



FEATURES

- Halogen Free
- Patents pending
- Lower Profile
- UL60950 Recognition pending
- UL60101 Recognition pending
- 3kVDC Isolation “Hi Pot Test”
- Substrate Embedded Transformer
- Automated Manufacture
- Industry Standard Footprint
- Short Circuit Protection

PRODUCT OVERVIEW

The NXE1 series is a new range of low cost, lower profile, fully automated manufacture surface mount DC/DC converters. The NXE1 series automated manufacturing process with substrate Embedded Transformer, offers increased product reliability and repeatability of performance in a halogen free, iLGA inspectable package. The NXE1 series, industry standard footprint is compatible with existing designs and offers the added benefit of short circuit protection.

The NXE1 series has a MSL rating 1, and is compatible with a peak reflow solder temperature of 260°C as per J-STD-020D.1.

SELECTION GUIDE

Order Code ¹	Nominal Input Voltage	Output Voltage	Output Current	Load Regulation (Typ)	Load Regulation (Max)	Output Ripple & Noise (Typ)	Output Ripple & Noise (Max)	Efficiency (Min)	Efficiency (Typ)	Isolation Capacitance	MTTF ²
	V	V	mA	%	%	mVp-p	mVp-p	%	%	pF	kHrs
NXE1S0505MC	5	5	200	7.8	10	28	50	65	69	8	5000

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 5V input types	4.5	5.0	5.5	V
Reflected ripple current			7.5	15	mA p-p

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Flash tested for 1 second	3000			VDC
Resistance	Viso= 1000VDC	10			GΩ

GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All output types		120		kHz

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated power	T _A =-40°C to 85°C			1.0	W
Voltage set point accuracy	See tolerance envelope				
Line regulation	High V _{IN} to low V _{IN}		1.1	1.2	%/%
Ripple and noise	BW=DC to 20MHz		47	64	mV p-p

TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		85	°C
Storage		-50		125	
Product temperature rise above ambient	All output types				
Cooling	Free air convection				

ABSOLUTE MAXIMUM RATINGS

Input voltage V _{IN} , NXE1S05 types	7V
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1. Components are supplied in tape and reel packaging, please refer to package specification section.
 2. Calculated using MIL-HDBK-217 FN2 calculation model with nominal input voltage at full load.
- All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

TECHNICAL NOTES**ISOLATION VOLTAGE**

'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage' are all terms that relate to the same thing, a test voltage, applied for a specified time, across a component designed to provide electrical isolation, to verify the integrity of that isolation.

Murata Power Solutions NXE1 series of DC/DC converters are all 100% production tested at their stated isolation voltage. This is 3kVDC for 1 second.

A question commonly asked is, "What is the continuous voltage that can be applied across the part in normal operation?"

For a part holding no specific agency approvals, such as the NXE1 series, both input and output should normally be maintained within SELV limits i.e. less than 42.4V peak, or 60VDC. The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with several hundred volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

REPEATED HIGH-VOLTAGE ISOLATION TESTING

It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. The NXE1 series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enameled wire. While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation. Any material, including this enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

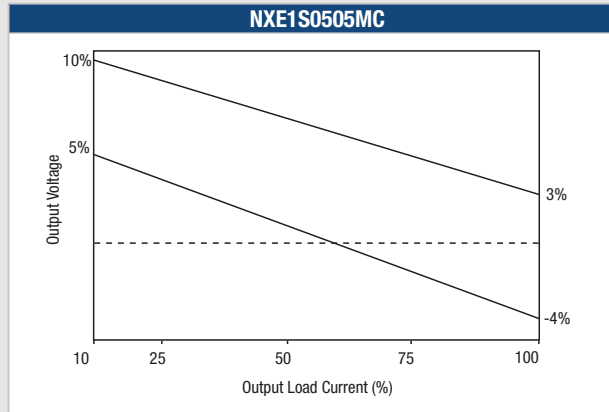
This consideration equally applies to agency recognized parts rated for better than functional isolation where the wire enamel insulation is always supplemented by a further insulation system of physical spacing or barriers.

RoHS COMPLIANCE, MSL AND PSL INFORMATION

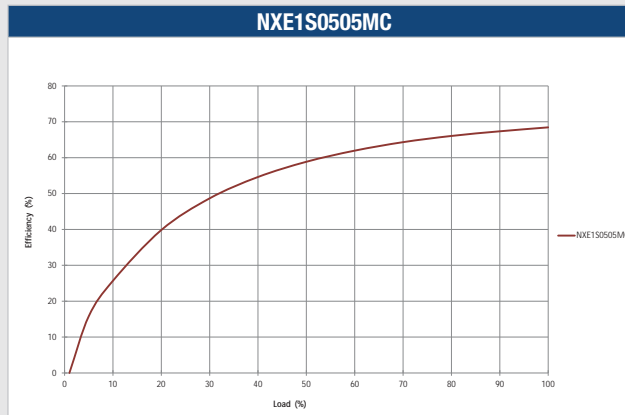
This series is compatible with RoHS soldering systems with a peak reflow solder temperature of 260°C as per J-STD-020D.1. The pin termination finish on this product series is gold over Nickel Pre-plate. The series is backward compatible with Sn/Pb soldering systems. The series has a Moisture Sensitivity Level (MSL) 1.

