CEL

PHOTOCOUPLER
PS2841-4A,PS2841-4B

WORLD'S SMALLEST CLASS, FOUR CHANNELS 12-PIN ULTRA SHRINK SOP PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

The PS2841-4A and PS2841-4B are optically coupled isolators containing GaAs light emitting diodes and NPN silicon phototransistors.

These products include four channels in a single package for high-density mounting applications.

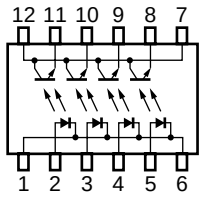
The PS2841-4A and PS2841-4B are the world's smallest class of photocouplers and realize about 50% reduction in mounting area compared with the PS280x and PS281x Series.

FEATURES

- Ultra small and thin package
  (12-pin ultra shrink SOP, Pin pitch 0.8 mm, 4.4 (L) × 5.6 (W) × 2.5 (H))
- Common lead PS2841-4A: cathode, collector common
  PS2841-4B: anode, collector common
- High current transfer ratio (CTR = 200% TYP. @ I_F = 1mA)
- High isolation voltage (BV = 1 500 Vr.m.s.)
- Pb-Free product
- Ordering number of tape product:
  PS2841-4A-F3, F4: 2 500 pcs/reel
  PS2841-4B-F3, F4: 2 500 pcs/reel
- Safety standards
  - UL approved: File No. E72422

PIN CONNECTIONS
(Top View)

PS2841-4A



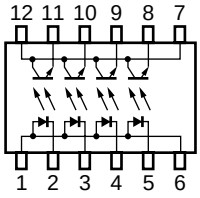
Channel	Anode	Cathode	Emitter	Collector
1 ch	2	1, 6 common	11	7, 12 common
2 ch	3	1, 6 common	10	7, 12 common
3 ch	4	1, 6 common	9	7, 12 common
4 ch	5	1, 6 common	8	7, 12 common

APPLICATIONS

- Programmable logic controllers (PLCs)
- Input and output forfunction automation
- Hybrid IC

PIN CONNECTIONS
(Top View)

PS2841-4B



Channel	Anode	Cathode	Emitter	Collector
1 ch	1, 6 common	2	11	7, 12 common
2 ch	1, 6 common	3	10	7, 12 common
3 ch	1, 6 common	4	9	7, 12 common
4 ch	1, 6 common	5	8	7, 12 common

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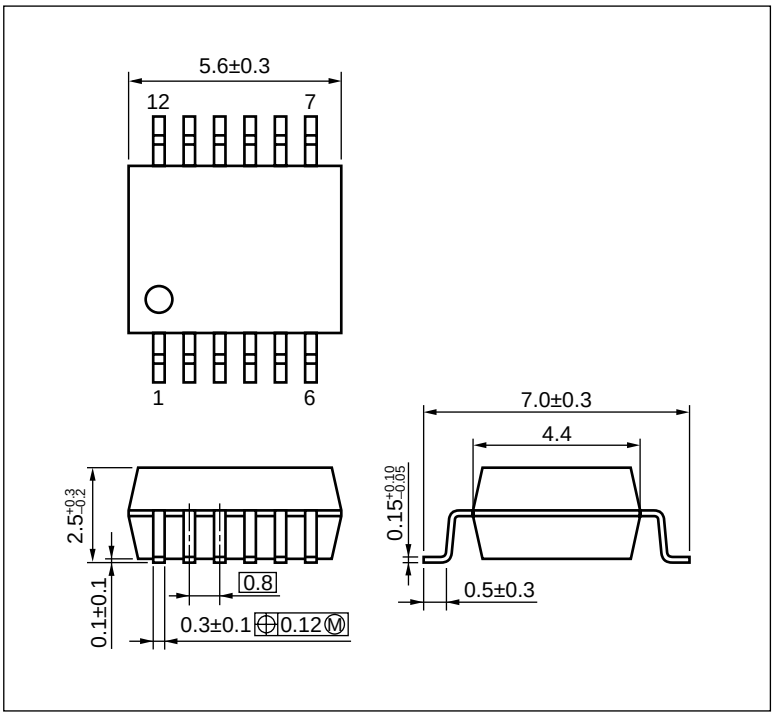
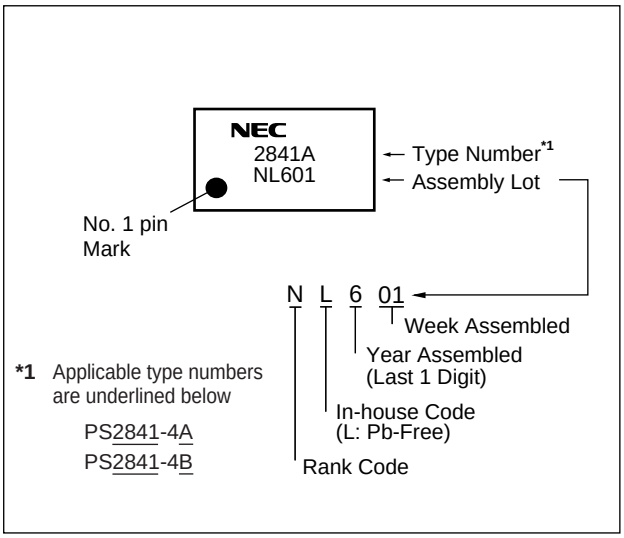
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PACKAGE DIMENSIONS (UNIT: mm)



