

1 Efficiency

Efficiency for linear regulator is given by:

$$\mathbf{Efficiency}(\eta) = 1 - (V_{in} - V_{out}/V_{in}) = V_{out}/V_{in} \quad (1)$$

MIC29300 series: $V_{out}+1 < V_{in} < 26V$

$$\mathbf{maximum}\eta = V_{out}/(V_{out} + 1) \quad (2)$$

$$\mathbf{minnimum}\eta = V_{out}/26 \quad (3)$$

$$\begin{bmatrix} OutputVoltage \\ 3.3 \\ 5 \\ 12 \end{bmatrix} = \begin{bmatrix} InputVoltage(min) & InputVoltage(max) \\ 4.3 & 26 \\ 6 & 26 \\ 13 & 26 \end{bmatrix} \quad (4)$$

$$\begin{bmatrix} \eta \\ 3.3 \\ 5 \\ 12 \end{bmatrix} = \begin{bmatrix} \eta(min) & \eta(max) \\ 0.126 & 0.767 \\ 0.192 & 0.833 \\ 0.461 & 0.923 \end{bmatrix} \quad (5)$$

2 Input Power

$I_{out}=3A$ for all calculations.

$$\mathbf{P_d} = I_{out}(1.01 * V_{in} - V_{out}) \quad (6)$$

$$\begin{bmatrix} P \\ 3.3 \\ 5 \\ 12 \end{bmatrix} = \begin{bmatrix} Power(min) & Power(max) \\ 3.129W & 68.88W \\ 3.18W & 63.78W \\ 3.39W & 42.78W \end{bmatrix} \quad (7)$$

3 Total System Efficiency

$$\mathbf{Efficiency}(\eta) = \eta_1 * \eta_2 * \eta_3 \quad (8)$$

$$[\eta] = \begin{bmatrix} \eta(min) & \eta(max) \\ 0.011 & 0.589 \end{bmatrix} \quad (9)$$