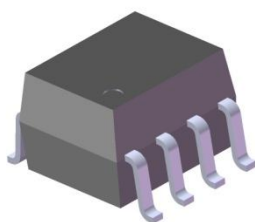


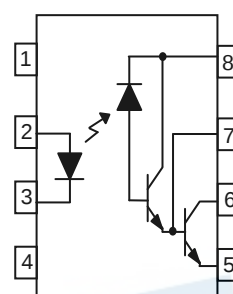
8 PIN SOP LOW INPUT CURRENT HIGH GAIN SPLIT DARLINGTON PHOTOCOUPLER EL0700_EL0701 Series



Features

- High current transfer ratio—2000% typical
- High isolation voltage between input and output (Viso=3750 Vrms)
- Guaranteed performance from 0 to 70°C
- Logic gate output
- Compliance with EU REACH
- Pb free and RoHS and Halogen free compliant.
- UL and cUL approved(No. E214129)
- VDE approved (No. 40028116)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

Schematic



Pin Configuration

1. No Connection
2. Anode
3. Cathode
4. No Connection
5. Gnd
6. Vout
7. V_B
8. V_{CC}

Description

The EL0700 and EL0701 devices each consists of an infrared emitting diode, optically coupled to a high gain split Darlington photo detector. They provide extremely high current transfer ratio between input and output, with access to a base terminal to adjust the gain bandwidth. These devices are packaged in to the standard SO-8 footprint.

Applications

- Digital logic ground isolation
- RS-232C line receiver
- Low input current line receiver
- Microprocessor bus isolation
- Current loop receiver

Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	20	mA
	Peak forward current (50% duty, 1ms P.W)	I_{FP}	40	mA
	Peak transient current ($\leq 1\mu s$ P.W, 300pps)	I_{Ftrans}	1	A
	Reverse voltage	V_R	5	V
	Power dissipation	P_{IN}	45	mW
Output	Power dissipation	P_O	100	mW
	Output current	I_O	60	mA
	Emitter-Base Reverse Voltage	V_{ER}	0.5	V
	Output voltage	V_O	-0.5 to 7 -0.5 to 18	V
	Supply voltage	V_{CC}	-0.5 to 7 -0.5 to 18	V
	Isolation voltage ^{*1}	V_{ISO}	3750	V rms
	Operating temperature	T_{OPR}	-40 ~ +85	°C
	Storage Temperature	T_{STG}	-55 ~ +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, 3, 4 are shorted together, and pins 5, 6, 7, 8 are shorted together.

*2 For 10 seconds

Electrical Characteristics (T_A=0 to 70°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V _F	-	1.25	1.7	V	I _F = 1.6mA
Reverse Voltage	V _R	5.0	-	-	V	I _R = 10μA, T _A =25°C
Temperature coefficient of forward voltage	ΔV _F /ΔT _A	-	-1.8	-	mV/°C	I _F =1.6mA

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Logic High Output Current	EL0700 EL0701 I _{OH}	-	0.01	100	μA	I _F =0mA, V _O =V _{CC} =18V
Logic Low Supply Current	EL0700 EL0701 I _{CCL}	-	0.5	1.5	mA	I _F =1.6mA, V _O =Open, V _{CC} =18V
Logic High Supply Current	EL0700 EL0701 I _{CC H}	-	0.05	10	μA	I _F =0mA, V _O =Open, V _{CC} =18V

Transfer Characteristics (T_a=0 to 70°C unless specified otherwise, V_{CC}=4.5V)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	EL0701 CTR	400	2500	-	%	I _F = 0.5mA, V _O = 0.4V, V _{CC} =4.5V
		500	2000	-		I _F = 1.6mA, V _O = 0.4V, V _{CC} =4.5V
		300	2000	-		
Logic Low Output Voltage	EL0701 V _{OL}	-	0.05	0.4	V	I _F = 0.5mA, I _O = 2mA, V _{CC} =4.5V
		-	0.1	0.4		I _F = 1.6mA, I _O = 8mA, V _{CC} =4.5V
		-	0.15	0.4		I _F = 5mA, I _O = 15mA, V _{CC} =4.5V
		-	0.18	0.4		I _F = 12mA, I _O = 24mA, V _{CC} =4.5V
		-	0.08	0.4		I _F = 1.6mA, I _O = 4.8mA, V _{CC} =4.5V
	EL0700	-	0.08	0.4		

