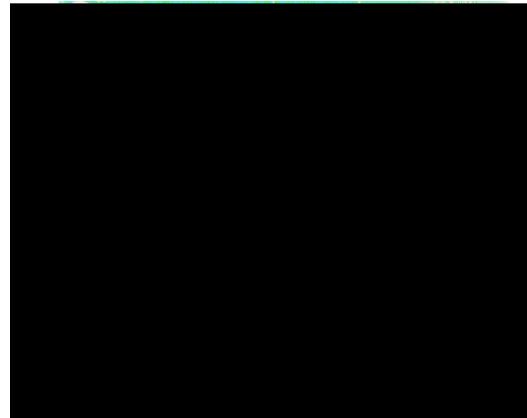
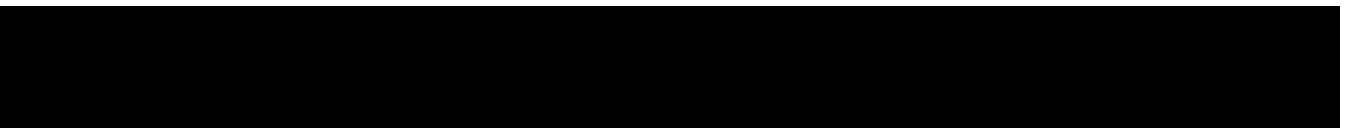
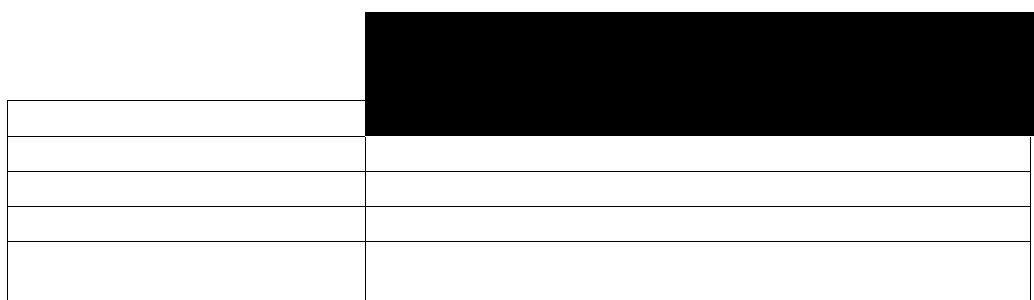




Input: 230 V ±15%





3.1.2 UCC27714D14

The UCC27714

3.1.6 TPD1E10B06

The TPD1E10B06 device is a single-channel

4 System Design Theory

The (the)volj30.2305Td3d(the)rippl0.230Td(stage)in.611T78(EMI)Tj11.330Td(the)Tj37.5Td4(power)(of)ha22.8404
EMI filter, three-phase inverter, sensing circuits, and MCU.(w)Tj20.4ir1Tf10060T00.1.890T0Td(AC)Tj16.8908.7Td(of)



2 f

—

● n × ×

$$V_{COMP_REF} = (I_{OC} \cdot R_{SENSE}) \cdot A_{GAIN}$$

$$n = \dots \times \dots = \dots \times \dots =$$

$$P_{CL} = \frac{1}{3} \times ((V_{CE0} \times I_{C,Avg}) + (r_C \times I_{C,RMS}^2))$$

—

ele

$$P_{SWL} = f_{ele} \times (E_{ON} + E_{OFF})$$

$$P_{SWL} = () \quad \frac{325}{ } \quad 2.1$$

$$P_L = P_{CL} + P_{SWL}$$
$$P_L = 0.634 + 0.01 \approx 0.65 \text{ W}$$

20115

4.2.3.2 Power Loss in High-Side IGBT

$$P_{CH} = \frac{1}{3} \times 0.733 \times 1 \times 1.47 \times 0.2 \times 1.47^2 = 0.465 \text{ W}$$

—	<u>NOM</u>	<u>PK</u>
—	—	—

S H —

$$P_{DIODE,SW} = \left(\frac{1}{3} \times (1 - D) \times V_F \times I_{F,Avg} \right) + (f_{SW} \times E_{DIODE})$$

