



Description

IS31LT3932 is a universal LED driver, which can operate in fly-back, buck-boost and buck convertor. For isolation fly-back, it can achieve high PF, high current accuracy, $\pm 5\%$ load and line regulation and wide voltage input voltage range, without loop compensation. For buck convertor, it also can achieve high PF, high current accuracy, high efficiency, good load and line regulation and wide voltage input voltage range, without loop compensation. with very few components.

IS31LT3932 has special power line sense and output voltage sense circuits, operates in primary feedback mode without opto-coupler and achieve stable output current control without any loop compensation.

IS31LT3932 has multiple protections to improve the system reliability, including LED open circuit, LED short circuit, UVLO, OVP, current sense resistor short, the primary over current limit and over temperature protections.

Features

- Universal isolation and non-isolation
- Single stage PFC fly-back
- No loop compensation required
- No opto-coupler required
- $\pm 3\%$ LED current accuracy
- $\pm 5\%$ line regulation and load regulation
- Wide input voltage: 85~265Vac
- Low start-up current(15uA)
- Valley turn-on MOSFET to achieve high efficiency for buck application
- Few external components
- 1A sourcing current and 2A sinking current
- multiple protections

Applications

- LED bulb

For pricing, delivery, and ordering information, please contact ISSI at analog_mkt@issi.com or call +1-408-969-6600

- LED Tube lamp
- LED PAR

Quick Start

Recommended Equipment

- 85~265VAC/50~60Hz power supply

Absolute Maximum Ratings

- ≤ 265 VAC power supply
- ≤ 50 V Vout (Total Vf)

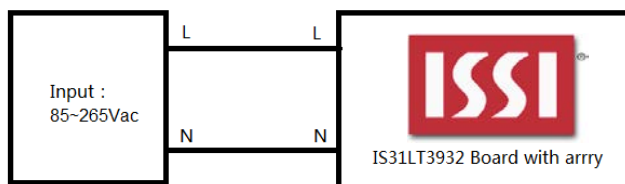
Caution: Do not exceed the conditions listed above, otherwise the board will be damaged or the output will be limited

Procedure

The IS31LT3932 DEMO Board is fully assembled and tested. Follow the steps listed below to verify board operation.

Caution: Do not turn on the power supply until all connections are completed.

- 1) Connect the input pin N of the Evaluation Board via the main power switch to AC power supply N.
- 2) Connect the input pin L of the Evaluation L.
- 3) Turn on the power supply.



Ordering Information

PART#	TEMP RANGE	IC PACKAGE
IS31LT3932-GRLS2-TR	-40 to 125°C	SOP-8

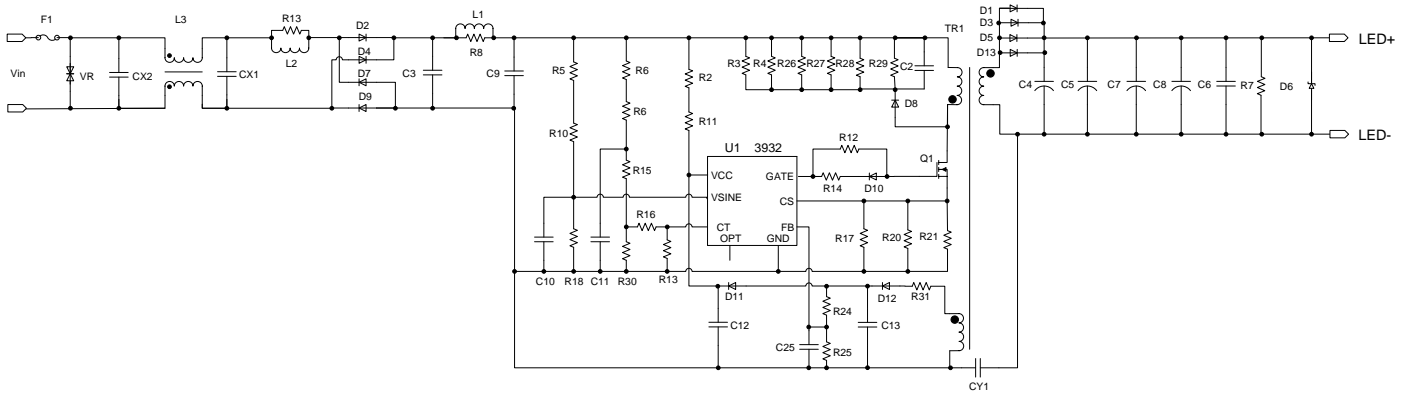


Figure 1 IS31LT3932 Evaluation Board Schematic
 Note: ISSI Evaluation Board does include a LED array



