



**THE DATASHEET OF  
PS2501-2-A**





APPLICATION BASED  
**OPTOCOUPLER**  
DESIGN GUIDE

## Solutions as Easy as 1-2-3

Quickly select the right optocoupler for your application. We made it as simple as **1-2-3** regardless if you are a seasoned engineer or novice.

Simply follow the steps below to find your optocoupler solution:

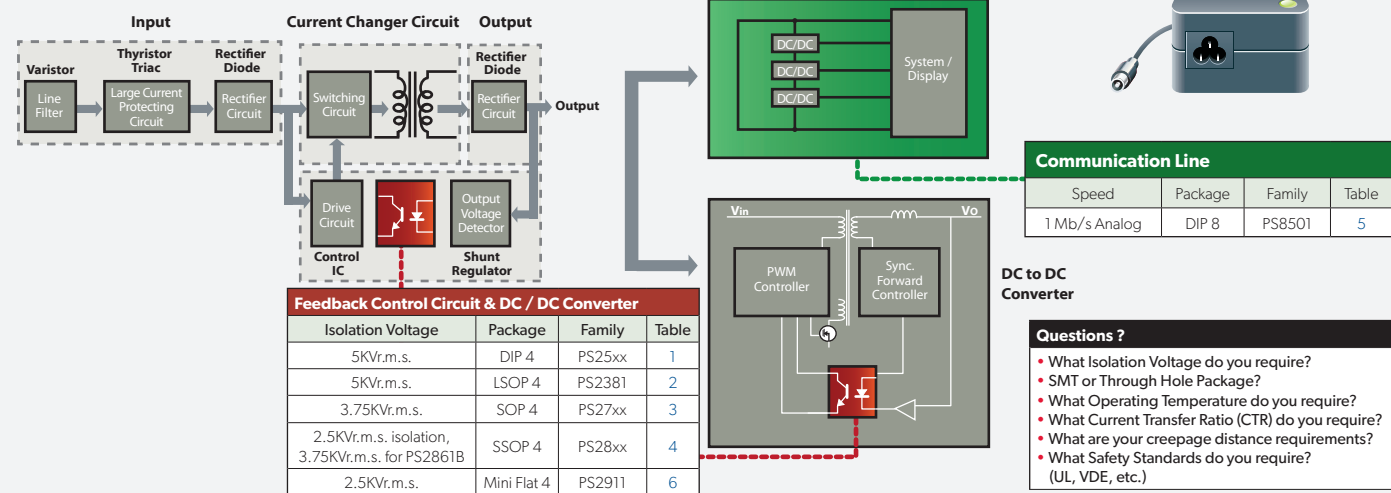
1. Select your application.
2. Look at the block diagram. Follow the corresponding color coded tables. (See reference tables on back page for series specs.)
3. Answer the questions in the block diagram to determine an orderable part. Visit [www.cel.com/Optocouplers](http://www.cel.com/Optocouplers) for a detailed datasheet.

## What is your Application?

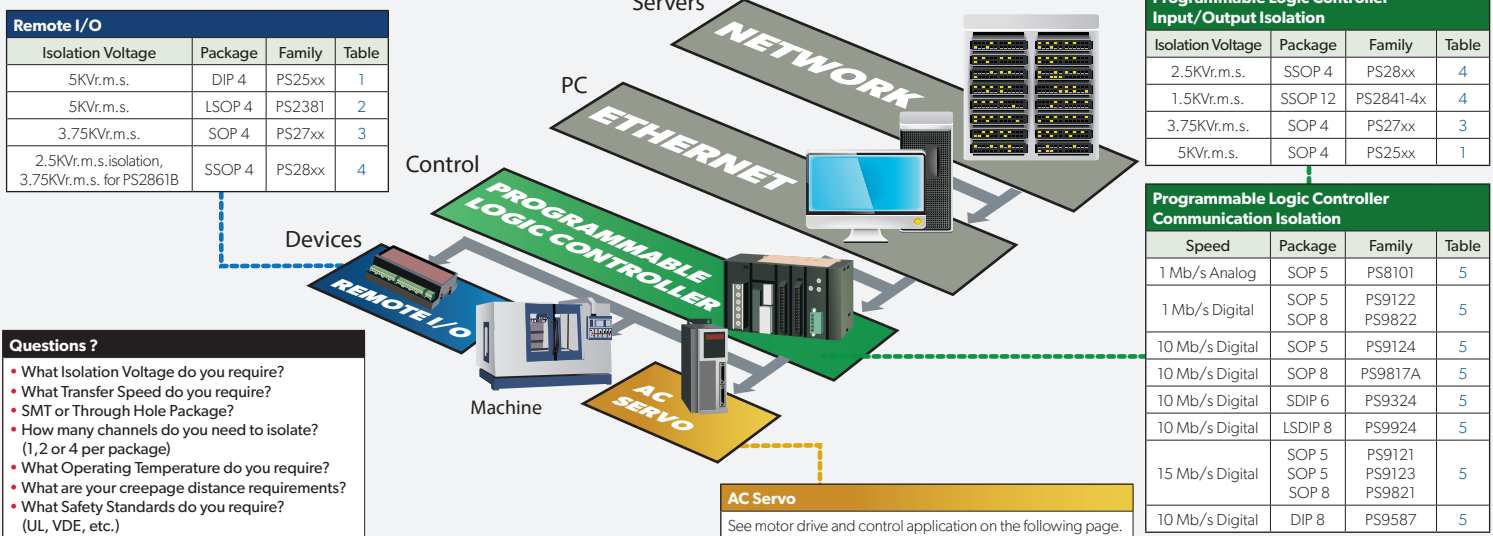
- ▶ [Switch Mode Power Supply](#)
- ▶ [Factory Automation](#)
- ▶ [Motor Drive and Control](#)
- ▶ [Power Over Ethernet \(PoE\)](#)
- ▶ [Power Line Communication \(PLC\)](#)
- ▶ [Smart Meters](#)
- ▶ [Solar Power](#)

