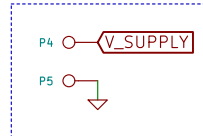
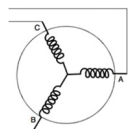
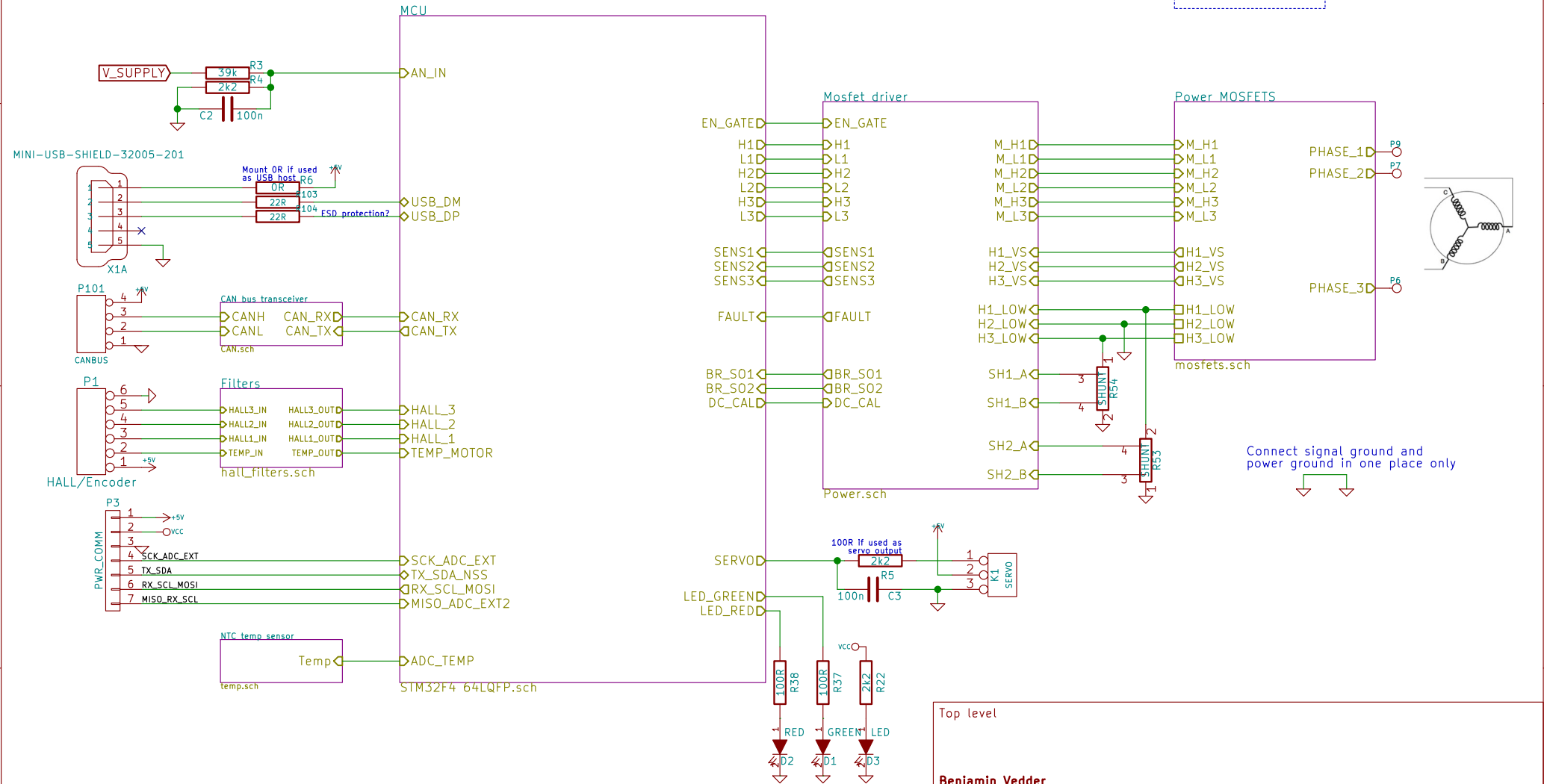


