



## UPC356

Preliminary

PHOTOCOUPLER

### 4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER

#### DESCRIPTION

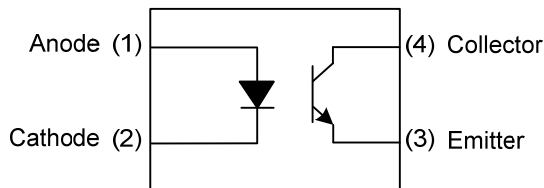
The UTC **UPC356** is a 4 pin SOP phototransistor photocoupler, it uses UTC's advanced technology to provide the customers with high isolation voltage between input and output, etc.

The UTC **UPC356** is suitable for programmable controllers and telecommunication equipments, etc.

#### FEATURES

- \* Current transfer ratio (CTR: MIN. 50% at  $I_F = \pm 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- \* Current transfer ratio (CTR: 50% to 300% at  $I_F = \pm 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- \* Response time ( $t_r$ : TYP.  $5.5\mu\text{s}$  at  $V_{CE} = 2\text{V}$ ,  $I_C = 2\text{mA}$ ,  $R_L = 1000\Omega$ )
- \* High input-output isolation voltage ( $V_{ISO} = 3,750\text{Vrms}$ )

#### SYMBOL



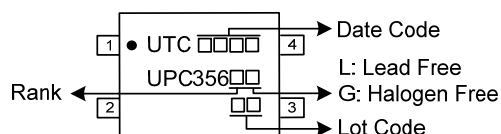
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
UPC356L-S04-R	UPC356G-S04-R	SOP-4	A / K	K / A	C	E	Tape Reel
UPC356xL-S04-R	UPC356xG-S04-R	SOP-4	A / K	K / A	C	E	Tape Reel

Note: Pin Assignment: A: Anode K: Cathode E: Emitter C: Collector

<p>UPC356xG-S04-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package (4) Rank</p>	<p>(1) R: Tape Reel (2) S04: SOP-4 (3) G: Halogen Free and Lead Free, L: Lead Free (4) Refer to TRANSFER CHARACTERISTICS</p>
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#### MARKING



■ ABSOLUTE MAXIMUM RATING ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

	PARAMETER	SYMBOL	RATINGS	UNIT
Input	Forward Current	$I_F$	50	mA
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	$P_D$	70	mW
Output	Collector-Emitter Voltage	$V_{CEO}$	80	V
	Emitter-Collector Voltage	$V_{ECO}$	6	V
	Collector Current	$I_C$	50	mA
	Collector Power Dissipation	$P_C$	150	mW
Total Power Dissipation		$P_{tot}$	170	mW
Isolation Voltage (Note 2)		$V_{ISO}$	3750	Vrms
Junction Temperature		$T_J$	+125	$^{\circ}\text{C}$
Operating Temperature		$T_{OPR}$	-55 ~ +110	$^{\circ}\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^{\circ}\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. 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.

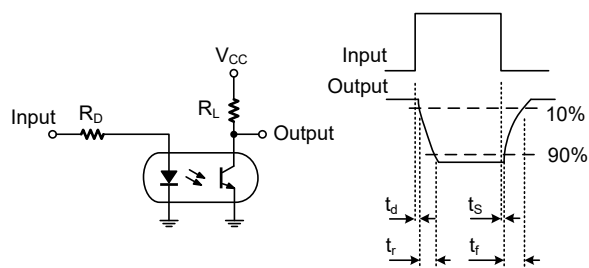
■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>INPUT</b>						
Forward Voltage	$V_F$	$I_F=20\text{mA}$			1.4	V
Reverse Current	$I_R$	$V_R=4\text{V}$			10	$\mu\text{A}$
<b>OUTPUT</b>						
Collector-Emitter Dark Current	$I_{CEO}$	$V_{CE}=20\text{V}$ , $I_F=0$			100	nA
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	$I_C=0.1\text{mA}$ , $I_F=0$	80			V
Emitter-Collector Breakdown Voltage	$BV_{ECO}$	$I_E=10\mu\text{A}$ , $I_F=0$	6			V

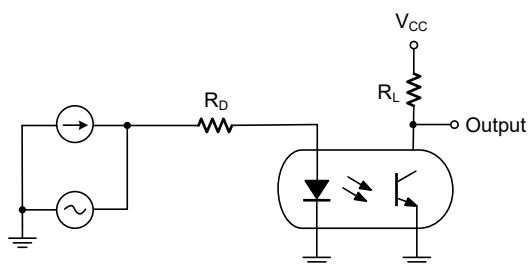
■ TRANSFER CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Collector Current	$I_C$	$I_F=5\text{mA}$ , $V_{CE}=5\text{V}$	2.5		30	mA
Current Transfer Ratio	CTR	$I_F=5\text{mA}$ , $V_{CE}=5\text{V}$	UPC356	50	600	%
			UPC356A	80	160	%
			UPC356B	130	260	%
			UPC356C	200	400	%
			UPC356D	300	600	%
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	$I_F=20\text{mA}$ , $I_C=1\text{mA}$			0.2	V
Isolation Resistance	$R_{IO}$	$V_{IO}=500\text{Vdc}$ , 40~60% R.H.	$5 \times 10^{10}$			$\Omega$
Rise Time	$t_r$	$V_{CE}=2\text{V}$ , $I_C=2\text{mA}$ , $R_L=100\Omega$			18	$\mu\text{s}$
Fall Time	$t_f$				18	$\mu\text{s}$

## ■ TEST CIRCUITS AND WAVEFORMS



Test Circuit for Response Time



Test Circuit for Frequency Response

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