NEC

HIGH ISOLATION VOLTAGE AC INPUT 4-PIN SOP PHOTOCOUPLER

PS2765-1

FEATURES

- **ISOLATION DISTANCE:**
  0.4 mm MIN.
- **AC INPUT RESPONSE**
- **HIGH ISOLATION VOLTAGE:**
  BV = 3.75 k $V_{r.m.s.}$
- **SOP (SMALL OUT-LINE PACKAGE)**
- **HIGH SPEED SWITCHING:**
  t_r = 4 μs TYP, t_f = 5 μs TYP
- **AVAILABLE ON TAPE AND REEL**

DESCRIPTION

The PS2765-1 is an optically coupled isolator containing GaAs light emitting diodes and an NPN silicon phototransistor. This package is mounted in a plastic SOP (Small Out-line Package) for high density applications and has a shield effect to cut off ambient light.

APPLICATIONS

- **HYBRID IC**
- **PROGRAMMABLE LOGIC CONTROLLERS**
- **POWER SUPPLY**

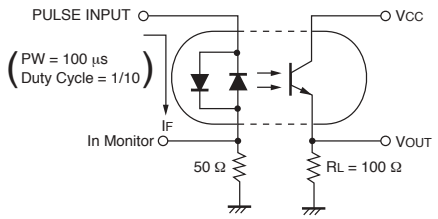
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER				PS2765-1		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = ±5 mA	V		1.1	1.4
	C_t	Terminal Capacitance, V = 0, f = 1 MHz	pF		30	
Transistor	I_{CEO}	Collector to Emitter Dark Current, V_{CE} = 40 V, I_F = 0 mA	nA			100
Coupled	CTR	Current Transfer Ratio (I_C/I_F)[1], I_F = ±5 mA, V_{CE} = 5 V	%	50	100	400
	$V_{CE\ (sat)}$	Collector Saturation Voltage, I_F = ±10 mA, I_C = 2 mA	V			0.3
	R_{I-O}	Isolation Resistance, V_{I-O} = 1 kV_{DC}	Ω	10^{11}		
	C_{I-O}	Isolation Capacitance, V = 0, f = 1 MHz	pF		0.4	
	t_r	Rise Time[2], V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	μs		4	
	t_f	Fall Time[2], V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω	μs		5	

Notes:

1. CTR Rank
   N: 50 to 400%

2. Test Circuit for Switching Time



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

SYMBOLS	PARAMETERS	UNITS	RATINGS
			PS2765-1
Diode			
I_F	Forward Current (DC)	mA	±50
P_D	Power Dissipation	mW	80
$I_{F\ (PEAK)}$	Peak Forward Current[2]	A	±1.0
Transistor			
V_{CEO}	Collector to Emitter Voltage	V	40
V_{ECO}	Emitter to Collector Voltage	V	5
I_C	Collector Current	mA	40
P_C	Power Dissipation	mW	150
ΔP_C/°C	Power Dissipation Derating	mW/°C	1.5
Coupled			
BV	Isolation Voltage[3]	$V_{r.m.s.}$	3750
T_A	Operating Ambient Temp.	°C	-55 to +100
T_{STG}	Storage Temperature	°C	-55 to +150

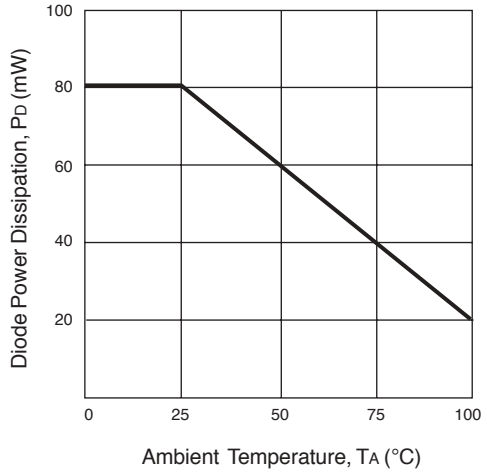
Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 μs, duty cycle = 1%.
3. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and ouput.

