FDD12 SERIES

DC - DC CONVERTER
10 ~ 12W SINGLE & DUAL OUTPUT

FEATURES

- LOW COST
- 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- INPUT Pi FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 YEARS WARRANTY

MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT (typ.)	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
Single Output Models								
FDD12 - 03S4	10~36 VDC	0.54 A	10 WATTS	+3.3 VDC	3000 mA	75%	78%	4700 μF
FDD12 - 05S4	10~36 VDC	0.64 A	12 WATTS	+ 5 VDC	2400 mA	77%	80%	4700 μF
FDD12 - 12S4	10~36 VDC	0.63 A	12 WATTS	+ 12 VDC	1000 mA	77%	80%	1000 μF
FDD12 - 15S4	10~36 VDC	0.63 A	12 WATTS	+ 15 VDC	800 mA	77%	80%	470 μF
FDD12 - 03S5	18~72 VDC	0.26 A	10 WATTS	+3.3 VDC	3000 mA	77%	80%	4700 μF
FDD12 - 05S5	18~72 VDC	0.32 A	12 WATTS	+ 5 VDC	2400 mA	77%	80%	4700 μF
FDD12 - 12S5	18~72 VDC	0.32 A	12 WATTS	+ 12 VDC	1000 mA	77%	80%	1000 μF
FDD12 - 15S5	18~72 VDC	0.32 A	12 WATTS	+ 15 VDC	800 mA	77%	80%	470 μF
Dual Output Models								
FDD12 - 05D4	10~36 VDC	0.64 A	12 WATTS	± 5 VDC	± 1200 mA	77%	80%	± 2200 μF
FDD12 - 12D4	10~36 VDC	0.64 A	12 WATTS	± 12 VDC	± 500 mA	77%	80%	± 470 μF
FDD12 - 15D4	10~36 VDC	0.64 A	12 WATTS	± 15 VDC	± 400 mA	77%	80%	± 470 μF
FDD12 - 05D5	18~72 VDC	0.32 A	12 WATTS	± 5 VDC	± 1200 mA	77%	80%	± 2200 μF
FDD12 - 12D5	18~72 VDC	0.32 A	12 WATTS	± 12 VDC	± 500 mA	77%	80%	± 470 μF
FDD12 - 15D5	18~72 VDC	0.32 A	12 WATTS	± 15 VDC	± 400 mA	77%	80%	± 470 μF

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		200		KHz
Isolation voltage	Input - Output	1500			VDC
Isolation resistance	Input - Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / 1V			1000	PF
Ambient temperature	Operating at Vi nom, Io nom	-25		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+100	°C
Derating	Vi nom	See derating curve			
Storage temperature	Non operational	-40		+100	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			± 0.02	% / °C
Dimension		L50.8 x W50.8 x H12.0			mm
MTBF	Bellcore issue 6@40°C, GB		1040000		Hours
Cooling	Free air convection				

INPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Input voltage range	Ta min ...Ta max, Io nom		10	24	36	VDC
			18	48	72	VDC
No load input current	Vi nom, Io=0	24V models			20	mA
		48V models			15	mA
Input voltage w/o damage	Io nom	24V models			40	VDC
		48V models			75	VDC
Startup voltage	Io nom	24V models		9		VDC
		48V models		15		VDC
Input filter	Pi type					

OUTPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom				± 2	%
Minimum load	Vi nom	single output models	0			%
		dual output models (each output)	20			%
Line regulation	Io nom, Vi min ...Vi max				± 1	%
Load regulation	Vi nom, Io 0 ...Io nom, single output models				± 2	%
	Vi nom, Io min ...Io nom, dual output models				± 5	%
Cross regulation (Dual model)	Aymmetrical load 20% - 100% FL				± 5	%
Startup time	Vi nom, Io nom				30	ms
Transient recovery time	Vi nom, 1 ~ 0.5 Io nom				500	μs
Ripple & noise	Vi nom, Io nom, BW = 20MHz	3.3V model			100	mV
		5V, 12V, 15V & dual			Vout x ±1%	mV
Efficiency	Vi nom, Io nom, Po / Pi		Up to 80%, See model list and efficiency curve			

