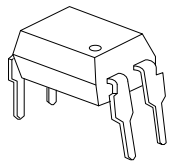
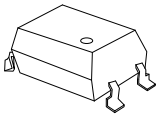
UPC816

PHOTOCOUPLER

4 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER



DIP-4



SMD-4

■ DESCRIPTION

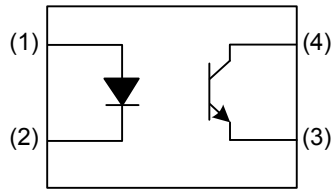
The UTC **UPC816** is a 4 pin DIP phototransistor photocoupler, it uses UTC's advanced technology to provide the customers with high isolation voltage between input and output, etc.

The UTC **UPC816** is suitable for programmable controllers and telecommunication equipments, etc.

■ FEATURES

* High isolation voltage between input and output
* Creepage distance > 7.62 mm

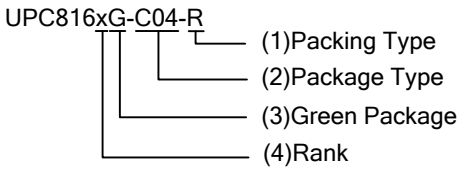
■ SYMBOL



■ ORDERING INFORMATION

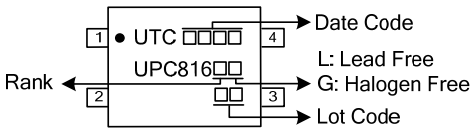
Ordering Number		Package	Pin Assignment				Packing
Lead Free	Halogen Free		1	2	3	4	
UPC816L-C04-R	UPC816G-C04-R	SMD-4	A	K	E	C	Tape Reel
UPC816xL-C04-R	UPC816xG-C04-R	SMD-4	A	K	E	C	Tape Reel
UPC816L-D04-T	UPC816G-D04-T	DIP-4	A	K	E	C	Tube
UPC816xL-D04-T	UPC816xG-D04-T	DIP-4	A	K	E	C	Tube

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



(1) R: Tape Reel, T: Tube
(2) C04: SMD-4, D04: DIP-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}	6	V
Total Power Dissipation		P_{TOT}	200	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.

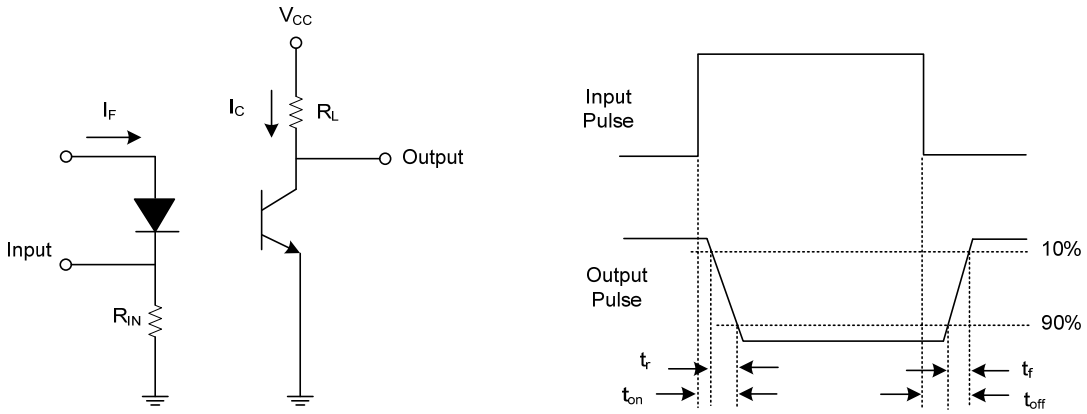
■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT						
Forward Voltage	V_F	I_F=20mA		1.2	1.4	V
Reverse Current	I_R	V_R=4V			10	μA
Input Capacitance	C_{IN}	V=0, f=1kHz		30	250	pF
OUTPUT						
Collector-Emitter Dark Current	I_{CEO}	V_{CE}=20V, I_F=0mA			100	nA
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=0.1mA	80			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	I_E=0.1mA	6			V

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

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Current Transfer Ratio	CTR	I_F=5mA ,V_{CE}=5V	UPC816	50		600	%
			UPC816A	80		160	%
			UPC816B	130		260	%
			UPC816C	200		400	%
			UPC816D	300		600	%
			UPC816X	100		200	%
			UPC816Y	150		300	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=20mA , I_C=1mA			0.1	0.2	V
Isolation Resistance	R_{IO}	V_{IO}=500Vdc, 40~60% R.H.		5×10^{10}			Ω
Floating Capacitance	C_{IO}	V_{IO}=0, f=1MHz			0.6	1.0	pF
Cut-Off Frequency	f_C	V_{CE}=5V, I_C=2mA, R_L=100Ω, -3dB			80		kHz
Rise Time	t_R	V_{CE}=2V, I_C=2mA, R_L=100Ω			4	18	μs
Fall Time	t_F				3	18	μs

