

1.Description

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.

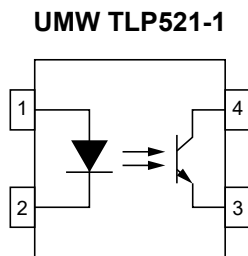
2.Features

- Collector-Emitter Voltage: 55V (min)
- Current Transfer Ratio: 50% (min)
- Rank GB: 100% (min)
- Isolation Voltage: 5000Vrms (high)
- UL-Approved: UL1577, File No.E547318

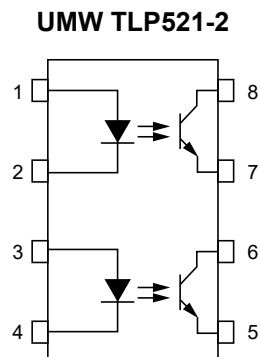
3.Applications

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

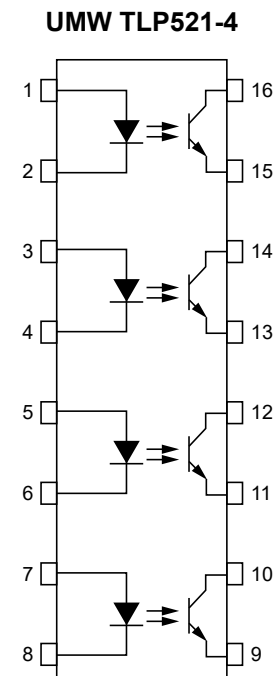
4.Pinning information



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



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



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 TLP521-1	UMW TLP521-2,-4	
LED	Forward Current	I_F	70	70	mA
	Forward Current Derating	$I_F/^\circ\text{C}$	$-0.93(T_a \geq 50^\circ\text{C})$	$-0.93(T_a \geq 50^\circ\text{C})$	mA/ $^\circ\text{C}$
	Pulse Forward Current	I_{FP}	1(100 μs pulse, 100 pps)		A
	Reverse Voltage	V_R	5		V
	Junction Temperature	T_J	125		$^\circ\text{C}$
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, $T_a \geq 25^\circ\text{C}$)	$\Delta P_D/^\circ\text{C}$	-1.5	-1	mW/ $^\circ\text{C}$
	Junction Temperature	T_J	125		$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 to 125		$^\circ\text{C}$
Operating Temperature Range		T_{OPR}	-55 to 100		$^\circ\text{C}$
Lead Soldering Temperature		T_{SOL}	260(10s)		$^\circ\text{C}$
Total Package Power Dissipation		P_T	200	150	mW
Total Package Power Dissipation Derating($T_a \geq 25^\circ\text{C}$)		$\Delta P_T/^\circ\text{C}$	-2.5	-1.5	mW/ $^\circ\text{C}$
Isolation Voltage		BV_S	2500(AC, 1min. 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.



6.Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
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

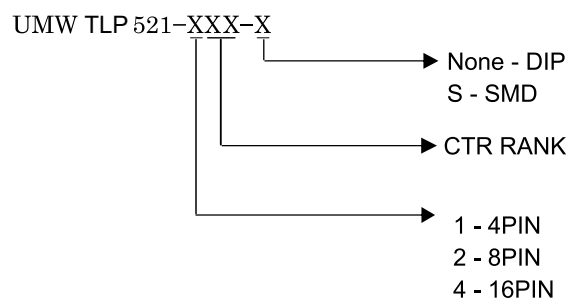
7.Current Transfer Ratio

Type	Classification (Note 1)	Current Transfer Ratio (%) (I_C/I_F)		Marking of Classification
		$I_F=5mA, V_{CE}=5V, T_a=25^{\circ}C$		
		Min	Max	
UMW 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
UMW TLP521-2	A	50	600	BLANK, GR, BL, GB
UMW 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)





8. Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
LED						
Forward Voltage	V_F	$I_F=10\text{mA}$	1	1.15	1.3	V
Reverse Current	I_R	$V_R=5\text{V}$			10	μA
Capacitance	C_T	$V=0, f=1\text{kHz}$		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	μA
		$V_{CE}=24\text{V}, T_a=85^\circ\text{C}$		2	50	μA
Capacitance (Collector to Emitter)	C_{CE}	$V=0, f=1\text{MHz}$		10		pF

