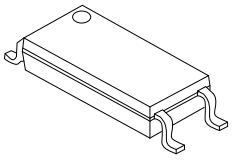
UPC10XX

PHOTOCOUPLER

4 PIN PHOTOTRANSISTOR PHOTOCOUPLER



LSOP-4

■ DESCRIPTION

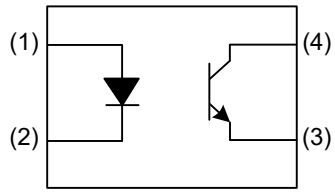
The UTC **UPC10XX** is a 4 pin phototransistor photocoupler, it uses UTC's advanced technology to provide the customers with high isolation voltage between input and output, etc.

The UTC **UPC10XX** is suitable for programmable controllers and telecommunication equipments, etc.

■ FEATURES

Current transfer ratio (CTR : MIN. 50% at I_F = 5mA, V_{CE} = 5V, T_A=25°C)
* High input-output isolation voltage (V_{ISO} = 5,000Vrms)
* High collector-emitter voltage (V_{CEO} = 70V)
* Temperature range -55°C to 110°C
* Creepage distance > 8mm
* Employs double transfer mold technology

■ SYMBOL



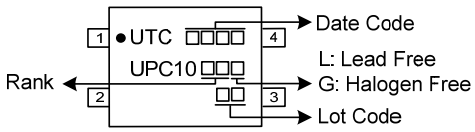
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
UPC10XXL-LS04-R	UPC10XXG-LS04-R	LSOP-4	A	K	E	C	Tape Reel

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

UPC10XXG-LS04-R (1)Packing Type (2)Package Type (3)Green Package (4)Rank	(1) R: Tape Reel (2) LS04: LSOP-4 (3) G: Halogen Free and Lead Free, L: Lead Free (4) Refer to TRANSFER CHARACTERISTICS

■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Input	Forward Current	I_F	60	mA
	Peak Forward Current (1μs, Pulse)	I_{FP}	1	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
	Derating Factor		1	mW/°C
Output	Power Dissipation	P_C	150	mW
	Derating Factor		1.5	mW/°C
	Collector Current	I_C	50	mA
	Collector-Emitter Voltage	V_{CEO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
Collector Power Dissipation		P_C	150	mW
Isolation Voltage (Note 2)		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-55 ~ +110	°C
Storage Temperature		T_{STG}	-55 ~ +125	°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.

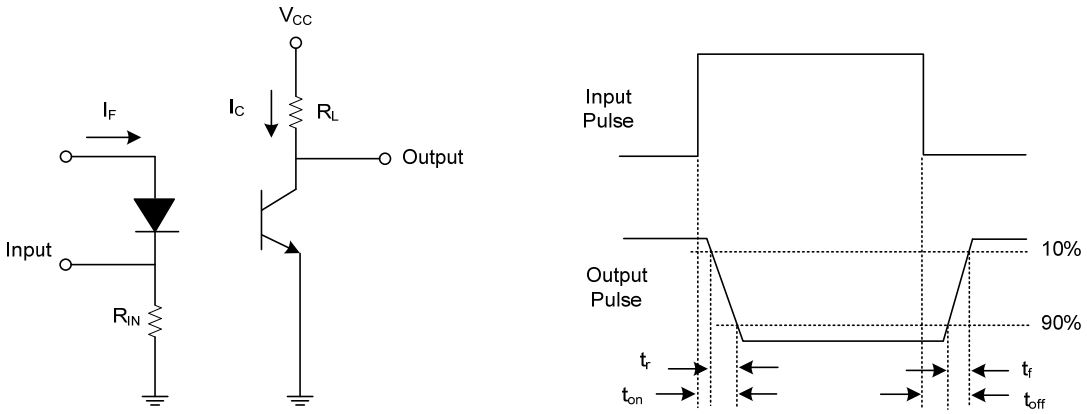
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT						
Forward Voltage	V_F	I_F=50mA		1.3	1.4	V
		I_F=100mA		1.35	1.6	V
Reverse Current	I_R	V_R=4V			10	μA
Input Capacitance	C_{IN}	V=0, f=1kHz		50		pF
OUTPUT						
Collector-Emitter Dark Current	I_{CEO}	V_{CE}=20V, I_F=0mA			100	nA
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=1mA, I_F=0mA	80			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	I_E=100μA, I_F=0mA	7			V

■ TRANSFER CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Collector Current	I_C	I_F=5mA, V_{CE}=5V		2.5		30	mA
Current Transfer Ratio	CTR	I_F=5mA, V_{CE}=5V	UPC1000	50		600	%
			UPC1001	100		160	%
			UPC1004	100		200	%
			UPC1005	50		150	%
			UPC1006	100		300	%
			UPC1007	80		160	%
			UPC1008	130		260	%
			UPC1009	200		400	%
			UPC1010	150		300	%
			UPC1019	250		500	%
		I_F=1mA, V_{CE}=5V	UPC1002	22			%
			UPC1003	34			%
			UPC1014	56			%
			UPC1015	63		125	%
			UPC1018	100		200	%
		I_F=10mA, V_{CE}=5V	UPC1002	63		125	%
			UPC1003	100		200	%
			UPC1014	160		320	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=10mA, I_C=1mA				0.3	V
Isolation Resistance	R_{IO}	V_{IO}=500Vdc, 40~60% R.H.		1×10^{12}			Ω
Floating Capacitance	C_{IO}	V_{IO}=0, f=1MHz			0.3		pF
Cut-Off Frequency	f_C	V_{CE}=5V, I_C=2mA, R_L=100Ω, -3dB			80		kHz
Turn-On Delay Time (Note 1)	$t_{D(ON)}$	V_{CE}=5V, I_C=2mA, R_L=100Ω			5		μs
Turn-Off Delay Time	$t_{D(OFF)}$				4.2		μs
Rise Time	t_R				3	18	μs
Fall Time	t_F				4.7	18	μs