Switching Characteristics ($T_a=0$ to 70°C unless specified otherwise, $V_{CC}=5\text{V}$)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation Delay Time to Logic Low (Fig. 13)	EL0701	-	11	25	μs	$I_F = 0.5\text{mA}$, $R_L=4.7\text{k}\Omega$, $T_A=25^{\circ}\text{C}$
		-	-	30		$I_F = 0.5\text{mA}$, $R_L=4.7\text{k}\Omega$
		-	0.5	1		$I_F = 12\text{mA}$, $R_L=270\Omega$, $T_A=25^{\circ}\text{C}$
	EL0700	-	-	2		$I_F = 12\text{mA}$, $R_L=270\Omega$
		-	3	10		$I_F = 1.6\text{mA}$, $R_L=2.2\text{k}\Omega$, $T_A=25^{\circ}\text{C}$
		-	-	15		$I_F = 1.6\text{mA}$, $R_L=2.2\text{k}\Omega$
Propagation Delay Time to Logic High (Fig. 13)	EL0701	-	20	60	μs	$I_F = 0.5\text{mA}$, $R_L=4.7\text{k}\Omega$, $T_A=25^{\circ}\text{C}$
		-	-	90		$I_F = 0.5\text{mA}$, $R_L=4.7\text{k}\Omega$
		-	2.5	7		$I_F = 12\text{mA}$, $R_L=270\Omega$, $T_A=25^{\circ}\text{C}$
	EL0700	-	-	10		$I_F = 12\text{mA}$, $R_L=270\Omega$
		-	8	35		$I_F = 1.6\text{mA}$, $R_L=2.2\text{k}\Omega$, $T_A=25^{\circ}\text{C}$
		-	-	50		$I_F = 1.6\text{mA}$, $R_L=2.2\text{k}\Omega$
Common Mode Transient Immunity at Logic High (Fig. 14) ^{*3}	CM_H	1,000	-	-	$\text{V}/\mu\text{s}$	$I_F = 0\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=2.2\text{k}\Omega$, $T_A=25^{\circ}\text{C}$
Common Mode Transient Immunity at Logic Low (Fig. 14) ^{*3}	CM_L	1,000	-	-	$\text{V}/\mu\text{s}$	$I_F = 1.6\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=2.2\text{k}\Omega$, $T_A=25^{\circ}\text{C}$

