

1.Description

The UMW TLP181GB-S is a small outline coupler, suitable for surface mount assembly. UMW TLP181GB-S consist of a photo transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP package.

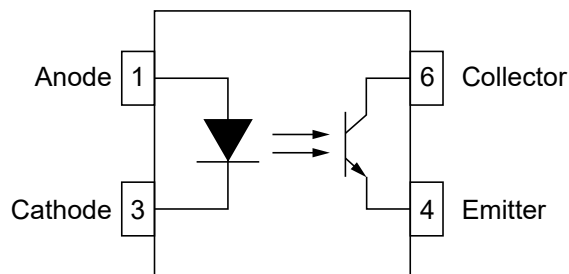
3.Features

- Collector-Emitter Voltage: 80V (Min.)
- Current Transfer Ratio: 50% (Min.)
- Rank GB: 100%(Min.)
- Isolation Voltage: 3750Vrms (Min.)
- UL Recognized: UL1577, File No.E547318

2.Applications

- Office Machine
- Programmable Controllers
- AC/DC-input Module
- Telecommunication

4.Pinning information



SOP-4



5. 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 TLP181GB-S	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

Notes1: EX, Rank GB: UMW TLP181GB-S



6.Limit Parameter (Ta=25°C)

Parameter		Symbol	Value	Unit
LED	Forward Current	I_F	50	mA
	Forward Current Derating	$\Delta I_F/^\circ\text{C}$	-0.7(Ta $\geq$ 53°C)	mA/°C
	Pulse Forward Current, (100 μ s pulse,100pps)	I_{FP}	1	A
	Diode power dissipation	P_D	100	mW
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_J	125	°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Collector Power Dissipation (1 Circuit)	P_C	150	mW
	Collector Power Dissipation Derating (Ta $\geq$ 25°C)	$\Delta P_C/^\circ\text{C}$	-1.5	mW/°C
	Junction Temperature	T_J	125	°C
Storage Temperature Range		T_{STG}	-55 to 125	°C
Operating Temperature Range		T_{OPR}	-55 to 110	°C
Lead Soldering Temperature		T_{SOL}	260(10s)	°C
Total Package Power Dissipation		P_T	200	mW
Total Package Power Dissipation Derating(Ta $\geq$ 25°C)		$\Delta P_T/^\circ\text{C}$	-2	mW/°C
Isolation Voltage (Note 1)		BV_S	3750 (AC,1min., RH $\leq$ 60%)	Vrms

Notes1: Device considered a two terminal device : Pins 1, 3 shorted together and pins 4,6 shorted together.



7. 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	$V_{(BR)CEO}$	$I_C=0.5\text{mA}$	80			V
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E=0.1\text{mA}$	7			V
Collector Dark Current	I_{CEO}	$V_{CE}=48\text{V}$ (Ambient Light Below 1000 lx)		0.01 (2)	0.1 (10)	μA
		$V_{CE}=48\text{V}, T_a=85^\circ\text{C}$ (Ambient Light Below 1000 lx)		2 (4)	50 (50)	μA
Capacitance (Collector to Emitter)	C_{CE}	$V=0, f=1\text{MHz}$		10		pF

8. 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	%
		Rank GB	100		600	%
Saturated CTR	$I_C/I_{F(SAT)}$	$I_F=1\text{mA}, V_{CE}=0.4\text{V}$		60		%
		Rank GB	30			%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=2.4\text{mA}, I_F=8\text{mA}$			0.4	V
		$I_C=0.2\text{mA}, I_F=1\text{mA}$		0.2		V
		Rank GB			0.4	V
Off-State Collector Current	$I_{C(off)}$	$V_F=0.7\text{V}, V_{CE}=48\text{V}$		1	10	μA



9.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	$V_s=500\text{V}$	5×10^{10}	10^{14}		Ω
Isolation Voltage	BV_s	AC, 1 minute	3750			Vrms
		AC, 1 second, in oil		10000		Vrms
		DC, 1 minute, in oil		10000		Vdc

10.Switch Characteristics (Ta=25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Rise Time	t_r	$V_{CC}=10\text{V}$, $I_C=10\text{mA}$ $R_L=100\Omega$		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			25		μs
Turn-off Time	t_{OFF}			40		μs

