

LTC3637EMSE High Efficiency 76V, 1A Step-Down Converter

DESCRIPTION

Demonstration circuit 2056A is a 76V input, 1A output DC/DC power supply featuring the LTC[®]3637. The IC operates in a high efficiency Burst Mode[®] operation and includes an internal high side power MOSFET. The board will accept an input voltage between 4V and 76V, and provide jumper selected output voltages of 1.8V, 3.3V, 5V and an option for additional voltages. The IC includes internal soft-start and a provision for increasing soft-start time.

Included on the board is an ON/OFF jumper that can also be configured as a precision undervoltage lockout.

Output voltage between 800mV and V_{IN} can be programmed using optional resistors. (Higher voltage rating output capacitors may be required.)

The LTC3637 data sheet gives a complete description of the IC operation and application information. The data sheet must be read in conjunction with this quick start guide.

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

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PERFORMANCE SUMMARY Specifications are at $T_A = 25^\circ\text{C}$

PARAMETER	CONDITION	VALUE
Input Voltage Range		4V to 76V
1.8V Output Voltage	$V_{IN} = 12\text{V}$, $I_{OUT} = 0\text{A to } 1\text{A}$	$1.8\text{V} \pm 2\%$
3.3V Output Voltage	$V_{IN} = 12\text{V}$, $I_{OUT} = 0\text{A to } 1\text{A}$	$3.3\text{V} \pm 2\%$
5V Output Voltage	$V_{IN} = 12\text{V}$, $I_{OUT} = 0\text{A to } 1\text{A}$	$5\text{V} \pm 2\%$
Maximum Output Current, I_{OUT}	$V_{IN} = 4\text{V to } 76\text{V}$, $V_{OUT} = 1.8\text{V, } 3.3\text{V or } 5\text{V}$	1A
Typical Efficiency	$V_{IN} = 12\text{V}$, $V_{OUT} = 5\text{V}$, $I_{OUT} = 1\text{A}$	85.5%
Typical Output Ripple	$V_{IN} = 76\text{V}$, $V_{OUT} = 5\text{V}$, $I_{OUT} = 1\text{A}$ (20MHz BW)	109mV _{P-P}

QUICK START PROCEDURE

Demonstration circuit 2056A is easy to set up to evaluate the performance of the LTC3637. Refer to Figure 1 for the proper measurement equipment setup and follow the procedure below:

1. With power off, connect the input power supply (set for 0V) to VIN and GND (input return).
2. Select 5V output using jumper JP1 (B position) and JP2 (A position). Select ON position for JP3.
3. Connect the 5V output load between VOUT and GND (Initial load: no load).
4. Connect the DVMs to the input and outputs.
5. Turn on the input power supply and slowly increase to 12V. Check for the proper output voltages. (5V output should be within $5V \pm 2\%$.)
6. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage and other parameters.

7. With power off, move jumpers JP1 and JP2 to the other fixed voltage settings (1.8V or 3.3V). Repeat steps 5 and 6. Check for the proper out-put voltage and other parameters.

Note: When measuring the output or input voltage ripple, do not use the long ground lead on the oscilloscope probe. See Figure 2 for the proper scope probe technique. Short, stiff leads need to be soldered to the (+) and (-) terminals of an output capacitor. The probe's ground ring needs to touch the (-) lead and the probe tip needs to touch the (+) lead.

Additional Notes

1. **CAUTION: Be careful when testing with high voltage. High voltage can result in an electric shock if care is not taken.**
2. For 5V output, V_{IN} input voltage should be at least 5V or higher.

