

TLP521-1GB-S-HX/TLP521-1GB-P-HX Programmable Controllers AC/DC-Input Module Solid State Relay

Description

The TLP521-1GB-S-HX/TLP521-1GB-P-HX Programmable Controllers AC/DC-Input Module Solid State Relay is engineered to deliver exceptional performance and reliability in a wide range of industrial applications. With a collector-emitter voltage rating of 55 V (min), this solid-state relay ensures stable operation even under demanding voltage conditions, providing a robust solution for high-voltage switching tasks.

One of its standout features is the current transfer ratio of 50% (min), which guarantees efficient signal transfer between the input and output circuits. This high ratio enables precise control and reduces power losses, enhancing the overall energy efficiency of the system.

The relay also boasts a Rank GB rating of 100% (min), indicating its superior quality and consistent performance. This ensures that every unit meets the highest industry standards, delivering reliable and long-lasting operation in critical applications.

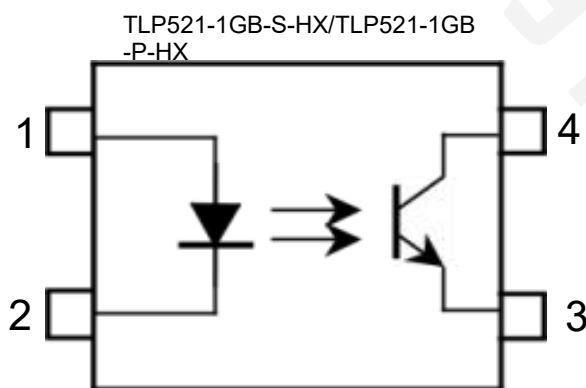
In terms of safety, the TLP521-1GB-S-HX/TLP521-1GB-P-HX features an isolation voltage of 2500 Vrms (min), providing a high level of electrical isolation between the input and output circuits. This isolation protects sensitive components from voltage surges and electrical noise, ensuring the integrity of the control system.

Overall, the TLP521-1GB-S-HX/TLP521-1GB-P-HX Programmable Controllers AC/DC-Input Module Solid State Relay combines high performance, reliability, and safety, making it an ideal solution for a wide range of industrial automation and control applications.

Features

- ★ Collector-emitter voltage: 55 V (min)
- ★ Current transfer ratio: 50% (min)
Rank GB: 100% (min)
- ★ Isolation voltage: 2500 Vrms (min)
- ★ UL recognized: UL1577, file no. E67349
- ★ c-UL recognized: CSA Component Acceptance Service No. 5A File No.E67349
- ★ SOP-4 and DIP-4 package

Pin Configurations (top view)



Weight: 0.26 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	IF	70	mA
	Forward current derating	$\Delta I_F/^{\circ}\text{C}$	-0.93 (Ta $\geq 50^{\circ}\text{C}$)	mA/ $^{\circ}\text{C}$
	Pulse forward current (100 μs pulse, 100 pps)	IFP	1	A
	Reverse voltage	VR	5	V
	Diode power dissipation	PD	150	mW
	Diode power dissipation derating	$\Delta P_D/^{\circ}\text{C}$	-2.0 (Ta $\geq 50^{\circ}\text{C}$)	mW/ $^{\circ}\text{C}$
	Junction temperature	Tj	125	$^{\circ}\text{C}$
Detector	Collector-emitter voltage	VCEO	55	V
	Emitter-collector voltage	VECO	7	V
	Collector current	IC	50	mA
	Collector power dissipation (1 circuit)	PC	100	mW
	Collector power dissipation derating (1 circuit) (Ta $\geq 25^{\circ}\text{C}$)	$\Delta P_C/^{\circ}\text{C}$	-1.0	mW/ $^{\circ}\text{C}$
	Junction temperature	Tj	125	$^{\circ}\text{C}$
Storage temperature range		Tstg	-55 to 125	$^{\circ}\text{C}$
Operating temperature range		Topr	-55 to 100	$^{\circ}\text{C}$
Lead soldering temperature (10 s)		Tsol	260	$^{\circ}\text{C}$
Total package power dissipation (1 circuit)		PT	250	mW
Total package power dissipation derating (1 circuit) (Ta $\geq 25^{\circ}\text{C}$)		$\Delta P_T/^{\circ}\text{C}$	-2.5	mW/ $^{\circ}\text{C}$
Isolation voltage (AC, 60 s, R.H. $\leq 60\%$) (Note 1)		BVs	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.

