UMW TLP181GB-S

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.

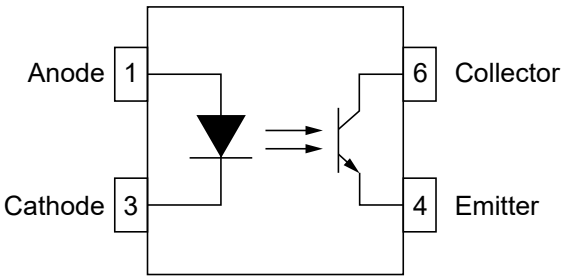
2.Applications

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

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

4.Pinning information



SOP-4

5.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 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	ΔI_F/°C	-0.7(Ta≥53°C)	mA/°C
	Pulse Forward Current, (100μs 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≥25°C)	ΔP_C/°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≥25°C)		ΔP_T/°C	-2	mW/°C
Isolation Voltage (Note 1)		BV_S	3750 (AC,1min., RH≤60%)	Vrms

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

7.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=1kHZ		30		pF
DETECTOR						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=0.5mA	80			V
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E=0.1mA	7			V
Collector Dark Current	I_{CEO}	V_{CE}=48V (Ambient Light Below 1000 lx)		0.01 (2)	0.1 (10)	μA
		V_{CE}=48V, Ta=85°C (Ambient Light Below 1000 lx)		2 (4)	50 (50)	μA
Capacitance (Collector to Emitter)	C_{CE}	V=0, f=1MHz		10		pF

8.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	%
		Rank GB	100		600	%
Saturated CTR	$I_C/I_{F(SAT)}$	I_F=1mA, V_{CE}=0.4V		60		%
		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
		Rank GB			0.4	V
Off-State Collector Current	$I_{C(off)}$	V_F=0.7V, V_{CE}=48V		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 =1MHz		0.8		pF
Isolation Resistance	R_S	V_S=500V	$5x10^{10}$	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}=10V, I_C=10mA 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			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	°C