—
—

c —————

· · · V_D = I_D A_D = 0.5 A

$$I_{F,avg} = \frac{2.1}{2} = 1.05 \text{ A}$$

$$P_{LOSS} = 3(P_L - P_H) = P_{DIODE}$$

Temperature rise in high-side switch 0.83 62.5 52 C

Temperature rise in low-side switch 0.81 62.5 50 C

$$g = \frac{g}{\pi}$$

$$\frac{1}{n} = \frac{1}{m} - \frac{1}{l}$$

$$= \frac{-}{\epsilon \epsilon \Omega} = \frac{-}{\epsilon \epsilon \Omega} \approx -$$

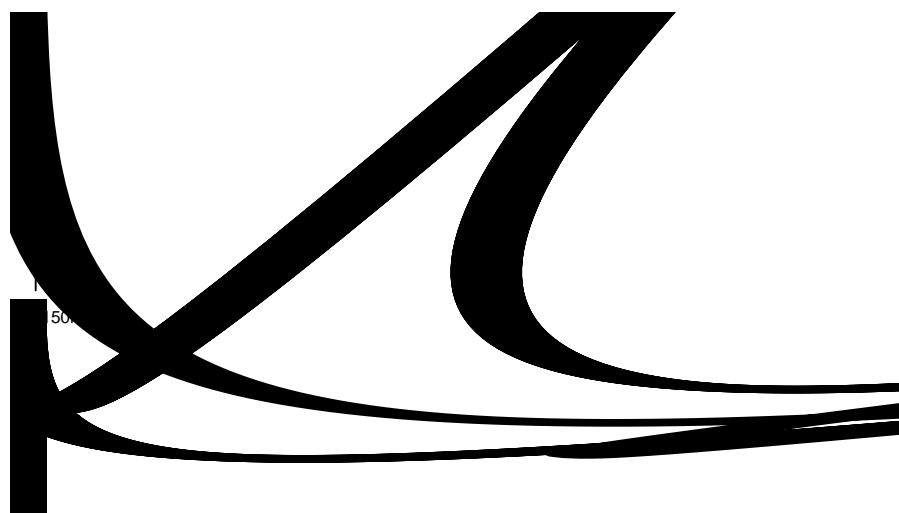
HO_DR DD DBOOT

I_{LO_SK} V_{DD} 15 V 3 A

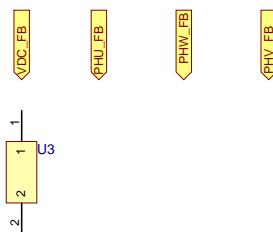
$$\text{P}_G = Q_G \times V_{GE} \times f_{SW}$$

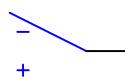
$$G = \frac{1}{G} + GE$$

$$P_G = Q_G \times V_{GE} \times f_{SW}$$



$$V_M \quad 3.3 \quad \underline{150 \quad 150 \quad 150 \quad 3.6} \quad 416 \text{ V}$$



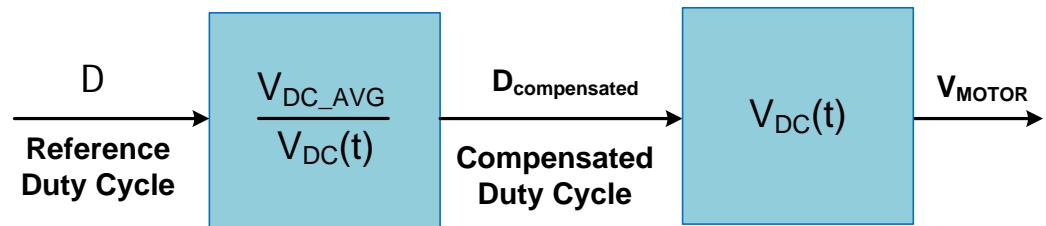


System

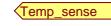
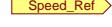
—

