

PROGRAMMABLE CONTROLLERS

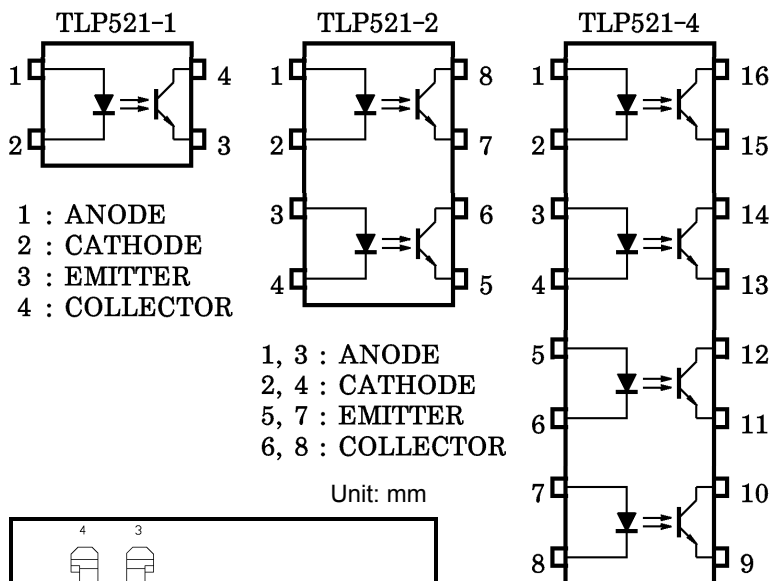
AC/DC-INPUT MODULE

SOLID STATE RELAY

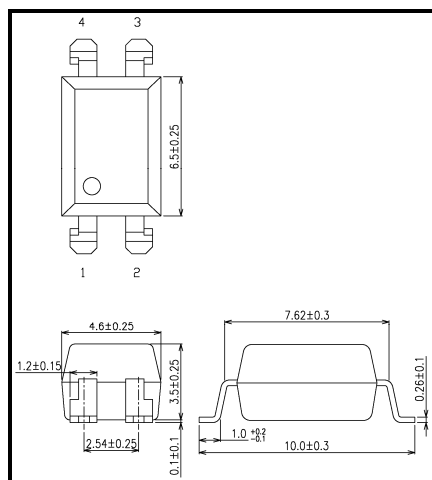
The UMW TLP521-1,-2 and -4 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP521-2 offers two isolated channels in an eight lead plastic DIP package, while the TLP521-4 provides four isolated channels in a sixteen plastic DIP package.

- Collector-Emitter Voltage : 55 V (min)
- Current Transfer Ratio : 50% (min)  
Rank GB : 100% (min)
- Isolation Voltage : 5000Vrms (high)
- UL Approved:UL1577,File No.E492440

PIN CONFIGURATIONS (TOP VIEW)

