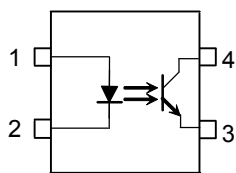


Office Equipment  
 Household Appliances  
 Solid State Relays  
 Switching Power Supplies  
 Various Controllers  
 Signal Transmission Between Different Voltage Circuits

The UMW TLP785 consists of a silicone phototransistor optically coupled to a gallium arsenide (GaAs) infrared emitting diode in a four lead plastic DIP (DIP4) with having high isolation voltage (AC: 5kV<sub>RMS</sub> (min)).

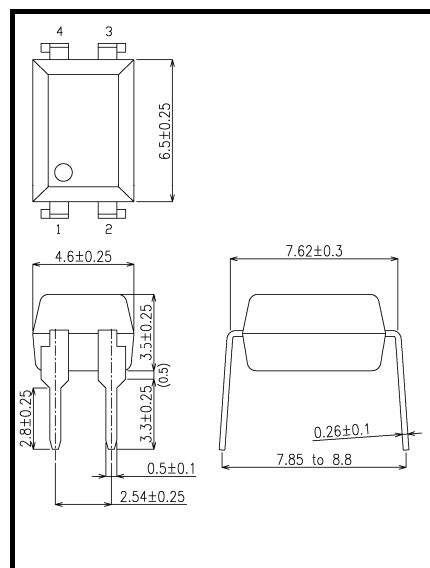
- Collector-emitter voltage: 80V (min.)
- Current transfer ratio: 50% (min.)  
 Rank GB: 100% (min.)
- Isolation voltage: 5000V<sub>rms</sub> (min.)
- UL approved: UL1577, file No. E492440

**Pin Configurations (top view)**



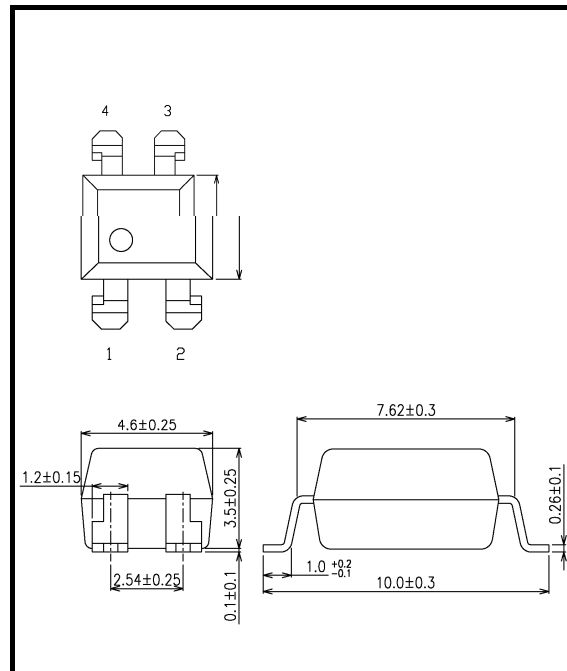
- 1 : Anode
- 2 : Cathode
- 3 : Emitter
- 4 : Collector

TLP785 Unit: mm



Weight: 0.32 g (typ.)

TLP785 Unit: mm



Weight: 0.31g (typ.)

**Current Transfer Ratio**

Type	Classification (Note 1)	Current Transfer Ratio (%) ( $I_C / I_F$ )		Marking of Classification
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
		Min	Max	
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

**Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )**

Characteristic		Symbol	Rating	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 ( $T_a \geq 25^\circ\text{C}$ )	$\Delta P_C / ^\circ\text{C}$	-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	$V_{rms}$

(Note 3): 100  $\mu\text{s}$  pulse, 100 Hz frequency

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

**Recommended Operating Conditions (Note)**

Characteristic	Symbol	Min	Typ.	Max	Unit
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.