* Typical values at $T_a = 25^{\circ}\text{C}$

Typical Electro-Optical Characteristics Curves

Figure 1. LED Forward Current vs Forward Voltage

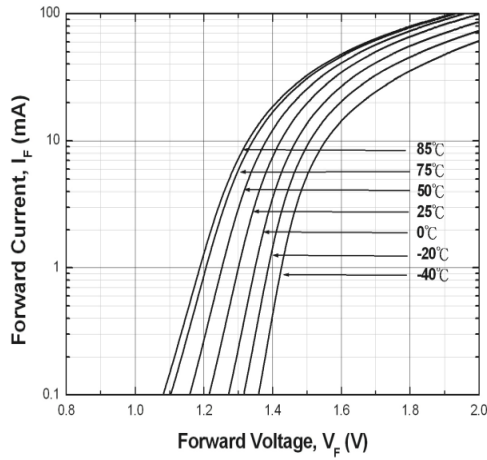


Figure 2. LED Forward Voltage vs Temperature

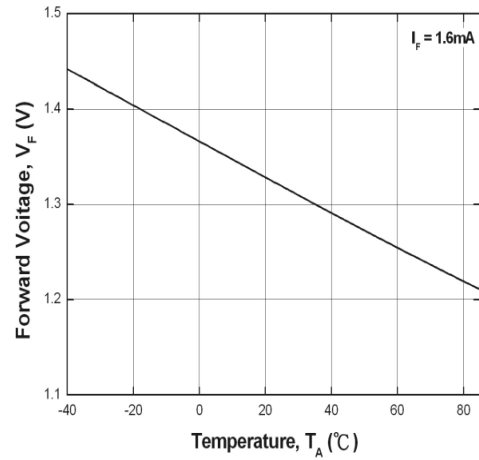


Figure 3. Output Current vs Output Voltage

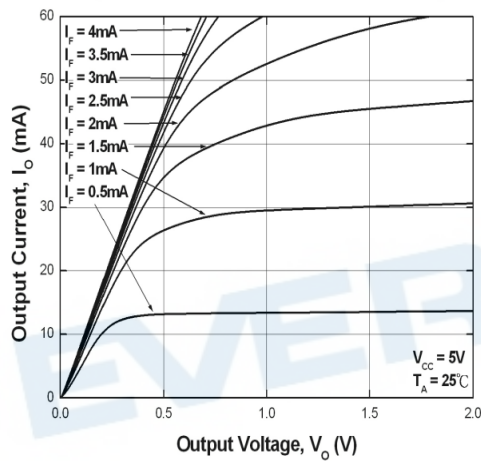


Figure 4. Output Current vs Input Diode Forward Current

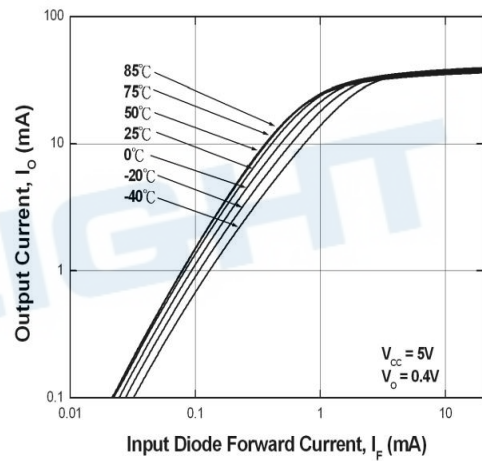


