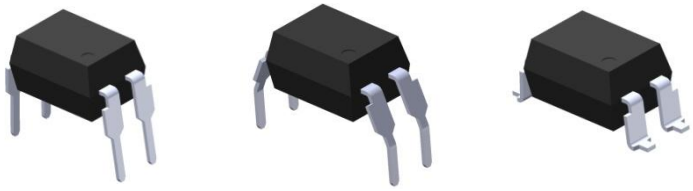
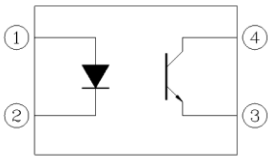
DATASHEET

4 PIN DIP HIGH VOLTAGE PHOTOTRANSISTOR PHOTOCOUPLER
EL851 Series



Schematic



Pin Configuration
1. Anode
2. Cathode
3. Emitter
4. Collector

Features:

- High collector- emitter voltage (V_{CEO} = 350V)
- Current transfer ratio
  (CTR: 50~600% at I_F = 5mA, V_{CE} = 5V)
- High isolation voltage between input
  and output (Viso = 5000 Vrms)
- Compact dual-in-line package
- Pb free and RoHS compliant.
- Compliance with EU REACH
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

Description

The EL851 series devices consist an infrared emitting diodes, optically coupled to a phototransistor detector.
The devices are in a 4-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- Telephone line interface
- Interface to power supply circuit
- Controller for SSRs. DC motor
- Programmable Controllers

Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current (1μs pulse)	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	100	mW
Output	Collector power dissipation	P_C	150	mW
	Collector-Emitter voltage	V_{CEO}	350	V
	Collector Current	I_C	50	mA
	Emitter-Collector voltage	V_{ECO}	7	V
Total Power Dissipation		P_{TOT}	200	mW
Isolation Voltage*1		V_{ISO}	5000	V rms
Operating Temperature		T_{OPR}	-55 to 100	°C
Storage Temperature		T_{STG}	-55 to 125	°C
Soldering Temperature*2		T_{SOL}	260	°C

Notes:
*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.
*2 For 10 seconds

Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	1.2	1.4	V	I_F = 10mA
Reverse Current	I_R	-	-	10	μA	V_R = 5V
Input capacitance	C_{in}	-	30	250	pF	V = 0, f = 1kHz

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	V_{CE} = 200V
Collector-Emitter breakdown voltage	BV_{CEO}	350	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	I_E = 0.1mA
Collector-Emitter capacitance	C_{CE}	-	10	-	pF	VCE = 0V, f = 1MHz

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	0.4	V	I_F = 20mA , I_C = 1mA
Isolation resistance	R_{IO}	10^{11}	-	-	Ω	V_{IO} = 500Vdc
Input-output capacitance	C_{IO}	-	0.6	-	pF	V_{IO} = 0, f = 1MHz
Rise time	t_r	-	4	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω
Fall time	t_f	-	5	18	μs	