Note 1: Device considered a two terminal device: LED side pins shorted together and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	VCC	—	5	24	V
Forward current	IF	—	16	25	mA
Collector current	IC	—	1	10	mA
Operating temperature	Topr	-25	—	85	$^{\circ}\text{C}$

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.

Current transfer ratio

Type	Classification (Note 1)	Current Transfer Ratio (%) (I _c /I _F)		Marking Of Classification
		I _F = 5mA, V _{CE} = 5V, T _a = 25°C		
		Min	Max	
TLP521-1GB-S-HX TLP521-1GB-P-HX	Blank	50	600	Blank, Y., YE, G, G., GR, B, BL, GB
	Rank Y	50	150	YE, Y.
	Rank GR	100	300	GR, G, G.
	Rank BL	200	600	BL, B
	Rank GB	100	600	GB, GR, G, G., BL, B
	Rank YH	75	150	Y.
	Rank GRL	100	200	G
	Rank GRH	150	300	G.
	Rank BLL	200	600	B

Note 1: Ex. rank GB: TLP521-1GB-S-HX/TLP521-1GB-P-HX (GB)

Note: Application type name for certification test, please use standard product type name, i.e.

TLP521-1GB-S-HX/TLP521-1GB-P-HX (GB): TLP521-1GB-S-HX/TLP521-1GB-P-HX

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 = 0.5 mA	55	—	—	V
	Emitter-collector breakdown voltage	V _{(BR)ECO}	I _E = 0.1 mA	7	—	—	V
	Collector dark current	I _{CEO}	V _{CE} = 24 V	—	10	100	nA
			V _{CE} = 24 V, Ta = 85°C	—	2	50	μA
	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 = 5 mA, V _{CE} = 5 V	50	—	600	%
		Rank GB	100	—	600	
Saturated CTR	I _C /I _{F(sat)}	I _F = 1 mA, V _{CE} = 0.4 V	—	60	—	%
		Rank GB	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	—	
		Rank GB	—	—	0.4	