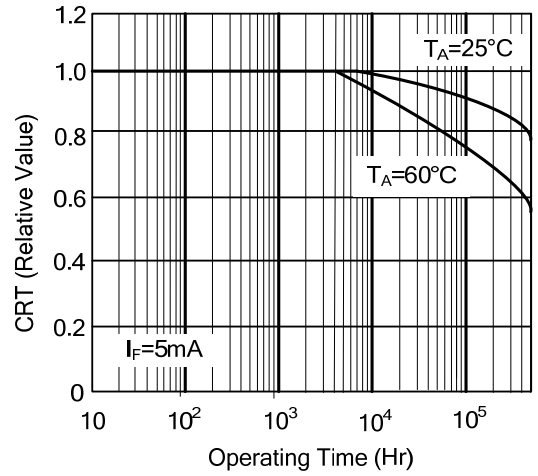
■ TEST CIRCUITS AND WAVEFORMS



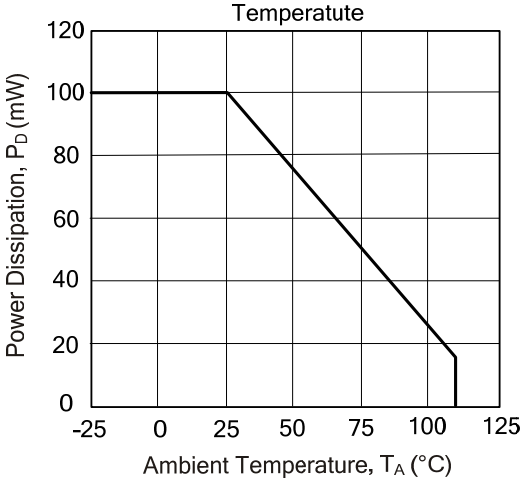
Switching Time Test Circuit & Waveforms

■ TYPICAL CHARACTERISTICS

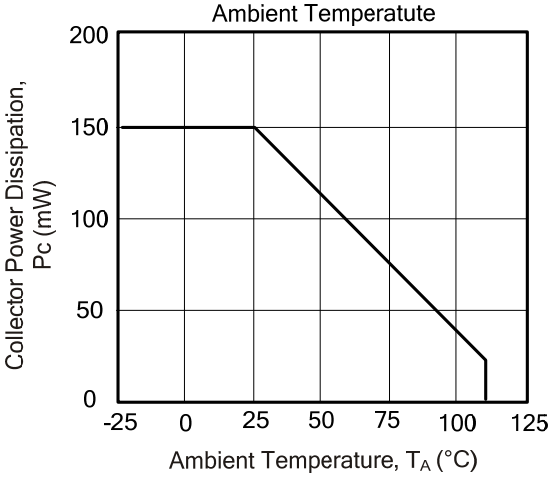
Life Prediction



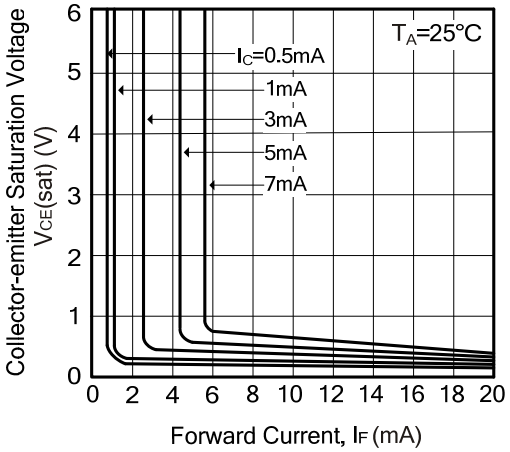
Power Dissipation vs. Ambient Temperatute



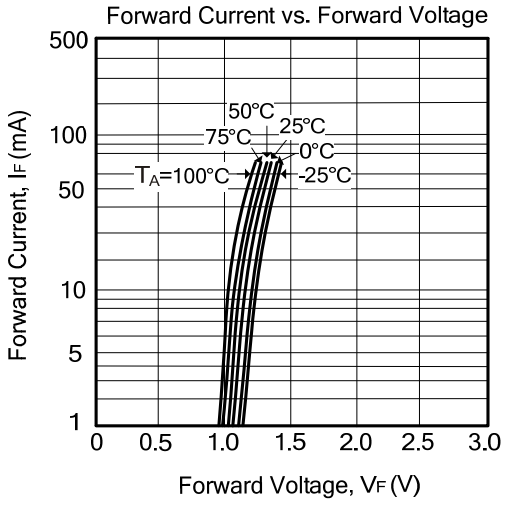
Collector Power Disspition vs. Ambient Temperatute



