LT4275
LTPoE++, IEEE 802.3at/ IEEE 802.3af Compliant PD Controller

DESCRIPTION

Demonstration circuit 1788B features the LT®4275, a fourth generation powered device (PD) controller for Power over Ethernet (PoE) applications.

The DC1788B is available in DC1788B-A, DC1788B-B, and DC1788B-C versions to meet the power level required by the PD application. The DC1788B-A features the LT4275A PD controller. This controller supports the IEEE 802.3at (Type 2, PoE+), IEEE 802.3af (Type 1, PoE) and LTPoE++™ specification. LTPoE++ adds four power levels to the existing IEEE standard with 38.7W, 52.7W, 70W, and 90W of delivered PD power at the RJ45 jack. The DC1788B-B features the LT4275B PD controller and is compliant with the IEEE 802.3at and IEEE 802.3af specifications. The DC1788B-C features the LT4275C PD controller and is compliant with the IEEE 802.3af specification.

The DC1788B includes an RJ45 Ethernet port, a high power Ethernet magnetic, a discrete active bridge rectifier, a surge protector, an external N-channel FET, and the LT4275. The discrete active bridge rectifier is used to achieve higher efficiency than a conventional diode bridge rectifier. Many of the main features from the previous generation PD controller are included in this generation PD controller. These include a power good indicator, a power sourcing equipment (PSE) type indicator, and support for an auxiliary power input. The major difference from the previous generation PD controller is that the LT4275 drives an external N-channel Hot Swap™ FET at the PoE high side voltage rail. This allows the user to choose a low $R_{DS(ON)}$ N-channel MOSFET to maximize power efficiency, reduce heat dissipation, and ease thermal design. An LED status indicator is included to indicate the Hot Swap FET is fully turned on and the PSE is powering the PD. A sufficient load to sink more than 10mA is also included to assure the PSE maintains power to the PD and to meet the DC maintain power signature current required by the IEEE 802.3at/IEEE 802.3af specification.

Simply connect the output of the DC1788B to the DC/DC converter that is right for the application. Linear Technology offers a variety of DC/DC converter solutions that can be used with the DC1788B (eg DC894, DC1317, etc).

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

Table 1. Summary of Features Supported by the DC1788B Assemblies

ASSEMBLY	PoE STANDARD	MAXIMUM POWER LEVEL	POWER GOOD INDICATOR (PWRGD)	PSE TYPE INDICATOR ($\overline{T2P}$)	AUXILIARY SUPPLY SUPPORT
DC1788B-A	LTPoE++ PoE+ PoE	90W	Yes	Yes	No
DC1788B-B	PoE+ PoE	25.5W	Yes	Yes	Yes
DC1788B-C	PoE	13W	Yes	No	Yes

PERFORMANCE SUMMARY

Table 2. DC1788B Performance Summary

PARAMETER	CONDITION	VALUE
PD Input Voltage After Start-Up (V_{PORT})	At the PD Ethernet Port LTPoE++ 38.7W	49.8V to 57V
	LTPoE++ 52.7W	47.8V to 57V
	LTPoE++ 70W	45.1V to 57V
	LTPoE++ 90W	41.0V to 57V
	IEEE 802.3at (Type 2, 25.5W)	42.5V to 57V
	IEEE 802.3af (Type 1, 13W)	37V to 57V
Efficiency	DC1788B-A, V_{PORT} = 48V, I_{LOAD} = 1.1A	99.1% (Typical)
	DC1788B-B, V_{PORT} = 48V, I_{LOAD} = 600mA	98.9% (Typical)
	DC1788B-C, V_{PORT} = 48V, I_{LOAD} = 350mA	99.1% (Typical)
PoE Type Switching Frequency	An LTPoE++ PSE is Powering a DC1788B-A	840Hz

THEORY OF OPERATION

When an LTPoE++ PSE is connected to the DC1788B demo board RJ45 connector, J1, via a CAT5e or CAT6 Ethernet cable, the PSE initiates the detection process. During this process, the discrete active bridge acts as a standard diode bridge and the PD solution presents a 25k resistive load to the PSE. After the PD has passed the detection process, the PSE uses an IEEE 802.3at/IEEE 802.3af or LTPoE++ classification method to determine the power level the PSE can deliver to the PD. The PSE turns on the port and provides power to the PD if the classification is successful. During turn on, the MOSFETs of the discrete active bridge are fully enhanced with low $R_{DS(ON)}$ in the high current path. This reduces the power and heat dissipation compared to the conventional diode bridge. Once the LT4275 detects the PSE has turned on the port, it drives an external N-channel MOSFET to ramp up the output voltage. After a successful PD controller output turn on, the LT4275 drives a power good indicator (PWRGD) and a PSE Type indicator ($\overline{T2P}$) (DC1788B-A and DC1788B-B only). The PWRGD indicator signals the load to start drawing current and the $\overline{T2P}$ indicator signals the load the type of PSE powering the PD.

Classification Signaling

The resistors at R_{CLS} and R_{CLS++} determine the classification signature and sequence. The DC1788B-A includes user-selectable jumpers to support IEEE 802.3af, IEEE 802.3at, and LTPoE++ power levels from 3.84W to 90W. Refer to Table 3 for the power levels. If an LTPoE++ power level is selected, an IEEE 802.3af or IEEE 802.3at compliant PSE will classify this PD as a Class 4 PD. The DC1788B-B includes a preselected R_{CLS} resistor to support IEEE 802.3at 2-event classification and this board does not contain jumper blocks. The DC1788B-C includes multiple jumpers to support all IEEE 802.3af power levels. Table 3 shows each shunt position and its associated class number and power level for the DC1788B-A and -C boards. Use Table 3 as a selection guide to choose a suitable power level for the load.

Table 3. DC1788B-A and DC1788B-C Shunt Positions for PoE Power Levels

ASSEMBLY	PoE CLASS	POWER LEVEL AT THE PD INPUT	RCLASS JUMPERS	
DC1788B-A & -C	0	13W	JP1	JP2
DC1788B-A & -C	1	3.84W	JP3	JP4
DC1788B-A & -C	2	6.49W	JP5	JP6
DC1788B-A & -C	3	13W	JP7	JP8
DC1788B-A	4	25.5W	JP9	JP10
DC1788B-A	4*	38.7W	JP11	JP12
DC1788B-A	4*	52.7W	JP13	JP14
DC1788B-A	4*	70W	JP15	JP16
DC1788B-A	4*	90W	JP17	JP18

*An LTPoE++ PD will be classified as Class 4 by an IEEE 802.3at/af compliant PSE.

THEORY OF OPERATION

Power Good Indicator and Power Supply Start-Up

The LT4275 limits the inrush current to the output bulk capacitor by controlling the output voltage slew rate during turn-on. The slew rate is preprogrammed via a resistor and a capacitor at the LT4275 HSGATE pin on the DC1788B to limit the inrush current to the bulk capacitor on board. If more capacitance is desired at the output, refer to Inrush and Powered On section in the LT4275 data sheet to recalculate the inrush current and ensure it is below the IEEE requirement of approximately 100mA. The inrush current limit will cause startup problems if an attached load draws more than 100mA of current during inrush. Therefore, it is strongly recommended to use the PWRGD indicator on the DC1788B to interface to a load such as a DC/DC converter as shown in Figures 1, 2 and 4.

PSE Type Indicator

Refer to Table 4 for the summary of $\overline{T2P}$ indicator signals supported by the DC1788B assembly. The $\overline{T2P}$ signal is valid after PWRGD is active. This indicator is not connected on the DC1788B-C.

