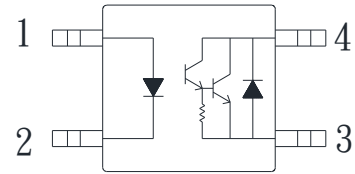


### ● Description

The KPC452 consist of a photo darlington optically coupled to a gallium arsenide infrared-emitting diodes in a 4-pin Mini-Flat package. Collector-emitter voltage is 300V. The input-output isolation voltage is rated at 3750 Vrms..

### ● Schematic



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

### ● Features

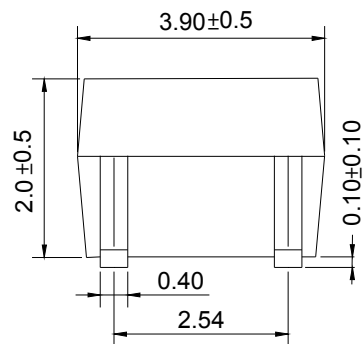
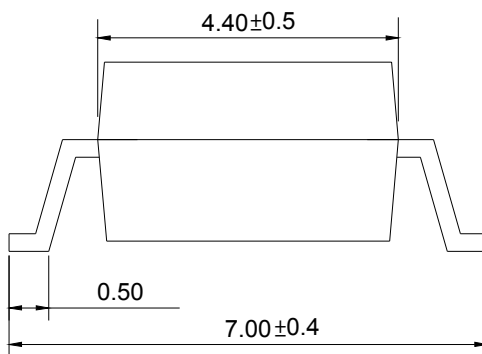
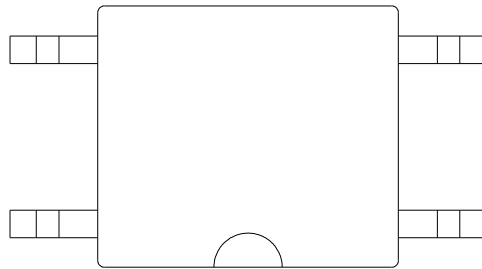
1. Halogen free
2. Pb free and RoHS compliant
3. Mini-flat package: compact 4 pin SOP with a 2.0mm profile
4. High collector-emitter voltage ( $V_{CEO} : 300V$ )
5. High current transfer ratio  
(CTR : MIN.1000% at  $I_F = 1mA, V_{CE} = 2V$ )
6. High isolation voltage between input and output (Viso:3750Vrms)
7. MSL class 1
8. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40014684): DIN EN 60747-5-5
  - FIMKO Approved: EN60065, EN60950
  - CQC Approved: GB8898-2011, GB4943.1-2011

### ● Applications

- Telephone sets
- Copiers, facsimiles
- Interfaces with various power supply circuits, power distribution boards
- Hybrid substrates which require high density mounting

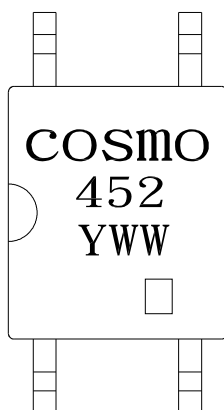
● **Outside Dimension**

Unit : mm



TOLERANCE : ±0.2mm

● **Device Marking**



**Notes:**

Cosmo

452

YWW



Y: Year code / WW: Week code

□: CTR rank

● **Absolute Maximum Ratings**

(Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	Peak forward current	$I_{FM}$	1	A
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	70	mW
Output	Collector-Emitter voltage	$V_{CEO}$	300	V
	Emitter-Collector voltage	$V_{ECO}$	0.1	V
	Collector current	$I_C$	150	mA
	Collector power dissipation	$P_C$	150	mW
Total power dissipation		$P_{tot}$	170	mW
Isolation voltage 1 minute		$V_{iso}$	3750	Vrms
Operating temperature		$T_{opr}$	-55 to +115	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
Soldering temperature 10 seconds		$T_{sol}$	260	°C

