

DS760SL

760 Watts

Distributed Power System

Total Power: 760 Watts
Input Voltage: 90-264 Vac
of Outputs: Main + Standby

Special Features

- 760W output power
- 18.1 W /cu-in
- 1U x 54.5mm form factor (slimline)
(5 V standby - consult factory)
- N + 1 redundant
- Hot-swap
- Internal OR'ing
- 5.0V housekeeping
- High efficiency 91% @ 230Vac,
50% load
- Variable speed "smart fans"
- EMI Class A
- EN61000 Immunity
- Two years warranty

Safety

UL/cUL	60950-1
CSA	60950-1
VDE	60950-1
China	CCC
CB Scheme Report/Cert	
BSMI	



Product Descriptions

Emerson Network Power's 12 V DS760SL distributed power supply is rated for 748 W of primary output power at 63.3 A. It features a secondary 5 Vsb housekeeping output that provides 12 W at 2.4 A for powering standby circuitry. The DS760SL accepts a wide operating input voltage of 90V to 264 V. A slim 1U (44.5 mm) x 54.55 mm form factor gives the DS760SL a power density of more than 18 W per cubic inch. It features opposite-side ac inputs and dc outputs and supports warm-swap installation, enhancing system-level serviceability. Designed to conveniently plug into equipment backplane or a power distribution unit (PDU), the DS760SL also supports parallel operation of up to four power supplies.

The DS760SL is equipped with a variety of features that enable reduced energy consumption without compromising performance or reliability, including a variable-speed smart fan supported by integrated controls. The power supply also features both N+1 redundancy and internal ORing controllers to minimize unplanned downtime. It offers a high operating efficiency of approximately 91 percent at 230 Vac (50 percent load) and delivers a demonstrated mean time between failures (MTBF) of more than 500,000 hours when used under normal operating conditions.

The DS760SL is backed by a comprehensive two-year warranty from Emerson Network Power. The power supply also carries UL/cUL60950 safety approvals and is fully compliant with EN61000 standards for conducted noise and Restriction of Hazardous Substances (RoHS) directives.

Model Numbers

Standard	Output Voltage	Minimum Load	Maximum Load	Stand-By Supply	Air Flow Direction
DS760SL-3	12.0Vdc	0A	62.3A	5.0V@2.4A	Standard (DC Connector to Handle)
DS760SL-3-001	12.0Vdc	0A	50.0A	5.0V@2.4A	Reverse (Handle to DC Connector)
DS760SL-3-002	12.0Vdc	0A	62.3A	3.3V@2.4A	Standard (DC Connector to Handle)
DS760SL-3-003	12.0Vdc	0A	50.0A	3.3V@2.4A	Reverse (Handle to DC Connector)

Options

None

Electrical Specifications

Absolute Maximum Ratings

Stress in excess of those listed in the "Absolute Maximum Ratings" may cause permanent damage to the power supply. These are stress ratings only and functional operation of the unit is not implied at these or any other conditions above those given in the operational sections of this TRN. Exposure to any absolute maximum rated condition for extended periods may adversely affect the power supply's reliability.

Table 1. Absolute Maximum Ratings:

Parameter	Model	Symbol	Min	Typ	Max	Unit
Input Voltage: AC continuous operation	All models	$V_{IN,AC}$	90	-	264	Vac
Maximum Output Power (Main + Stand-by)	DS760SL-3 DS760SL-3-001 DS760SL-3-002 DS760SL-3-003	$P_{O,max}$	- - - -	- - - -	760 600 760 600	W W W W
Isolation Voltage Input to output Input to safety ground	All models		- -	- -	2121 2121	Vac Vdc
Ambient Operating Temperature	All models	T_A	-10	-	+50	°C
Storage Temperature	All models	T_{STG}	-40	-	+85	°C
Humidity (non-condensing) Operating Non-operating	All models All models		7 5	- -	93 95	% %
Altitude Operating Non-operating	All models All models		- -	- -	4,000 13,000	m m

Input Specifications

Table 2. Input Specifications:

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Operating Input Voltage, AC		V_{IAC}	90	115/230	264	V _{AC} _{RMS}
Input Vac Source Frequency		f_{IAC}	47	50/60	63	Hz
Maximum Input Current ($I_O = I_{O,max}$, $I_{VSB} = I_{VSB,max}$)	$V_{IAC} = 100V_{AC}$	$I_{I,max}$	-	-	9	A _{RMS}
Standby Input Current (V_O Off, $I_{VSB} = 0A$)	$V_{IAC} = 90V_{AC}$ $V_{IAC} = 180V_{AC}$	$I_{I,standby}$	- -	- -	400 300	mA _{RMS}
No Load Input Current (V_O On, $I_O = 0A$, $I_{VSB} = 0A$)	$V_{IAC} = 90V_{AC}$ $V_{IAC} = 180V_{AC}$	I_{I,no_load}	- -	- -	800 450	mA _{RMS}
Harmonic Line Currents	All	THD	Per IEC61000-3-2			
Power Factor	All		-	0.99	-	
Startup Surge Current (Inrush) @ 25°C	$V_{IAC} = 264V_{AC}$		-	-	25	A _{PK}
Input Fuse	Internal, L and N 5x20mm, Quick Acting 10A, 250V		-	-	10	A
Leakage Current to earth ground	$V_{IAC} = 264V_{AC}$ $f_{IAC} = 50/60$ Hz		-	-	1.5	mA
Operating Efficiency @ 25°C	$I_O = I_{O,max}$ $V_{IAC} = 100V_{AC}$ $V_{IAC} = 230V_{AC}$	η	87 87	- -	- -	% %
System Stability: Phase Margin Gain Margin			45 6	-	-	Ø dB

Output Specifications

Table 3. Output Specifications:

Parameter		Condition	Symbol	Min	Typ	Max	Unit
Output Regulation	All models	Inclusive of set-point, temperature change, warm-up drift and dynamic load	V _O	11.88	12.0	12.12	V
			V _{VSB}	4.75	5.0	5.25	
Output Ripple, pk-pk	All models	Measure with a 0.1μF ceramic capacitor in parallel with a 10μF tantalum capacitor, 0 to 20MHz bandwidth	V _O	-	-	100	mV _{PK-PK}
			V _{VSB}	-	-	100	
Output Current	DS760SL-3 DS760SL-3-001 DS760SL-3-002 DS760SL-3-003	90Vac≤ V _{IAC} ≤ 264Vac	I _O	0 0 0 0	- - - -	62.3 49.0 63.3 49.0	A
			I _{VSB}	0	-	2.4	
V _O Current Share Accuracy ¹		20% to 100% I _O ≤ 20% I _O		- -	- -	10 3.11	%I _O A
V _O Minimum Current Share Loading				20	-	-	%I _{O,max}
V _O Load Capacitance		Start up	-		5000	30000	μF
V _{SB} Load Capacitance		Start up			3000	10000	μF
V _O Dynamic Response		50% load change, slew rate = 1A/μs	±%V _O T _s	- -	- -	1 250	% uSec
Peak Deviation Settling Time							
V _O Long Term Stability Max change over 24 hours		After thermal equilibrium (30 mins)	±%V _O			0.2	%

Note 1 - This is typical testing results of two sample, it does not representing the extreme cases (one unit set to +0.5% above and one unit set to -0.5% below nominal)

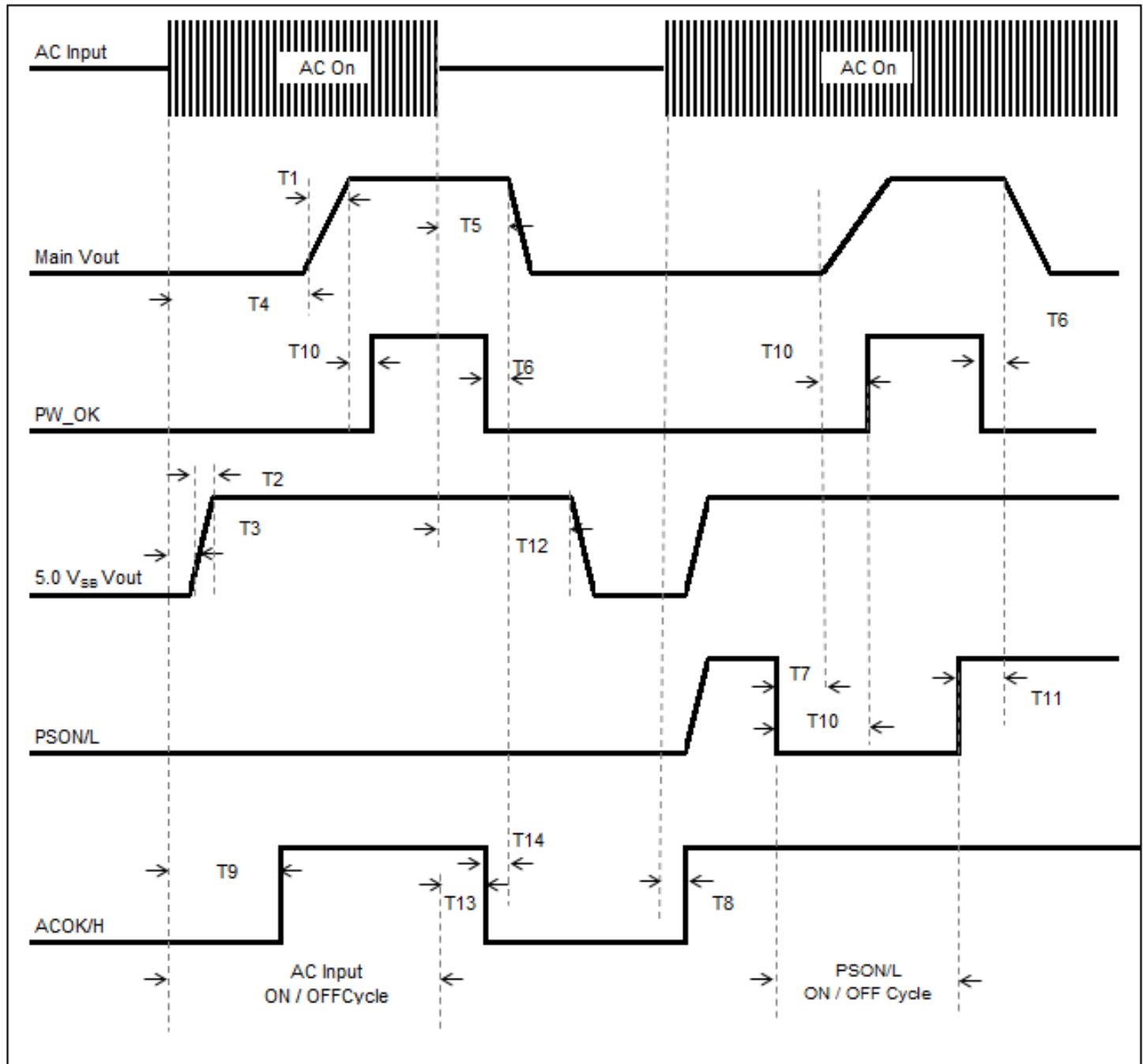
System Timing Specifications

Table 4. System Timing Specifications:

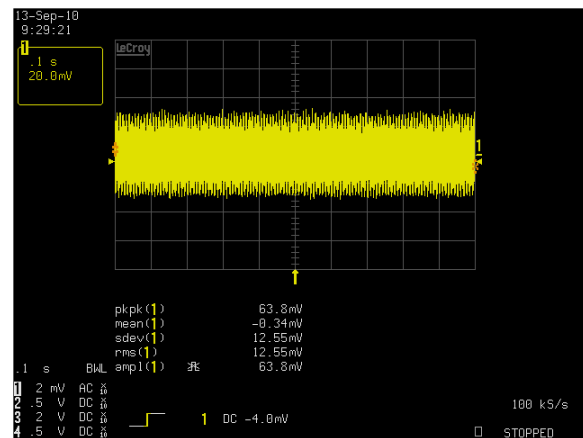
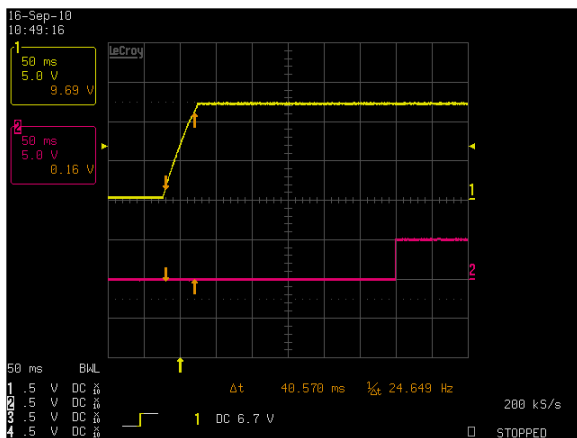
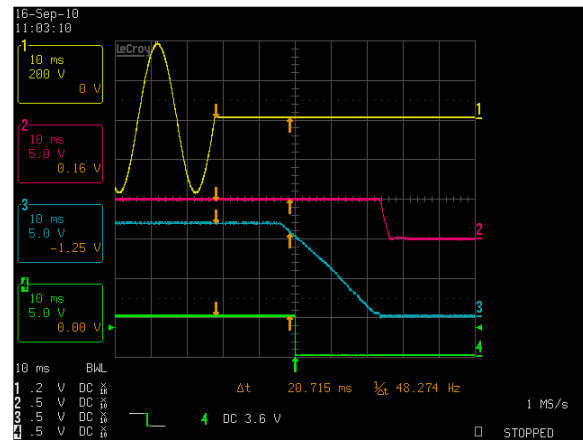
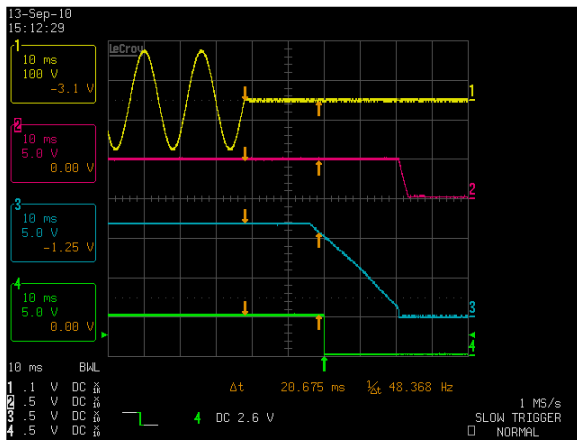
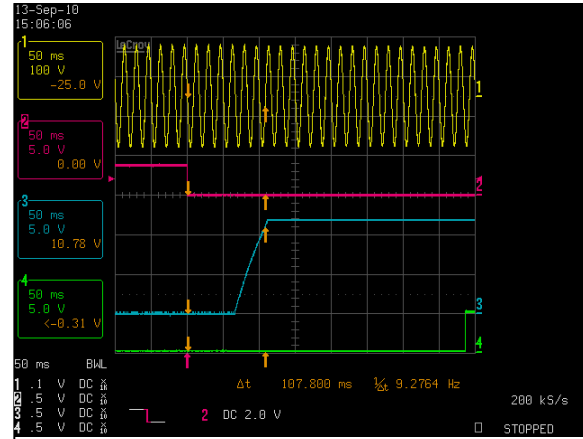
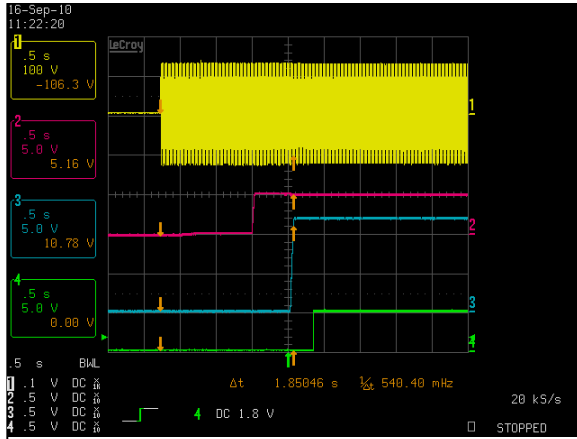
Label	Parameter	Min	Typ	Max	Unit
T1	+12 Output rise time	10	-	300	mSec
T2	5.0 Vsb output rise time	10	-	300	mSec
T3	Delay from AC being applied to 5.0 Vsb begin to rise up.	-	-	1500	mSec
T4	Delay from AC being applied to 12 Vdc begin to rise up.	-	-	3000	mSec
T5	Time all 12 Vdc hold up time after loss of AC..	12	-	-	mSec
T6	Delay from loss of 12V dc to de-assertion of PW_OK	-1		1	mSec
T7	Delay from PSON/L active to output voltages starts rise up	45	-	2500	mSec
T8	Delay ACOK/H after AC recycle.	0	-	300	mSec
T9	Delay from sense of AC input to de-assertion of ACOK/H.	0	-	600	mSec
T10	Delay PSON/L to PW_OK asserted at turn on.	100	-	500	mSec
T11	Delay from PSON/H to 12 Vdc dropping out of regulation limits.	0	-	100	mSec
T12	Duration of 5.0 Vsb hold up after loss of AC.	20	-	-	mSec
T13	ACOK/L detected after loss of AC.	0	-	-	mSec
T14	Warn of AC loss before 12 Vdc drop out of regulation	7			mSec