ORDERING INFORMATION

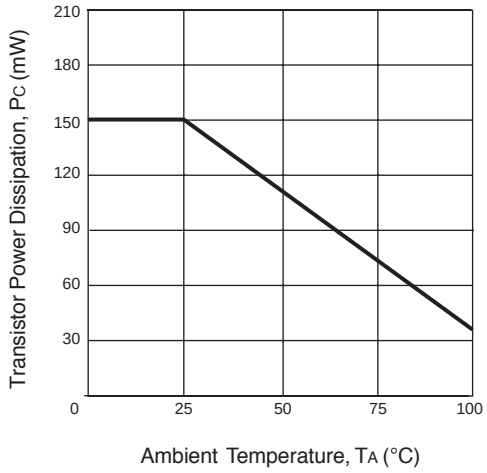
PART NUMBER	PACKAGE	PACKING STYLE
PS2765-1	4-pin SOP	Magazine case 100 pcs
PS2765-1-F3		Embossed Tape 3500 pcs/reel
PS2765-1-F4		

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

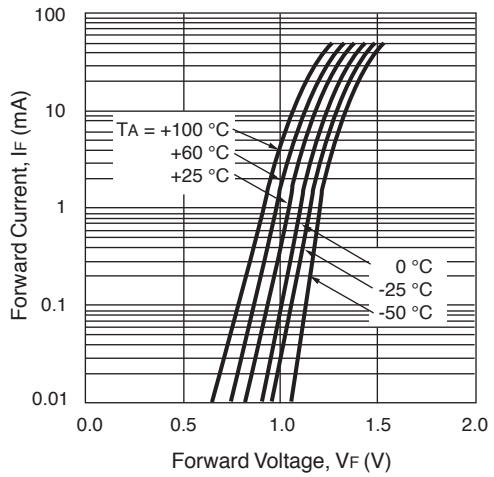
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



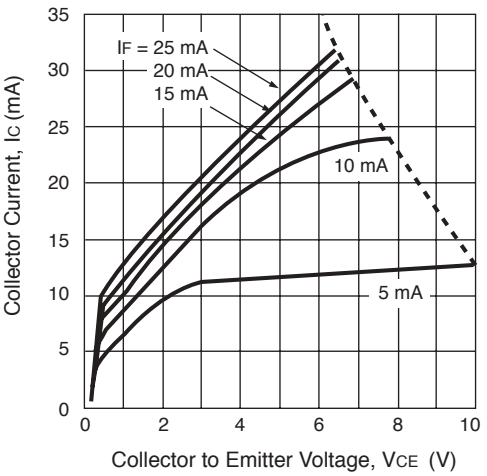
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