12.Test circuit

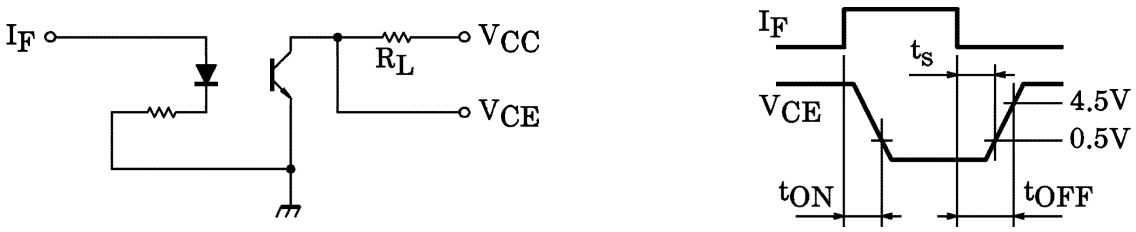


Fig.1 Switching Time Test Circuit

13.1Typical Characteristic

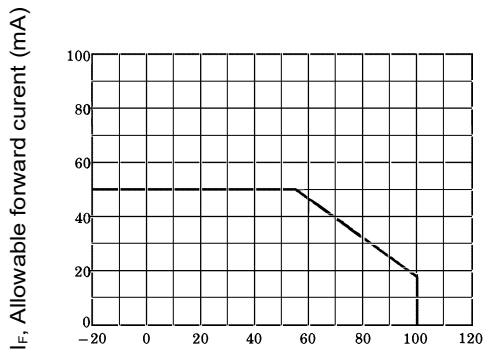


Figure 1: I_F-T_a

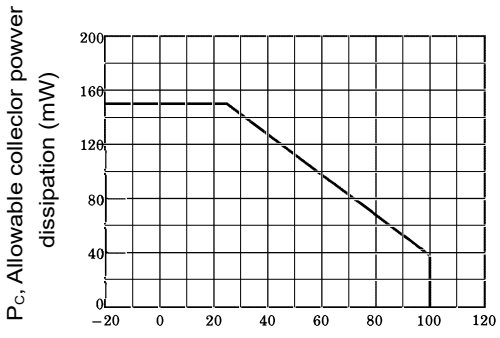


Figure 2: P_C-T_a

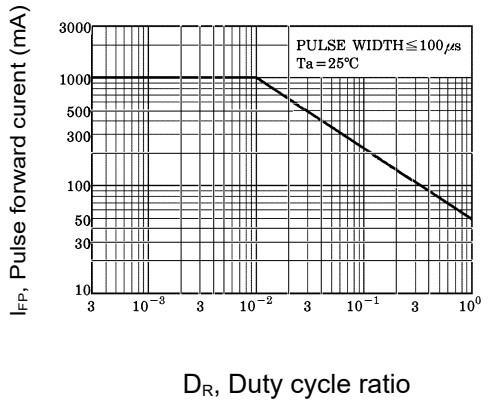


Figure 3: I_{FP}-D_R

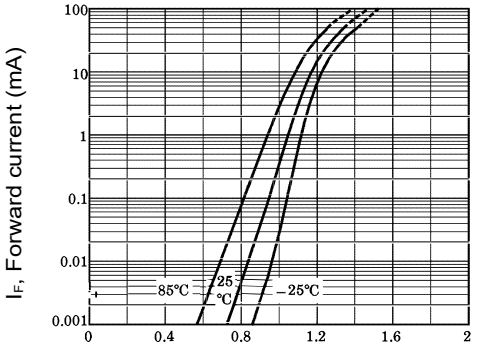


Figure 4: I_F - V_F

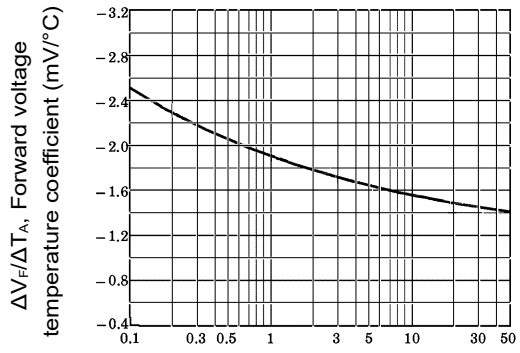


Figure 5: $\Delta V_F/\Delta T_A$ - I_F

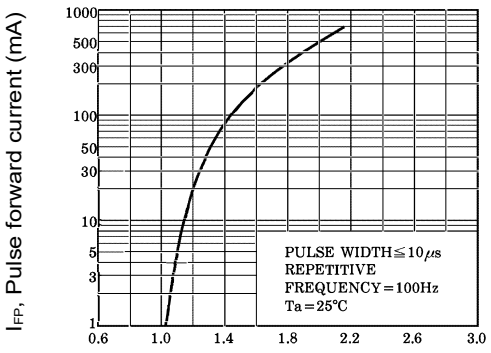


Figure 6: I_{FP}-V_{FP}

13.2Typical Characteristic

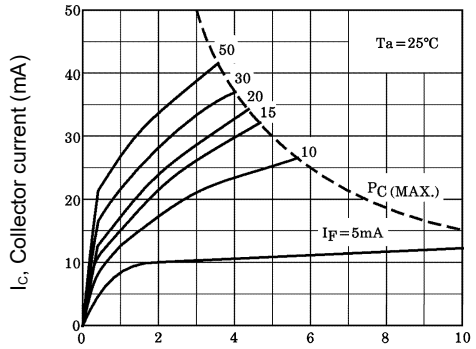


Figure 7: I_C - V_{CE}

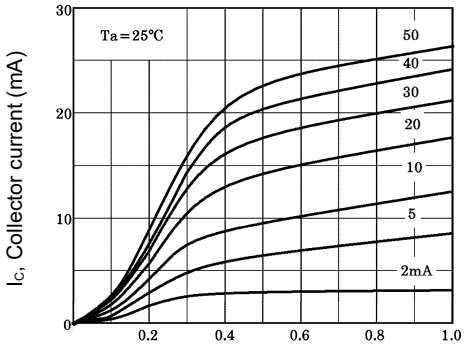


Figure 8: I_C - V_{CE}

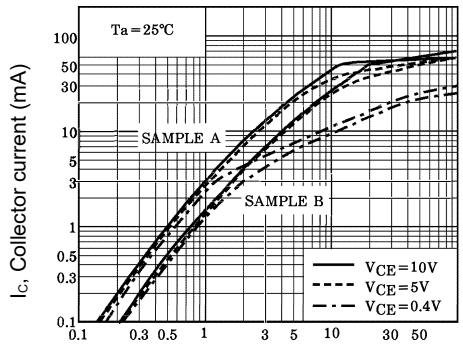


Figure 9: I_C - I_F

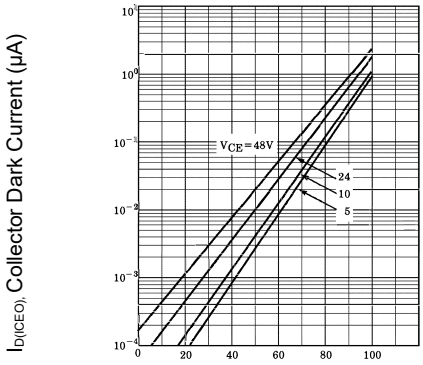


Figure 10: I_{CEO} - T_A

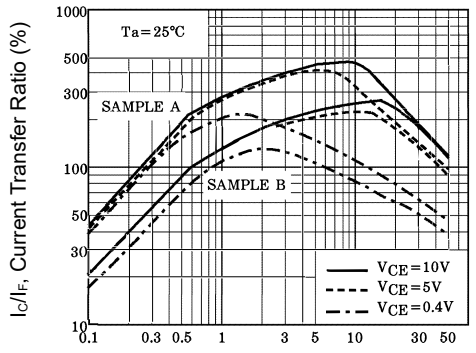


Figure 11: I_C/I_F - I_F

