PC813 Series

AC Input Type & High Noise Reduction Type Photocoupler

■ Features

1. High instantaneous common mode rejection voltage
   (CM_H : TYP.2kV/μs)
2. AC input response
3. Compact dual-in-line package
   PC813 (1ch), **PC823** (2ch), **PC843** (4ch)
4. High isolation voltage between input and output
   (V_{iso} : 5 000V $_{rms}$)
5. Recognized by UL, file No. E64380

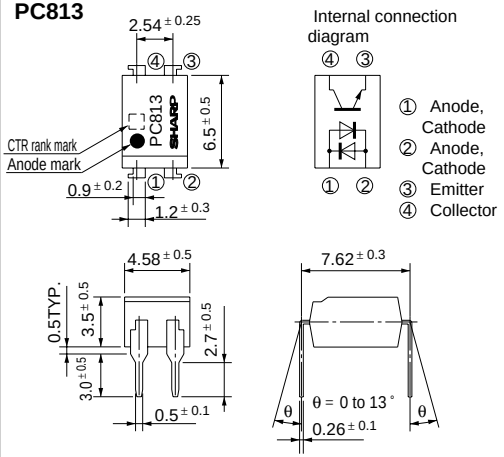
■ Applications

1. Telephones (**PC813**)
2. Programmable controllers
   (**PC823/PC843**)
3. System appliances, measuring instruments
4. Signal transmission between circuits of different potentials and impedances

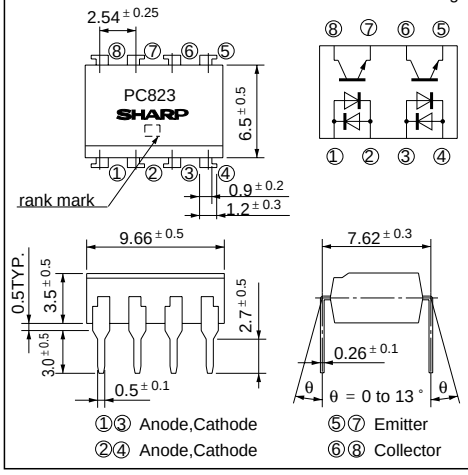
■ Outline Dimensions

(Unit : mm)

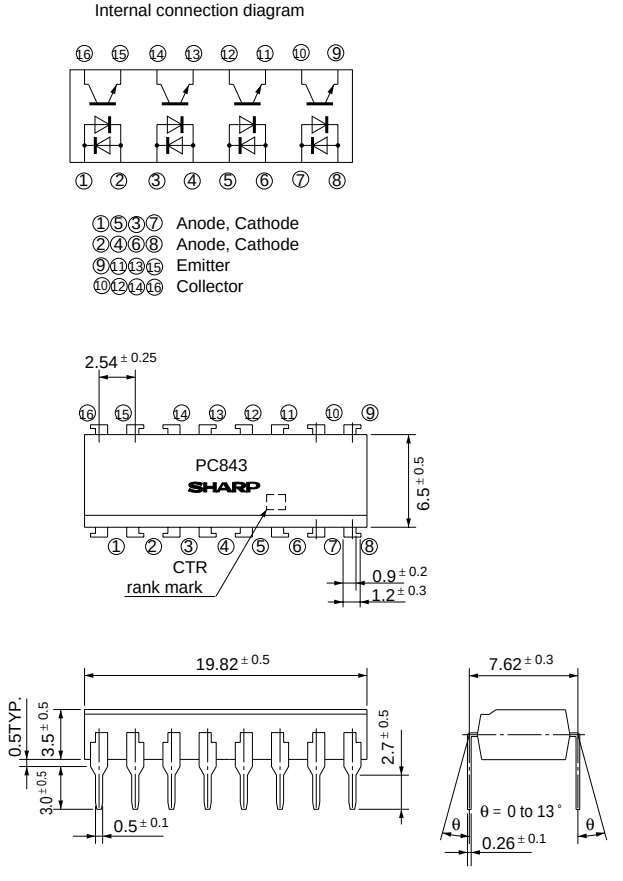
PC813



PC823



PC843



■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	± 50	mA
	*1Peak forward current	I_{FM}	± 1	A
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	35	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}	200	mW
*2Isolation voltage		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	- 30 to + 100	˚C
Storage temperature		T_{stg}	- 55 to + 125	˚C
*3Soldering temperature		T_{sol}	260	˚C

