

### FEATURES

- **2 CHANNEL TYPE**  
OCMOS FET + PHOTOCOUPLER
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE**  
8-PIN SOP
- **ISOLATION VOLTAGE**  
BV: 1500 Vr.m.s. MIN
- **LOW OFFSET VOLTAGE**
- **AVAILABLE IN TAPE AND REEL**  
PS7241-AT1-F3, F4, PS7241-AT5-F3, F4

### DESCRIPTION

PS7241-AT1 and PS7241-AT5 are solid state relays containing a GaAs LED on the emitting side (input side) and MOSFETs (+ Phototransistor) on the output side. They are suitable for analog signal control because of their low offset and high linearity.

### APPLICATIONS

- EXCHANGE EQUIPMENT
- MEASUREMENT EQUIPMENT
- FA/OA EQUIPMENT
- COMMUNICATIONS EQUIPMENT
- DAA
- PCMCIA MODEM

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

		PART NUMBER				PS7241-AT1, PS7241-AT5		
		SYMBOLS	PARAMETERS	CONDITIONS	UNITS	MIN	TYP	MAX
OCMOS FET	Diode	V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 5 mA	V		1.1	1.5
		I <sub>R</sub>	Reverse Current	V <sub>R</sub> = 5 V	μA			5
	MOSFET	I <sub>LOFF</sub>	Off-state Leakage Current	V <sub>D</sub> = 400 V	μA		0.03	1
	Coupler	R <sub>ON</sub>	On-state Resistance	I <sub>F</sub> = 20 mA, I <sub>L</sub> = 1 mA	Ω		20	30
		t <sub>ON</sub>	Turn-on Time	I <sub>F</sub> = 20 mA, V <sub>L</sub> = 5 V,	ms			1.0
		t <sub>OFF</sub>	Turn-off Time	R <sub>L</sub> = 500 Ω, P <sub>W</sub> ≥ 10 ms	ms			0.2
		R <sub>I-O</sub>	Isolation Resistance	V <sub>I-O</sub> = 1.0 kV	Ω	10 <sup>9</sup>		
	C <sub>I-O</sub>	Isolation Capacitance	V = 0 V, f = 1 MHz	pF		1.1		
Photocoupler	Diode	V <sub>F</sub>	Forward Voltage	I <sub>F</sub> = 5 mA	V		1.1	1.5
		I <sub>R</sub>	Reverse Current <sup>1</sup>	V <sub>R</sub> = 5 V	μA			5
	Transistor	I <sub>CEO</sub>	Collector to Emitter Dark Current	V <sub>CE</sub> = 40 V, I <sub>F</sub> = 0 mA	nA			100
		B <sub>VCEO</sub>	Collector to Emitter Breakdown Voltage	I <sub>C</sub> = 1 mA	V	40		
		B <sub>VECO</sub>	Emitter to Collector Breakdown Voltage	I <sub>E</sub> = 100 μA	V	6		
	Coupler	CTR	Current Transfer Ratio	I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V	%	50		400
		V <sub>CE(sat)</sub>	Collector Saturation Voltage	I <sub>F</sub> = 10 mA, I <sub>C</sub> = 2 mA	V			0.3
		R <sub>I-O</sub>	Isolation Resistance	V <sub>in-out</sub> = 1.0 kV	Ω	10 <sup>11</sup>		
		C <sub>I-O</sub>	Isolation Capacitance	V = 0 V, f = 1 MHz	pF		0.4	
		t <sub>R</sub>	Rise Time	V <sub>CC</sub> = 5 V, I <sub>C</sub> = 2 mA	μs		3	
t <sub>F</sub>	Fall Time	R <sub>L</sub> = 100 Ω	μs		5			

NOTE:

1. PS7241-AT1 only.

# PS7241-AT1, PS7241-AT5

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25°C)