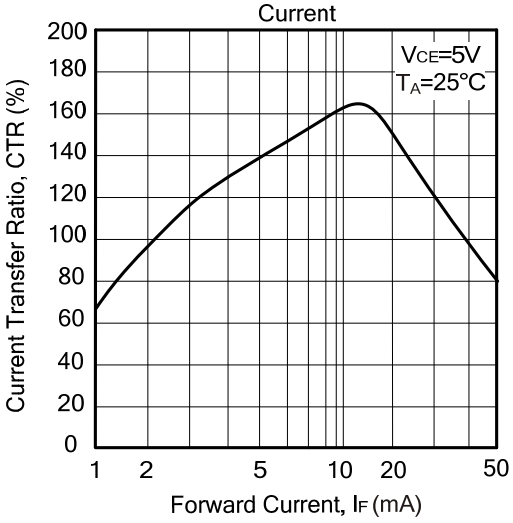
Collector-emitter Saturation Voltage vs. Forward Current



Forward Current vs. Forward Voltage

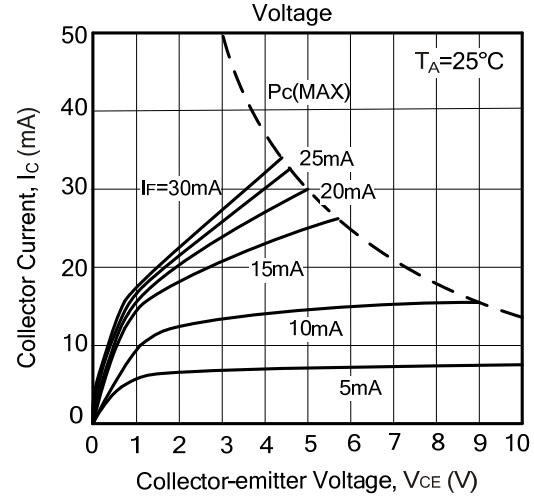


Current Transfer Ratio vs. Forward Current

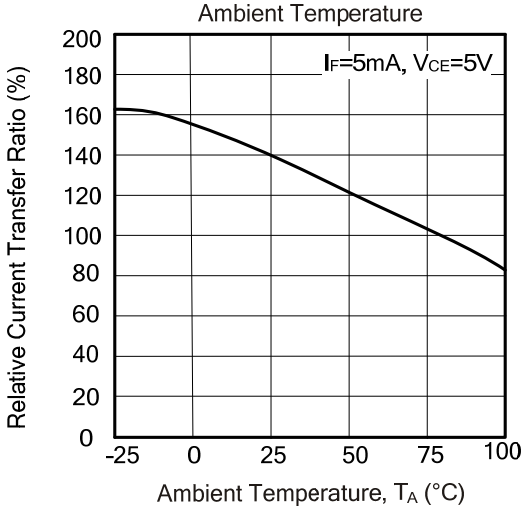


■ TYPICAL CHARACTERISTICS

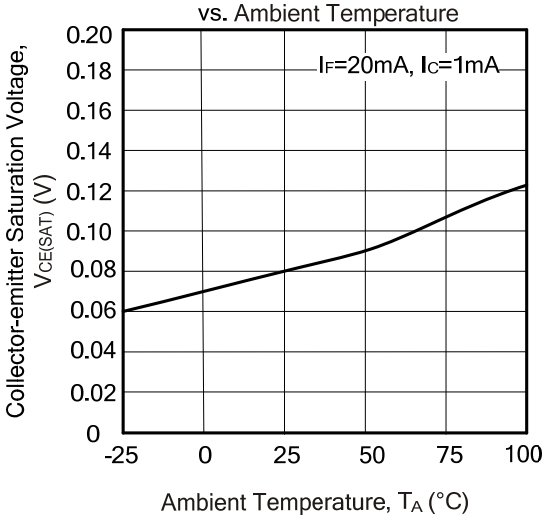
Collector Current vs. Collector-emitter Voltage



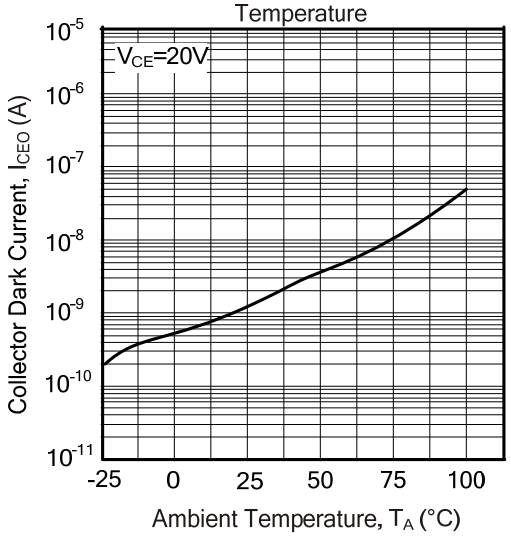
Relative Current Transfer Ratio vs. Ambient Temperature



Collector-emitter Saturation Voltage vs. Ambient Temperature



Collector Dark Current vs. Ambient Temperature



Switching Time vs Load Resistance