*1 Pulse width<=100μs, Duty ratio : 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

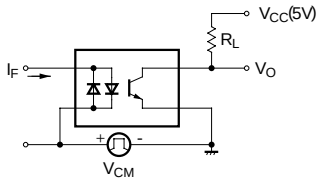
■ Electro-optical Characteristics (Ta= 25˚C)

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	-	-	3.0	V
	Terminal capacitance		C_t	V = 0, f = 1kHz	-	50	250	pF
Output	Collector dark current		I_{CEO}	V_{CE} = 20V, I_F = 0	-	-	10^{-7}	A
Transfer characteristics	*4Current transfer ratio		CTR	I_F = ± 1mA, V_{CE} = 5V	20	-	200	%
	Collector-emitter saturation voltage		$V_{CE(sat)}$	I_F = ± 20mA, I_C = 1mA	-	0.1	0.2	V
	Isolation voltage		R_{ISO}	DC500V, 40 to 60% RH	5×10^{10}	10^{11}	-	Ω
	Floating capacitance		C_f	V = 0, f = 1MHz	-	0.6	1.0	pF
	Cut-off frequency		f_c	V_{CE} = 5V, I_C = 2mA, R_L = 100Ω,-3dB	15	80	-	kHz
	Response time	Rise time	t_r	V_{CE} = 2V, I_C = 2mA	-	4	18	μs
		Fall time	t_f	R_L = 100Ω	-	5	20	μs
	*5Instantaneous common mode rejection voltage "Output : high level"		CM_H	V_{CM} = 600V, I_F = 0 V_O = 2V, R_L = 1.9kΩ,Vcc=5V	-	2	-	kV/μs
	*5Instantaneous common mode rejection voltage "Output : low level"		CM_L	V_{CM} = 600V, I_F = 16mA V_O = 0.8V, R_L = 1.9kΩ,Vcc=5V	-	2	-	kV/μs

*4 Classification table of current transfer ratio is shown below

Model No.	Rank Mark	CTR (%)
PC813A	A	50 to 150%
PC823A		
PC843A		
PC813	A or no mark	20 to 200%
PC823		
PC843		

