Efficiency Formula Parameters, P_{oh} and P_{sc}, for Some of International Rectifier's LSO dc-to-dc Converter Series

Vatché Vorpérian

The efficiency characteristics of InternationalRectifier's LSO series single output, dc-dc converters given in their data sheet PD-97812A are modeled here using the efficiency formula described in [1,2] and explained on my YouTube channel.

The following converter units by IR are modeled:

LSO2805S	5.0V
LSO2805D	5.0V
LSO2815S	15.0V
LSO2803R3 S	3.3V

To compare the efficiency curves given here with those provided by IR, please refer to their data sheet at:
http://www.irf.com/product-info/datasheets/data/lso28.pdf

[1] Vatché Vorpérian, "A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

[2] Vatché Vorpérian, "**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**" vorperian.com .

The efficiency formula described in [1,2] is given by:

$$\eta = \frac{1}{1 + \frac{P_{oh}}{P_{out}} + \frac{P_{out}}{P_{sc}}}$$

Where the two parameters, P_{oh} and P_{sc}, are given by:

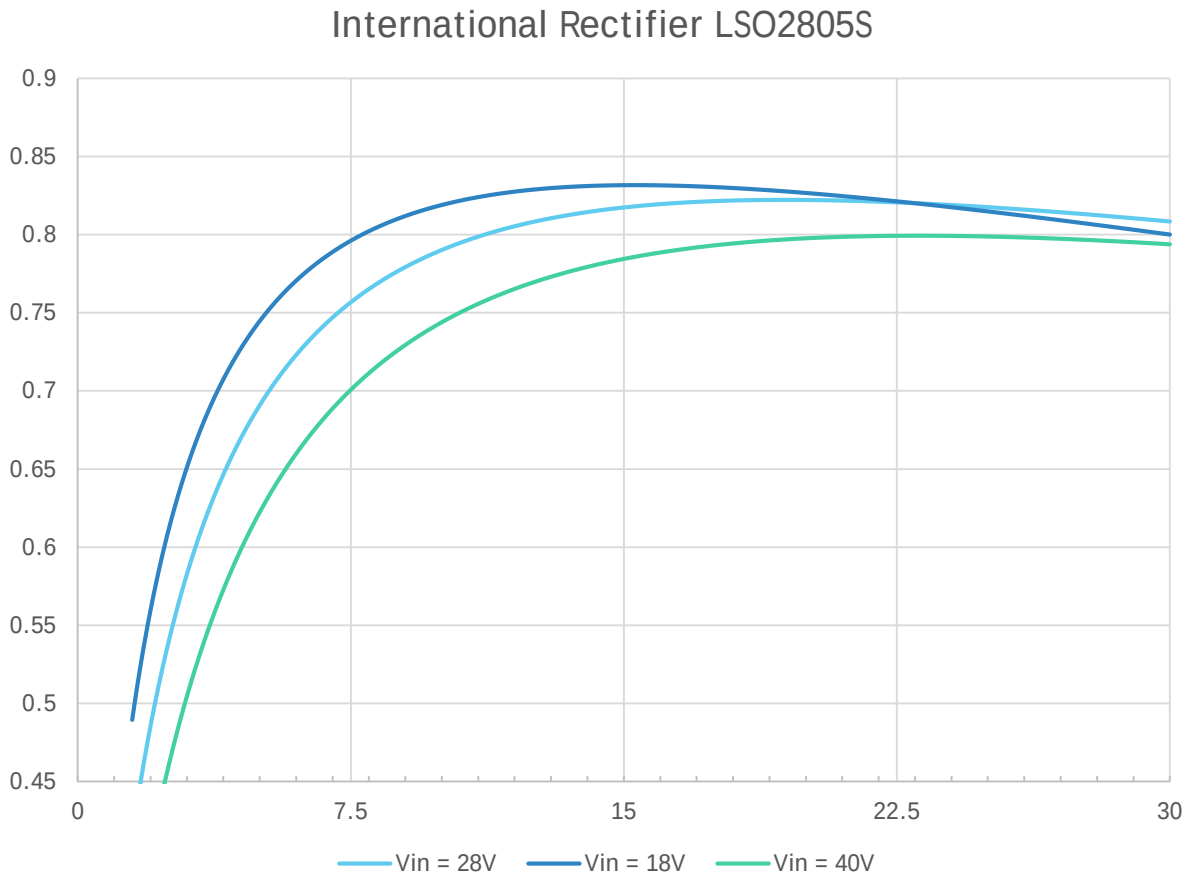
$P_{oh} \equiv$ Input power at no load

$$P_{sc} \equiv \frac{P_{o\_max}^2}{P_{in\_max} - P_{o\_max} - P_{oh}}$$

In the following slides, these two parameters are given for each converter and the efficiency curves obtained by the formula above are plotted. These curves are in very close agreement with those provide by IR in their data sheet PD-9781A.

[1] Vatché Vorpérian, "A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

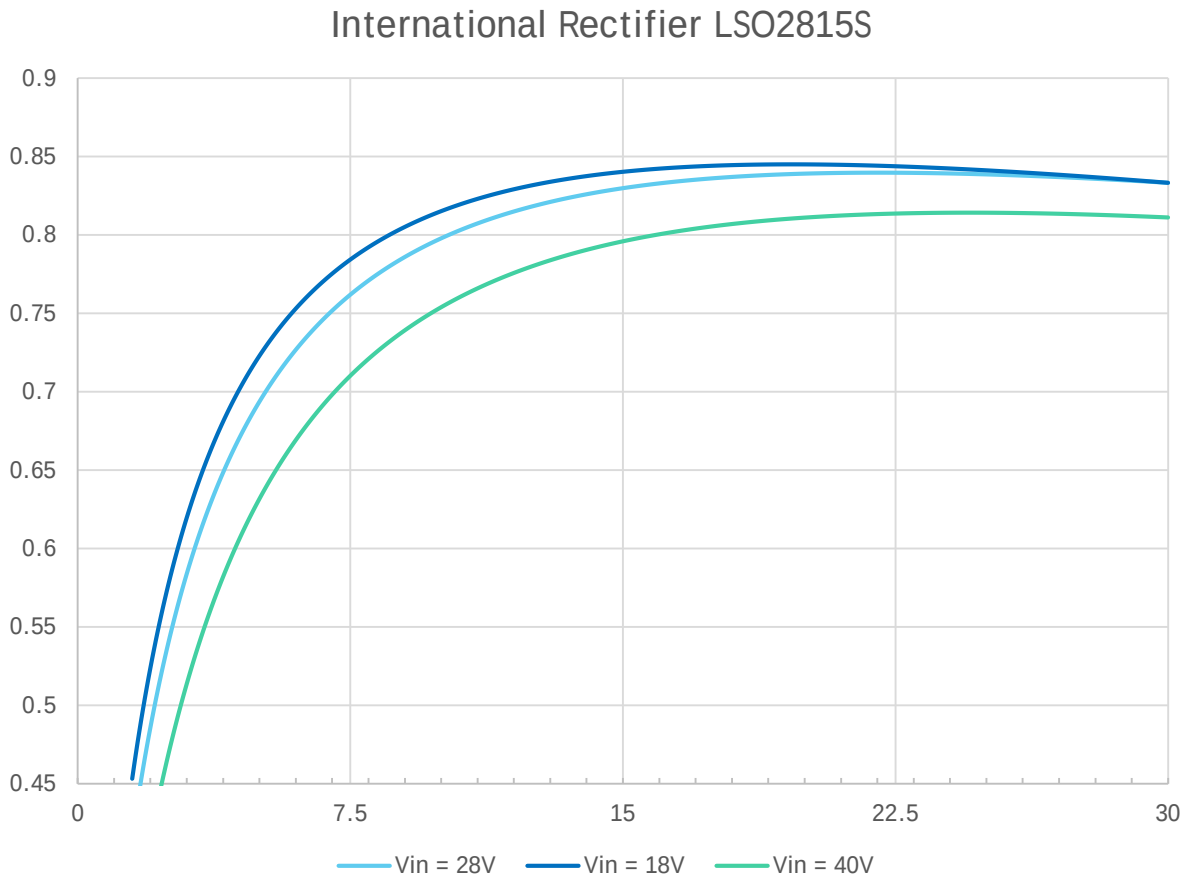
[2] Vatché Vorpérian, "**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**" vorperian.com .



