

1. Description

The TLP184 is a small surface-mount optocoupler suitable for surface mount manufacturing. The TLP184 is an optocoupler consisting of a gallium arsenide light-emitting diode (GaAs) and a phototransistor (PTZ). Its size is smaller than a DIP (Digital In-line Package) and it is suitable for high-density surface mount applications, such as programmable logic controllers (PLCs).

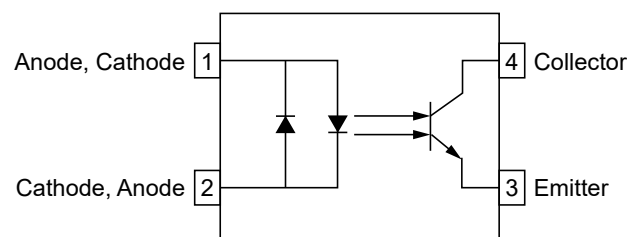
2. Features

- Current conversion ratio (CTR) range:
(CTR: 50~600% at $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)
- Input-output isolation voltage ($V_{iso}=3750\text{Vrms}$)
- Collector-emitter breakdown voltage $BV_{CEO} \geq 80\text{V}$
- Operating temperature: -55 to 110°C
- Compliant with EU REACH and RoHS

3. Applications

- Switching power supply, smart meter
- Industrial control, measuring instruments
- Office equipment, such as photocopiers
- Household appliances, such as air conditioners, fans, water heaters, etc

4. Pinning Information



SOP-4



5. Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	± 50	mA
	Power Dissipation	I_{FP}	± 1	A
	Reverse Voltage	V_R	6	V
	Power Consumption	P	70	mW
	Junction Temperature	T_J	125	$^{\circ}\text{C}$
Output	Collector Power Consumption	P_C	150	mW
	Collector Current	I_C	50	mA
	Collector Emitter Voltage	V_{CEO}	80	V
	Emitter Collector Voltage	V_{ECO}	7	V
	Junction Temperature	T_J	125	$^{\circ}\text{C}$
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage		V_{ISO}	3750	Vrms
Operating Temperature		T_{OPR}	-55 to 110	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 to 125	$^{\circ}\text{C}$
Welding Temperature		T_{SOL}	260 (10s)	$^{\circ}\text{C}$



6. Electrical Characteristics ($T_A=25^\circ\text{C}$)

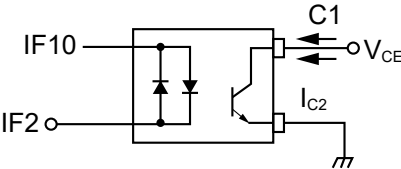
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input						
Forward Voltage	V_F	$I_F=\pm 10\text{mA}$	1.1	1.25	1.4	V
Reverse Current	I_R	$V_R=5\text{V}$			10	μA
Input Capacitance	C_i	$V=0, f=1\text{MHz}$		60		pF
Output						
Collector Dark Current	I_{CEO}	$V_{CE}=70\text{V}$			100	nA
		$V_{CE}=70\text{V}, T_A=85^\circ\text{C}$		2	50	μA
Emitter-Collector Breakdown Voltage	BV_{CEO}	$I_C=0.5\text{mA}, I_F=0$	80			V
Collector Dark Current	BV_{ECO}	$I_E=0.1\text{mA}, I_F=0$	7			V
Transmission Characteristics						
Current Conversion Ratio	CTR	$I_F=5\text{mA}, V_{CE}=5\text{V}$	50		400	%
		Rank GB	100		600	%
Saturated CTR	$CTR_{(sat)}$	$I_F=\pm 1\text{mA}, V_{CE}=0.4\text{V}$		60		%
		Rank GB	30			%
Collector-emitter Saturation Voltage Drop	$V_{CE(sat)}$	$I_F=\pm 8\text{mA}, I_C=2.4\text{mA}$			0.3	V
		$I_F=\pm 1\text{mA}, I_C=0.2\text{mA}$		0.2		V
		Rank GB			0.3	V
Isolation Resistor	R_{ISO}	DC500V, 40~60%R.H.	1×10^{10}			Ω
Isolation Capacitors	C_f	$V=0, f=1\text{MHz}$		0.6	1	pF
Collector-emitter Capacitance	C_{CE}	$V=0, f=1\text{MHz}$		10		pF
Input-output Capacitance	C_s	$V=0, f=1\text{MHz}$		0.8		pF
Cut Off Frequency	F_C	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$		80		kHz
Cut Off State Collector Current	$I_{C(off)}$	$V_F=\pm 0.7\text{V}, V_{CE}=48\text{V}$		1	10	μA
CTR Symmetry Ratio	$I_{C(ratio)}$	$I_{C2}(I_F=-5\text{mA})/I_{C1}(I_F=5\text{mA})$	0.33	1	3	
Isolation Voltage	BV_S	AC, 1 minute	3750			Vrms