Table 4. Summary of $\overline{T2P}$ Signals Supported by the DC1788B Assemblies

ASSEMBLY	PSE TYPE	$\overline{T2P}$ SIGNAL
DC1788B-A	LTPoE++	840Hz, 50% Duty Cycle
	IEEE 802.3at (Type 2, PoE+)	Logic Low
	IEEE 802.3af (Type 1, PoE)	Logic High
DC1788B-B	LTPoE++	Logic Low
	IEEE 802.3at (Type 2, PoE+)	Logic Low
	IEEE 802.3af (Type 1, PoE)	Logic High
DC1788B-C	Any PSE	Not Supported

Auxiliary Supply Support

The DC1788B-B and DC1788B-C versions support an auxiliary supply input. The auxiliary supply input has priority over the PoE input. When the PD controller detects a valid voltage from the auxiliary supply input, it turns off the N-channel MOSFET (Q2) to cut the power from the PSE and lets the auxiliary supply take over powering the load. The PSE may detect the disconnected PD and turn off the port. The PWRGD indicator outputs a logic high signal when an auxiliary supply is present. The $\overline{T2P}$ indicator outputs a logic low signal on the DC1788B-B board when an auxiliary supply is present. The auxiliary supply input is an assembly option on the DC1788B-A board.

DC1788B Companion PSE Demo Boards

Linear Technology offers a variety of PSE solutions to evaluate with DC1788B. Refer to Table 5 to select a PSE demo board based on the DC1788B assembly and the application power requirement.

Table 5. Selection of Companion PSE Demo Board depending on the DC1788 Assembly and the PoE Power Level

DC1788 ASSEMBLY	PoE POWER LEVEL	COMPANION PSE DEMO BOARD
DC1788B-A	90W	DC1814A-D
	70W	DC1814A-C
	52.7W	DC1814A-B
	38.7W	DC1814A-A
DC1788B-B	25.5W	DC1567A
DC1788B-C	13W	DC981A/B

**Contact Linear for multi-port PSE demo board options.

DC1788B-A QUICK START PROCEDURE

NOTE: Handle the DC1788B-A by the edge of the board.

Power over Ethernet Input

1. Refer to Figure 1 to evaluate the DC1788B-A with a DC/DC converter. If a resistive load is used to evaluate the DC1788B-A, connect the load by hand between VOUT+ and VOUT– after the LED (D3) is lit. It is recommended to disconnect the resistive load before powering down the DC1788B-A, so at the next turn on the load is disconnected. If the load is not connected and disconnected by hand properly, the PD may not power on. Contact field applications engineers for further details.
2. Default class select shunt positions are at JP1 and JP2 on the DC1788B-A board. In this configuration, any PSE will turn on this PD. Choose a power level from Table 3 and select the corresponding shunt positions.
3. Check the power delivery capability of the LTPoE++ PSE to ensure it can power the PD and the load. Do not select a jumper position corresponding to a higher power level than the LTPoE++ PSE can provide. Otherwise, the LTPoE++ PSE will not turn on the PD after classification.
4. Connect the output of the PSE to the RJ45 connector (J1) on the DC1788B-A board with a CAT5e or CAT6 Ethernet cable.
5. After connection has been established, verify that the LED (D3) is lit. This indicates the PSE has successfully detected and powered the PD

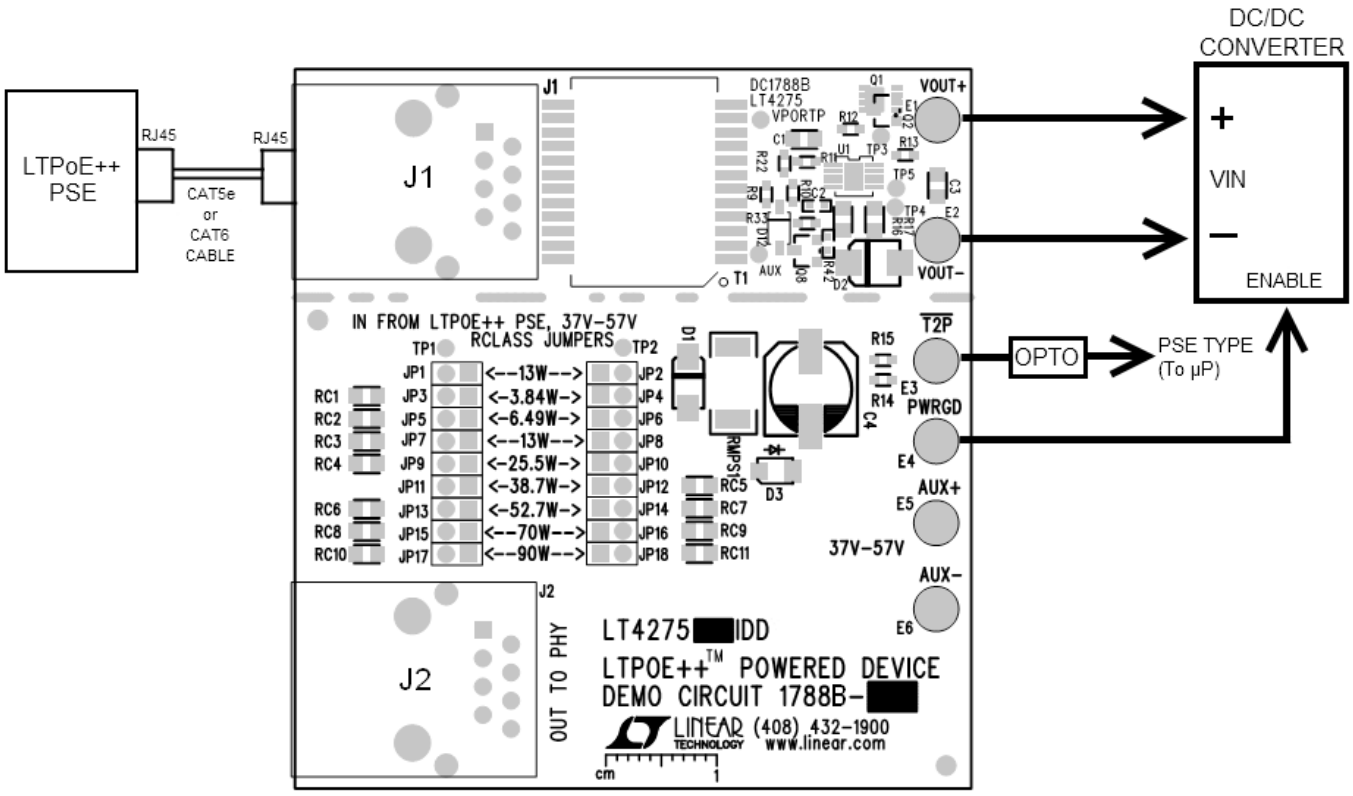


Figure 1. Setup Diagram for the DC1788B-A with a DC/DC Converter, a Microprocessor, and an LTPoE++ PSE

DC1788B-B QUICK START PROCEDURE

NOTE: Handle the DC1788B-B by the edge of the board.

Power over Ethernet Input

1. Refer to Figure 2 to evaluate the DC1788B-B with a DC/DC converter. If a resistive load is used to evaluate the DC1788B-B, connect the load by hand between VOUT+ and VOUT– after the LED (D3) is lit. It is recommended to disconnect the resistive load before powering down the DC1788B-B, so at the next turn on the load is disconnected. If the load is not connected and disconnected by hand properly, the PD may not power on. Contact field applications engineers for further details.
2. Connect the output of the PSE to the RJ45 connector (J1) on the DC1788B-B board with a CAT5e or CAT6 Ethernet cable.
3. After connection has been established, verify that the LED (D3) is lit. This indicates the PSE has successfully detected and powered the PD.

Auxiliary Supply Input

1. Refer to Figure 3 to evaluate the DC1788B-B with a DC/DC converter and an auxiliary DC power supply.
2. Connect the auxiliary supply to the AUX+ to AUX– inputs. Check to make sure the voltage polarity is correct before turning on the auxiliary power supply.
3. Turn on the auxiliary power supply and verify that the LED (D3) is lit.

