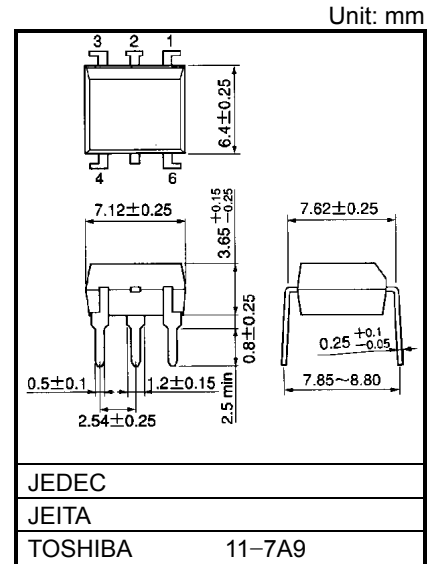


TLP3542

TESTERS
DATA RECORDING EQUIPMENTS
MEASUREMENT EQUIPMENTS

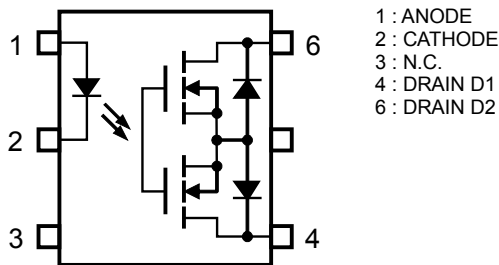
The TOSHIBA TLP3542 consists of an infrared emitting diode optically coupled to a photo-MOS FET in a plastic DIP package.
The TLP3542 series are a bi-directional switch, which can replace mechanical relays in many applications. And its high on-state current maximum rating is suitable to control a power line.

- 6 pin DIP (DIP6)
- 1-Form-A
- Peak Off-State Voltage : 60 V (min)
- Trigger LED Current : 3 mA (max)
- On-State Current : 2.5 A (max)
- On-State Resistance : 100 mΩ (max)
- Output capacitance : 600 pF (max)
- Isolation Voltage : 2500 Vrms (min)
- UL-recognized : UL 1577, File No.E67349
- cUL-recognized : CSA Component Acceptance Service No.5A
File No.E67349

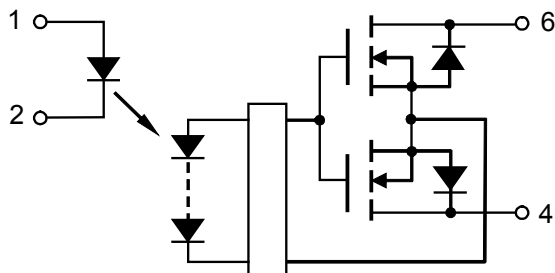


Weight: 0.4 g (typ.)

Pin Configuration (top view)



Schematic



Start of commercial production
2003-07

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	30	mA
	Forward Current Derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.3	mA/°C
	Reverse Voltage	V_R	5	V
	Diode Power Dissipation	P_D	50	mW
	Diode Power Dissipation Derating (Ta ≥ 25°C)	$\Delta P_D / ^\circ\text{C}$	-0.5	mW/°C
	Junction Temperature	T_j	125	°C
DETECTOR	Off-State Output Terminal Voltage	V_{OFF}	60	V
	On-State Current	I_{ON}	2.5	A
	On-State Current Derating (Ta ≥ 40°C)	$\Delta I_{ON} / ^\circ\text{C}$	-22	mA/°C
	Output Power Dissipation	P_o	625	mW
	Output Power Dissipation Derating (Ta ≥ 40°C)	$\Delta P_o / ^\circ\text{C}$	-7.4	mW / °C
	Junction Temperature	T_j	125	°C
Storage Temperature Range		T_{stg}	-40 to 125	°C
Operating Temperature Range		T_{opr}	-20 to 85	°C
Lead Soldering Temperature (10 s)		T_{sol}	260	°C
Isolation Voltage (AC, 60 s, R.H. ≤ 60 %) (NOTE1)		BV_S	2500	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: Device considered a two-terminal device: Pins 1, 2 and 3 shorted together, and pins 4 and 6 shorted together.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN	TYP.	MAX	UNIT
Supply Voltage	V_{DD}	—	—	48	V
Forward Current	I_F	10	—	20	mA
On-State Current	I_{ON}	—	—	2.5	A
Operating Temperature	T_{opr}	-20	—	60	°C

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.