***5 Test Circuit for instantaneous common mode rejection voltage**



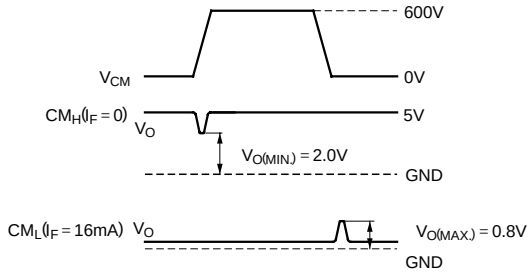


Fig. 1 Forward Current vs. Ambient Temperature

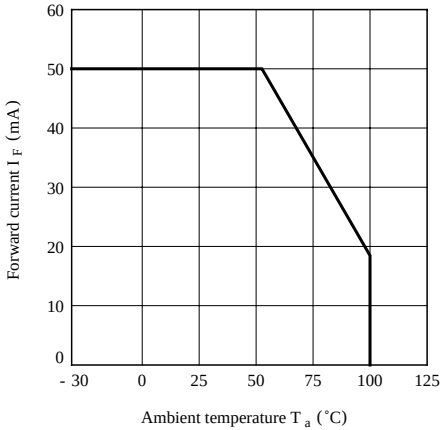


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

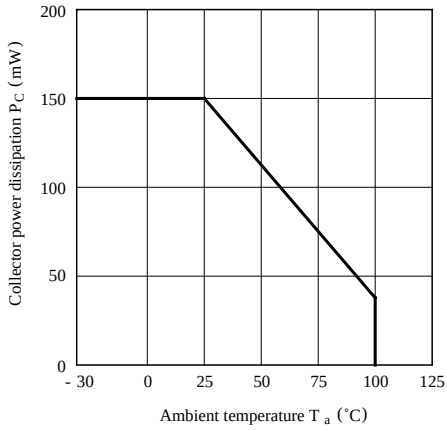


Fig. 3 Peak Forward Current vs. Duty Ratio

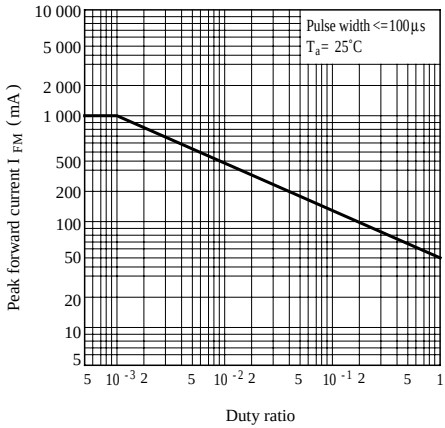


Fig. 4 Forward Current vs. Forward Voltage

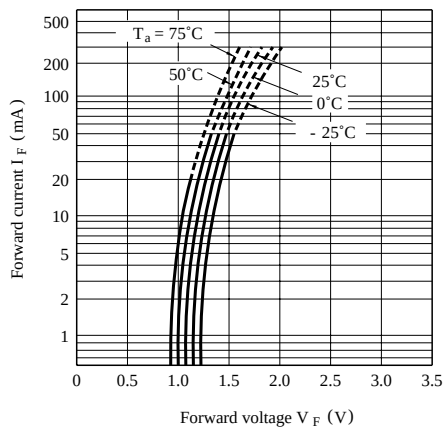


Fig. 5 Current Transfer Ratio vs. Forward Current

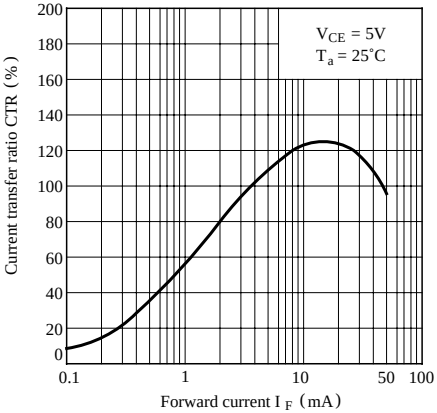


Fig. 6 Collector Current vs. Collector-emitter Voltage

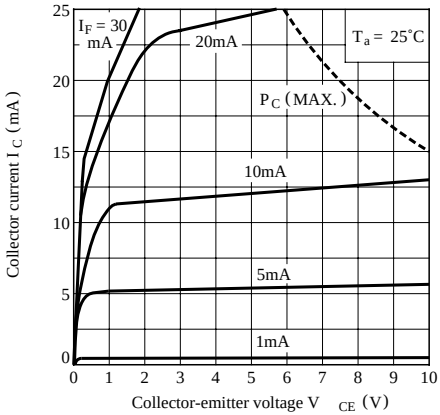


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

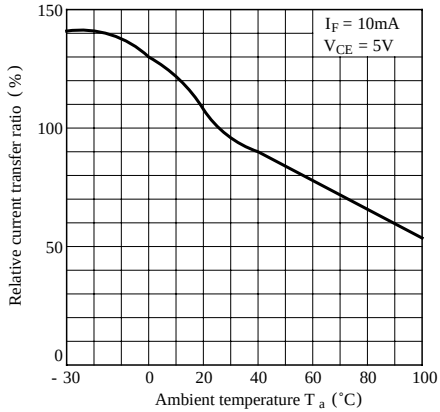


Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

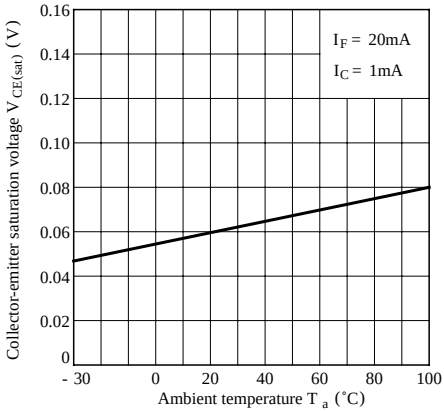


Fig. 9 Collector Dark Current vs. Ambient Temperature

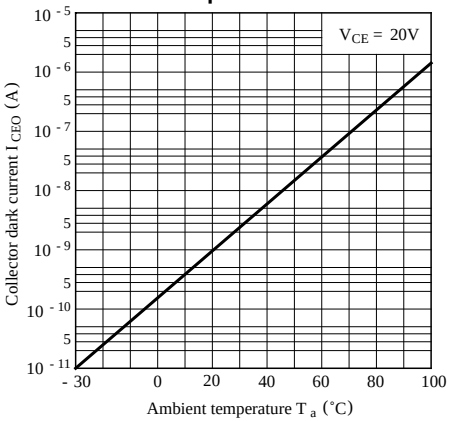


Fig.10 Response Time vs. Load Resistance

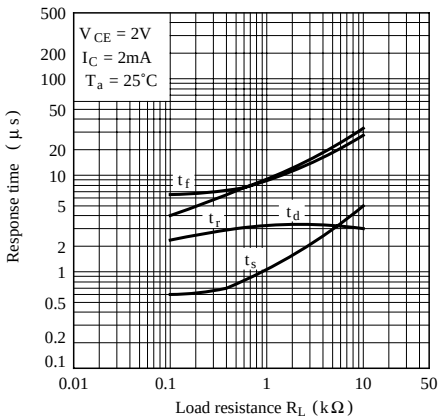
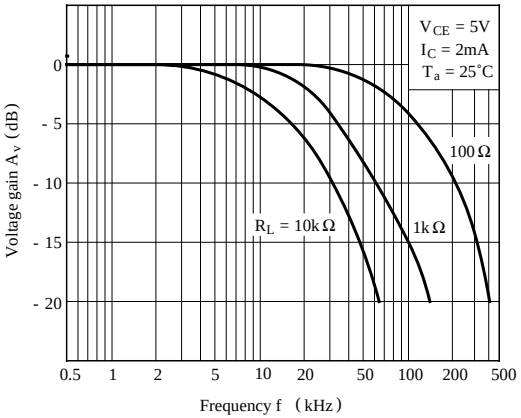


Fig.11 Frequency Response



Test Circuit for Response Time

