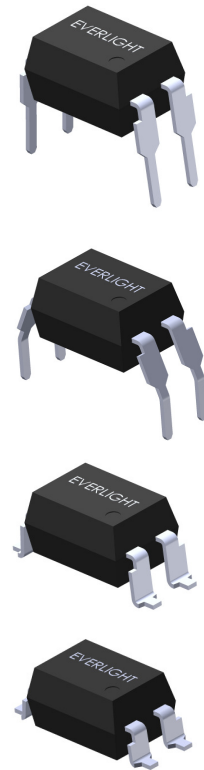


4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Features:

- Current transfer ratio
(CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
(CTR: 63~320% at $I_F = 10\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between inputs and output ($V_{iso} = 5000\text{ V rms}$)
- Creepage distance $> 7.62\text{ mm}$
- Operating temperature up to $+110^\circ\text{C}$
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved



Description

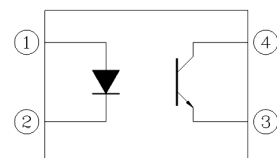
The EL816 series of devices each consist of an infrared emitting diodes, optically coupled to a phototransistor detector.

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

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

Schematic



Pin Configuration

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

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

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

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 $T_a = 100^{\circ}\text{C}$	P_D	100	mW
Output	Power dissipation Derating factor (above $T_a = 80^{\circ}\text{C}$)	P_C	150	mW
			5.8	mW/ $^{\circ}\text{C}$
	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	6	V
Total power dissipation		P_{TOT}	200	mW
Isolation voltage ^{*1}		V_{ISO}	5000	V rms
Operating temperature		T_{OPR}	-55 ~ +110	$^{\circ}\text{C}$
Storage temperature		T_{STG}	-55 ~ +125	$^{\circ}\text{C}$
Soldering temperature ^{*2}		T_{SOL}	260	$^{\circ}\text{C}$

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.

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.2	1.4	V	$I_F = 20\text{mA}$
Reverse current	I_R	-	-	10	μA	$V_R = 4\text{V}$
Input capacitance	C_{in}	-	30	250	pF	$V = 0, f = 1\text{kHz}$

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	BV_{CEO}	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	6	-	-	V	$I_E = 0.1\text{mA}$

Transfer Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL816	CTR	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
	EL816A		80	-	160		
	EL816B		130	-	260		
	EL816C		200	-	400		
	EL816D		300	-	600		
	EL816X		100	-	200		
	EL816Y		150	-	300		
	EL816I	CTR	63	-	125	%	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$
	EL816J		100	-	200		
	EL816K		160	-	320		
	EL816I		22	-	-		$I_F = 1\text{mA}, V_{CE} = 5\text{V}$
	EL816J		34	-	-		
	EL816K		56	-	-		

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Transfer Characteristics ($T_a=25^\circ\text{C}$ unless specified otherwise) Continuity

Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F = 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	$V_{IO} = 500\text{Vdc}$, 40~60% R.H.
Floating capacitance	C_{IO}	-	0.6	1.0	pF	$V_{IO} = 0$, $f = 1\text{MHz}$
Cut-off frequency	f_c	-	80	-	kHz	$V_{CE} = 5\text{V}$, $I_C = 2\text{mA}$ $R_L = 100\Omega$, -3dB
Rise time	t_r	-	4	18	μs	$V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$
Fall time	t_f	-	3	18	μs	

