

HIGH NOISE REDUCTION/ HIGH SPEED 10 Mbps, TOTEM-POLE OUTPUT TYPE 5 PIN SOP TOM OPTOCOUPLER

PS9711

FEATURES

- **HIGH COMMON MODE TRANSIENT IMMUNITY**
CMH, CML: ± 10 kV/ μ s TYP
- **SMALL PACKAGE**
5 pin SOP
- **HIGH SPEED RESPONSE**
 $t_{PHL} = 30$ ns, $t_{PLH} = 35$ ns TYP
- **PULSE WIDTH DISTORTION**
 $|t_{PHL}-t_{PLH}| = 7$ ns TYP
- **TOTEM-POLE OUTPUT**
No Pull-up resistor required
- **TAPE AND REEL AVAILABLE**

DESCRIPTION

The PS9711 is an optically coupled high speed totem pole isolator containing a GaAlAs LED on the light emitting diode side (input side) and a photodiode and a signal processing circuit on the light receiving side (output side) on one chip. It is housed in a plastic SOP (Small Out-Line Package) for high density applications.

APPLICATIONS

- **COMPUTER AND PERIPHERAL DEVICES**
- **MEASUREMENT EQUIPMENT**
- **POWER SUPPLY**

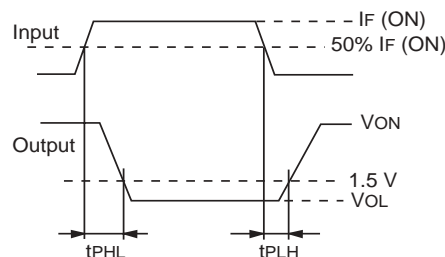
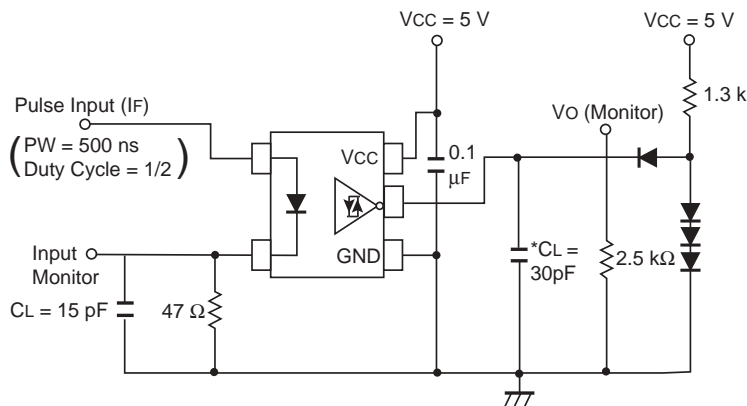
ELECTRICAL CHARACTERISTICS (T_A = -40 to +85 °C, unless otherwise specified)