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

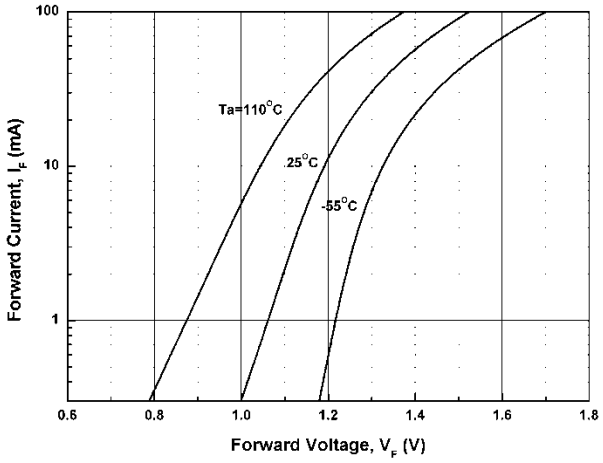


Figure 2. Current Transfer Ratio vs Forward Current

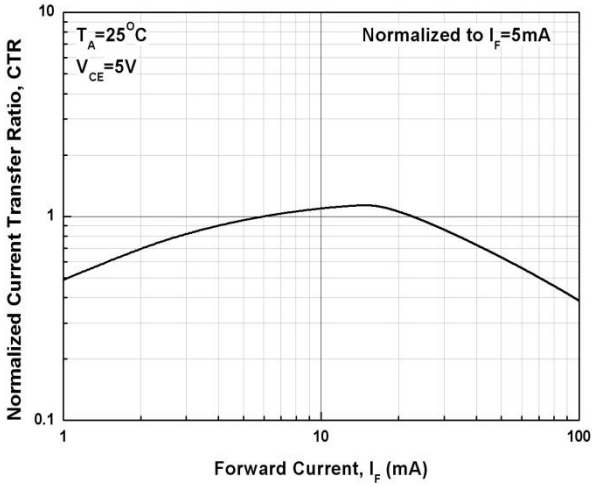


Figure 3. Collector Current vs Collector-emitter Voltage

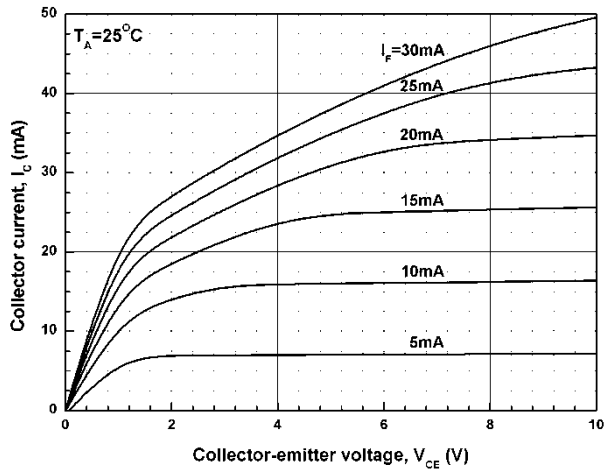


Figure 4. Relative Current Transfer Ratio vs Ambient Temperature