TOLERANCE ENVELOPES

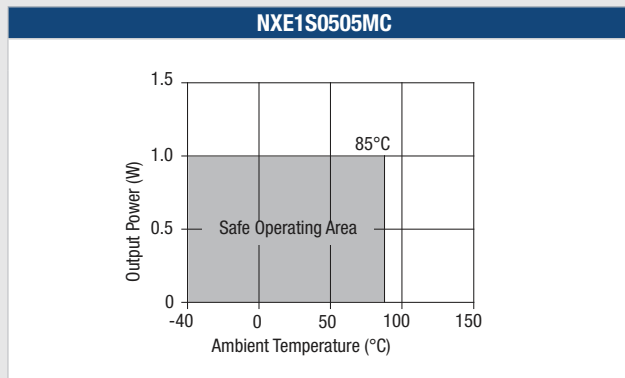
The voltage tolerance envelope shows typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading.



EFFICIENCY VS LOAD



TEMPERATURE DERATING GRAPH



APPLICATION NOTES

Advisory Notes

The NXE1 series is not hermetically sealed, customers should ensure that parts are fully dried before input power application.

The NXE1 has been tested to the following standards, which should not be exceeded for shock and vibration:

- BS EN 60068-2-64:2008 (Vibration Broadband Random)
- BS EN 60068-2-27:2009 (Mechanical Shock)

Minimum Load

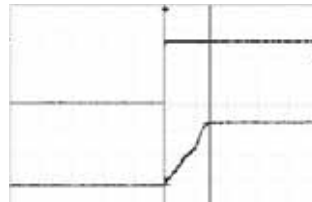
The minimum load to meet datasheet specification is 10% of the full rated load across the specified input voltage range. Lower than 10% minimum loading will result in an increase in output voltage, which may rise to typically double the specified output voltage if the output load falls to less than 5%.

Capacitive Loading & Start Up

Typical start up times for this series, with a typical input voltage rise time of 2.2µs and output capacitance of 10µF, are shown in the table below. The product series will start into a capacitance of 47µF with an increased start time, however, the maximum recommended output capacitance is 10µF.

	Start-up time	
	µS	
NXE1S0505MC	330	

Typical Start-Up Wave Form



Output Ripple Reduction

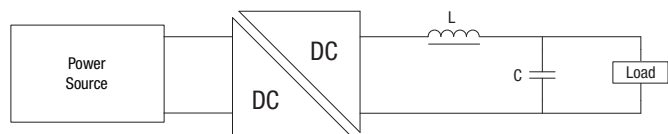
By using the values of inductance and capacitance stated, the output ripple at the rated load is lowered to 5mV p-p max.

Component selection

Capacitor: It is required that the ESR (Equivalent Series Resistance) should be as low as possible, ceramic types are recommended. The voltage rating should be at least twice (except for 15V output), the rated output voltage of the DC/DC converter.

Inductor: The rated current of the inductor should not be less than that of the output of the DC/DC converter. At the rated current, the DC resistance of the inductor should be such that the voltage drop across the inductor is <2% of the rated voltage of the DC/DC converter. The SRF (Self Resonant Frequency) should be >20MHz.

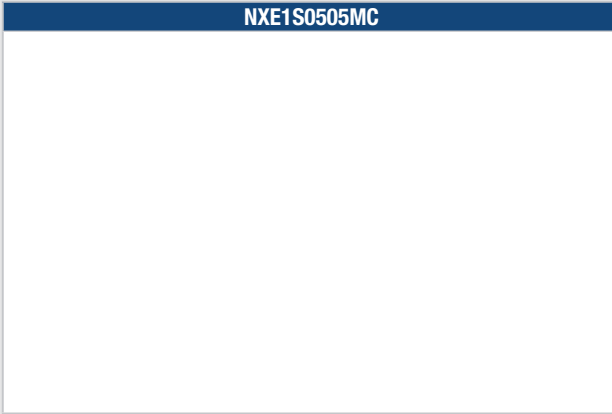
	Inductor			Capacitor
	L, µH	SMD	Through Hole	C, µF
NXE1S0505MC				



