UMW TLP621

1.Description

The UMW TLP621-1,2 and -4 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode.The TLP621-2 offers two isolated channels in an eight lead plastic DIP, which the TLP621-4 provides four isolated channels in a sixteen plastic DIP.

2.Features

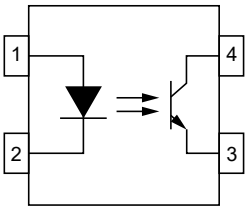
- Collector-Emitter Voltage: 55V (min)
- Current Transfer Ratio: 50% (min)
- Rank GB: 100% (min)
- UL-Approved: UL1577, File No.E547318

3.Applications

- Programmable Controller
- AC/DC-Input Module
- Solid State Relay

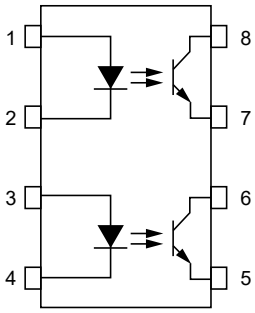
4.Pinning information

UMW TLP621-1



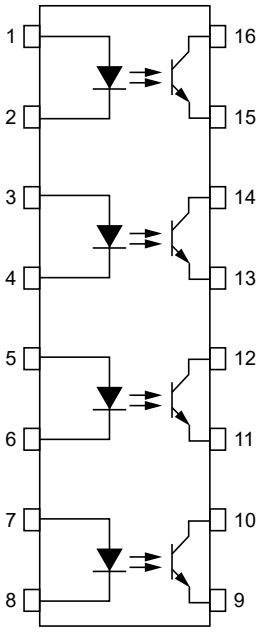
1: Anode
2: Cathode
3: Emitter
4: Collector

UMW TLP621-2



1,3: Anode
2,4: Cathode
5,7: Emitter
6,8: Collector

UMW TLP621-4



1,3,5,7: Anode
2,4,6,8: Cathode
9,11,13,15: Emitter
10,12,14,16: Collector

5.Absolute Maximum Ratings

Parameter		Symbol	Ratings		Unit
			UMW TLP621-1	UMW TLP621-2,-4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Derating	ΔI_F/°C	-0.7(Ta>39°C)	-0.5(Ta=25°C)	mA/°C
	Pulse Forward Current	I_{FP}	1(100μs pulse, 100pps)		A
	Power Dissipation	P_D	100	70	mW
	Power Dissipation Derating	ΔP_D/°C	-1	-0.7	mW/°C
	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≥25°C)	ΔP_D/°C	-1.5	-1	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		T_{SOL}	260(10s)		°C
Total Package Power Dissipation		P_T	250	150	mW
Total Package Power Dissipation Derating (Ta≥ 25°C)		ΔP_T/°C	-2.5	-1.5	mW/°C
Isolation Voltage (Note 1)		BV_S	5000(AC,1min.R.H.≤60%)		Vrms

(Note 1):

Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

6.Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Supply Voltage	V_{CC}		5	24	V
Forward Current	I_F		16	20	mA
Collector Current	I_C		1	10	mA
Operating Temperature	T_{OPR}	-25		85	°C

7.Current Transfer Ratio

Type	Classification (Note 1)	Current Transfer Ratio (%) (I_C/I_F) I_F=5mA, V_{CE}=5V, Ta=25°C		Marking of Classification
		Min	Max	
UMW TLP621-1	(None)	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
UMW TLP621-2	(None)	50	600	BLANK, GR, BL, GB
UMW TLP621-4	Rank GB	100	600	GR, BL, GB

8.Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
LED						
Forward Voltage	V_F	I_F=10mA	1	1.15	1.3	V
Reverse Current	I_R	V_R=5V			10	μA
Capacitance	C_T	V=0, f=1MHz		30		pF
Detector						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=0.5mA	55			V
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E=0.1mA	7			V
Collector Dark Current	I_{CEO}	V_{CE}=24V		10	100	nA
		V_{CE}=24V, Ta=85°C		2	50	μA
Capacitance (Collector to Emitter)	C_{CE}	V=0, f=1MHz		10		pF