# BLDC motor controller

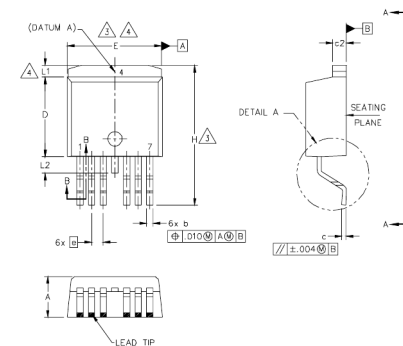
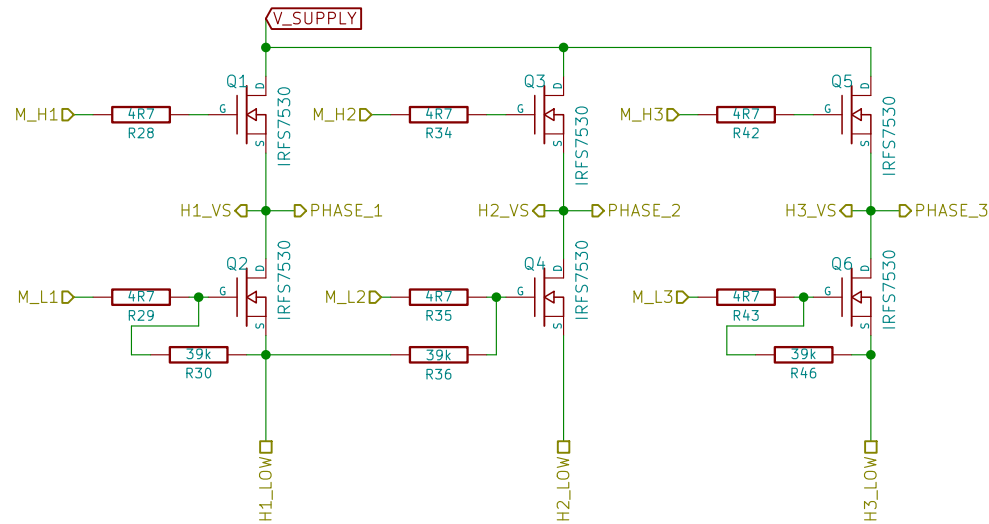


Voltage supply (0 - 60v)  
Needs external decoupling caps to avoid high voltage transients produced by the inductance of the battery wiring while switching the FETs  
Also critical for EMI/RF compliance



Connect signal ground and power ground in one place only

Top level	
<b>Benjamin Vedder</b>	
Sheet: /	
File: BLDC_4.sch	
<b>Title: BLDC Driver 4.11</b>	
Size: A4	Date: 21 aug 2015
KiCad E.D.A. kicad (2015-08-21 BZR 6112)-product	Rev: 4.12
	Id: 1/7