CONTROL AND PROTECTION

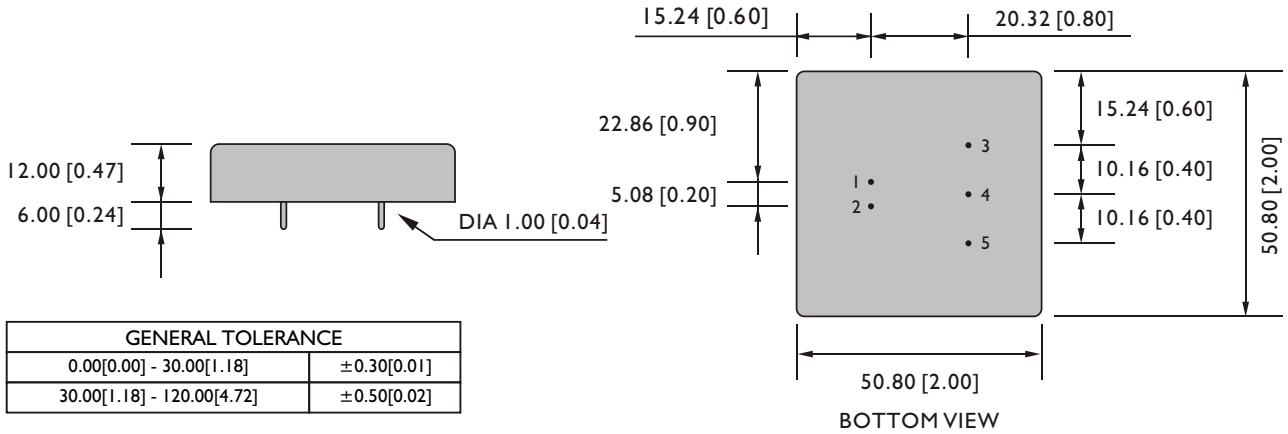
Input reversed	Shunt diode built in, external fuse recommended (24Vin : 1.5A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	110%min....140%max

PHYSICAL CHARACTERISTICS

Case size	50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches)
Case material	Plastic base / Metal case
Weight	70 g
Patting material	Epoxy

MECHANISM & PIN CONFIGURATION

mm [inch]



GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

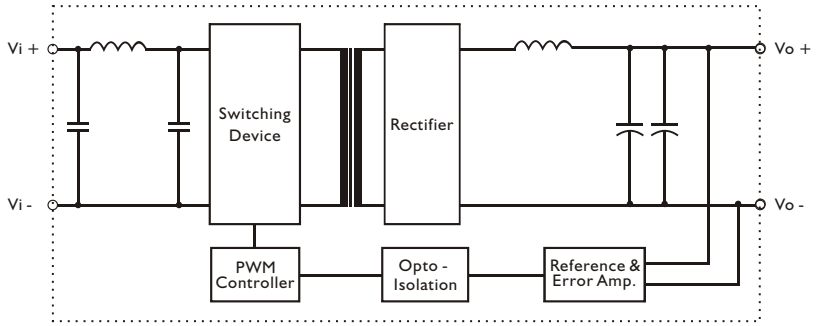
PIN ASSIGNMENT

GENERAL

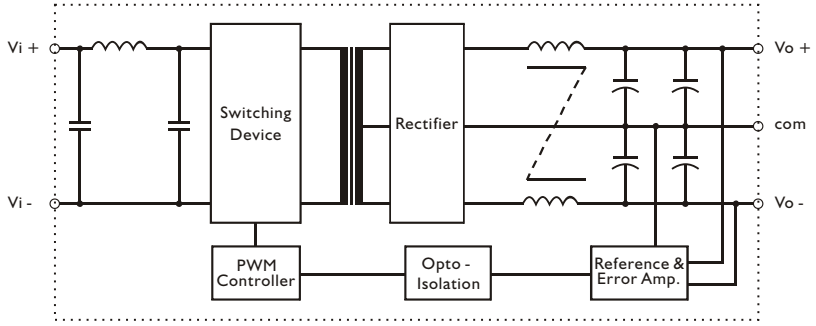
PIN NO.	1	2	3	4	5
SINGLE	Vi+	Vi -	Vo+	NO PIN	Vo -
DUAL	Vi+	Vi -	Vo+	com	Vo -

