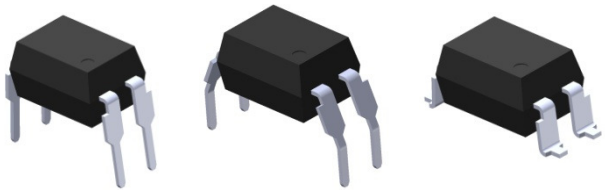
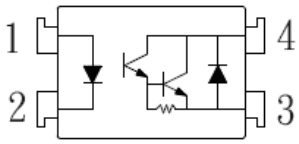
DATASHEET

4 PIN DIP HIGH VOLTAGE PHOTODARLINGTON PHOTOCOUPLER
EL852 Series



Schematic



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

Features:

- •High collector- emitter voltage (VCEO=350V)
- • Current transfer ratio
  (CTR: 1000% min. at I_F =1mA, V_{CE} =2V)
- • High isolation voltage between input
  and output (Viso=5000 V rms)
- • Creepage distance >7.62 mm
- • Operating temperature up to +100℃
- • Compact small outline package
- • Pb free and RoHS compliant.
- • UL approved
- • VDE approved
- • SEMKO approved
- • NEMKO approved
- • DEMKO approved
- • FIMKO approved

Description

The EL852 series consists an infrared emitting diodes, optically coupled to a high voltage photo Darlington detector.

It is packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- • Telephone set, telephone exchangers
- • Sequence controllers
- • System appliances, measuring instruments
- • Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25℃)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current (1us, pulse)	I_{FP}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation No derating required up to Ta = 100℃	P_D	100	mW
Output	Power dissipation	P_C	300	mW
	Derating factor (above Ta = 80℃)		5.8	mW/℃
	Collector current	I_C	150	mA
	Collector-Emitter voltage	V_{CEO}	350	V
	Emitter-Collector voltage	V_{ECO}	0.1	V
Total power dissipation		P_{TOT}	320	mW
Isolation voltage *1		V_{ISO}	5000	V rms
Operating temperature		T_{OPR}	-55 ~ +100	℃
Storage temperature		T_{STG}	-55 ~ +125	℃
Soldering Temperature*2		T_{SOL}	260	℃

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 = 4V
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}	-	-	200	nA	V_{CE} = 200V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	350	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	0.1	-	-	V	I_E = 0.1mA

Transfer Characteristics

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	CTR	1000	-	15000	%	I_F = 1mA ,V_{CE} = 2V
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	-	1.2	V	I_F = 20mA ,I_C = 100mA
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance	C_{IO}	-	0.6	1.0	pF	V_{IO} = 0, f = 1MHz
Cut-off frequency	fc	-	7	-	kHz	V_{CE} = 2V, I_C = 20mA R_L = 100Ω, -3dB
Rise time	t_r	-	-	300	μs	V_{CE} = 2V, I_C = 20mA, R_L = 100Ω
Fall time	t_f	-	-	100	μs	