System Timing Specifications

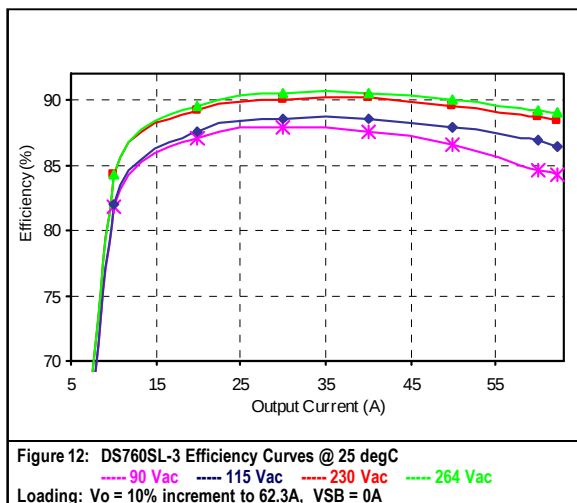
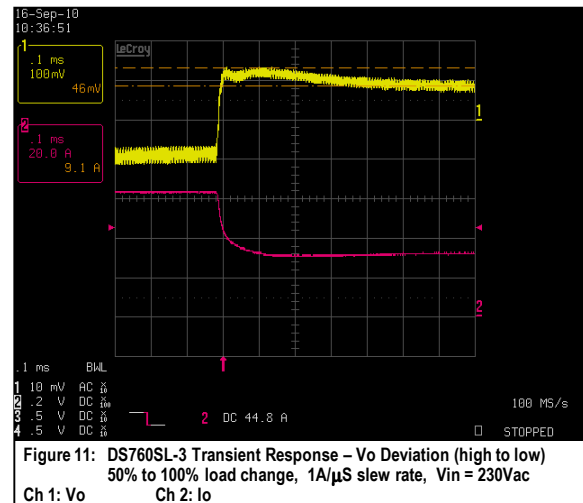
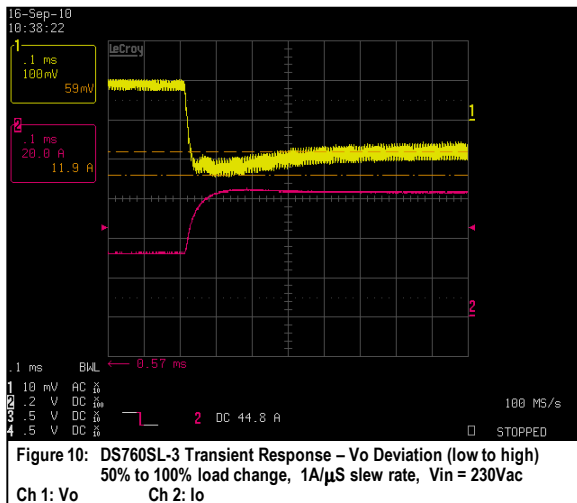
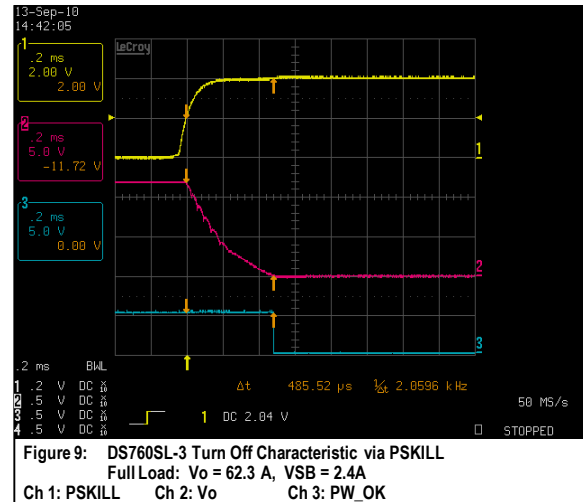
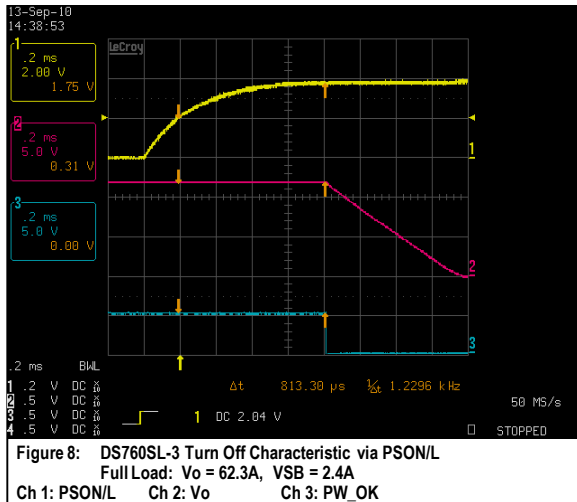
Figure 1. System Timing Diagram:



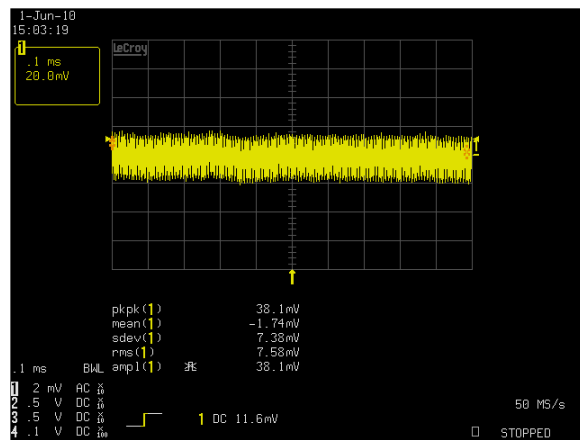
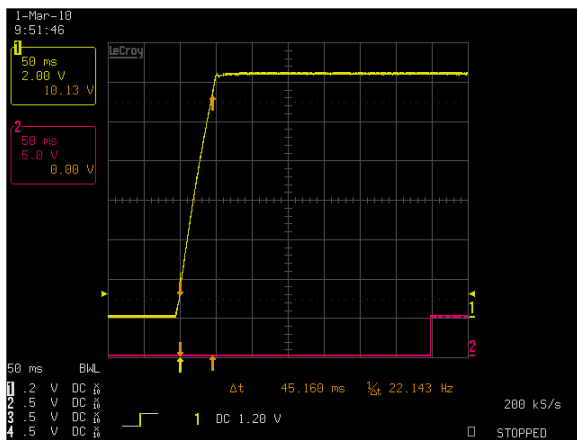
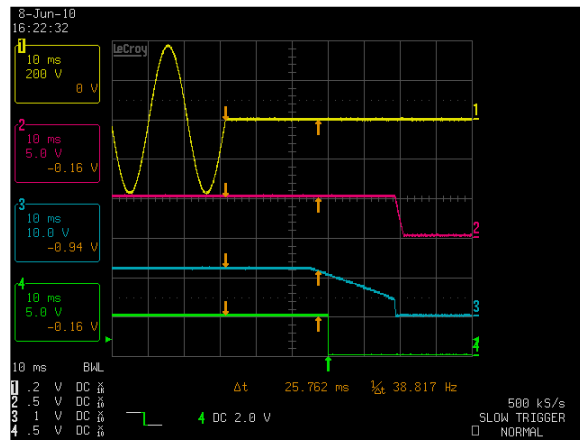
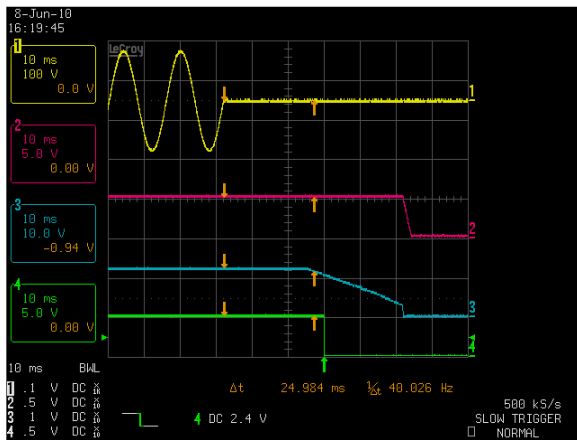
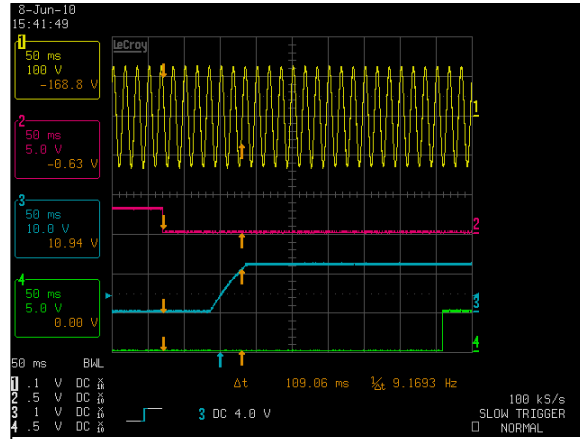
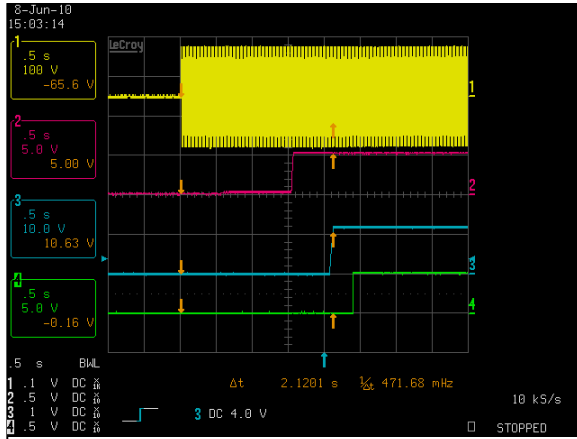
DS760SL-3 Performance Curves



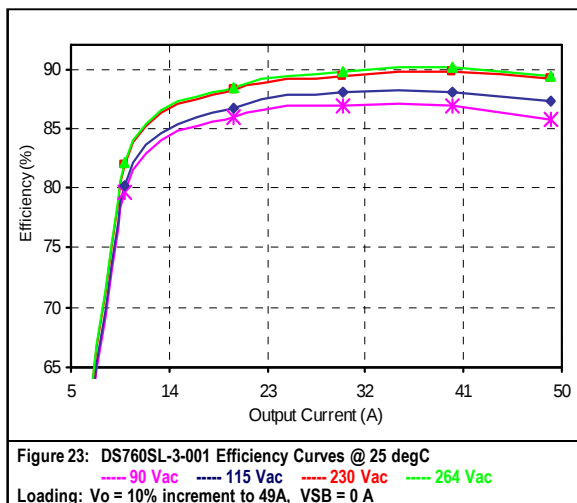
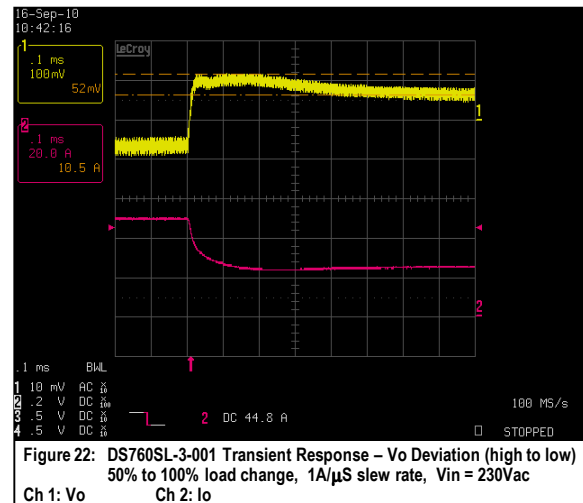
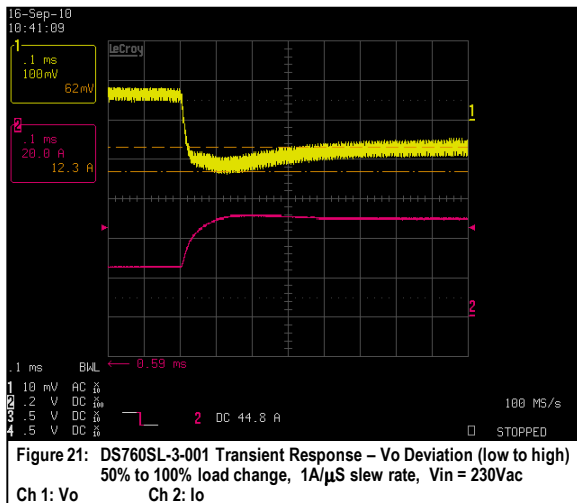
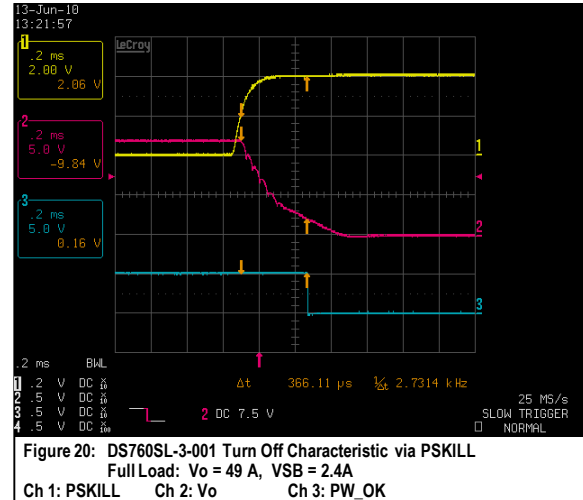
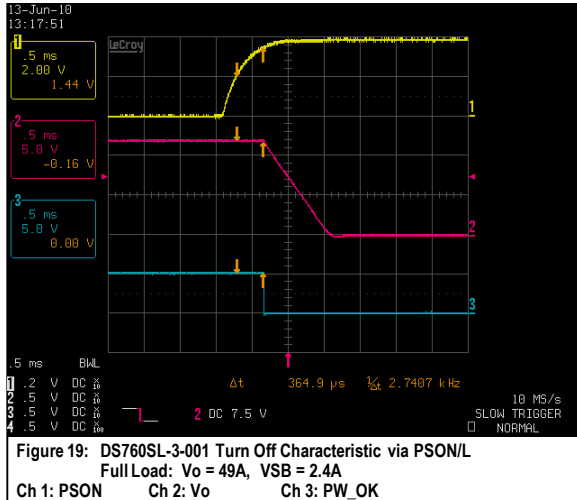
DS760SL-3 Performance Curves



DS760SL-3-001 Performance Curves



DS760SL-3-001 Performance Curves



Protection Function Specification

Input Fusing

DS760SL series is equipped with an internal non user serviceable 10A High Rupturing Capacity (HRC) 250 Vac fuse to IEC 127 for fault protection in both the L1 and L2 lines input.