**Benjamin Vedder**

Sheet: /Power MOSFETS/

File: mosfets.sch

**Title: BLDC Driver 4.11**

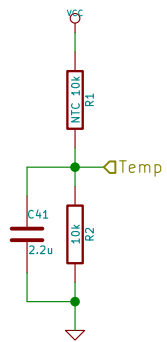
Size: A4

Date: 21 aug 2015

**Rev: 4.12**

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Id: 2/7



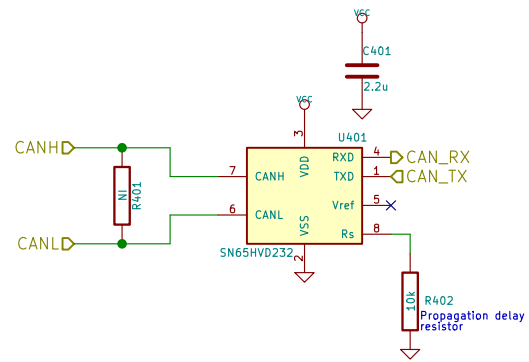
**Benjamin Vedder**

Sheet: /NTC temp sensor/  
File: temp.sch

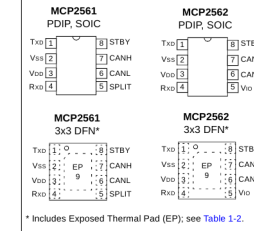
**Title: BLDC Driver 4.11**

Size: A4 Date: 21 aug 2015  
KiCad E.D.A. kicad (2015-08-21 BZR 6112)-product

**Rev: 4.12**  
Id: 3/7



**Package Types**



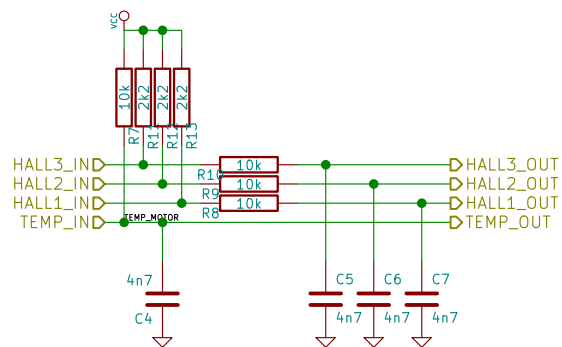
**Benjamin Vedder**

Sheet: /CAN bus transceiver/  
File: CAN.sch

**Title: BLDC Driver 4.11**

Size: A4 | Date: 21 aug 2015  
KiCad E.D.A. kicad (2015-08-21 BZR 6112)-product

**Rev: 4.12**  
Id: 4/7



**Benjamin Vedder**

Sheet: /Filters/  
File: hall\_filters.sch

**Title: BLDC Driver 4.11**

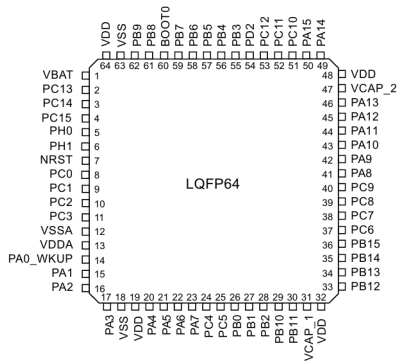
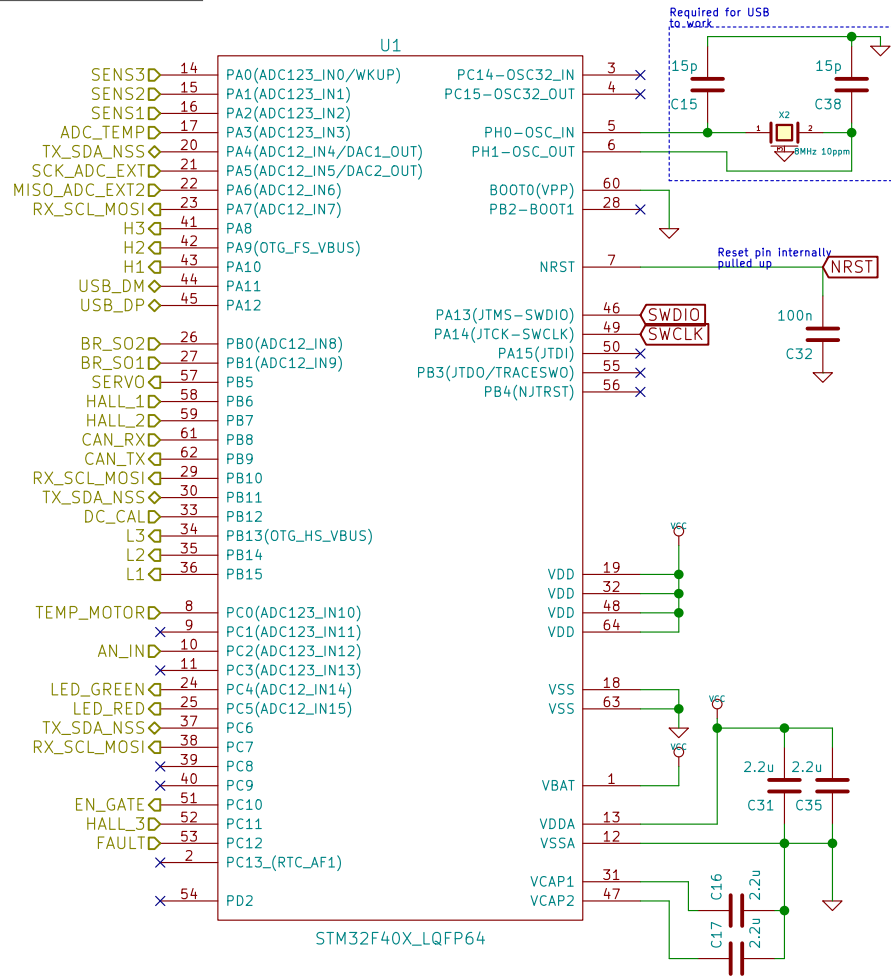
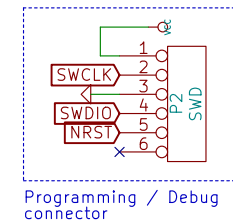
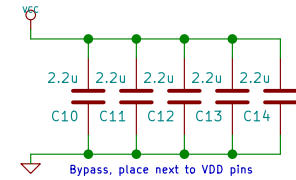
Size: A4 Date: 21 aug 2015  
KiCad E.D.A. kicad (2015-08-21 BZR 6112)-product