## Choose your Application:

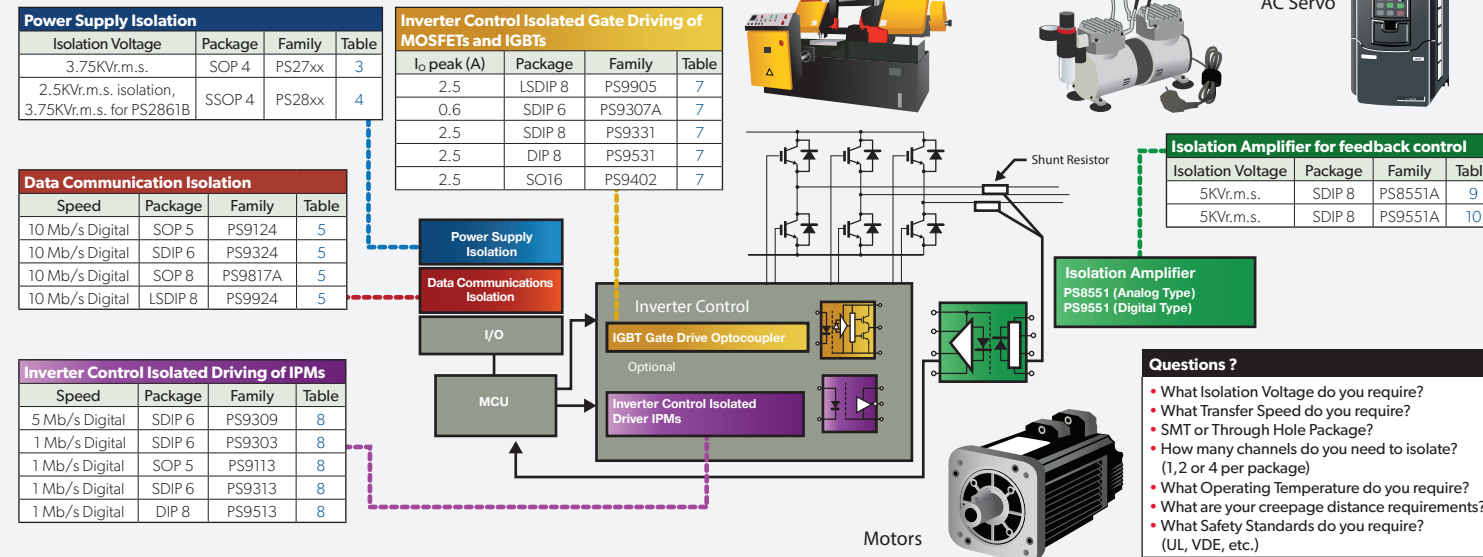
### Switch Mode Power Supply AC to DC Converter



