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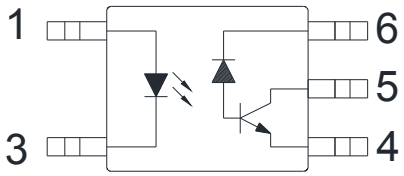
KPC457 Series

5PIN HIGH-SPEED OUTPUT PHOTOCOUPLER

Description

The KPC457 series consist of a LED. It is a high-speed digital output type photocoupler. And it is packaged in a 5pin mini-flat package.

Schematic



1. Anode
3. Cathode
4. GND(Emitter)
5. Vo (Open collector)
6. Vcc

Features

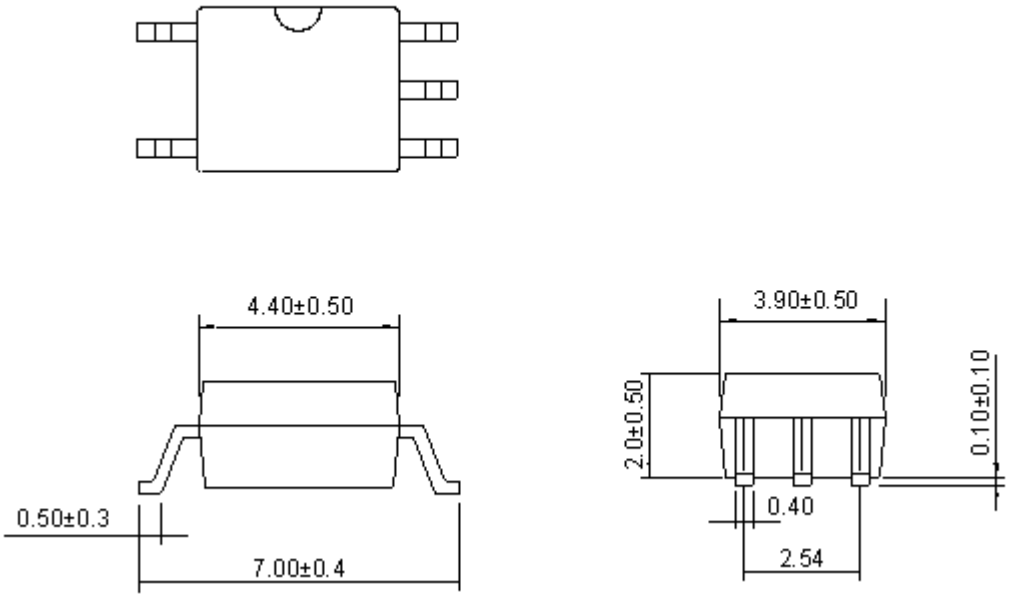
1. Pb free and RoHS compliant
2. 5 pin mini-flat package
3. High speed response (tPLH:typ.0.2us, tPHL:typ.0.4us)
4. High instantaneous common mode rejection voltage (C_{MH}: Min. 15KV/us, $C_{M}L$: Min. -15KV/us)
5. High isolation voltage between input and output (Viso: 3750Vrms)
6. MSL class 1
7. Agency Approvals:
   - UL Approved (No. E169586): UL1577
   - c-UL Approved (No. E169586)
   - VDE Approved (No. 40020973): DIN EN60747-5-5

Applications

- Computers, measuring instruments, control equipment
- High speed line receivers, high speed logic
- Telephone sets
- Signal transmission between circuits of different potentials and impedances

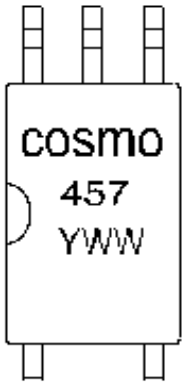
Outside Dimension

Unit : mm



TOLERANCE: ±0.2mm

Device Marking



Notes:

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457
YWW Y: Year code / WW: Week code

● Absolute Maximum Ratings

(Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current (*1)	I_F	25	mA
	Peak forward current (*2)	I_{FM}	200	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	45	mW
Output	Supply voltage	V_{CC}	-0.5 to +30	V
	Output voltage	V_{OIL}	-0.5 to +20	V
	Output current	I_{OL}	8	mA
	Power dissipation (*3)	Po	100	mW
Total power dissipation (*3)		Ptot	100	mW
Isolation voltage 1 minute (*4)		Viso	3750	Vrms
Operating temperature		Topr	-55 to +85	℃
Storage temperature		Tstg	-55 to +125	℃
Soldering temperature 10 seconds		Tsol	260	℃

*1 When ambient temperature goes above 70°C, the power dissipation goes down at 0.8mA/°C.
*2 When ambient temperature goes above 70°C, the power dissipation goes down at 1.5mW/°C.
*3 When ambient temperature goes above 70°C, the power dissipation goes down at 1.8mW/°C.
*4 40 to 80%RH AC for 1 minute=60HZ.

