting of the number is started on every week from 01.
and reset when Lot No or weekly code is changed.

Note 5: The above marking is applied to the photocouplers that have been qualified according to option (D4) of EN IEC 60747.

©2018-2026
Toshiba Electronic Devices & Storage Corporation

Figure 1 Partial discharge measurement procedure according to EN IEC 60747
Destructive test for qualification and sampling tests.

Method A

(for type and sampling tests, destructive tests)

t_1, t_2	= 1 to 10 s
t_3, t_4	= 1 s
t_p (Measuring time for partial discharge)	= 10 s
t_b	= 12 s
t_{ini}	= 60 s

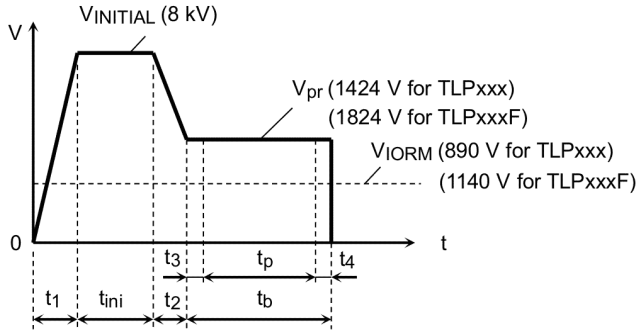


Figure 2 Partial discharge measurement procedure according to EN IEC 60747
Non-destructive test for 100 % inspection.

Method B

(for sample test, non-destructive test)

