

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**

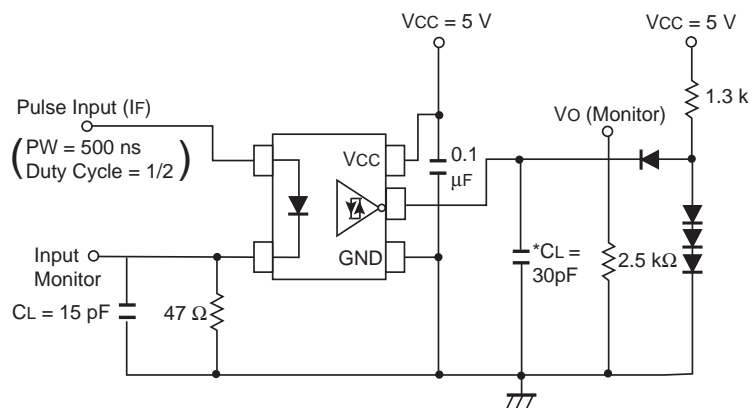
ELECTRICAL CHARACTERISTICS (T_A = -40 to +85 °C, unless otherwise specified)

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 T_A = 25°C	mA		2.0	5 6
	I _{FLH}	Threshold Input Current, Low \rightarrow High, V _{CC} = 5 V T_A = 25°C	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 T_A = 25°C	ns	15 10	30	65 85
	t _{PLH}	Propagation Delay Time, Low \rightarrow High ² , V _{CC} = 5 V, I _F = 7.5 mA T_A = 25°C	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	

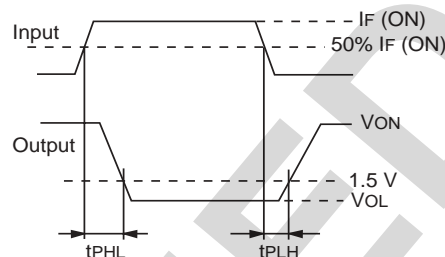
SEE NOTES ON NEXT PAGE

ELECTRICAL CHARACTERISTICS NOTES:

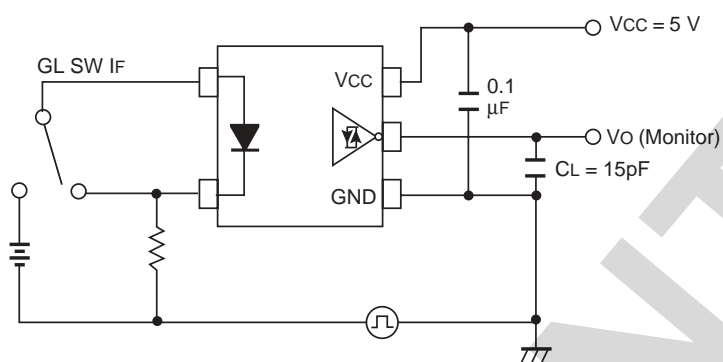
1. Typical Values at $T_A = 25^\circ\text{C}$.
2. Test Circuit for Propagation Delay Time:



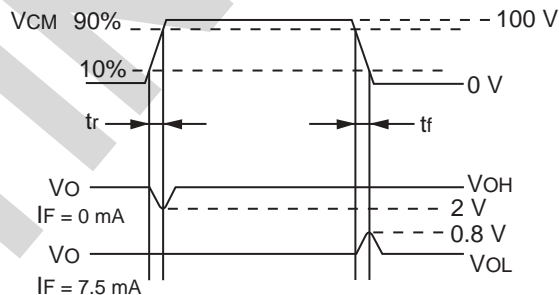
C_L is approximately 15 pF, which includes probe and stray wiring capacitance.



