# Debug Connectors

U_Debug_Connectors
EPR_EVM_Debug_Connectors_RevE3.SchDoc

ADCIN2, ADCIN1, I2C3_IRQZ, I2C3_SDA, I2C3_SCL, I2C2_IRQZ, I2C2_SDA, I2C2_SCL, I2C1_IRQZ, I2C1_SDA, I2C1_SCL, GPIO9, GPIO8, GPIO7, GPIO6, GPIO5, GPIO4, GPIO3, GPIO2, GPIO1, GPIO0, P3V3, P5V, C_USB_PA_N, C_USB_PA_P, C_USB_PB_N, C_USB_PB_P, LDO_1V5, LDO_3V3, PB_CC1, PB_CC2, PB_VBUS, PA_CC1, PA_CC2, PA_VBUS

## High Power Converter Port A

U_High_Power_Supply
EPR_EVM_High_Power_Supply_RevE3.SchDoc
I2C3_SCL, I2C3_SDA, P5V, PGOOD, P3V3, PPHV, HV_EN_N, SYS_PWR

## PD Controller

U_PD_Controller
EPR_EVM_PD_Controller_RevE3.SchDoc
PA_CC1, PA_CC2, PPHV, HV_EN_N, LDO_3V3, PA_VBUS, GPIO0–GPIO9, I2C1_SCL, I2C1_SDA, I2C1_IRQZ, I2C2_SCL, I2C2_SDA, I2C2_IRQZ, I2C3_SCL, I2C3_SDA, I2C3_IRQZ, ADCIN1, ADCIN2, LDO_1V5, P3V3, P5V, PB_VBUS, PB_CC2, PB_CC1

## System Power

U_Power_Supply
EPR_EVM_Power_Supplies_RevE3.SchDoc
P3V3, PGOOD, P5V, LDO_3V3, SYS_PWR, CP_9V9

## Port A Type-C

PA
EPR_EVM_Type_C_RevE3.SchDoc
C_USB_PA_P, C_USB_PA_N, C_USB_P, C_USB_N, PA_CC1, PA_CC2, C_CC1, C_CC2, LDO_3V3, PA_VBUS, VBUS, CP_9V9

## Port B Type-C

PB
EPR_EVM_Type_C_RevE3.SchDoc
CP_9V9, LDO_3V3, PB_VBUS, VBUS, PB_CC1, PB_CC2, C_CC2, C_CC1, C_USB_PB_P, C_USB_PB_N, C_USB_P, C_USB_N

## Tiva & Debug

U_Tiva_Debug
EPR_EVM_Tiva_Debug_RevE3.SchDoc
I2C3_IRQZ, I2C3_SDA, I2C3_SCL, I2C2_IRQZ, I2C2_SDA, I2C2_SCL, I2C1_IRQZ, I2C1_SDA, I2C1_SCL, P3V3

U_EVM_Hardware
EPR_EVM_Hardware_RevE3.SchDoc



| | |
|---|---|
| Orderable: ChangeMe in variant | Designed for: Public Release Mod. Date: 7/16/2021 |
| TID #: N/A | Project Title: Change in menu Project\|Project Options\|Parameter |
| Number: EPR_EVM Rev: E3 | Sheet Title: |
| SVN Rev: Not in version control | Assembly Variant: 001 Sheet: 1 of 9 |
| Drawn By: | File: EPR_EVM_Block_Diagram_RevE3.SchDoc Size: C |
| Engineer: Emma Hoying | Contact: http://www.ti.com/support |

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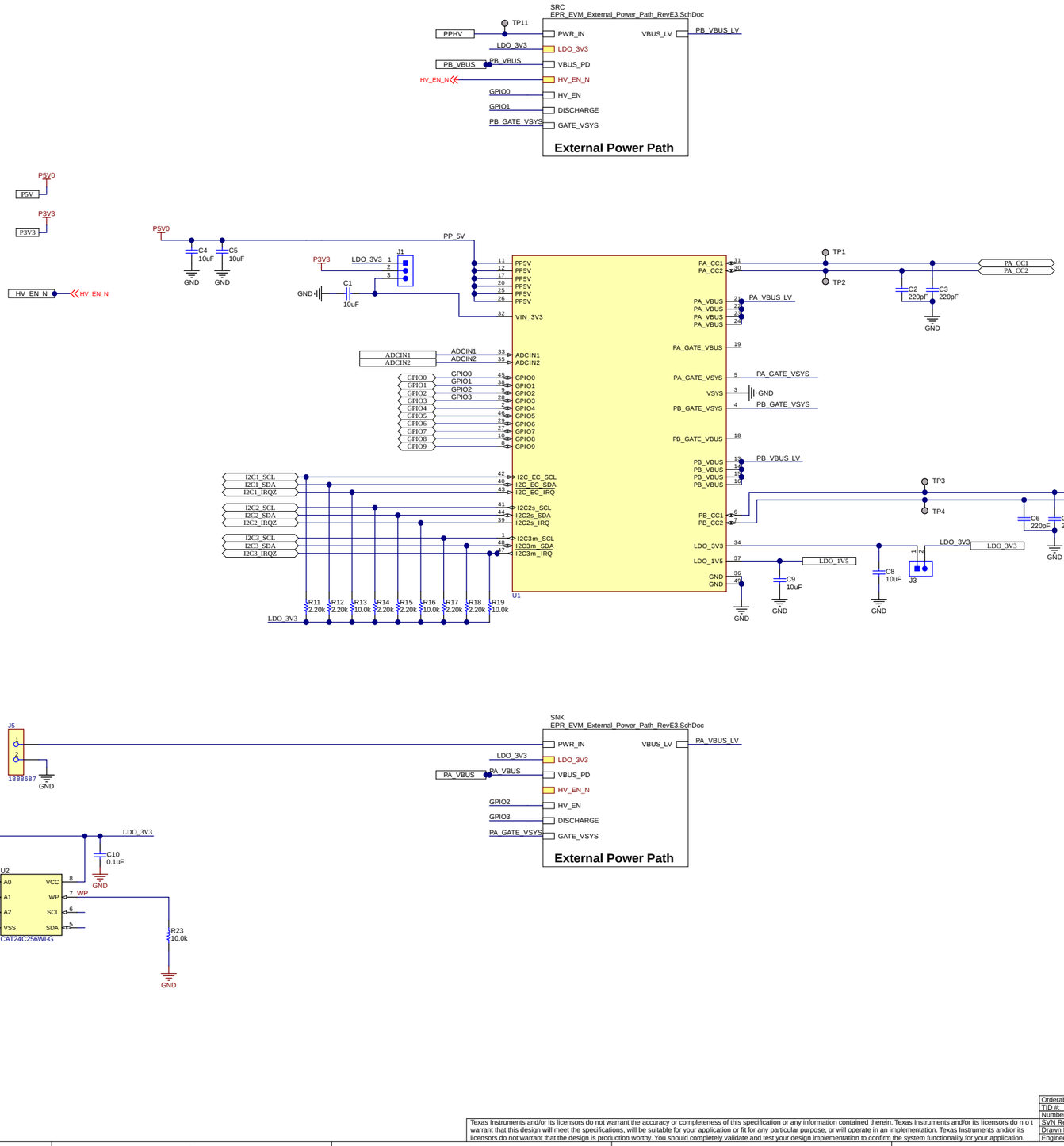




