NEC

8 PIN DIP SOLID STATE RELAY

PS7160-2A
PS7160L-2A

FEATURES

- **2 CHANNEL TYPE:**
  (1a + 1a output)
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE:**
  8 pin DIP
- **LOW OFFSET VOLTAGE**
- **LOW LED OPERATING CURRENT:**
  I_F = 2 mA
- **SURFACE MOUNT AVAILABLE**

DESCRIPTION

PS7160-2A and PS7160L-2A are solid state relays containing GaAs LEDs on the light emitting side (input side) and MOS FETs on the output side. They are suitable for analog signal control because of their low offset and high linearity.

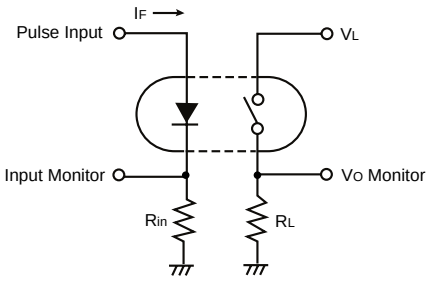
APPLICATIONS

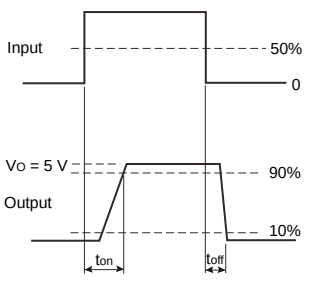
- **EXCHANGE EQUIPMENT**
- **MEASUREMENT EQUIPMENT**
- **FA/OA EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

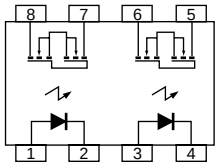
PART NUMBER					PS7160-2A, PS7160L-2A		
	SYMBOLS	PARAMETERS		UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA		V		1.2	1.4
	I_R	Reverse Current, V_R = 5 V		μA			5.0
MOS FET	I_{LOFF}	Off-State Leakage Current, V_D = 600 V		μA		0.03	1.0
	C_{OUT}	Output Capacitance, V_D = 0 V, f = 1 MHz		pF/ch		110	
Coupled	R_{ON1}	On-State Resistance,	I_F = 10 mA, I_L = 10 mA	Ω		42	50
	R_{ON2}		I_F = 10 mA, I_L = 90 mA, t≤10 ms	Ω		33	50
	t_{ON}	Turn-on Time I_F = 10 mA, V_L = 5 V, R_L = 500 Ω, PW ≥ 10 ms		ms		0.8	1.5
	t_{OFF}	Turn-off Time I_F = 10 mA, V_L = 5 V, R_L = 500 Ω, PW ≥ 10 ms		ms		0.06	0.2
	R_{I-O}	Isolation Resistance, V_{I-O} = 1.0 kV		Ω	10^9		
	C_{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz		pF/ch		1.1	

Note:
1. Test Circuit for Switching Time





PS7160-2A, PS7160L-2A



ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I_F	Forward Current (DC)	mA	50
V_R	Reverse Voltage	V	5.0
P_D	Power Dissipation	mW/ch	50
I_{FP}	Peak Foward Current[2]	A	1
MOSFET			
V_L	Break Down Voltage	V	600
I_L	Continuous Load Current	mA	90
I_{LP}	Pulse Load Current[3] (AC/DC Connection)	mA	250
P_{OUT}	Power Dissipation	mW/ch	375
Coupled			
BV	Isolation Voltage[4]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	850
T_A	Operating Ambient Temp.	°C	-40 to +80
T_{STG}	Storage Temperature	°C	-40 to +100

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 µs, Duty Cycle = 1 %
3. PW = 100 ms, 1 shot.
4. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

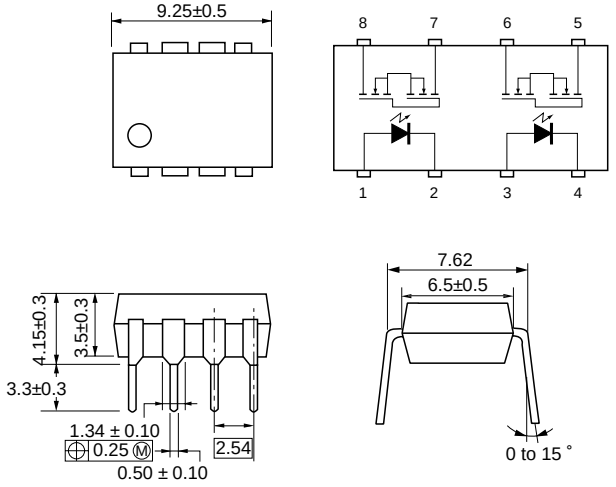
PART NUMBER		PS7160-2A,PS7160L-2A			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
I_F	LED Operating Current	mA	2	10	20
V_F	LED Off Voltage	V	0		0.5