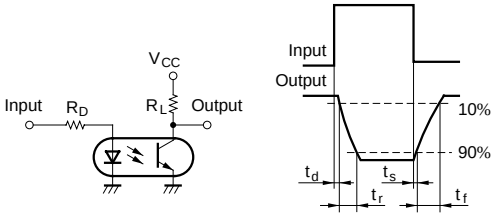
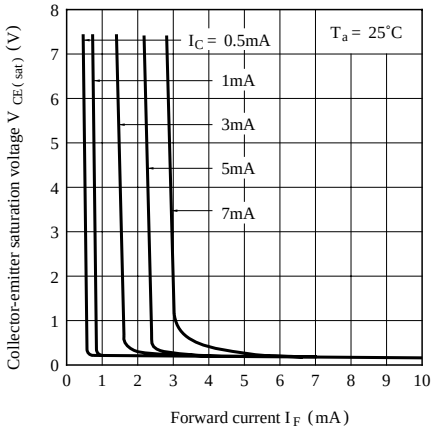
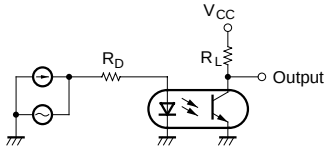


Fig.12 Collector-emitter Saturation Voltage vs. Forward Current



Test Circuit for Frepuency Response



●Please refer to the chapter "Precautions for Use"

NOTICE

- The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

(i) The devices in this publication are designed for use in general electronic equipment designs such as:
— Personal computers
— Office automation equipment
— Telecommunication equipment [terminal]
— Test and measurement equipment
— Industrial control
— Audio visual equipment
— Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
— Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
— Traffic signals
— Gas leakage sensor breakers
— Alarm equipment
— Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
— Space applications
— Telecommunication equipment [trunk lines]
— Nuclear power control equipment
— Medical and other life support equipment (e.g., scuba).

- Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
-
- Contact and consult with a SHARP representative if there are any questions about the contents of this publication.