t_3, t_4	= 0.1 s
t_p (Measuring time for partial discharge)	= 1 s
t_b	= 1.2 s

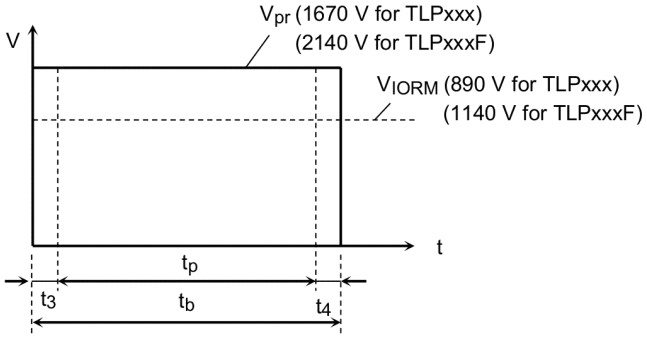


Figure 3 Dependency of maximum safety ratings on ambient temperature

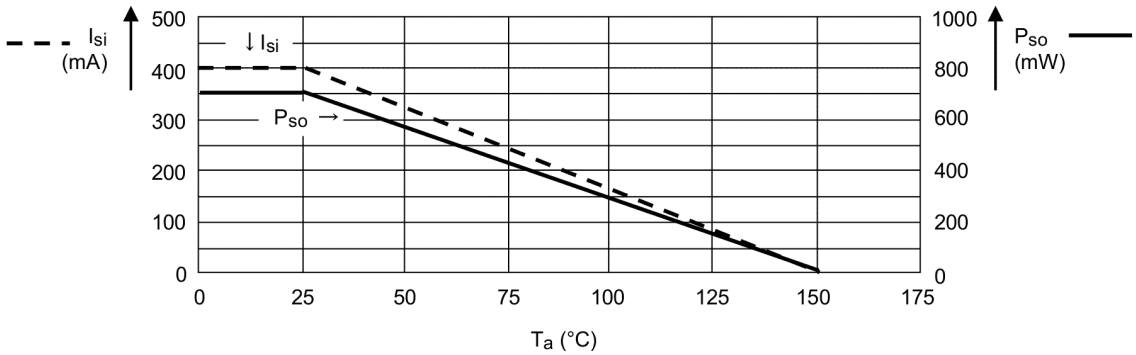


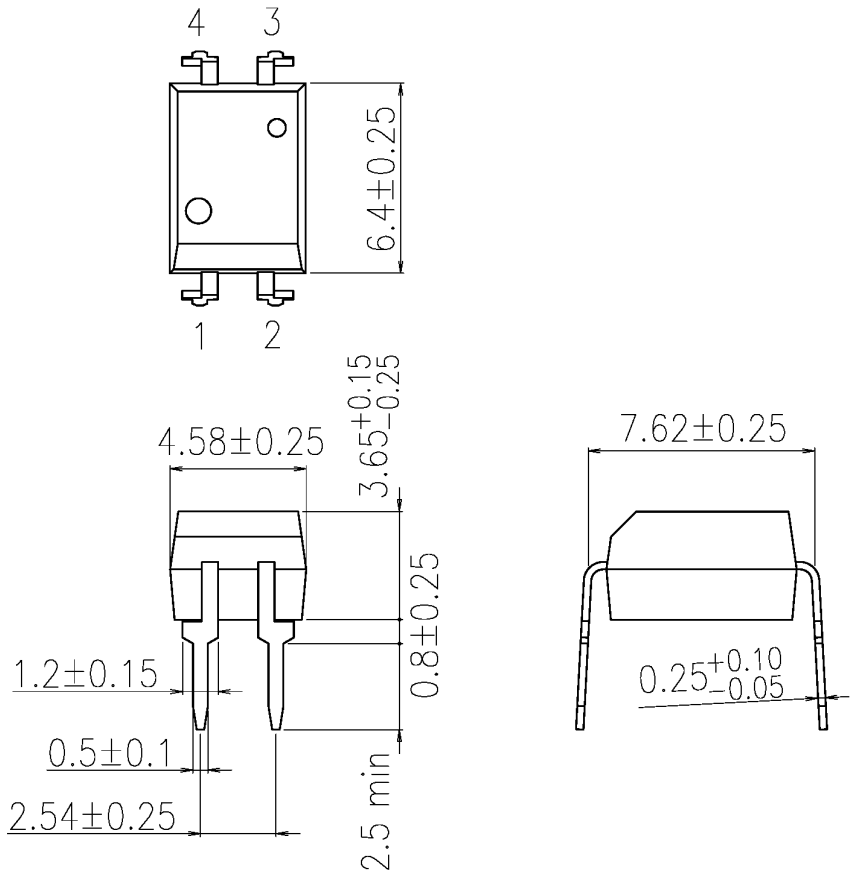
Fig. 15.5 Measurement Procedure

©2018-2026
Toshiba Electronic Devices & Storage Corporation

Package Dimensions

Unit: mm

TLP628M



Weight: 0.24 g (typ.)

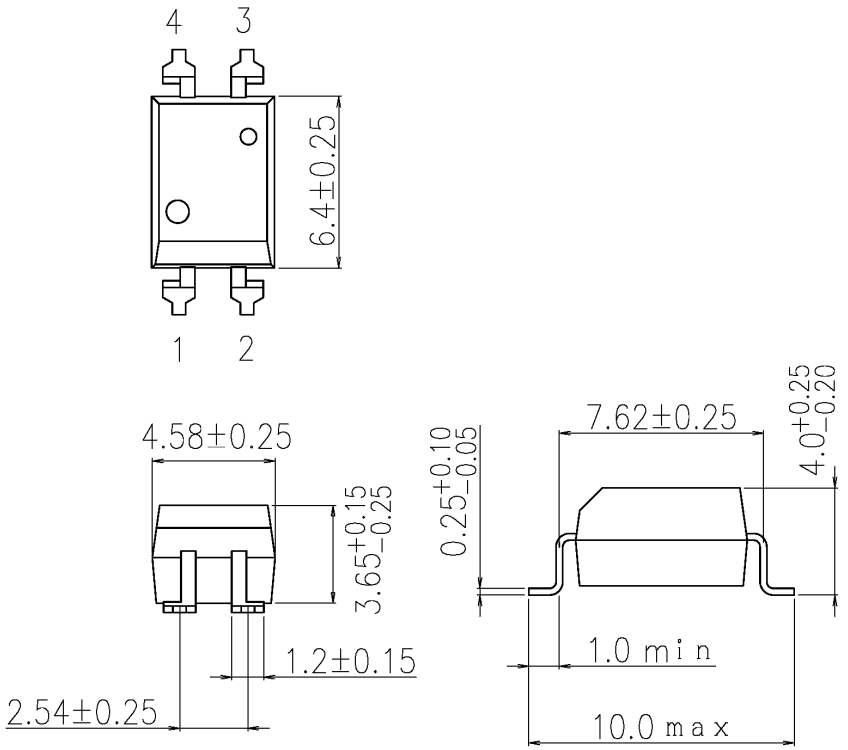
Package Name(s)
TOSHIBA: 11-5B2S

©2018-2026
Toshiba Electronic Devices & Storage Corporation

Package Dimensions

Unit: mm

TLP628M(LF1,TP1)



Weight: 0.24 g (typ.)

