

# Light Dependent Resistors (LDR)

R. Becker

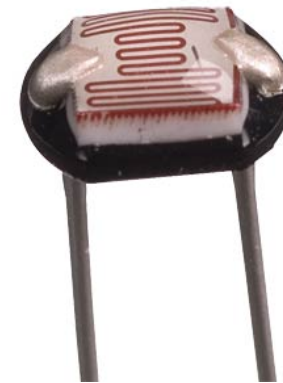
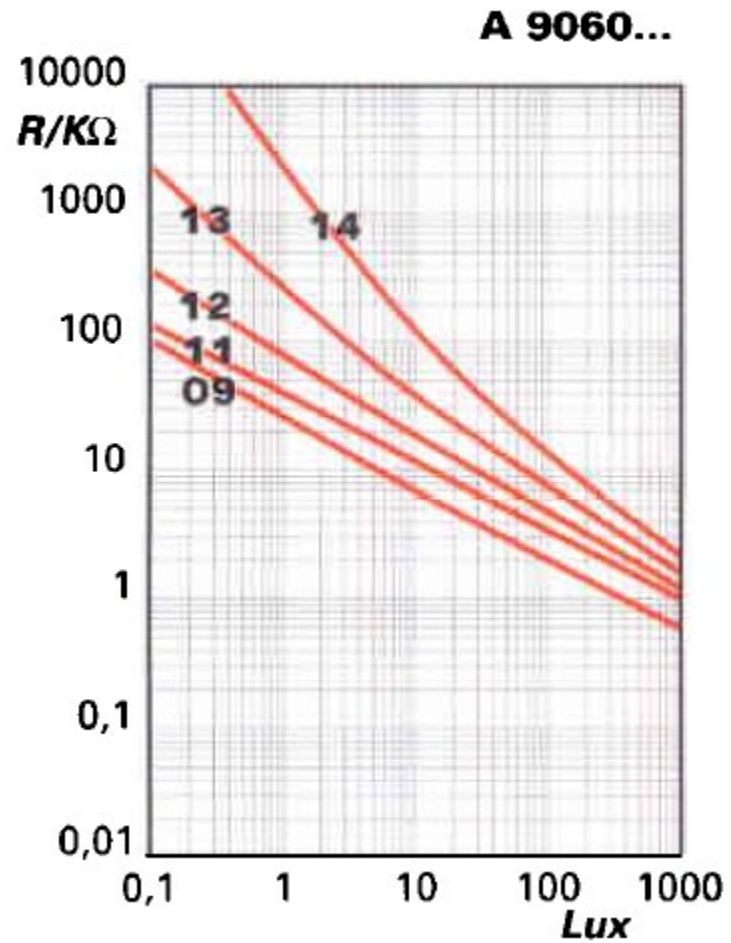
2022-09-22

# Illuminance

Examples	
Illuminance	Surfaces illuminated by:
$10^{-4}$ lux	Moonless, overcast night sky ( <a href="#">starlight</a> ) <sup>[2]</sup>
0.002 lux	Moonless clear night sky with <a href="#">airglow</a> <sup>[2]</sup>
$10^0$ → 0.27–1.0 lux	Full moon on a clear night <sup>[2][3]</sup>
3.4 lux	Dark limit of civil <a href="#">twilight</a> under a clear sky <sup>[4]</sup>
50 lux	Family living room lights (Australia, 1998) <sup>[5]</sup>
80 lux	Office building hallway/ <a href="#">toilet</a> lighting <sup>[6][7]</sup>
$10^2$ → 100 lux	Very dark overcast day <sup>[2]</sup>
320–500 lux	Office lighting <sup>[8][9][10]</sup>
400 lux	<a href="#">Sunrise</a> or <a href="#">sunset</a> on a clear day.
$10^3$ → 1,000 lux	Overcast day; <sup>[2]</sup> typical TV <a href="#">studio</a> lighting
$10^4$ → 10,000–25,000 lux	Full <a href="#">daylight</a> (not direct sun) <sup>[2]</sup>
$10^5$ → 32,000–130,000 lux	Direct <a href="#">sunlight</a>

