EC4SAWH SERIES
6 WATT 4:1 INPUT
ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 87.5%
- Fixed Switching Frequency
- Regulated Outputs
- Negative Remote On/Off
- 3000Vdc I/O Isolation
- Continuous Short Circuit Protection
- Safety Meets IEC/EN/UL 62368-1
- Shock & Vibration MIL-STD-810F Compliant

CE

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(3)	(2)	
EC4SAW-24S33HN	9-36 VDC	3.3 VDC	0 mA	1500 mA	4 mA	256 mA	81.5	80.5	4700 uF
EC4SAW-24S05HN	9-36 VDC	5 VDC	0 mA	1200 mA	4 mA	292 mA	85.5	85.5	2200 uF
EC4SAW-24S12HN	9-36 VDC	12 VDC	0 mA	500 mA	5 mA	291 mA	88	86	1100 uF
EC4SAW-24S15HN	9-36 VDC	15 VDC	0 mA	400 mA	5 mA	286 mA	88	87.5	470 uF
EC4SAW-24D05HN	9-36 VDC	±5 VDC	0 mA	±600 mA	4 mA	292 mA	85.5	85.5	1400 uF
EC4SAW-24D12HN	9-36 VDC	±12 VDC	0 mA	±250 mA	6 mA	291 mA	88	86	660 uF
EC4SAW-24D15HN	9-36 VDC	±15 VDC	0 mA	±200 mA	6 mA	289 mA	87	86.5	220 uF
EC4SAW-48S33HN	18-74 VDC	3.3 VDC	0 mA	1500 mA	3 mA	127 mA	81	81	4700 uF
EC4SAW-48S05HN	18-74 VDC	5 VDC	0 mA	1200 mA	3 mA	151 mA	84.5	83	2200 uF
EC4SAW-48S12HN	18-74 VDC	12 VDC	0 mA	500 mA	3 mA	145 mA	88	86.5	1100 uF
EC4SAW-48S15HN	18-74 VDC	15 VDC	0 mA	400 mA	3 mA	144 mA	88.5	87	470 uF
EC4SAW-48D05HN	18-74 VDC	±5 VDC	0 mA	±600 mA	4 mA	149 mA	85	84	1400 uF
EC4SAW-48D12HN	18-74 VDC	±12 VDC	0 mA	±250 mA	3 mA	144 mA	88	87	660 uF
EC4SAW-48D15HN	18-74 VDC	±15 VDC	0 mA	±200 mA	3 mA	144 mA	88	87	220 uF

NOTE:

1. Nominal Input Voltage 24 or 48VDC
2. Measured at Nominal Input Voltage
3. Measured at 12VDC for 24Vin, 24VDC for 48Vin

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Isolation Voltage	Remote On/Off Logic
EC4SAW	II	O	XX	L	Y
EC4SAW	24: 24 VDC 48: 48 VDC	S: Single D: Dual	33: 3.3VDC 05: 5.0VDC 12: 12VDC 15: 15VDC	H: 3000Vdc	N: Negative

Part Number Example:

EC4SAW-24S12HN: 6W, 4:1 9-36Vdc Input, Single 12Vdc Output, 3000VDC Isolation, Negative Logic,

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	24Vin 48Vin	-0.3 -0.3		36 74	V_{dc}
Input Surge Voltage	100ms max.	24Vin 48Vin			50 100	V_{dc}
Operating Ambient Temperature	With de-rating, above 61℃	Vo=3.3V Vo=5V Vo=±5V	-40		85	℃
	With de-rating, above 65℃	Vo=12V Vo=15V Vo=±12V Vo=±15V				
Maximum Case Temperature	At the center part of case plate	All			105	℃
Storage Temperature		All	-55		125	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		24Vin 48Vin	9 18	24 48	36 74	V_{dc}
Maximum Input Current	V_{in}=9V, Full load.	24Vin		0.8		A
	V_{in}=18V, Full load.	48Vin		0.4		
No-Load Input Current	V_{in}=24, 48V, Io=0A	See Model Number Table				mA
Input Filter	Capacitive	All				
Inrush Current (I^2t)	As per ETS300 132-2.	All			0.1	A^2s
Input Reflected Ripple Current	Vin=Nominal, L=12uH, C=47uF, Load=Full load	All		10		mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=24, 48V, Full load, Tc=25℃	All	-1.5		+1.5	%
Output Voltage Balance	V_{in}=24, 48V, Full load, Tc=25℃	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	Single Dual			±0.5 ±1.0	%
Line Regulation	V_{in}=High line to low line, full load	xxD05HN Others			±0.5 ±0.2	%
Cross Regulation	Asymmetrical load 25%/100%	Dual			±5.0	%
Temperature Coefficient	T_c=-40℃ to 85℃	All			±0.03	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, Tc=25℃	xxS15HN			120	mV
		Others			100	
Output Current Range	V_{in}= 9 to 36V, 18 to 74V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All		180		%
Short Circuit Protection		All		Continuous, Auto Recovery		
External Load Capacitance	Full load (resistive)	See Model Number Table				uF

