25 to 30 Watt XW Single Series DC/DC Converters

Features

- 4:1 Input Voltage Range
- Low Noise, Highly Regulated Output
- Efficiencies to 84% at Full Load
- No Derating to 80°C Case Temperature
- Six-Sided Continuous Shielded, Low Thermal Gradient Copper Case
- 500 VDC Minimum Input To Output Isolation
- Overvoltage Protection for Input and Outputs
- Direct Output Paralleling for Added Power
- Five Year Warranty

Selection Chart

Model	Input Range VDC		Output VDC	Output mA
	MIN	MAX		
24S5.5000XW	9.0	36.0	5.0	5000
24S12.2500XW	9.0	36.0	12.0	2500
24S15.2000XW	9.0	36.0	15.0	2000
48S5.5000XW	20.0	72.0	5.0	5000
48S12.2500XW	20.0	72.0	12.0	2500
48S15.2000XW	20.0	72.0	15.0	2000

Description

These single output DC/DC converters are designed for wide input range low noise telecommunications, industrial control and instrument applications. The ultra wide input range (4:1) is ideal for battery or solar based applications.

The converters are state-of-the-art 75kHz MOSFET based designs that provide outstanding efficiencies up to 84 percent at full load.

The output is regulated with a high loop gain feedback control method that provides linear regulator type performance with a true, high efficiency switching DC/DC topology. The large amount of loop gain insures excellent input ripple rejection and line transient response.

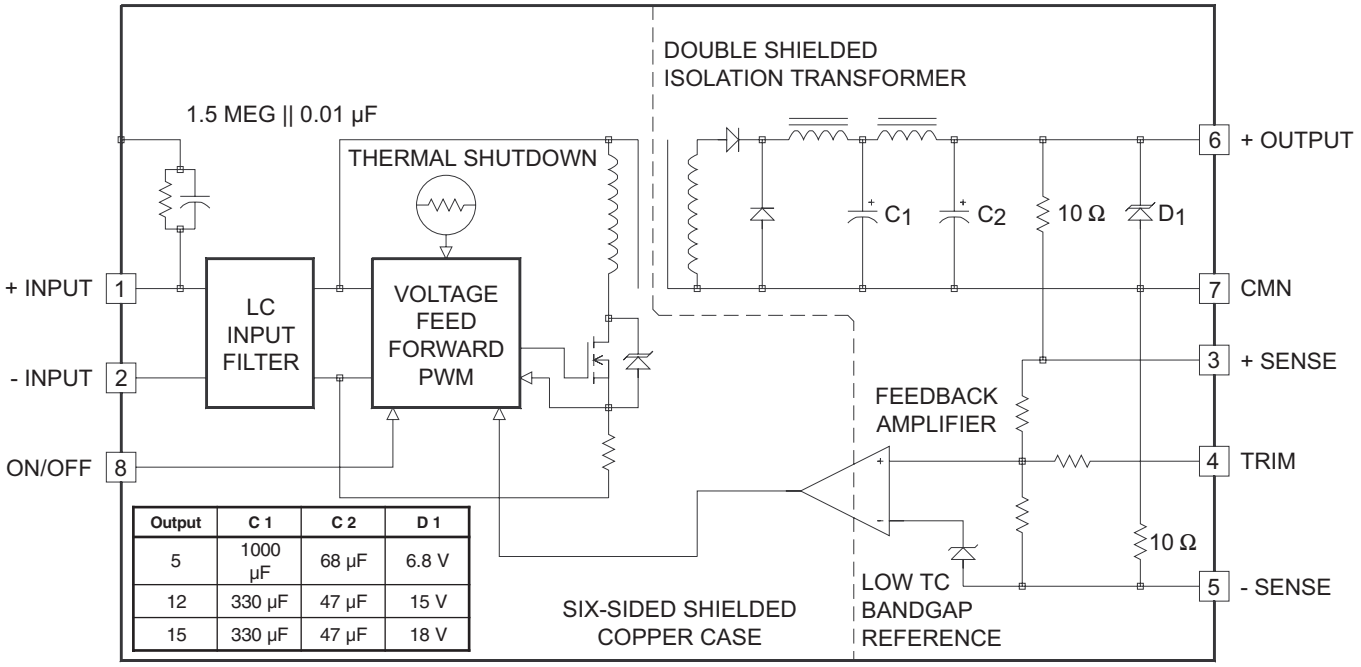
Outstanding line and load regulation are achieved over the full input voltage range and over the specified load current range.