CIRCUIT SCHEMATIC

• Block diagram for FDD12 series with single output

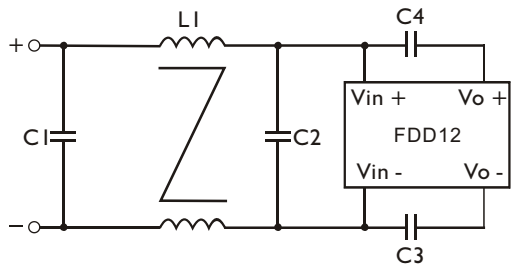


• Block diagram for FDD12 series with dual output



RECOMMENDED CIRCUIT

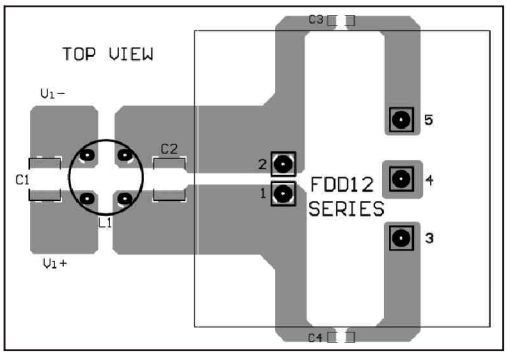
• Recommended filter for EN55022 Class B compliance



• The commponents used in the above figure, together with the manufacturer part numbers for these components, are as follows.

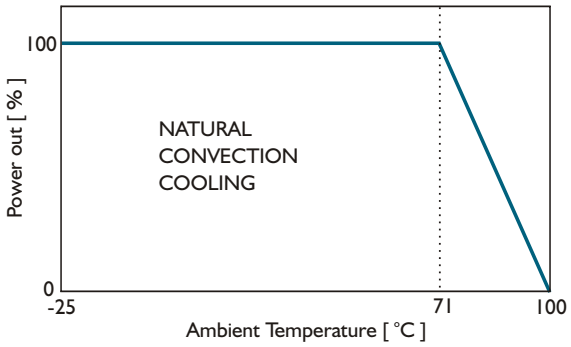
	C1	C2	C3	C4	L1
FDD12-XXX4	4.7μF / 50V MLCC	4.7μF / 50V MLCC	InF / 2KV MLCC	InF / 2KV MLCC	0.5mH Common Choke
FDD12-XXX5	6.8μF / 100V MLCC	6.8μF / 100V MLCC	InF / 2KV MLCC	InF / 2KV MLCC	0.5mH Common Choke

• Recommended EN 55022 Class B filter circuit layout.