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	Vin=24V, 48V	See Model Number Table				%

DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Current Transient						
Error Band	75% to 100% of I_{o_max} step load change d_i/d_t=0.1A/us (within 1% Vout nominal)	All			±5	%
Recovery Time		All			250	us
Turn-On Delay and Rise Time	Full load (Constant resistive load)					
Turn-On Delay Time, From On/Off Control	$V_{on/off}$ to 10%V_{o_set}, Remote on	All		15		ms
Turn-On Delay Time, From Input	V_{in_min} to 10%V_{o_set}, Power up	All		15		ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	All		8		ms

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% factory Hi-Pot tested @2sec.)	1 minute; Input to output,	All			3000	V_{dc}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		50		pF

FEATURE CHARACTERISTICS

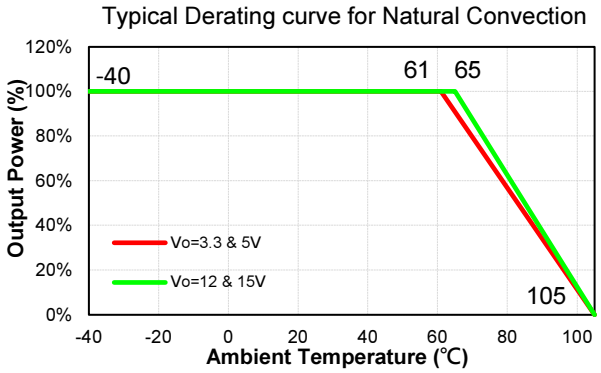
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse wide modulation (PWM), Fixed	All		580		KHz
On/Off Control, Negative Remote On/Off logic, Refer to –Vin pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}$	All	2		4	mA
Logic Low (Module On)	Pin open=On, high impedance	All				
Off Converter Input Current	Shutdown input idle current	All			2.5	mA

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of I_{o_max}; MIL-HDBK - 217F_Notice 1, GB, 25°C	All		1850		K hours
Weight		All		4.8		grams
Case Material	Non-Conductive Black Plastic, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Phosphor Bronze (C5191-H) Plating: Nickel and Bright Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	2000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
EMI	Meets EN55032 (with external filter)					Class A
ESD	Meets EN61000-4-2	Level 2: Air ±8kV, Contact ±4kV				Perf. Criteria A
Radiated immunity	Meets EN61000-4-3	Level 2: 80~1000MHz, 3V/m				Perf. Criteria A
Fast Transient	Meets EN61000-4-4	Level 2: On power input port, ±0.5kV, external input capacitor required				Perf. Criteria A
Surge	Meets EN61000-4-5	Level 2: Line to earth, ±1kV, Line to line, ±0.5kV, external input capacitor required				Perf. Criteria A
Conducted immunity	Meets EN61000-4-6	Level 2: 0.15~80MHz, 3V				Perf. Criteria A
Application Note Link						EC4SAWH Series App Notes
Packaging Information Link						Packaging Information

