

TLP570, TLP571

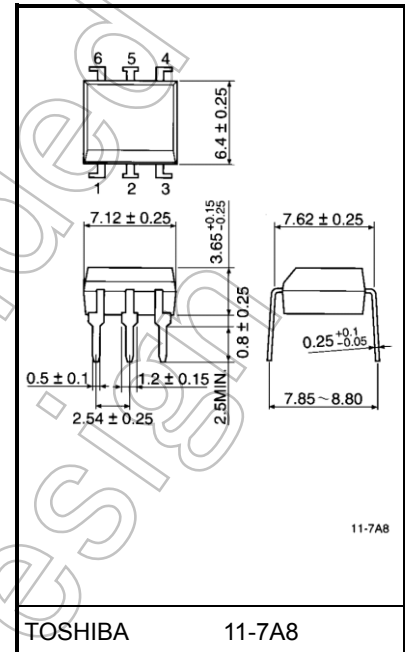
Programmable Controllers
 AC / DC-Input Module
 Solid State Relay

The TOSHIBA TLP570 and TLP571 consist of a Darlington connected photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

TLP570 has no-base internal connection for high-EMI environments.

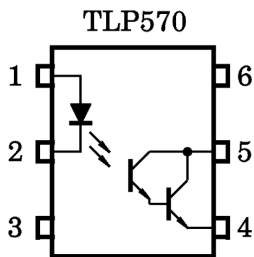
- Collector-emitter voltage: 35 V (min)
- Current transfer ratio: 1000 % (min)
- Isolation voltage: 2500 Vrms (min)
- UL recognized: UL1577, file no. E67349
- c-UL approved: CSA Component Acceptance Service
 No. 5A, File No.E67349

Unit: mm

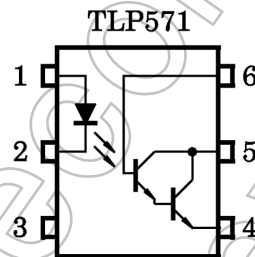


Weight: 0.4 g (typ.)

Pin Configurations (top view)



- TLP570**
- 1 : ANODE
 - 2 : CATHODE
 - 3 : NC
 - 4 : EMITTER
 - 5 : COLLECTOR
 - 6 : NC



- TLP571**
- 1 : ANODE
 - 2 : CATHODE
 - 3 : NC
 - 4 : EMITTER
 - 5 : COLLECTOR
 - 6 : BASE

Start of commercial production
 1982-02

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	70	mA
	Forward current derating (Ta ≥ 25°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / °C
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Diode power dissipation	P_D	100	mW
	Diode power dissipation derating (Ta > 25°C)	$\Delta P_D / ^\circ\text{C}$	-1.0	mW / °C
	Junction temperature	T_j	125	°C
Detector	Collector-emitter voltage	V_{CEO}	35	V
	Collector-base voltage (TLP571)	V_{CBO}	80	V
	Emitter-collector voltage	V_{ECO}	7	V
	Emitter-base voltage (TLP571)	V_{EBO}	7	V
	Collector current	I_C	150	mA
	Power dissipation	P_C	150	mW
	Power dissipation derating (Ta ≥ 25°C)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / °C
	Junction temperature	T_j	125	°C
Storage temperature range		T_{stg}	-55 to 125	°C
Operating temperature range		T_{opr}	-55 to 100	°C
Lead soldering temperature (10s)		T_{sol}	260	°C
Total package power dissipation		P_T	250	mW
Total package power dissipation derating (Ta ≥ 25°C)		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / °C
Isolation voltage (AC, 60 s, R.H. ≤ 60%) (Note 1)		BVS	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: Device considered a two terminal: Pins 1, 2 and 3 shorted together and pins 4, 5 and 6 shorted together.

Recommends Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{CC}	—	5	24	V
Forward current	I_F	—	16	25	mA
Collector current	I_C	—	—	50	mA
Operating temperature	T_{opr}	-25	—	85	°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.