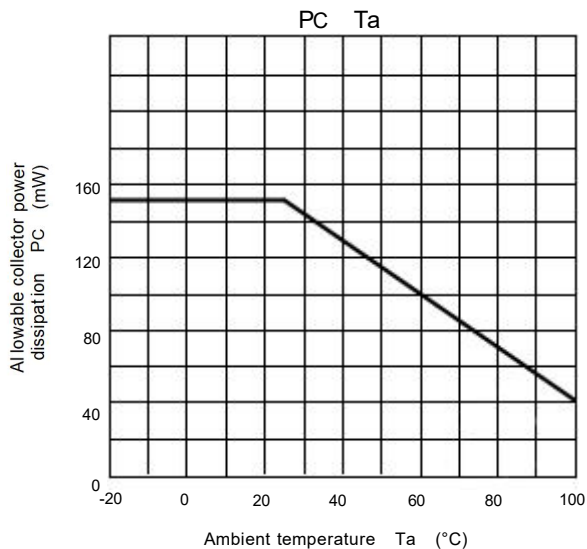
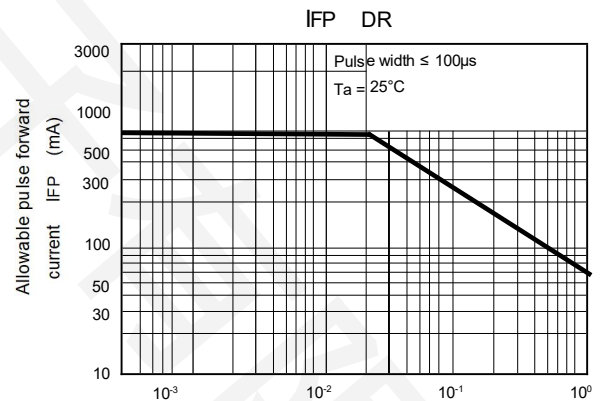
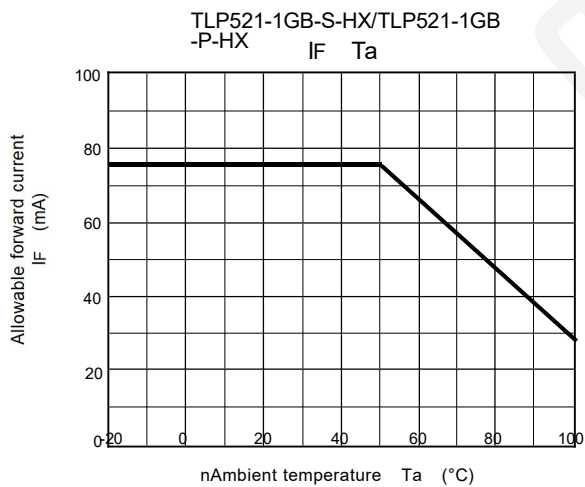
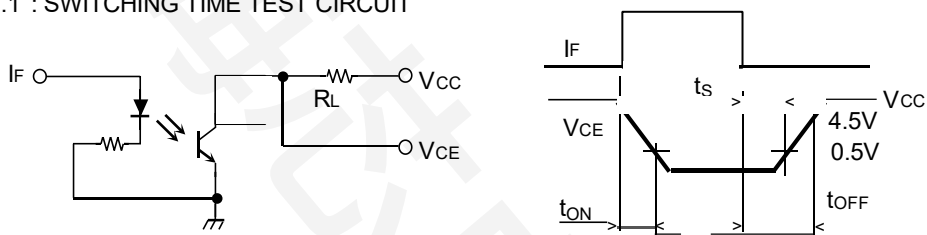
Isolation Characteristics (Ta = 25°C)