9.Coupling Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Current Transfer Ratio	I_C/I_F	I_F=5mA, V_{CE}=5V	50		600	%
		I_F=5mA, V_{CE}=5V, Rank GB	100		600	%
Saturated CTR	$I_C/I_{F(SAT)}$	I_F=1mA, V_{CE}=0.4V		60		%
		I_F=1mA, V_{CE}=0.4V, Rank GB	30			%
Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_C=2.4mA, I_F=8mA			0.4	V
		I_C=0.2mA, I_F=1mA		0.2		V
		I_C=0.2mA, I_F=1mA, Rank GB			0.4	V

10.Isolation Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Capacitor (Input To Output)	C_S	V_S=0, f =1MHz		0.8		pF
Isolation Resistance	R_S	V_S=500V	$1x10^{12}$	10^{14}		Ω
Isolation Voltage	BV_S	AC, 1 minute	5000			Vrms
		AC, 1 second, in oil		10000		Vrms
		DC, 1 minute, in oil		10000		Vdc

11.Switch Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Rise Time	t_r	V_{CC}=10V, I_C=2mA R_L=100Ω		2		μs
Fall Time	t_f			3		μs
Turn-on Time	t_{on}			3		μs
Turn-off Time	t_{off}			3		μs
Turn-on Time	t_{ON}	R_L=1.9kΩ (Fig.1) V_{CC}=5V, I_F=16mA		2		μs
Storage Time	t_s			15		μs
Turn-off Time	t_{OFF}			25		μs