	SYMBOLS	PARAMETERS	UNITS	RATINGS
OCMOS	Diode			
	I <sub>F</sub>	Forward Current (DC)	mA	50
	V <sub>R</sub>	Reverse Voltage	V	5
	P <sub>D</sub>	Power Dissipation	mW/ch	50
	I <sub>FP</sub>	Peak Forward Current <sup>2</sup>	A	1
	MOSFET			
	V <sub>L</sub>	Break Down Voltage	V	400
	I <sub>L</sub>	Continuous Load Current	mA	120
	P <sub>D</sub>	Power Dissipation	mW	430
	Photocoupler	Diode		
I <sub>F</sub>		Forward Current	mA	50
V <sub>R</sub>		Reverse Voltage <sup>3</sup>	V	5
P <sub>D</sub>		Power Dissipation	mW/ch	50
I <sub>FP</sub>		Peak Forward Current <sup>2</sup>	A	1
Transistor				
V <sub>CEO</sub>		Collector to Emitter Voltage	V	40
V <sub>ECO</sub>		Emitter to Collector Voltage	V	6
I <sub>C</sub>		Collector Current	mA	80
P <sub>C</sub>		Power Dissipation	mW	100
BV		Isolation Voltage <sup>4</sup>	Vr.m.s.	1500
P <sub>T</sub>		Total Power Dissipation	mW	630
T <sub>A</sub>	Operating Ambient Temp.	°C	-40 to 80	
T <sub>STG</sub>	Storage Temperature	°C	-40 to 100	

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

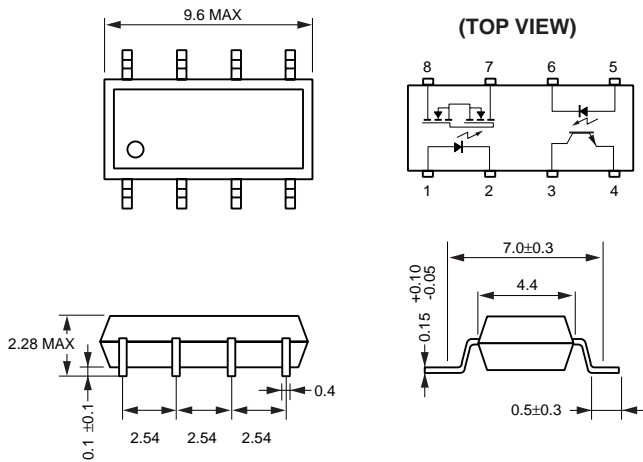
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
OCMOS FET					
I <sub>F</sub>	LED Operating Current	mA	2	20	30
V <sub>F</sub>	LED Off Voltage	V	0		0.5
Photocoupler					
I <sub>F</sub>	LED Operating Current	mA	2	5	20

### Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 μs, Duty Cycle = 1%.
3. PS7241-AT1 only.
4. AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output.

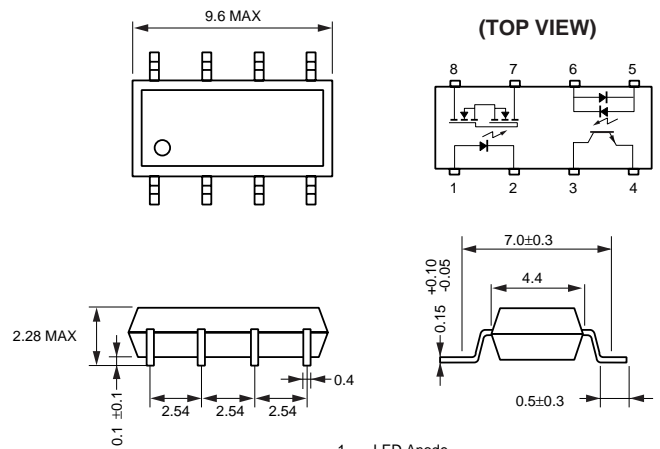
## OUTLINE DIMENSIONS (Units in mm)

PS7241-AT1



- 1 LED Anode
- 2 LED Cathode
- 3 Tr Collector
- 4 Tr Emitter
- 5 LED Anode
- 6 LED Cathode
- 7 MOSFET
- 8 MOSFET