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|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 7/15/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 2 of 9 |
| Drawn By: | | File: EPR_EVM_PD_Controller_RevE3.SchDoc | Size: C |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |



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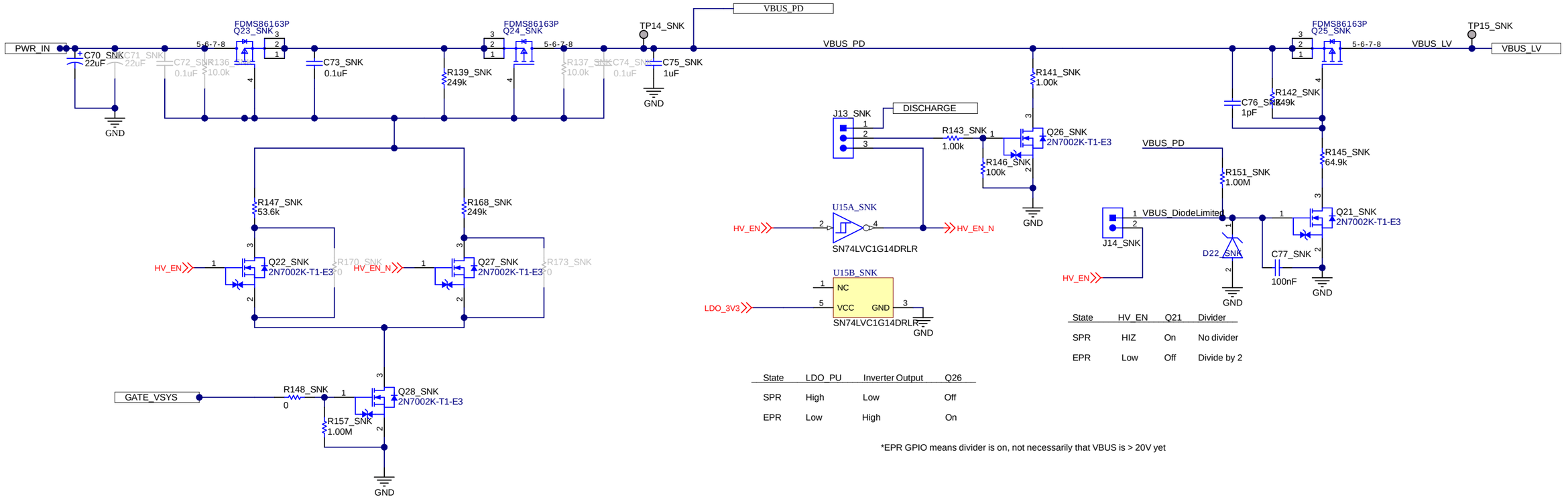
# External Power Path



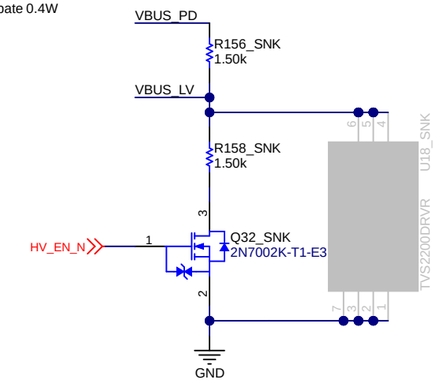

| State | LDO_PU | Inverter Output | Q26 |
|---|---|---|---|
| SPR | High | Low | Off |
| EPR | Low | High | On |

*EPR GPIO means divider is on, not necessarily that VBUS is > 20V yet

| State | HV_EN | Q21 | Divider |
|---|---|---|---|
| SPR | HIZ | On | No divider |
| EPR | Low | Off | Divide by 2 |

## Resistor Divider

For 36V systems, resistors need to dissipate 0.25W
For 48V systems, resistors need to dissipate 0.4W