Figure 5. Current Transfer Ratio vs Forward Current

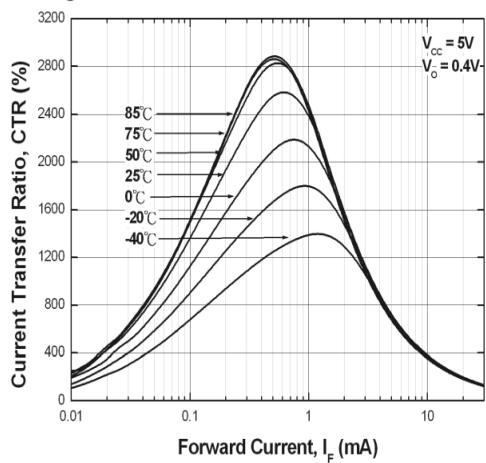


Figure 6. Current Transfer Ratio vs Base-Emitter Resistance

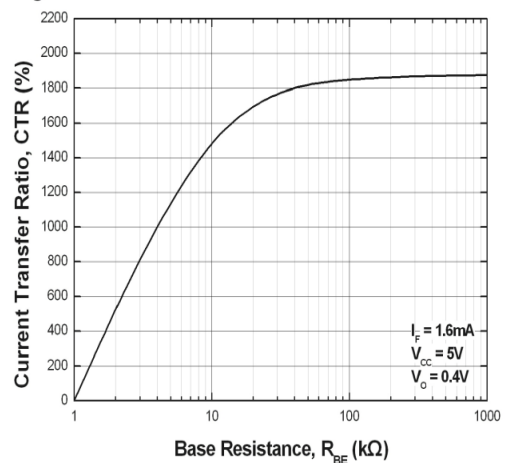


Figure 7. Non-saturated Rise and Fall Times vs Load Resistance

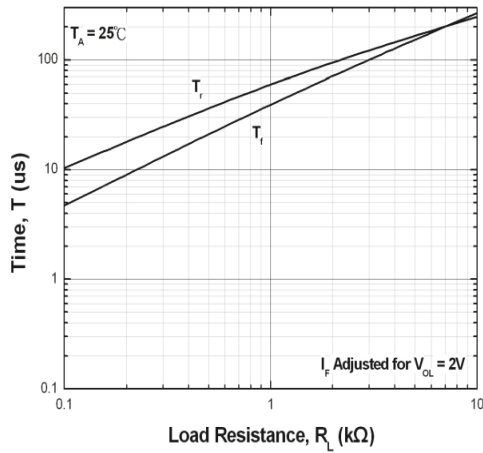


Figure 8. Propagation Delay To Logic Low vs Base-Emitter Resistance

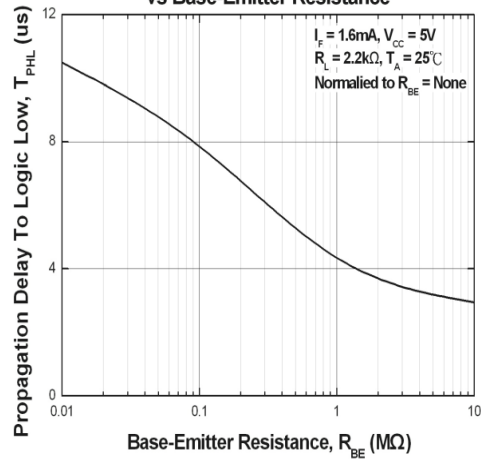


Figure 9. Propagation Delay vs Input Diode Forward Current