**Individual Electrical Characteristics (Ta = 25°C)**

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	$V_F$	$I_F = 10 \text{ mA}$	1.0	1.15	1.3	V
	Reverse current	$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0\text{V}, f = 1 \text{ MHz}$	—	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	$\mu\text{A}$
			$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$	—	0.6	50	$\mu\text{A}$
Capacitance (collector to emitter)	$C_{CE}$	$V = 0\text{V}, f = 1 \text{ MHz}$	—	6	—	pF	

**Coupled Electrical Characteristics (Ta = 25°C)**

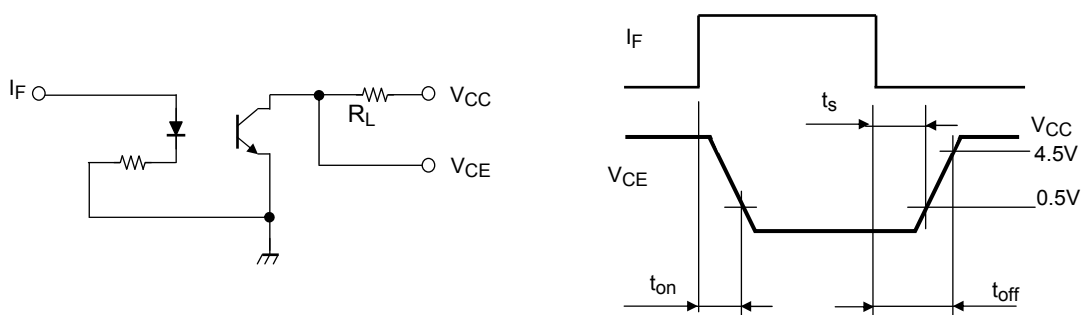
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	$I_C / I_F$	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F(\text{sat})$	$I_F = 1 \text{ mA}, V_{CE} = 0.4 \text{ V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-emitter saturation voltage	$V_{CE}(\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$ $I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	—	0.4	V
			—	0.2	—	
		—	—	0.4		

**Isolation Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance (input to output)	$C_S$	$V_S = 0\text{V}, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	5000	—	—	$V_{rms}$
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	$t_r$	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}$ $R_L = 100\Omega$	—	2	—	$\mu\text{s}$
Fall time	$t_f$		—	3	—	
Turn-on time	$t_{on}$		—	3	—	
Turn-off time	$t_{off}$		—	3	—	
Turn-on time	$t_{on}$	$R_L = 1.9\text{ k}\Omega$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$ (fig. 1)	—	1.5	—	$\mu\text{s}$
Storage time	$t_s$		—	25	—	
Turn-off time	$t_{off}$		—	50	—	

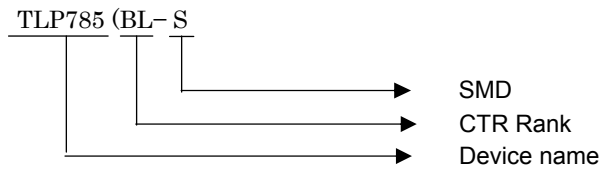


(fig. 1): Switching time test circuit

### 1. 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.

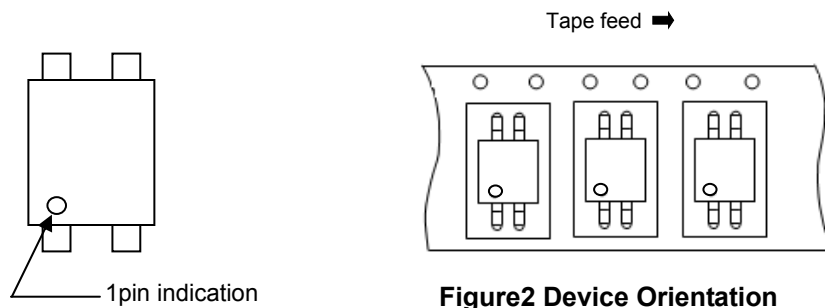
(Example)