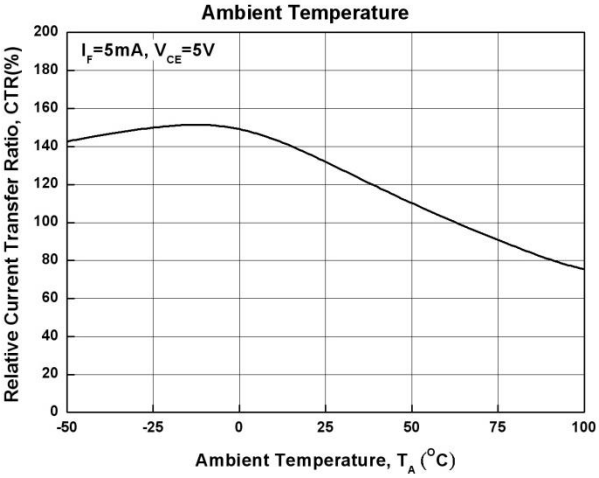


Figure 5. Collector-emitter Saturation Voltage vs Ambient Temperature

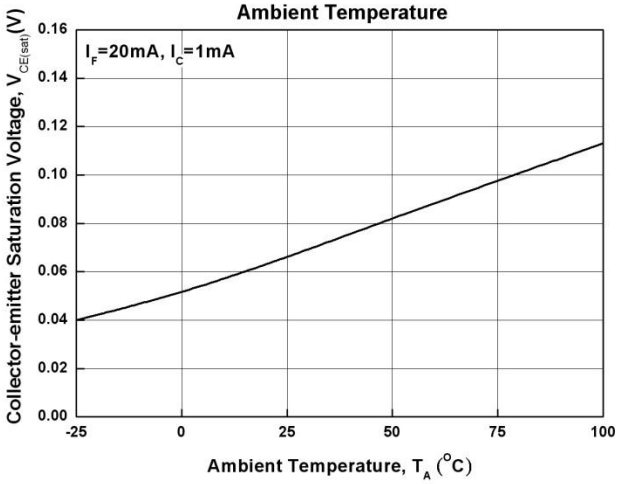


Figure 6. Dark Current vs Ambient Temperature

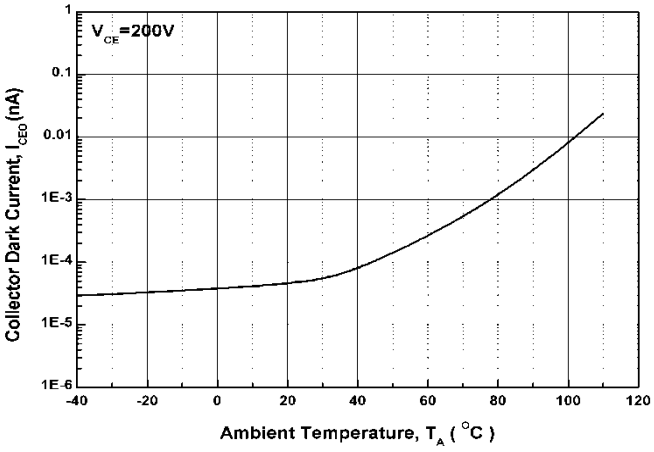


Figure .7 Switching Time vs. Load Resistance

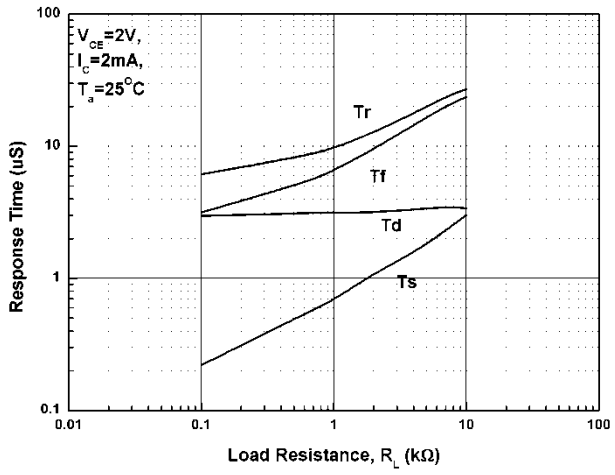
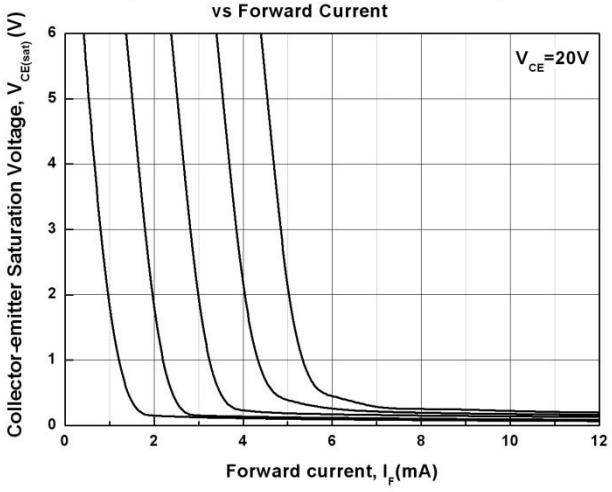