P_sc	P_oh	V_in
151.2605	1.55	18V
179.464	2.1	28V
183.7517	2.8	40V

[1] Vatché Vorpérian, “A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

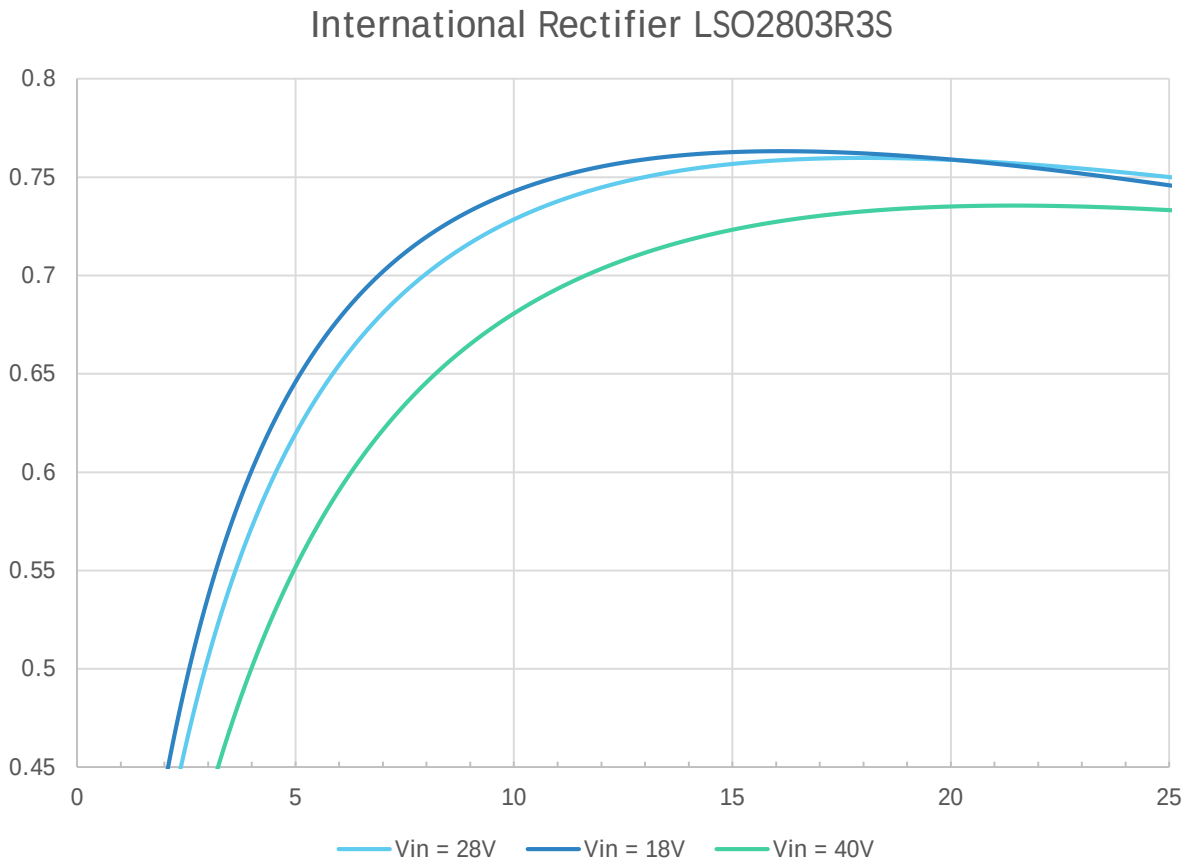
[2] Vatché Vorpérian, “**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**” vorperian.com .



P_Sc	P_oh	V_in
214.2123	1.8	18V
230.6841	2.1	28V
214.9609	2.8	40V

[1] Vatché Vorpérian, “A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

[2] Vatché Vorpérian, “**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**” vorperian.com .