**Rev: 4.12**  
Id: 5/7



# STM32F405xx STM32F407xx

ARM Cortex-M4 32b MCU+FPU, 210DMIPS, up to 1MB Flash/192+4KB RAM, USB  
OTG HS/FS, Ethernet, 17 TIMs, 3 ADCs, 15 comm. interfaces & camera



**Benjamin Vedder**

Sheet: /MCU/  
File: STM32F4\_64LQFP.sch

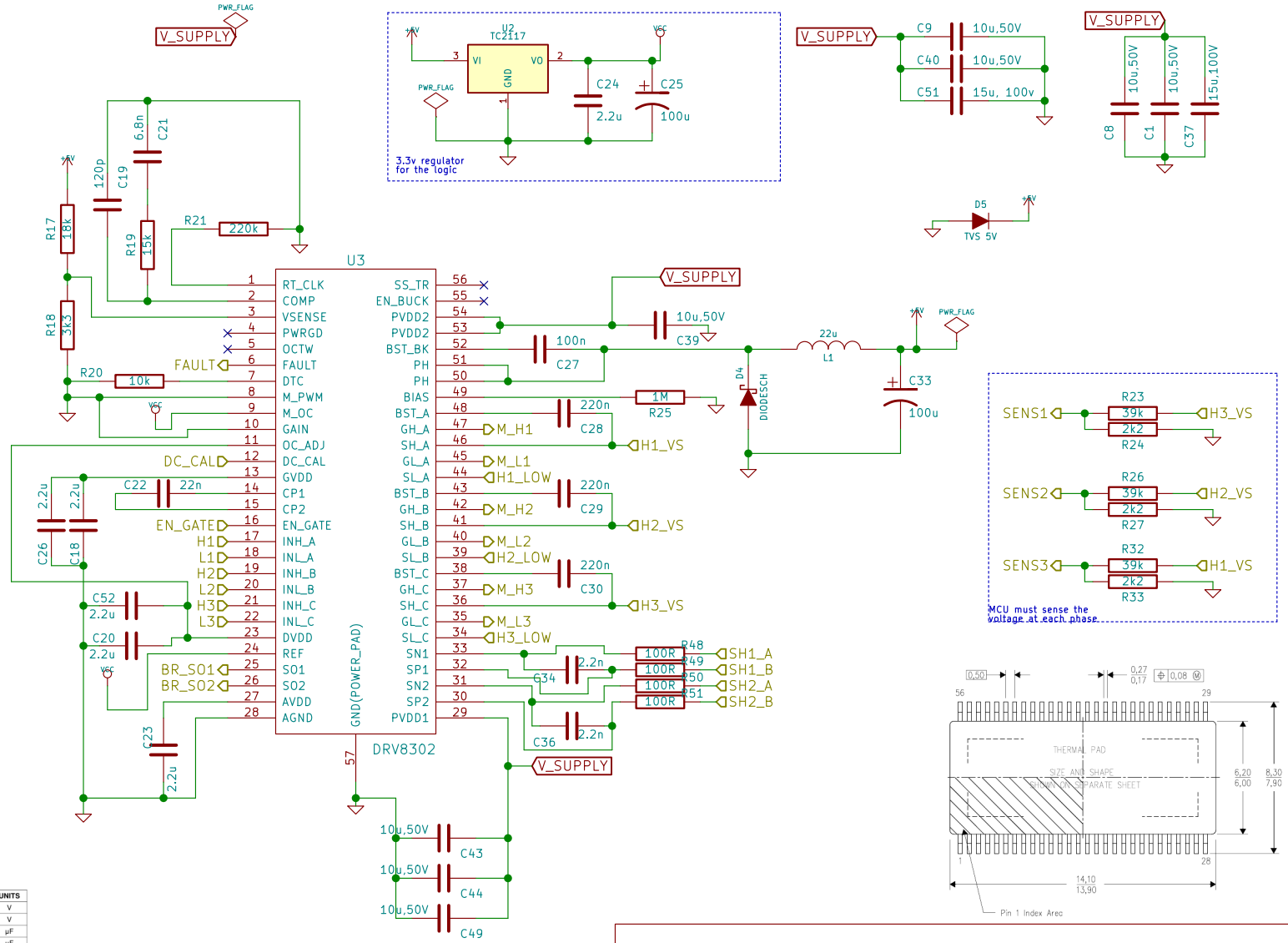
**Title: BLDC Driver 4.11**

Size: A4 Date: 21 aug 2015  
KiCad E.D.A. kicad (2015-08-21 BZR 6112)-product

**Rev: 4.12**  
Id: 6/7

## FEATURES

- Operating Supply Voltage 8V–60V
- 2.3A Sink and 1.7A Source Gate Drive Current Capability
- Integrated Dual Shunt Current Amplifiers With Adjustable Gain and Offset
- Integrated Buck Converter to Support up to 1.5A External Load
- Independent Control of 3 or 6 PWM Inputs
- Bootstrap Gate Driver With 100% Duty Cycle Support
- Programmable Dead Time to Protect External FETs from Shoot Through
- Programmable Overcurrent Protection of External MOSFETs
- Thermally Enhanced 56-Pin TSSOP Pad Down DCA Package



## RECOMMENDED OPERATING CONDITIONS

		MIN	TYP	MAX	UNITS
PVDD1	DC supply voltage PVDD1 for normal operation	8	60		V
PVDD2	DC supply voltage PVDD2 for buck converter	3.5	60		V
C <sub>AVDD</sub>	External capacitance on AVDD pin (ceramic cap) 20% tolerance		1		µF
