KPC355NT Series
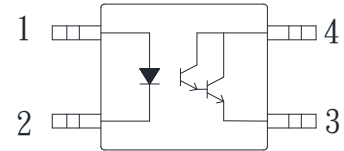## 4PIN MINI-FLAT PHOTODARLINGTON PHOTOCOUPLER

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● **Description**

The KPC355NT series consist of a photodarlington optically coupled to a gallium arsenide infrared-emitting diodes in a 4-pin Mini-Flat package. The input-output isolation voltage is rated at 3750 Vrms.

● **Schematic**

1. Anode

2. Cathode

3. Emitter

4. Collector

● **Features**

1. Pb free and RoHS compliant

2. High current transfer ratio

(CTR : Min.600% at I_F =1mA, Vce=2V)

3. High isolation voltage between input and output

(Viso : 3750Vrms)

4. Mini-flat package: compact 4 pin SOP with a 2.0mm profile

5. MSL class 1

6. Agency Approvals:

• UL Approved (No. E169586): UL1577

• c-UL Approved (No. E169586)

• VDE Approved (No. 40014684): DIN EN 60747-5-5

• FIMKO Approved EN62368-1, EN60601-1

• CQC Approved: GB8898-2011, GB4943.1-2011

● **Applications**

• System appliances, measuring instruments

• Industrial robots

• Copiers, automatic vending machines

• Signal transmission between circuits of different potentials and impedances

• Telephone sets

• Copiers, facsimiles

• Interface with various power supply circuits, power distribution boards
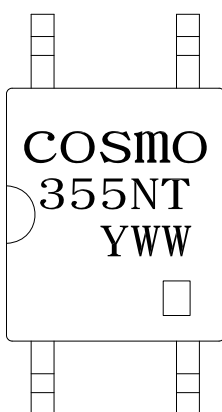
• Numerical control machines

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● **Outside Dimension**

Unit : mm

4.40±0.5

0.50

7.00±0.4

3.90±0.5

2.0±0.5

0.10±0.10

0.40

2.54
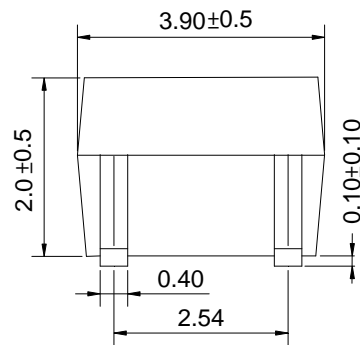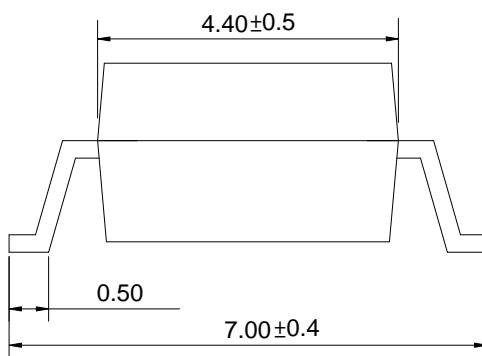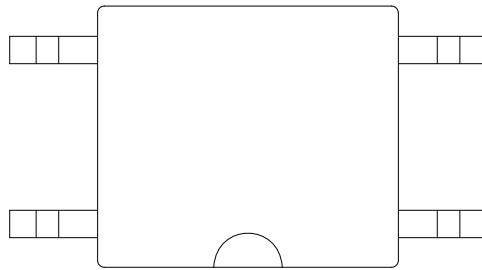
TOLERANCE : ±0.2mm

● **Device Marking**

COSMO
355NT
YWW

Notes:

Cosmo
355NT
YWW   Y: Year code / WW: Week code

☐   ☐ : CTR rank

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● Absolute Maximum Ratings

(Ta=25℃)

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}	35	V
	Emitter-Collector voltage	V_{ECO}	5	V
	Collector current	I_C	150	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		Ptot	170	mW
Isolation voltage 1 minute		Viso	3750	Vrms
Operating temperature		Topr	-55 to +115	℃
Storage temperature		Tstg	-55 to +125	℃
Soldering temperature 10 seconds		Tsol	260	℃

