

1.Description

The UMW TLP785 consists of a silicone photo transistor optically coupled to a gallium arsenide (GaAs) infrared emitting diode in a four lead plastic DIP (DIP4) with having high isolation voltage (AC: 5kVRMS (min)).

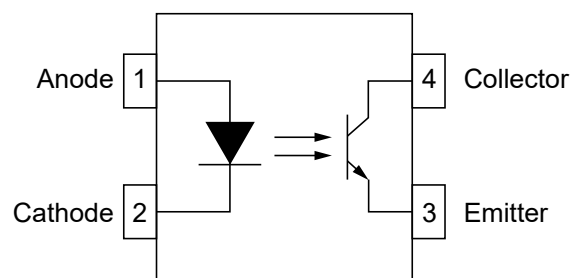
2.Features

- Collector-emitter voltage: 80V (min.)
- Current transfer ratio: 50% (min.)
- Rank GB: 100% (min.)
- Isolation voltage: 5000Vrms(min.)
- UL approved: UL1577, file No. E547318

3.Applications

- Office Equipment
- Household Appliances
- Solid State Relays
- Switching Power Supplies
- Various Controllers
- Signal Transmission Between Different Voltage Circuits

4.Pinning information



DIP-4/SOP-4



5. Absolute Maximum Ratings

Parameter		Symbol	Ratings	Unit
LED	Forward Current	I_F	60	mA
	Forward Current Derating ($T_a \geq 39^\circ\text{C}$)	$\Delta I_F/^\circ\text{C}$	-0.7	mA/ $^\circ\text{C}$
	Pulse Forward Current (Note 3)	I_{FP}	1	A
	Power Dissipation	P_D	100	mW
	Power Dissipation Derating	$\Delta P_D/^\circ\text{C}$	-0.9	mW/ $^\circ\text{C}$
	Reverse Voltage	V_R	5	V
	Junction Temperature	T_J	125	$^\circ\text{C}$
DETECTOR	Collector-Emitter Voltage	V_{CEO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	80	mA
	Power dissipation (single circuit)	P_C	150	mW
	Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)	$\Delta P_D/^\circ\text{C}$	-1.5	mW/ $^\circ\text{C}$
	Junction Temperature	T_J	125	$^\circ\text{C}$
Operating Temperature Range		T_{OPR}	-55 to 110	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 to 125	$^\circ\text{C}$
Lead Soldering Temperature (10s)		T_{SOL}	260	$^\circ\text{C}$
Total Package Power Dissipation		P_T	200	mW
Total Package Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T/^\circ\text{C}$	-2.4	mW/ $^\circ\text{C}$
Isolation Voltage (Note 4)		BV_S	5000	Vrms

(Note 3): 100 μs pulse, 100 Hz frequency

(Note 4): AC, 1 min., R.H. $\leq$ 60%. Apply voltage to LED pin and detector pin 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

(Note): Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

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 TLP785	(None)	50	600	BLANK
	Rank Y	50	150	YE
	Rank GR	100	300	GR
	Rank BL	200	600	BL
	Rank GB	100	600	GB
	Rank YH	75	150	Y+
	Rank GRL	100	200	G
	Rank GRH	150	300	G+
	Rank BLL	200	400	B

(Note 1): Ex. rank GB: TLP785 (GB)

(Note 2): Application type name for certification test, please use standard product type name, i. e. TLP785 (GB): TLP785



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	$V=0, f=1\text{MHz}$		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	$I_D(I_{CEO})$	$V_{CE}=24\text{V}$		0.01	0.1	μA
		$V_{CE}=24\text{V}, T_a=85^\circ\text{C}$		0.6	50	μA
Capacitance (Collector to Emitter)	C_{CE}	$V=0, f=1\text{MHz}$		6		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	$I_C/I_{F(sat)}$	$I_F=1\text{mA}, V_{CE}=0.4\text{V}$		60		%
		$I_F=1\text{mA}, V_{CE}=0.4\text{V}, \text{Rank GB}$	30			%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=2.4\text{mA}, I_F=8\text{mA}$			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	$V_s=500\text{V}$	1×10^{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	$V_{CC}=10\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$		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) $V_{CC}=5\text{V}, I_F=16\text{mA}$		1.5		μs
Storage Time	t_s			25		μs
Turn-off Time	t_{off}			50		μs