CHARACTERISTIC CURVE

Power Derating Curve



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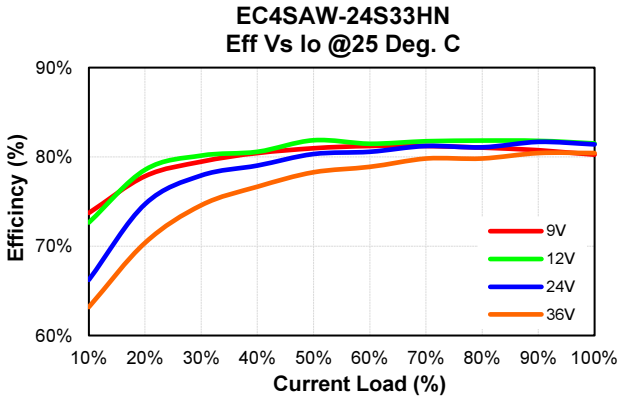
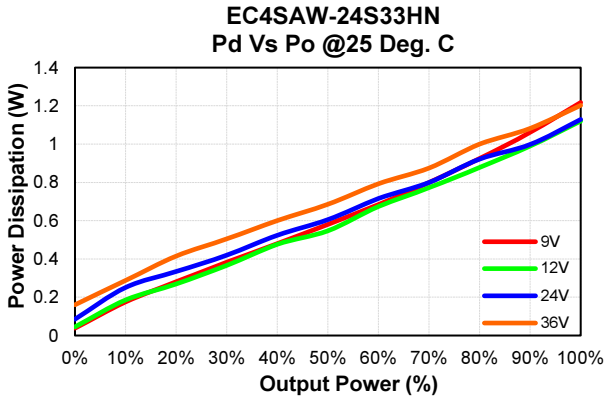
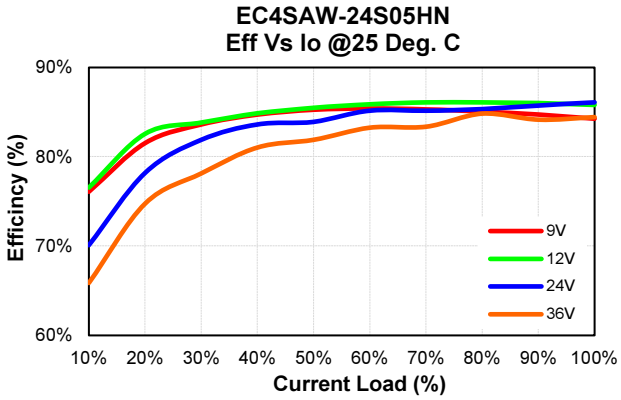
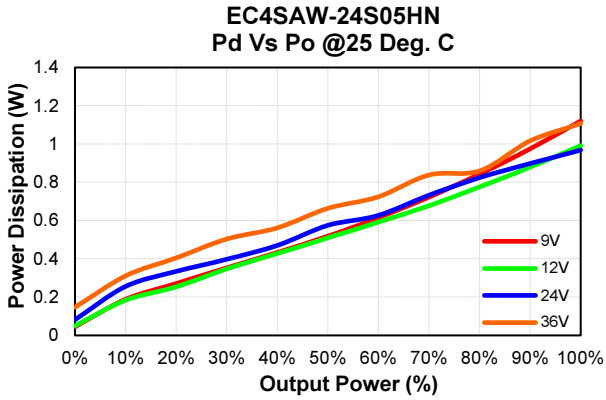