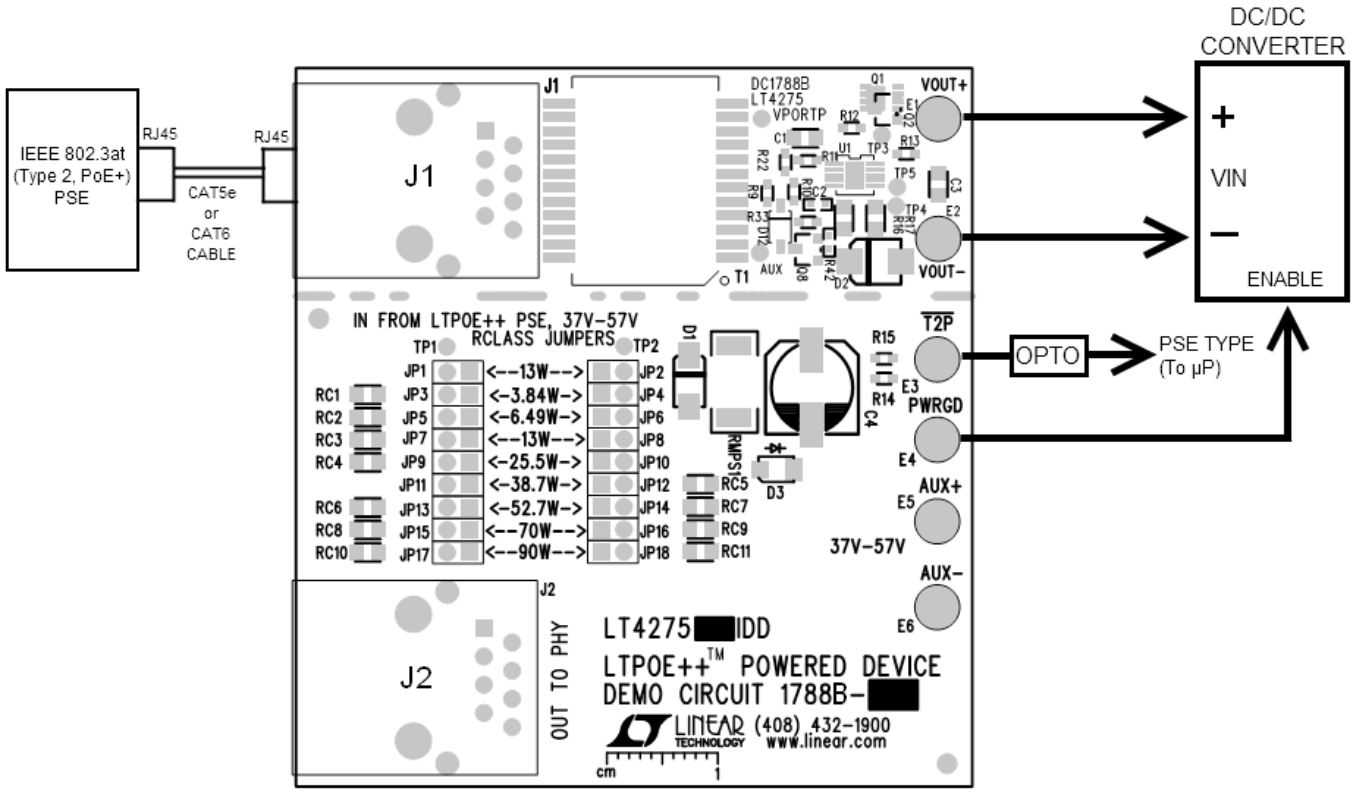


Figure 2. Setup Diagram for the DC1788B-B with a DC/DC Converter, a Microprocessor, and a Type 2 PSE

DC1788B-B QUICK START PROCEDURE

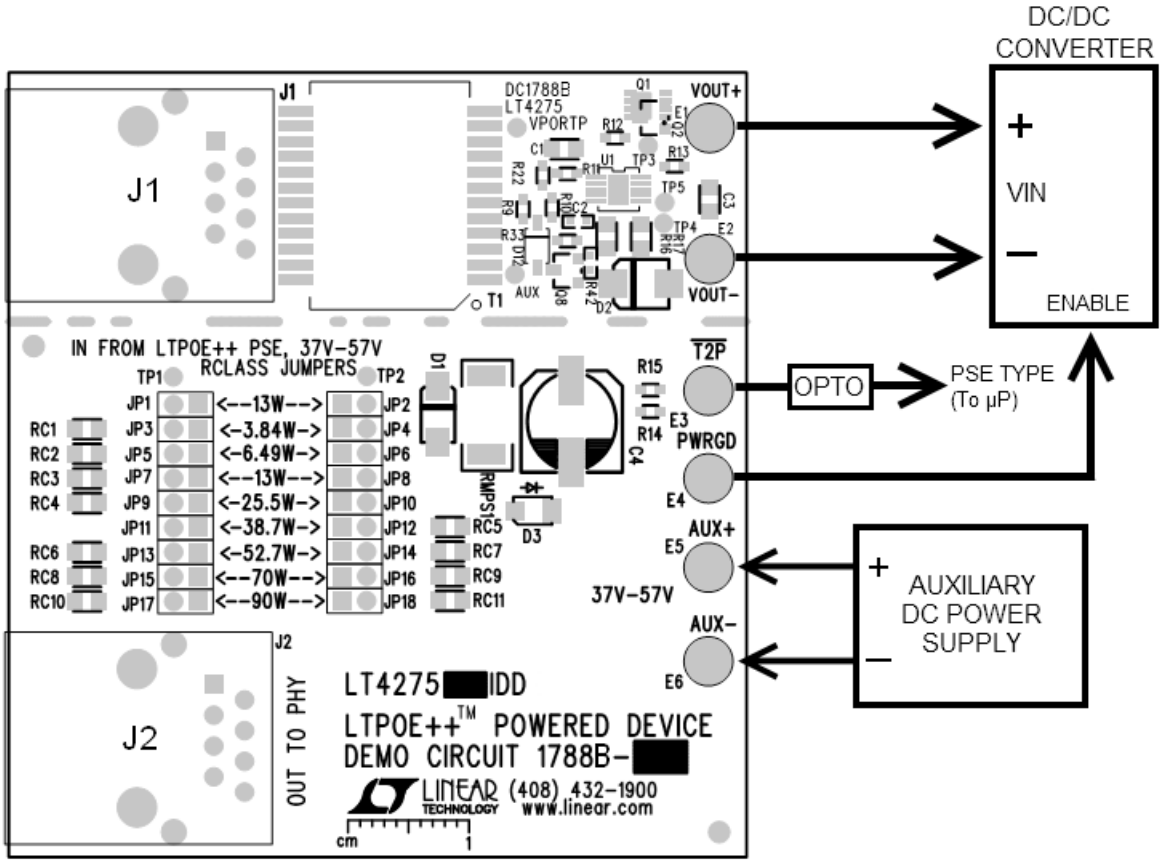


Figure 3. Setup Diagram for the DC1788B-B with a DC/DC Converter, a Microprocessor, and an Auxiliary DC Power Supply

DC1788B-C QUICK START PROCEDURE

NOTE: Handle the DC1788B-C by the edge of the board.

Power over Ethernet Input

1. Refer to Figure 4 to evaluate the DC1788B-C with a DC/DC converter. If a resistive load is used to evaluate the DC1788B-C, connect the load by hand between VOUT+ and VOUT– after the LED (D3) is lit. It is recommended to disconnect the resistive load before powering down the DC1788B-C, so at the next turn on the load is disconnected. If the load is not connected and disconnected by hand properly, the PD may not power on. Contact field applications engineers for further details.
2. Connect the output of the PSE to the RJ45 connector (J1) on the DC1788B-C board with a CAT5e or CAT6 Ethernet cable.
3. After connection has been established, verify that the LED (D3) is lit. This indicates the PSE has successfully detected and powered the PD.