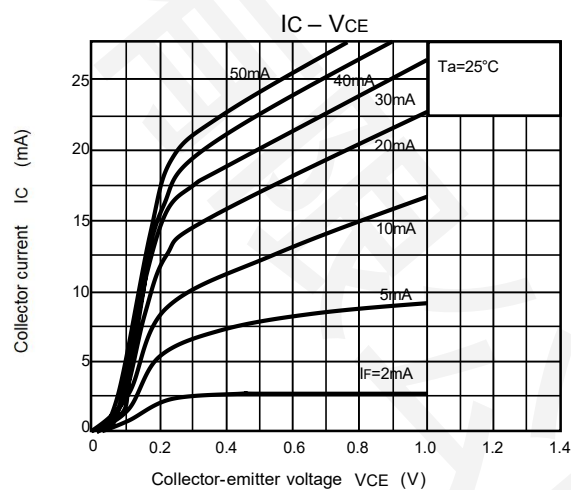
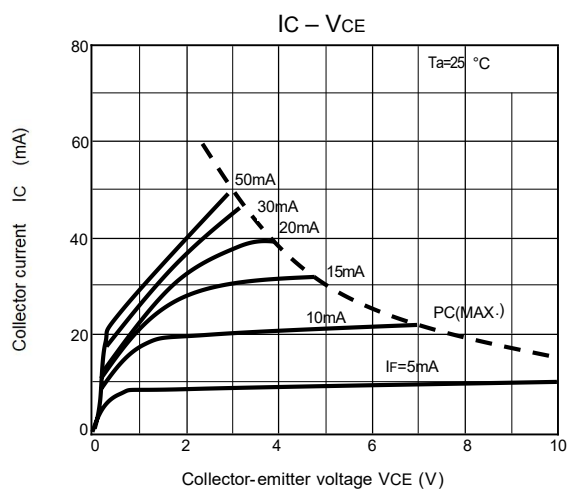
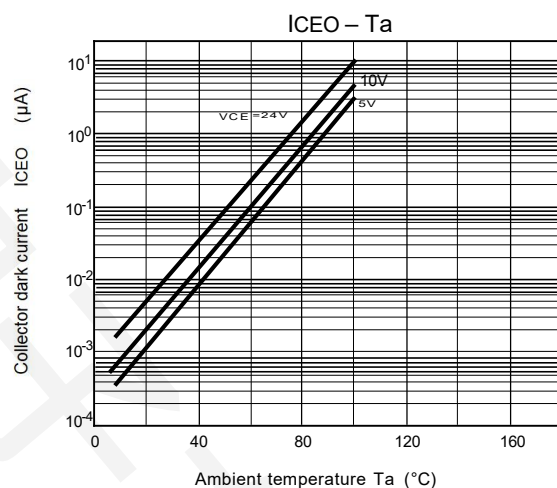
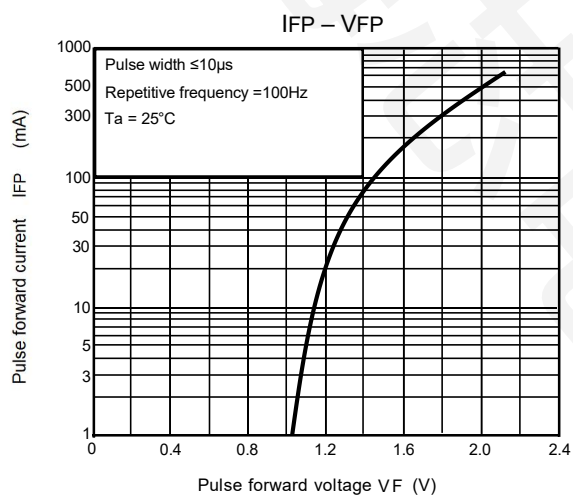
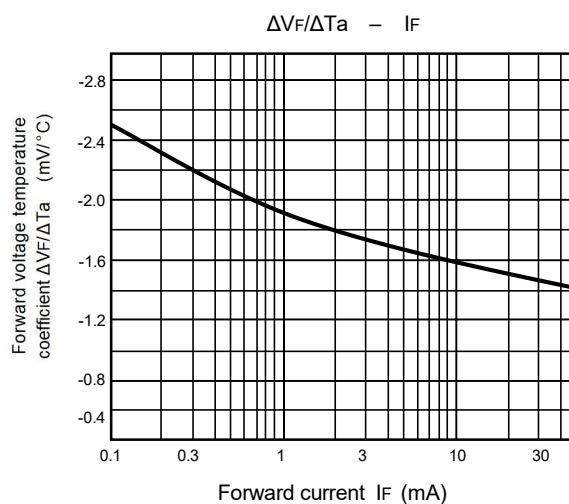
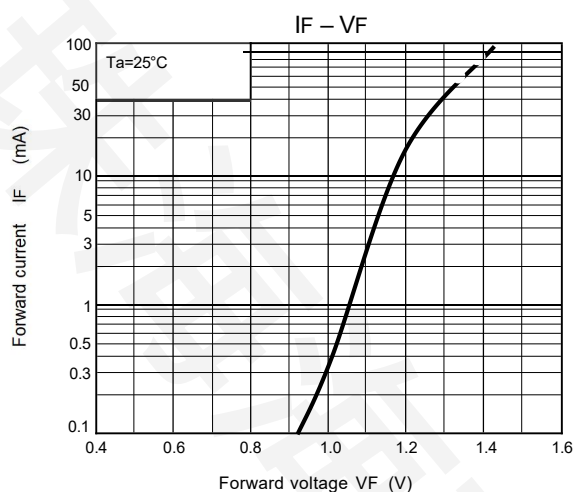
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input to output)	C _s	V _s = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _s	V _s = 500 V, R.H. ≤ 60%	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	B _{Vs}	AC, 60 s	2500	—	—	V _{rms}
		AC, 1 s, in oil	—	5000	—	
		DC, 60 s, in oil	—	5000	—	V _{dc}