### Factory Automation

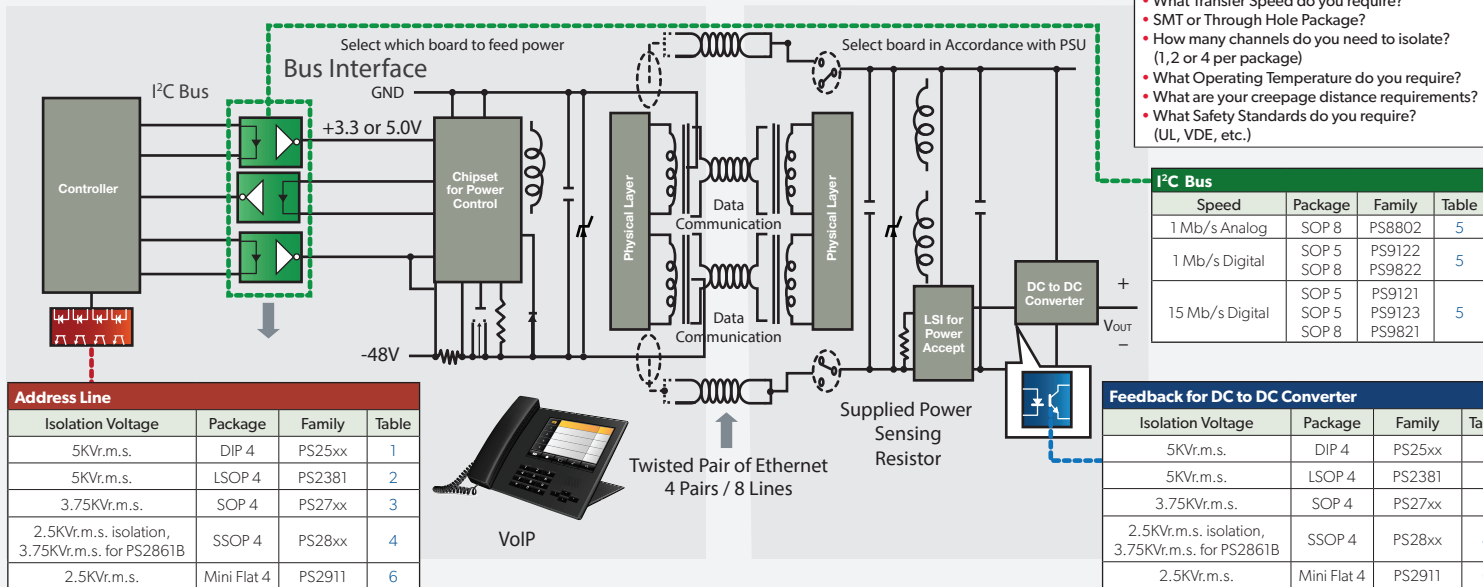


## Motor Driven and Control



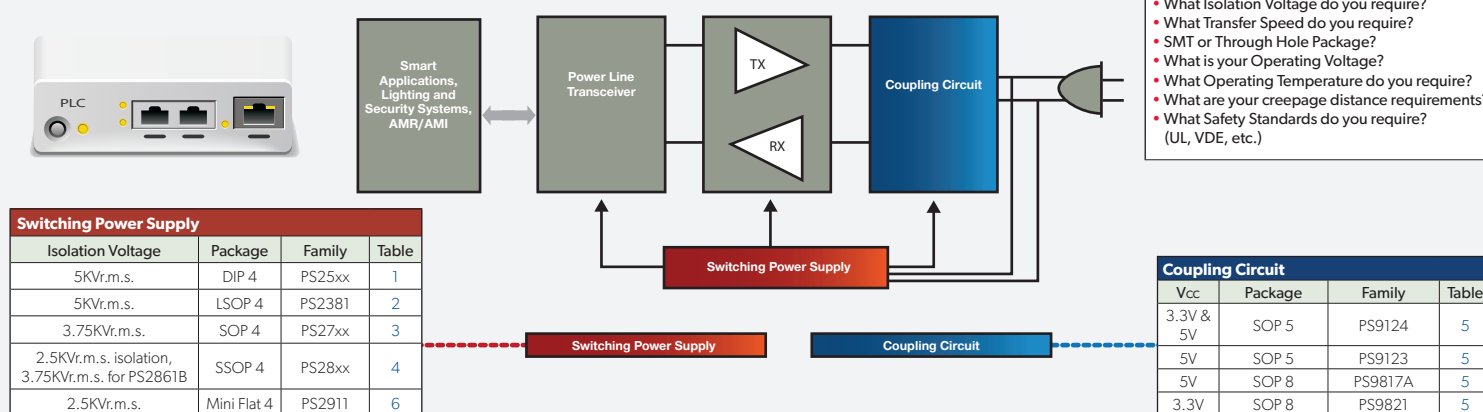
- Questions ?**
- What Isolation Voltage do you require?
  - What Transfer Speed do you require?
  - SMT or Through Hole Package?
  - How many channels do you need to isolate? (1, 2 or 4 per package)
  - What Operating Temperature do you require?
  - What are your creepage distance requirements?
  - What Safety Standards do you require? (UL, VDE, etc.)

## PoE (Power Over Ethernet)



- Questions ?**
- What Isolation Voltage do you require?
  - What Transfer Speed do you require?
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## PLC (Power Line Communication)