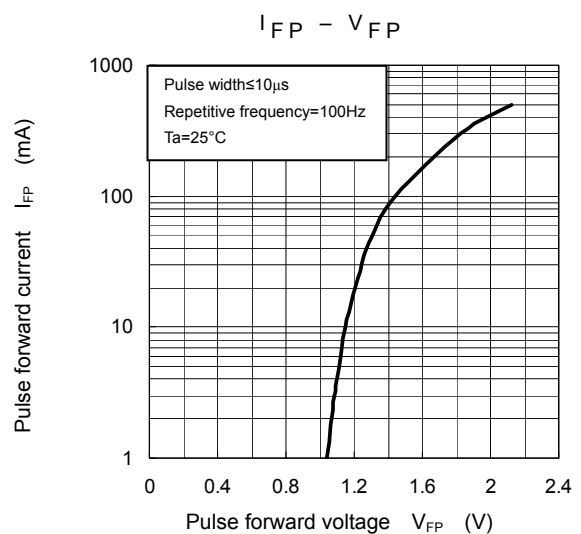
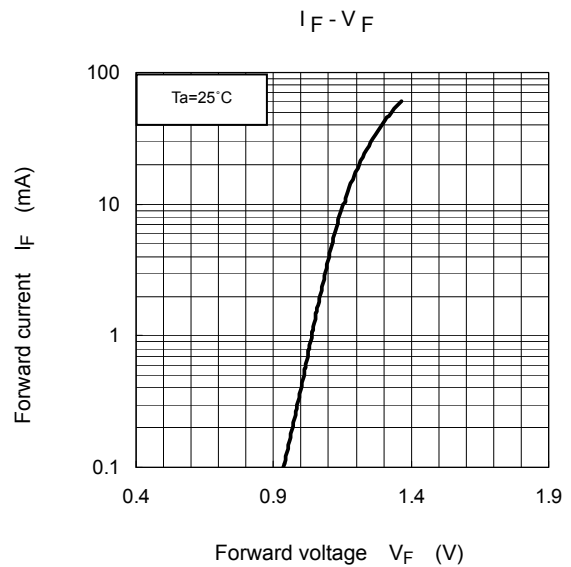
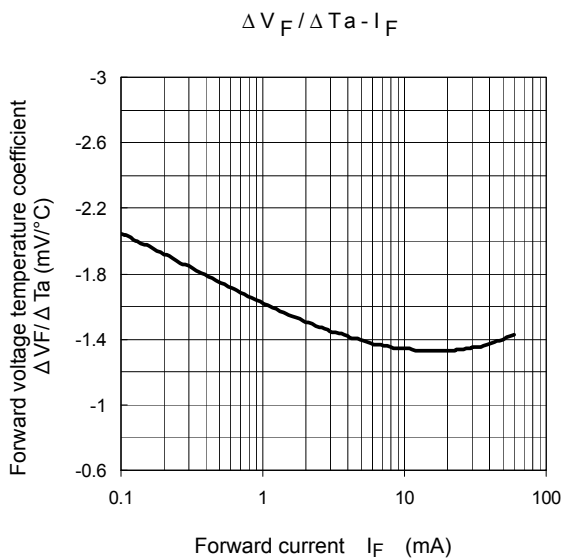
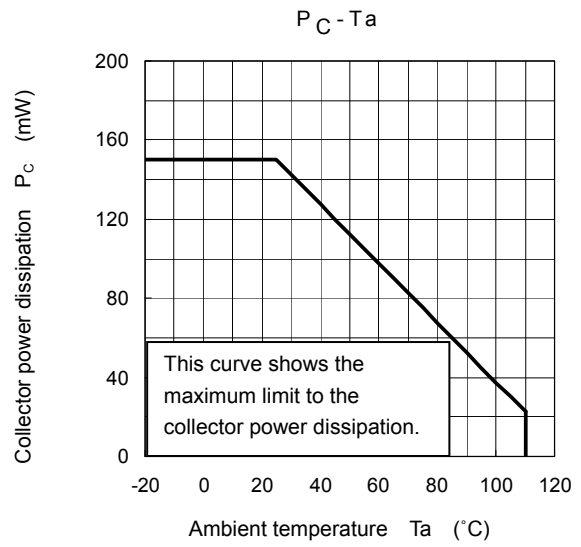
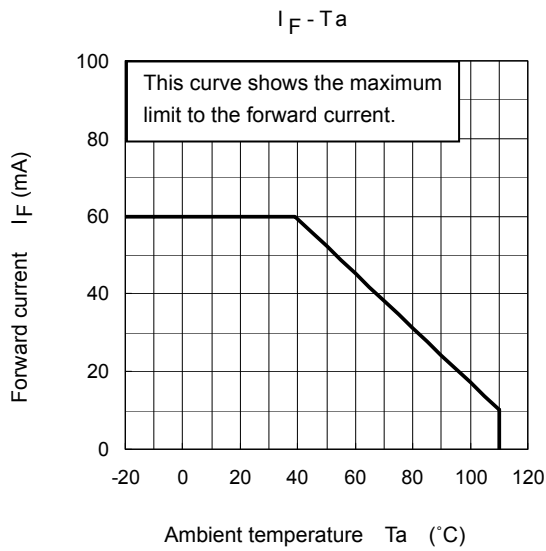
### 2. Tape Dimensions