PART NUMBER				PS9711		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V _F	Forward Voltage, I _F = 10 mA, T _A = 25°C	V	1.4	1.65	1.9
	I _R	Reverse Current, V _R = 3 V, T _A = 25°C	μ A			10
	C _t	Capacitance, V = 0, f = 1.0 MHz, T _A = 25°C	pF		30	
Detector	I _{OH}	High Level Output Current, V _{CC} = V _O = 5.5 V, I _F = 250 μ A	μ A		1	200
	V _{OH}	High Level Output Voltage, V _{CC} = 4.5 V, I _F = 250 μ A, I _{OH} = -2 mA	V	2.4	3.0	
	V _{OL}	Low Level Output Voltage, V _{CC} = 4.5 V, I _F = 7 mA, I _O = 8 mA	V		0.38	0.6
	I _{CCH}	High Level Supply Current, V _{CC} = 5.5 V, I _F = 0 mA	mA		11	17
	I _{CCL}	Low Level Supply Current, V _{CC} = 5.5 V, I _F = 10 mA	mA		12	18
	I _{OSH}	High Level Output Short Circuit Current, V _{CC} = 5.5 V, V _O = GND, I _F = 0 mA, 10 ms or less	mA			-26
	I _{OSL}	Low Level Output Short Circuit Current, V _{CC} = 5.5 V, V _O = GND, I _F = 8 mA, 10 ms or less	mA		34	
Coupled	I _{FHL}	Threshold Input Current, High \rightarrow Low, V _{CC} = 5 V <small>T_A = 25°C</small>	mA		2.0	5 6
	I _{FLH}	Threshold Input Current, Low \rightarrow High, V _{CC} = 5 V <small>T_A = 25°C</small>	mA	0.5 0.35		
	R _{I-O}	Isolation Resistance, V _{in-out} = 1 kV _{DC} , R _H = 40 to 60%, T _A = 25°C	Ω		10 ¹¹	
	C _{I-O}	Isolation Capacitance, V = 0, f = 1.0 MHz, T _A = 25°C	pF		0.6	
	t _{PHL}	Propagation Delay Time, High \rightarrow Low ² , V _{CC} = 5 V, I _F = 7.5 mA <small>T_A = 25°C</small>	ns	15 10	30	65 85
	t _{PLH}	Propagation Delay Time, Low \rightarrow High ² , V _{CC} = 5 V, I _F = 7.5 mA <small>T_A = 25°C</small>	ns	15 10	35	65 85
	t _{PHL} -t _{PLH}	Pulse Width Distortion, (PWD) ² , V _{CC} = 5 V, I _F = 7.5 mA	ns		7	35
	CMH	Common Mode Transient Immunity at High Level Output ³ V _{CC} = 5 V, T _A = 25°C, I _F = 0 mA, V _{O(min)} = 2 V, V _{CM} = 100 V	kV/ μ s		1	10
	CML	Common Mode Transient Immunity at Low Level Output ³ V _{CC} = 5 V, T _A = 25°C, I _F = 7.5 mA, V _O = 0.8 V (max) R _L = 350 Ω V _{CM} = 1 kV	kV/ μ s		1	10

SEE NOTES ON NEXT PAGE

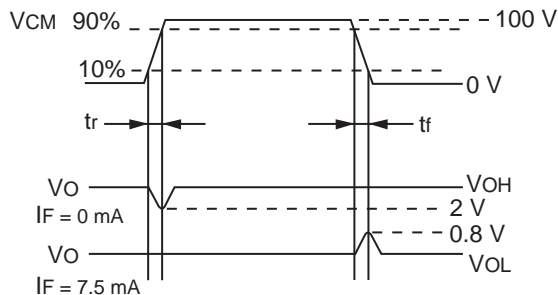
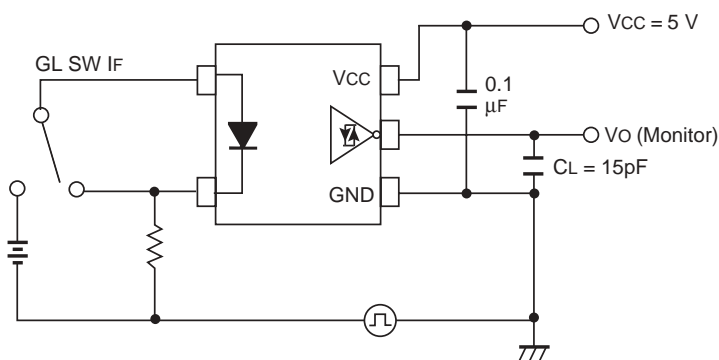
ELECTRICAL CHARACTERISTICS NOTES:

1. Typical Values at TA = 25°C.
2. Test Circuit for Propagation Delay Time:



CL is approximately 15 pF, which includes probe and stray wiring capacitance.

3. Test Circuit for Common Mode Transient Immunity



CL is approximately 15 pF, which includes probe and stray wiring capacitance.

USAGE CAUTIONS

1. Protect against static electricity when handling.
2. By-pass capacitor of more than 0.1 μF is used between Vcc and GND near device.

ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
VR	Reverse Voltage	V	3.0
IF	Forward Current (DC)	mA	30
Detector			
VCC	Supply Voltage	V	7
VO	Output Voltage	V	7
IOH	High Level Output Current ²	mA	-5
IOL	Low Level Output Current ²	mA	13
PD	Power Dissipation	mW	130
Coupled			
BV	Isolation Voltage ³	V _{r.m.s.}	2500
TSTG	Storage Temperature	°C	-55 to +125
TA	Operating Temperature	°C	-40 to +85

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. TA = -40 to +85°C.
3. AC voltage for 1 minute at TA = 25 °C, RH = 60 % between input and output.

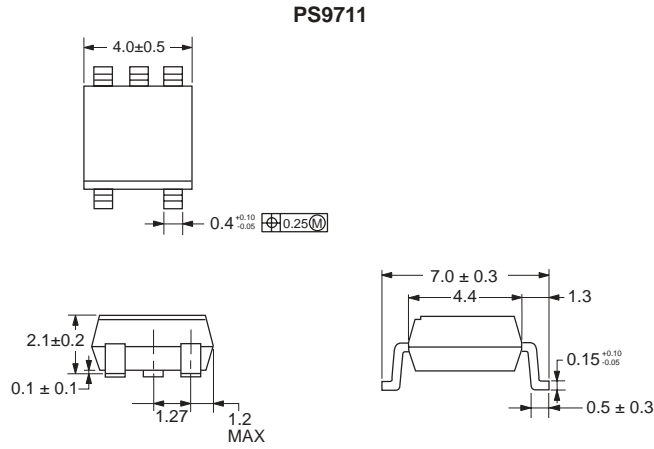
RECOMMENDED OPERATING CONDITIONS

PART NUMBER			PS9711		
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
IFH	High Level Input Current	mA	7.5		12.5
IFL	Low Level Input Current	μA	0		250
VCC	Supply Voltage	V	4.5	5.0	5.5
N	TTL → RL = 1 kΩ	TTL			3

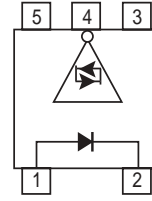
ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING STYLE
PS9711	5 Pin SOP	Magazine case 100 pcs
PS9711-E3		Embossed Tape 900 pcs/reel
PS9711-E4		
PS9711-F3		Embossed Tape 3500 pcs/reel
PS9711-F4		

OUTLINE DIMENSIONS (Units in mm)

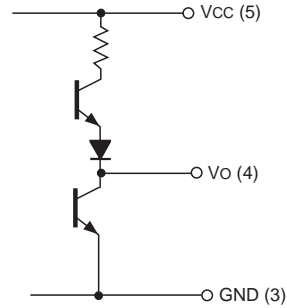


PIN CONNECTION (Top View)