<http://en.wikipedia.org/wiki/Lux>

# Fritzing: LDR A 9060(-09?)



Source: PerkinElmer

# Fritzing: LDR A 9060(-09?)

**R 10** Resistance at E = 10 lux light intensity  
**R 100** Resistance at E = 100 lux light intensity  
**R01** Dark Resistance after 1 sec (E = 0)  
**R05** Dark Resistance after 5 sec (E = 0)  
 $\gamma_{10/100}$  Sensitivity  $\log(R10/R100) / \log(100\text{lux}/10\text{ lux})$   
 $\lambda_{\text{peak}}$  Peak Spectral Sensitivity  
**Top** Operating Temperature

**Tst** Storage Temperature  
**TC** Thermal Coefficient  
**ton** Rise Time to 63% of final I (R10)  
**toff** Decay Time to 37% of initial I (R10)  
**Vmax** Maximum Operating Voltage at E = 0 lux  
**Pmax** Power Dissipation at 25°C Ambient Temp.

Typical Electro-Optical Characteristics						
Type	R 10 [kΩ]	R 100 typ. [kΩ]	R01 min. [MΩ]	R05 min. [MΩ]	$\gamma_{10/100}$ typ.	$\lambda_{\text{peak}}$ [nm]
<i>all readings taken at standard light A (2854 K color temperature) after 2 hours of preillumination at 500 lux</i>						
<b>A 9060 09</b>	4 ... 11	2	0.04	0.12	0.65	600
<b>A 9060 11</b>	9 ... 20	3.5	0.06	0.18	0.65	600
<b>A 9060 12</b>	16 ... 33	5	0.18	0.5	0.7	600
<b>A 9060 13</b>	27 ... 94	8	0.5	1.5	0.8	600
<b>A 9060 14</b>	77 ... 340	15	1.5	5.0	0.9	600

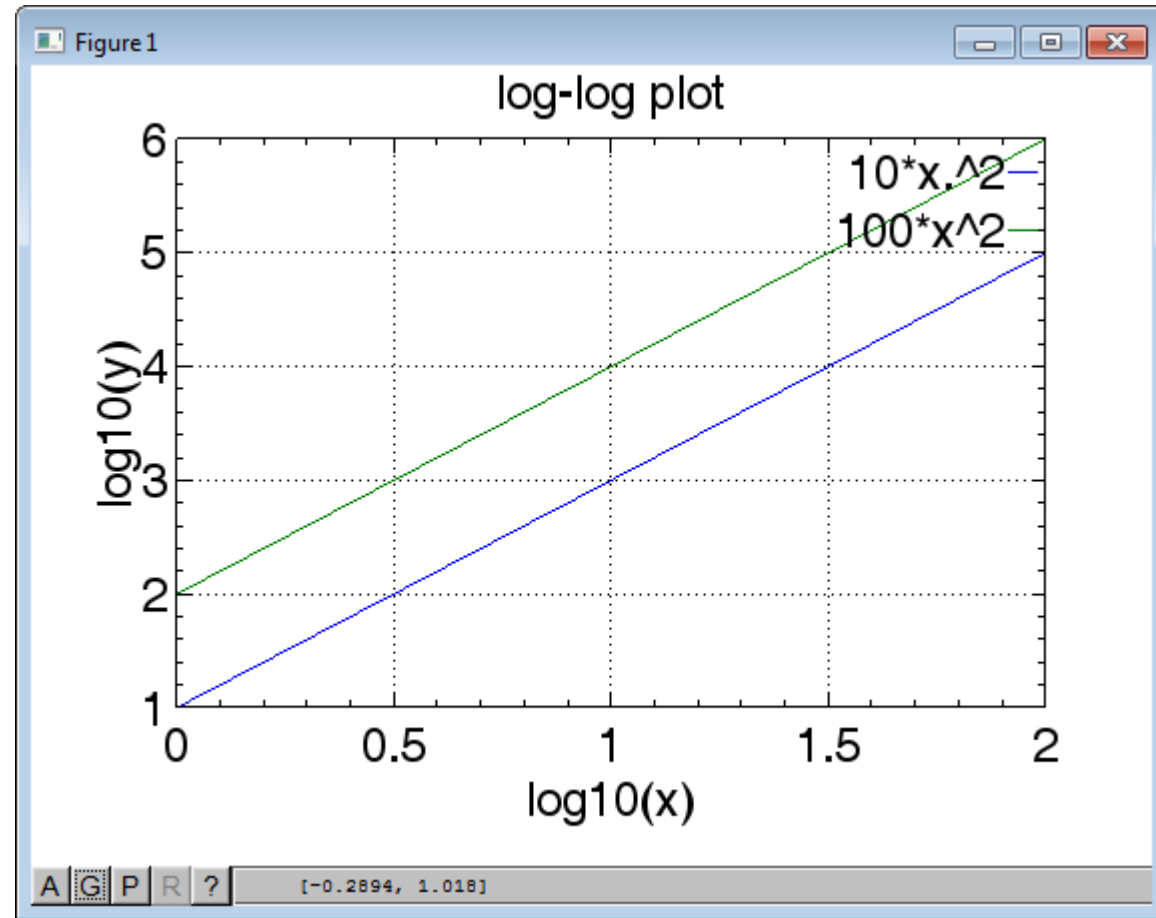
# log-log Plot

```
x = [1:100]
```

```
y1 = 10 * x.^2
```

```
y2 = 100 * x.^2
```

```
plot(log10(x),log10(y))
```