12.Test circuit

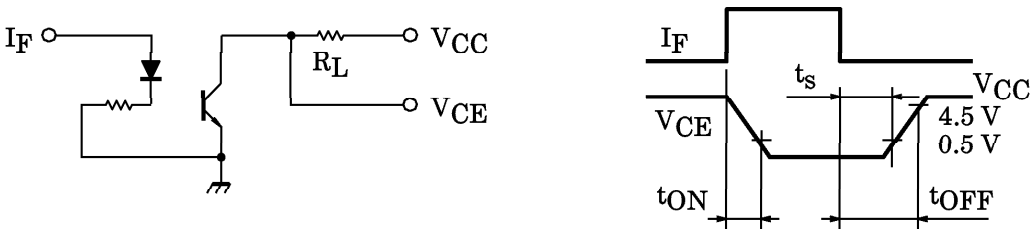


Fig.1 Switching Time Test Circuit

13.1Typical Characteristic

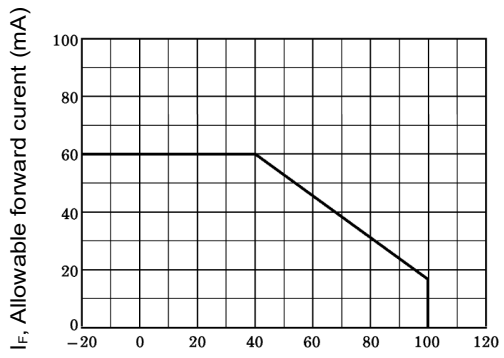


Figure 1: I_F-T_a

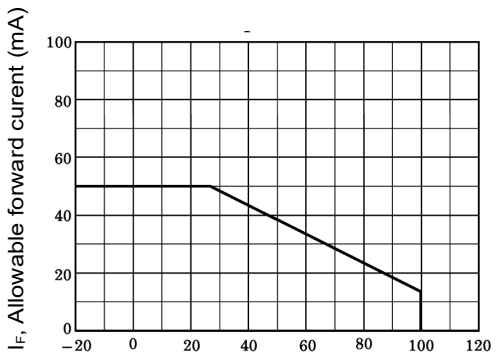


Figure 2: I_F-T_a

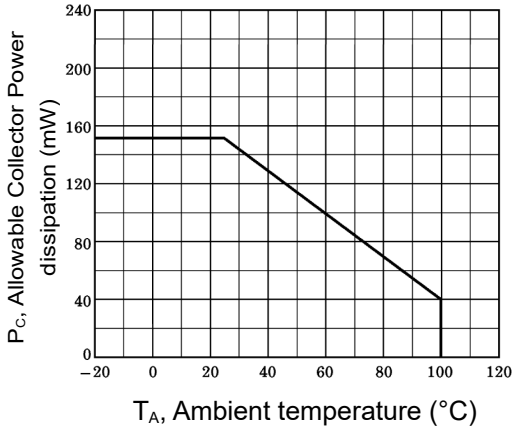


Figure 3: P_C-T_a

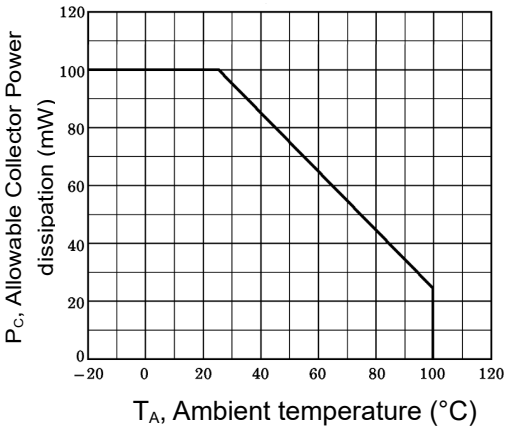


Figure 4: P_C-T_a

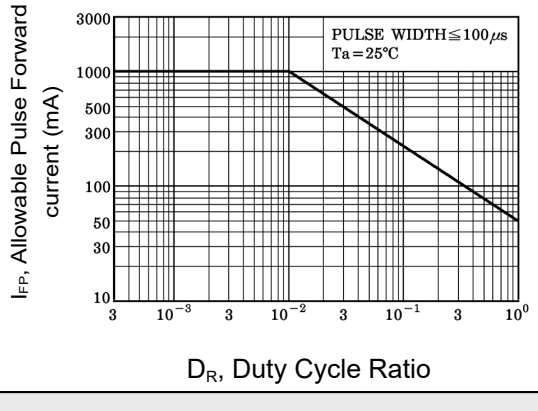


Figure 5: I_{FP} - D_R

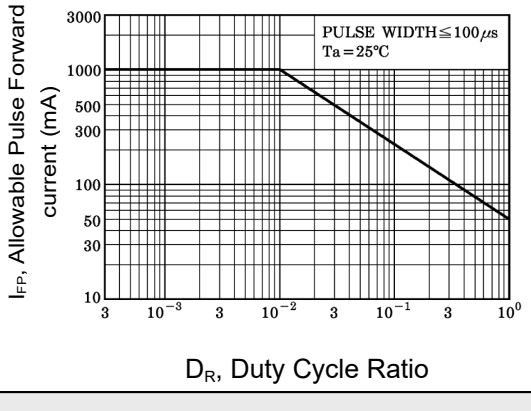


Figure 6: I_{FP} - D_R

13.2Typical Characteristic

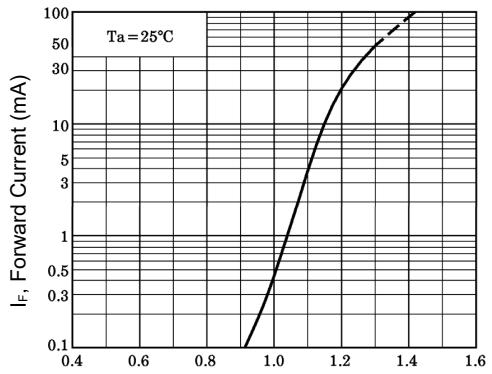