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V _F	I _F = 10 mA	1.0	1.15	1.3	V
	Reverse current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0 V, f = 1 MHz	—	30	—	pF
Detector	Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C = 1 mA	35	—	—	V
	Emitter-collector breakdown voltage	V _{(BR)ECO}	I _E = 0.1 mA	7	—	—	V
	Collector-base breakdown voltage (TLP571)	V _{(BR)CBO}	I _C = 0.1 mA	80	—	—	V
	Emitter-base breakdown voltage (TLP571)	V _{(BR)EBO}	I _E = 0.1 mA	7	—	—	V
	Collector dark current	I _{CEO}	V _{CE} = 24 V	—	10	200	nA
			V _{CE} = 24 V, Ta = 85°C	—	—	300	μA
	Collector dark current (TLP571)	I _{CER}	V _{CE} = 24 V, Ta = 85°C R _{BE} = 10 MΩ	—	0.5	10	μA
	Collector dark current (TLP571)	I _{CBO}	V _{CB} = 10 V	—	0.01	—	nA
	DC forward current gain (TLP571)	h _{FE}	V _{CE} = 5 V, I _C = 10 mA	—	50k	—	—
	Capacitance (collector to emitter)	C _{CE}	V = 0 V, f = 1 MHz	—	10	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	I _C / I _F	I _F = 1 mA, V _{CE} = 1 V	1000	2000	—	%
Saturated CTR	I _C / I _F (sat)	I _F = 10 mA, V _{CE} = 1 V	500	—	—	%
Base photo-current (TLP571)	I _{PB}	I _F = 1 mA, V _{CB} = 1 V	—	2	—	μA
Collector-emitter saturation voltage	V _{CE} (sat)	I _C = 10 mA, I _F = 1 mA	—	—	1.0	V
		I _C = 100 mA, I _F = 10 mA	0.3	—	1.2	

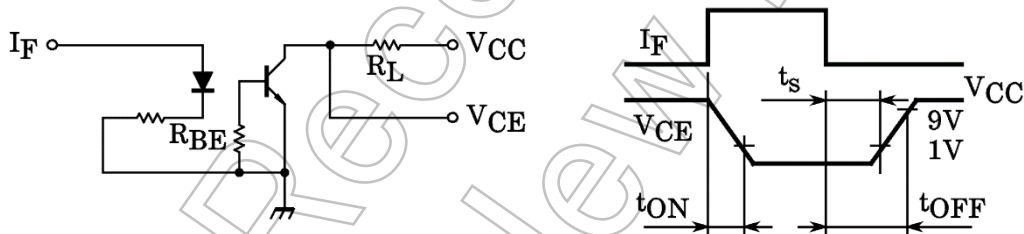
Isolation Characteristics (Ta = 25°C)

