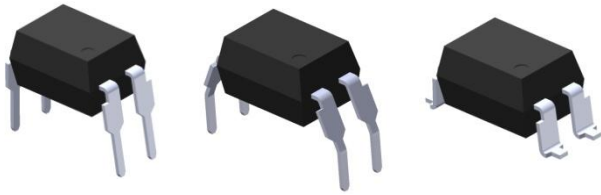
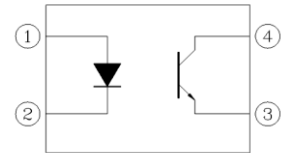


DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER



Schematic



Features:

- Current transfer ratio (CTR: 50~600% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- High isolation voltage between input and output ($V_{iso} = 5000\text{Vrms}$)
- Creepage distance $> 7.62\text{mm}$
- Operating temperature up to $+110^\circ\text{C}$
- Compact small outline package
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH

Pin Configuration

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

Description

The PC816 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

DATASHEET

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Absolute Maximum Ratings (Ta=25°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	P_D	100	mW
	Derating factor (above $T_a = 100^\circ\text{C}$)		2.9	mW/°C
Output	Power dissipation	P_C	150	mW
	Derating factor (above $T_a = 100^\circ\text{C}$)		5.8	mW/°C
	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	35	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 to 110	°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

DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Electro-Optical Characteristics (Ta=25°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}	35	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	6	-	-	V	$I_E = 0.1\text{mA}$