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

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

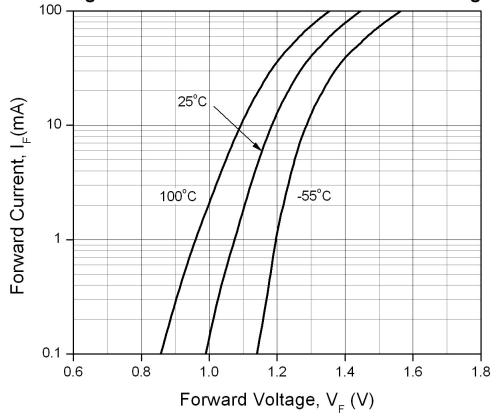


Figure 2. Normalized Collector Current vs Forward Current

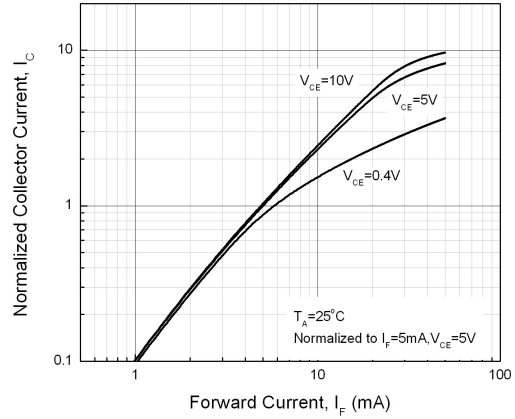


Figure 3. Normalized Current Transfer Ratio vs Forward Current

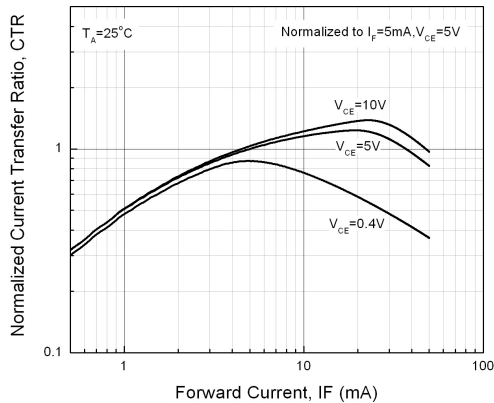


Figure 4. Normalized Collector Current vs Ambient Temperature

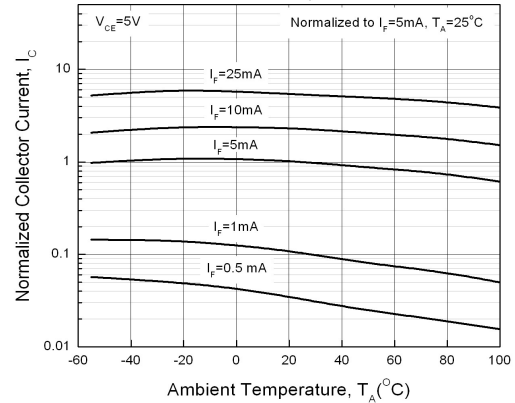


Figure 5. Collector Current vs Collector-Emitter Voltage

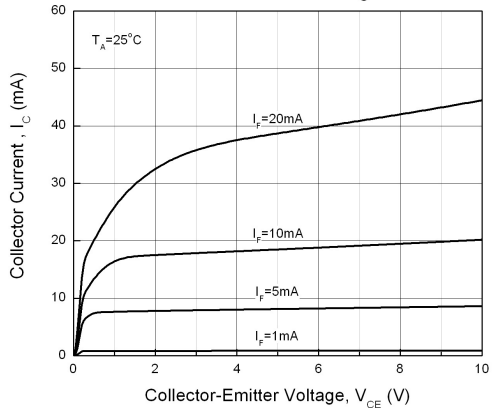
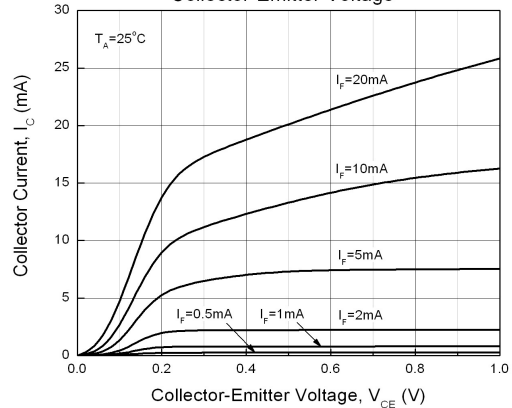


Figure 6. Collector Current vs Collector-Emitter Voltage



4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Figure 7. Collector Dark Current vs Ambient Temperature