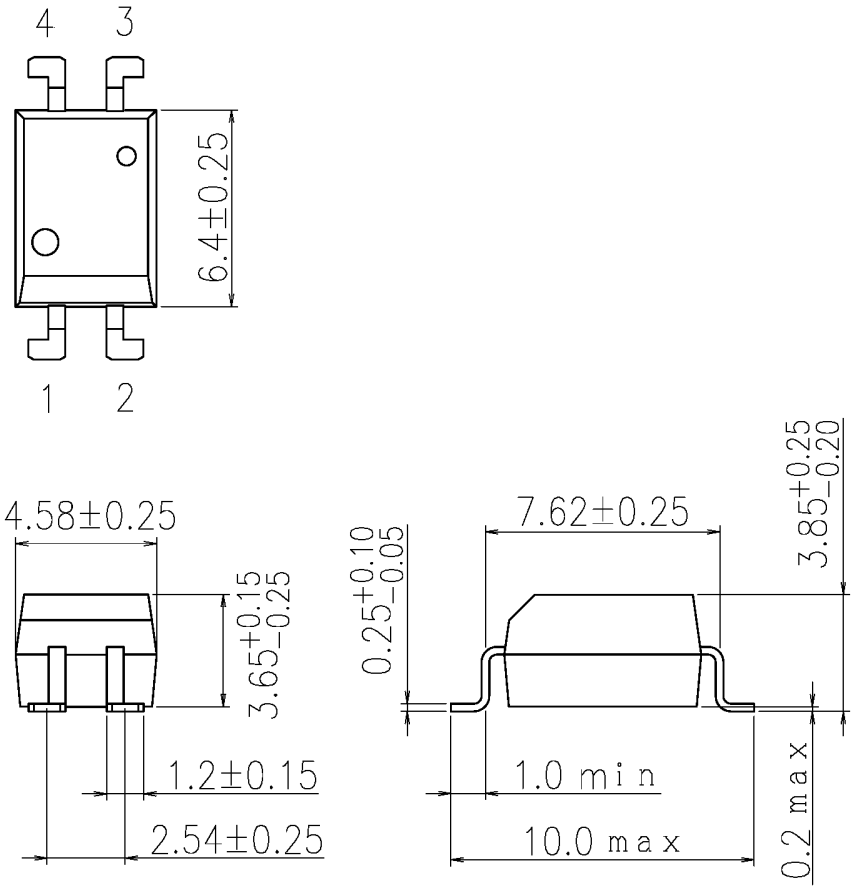
Package Name(s)
TOSHIBA: 11-5B201S

©2018-2026
Toshiba Electronic Devices & Storage Corporation

Package Dimensions

Unit: mm

TLP628M(LF5,TP5)



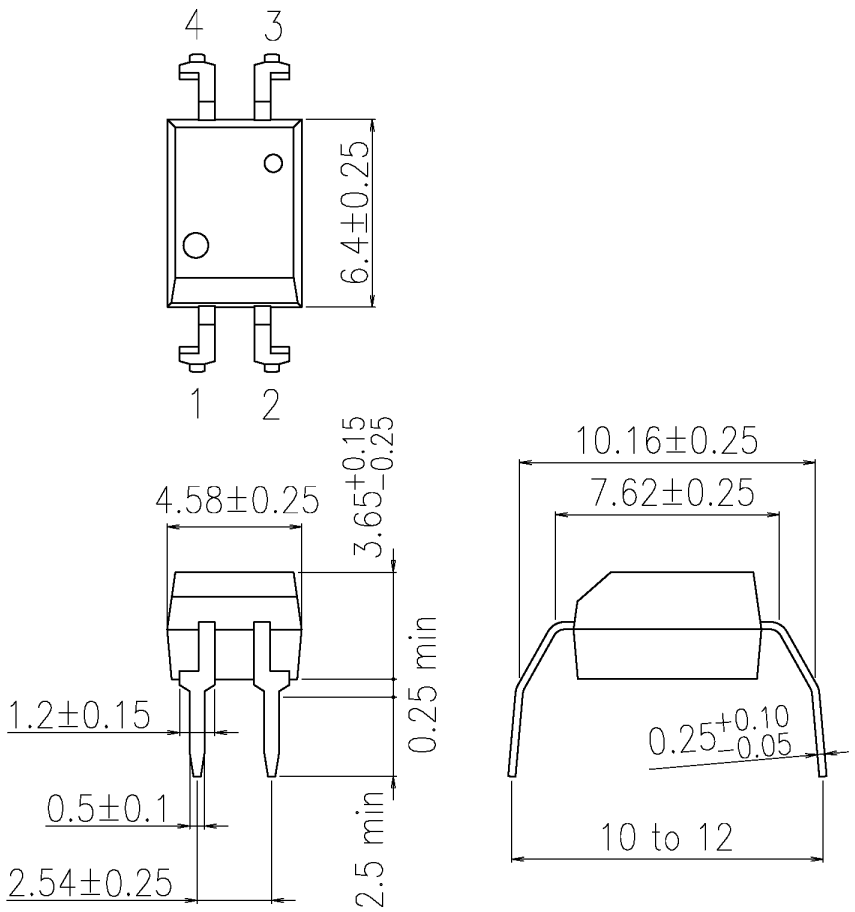
Weight: 0.24 g (typ.)