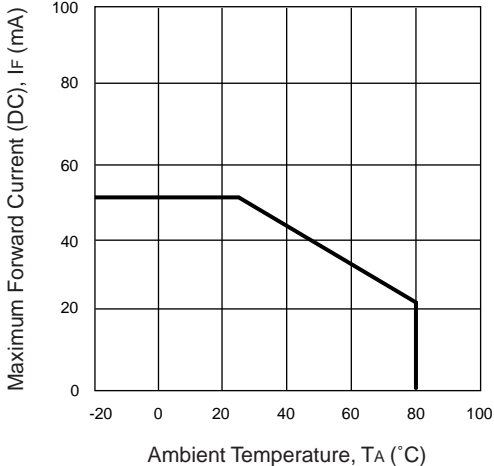
PS7241-AT5



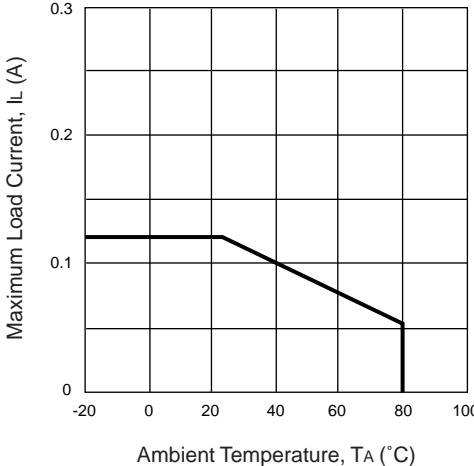
- 1 LED Anode
- 2 LED Cathode
- 3 Tr Collector
- 4 Tr Emitter
- 5 LED Anode/Cathode
- 6 LED Cathode/Anode
- 7 MOSFET
- 8 MOSFET

OCMOS TYPICAL PERFORMANCE CURVES (TA = 25°C)

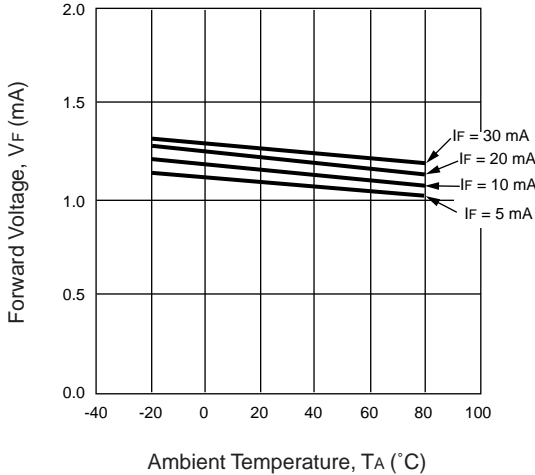
MAXIMUM FORWARD CURRENT (DC)  
vs. AMBIENT TEMPERATURE



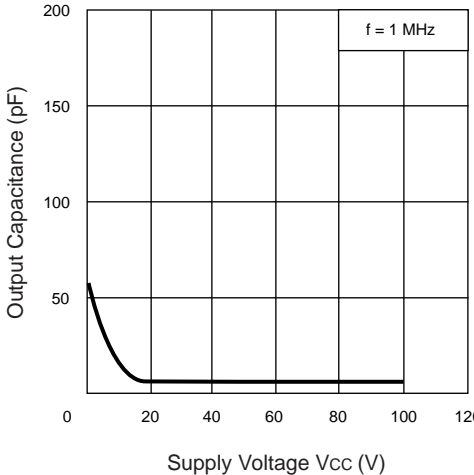
MAXIMUM LOAD CURRENT  
vs. AMBIENT TEMPERATURE



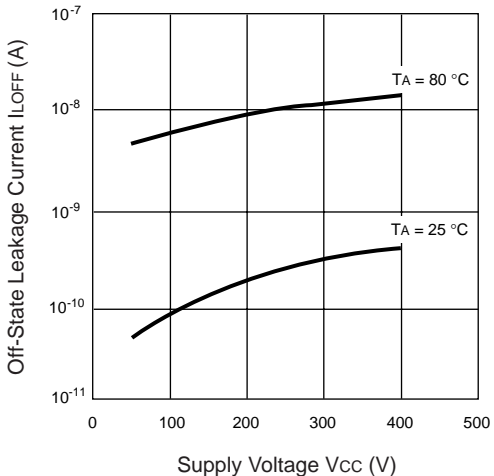
FORWARD VOLTAGE vs.  
AMBIENT TEMPERATURE