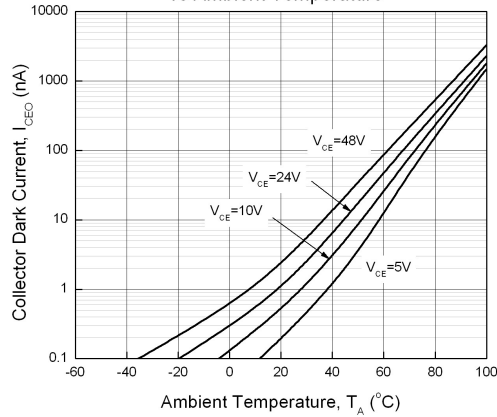


Figure 8. Switching Time vs Load Resistance

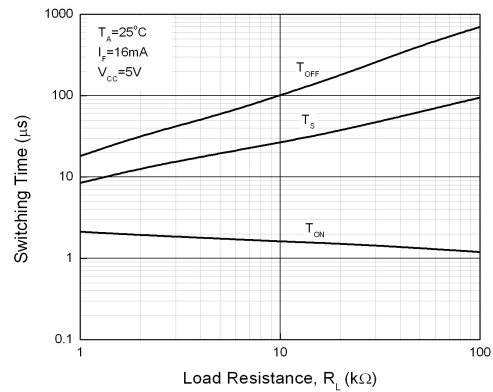


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

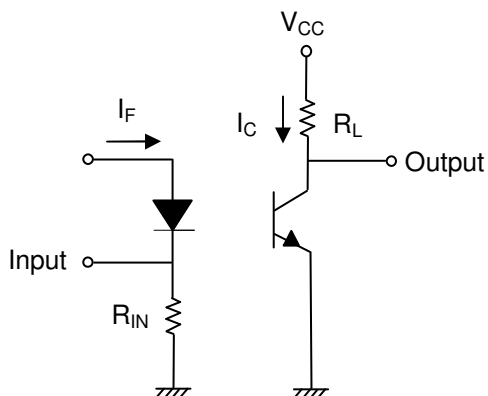
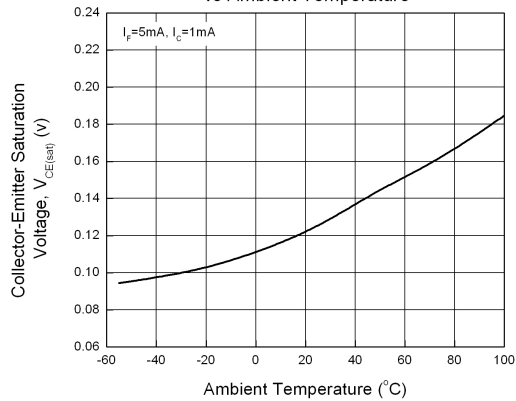


Figure 10. Switching Time Test Circuit & Waveforms

**4 PIN DIP PHOTOTRANSISTOR
PHOTOCOUPLER****EL816 Series****Order Information****Part Number****EL816(X)(Y)(Z)-FV****Note**

- X = Lead form option (S, S1, S2, M or none)
Y = CTR Rank (A, B, C, D, X, Y, I, J, H or none)
Z = Tape and reel option (TA, TB, TU, TD or none)
F = Lead frame option (F: Iron, None: copper)
V = VDE (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
S2 (TA)	Surface mount lead form (Gull-wing) + TA tape & reel option	1000 units per reel
S2 (TB)	Surface mount lead form (Gull-wing) + 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