12. Test circuit

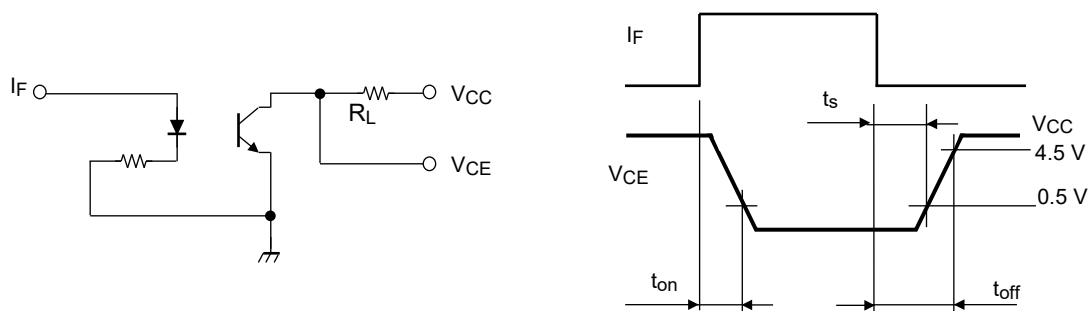


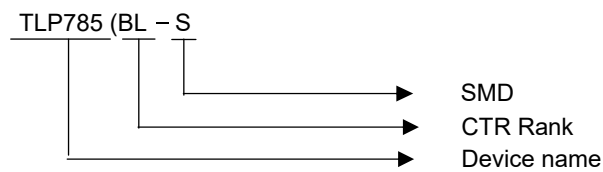
Fig.1 Switching Time Test Circuit



13.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)



14.Tape Dimensions

Orientation of Device in Relation to Direction of Tape Movement

Device orientation in the recesses is as shown in Figure 2.