ORDERING INFORMATION

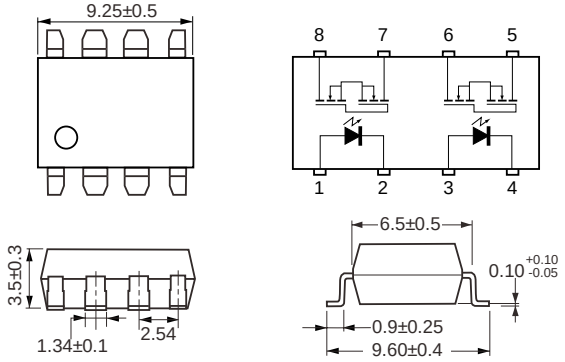
PART NUMBER	PACKAGE	PACKING STYLE
PS7160-2A	8 pin DIP	Magazine cae 50 pcs
PS7160L-2A		
PS7160L-2A-E3		Embossed Tape 1000 pcs/reel
PS7160L-2A-E4		

OUTLINE DIMENSIONS (Units in mm)

PS7160-2A

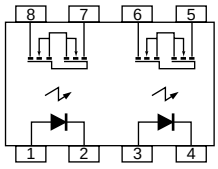


PS7160L-2A



PIN CONNECTION (Top View)

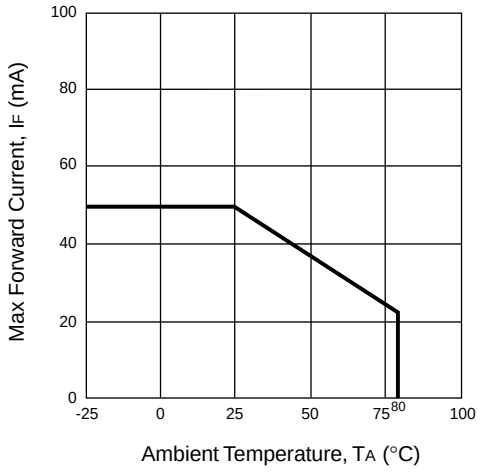
PS7160-2A, PS7160L-2A



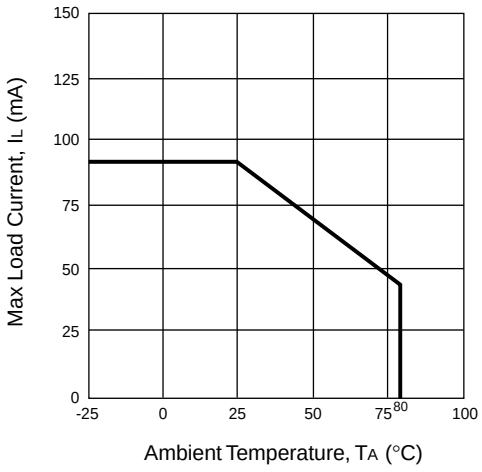
1. LED Anode 1
2. LED Cathode 1
3. LED Anode 2
4. LED Cathode 2
5. MOS FET 2
6. MOS FET 2
7. MOS FET 1
8. MOS FET 1

TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

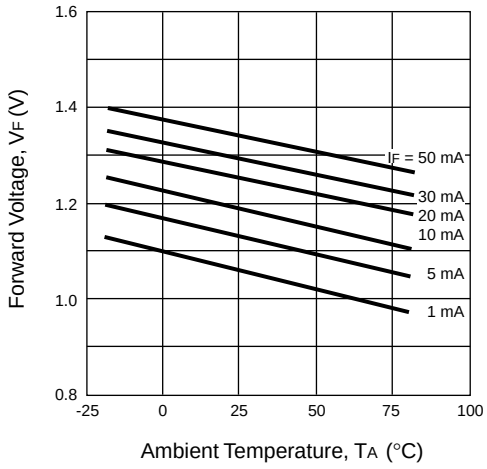
MAX FORWARD CURRENT vs. AMBIENT TEMPERATURE