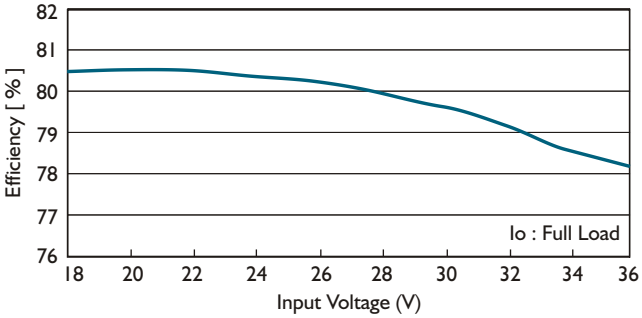


DERATING AND EFFICIENCY CURVE

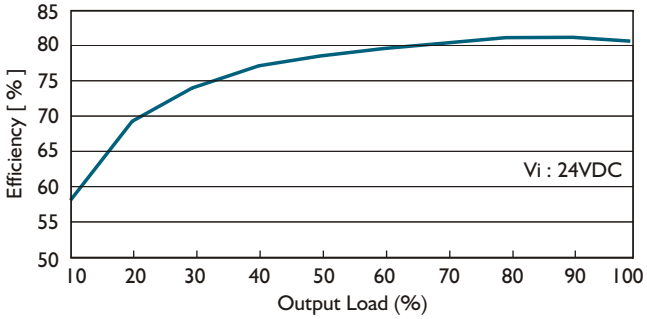
Temperature derating curve



Efficiency Vs Input Voltage
FDD12-05S4



Efficiency Vs Output Load
FDD12-05S4



FDD12 SERIES

DC - DC CONVERTER
12W TRIPLE OUTPUT

FEATURES

- LOW COST
- 4:1 WIDE INPUT RANGE
- I/O ISOLATION
- LC INPUT FILTER
- SHORT CIRCUIT PROTECTION
- HIGH PERFORMANCE
- 2 YEARS WARRANTY

MODEL LIST

MODEL NO.	INPUT VOLTAGE	INPUT CURRENT (typ.)	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
Triple Output Models								
FDD12 - 0512T4	10~36 VDC	0.62 A	12 WATTS	+5 / ±12 VDC	1.5A / ± 0.2 A	80%	82%	3500 μF / ±1000 μF
FDD12 - 0515T4	10~36 VDC	0.64 A	12 WATTS	+5 / ±15 VDC	1.5A / ± 0.16A	80%	82%	3500 μF / ±1000 μF
FDD12 - 0512T5	18~72 VDC	0.31 A	12 WATTS	+5 / ±12 VDC	1.5A / ± 0.2 A	80%	82%	3500 μF / ±1000 μF
FDD12 - 0515T5	18~72 VDC	0.31 A	12 WATTS	+5 / ±15 VDC	1.5A / ± 0.16A	80%	82%	3500 μF / ±1000 μF

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	Vi nom, Io nom		200		KHz
Isolation voltage	Input - Output	1500			VDC
Isolation resistance	Input - Output, @ 500VDC	100			MΩ
Isolation capacitance	100KHz / 1V			1000	PF
Ambient temperature	Operating at Vi nom, Io nom	-25		+ 71	°C
Case temperature	Operating at Vi nom, Io nom			+100	°C
Derating	Vi nom	See derating curve			
Storage temperature	Non operational	-40		+100	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			± 0.02	% / °C
Dimension		L50.8 x W50.8 x H12.0			mm
MTBF	Bellcore issue 6@40°C, GB		960000		Hours
Cooling	Free air convection				

INPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Input voltage range	Ta min ...Ta max, Io nom		10	24	36	VDC
			18	48	72	VDC
No load input current	Vi nom, Io=0	24V models			25	mA
		48V models			15	mA
Input voltage w/o damage	Io nom	24V models			40	VDC
		48V models			75	VDC
Startup voltage	Io nom	24V models		9.4		VDC
		48V models		15		VDC
Input filter	Pi type					

OUTPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom	+ 5V			± 2	%
		± 12V or ± 15V			± 6	%
Minimum load	Vi nom	+ 5V	10			%
		± 12V or ± 15V	20			%
Line regulation	Io nom, Vi min ...Vi max				± 2	%
Load regulation	Vi nom, Io min...Io nom	+ 5V			± 2	%
		± 12V or ± 15V			± 6	%
Cross regulation	Aymmetrical load 20% - 100% FL				± 6	%
Startup time	Vi nom, Io nom				30	ms
Transient recovery time	Vi nom, 1 ~ 0.5 Io nom				500	μs
Ripple & noise	Vi nom, Io nom, BW = 20MHz				Vout x ±1%	mV
Efficiency	Vi nom, Io nom, Po / Pi		Up to 82%, See model list and efficiency curve			

