

**NEC**

OCMOS FET™

**PS7841C-A11, PS7841C-A15****FOR OPTICAL DAA, CURRENT LIMIT TYPE  
16-PIN SSOP OCMOS FET****DESCRIPTION**

The PS7841C-A11 and PS7841C-A15 are solid state relays for optical DAA (Data Access Arrangement). They have an OCMOS FET with current control circuit, photocoupler, diode bridge and darlington transistor.

Current control circuit of OCMOS FET protects output circuit and this device from thermal breakdown.

This device is suitable for analog signal control applications such as laptop PCs, modem cards, voice telephony and fax machines.

**FEATURES**

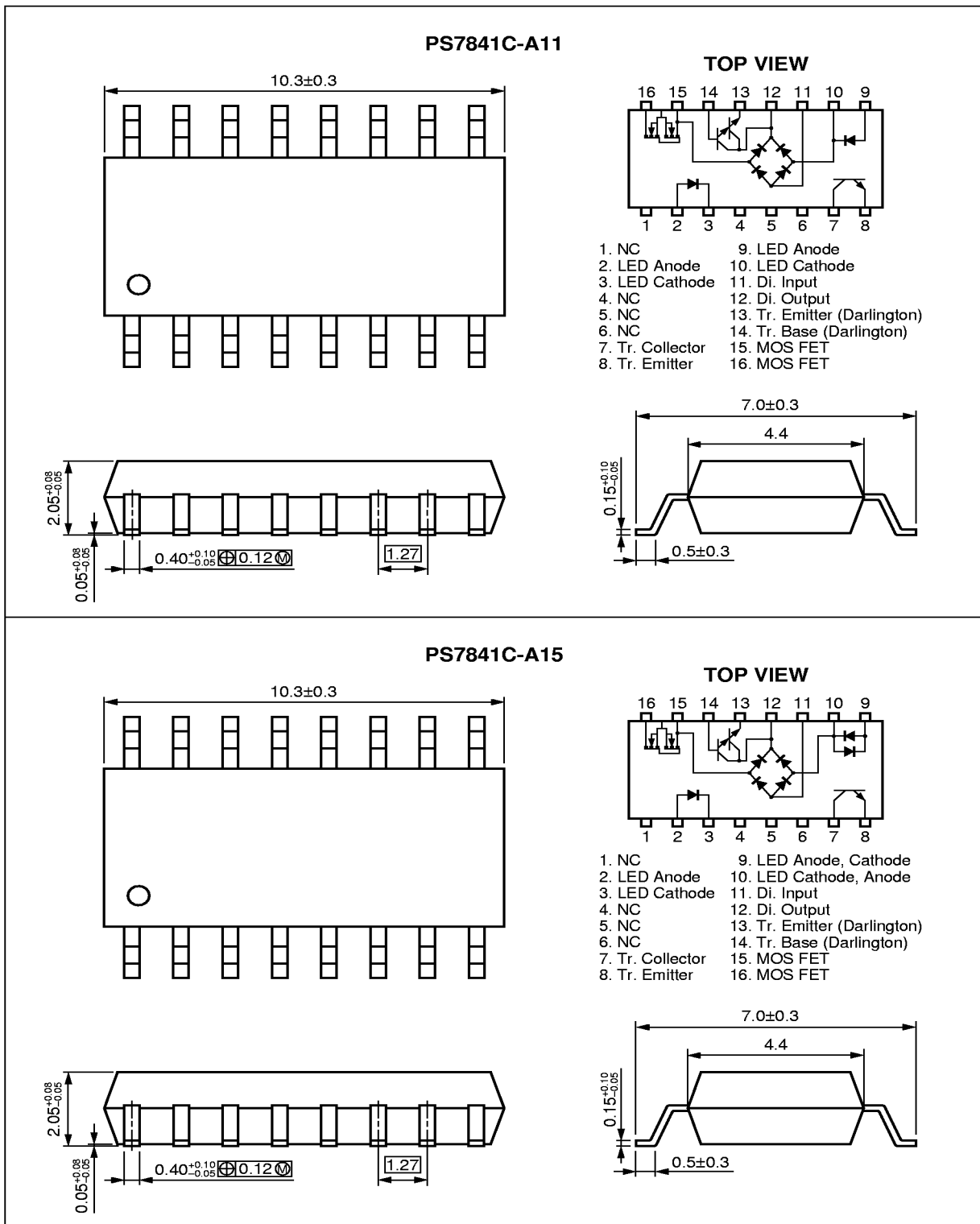
- For optical DAA circuit
  - OCMOS FET
  - Photocoupler DC input response : PS7841C-A11  
AC input response : PS7841C-A15
  - Diode bridge
  - Darlington transistor
- Limit Current ( $I_{LMT} = 180 \text{ mA TYP.}$ )
- Low LED Operating Current ( $I_F = 2 \text{ mA}$ )
- Small and thin package (16-pin SSOP: 255 mil, Pin pitch = 1.27 mm, Height = 2.1 mm)
- Ordering number of taping product: PS7841C-A11-F3, F4, PS7841C-A15-F3, F4

**APPLICATIONS**

- Laptop PC, PDA
- Modem card
- Telephone, FAX

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.  
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

PACKAGE DIMENSIONS (in millimeters)



