## DM355 Reference Design BOM

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<td>TPS73101DBV</td>
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1 Block Diagram

Figure 1. Block Diagram of Power Design

TPS79501
VIN VOUT
ENABLE

1.3V @ 210mA

TPS73101
VIN VOUT
ENABLE

1.8V @ 30mA

TPS79501
VIN VOUT
ENABLE

3.3V @ 95mA

5V Input
4.5-5.5V

VIN Min = 2.7V
VIN Min Enable 2.7V
UVLO 2.25-2.65V
Enable High 1.7V Min
Enable Low 0.7V max
Turn on time 75us

47K
10K
47K
475K
Q1
Q2

VIN Min = 3.47V
VIN Min Enable 2.7V
UVLO 2.25-2.65V
Enable High 1.7V Min
Enable Low 0.7V max
Turn on time 75us

VIN Min = 2.7V
VIN Min Enable 2.7V
No UVLO
Enable High 1.4-2.0V
Enable Low 0.5-1.2V
Turn on time 75us

Summary:
If Ven < 0.7V:
Vout = Vin if Vin < 0.7V
Vout ~0.3V if Vin>0.7V
If Ven > 0.7V:
Vout = Vin
2 Power Up

The figure below shows the startup waveforms after ENABLE is applied. The outputs voltages shown are at full load. (Enable=2.00V/div, 1.3-V=1.00V/div, 1.8-V=1.00V/div, 3.3-V=2.00V/div, 500us/div)

![Waveform Diagram]

Once ENABLE is pulled high, the 1.3-V rail comes up and the 1.8V and 3.3V come up together later.
3 Power Down

The figure below shows the power down waveforms after ENABLE is pulled low. The outputs voltages shown are at full load. (Enable=2.00V/div, 1.3-V=1.00V/div, 1.8-V=1.00V/div, 3.3-V=2.00V/div, 500us/div)

![Power Down Waveforms](image.png)

**Figure 3. Power Down with 5-V Input and ENABLE Voltage**

Once ENABLE is pulled low, the 1.3-V rail starts to come down first, and 1.8V and 3.3V come down after 50us.
Thermal Considerations:

TPS79501: (from page 11 of TPS79501 datasheet)
\[ V_{in}=5V, \ V_{out}=1.3V, \ I_{out}=210mA \]
\[ P_D = (5-1.3) \times (210) = 780mW \]
For Ambient temperature of 85°C
\[ R_{\theta JA} = \frac{(125-85)C}{780mW} = 51.3 \frac{C}{W} \]
Using Figure 26 of TPS79501 datasheet, with no airflow, the ground plane needs to be approximately 1.5 in² to dissipate 780mW.


TPS79533: (from page 11 of TPS79501 datasheet)
\[ V_{in}=5V, \ V_{out}=3.3V, \ I_{out}=95mA \]
\[ P_D = (5-3.3) \times (95) = 162mW \]
For Ambient temperature of 85°C
\[ R_{\theta JA} = \frac{(125-85)C}{162mW} = 247 \frac{C}{W} \]
Using Figure 26 of TPS79501 datasheet, with no airflow, the ground plane needs to be approximately 0.1 in² to dissipate 247mW.


TPS73101: (from page 11 of TPS79501 datasheet)
\[ V_{in}=5V, \ V_{out}=1.8, \ I_{out}=30mA \]
\[ P_D = (5-1.8) \times (30) = 96mW \]
For Ambient temperature of 85°C, TPS73101 can dissipate 155mW. (page 2 of TPS73101 datasheet power dissipation ratings for Low-K JEDEC board).
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