LTM4622A
Ultrathin Dual 2A Step-Down µModule Regulator

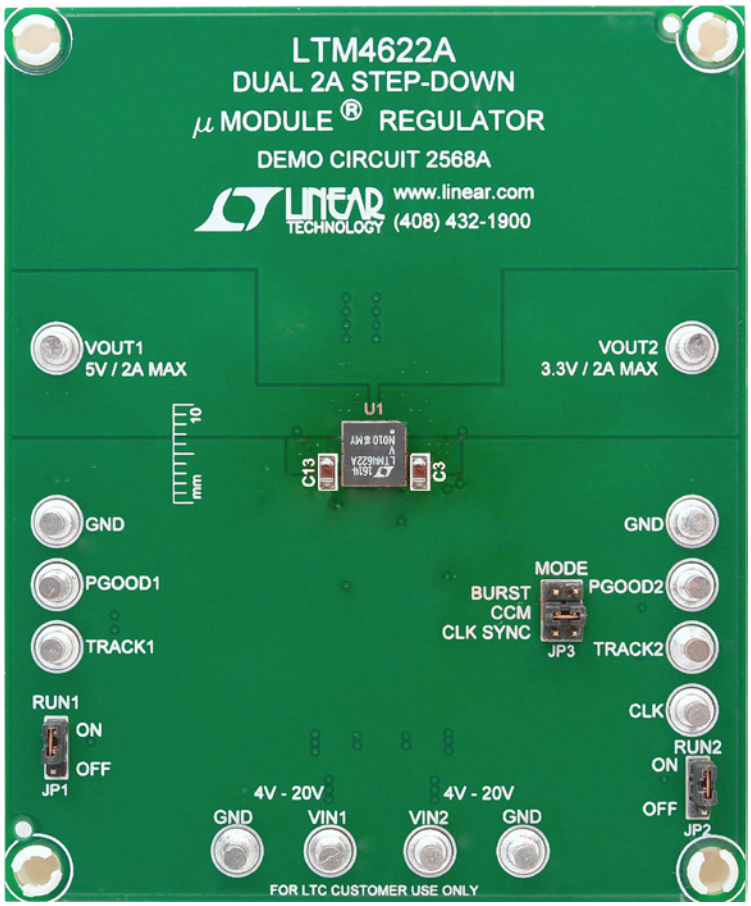
DESCRIPTION

Demonstration circuit 2568A features the LTM®4622A µModule® regulator, a tiny low profile high performance high efficiency dual step-down regulator. The LTM4622A has an operating input voltage range of 3.6V to 20V and is able to provide an output current of up to 2A for each channel. Each output's voltage is programmable from 1.5V to 12V. The LTM4622A is a complete DC/DC point of load regulator in a low profile thermally enhanced 6.25mm × 6.25mm × 1.82mm LGA package requiring only a few input and output capacitors. Output voltage tracking is available through the TRACK/SS pin for supply rail sequencing. External clock synchronization is available through the MODE pin. For high efficiency at low load currents, the MODE pin jumper (JP3) selects the Burst Mode® option for operation in less noise sensitive applications. The LTM4622A data sheet must be read in conjunction with this demo manual for working on or modifying demo circuit 2568A.

Design files for this circuit board are available at http://www.linear.com/demo/DC2568A

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BOARD PHOTO



PERFORMANCE SUMMARY

PARAMETER	CONDITIONS/NOTES	VALUE
Input Voltage Range		4V – 20V
Output Voltage V_{OUT1}, V_{OUT2}	Programmable with FB Pin Resistors	$5V_{DC}$, $3.3V_{DC}$
Maximum Continuous Output Current Each Phase	Derating is Necessary for Certain Operating Conditions, See Data Sheet for Details	2ADC
Default Operating Frequency		1MHz
Efficiency	V_{IN} = 12V, V_{OUT1} = 5V, I_{OUT} = 2A, f_{SW} = 1MHz	91.6% (See Figure 2)
	V_{IN} = 12V, V_{OUT2} = 3.3V, I_{OUT} = 2A, f_{SW} = 1MHz	88.5% (See Figure 2)

QUICK START PROCEDURE

Demonstration circuit 2568A is an easy way to evaluate the performance of the LTM4622A. Please refer to Figure 1 for test setup connections and follow the procedure below.

1. With power off, place the jumpers in the following positions for a typical application for $5V_{OUT}$ and $3.3V_{OUT}$ rails.