CONTROL AND PROTECTION

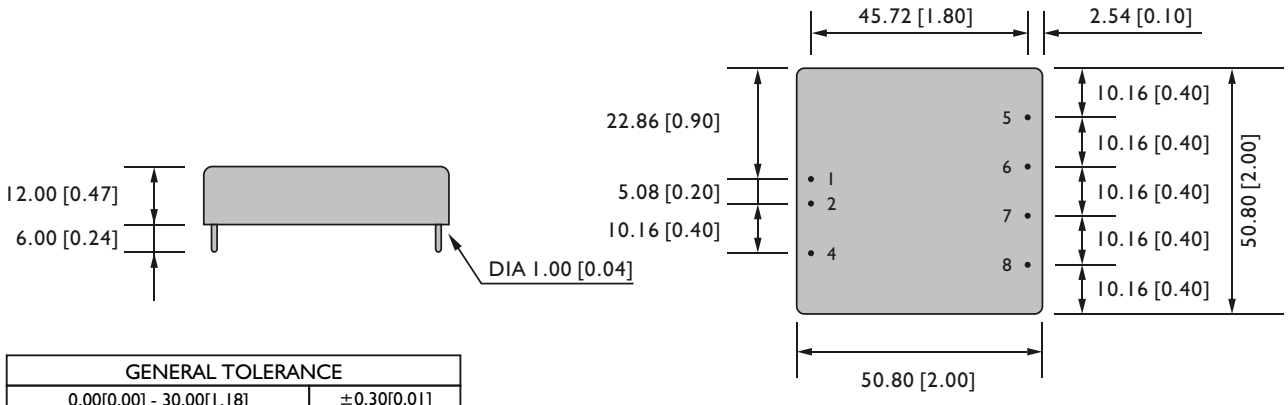
Remote ON / OFF	ON : opened or 8 ~ 10VDC applied, reference to input GND OFF : -0.3 ~ 2VDC applied, reference to input GND
Input reversed	Shunt diode built in, external fuse recommended (24Vin : 1.5A, 48Vin : 1A)
Output short circuit	Current limited (Auto-recovery)
Rated over load protection	110%min....140%max

PHYSICAL CHARACTERISTICS

Case size	50.8 x 50.8 x 12.0 mm (2 x 2 x 0.47 inches)
Case material	Plastic base / Metal case
Weight	70 g
Patting material	Epoxy

MECHANISM & PIN CONFIGURATION

mm [inch]



GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

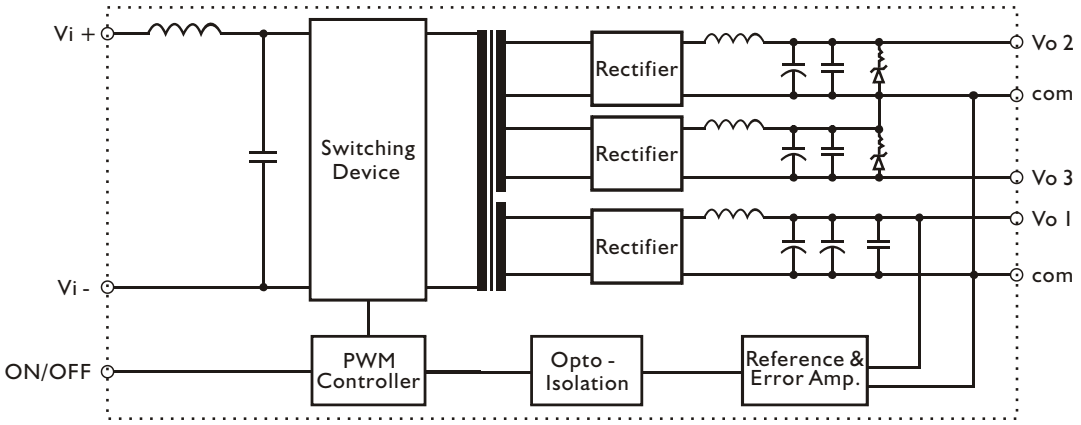
PIN ASSIGNMENT

GENERAL

PIN NO.	1	2	4	5	6	7	8
TRIPLE	Vi+	Vi -	ON / OFF	Vo2 (+ OUT)	Vo1 (+ 5V)	com	Vo3 (- OUT)