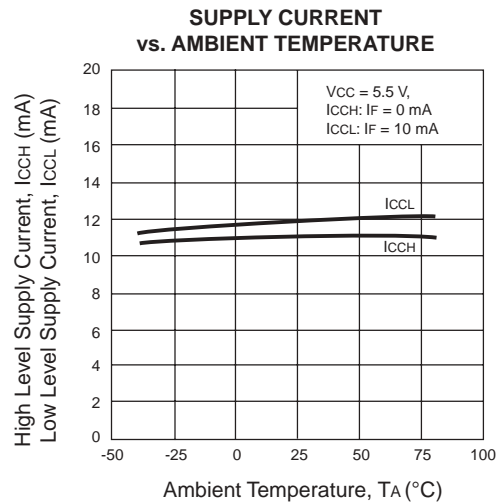
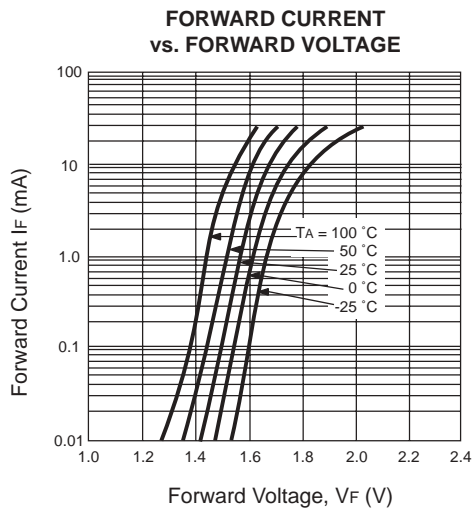
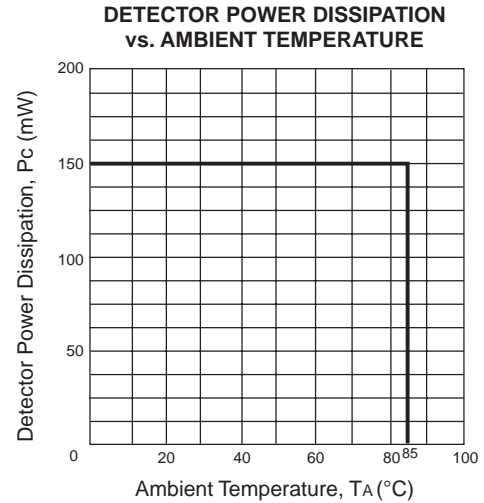
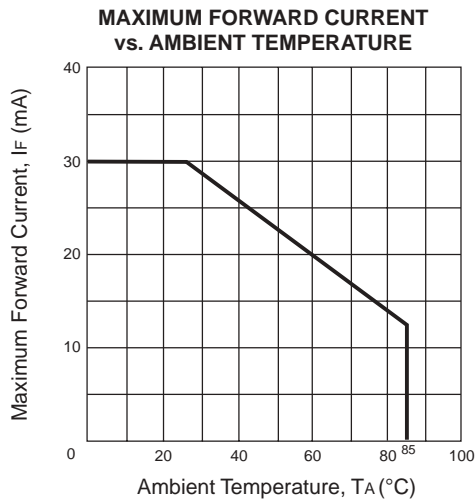
- 1. Anode
- 2. Cathode
- 3. GND
- 4. Vo
- 5. Vcc