JP1	JP2	JP3
RUN1	RUN2	MODE
ON	ON	CCM

2. Before powering up the input supply and loads, preset the input voltage supply to be between 4V to 20V. Preset the load current for each output rail to 0A.
3. With power off, connect the loads, input voltage supply and meters as shown in Figure 1.
4. Turn on the input power supply. The output voltage meters for each output rail should display the programmed output voltage ± 2%.
5. Once the proper output voltages are established, adjust the load current on each rail within the 0A to 2A range and observe each output rail's load regulation, efficiency, and other parameters.
6. To observe increased light load efficiency, place the MODE pin jumper (JP3) in the BURST position.

NOTES:

1. V_{IN1}, V_{IN2} are tied together by default (via R30 jumper). Because $INTV_{CC}$ is generated from V_{IN1}, for applications where V_{IN1} and V_{IN2} use separate supplies (R30 unstuffed) V_{IN1} must be at least 3.6V in order to enable V_{OUT2}.
2. Demonstration circuit 2568A is designed to exhibit the wide output voltage range of the LTM4622A. In order to keep inductor current ripple within reasonable limits, it is recommended to increase programmed switching frequency for higher output voltages. The programmed switching frequency for data provided in this manual is consistent with switching frequency recommendations corresponding to the programmed output voltage. Please refer to the LTM4622A data sheet for more details regarding recommended switching frequency for your particular application.