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
LED	Forward Voltage	V _F	I _F = 10 mA	1.18	1.33	1.48	V
	Reverse Current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0 V, f = 1 MHz	—	70	—	pF
DETECTOR	Off-State Current	I _{OFF}	V _{OFF} = 20 V	—	0.1	1.5	nA
			V _{OFF} = 60 V	—	1.0	10	nA
	Capacitance	C _{OFF}	V = 0 V, f = 1 MHz	—	400	600	pF

Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Trigger LED Current	I _{FT}	I _{ON} = 1.0 A	—	1	3	mA
Return LED Current	I _{FC}	I _{OFF} = 10 μA	0.1	—	—	mA
On-State Resistance	R _{ON}	I _{ON} = 2.0 A, I _F = 10 mA, t = 10 ms	—	65	100	mΩ

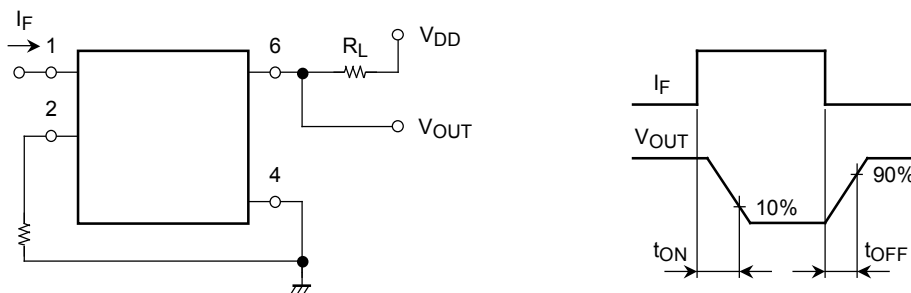
Isolation Characteristics (Ta = 25°C)

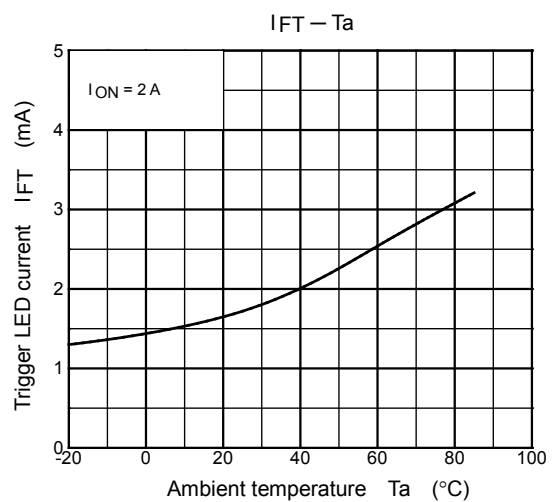
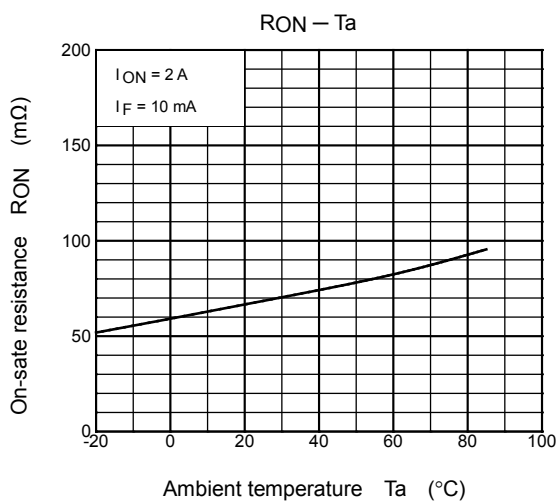
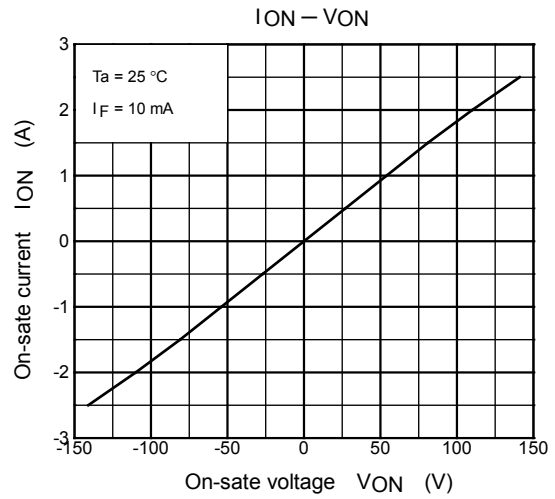
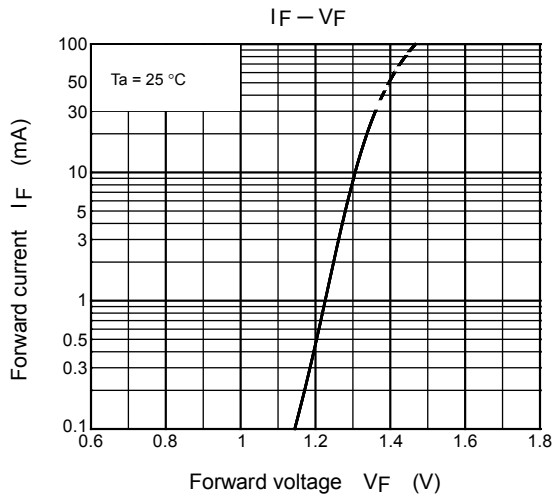
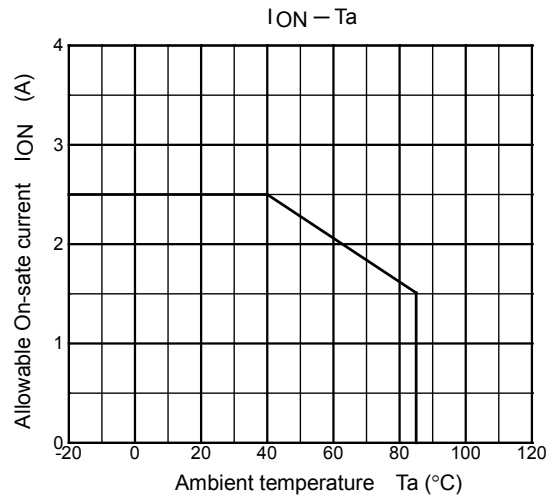
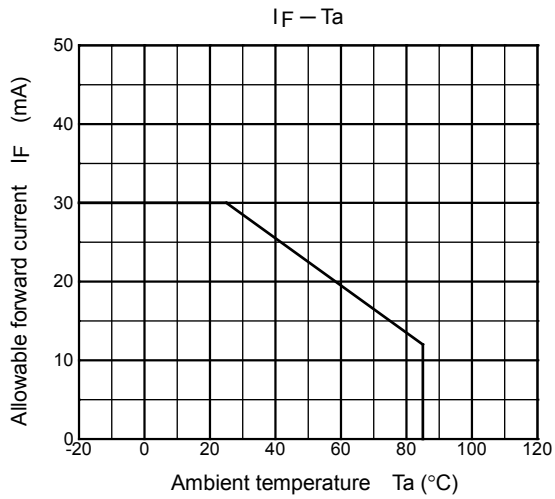
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Capacitance Input to Output	C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S = 500 V, R.H. ≤ 60 %	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 60 s	2500	—	—	V _{rms}

