



# NEC's HIGH SPEED (200 kbps) ANALOG OUTPUT TYPE 5 PIN SOP OPTOCOUPLER

## PS8703

### FEATURES

- **WIDE OPERATING Vcc RANGE:**  
Vcc = -0.5 to +15 V
- **HIGH ISOLATION VOLTAGE:**  
BV: 2500 V<sub>r.m.s.</sub>
- **HIGH-SPEED RESPONSE:**  
t<sub>PHL</sub>, t<sub>PLH</sub> = 5 μs MAX (@R<sub>L</sub> = 4.1 kΩ)
- **AVAILABLE IN TAPE AND REEL:**  
PS8703-F3, F4

### DESCRIPTION

NEC's PS8703 is an optically coupled isolator containing a GaAlAs LED on the input side and a PIN photodiode and a high speed amplifier transistor on the output side. This is a plastic SOP (Small Outline Package) type for high density applications.

### APPLICATIONS

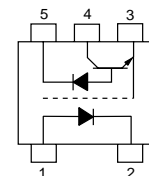
- COMPUTERS AND PERIPHERALS
- GENERAL PURPOSE INVERTER
- SUBSTITUTIONS FOR RELAY AND PULSE TRANSFORMERS
- POWER SUPPLY

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

PART NUMBER			PS8703			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	
Diode	V <sub>F</sub>	Forward Voltage, I <sub>F</sub> = 16 mA	V	1.2	1.5	
	I <sub>R</sub>	Reverse Current, V <sub>R</sub> = 3 V	μA		10	
	C <sub>t</sub>	Terminal Capacitance, V = 0 V, f = 1.0 MHz	pF	30		
Detector	I <sub>OH(1)</sub>	High Level Output Current I <sub>F</sub> = 0 mA, V <sub>CC</sub> = V <sub>O</sub> = 5.5 V	nA	7	500	
	I <sub>OH(2)</sub>	High Level Output Current I <sub>F</sub> = 0 mA, V <sub>CC</sub> = V <sub>O</sub> = 15 V	μA		100	
	V <sub>OL</sub>	Low Level Output Voltage I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 1.1 mA	V	0.1	0.4	
	I <sub>CCH</sub>	High Level Supply Current I <sub>F</sub> = 0 mA, V <sub>O</sub> = Open, V <sub>CC</sub> = 15 V	μA	0.01	1	
	I <sub>CCL</sub>	Low Level Supply Current I <sub>F</sub> = 16 mA, V <sub>O</sub> = Open, V <sub>CC</sub> = 15 V	μA	150	800	
Coupled	CTR	Current Transfer Ratio (I <sub>C</sub> /I <sub>F</sub> ) <sup>1</sup> , I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 4.5 V, V <sub>O</sub> = 0.4 V	%	10	23	30
	R <sub>I-O</sub>	Isolation Resistance, V <sub>IN-OUT</sub> = 1kV <sub>DC</sub> , R <sub>H</sub> = 40 to 60 %	Ω	10 <sup>11</sup>		
	C <sub>I-O</sub>	Isolation Capacitance, V = 0, f = 1.0 MHz	pF		0.4	
	t <sub>PHL</sub>	Propagation Delay Time, (High → Low) <sup>2</sup> I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ, C <sub>L</sub> = 15 pF	μs		1	5
	t <sub>PLH</sub>	Propagation Delay Time, (Low → High) <sup>2</sup> I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 4.1 kΩ, C <sub>L</sub> = 15 pF	μs		2	5
	t <sub>PHL</sub>	Propagation Delay Time, (High → Low) <sup>2</sup> I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 20 kΩ, C <sub>L</sub> = 15 pF	μs		1	15
	t <sub>PLH</sub>	Propagation Delay Time, (Low → High) <sup>2</sup> I <sub>F</sub> = 16 mA, V <sub>CC</sub> = 5 V, R <sub>L</sub> = 20 kΩ, C <sub>L</sub> = 15 pF	μs		7	15

PLEASE SEE NOTES ON NEXT PAGE.