Figure 7: I_F - V_F

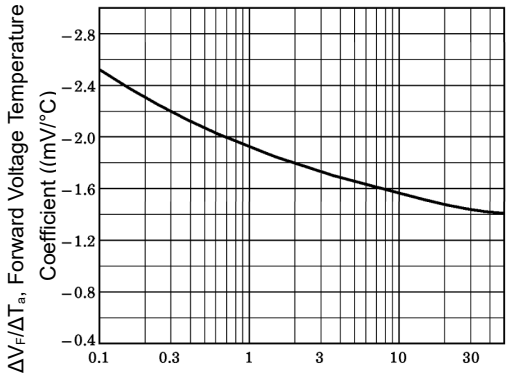


Figure 8: $\Delta V_F/\Delta T_a$ - I_F

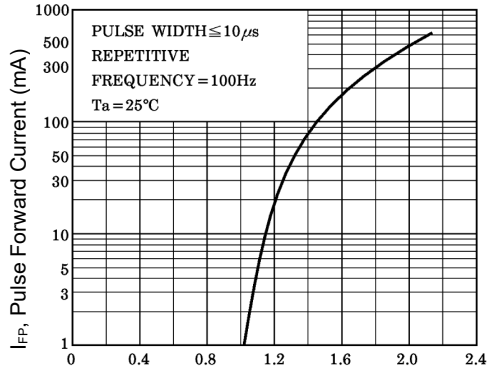


Figure 9: I_{FP} - V_{FP}

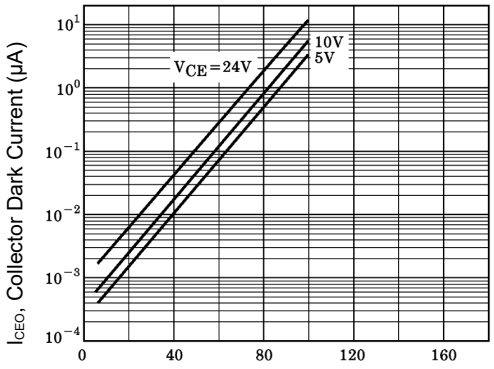


Figure 10: I_{CEO} - T_A

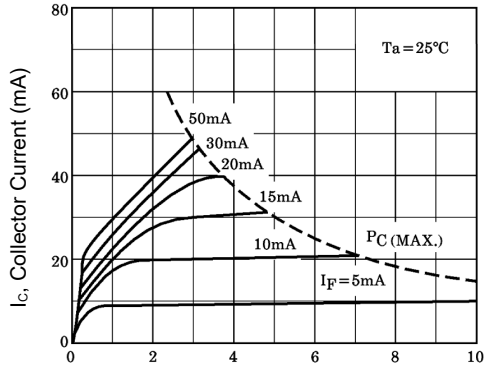


Figure 11: I_C - V_{CE}

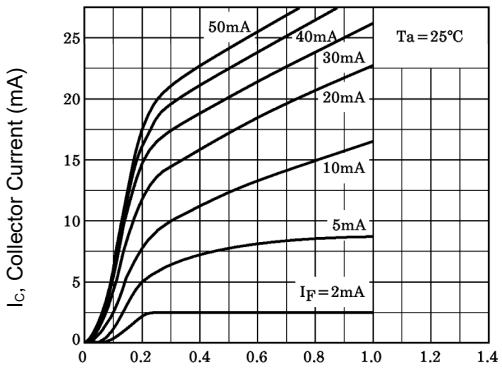
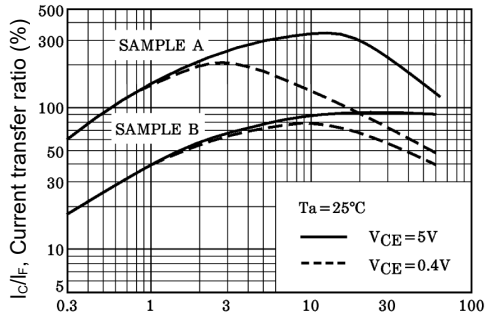


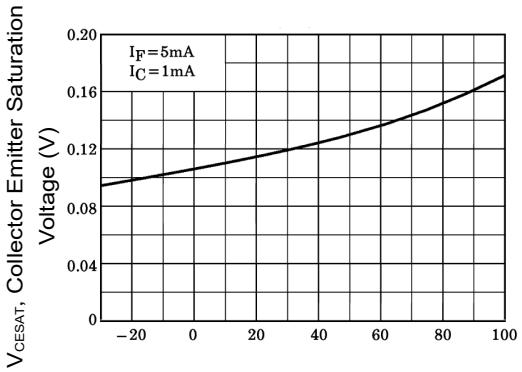
Figure 12: I_C - V_{CE}

13.3Typical Characteristic



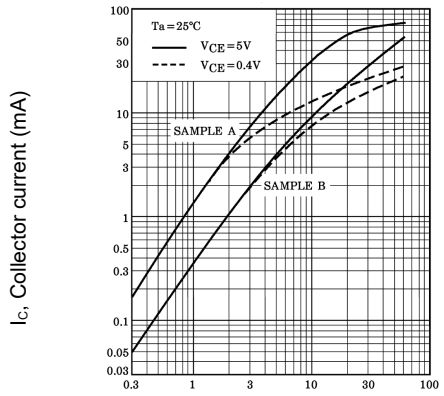
I_F, Forward Current (mA)