INTERNAL OUTPUT CIRCUIT

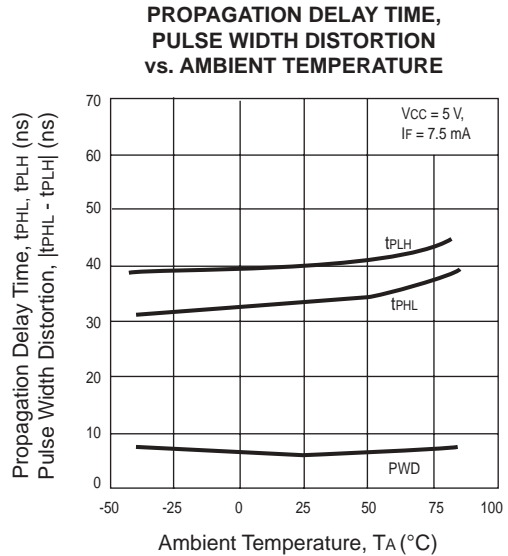
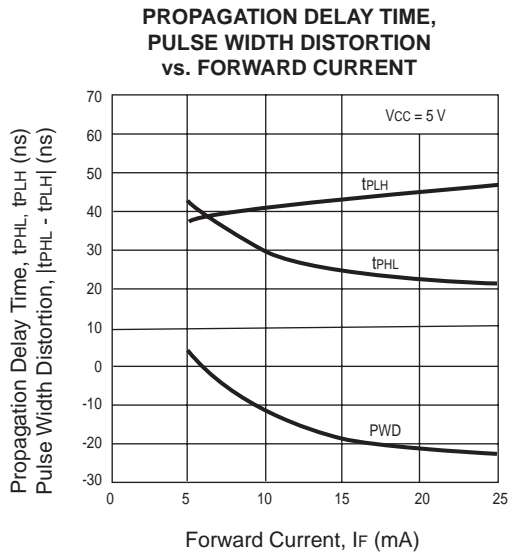
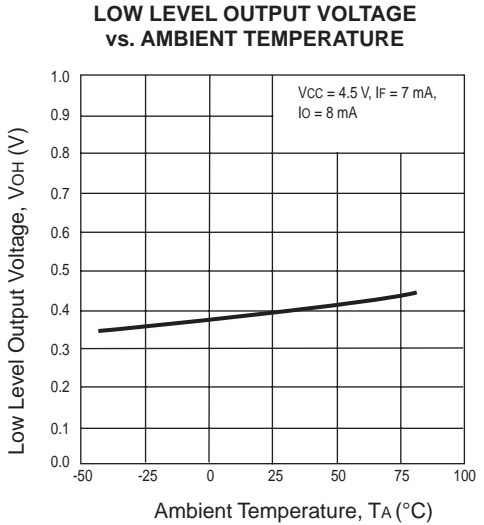
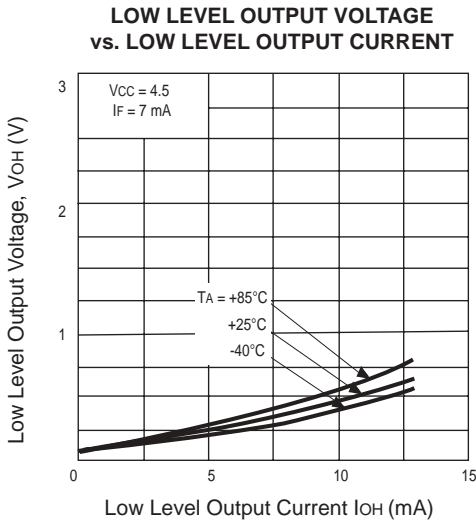
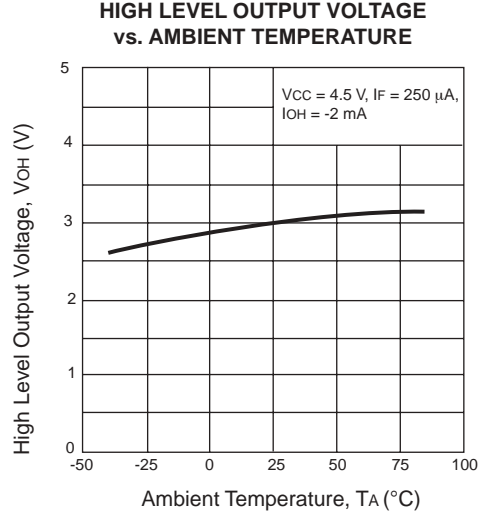
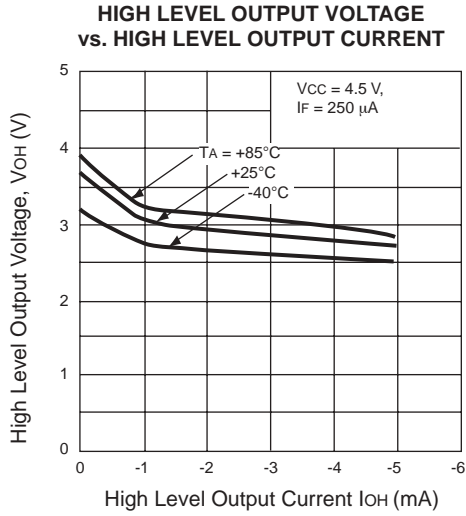


LED	OUTPUT
ON	L
OFF	H

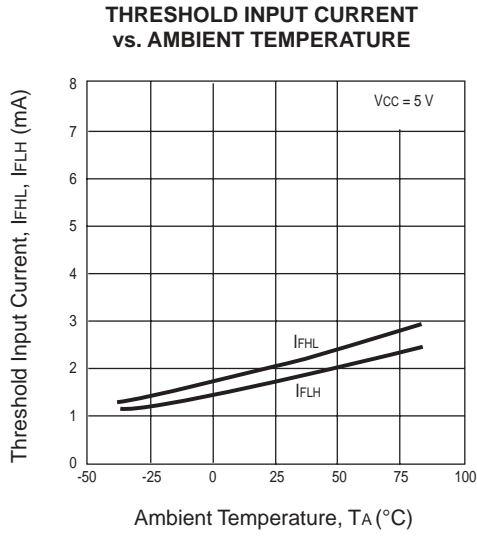
TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$ unless otherwise specified)