Transfer Characteristics

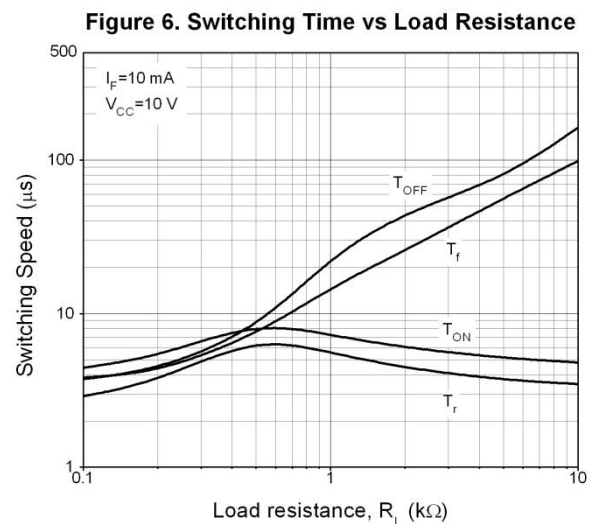
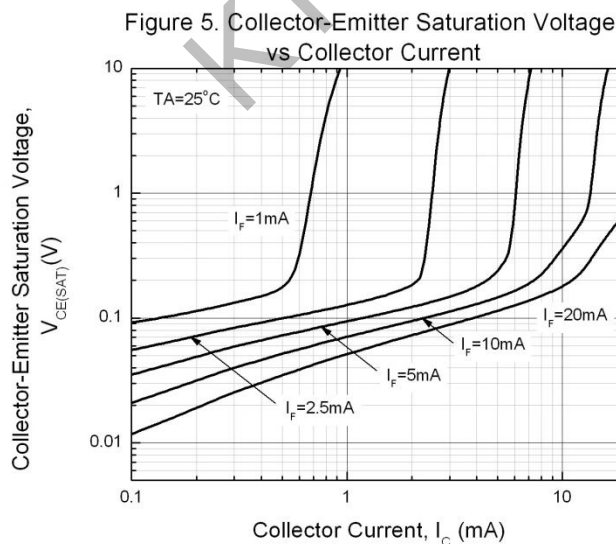
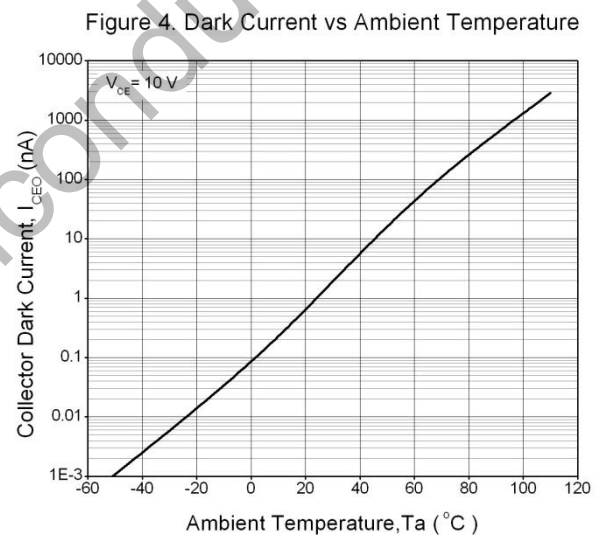
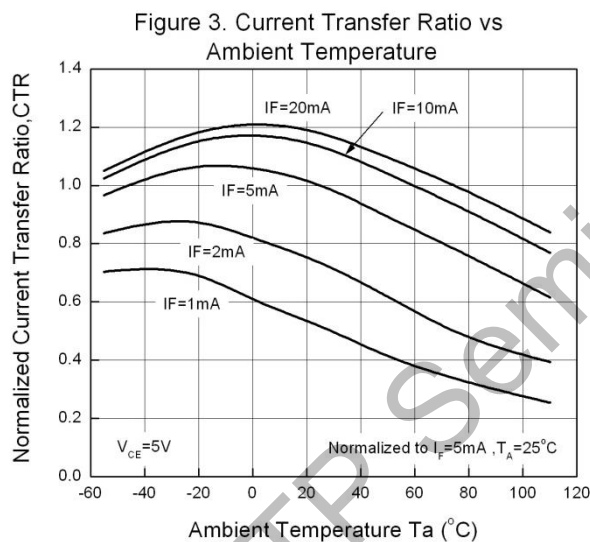
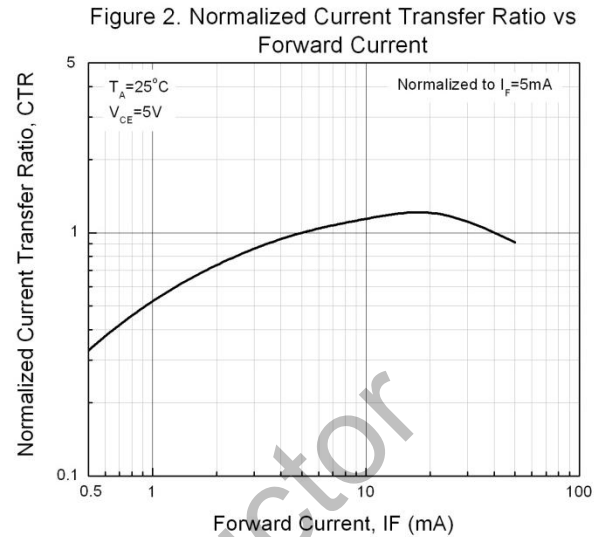
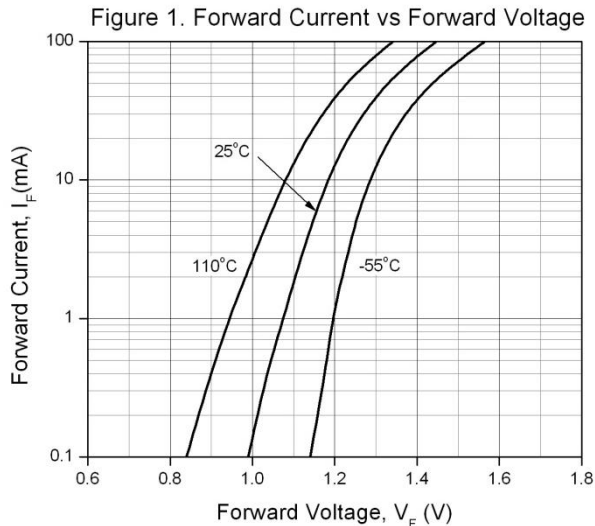
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	PC816	50	-	600	%	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$
	PC816A	80	-	160		
	PC816B	130	-	260		
	PC816C	200	-	400		
	PC816D	300	-	600		
	PC816X	100	-	200		
	PC816Y	150	-	300		
Collector-Emitter saturation voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F = 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	R_{IO}	5×10^{10}	-	-	Ω	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$
Floating capacitance	C_{IO}	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Cut-off frequency	f_c	-	80	-	kHz	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$
Rise time	t_r	-	-	18	μs	$V_{CE} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$
Fall time	t_f	-	-	18	μs	