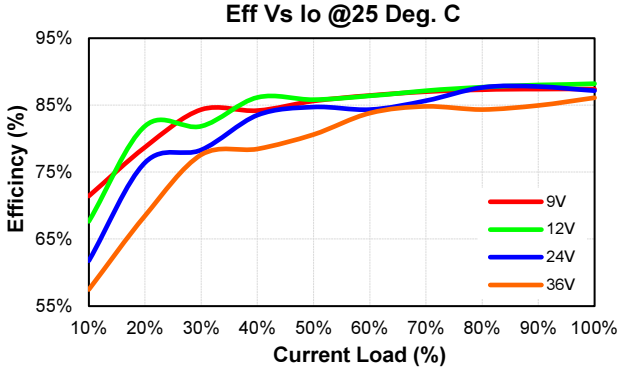




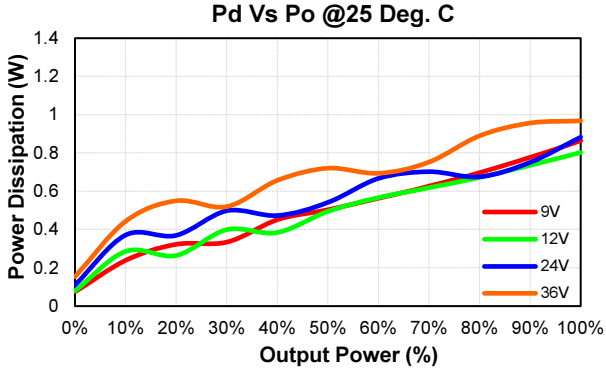


EC4SAWH Series

EC4SAW-24S12HN
Eff Vs Io @25 Deg. C



EC4SAW-24S12HN
Pd Vs Po @25 Deg. C



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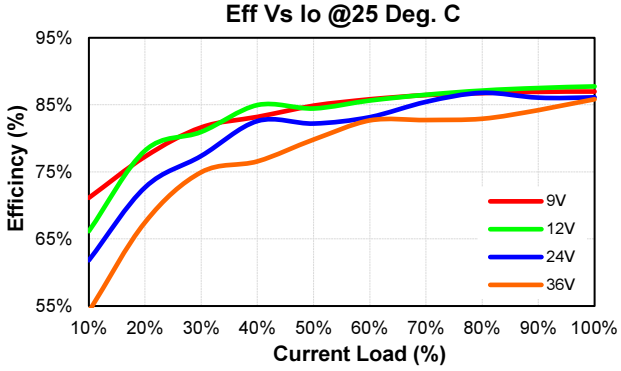

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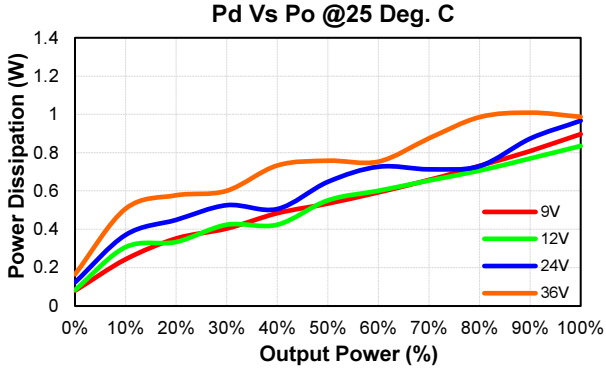

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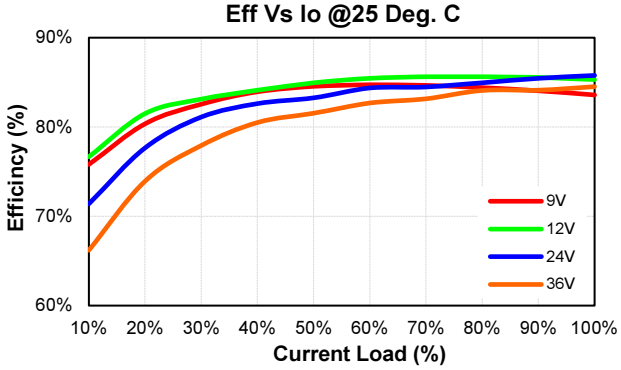

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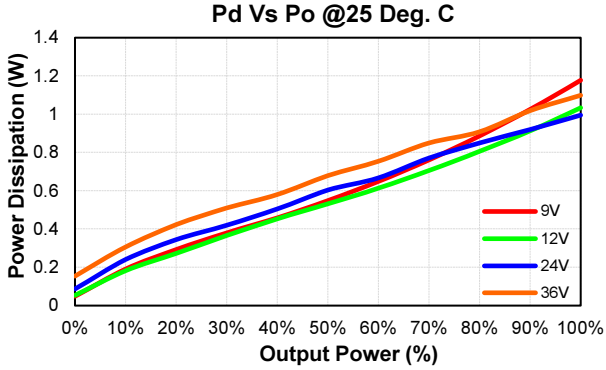