Also included is a logic (open collector TTL / CMOS compatible) shutdown pin to control converter operation.

The XW Single Series is protected from output shorts to common by a high speed pulse by pulse digital current limit circuit and a resettable thermal shut down circuit.

The output and the power switch are overvoltage protected.

25 - 30 Watt XW Single Series Block Diagram



Output	C 1	C 2	D 1
5	1000 µF	68 µF	6.8 V
12	330 µF	47 µF	15 V
15	330 µF	47 µF	18 V

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Input Parameters*								
Model		**24S5.5000XW**	**24S12.2500XW**	**24S15.2000XW**	**48S5.5000XW**	**48S12.2500XW**	**48S15.2000XW**	**Units**
Voltage Range	MIN MAX		9.0 36.0			20.0 72.0		VDC
Reflected Ripple 0-20MHz bw	TYP MAX	35 100	40 100	40 100	20 40	20 40	20 40	mA P-P
Input Current Full Load No Load	TYP TYP-RMS	1320 15	1540 25	1510 25	650 20	760 20	745 20	mA
Efficiency	TYP	79	81	83	80	82	84	%
Switching Frequency	TYP	75						kHz
Maximum Input Overvoltage, 100ms No Damage	MAX	40			80			VDC
Undervoltage Lockout	TYP	8.5			18.0			VDC
Turn-on Time, 1% Output Error	TYP	30						ms
Recommended Fuse		Slow Blow Type (2)						

Output Parameters*					
Model		**24S5.5000XW 48S5.5000XW**	**24S12.2500XW 48S12.2500XW**	**24S15.2000XW 48S15.2000XW**	**Units**
Output Voltage		5	12	15	VDC
Rated Current	MIN MAX	0 5000	0 2500	0 2000	mA
Voltage Range 100% Load	MIN TYP MAX	4.95 5.00 5.05	11.90 12.00 12.10	14.90 15.00 15.10	VDC
Load Regulation 0-100% Load	TYP MAX	0.05 0.50			%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.05 0.50			%
Short Term Stability (3)	TYP	0.02			%
Long Term Stability	TYP	0.20			%/kHrs
Transient Response (4)	TYP	50 100	40 200	40 200	µs
Dynamic Response (5)	TYP	250 270	150 250	150 200	mV peak
Input Ripple Rejection (6)	TYP	75			dB
Noise, 0-20 MHz bw	TYP MAX	10 50	20 50	20 50	mV P-P
Temperature Coefficient	TYP MAX	50 200	100 200	100 200	ppm/°C
Overvoltage Clamp (7)	TYP	6.8	15	18	VDC
Maximum Allowable Voltage Between Pins 6 and 7 (8)	MAX	6.3	14	17	VDC
Short Circuit Protection to Common for all Outputs		Continuous, 8 Hours Minimum Current Limit and Thermal Overload			

NOTES:

* **All parameters measured at Tc=25°C, nominal input voltage and full rated load unless otherwise noted. Refer to the CALEX Application Notes for the definition of terms, measurement circuits and other information.**

(2) Determine the correct fuse size by calculating the maximum DC current drain at low line input , maximum load(or use the supplied curves) and then adding 20 to 25 percent to get the desired fuse size.

(3) Short term stability is specified after a 30 minute warm-up at full load.

(4) Transient response is defined as the time for the output to settle from a 25 to 75 % step load change to a 1% error band (rise time of step = 2µ Sec).

(5) Dynamic response is defined as the peak overshoot during a transient as defined in note 4 above.

(6) The input ripple rejection is specified for DC to 120 Hz ripple with a modulation amplitude of 1% of Vin.

(7) For module protection only, see also note 2.

(8) The user must not let the output at the pins exceed this voltage due to the combined effects of line drops and output trim.

(9) The logic shutdown pin is Open Collector TTL, CMOS, and relay compatible. The input to this pin is referenced to input (pin 2) and is protected to +100 VDC.

(10) The functional temperature range is intended to give an additional data point for use in evaluating this power supply. At the low functional temperature the power supply will function with no side effects, however, sustained operation at the high functional temperature will reduce expected operational life. The data sheet specifications are not guaranteed over the functional temperature range.

(11) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.

(12) Water Washability - Calex DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.