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

DATASHEET

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Typical Electro-Optical Characteristics Curves



DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

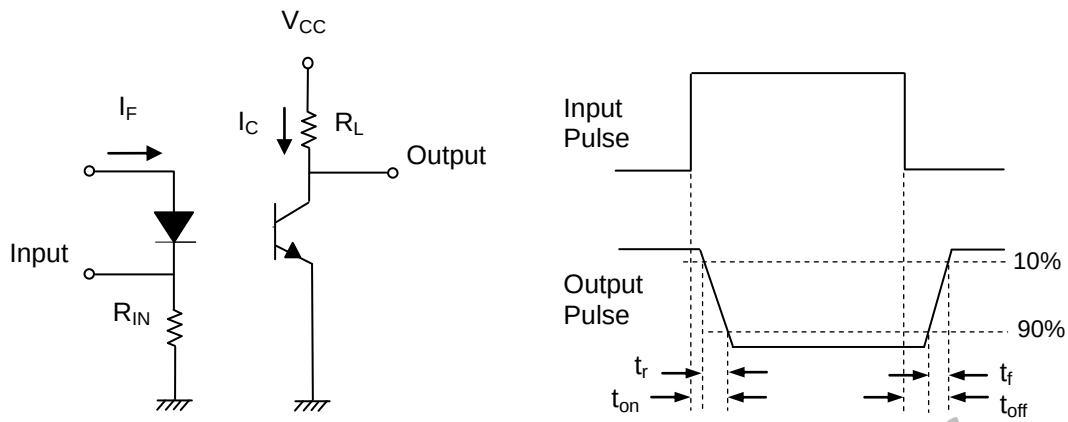


Figure 7. Switching Time Test Circuit & Waveforms

DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Order Information

Part Number

PC816X(Y)(Z)-FV

Note

- X = Lead form option (S, S1, S2, M or none)
- Y = CTR Rank (A, B, C, D, X, Y or none)
- Z = Tape and reel option (TA, TB, TU, TD or none)
- F = Lead frame option (F: Iron, None: copper)
- V = VDE safety (optional).

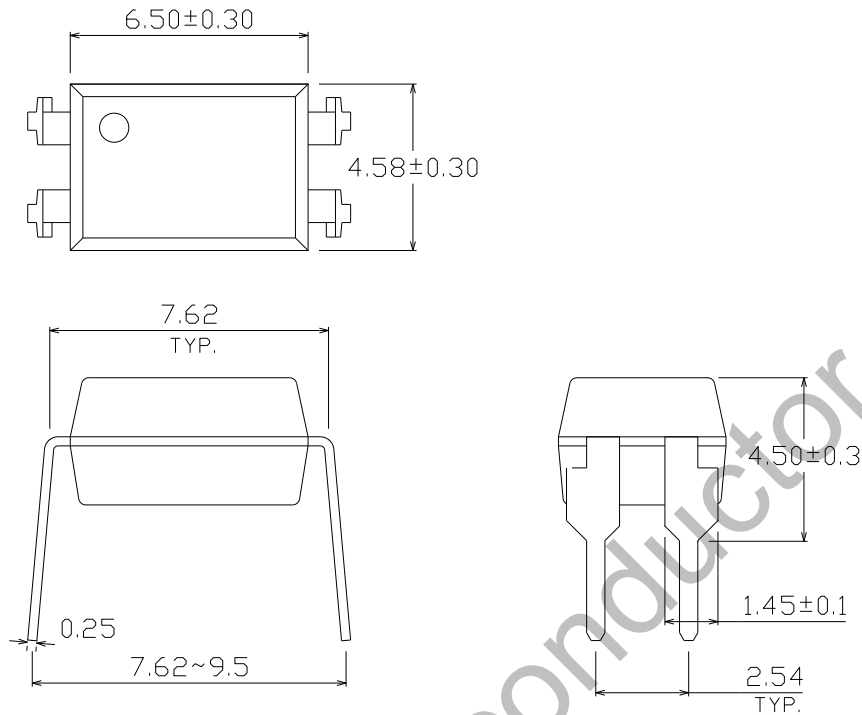
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount 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
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
S2 (TU)	Surface mount lead form (low profile) + TU tape & reel option	2000 units per reel
S2 (TD)	Surface mount lead form (low profile) + TD tape & reel option	2000 units per reel