EMC FILTERING AND SPECTRA

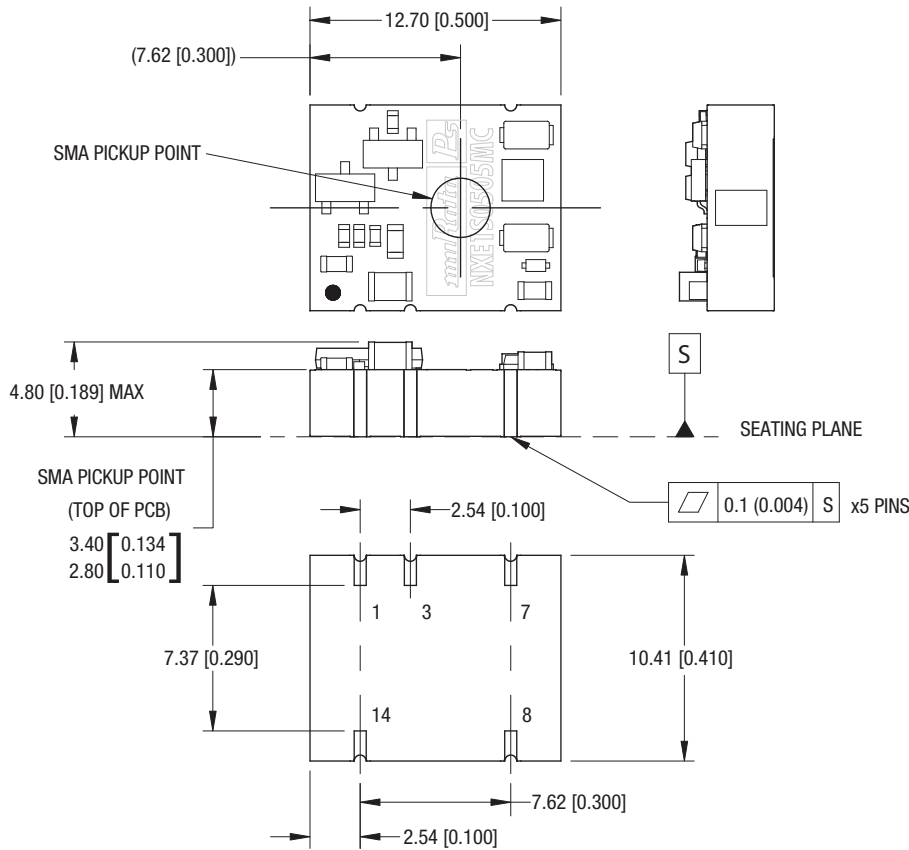
FILTERING

NXE1S0505MC



PACKAGE SPECIFICATIONS

Mechanical Dimensions



Pin Connections

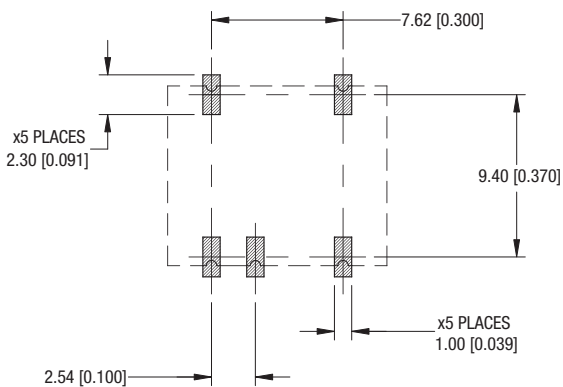
Pin	Function
1	-Vin
3	+Vin
7	-Vout
8	+Vout
14	NA

NA - Not available for electrical connection.

All dimensions in mm ± 0.25 mm (inches ± 0.01). All pins on a 2.54 (0.1) pitch and within ± 0.25 (0.01) of true position.

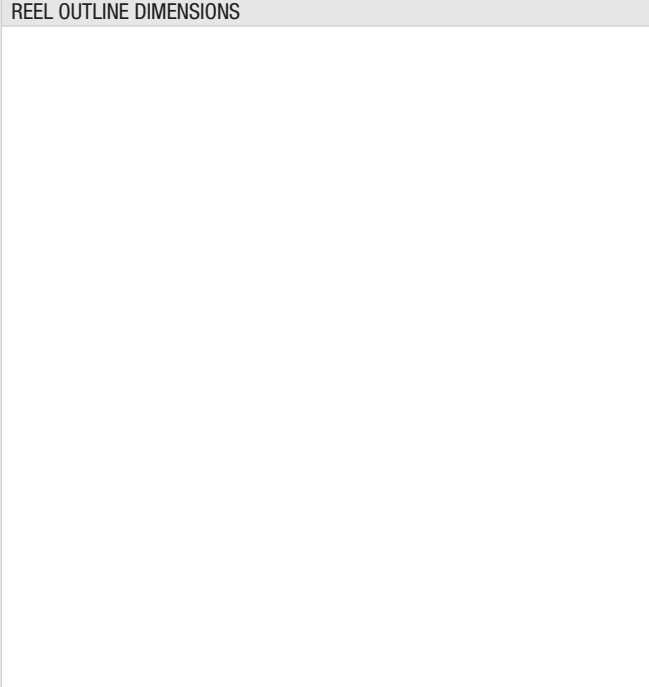
Weight: 1 g

Recommended Footprint Details



TAPE & REEL SPECIFICATIONS

REEL OUTLINE DIMENSIONS



TAPE OUTLINE DIMENSIONS



REEL PACKAGING DETAILS



Product Orientation
Pin 1, located nearest to
carrier drive sprocket.

Reel Quantity: 420 or 1000

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ISO 9001 and 14001 REGISTERED



This product is subject to the following [operating requirements](http://www.murata-ps.com/requirements/)
and the [Life and Safety Critical Application Sales Policy](http://www.murata-ps.com/requirements/):

Refer to: <http://www.murata-ps.com/requirements/>

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