<R> **MARKING EXAMPLE**



<R> **ORDERING INFORMATION**

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number *1
PS2841-4A-F3	PS2841-4A-F3-A	Pb-Free	Embossed Tape 2 500 pcs/reel	Standard products (UL Approved)	PS2841-4A
PS2841-4A-F4	PS2841-4A-F4-A				
PS2841-4B-F3	PS2841-4B-F3-A				PS2841-4B
PS2841-4B-F4	PS2841-4B-F4-A				

***1** For the application of the Safety Standard, following part number should be used.

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

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	20	mA/ch
	Reverse Voltage	V_R	6	V
	Power Dissipation Derating	ΔI_F /°C	0.2	mA /°C
	Peak Forward Current *1	I_{FP}	0.5	A/ch
Transistor	Collector to Emitter Voltage	V_{CEO}	70	V
	Emitter to Collector Voltage	V_{ECO}	5	V
	Collector Current	I_C	20	mA/ch
	Power Dissipation Derating	ΔP_C/°C	0.4	mW/°C
	Power Dissipation	P_C	40	mW/ch
Isolation Voltage *2		BV	1 500	Vr.m.s.
Operating Ambient Temperature		T_A	–40 to +100	°C
Storage Temperature		T_{stg}	–55 to +125	°C

***1** PW = 100 μs, Duty Cycle = 1%

***2** AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.
Pins 1-6 shorted together, 7-12 shorted together.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

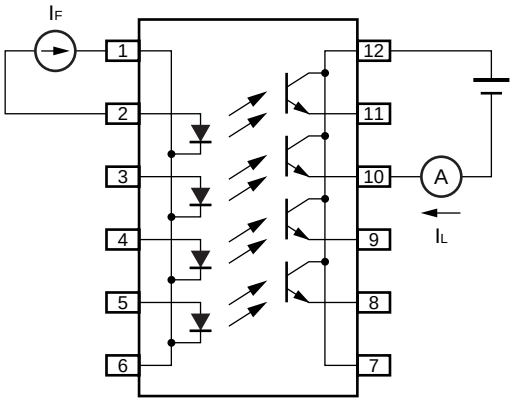
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 1 mA	0.9	1.1	1.2	V
	Reverse Current	I_R	V_R = 5 V			10	μA
	Terminal Capacitance	C_t	V = 0 V, f = 1 MHz		15		pF
Transistor	Collector to Emitter Current	I_{CEO}	I_F = 0 mA, V_{CE} = 24 V			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	I_F = 1 mA, V_{CE} = 0.4 V	100	200	400	%
	Optical Leakage Current *1 (1 to 2-ch, 2 to 3-ch, 3 to 4-ch)	I_L	I_F = 5 mA, V_{CE} = 24 V			100	nA
	Collector Saturation Voltage	$V_{CE (sat)}$	I_F = 1 mA, I_C = 0.2 mA		0.13	0.3	V
	Isolation Resistance	R_{I-O}	V_{I-O} = 1 kV_{DC}	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	V = 0 V, f = 1 MHz		0.4		pF
	Turn-on Time *2	t_{on}	V_{CC} = 5 V, I_F = 1 mA, R_L = 5 kΩ		20		μs
	Turn-off Time *2	t_{off}			110		

***1** The optically induced leakage current is current which can be measured at transistor if LED = ”ON” and LED = ”OFF”.