QUICK START PROCEDURE

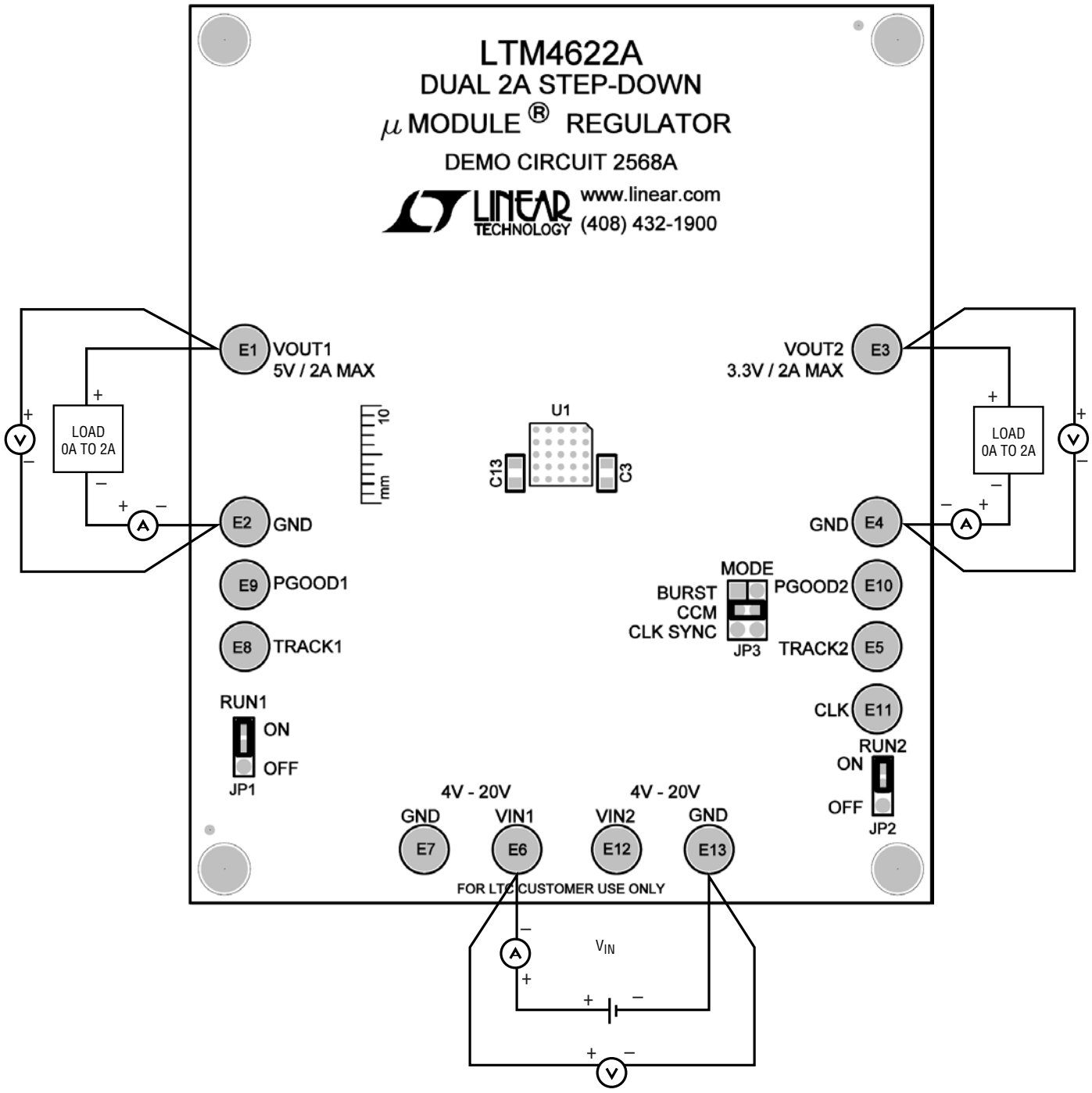


Figure 1. DC2568A Test Setup

QUICK START PROCEDURE

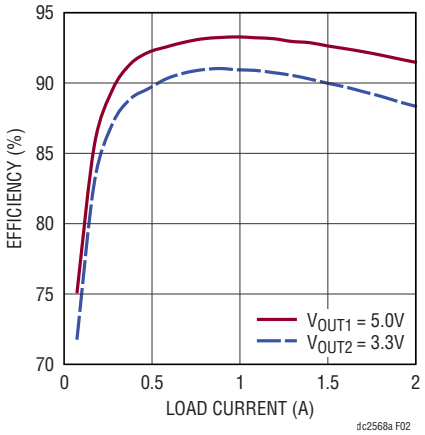
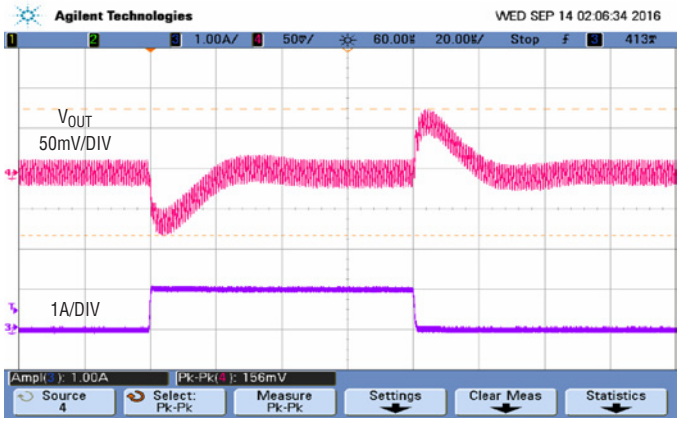
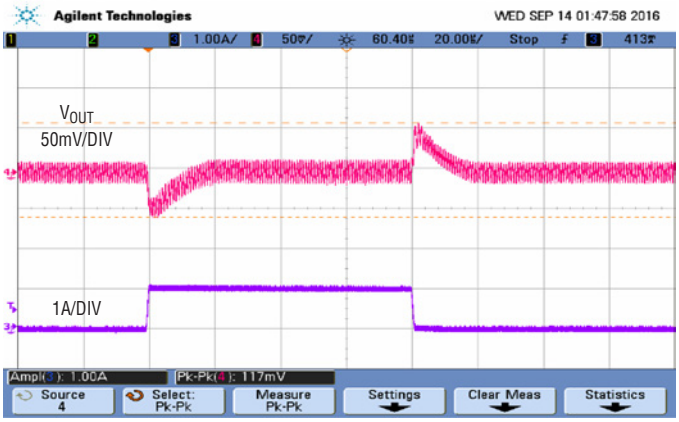