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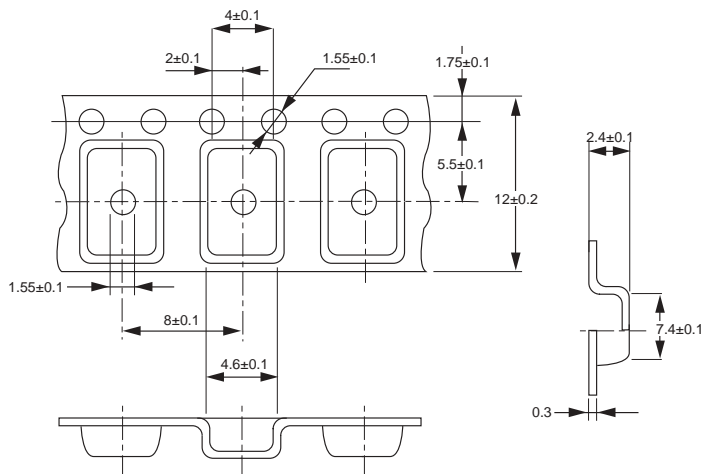


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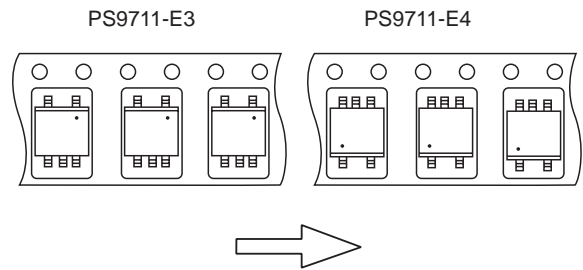


TAPING SPECIFICATIONS (Units in mm)