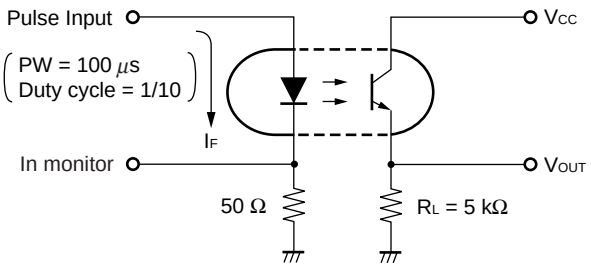
LED of channel 1 is switched to ”ON”.

At Tr-output of channel 2 a voltage is applied and one can measure a current between emitter and collector.

This is leakage current (at I_F = 5 mA, V_{CEO} = 24 V).
Measurement circuits for optical leakage current
E.g. : In the case of 1 to 2-ch (PS2841-4A)

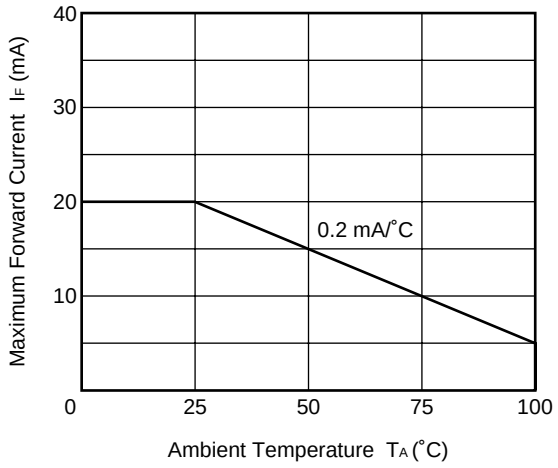


***2** Test circuit for switching time

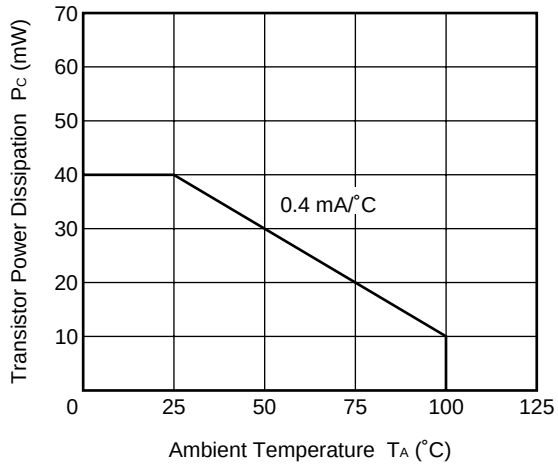


TYPICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

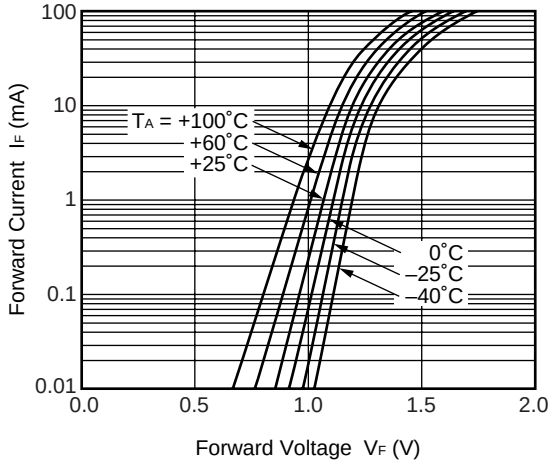
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