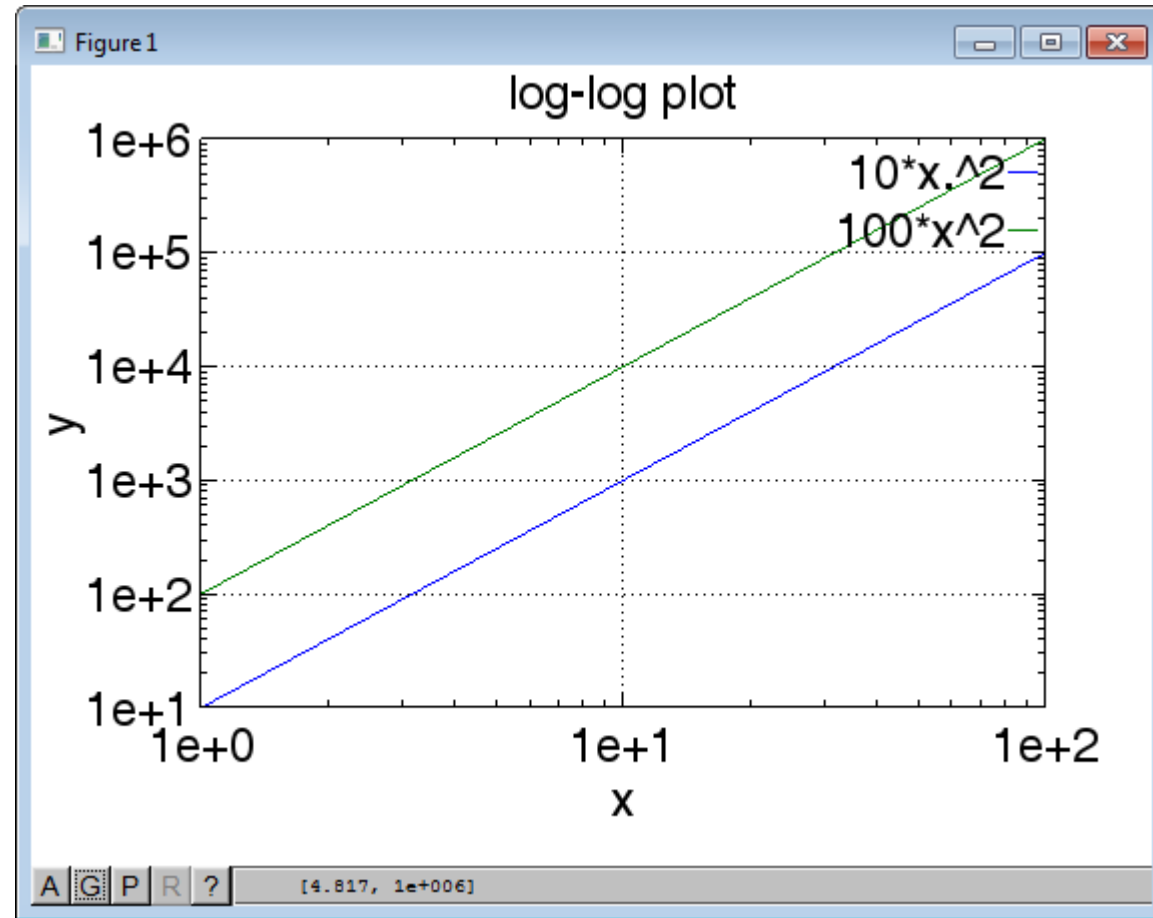
# log-log Plot

```
x = [1:100]
```

```
y1 = 10 * x.^2
```

```
y2 = 100 * x.^2
```

```
loglog(x,y)
```