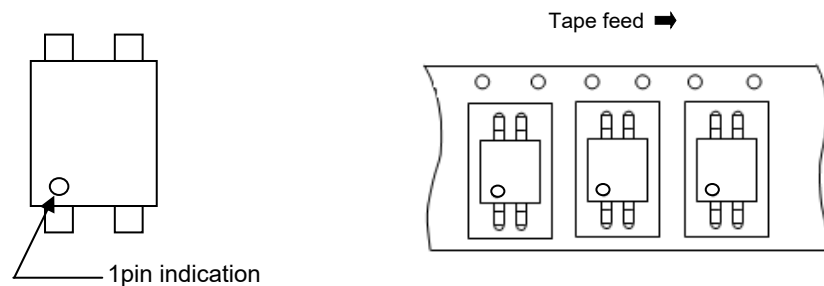
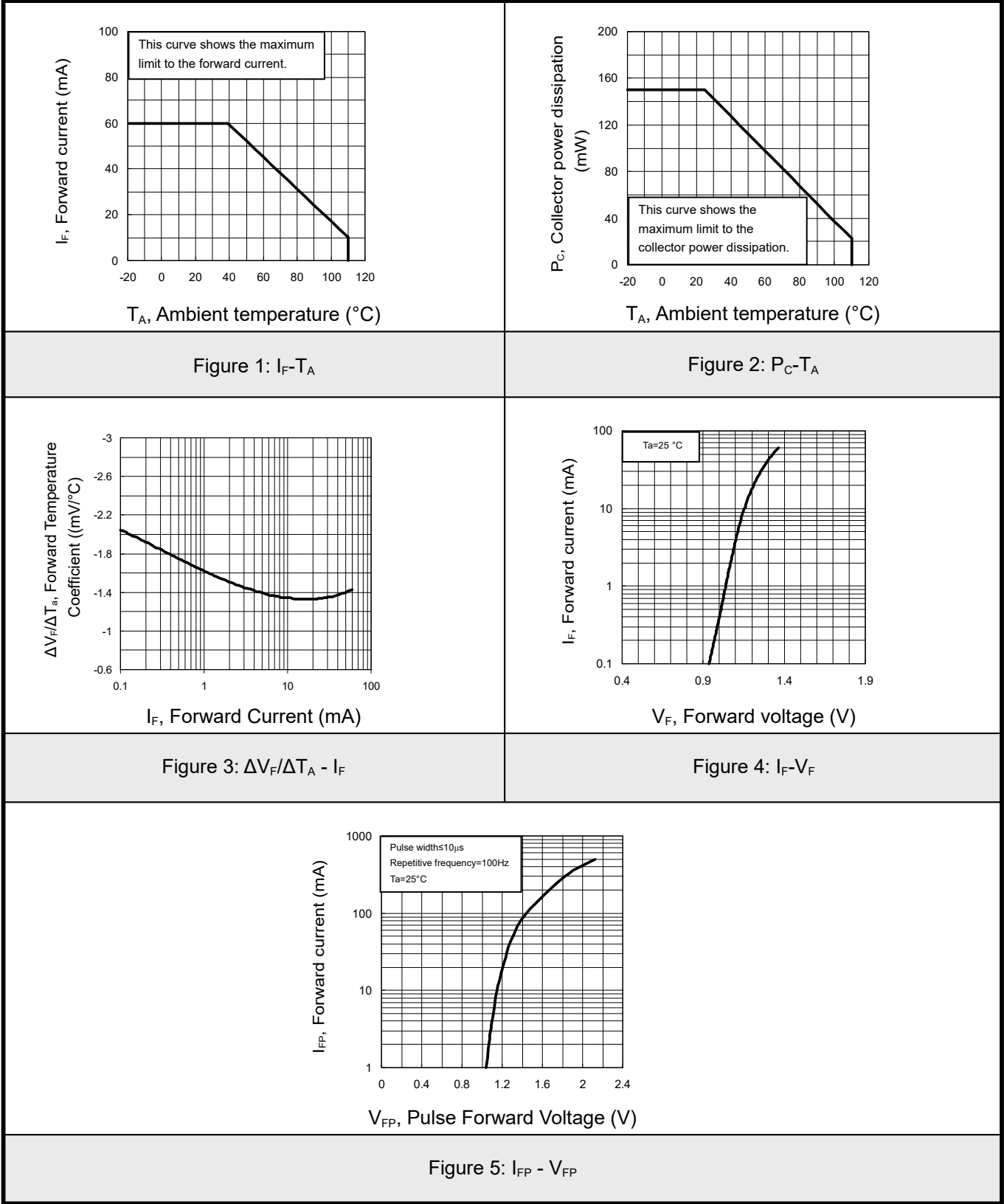