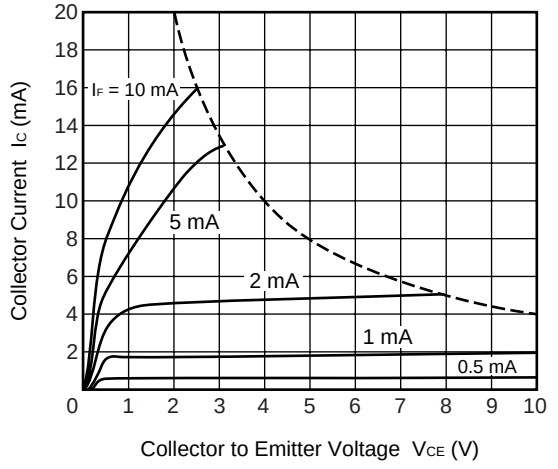
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



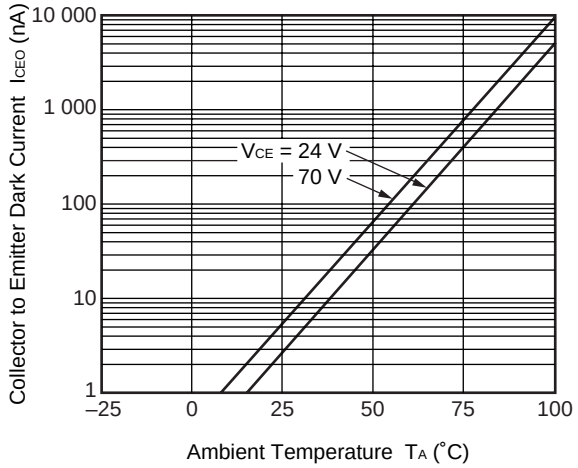
FORWARD CURRENT vs. FORWARD VOLTAGE



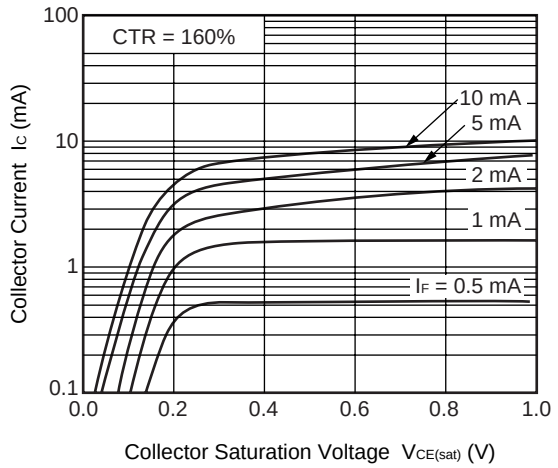
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

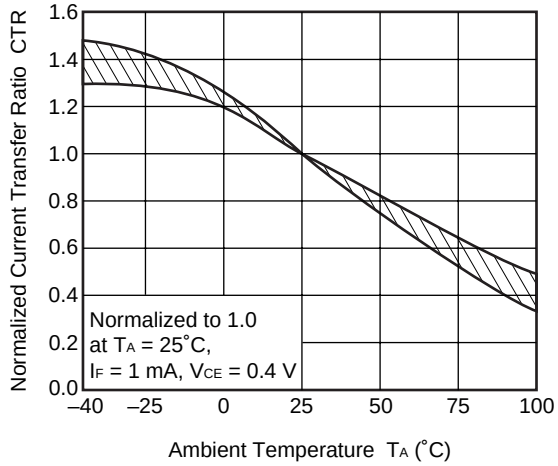


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

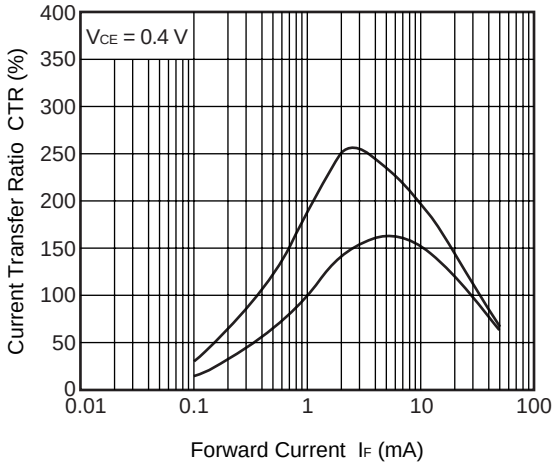


Remark The graphs indicate nominal characteristics.