● **Electro-optical Characteristics**

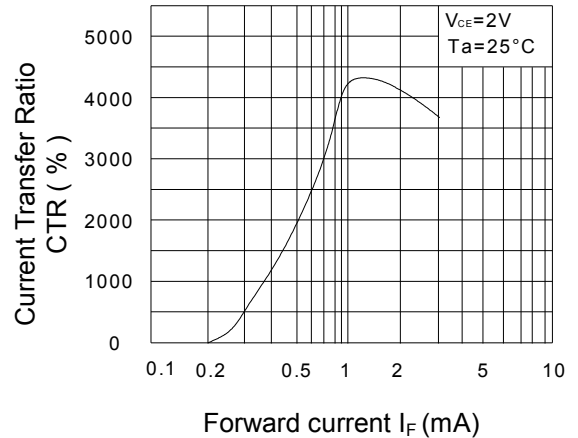
(Ta=25°C)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	$V_F$	$I_F=20mA$	-	1.2	1.4	V
	Reverse current	$I_R$	$V_R=4V$	-	-	10	uA
	Terminal capacitance	$C_t$	$V=0, f=1KHz$	-	30	-	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE}=200V, I_F=0$	-	-	1	uA
	Collector-Emitter breakdown voltage	$BV_{CEO}$	$I_C=0.1mA, I_F=0$	300	-	-	V
Transfer characteristics	Current transfer ratio	CTR	$I_F=1mA, V_{CE}=2V$	1000	-	-	%
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_F=20mA, I_C=100mA$	-	-	1.5	V
	Isolation resistance	Riso	DC500V, 40 to 60%RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Floating capacitance	$C_f$	$V=0, f=1MHz$	-	0.6	1.0	pF
	Response time (Rise)	$t_r$	$V_{ce}=2V, I_C=20mA, R_L=100\Omega$	-	100	300	us
	Response time (Fall)	$t_f$		-	20	100	us

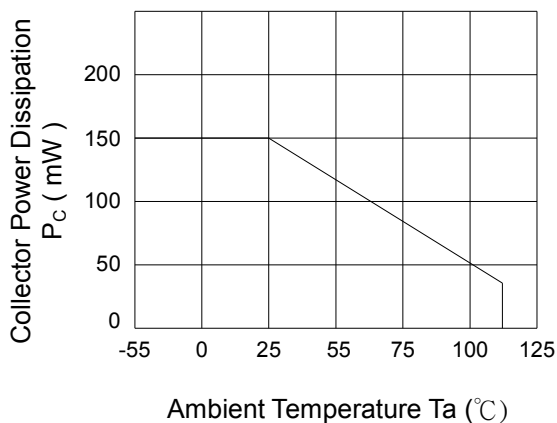
Classification table of current transfer ratio is shown below.

CTR RANK	CTR ( % )
KPC4520E	Min.1000

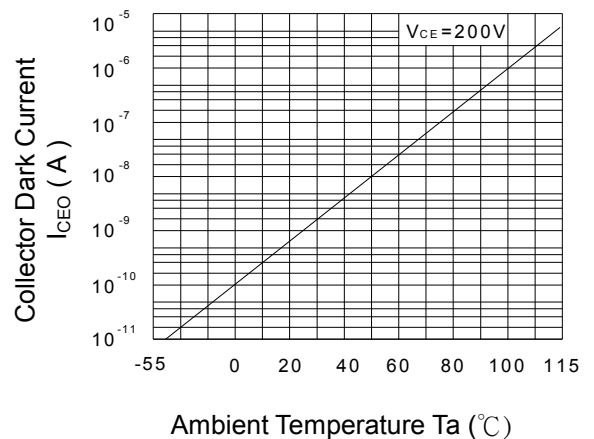
**Fig.1 Current Transfer Ratio vs. Forward Current**