Figure 8. Collector-emitter Saturation Voltage vs Forward Current



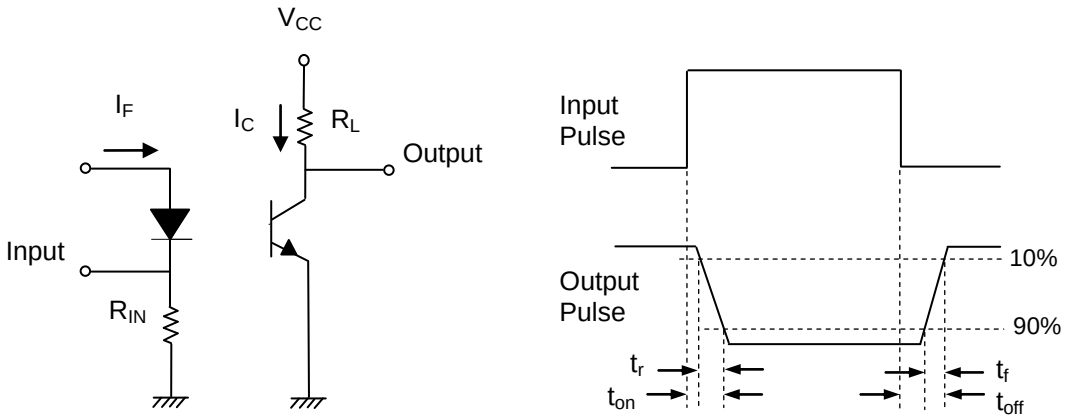


Figure 9. Switching Time Test Circuit & Waveforms

Order Information

Part Number

EL851X(Z)-V

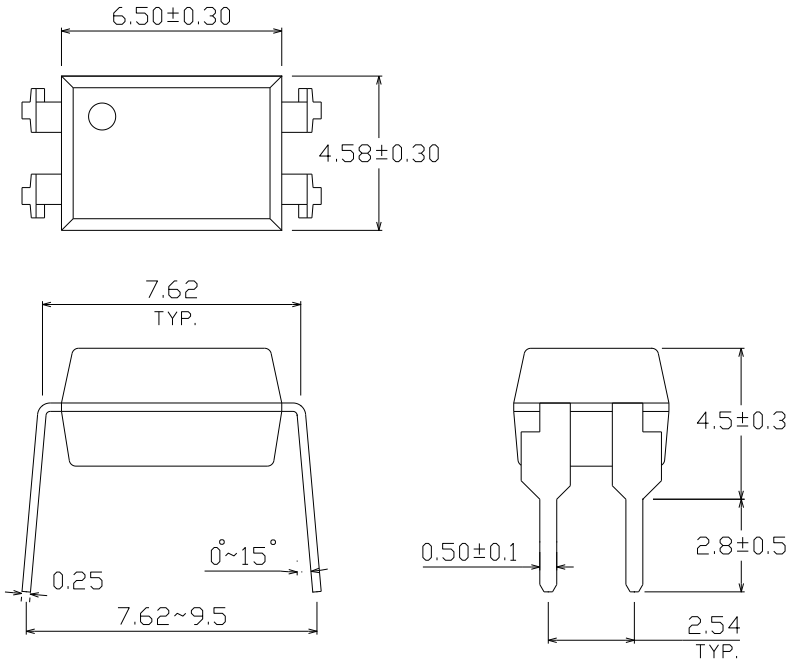
Note

X = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB, TU, TD or none)
V = VDE safety (optional)

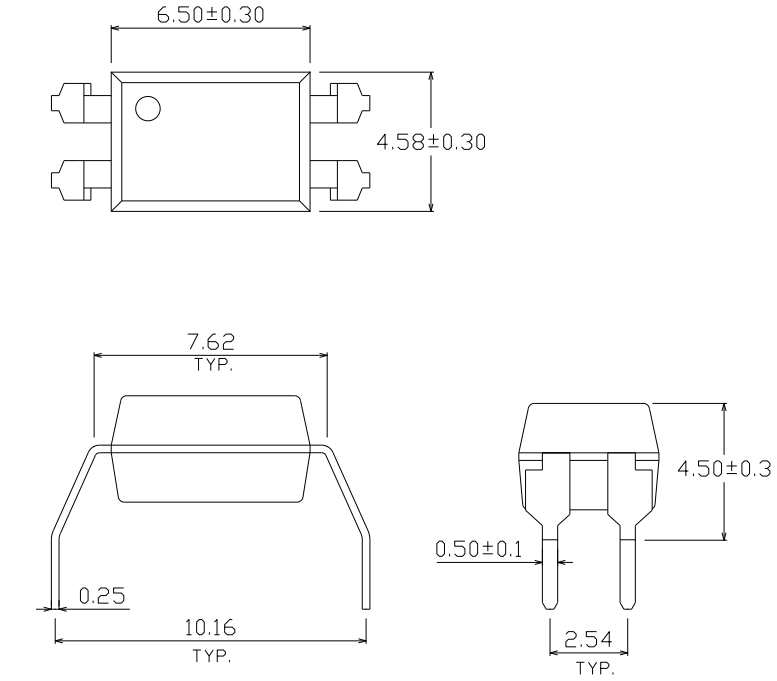
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel
S (TU)	Surface mount lead form + TU tape & reel option	1500 units per reel
S (TD)	Surface mount lead form + TD tape & reel option	1500 units per reel
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

