EC3SAW SERIES
3 WATT 4:1 INPUT
ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 85%
- Regulated Outputs
- Positive Remote On/Off
- 1500Vdc I/O Isolation
- Continuous Short Circuit Protection
- Input Under Voltage Protection
- Safety Meets IEC/EN/UL 62368-1
- Shock & Vibration MIL-STD-810F Compliant

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
EC3SAW-24S33P	9-36 VDC	3.3 VDC	0 mA	700 mA	4 mA	122 mA	79	1800uF
EC3SAW-24S05P	9-36 VDC	5 VDC	0 mA	600 mA	4 mA	154 mA	81	1000uF
EC3SAW-24S12P	9-36 VDC	12 VDC	0 mA	250 mA	8 mA	150 mA	84	220uF
EC3SAW-24S15P	9-36 VDC	15 VDC	0 mA	200 mA	12 mA	150 mA	84	120uF
EC3SAW-24D05P	9-36 VDC	±5 VDC	0 mA	±300 mA	8 mA	154 mA	81	470uF
EC3SAW-24D12P	9-36 VDC	±12 VDC	0 mA	±125 mA	12 mA	150 mA	84	100uF
EC3SAW-24D15P	9-36 VDC	±15 VDC	0 mA	±100 mA	12 mA	151 mA	83	47uF
EC3SAW-48S33P	18-75 VDC	3.3 VDC	0 mA	700 mA	3 mA	61 mA	79	1800uF
EC3SAW-48S05P	18-75 VDC	5 VDC	0 mA	600 mA	3 mA	76 mA	82	1000uF
EC3SAW-48S12P	18-75 VDC	12 VDC	0 mA	250 mA	5 mA	74 mA	85	220uF
EC3SAW-48S15P	18-75 VDC	15 VDC	0 mA	200 mA	5 mA	75 mA	84	120uF
EC3SAW-48D05P	18-75 VDC	±5 VDC	0 mA	±300 mA	5 mA	76 mA	82	470uF
EC3SAW-48D12P	18-75 VDC	±12 VDC	0 mA	±125 mA	10 mA	75 mA	84	100uF
EC3SAW-48D15P	18-75 VDC	±15 VDC	0 mA	±100 mA	10 mA	75 mA	83	47uF

NOTE:

1. Nominal input voltage 24 or 48VDC.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
EC3SAW	II	O	XX	Y
EC3SAW	24 : 24VDC 48 : 48VDC	S : Single	33 : 3.3VDC 05 : 5.0VDC 12 : 12VDC 15 : 15VDC	P : Positive
		D : Dual	05 : ±5VDC 12 : ±12VDC 15 : ±15VDC	

Part Number Example:

EC3SAW-24S12P: 3W, 4:1 9-36Vdc Input, Single 12Vdc Output, Positive 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 75	V_{dc}
Input Surge Voltage	100ms max.	24Vin 48Vin			50 100	V_{dc}
Operating Ambient Temperature	With de-rating, above 71℃	All	-40		85	℃
Maximum Case Temperature	At the center part of case plate	All			100	℃
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 75	V_{dc}
Under Voltage Protection						
Turn-On Voltage Threshold		24Vin 48Vin			7.5 15.5	V_{dc}
Turn-Off Voltage Threshold		24Vin 48Vin	6 12			V_{dc}
Maximum Input Current	V_{in}=9V, Full load V_{in}=18V, Full load	24Vin 48Vin		427 213		mA
No-Load Input Current	V_{in}=24, 48V, I_o=0A	See Model Number Table				mA
Inrush Current (I^2t)	As per ETS300 132-2	All			0.01	A^2s
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz	All		30		mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=24, 48V, Full load, T_c=25℃	All	-1.5		+1.5	%
Output Voltage Balance	V_{in}=24, 48V, Full load, T_c=25℃	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to 10% load	Single Dual			±0.5 ±1.0	%
Line Regulation	V_{in}=High line to low line, full load	All			±0.5	%
Cross Regulation	Asymmetrical load 25%/100%	Dual			±5	%
Temperature Coefficient	T_c=-40℃ to 85℃	All			±0.03	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load	All			50	mV
Output Current Range	V_{in}= 9 to 36V, 18 to 75V	See Model Number Table				A
Over Current Protection	Foldback mode. Auto recovery Output voltage =90% $V_{o\_nominal}$	All	120			%
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	V_{in}=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 di/dt=0.1A/us (within 1% V_{out} nominal)	All			±6	%
Recovery Time		All			500	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		1	2	ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10%V_{o_set}, Power up	All		1	2	ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	All		1.5	3	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			1500	V_{dc}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		500		pF