3. Test Circuit for Common Mode Transient Immunity



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

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
V_R	Reverse Voltage	V	3.0
I_F	Forward Current (DC)	mA	30
Detector			
V_{CC}	Supply Voltage	V	7
V_O	Output Voltage	V	7
I_{OH}	High Level Output Current ²	mA	-5
I_{OL}	Low Level Output Current ²	mA	13
P_D	Power Dissipation	mW	130
Coupled			
B_V	Isolation Voltage ³	$V_{r.m.s.}$	2500
T_{STG}	Storage Temperature	$^\circ\text{C}$	-55 to +125
T_A	Operating Temperature	$^\circ\text{C}$	-40 to +85

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. $T_A = -40$ to $+85^\circ\text{C}$.
3. AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60 % between input and output.

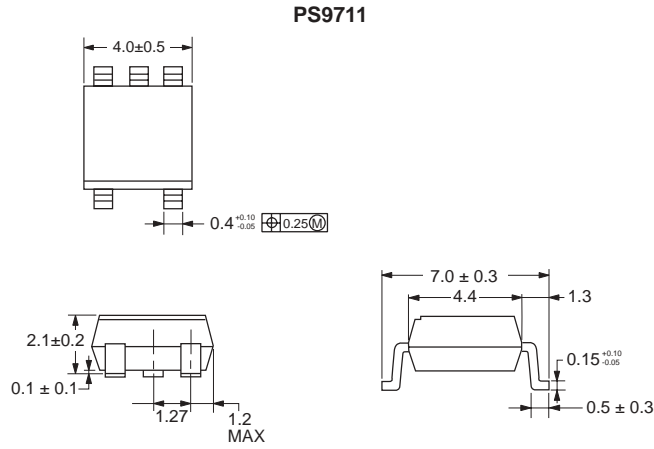
RECOMMENDED OPERATING CONDITIONS

PART NUMBER			PS9711		
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
I_{FH}	High Level Input Current	mA	7.5		12.5
I_{FL}	Low Level Input Current	μA	0		250
V_{CC}	Supply Voltage	V	4.5	5.0	5.5
N	TTL \rightarrow $R_L = 1\text{ k}\Omega$	TTL			3

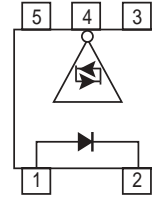
ORDERING INFORMATION

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

OUTLINE DIMENSIONS (Units in mm)

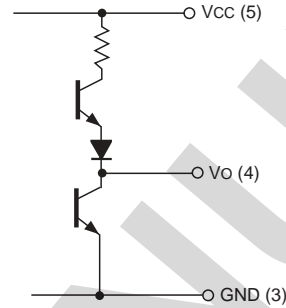


PIN CONNECTION (Top View)