9. Coupling Electrical Characteristics ($T_a=25^\circ\text{C}$)

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



10. Isolation Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Capacitor (Input To Output)	C_s	$V_s=0$, $f=1\text{MHz}$		0.8		pF
Isolation Resistance	R_s	$V_s=500\text{V}$, R.H.≤ 60%		10^{11}		Ω
Isolation Voltage	BV_s	AC, 1 minute	2500			Vrms
		AC, 1 second, in oil		5000		Vrms
		DC, 1 minute, in oil		5000		Vdc

11. Switch Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
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		μs
Turn-on Time	t_{on}			3		μs
Turn-off Time	t_{off}			3		μs
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		μs
Turn-off Time	t_{OFF}			25		μs

12. Test circuit

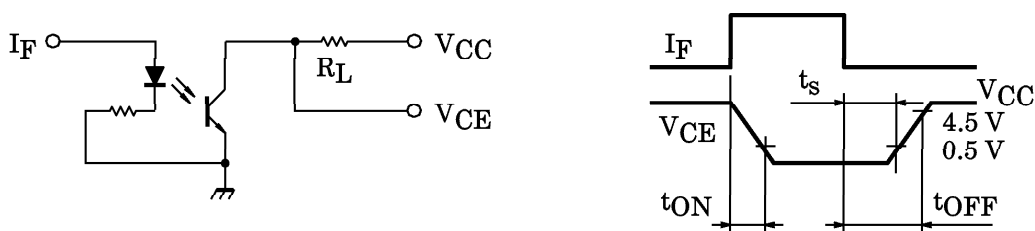
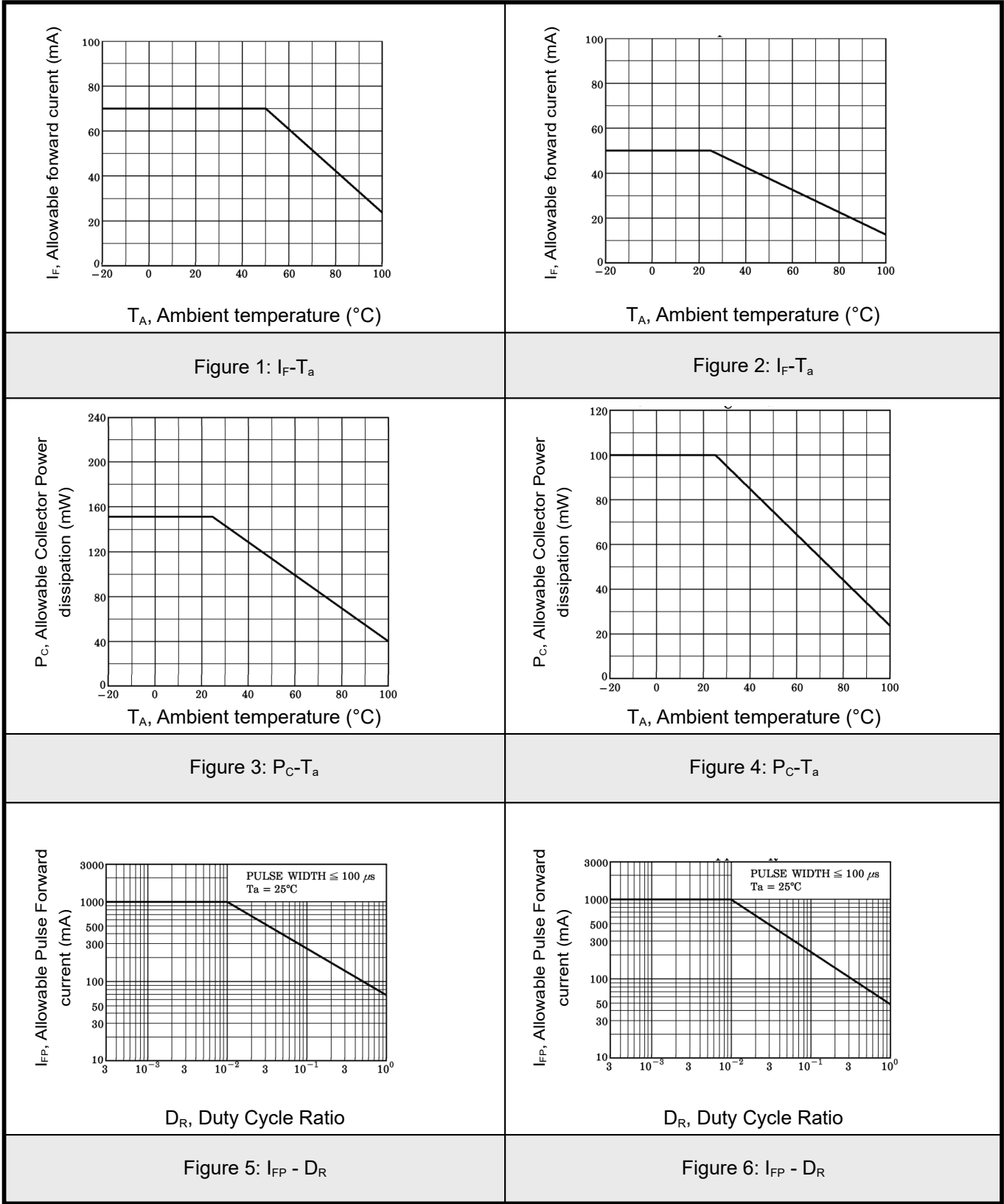