DATASHEETL

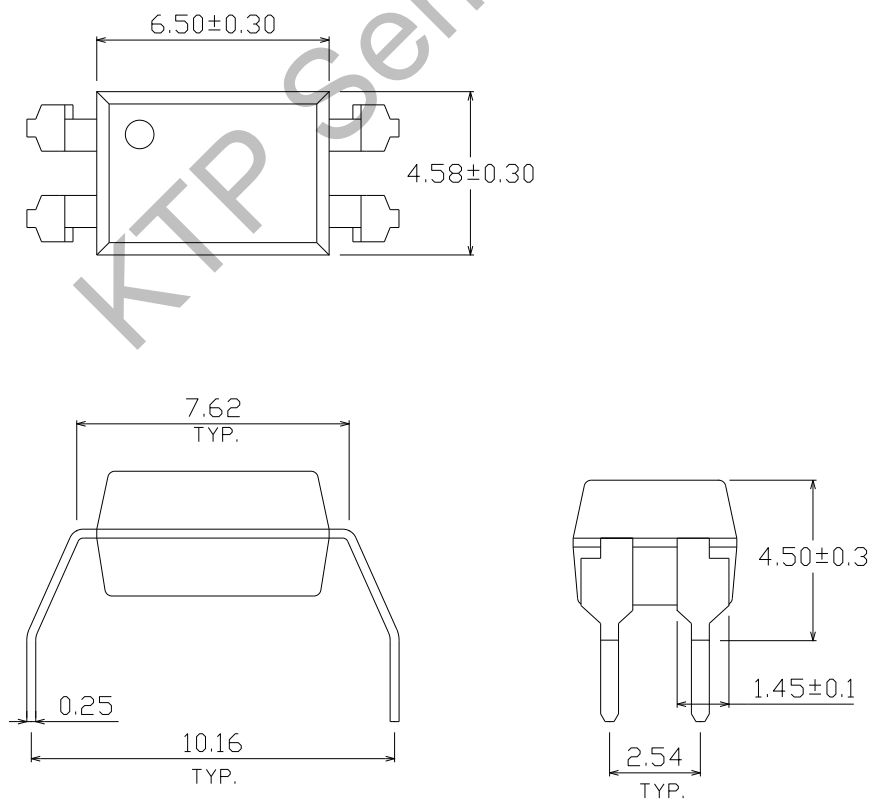
4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Package Dimension (Dimensions in mm)