* Typical values at T_a = 25℃

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs. Forward Voltage

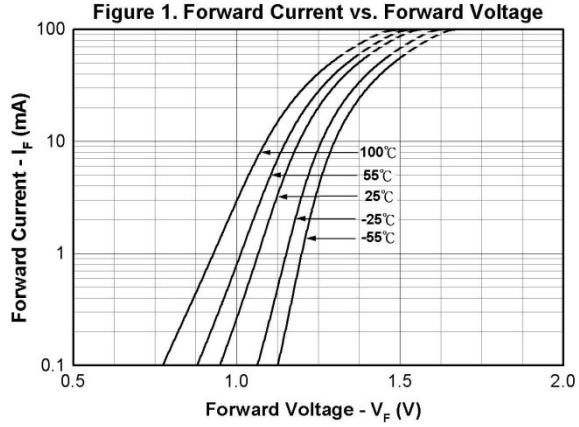


Figure 2. Collector Current vs. Collector Emitter Voltage

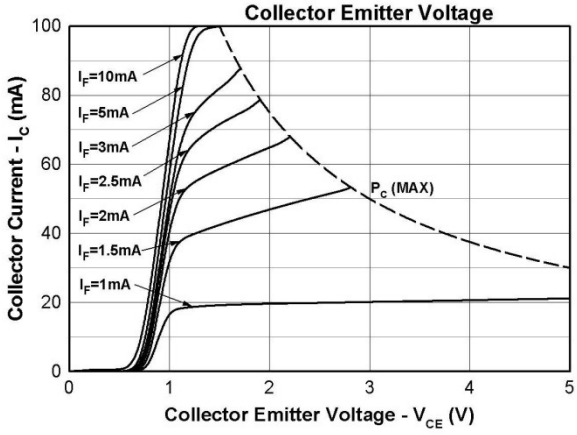


Figure 3. Collector Emitter Saturation Voltage vs. Ambient Temperature

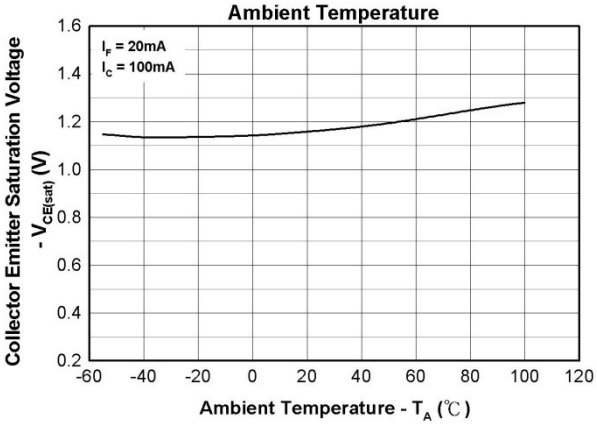


Figure 4. Collector-Emitted Saturation Voltage vs. Forward Current

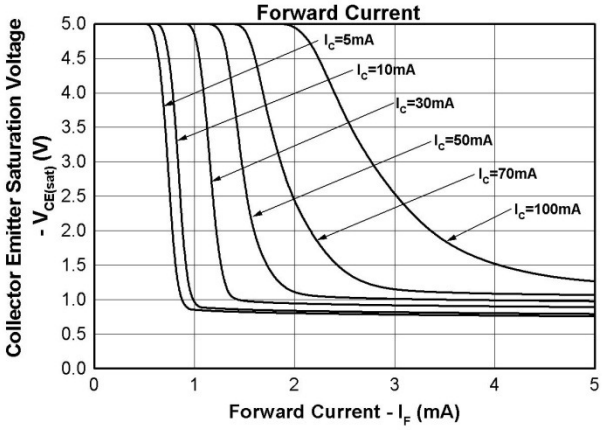