● Electro-optical Characteristics

(Ta= 25℃)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F=16mA	-	1.7	1.95	V
	Reverse current	I_R	V_R=5V	-	-	10	uA
	Terminal capacitance	C_t	V=0, f=1MHz	-	60	250	pF
Output	High level output current (1)	I_{OH} (1)	I_F=0,V_{CC}=5.5V,V_O=5.5V	-	3	500	nA
	High level output current (2)	I_{OH} (2)	I_F=0,V_{CC}=15V,V_O=15V	-	-	1.0	uA
	High level output current (3) (*6)	I_{OH} (3)		-	-	50	uA
	High level supply current (1)	I_{CCH} (1)	I_F=0,V_{CC}=15V,V_O=Open	-	0.02	1.0	uA
	High level supply current (2) (*6)	I_{CCH} (2)		-	-	2.0	uA
	Low level supply current	I_{CCL}	I_F=16mA,V_{CC}=15V,V_O=Open	-	120	-	uA
	Low level supply voltage	V_L	I_F=16mA,V_{CC}=4.5V,I_O=2.4mA	-	-	0.4	V
Transfer Charac-teristics	Current transfer ratio (1)	CTR(1)	I_F=16mA,V_{CC}=4.5V,V_O=0.4V, R_L=1.9KΩ	19	-	50	%
	Current transfer ratio (2) (*6)	CTR(2)		15	-	-	%
	Isolation resistance	R_{ISO}	DC=500V,40 to 60%RH	$5x10^{10}$	$1x10^{11}$	-	Ω
	Floating capacitance	C_f	V=0,f=1MH$_Z$	-	0.6	1.0	pF
	"High-->Low" propagation delay time	t_{PHL}	I_F=16mA,Vcc=5V, R_L=1.9KΩ	-	0.2	0.8	us
	"High-->Low" propagation delay time	t_{PLH}		-	0.4	0.8	us
	Instantaneous common mode rejection voltage (High level output)	C_{MH}	I_F=0,V_{CC}=5V, V_{CM}=1.0KV(p-p), R_L=1.9KΩ	15	30	-	KV/us

	Instantaneous common mode rejection voltage (High level output)	C_{ML}	I_F=16mA,V_{CC}=5V, V_{CM}=1.0KV(p-p), R_L=1.9KΩ	-15	-30	-	KV/us

*5 It shall connect a by-pass capacitor of 0.01uF or more between Vcc (pin 6) and GND(pin 4) near the device ,when it measures transfer characteristics and the output side characteristics.
*6 Ta=0 to 70°C.