C <sub>DVDD</sub>	External capacitance on DVDD pin (ceramic cap) 20% tolerance		1		µF
C <sub>GVDD</sub>	External capacitance on GVDD pin (ceramic cap) 20% tolerance		2.2		µF
C <sub>CP</sub>	Flying cap on charge pump pins (between CP1 and CP2) (ceramic cap) 20% tolerance		22		nF
C <sub>BS1</sub>	Bootstrap cap (ceramic cap)		100		nF
I <sub>DM,EN</sub>	Input current of digital pins when EN_GATE is high		8		µA
I <sub>DM,DIS</sub>	Input current of digital pins when EN_GATE is low		1		µA
C <sub>DM</sub>	Maximum capacitance on digital input pin		10		pF
C <sub>OS,OPA</sub>	Maximum output capacitance on outputs of shunt amplifier		20		pF
R <sub>DT</sub>	Dead time control resistor range. Time range is 50ns (-GND) to 500ns (150kΩ) with a linear approximation.	0	150		kΩ
I <sub>FAULT</sub>	FAULT pin sink current. Open-drain		2		mA
I <sub>OS1W</sub>	OS1W pin sink current. Open-drain		2		mA
V <sub>REF</sub>	External voltage reference voltage for current shunt amplifiers	2	6		V
f <sub>SW</sub>	Operating switching frequency of gate driver		200		kHz
T <sub>A</sub>	Ambient temperature	-40	125		°C

Benjamin Vedder

Sheet: /Mosfet driver/  
File: Power.sch

## Title: BLDC Driver 4.11

Size: A4 Date: 21 aug 2015  
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Rev: 4.12  
Id: 7/7