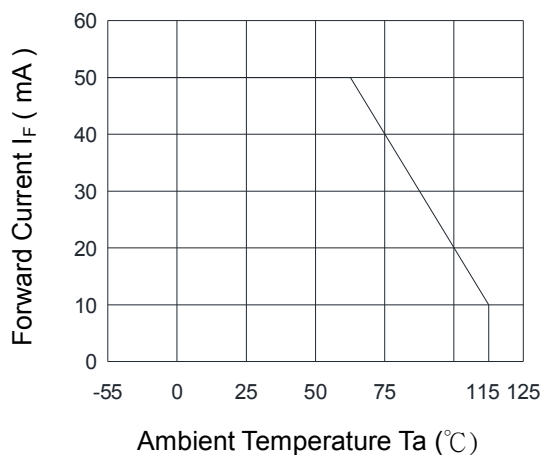
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



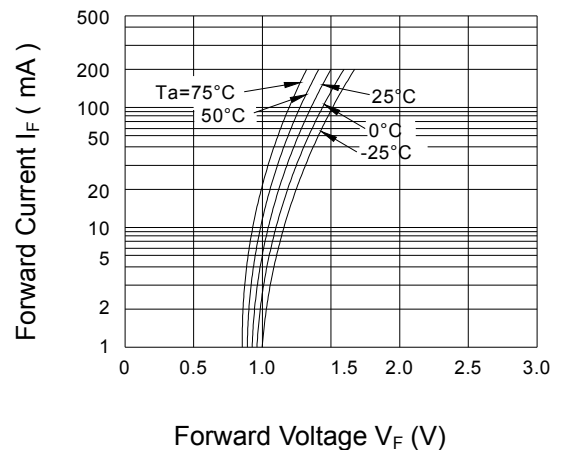
**Fig.3 Collector Dark Current vs. Ambient Temperature**



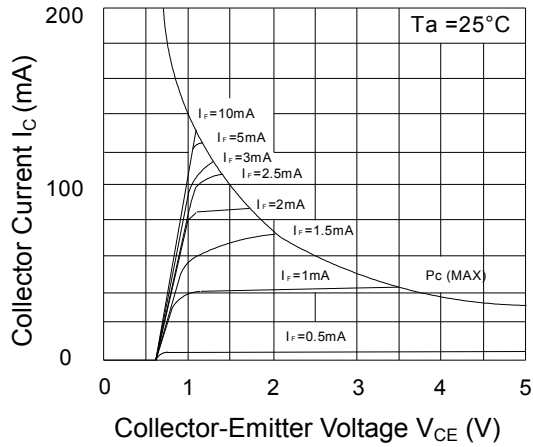
**Fig.4 Forward Current vs. Ambient Temperature**



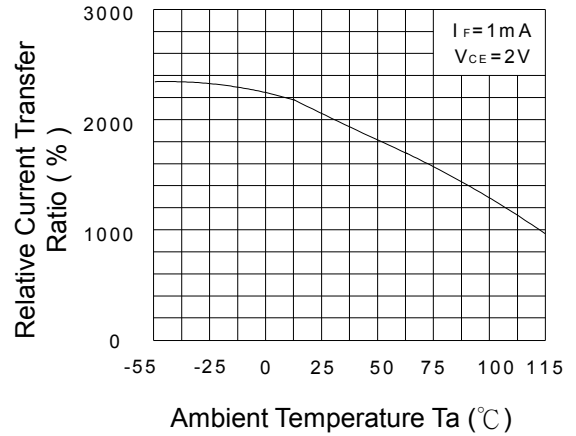
**Fig.5 Forward Current vs. Forward Voltage**



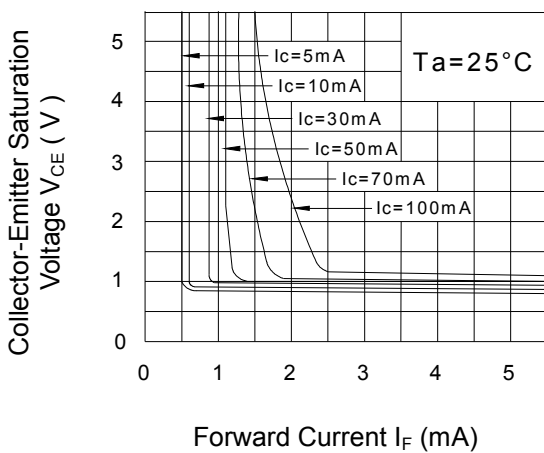
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