Figure 2 Picture of Evaluation Board

NOTE: Physical dimensions of power board are (LxWxH): 128mmx34mmx30mm

PCB Layout

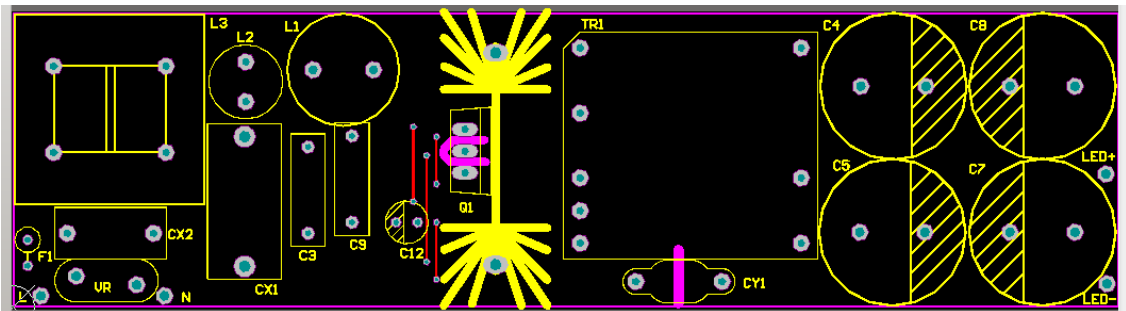


Figure 3 PCB Layout – Top layer

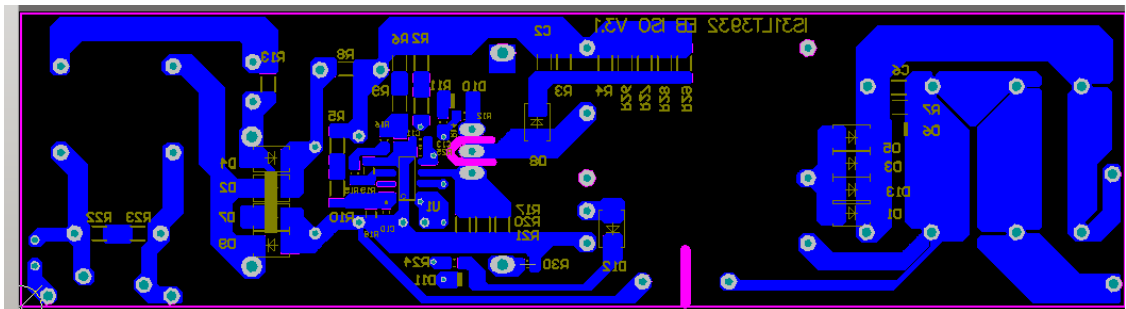


Figure 4 PCB Layout – Bottom layer

Bill of Materials

No.	Name	Description	Ref Des.	Qty.	Mfr P/N
1	FUSE	3A 250V 3*10	F1	1	
2	MOV	10D561	VR	1	
3	X2-CAP	100nF 275Vac PIN=10	CX2	1	
4	X2-CAP	NC	CX1	0	
5	INDUCTOR	ET20 L(1-2)=L(3-4)=20mH	L3	1	
6	INDUCTOR	NC	L2	0	
7	INDUCTOR	3mH 12*16	L1	1	
8	Resistor	0Ω 5% 1206	R13	1	
9	Resistor	5.6kΩ 5% 1206	R8	1	
10	Resistor	1MΩ 1% 1206	R5,R10	2	
11	Resistor	13kΩ 1% 0805	R18	1	
12	Resistor	68kΩ 5% 1206	R2,R11	2	
13	Resistor	750kΩ 5% 1206	R3,R4,R26,R27,R28,R29	6	
14	Resistor	20Ω 5% 0603	R12	1	
15	Resistor	NC	R14,R22,R23	0	
16	Resistor	0.43 Ω 1% 1206	R17,R20,R21	3	
17	Resistor	200 Ω 1% 0805	R31	1	
18	Resistor	10kΩ 1% 0805	R25	1	
19	Resistor	330kΩ//360 kΩ 1% 0805	R24	2	
20	Resistor	62kΩ 5% 1206	R7	1	
21	Resistor	NC	R6,R9,R15,R16,R30	0	