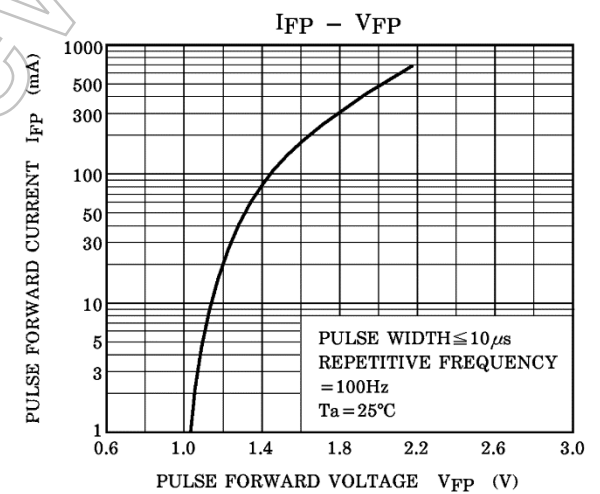
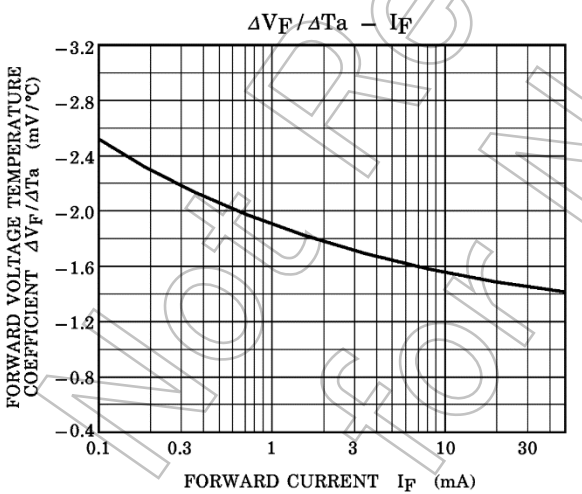
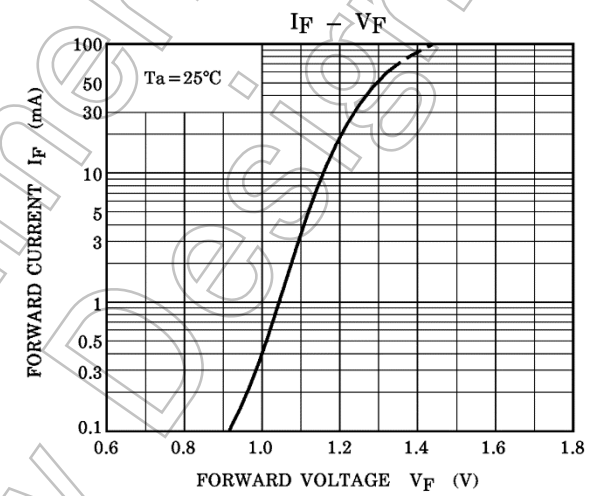
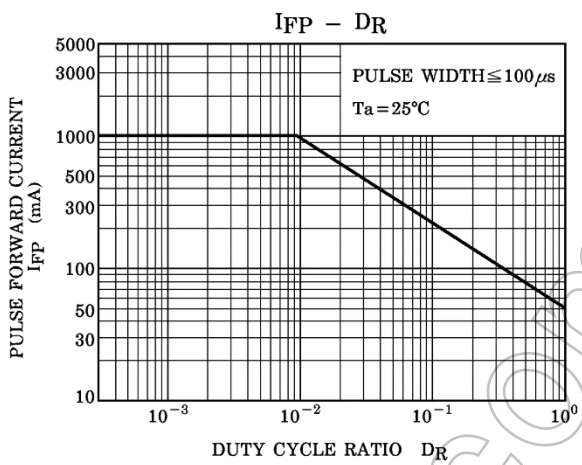
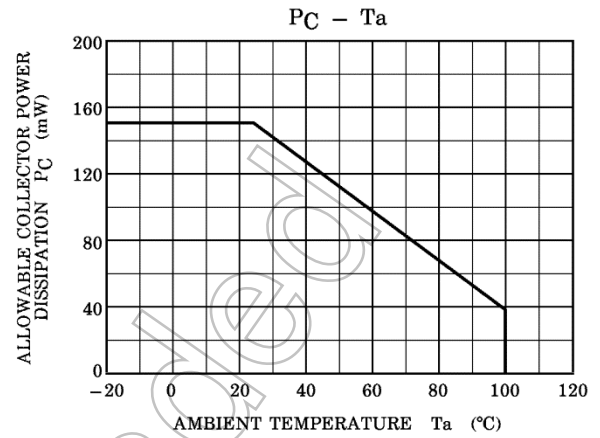
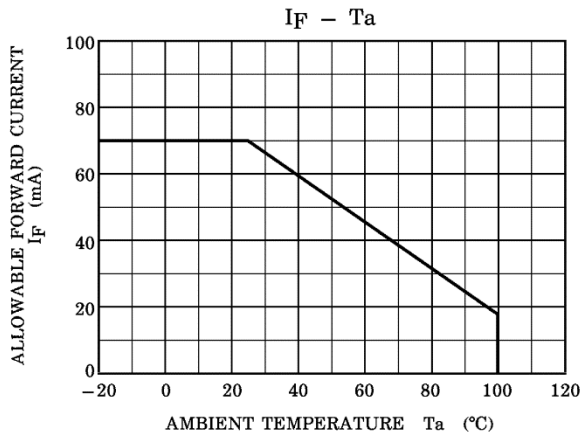
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input to output)	Cs	Vs = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	Rs	Vs = 500 V, R.H. ≤ 60%	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BVs	AC, 60 s	2500	—	—	Vrms
		AC, 1 s, in oil	—	5000	—	
		DC, 60 s, in oil	—	5000	—	Vdc