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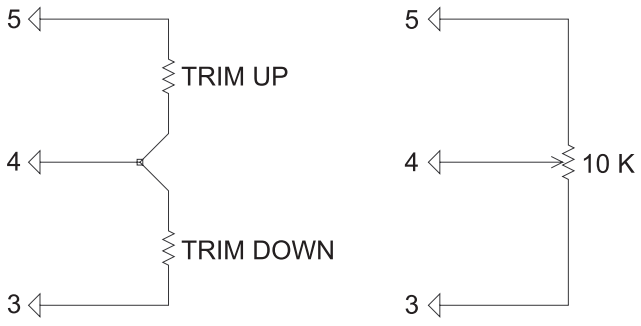
General Specifications*			
All Models			**Units**
ON/OFF Function (9)			
ON Logic Level or Leave Pin Open	MIN	5.5	VDC
OFF Logic Level	MAX	0.8	VDC
Input Resistance	TYP	100	kohms
Converter Idle Current, Shut Down Pin Low	TYP	5	mA
Isolation			
Isolation Voltage Input to Either Output Single to Dual Output 10µA Leakage	 MIN MIN	 500 250	VDC
Input to Output Capacitance	TYP	160	pF
Output Trim Function			
Input Resistance	TYP	20	kohms
Proigramming Range	MIN	±10	%
Environmental			
Case Operating Range No Derating	MIN MAX	-25 80	°C
Case Funtional Range (10)	MIN MAX	-40 90	°C
Storage Range	MIN MAX	-55 100	°C
Thermal Impedance (11)	TYP	3.4	°C/Watt
Thermal Shutdown Case Temperature	TYP	90	°C
General			
Unit Weight		10.5	oz.
Mounting Kit		MS10	

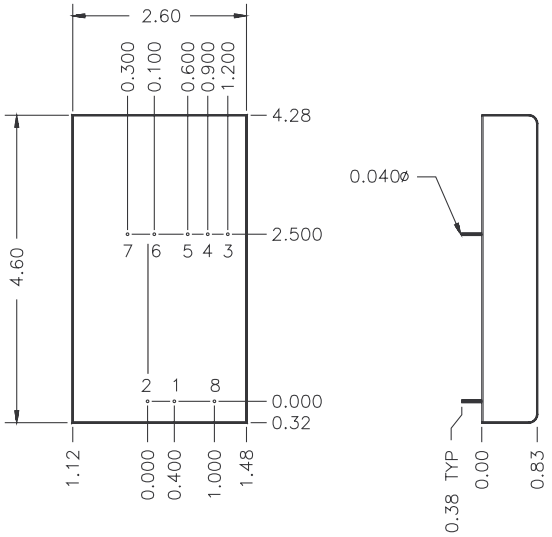
If the sense leads are not used they must be connected to their respective output pins (i.e. Pin 3 to Pin 6 and Pin 5 to Pin 7).

Either a fixed resistor or a trimpot can be used for adjusting the output voltage as shown in Figure 1.

The XW Single Output Series can be directly paralleled for higher output current. The circuit shown in Figure 2 results in output currents that differ by less than 10% between the two units. With the addition of an OPAMP active trim as shown in Figure 3, the current sharing will be as good as the match between the current sense resistors. A minimum load of 100mA should be used with these circuits.

Figure 1. CONNECTIONS FOR OUTPUT TRIM





BOTTOM VIEW SIDE VIEW

Mechanical tolerances unless otherwise noted:

X.XX dimensions: ±0.020 inches

X.XXX dimensions: ±0.005 inches

Seal around terminals is not hermetic. Do not immerse units in any liquid.

Pin	Function
1	+INPUT
2	-INPUT
3	+SENSE
4	OUTPUT TRIM
5	-SENSE
6	+OUTPUT
7	CMN
8	ON/OFF

Figure 2. SIMPLE PARALLEL CIRCUIT

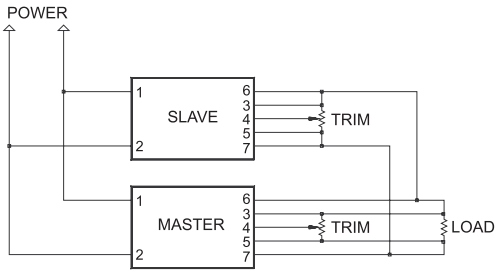
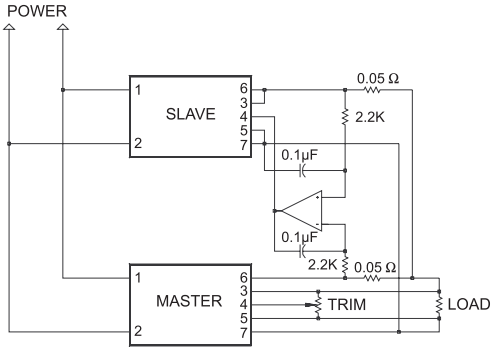