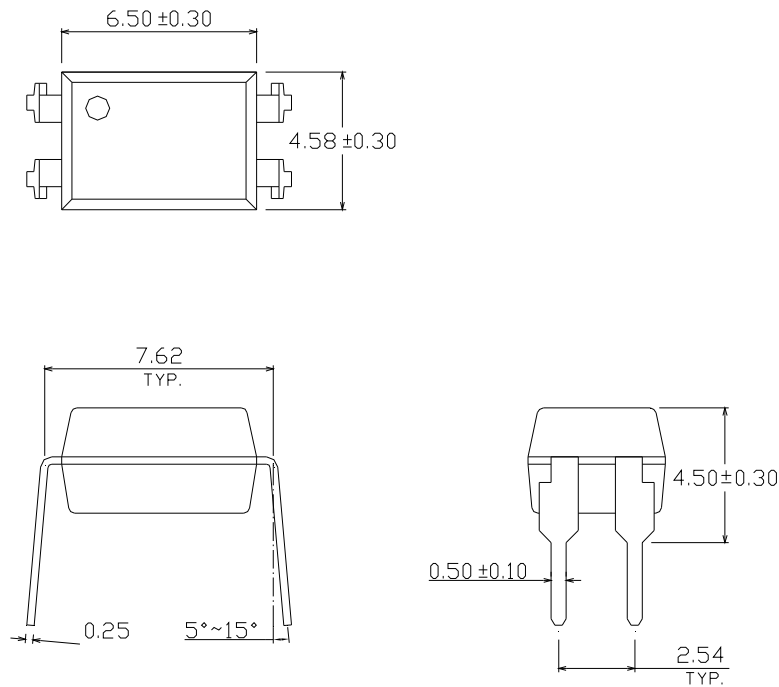
4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

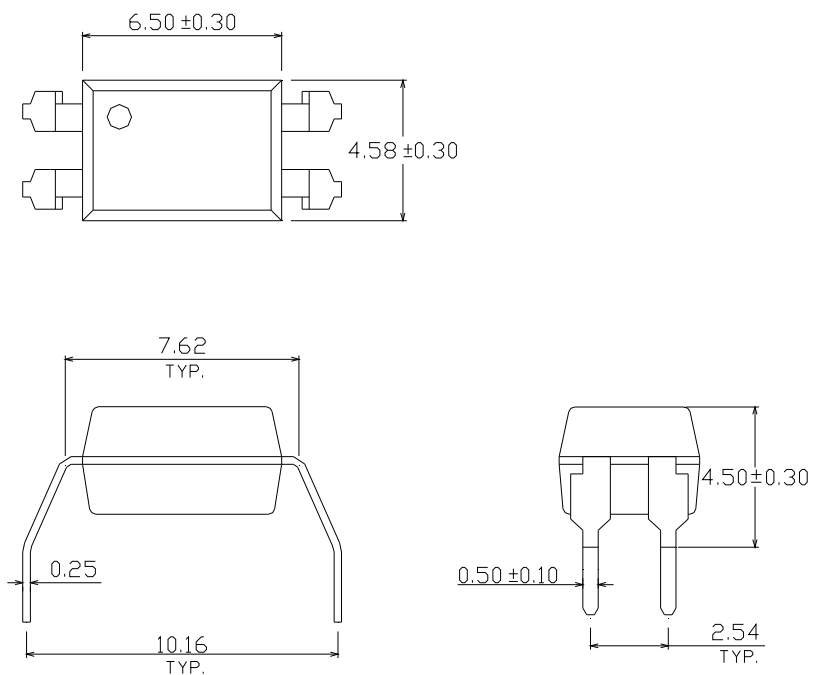
Package Drawing

(Dimensions in mm)