Auxiliary Supply Input

1. Refer to Figure 5 to evaluate the DC1788B-C with a DC/DC converter and an auxiliary DC power supply.
2. Connect the auxiliary supply to the AUX+ to AUX– inputs. Check to make sure the voltage polarity is correct before turning on the auxiliary power supply.
3. Turn on the auxiliary power supply and verify that the LED (D3) is lit.

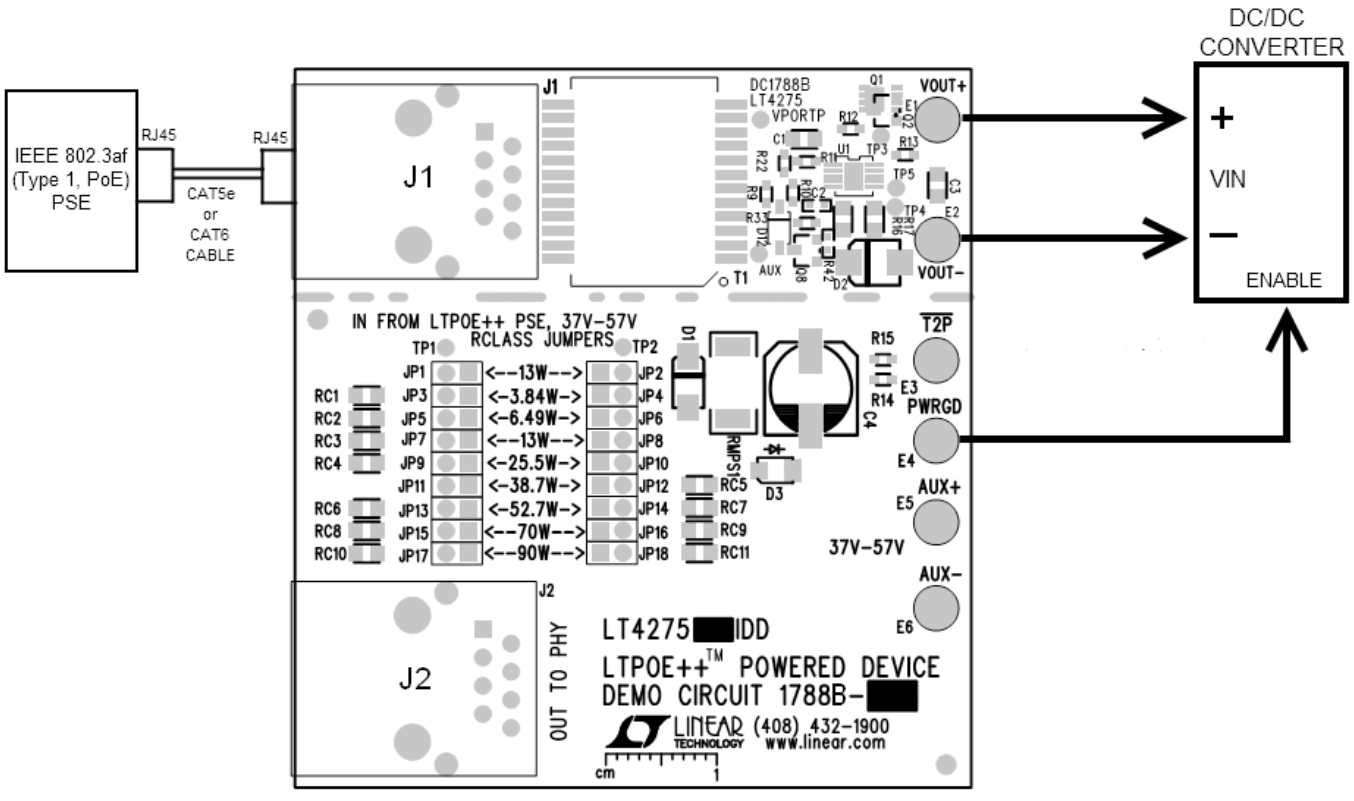


Figure 4. Setup Diagram for the DC1788B-C with a DC/DC Converter and a Type 1 PSE

DC1788B-C QUICK START PROCEDURE

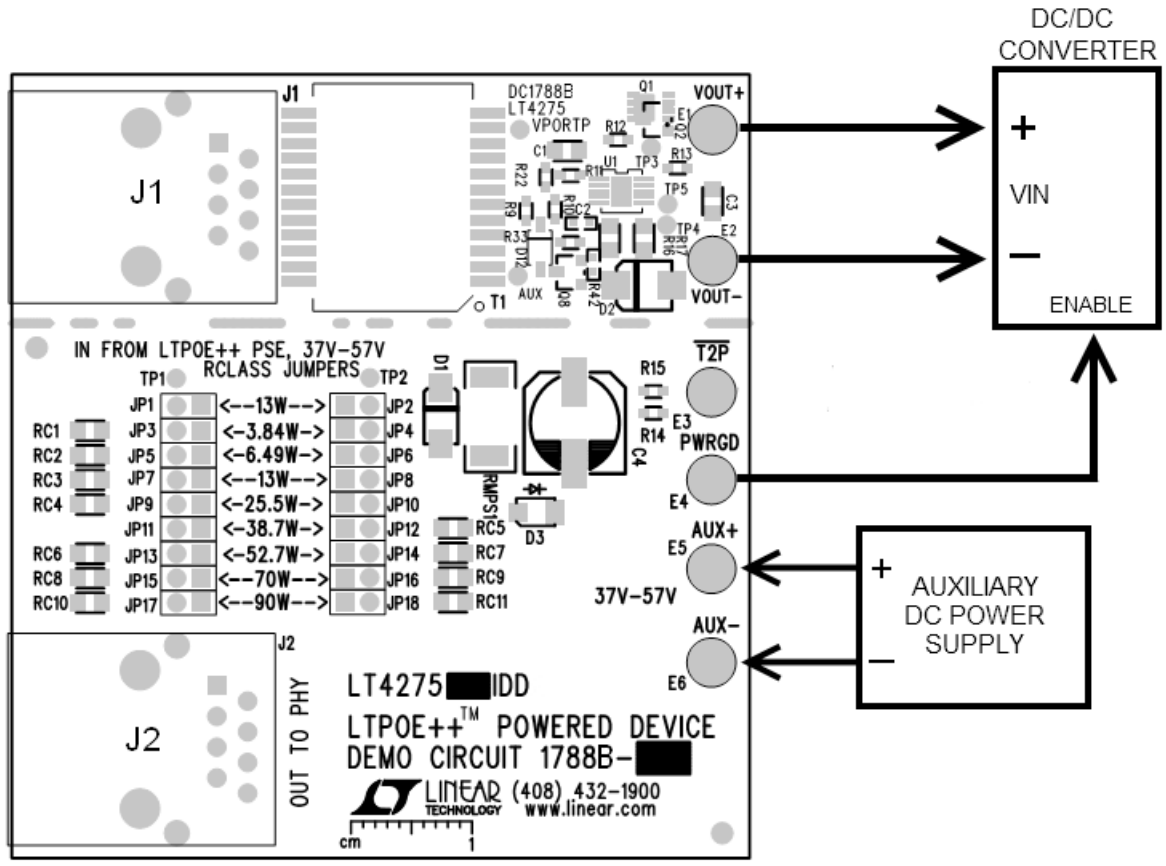


Figure 5. Setup Diagram for the DC1788B-C with a DC/DC Converter and an Auxiliary DC Power Supply