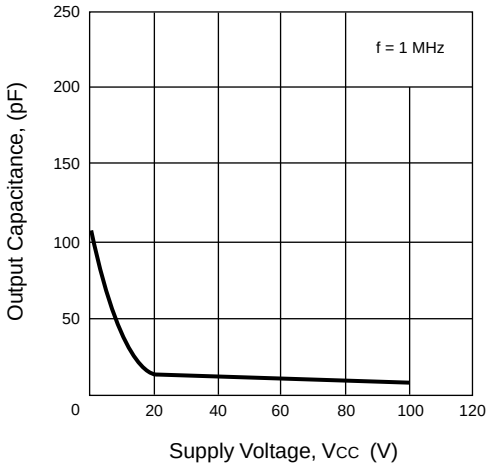
MAX LOAD CURRENT vs. AMBIENT TEMPERATURE



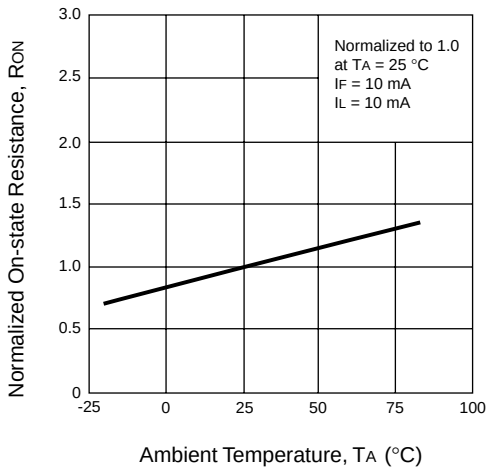
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



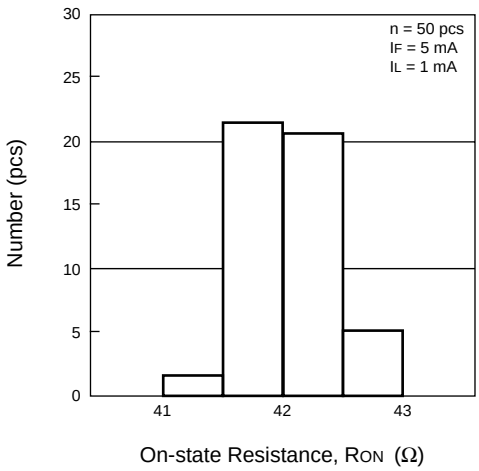
OUTPUT CAPACITANCE vs. SUPPLY VOLTAGE



NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE

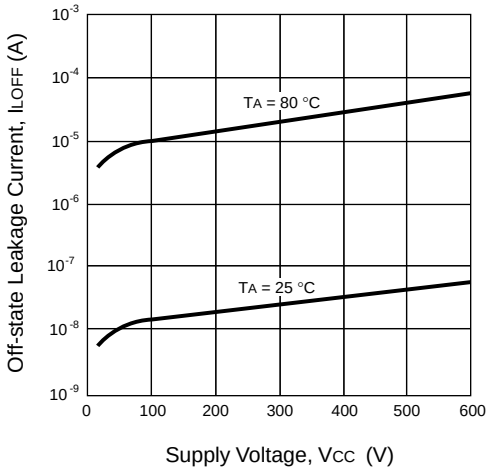


ON-STATE DISTRIBUTION

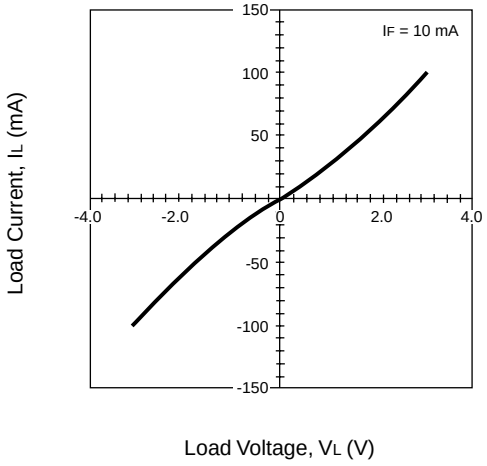


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

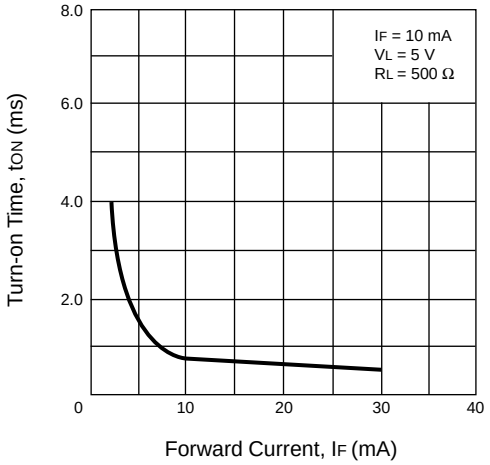
OFF-STATE LEAKAGE CURRENT vs. SUPPLY VOLTAGE