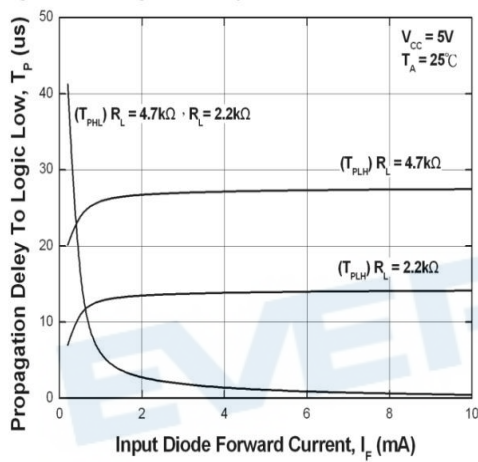


Figure 10. Propagation Delay To Logic Low vs Pulse Period

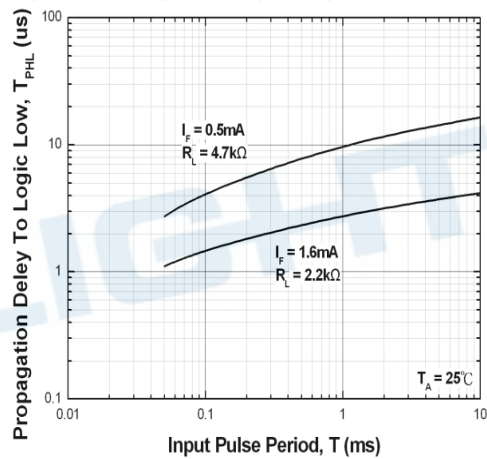


Figure 11. Propagation Delay vs Temperature

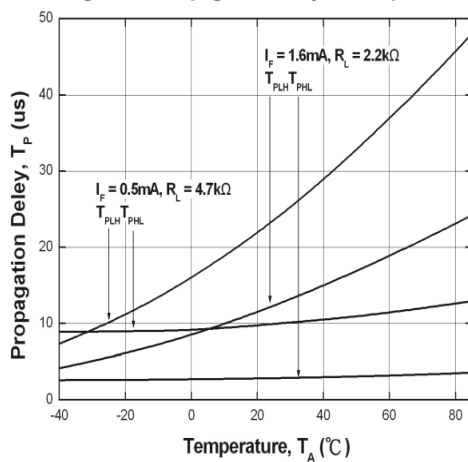


Figure 12. Logic Low Supply Current vs input Diode Forward Current

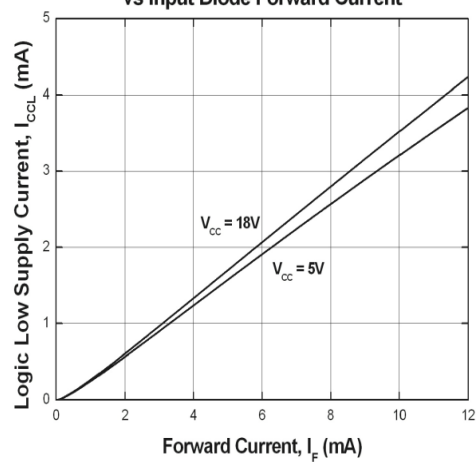


Fig. 13 Switching Time Test Circuit and Waveform

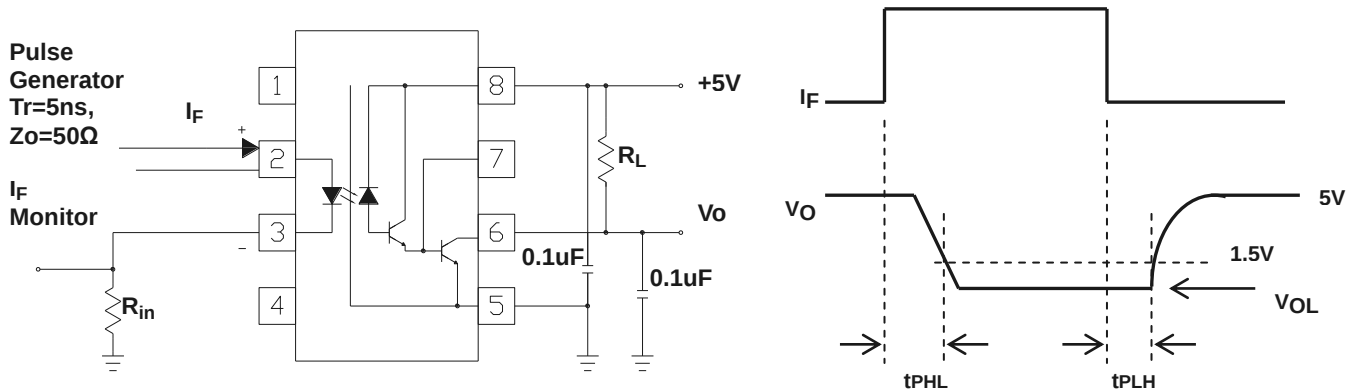
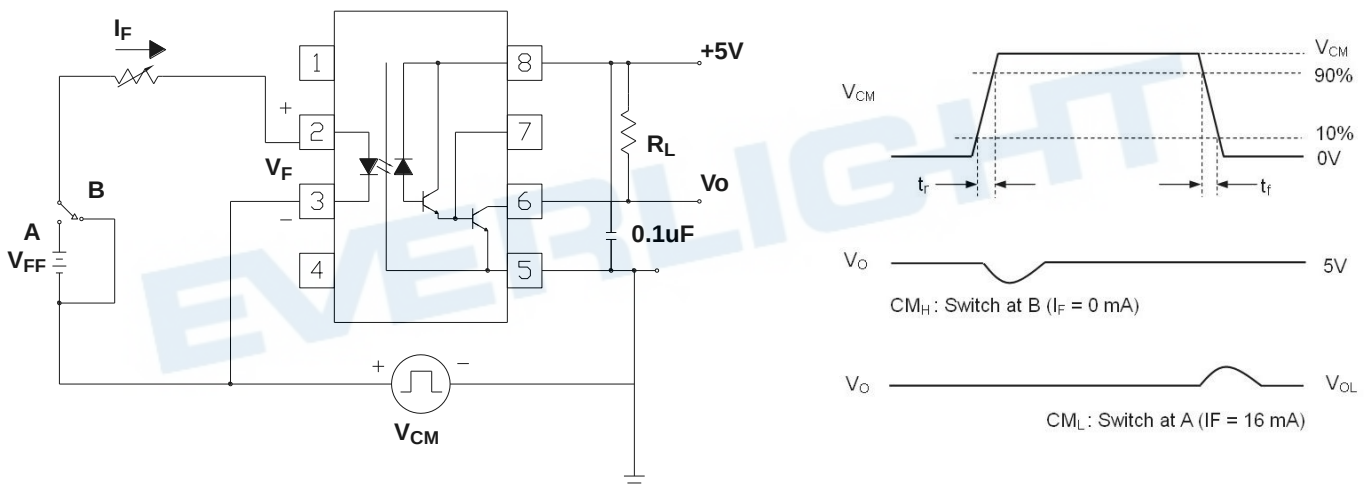