Over Voltage / Under Voltage Protection (OVP / UVP)

OVP

Power supply latches off during output overvoltage, and restart by cycling the input or PSON/L, ON after a minimum OFF time of 1 second.

Note if the standby output (VSB) was detected to be over-voltage and shutdown then the asserting edge of the PSON/L signal will re-enable the standby rail.

Parameter	Min	Nom	Max	Unit
V _O Output Overvoltage	13.3	/	14.5	V
5V Standby Overvoltage	5.75	/	6.40	V

UVP

If the V_O output is below the regulation band then the output V_O will be latched off and only restarted by cycling the input or Remote Enable, ON after a minimum OFF time of 1 second.

If VSB falls below the regulation band the power supply will not latch this output off but V_O will be turned off until the Vsb is back within range.

Over Current Protection (OCP)

DS760SL series includes internal current limit circuitry to prevent damage in the event of over current or short circuit.

The V_O over-current protection is a latched off type. When the over load condition is removed, the power supply can be restart by cycling the AC line or PSON/L, ON after a minimum OFF time of 1 second to reset the latch..

The VSB over-current protection is auto-recovery once the fault is removed.

Parameter	Min	Nom	Max	Unit
V _O Output Overcurrent	65.42	/	80.99	A
5V Standby Overcurrent	3.7	/	5.0	A

Short Circuit Protection (SCP)

If a short circuit condition occurs to main Vo output, the power supply main output Vo will shut down within 50ms in order to reduce the power that can be delivered into the short. The VSB will remain ON.

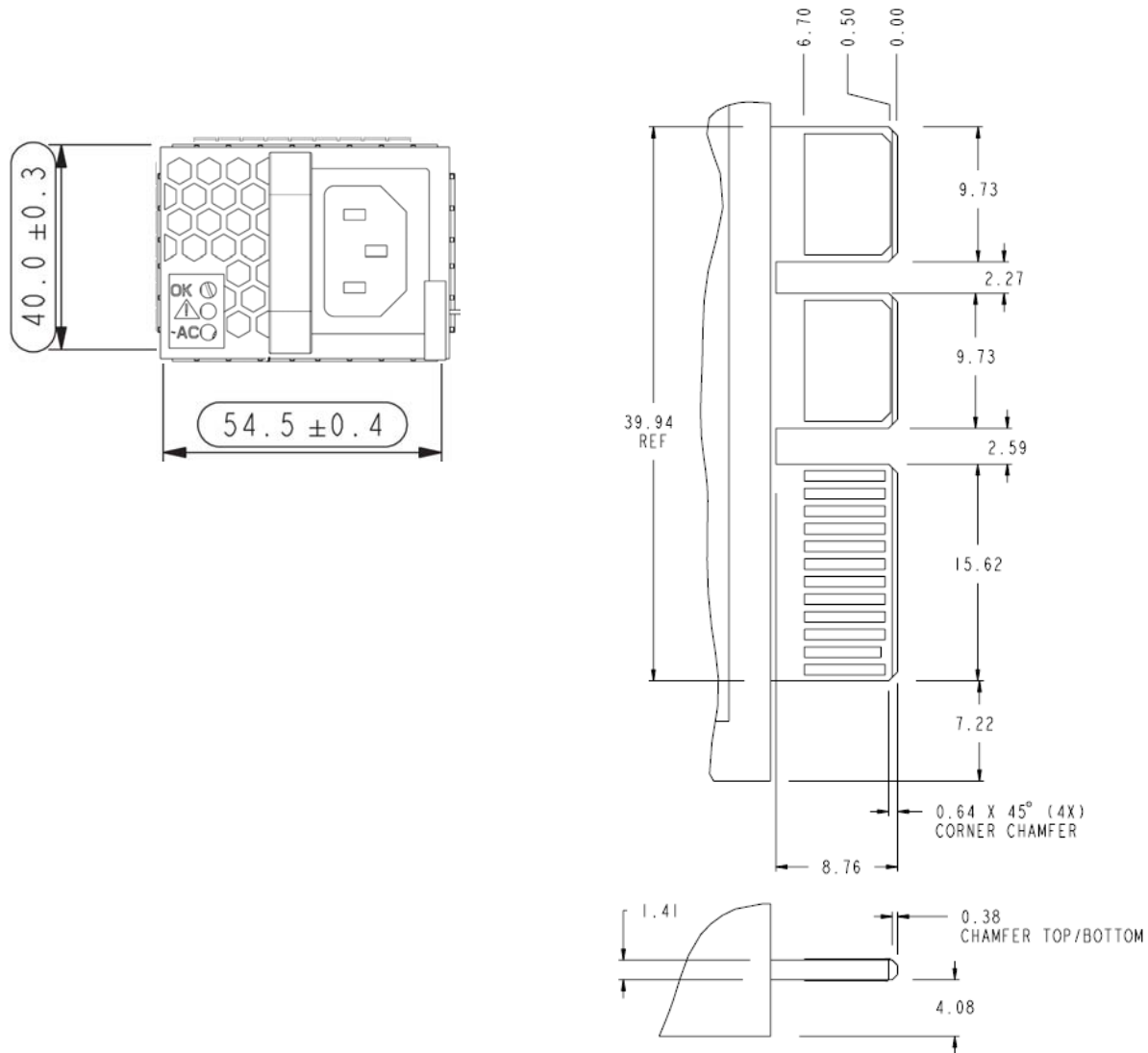
If a short circuit condition occurs to the VSB output, the power supply will shut down with main output Vo turned off and the standby VSB output will auto-recovery once the fault is removed.

Over Temperature Protection (OTP)

The DS760SL series power supply incorporated thermal protection to prevent damage or degradation due to overheating. The power supply will turn off if there is an over temperature condition or if the output connector exceeds 100 degrees C. The output connector temp. sensor is located on the output connector PCB area. Once the temperature of the power supply or connector is reduced within the normal limit, the power supply will restart automatically.

Mechanical Specifications

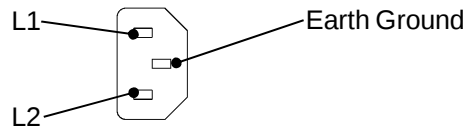
Mechanical Outlines



Connector Definitions

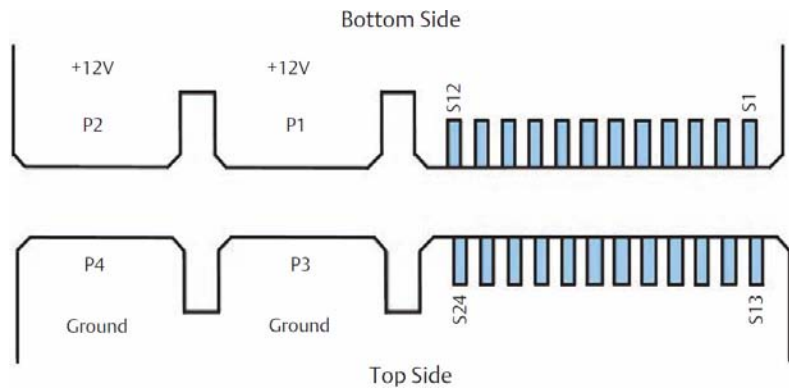
AC Input Connector

- Pin 1 – L1
- Pin 2 – L2
- Pin 3 – Earth Ground



Output Connector – Power Blades

- P1 – +12V
- P2 – +12V
- P3 – Ground
- P4 – Ground



Output Connector – Control Signals

- S1 – +12V Sense
- S2 – +12V RTN Sense
- S3 – +12V Current Share
- S4 – SMB_ALERT/L
- S5 – SDA
- S6 – SCL
- S7 – PSKILL
- S8 – PSON/L
- S9 – PW_OK
- S10 – PS_A1
- S11 – +5.0V_STBY (VSB)
- S12 – +5.0V_STBY (VSB)
- S13 – Reserved
- S14 – PRESENT/L
- S15 – PS_A0
- S16 – Reserved
- S17 – Reserved for factory use
- S18 – EEPROM_WP
- S19 – ACOK/H
- S20 – Not used
- S21 – Not used
- S22 – Reserved for factory use
- S23 – +5.0V_STBY (VSB)
- S24 – +5.0V_STBY (VSB)

Power / Signal Mating Connectors and Pin Types

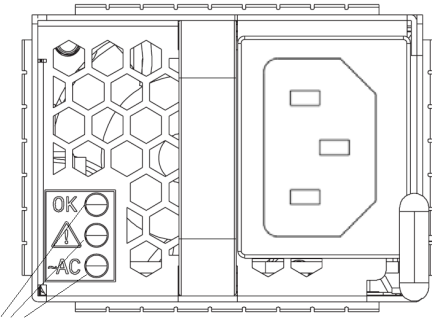
Table 5. Mating Connectors for DS760SL series

Reference	On Power Supply	Mating Connector or Equivalent
AC Input Connector	IEC60320-C14	IEC60320-C13
Output Connector	MOLEX P/N 45984005	MOLEX P/N 45984-4343

LED indicator Definition

Three status LEDs located at the front panel of the power supply beside the AC inlet provide status signal indication.

:



Status LED

LED	Function	Color
OK	DCOK	Green
	Fail	Yellow
~AC	ACOK	Green

Summary of Status Signals, Registers and LED indicators

Conditions:	Status Signals		Status Register		Shutdown register					LED status		
	ACOK/ H	PWOK/ H	PSON	PWOK	Fan Fail	AC- Loss	0- Temp	0- Current	Fail	AC	DC	Fail
Normal Operation	1	1	1	1	0	0	0	0	0	On	On	Off
Vo 12V Over current	1	0	1	0	0	0	0	1	1	On	Off	On
AC input fail	0	0	1	0	0	1	0	0	1	Off	Off	Off
Fan Blocked or Running Under Speed. O/P's ok	1	1	1	1	0	0	0	0	0	On	On	Off
UV on Vo 12V & PS has latched off	1	0	1	0	0	0	0	0	1	On	Off	On
UV on Vsb +5.0 and PS Has Turned O#	1	0	1	0	0	0	0	0	1	On	Off	On
OV on V1 12V or Vsb +5.0 & PS Has Latched O#	1	0	1	0	0	0	0	0	1	On	Off	On
Over Temp and PS Has Turned O#	1	0	1	0	0	0	1	0	1	On	Off	On
Fan Below Shutdown Limit	1	0	1	0	1	0	0	0	1	On	Off	On
No Problems But PS is in Standby Mode	1	0	0	0	0	0	0	0	0	On	Off	Off

Weight

The DS760SL series weight is 2.19 lbs. maximum.

Environmental Specifications

EMC Immunity

DS760SL series power supply is designed to meet the following EMC immunity specifications:

Table 6. Environmental Specifications:

Document	Description
EN 61000-3-2:1995	Electromagnetic compatibility (EMC) - Part 3: Limits Section 2: Limits for harmonic current emissions (equipment input current up to and including 16A Amendment A1:1998 per phase) Amendment A2:1998 Amendment A14:2000
EN61000-3-3:1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16A.
IEC 1000-4 / 801	Industrial-Process Measurement and Control Equipment Immunity Requirements and Test Method.
EN61000-4	Industrial-Process Measurement and Control Equipment Immunity Requirements and Test Method.
EN61000-4-2:1995	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test. Basic EMC Publication.
EN61000-4-3:1995	Section 3: Radiated, radio frequency, electromagnetic field immunity test
EN61000-4-4:1995	Section 4: Electrical Fast Transient/Burst immunity test. Basic EMC Publication.
EN61000-4-5:1995	Section 5: Surge immunity test
EN61000-4-6:1995	Section 6: Immunity to conducted disturbances induced by radio frequency fields
EN61000-4-8:1995	Section 8: Power frequency magnetic field immunity test
EN61000-4-11:1995	Section 11: Voltage dips, short interruptions and voltage variations immunity tests
CSA C108.8-M1983	Canadian Department of Communications Radio Interface Regulations
VCCI	Voluntary Control Council for Interference, Japanese EMI regulations

Safety Certifications

The DS760SL power supply is intended for inclusion in other equipment and the installer must ensure that it is in compliance with all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand alone product.

Table 7. Safety Certifications for DS760SL series power supply system

Document	File #	Description
UL 60950-1 CSA-C22.2 No. 60950-1-03	E132002	United States and Canada Standard, Safety for information technology equipment.
EN60950-1:A11/2004	B090313890540	Harmonized European Standard, Safety for information technology Equipment.
IEC60950-1		International Standard, Safety for Information Technology Equipment. (ITE)
CB Certificate and Report	SG-OF-02936	(All CENELEC Countries)
CHINA CCC Approval	2008010907283624	China Requirements
BSMI	C1337061600869	Taiwan bureau of standards, metrology and inspection.
GOST	8637846	Mandatory certification mark for all electrical products to be shipped into Russia
IRAM	211-238023-300	Electrical & electronic equipment that meet Argentina's requirements
KCC	AIL-7001497-J000(A)	Korea mandatory certification mark for all electrical products
TUV	B091113890647	German Safety of Equipment Act.
		The PSU will have Protective Earth and reinforced/double insulation between input and output. Work with TN supply systems.

EMI Emissions

The DS760SL-3 series has been designed to comply with the Class A limits of EMI requirements.

Conducted Emissions (CISPR22, EN55022)

The DS760SL-3 series power supplies comply with the Class A limits for conducted emissions with a margin of 3 dB or greater as calculated according to the statistical methods described in EN55022.

Radiated Emissions (CISPR22, EN55022)

The DS760SL-3 series power supplies comply with the Class A limits for radiated emissions with a margin of 3 dB or greater.

AC Harmonic Current Emissions (IEC 61000-3-2)

The DS760SL-3 series power supplies meet the AC Harmonic Current Emission Class A limits as adjusted for input voltage.

Operating Temperature

The DS760SL-3 series power supplies will start and operate within stated specifications at the below ambient temperature and altitude conditions:

- 0 to 40 °C from 0 to 1800 meters altitude without derating in any output

- 0 to 38 °C from 1800 to 3000 meters altitude without derating in any output

- 0 to 60 °C from 0 to 1800 meters altitude with Vo derated to 40A and Vsb to 2.4A

- 0 to 40 °C from 0 to 4000 meters altitude with Vo derated to 45A and Vsb to 2.4A

Storage and Shipping Temperature / Humidity

The DS760SL-3 series power supplies can be stored or shipped at temperatures between -40°C to $+85^{\circ}\text{C}$ and relative humidity from 5% to 95% non-condensing.

Altitude

The DS760SL-3 series power supplies will operate within specifications at altitudes up to 4,000 meters with the output derating defined in Operating Temperature section.

The power supply can be stored at altitudes of up to 13,000 meters above sea level.

Humidity

The DS760SL-3 series power supplies will operate within specifications when subjected to a relative humidity from 7% to 93% non condensing.

The DS760SL-3 series power supplies can be stored in a relative humidity from 5% to 95% non-condensing.