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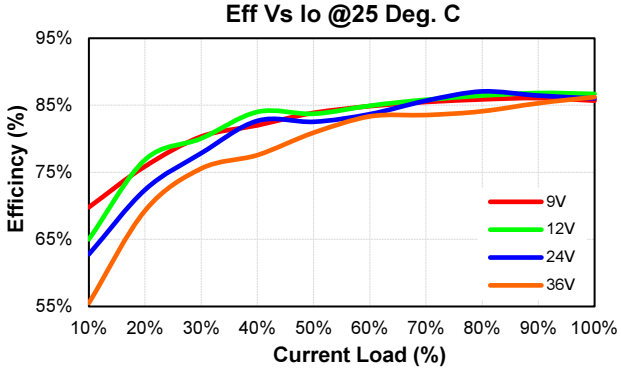

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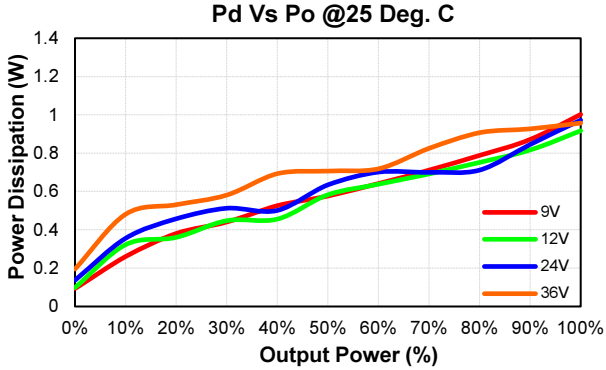

EC4SAWH Series

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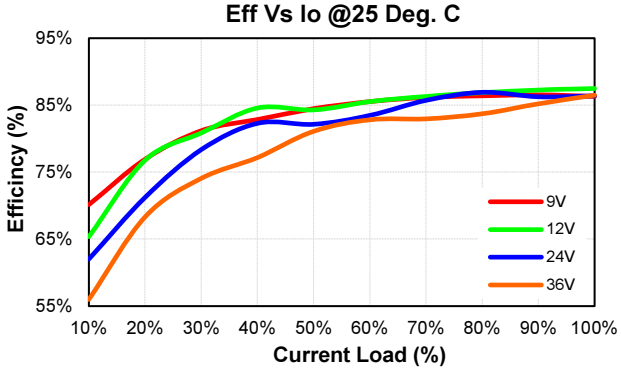

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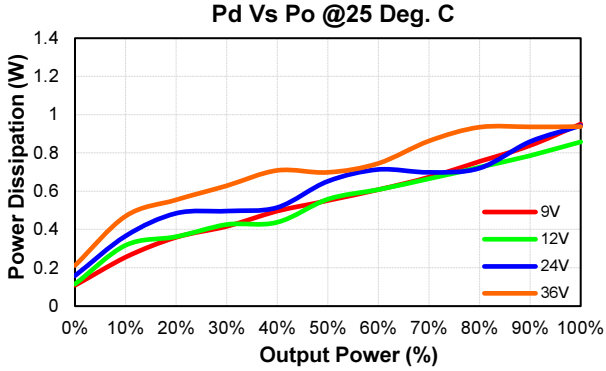

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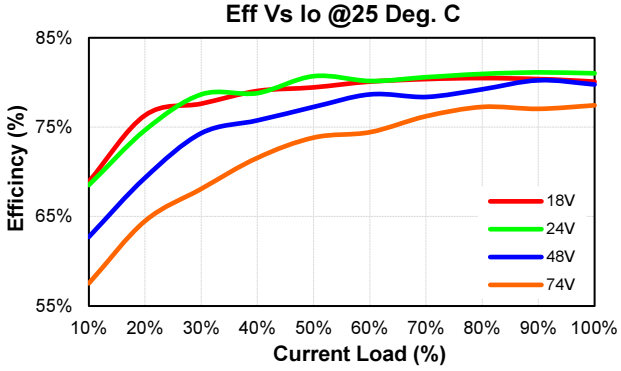