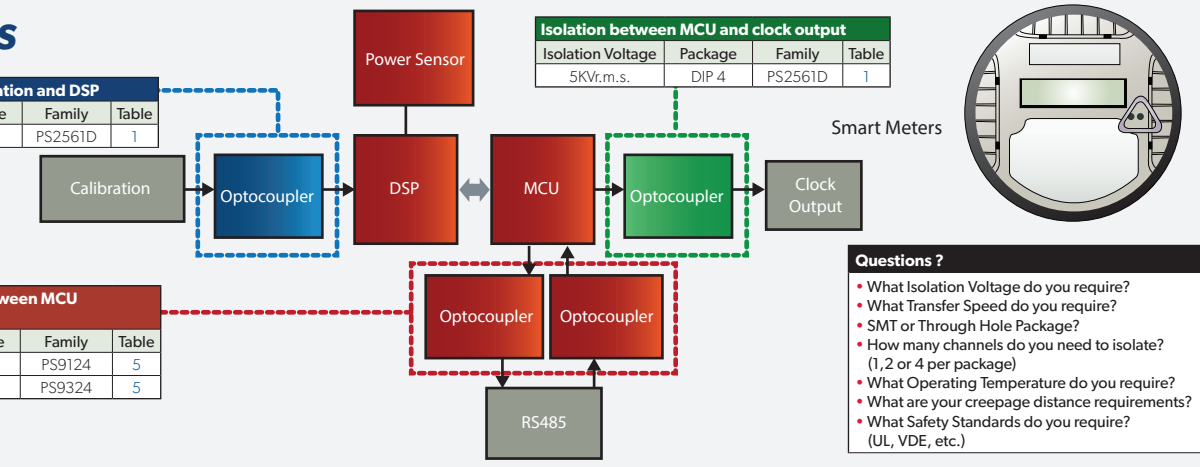
- Questions ?**
- What Isolation Voltage do you require?
  - What Transfer Speed do you require?
  - SMT or Through Hole Package?
  - What is your Operating Voltage?
  - What Operating Temperature do you require?
  - What are your creepage distance requirements?
  - What Safety Standards do you require? (UL, VDE, etc.)

## Smart Meters

| Isolation between Calibration and DSP |         |         |       |
|---------------------------------------|---------|---------|-------|
| Isolation Voltage                     | Package | Family  | Table |
| 5kVr.m.s.                             | DIP 4   | PS2561D | 1     |

| High Speed Isolation between MCU and RS485 |         |        |       |
|--|---------|--------|-------|
| Speed                                      | Package | Family | Table |
| 10 Mb/s Digital                            | SOP 5   | PS9124 | 5     |
| 10 Mb/s Digital                            | SDIP 6  | PS9324 | 5     |

| Isolation between MCU and clock output |         |         |       |
|--|---------|---------|-------|
| Isolation Voltage                      | Package | Family  | Table |
| 5kVr.m.s.                              | DIP 4   | PS2561D | 1     |

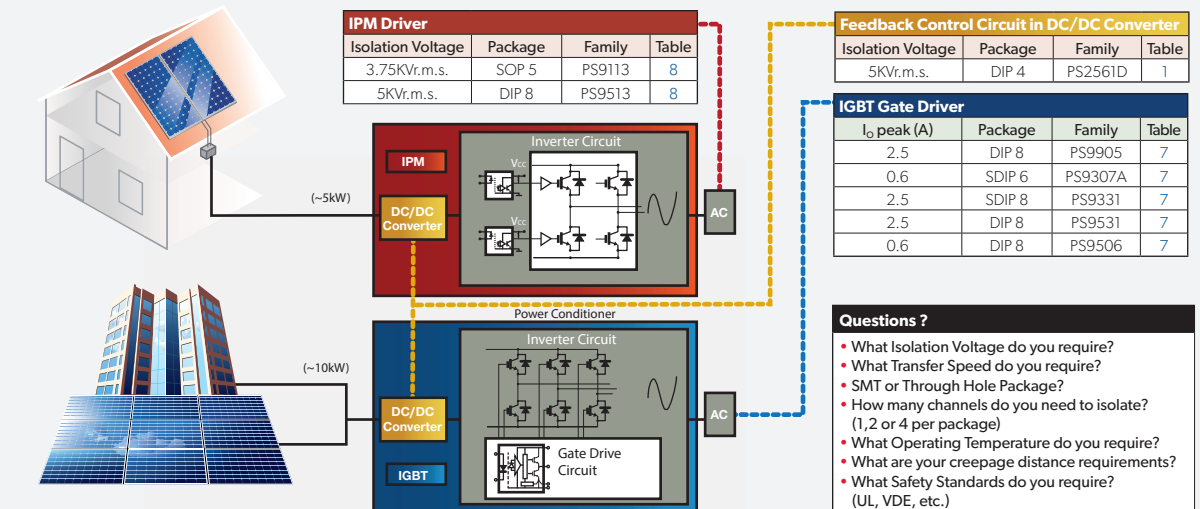


- Questions ?**
- What Isolation Voltage do you require?
  - What Transfer Speed do you require?
  - SMT or Through Hole Package?
  - How many channels do you need to isolate? (1, 2 or 4 per package)
  - What Operating Temperature do you require?
  - What are your creepage distance requirements?
  - What Safety Standards do you require? (UL, VDE, etc.)