Package Name(s)
TOSHIBA: 11-5B205S

Package Dimensions

Unit: mm

TLP628MF



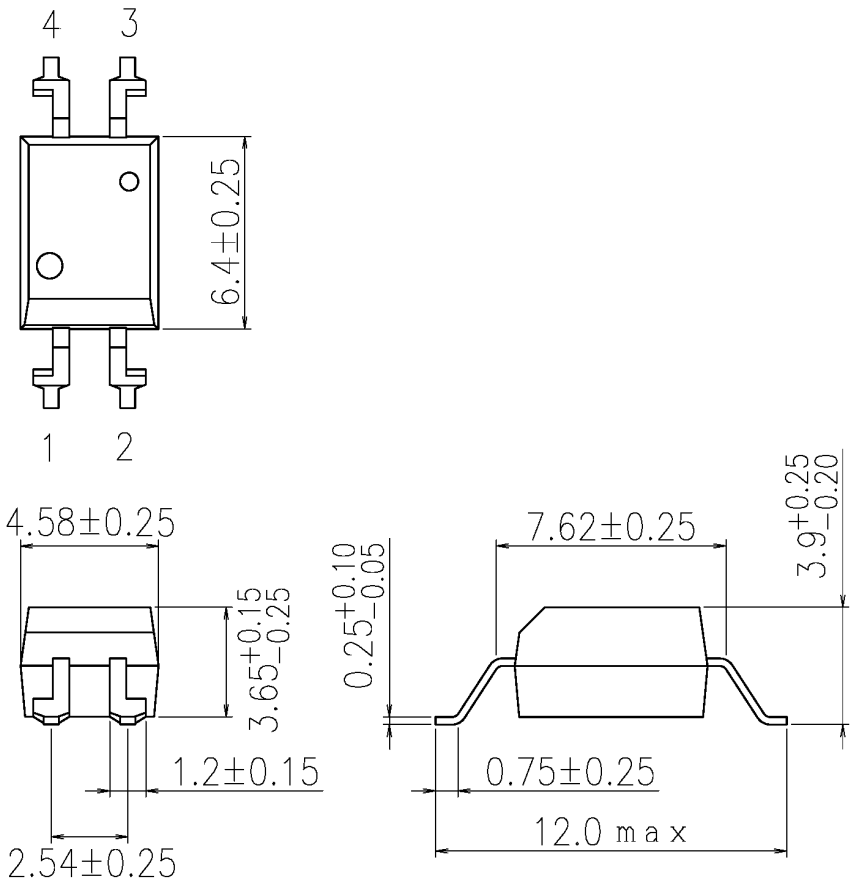
Weight: 0.24 g (typ.)

Package Name(s)
TOSHIBA: 11-5B202S

Package Dimensions

Unit: mm

TLP628MF(LF4,TP4)



Weight: 0.24 g (typ.)

Package Name(s)
TOSHIBA: 11-5B204S

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, Class 3 medical devices, equipment used for automobiles, and military vehicles and munitions. **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.**

©2018-2026
Toshiba Electronic Devices & Storage Corporation