● Electro-optical Characteristics

(Ta=25℃)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F=20mA	–	1.2	1.4	V
	Peak forward voltage	V_{FM}	I_{FM}=0.5A	–	–	3.5	V
	Reverse current	I_R	V_R=4V	–	–	10	uA
	Terminal capacitance	Ct	V=0, f=1KH$_Z$	–	30	–	pF
Output	Collector dark current	I_{CEO}	V_{CE}=10V, I_F=0	–	–	1.0	uA
Transfer characteristics	Current transfer ratio	CTR	I_F=1mA, V_{CE}=2V	600	1600	7500	%
	Collector-Emitter saturation	V_{CE}(sat)	I_F=20mA, Ic=1mA	–	-	1.0	V
	Isolation resistance	Riso	DC500V	5×10^{10}	-	–	Ω
	Floating capacitance	Cf	V=0, f=1MH$_Z$	–	0.6	1.0	pF
	Cut-off frequency	fc	Vcc=5V,Ic=2mA,R_L=100Ω	–	7	–	kHz
	Response time (Rise)	tr	Vce=2V,Ic=2mA,R_L=100Ω	–	60	300	us
	Response time (Fall)	tf		–	53	250	us

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Fig.1 Current Transfer Ratio vs. Forward Current

Classification table of current transfer ratio is shown below.

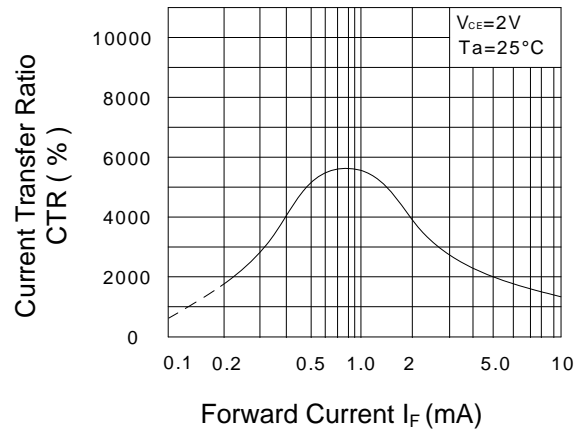| CTR RANK	CTR (%)
KPC355NT0E	Min.600

Fig.2 Collector Power Dissipation vs. Ambient Temperature
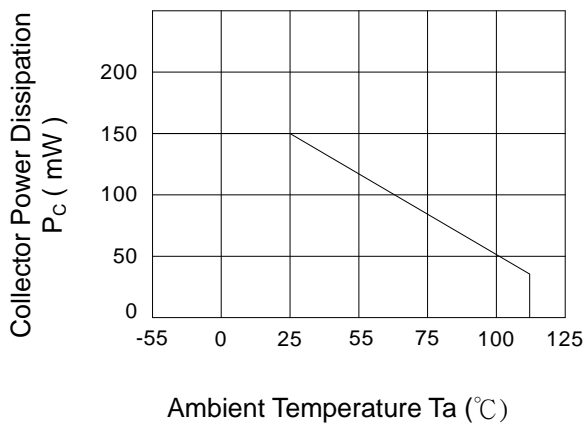

Fig.3 Collector Dark Current vs. Ambient Temperature
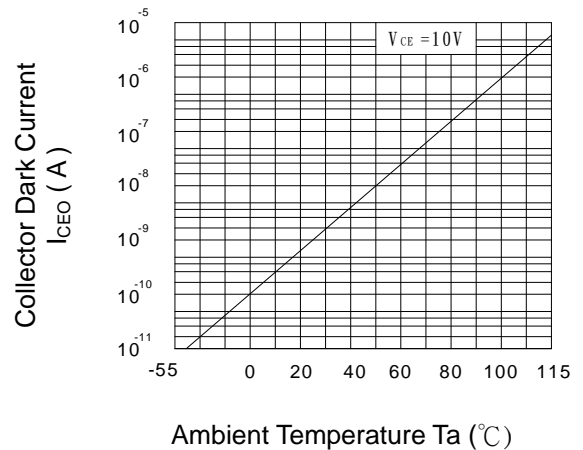