22	Resistor	470 kΩ 1% 0805	R13	1	
23	CBB-CAP	100nF 400V pin=10	C3	1	
24	CBB-CAP	330 nF 400V pin=15	C9	1	
25	SMD-CAP	1nF 1kV 1206 x7R	C2	1	
26	SMD-CAP	1nF 25V 0603 x7R	C10	1	
27	SMD-CAP	NC	C11,C6	0	
28	SMD-CAP	1uF 50V 1206 x7R	C13	1	
29	SMD-CAP	150pF 25V 0603 x7R	C25	1	
30	E-CAP	10 uF 50V LR 5*11	C12	1	
31	E-CAP	1000uF 63V LR 18*30	C4,C5,C7,C8	4	
32	SMD-DIODE	1N4007 SMA	D2,D4,D7,D9	4	
33	SMD-DIODE	ES1J SMA	D8,D12	2	
34	SMD-DIODE	1N4148 SOD-80	D11	1	
35	SMD-DIODE	ES2G SMA	D1,D3,D5,D13	4	
36	MOS	8N80 TO-220	Q1	1	
37	IC	IS31LT3932	U1	1	
38	TRANSFORMER	PQ2625	TR1	1	
39	Y1-CAP	1nF 400V pin=10	Cy1	1	
40	radiator	12*35*24		1	

Transformer Design

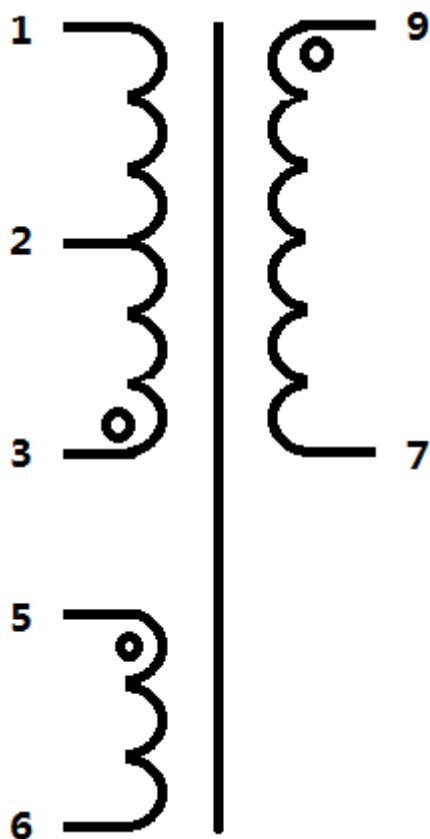
ELECTRICAL SPECIFICATIONS:

1.Primary inductance(Lp)=310uH@10kHz

MATERIALS:

1. Core:PQ2625(Ferrite Material TDK PC40 or equivalent)
2. Bobin: PQ2625 Primary 6,Secondary:6
- 3.. Magnet Wires (Pri) : Type 2-UEW
4. Magnet Wire (Sec) : Triple Insulated Wires
5. Layer Insulation Tape :3M1298 or equivalent.