Fig. 14 Common Mode Transient Immunity Test Circuit and Waveform



Note:

*3 Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{cm}/dt on the leading edge of the common mode pulse signal V_{CM} , to assure that the output will remain in a logic high state (i.e., $V_O > 2.0V$).

Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{cm}/dt on the trailing edge of the common mode pulse signal, V_{CM} , to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

Order Information

Part Number

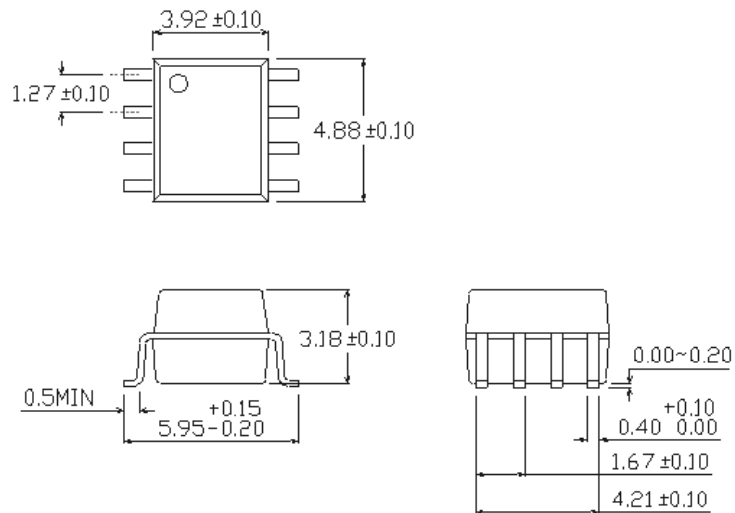
EL070X(Z)-VG

Note

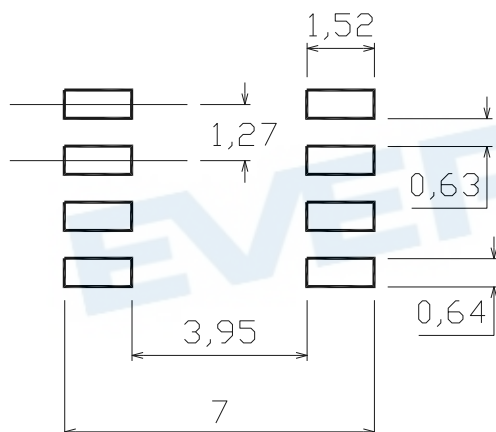
X = Part No. (X = 0 or 1)
Z = Tape and reel option (TA, TB or none).
V = VDE
G = Halogens free

Option	Description	Packing quantity
None	Standard	100 units per tube
-V	Standard + VDE	100 units per tube
(TA)	TA tape & reel option	2000 units per reel
(TB)	TB tape & reel option	2000 units per reel
(TA)-V	TA tape & reel option + VDE	2000 units per reel
(TB)-V	TB tape & reel option + VDE	2000 units per reel

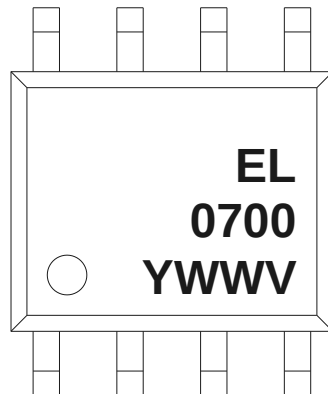
Package Dimension
 (Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking



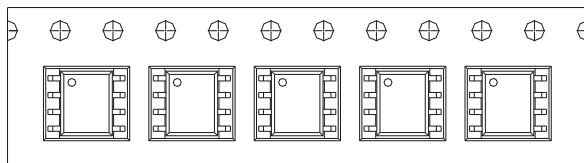
Notes

EL	denotes EVERLIGHT
0700	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE

EVERLIGHT

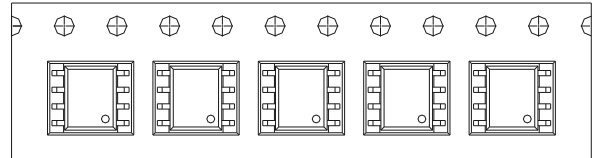
Tape & Reel Packing Specifications

Option TA



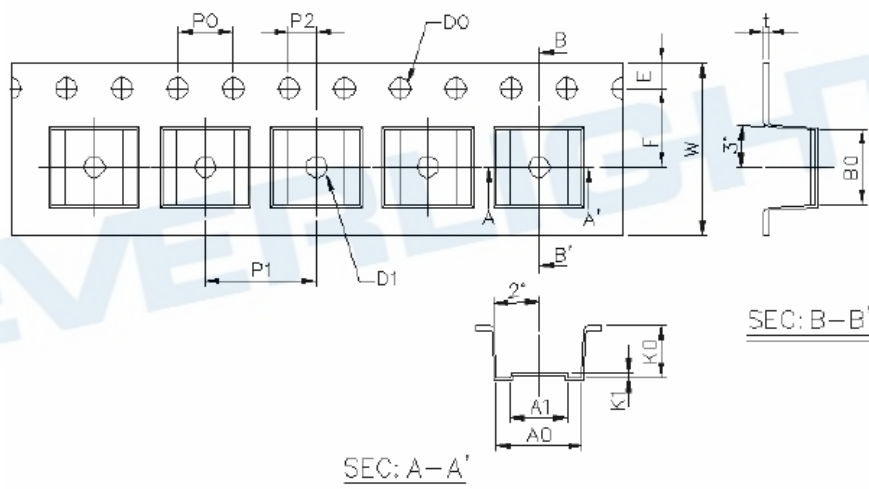
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

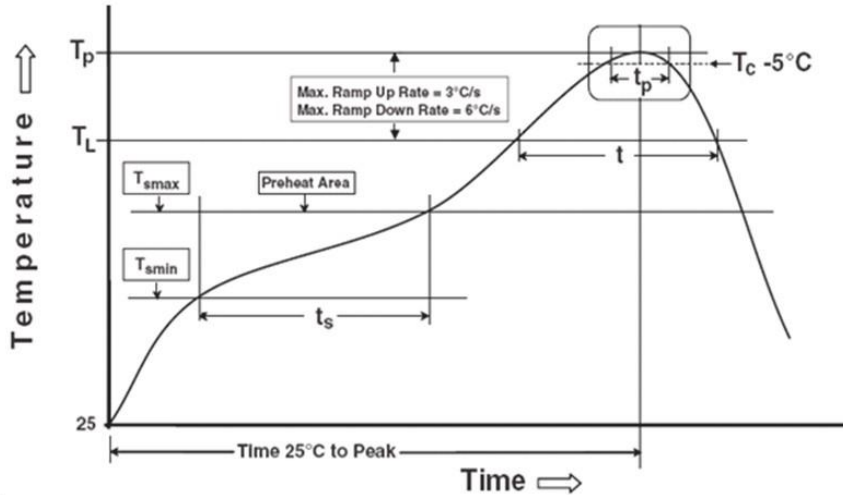


Dimension No.	A0	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	5.26±0.1	1.5±0.1	1.5±0.25	1.75±0.1	5.5±0.05
Dimension No.	P0	P1	P2	t	W	K0
Dimension(mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.25±0.02	12.0+0.3/ -0.1	3.75±0.1

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: $T_p - 5^\circ\text{C}$	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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