DNP TVS for above 44V on VBUS
Resistor divider needs to be changed for 48V



| | | |
|---|---|---|
| Orderable: ChangeMe in variant | Designed for: Public Release | Mod. Date: 7/15/2021 |
| TID #: N/A | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | Assembly Variant: 001 | Sheet: 2 of 9 |
| Drawn By: | File: EPR_EVM_External_Power_Path_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | Contact: http://www.ti.com/support | |

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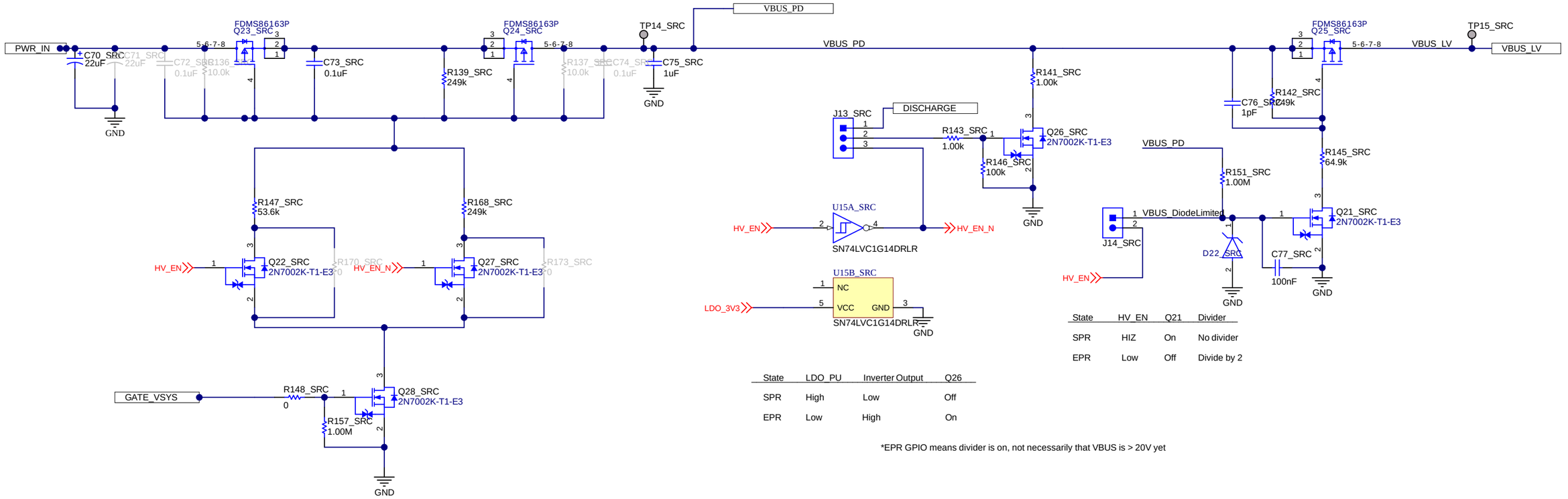
# External Power Path



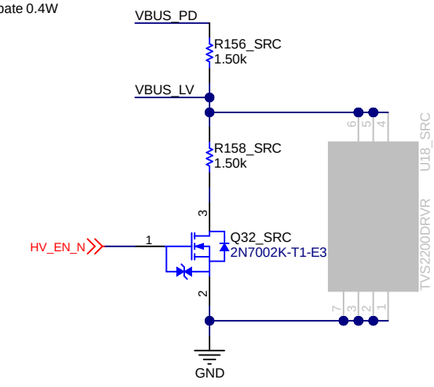

| State | LDO_PU | Inverter Output | Q26 |
|---|---|---|---|
| SPR | High | Low | Off |
| EPR | Low | High | On |

*EPR GPIO means divider is on, not necessarily that VBUS is > 20V yet

| State | HV_EN | Q21 | Divider |
|---|---|---|---|
| SPR | HIZ | On | No divider |
| EPR | Low | Off | Divide by 2 |

## Resistor Divider

For 36V systems, resistors need to dissipate 0.25W
For 48V systems, resistors need to dissipate 0.4W




DNP TVS for above 44V on VBUS
Resistor divider needs to be changed for 48V



| | | |
|---|---|---|
| Orderable: ChangeMe in variant | Designed for: Public Release | Mod. Date: 7/15/2021 |
| TID #: N/A | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | Assembly Variant: 001 | Sheet: 2 of 9 |
| Drawn By: | File: EPR_EVM_External_Power_Path_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | Contact: http://www.ti.com/support | |

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16A max

J4
1888687
GND

J6
JPD1135-509-7F
GND
GND
SHIELD
SHIELD
SHIELD
SHIELD
POWER
SENSE
POWER
VIN = 19.5V
Max Current = 3A
TP5
SYS_PWR
R27 0
R28 100k
GND

TVS Diode for faulty barrel jacks
D1
GND

C11 22uF
C12 22uF
GND

P5V
P5V0
TP6
P5V
L1 3.3uH
C19 100uF
C20 100uF
R32 15.4k
R38 10.0k
GND

Q1
CSD87330Q3D
R29 2.2
C15 0.1uF

U3
TPS51225RUKR
VIN
VBST1
DRVH1
SW1
DRVL1
VO1
VFB1
CS1
VCLK
EN1
VREG5
VBST2
DRVH2
SW2
DRVL2
VFB2
CS2
PGOOD
EN2
VREG3
GND

R34 51.1k
R33 0
PWR_EN
R36 0
C21 4.7uF
GND GND GND

C16 0.1uF
R30 2.2
Q2
CSD87330Q3D
L2 2.2uH
C17 100uF
C18 100uF
R31 6.49k
R39 10.0k
R35 47.5k
PGOOD
R37 0
PWR_EN
3V3_LDO_EN
GND GND GND