Fig.1 Forward Current vs. Ambient Temperature

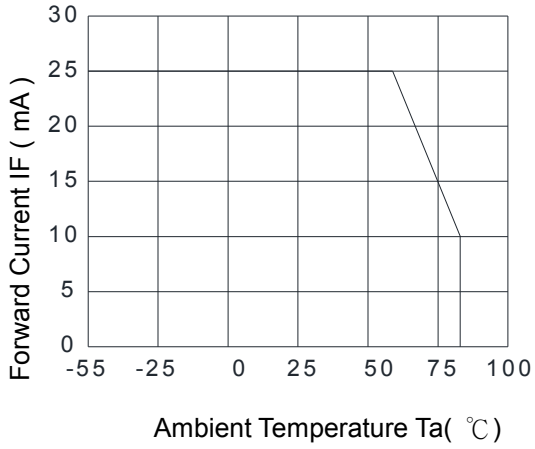


Fig.2 Power Dissipation vs. Ambient Temperature

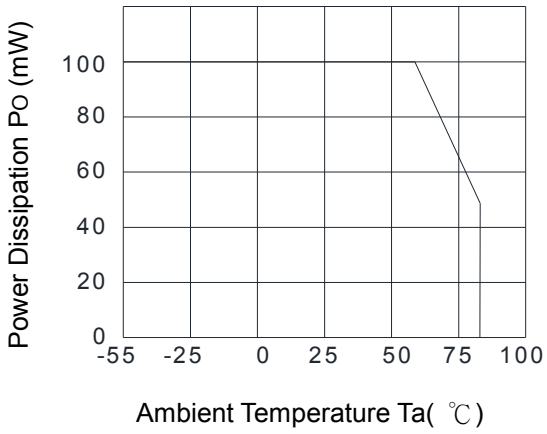


Fig.3 Forward Current vs. Forward Voltage

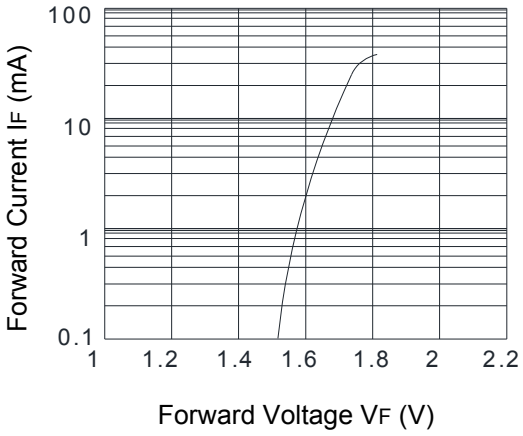


Fig.4 Current Transfer Ratio vs. Forward Current

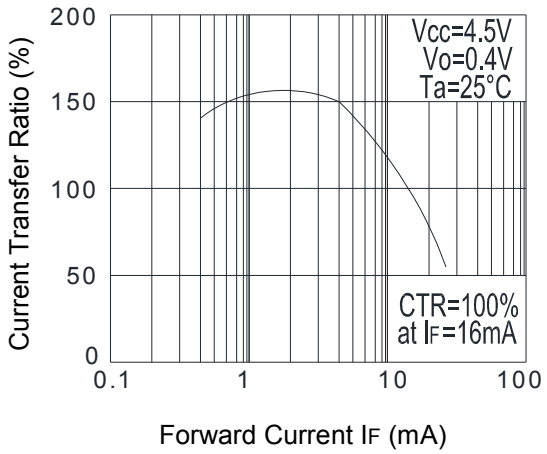


Fig.5 Output Current vs. Output Voltage

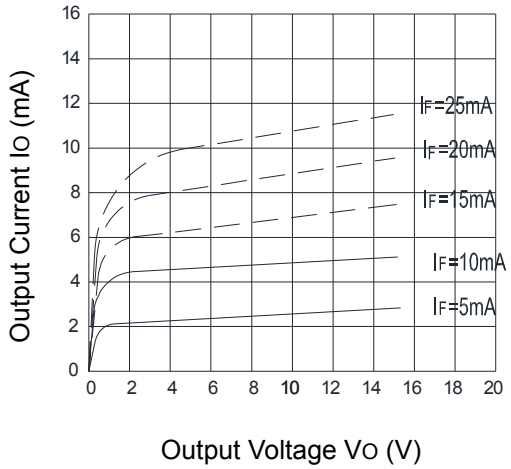


Fig.6 Current Transfer Ratio vs. Ambient Temperature

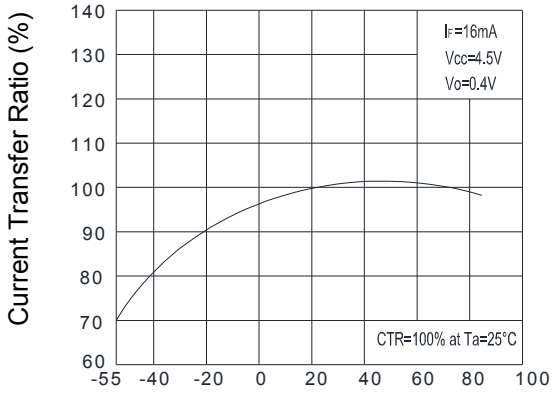


Fig.7 Pulse Width Distortion vs. Ambient Temperature

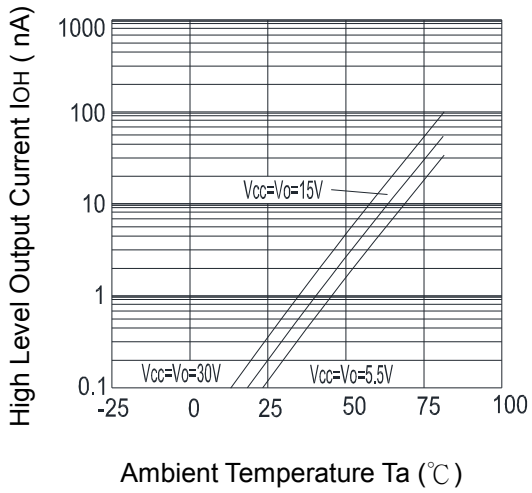
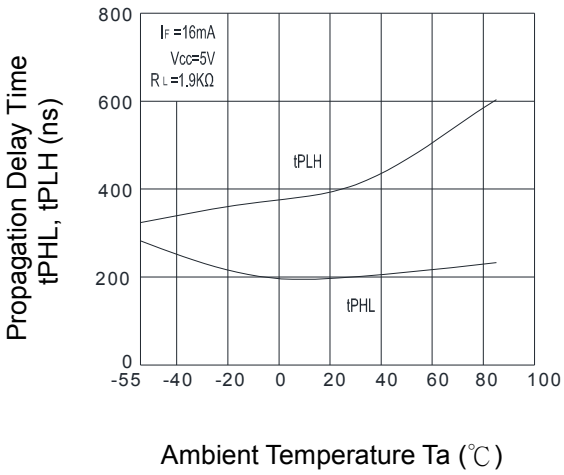