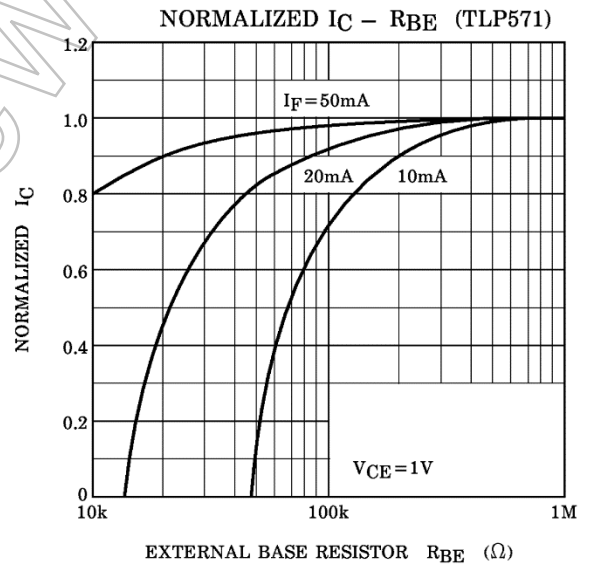
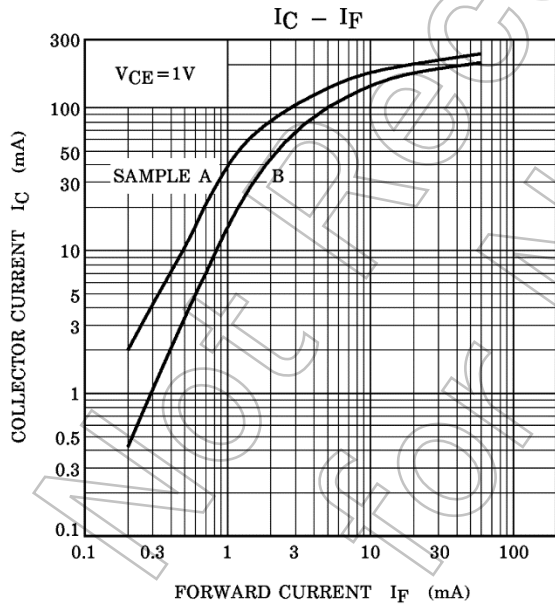
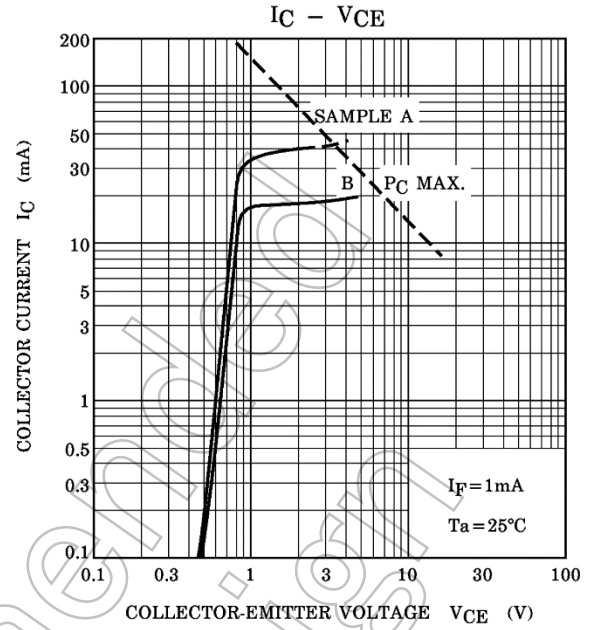
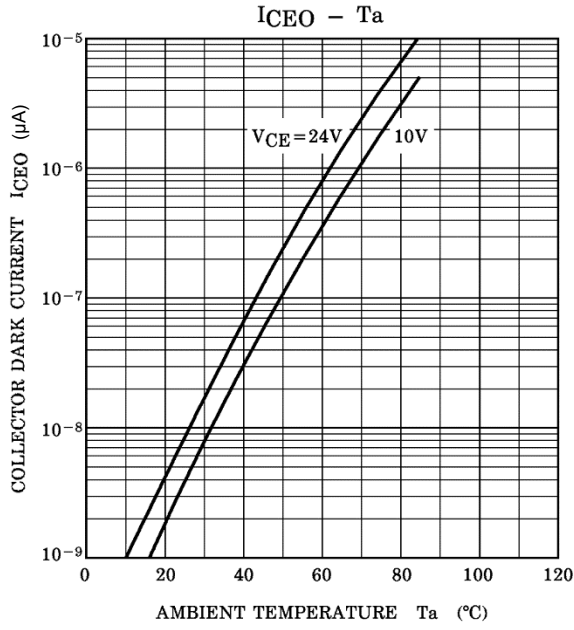
Switching Characteristics (Ta = 25°C)