FORWARD CURRENT vs. FORWARD VOLTAGE

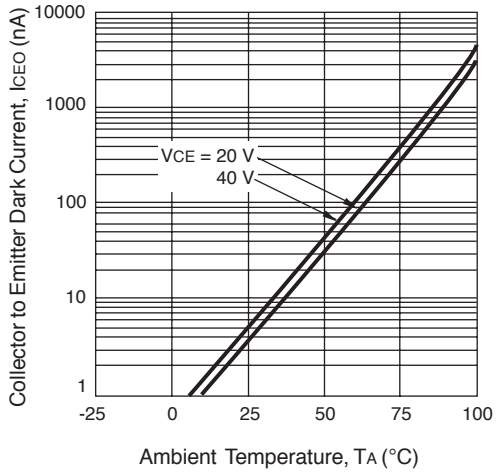


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

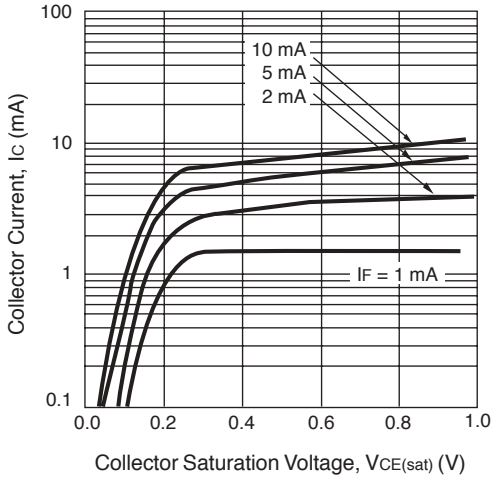


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

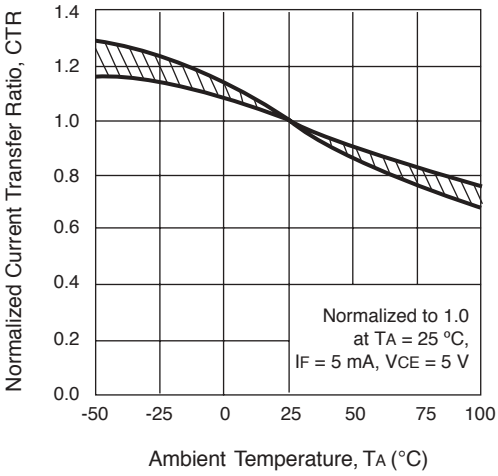
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



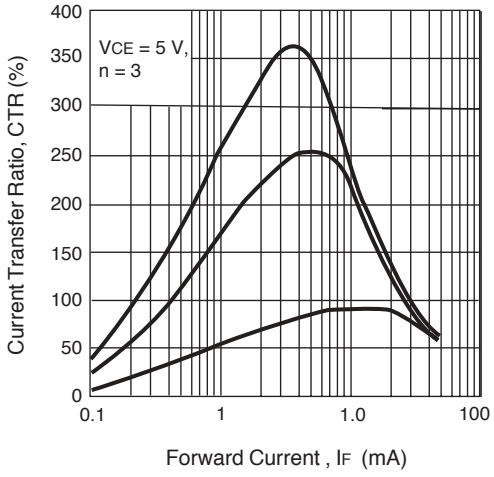
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



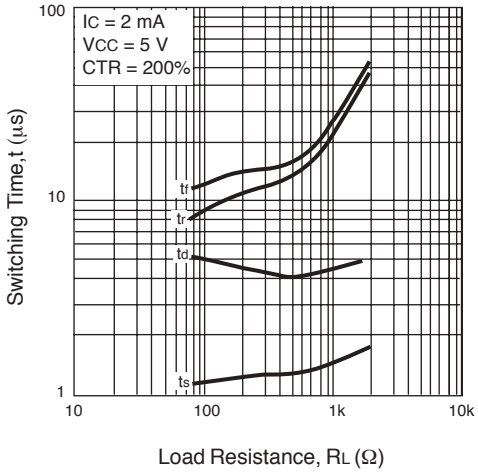
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



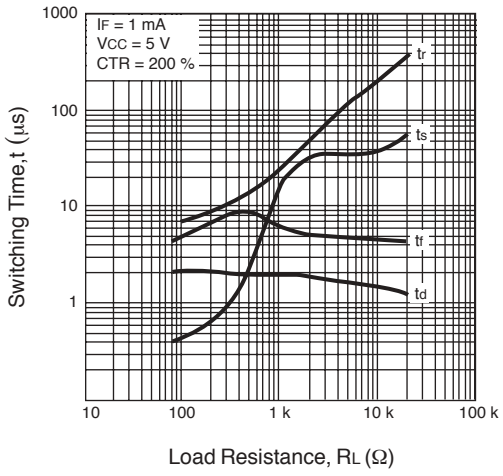
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