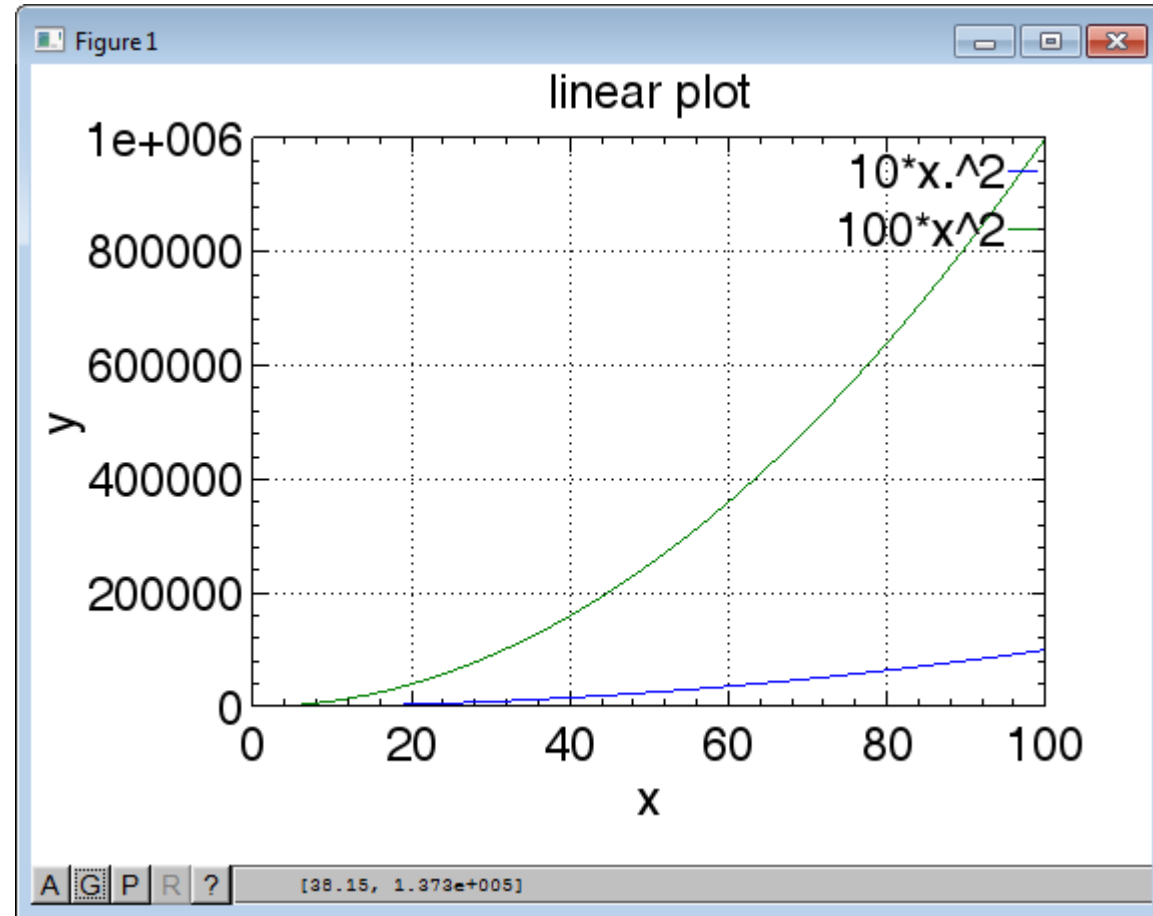
# Linear Plot

```
x = [1:100]
```

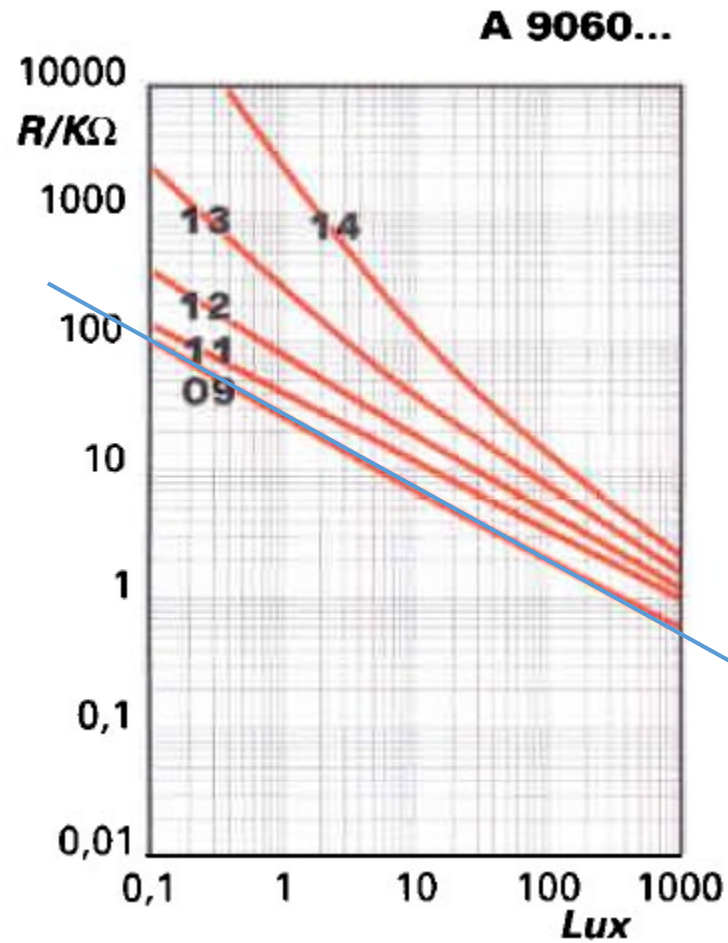
```
y1 = 10 * x.^2
```

```
y2 = 100 * x.^2
```