Parameter	Symbol	Conditions	Min	Typ	Max	Units
Switching Time						
Rise Time	T_r	$V_{CE}=10V, I_C=2mA$ $R_L=100\Omega$		5		μs
Descent Time	T_f			9		μs
Start Time	T_{on}			9		μs
Off Time	T_{off}			9		μs
Switching Time	T_{on}	$V_{CE}=5V, I_C=\pm 16mA$ $R_L=1.9K\Omega$		2		μs
Duration	T_s			30		μs
Off Time	T_{off}			70		μs

$CTR=I_C/I_F \times 100\%$

$I_{C(ratio)}=I_{C2}(I_F=I_{F2}, V_{CE}=5V)/I_{C1}(I_F=I_{F1}, V_{CE}=5V)$





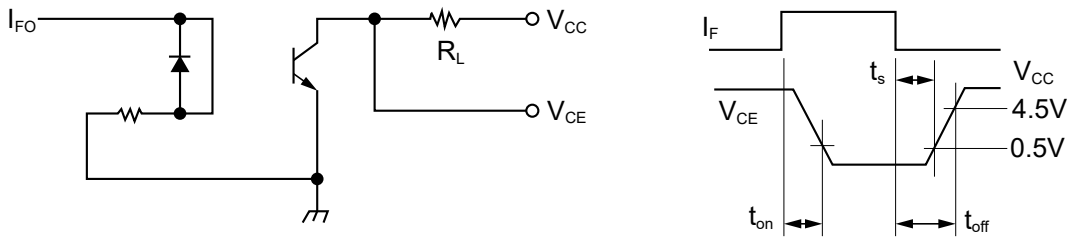
7.CTR Grading

Model	CTR Grading	Current Conversion Rate (%) (I _C /I _F)			Gear Indicator
		I _F =5mA, V _{CE} =5V, T _A =25°C			
		Min	Typ	Max	
TLP184	Standard	50		600	Blank,YE,GR,B,GB
	Y	50		150	YE
	GE	100		300	GR
	BL	200		400	BL
	GB	100		600	GB