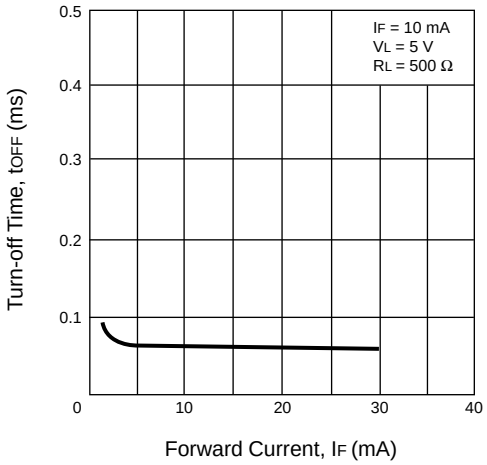
LOAD CURRENT vs. LOAD VOLTAGE



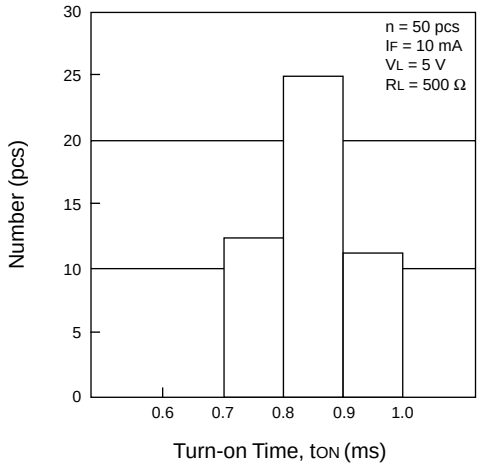
TURN-ON TIME vs. FORWARD CURRENT



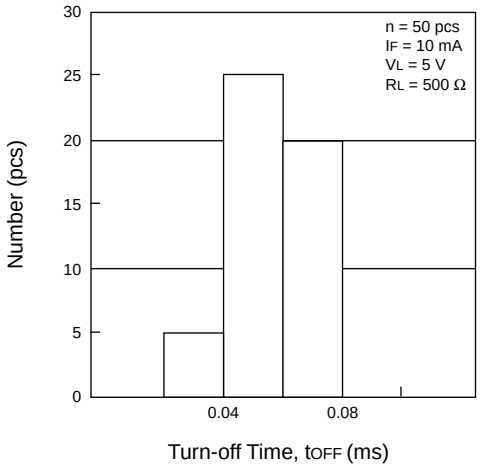
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

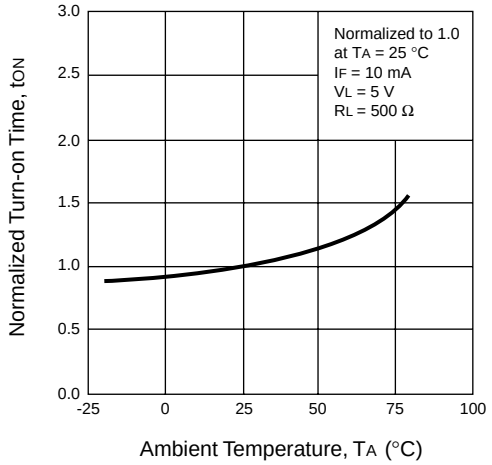


TURN-OFF TIME DISTRIBUTION

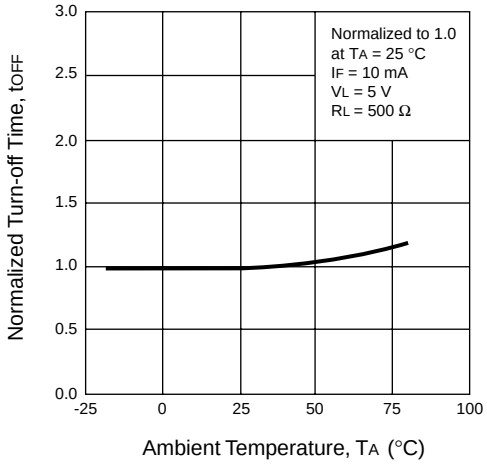


TYPICAL PERFORMANCE CURVES (T_A = 25 °C)