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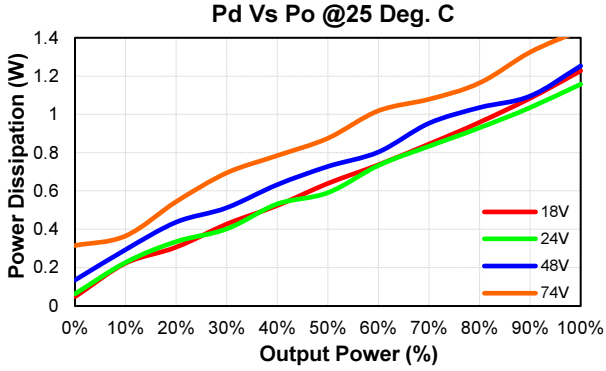

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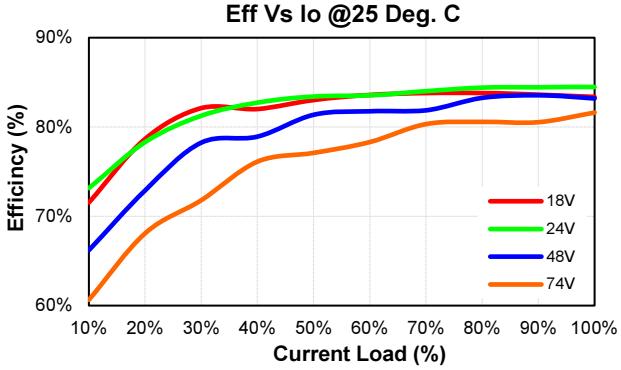

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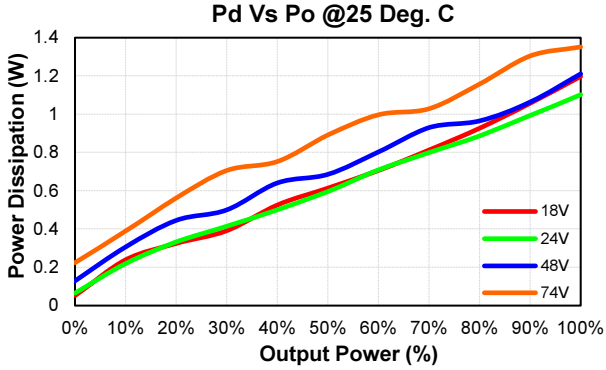

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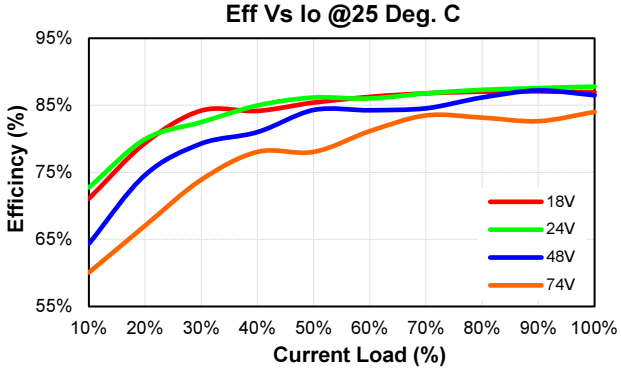

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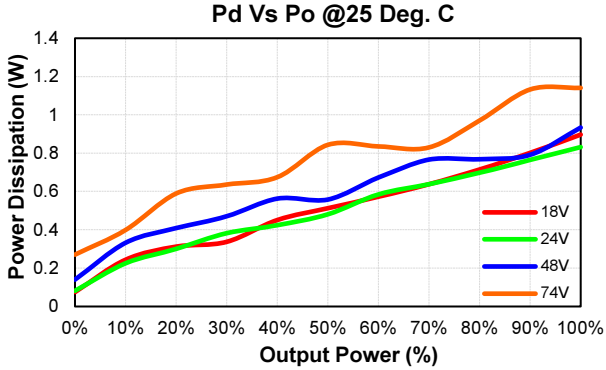