8.Recommended Operating Conditions

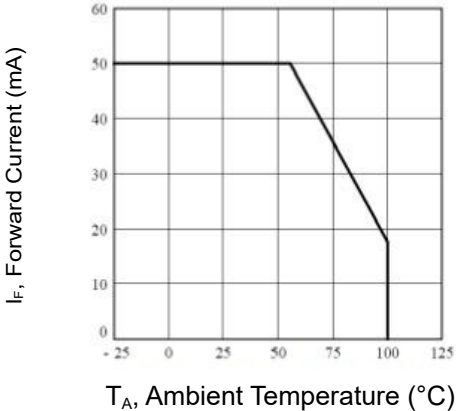
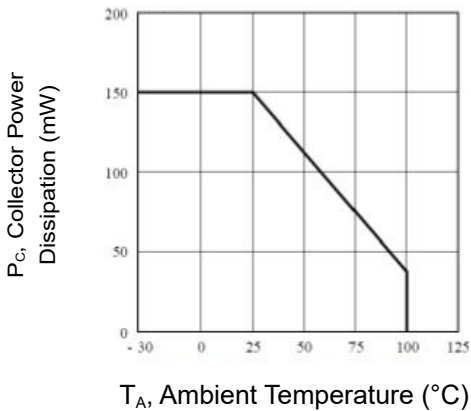
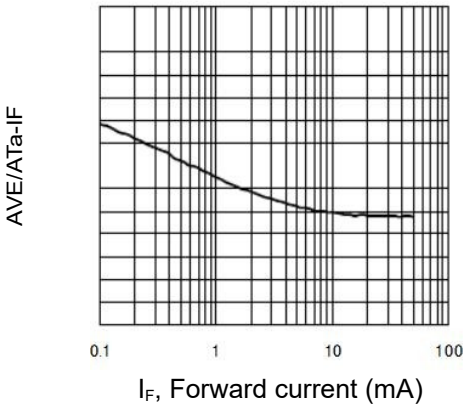
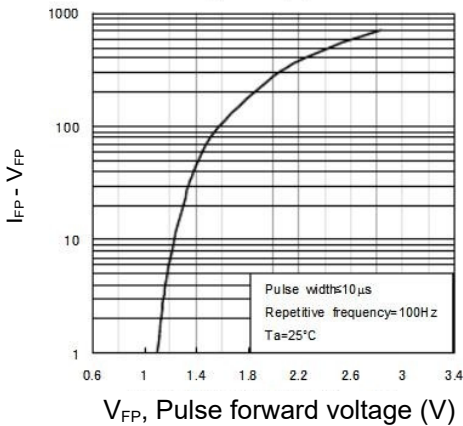
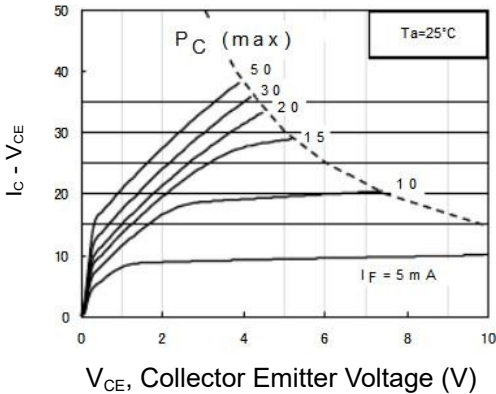
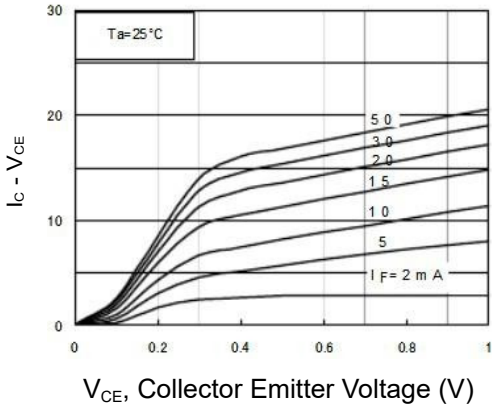
Parameter	Symbol	Min	Typ	Max	Units
Power Supply Voltage	V_{CC}		5	48	V
Forward Current	I_F		16	20	mA
Collector Current	I_C		1	10	mA

9.Switching Time Test Circuit





9.1 Typical Characteristic

	
Figure 1: Forward Current vs. Temperature	Figure 2: Collector Power Consumption vs. Temperature
	
Figure 3: Forward current versus temperature variation VS I_F	Figure 4: Forward Pulse Voltage VS Forward Pulse Current
	
Figure 5: Collector current vs. collector emitter voltage	Figure 6: Collector current vs. collector emitter voltage