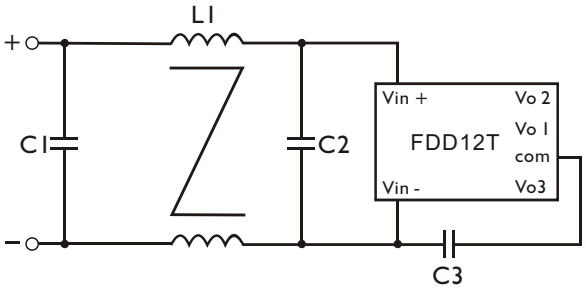
CIRCUIT SCHEMATIC

• Block diagram for FDD12T series with triple output



RECOMMENDED CIRCUIT

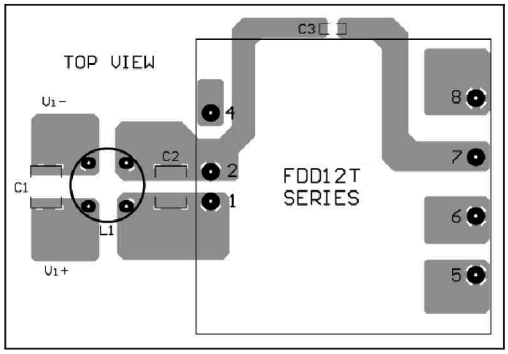
• Recommended filter for EN55022 Class B compliance



• The commponents used in the above figure, together with the manufacturer part numbers for these components, are as follows.

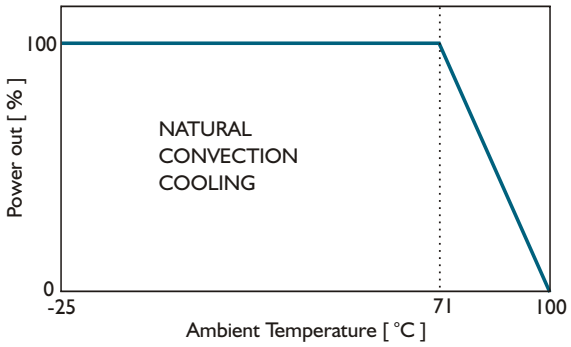
	C1	C2	C3	L1
FDD12-XXXXT4	3.3μF / 50V MLCC	3.3μF / 50V MLCC	InF / 2KV MLCC	0.5mH Common Choke
FDD12-XXXXT5	3.3μF / 100V MLCC	3.3μF / 100V MLCC	InF / 2KV MLCC	0.5mH Common Choke

• Recommended EN 55022 Class B filter circuit layout.

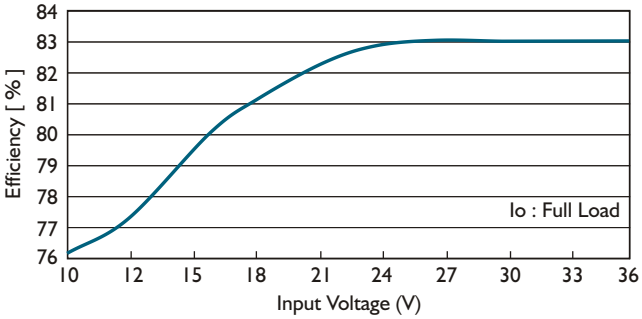


DERATING AND EFFICIENCY CURVE

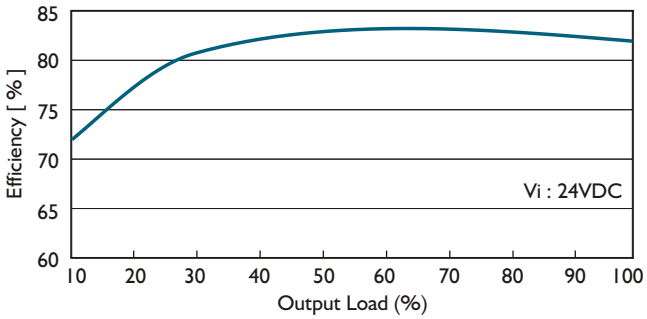
Temperature derating curve



Efficiency Vs Input Voltage
FDD12-0515T4



Efficiency Vs Output Load
FDD12-0515T4



OCEAN CHIPS
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Поставка электронных компонентов

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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения **«JONHON»**, а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов **«FORSTAR»**.

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«JONHON» (основан в 1970 г.)

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FORSTAR®

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