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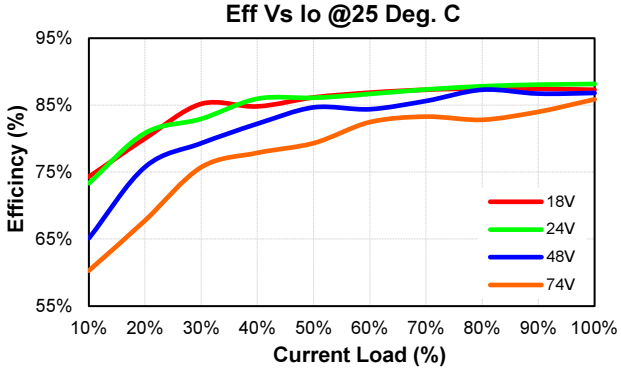

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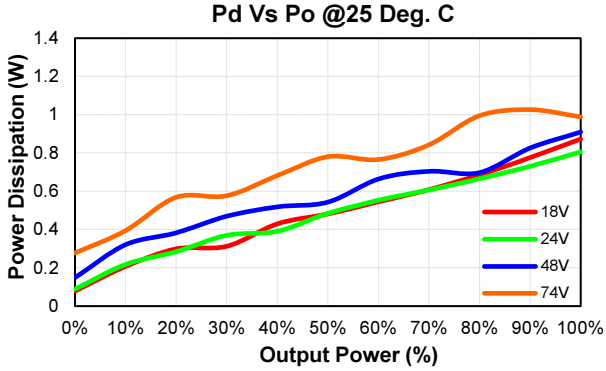

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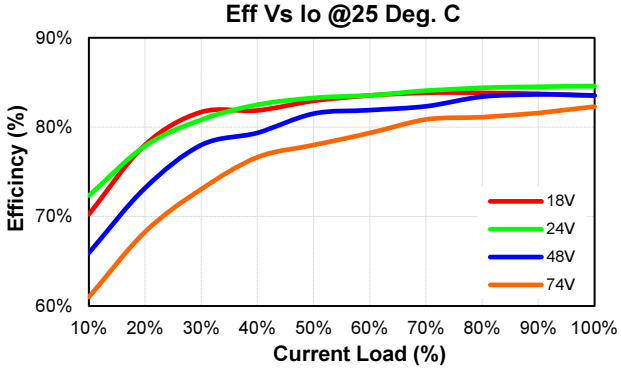

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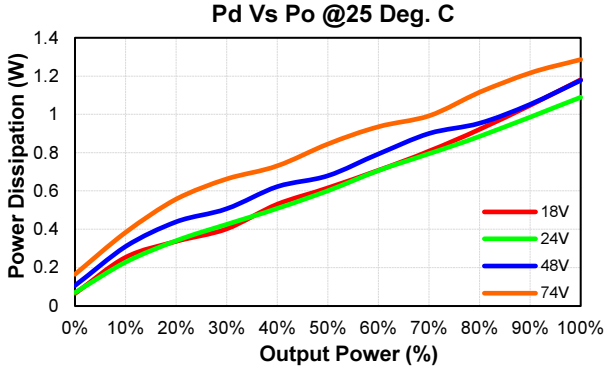

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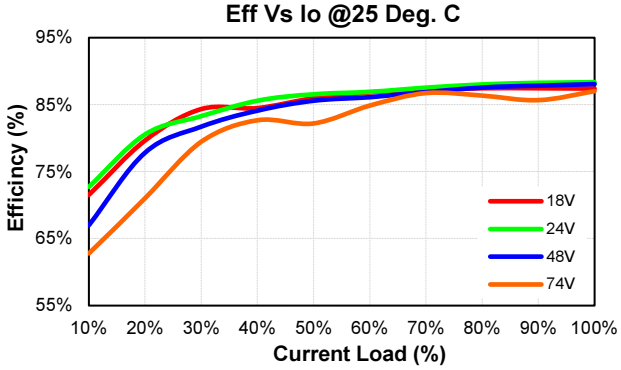

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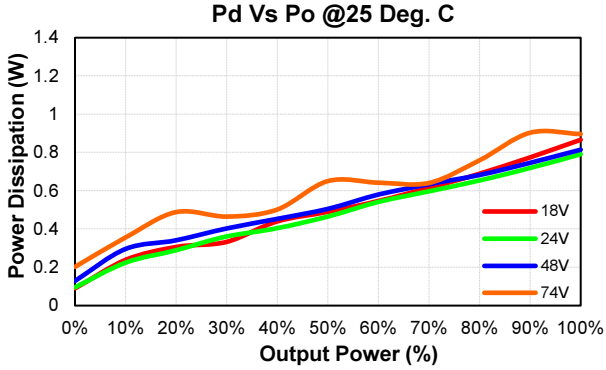