9.2 Typical Characteristic

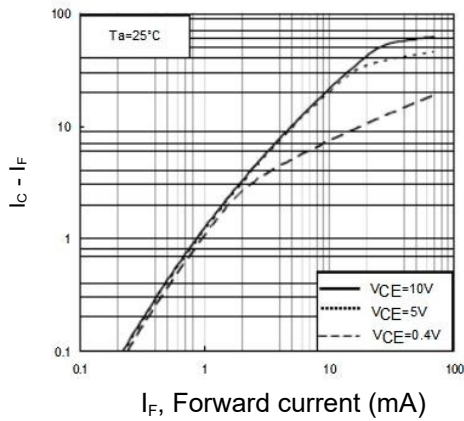


Figure 7: Collector current vs. forward current

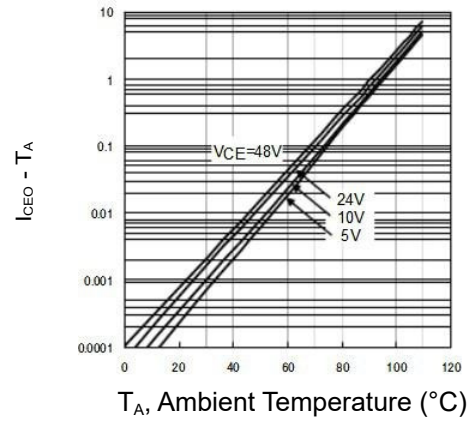


Figure 8: Collector dark current vs. temperature

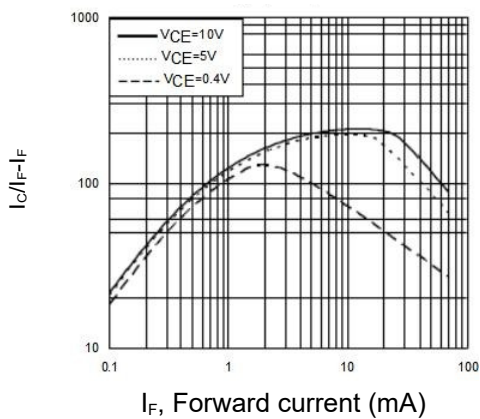


Figure 9: CTR VS Forward Current

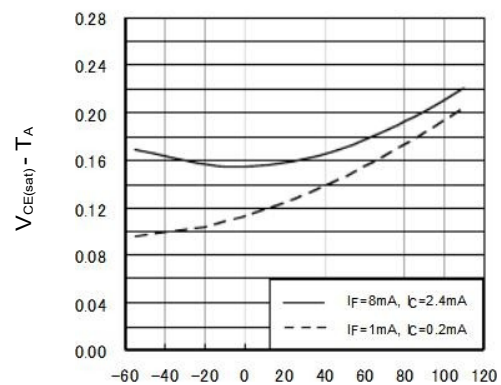


Figure 10: Saturation voltage vs. temperature

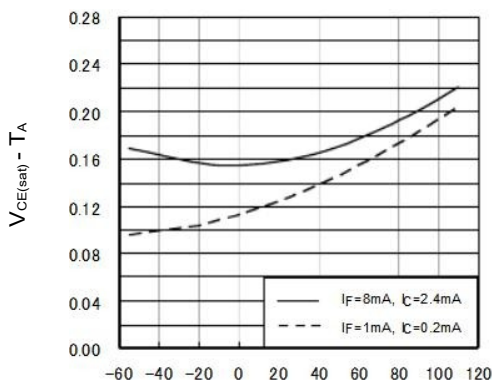


Figure 11: CTR VS Forward Current

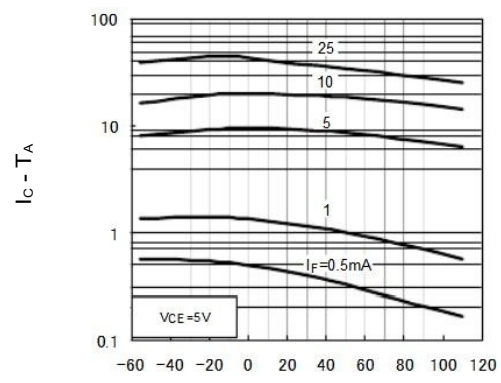
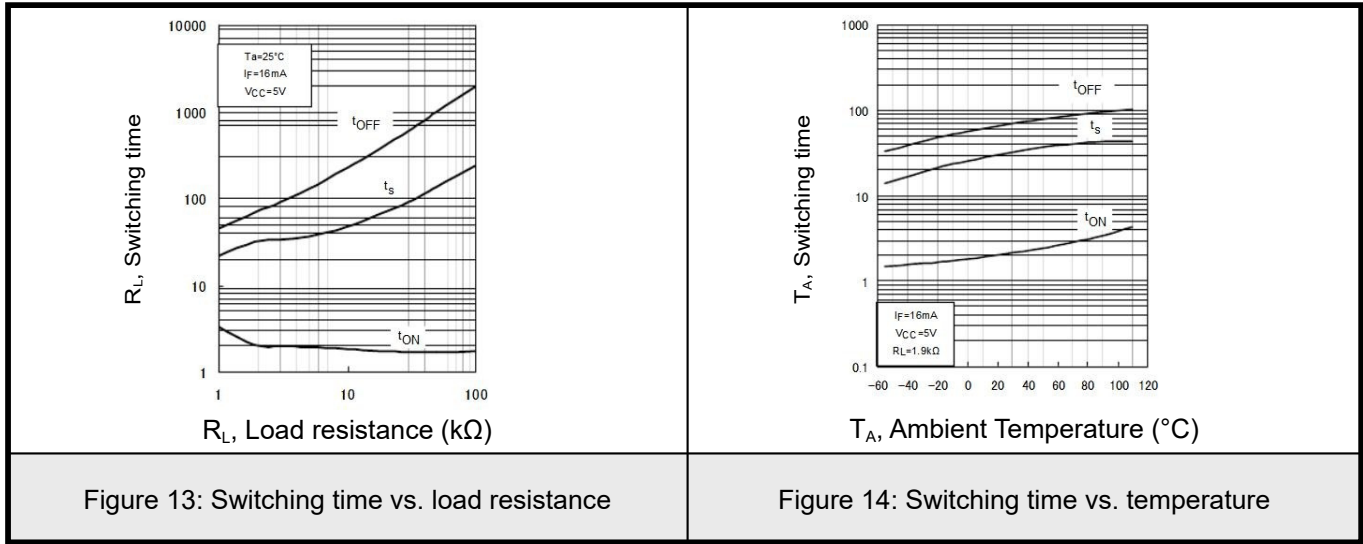