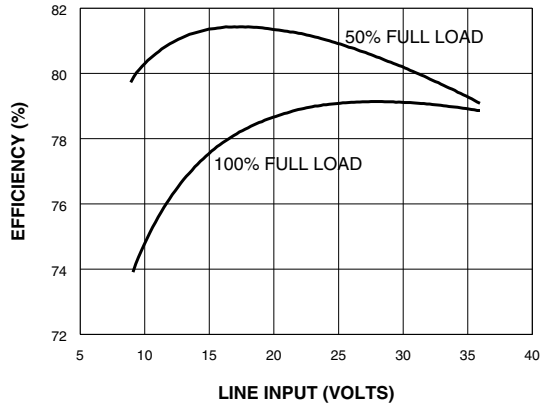
Figure 3. OPTIMUM PARALLEL CIRCUIT



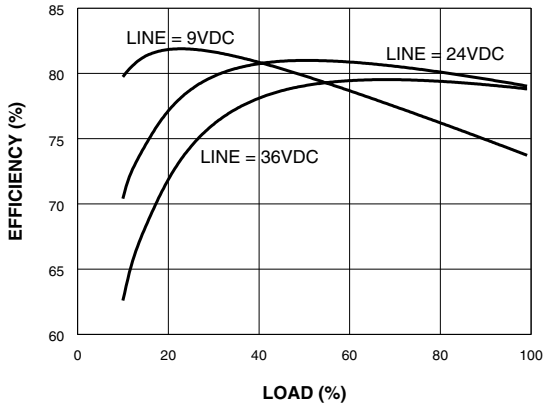
25 to 30 Watt XW Single Series DC/DC Converters

Typical Performance (Tc=25°C, Full Rated Load).