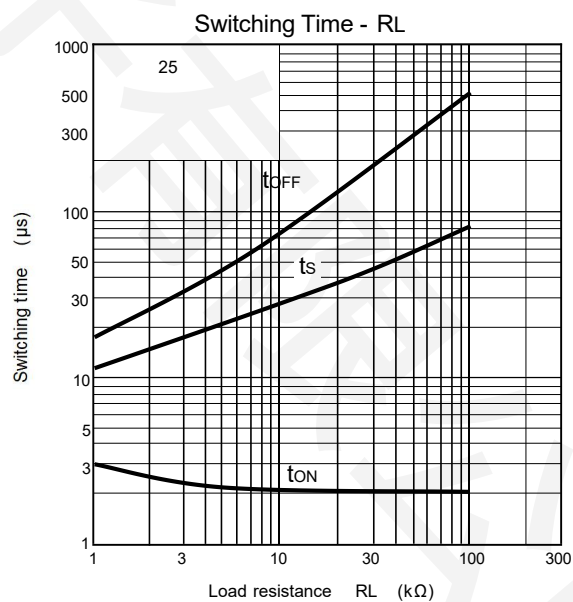
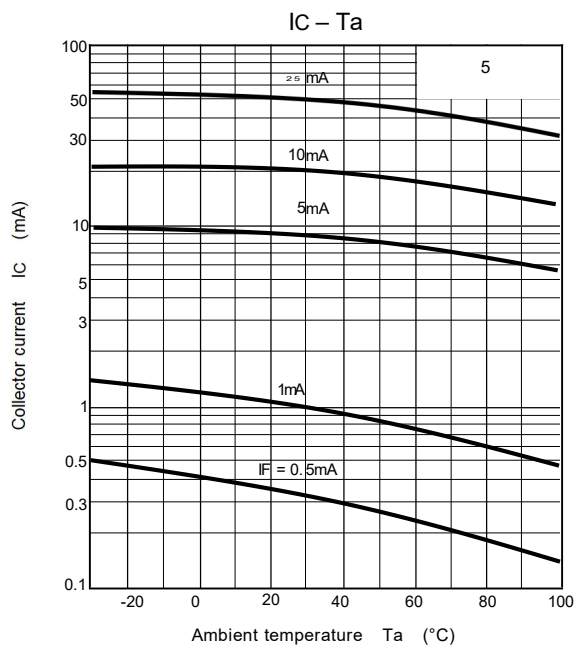
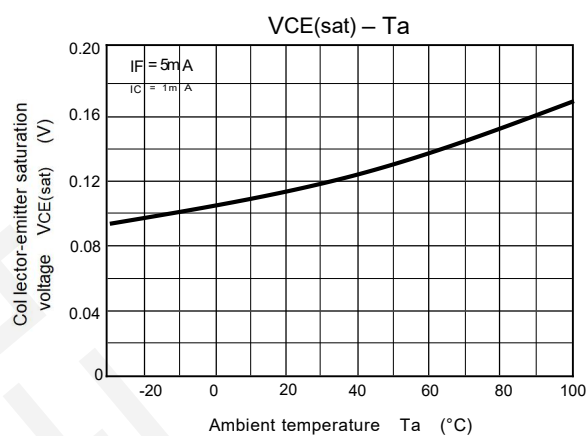
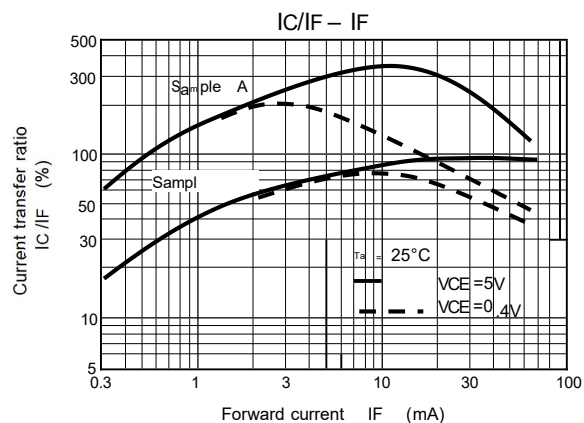
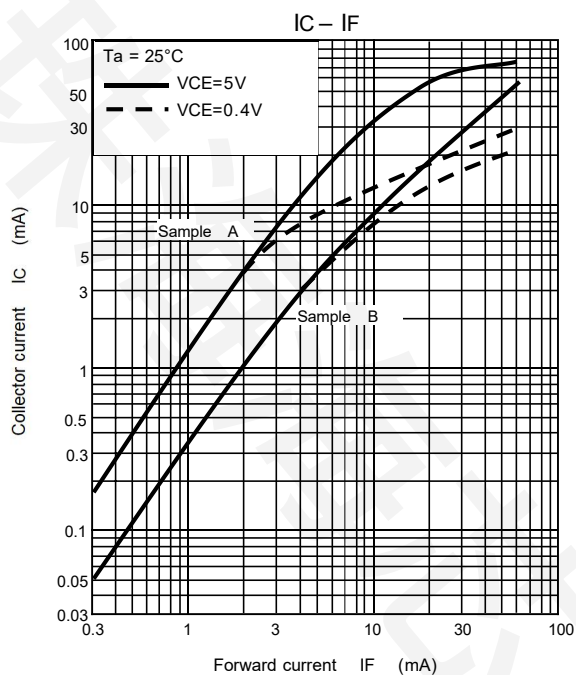
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	t_r	$V_{CC} = 10\text{ V}$ $I_C = 2\text{ mA}$ $R_L = 100\Omega$	—	2	—	μs
Fall time	t_f		—	3	—	
Turn-on time	t_{on}		—	3	—	
Turn-off time	t_{off}		—	3	—	
Turn-on time	t_{ON}	$R_L = 1.9\text{ k}\Omega$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$ (Fig.1)	—	2	—	μs
Storage time	t_s		—	15	—	
Turn-off time	t_{OFF}		—	25	—	