Figure 2. Measured Supply Efficiency at $12V_{IN}$



V_{IN} (V)	V_{OUT} (V)	C_{OUT}
12	5	2 × 4.7µF + 1 × 47µF

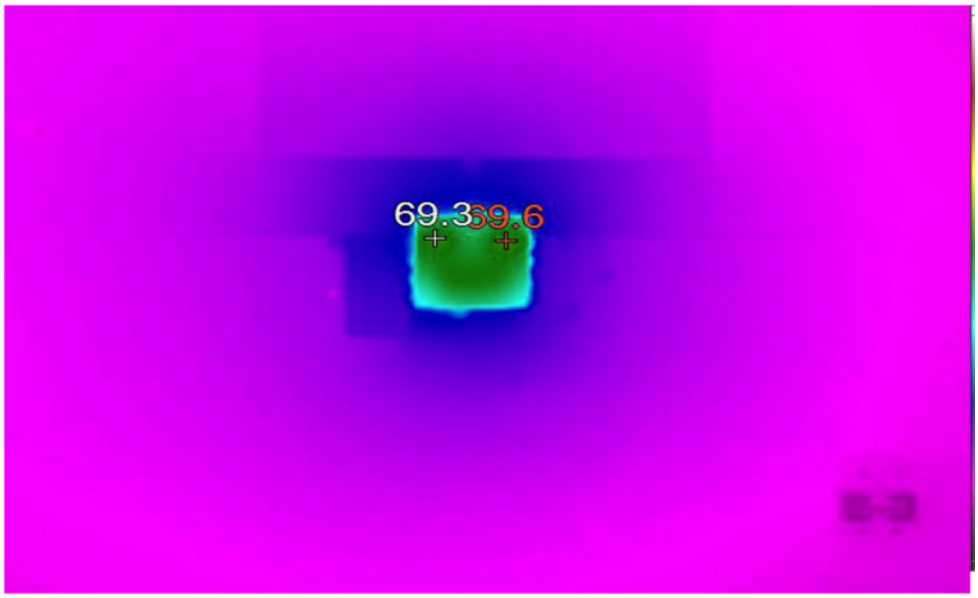
Figure 3. Measured Load Transient Response, (1A to 2A Load Step)



V_{IN} (V)	V_{OUT} (V)	C_{OUT}
12	3.3	2 × 4.7µF + 1 × 47µF

Figure 4. Measured Load Transient Response (1A to 2A Load Step)

QUICK START PROCEDURE



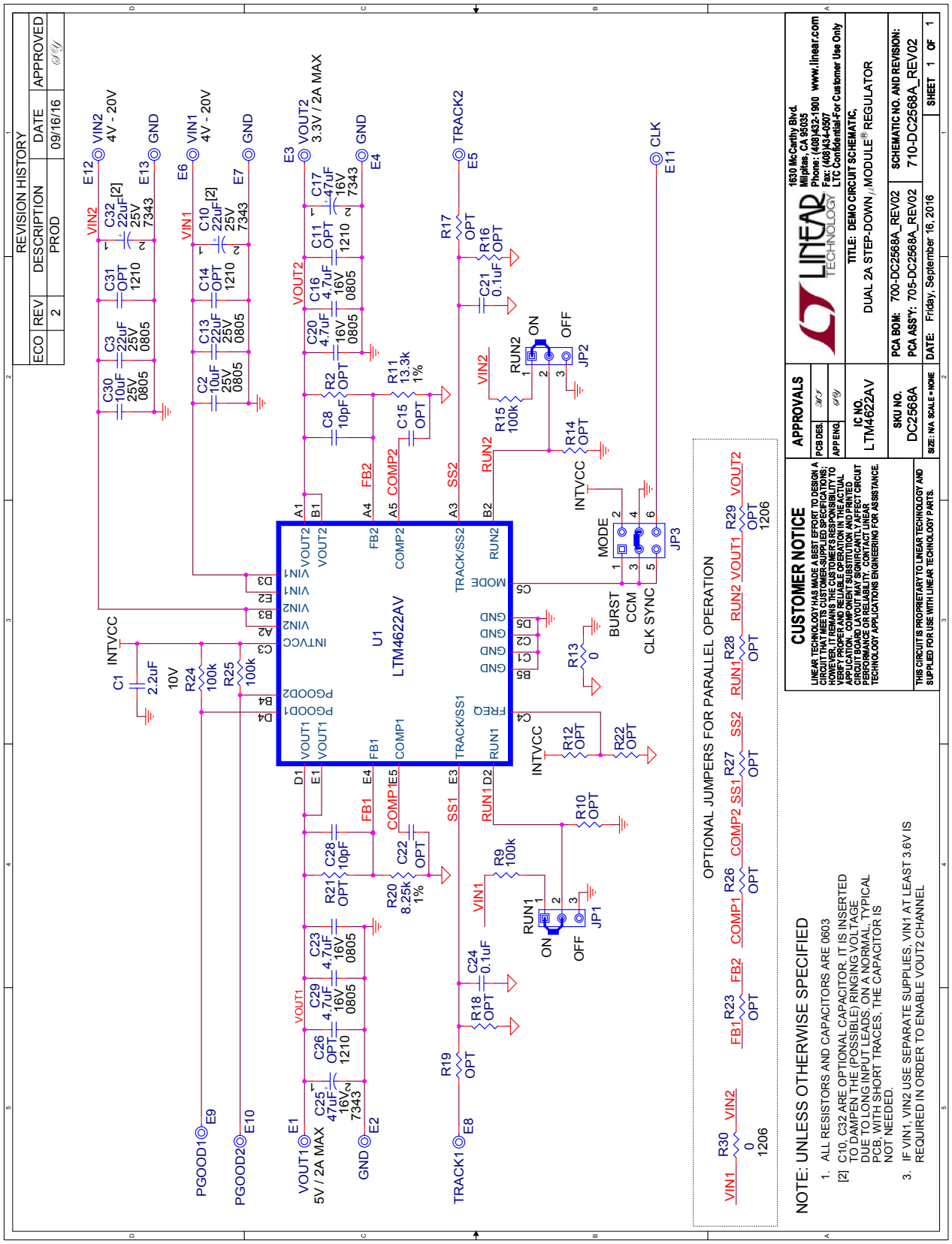
V_{IN} (V)	V_{OUT1} (V), I_{OUT1} (A)	V_{OUT2} (V), I_{OUT2} (A)	f_{SW} (MHz)	AMBIENT TEMPERATURE (°C)
12	5, 2	3.3, 2	1	26

