

# PRELIMINARY DATA SHEET

**NEC**

OCMOS FET™

**PS7841-A15**

## 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.

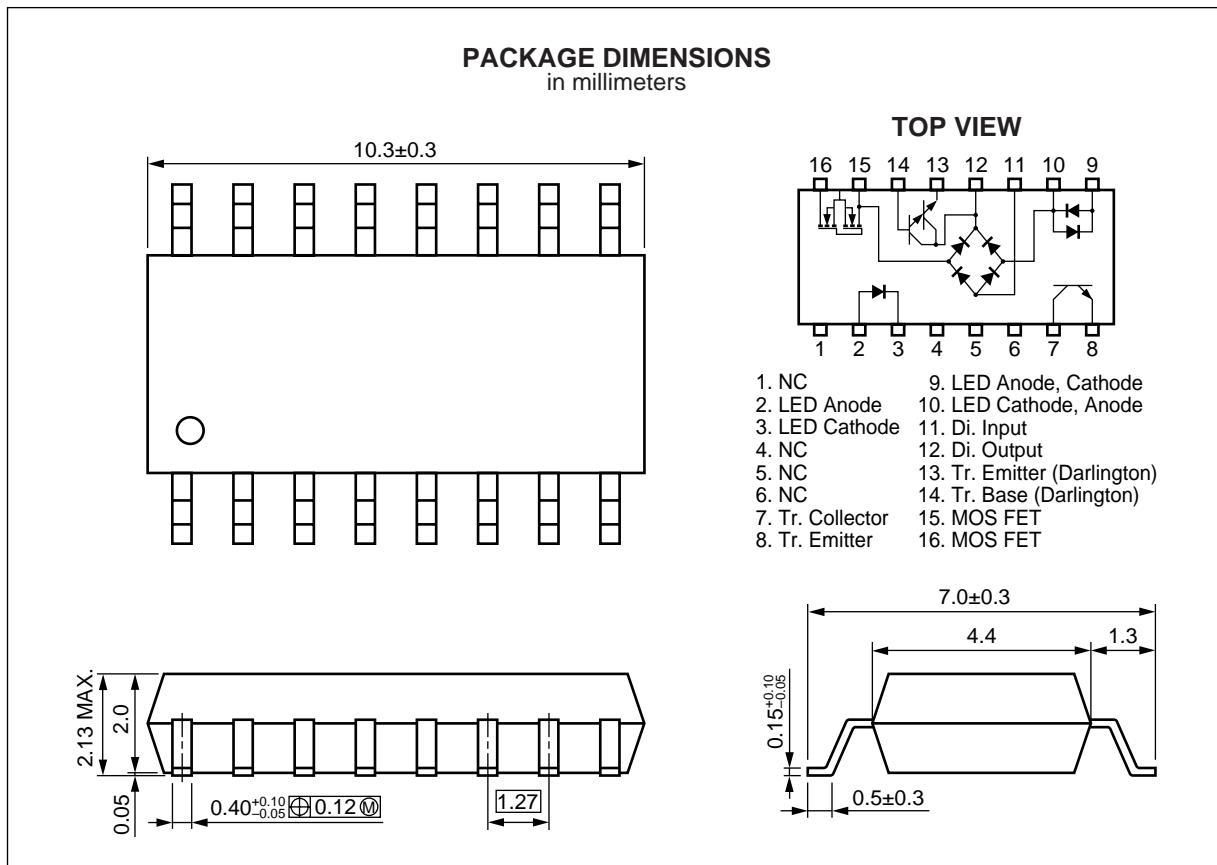
### FEATURES

- 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.



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , 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 <sup>1</sup>	$I_{FP}$	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 <sup>1</sup>	$I_{FP}$	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 <sup>2</sup>			$BV$	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		

<sup>1</sup>  $PW = 100 \mu\text{s}$ , Duty Cycle = 1 %<sup>2</sup> AC voltage for 1 minute at  $T_A = 25^\circ\text{C}$ , RH = 60 % between input and outputRECOMMENDED OPERATING CONDITIONS ( $T_A = 25^\circ\text{C}$ )

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

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$		1.2	1.4	V
MOS FET	Off-state Leakage Current	$I_{off}$	$V_L = 400 \text{ V}, I_F = 0 \text{ mA}$		1.0		$\mu\text{A}$
Coupled	On-state Resistance	$R_{on}$	$I_F = 10 \text{ mA}, I_L = 10 \text{ mA}$		20	30	$\Omega$
			$I_F = 10 \text{ mA}, I_L = 120 \text{ mA}$		16	25	
	Turn-on Time	$t_{on}$	$I_F = 10 \text{ mA}, V_L = 5 \text{ V}, RL = 500 \Omega$ , $PW \geq 10 \text{ ms}$		0.3	1.0	ms
	Turn-off Time	$t_{off}$			0.04	0.2	
Isolation Resistance		$R_{i-o}$	$V_{i-o} = 500 \text{ V}_{\text{DC}}$	$10^9$			$\Omega$
Isolation Capacitance		$C_{i-o}$	$V = 0 \text{ V}, f = 1 \text{ MHz}$		1.1		pF

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	$V_F$	$I_F = 10 \text{ mA}$		1.2	1.4	V
Transistor	Collector to Emitter Dark Current	$I_{CEO}$	$V_{CE} = 40 \text{ V}, I_F = 0 \text{ mA}$			0.1	$\mu\text{A}$
Coupler	Current Transfer Ratio ( $I_C/I_F$ )	CTR	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	50	200	400	%
	Collector Saturation Voltage	$V_{CE(\text{sat})}$	$I_F = 10 \text{ mA}, I_C = 2 \text{ mA}$		0.1	0.3	V
	Rise Time	$t_r$	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, RL = 100 \Omega$		3.0		$\mu\text{s}$
	Fall Time	$t_f$			5.0		
Isolation Resistance		$R_{i-o}$	$V_{i-o} = 500 \text{ V}_{\text{DC}}$	$10^{11}$			$\Omega$
Isolation Capacitance		$C_{i-o}$	$V = 0 \text{ V}, f = 1 \text{ MHz}$		0.4		pF

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage		$V_F$	$I_F = 120 \text{ mA}$		0.9	1.2	V
Reverse Current		$I_R$	$V_R = 100 \text{ V}$			10	$\mu\text{A}$

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector Saturation Voltage		$V_{CE(\text{sat})}$	$I_C = 120 \text{ mA}, I_B = 100 \mu\text{A}$		0.9	1.2	V
Collector to Emitter Dark Current		$I_{CEX}$	$I_B = 0 \text{ mA}, V_{CE} = 30 \text{ V}$		0.01	1.0	$\mu\text{A}$
DC Current Gain		$h_{FE}$	$I_C = 120 \text{ mA}, V_{CE} = 10 \text{ V}$		10 000	30 000	

**[MEMO]**

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## 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.**

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Anti-radioactive design is not implemented in this product.