## Solar Power

Home System  
Solar Cell

Plant / Building  
System



| IPM Driver        |         |        |       |
|-------------------|---------|--------|-------|
| Isolation Voltage | Package | Family | Table |
| 3.75kVr.m.s.      | SOP 5   | PS9113 | 8     |
| 5kVr.m.s.         | DIP 8   | PS9513 | 8     |

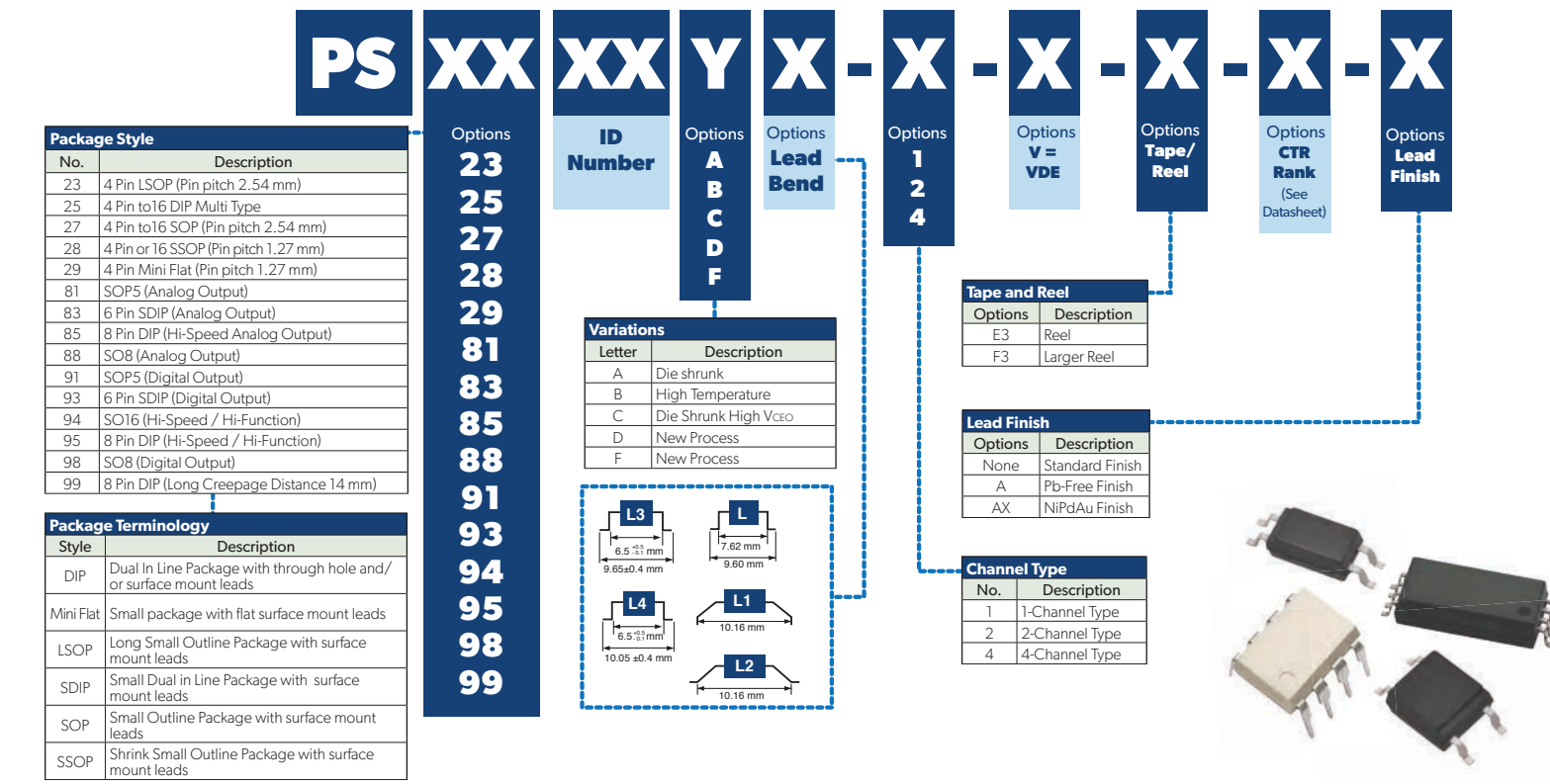
| Feedback Control Circuit in DC/DC Converter |         |         |       |
|---|---------|---------|-------|
| Isolation Voltage                           | Package | Family  | Table |
| 5kVr.m.s.                                   | DIP 4   | PS2561D | 1     |

| IGBT Gate Driver        |         |         |       |
|-------------------------|---------|---------|-------|
| I <sub>c</sub> peak (A) | Package | Family  | Table |
| 2.5                     | DIP 8   | PS9905  | 7     |
| 0.6                     | SDIP 6  | PS9307A | 7     |
| 2.5                     | SDIP 8  | PS9331  | 7     |
| 2.5                     | DIP 8   | PS9531  | 7     |
| 0.6                     | DIP 8   | PS9506  | 7     |

- Questions ?**
- What Isolation Voltage do you require?
  - What Transfer Speed do you require?
  - SMT or Through Hole Package?
  - How many channels do you need to isolate? (1, 2 or 4 per package)
  - What Operating Temperature do you require?
  - What are your creepage distance requirements?
  - What Safety Standards do you require? (UL, VDE, etc.)