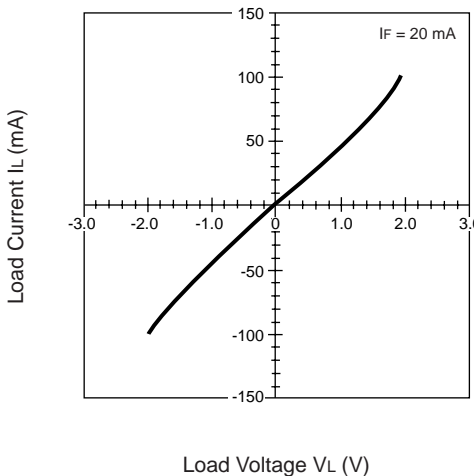
OUTPUT CAPACITANCE  
vs. SUPPLY VOLTAGE



OFF-STATE LEAKAGE CURRENT  
vs. SUPPLY VOLTAGE

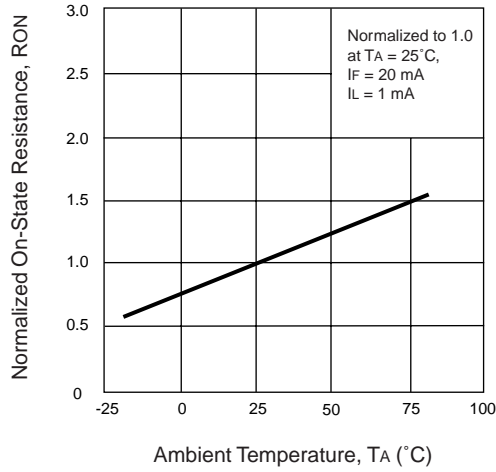


LOAD CURRENT vs.  
LOAD VOLTAGE

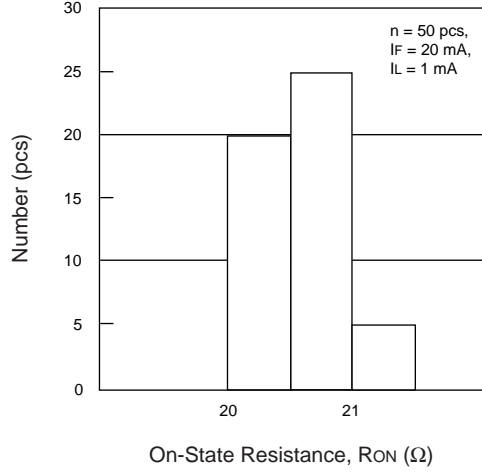


OCMOS TYPICAL PERFORMANCE CURVES (TA = 25°C)

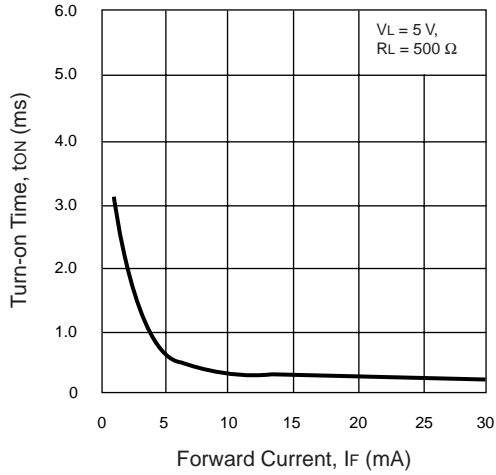
**NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE**



