

**FOR OPTICAL DAA
16-PIN SOP OCMOS FET**

DESCRIPTION

The PS7841-A15 is a solid state relay for optical DAA (Data Access Arrangement) containing a diode bridge, MOS FET, photocoupler, Darlington transistor and LED.

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

FEATURES

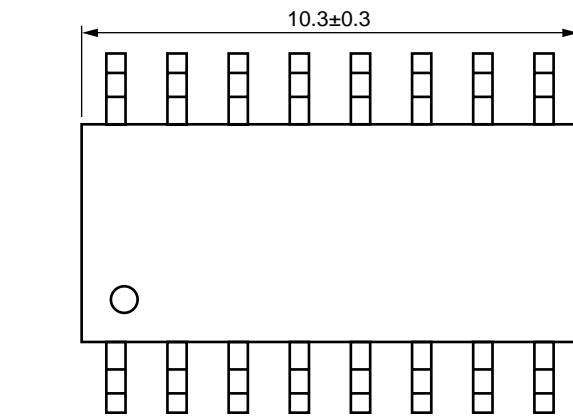
- For optical DAA circuit
 - OCMOS FET
 - Photocoupler (AC input response)
 - Diode bridge
 - Darlington transistor
- Small and thin package (16-pin SOP: 255 mil, Pin pitch = 1.27 mm, Height = 2.1 mm)
- High isolation voltage (BV = 1 500 Vr.m.s.)
- Ordering number of taping product: PS7841-A15-F3, F4

APPLICATIONS

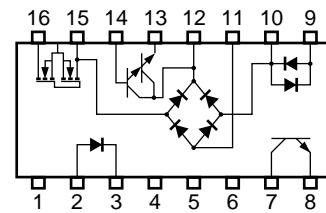
- Notebook PC, PDA
- Modem card
- Telephone, FAX

The information in this document is subject to change without notice.

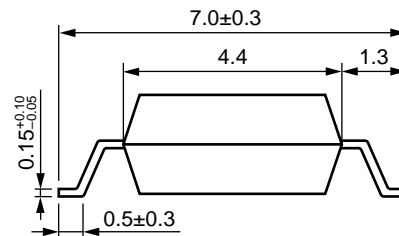
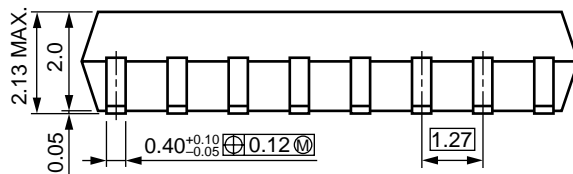
PACKAGE DIMENSIONS
in millimeters



TOP VIEW



- | | |
|------------------|------------------------------|
| 1. NC | 9. LED Anode, Cathode |
| 2. LED Anode | 10. LED Cathode, Anode |
| 3. LED Cathode | 11. Di. Input |
| 4. NC | 12. Di. Output |
| 5. NC | 13. Tr. Emitter (Darlington) |
| 6. NC | 14. Tr. Base (Darlington) |
| 7. Tr. Collector | 15. MOS FET |
| 8. Tr. Emitter | 16. MOS FET |



ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter			Symbol	Ratings	Unit
OCMOS FET (Pin No. 2, 3, 15, 16)	Diode	Forward Current	I _F	50	mA
		Reverse Voltage	V _R	5.0	V
		Power Dissipation	P _D	50	mW/ch
		Peak Forward Current ^{*1}	I _{FP}	1	A
	MOS FET	Break Down Voltage	V _L	400	V
		Continuous Load Current	I _L	120	mA
		Power Dissipation	P _C	430	mW/ch
Photocoupler (Pin No. 7, 8, 9, 10)	Diode	Forward Current	I _F	50	mA
		Power Dissipation	P _D	50	mW/ch
		Peak Forward Current ^{*1}	I _{FP}	1	A
	Transistor	Collector to Emitter Voltage	V _{CEO}	40	V
		Collector Current	I _C	80	mA
		Power Dissipation	P _C	50	mW/ch
Diode Bridge (Pin No. 10, 11, 12, 16)	Forward Current		I _F	140	mA
	Reverse Voltage		V _R	100	V
Darlington Transistor (Pin No. 12, 13, 14)	Collector to Emitter Voltage		V _{CEO}	40	V
	Collector Current		I _C	120	mA
	Power Dissipation		P _C	500	mW/ch
Isolation Voltage ^{*2}			BV	1 500	Vr.m.s.
Total Power Dissipation			P _T	650	mW
Operating Ambient Temperature			T _A	−40 to +80	°C
Storage Temperature			T _{stg}	−40 to +100	°C

*1 PW = 100 μs , Duty Cycle = 1 %

*2 AC voltage for 1 minute at $T_A = 25\text{ }^{\circ}\text{C}$, RH = 60 % between input and output

RECOMMENDED OPERATING CONDITIONS ($T_A = 25\text{ }^{\circ}\text{C}$)

Parameter		Symbol	MIN.	TYP.	MAX.	Unit
OCMOS FET	LED Operating Current	I_F	2	10	20	mA
	LED Off Voltage	V_F	0		0.5	V

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA		1.2	1.4	V
MOS FET	Off-state Leakage Current	I _{off}	V _L = 400 V, I _F = 0 mA			1.0	μA
Coupled	On-state Resistance	R _{on}	I _F = 10 mA, I _L = 10 mA		20	30	Ω
			I _F = 10 mA, I _L = 120 mA		16	25	
	Turn-on Time	t _{on}	I _F = 10 mA, V _L = 5 V, R _L = 500 Ω,		0.3	1.0	ms
	Turn-off Time	t _{off}	PW ≥ 10 ms		0.04	0.2	
Isolation Resistance		R _{I-O}	V _{I-O} = 500 V _{DC}	10 ⁹			Ω
Isolation Capacitance		C _{I-O}	V = 0 V, f = 1 MHz		1.1		pF

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA		1.2	1.4	V
Transistor	Collector to Emitter Dark Current	I _{CEO}	V _{CE} = 40 V, I _F = 0 mA			0.1	μA
Coupler	Current Transfer Ratio (I _C /I _F)	CTR	I _F = 5 mA, V _{CE} = 5 V	50	200	400	%
	Collector Saturation Voltage	V _{CE(sat)}	I _F = 10 mA, I _C = 2 mA		0.1	0.3	V
	Rise Time	t _r	V _{CC} = 5 V, I _C = 2 mA, R _L = 100 Ω		3.0		μs
	Fall Time	t _f			5.0		
Isolation Resistance		R _{I-O}	V _{I-O} = 500 V _{DC}	10 ¹¹			Ω
Isolation Capacitance		C _{I-O}	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 _F	I _F = 120 mA		0.9	1.2	V
Reverse Current	I _R	V _R = 100 V			10	μA

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

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector Saturation Voltage	V _{CE(sat)}	I _C = 120 mA, I _B = 100 μA		0.9	1.2	V
Collector to Emitter Dark Current	I _{CEX}	I _B = 0 mA, V _{CE} = 30 V		0.01	1.0	μA
DC Current Gain	h _{FE}	I _C = 120 mA, V _{CE} = 10 V		10 000	30 000	

[MEMO]

[MEMO]

[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

OCMOS FET is a trademark of NEC Corporation.

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.