## Part Numbering System

**Note:** This diagram is intended to explain existing part numbers and is not to be used to create part numbers since NOT all combinations are available.



# Reference Tables

**Bold\*** = Focus Products

| Table 1 | Root Part       | Input     | Output          | Operating Temperature Range (°C) | V <sub>ceo</sub> Max (V) | I <sub>f</sub> Max (mA) | CTR (%)       | CTR Rank Available | Comments  |
|---------|-----------------|-----------|-----------------|----------------------------------|--------------------------|-------------------------|---------------|--------------------|---|
|         | <b>PS2561D*</b> | <b>DC</b> | <b>Standard</b> | <b>-55 to +110</b>               | <b>80</b>                | <b>40</b>               | <b>50-400</b> | <b>Yes</b>         | <b>Low cost version of PS2561B, PS2501 and PS2501A, High temp</b> |
|         | PS2514          | DC        | Standard        | -55 to +100                      | 40                       | 30                      | 50-200        | Yes                | Standard  |
|         | PS2561F         | DC        | Standard        | -55 to +110                      | 80                       | 30                      | 300-600       | No                 | Low cost version of PS2501-I-K, High temp                         |

| Table 2 | Root Part      | Input     | Output          | Operating Temperature Range (°C) | V <sub>ceo</sub> Max (V) | I <sub>f</sub> Max (mA) | CTR (%)       | CTR Rank Available | Comments                                      |
|---------|----------------|-----------|-----------------|----------------------------------|--------------------------|-------------------------|---------------|--------------------|---|
|         | <b>PS2381*</b> | <b>DC</b> | <b>Standard</b> | <b>-40 to +115</b>               | <b>80</b>                | <b>60</b>               | <b>50-450</b> | <b>Yes</b>         | <b>Stretched package, high temp operation</b> |

| Table 3 | Root Part       | Input     | Output          | Operating Temperature Range (°C) | V <sub>ceo</sub> Max (V) | I <sub>f</sub> Max (mA) | CTR (%)       | CTR Rank Available | Comments   |
|---------|-----------------|-----------|-----------------|----------------------------------|--------------------------|-------------------------|---------------|--------------------|--|
|         | <b>PS2761B*</b> | <b>DC</b> | <b>Standard</b> | <b>-55 to +110</b>               | <b>70</b>                | <b>25</b>               | <b>50-400</b> | <b>Yes</b>         | <b>High temp, low cost version of PS2701 and PS2701A</b> |
|         | PS2711          | DC        | Standard        | -55 to +100                      | 40                       | 50                      | 100-400       | Yes                | Low Input Current  |
|         | PS2701A         | DC        | Standard        | -55 to +100                      | 70                       | 30                      | 50-300        | Yes                | Low cost version of PS2701                               |
|         | PS2705A         | AC        | Standard        | -55 to +100                      | 80                       | ±30                     | 50-300        | Yes                | AC Input   |

| Table 4 | Root Part       | Input                                  | Output           | Operating Temperature Range (°C) | V <sub>ceo</sub> Max (V) | I <sub>f</sub> Max (mA) | CTR (%)       | CTR Rank Available | Comments                                |
|---------|-----------------|--|------------------|----------------------------------|--------------------------|-------------------------|---------------|--------------------|---|
|         | <b>PS2801C*</b> | <b>DC</b>                              | <b>Standard</b>  | <b>-55 to +100</b>               | <b>80</b>                | <b>30</b>               | <b>50-400</b> | <b>Yes</b>         | <b>Low cost version of PS2801</b>       |
|         | PS2861B         | DC                                     | Standard         | -55 to +110                      | 70                       | 50                      | 50-400        | No                 | High temp version of PS2801 and PS2801C |
|         | PS2811          | DC                                     | Standard         | -55 to +100                      | 40                       | 50                      | 100-400       | Yes                | Low Input Current                       |
|         | PS2805C         | AC                                     | Standard         | -55 to +100                      | 80                       | ±30                     | 50-400        | Yes                | AC input                                |
|         | PS2841-4x       | x=A common cathode<br>x=B common anode | Common Collector | -40 to +100                      | 70                       | 20                      | 100-400       | No                 | Ultra SSOP, quad channel with 12 leads  |