11.Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Supply Voltage	V_{CC}		5	48	V
Forward Current	I_F		16	20	mA
Collector Current	I_C		1	10	mA
Operating Temperature	T_{OPR}	-25		85	$^{\circ}\text{C}$



12. Test circuit

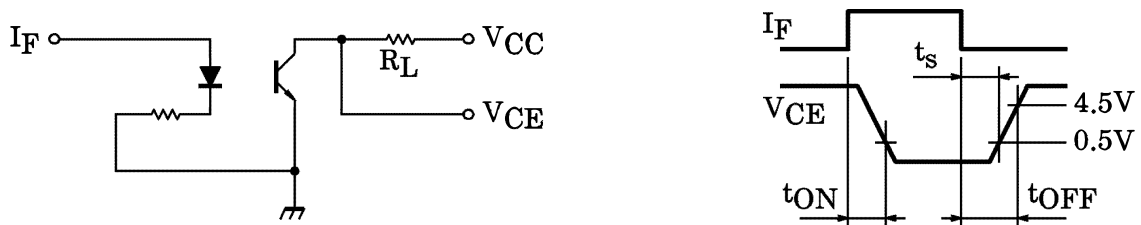
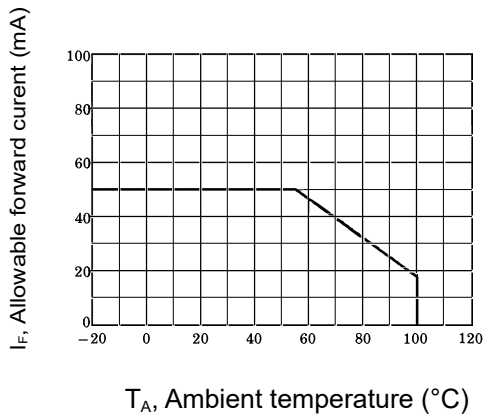
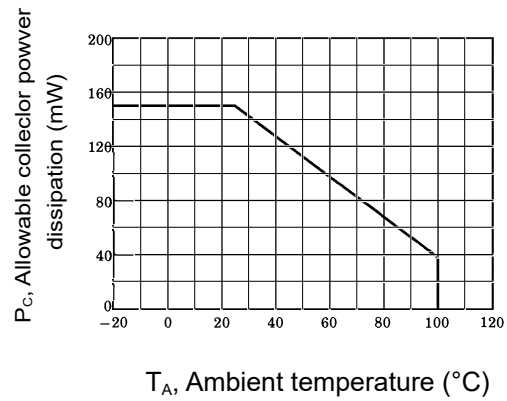
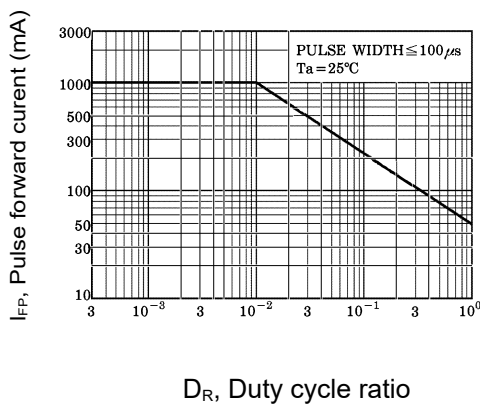
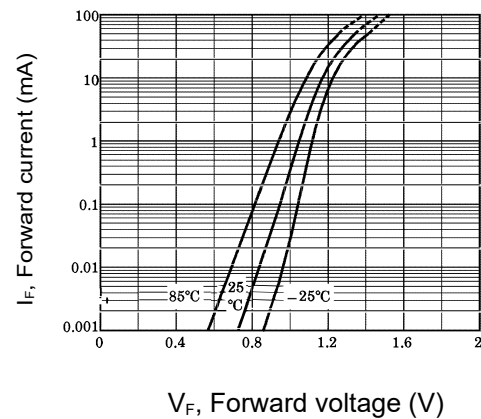
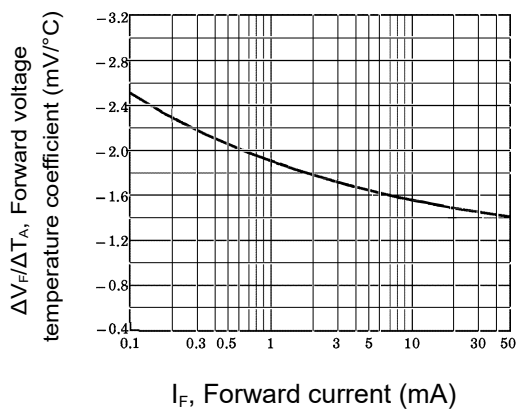
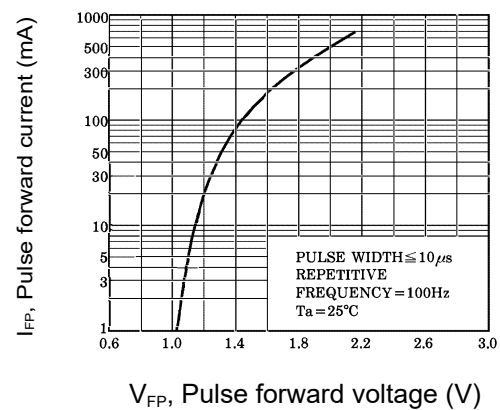