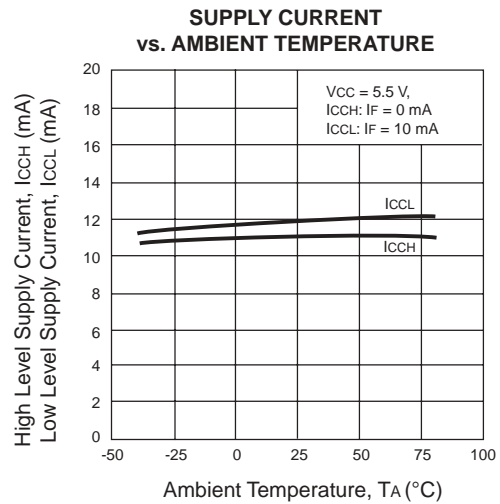
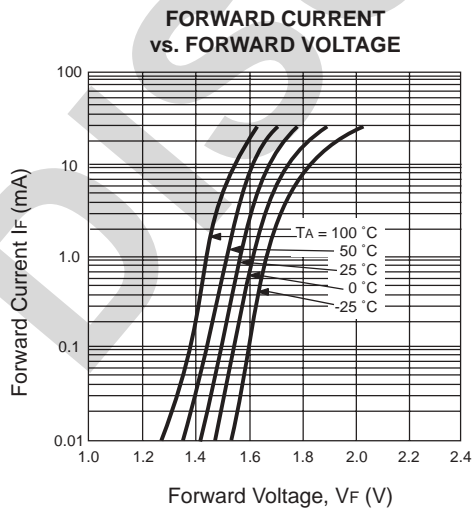
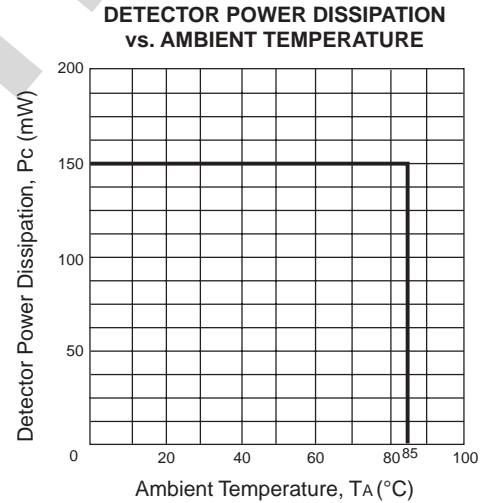
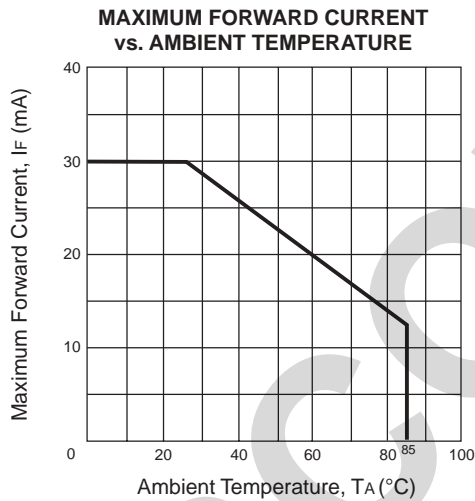
1. Anode
2. Cathode
3. GND
4. Vo
5. Vcc