| Table 5            | Root Part                         | Type                              | Speed              | Operating Temperature Range (°C) | Package          | Isolation Voltage (Vr.m.s.) | CMR (KV/μS) | V <sub>cc</sub> Max (V) | V <sub>cc</sub> TYP (V)                                       | Comments                           |
|--------------------|-----------------------------------|-----------------------------------|--------------------|----------------------------------|------------------|-----------------------------|-------------|-------------------------|---|------------------------------------|
|                    | <b>PS8501*</b>                    | <b>High Speed / High Function</b> | <b>1 Mbps</b>      | <b>-55 to +100</b>               | <b>8 pin DIP</b> | <b>5K</b>                   | <b>-</b>    | <b>35</b>               | <b>-</b>  | <b>8mm creepage, 8 pin DIP</b>     |
| <b>PS9122*</b>     | <b>High Speed / High Function</b> | <b>1 Mbps</b>                     | <b>-40 to +100</b> | <b>5 pin SOP</b>                 | <b>3.75K</b>     | <b>±15</b>                  | <b>7</b>    | <b>3.3 or 5</b>         | <b>3.3V &amp; 5V versions, Open Collector</b>                 |                                    |
| <b>PS9124*</b>     | <b>High Speed / High Function</b> | <b>10 Mbps</b>                    | <b>-40 to +100</b> | <b>5 pin SOP</b>                 | <b>3.75K</b>     | <b>±15</b>                  | <b>7</b>    | <b>3.3 or 5</b>         | <b>3.3V &amp; 5V versions, Low Distortion</b>                 |                                    |
| <b>PS9821*</b>     | <b>High Speed / High Function</b> | <b>15 Mbps</b>                    | <b>-40 to +85</b>  | <b>SO8</b>                       | <b>2.5K</b>      | <b>±15</b>                  | <b>7</b>    | <b>3.3</b>              | <b>3.3V, Low Distortion</b>                                   |                                    |
| <b>PS9324L/L2*</b> | <b>High Speed / High Function</b> | <b>10 Mbps</b>                    | <b>-40 to +110</b> | <b>6 pin SDIP</b>                | <b>5K</b>        | <b>±15</b>                  | <b>7</b>    | <b>3.3 or 5</b>         | <b>3.3V &amp; 5V versions, Open Collector, Low Distortion</b> |                                    |
| <b>PS9123*</b>     | <b>High Speed / High Function</b> | <b>15 Mbps</b>                    | <b>-40 to +100</b> | <b>5 pin SOP</b>                 | <b>3.75K</b>     | <b>±15</b>                  | <b>7</b>    | <b>5</b>                | <b>Totem Pole Output, Low Distortion</b>                      |                                    |
|                    | PS8101                            | High Speed / High Function        | 1 Mbps             | -55 to +100                      | 5 pin SOP        | 3.75K                       | ±15         | 35                      | -   | High CMR analog output             |
|                    | PS9924                            | High Speed / High Function        | 10 Mbps            | -40 to +100                      | LS DIP           | 7.5K                        | ±15         | 7                       | 3.3 or 5  | 3.3V & 5V, 14mm creepage           |
|                    | PS8802                            | High Speed / High Function        | 10 Mbps            | -55 to +100                      | SO8              | 2.5K                        | ±10         | 35                      | 5   | High CMR analog output             |
|                    | PS9822                            | High Speed / High Function        | 1 Mbps             | -40 to +100                      | SO8              | 2.5K                        | ±20         | 7                       | 3.3 or 5  | 3.3V & 5V versions, Open Collector |
|                    | PS9121                            | High Speed / High Function        | 15 Mbps            | -40 to +85                       | 5 pin SOP        | 3.75K                       | ±15         | 7                       | 3.3   | 3.3V, Low Distortion               |
|                    | PS9817A                           | High Speed / High Function        | 10 Mbps            | -40 to +85                       | SO8              | 2.5K                        | ±15         | 7                       | 5   | 5V, Low Distortion                 |
|                    | PS9317                            | High Speed / High Function        | 10 Mbps            | -40 to +85                       | 6 pin SDIP       | 5K                          | ±15         | 7                       | 5   | 8mm creepage, 6 pin SDIP           |
|                    | PS9587                            | High Speed / High Function        | 10 Mbps            | -40 to +85                       | 8 pin DIP        | 5K                          | ±15         | 7                       | 5   | 8mm creepage, 8 pin DIP            |
|                    | PS9851                            | High Speed / High Function        | 15 Mbps            | -40 to +100                      | SO8              | 2.5K                        | ±10         | 5.5                     | 5   | 5V, 100°C max operating temp       |

| Table 6 | Root Part      | Input     | Output          | Operating Temperature Range (°C) | V <sub>ceo</sub> Max (V) | I <sub>f</sub> Max (mA) | CTR (%)          | CTR Rank Available | Comments                             |
|---------|----------------|-----------|-----------------|----------------------------------|--------------------------|-------------------------|------------------|--------------------|--------------------------------------|
|         | <b>PS2911*</b> | <b>DC</b> | <b>Standard</b> | <b>-55 to +100</b>               | <b>40</b>                | <b>50</b>               | <b>100 - 400</b> | <b>Yes</b>         | <b>Ultra small flat-lead package</b> |