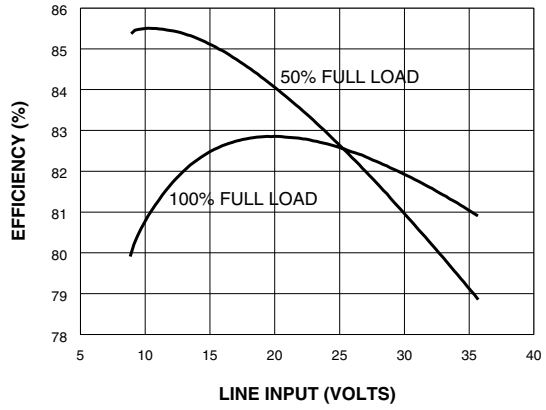
24S5.5000XW EFFICIENCY Vs. LINE INPUT



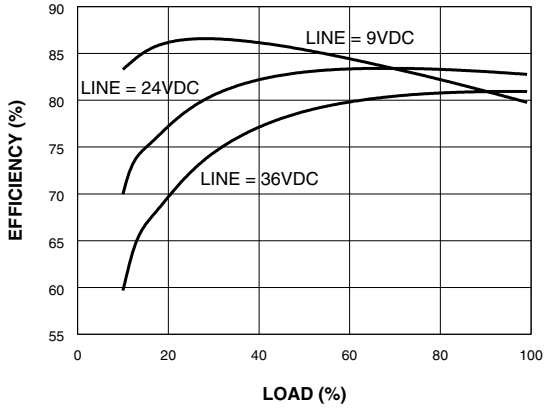
24S5.5000XW EFFICIENCY Vs. LOAD



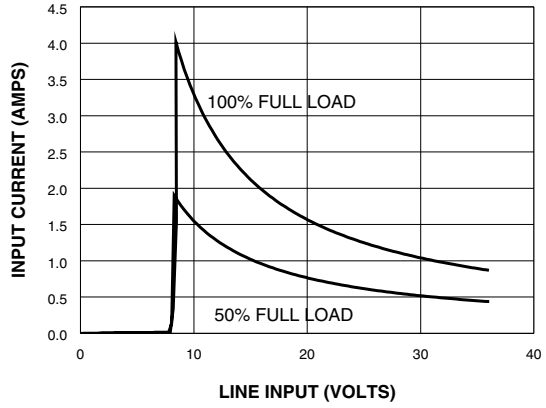
24S15.2000XW EFFICIENCY Vs. LINE INPUT



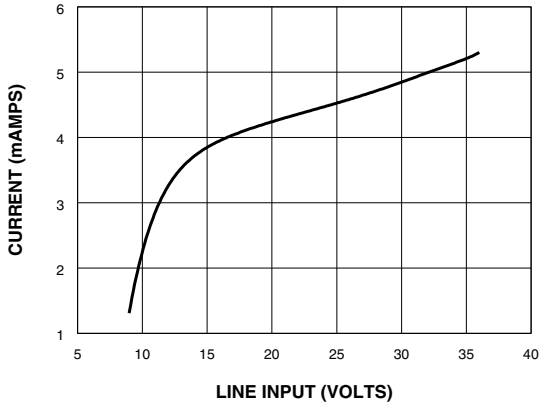
24S15.2000XW EFFICIENCY Vs. LOAD



24S INPUT CURRENT Vs. LINE INPUT VOLTAGE



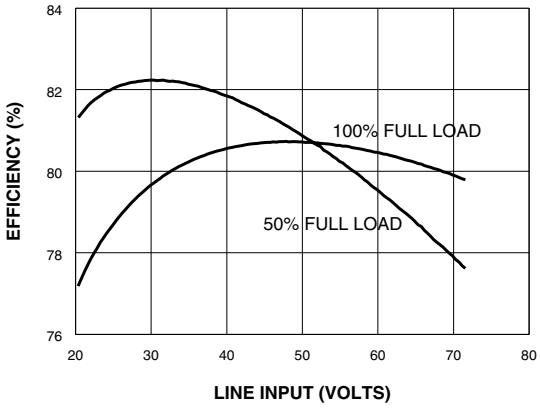
24S5.5000XW IDLE CURRENT Vs. LINE INPUT



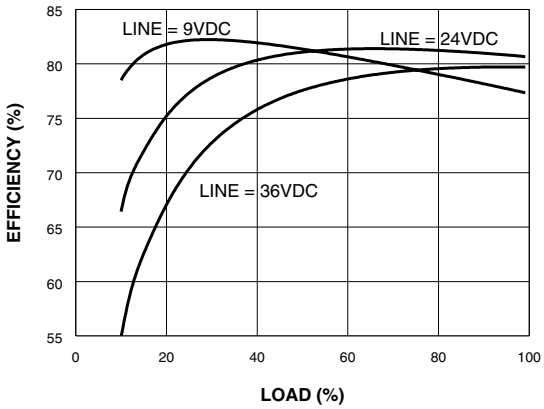
25 to 30 Watt XW Single Series DC/DC Converters

Typical Performance (Tc=25°C, Full Rated Load).