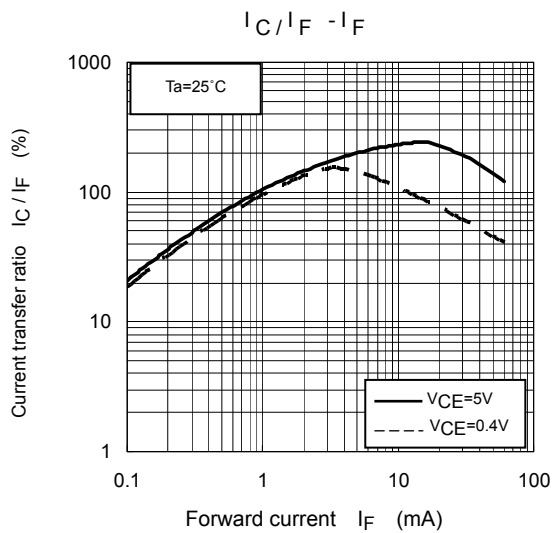
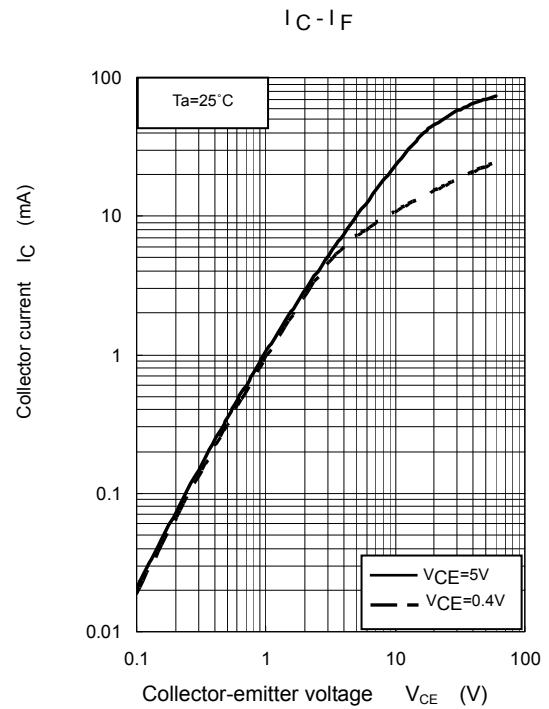
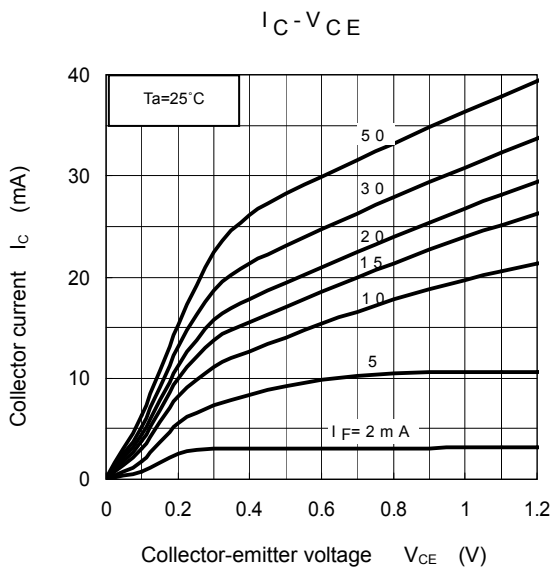
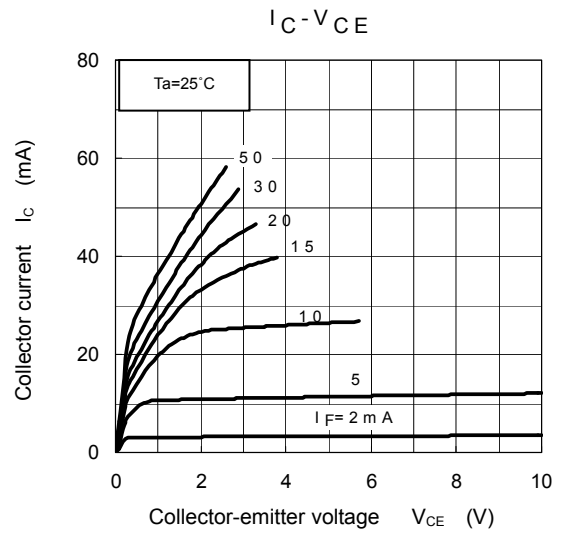
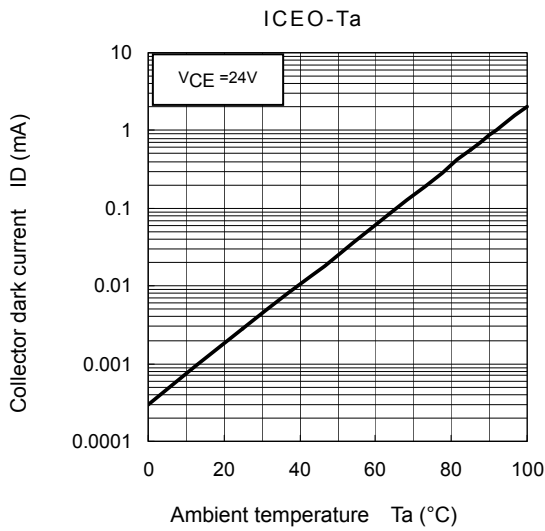
#### 2.1 Orientation of Device in Relation to Direction of Tape Movement