$$V_{\text{MOTOR}} = D \times V_{\text{DC}}(t)$$

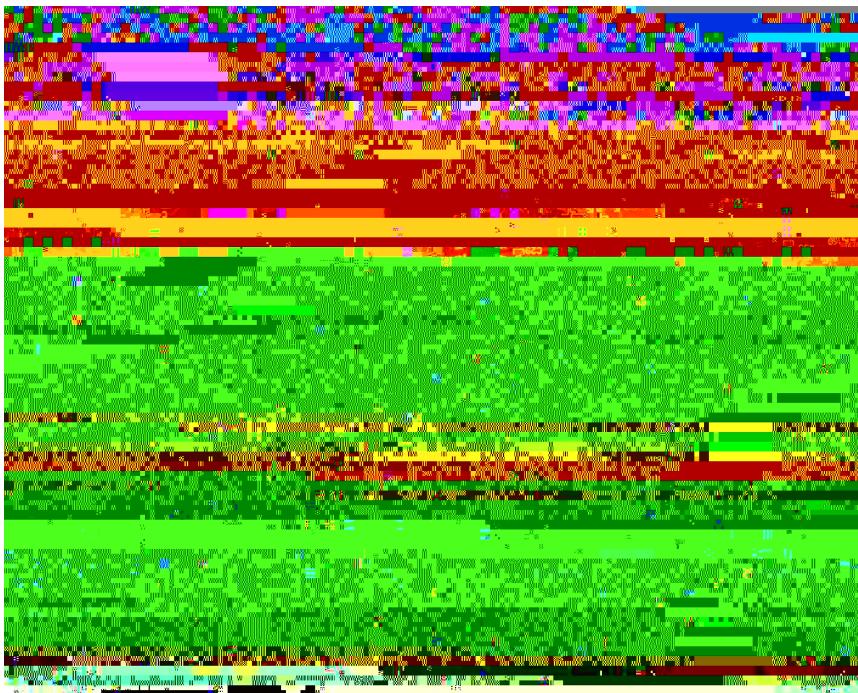
Feed forward gain $\frac{V_{DC_AVG}}{V_{DC}(t)}$