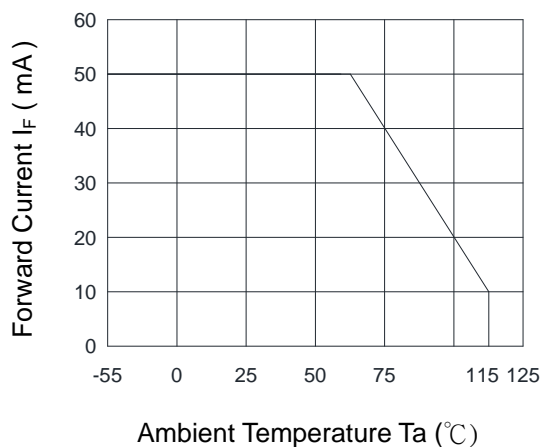### Fig.4 Forward Current vs. Ambient Temperature
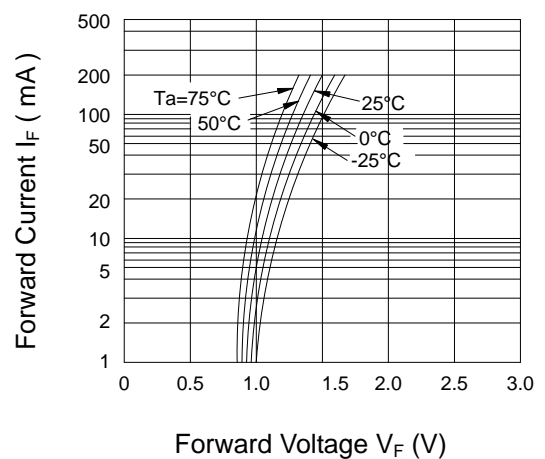

Fig.5 Forward Current vs. Forward Voltage
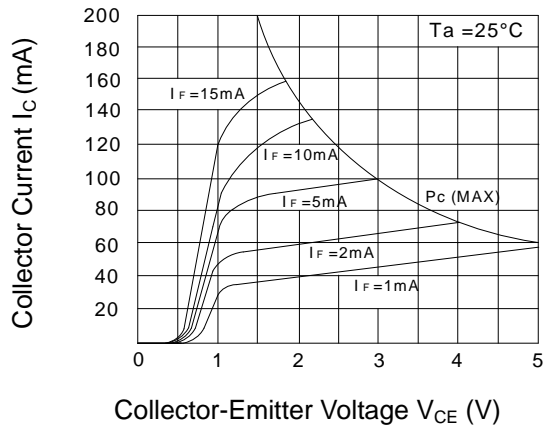
Fig.6 Collector Current vs. Collector-Emitter Voltage

Collector-Emitter Voltage V_{CE} (V)

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

Ambient Temperature Ta (℃)

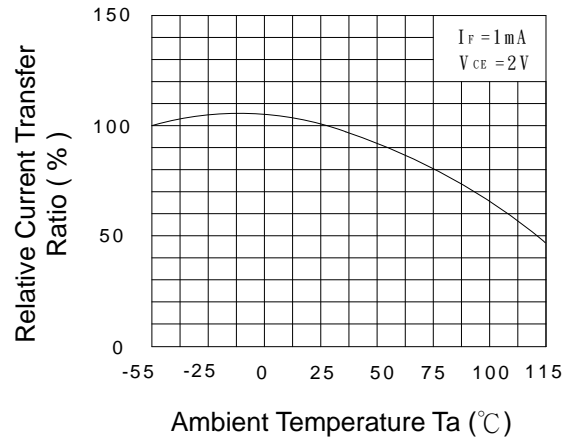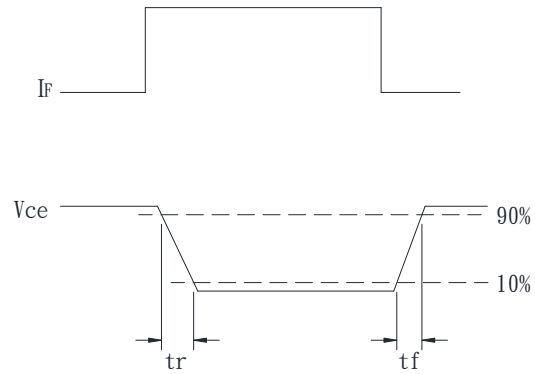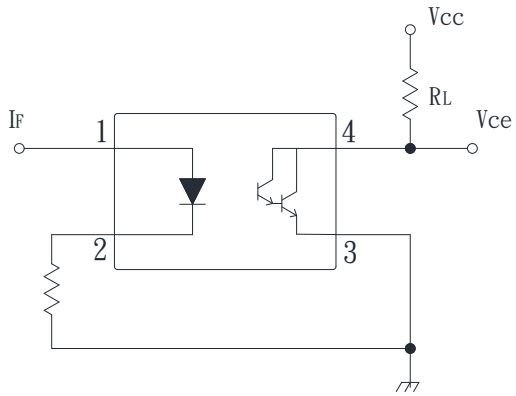## Fig.8 Collector-Emitter Saturation Voltage vs. Forward Current