Package Dimension (Dimensions in mm)

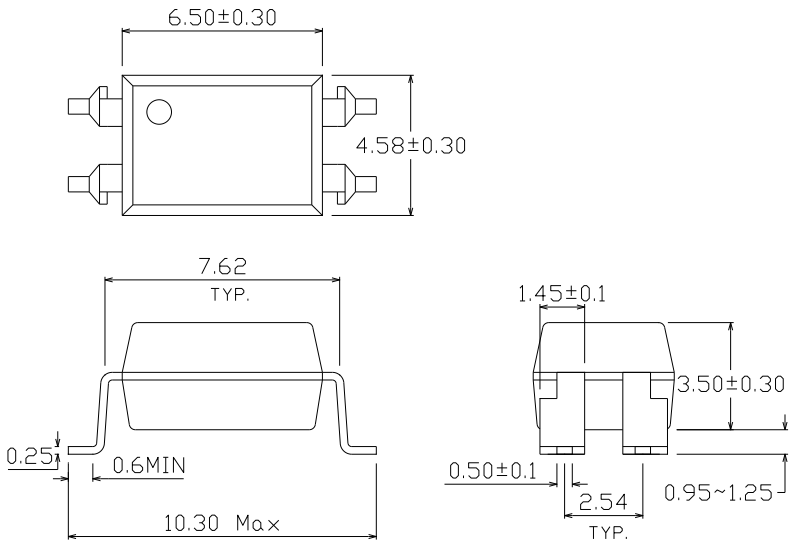
Standard DIP Type



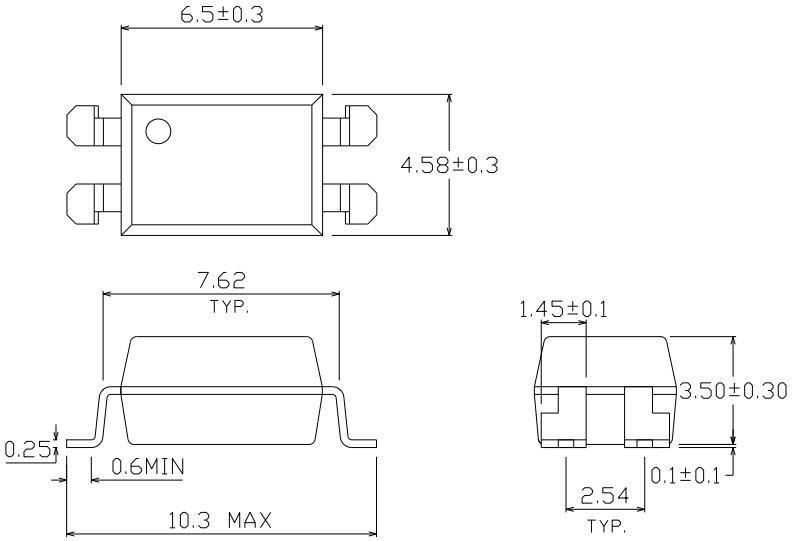
Option M Type



Option S Type

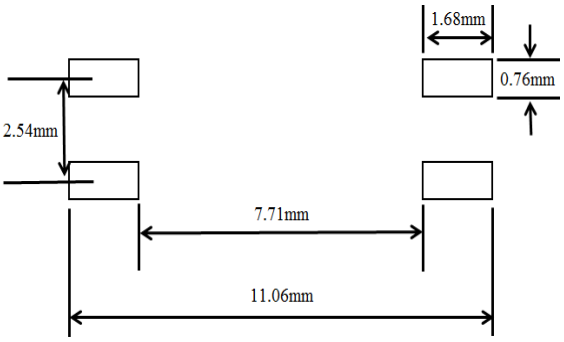


Option S1 Type

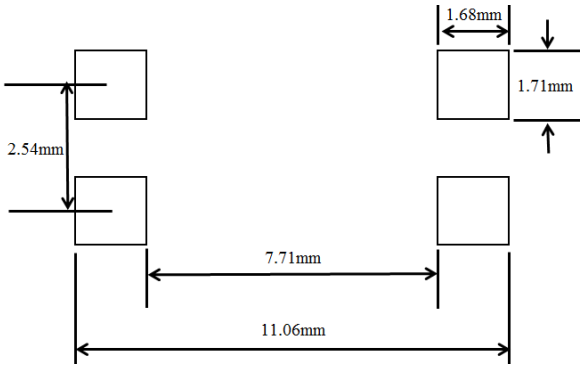


Recommended pad layout for surface mount leadform

For S option



For S1 option



Notes

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

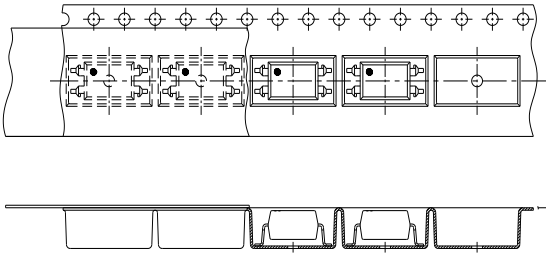
Device Marking

Notes

EL	denotes EVERLIGHT
851	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

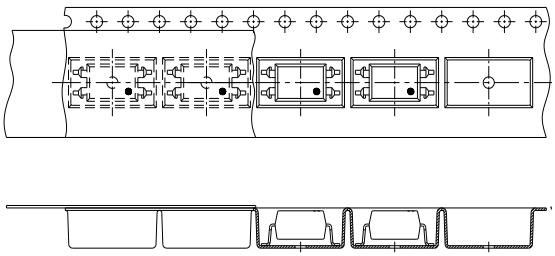
Tape & Reel Packing Specifications