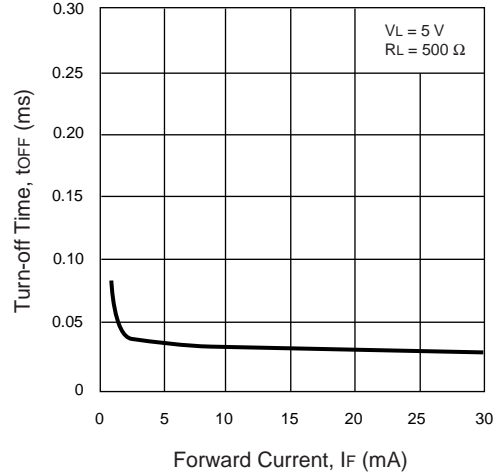
**ON-STATE RESISTANCE DISTRIBUTION**



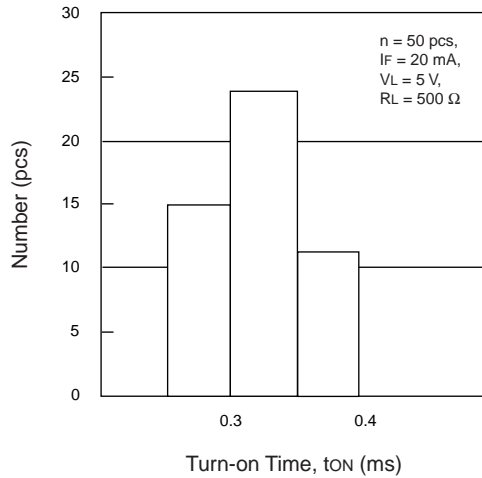
**TURN-ON TIME vs. FORWARD CURRENT**



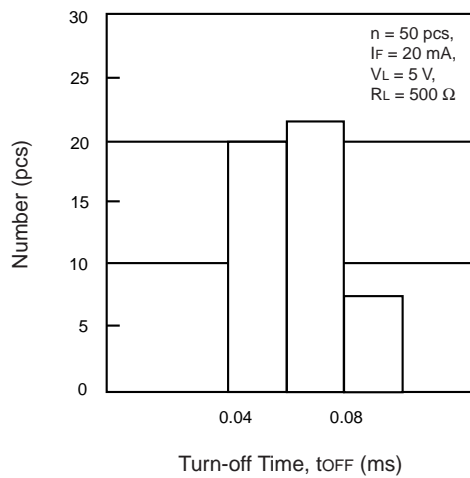
**TURN-OFF TIME vs. FORWARD CURRENT**



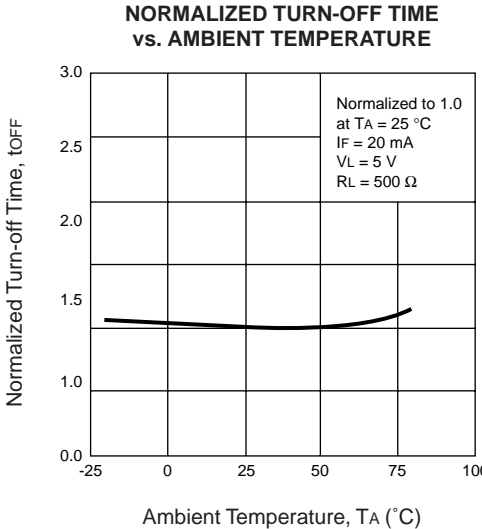
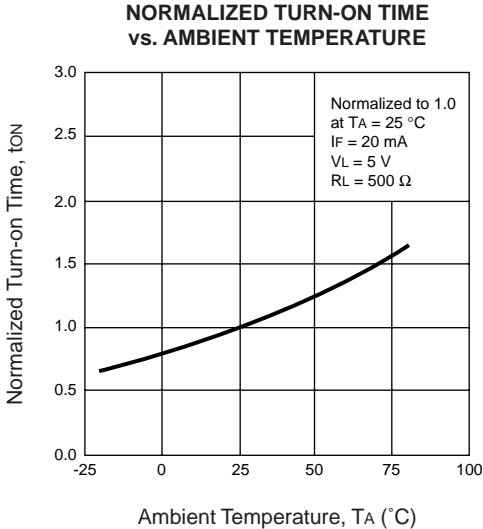
**TURN-ON TIME DISTRIBUTION**