Fig.8 Propagation Delay Time vs. Ambient Temperature

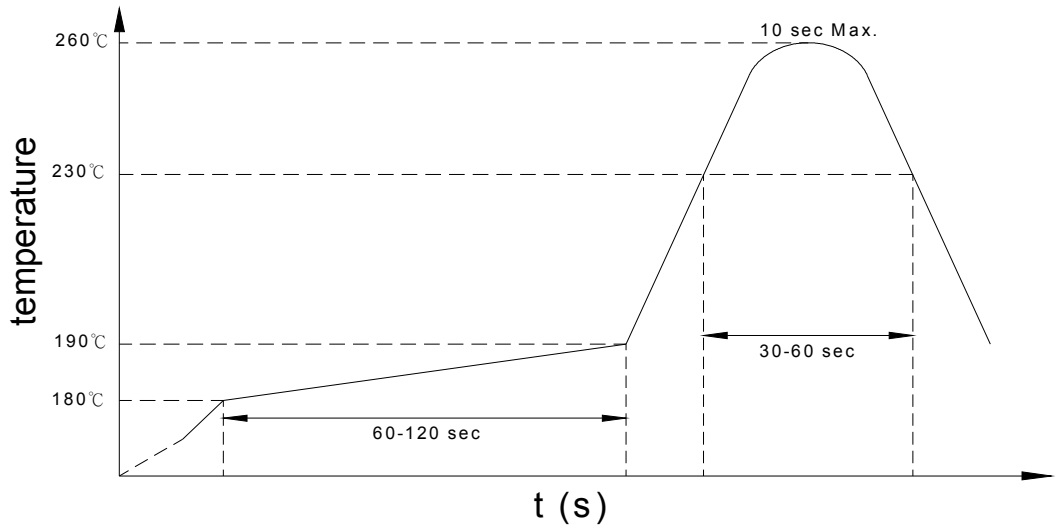


● Recommended Soldering Conditions

(a) Infrared reflow soldering：

- Peak reflow soldering： 260℃ or below (package surface temperature)
- Time of peak reflow temperature： 10 sec
- Time of temperature higher than 230℃： 30-60 sec
- Time to preheat temperature from 180~190℃： 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℃ or below (molten solder temperature)
- Time： 10 seconds or less
- Preheating conditions： 120℃ 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**

KPC457 (Z)

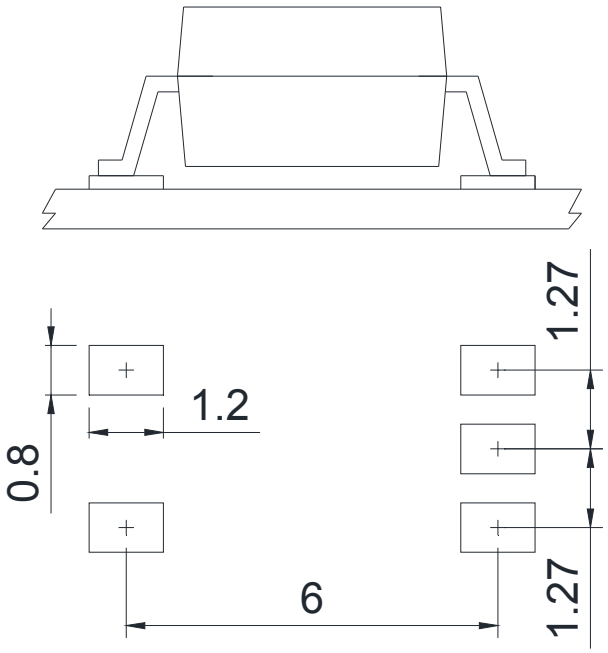
Notes:

KPC457 = Part No.