Figure 5. Current Transfer Ratio vs. Forward Current

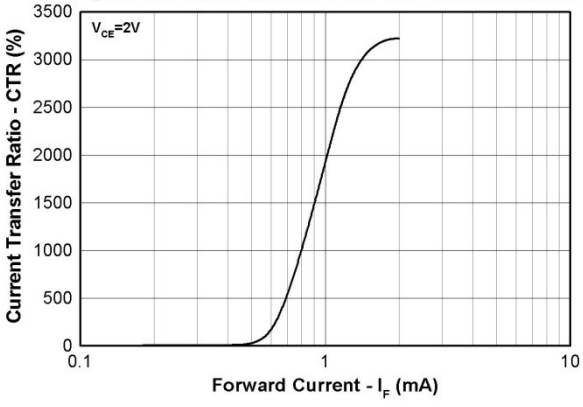


Figure 6. Normalized Current Transfer Ratio vs. Ambient Temperature

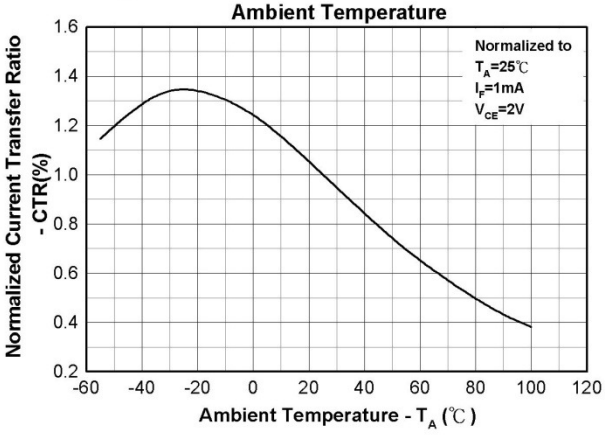


Figure 7. Collector Dark Current vs. Ambient Temperature

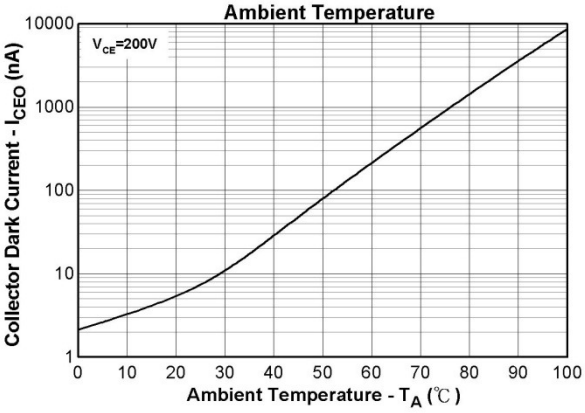


Figure 8. Response Time vs. Load Resistance

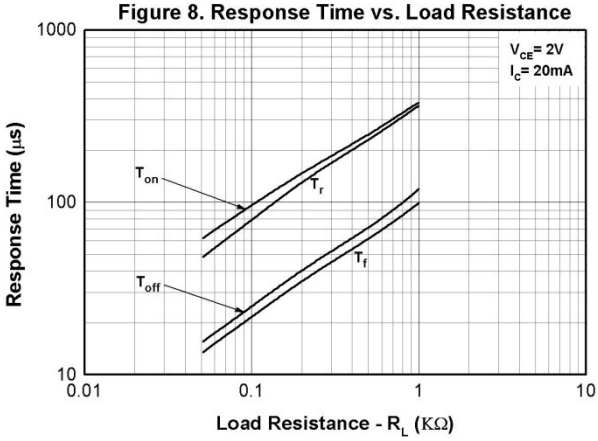
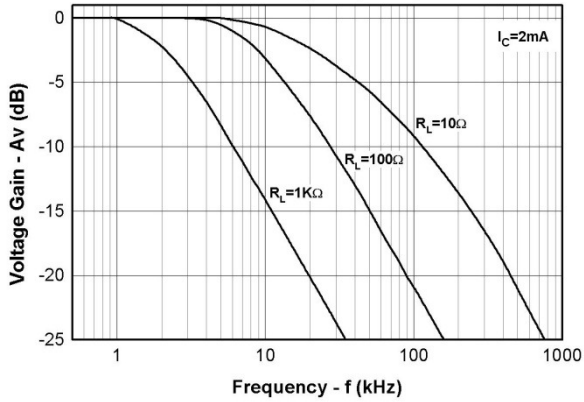