QUICK START PROCEDURE

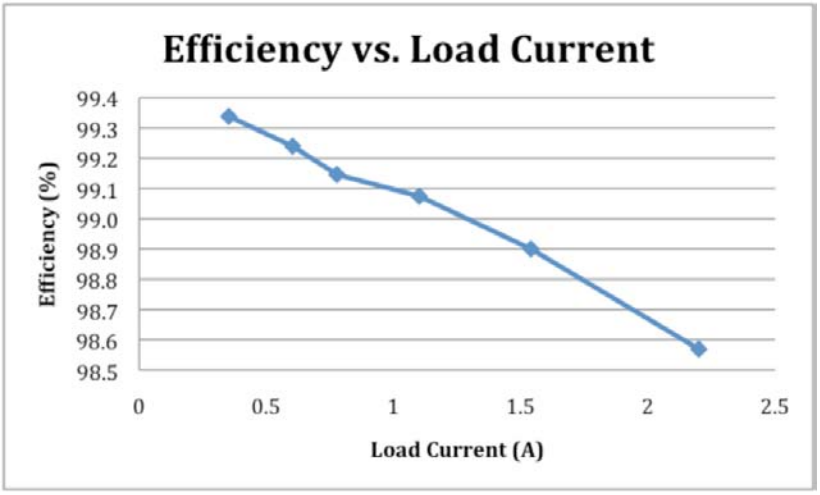


Figure 6. DC1788B-A Efficiency at Various PoE Load Currents (without LED D3)