Fig.1 Switching Time Test Circuit

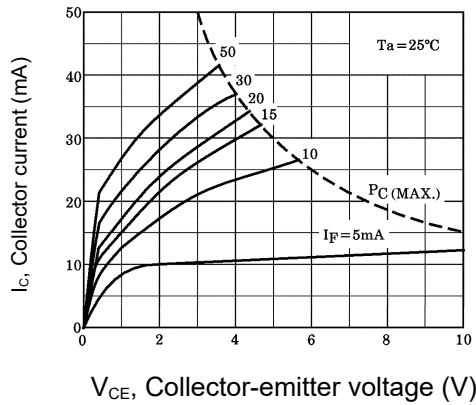
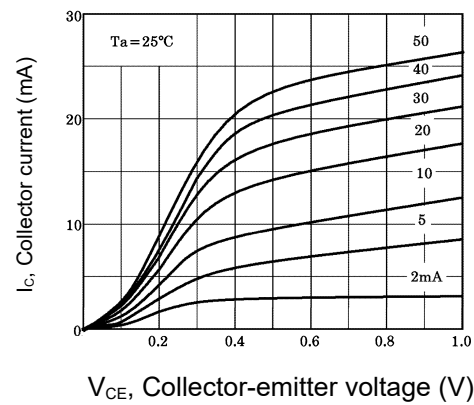
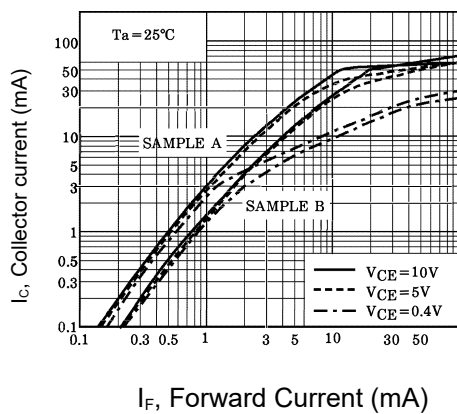
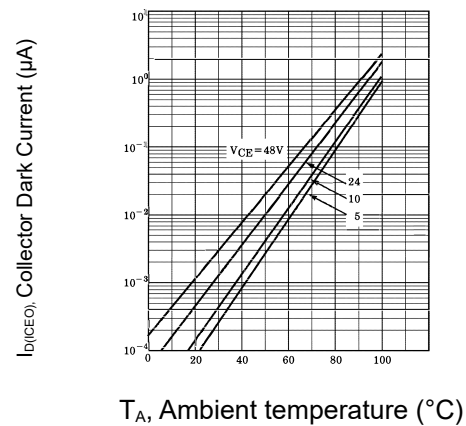
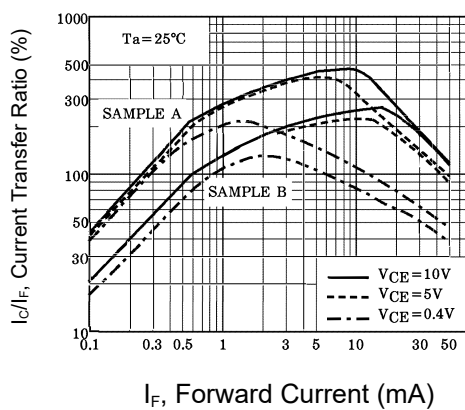
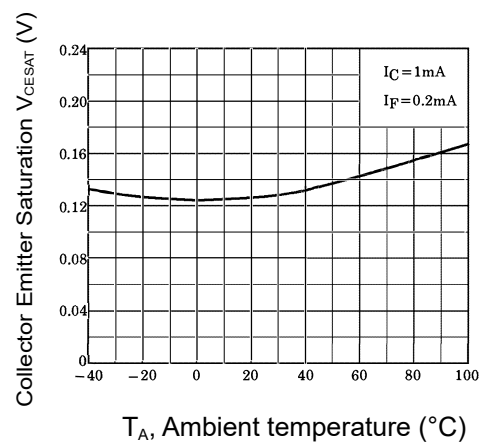