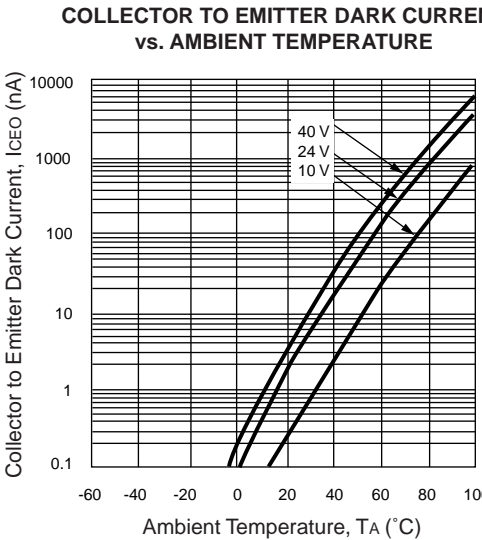
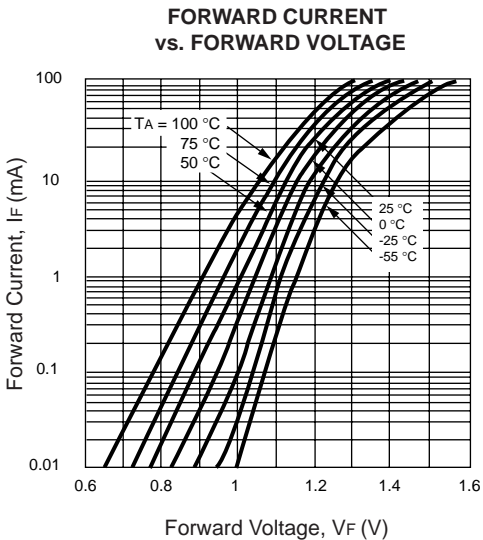
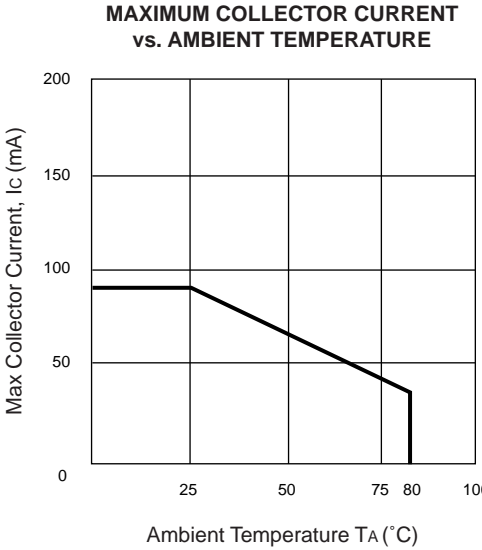
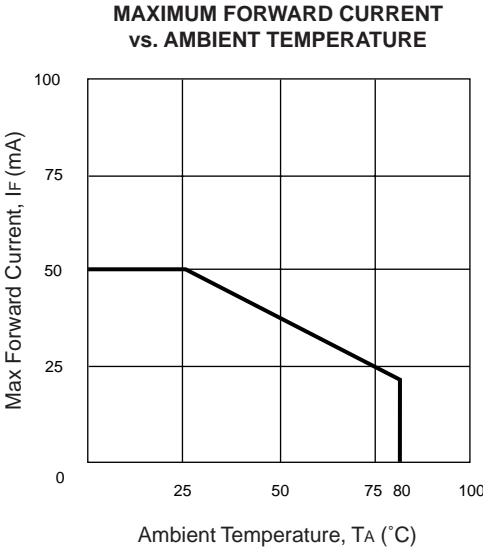
**TURN-OFF TIME DISTRIBUTION**