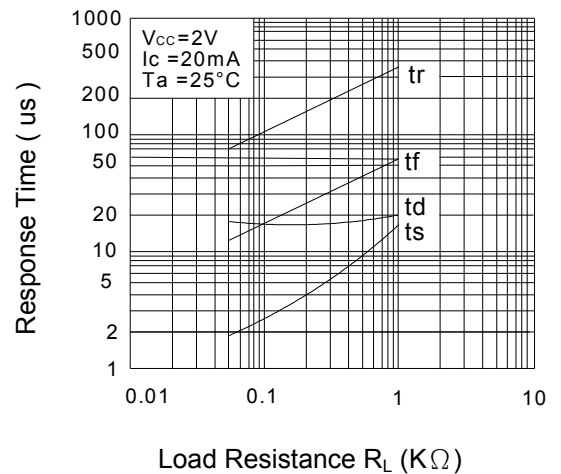
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



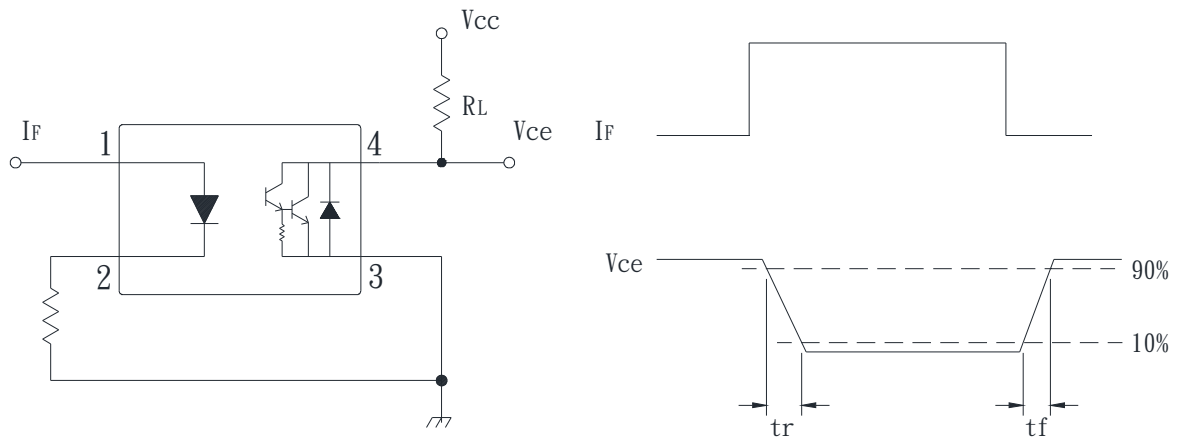
**Fig.8 Collector-Emitter Saturation Voltage vs. Forward Current**



