



## 3D8W4\_1.6RP series

3Watt - 4:1 Regulated Single & Dual output

## DC-DC Converter

3 Watt

- ⊕ Wide input range (4:1)
- ⊕ Highest Power Density in 8 Pin DIL Package
- ⊕ 1.6kVDC isolation
- ⊕ Efficiency up to 84%
- ⊕ Full SMD Technology
- ⊕ Short circuit protection (SCP)
- ⊕ Operating temperature range: -40°C ~ +80°C
- ⊕ Remote on/off Control
- ⊕ Under Voltage Lock-Out Circuit

The 3D8W4\_1.6RP series is a family of cost effective and high performed 3W single & dual output DC-DC converters. These converters are built in non-conductive black plastic package in a 8-pin DIL miniature compact case with high performance features wide range devices operate over 4:1 input voltage range providing stable output voltage. Devices are encapsulated using flame retardant resin. Input voltages of 12, 24, 48 Vdc with output voltage of 3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$ ,  $\pm 15$  Vdc. High performance features include high efficiency operation up to 84% and output voltage accuracy of  $\pm 1\%$  maximum.



### Common specifications

Efficiency	See table,typ.
Short circuit protection:	Indefinite
Cooling:	Nature Convection
Operation temperature range:	-40°C~+80°C
Storage temperature:	-55°C~+125°C
Storage humidity range:	< 95% relH
Pin soldering resistance temperature:	300°C MAX, 1.5mm away from case for 10s.
Case material:	Non conductive black plastic (UL94V-0 rated)
MTBF (MIL-HDBK-217F@25°C):	>820,000 hours
Weight:	3.6g
Switing Frqeunchcy	100kHz,min.

### Input specifications

Voltage Range	See table
Start up Time (Nominal Vin and constant resistive load)	30ms, typ.
Input Current	See table
No-Load Input Current	See table
Input Filter	Capacitor
Input Reflected Ripple Current(5)	20mA pk-pk
Remote on/off	
ON:	open or high impedance
OFF:	2-4mA input current (via 1K)
Off stand by input current (Nominal Vin)	2.5mA, max.
Under Voltage Lockout	
12V Modes Module ON / OFF	4.2Vdc / 3.5Vdc, typ.
24V Modes Module ON / OFF	8.5Vdc / 7.0Vdc, typ.
48V Modes Module ON / OFF	17.5Vdc / 15.5Vdc, typ.

### Isolation specifications

Isolation voltage	1600VDC
Isolation resistance	500VDC 1000 MΩ
Isolation capacitance	1000M Ohm,min.

### Output specifications

Voltage accuracy	$\pm 1\%$
Maximun Output Current	See table
No load output voltage accuracy	%
Line regulation	$\pm 0.2\%$ ,max.
Load regulation	(From 0% to 100% Load) $\pm 1.0\%$ ,max.
Cross Regulation (Dual Output)(1)	$\pm 5\%$
Ripple & Noise (20 MHz bandwidth)(2)	Single 150mVpp,max. Dual 100mVpp,max.
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$
Capacitive Load(3)	See table
Transient Recovery Time (4)	500us, typ.
Transient response deviation(4)	$\pm 3\%$ , max. Single Output 3.3V, 5V: $\pm 5\%$ , max.

### EMC specifications

CE(8)	EN55032	CLASSA
RE	EN55032	CLASSA
ESD	IEC61000-4-2	perf. Criteria A
RS	IEC61000-4-3	perf. Criteria A
EFT(9)	IEC61000-4-4	perf. Criteria A
Surge(9)	IEC61000-4-5	perf. Criteria A
CS	IEC61000-4-6	perf. Criteria A
PFMF	IEC61000-4-8	perf. Criteria A

### Example:

#### 3D8W4\_1205S1.6RP

3 = 3Watt; D8 = DIP8; W4 = Wide input (4:1); 12 = 12Vin; 05 = 5Vout; S = Single output; 1.6= 1.6kVDC; R= Regulated output; P= Short circuit protection

### Note:

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within  $\pm 5\%$ .
- Ripple/Noise measured with a 10 $\mu\text{F}$  electrolytic capacitor and 0.1 $\mu\text{F}$  ceramic capacitor.
- Test by minimal Vin and constant resistive load.
- Test by normal Vin and 100%-25% load,25% load step change.
- Measured Input reflected ripple current with a simulated source inductance of 27 $\mu\text{H}$  and a source capacitor Cin (47 $\mu\text{F}$ , ESR<1.0 $\Omega$ ).
- "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
- Exceeding the absolute ratings of the unit could cause damage. It's not allowed for continuous operating ratings.
- Input filter components are required to help meet conducted emission class A, Which application refer to the EMI Filter(Conduct).
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. The filter capacitor Motien suggest: Nippon - chemi - con KY series, 220 $\mu\text{F}/100\text{V}$ .