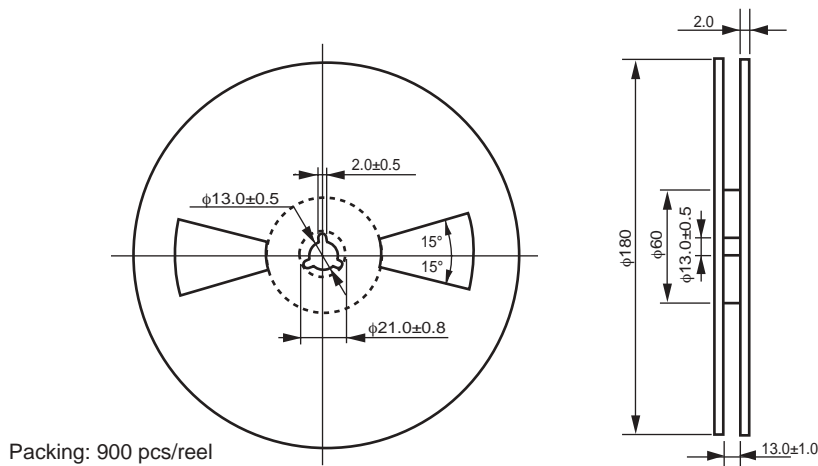
TAPE OUTLINE AND DIMENSIONS



TAPE DIRECTION

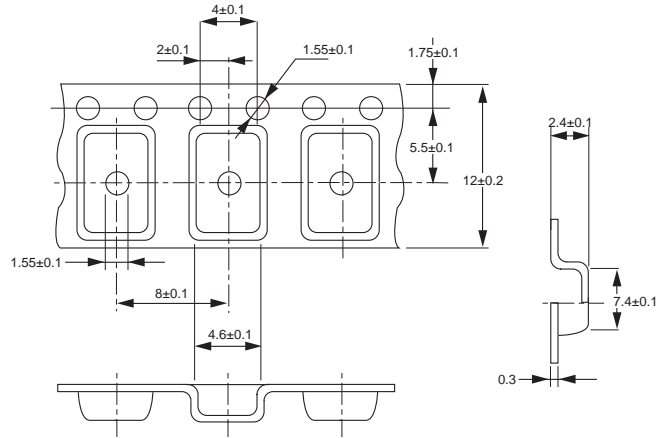


REEL OUTLINE AND DIMENSIONS

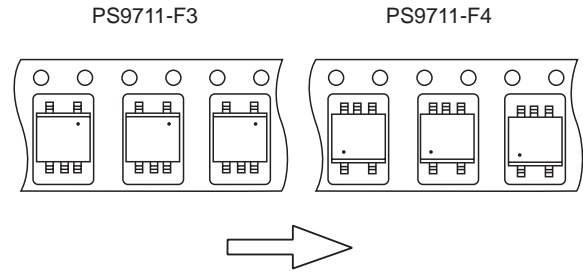


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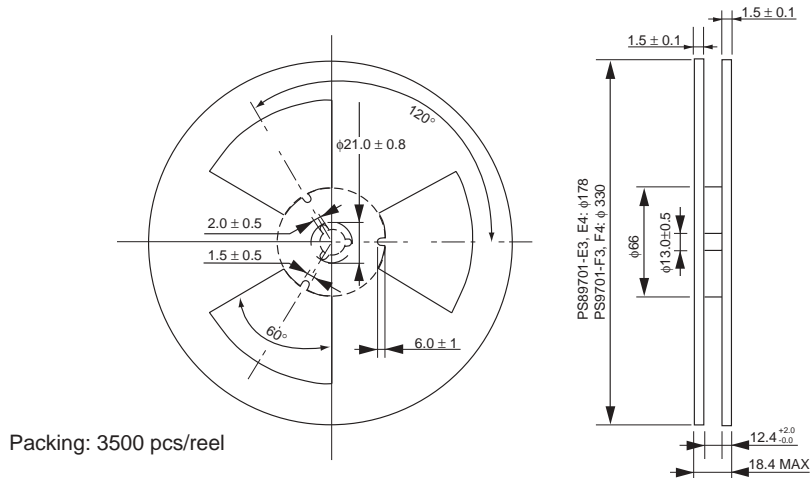
TAPE OUTLINE AND DIMENSIONS



TAPE DIRECTION



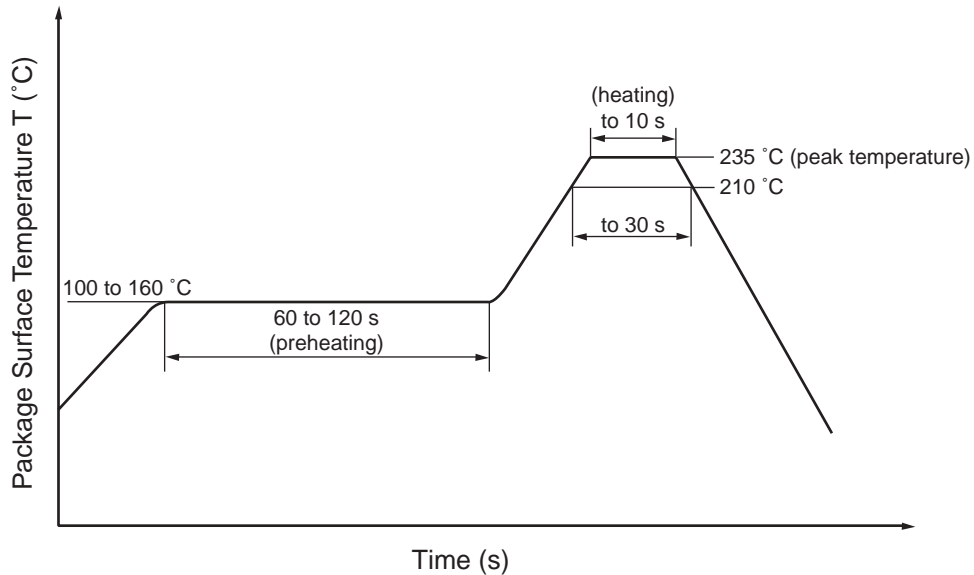
REEL OUTLINE AND DIMENSIONS



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 Three
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended).



(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 chlorine-based cleaning solvent after a reflow process.

Life Support Applications

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