Figure 12: Collector current vs. temperature

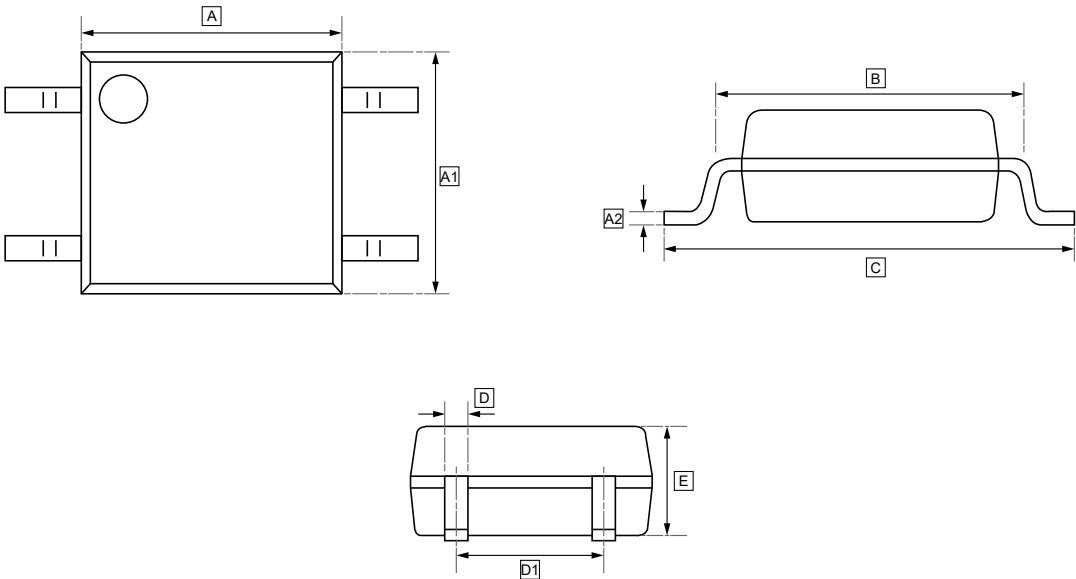


9.3 Typical Characteristic





11.SOP-4 Package Outline Dimensions

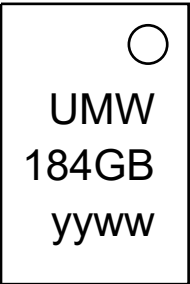


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	B	C	D	D1	E
Min	4.30	3.60	0.15	5.00	6.70	0.30	2.54	1.82
Max	4.50	4.10		5.40	7.30	0.50	TYP	2.02



12.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW TLP184GB-S	SOP-4	3000	Tape and reel



13.Disclaimer

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