Standard DIP Type



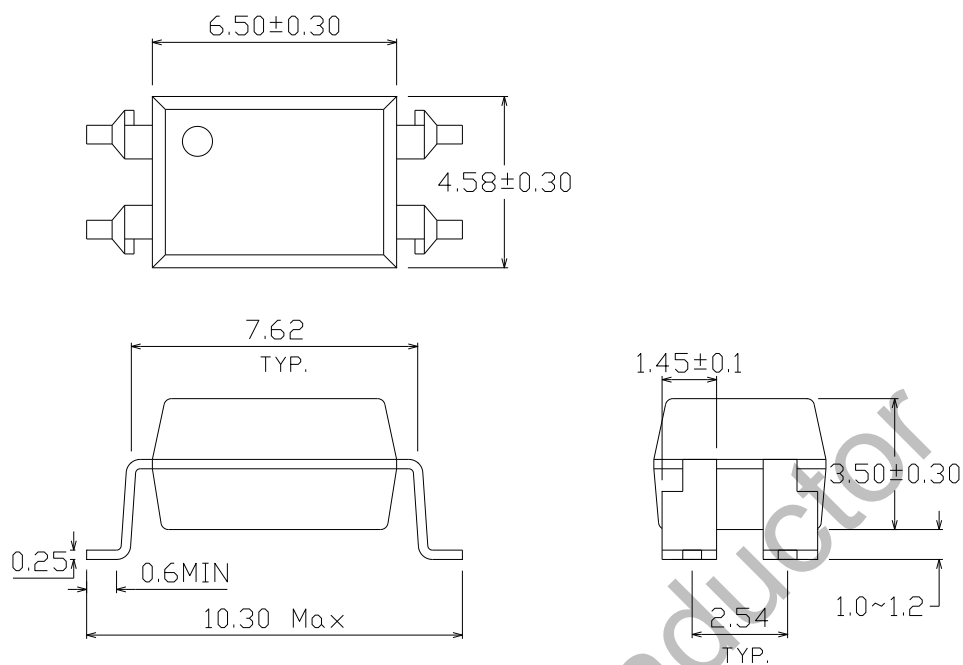
Option M Type



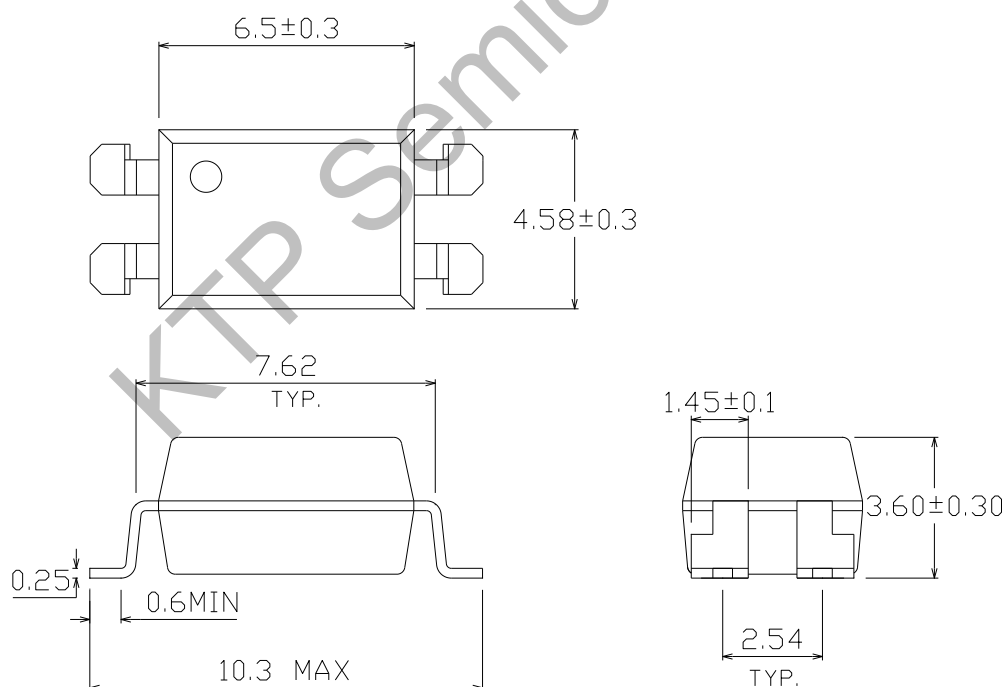
DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Option S Type