QUICK START PROCEDURE

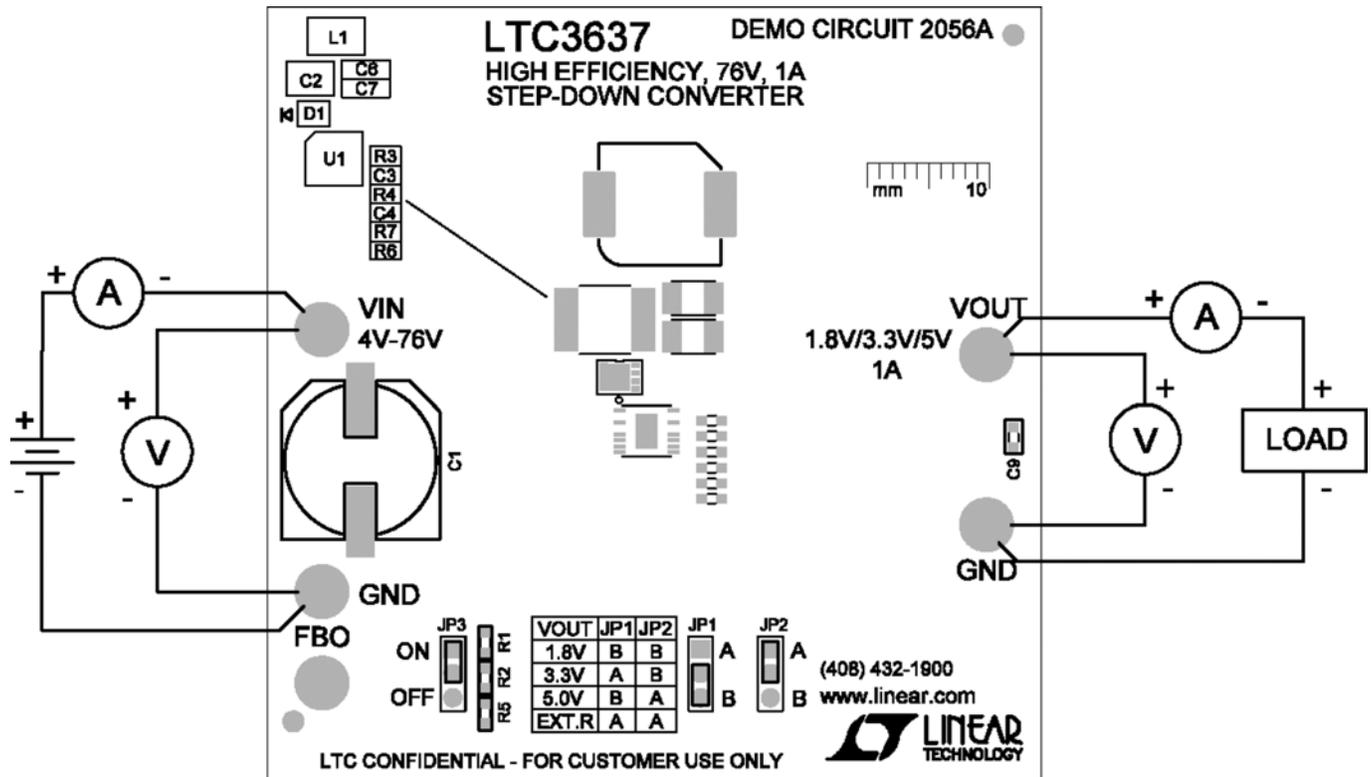
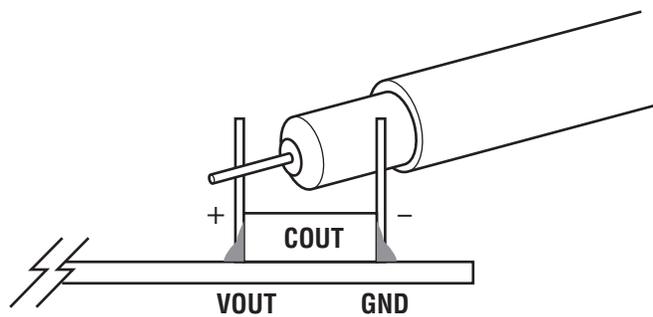
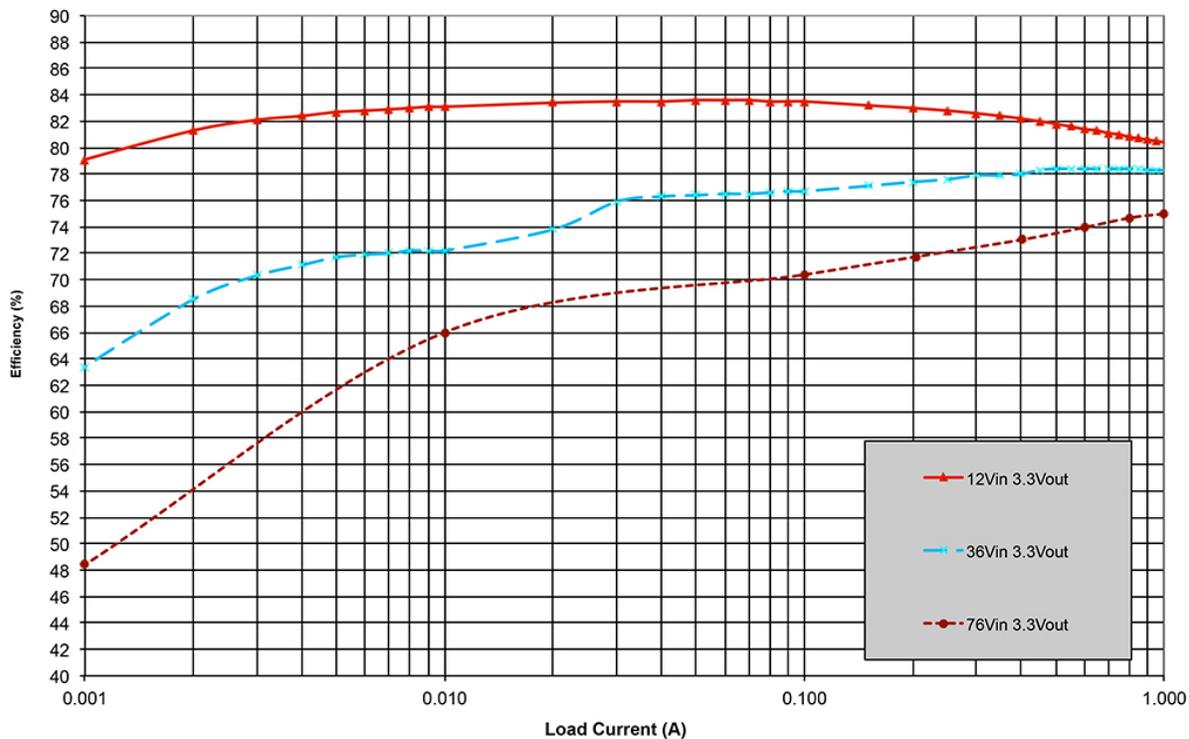