SWITCHING TIME vs. LOAD RESISTANCE

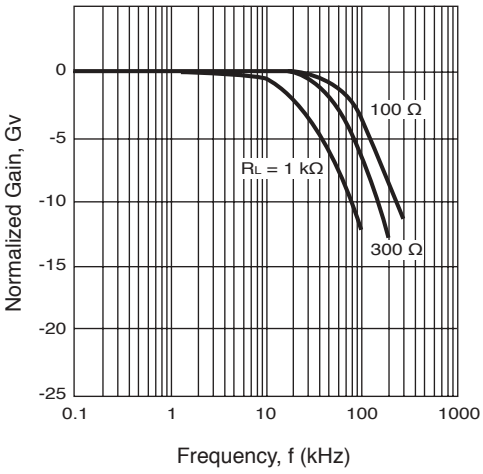


SWITCHING TIME vs. LOAD RESISTANCE

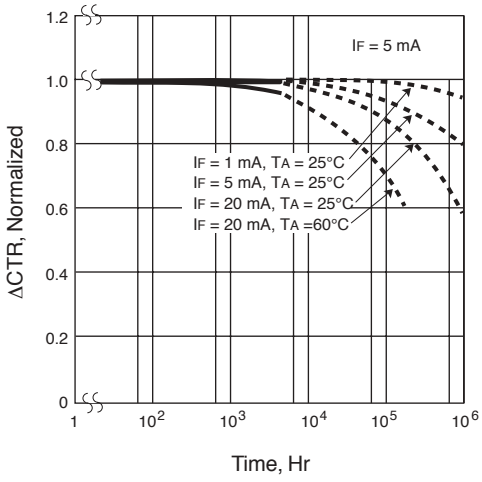


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

FREQUENCY RESPONSE



LONG TERM CTR DEGRADATION

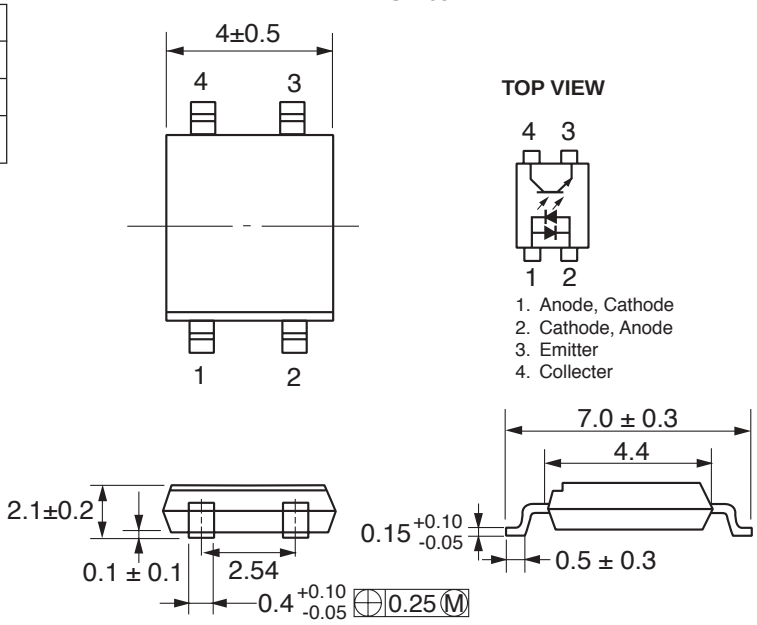


PHOTOCOUPLER CONSTRUCTION

PARAMETER	UNIT (MIN)
Air Distance	5 mm
Creepage Distance	5 mm
Isolation Distance	0.4 mm

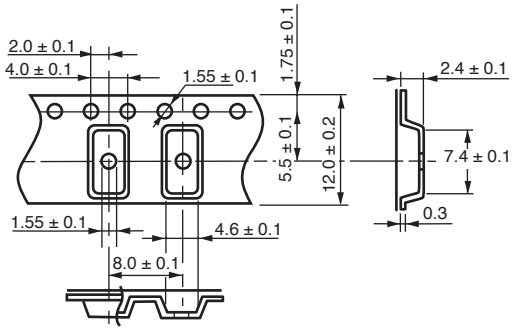
OUTLINE DIMENSIONS (Units in mm)