**OCMOS TYPICAL PERFORMANCE CURVES** (TA = 25°C)

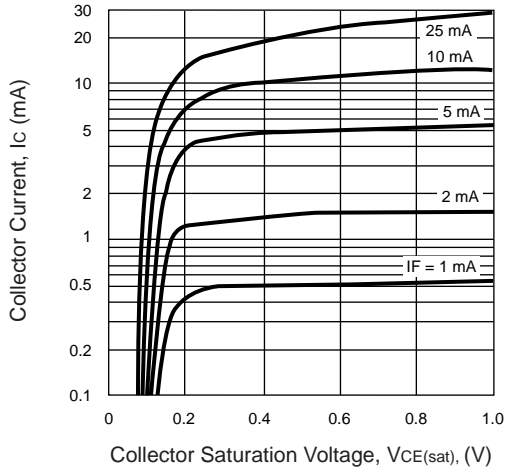


**PHOTOCOUPLER TYPICAL PERFORMANCE CURVES** (TA = 25°C)

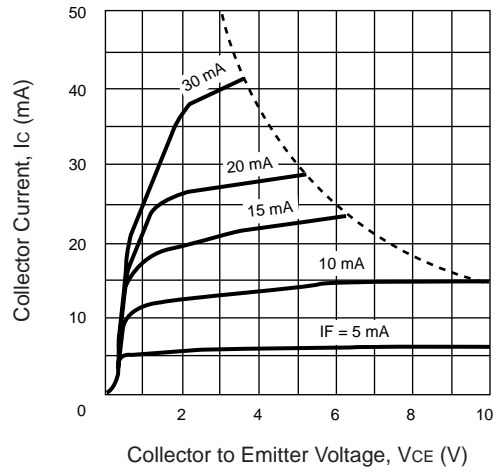


PHOTOCOUPLER TYPICAL PERFORMANCE CURVES (TA = 25°C)

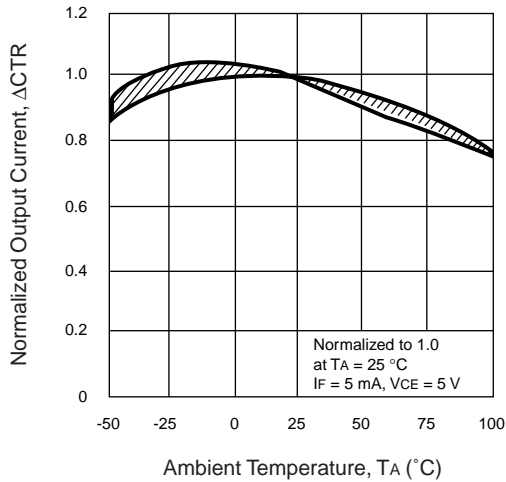
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



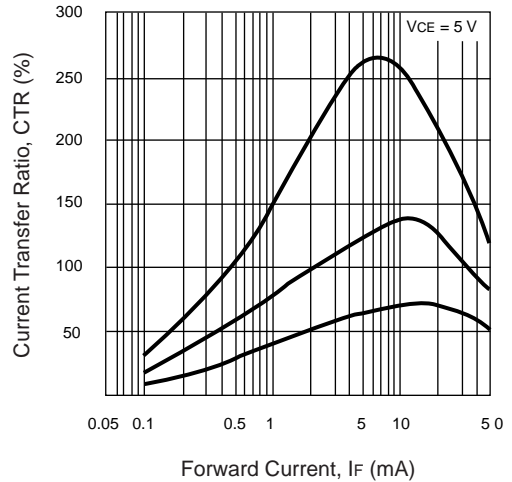
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



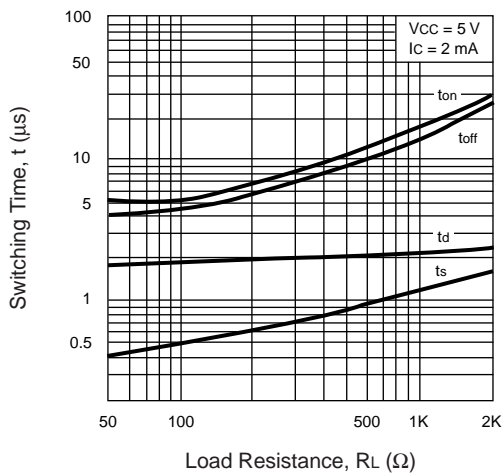
NORMALIZED OUTPUT CURRENT vs. AMBIENT TEMPERATURE