Figure 5. Thermal Capture at Full Load, Natural Convection

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	PART NUMBER
Required Circuit Components					
1	1	C1	CAP 0603 2.2µF 10% 10V X5R	MURATA	GRM188R61A225KE34D
2	2	C2, C30	CAP 0805 10µF 10% 25V X5R	MURATA	GRM21BR61E106KA73L
3	4	C16, C20, C23, C29	CAP 0805 4.7µF 10%16V X5R	MURATA	GRM21BR61E106KA73L
4	2	C17, C25	CAP 7343 47µF 20% 16V POSCAP	PANASONIC	16TQC47MW
5	2	C21, C24	CAP 0603 0.1µF 10% 25V X5R	AVX	06033D104KAT2A
6	1	R11	RES 0603 13.3k 1% 0.1W	VISHAY	CRCW060313K3FKEA
7	1	R20	RES 0603 8.25k 1% 0.1W	VISHAY	CRCW06038K25FKEA
8	1	R30	RES 1206 0Ω 0.5W	VISHAY	WSL120600000EA9
9	1	U1	IC, DUAL 2A STEP-DOWN µModule REG., LGA	LINEAR TECHNOLOGY	LTM4622AV#PBF
Additional Demo Board Circuit Components					
1	2	C3, C13	CAP 0805 22µF 20% 25V X5R	MURATA	GRM21BR61E226ME-44L
2	2	C8, C28	CAP 0603 10pF 5% 25V X5R	AVX	06033A100JAT2A
3	2	C10, C32	CAP 7343 22µF 20% 25V TANT POLY	PANASONIC	25TQC22MV
4	0	C11, C14, C26, C31	CAP 1210 OPTION	OPTION	OPTION
5	0	C15, C22	CAP 0603 OPTION	OPTION	OPTION
6	0	R2, R10, R12, R14, R16-R19, R21-R23, R26-R28	RES 0603 OPTION	OPTION	OPTION
7	4	R9, R15, R24, R25	RES 0603 100k 5% 1/10W	VISHAY	CRCW0603100KJNEA
8	1	R13	RES 0603 0Ω JUMPER	VISHAY	CRCW06030000Z0EA
9	0	R29	RES 1206 OPTION	OPTION	OPTION
Hardware					
1	13	E1-E13	TEST POINT, TURRET, 0.094", MTG. HOLE	MILL-MAX	2501-2-00-80-00-00-07-0
2	2	JP1, JP2	HEADER 3-PIN, 2mm	WURTH ELEKTRONIK	62000311121
3	1	JP3	HEADER 3-PIN, DBL ROW 2mm	WURTH ELEKTRONIK	62000621121
4	4	MP1-MP4	STANDOFF, NYLON, SNAP-ON, 0.250"	KEYSTONE	8831
5	3	XJP1-XJP3	CONN., SHUNT, FEMALE, 2-POS, 2mm	WURTH ELEKTRONIK	60800213421

SCHEMATIC DIAGRAM



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