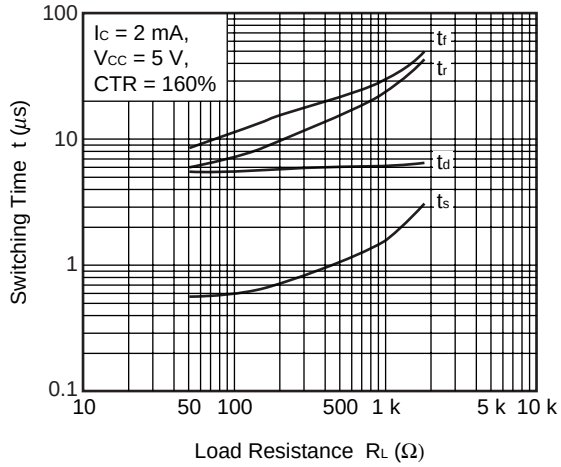
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



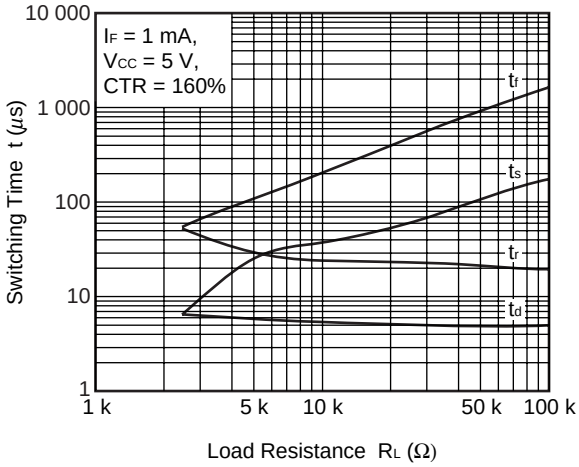
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



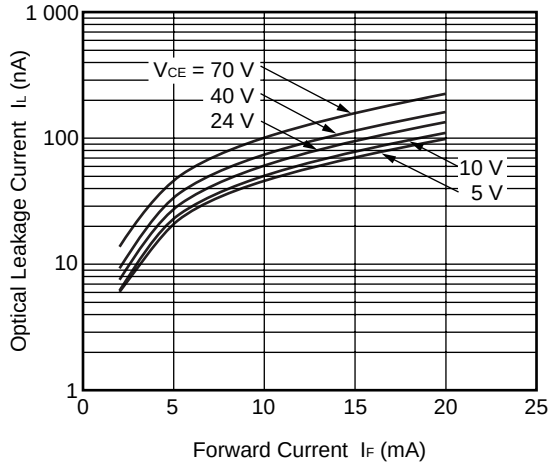
SWITCHING TIME vs. LOAD RESISTANCE



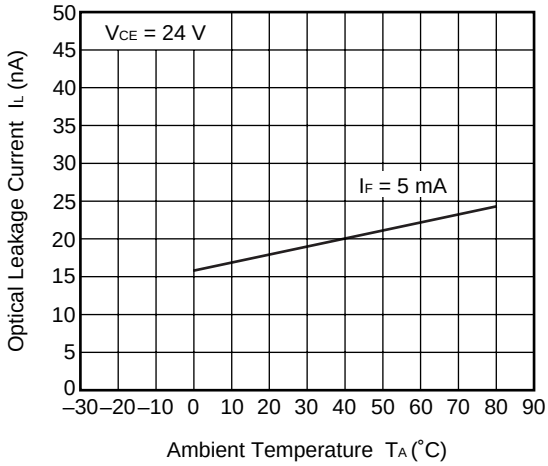
SWITCHING TIME vs. LOAD RESISTANCE



OPTICAL LEAKAGE CURRENT vs. FORWARD CURRENT



OPTICAL LEAKAGE CURRENT vs. AMBIENT TEMPERATURE



Remark The graphs indicate nominal characteristics.