Pin Connection (Top View)



**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATING
Diode			
IF	Forward Current	mA	50
VR	Reverse Voltage	V	5
Detector			
VCC	Supply Voltage	V	-0.5 to +15
Vo	Output Voltage	V	-0.5 to +15
Io	Output Current	mA	8
PC	Power Dissipation <sup>2</sup>	mW	80
Coupled			
BV	Isolation Voltage <sup>3</sup>	V <sub>r.m.s.</sub>	2500
TA	Operating Ambient Temp.	°C	-40 to +100
TSTG	Storage Temperature	°C	-55 to +125

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. Applies to output pin Vo. Reduced to 0.8 mW/°C at TA = 25°C or more.
2. AC voltage for one minute at TA = 25°C, RH = 60% between input and output.

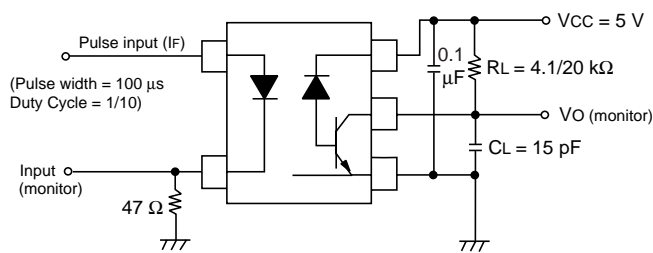
**ORDERING INFORMATION**

PART NUMBER	PACKING STYLE
PS8703	Magazine case 100 pcs
PS8703-F3	Embossed Tape 3500 pcs/reel
PS8703-F4	

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NOTES:

1. CTR rank  
 L: 15 to 30 (%)  
 N: 10 to 30 (%)
2. Test Circuit for Propagation Delay Time:

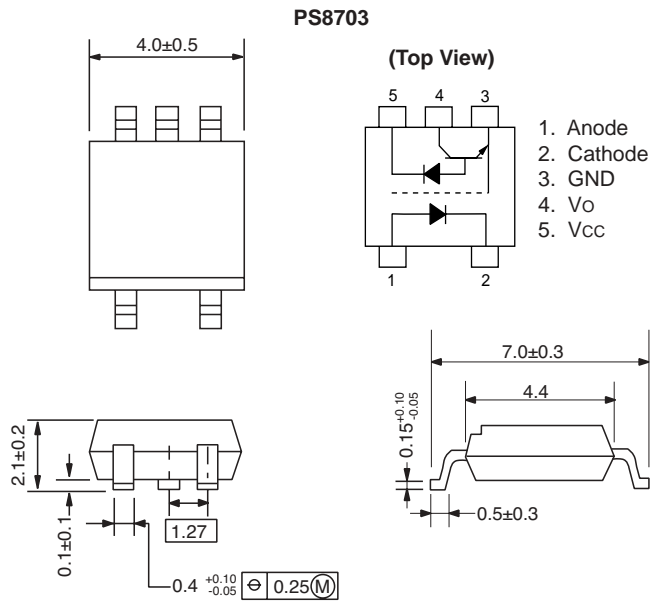


\*CL includes probe and stray wiring capacitance.

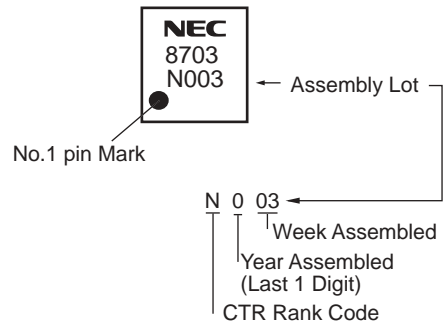
**Usage Cautions:**

1. When handling this product, precautions should be taken against static electricity.
2. A by-pass capacitor of ≥ 0.1 μF is used between Vcc and GND.