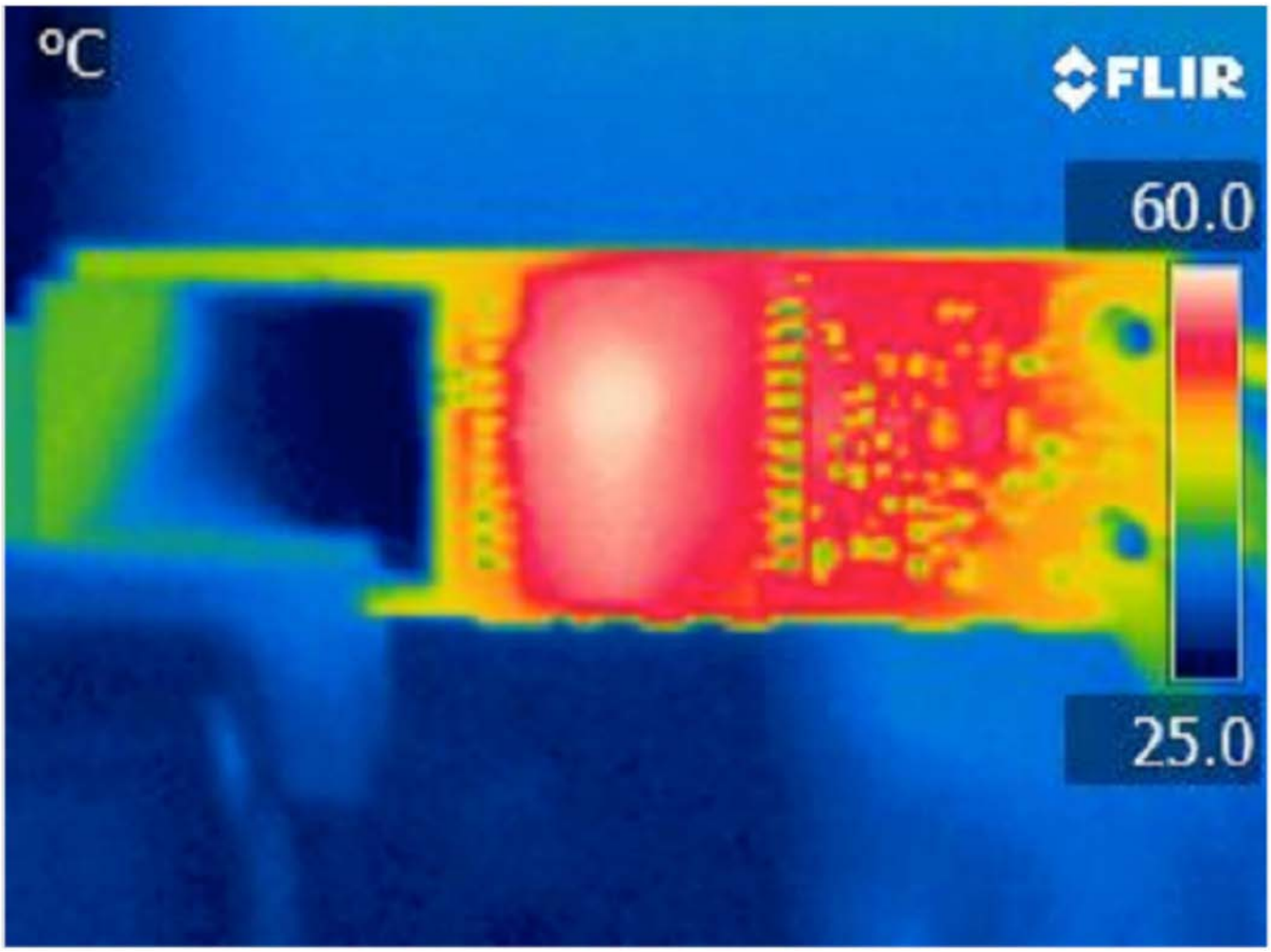


Figure 7. Thermal Image. DC1788B-A with 90W Load. Top View

QUICK START PROCEDURE

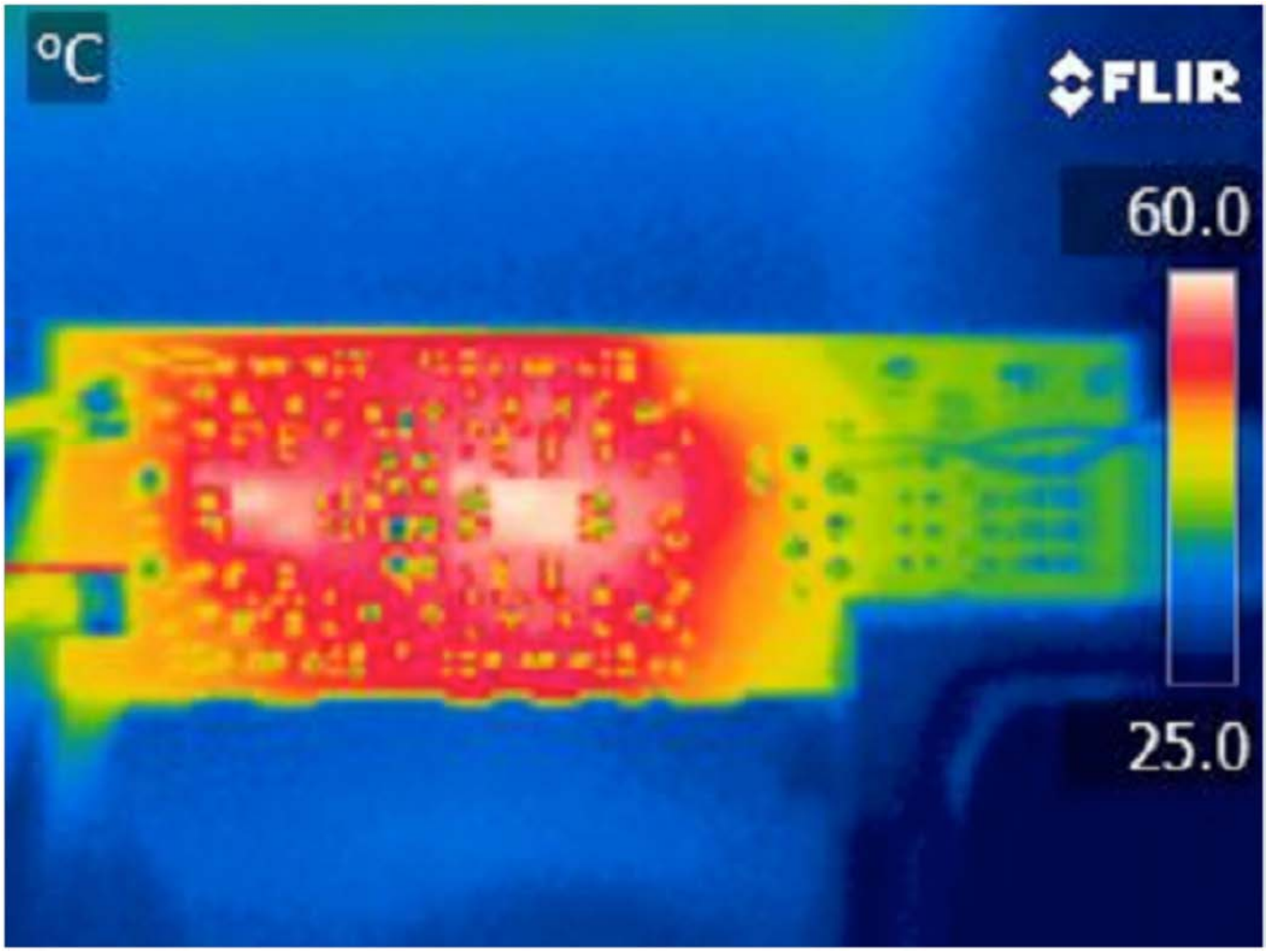


Figure 8. Thermal Image. DC1788B-A with 90W Load. Bottom View

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
			DC1788B General BOM	
1	1	C1	Cap., X7R, 0.1µF, 100V, 10%, 0805	TDK, C2012X7R2A104K
2	1	C3	Cap., X7R, 47nF, 100V, 10%, 0805	AVX, 08051C473KAT2A
3	1	CG1	Cap., X7R, 1nF, 2KV, 10%, 1808	TDK, C4520X7R3D102K
4	4	CT1, CT2, CT3, CT4	Cap., X7R, 0.01µF, 10%, 200V, 0805	AVX, 08052C103KAZ2A
5	1	D2	Diode, SMBJ58A, SMB-DIODE	DIODES INC., SMBJ58A-13-F
6	8	D4-D7, D17-D20	Diode, MMSZ5242BS, SOD-323	DIODES INC., MMSZ5242BS
7	8	D8-D11, D13-D16	Diode, MMBD4148, SOT23	FAIRCHILD, MMBD4148
8	4	Q3-Q6	Trans., MMBT3904, SOT23	FAIRCHILD, MMBT3904
9	4	Q9-Q12	Trans., MMBT3906, SOT23	FAIRCHILD, MMBT3906
10	1	R12	Res., Chip, 8.2Ω, 5%, 0603	VISHAY, CRCW06038R20JNEA
11	1	R13	Res., Chip, 3.3k , 5%, 0603	VISHAY, CRCW06033K3JNEA
12	1	R14	Res., Chip, 100k, 5%, 0603	VISHAY, CRCW0603100KJNEA
13	8	R18-R21, R43-R46	Res., Chip, 100k, 5%, 0402	VISHAY, CRCW0402100KJNEA
14	8	R23, R25, R27, R29, R34, R36, R38, R40	Res., Chip, 4.3k , 5%, 0402	VISHAY, CRCW04024K30JNEA
15	8	R24, R26, R28, R30, R35, R37, R39, R41	Res., Chip, 3.6k , 5%, 0402	VISHAY, CRCW04023K60JNEA
16	4	RT1-RT4	Res., Chip, 75Ω, 5%, 0603	VISHAY, CRCW060375R0JNEA
17	2	U2, U3	Quad MOSFETs, FDMQ8203	FAIRCHILD, FDMQ8203
			DC1788B-A BOM	
1	1	Q1	Trans., FDMC86102, POWER33	FAIRCHILD, FDMC86102
2	1	R10	Res., Chip, 0Ω, 5%, 0603	VISHAY, CRCW06030000Z0EA
3	1	R15	Res., Chip, 100k, 5%, 0603	VISHAY, CRCW0603100KJNEA
4	1	R31	Res., Chip, 10k, 1%, 0805	VISHAY, CRCW080510K0FKEA
5	2	RC1, RC6	Res., Chip, 140Ω, 1%, 0805	VISHAY, CRCW0805140RFKEA
6	2	RC2, RC8	Res., Chip, 76.8Ω, 1%, 0805	VISHAY, CRCW080576R8FKEA
7	2	RC3, RC10	Res., Chip, 49.9Ω, 1%, 0805	VISHAY, CRCW080549R9FKEA
8	2	RC4, RC5	Res., Chip, 34.8Ω, 1%, 0805	VISHAY, CRCW080534R8FKEA
9	1	RC7	Res., Chip, 46.4Ω, 1%, 0805	VISHAY, CRCW080546R4FKEA
10	1	RC9	Res., Chip, 64.9Ω, 1%, 0805	VISHAY, CRCW080564R9FKEA
11	1	RC11	Res., Chip, 118Ω, 1%, 0805	VISHAY, CRCW0805118RFKEA
12	1	T1	XFMR, Würth 749022016	WÜRTH, 749022016
13	1	U1	IC, LT4275AIDD, DFN10DD	LINEAR TECHNOLOGY, LT4275AIDD
Optional Circuit Components				
1	0	C2	Cap., OPT, 0402	OPT
3	0	C5	Cap., OPT, 0603	OPT
4	0	D1	Diode, OPT, SMA	OPT
5	0	D12	Diode, OPT, SOD-123	OPT
6	0	E5,E6	TP, OPT	OPT
7	0	Q2	Trans., FDN8601, SOT23	FAIRCHILD, FDN8601
8	0	Q7,Q8	Trans., OPT, SOT23	OPT
9	0	R9, R22, R33, R42	Res., 0603, OPT	OPT
6	0	R16, R17, R32	Res., 0805, Opt	OPT
2	0	RV1-RV4	Varistor, Opt	SANKOSHA, SD4-90, OPT