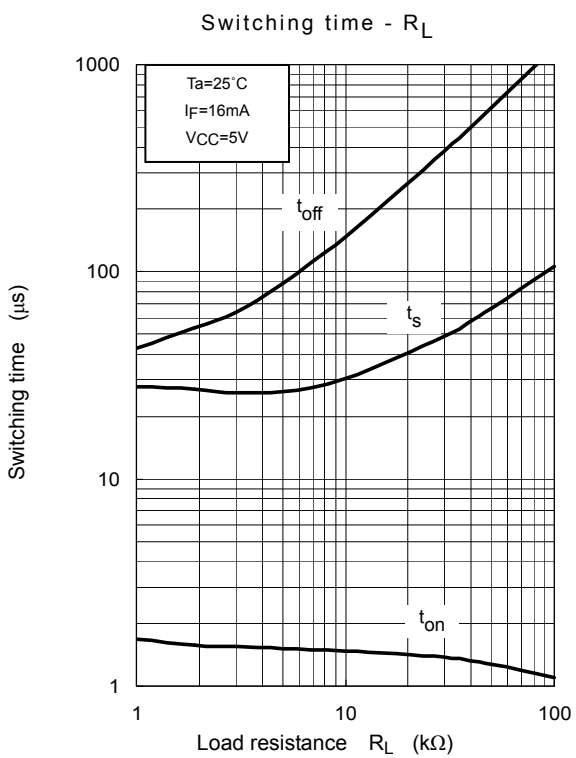
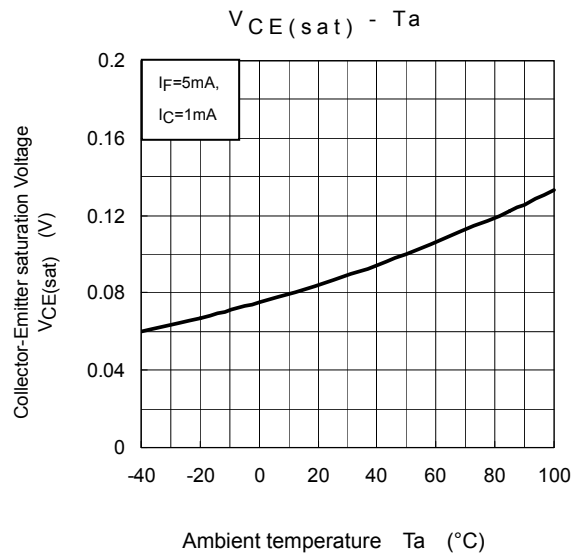
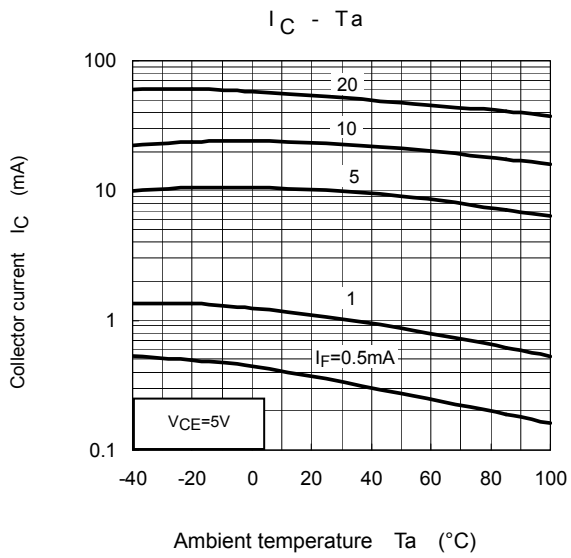
Device orientation in the recesses is as shown in Figure 2.



#### 2.2 Tape Packing Quantity:2000 devices per reel









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