Forward Current I_F (mA)
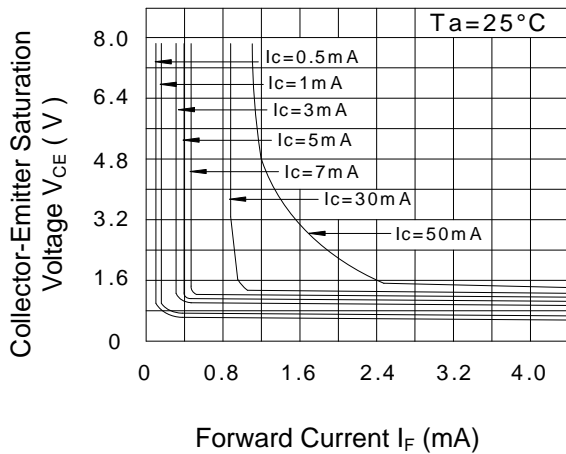
Fig.9 Response Time vs. Load Resistance

Load Resistance R_L (KΩ)
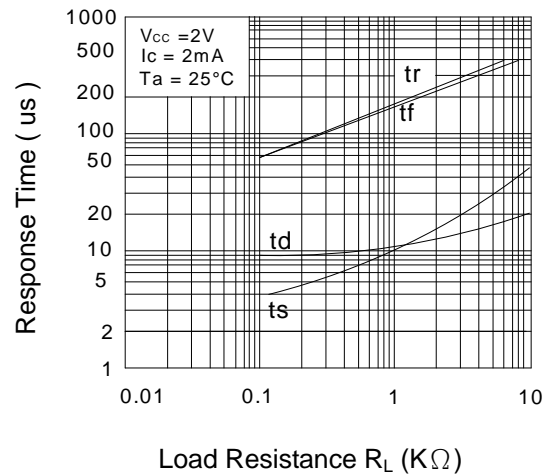
● **Test Circuit for Response Time**

● **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
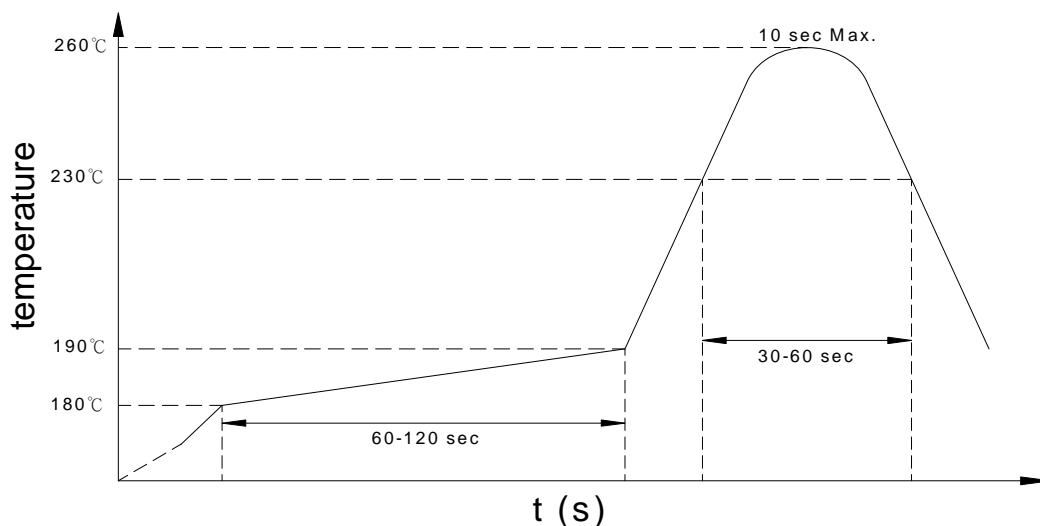
(b) Wave soldering：

■ 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.
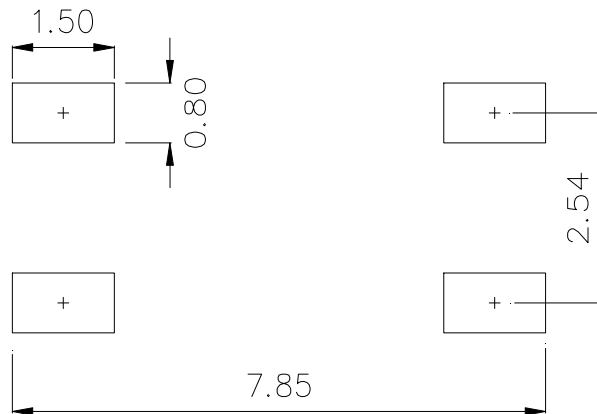
KPC355NT Series

● **Numbering System**

KPC355NT Y (Z)

Notes:

KPC355NT = 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**
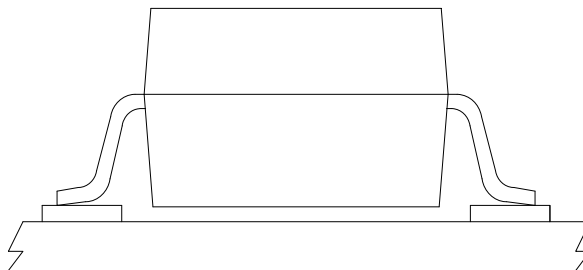
Unit：mm

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● **4-pin Mini-Flat Carrier Tape & Reel**

Unit：mm

TLD

TRU

TOLERANCE：±0.2mm

Direction of feed from reel

Direction of feed from reel
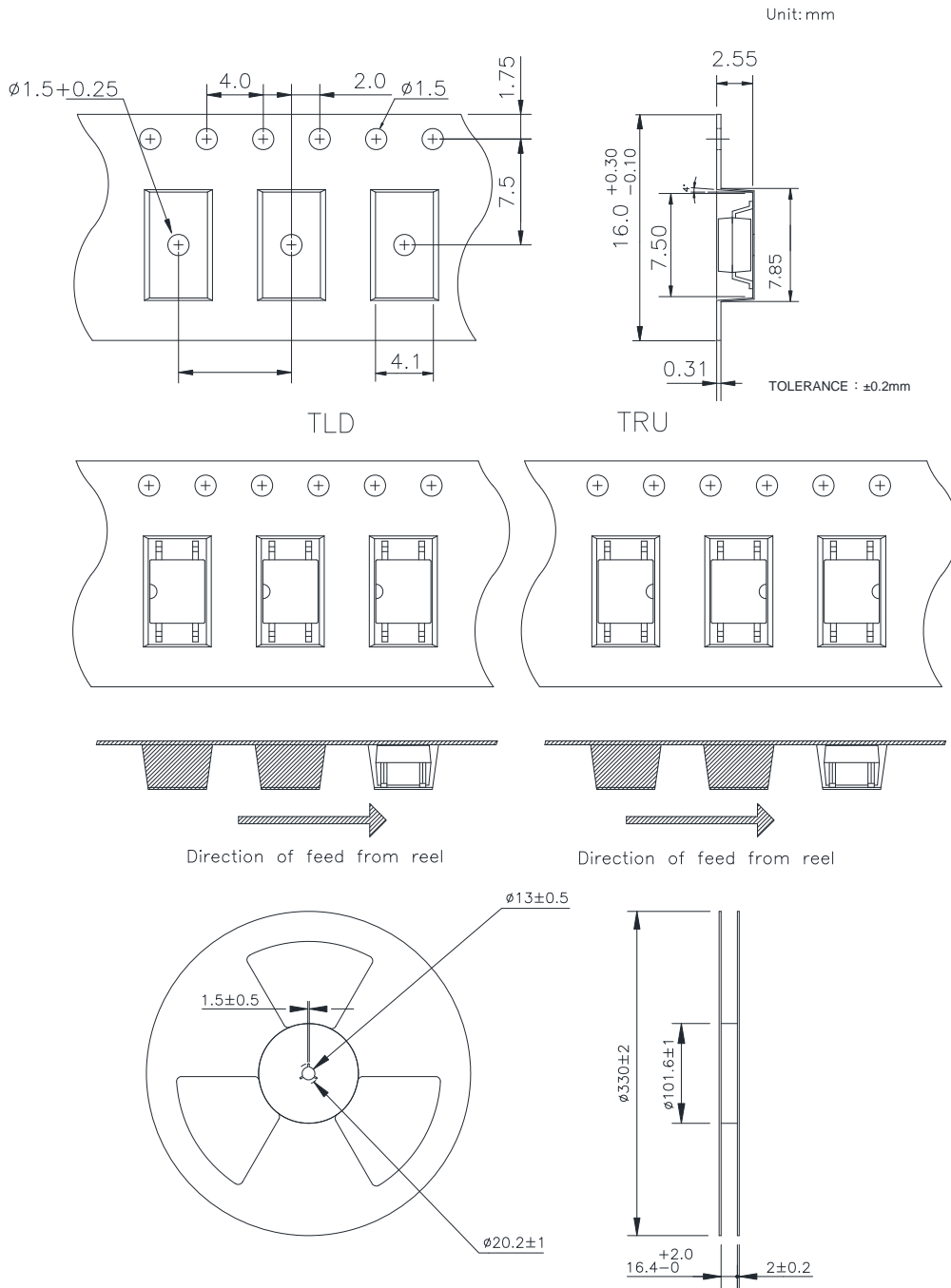
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