Vibration

The DS760SL-3 series power supplies will pass the following vibration specifications:

Non-operational - 5 G sine sweep from 5 Hz to 500 Hz, dwelling at resonant frequencies for 1 hour each.

Acoustic Noise Emissions

When operated with specified cooling under any steady-state or repetitive dynamic load within the range specified in this document the power supply will meet the requirements below:

Model	Acoustic Requirements
DS760SL-3	The measured A-weighted sound power level (L _{WA}) will not exceed 69dBA at an ambient/inlet air temperature of $23 \pm 2^{\circ}\text{C}$ per ISO 7779 and ISO 9295. No prominent discrete tones will be emitted per ISO 7779 Annex D, using a criterion of $(L_t - L_n)^3$ 3dB. The frequency of repetition is defined as $10 < f_{REP} < 1/(2 * t_{RESPONSE})$ Hz
DS760SL-3-001	N/A

Power and Control Signal Descriptions

AC Input Connector

This connector supplies the AC Mains to the DS760SL power supply.

- Pin 1 - L1
- Pin 2 - L2
- Pin 3 - Earth Ground

Output Connector – Power Blades

These pins provide the main output for the DS760SL.

- P1 - +12V
- P2 - +12V
- P3 - Ground
- P4 - Ground

Output Connector - Control Signals

The DS760SL series contains control signal header providing analog control interface, standby power and i²C interface. These are Control signals which are directly connected from the System to the Power Supply.

+12V Sense, +12V RTN Sense – (pins S1, S2)

The main output of the DS760SL-3 is equipped with a Remote Sensing capability that will compensate for a power path drop around the entire loop of 100mV. This feature is implemented by connecting the +12V Sense (pin S1) and the +12V RTN Sense (pin S2) to the positive and negative rails of the main output, respectively, at a location that is near to the load. Care should be taken in the routing of the sense lines as any noise sources or additional filtering components introduced into the voltage rail may affect the stability of the power supply. The DS760SL-3 will operate appropriately without the sense lines connected, however it is recommended that the sense lines be connected directly to the main output terminals if remote sensing is not required. This remote sense circuit will not raise the power supply's output voltage to the OVP trip level. Main Output Remote Sense has no effect on the Standby Output (VSB).

+12V Current Share – (pin S3)

Single wire parallel signal used for +12V output current sharing among the power supplies.

SMB_ALERT/L, SDA and SCL – (pin 4, 5, 6)

Please refer to "Communication Bus Descriptions" section.

PSKILL – (pin S7)

This signal pin should be grounded in the system. If left open, power supply operation will be inhibited (StandBy VSB output will remain on).

PERSON/L – (pin S8)

This signal input pin controls the normal turning ON and Off of the +12V of the DS760SL-3 power supply. The power supply main output (Vo) will be enabled when this signal is pulled low, below 0.8 V. The Power supply output (except VSB output) will be disabled when this input is driven higher than 2.0V, or left open circuited.

PW_OK – (pin S9)

The PW_OK is an output signal driven high, by the power supply to indicate that all outputs are valid. If any of the power supply outputs fails below its regulation limits, this output will be driven low. The output signal is an open drain output internally pulled up in the power supply to internal standby supply 5.0V via a 1K ohm resistor. It is capable of driving the output below 0.4V with a load of 4mA.

PS_A1, PS_A0 – (pin S10, S15)

Please refer to “Communication Bus Descriptions” section.

+5.0V_STBY – (pin S11, S12, S23, S24)

The DS760SL-3 provides a regulated 5.0 volt 2.4 amp auxiliary output voltage to power critical circuitry that remain active regardless of the on/off status of the power supply's main output. The Standby Output (VSB) voltage is available whenever a valid AC input voltage is applied to the unit. The Standby Output is independently short circuit protected and is referenced to the main +12V output Ground (P3, P4).

Reserved, Not Used – (pin S13, S16, S17, S20, S21, S22)

These pins are reserved and might be connected internally in the power supply. No externally connection should be make to these pins.

PRESENT/L – (pin S14)

This signal pin is connected to +12V output Ground inside the power supply. This pin is to be pull high on the system side by a resistor of 4.7K or higher. A TTL logic LOW indicates the power supply is inserted and seated into the system power supply connector. A Logic HIGH indicated the removal of the power supply.

EEPROM_WP – (pin S18)

This signal is pulled up to internal standby 5.0V by a 3.74k resistor in the power supply to prevent data in the EEPROM from being over-written. If this signal is pulled down by the system, write cycles to the EEPROM are permitted.

ACOK/H– (pin S19)

The ACOK signal is a normally HIGH level TTL logic signal when the AC input voltage is within the allowable limits. A TTL logic LOW level, with a 7mS early warning will be sent before the main output loses regulation. This signal is an open drain output internally pulled up in the power supply 5.0V via a 1K ohm resistor. It is capable of driving the output below 0.4V with a load of 4mA

Communication Bus Descriptions

I²C Bus Signals

The DS760SL-3 power supply contains enhanced monitoring and control functions implemented via the I²C bus. The DS760SL-3 I²C functionality (PSMI and FRU data) can be accessed via the output connector control signals. The communication bus is powered either by the internal standby supply or from an external power source connected to the 5.0V STBY (ie: accessing an unpowered power supply as long as the Standby Output of another power supply connected in parallel is on).

If units are connected in parallel or in redundant mode, the 5.0V STBY (VSB) must be connected together in the system. Otherwise, the I²C bus will not work properly when a unit is inserted into the system without the AC source connected.

SMB_ALERT/L – (pin S4)

Interrupt signal indicating system should check the power supply status and warnings. This signal is an open drain output from the power supply. A pull up resistor should be located on the system side to standby VSB Output.

SDA and SCL – (pin S5, S6)

I²C serial data and clock bus - these pins are internally pulled up to 3.3V with a 100K resistor.

PS_A0, PS_A1 (I²C Address BIT 0, BIT1 Signals) – (pin S15, S10)

These two input pins are the address lines A0 and A1 to indicate the slot position the power supply occupies in the power bay and define the power supply addresses for FRU data and PSMI data communication. This allows the system to assign different addresses for each power supply. During I²C communication between system and power supplies, the system will be the master and power supplies will be slave.

They are internally pulled up to internal standby supply with a 10K resistor.

I²C Bus Communication Interval

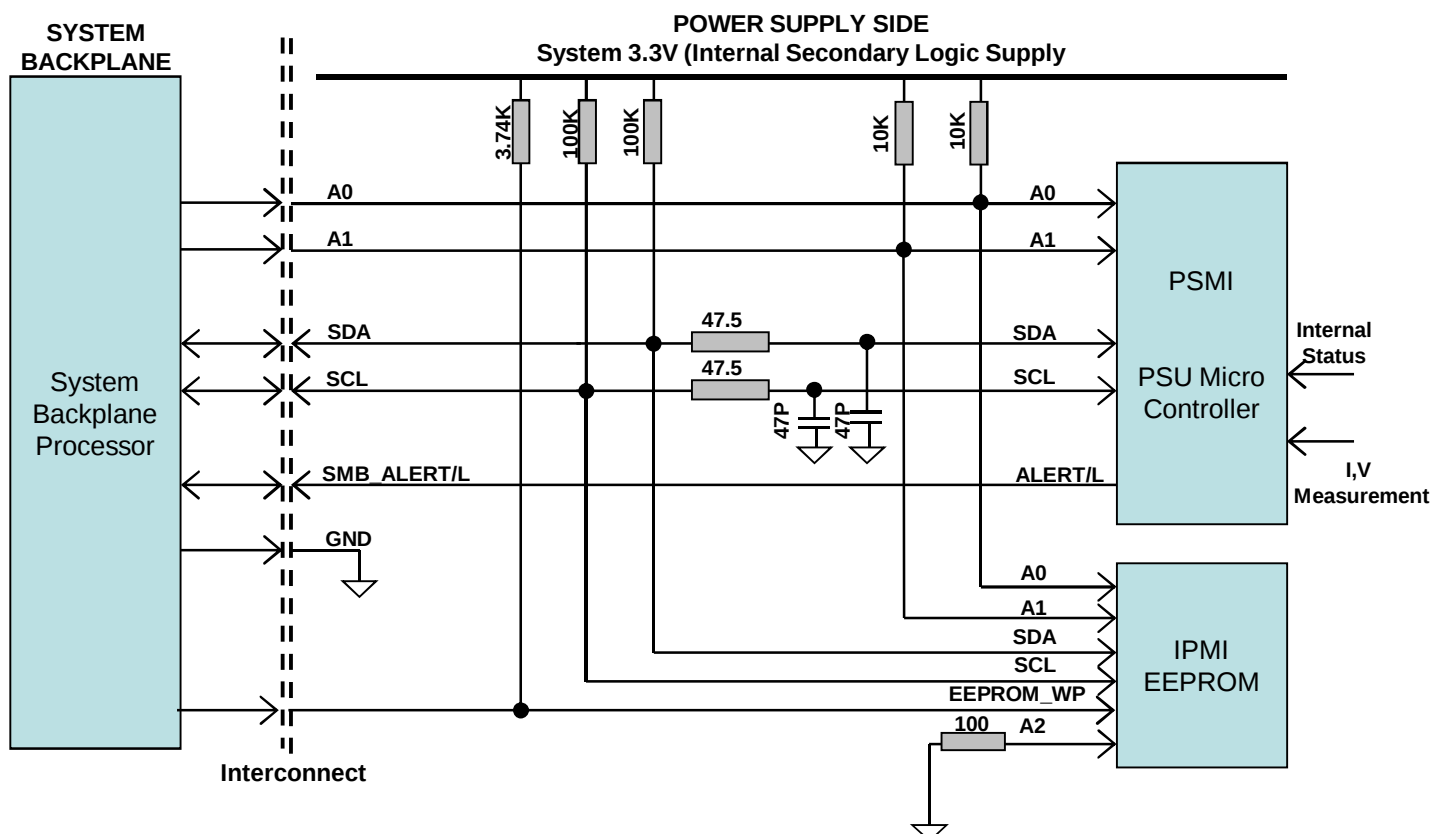
The interval between two consecutive I²C communications to the power supply should be at least 200us to ensure proper monitoring functionality.

I²C Bus Signal Integrity

The noise on the I²C bus (SDA, SCL lines) due to the power supply will be less than 500mV peak-to-peak. This noise measurement should be made with an oscilloscope bandwidth limited to 100MHz. Measurements should be made at the power supply output connector with 3.2K ohm resistors pulled up to Standby Output and 20pf ceramic capacitors to Ground.

The noise on the address lines A0 and A1 will be less than 100mV peak-to-peak. This noise measurement should be made at the power supply output connector.

I²C Bus Internal Implementation, Pull-ups and Bus Capacitances



I²C Bus - Recommended external pull-ups:

Electrical and Interface specifications of I²C signals (referenced to StandBy Output Return pin, unless otherwise indicated):

Parameter	Condition	Symbol	Min	Typ	Max	Unit
SDA, SCL internal pull-up resistor		R_{int}	-	100	-	Kohm
SDA, SCL internal bus capacitance		C_{int}	-	47	-	pF
Recommended external pull-up resistor	1 PSU	R_{ext}	-	1.0	-	Kohm
	2 PSU		-	0.5	-	Kohm

Logic Levels

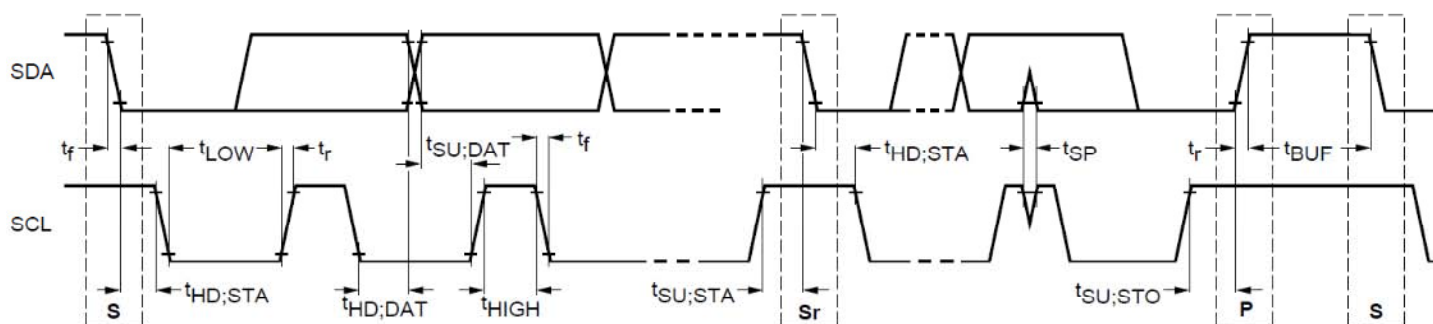
DS760SL-3 series power supply I²C Communication Bus will respond to logic levels as per below:

Logic High: 5.0V Nominal (Specs is 2.1V to 5.5V)**

Logic Low: 500mV nominal (Specs is 800mV max)**

** Note: Emerson 73-769-001 I²C adapter was used.

Timings



Parameter	Symbol	Standard-Mode Specs		Actual Measured		Unit
		Min	Max			
SCL Clock Frequency	f_{SCL}	0	100	96.8		KHz
Hold time (repeated) START condition	$t_{HD;STA}$	4.0	-	4.3		μS
LOW period of SCL clock	t_{LOW}	4.7	-	13.5		μS
HIGH period of SCL clock	t_{HIGH}	4.0	-	4.4		μS
Setup time for repeated START condition	$t_{SU;STA}$	4.7	-	5.83		μS
Data hold time	$t_{HD;DAT}$	0	3.45	1.87		μS
Data setup time	$t_{SU;DAT}$	250	-	5765		nS
Rise time	t_r	-	1000	SCL = 972	SDA = 986	nS
Fall time	t_f	-	300	SCL = 148.5	SDA = 148	nS
Setup time for STOP condition	$t_{SU;STO}$	4.0	-	6.36		μS
Bus free time between a STOP and START condition	t_{BUF}	4.7	-	100		μS

*** Note Emerson 73-769-001 I²C adapter (USB-to-I²C) and Universal PMBus™ GUI software was used

Device Addressing

The DS760SL series will respond to supported commands on the I²C™ bus that are addressed according to pins A1 and A0 pins of output connector.

Address pins are held HIGH by default via pulled up to internal standby supply with a 10K resistor. To set the address as “0”, the corresponding address line should be pulled down to logic ground level. Below table show the address of the power supply with A0 and A1 pins set to either “0” or “1”:

PSU Slot	Slot ID Bits		PSMI port Address	IPMI EEPROM (FRU) Read Address
	A1	A0		
1	0	0	0xB0	0xA0
2	0	1	0xB2	0xA2
3	1	0	0xB4	0xA4
4	1	1	0xB6*	0xA6*

* Default I²C address when A0 and A1 are left open

System Management bus

Power supply System Management Bus will be accessible within the following delays from events visible to the system.

Any EEPROM devices, measurement ports or other features will be accessible and valid with the same timing as for the status port.