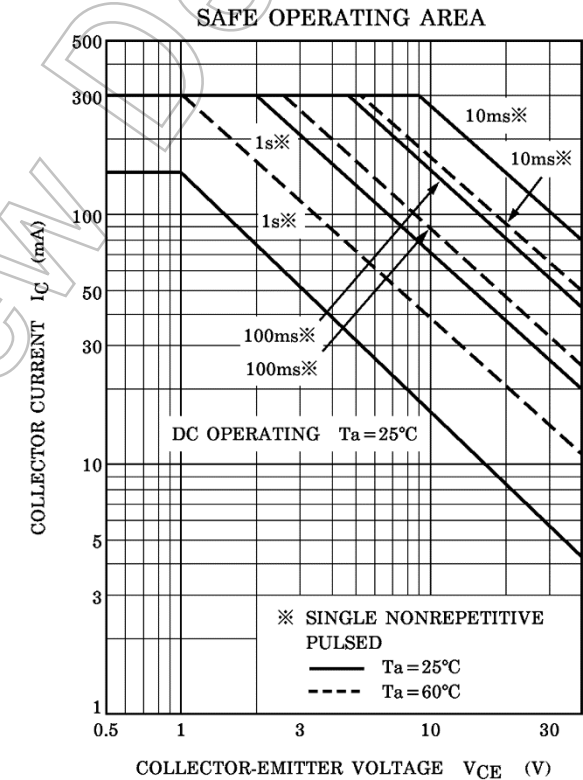
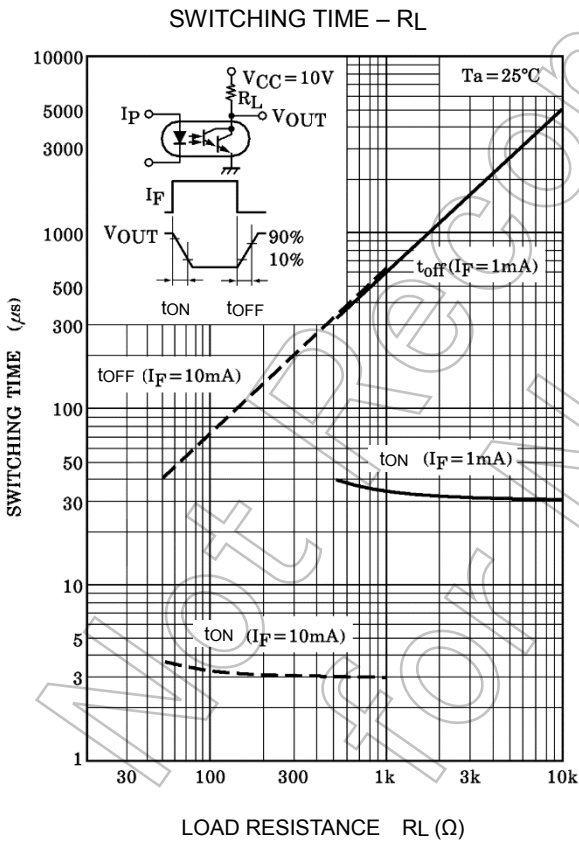
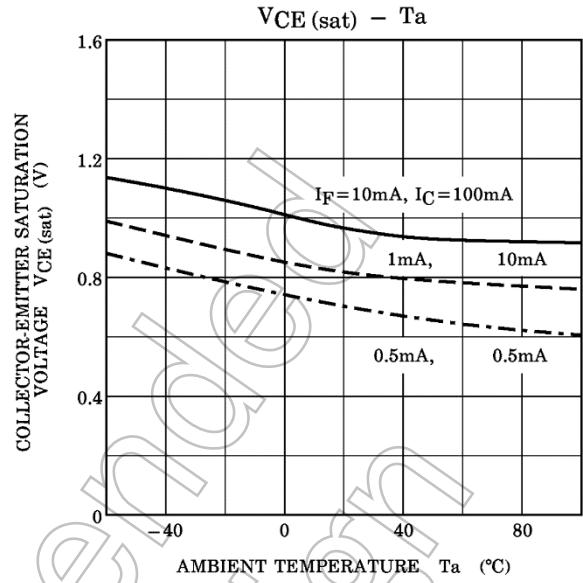
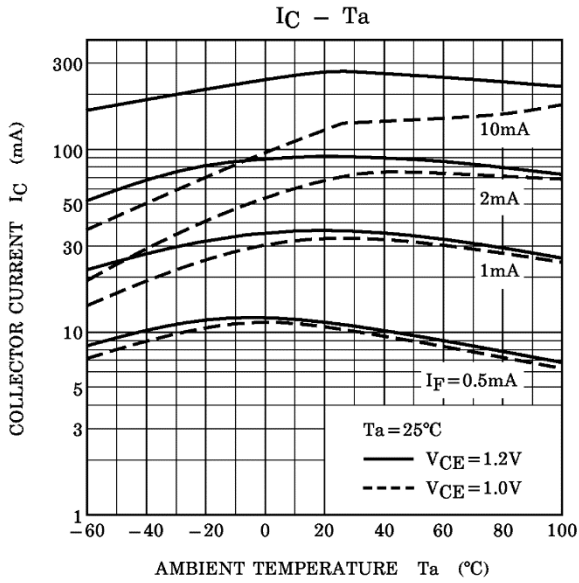
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	tr	VCC = 10 V IC = 10 mA RL = 100Ω	—	40	—	μs
Fall time	tf		—	30	—	
Turn-on time	tON		—	45	—	
Turn-off time	tOFF		—	35	—	
Turn-on time	tON	RL = 180Ω RBE = open VCC = 10 V, IF = 10 mA (Fig.1)	—	5	—	μs
Storage time	ts		—	20	—	
Turn-off time	tOFF		—	100	—	
Turn-on time	tON	RL = 180Ω RBE = 10MΩ (TLP571) VCC = 10 V, IF = 10 mA (Fig.1)	—	5	—	μs
Storage time	ts		—	15	—	
Turn-off time	tOFF		—	60	—	

Fig. 1 Switching time test circuit









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