**Fig.9 Response Time vs. Load Resistance**



● Test Circuit for Response Time

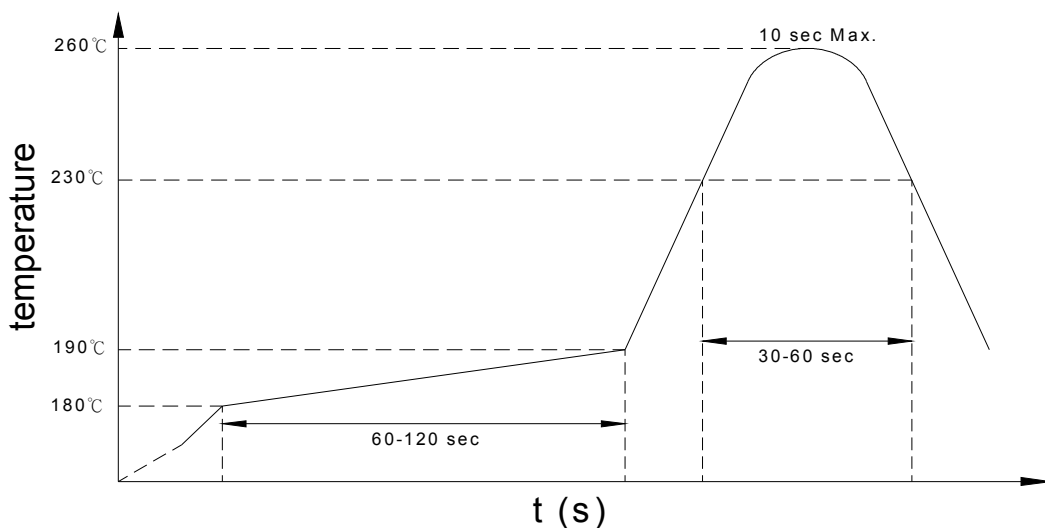


● **Recommended Soldering Conditions**

(a) **Infrared reflow soldering :**

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature : 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Time(s) of reflow : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

**Recommended Temperature Profile of Infrared Reflow**



(b) **Wave soldering :**

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C or below (package surface temperature)
- Time(s) of reflow : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(c) **Cautions :**

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

- **Numbering System**

### KPC452 Y (Z)

**Notes:**

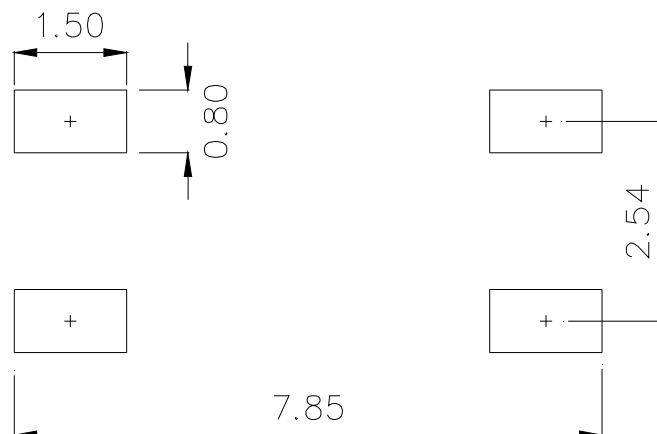
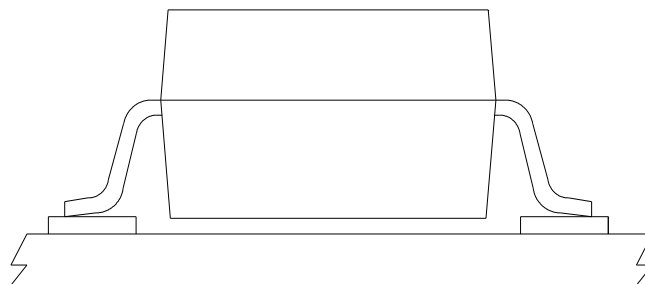
KPC452 = Part No.

Y = CTR rank (E)

Z = Tape and reel option (TLD · TRU)

Option	Description	Packing quantity
TLD	TLD tape & reel option	3000 units per reel
TRU	TRU tape & reel option	3000 units per reel

- **Recommended Pad Layout for Surface Mount Lead Form**



Unit : mm







# KPC452 Series

## 4PIN MINI-FLAT PHOTODARLINGTON PHOTOCOUPLER

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### ● Application Notice

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- b. OA machine
- c. Audio / Video
- d. Instrumentation
- e. Electrical application
- f. Measurement equipment
- g. Consumer electronics
- h. Telecommunication

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- a. Medical and other life supporting equipments
- b. Space application
- c. Telecommunication equipment (trunk lines)
- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

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