

PROGRAMMABLE CONTROLLERS

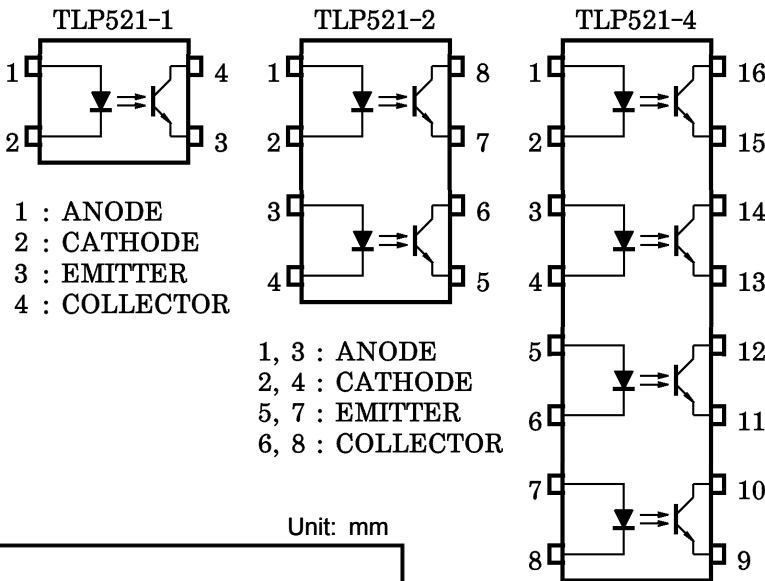
AC/DC-INPUT MODULE

SOLID STATE RELAY

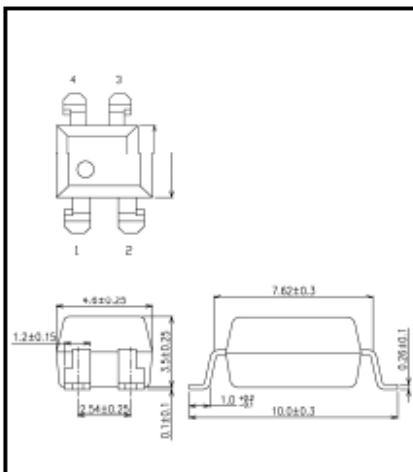
The UMW TLP521-1, -2 and -4 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP521-2 offers two isolated channels in an eight lead plastic DIP package, while the TLP521-4 provides four isolated channels in a sixteen plastic DIP package.

- 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)

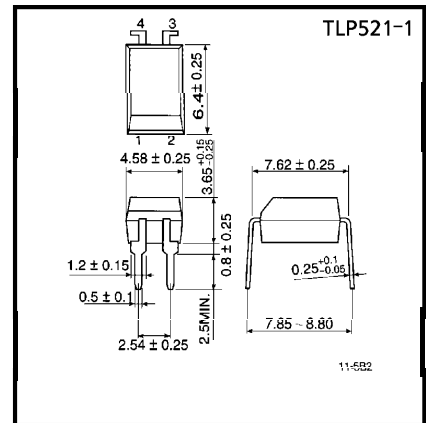


Unit: mm

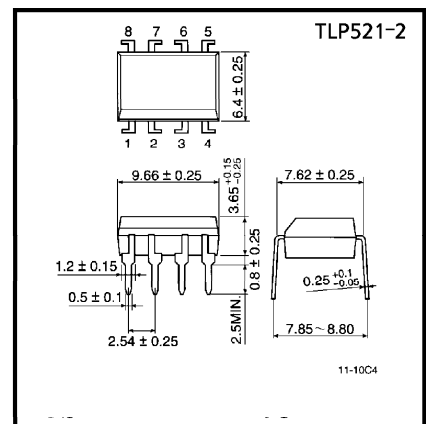


Weight:0.31g(typ.)

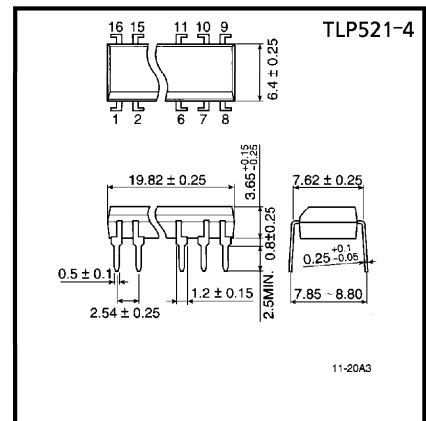
Unit in mm



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 μ 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	CLASSI- FICATION (*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 [■] , G, G [■] , B, B [■] , GB
	Rank Y	50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
	Rank BL	200	600	B, B [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB
TLP521-2	A	50	600	BLANK, GR, BL, GB
TLP521-4	Rank GB	100	600	GR, BL, GB

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	μA
	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	μA
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}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	2500	—	—	V_{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	—	μS
Fall Time	t_f		—	3	—	
Turn-on Time	t_{on}		—	3	—	
Turn-off Time	t_{off}		—	3	—	
Turn-on Time	t_{ON}	$R_L = 1.9\text{ k}\Omega$ (Fig.1) $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$	—	2	—	μS
Storage Time	t_s		—	15	—	
Turn-off Time	t_{OFF}		—	25	—	

Fig.1 : SWITCHING TIME TEST CIRCUIT