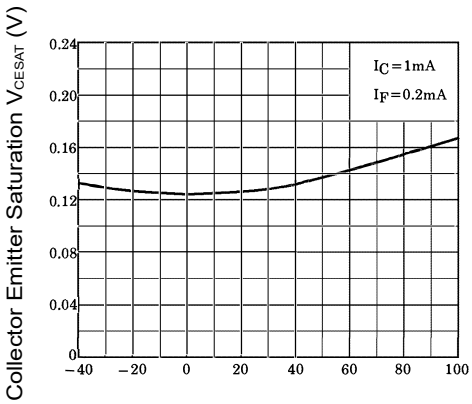


Figure 12: $V_{CE(SAT)}$-T_A

13.3Typical Characteristic

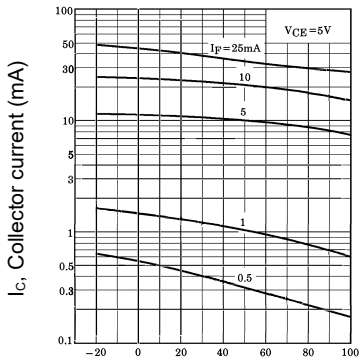


Figure 13: I_C - T_A

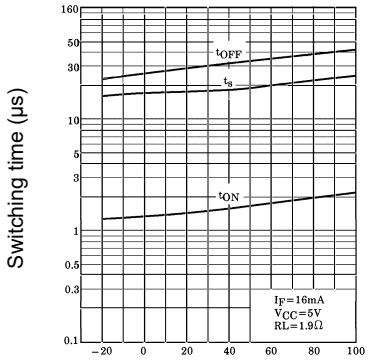


Figure 14: Switching Time -T_a

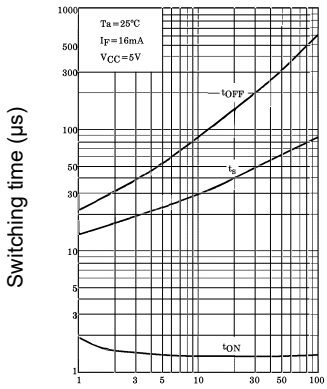
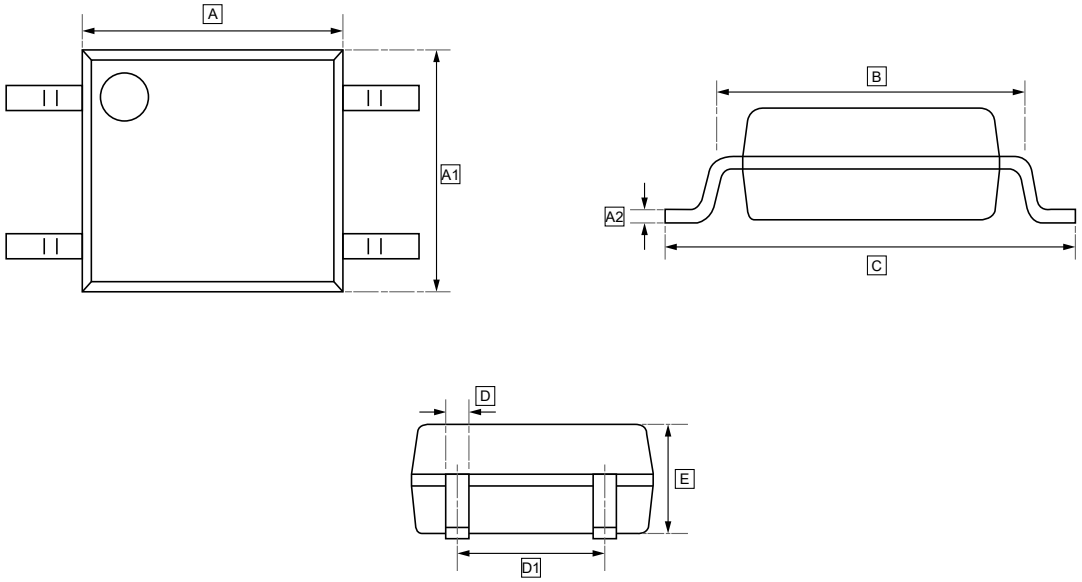


Figure 15: Switching Time -R_L

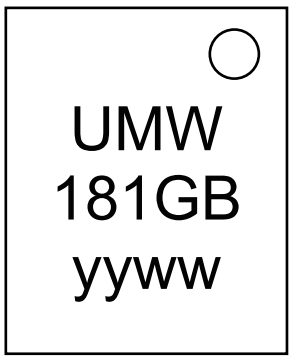
14.SOP-4 Package Outline Dimensions



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

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

When applying our products, please do not exceed the maximum rated values, as this may affect the reliability of the entire system. Under certain conditions, any semiconductor product may experience faults or failures. Buyers are responsible for adhering to safety standards and implementing safety measures during system design, prototyping, and manufacturing when using our products to prevent potential failure risks that could lead to personal injury or property damage.

Unless explicitly stated in writing, UMW products are not intended for use in medical, life-saving, or life-sustaining applications, nor for any other applications where product failure could result in personal injury or death. If customers use or sell the product for such applications without explicit authorization, they assume all associated risks.

When reselling, applying, or exporting, please comply with export control laws and regulations of China, the United States, the United Kingdom, the European Union, and other relevant countries, regions, and international organizations.

This document and any actions by UMW do not grant any intellectual property rights, whether express or implied, by estoppel or otherwise. The product names and marks mentioned herein may be trademarks of their respective owners.