Signal timing - status signals and ports

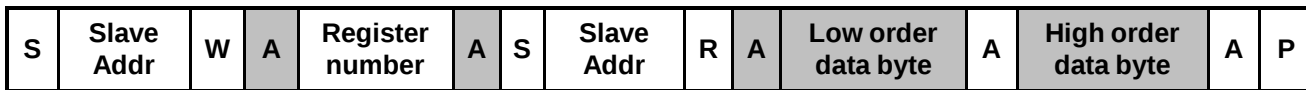
Event	Time	Max	Notes
AC applied to this PS, no other shared power source	AC Input to status valid.	1.0s	AC Input to Status signals valid.
	AC Input to ports valid.	1.0s	AC Input to Status, Control and Measurement Ports accessible and valid.
External shared power source provided.	Shared Power to Status valid.	1.0s	Shared Power to Status signals valid.
	Shared Power to ports valid.	1.0s	Shared Power to Status, Control and Measurement Ports accessible and valid.
PS inserted into active system	PRESENT to ON status valid.	1.0s	Hot Plug to Status signals valid.
	PRESENT to ON ports valid.	1.0s	Hot Plug to Status, Control and Measurement Ports accessible and valid
PS turned on	STANDBY to ON status valid.	1.0s	PSON/L to Status signals valid for ON condition.
	STANDBY to ON ports valid.	1.0s	PSON/L to Status and Measurement Ports valid for ON condition.

PSMI interface

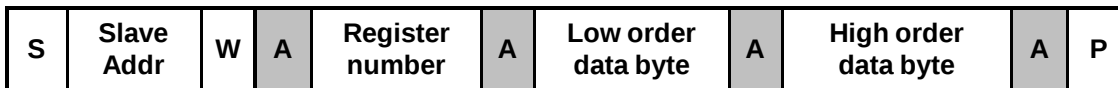
The Power supply will have a Power Supply Management Interface (PSMI) compliant with Design guide V2.12. PSMI is a register based interface with an access protocol as shown in the diagrams below.

For format details and contents refer the PSMI design guide. Any registers not specified will return 0x00.

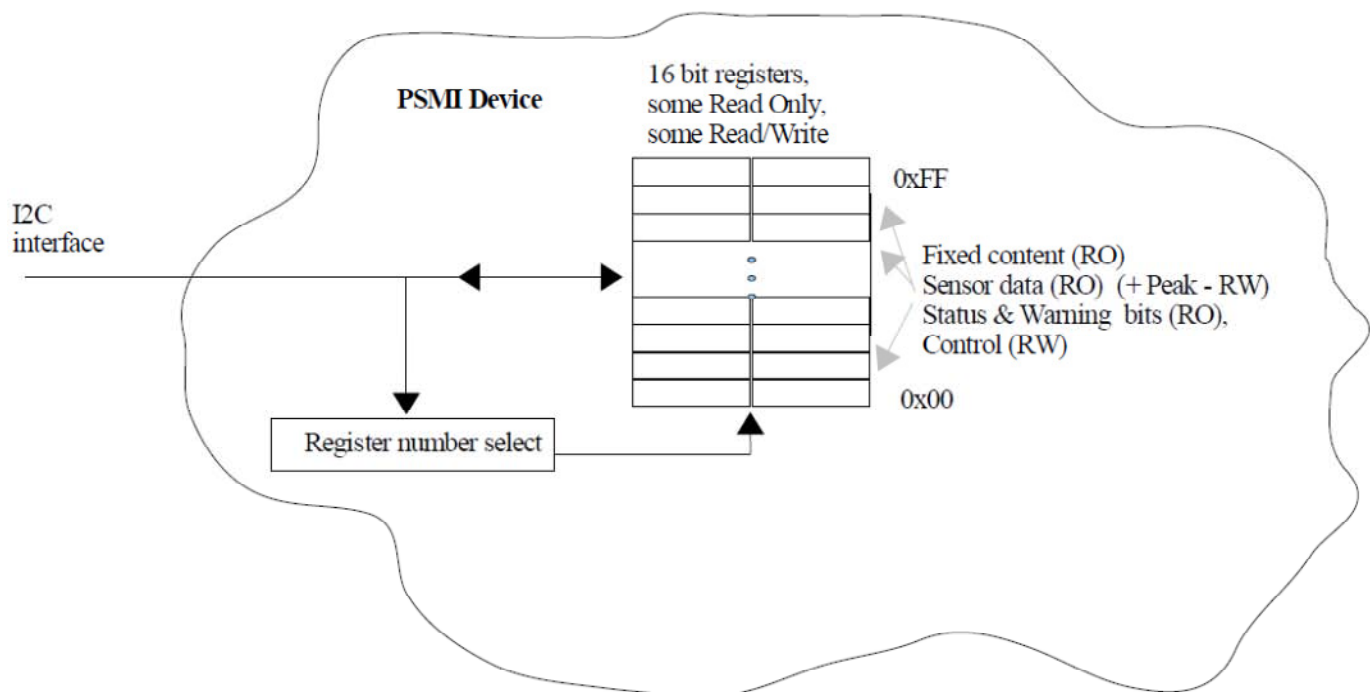
READ Protocol



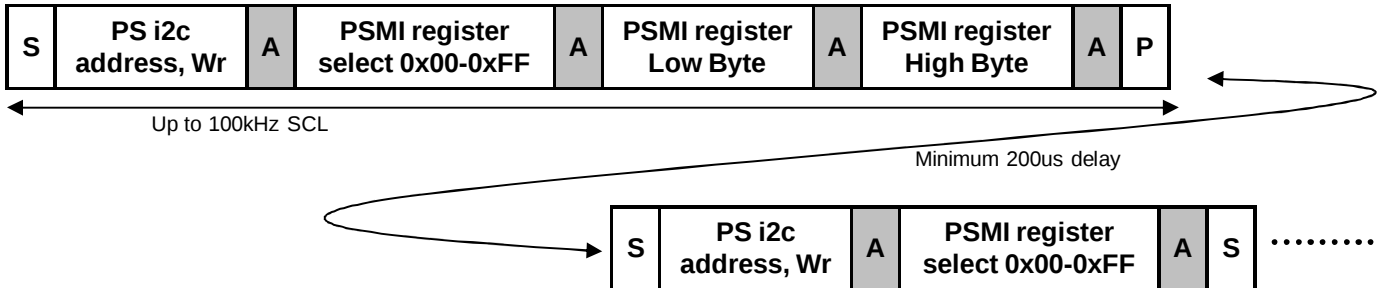
WRITE Protocol



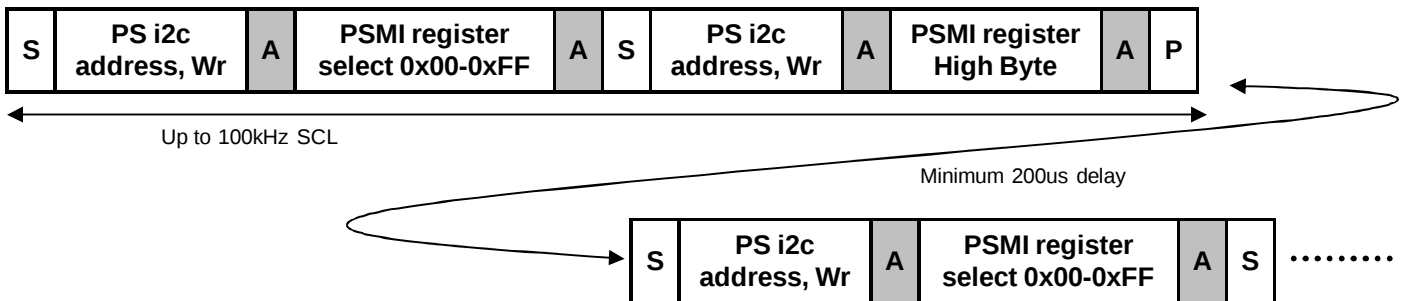
S = Start condition
P = Stop condition
W = Write
R = Read
A = Acknowledge



Write to PSMI register, no repeated address, without stop



Write to PSMI register, repeated address, without stop



S: Start condition

P: Stop condition

A: Acknowledge

N: Not Acknowledge

Grey: driven by power supply

Register Definition

PSMI Register address		Register groups
0x00	0x05	Sensor (Temperature)
0x06	0x1F	PSMI Capability
0x20	0x23	Sensor (fan speed)
0x24	0x27	Control (fan speed)
0x28	0x32	Sensor (Voltage)
0x33	0x3D	Sensor (Current)
0x3E	0x52	PSMI Header
0x53	0x5D	Sensor (Peak Current)
0x5E	-	Shutdown
0x5F	0x61	Warning
0x62	-	Status
0x63	-	Control
0x64	0xBF	PS Capability records
0xC0	0xDF	Custom Registers
0xE0	0xFF	PS Capability records (2)

PSMI Header

The PSMI device shall include the discovery key ("PSMI"), PSMI specification revision number, Power Supply code revision, and optionally LANA Enterprise ID. All registers are read only.

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0x3E	Discovery key 1 - 2	"P"	"S"
0x3F	Discovery key 3 - 4	"M"	"I"
0x40	PSMI version	Major version 0x02	Minor version 0x12
0x41	PSU code version	Major version to be defined by supplier	Minor version to be defined by supplier
0x42	Supplier ID	Reserved for LANA Enterprise ID LS	Reserved for LANA Enterprise ID
0x43	Supplier ID 2	Reserved for LANA Enterprise ID	Reserved for LANA Enterprise ID
0x44 - 0x52	Reserved	0x0000	

PSMI Sensors

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0x06	Thermal sensor configuration	To be defined by supplier. Expected to be 1 fan sensor, 1 temperature sensor no association between sensors and fans.	
0x07	Temperature sensor types	To be defined by supplier. Expected to be internal.	
0x08	T1 Temperature sensor offset	Not present, 0x0000.	
0x09 - 0x0B	T2, T3, T4 Temperature sensor offset	Not present, 0x0000.	
0x0C	Fan 1, 2 resolution register	Not present, 0x0000.	
0x0D	Fan 3, 4 resolution register	Not present, 0x0000.	
0x0E	F1 config	0x3E80	
0x0F - 0x11	F2, F3, F4 config	Not present, 0x0000.	
0x12	Voltage / Current sensor configuration.	0x0E32. 2 Outputs, 2 output voltage sensor, 1 output current sensor, input voltage sensor, input current sensor, peak current sensor.	
0x13	Fan associations	0x0000	
0x14	F1, F2 cont	0x0000	
0x15	F3, F4 cont	0x0000	
0x16	Shutdown events register capability	0x001F	
0x17	Status capability	0x0071	
0x18	Control / Record capability	0x0111	
0x19	Warning events capability	0x1891	
0x1A - 0x1F	Reserved	0x0000	

Sensor data shall be updated at least once every 250ms for temperatures, currents and voltages. Fan data shall be updated at least once a second. Data representation shall be 16 bits however the sensor resolution shall be 8 bits or greater were specified and placed into the 16 bit format as individually defined below.

- Temperature sensor data shall be relative to a target defined in the PS capability section. The actual temperature is the value from the register plus the offset defined in the PSMI capabilities section (register 0x08).

Sensor				Range		Resolution				Register				Error				
Relative Temperature to T1 Target in PSMI capability				-20°C~+15°C		0.25°C				0x00				+1°C over range from -20°C to +15°C from target temperature.				
MSB Upper nibble					MSB Lower nibble					LSB Upper nibble					LSB Lower nibble			
X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X
Sign	Integer value (0-511)										Fractional value (1/64C)							

- Fan rotation in RPM shall be available

Sensor				Range		Resolution				Register				Error				
F1 Sensor				0 - 65,635RPM		TBD				0x20				TBD				
MSB Upper nibble					MSB Lower nibble					LSB Upper nibble					LSB Lower nibble			
X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X
Integer value (0 - 65535)																		

- Output current for V1 shall be measured and represented as below

Sensor	Range	Resolution	Register	Error
V1 Current	0 – 1024A	0.34A	0x33 Peak in 0x53	+/- 5% Rated Current

The peak register shall be reset at power on or if the Peak register is written to

MSB Upper nibble					MSB Lower nibble					LSB Upper nibble					LSB Lower nibble			
X	X	X	X		X	X	X	X		X	X	X	X		X	X	X	X
Integer value (0 - 1023)											Fractional value (1 / 64A)							

- Input current for the power supply shall be measured and represented as below

Sensor	Range	Resolution	Register	Error
Input Current	0 – 1024A RMS	0.06A	0x3D Peak in 0x5D	+/- 5% Rated Current
MSB Upper nibble				MSB Lower nibble
X	X	X	X	X
Integer value (0 - 1023)				Fractional value (1 / 64A)

The peak register shall be reset at power on or if the Peak register is written to.

The input current register value (not Peak register) shall be averaged over at least 2 seconds

- Input Voltage for the power supply shall be measured and represented as below

Sensor	Range	Resolution	Register	Error
Input Voltage	0 – 320VAC RMS	1.26VAC	0x32 (RO)	+/- 5% Rated Voltage
MSB Upper nibble				MSB Lower nibble
X	X	X	X	X
Integer value (0-1023)				Fractional value (1/32V)

Note the sign is always 0 (positive) for the AC RMS input.

- Output Voltage for the power supply shall be measured and represented as below

Sensor	Range	Resolution	Register	Error
Output Voltage	+ - 128V	1/190 rated voltage	0x28 (RO)	+/- 2%
MSB Upper nibble				MSB Lower nibble
X	X	X	X	X
Integer value (0-127)				Fractional value (1/256V)

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0x00	T1 temperature	Relative temperature to T1 target	
0x01- 0x05	T2, T3, T4 reserved	Not used 0x0000	
0x20	F1 Sense	F1 speed in RPM	
0x21 - 0x23	F2, F3, F4 Sense	Not used 0x0000	
0x28	V1 output voltage	V1 output voltage	
0x29 - 0x31	V2 – V10 output voltage	Not used 0x0000	
0x32	Input voltage	Input voltage	
0x33	V1 output current	V1 output current	
0x34 - 0x3C		Not used 0x0000	
0x3D	Input current	Input current	
0x53	V1 output current Peak	V1 peak output current Read / Write	
0x54 - 0x5C		Not used 0x0000 Read / Write	
0x5D	Input current Peak	Peak input current Read / Write	

PSMI Shutdown

The power supply shall provide a Shutdown event register (0x5E, R/W) which will maintain data while the Standby rail is present even if the AC supply to the power supply is lost. The register will be cleared at initial power on, when PSON is cycled, and if 1 is written to the associated bit

Shutdown register 0x5E bit	Name	Detail
0	Failure	1 if the power supply not supplying output due to internal shutdown including over current, over temperature, over or under voltage, fan failure, device failure. Also AC failure. 0 if no faults
1	Over Current	1 if any output has over current (note 5.0Vstby must still power the interface) 0 if normal operation
2	Over temperature	1 if PS shutdown due to over temperature 0 if normal operation
3	AC Loss	1 if PS shutdown for AC loss, not asserted for momentary loss of AC where PS does not shutdown 0 for normal operation
4	Fan failure	1 if PS shutdown due to fan failure 0 if normal operation
5 - F	Reserved	Must return 0

PSMI Warning

The power supply shall provide Shutdown event register for thermal warnings, output over current warnings, and input warnings (0x5F, 0x60, 0x61, R/W) which will maintain data while the Standby rail is present even if the AC supply to the power supply is lost. The register will be cleared at initial power on, when PSON is cycled, and if 1 is written to the associated bit.

Thermal Warning register 0x5F bit	Name	Detail
0	T1 Cont warning	1 if the power supply temperature has exceeded the maximum value in the PS capabilities registers 0 if not exceeded the temperature
1 - 3	Not used	Must return 0
4	F1 warning	1 if fan failure is predicted 0 if normal operation
5 - F	Not used or reserved	Must return 0

Current Warning register 0x60 bit	Name	Detail
0	V1 Current warning	1 if the power supply output on V1 has exceeded the maximum value in the PS capabilities registers 0 if not exceeded the current limit
1 - F	Not used	Must return 0

Input Warning register 0x61 bit	Name	Detail
0	Input Over Current warning	1 if the power supply input current has exceeded the maximum value in the PS capabilities register 0 if not exceeded the current limit
1 - 2	Not used	Must return 0
3	Input Under Voltage warning	1 if the power supply input voltage was below the minimum value in the PS capabilities register 0 if not dropped below the minimum input voltage limit
4 - F	Not used	Must return 0

PSMI Status

The power supply shall provide a Status register which will maintain data while the Standby rail is present even if the AC supply to the power supply is lost. The register will be cleared at initial power on and when PSON is asserted.