INTERNAL OUTPUT CIRCUIT

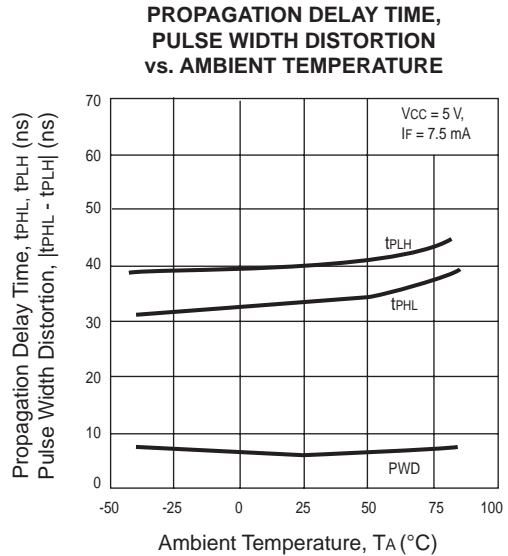
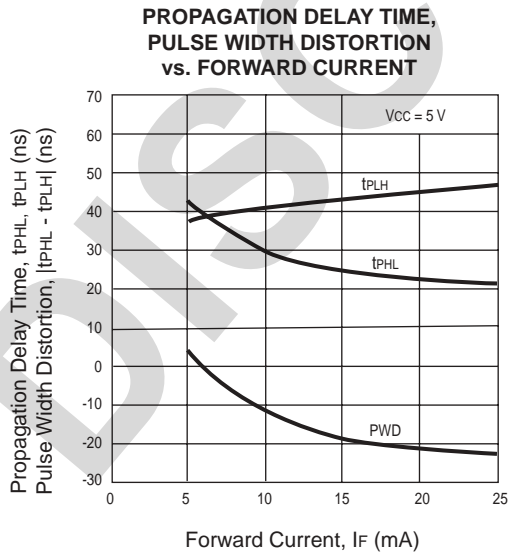
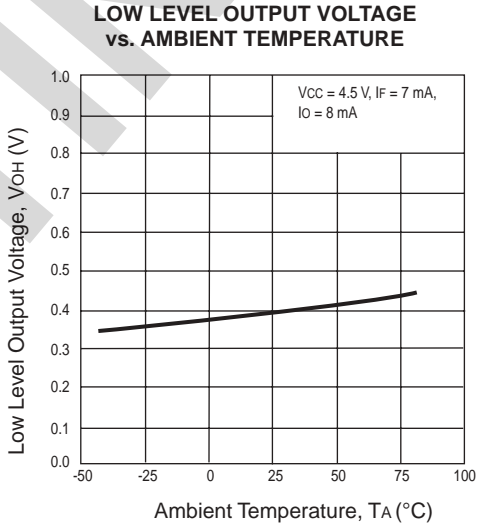
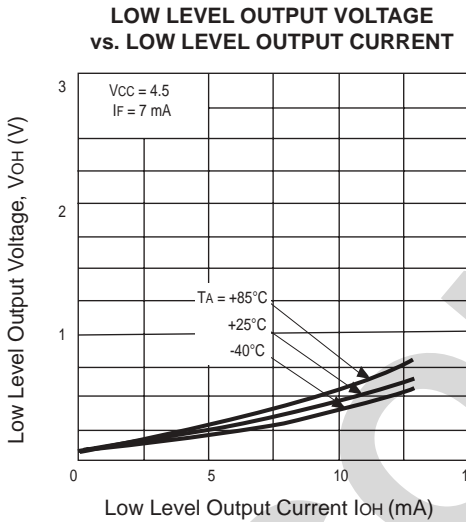
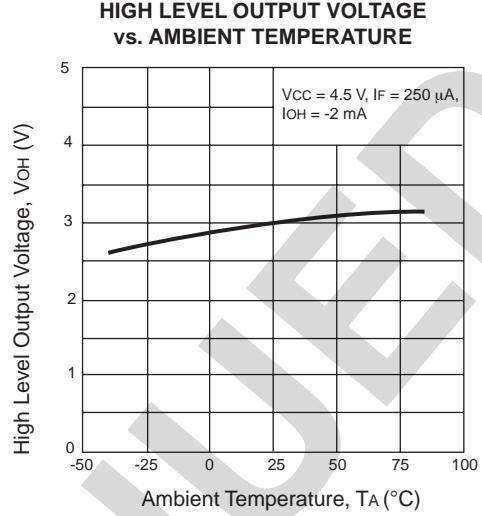
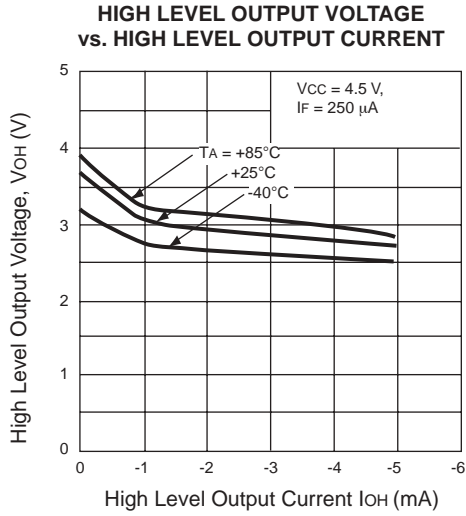


LED	OUTPUT
ON	L
OFF	H

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

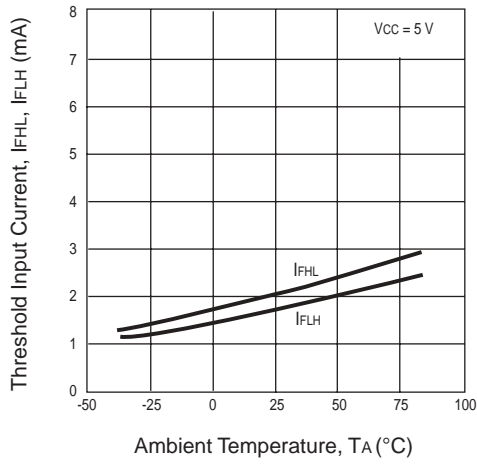


TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$ unless otherwise specified)



