

FEATURES :

- Small Footprint
- 22PIN SMD Package
- High Efficiency up to 80%
- Unregulated Output Types
- High Power Density
- Industry Standard Pinout
- Operating Temperature:-40°C TO +85°C
- No External Component Required

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

Part Number	Output Voltage	Output Current	Efficiency	Package Style	Recognized By UL 60950-1 :
	Vdc	mA	%TYP		
13DS1-XXS03NNL	3.3	303	65	1	13DS1-05S03NNL 13DS1-05S12NNL 13DS1-05S15NNL 13DS1-12S05NNL
13DS1-XXS05NNL	5	200	70	1	
13DS1-XXS09NNL	9	112	75	1	
13DS1-XXS12N2NL	12	84	78	2	
13DS1-XXS15N2NL	15	67	80	2	Recognized By UL 62368-1 :
13DS1-XXD03NNL	±3.3	±150	65	1	
13DS1-XXD05NNL	±5	±100	70	1	
13DS1-XXD09NNL	±9	±56	75	1	
13DS1-XXD12N2NL	±12	±42	78	2	
13DS1-XXD15N2NL	±15	±34	80	2	

Note:

- 1."XX" Is Input Voltage:03=3.3Vdc,05=5Vdc, 09=9Vdc,12=12Vdc,15=15Vdc.
- 2.Over 12Vdc,15Vdc input voltage, using the 2nd package.
- 3.The input voltage increases, there will be an increase in efficiency.

Input Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	Vo,Io Nom			±10	%
Filter	Capacitor				

Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% full load			±5	%
Short Circuit Protection	Short Term			1	Sec
Line Regulation	For 1.0% OF Vin		1.2		%
Load Regulation	3.3V (10% To 100% F.L)		15		%
Load Regulation	5V,9V (10% To 100% F.L)			12&8.0	%
Load Regulation	12V,15V (10% To 100% F.L)			8.5&7.0	%
Ripple & Noise	BW=DC To 20MHz			75	mVp-p
Transient response setting time	50% load step change		350		us

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DC-DC Converter

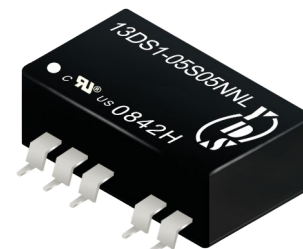
13DS1 SERIES

1Watt

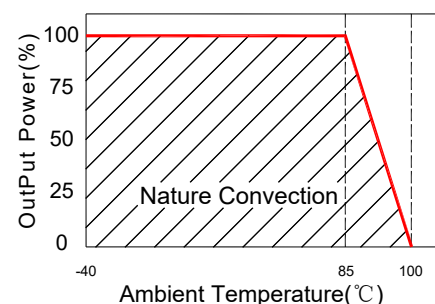
3KV Isolated

Single & Dual Output

SMD



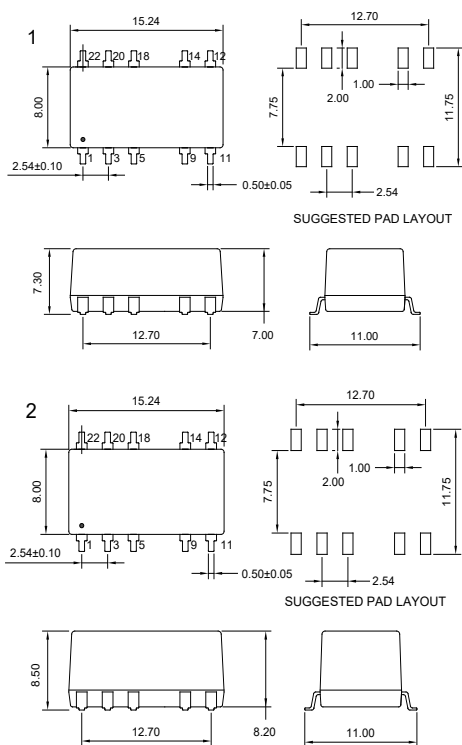
Temperature Derating Graph



General Specifications

Parameters	Conditions	Min	Typ	Max	Units
Isolation Resistance	500Vdc	1000			MΩ
Switching Frequency	Full load, nominal input		100		KHz
Operating Temperature		-40		+85	°C
Humidity	Non Condensing			95	%
Cooling	Free air Convection				
Case material	DAP				
MTBF	MIL-HDBK-217F @25°C	3500000			Hours
Weight	Package1 or Package2		1.36/1.5		g
Dimensions	Package 1		15.24x8.0x7.30		mm
Dimensions	Package 2		15.24x8.0x8.50		mm

Markings and Dimensions

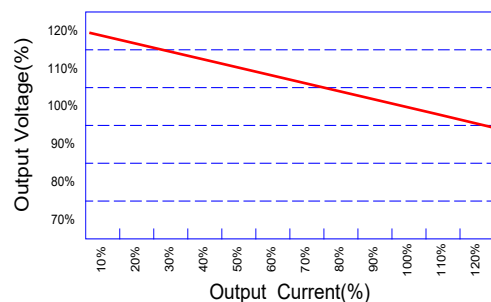


Unit : mm Unless otherwise specified, all tolerances are ±0.25

PIN Connection

PIN	1	3	5	9	11	12	14	18	20	22
Single	-Vin	+Vin	NC	-Vout	NC	NC	+Vout	NC	NC	NC
Dual	-Vin	+Vin	NC	Com	-Vout	NC	+Vout	NC	NC	NC

Tolerance Envelope Graph



Part Number

13DS1 - 05 S 12 N 2 NL
A B C D E F G

- A:Series
- B:Input Voltage
- C:Single(S)Dual(D)
- D:Output Voltage
- E:Unregulated(N)
- F:Package
- G:RoHS Version

Recommended Test Circuit