SCHEMTIC

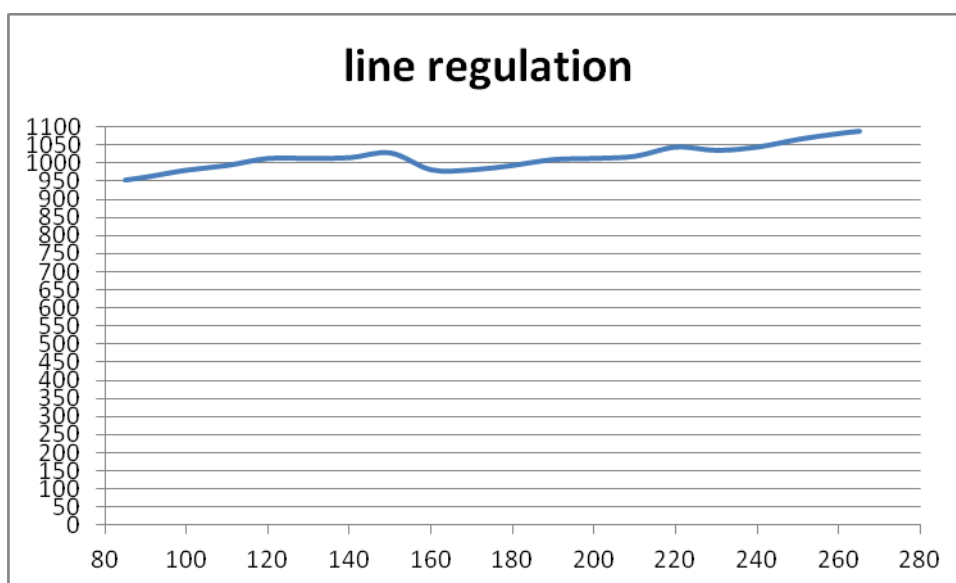


No	winding	start	end	Wires		Tape		
1	N1	3	2	24T	2P*0.25mm-QA	13.6mm-3		
2	N2	9	7	21T	2P*0.4mm-TEX	13.6mm-3		
3	N3	2	1	20T	2P*0.25mm-QA	13.6mm-2		
4	N4	5	6	11T	0.15mm-QA	13.6mm-2		



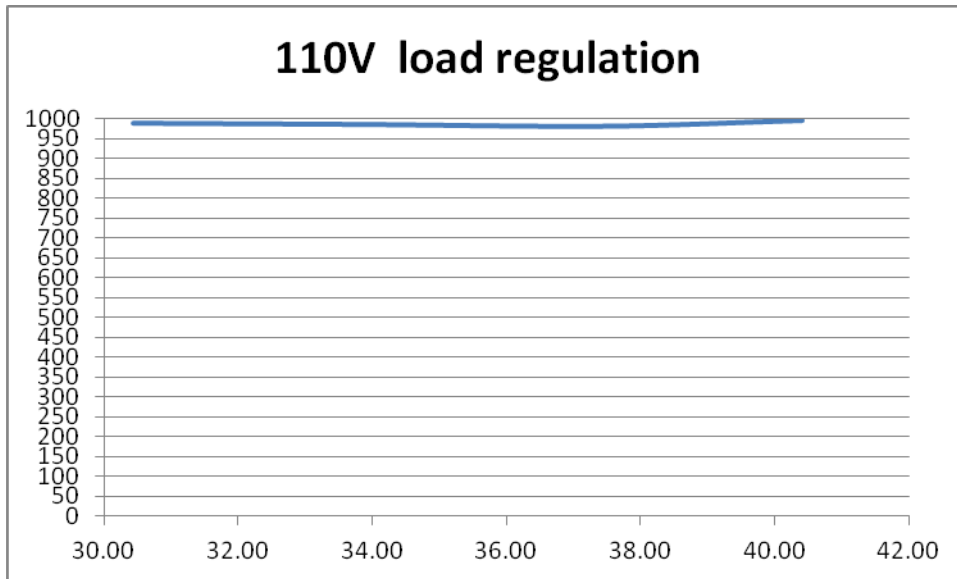
Test data

Vin	PF	THD	PIN	VOUT	IOUT	eff..
85	1.000	0.8%	45.28	40.40	955	85.2%
90	1.000	0.7%	45.50	40.50	963	85.7%
100	1.000	1.0%	45.80	40.50	982	86.8%
110	1.000	0.8%	46.17	40.40	995	87.1%
120	0.999	1.0%	46.70	40.40	1014	87.7%
130	0.999	1.1%	46.34	40.20	1014	88.0%
140	0.998	1.1%	46.18	40.20	1016	88.4%
150	0.997	1.1%	46.61	40.10	1029	88.5%
160	0.997	1.6%	44.10	39.99	983	89.1%
170	0.996	1.6%	43.93	39.92	983	89.3%
180	0.995	1.8%	44.56	40.03	995	89.4%
190	0.993	2.0%	45.13	39.98	1011	89.6%
200	0.992	2.3%	45.19	40.02	1014	89.8%
210	0.990	2.5%	45.39	40.06	1020	90.0%
220	0.989	2.7%	46.53	40.06	1045	90.0%
230	0.986	3.2%	46.02	40.02	1036	90.1%
240	0.984	3.5%	46.37	39.90	1045	89.9%
250	0.982	3.9%	47.27	39.90	1066	90.0%
260	0.980	4.4%	47.80	39.84	1082	90.2%
265	0.979	4.6%	48.13	39.79	1088	89.9%