**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

Parameter		Symbol	Ratings	Unit	
OCMOS FET (Pin No. 2, 3, 15, 16)	Diode	Forward Current (DC)	I <sub>F</sub>	50	mA
		Reverse Voltage	V <sub>R</sub>	5.0	V
		Power Dissipation	P <sub>D</sub>	50	mW
		Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1	A
	MOS FET	Break Down Voltage	V <sub>L</sub>	400	V
		Continuous Load Current	I <sub>L</sub>	120	mA
		Pulse Load Current <sup>*2</sup> (AC/DC Connection)	I <sub>LP</sub>	250	mA
		Power Dissipation	P <sub>D</sub>	430	mW
Photocoupler (Pin No. 7, 8, 9, 10)	Diode	Forward Current	I <sub>F</sub>	50	mA
		Reverse Voltage <sup>*3</sup>	V <sub>R</sub>	5.0	V
		Power Dissipation	P <sub>D</sub>	50	mW
		Peak Forward Current <sup>*1</sup>	I <sub>FP</sub>	1	A
	Transistor	Collector to Emitter Voltage	V <sub>CEO</sub>	40	V
		Collector Current	I <sub>C</sub>	80	mA
		Power Dissipation	P <sub>C</sub>	50	mW
Diode Bridge (Pin No. 10, 11, 12, 15)	Forward Current	I <sub>F</sub>	140	mA	
	Reverse Voltage	V <sub>R</sub>	100	V	
Darlington Transistor (Pin No. 12, 13, 14)	Collector to Emitter Voltage	V <sub>CEO</sub>	40	V	
	Collector Current	I <sub>C</sub>	120	mA	
	Power Dissipation	P <sub>C</sub>	500	mW	
Isolation Voltage <sup>*4</sup>		BV	1 500	Vr.m.s.	
Total Power Dissipation		P <sub>T</sub>	650	mW	
Operating Ambient Temperature		T <sub>A</sub>	-40 to +80	°C	
Storage Temperature		T <sub>stg</sub>	-40 to +100	°C	

\*1 PW = 100 μs, Duty Cycle = 1 %

\*2 PW = 100 ms, 1 shot

\*3 PS7841C-A11 only

\*4 AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output

**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25 °C)**

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
OCMOS FET	LED Operating Current	I <sub>F</sub>	2	10	20	mA
	LED Off Voltage	V <sub>F</sub>	0		0.5	V

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

**OCMOS FET (Pin No. 2, 3, 15, 16)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA		1.2	1.4	V
MOS FET	Off-state Leakage Current	I <sub>off</sub>	V <sub>D</sub> = 400 V			1.0	μA
Coupled	LED On-state Current	I <sub>Fon</sub>	I <sub>L</sub> = 120 mA			2.0	mA
	On-state Resistance	R <sub>on1</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 10 mA		26	35	Ω
		R <sub>on2</sub>	I <sub>F</sub> = 10 mA, I <sub>L</sub> = 120 mA		22	30	
	Turn-on Time	t <sub>on</sub>	I <sub>F</sub> = 10 mA, V <sub>O</sub> = 5 V, PW ≥ 10 ms		0.3	1.0	ms
	Turn-off Time	t <sub>off</sub>			0.04	0.2	
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 500 V <sub>DC</sub>	10 <sup>9</sup>			Ω
	Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		1.1		pF
	Limit Current	I <sub>LMT</sub>	I <sub>F</sub> = 10 mA, t = 5 ms, V <sub>L</sub> = 6 V	155	180	210	mA

**PHOTOCOUPLER (Pin No. 7, 8, 9, 10)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA		1.2	1.4	V
Transistor	Collector to Emitter Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 40 V, I <sub>F</sub> = 0 mA			0.1	μA
Coupler	Current Transfer Ratio (I <sub>C</sub> /I <sub>F</sub> )	CTR	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V	50	200	400	%
	Collector Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = 10 mA, I <sub>C</sub> = 2 mA		0.1	0.3	V
	Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 5 V, I <sub>C</sub> = 2 mA, R <sub>L</sub> = 100 Ω		3.0		μs
	Fall Time	t <sub>f</sub>			5.0		
	Isolation Resistance	R <sub>I-O</sub>	V <sub>I-O</sub> = 500 V <sub>DC</sub>	10 <sup>11</sup>			Ω
	Isolation Capacitance	C <sub>I-O</sub>	V = 0 V, f = 1 MHz		0.4		pF

**DIODE BRIDGE (Pin No. 10, 11, 12, 15)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage		V <sub>F</sub>	I <sub>F</sub> = 120 mA		0.9	1.2	V
Reverse Current		I <sub>R</sub>	V <sub>R</sub> = 100 V			10	μA

**DARLINGTON TRANSISTOR (Pin No. 12, 13, 14)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector Saturation Voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> = 120 mA, I <sub>B</sub> = 100 μA		1.0	1.4	V
Collector to Emitter Dark Current		I <sub>CEX</sub>	I <sub>B</sub> = 0 mA, V <sub>CE</sub> = 30 V		0.01	1.0	μA
DC Current Gain		h <sub>FE</sub>	I <sub>C</sub> = 120 mA, V <sub>CE</sub> = 10 V	10 000	35 000		