PS2765-1

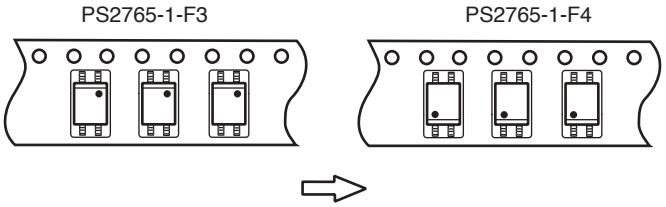


TAPING SPECIFICATIONS (Units in mm)

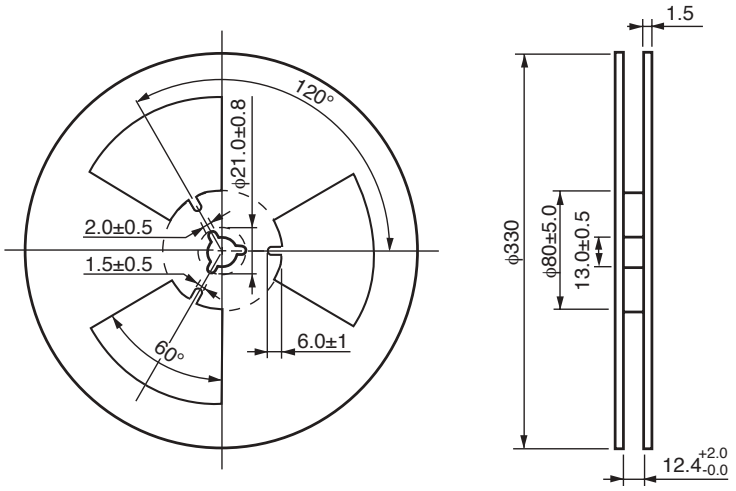
OUTLINE AND DIMENSIONS (TAPE)



TAPING DIRECTION



OUTLINE AND DIMENSIONS (REEL)



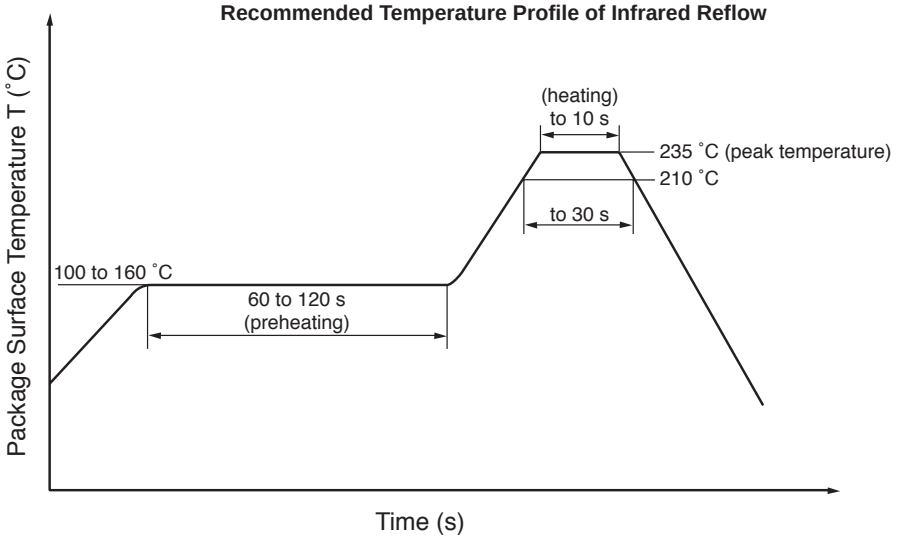
Packing: 3500 pcs/reel

1. Recommended Soldering Conditions

(1) Infrared reflow soldering

• Peak reflow temperature	235 ˚C (package surface temperature)
• Time of temperature higher than 210 ˚C	30 seconds or less
• Number of reflows	Three
• 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 (allowed to be dipped in solder including plastic mold portion)
• 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 and chlorine-based cleaning solvent.

2. Cautions regarding noise

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between corrector -emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.