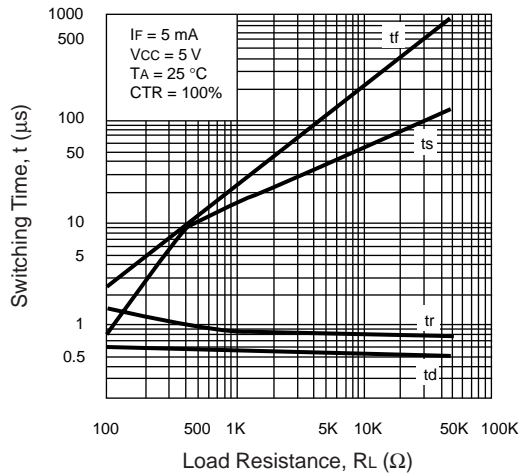
CURRENT TRANSFER RATIO (CTR) vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

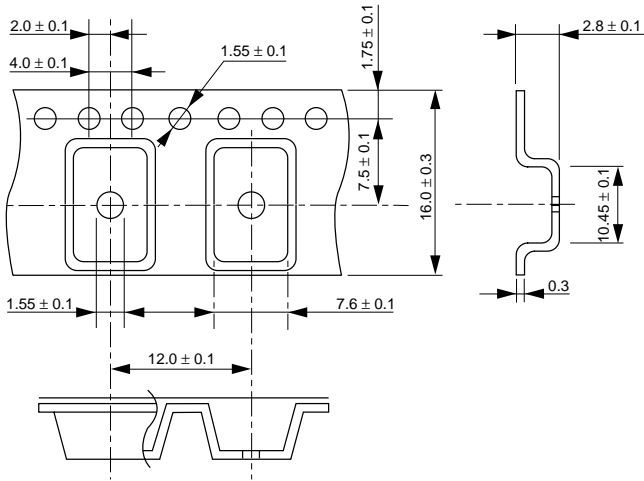


SWITCHING TIME vs. LOAD RESISTANCE

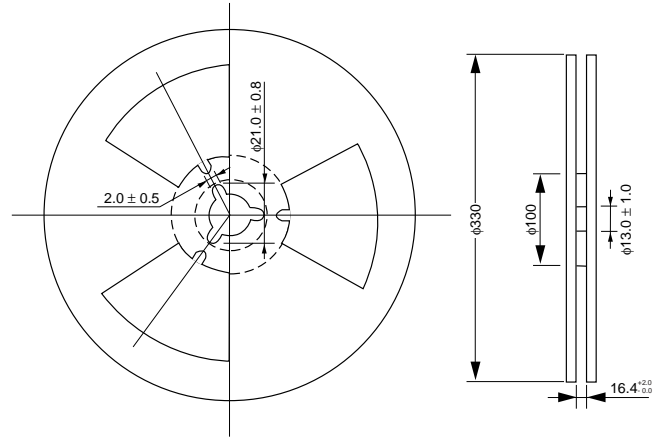


**TAPING SPECIFICATIONS** (Units in mm)

**OUTLINE AND DIMENSIONS (TAPE)**



**OUTLINE AND DIMENSIONS (REEL)**

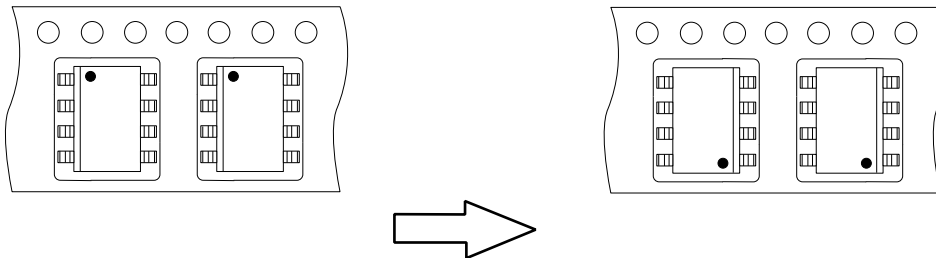


Notes:  
1. Packaging : 1500 pcs/reel

**TAPING DIRECTION**

PS7241-AT1-F3  
PS7241-AT5-F3

PS7241-AT1-F4  
PS7241-AT5-F4



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