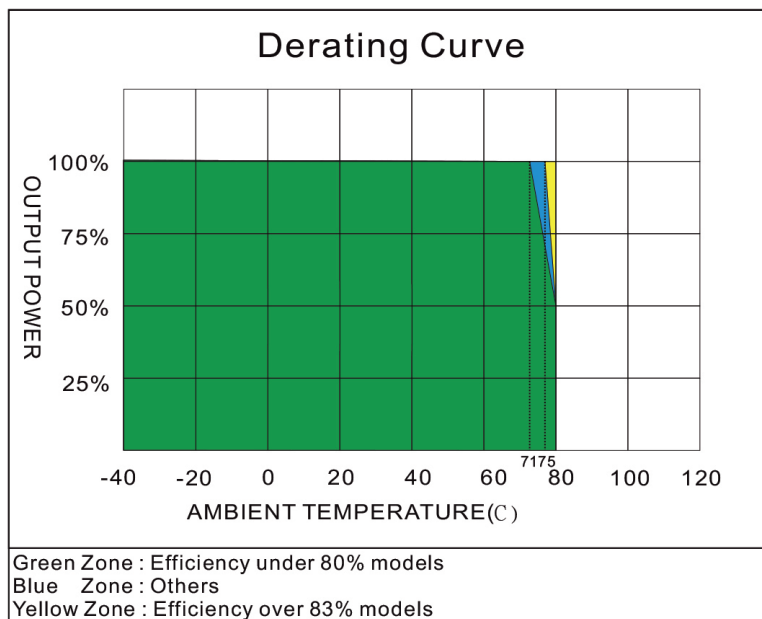
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Part Number	Input Voltage Range [V]	Input current [mA, max/min]	Output Voltage [VDC]	Output current [mA, max/min]	Efficiency [%; min/typ]	Capacitive load [ $\mu$ F]
3D8W4_1203S1.6RP	12 ( 4.5-18 )	257/30	3.3	700/0	75	3300
3D8W4_1205S1.6RP	12 ( 4.5-18 )	309/45	5	600/0	81	1680
3D8W4_1212S1.6RP	12 ( 4.5-18 )	301/55	12	250/0	83	470
3D8W4_1215S1.6RP	12 ( 4.5-18 )	301/60	15	200/0	83	330
3D8W4_1205D1.6RP	12 ( 4.5-18 )	313/30	$\pm$ 5	300/0	80	$\pm$ 1000
3D8W4_1212D1.6RP	12 ( 4.5-18 )	305/55	$\pm$ 12	125/0	82	$\pm$ 220
3D8W4_1215D1.6RP	12 ( 4.5-18 )	301/60	$\pm$ 15	100/0	83	$\pm$ 220
3D8W4_243R3S1.6RP	24 ( 9-36 )	127/25	3.3	700/0	76	3300
3D8W4_2405S1.6RP	24 ( 9-36 )	152/20	5	600/0	82	1680
3D8W4_2412S1.6RP	24 ( 9-36 )	149/30	12	250/0	84	470
3D8W4_2415S1.6RP	24 ( 9-36 )	149/35	15	200/0	84	330
3D8W4_2405D1.6RP	24 ( 9-36 )	154/25	$\pm$ 5	300/0	81	$\pm$ 1000
3D8W4_2412D1.6RP	24 ( 9-36 )	151/30	$\pm$ 12	125/0	83	$\pm$ 220
3D8W4_2415D1.6RP	24 ( 9-36 )	149/35	$\pm$ 15	100/0	84	$\pm$ 220
3D8W4_483R3S1.6RP	48 ( 18-75 )	65/10	3.3	700/0	74	3300
3D8W4_4805S1.6RP	48 ( 18-75 )	77/10	5	600/0	81	1680
3D8W4_4812S1.6RP	48 ( 18-75 )	77/15	12	250/0	81	470
3D8W4_4812S1.6RP	48 ( 18-75 )	77/15	12	250/0	81	470
3D8W4_4815S1.6RP	48 ( 18-75 )	76/15	15	200/0	82	330
3D8W4_4805D1.6RP	48 ( 18-75 )	79/20	$\pm$ 5	300/0	79	$\pm$ 1000
3D8W4_4812D1.6RP	48 ( 18-75 )	78/20	$\pm$ 12	125/0	80	$\pm$ 220
3D8W4_4815D1.6RP	48 ( 18-75 )	78/25	$\pm$ 15	100/0	80	$\pm$ 220