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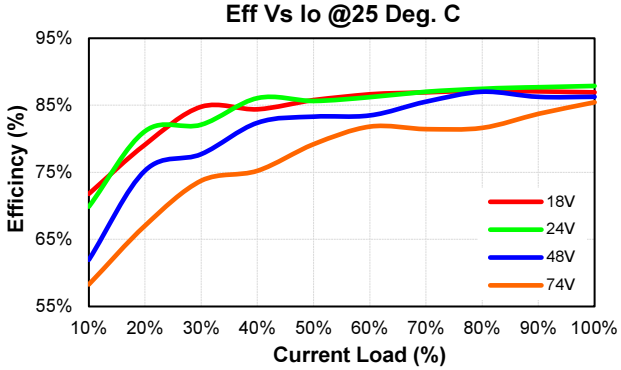

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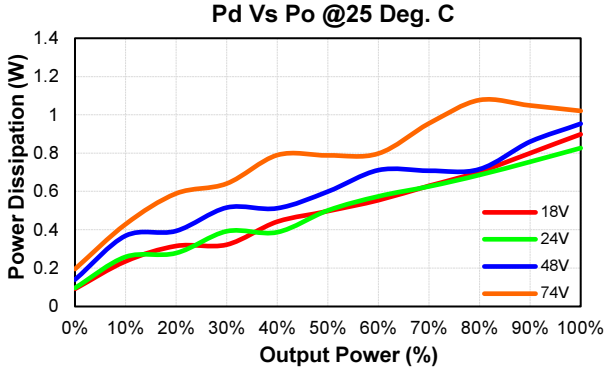
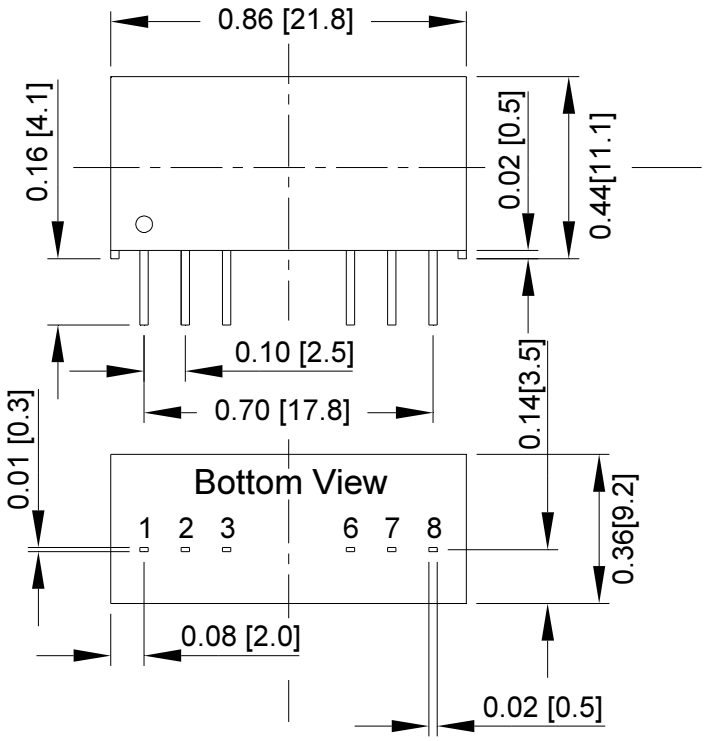


MECHANICAL SPECIFICATION



PIN CONNECTION		
Pin	Single	Dual
1	-V Input	-V Input
2	+V Input	+V Input
3	On/Off	On/Off
6	+V Output	+V Output
7	-V Output	Common
8	NC	-V Output

All Dimensions In Inches(mm)

Tolerances : Inches	millimeters
X.XX±0.02	X.X±0.5
Pin ±0.002	±0.05

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