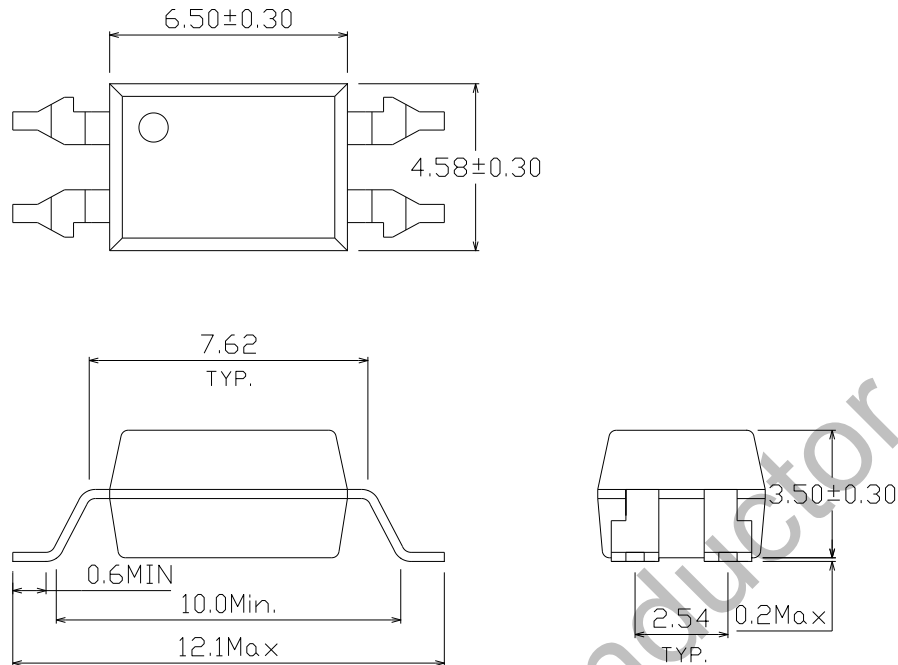
Option S1 Type



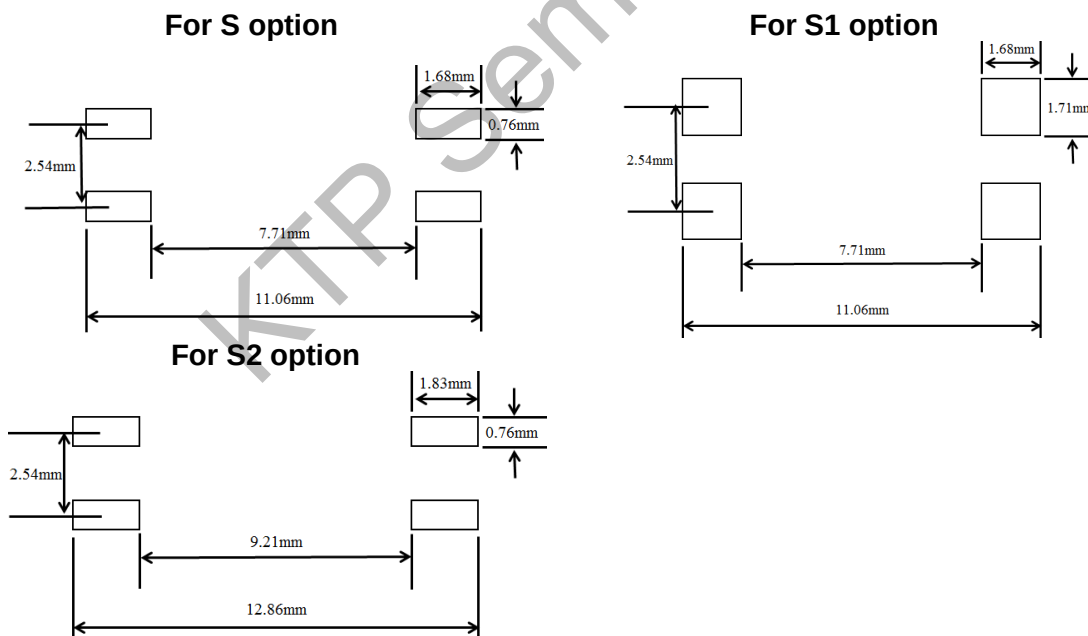
DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Option S2 Type