Figure 9. Frequency Response



Order Informatio

Part Number

EL852X(Y)-V

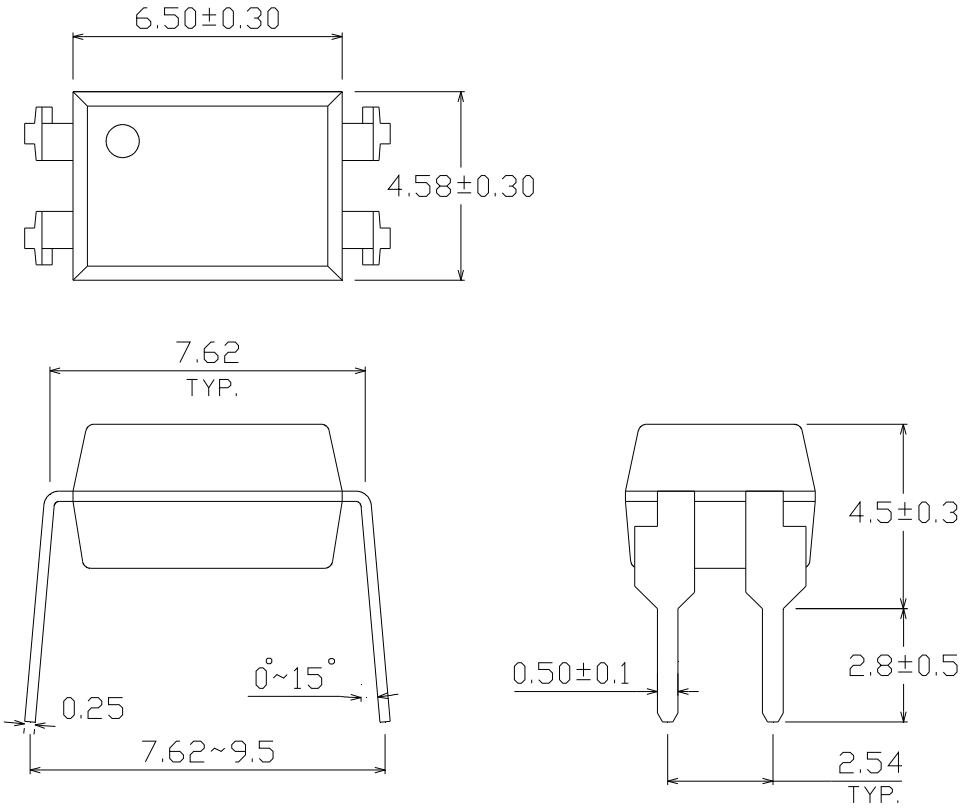
Note

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

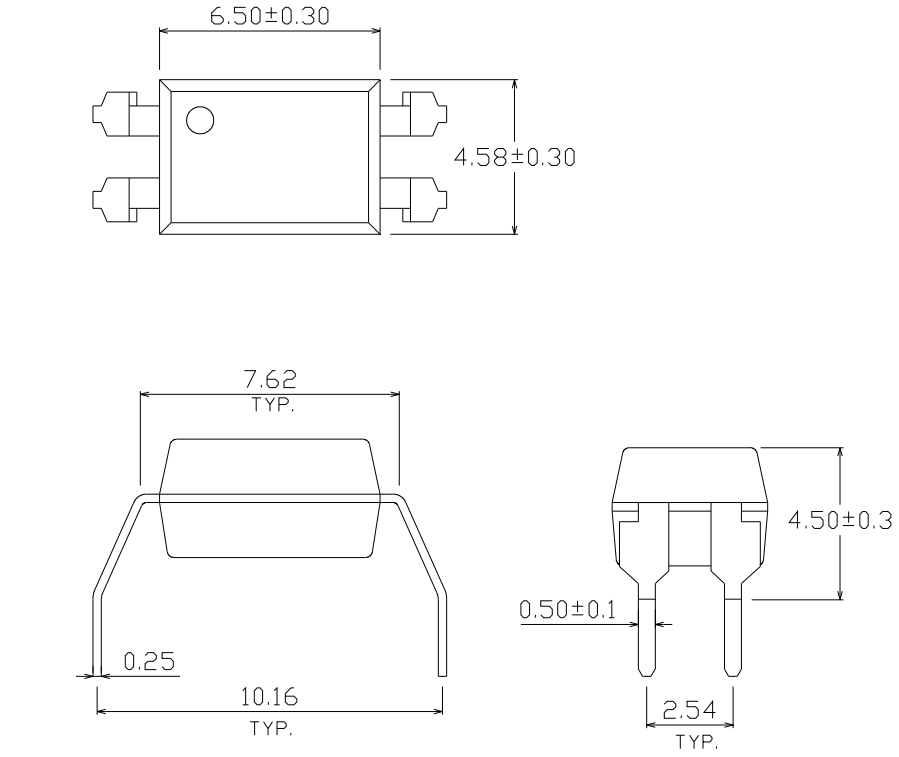
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount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