Figure 13: I_C - I_F



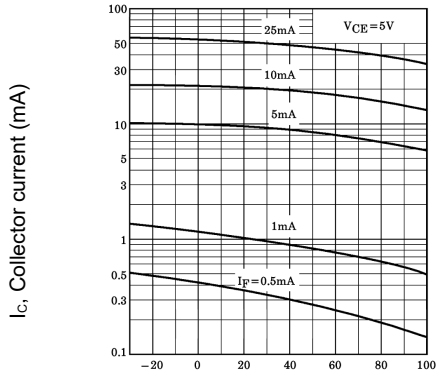
T_A, Ambient temperature (°C)

Figure 14: $V_{CE(SAT)}$-T_A



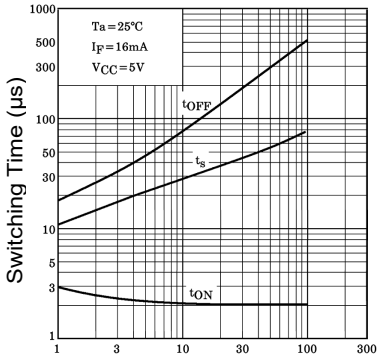
I_F, Forward Current (mA)

Figure 15: I_C - I_F



T_A, Ambient temperature (°C)

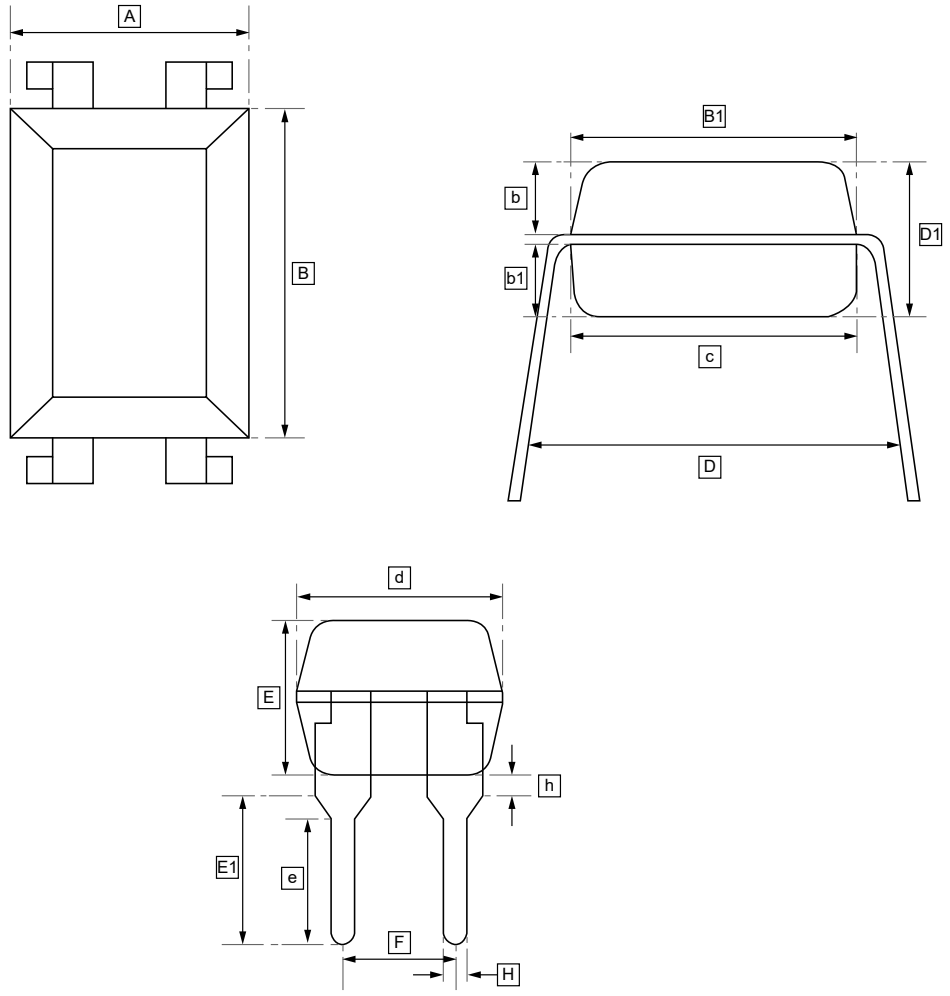
Figure 16: I_C - T_A



R_L, Load Resistance (kΩ)