Status register 0x62 bit	Name	Detail
0 RO	RPMI over-ride	1 if fan speed over-ride is in operation. 0 if fan speed over-ride is not in operation.
1 – 3 RO	Not used	Must return 0
4 RO	PW_OK	1 if the power supply PW_OK is asserted 0 if the power supply PW_OK is not asserted
5 RO	PSON/L	1 if the PSON/L signal to the power supply is asserted 0 if the PSON/L signal to the power supply is not asserted
6 R/W	SMB_ALERT/L	1 if the power supply SMB_ALERT/L interrupt to the system is asserted, caused by an event and latched on. 0 if the power supply SMB_ALERT/L is not asserted This bit shall be reset to 0 by power cycle or writing 1 to this register bit
7, 8 RO	Power supply operating range	Input operating range – It has only one range so always 00b
9 RO	Redundancy	Must return 0 – only used on PDB
A – F RO	Not used	Must return 0

PSMI Control

The Power supply shall provide registers for fan speed control and miscellaneous control items, the miscellaneous control register shall be reset on initial power on and maintain values whenever 5V Standby is present.

Fan speed Control register 0x24 bit	Name	Detail
0 - 7	F1 cont	Fan speed increase function shall be available with the control represented as an 8 bit number giving the % duty cycle for the PWM (0 = 0%, 255 = 100%)
8 - E	Not used	Must return 0

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0x25 – 0x27	F2, F3, F4 speed control	Not used 0x0000	

Control register 0x63 bit	Name	Detail
0	RPMI over-ride	1 if fan speed over-ride is in operation 0 if fan speed over-ride is not in operation
1 - 3	Not used	Must return 0
4	Shutdown LED status	1 if shutdown LED is turned on by the system 0 if controlled by the power supply (Default) This will turn on the Amber Fail LED. Note either shutdown or warning LED control shall turn that LED on Amber
5	Warning LED status	1 if warning LED is turned on by the system 0 if controlled by the power supply (Default)
6	Shutdown event mask	1 if shutdown events cause an interrupt (Default) 0 if shutdown events do not cause an interrupt
7	Warning event mask	1 if warning events cause an interrupt (Default) 0 if warning events do not cause an interrupt
8 - F	Reserved	Must return 0

PSMI Power Supply Capability Records

The Power supply shall implement the registers in the table below, other registers within the Power Supply Capabilities. Records are not used and shall return 0 if read. All registers in this section are defined as read only. Data formats are defined in the PSMI design guide.

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0x64	T1 target	Defined by suppliers, operating temperature of T1 sensor, must be lower than shutdown limit.	
0x65 - 0x67	T2, 3,4 target	Not used 0x0000	
0x68	F1 min	Defined by supplier, minimum fan speed in RPM (0 – 65535RPM)	
0x69 – 0x6B	F2, 3, 4 min	Not used 0x0000	
0x6C	Fan sound	0x00 Max	0x00 Min
0x6D	V1 output max voltage	From regulation specification	
0x6E	V1 output min voltage	From regulation specification	
0x6F	Vsb output max voltage	From regulation specification	
0x70	Vsb output min voltage	From regulation specification	
0x71 – 0x80	Vout 3-10 limits	Not used 0x0000	
0x81	Iout1 @ V-input R1	Set to 62.3A for DS760SL-3; Set to 49.0A for DS760SL-3-001	
0x82	Iout2 @ V-input R1	Set to 2.4A	
0x83 - 0x84	Iout 3-10 @ V-input R1	Not used 0x0000	
0x8B - 0x94	Iout 1-10 @ V-input R2	Not used 0x0000	
0x95 - 0x9E	Iout 1-10 @ V-input R3	Not used 0x0000	
0x9F	First input current limit	Defined by supplier as maximum rated input current at 90VAC	
0xA0	Second input current limit	Not used 0x0000	
0xA1	Third input current limit	Not used 0x0000	
0xA2	First input voltage min	Set to 90VAC	

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0xA3	Second input voltage min	Not used 0x0000	
0xA4	Third input voltage min	Not used 0x0000	
0xA5	First output power limit	Set to 760W for DS760SL-3; Set to 600W for DS7690SL-3-001	
0xA6	First output power limit	Not used 0x0000	
0xA7	First output power limit	Not used 0x0000	
0xA8	Combined output power limit1	0x0000 no combined limit	
0xA9	Combined outputs for power limit1	0x0000 no combined limit	
0xAA	Combined output power limit2	0x0000 no combined limit	
0xAB	Combined outputs for power limit2	0x0000 no combined limit	
0xAC	Output1 current sensor bandwidth	Defined by supplier	
0xAD	Input current sensor bandwidth	Defined by supplier	
0xAE	High line light load output power	STS # 7	
0xAF	High line mid-load output power	STS # 6	
0xB0	High line max load output power	STC # 3	
0xB1	High line efficiency1	High line light load efficiency. Defined by supplier. The efficiency data is returned as an 8-bit binary value with each 1 bit increment representing (1/256%)	High line mid load efficiency Defined by supplier.
0xB2	High line efficiency2	High line max load efficiency. Defined by supplier	0x00
0xB3	Low line light load output power	STC # 5	

Register number	Name	Register description	
		Bits 0 - 7	Bits 8 - F
0xB4	Low line mid-load output power	STS # 4	
0xB5	Low line max load output power	STC # 2	
0xB6	Low line efficiency1	Low line light load efficiency. Defined by supplier. The efficiency data is returned as an 8-bit binary value with each 1 bit increment representing (1/256%)	Low line mid load efficiency Defined by supplier.
0xB7	Low line efficiency2	Low line max load efficiency Defined by supplier	0x00
0xB8	V1 (12V) load share accuracy	To be defined by supplier (must be 5.4A or better) represented as a range 0 to 25.5A in 0.1A increments	0x00
0xB8 – 0xBB	V2, V3, V4 load share accuracy	Not used 0x0000	0x00
0xBC	Redundancy configuration	Not used 0x0000 (PDB use only)	
0xBD – 0xBF	Not used	Not used 0x0000	
0xE0 – 0xFF	Not used	Not used 0x0000	

FRU (EEPROM) Data

The FRU (Field Replaceable Unit) data format compliant with the Intel IPMI V1.0 specification.

The DS760SL-3 uses 1 page of EEPROM for FRU purpose. A page of EEPROM contains up to 256 byte-sized data locations.

- Where:
- OFFSET - The OFFSET denotes the address in decimal format of a particular data byte within DS760SL-3 EEPROM.
 - VALUE - The VALUE details data written to a particular memory location of the EEPROM.
 - DEFINITION - The contents DEFINITION refers to the definition of a particular data byte.

DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
COMMON HEADER, 8 BYTES				
0	00	FORMAT VERSION NUMBER (Common Header)	1	01
1	01	INTERNAL USE AREA OFFSET (In multiples of 8 Bytes)	24	18
2	02	CHASSIS INFO AREA OFFSET (In multiples of 8 Bytes)	1	01
3	03	BOARD INFO AREA OFFSET (Not Used)	0	00
4	04	PRODUCT INFO AREA OFFSET (In multiples of 8 Bytes)	5	05
5	05	MULTI RECORD AREA OFFSET (In multiples of 8 Bytes)	15	0F
6	06	PAD (reserved – always 00H)	0	00
7	07	ZERO CHECK SUM (256 – (Sum of bytes 000d to 006d))	210	D2
CHASSIS INFO AREA(32 BYTES)				
8	08	FORMAT VERSION NUMBER (Default value is 1.)	1	01
9	09	CHASSIS INFO AREA LENGTH (Default value is 0.)	0	00
10	0A	CHASSIS TYPE (Default value is 0.)	0	00
11	0B	CHASSIS PART NUMBER Type/Length 10 byte allocation 0CAH (if used) (Default value is 0.)	0	00
12	0C	CHASSIS PART NUMBER BYTES (Default value is 0.)	0	00
13	0D		0	00
14	0E		0	00
15	0F		0	00
16	10		0	00
17	11		0	00
18	12		0	00
19	13		0	00
20	14		0	00
21	15		0	00
22	16	CHASSIS SERIAL NUMBER Type/Length 15 byte allocation 0CFH (if used) (Default value is 0.)	0	00
23	17	CHASSIS SERIAL NUMBER (Default value is 0.)	0	00
24	18		0	00
25	19		0	00
26	1A		0	00
27	1B		0	00
28	1C		0	00
29	1D		0	00
30	1E		0	00
31	1F		0	00
32	20		0	00

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DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
33	20	CHASSIS SERIAL NUMBER BYTES, Default value is 0.	0	00
34	22		0	00
35	23		0	00
36	24		0	00
37	25		0	00
38	26	END TAG (0C1H if used) (Default value is 0.)	0	00
39	27	ZERO CHECK SUM (From 08d to 38d if used)	255	FF
PRODUCT INFORMATION AREA, 80 BYTES				
40	28	FORMAT VERSION NUMBER	1	01
41	29	PRODUCT INFO AREA LENGTH (In multiples of 8 bytes) 80 Bytes are allocated. 80-Bytes / 8 =0AH.	10	0A
42	2A	LANGUAGE (English = 19H)	25	19
43	2B	MANUFACTURER NAME TYPE / LENGTH (0C7H) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000111)b, 7-Byte Allocation	199	C7
44	2C	MANUFACTURER NAME "E"= 45H	69	45
45	2D	"M"= 4DH	77	4D
46	2E	"E"= 45H	69	45
47	2F	"R"= 52H	82	52
48	30	"S"= 53H	83	53
49	31	"O"= 4FH	79	4F
50	32	"N"= 4EH	78	4E
49	33	PRODUCT NAME Type/Length (0CEH) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000110)b, 14-Byte Allocation	206	CE
52	34	Product Name "D"= 44H	68	44
53	35	"S"= 53H	83	53
54	36	"7"= 37H	55	37
55	37	"6"= 36H	54	36
56	38	"0"= 30H	48	30
57	39	"S"= 53H	83	53
58	3A	"L"= 4CH	76	4C
59	3B	"-"= 2DH	45	2D
60	3C	"3"= 33H	51	33
61	3D		00	00
62	3E		00	00
63	3F		00	00
64	40		00	00
65	41		00	00
66	42	PRODUCT PART/MODEL NUMBER Type/Length (0CAH) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000110)b, 6-Byte Allocation	PER UNIT	
67	43	POWER SUPPLY SPARE KIT NUMBER	00	00
68	44	NOT APPLICABLE	00	00
69	45		00	00
70	46		00	00
71	47		00	00
72	48		00	00
73	49	PRODUCT VERSION NUMBER Type/Length (0C2H) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000010)b, 2-Byte Allocation	194	C2
74	4A	*SHOULD TRACK MODEL REVISION indicated on BOM	PER UNIT	
75	4B		PER UNIT	

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DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
76	4C	PRODUCT SERIAL NUMBER Type/Length (0CDH) *PRODUCT SERIAL NUMBER IS BASED ON ASTEC SERIAL NUMBER FORMAT P/N: 41700201000 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001101)b, 13-Byte Allocation PRODUCT SERIAL NUMBER: Model ID “1” = 49H “0” = 49H “8” = 49H “0” = 49H	205	CD
77	4D		73	49
78	4E		48	30
79	4F		56	38
80	50		48	30
81	51	PRODUCT SERIAL NUMBER: MANUFACTURING YEAR AND WEEK CODE	PER UNIT	
82	52	*REFER TO 4170020100 FOR DETAILS	PER UNIT	
83	53	PRODUCT SERIAL NUMBER: UNIQUE SERIAL NUMBER *REFER TO EN2274B FOR DETAILS	PER UNIT	
84	54		PER UNIT	
85	55		PER UNIT	
86	56		PER UNIT	
87	57	PRODUCT SERIAL NUMBER: MODEL REVISION	PER UNIT	
88	58	*SHOULD TRACK MODEL REVISION indicated on BOM	PER UNIT	
PRODUCT SERIAL NUMBER MANUFACTURING LOCATION * REFER TO EN2274B FOR DETAILS				
89	59	“Z” = 5AH (Z for ZhongShan China)	90	5A
90	5A	ASSET TAG 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001000)b, 8-Byte Allocation	200	C8
91	5B	NO ASSET TAG	00	00
92	5C		00	00
93	5D		00	00
94	5E		00	00
95	5F		00	00
96	60		00	00
97	61		00	00
98	62		00	00
99	63	FRU FILE ID 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (010001)b, 17-Byte Allocation REFER TO IPS FOR LATEST FRU FILE NAME	209	D1
100	64	“D”= 44H “S”= 53H “7”= 37H “6”= 36H “0”= 30H “S”= 53H “L”= 4CH “ -”= 2DH “3”= 033H “R”= 52H <u>“Should track latest FRU File ID on Spec. 1.1”</u> “E”= 45H “V”= 56H “1 “= 31H “C”= 43H	68	44
101	65		83	53
102	66		55	37
103	67		54	36
104	68		48	30
105	69		83	53
106	6A		76	4C
107	6B		45	2D
108	6C		51	33
109	6D		82	52
110	6E		69	45
111	6F		86	56
112	70		PER	UNIT
113	71		PER	UNIT
114	72		00	00
115	73		00	00
116	74	00	00	

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DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
117	75	END OF FIELD MARKER	193	C1
118	76	RESERVED	00	00
119	77	ZERO CHECK SUM (256-(Sum of bytes 40d to 118d))	PER UNIT	
MULTI RECORD AREA: Power Supply Information 72 Bytes				
Power Supply Record Header				
120	78	RECORD TYPE ID (0X00= Power Supply Information)	00	00
121	79	7: (0)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	02	02
122	7A	RECORD LENGTH: 24 Bytes	24	18
123	7B	RECORD CHECKSUM (Zero Checksum From 125d to 148d)	69	45
124	7C	HEADER CHECKSUM (Zero Checksum From 120d to 123d)	161	A1
POWER SUPPLY RECORD				
125 126	7D 7E	Overall Capacity (Watts) 15-12: (0000)b, Reserved 11-0: (1011111000)b, 760W =02F8H Stored with LSB first then MSB	248 002	F8 02
127 128	7F 80	Peak VA (Watts) 15-12: (0000)b, Reserved 11-0: (1101110000)b, 880W =0370H Stored with LSB first then MSB	112 003	70 03
129	81	INRUSH CURRENT (Amps) 25Amps = 19H	25	19
130	82	INRUSH INTERVAL (ms) 200ms = C8H	200	C8
131 132	83 84	LOW END INPUT VOLTAGE RANGE 1 90V = 9000(×10mV) = 2328H STORED WITH LSB FIRST THEN MSB	40 35	28 23
133 134	85 86	HIGH END INPUT VOLTAGE RANGE 1 264V = 26400(×10mV) = 6720H STORED WITH LSB FIRST THEN MSB	32 103	20 67
135 136	87 88	LOW END INPUT VOLTAGE RANGE 2 0V = 0(×10mV) = 0H, No voltage range 2 STORED WITH LSB FIRST THEN MSB	00 00	00 00
137 138	89 8A	HIGH END INPUT VOLTAGE RANGE 2 0V = 0(×10mV) = 0H, No voltage range 2 STORED WITH LSB FIRST THEN MSB	00 00	00 00
139	8B	LOW END INPUT FREQUENCY RANGE, 47Hz = 2FH	47	2F
140	8C	HIGH END INPUT FREQUENCY RANGE, 63Hz = 3FH	63	3F
141	8D	A/C DROPOUT TOLERANCE IN ms, 12ms = 0CH	12	0C
142	8E	BINARY FLAGS 7-5: (000)b, Reserved 4: (1)b, Tachometer Pulses per Rotation / Predictive Fail Polarity (2 Pulses Per Rotation = 1; 1 Pulse Per Rotation = 0) OR (Signal Asserted(1) Indicates Failure = 0, Signal Deasserted(0) Indicates Failure = 1) 3: (1)b, Hot Swap / Redundancy Support 2: (0)b, AutoSwitch Support 1: (1)b, Power Factor Correction Support 0: (0)b, Predictive Fail Support	27	1B