| Table 7         | Root Part      | Input        | t <sub>PH</sub> / t <sub>PHL</sub> (μS) | Operating Temperature Range (°C) | Isolation Voltage (Vr.m.s.) | I <sub>f</sub> Max (mA) | CMR (KV/μS) | V <sub>cc</sub> Max (V)   | Comments   |
|-----------------|----------------|--------------|---|----------------------------------|-----------------------------|-------------------------|-------------|---|--|
|                 | <b>PS9905*</b> | <b>DC</b>    | <b>0.25</b>                             | <b>-40 to +110</b>               | <b>7.5K</b>                 | <b>25</b>               | <b>±25</b>  | <b>30</b>   | <b>14mm Long creepage, 8 pin LSDIP</b>                   |
| <b>PS9307A*</b> | <b>DC</b>      | <b>0.150</b> | <b>-40 to +125</b>                      | <b>5K</b>                        | <b>25</b>                   | <b>±50</b>              | <b>35</b>   | <b>6 pin SDIP</b>   |  |
| <b>PS9531*</b>  | <b>DC</b>      | <b>0.175</b> | <b>-40 to +125</b>                      | <b>5K</b>                        | <b>25</b>                   | <b>±50</b>              | <b>35</b>   | <b>UVLO (Under Voltage Lock Out) protection with hysteresis</b>                             |  |
| <b>PS9402*</b>  | <b>DC</b>      | <b>0.2</b>   | <b>-40 to +110</b>                      | <b>5K</b>                        | <b>25</b>                   | <b>±25</b>              | <b>33</b>   | <b>Fault detection (desaturation detection, UVLO protection and active Miller clamping)</b> |  |
|                 | PS9506         | DC           | 0.4                                     | -40 to +110                      | 5K                          | 25                      | ±25         | 30  | 8mm creepage option available                            |
|                 | PS9331         | DC           | 0.175                                   | -40 to +125                      | 5K                          | 25                      | ±50         | 33  | UVLO (Under Voltage Lock Out) protection with hysteresis |

| Table 8 | Root Part      | Input     | t <sub>PH</sub> / t <sub>PHL</sub> (nS) | Operating Temperature Range (°C) | Isolation Voltage (Vr.m.s.) | I <sub>f</sub> Max (mA) | CMR (KV/μS) | V <sub>cc</sub> Max (V) | Comments  |
|---------|----------------|-----------|---|----------------------------------|-----------------------------|-------------------------|-------------|-------------------------|---|
|         | <b>PS9309*</b> | <b>DC</b> | <b>250/250</b>                          | <b>-40 to +110</b>               | <b>5K</b>                   | <b>20</b>               | <b>±15</b>  | <b>20</b>               | <b>5 Mbps Totem Pole output type, 6 pin SDIP, IPM driver</b>      |
|         | PS9303         | DC        | 500/550                                 | -40 to +110                      | 5K                          | 20                      | ±15         | 25                      | 1 Mbps Totem Pole output type, 6 pin SDIP, IPM driver             |
|         | PS9113         | DC        | 750/500                                 | -40 to +110                      | 3.75K                       | 25                      | ±15         | 25                      | 1 Mbps, open collector output, 5 pin SOP (SOS) IPM driver         |
|         | PS9313         | DC        | 750/500                                 | -40 to +110                      | 5K                          | 25                      | ±15         | 25                      | 1 Mbps, open collector output, 8mm creepage 6 pin SDIP IPM driver |
|         | PS9513         | DC        | 750/500                                 | -40 to +100                      | 5K                          | 30                      | ±15         | 25                      | 1 Mbps, open collector output, 8mm creepage 8 pin DIP IPM driver  |

| Table 9 | Root Part       | Operating Temperature Range (°C) | Bandwidth TYP (kHz) | Input Supply <sup>001</sup> Max (mA) | Output Supply <sup>002</sup> Max (mA) | Gain v/v TYP | Gain Error (%) | CMR (KV/μS) | Comments  |
|---------|-----------------|----------------------------------|---------------------|--------------------------------------|---------------------------------------|--------------|----------------|-------------|---|
|         | <b>PS8551A*</b> | <b>-40 to +105</b>               | <b>100</b>          | <b>16</b>                            | <b>16</b>                             | <b>8</b>     | <b>±1</b>      | <b>±10</b>  | <b>High CMR analog output isolation amplifier</b> |

| Table 10 | Root Part | Operating Temperature Range (°C) | V <sub>cc</sub> Max (V) | V <sub>cc</sub> Range Recommended (V) | Input Supply <sup>001</sup> Max (mA) | Output Supply <sup>002</sup> Max (mA) | ENOB (Bits Min) | Output Clock Frequency (MHz Typ) | Comments   |
|----------|-----------|----------------------------------|-------------------------|---------------------------------------|--------------------------------------|---------------------------------------|-----------------|----------------------------------|--|
|          | PS9551A   | -40 to +105                      | 5.5                     | 4.5 to 5.5                            | 18                                   | 15                                    | 10              | 10                               | High CMR digital output isolation amplifier, sigma-delta modulator |



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