Standard DIP Type



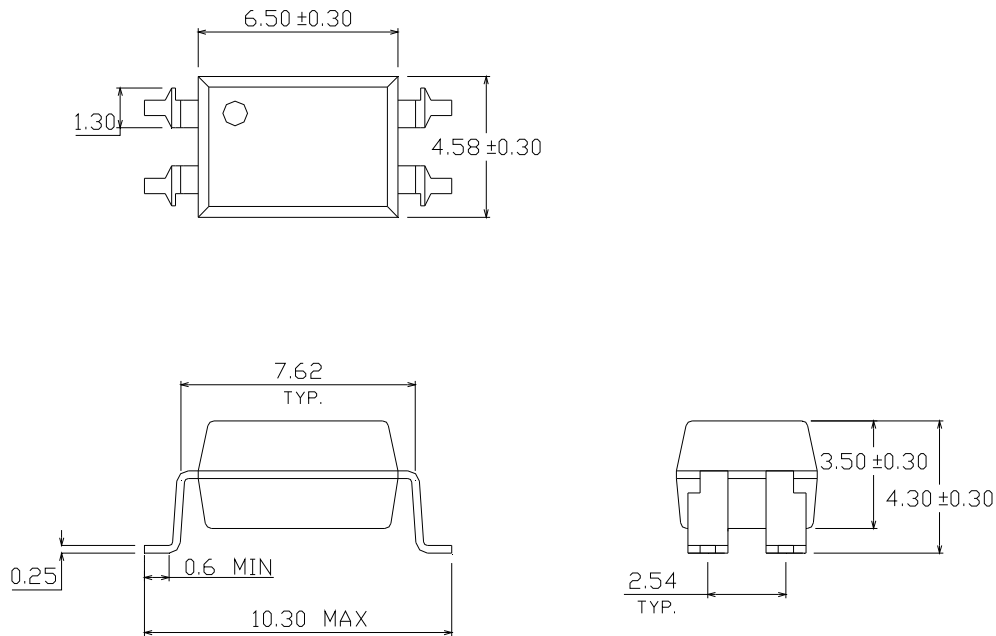
Option M Type



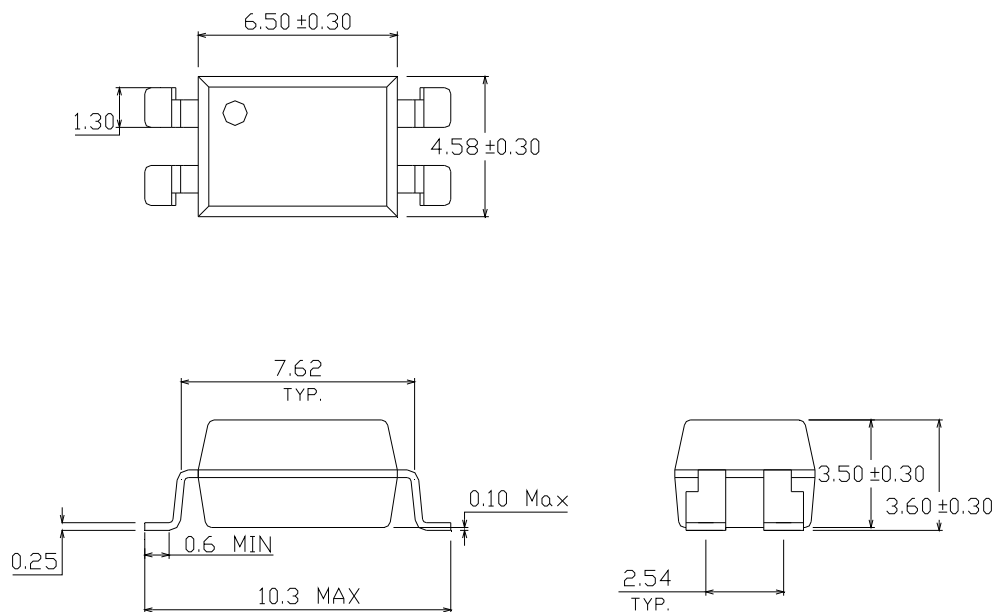
4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Option S Type