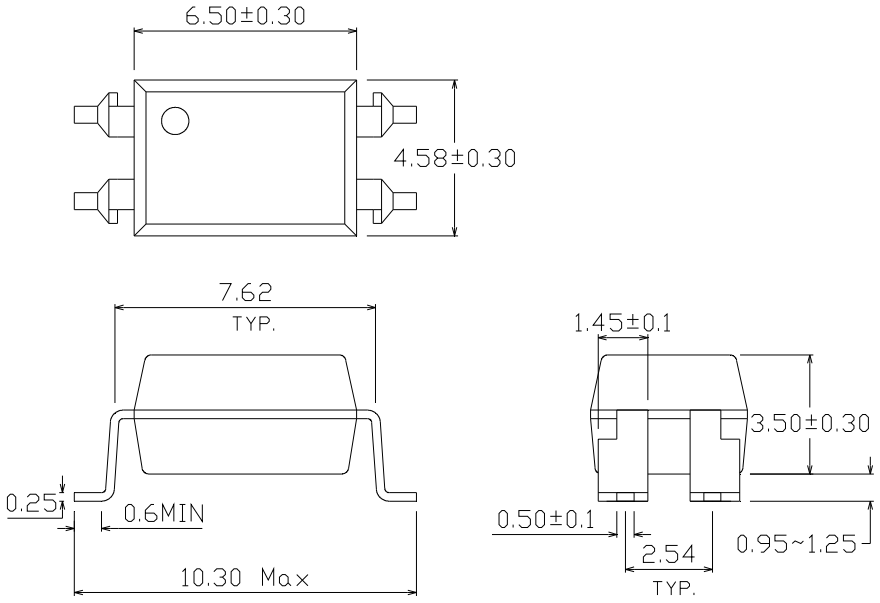
Standard DIP Type



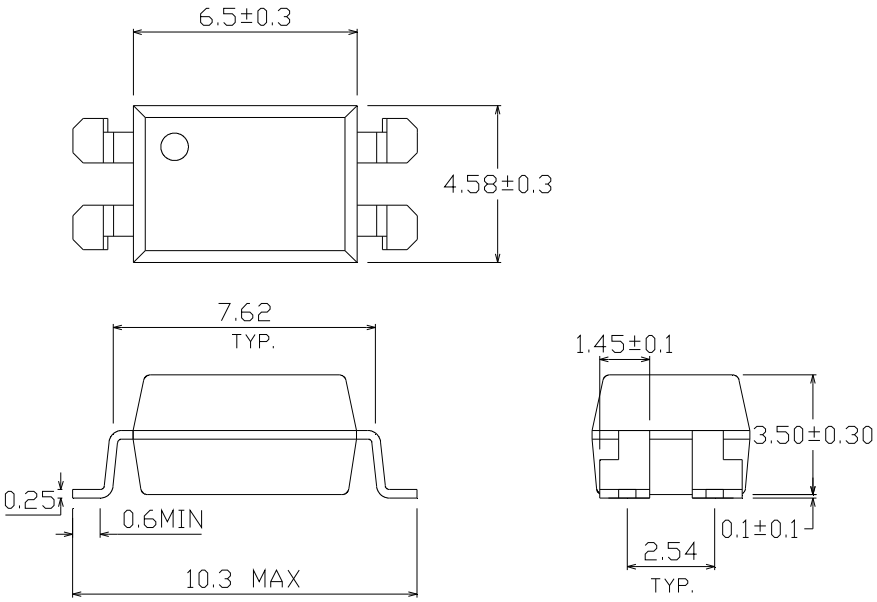
Option M Type



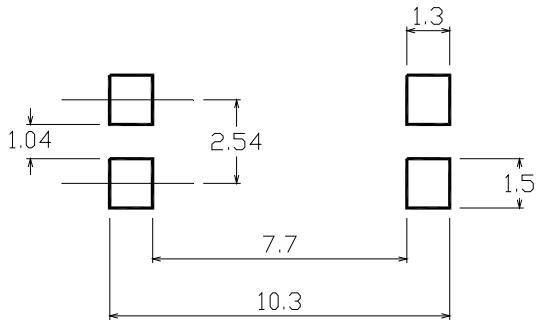
Option S Type



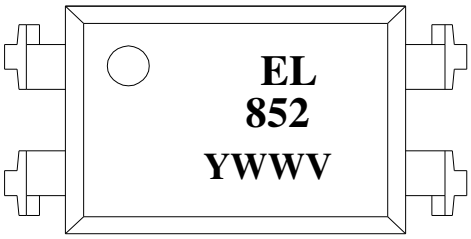
Option S1 Type



Recommended pad layout for surface mount leadform



Device Marking

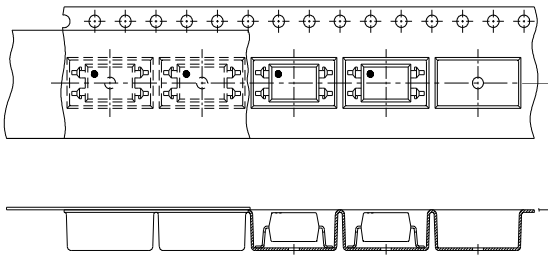


Notes

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

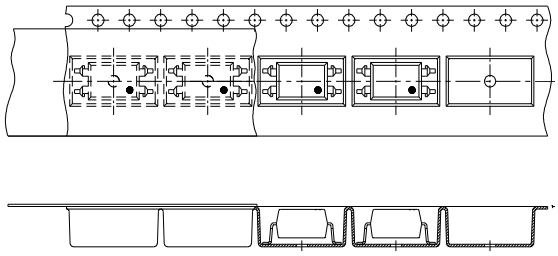