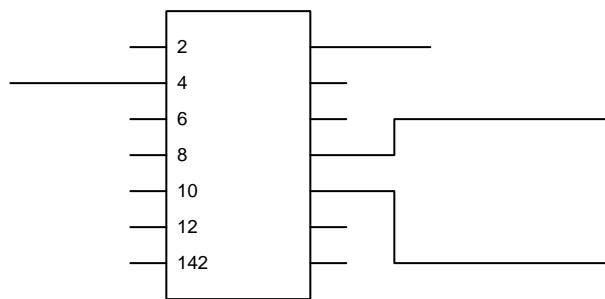


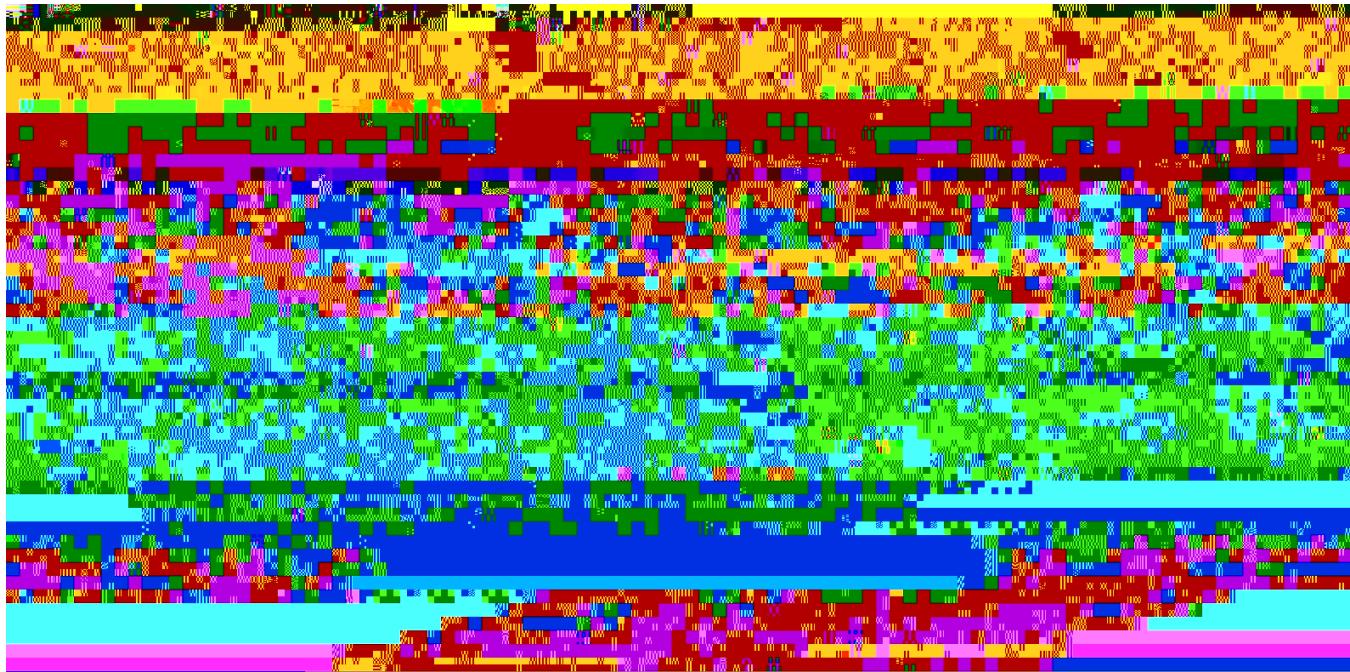
MOTOR $\xrightarrow{DC_AVG}$


+3.3VD
AGNDTemp_senseSpeed_Ref

1.0Meg