Figure 1. Proper Measurement Equipment Setup

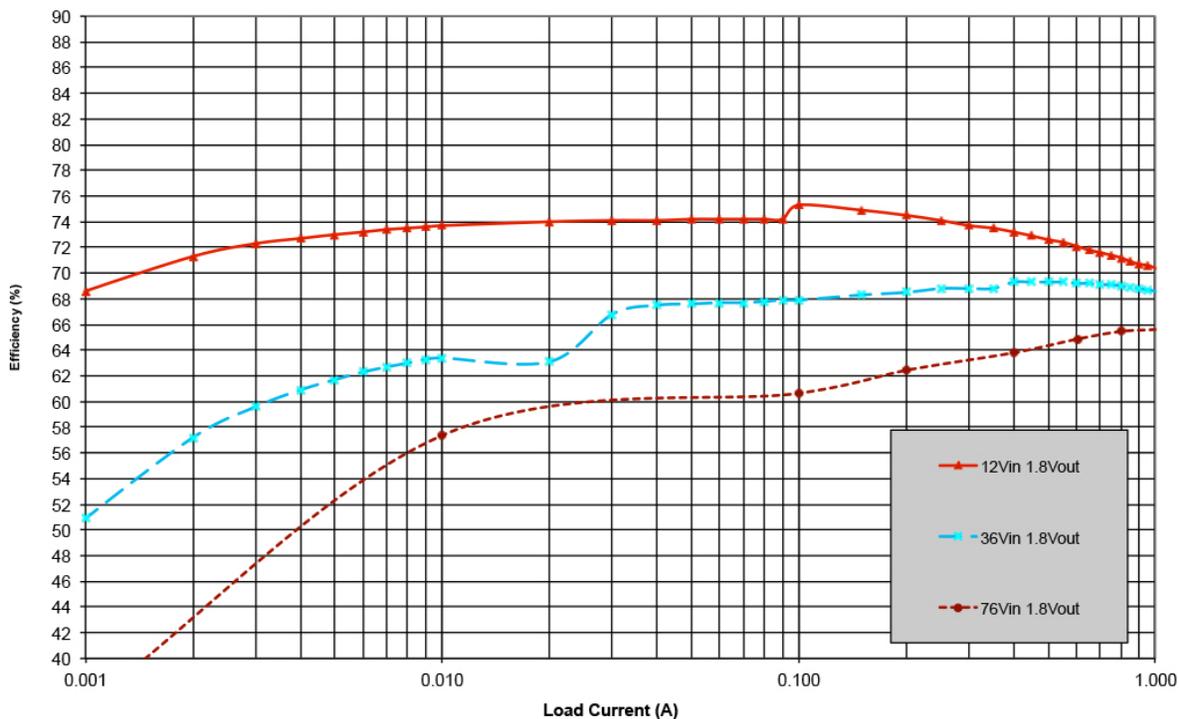


QUICK START PROCEDURE

LTC3637 3.3V_{OUT} Efficiency vs Load Current

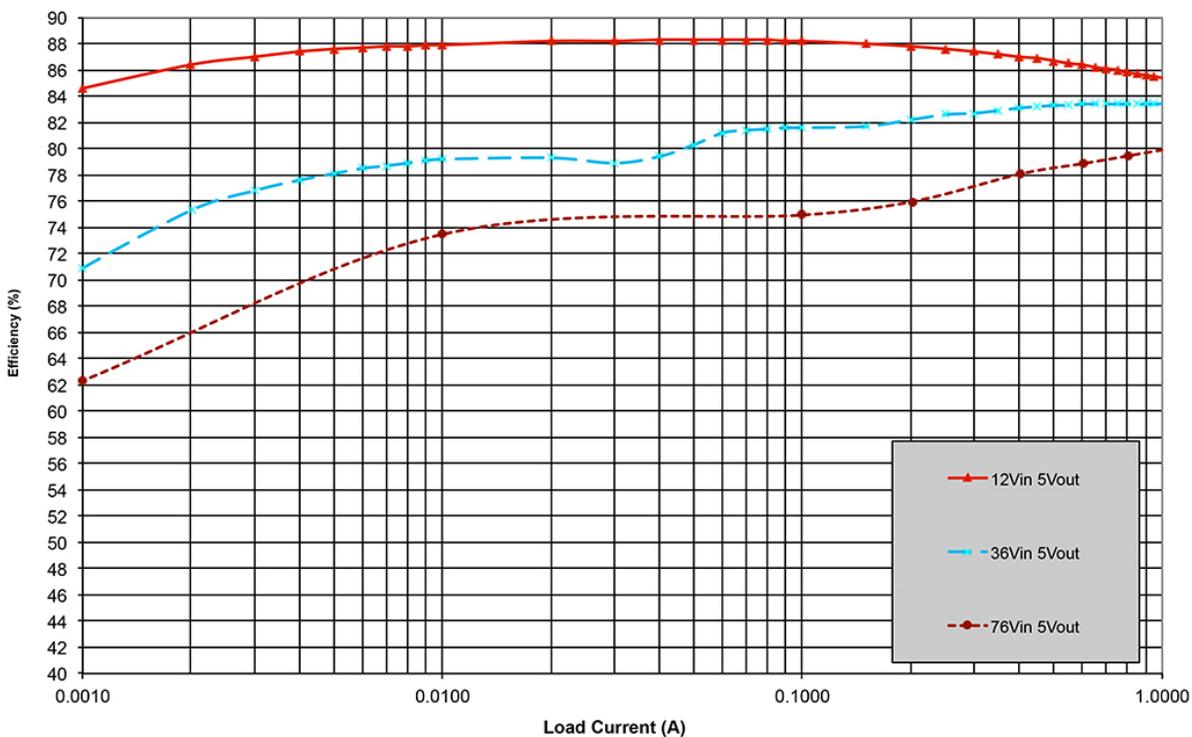


LTC3637 1.8V_{OUT} Efficiency vs Load Current



QUICK START PROCEDURE

LTC3637 5V_{OUT} Efficiency vs Load Current

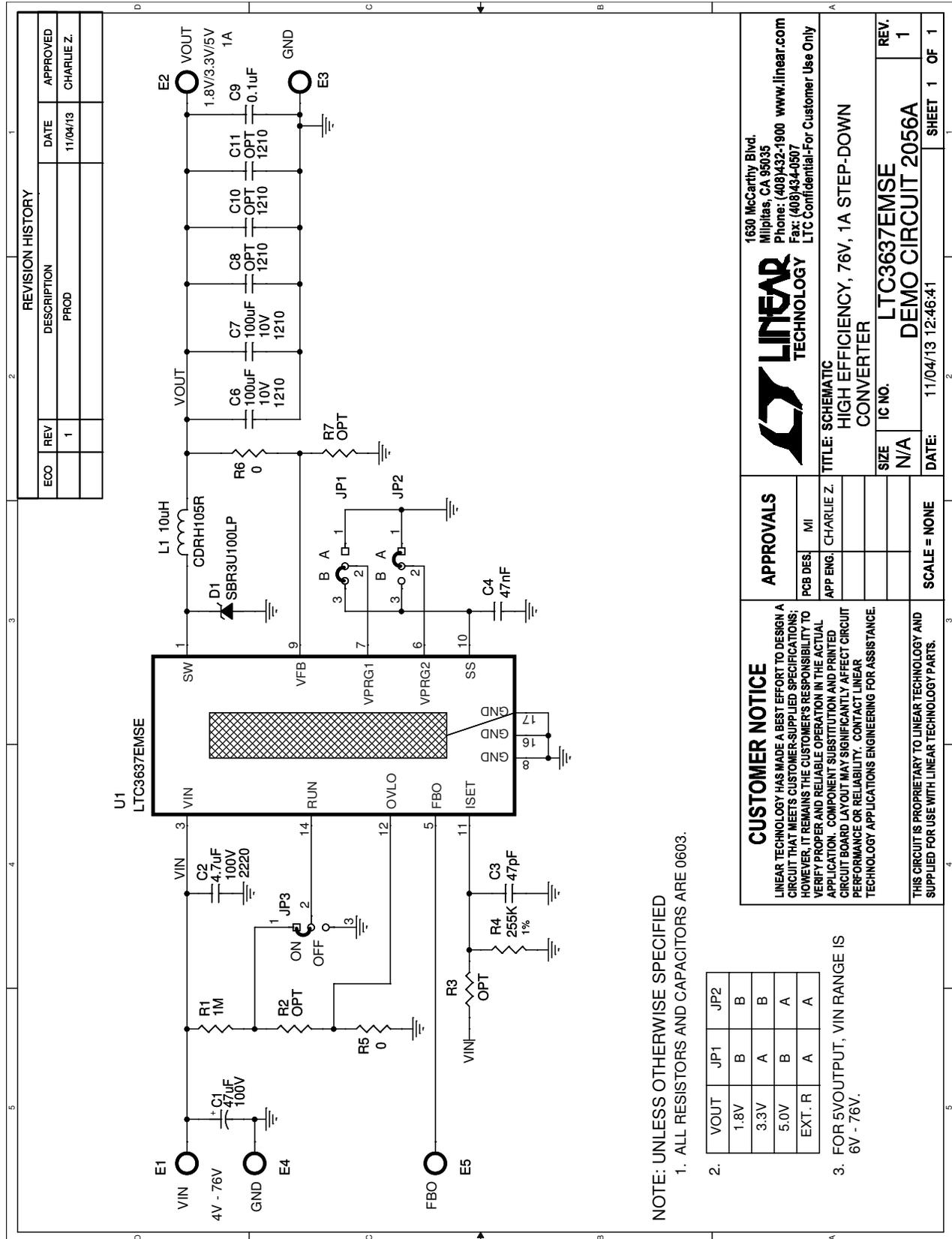


DEMO MANUAL DC2056A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, 47 μ F 20% 100V ALUM	NIPPON CHEMI-CON EMVY101ARA470MKE0S