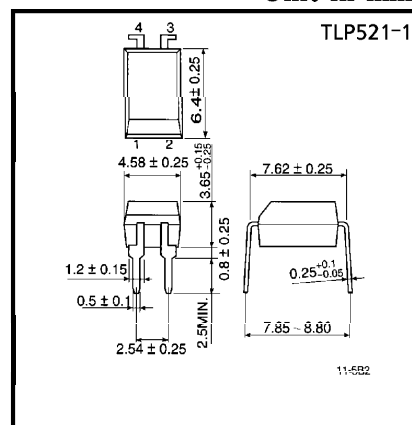


Unit: mm

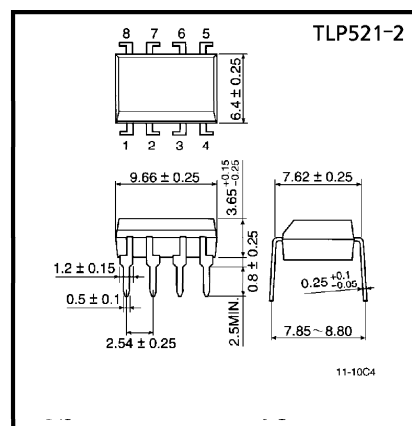


•Weight: 0.31g

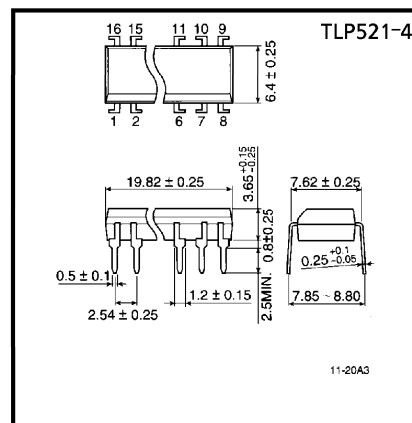
Unit in mm



Weight : 0.26 g



Weight : 0.54 g



Weight : 1.1 g

## MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING		UNIT
			TLP521-1	TLP521-2 TLP521-4	
LED	Forward Current	$I_F$	70	50	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	-0.93 (Ta $\geq$ 50°C)	-0.5 (Ta $\geq$ 25°C)	mA / °C
	Pulse Forward Current	$I_{FP}$	1 (100 $\mu$ pulse, 100 pps)		A
	Reverse Voltage	$V_R$	5		V
	Junction Temperature	$T_j$	125		°C
DETECTOR	Collector-Emitter Voltage	$V_{CEO}$	55		V
	Emitter-Collector Voltage	$V_{ECO}$	7		V
	Collector Current	$I_C$	50		mA
	Collector Power Dissipation (1 Circuit)	$P_C$	150	100	mW
	Collector Power Dissipation Derating (1 Circuit, Ta $\geq$ 25°C)	$\Delta P_C / ^\circ\text{C}$	-1.5	-1.0	mW / °C
	Junction Temperature	$T_j$	125		°C
Storage Temperature Range	$T_{stg}$	-55~125		°C	
Operating Temperature Range	$T_{opr}$	-55~100		°C	
Lead Soldering Temperature	$T_{sol}$	260 (10 s)		°C	
Total Package Power Dissipation	$P_T$	200	150	mW	
Total Package Power Dissipation Derating (Ta $\geq$ 25°C)	$\Delta P_T / ^\circ\text{C}$	-2.5	-1.5	mW / °C	
Isolation Voltage	$BV_S$	2500 (AC, 1 min., R.H. $\leq$ 60%) (Note 1)		Vrms	

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

## RECOMMENDED OPERATING CONDITIONS

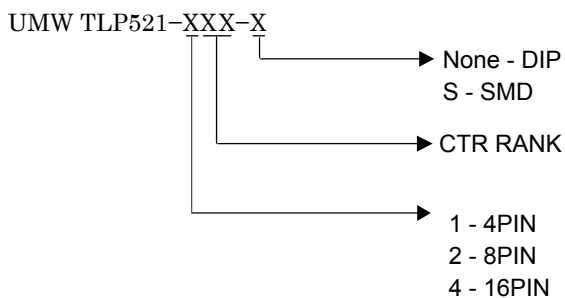
CHARACTERISTIC	SYMBOL	Min	Typ.	Max	UNIT
Supply Voltage	$V_{CC}$	—	5	24	V
Forward Current	$I_F$	—	16	25	mA
Collector Current	$I_C$	—	1	10	mA
Operating Temperature	$T_{opr}$	-25	—	85	°C

TYPE	CLASSIFICATION (*1)	CURRENT TRANSFER RATIO (%) ( $I_C / I_F$ )		MARKING OF CLASSIFICATION
		$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}, T_a = 25^\circ\text{C}$		
		Min	Max	
TLP521	A	50	600	BLANK, Y, Y <sup>■</sup> , G, G <sup>■</sup> , B, B <sup>■</sup> , GB
	Rank Y	50	150	Y, Y <sup>■</sup>
	Rank GR	100	300	G, G <sup>■</sup>
	Rank BL	200	600	B, B <sup>■</sup>
	Rank GB	100	600	G, G <sup>■</sup> , B, B <sup>■</sup> , GB
TLP521-2	A	50	600	BLANK, GR, BL, GB
TLP521-4	Rank GB	100	600	GR, BL, GB

● Product Naming System

Type of package used for shipment is denoted by a symbol suffix after a product number. The method of classification is as below.

(Example)



## INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
LED	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse Current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1 \text{ MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	55	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	6	—	—	V
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 24 \text{ V}$	—	—	100	nA
			$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	$\mu\text{A}$
Capacitance (Collector to Emitter)	$C_{CE}$	$V = 0, f = 1 \text{ MHz}$	—	10	—	pF	

## COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Current Transfer Ratio	$I_C / I_F$	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F(\text{sat})$	$I_F = 1 \text{ mA}, V_{CE} = 0.4 \text{ V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	0.2	—	
		—	—	—	0.4	

## ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
Capacitance (Input to Output)	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	—	$10^{11}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	2500	—	—	$V_{\text{rms}}$
		AC, 1 second, in oil	—	5000	—	
		DC, 1 minute, in oil	—	5000	—	Vdc

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	—	$\mu\text{S}$
Fall Time	$t_f$		—	3	—	
Turn-on Time	$t_{on}$		—	3	—	
Turn-off Time	$t_{off}$		—	3	—	
Turn-on Time	$t_{ON}$	$R_L = 1.9\text{ k}\Omega$ (Fig.1) $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$	—	2	—	$\mu\text{S}$
Storage Time	$t_s$		—	15	—	
Turn-off Time	$t_{OFF}$		—	25	—	

Fig.1 : SWITCHING TIME TEST CIRCUIT