Figure 12: R_L-switching Time

14.1 DIP-4 Package Outline Dimensions

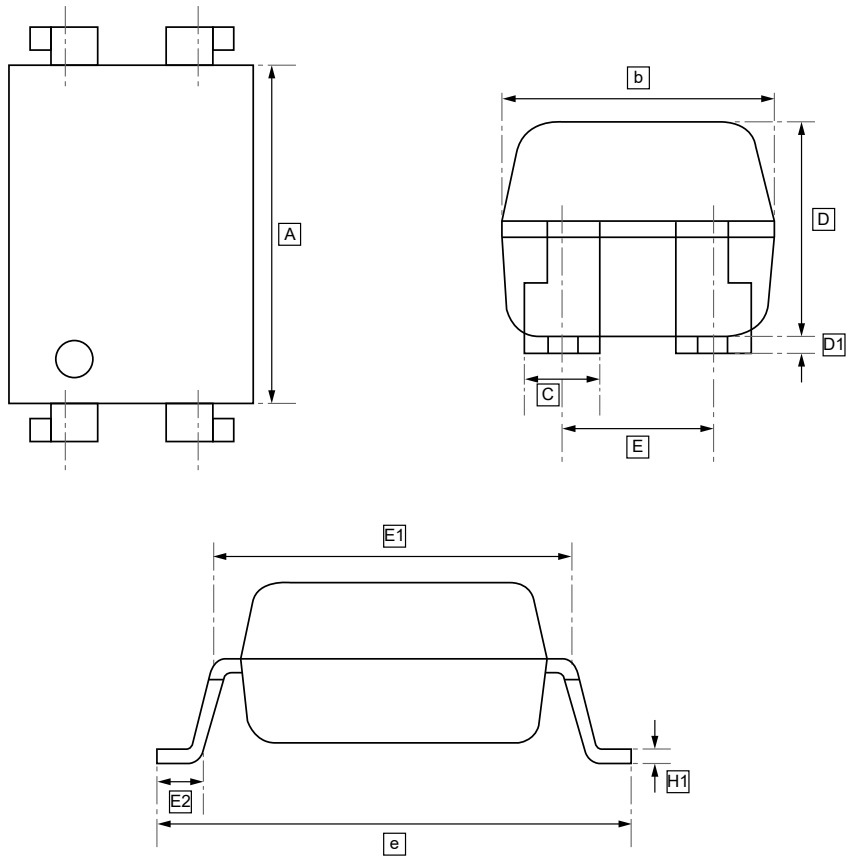


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	B1	b	b1	c	D	D1	d	E	E1	e
Min	4.60	6.40	6.35	1.64	1.60	6.45	8.86	3.43	4.55	3.48	3.05	2.55
Max			6.45			6.55	9.16	3.53	4.65		3.55	3.05

Symbol	F	H	h
Min	2.29	0.50	0.50
Max	2.79		

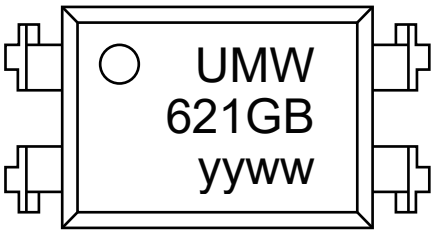
14.2 SOP-4 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	b	C	D	D1	E	E1	E2	e	H1
Min	6.15	4.33	1.1	3.4	0.05	2.29	7.37	0.75	9.85	0.26
Max	6.65	4.83	1.3	3.9	0.6	2.79	7.87	1.25	10.45	

15.Ordering information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW TLP621GB-1	621GB	DIP-4	5000	Tube and box
UMW TLP621GB-1S	621GB	SOP-4	2000	Tape and reel



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