SYS_PWR
SYS_PWR
C13 22uF
C14 22uF
GND
P3V3
P3V3

SYS_PWR
SYS_PWR LED Indicator
D2
Blue
R40 10.0k
GND

P5V
C23 47uF
C24 47uF
GND

3V3_LDO_EN
PWR_EN
C22 4.7uF
GND

P3V3
C25 47uF
C26 47uF
GND

TP7 TP8
TP9 TP10
GND GND GND GND

Used for GND return for high currents

D5
MBR0520LT1G
D6
MBR0520LT1G

U10
U11
LM2767M5/NOPB
LM2767M5/NOPB
V+
C1+
C1-
OUT
GND

LDO_3V3
R61 0
P3V3
R149 0
C56 10uF
C55 10uF
C57 10uF
C54 10uF
CP_9V9
GND

OUT = 3*Vin - Need extra boost because Vth of 60V rated FETs is around 3.2-3.8V



| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 5/13/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 3 of 9 |
| Drawn By: | | File: EPR_EVM_Power_Supplies_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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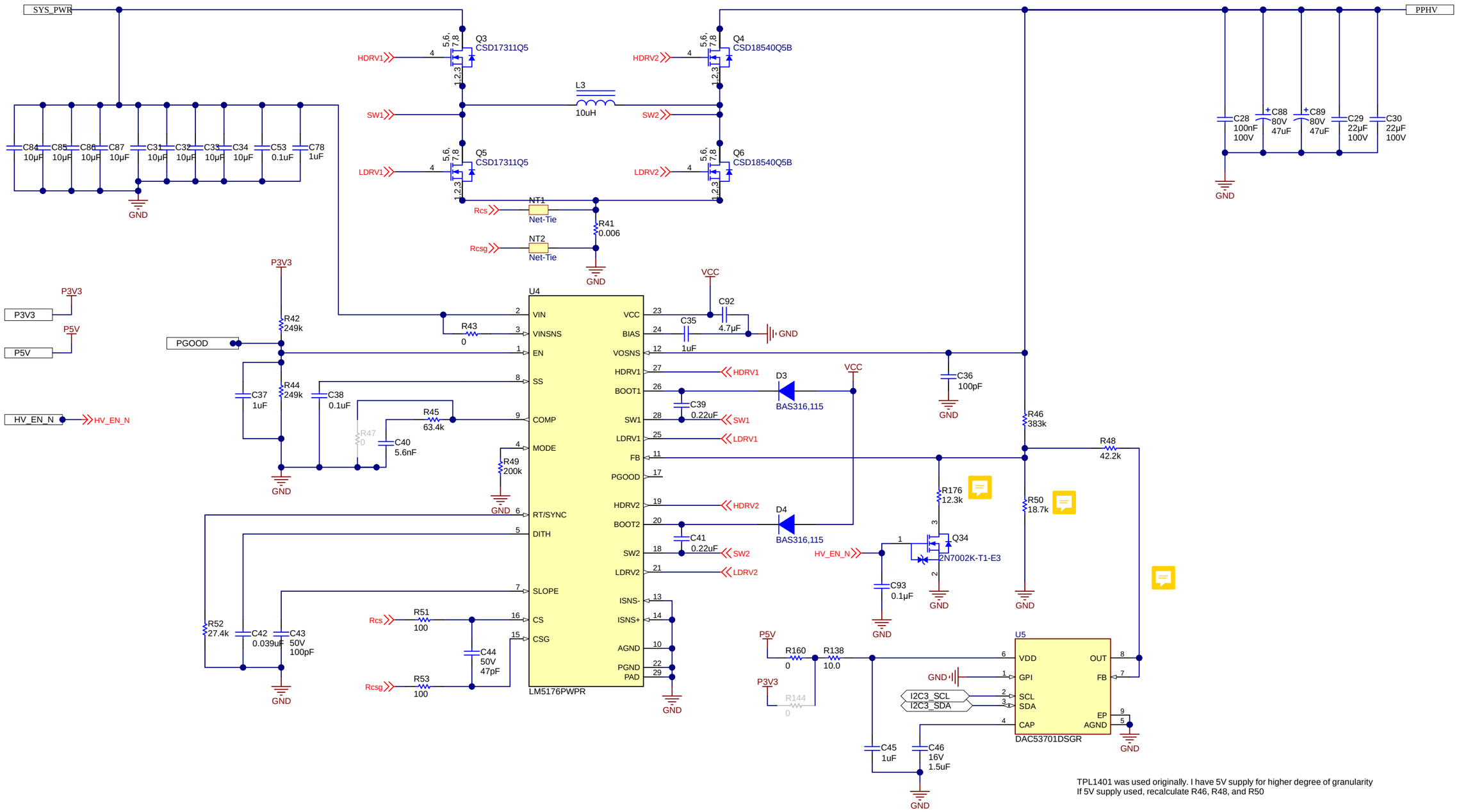




| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 7/16/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 4 of 9 |
| Drawn By: | | File: EPR_EVM_High_Power_Supply_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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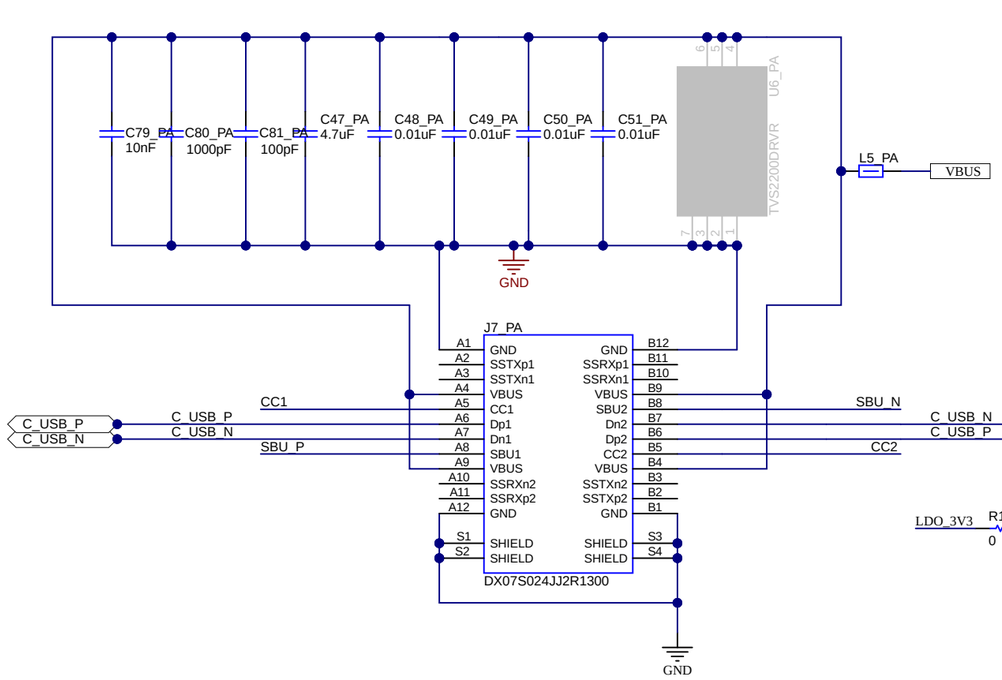
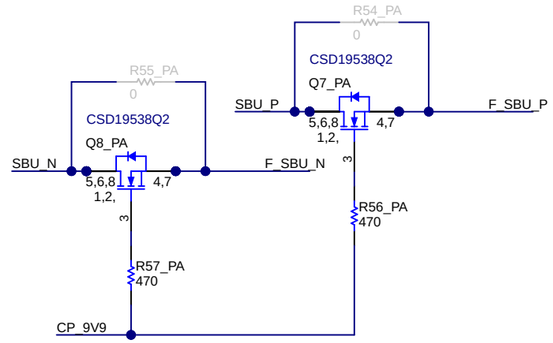
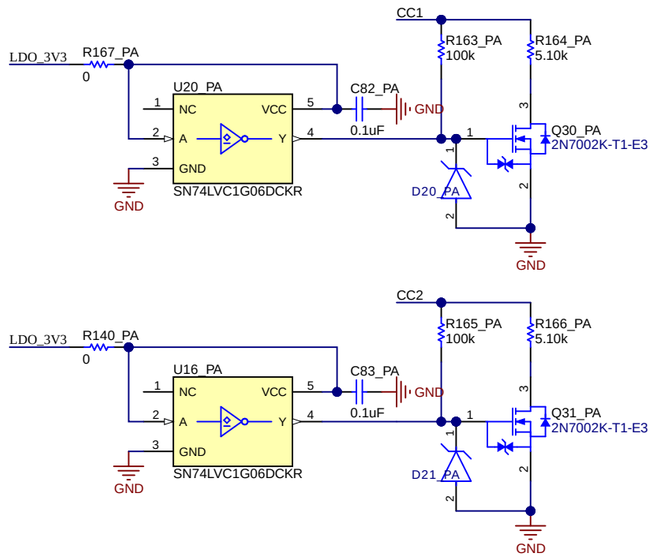


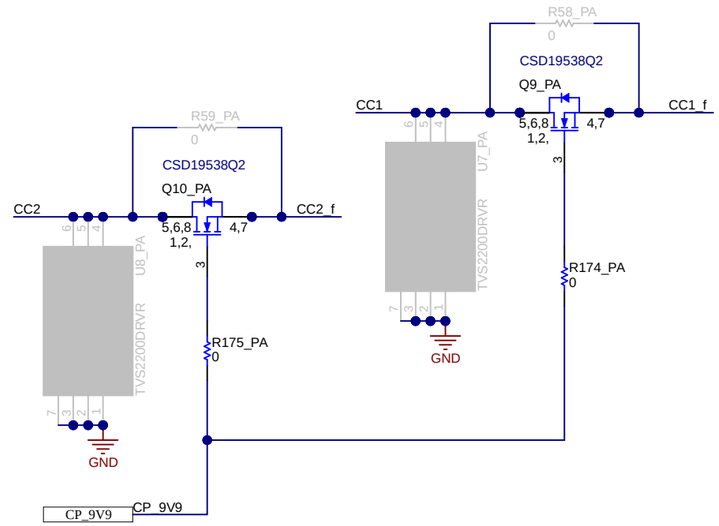



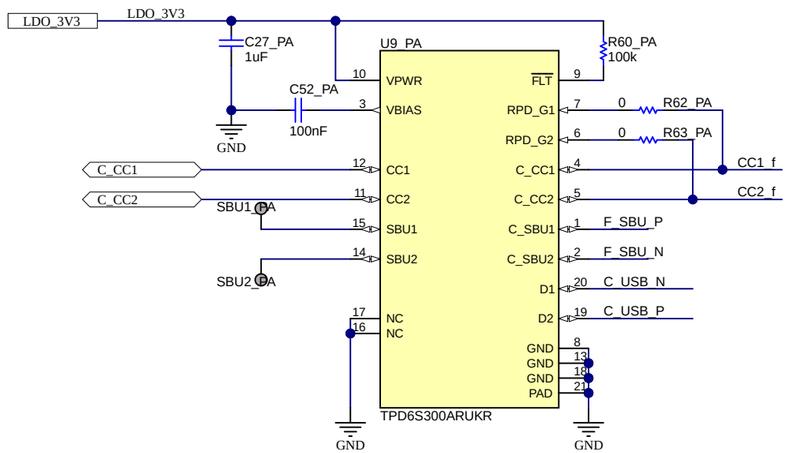

## Dead Battery Resistors




| State | LDO3V3 | Inverter | Q31 |
|---|---|---|---|
| Dead Bat | Low | HIZ | On |
| Normal On | High | Low | Off |