P_Sc	P_oh	V_in
108.0692	2.55	18V
110.2088	2.85	28V
119.2189	3.85	40V

[1] Vatché Vorpérian, “A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

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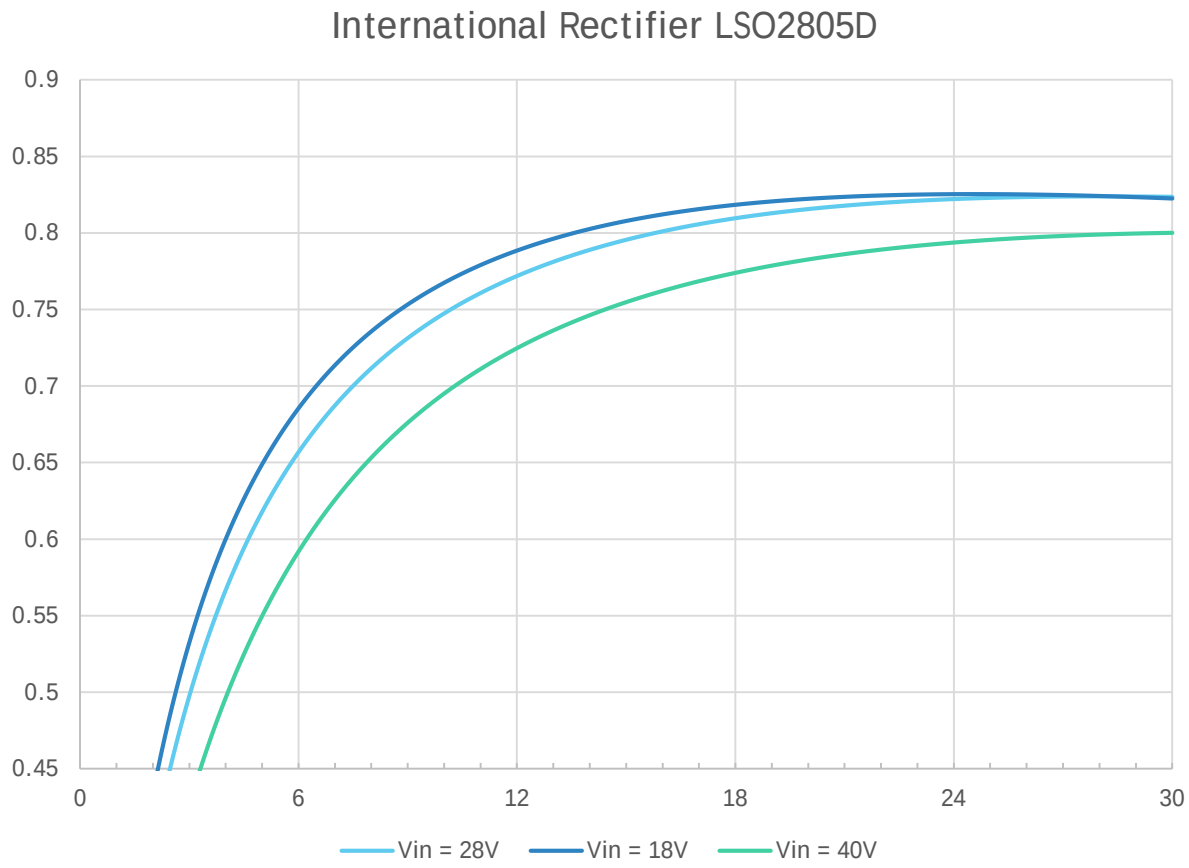

P_Sc	P_oh	V_in
232.3082	2.6	18V
262.4004	3	28V
257.1429	4	40V

[1] Vatché Vorpérian, “A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

[2] Vatché Vorpérian, “**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**” vorperian.com .

Note 1: The no load overhead losses, Poh, used here are higher than those reported in the data sheet, i.e., the reported input current at no load multiplied by the nominal input voltage.

Note 2: The agreement between the efficiency curves obtained with the efficiency formula and those given in the data sheet agree within $\pm 0.2\%$ except for the 3.3V single output converter for which the maximum deviation between the curves in the data sheet and the formula is about 1.5%.

[1] Vatché Vorpérian, "A **Simple Efficiency Formula for Regulated DC-to-DC Converters**," IEEE Transactions on Aerospace and Electronic Systems Vol. 46, No. 4 Oct. 2010, pp. 2123-2130.

[2] Vatché Vorpérian, "**A Recommended Simple and General Formula for the Specification of the Efficiency of Regulated dc-to-dc Converters**" vorperian.com .