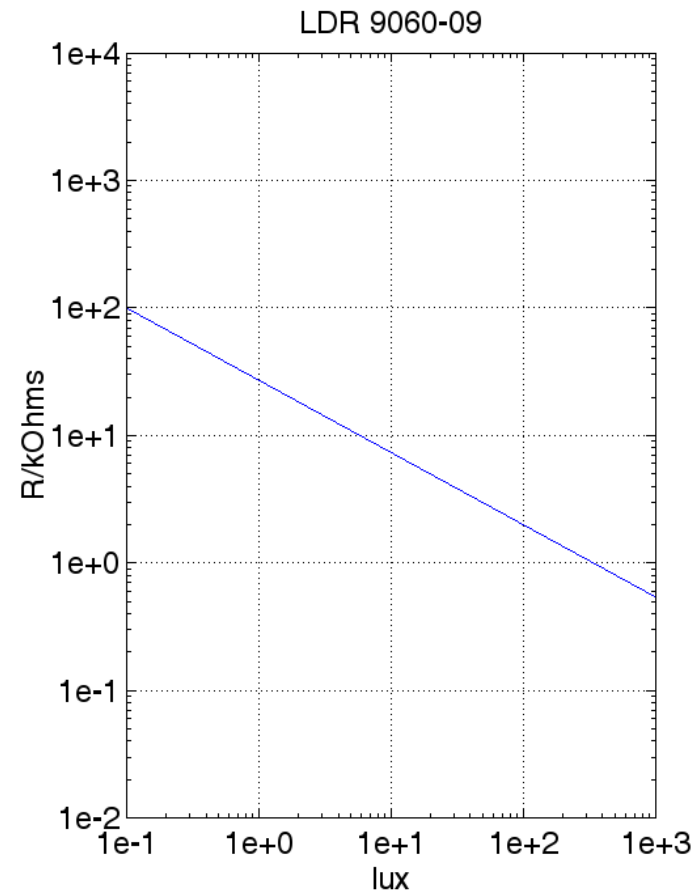
```
loglog(x,y)
```



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$$R = 2.71e4 * x^{(-0.57)}$$



Source: PerkinElmer



# Sensitivity!