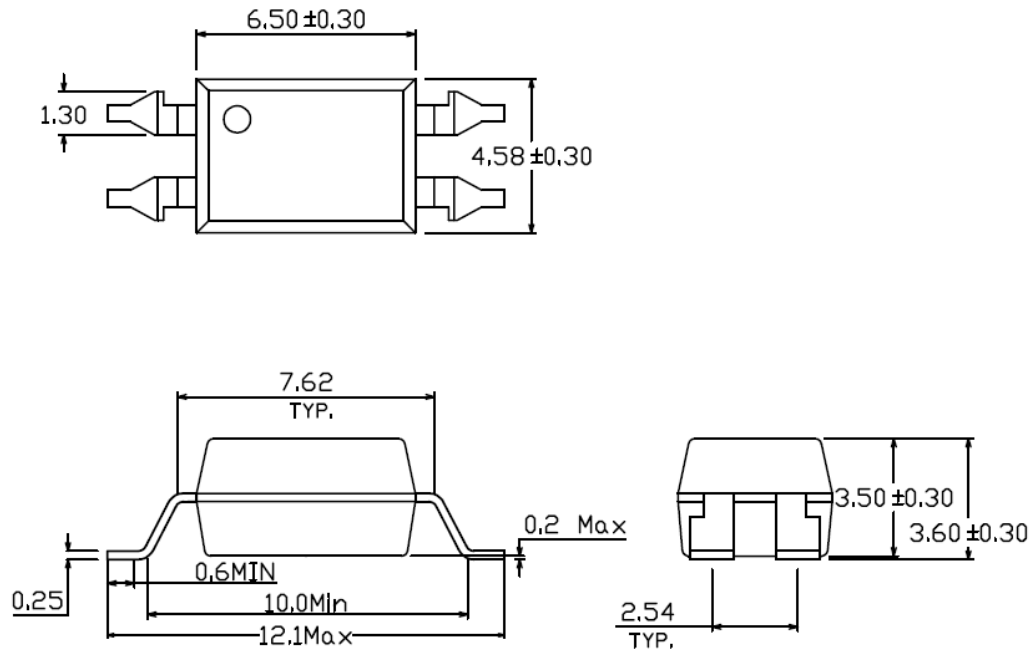
Option S1 Type



4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

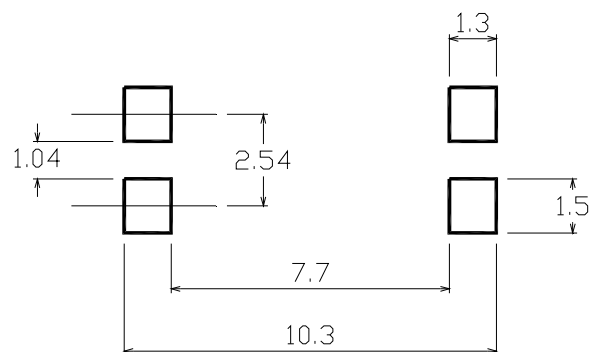
EL816 Series

Option S2 Type

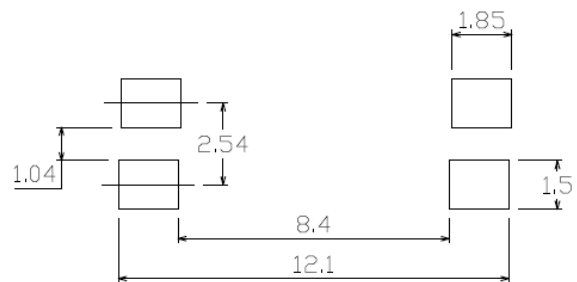


Recommended pad layout for surface mount leadform

For S and S1 option



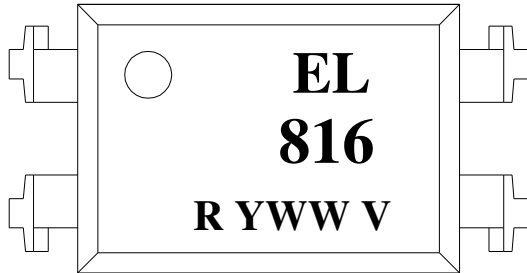
For S2 option



4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

EL816 Series

Device Marking



Notes

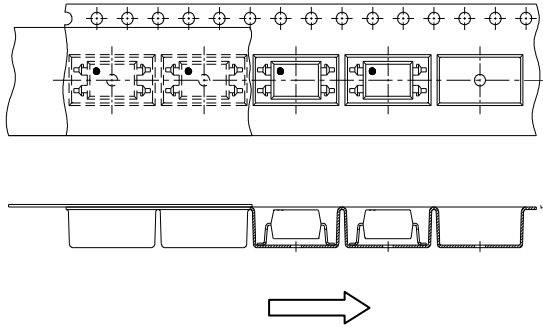
EL	denotes EVERLIGHT
816	denotes Device Number
R	denotes CTR Rank
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