Recommended pad layout for surface mount leadform



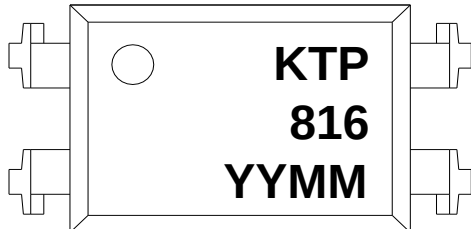
Notes

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

DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Device Marking



Notes

KTP	denotes Brand LOGO
816	denotes Device Number
YY	denotes 2 digit Year code
MM	denotes 2 digit Month code

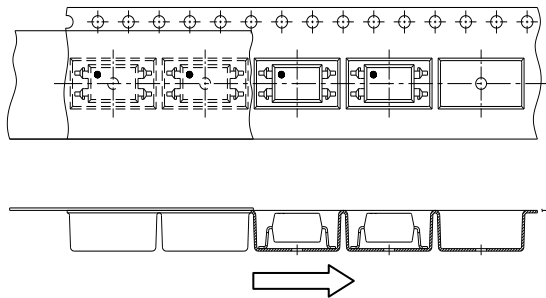
KTP Semiconductor

DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

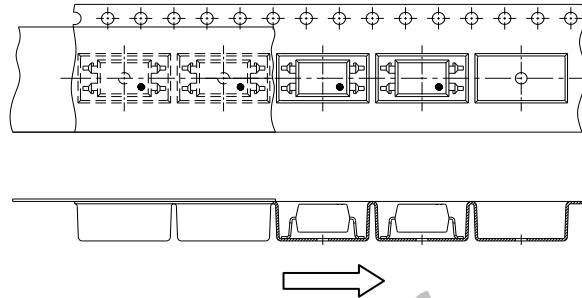
Tape & Reel Packing Specifications

Option TA



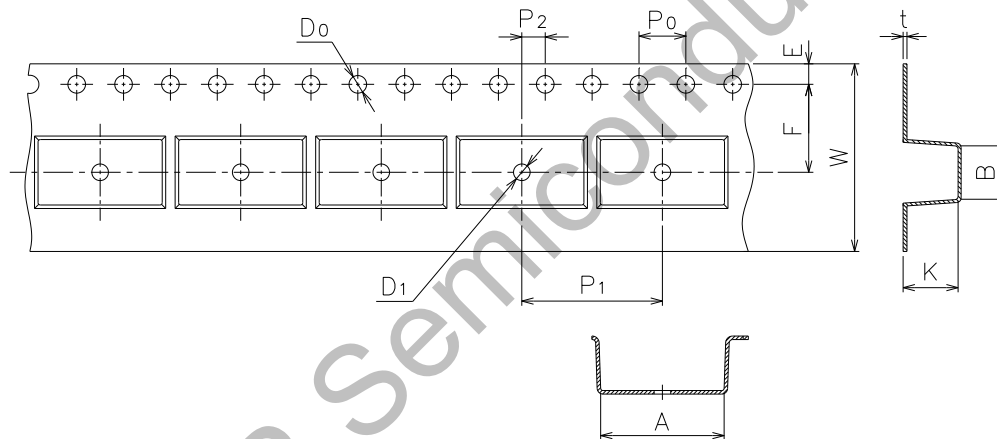
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