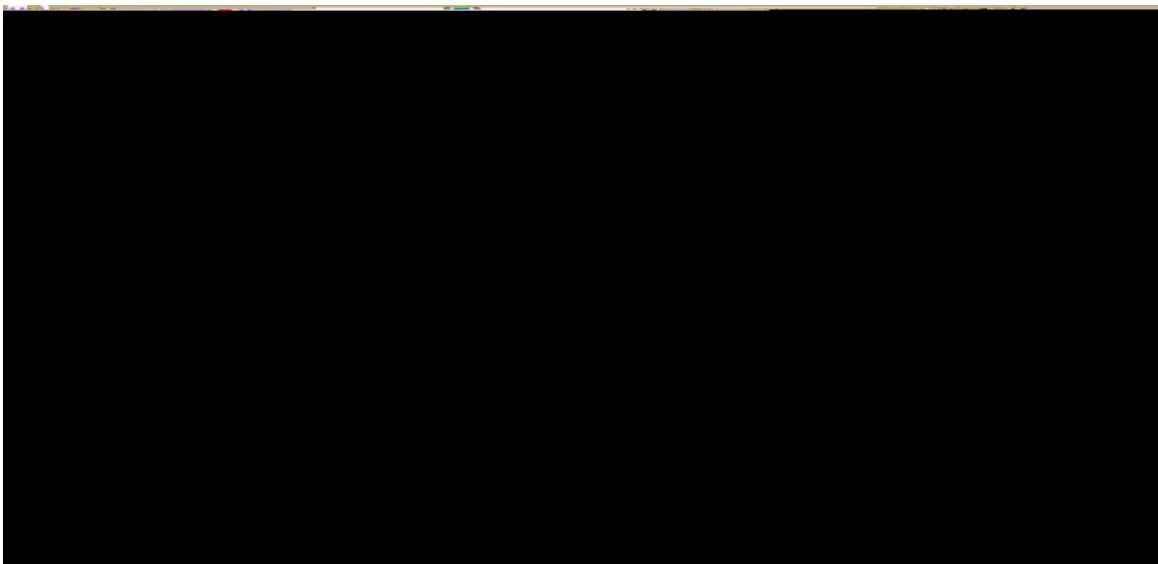


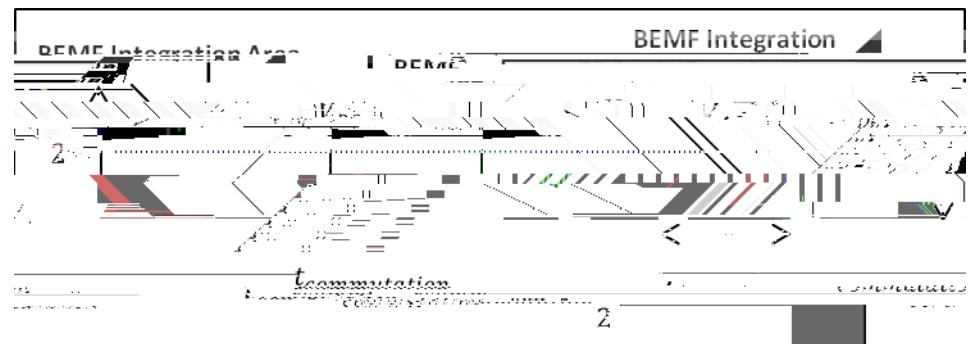
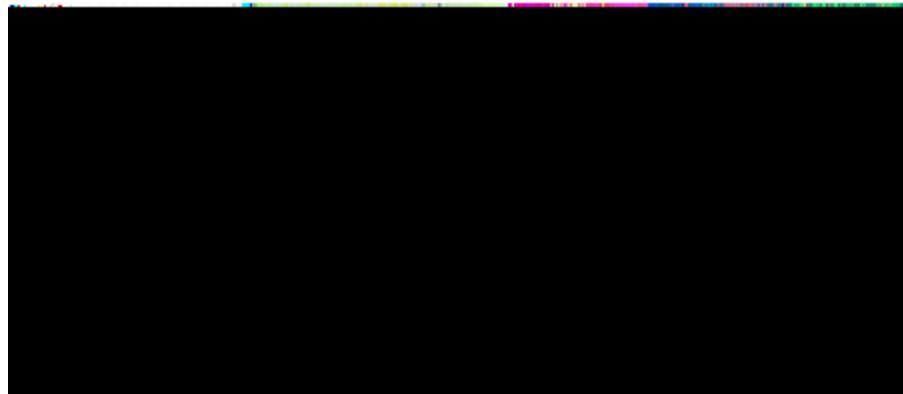
Auxiliary power supply board