Figure2 Dev ice Orientation

Tape Packing Quantity:2000 devices per reel

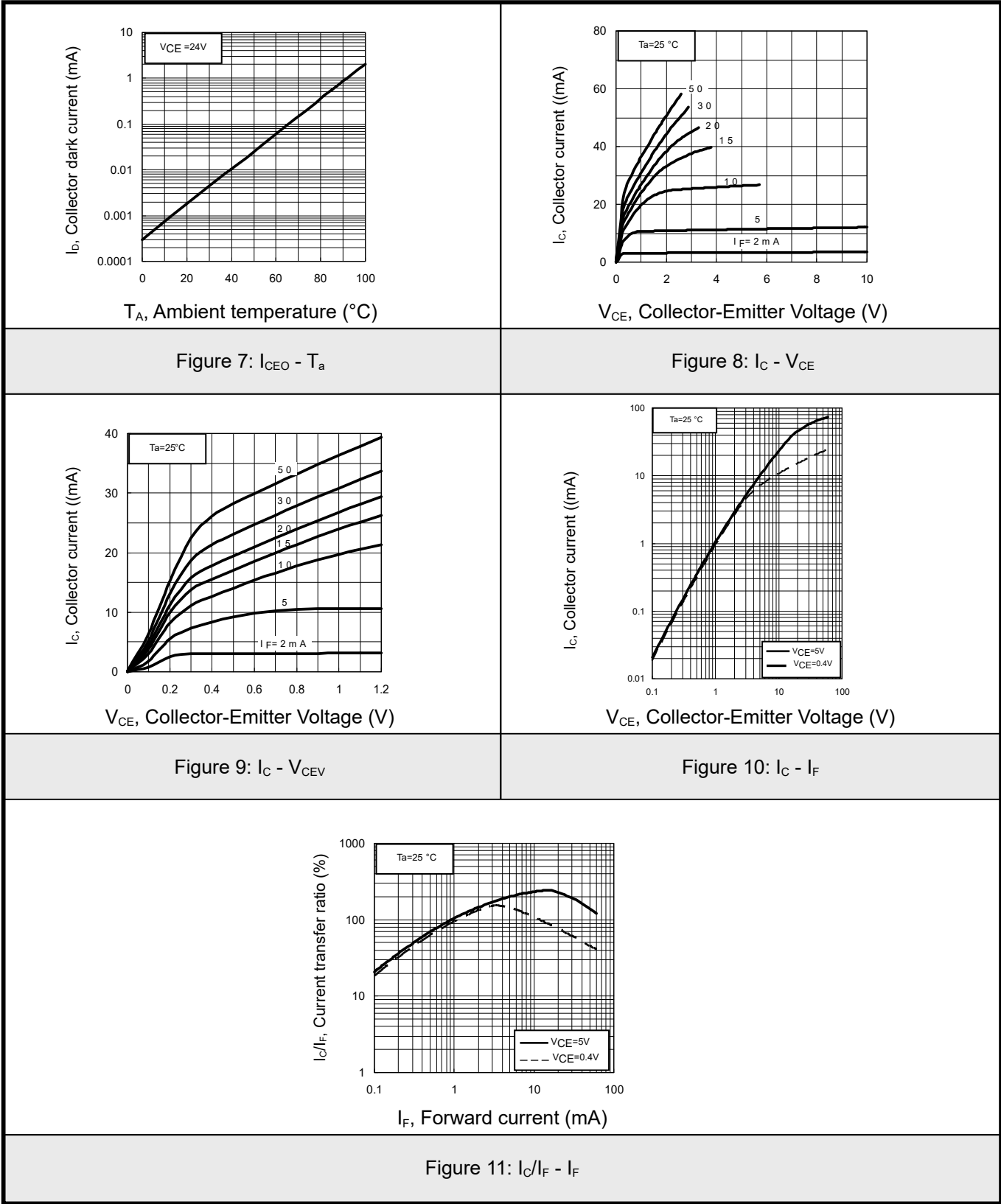


15.1 Typical Characteristic



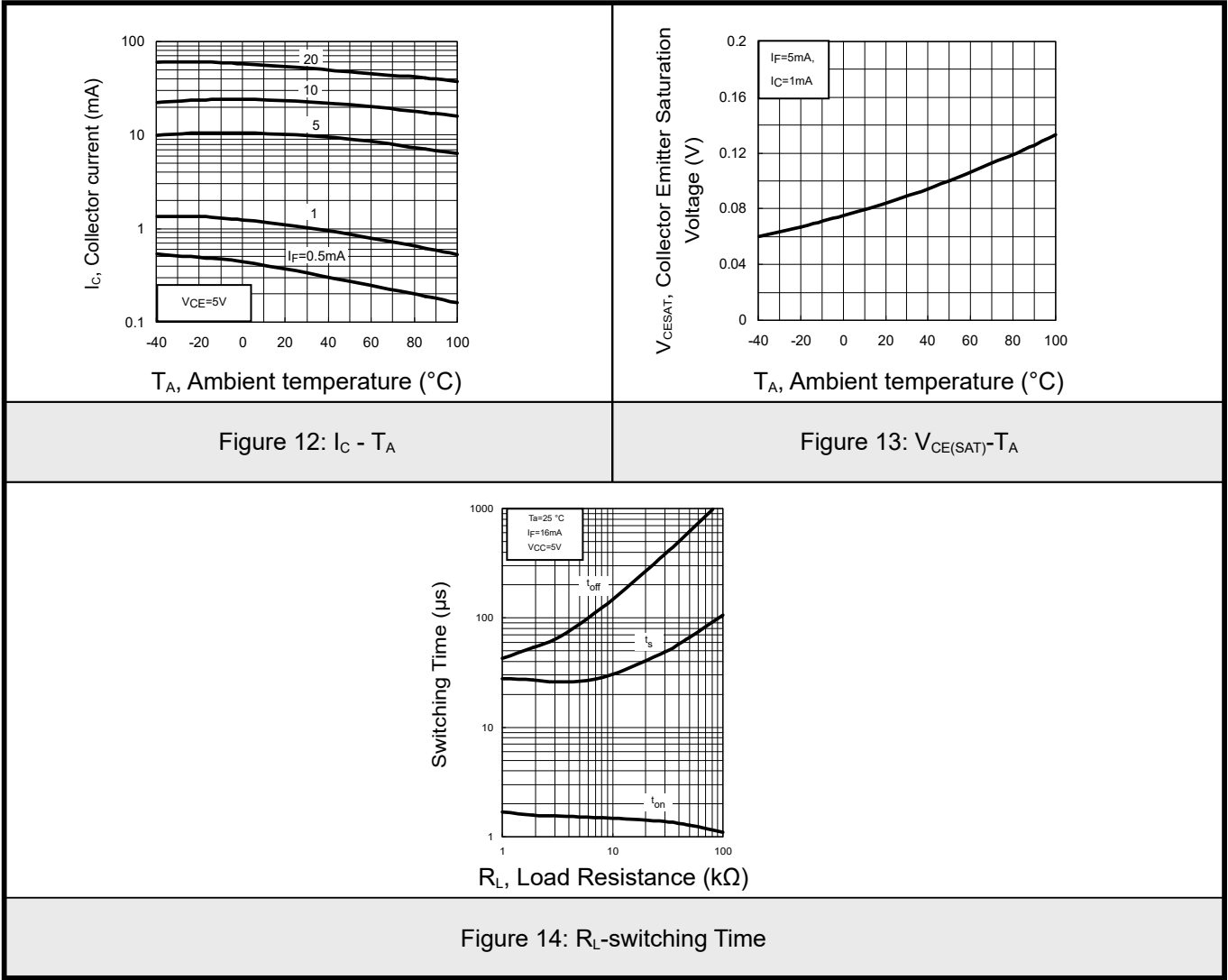


15.2Typical Characteristic



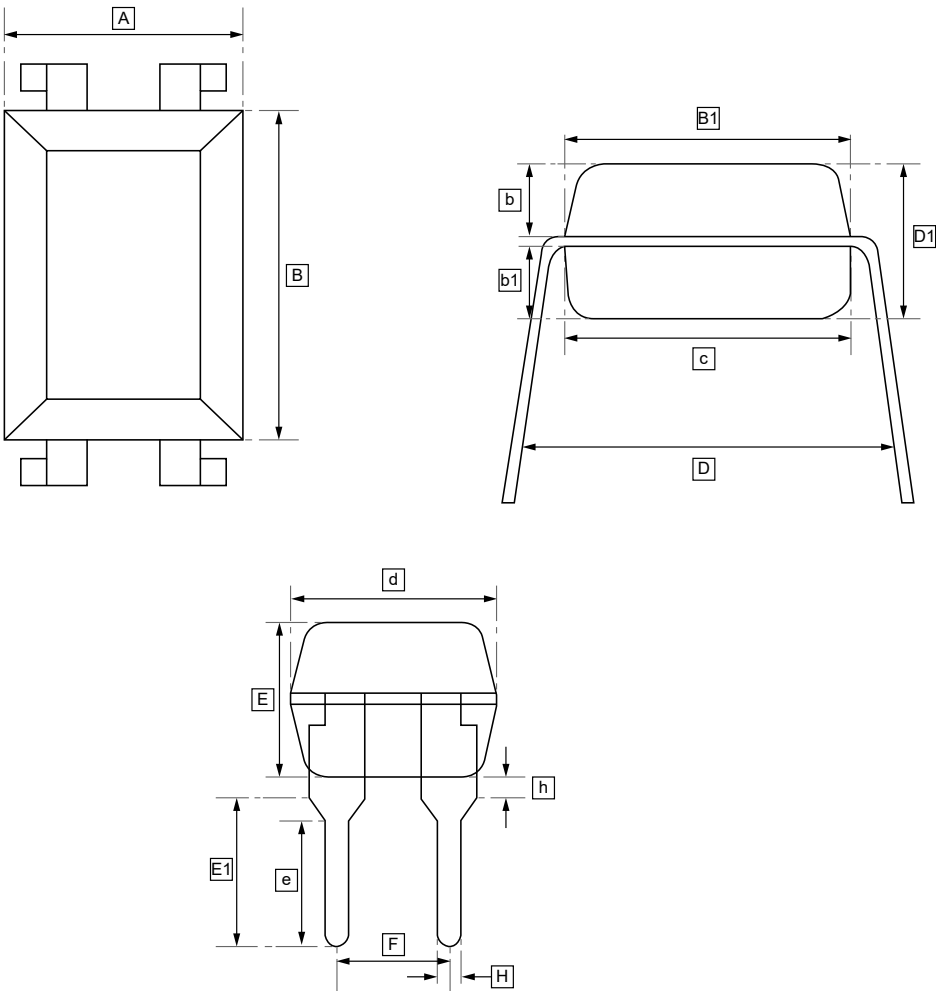


15.3Typical Characteristic