Fig.1 Switching Time Test Circuit



13.1Typical Characteristic





13.2 Typical Characteristic

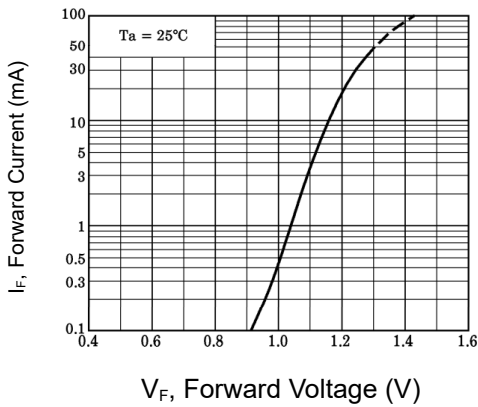


Figure 7: $I_F - V_F$

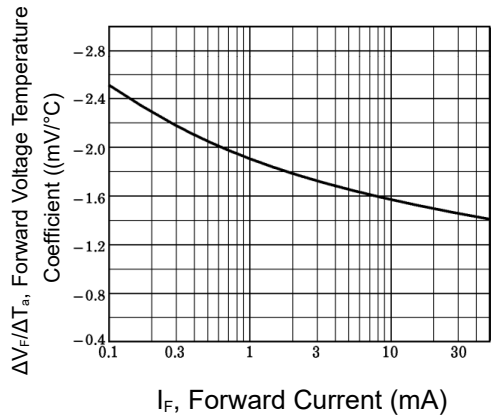


Figure 8: $\Delta V_F / \Delta T_a - I_F$

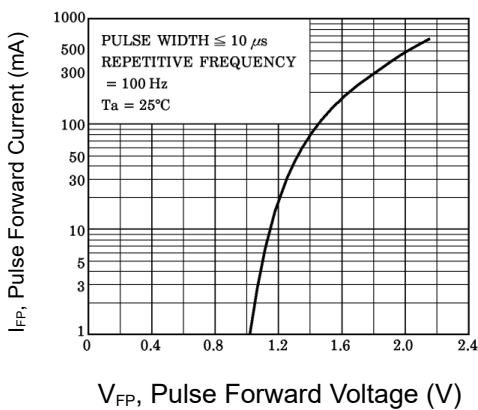