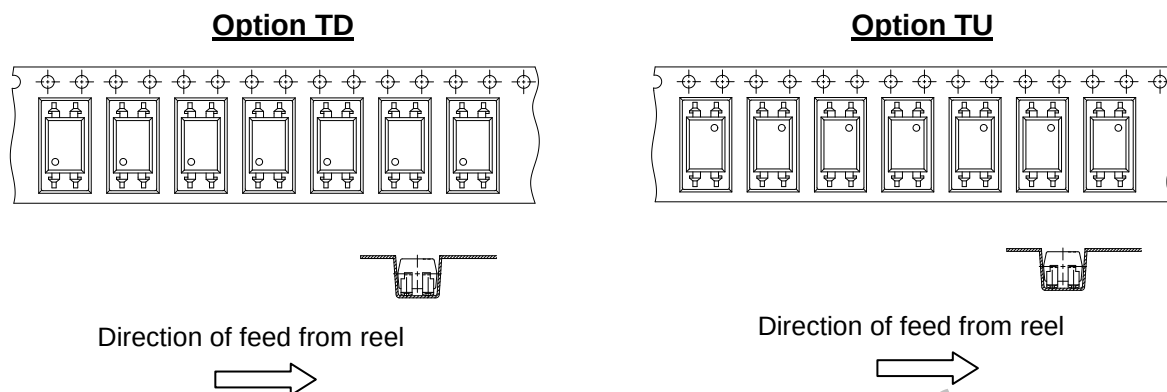


Dimension No.	A	B	Do	D1	E	F
Dimension (mm) S	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S1	10.7±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension (mm) S2	12.15±0.1	4.65±0.1	1.5±0.1	1.50±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm) S	4.0±0.1	12.0±0.1	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
Dimension (mm) S2	4.0±0.1	16.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	3.90±0.1

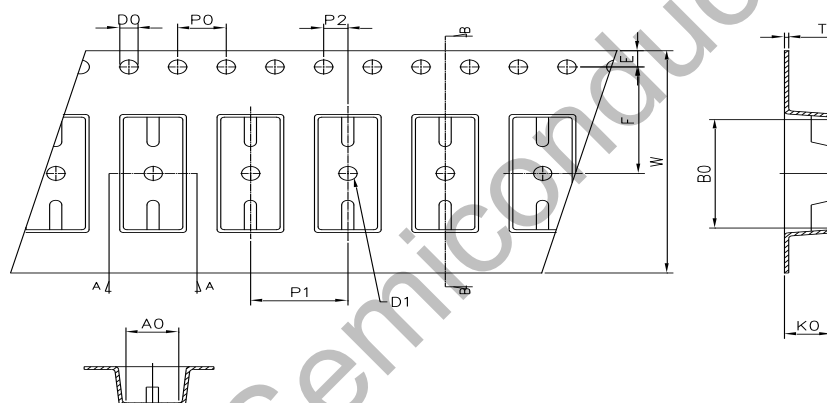
DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

Tape & Reel Packing Specifications



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 (mm) S2	4.88±0.1	12.55±0.1	1.5±0.1	1.50±0.1	1.75±0.1	11.5±0.1
Dimension No.	Po	P1	P2	t	W	Ko
Dimension (mm) S.S1	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	16.00±0.3	4.60±0.1
Dimension (mm) S2	4.00±0.1	8.00±0.1	2.00±0.1	0.40±0.1	24.00±0.3	4.00±0.1

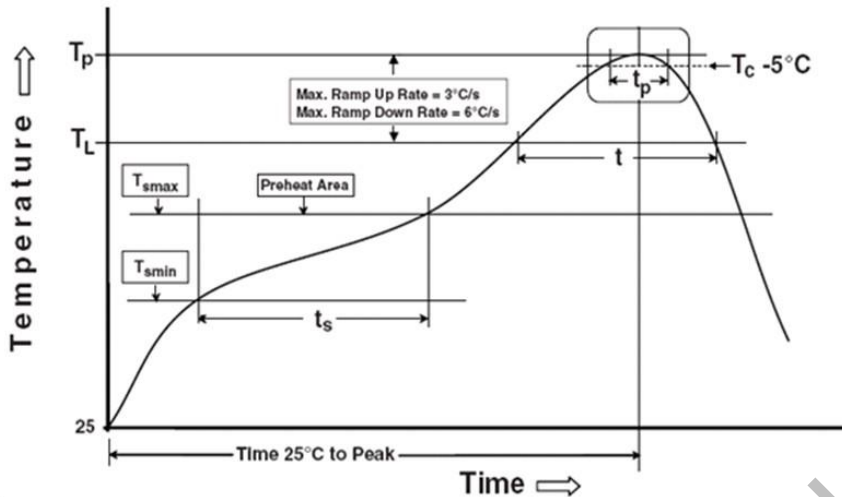
DATASHEETL

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

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

DATASHEETL**4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER**

DISCLAIMER

1. Above specification may be changed without notice. KTP 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.
3. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. KTP assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
4. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death.

KTP Semiconductor