Switching Characteristics (Ta = 25°C)

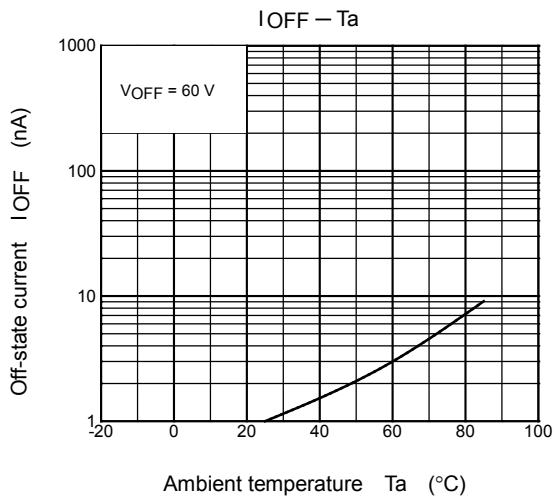
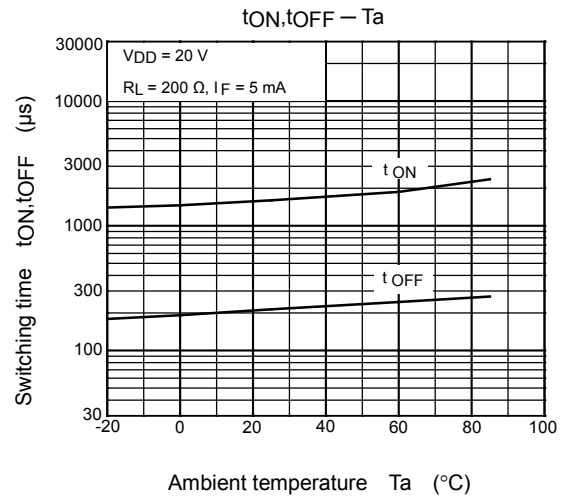
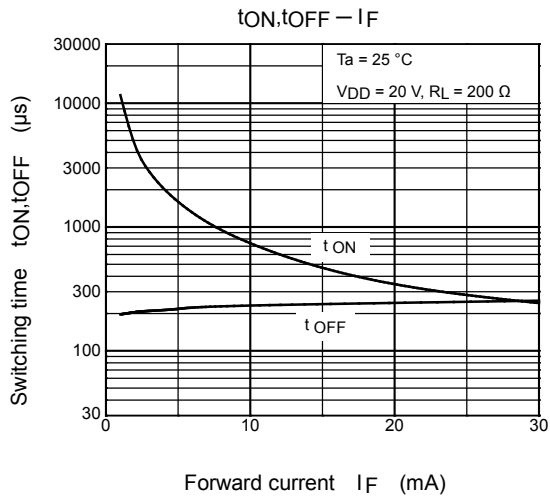
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Turn-on Time	t _{ON}	R _L = 200 Ω (NOTE 2) V _{DD} = 20 V, I _F = 5 mA	—	1.5	3.0	ms
Turn-off Time	t _{OFF}		—	0.2	0.6	
Turn-on Time	t _{ON}	R _L = 200 Ω (NOTE 2) V _{DD} = 20 V, I _F = 10 mA	—	1.0	1.5	ms
Turn-off Time	t _{OFF}		—	0.2	0.4	

(NOTE 2) : SWITCHING TIME TEST CIRCUIT





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



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

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