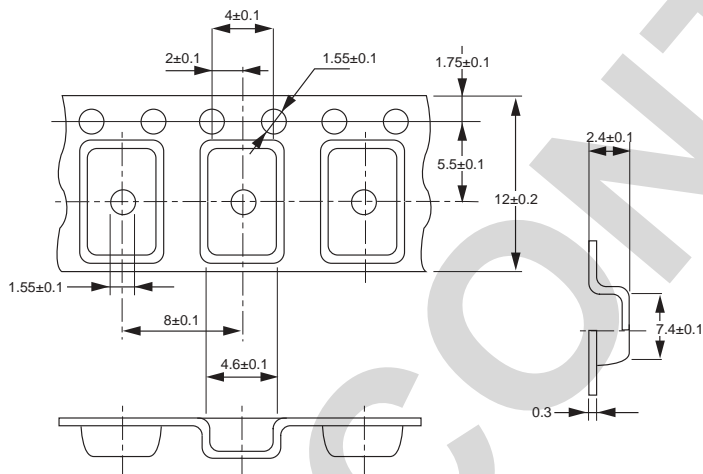
TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$ unless otherwise specified)

THRESHOLD INPUT CURRENT vs. AMBIENT TEMPERATURE

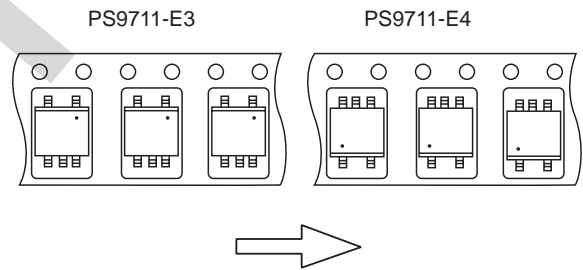


TAPING SPECIFICATIONS (Units in mm)

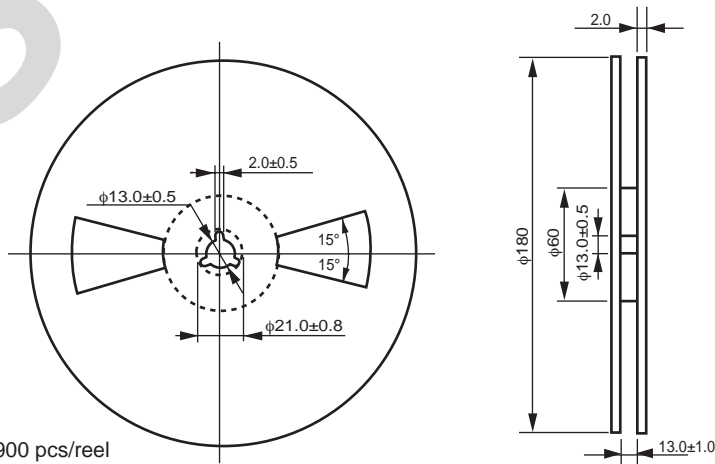
TAPE OUTLINE AND DIMENSIONS



TAPE DIRECTION



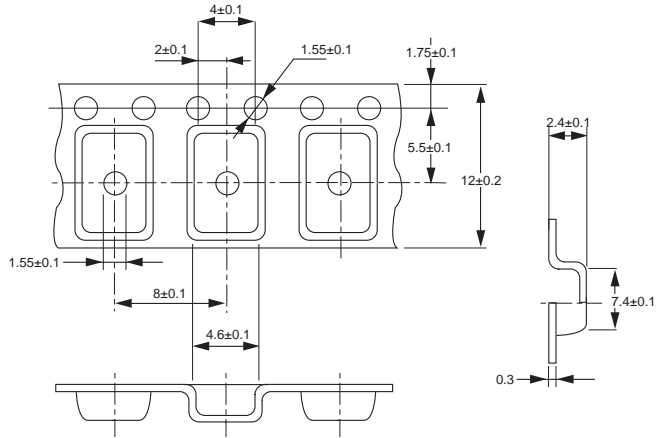
REEL OUTLINE AND DIMENSIONS



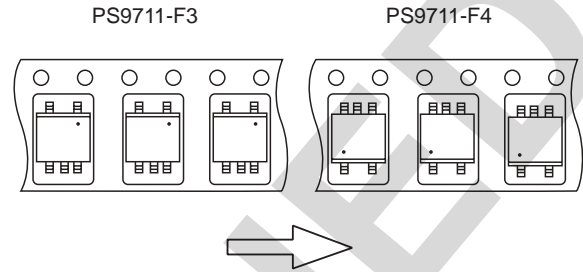
Packing: 900 pcs/reel

TAPING SPECIFICATIONS (Units in mm)

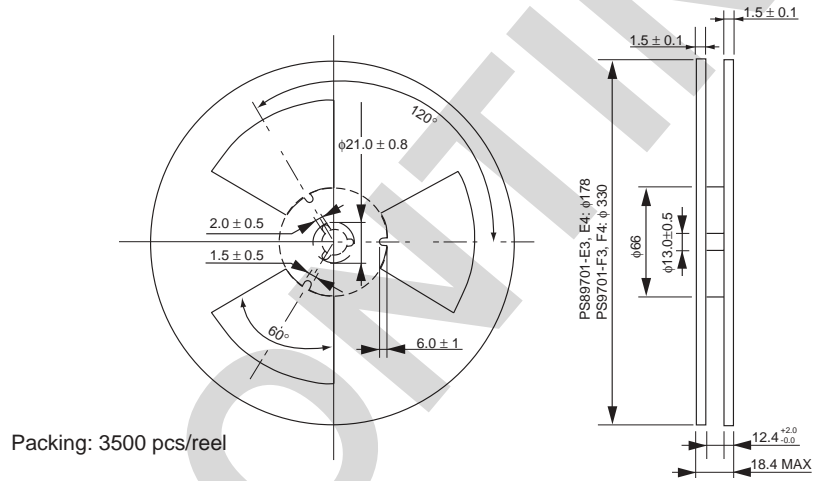
TAPE OUTLINE AND DIMENSIONS



TAPE DIRECTION



REEL OUTLINE AND DIMENSIONS

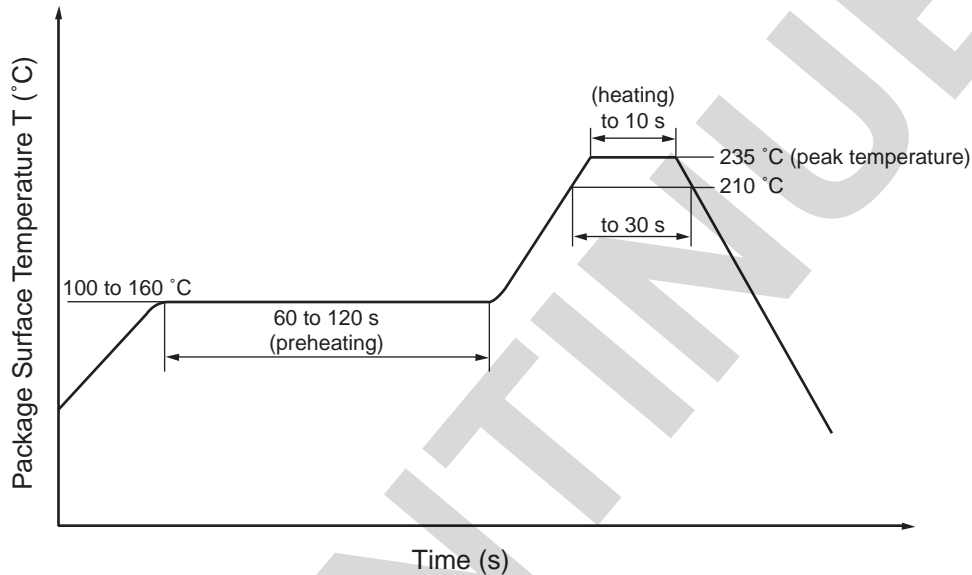


DISCO

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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