Option TA



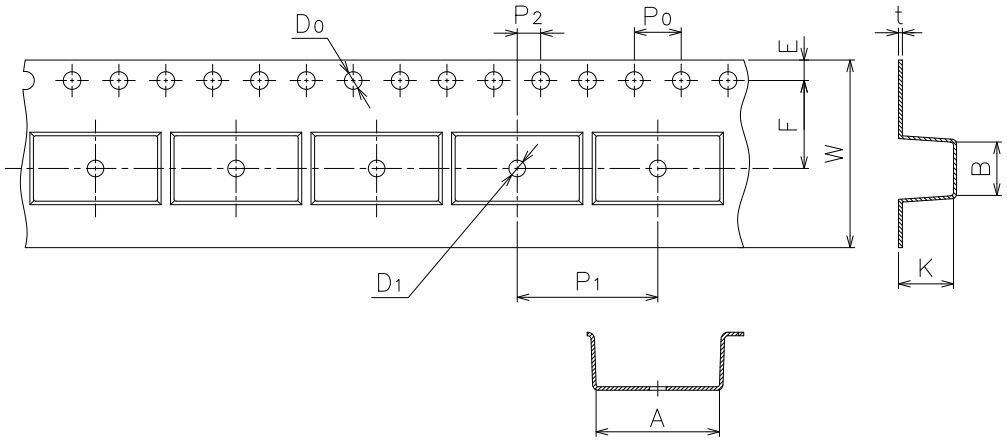
Direction of feed from reel

Option TB



Direction of feed from reel

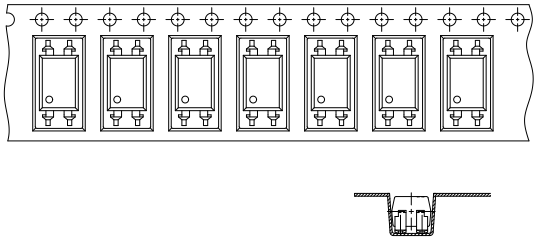
Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm) S	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	4.75±0.1
Dimension (mm) S1	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

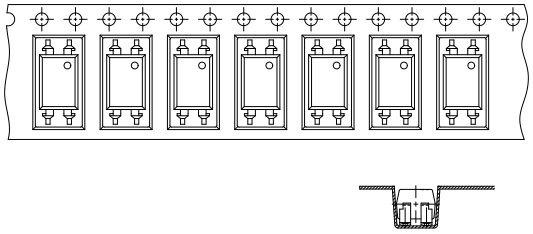
Tape & Reel Packing Specifications

Option TD



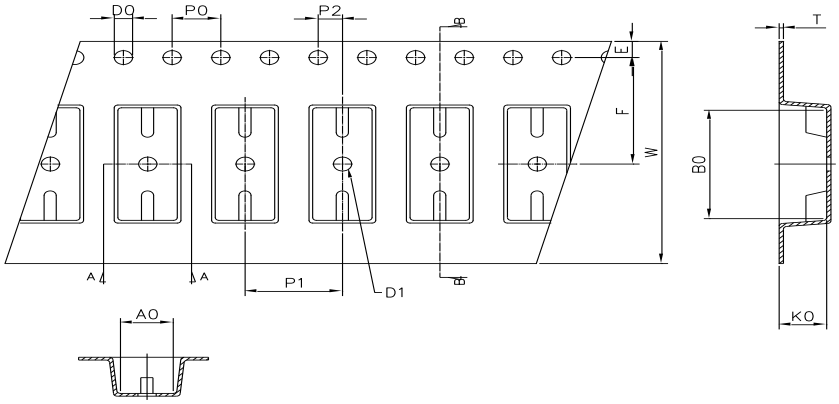
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions

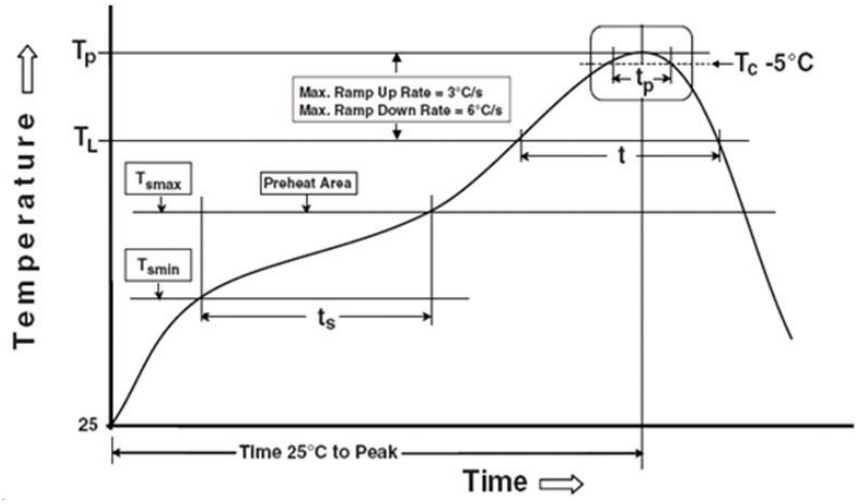


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension (mm)	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension(mm)	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note: Reference: IPC/JEDEC J-STD-020D

Preheat	
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max
Other	
Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-100 sec
Peak Temperature (T_P)	260°C
Time within 5 °C of Actual Peak Temperature: T_P - 5°C	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

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DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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