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

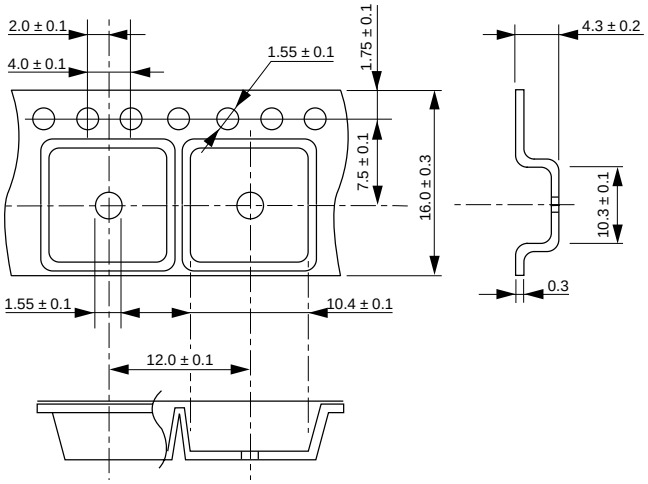


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

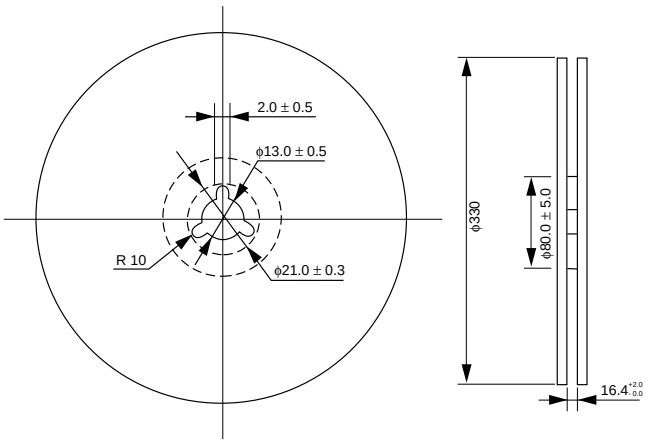


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



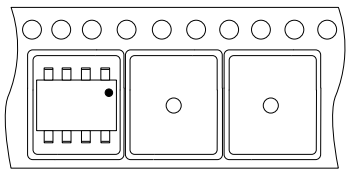
OUTLINE AND DIMENSIONS (REEL)



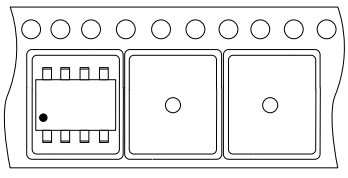
Packaging : 1000 pcs/reel

TAPING DIRECTION

PS7160L-2A-E3



PS7160L-2A-E4

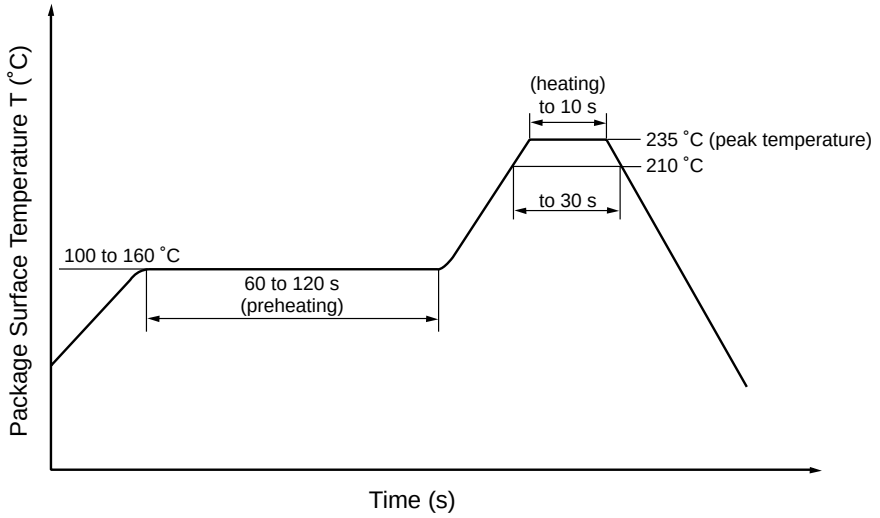


RECOMMENDED SOLDERING CONDITIONS

(1) Infrared reflow soldering

• Peak reflow temperature	235 °C or below (package surface temperature)
• Time of temperature higher than 210 °C	30 seconds or less
• Number of reflows	Two
• Flux	Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

Recommended Temperature Profile of Infrared Reflow



(2) Dip soldering

• Temperature	260 °C or below (molten solder temperature)
• Time	10 seconds or less
• Number of times	One
• Flux	Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

(3) Cautions

- Fluxes
  Avoid removing the residual flux with freon-based cleaning solvent.