13.1 Typical Characteristic

Figure 1: I_F - T_A Figure 2: P_C - T_A Figure 3: I_{FP} - D_R Figure 4: I_F - V_F Figure 5: $\Delta V_F / \Delta T_A$ - I_F Figure 6: I_{FP} - V_{FP}

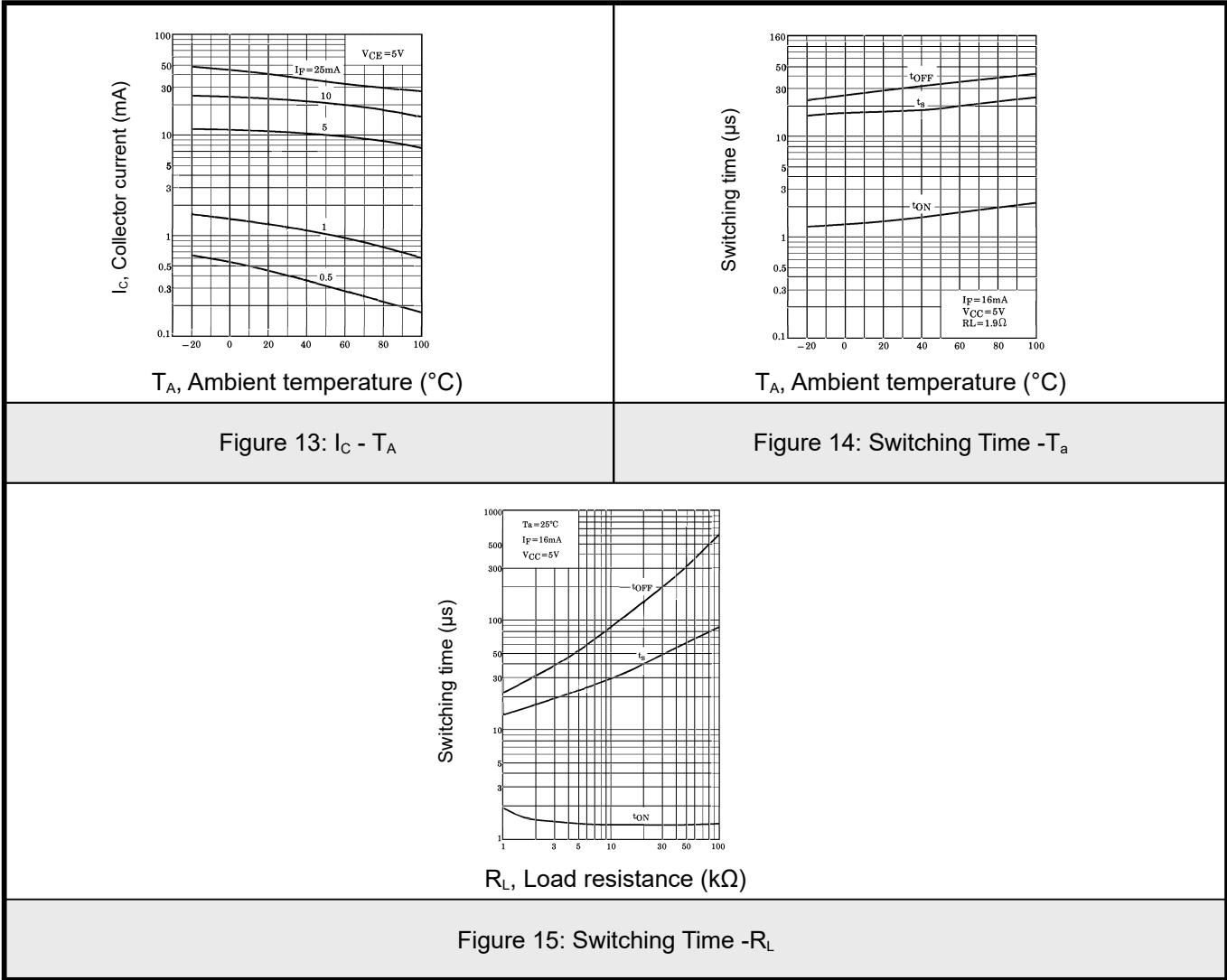


13.2 Typical Characteristic

Figure 7: $I_C - V_{CE}$ Figure 8: $I_C - V_{CE}$ Figure 9: $I_C - I_F$ Figure 10: $I_{C(CEO)} - T_A$ Figure 11: $I_C/I_F - I_F$ Figure 12: $V_{CE(SAT)} - T_A$

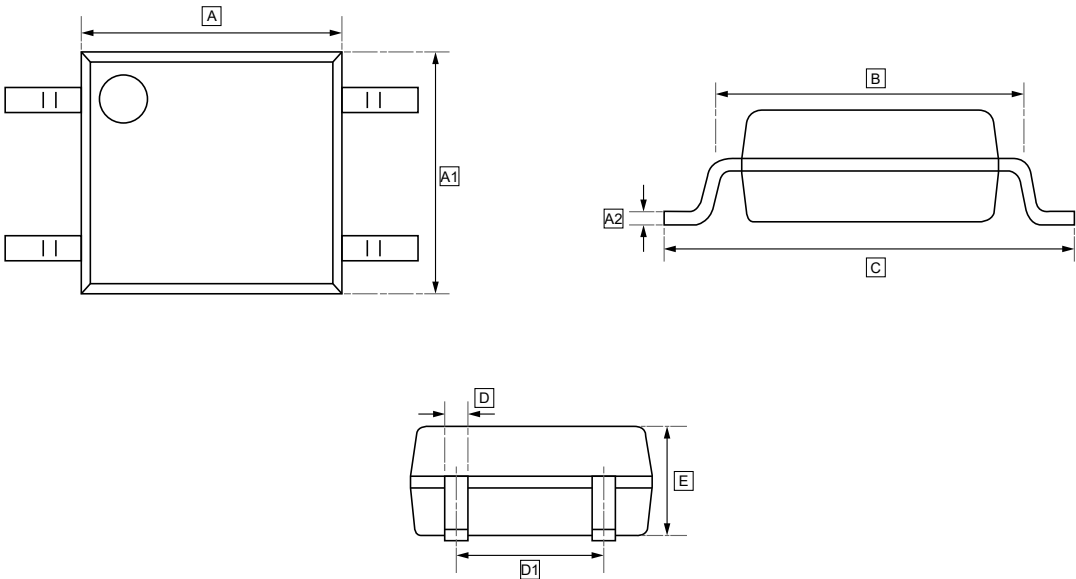


13.3Typical Characteristic





14.SOP-4 Package Outline Dimensions

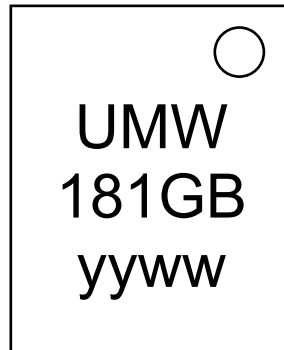


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	C	D	D1	E
Min	4.40	3.60	0.15	4.90	6.70	0.30	2.54	1.82
Max	4.80	4.10		5.50	7.30	0.50	TYP	2.02



15. Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW TLP181GB-S	SOP-4	3000	Tape and reel



16.Disclaimer

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