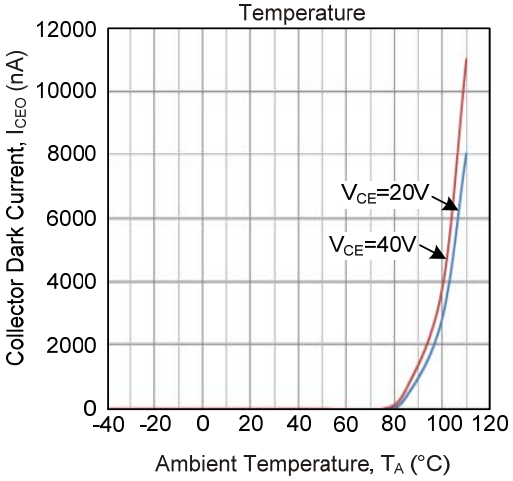
■ TEST CIRCUITS AND WAVEFORMS



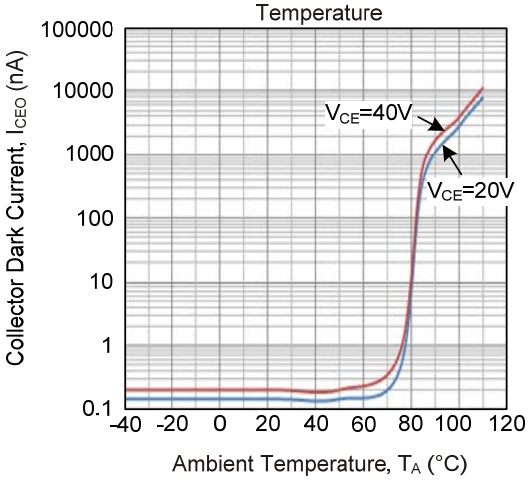
Switching Time Test Circuit & Waveforms

■ TYPICAL CHARACTERISTICS

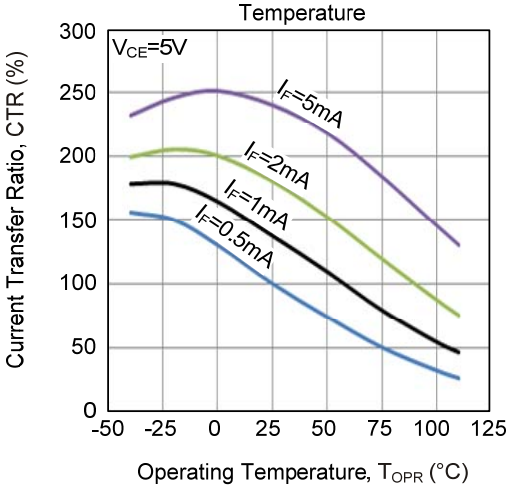
Collector Dark Current vs. Ambient Temperature



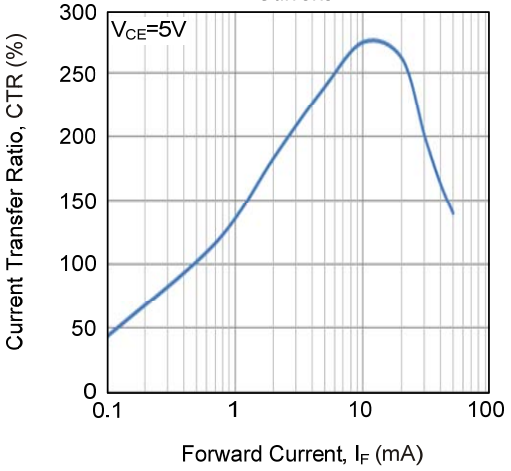
Collector Dark Current vs. Ambient Temperature



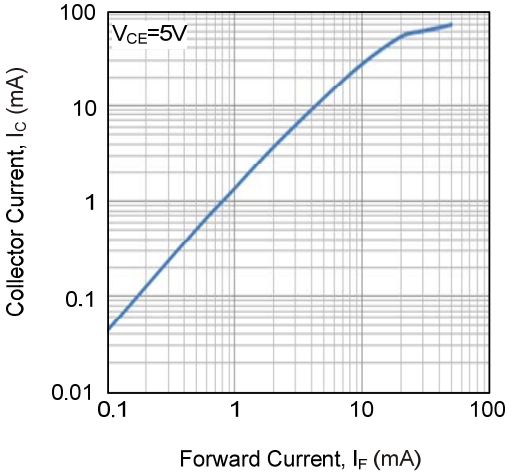
Current Transfer Ratio vs. Operating Temperature



Current Transfer Ratio vs. Forward Current



Collector Current vs. Forward Current



Life Prediction