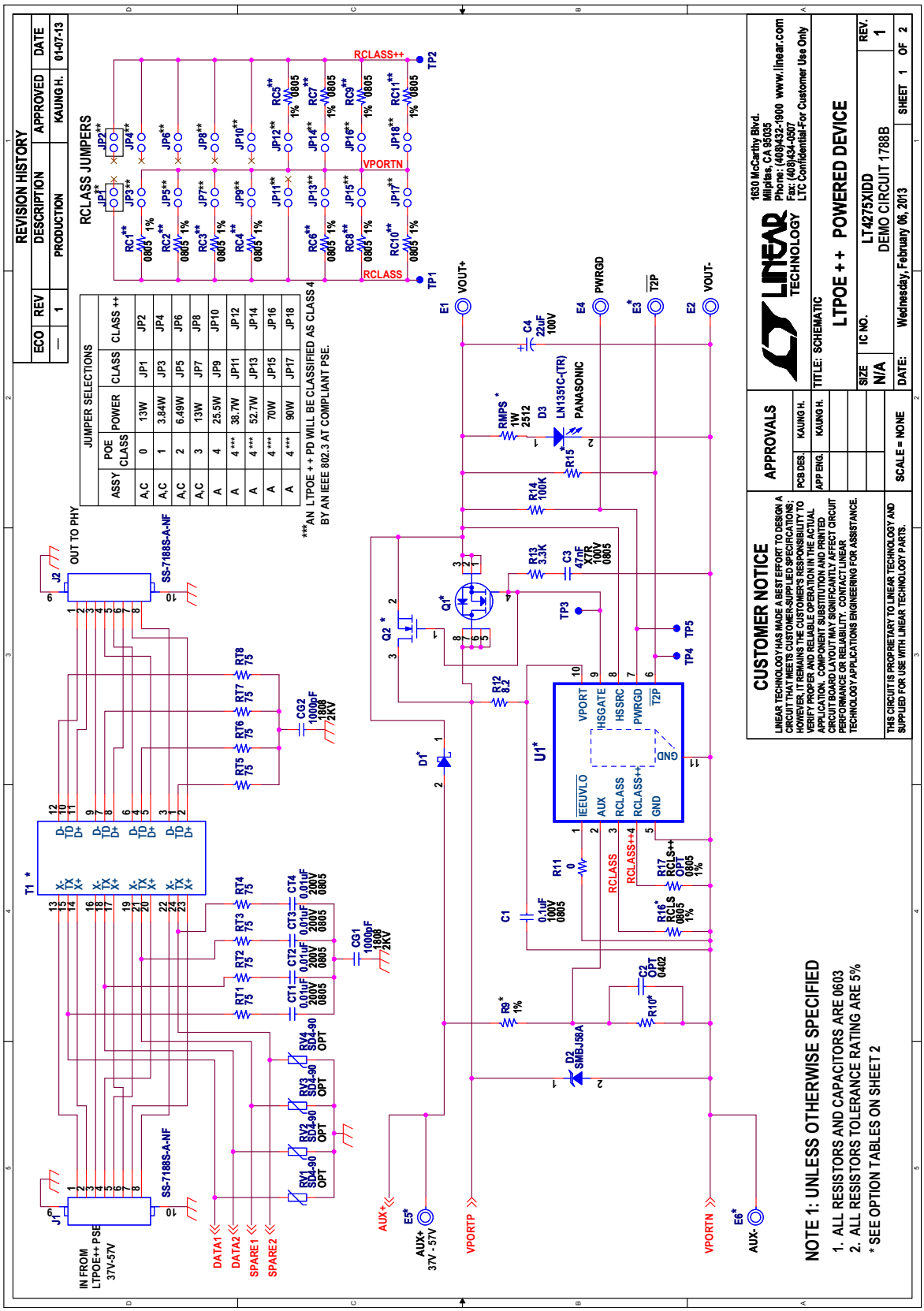
PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Hardware for Demo Board Only				
1	1	C4	Cap., 22µF, 100V, OS-CON	SUN ELECT., 100CE22BS
2	1	CG2	Cap., X7R, 1nF, 2kV, 10%, 1808	TDK, C4520X7R3D102K
3	1	D3	LED, LN1351C-(TR), J-Type-LN1351CTR	PANASONIC, LN1351C-(TR)
4	3	E1, E2, E4	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
5	1	E3	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
6	2	J1, J2	Conn., SS-7188S-A-NF	STEWART CONNECTOR, SS-7188S-A-NF
7	18	JP1-JP18	HDR, 1x2 2mm, HD1X2-079	SAMTEC, TMM-102-02-L-S
8	1	R11	Res., Chip, 0Ω, 5%, 0603	VISHAY, CRCW06030000Z0EA
9	1	RMPS1	Res., Chip, 5.1k, 5%, 2512	VISHAY,CRCW25125K10JNEA
10	4	RT5-RT8	Res., Chip, 75Ω, 5%, 0603	VISHAY, CRCW060375R0JNEA
11	1		Fab, Printed Circuit Board	DEMO CIRCUIT 1788B
			DC1788B-B BOM	
1	1	C5	Cap., X5R, 0.1µF, 25V, 10%, 0603	TDK, C1608X5R1E105K
2	1	D1	Diode, B1100A, 100V, SMA	DIODES INC., B1100A
3	1	D12	Diode, 30V, Zener, SOD-123	CENTRAL SEMI, CMHZ5256B
4	1	E3	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
5	2	E5, E6	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
6	1	Q2	Trans, FDN8601, SOT23	FAIRCHILD, FDN8601
7	2	Q7, Q8	Trans, MMBTA42, 300V, SOT23	FAIRCHILD, MMBTA42
8	1	R9	Res., Chip, 82.5k, 1%, 0603	VISHAY, CRCW060382K5FKEA
9	1	R10	Res., Chip, 20k, 1%, 0603	VISHAY, CRCW060320KFKEA
10	2	R15, R22	Res., Chip, 100k, 5%, 0603	VISHAY, CRCW0603100KJNEA
11	1	R16	Res., Chip, 34.8Ω, 1%, 0805	VISHAY, CRCW080534R8FKEA
12	1	R32	Res., Chip, 10k, 5%, 0805	VISHAY, CRCW080510K0JNEA
13	1	R33	Res., Chip, 56k, 5%, 0603	VISHAY, CRCW080556K0JNEA
14	1	R42	Res., Chip, 62k, 5%, 0402	VISHAY, CRCW040262K0JNED
15	1	RMPS1	Res., Chip, 4.7k, 5%, 2512	VISHAY, CRCW25124K70JNEG
16	1	T1	XFMR, Würth 749022017	WÜRTH, 749022017
17	1	U1	IC, LT4275BIDD, DFN10DD	LINEAR TECHNOLOGY, LT4275BIDD
Optional Circuit Components				
1	0	C2	Cap., OPT, 0402	OPT
2	0	JP1-JP18	HDR, 1x2 2mm, Opt	OPT
3	0	Q1	Trans., Opt	OPT
4	0	R17, R31	Res., 0805, Opt	OPT
5	0	RC1-RC11	Res., 0805, Opt	OPT
6	0	RV1-RV4	Varistor, Opt	Sankosha, SD4-90, OPT
Hardware for Demo Board Only				
1	1	C4	Cap., 22µF, 100V, OS-CON	SUN ELECT., 100CE22BS
2	1	CG2	Cap., X7R, 1nF, 2KV, 10% 1808	TDK, C4520X7R3D102K
3	1	D3	LED, LN1351C-(TR), J-Type-LN1351CTR	PANASONIC, LN1351C-(TR)
4	3	E1, E2, E4	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
5	1	E3	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
6	2	J1, J2	Conn., SS-7188S-A-NF	STEWART CONNECTOR, SS-7188S-A-NF
7	18	JP1-JP18	HDR, 1x2 2mm, HD1X2-079	SAMTEC, TMM-102-02-L-S