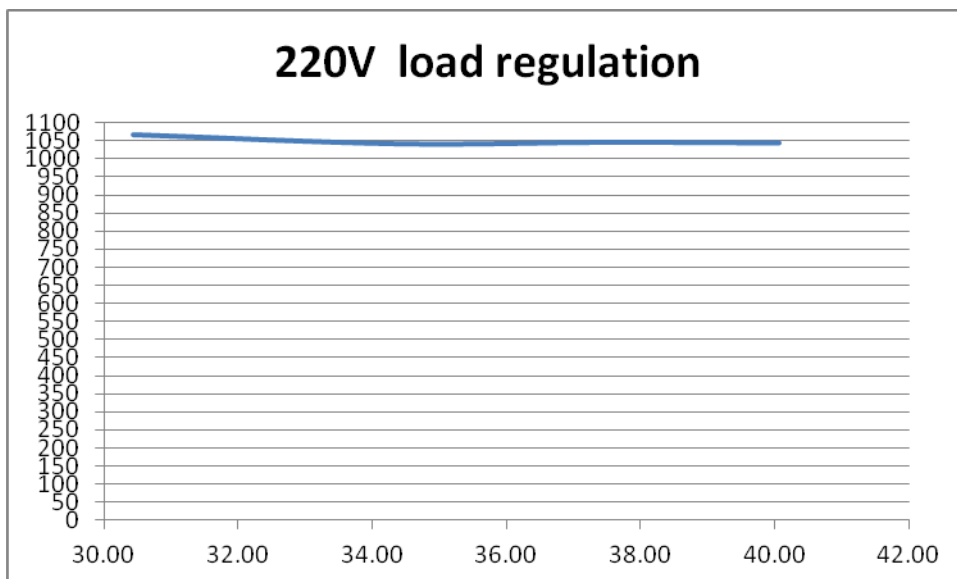


Load regulation

Vin	PF	THD	PIN	VOUT	IOUT	eff..
110	0.999	1.2%	34.60	30.43	989	87.0%
110	0.999	1.2%	38.41	33.98	986	87.2%
110	1.000	1.0%	42.13	37.43	982	87.2%
110	1.000	0.8%	46.17	40.40	995	87.1%



Vin	PF	THD	PIN	VOUT	IOUT	eff..
220	0.982	4.0%	36.44	30.43	1067	89.1%
220	0.985	3.4%	39.93	34.37	1043	89.8%
220	0.987	3.0%	43.71	37.47	1047	89.8%
220	0.989	2.7%	46.53	40.06	1045	90.0%



EMI test Report

EMI TEST REPORT

----- parameter

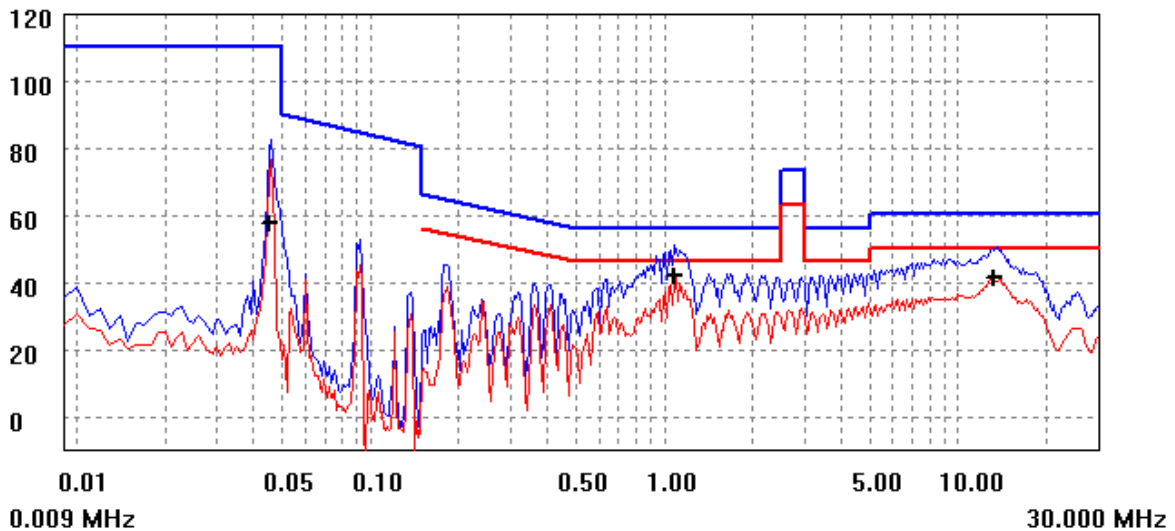
Organization: ISSI	Operator: lory	EUT: IS31LT3932
Place: XM	Time: 2013/11/8/15:7	
Detector: PK+AV	Test-time(ms): 10	
Limit: EN55015	Transductor: PK0	
Remark: IS31LT3932 220V L 40V 1A		

----- freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.001
0.150	3.000	0.002
3.000	10.000	0.020
10.000	30.000	0.025

----- scan result

dBuV



----- final test

[AV]	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ(lev-Lim)
	0.045	57.6	0.0	57.6
	1.089	41.8	46.0	-4.2
	13.306	41.1	50.0	-8.9

Figure 5. L line



EMI TEST REPORT

----- parameter

Organization: ISSI	Operator: lory	EUT: IS31LT3932
Place: XM	Time: 2013/11/8/15:11	
Detector: PK+AV	Test-time(ms): 10	
Limit: EN55015	Transductor: PK0	

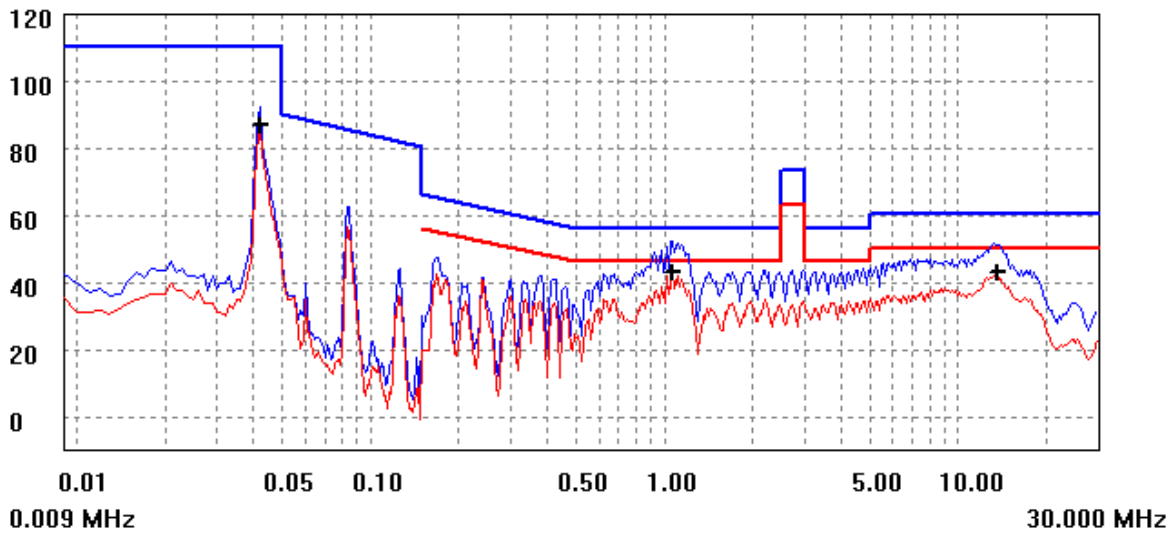
Remark: IS31LT3932 220V N 40V 1A

----- freq, step

Start(MHz)	End(MHz)	Step(MHz)
0.009	0.150	0.001
0.150	3.000	0.002
3.000	10.000	0.020
10.000	30.000	0.025

----- scan result

dBuV



----- final test

(AV)	freq(MHz)	lev(dBuV)	Lim(dBuV)	Δ(lev-Lim)
	0.042	86.6	0.0	86.6
	1.065	42.7	46.0	-3.3
	13.530	42.8	50.0	-7.2

Figure 6. N line

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