Fig.1 : SWITCHING TIME TEST CIRCUIT



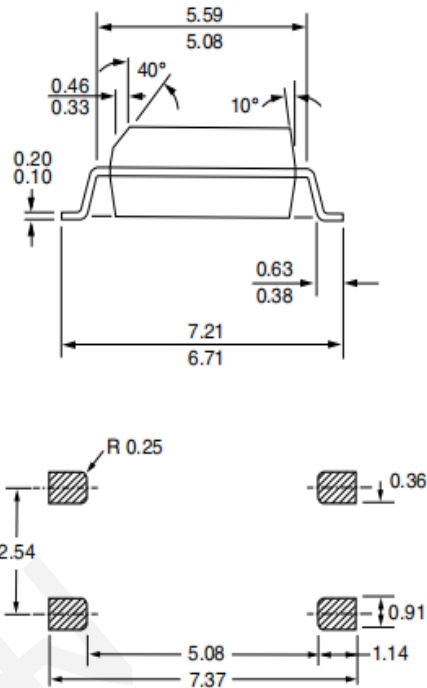
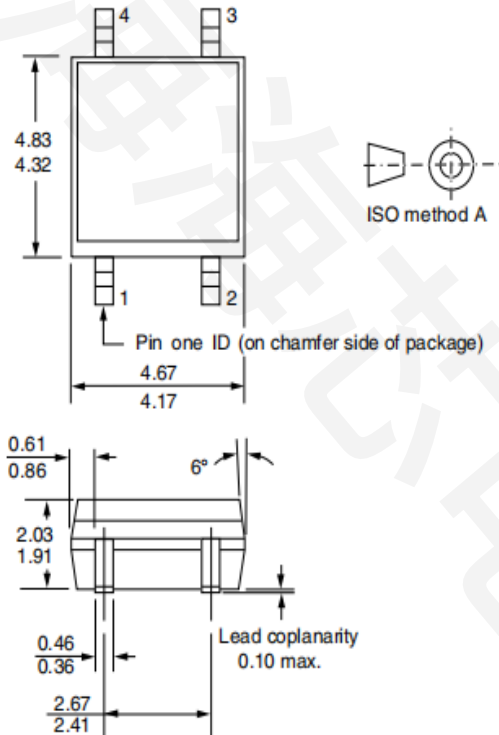




Packaging dimensions

TLP521-1GB-S-HX

SOP-4



TLP521-1GB-P-HX

DIP-4