2	1	C2	CAP, 2220 4.7 μ F 20% 100V X7R	TDK C5750X7R2A475M
3	1	C3	CAP, 0603 47pF 5% 50V C0G	AVX 06035A470JAT2
4	1	C4	CAP, 0603 47nF 10% 25V X7R	AVX 06033C473KAT
5	2	C6, C7	CAP, 1210 100 μ F 20% 10V X5R	MURATA GRM32ER61A107ME20L
6	1	C9	CAP, 0603 0.1 μ F 10% 25V X7R	AVX 06033C104KAT2A
7	1	D1	DIODE, SUPER BARRIER RECTIFIER	DIODES INC. SBR3U100LP
8	1	L1	IND, 10 μ H 30% 4.45A SMD	SUMIDA CDRH105RNP-100NC
9	1	R1	RES, 0603 1M 5% 1/10W	NIC NRC06J105TRF
10	1	R4	RES, 0603 255k 1% 1/10W	VISHAY CRCW0603255KFKEA
11	2	R5, R6	RES, 0603 0 Ω JUMPER	VISHAY CRCW06030000Z0EA
12	1	U1	IC, HIGH EFFICIENCY STEP-DOWN CONVERTER	LINEAR TECH. LTC3637EMSE
Additional Demo Board Circuit Components				
1	0	C8, C10, C11	CAP, 1210 OPTION	OPTION
2	0	R2, R3, R7	RES, 0603 OPTION	OPTION
Hardware				
1	5	E1, E2, E3, E4, E5	TURRET	MILL MAX 2501-2-00-80-00-00-07-0
2	3	JP1, JP2, JP3	HEADER, 3-PIN, 2mm	SAMTEC TMM-103-02-L-S
3	3	JP1, JP2, JP3	SHUNT, 2mm	SAMTEC 2SN-BK-G

SCHEMATIC DIAGRAM



dc2056af

DEMO MANUAL DC2056A

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