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DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
143	8F	Peak Wattage Capacity and Holdup Time 15-12: (0000)b, 12 mSeconds = 0CH	12	0C
144	90	11-0: (1001011000)b, 760Watts = 02F8H	248	F8
145	91	Stored with LSB first then MSB.	002	02
146	92	Combined Wattage	00	00
147	93	NOT APPLICABLE	00	00
148	94	PREDICTIVE FAIL TACHOMETER LOWER THRESHOLD , Not applicable	00	00
12V DC OUPUT RECORD HEADER				
149	95	RECORD TYPE ID (0X01 = DC OUPUT)	001	01
150	96	End Of List/Record Format Version Number 7: (0)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	002	02
151	97	Record Length: 13 Bytes	13	0D
152	98	Record Checksum (Zero Checksum From 154d To 166d)	28	1C
153	99	Header Checksum (Zero Checksum From 149d To 152d)	212	D4
+12V DC Output Record				
164	9A	+12V Output Information 7: (0)b, Standby 6-4: (000)b, Reserved 3-0: (0001)b, Output Number 1 = 001b	001	01
Nominal Voltage				
155	9B	12.00V = 1200 (x10mV) = 04B0H	176	B0
156	9C	Stored with LSB first then MSB.	004	04
157	9D	Maximum Negative Voltage Deviation 11.88V = 1188 (x10mV) = 04A4H.	164	A4
158	9E	Stored with LSB first then MSB.	004	04
159	9F	Maximum Positive Voltage Deviation 12.12V = 1212 (x10mV) = 04BCH	188	BC
160	A0	Stored with LSB first then MSB.	004	04
161	A1	Ripple And Noise pk-pk 10Hz To 30MHz (mV) 100mV = 0064H	100	64
162	A2	Stored with LSB first then MSB.	000	00
163	A3	Minimum Current Draw (10mA) 5.0A = 500 (x10mA) = 01F4H	244	F4
164	A4	Stored with LSB first then MSB.	001	01
165	A5	Maximum Current Draw (10mA) 62.3A = 6230 (x10mA) = 1856H	086	56
166	A6	Stored with LSB first then MSB.	024	18
5V0SB DC OUTPUT RECORD HEADER				
167	A7	Record Type ID (0x01 = DC Output)	001	01
168	A8	End Of List/Record Format Version Number 7: (1)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	130	82
169	A9	Record Length: 20 Bytes	001	01
170	AA	Record Checksum (Zero Checksum From 172d To 191d)	074	4A
171	AB	Header Checksum (Zero Checksum From 167d To 170d)	031	1F
5V0SB DC OUTPUT RECORD				

DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
172	AC	5V0SB Output Information 7: (1)b, Standby (Bit = 1 to indicate standby output) 6-4: (000)b, Reserved 3-0: (0010)b, Output Number 2 = 010b	130	82
173	AD	Nominal Voltage 5.00V = 500 (x10mV) = 01F4H Stored with LSB first then MSB.	244	F4
174	AE		001	01
175	AF	Maximum Negative Voltage Deviation 5.25V = 525 (x10mV) = 020DH Stored with LSB first then MSB.	013	0D
176	B0		002	02
177	B1	Maximum Positive Voltage Deviation 4.75V = 475 (x10mV) = 01DBH Stored with LSB first then MSB.	219	DB
178	B2		001	01
179	B3	Ripple And Noise pk-pk 10Hz To 30MHz (mV) 100mV = 0064H Stored with LSB first then MSB.	100	64
180	B4		000	00
181	B5	Minimum Current Draw (10mA) 000 = 0000H	000	00
182	B6	Stored with LSB first then MSB.	000	00
183	B7	Maximum Current Draw (10mA) 2.40A = 240(x 10mA) = 00F0H Stored with LSB first then MSB.	240	F0
184	B8		000	00
185	B9	Reserved	00	00
186	BA	Reserved	00	00
187	BB	Reserved	00	00
188	BC	Reserved	00	00
189	BD	Reserved	00	00
190	BE	Reserved	00	00
191	BF	Reserved	00	00
INTERNAL USE AREA, 64 bytes				
192	C0	Format Version Number 7:4 -reserved, write as 0000b 3:0 -format version number = 1h for this specification.	001	01
193	C1		000	00
194	C2		000	00
195	C3		000	00
196	C4		000	00
197	C5		000	00
198	C6		000	00
199	C7		000	00
200	C8		000	00
201	C9		000	00
202	CA		000	00
203	CB		000	00
204	CC		000	00
205	CD		000	00
206	CE		000	00
207	CF		000	00
208	D0		000	00
209	D1		000	00
210	D2		000	00
211	D3		000	00

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DS760SL-3 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
212	D4		0	00
213	D5		0	00
214	D6		0	00
215	D7		0	00
216	D8		0	00
217	D9		0	00
218	DA		0	00
219	DB		0	00
220	DC		0	00
221	DD		0	00
222	DE		0	00
223	DF		0	00
224	E0		0	00
225	E1		0	00
226	E2		0	00
227	E3		0	00
228	E4		0	00
229	E5		0	00
230	E6		0	00
231	E7		0	00
232	E8		0	00
233	E9		0	00
234	EA		0	00
235	EB		0	00
236	EC		0	00
237	ED		0	00
238	EE		0	00
239	EF		0	00
240	F0		0	00
241	F1		0	00
242	F2		0	00
243	F3		0	00
244	F4		0	00
245	F5		0	00
246	F6		0	00
247	F7		0	00
248	F8		0	00
249	F9		0	00
250	FA		0	00
251	FB		0	00
252	FC		0	00
253	FD		0	00
254	FE		0	00
255	FF	CHECKSUM : (From 192 to 254 if used)	PER UNIT	

FRU (EEPROM) Data

The FRU (Field Replaceable Unit) data format compliant with the Intel IPMI V1.0 specification.

The DS760SL-3-001 uses 1 page of EEPROM for FRU purpose. A page of EEPROM contains up to 256 byte-sized data locations.

Where: OFFSET - The OFFSET denotes the address in decimal format of a particular data byte within DS760SL-3-001 EEPROM.

VALUE - The VALUE details data written to a particular memory location of the EEPROM.

DEFINITION - The contents DEFINITION refers to the definition of a particular data byte.

DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
COMMON HEADER, 8 BYTES				
0	00	FORMAT VERSION NUMBER (Common Header)	1	01
1	01	INTERNAL USE AREA OFFSET (In multiples of 8 Bytes)	24	18
2	02	CHASSIS INFO AREA OFFSET (In multiples of 8 Bytes)	1	01
3	03	BOARD INFO AREA OFFSET (Not Used)	0	00
4	04	PRODUCT INFO AREA OFFSET (In multiples of 8 Bytes)	5	05
5	05	MULTI RECORD AREA OFFSET (In multiples of 8 Bytes)	15	0F
6	06	PAD (reserved – always 00H)	0	00
7	07	ZERO CHECK SUM (256 – (Sum of bytes 000d to 006d))	210	D2
COMPUTER / CHASSIS INFORMATION AREA(32 BYTES)				
8	08	FORMAT VERSION NUMBER (Default value is 1.)	1	01
9	09	CHASSIS INFO AREA LENGTH (Default value is 0.)	0	00
10	0A	CHASSIS TYPE (Default value is 0.)	0	00
11	0B	CHASSIS PART NUMBER Type/Length 10 byte allocation 0CAH (if used) (Default value is 0.)	0	00
12	0C	CHASSIS PART NUMBER (Default value is 0.)	0	00
13	0D		0	00
14	0E		0	00
15	0F		0	00
16	10		0	00
17	11		0	00
18	12		0	00
19	13		0	00
20	14		0	00
21	15		0	00
22	16	CHASSIS SERIAL NUMBER Type/Length 15 byte allocation 0CFH (if used) (Default value is 0.)	0	00
23	17	CHASSIS SERIAL NUMBER (Default value is 0.)	0	00
24	18		0	00
25	19		0	00
26	1A		0	00
27	1B		0	00
28	1C		0	00
29	1D		0	00
30	1E		0	00
31	1F		0	00
32	20		0	00

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DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
33	20	CHASSIS SERIAL NUMBER BYTES, Default value is 0.	0	00
34	22		0	00
35	23		0	00
36	24		0	00
37	25		0	00
38	26	END TAG (0C1H if used) (Default value is 0.)	0	00
39	27	ZERO CHECK SUM (From 08d to 38d if used)	255	FF
PRODUCT INFORMATION AREA, 80 BYTES				
40	28	FORMAT VERSION NUMBER	1	01
41	29	PRODUCT INFO AREA LENGTH (In multiples of 8 bytes) 80 Bytes are allocated. 80-Bytes / 8 =0AH.	10	0A
42	2A	LANGUAGE (English = 19H)	25	19
43	2B	MANUFACTURER NAME TYPE / LENGTH (0C7H) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000101)b, 5-Byte Allocation	199	C7
44	2C	MANUFACTURER NAME "E"= 45H	69	45
45	2D	"M"= 4DH	77	4D
46	2E	"E"= 45H	69	45
47	2F	"R"= 52H	82	52
48	30	"S"= 53H	83	53
49	31	"O"= 4FH	79	4F
50	32	"N"= 4EH	78	4E
49	33	PRODUCT NAME Type/Length (0CEH) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001110)b, 14-Byte Allocation	206	CE
52	34	Product Name "D"= 44H	68	44
53	35	"S"= 53H	83	53
54	36	"7"= 37H	55	37
55	37	"6"= 36H	54	36
56	38	"0"= 30H	48	30
57	39	"S"= 53H	83	53
58	3A	"L"= 4CH	76	4C
59	3B	"-"= 2DH	45	2D
60	3C	"3"= 33H	51	33
61	3D	"-"= 2DH	45	2D
62	3E	"0"= 30H	48	30
63	3F	"0"= 30H	48	30
64	40	"0"= 30H	49	31
65	41	"1"= 31H	00	00
66	42	PRODUCT PART/MODEL NUMBER Type/Length (0CAH) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001000)b, 6-Byte Allocation	PER UNIT	
67	43	POWER SUPPLY SPARE KIT NUMBER NOT APPLICABLE	00	00
68	44		00	00
69	45		00	00
70	46		00	00
71	47		00	00
72	48		00	00
73	49	PRODUCT VERSION NUMBER Type/Length (0C2H) 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (000010)b, 2-Byte Allocation	194	C2
74	4A	PRODUCT VERSION NUMBER / AUTO REV	PER UNIT	
75	4B	*SHOULD TRACK MODEL REVISION indicated on BOM	PER UNIT	

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DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
76	4C	PRODUCT SERIAL NUMBER Type/Length (0CDH) *PRODUCT SERIAL NUMBER IS BASED ON ASTEC SERIAL NUMBER FORMAT P/N: 41700201000 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001101)b, 13-Byte Allocation PRODUCT SERIAL NUMBER: Model ID “1” = 47H “1” = 31H “3” = 33H “1” = 31H	205	CD
77	4D		73	49
78	4E		49	31
79	4F		51	33
80	50		49	31
81	51	PRODUCT SERIAL NUMBER: MANUFACTURING YEAR AND WEEK CODE *REFER TO 4170020100 FOR DETAILS	PER UNIT	
82	52		PER UNIT	
83	53	PRODUCT SERIAL NUMBER: UNIQUE SERIAL NUMBER *REFER TO 41700201000 FOR DETAILS	PER UNIT	
84	54		PER UNIT	
85	55		PER UNIT	
86	56		PER UNIT	
87	57	PRODUCT SERIAL NUMBER: MODEL REVISION *SHOULD TRACK MODEL REVISION indicated on BOM	PER UNIT	
88	58		PER UNIT	
PRODUCT SERIAL NUMBER MANUFACTURING LOCATION * REFER TO EN2274B FOR DETAILS				
89	59	“Z” = 5AH (Z for ZhongShan China)	90	5A
90	5A	ASSET TAG 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (001000)b, 8-Byte Allocation	200	C8
91	5B	NO ASSET TAG	00	00
92	5C		00	00
93	5D		00	00
94	5E		00	00
95	5F		00	00
96	60		00	00
97	61		00	00
98	62		00	00
99	63	FRU FILE ID 7-6: (11)b, 8-Bit ASCII+LATIN1, 5-0: (010010)b, 17-Byte Allocation REFER TO IPS FOR LATEST FRU FILE NAME	210	D1
100	64	“D”= 44H “S”= 53H “7”= 37H “6”= 36H “0”= 30H “S”= 53H “L”= 4CH “ -”= 2DH “3”= 33H “-”= 2DH “O”= 30H “O”= 30H “1”= 31H “R”= 52H <u>“Should track latest FRU File ID on Spec. 1.1”</u> “E”= 45H “V”= 56H “B ”= 42H	68	44
101	65		83	53
102	66		55	37
103	67		54	36
104	68		48	30
105	69		83	53
106	6A		76	4C
107	6B		45	2D
108	6C		51	33
109	6D		45	2D
110	6E		48	30
111	6F		48	30
112	70		49	31
113	71		82	52
114	72		69	45
115	73		86	56
116	74	PER	UNIT	

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DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
117	75	END OF FIELD MARKER	193	C1
118	76	RESERVED	00	00
119	77	ZERO CHECK SUM (256-(Sum of bytes 40d to 118d))	PER UNIT	
MULTI RECORD AREA: Power Supply Information 72 Bytes				
Power Supply Record Header				
120	78	RECORD TYPE ID (0X00= Power Supply Information)	00	00
121	79	7: (0)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	02	02
122	7A	RECORD LENGTH: 24 Bytes	24	18
123	7B	RECORD CHECKSUM (Zero Checksum From 125d to 148d)	63	3F
124	7C	HEADER CHECKSUM (Zero Checksum From 120d to 123d)	167	A7
POWER SUPPLY RECORD				
125	7D	Overall Capacity (Watts)	88	58
126	7E	15-12: (0000)b, Reserved 11-0: (1001011000)b, 600W =0258H Stored with LSB first then MSB	02	02
127	7F	Peak VA (Watts)	183	B7
128	80	15-12: (0000)b, Reserved 11-0: (1010110111)b, 695W =02B7H Stored with LSB first then MSB	002	02
129	81	INRUSH CURRENT (Amps) 25Amps = 19H	25	19
130	82	INRUSH INTERVAL (ms) B7 200ms = C8H	200	C8
131	83	LOW END INPUT VOLTAGE RANGE 1	40	28
132	84	90V = 9000(×10mV) = 2328H STORED WITH LSB FIRST THEN MSB	35	23
133	85	HIGH END INPUT VOLTAGE RANGE 1	32	20
134	86	264V = 26400(×10mV) = 6720H STORED WITH LSB FIRST THEN MSB	103	67
135	87	LOW END INPUT VOLTAGE RANGE 2	00	00
136	88	0V = 0(×10mV) = 0H, No voltage range 2 STORED WITH LSB FIRST THEN MSB	00	00
137	89	HIGH END INPUT VOLTAGE RANGE 2	00	00
138	8A	0V = 0(×10mV) = 0H, No voltage range 2 STORED WITH LSB FIRST THEN MSB	00	00
139	8B	LOW END INPUT FREQUENCY RANGE, 47Hz = 2FH	47	2F
140	8C	HIGH END INPUT FREQUENCY RANGE, 63Hz = 3FH	63	3F
141	8D	A/C DROPOUT TOLERANCE IN ms, 12ms = 0CH	12	0C
142	8E	BINARY FLAGS 7-5: (000)b, Reserved 4: (1)b, Tachometer Pulses per Rotation / Predictive Fail Polarity (2 Pulses Per Rotation = 1; 1 Pulse Per Rotation = 0) OR (Signal Asserted(1) Indicates Failure = 0, Signal Deasserted(0) Indicates Failure = 1) 3: (1)b, Hot Swap / Redundancy Support 2: (0)b, AutoSwitch Support 1: (1)b, Power Factor Correction Support 0: (0)b, Predictive Fail Support	27	1B