Tape & Reel Packing Specifications

Option TA



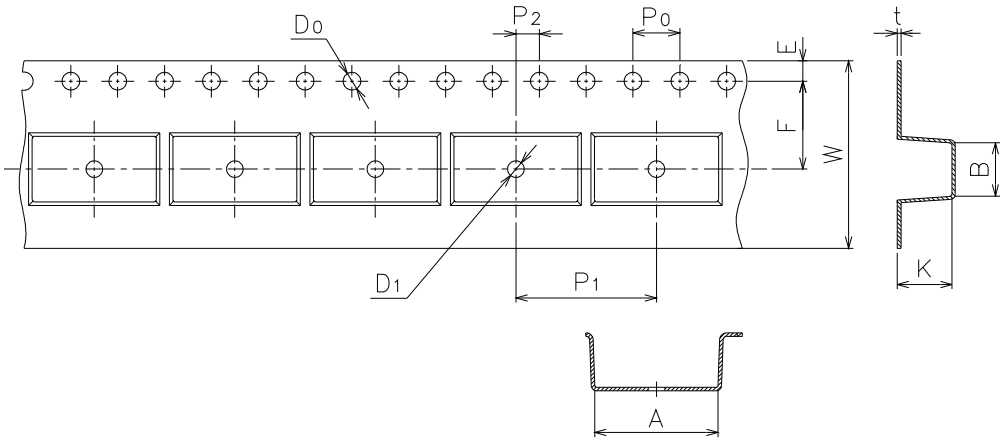
Direction of feed from reel

Option TB



Direction of feed from reel

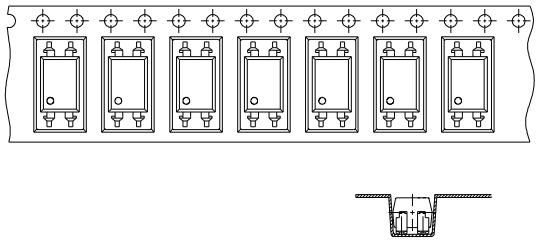
Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S	10.5±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	10.5±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	5.05±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	4.75±0.1