16.1DIP-4 Package Outline Dimensions



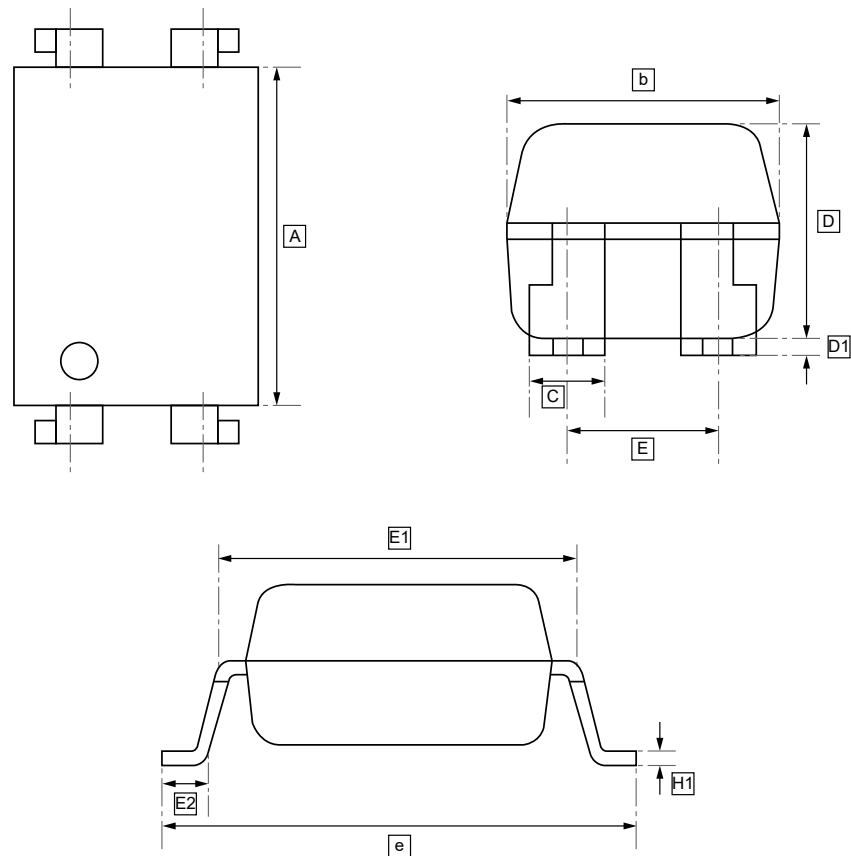
DIMENSIONS (mm are the original dimensions)

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		



16.2SOP-4 Package Outline Dimensions

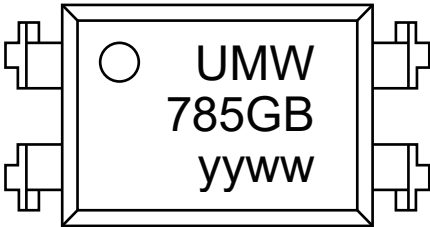


DIMENSIONS (mm are the original dimensions)

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	



17.Ordering information



yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW TLP785GB	785GB	DIP-4	5000	Tube and box
UMW TLP785GB-S	785GB	SOP-4	2000	Tape and reel



18.Disclaimer

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