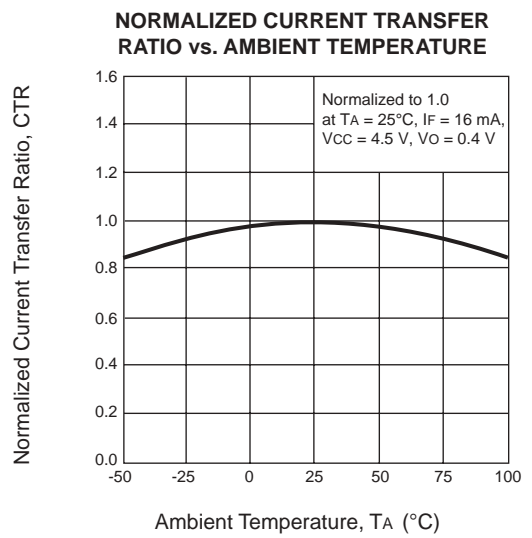
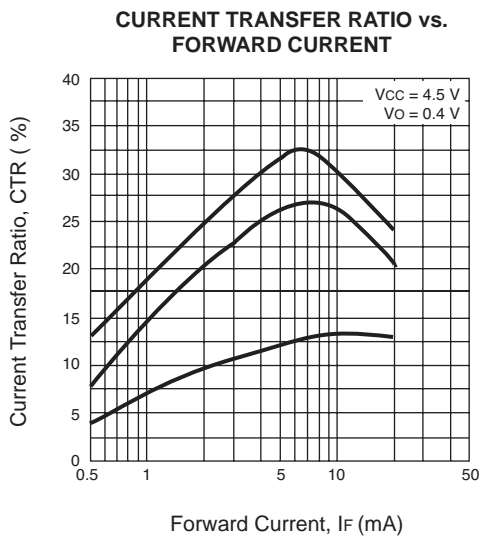
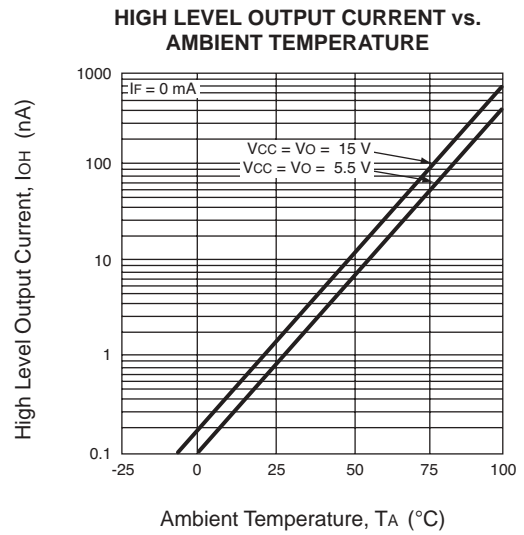
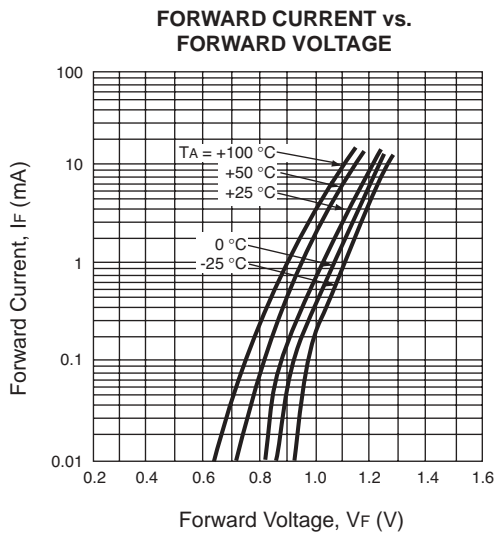
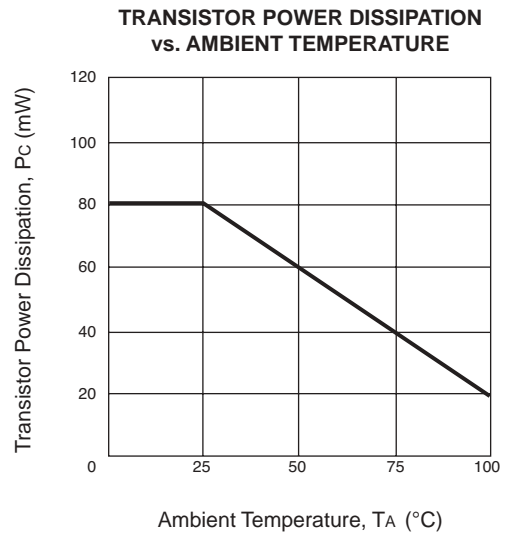
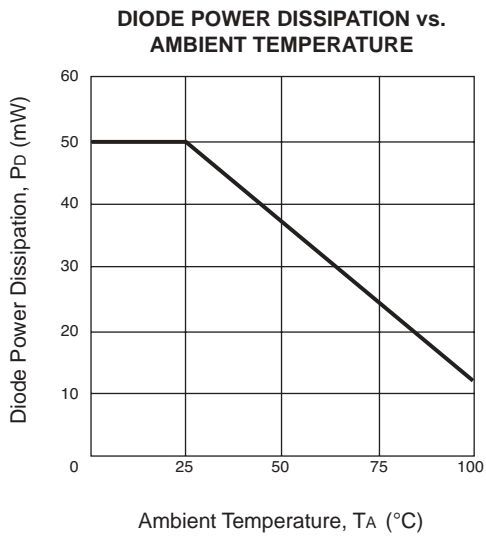
**OUTLINE DIMENSIONS** (Units in mm)