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DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
143	8F	Peak Wattage Capacity and Holdup Time 15-12: (0000)b, 12 mSeconds = 0CH	12	0C
144	90	11-0: (1001011000)b, 760Watts = 0258H	248	58
145	91	Stored with LSB first then MSB.	002	02
146	92	Combined Wattage	00	00
147	93	NOT APPLICABLE	00	00
148	94	PREDICTIVE FAIL TACHOMETER LOWER THRESHOLD , Not applicable	00	00
12V DC OUPUT RECORD HEADER				
149	95	RECORD TYPE ID (0X01 = DC OUPUT)	001	01
150	96	End Of List/Record Format Version Number 7: (0)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	002	02
151	97	Record Length: 13 Bytes	13	0D
152	98	Record Checksum (Zero Checksum From 154d To 166d)	83	53
153	99	Header Checksum (Zero Checksum From 149d To 152d)	157	9D
+12V DC Output Record				
164	9A	+12V Output Information 7: (0)b, Standby 6-4: (000)b, Reserved 3-0: (0001)b, Output Number 1 = 001b	001	01
Nominal Voltage				
155	9B	12.00V = 1200 (x10mV) = 04B0H	176	B0
156	9C	Stored with LSB first then MSB.	004	04
157	9D	Maximum Negative Voltage Deviation 11.88V = 1188 (x10mV) = 04A4H.	164	A4
158	9E	Stored with LSB first then MSB.	004	04
159	9F	Maximum Positive Voltage Deviation 12.12V = 1212 (x10mV) = 04BCH	188	BC
160	A0	Stored with LSB first then MSB.	004	04
161	A1	Ripple And Noise pk-pk 10Hz To 30MHz (mV) 100mV = 0064H	100	64
162	A2	Stored with LSB first then MSB.	000	00
163	A3	Minimum Current Draw (10mA) 5.0A = 500 (x10mA) = 01F4H	244	F4
164	A4	Stored with LSB first then MSB.	001	01
165	A5	Maximum Current Draw (10mA) 49.0A = 4900 (x10mA) = 1324H	036	24
166	A6	Stored with LSB first then MSB.	019	13
5V0SB DC OUTPUT RECORD HEADER				
167	A7	Record Type ID (0x01 = DC Output)	001	01
168	A8	End Of List/Record Format Version Number 7: (1)b, End of List 6-4: (000)b, Reserved 3-0: (0010)b, Record Format Version	130	82
169	A9	Record Length: 20 Bytes	020	14
170	AA	Record Checksum (Zero Checksum From 172d To 191d)	074	4A
171	AB	Header Checksum (Zero Checksum From 167d To 170d)	031	1F
5V0SB DC OUTPUT RECORD				

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DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
172	AC	5V0SB Output Information 7: (1)b, Standby (Bit = 1 to indicate standby output) 6-4: (000)b, Reserved 3-0: (0010)b, Output Number 2 = 010b	130	82
173 174	AD AE	Nominal Voltage 5.00V = 500 (x10mV) = 01F4H Stored with LSB first then MSB.	244 001	F4 01
175 176	AF B0	Maximum Negative Voltage Deviation 5.25V = 525 (x10mV) = 020DH Stored with LSB first then MSB.	013 002	0D 02
177 178	B1 B2	Maximum Positive Voltage Deviation 4.75V = 475 (x10mV) = 01DBH Stored with LSB first then MSB.	219 001	DB 01
179 180	B3 B4	Ripple And Noise pk-pk 10Hz To 30MHz (mV) 100mV = 0064H Stored with LSB first then MSB.	100 000	64 00
181	B5	Minimum Current Draw (10mA) 000 = 0000H	000	00
182	B6	Stored with LSB first then MSB.	000	00
183 184	B7 B8	Maximum Current Draw (10mA) 2.40A = 240(x 10mA) = 00F0H Stored with LSB first then MSB.	240 000	F0 00
185	B9	Reserved	00	00
186	BA	Reserved	00	00
187	BB	Reserved	00	00
188	BC	Reserved	00	00
189	BD	Reserved	00	00
190	BE	Reserved	00	00
191	BF	Reserved	00	00
INTERNAL USE AREA, 64 bytes				
192	C0	Format Version Number 7:4 -reserved, write as 0000b 3:0 -format version number = 1h for this specification.	001	01
193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211	C1 C2 C3 C4 C5 C6 C7 C8 C9 CA CB CC CD CE CF D0 D1 D2 D3		000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

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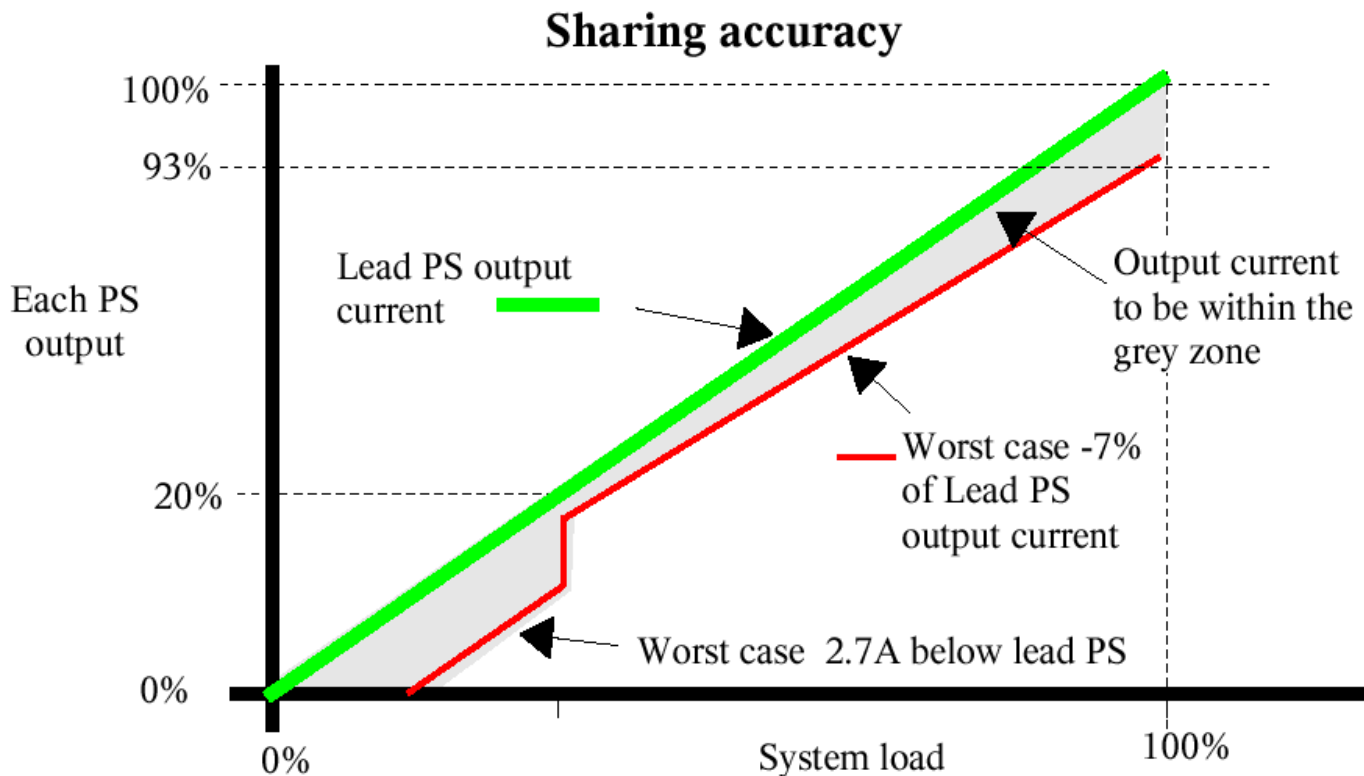
DS760SL-3-001 FRU (EEPROM) Data:

OFFSET		DEFINITION	SPEC VALUE	
(DEC)	(HEX)	(REMARKS)	(DEC)	(HEX)
212	D4		0	00
213	D5		0	00
214	D6		0	00
215	D7		0	00
216	D8		0	00
217	D9		0	00
218	DA		0	00
219	DB		0	00
220	DC		0	00
221	DD		0	00
222	DE		0	00
223	DF		0	00
224	E0		0	00
225	E1		0	00
226	E2		0	00
227	E3		0	00
228	E4		0	00
229	E5		0	00
230	E6		0	00
231	E7		0	00
232	E8		0	00
233	E9		0	00
234	EA		0	00
235	EB		0	00
236	EC		0	00
237	ED		0	00
238	EE		0	00
239	EF		0	00
240	F0		0	00
241	F1		0	00
242	F2		0	00
243	F3		0	00
244	F4		0	00
245	F5		0	00
246	F6		0	00
247	F7		0	00
248	F8		0	00
249	F9		0	00
250	FA		0	00
251	FB		0	00
252	FC		0	00
253	FD		0	00
254	FE		0	00
255	FF	CHECKSUM : (From 192 to 254 if used)	PER UNIT	

Application Notes

Current Sharing

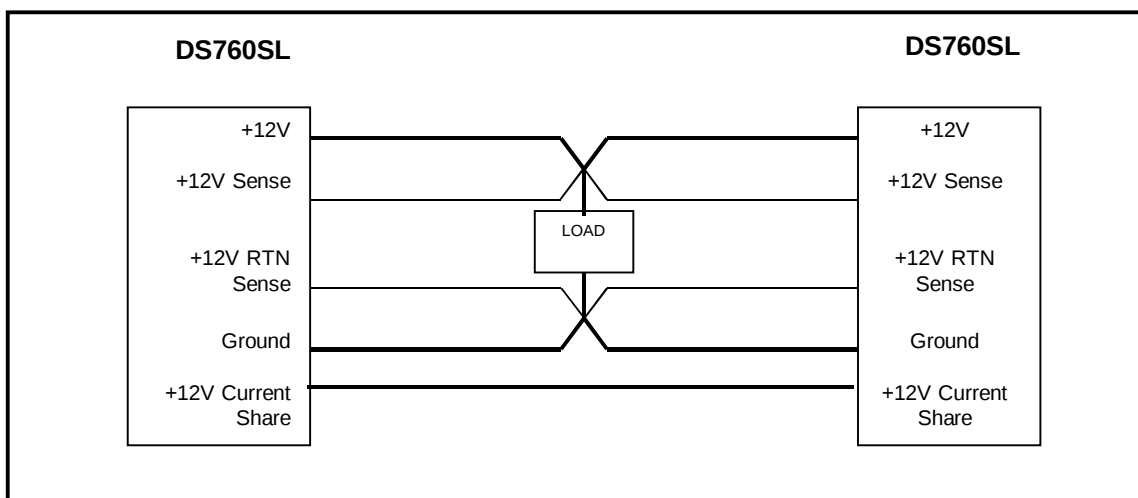
The DS760SL series' main output is equipped with current sharing capability. This will allow up to 4 power supplies to be connected in parallel for higher power application. All outputs with active current sharing will share load current within 10% of the average current at operating load. This will be valid for all loads greater than 20% rated output. For loads less than 20% of rated output the share will be 5% of the full rated output.



All outputs with active current sharing will share load current within 10% of the average current at operating load. This shall be valid for all loads greater than 20% rated output. For loads less than 20% of rated output the share shall be 5% of the full rated output.

Redundancy/Fault Tolerance

The DS760SL series power supplies can be connected in the following to provide redundancy/fault tolerance operation:



The main output will be capable of operating in a redundant current share mode. A maximum of 4 power supplies may be operated in parallel. All outputs will incorporate an isolation device for fault isolation. Filter capacitors that are located after the isolation device will be of high reliability and will be de-rated sufficiently to minimize failures.

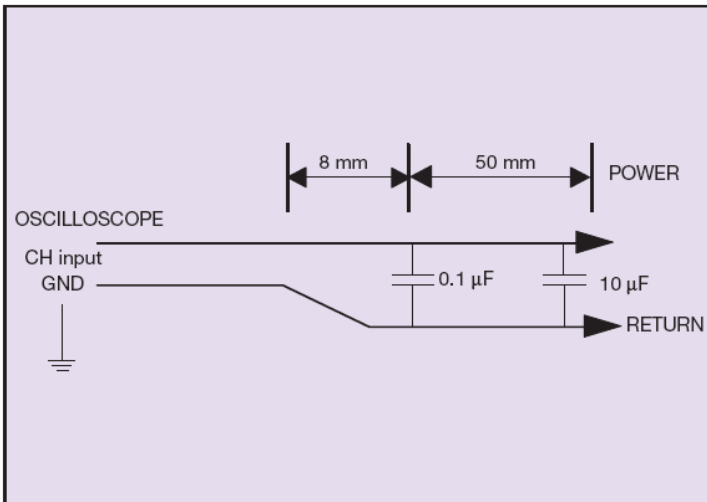
Outputs of two (or more) supplies connected in parallel must meet the regulation requirements of a single supply. Under normal operation with two (or more) supplies running in parallel the outputs must share load current. If one of the supplies fails the remaining supply (supplies) must pick up the entire load without causing the output to go out of regulation. A defective supply that is connected to the output voltage bus will cause no adverse effect on bus or the operation of the remaining functional supply (supplies).

When the parallel units operate within the specified input, output conditions, power up and power down conditions the power supplies will not exhibit any instability. The bus voltage will be within the regulation band, and the bus's periodic and random deviation will meet individual differential supply specification requirements. At initial start-up the load will be limited to the rating of one power supply.

Output	Voltage (V)	For N power supplies in parallel Combined current (A)	Load step Current (A)
Vo	12.0	2 PS – 118.37A	31.2
Vsb	5.0	2 PS - 4A	1.2A

Output Ripple and Noise Measurement

The setup outlined in the diagram below has been used for output voltage ripple and noise measurements on the DS760SL Series. When measuring output ripple and noise, a scope jack in parallel with a $0.1\mu\text{F}$ ceramic chip capacitor, and a $10\mu\text{F}$ aluminum electrolytic capacitor should be used. Oscilloscope should be set to 20MHz bandwidth for this measurement.



Record of Revision and Changes

Issue	Date	Description	Originators
1.0	08.09.2010	First Issue	A. Fu
1.1	08.20.2013	Update to the Artesyn template	A. Fu
1.2	09.11.2014	Update the typo error	A. Fu
1.3	07.08.2016	Update the system timing	A. Fu

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