## Typical characteristics

Temperature derating graph

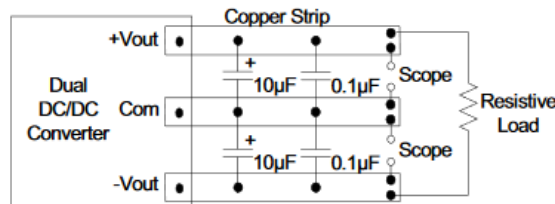
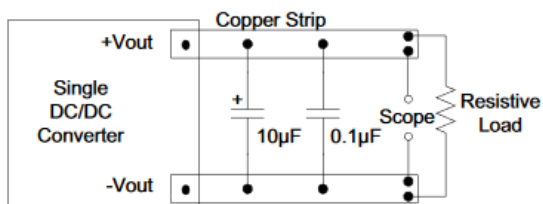


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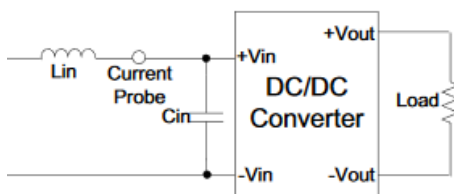
### Output Ripple & Noise Measurement Test

Use a 10µF electrolytic capacitor and 0.1µF ceramic capacitor.  
The Scope measurement bandwidth is 20MHz.



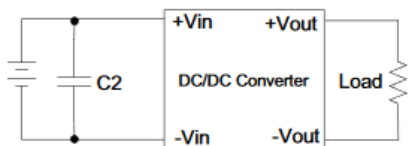
### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$  (27µH) and a source capacitor  $C_{in}$  (47µF, ESR<1.0Ω at 100KHz) at nominal input and full load.



### EFT/Surge Filter

Input filter components (C2) is used to help meet IEC .61000-4-4 and IEC61000-4-5

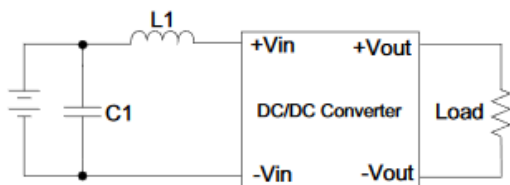


	C2
3D8W4_1.6RP	220µF,100V

### EMI Filter Conducted Emissions

Input filter components (C1,L1) are used to meet EMI test criterial A.

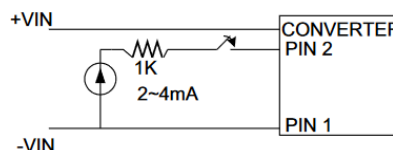
These components should be mounted as close as possible to the module; and all leads should be minimized to decrease



	C1	L1
3D8W4_12XXXXXX	1210,10µF,35V	2.2µH
3D8W4_24XXXXXX	1210,2.2µF,100V	
3D8W4_48XXXXXX	1210,4.7µF,100V	

### Remote ON / OFF Test Step

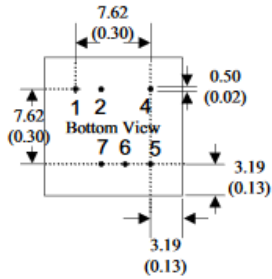
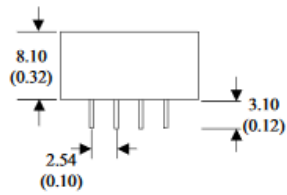
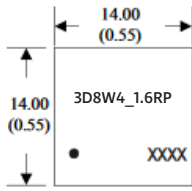
Input current(2~4mA) via 1KΩ to Pin2 , converter OFF.  
open or high impedance , converter ON



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### Mechanical dimensions



#### 8 Pin DIL Package

- Notes : All dimensions are typical in millimeters ( inches ).
1. Pin diameter:  $0.5 \pm 0.05$  (  $0.02 \pm 0.002$  )
  2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
  3. Pin to case tolerance:  $\pm 0.5$  (  $\pm 0.02$  )
  4. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

#### PIN CONNECTIONS

PIN NUMBER	SINGLE	DUAL
1	-V Input	-V Input
2	Remote On/ Off	Remote On/Off
4	+V Input	+V Input
5	+V Output	+V Output
6	N.P.	Common
7	-V Output	-V Output