Figure 9: $I_{FP} - V_{FP}$

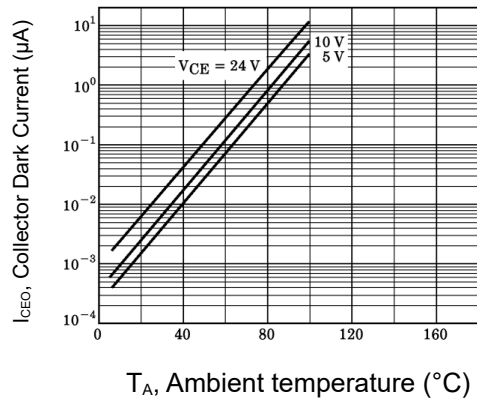


Figure 10: $I_{CEO} - T_A$

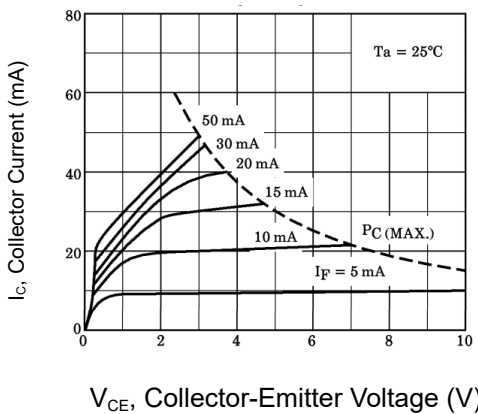


Figure 11: $I_C - V_{CE}$

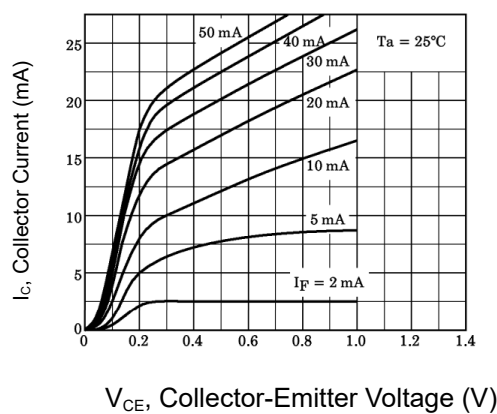
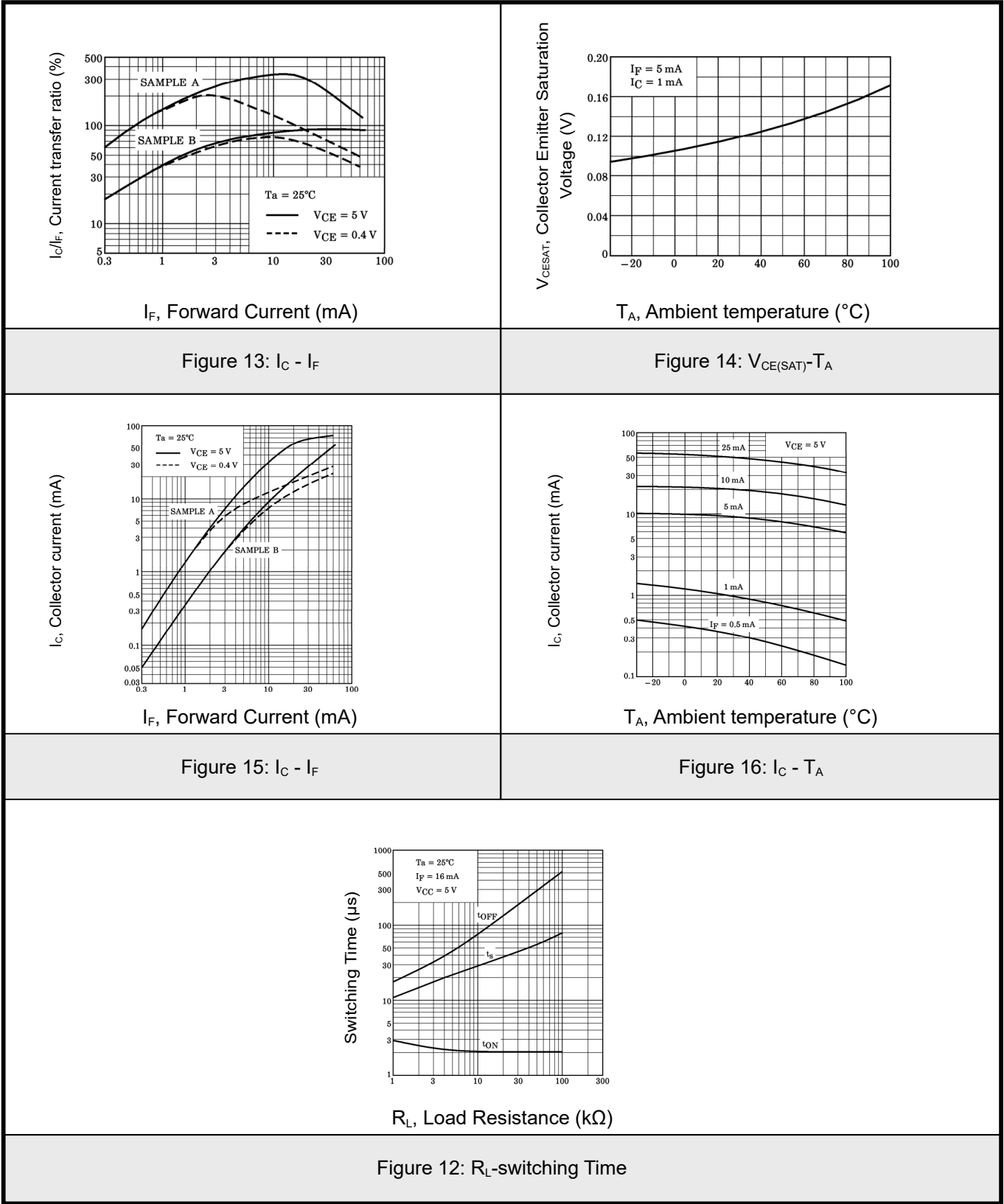