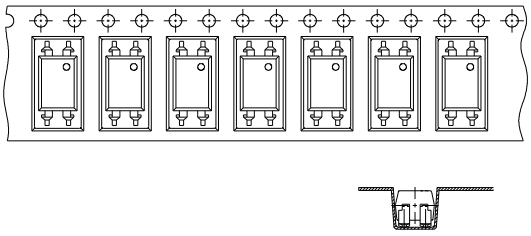
Tape & Reel Packing Specifications

Option TD



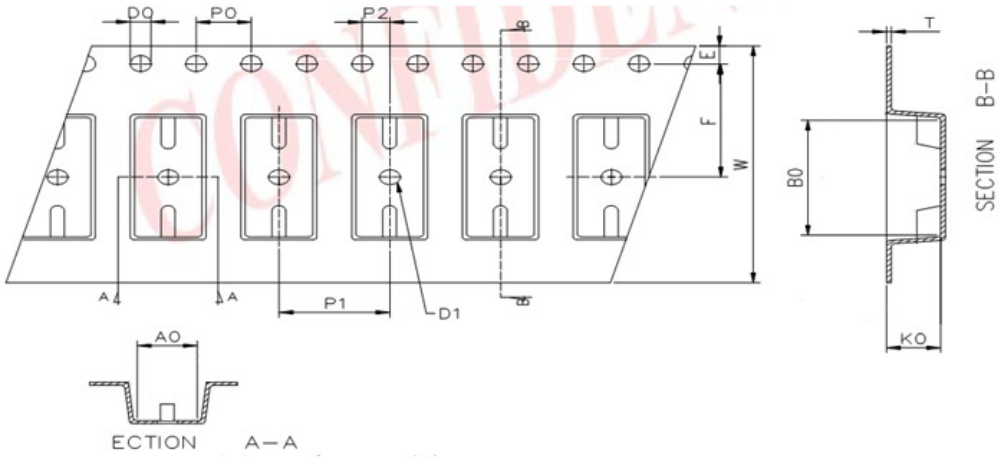
Direction of feed from reel

Option TU



Direction of feed from reel

Tape dimensions

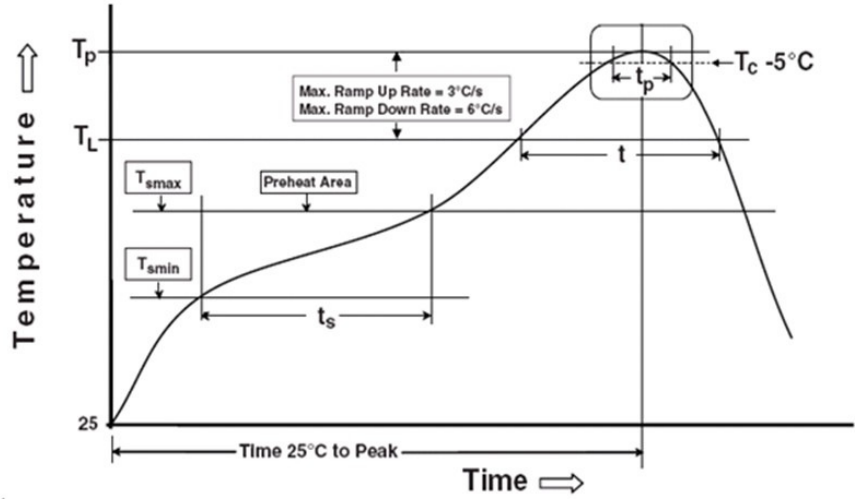


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension (mm) S.S1	4.90±0.1	10.40±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.50±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**Ko**
Dimension (mm) S.S1	4.00±0.1	8.00±0.	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1

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

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