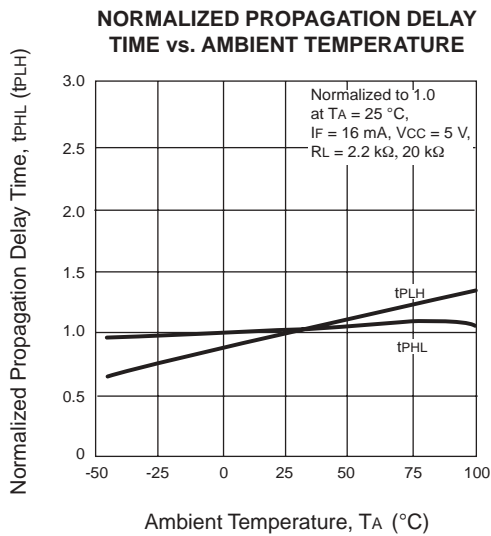
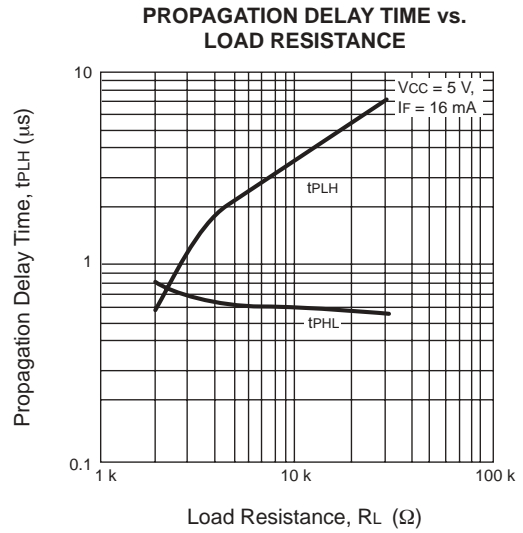
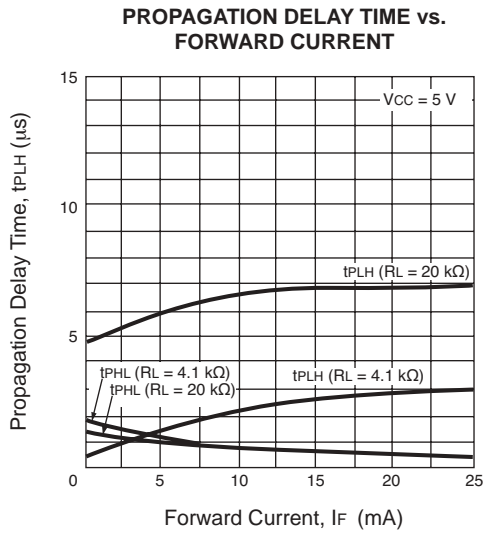
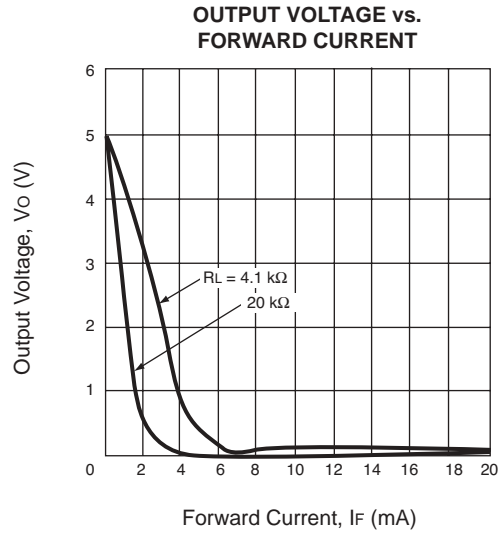
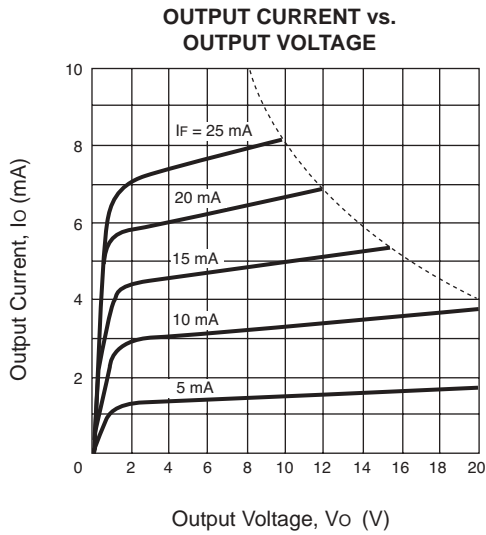
**MARKING**