Figure 12: $I_C - V_{CE}$

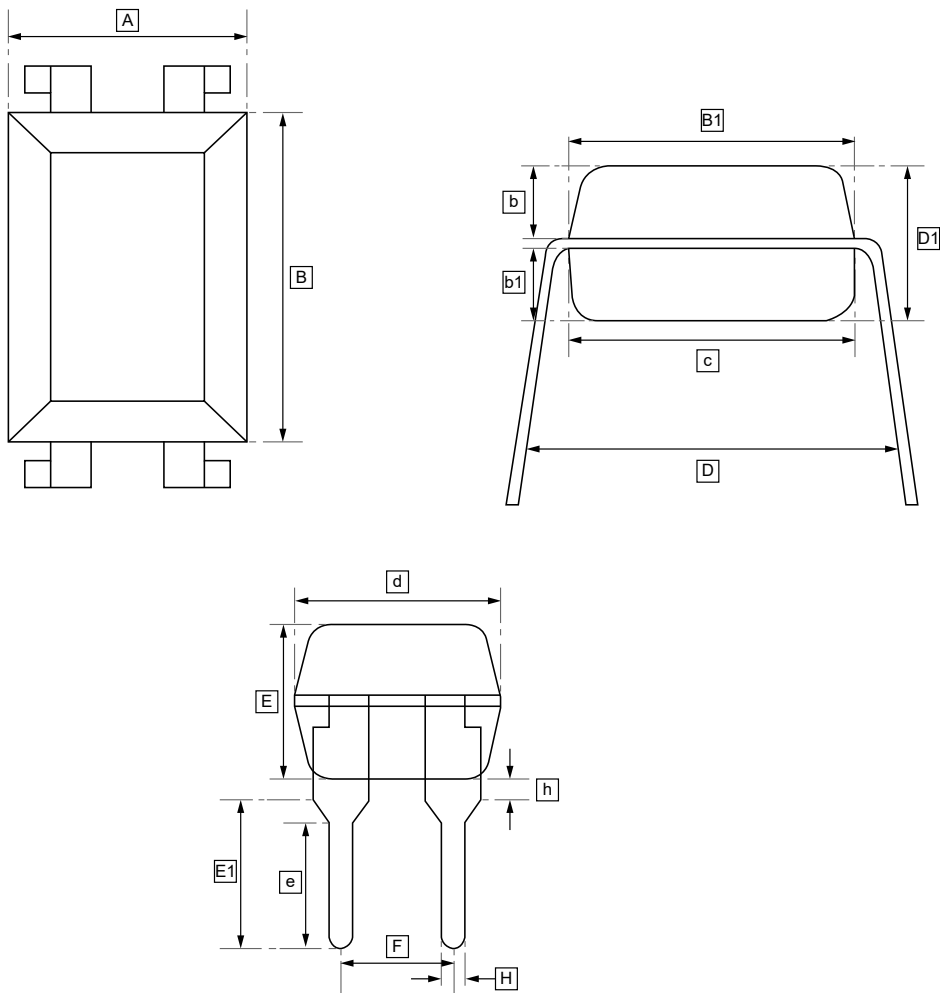


13.3Typical Characteristic





14.1 DIP-4 Package Outline Dimensions



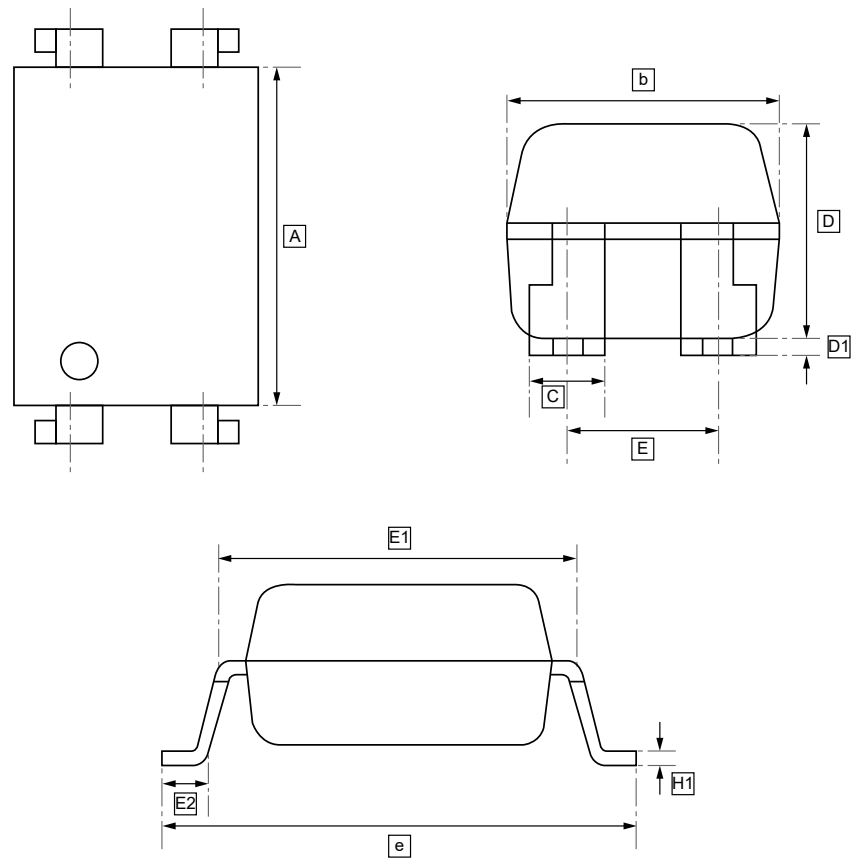
DIMENSIONS (mm are the original dimensions)

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					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

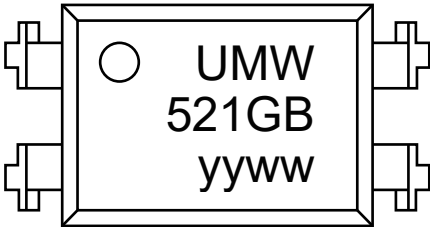


DIMENSIONS (mm are the original dimensions)

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 TLP521GB	521GB	DIP-4	5000	Tube and box
UMW TLP521GB-S	521GB	SOP-4	2000	Tape and reel



16.Disclaimer

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