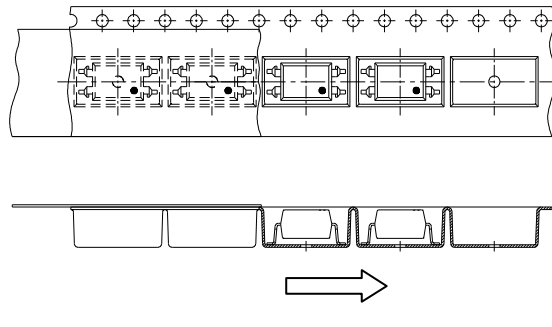
EL816 Series

Tape & Reel Packing Specifications

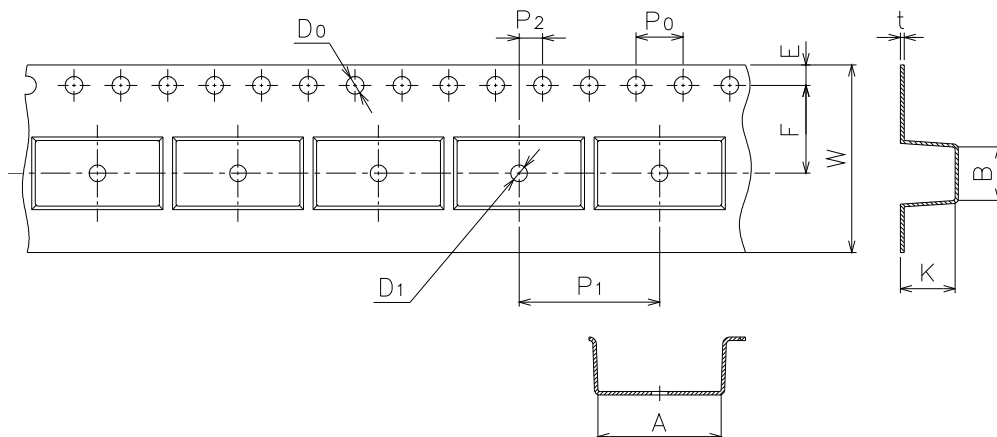
Option TA



Option TB



Tape dimensions

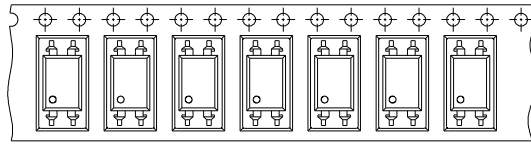


Dimension No.	A	B	Do	D1	E	F
Dimension(mm)	10.4±0.1	4.55±0.1	1.5±0.1	1.5±0.05	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.33±0.1	16.0+0.3/ -0.1	4.55±0.1