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



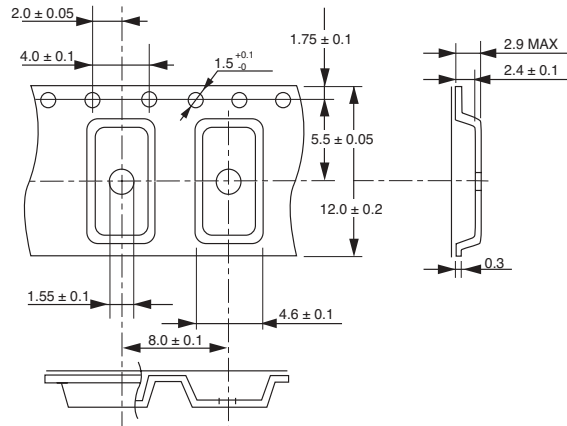
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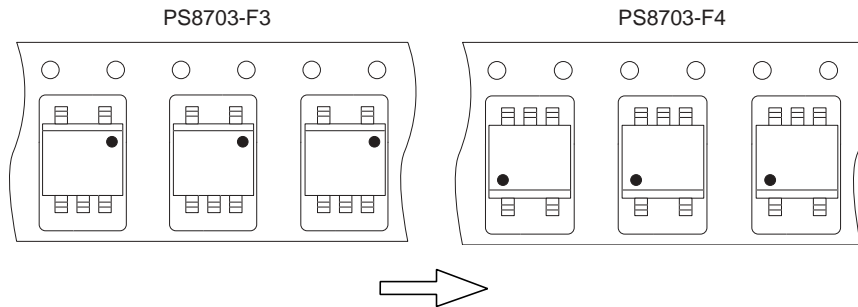
Remark: The graphs indicate nominal characteristics.