Note, the Vgs = 20V for Q30 and Q31.






| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 6/17/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 5 of 9 |
| Drawn By: | | File: EPR_EVM_Type_C_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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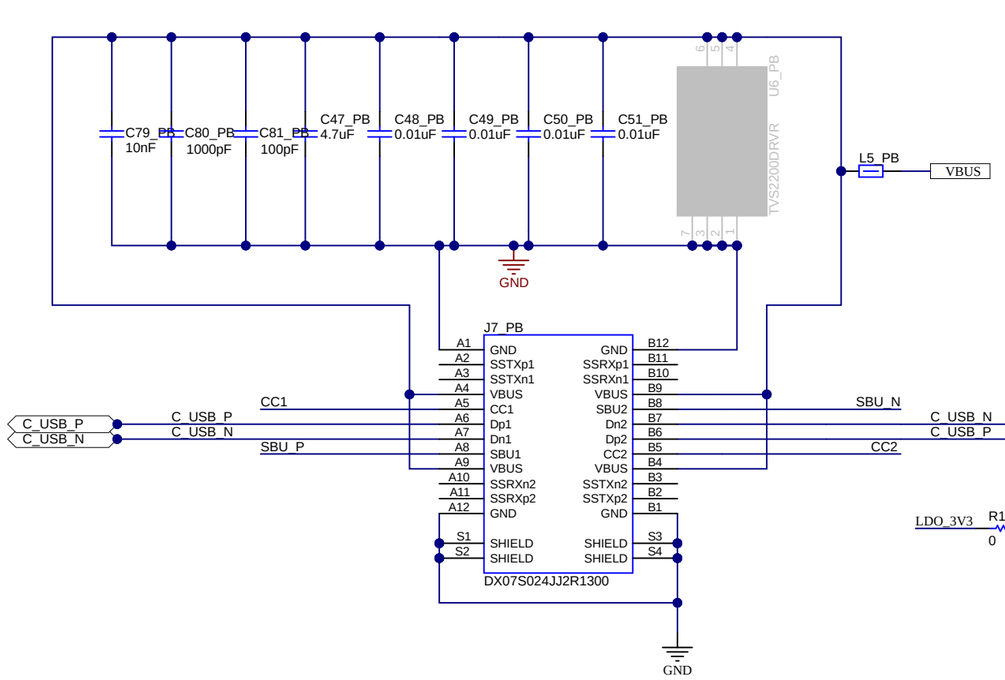
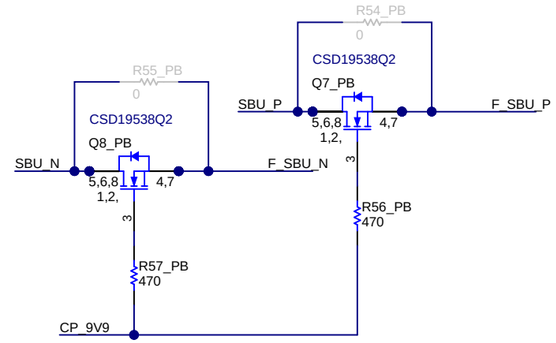
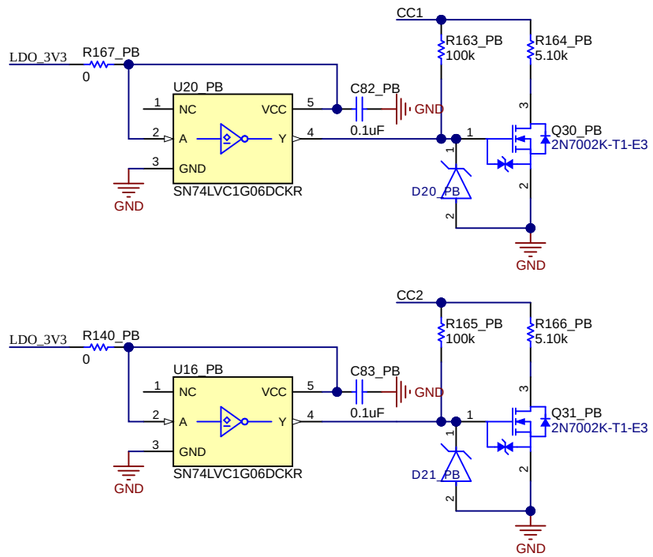