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

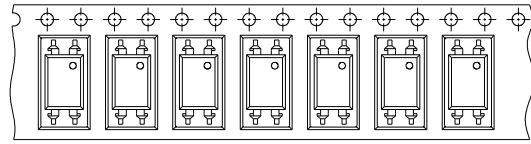
EL816 Series

Option TD



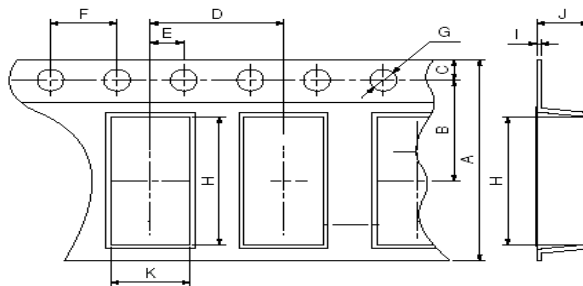
Direction of feed from reel

Option TU

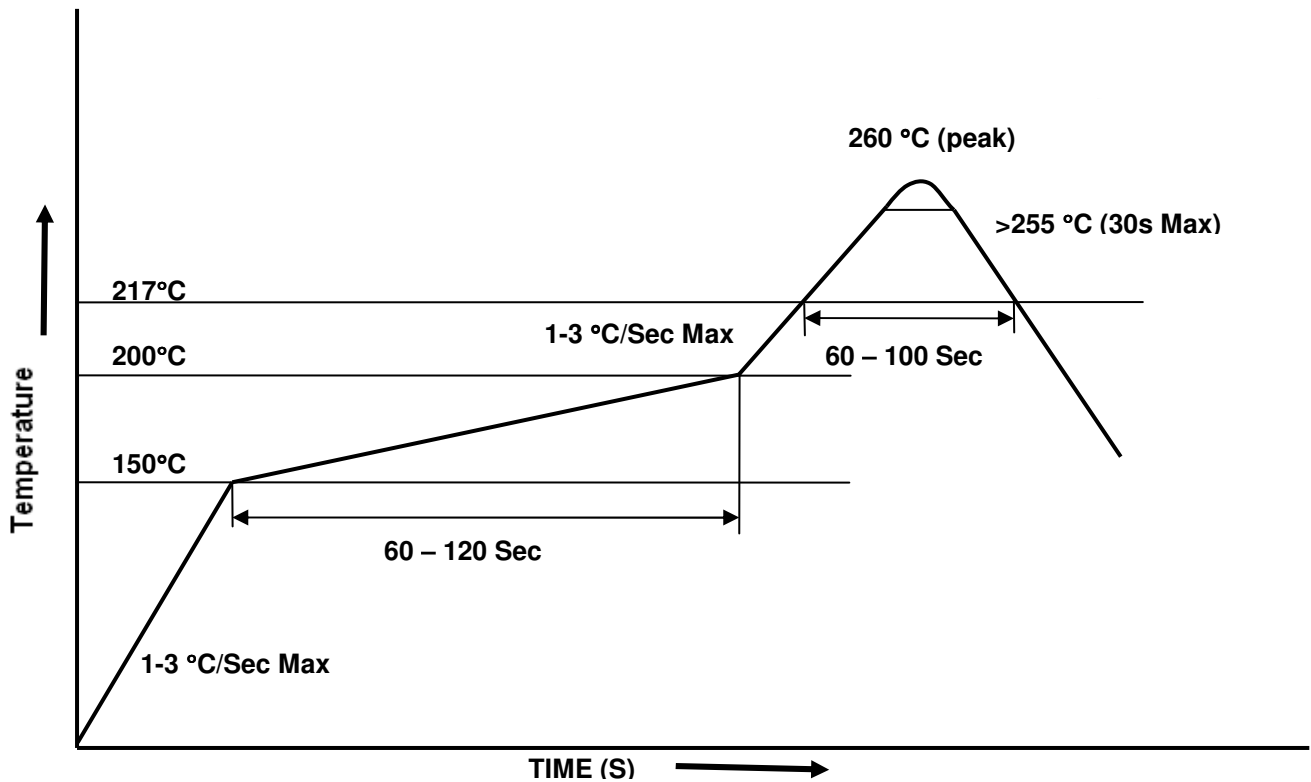


Direction of feed from reel

Tape dimensions



Dimension No.	A	B	C	D	E	F
Dimension(mm)	16.00±0.3	7.5±0.1	1.75±0.1	8.0±0.1	2.0±0.1	4.0±0.1
Dimension No.	G	H	I	J	K	
Dimension(mm)	1.5+0.1/-0	10.4±0.1	0.4±0.05	4.55±0.1	5.1±0.1	

**4 PIN DIP PHOTOTRANSISTOR
PHOTOCOUPLER****EL816 Series****Solder Reflow Temperature Profile**

**4 PIN DIP PHOTOTRANSISTOR
PHOTOCOUPLER****EL816 Series**

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