# TAPING SPECIFICATIONS (Units in mm)

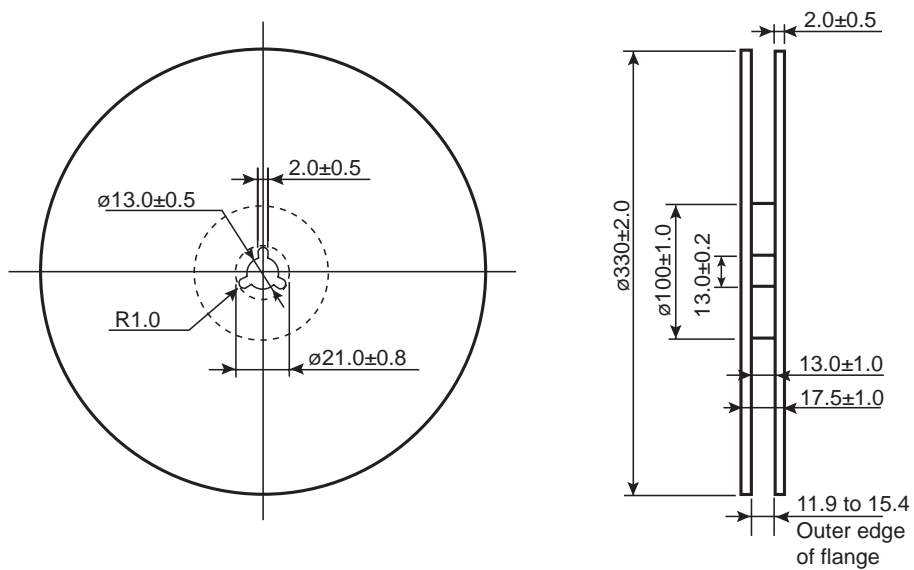
## Tape Outline and Dimensions



## Tape Direction



## Reel Outline and Dimensions

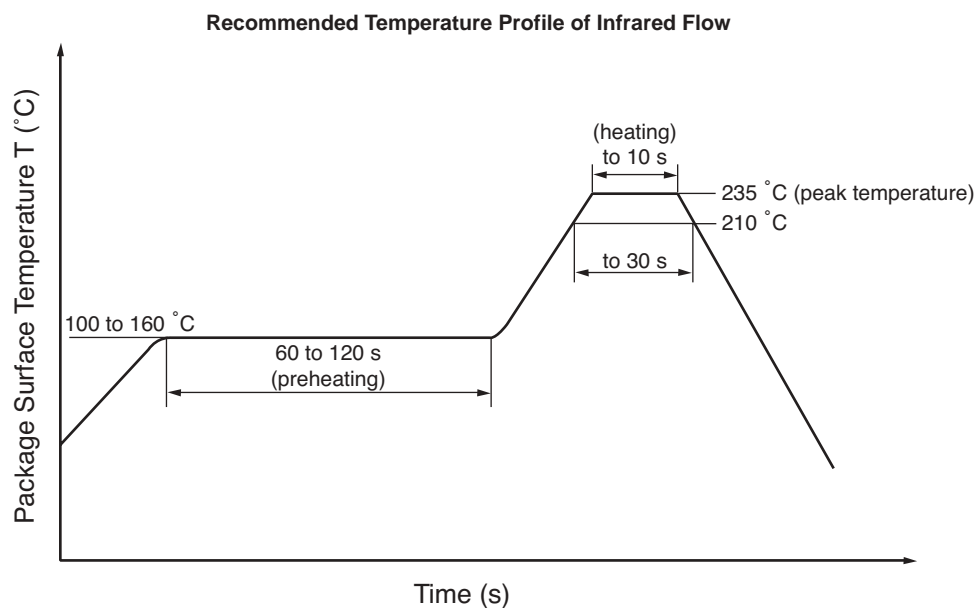


Packing: 3500 pcs/reel

## 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 max. chlorine content of 0.2 Wt % is recommended)



### (2) Cautions

- Fluxes

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

#### Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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