$\frac{z}{()}$

B → on n — $\frac{A}{n}$



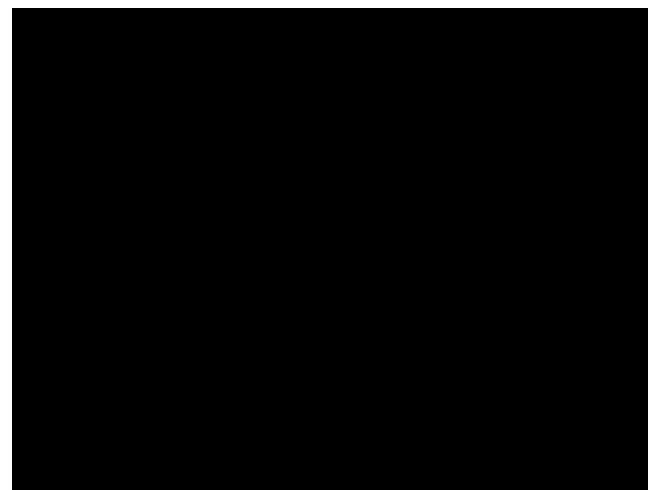


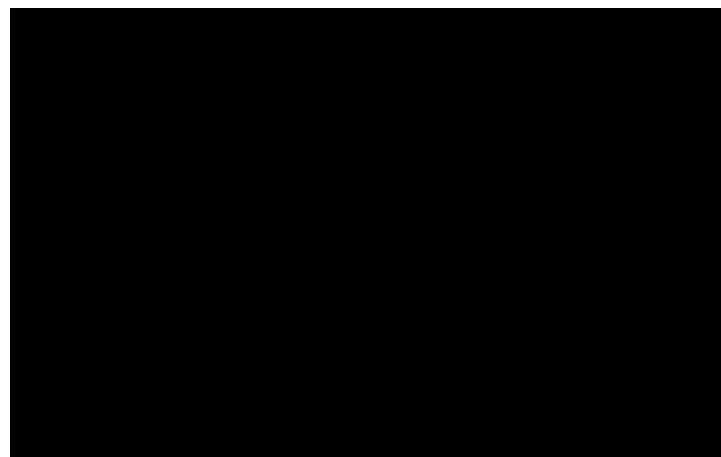
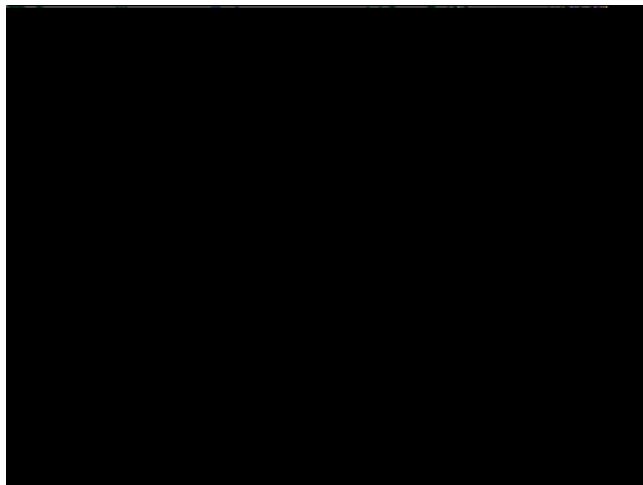
V_{DC}

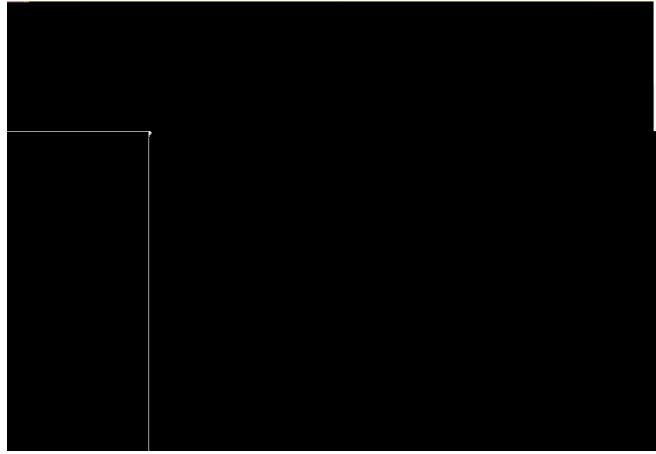
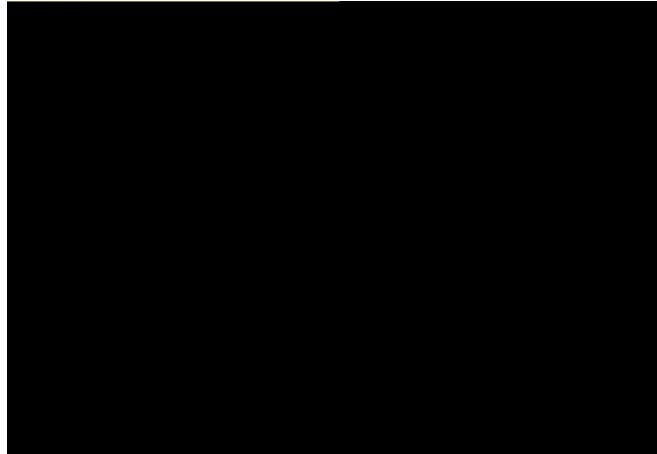
t_{commutation} t_{commutation}