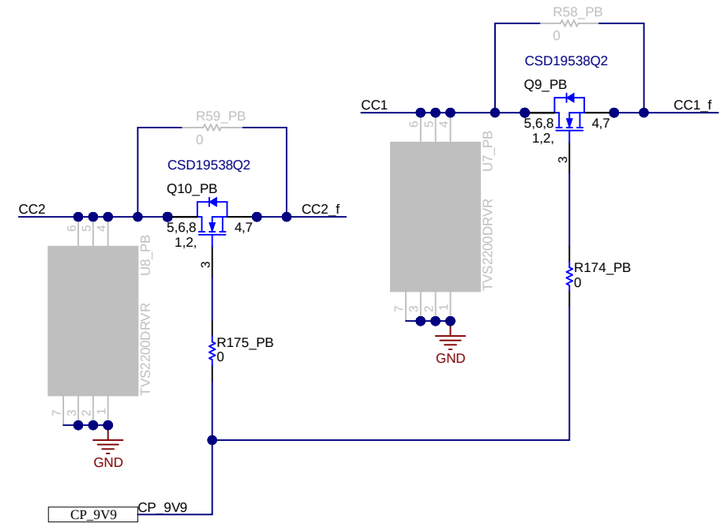



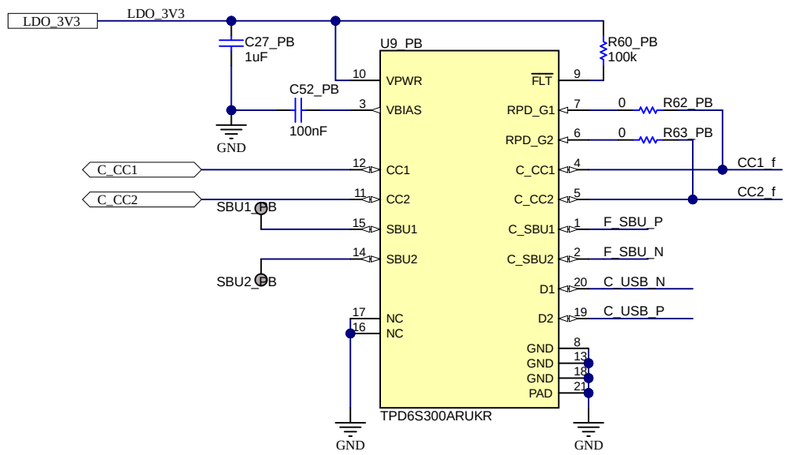

## Dead Battery Resistors




| State | LDO3V3 | Inverter | Q31 |
|---|---|---|---|
| Dead Bat | Low | HIZ | On |
| Normal On | High | Low | Off |

Note, the Vgs = 20V for Q30 and Q31.






| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 6/17/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 5 of 9 |
| Drawn By: | | File: EPR_EVM_Type_C_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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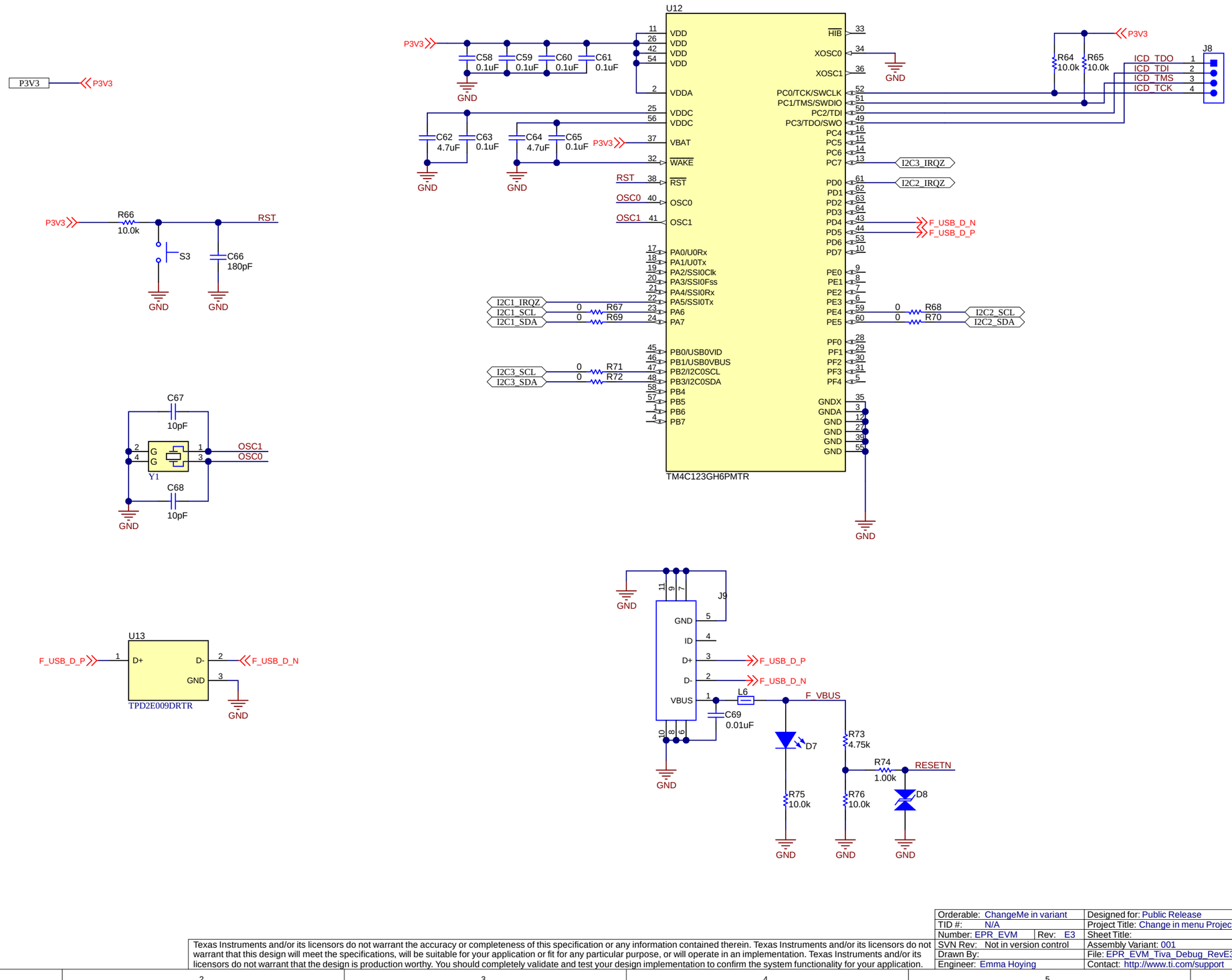