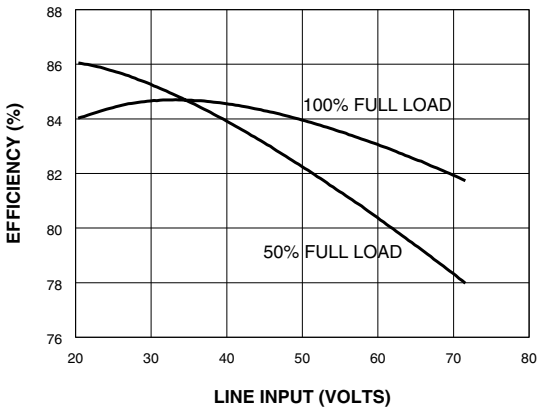
48S5.5000XW EFFICIENCY Vs. LINE INPUT



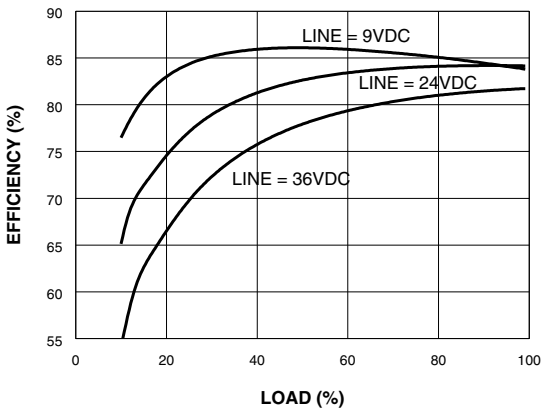
48S5.5000XW EFFICIENCY Vs. LOAD



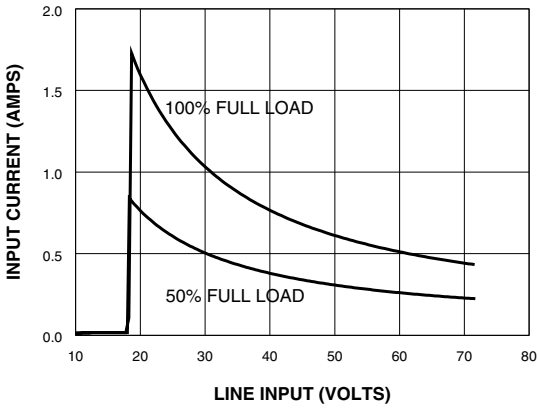
48S15.2000XW EFFICIENCY Vs. LINE INPUT



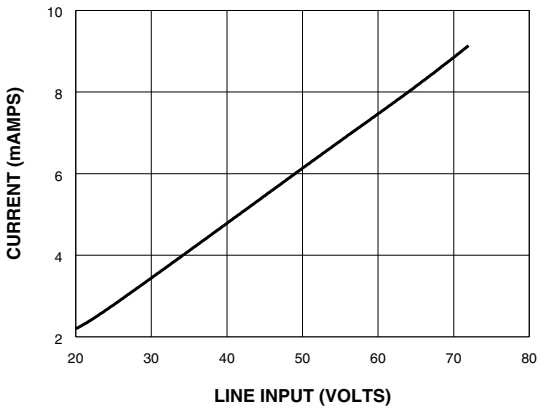
48S15.2000XW EFFICIENCY Vs. LOAD



48S INPUT CURRENT Vs. LINE INPUT VOLTAGE

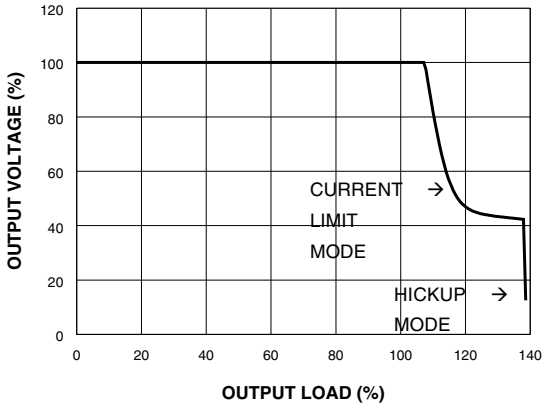


48S5.5000XW IDLE CURRENT Vs. LINE INPUT

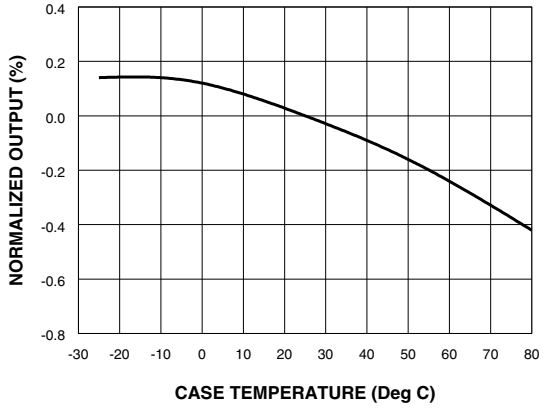


Typical Performance (Tc=25°C, Full Rated Load).

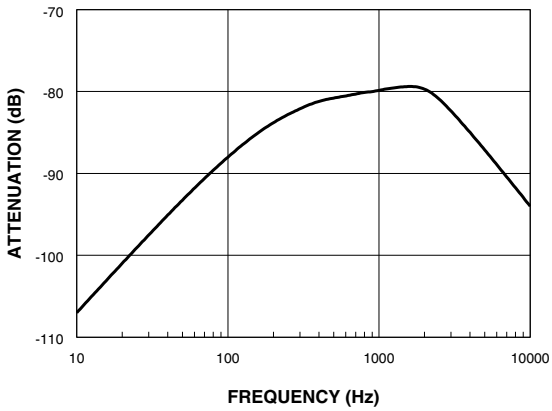
OUTPUT VOLTAGE Vs. OUTPUT LOAD



OUTPUT VOLTAGE Vs. CASE TEMPERATURE



48S5.5000XW LINE TO OUTPUT TRANSFER FUNCTION



OUTPUT IMPEDANCE Vs. FREQUENCY