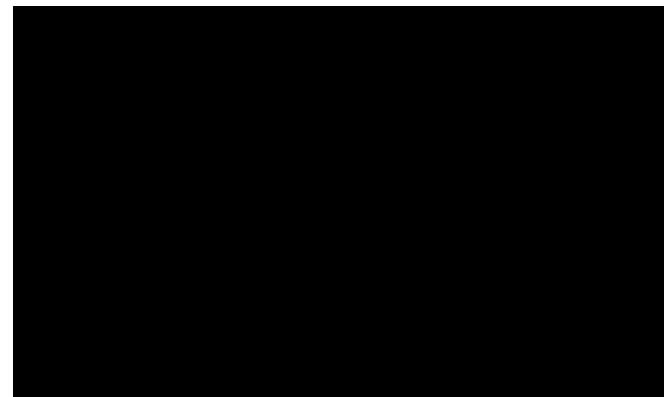
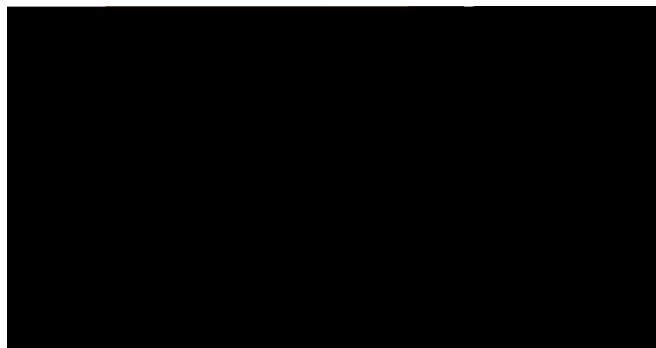
Scaled software area $\frac{1}{2} \times \frac{V_{DC}}{2} \times \frac{t_{commutation}}{2 \times 50} \times 2.460317$

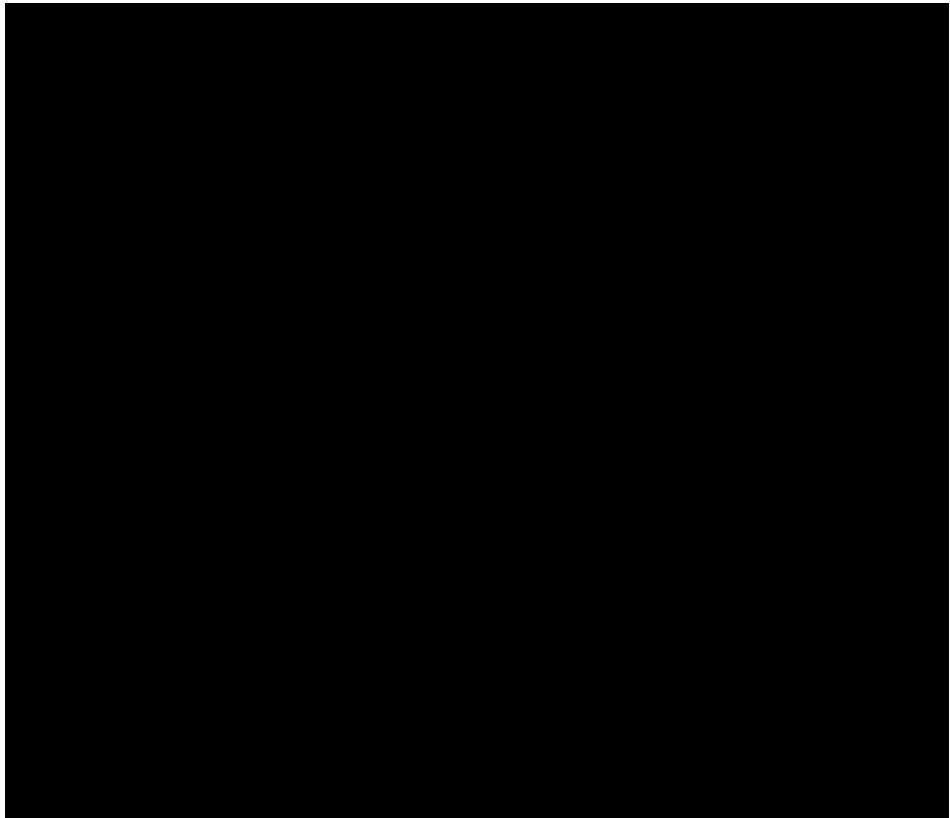
V











9 Design Files

9.1 Schematics

To download the schematics for each board, see the design files at [TIDA-00472](#).

9.2 Bill of Materials

To download the bill of materials (BOM), see the design files at [TIDA-00472](#).

9.3 Layout Prints

To download the layer plots, see the design files at [TIDA-00472](#).

9.4 Altium Project

To download the Altium project files, see the design files at [TIDA-00472](#). atAIB80rg54551.9Td(9.4)TjGer0Td(Noveia

IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Designer(s)") who are developing systems that incorporate TI products. TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.

TI's provision of reference designs and any other technical,