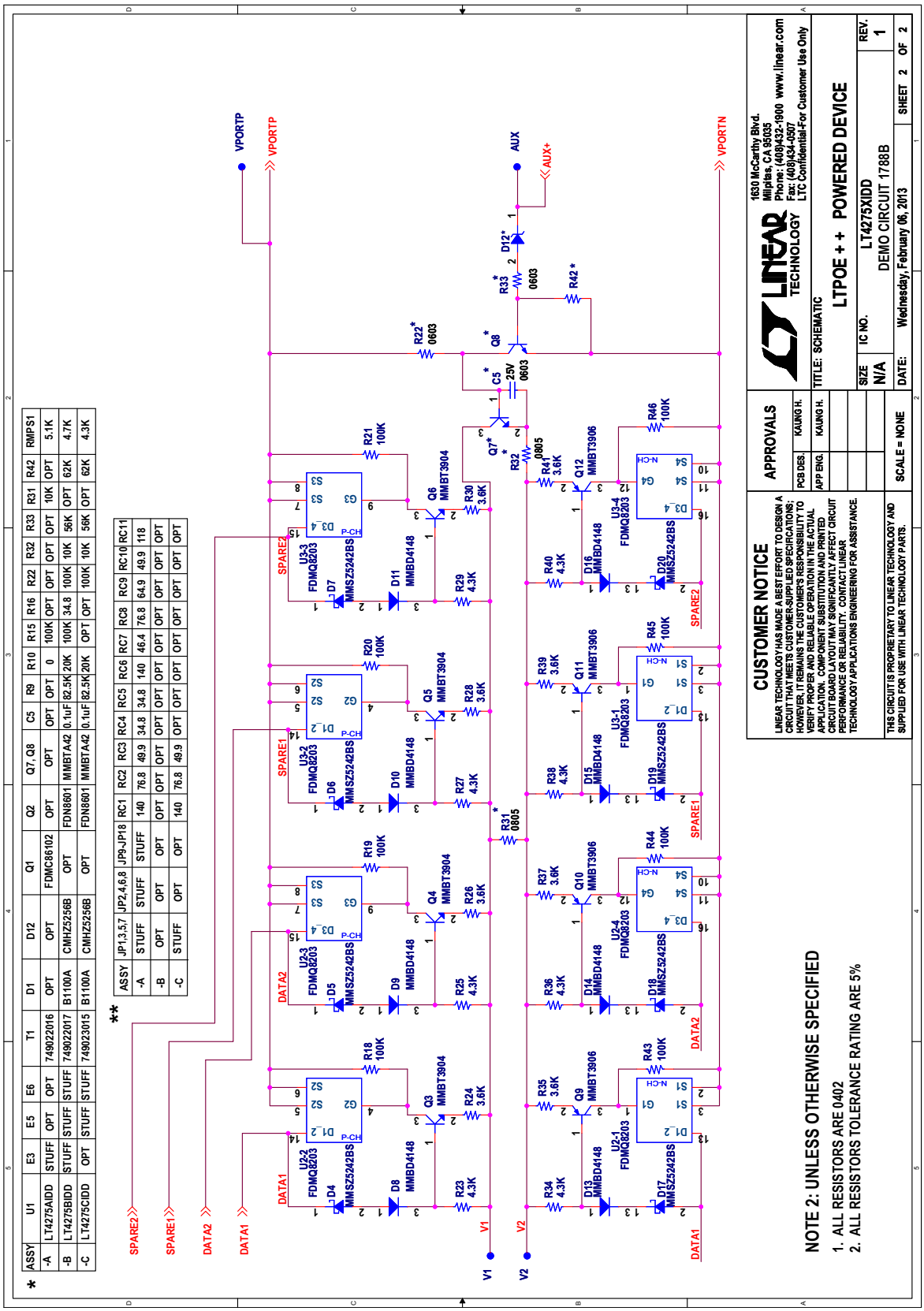
PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
8	1	R11	Res., Chip, 0Ω, 5%, 0603	VISHAY, CRCW06030000Z0EA
9	1	RMPS1	Res., Chip, 5.1k, 5%, 2512	VISHAY, CRCW25125K10JNEA
10	4	RT5-RT8	Res., Chip, 75Ω, 5%, 0603	VISHAY, CRCW060375R0JNEA
11	1		Fab, Printed Circuit Board	DEMO CIRCUIT 1788B
			DC1788B-C BOM	
1	1	C5	Cap., X5R, 0.1µF, 25V, 10%, 0603	TDK, C1608X5R1E105K
2	1	D1	Diode, B1100A, 100V, SMA	DIODES INC., B1100A
3	1	D12	Diode, 30V Zener, SOD-123	CENTRAL SEMI, CMHZ5256B
4	2	E5,E6	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
5	1	Q2	Trans., FDN8601, SOT23	FAIRCHILD, FDN8601
6	2	Q7,Q8	Trans., MMBTA42, 300V, SOT23	FAIRCHILD, MMBTA42
7	1	R9	Res., Chip, 82.5k, 1%, 0603	VISHAY, CRCW060382K5FKEA
8	1	R10	Res., Chip, 20k, 1%, 0603	VISHAY, CRCW060320KFKEA
9	1	R22	Res., Chip, 100k, 5%, 0603	VISHAY, CRCW0603100KJNEA
10	1	R32	Res., Chip, 10k, 5%, 0805	VISHAY, CRCW080510K0JNEA
11	1	R33	Res., Chip, 56k, 5%, 0603	VISHAY, CRCW060356K0JNEA
12	1	R42	Res., Chip, 62k, 5%, 0402	VISHAY, CRCW040262K0JNED
13	1	RC1	Res., Chip, 140Ω, 1%, 0805	VISHAY, CRCW0805140RFKEA
14	1	RC2	Res., Chip, 76.8Ω, 1%, 0805	VISHAY, CRCW080576R8FKEA
15	1	RC3	Res., Chip, 49.9Ω, 1%, 0805	VISHAY, CRCW080549R9FKEA
16	1	RMPS1	Res., Chip, 4.3k, 5%, 2512	VISHAY, CRCW25124K30JNEA
17	1	T1	XFMR, Würth 749023015	WÜRTH, 749023015
18	1	U1	IC, LT4275CIDD, DFN10DD	LINEAR TECHNOLOGY, LT4275CIDD
Optional Circuit Components				
1	0	C2	Cap., OPT, 0402	OPT
2	0	E3	TP, Turret, 0.094", Opt	OPT
3	0	JP2, JP4, JP6, JP8, JP9-JP18	HDR, 1x2 2mm, Opt	OPT
4	0	Q1	Trans., Opt	OPT
5	0	R15	Res., 0603, Opt	OPT
6	0	R16, R17, R31	Res., 0805, Opt	OPT
7	0	RC4-RC11	Res., Opt	OPT
8	0	RV1-RV4	Varistor, Opt	SANKOSHA, SD4-90, OPT
Hardware for Demo Board Only				
1	1	C4	Cap., 22µF, 100V, OS-CON	SUN ELECT., 100CE22BS
2	1	CG2	Cap., X7R, 1nF, 2KV, 10% 1808	TDK, C4520X7R3D102K
3	1	D3	LED, LN1351C-(TR), J-Type-LN1351CTR	PANASONIC, LN1351C-(TR)
4	3	E1, E2, E4	TP, Turret, 0.094"	MILL-MAX, 2501-2-00-80-00-00-07-0
5	2	J1, J2	Conn., SS-7188S-A-NF	STEWART CONNECTOR, SS-7188S-A-NF
6	4	JP1, JP3, JP5, JP7	HDR, 1x2 2mm	SAMTEC, TMM-102-02-L-S
7	1	R11	Res., Chip, 0Ω, 5%, 0603	VISHAY, CRCW06030000Z0EA
8	1	RMPS1	Res., Chip, 5.1k, 5%, 2512	VISHAY, CRCW25125K10JNEA
9	4	RT5-RT8	Res., Chip, 75Ω, 5%, 0603	VISHAY, CRCW060375R0JNEA
10	1		Fab, Printed Circuit Board	DEMO CIRCUIT 1788B

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



ASSY	U1	E3	E5	E6	T1	D1	D12	Q1	Q2	Q7, Q8	C5	R9	R10	R15	R16	R22	R32	R33	R31	R42	RMPS1
-A	LT4275AIDD	STUFF	OPT	OPT	749022016	OPT	OPT	FDMC86102	OPT	OPT	OPT	OPT	0	100K	OPT	OPT	OPT	OPT	10K	OPT	5.1K
-B	LT4275BIDD	STUFF	STUFF	STUFF	749022017	B1100A	CMHZ5256B	OPT	FDN8601	MMBTA42	0.1uF	82.5K	20K	100K	34.8	100K	10K	56K	OPT	62K	4.7K
-C	LT4275CIDD	OPT	STUFF	STUFF	749023015	B1100A	CMHZ5256B	OPT	FDN8601	MMBTA42	0.1uF	82.5K	20K	OPT	OPT	100K	10K	56K	OPT	62K	4.3K

ASSY	JP1,3,5,7	JP2,4,6,8	JP9-JP18	RC1	RC2	RC3	RC4	RC5	RC6	RC7	RC8	RC9	RC10	RC11
-A	STUFF	STUFF	STUFF	140	76.8	49.9	34.8	34.8	140	46.4	76.8	64.9	49.9	118
-B	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT
-C	STUFF	OPT	OPT	140	76.8	49.9	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035