Z = Tape and reel option (TLD, TRU)

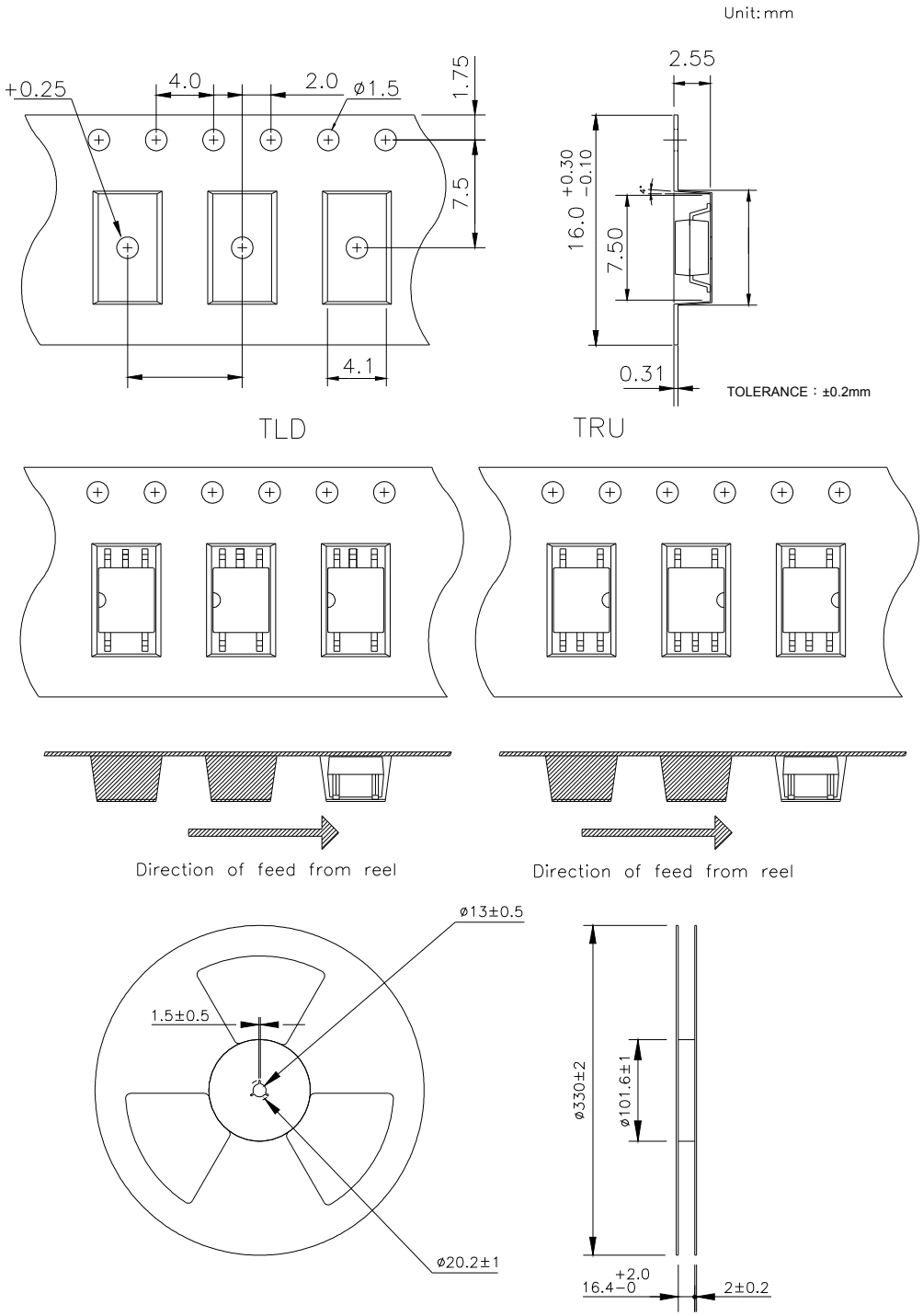
Option	Description	Packing quantity
TLD	TLD tape & reel option	3000 units per reel
TRU	TRU tape & reel option	3000 units per reel

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



Unit : mm

● SOP Carrier Tape & Reel



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