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| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 4/29/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 6 of 9 |
| Drawn By: | | File: EPR_EVM_Tiva_Debug_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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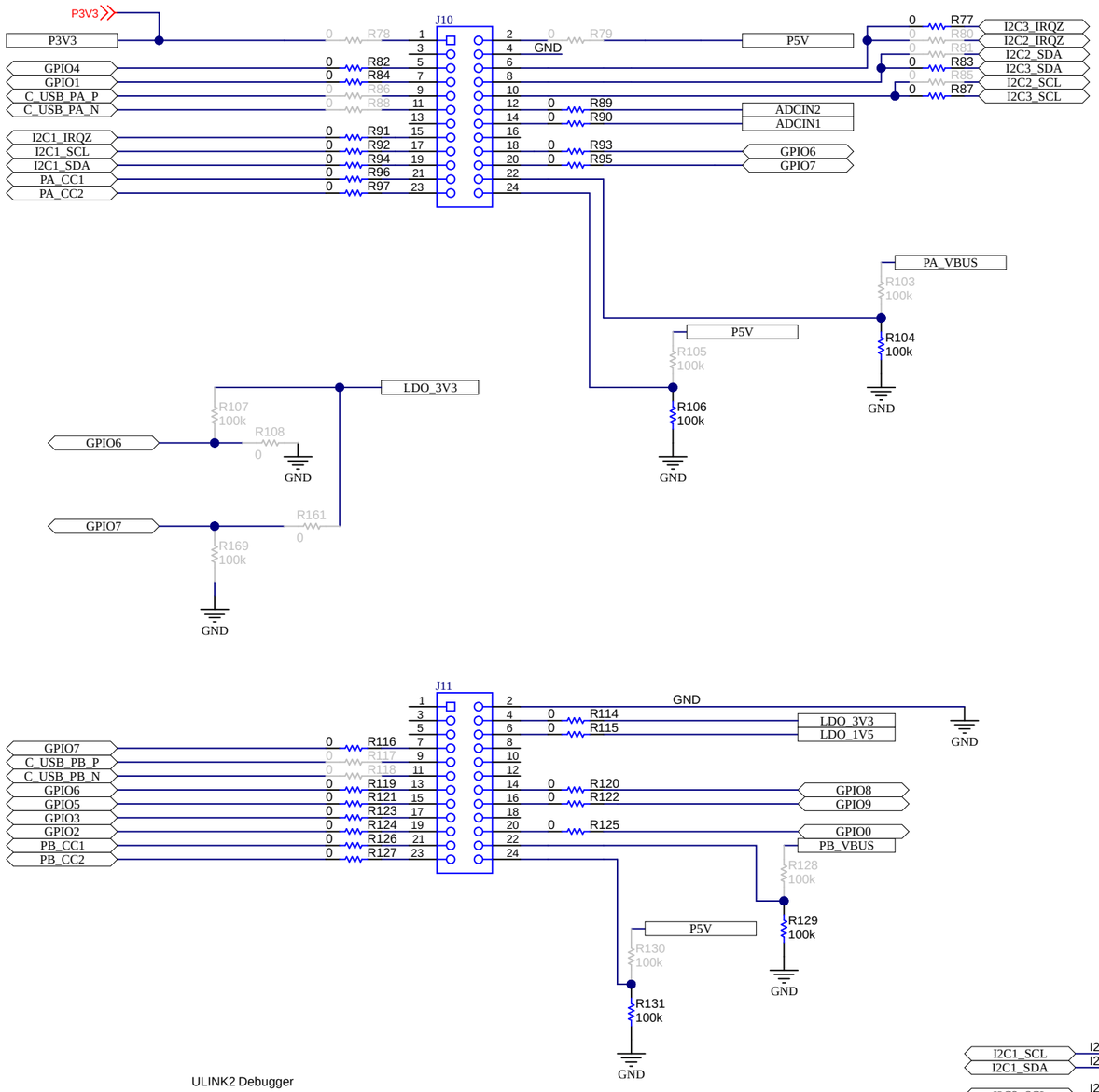


| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 4/29/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 7 of 9 |
| Drawn By: | | File: EPR_EVM_Debug_Connectors_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

H1 1
NY PMS 440 0025 PH

H2 1
NY PMS 440 0025 PH

H3 1
NY PMS 440 0025 PH

H4 1
NY PMS 440 0025 PH

H5
1902C

H6
1902C

H7
1902C

H8
1902C

SH-J1 SH-J2

SH-J3 SH-J4

SH-J5 SH-J6

FID1 FID2 FID3

FID4 FID5 FID6

PCB Number: EPR_EVM
PCB Rev: E3

CE Mark

PCB
LOGO
ESD Susceptible

PCB
LOGO
WEEE logo

PCB
LOGO
Texas Instruments

PCB
LOGO
FCC disclaimer

ZZ2
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ3
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

ZZ4
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.



| | | | |
|---|---|---|---|
| Orderable: ChangeMe in variant | | Designed for: Public Release | Mod. Date: 5/13/2021 |
| TID #: N/A | | Project Title: Change in menu Project\|Project Options\|Parameter | |
| Number: EPR_EVM | Rev: E3 | Sheet Title: | |
| SVN Rev: Not in version control | | Assembly Variant: 001 | Sheet: 8 of 9 |
| Drawn By: | | File: EPR_EVM_Hardware_RevE3.SchDoc | Size: B |
| Engineer: Emma Hoying | | Contact: http://www.ti.com/support | |

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