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse frequency modulation (PFM)	All	100			KHz
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
Logic High (Module On)	Pin open=on, high impedance	All				
Off Converter Input Current	Shutdown input idle current	All			1	mA

GENERAL SPECIFICATIONS

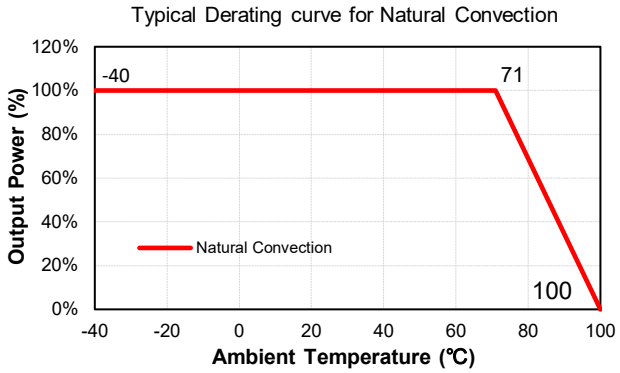
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of $I_{o\_max.}$; MIL-HDBK - 217F_Notice 1, GB, 25℃	Single Dual		2.8 2.1		M hours
Weight		All		4.8		grams
Case Material	Non-conductive black plastic, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: 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					

EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI	Meets EN 55032 (with external filter)		Class B
ESD	Meets EN 61000-4-2	Level 2: Air ±8kV, Contact ±4kV	Perf. Criteria A
Radiated Immunity	Meets EN 61000-4-3	Level 2: 80~1000MHz, 3V/m	Perf. Criteria A
Fast Transient	Meets EN 61000-4-4	Level 2: On power input port, ±0.5kV, external input TVS required	Perf. Criteria A
Surge	Meets EN 61000-4-5	Level 2: Line to line, ±0.5kV, external input TVS required	Perf. Criteria A
Conducted Immunity	Meets EN 61000-4-6	Level 2: 0.15~80MHz, 3V	Perf. Criteria A
Magnetic Field Immunity	Meets EN 61000-4-8	Level 2: 50 or 60Hz, 3A/m (rms)	Perf. Criteria A
Application Note Link			EC3SAW Series App Notes
Packaging Information Link			Packaging Information

CHARACTERISTIC CURVE

Power Derating Curve



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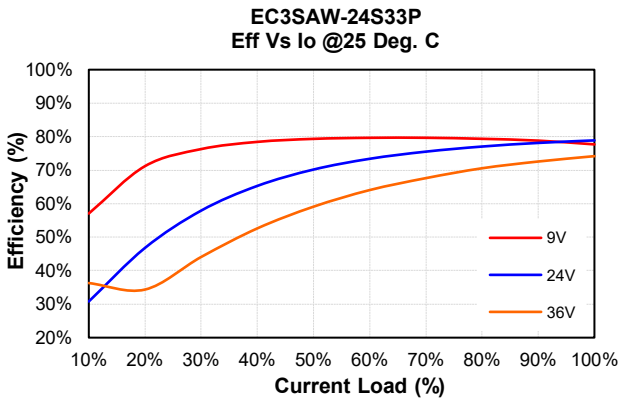
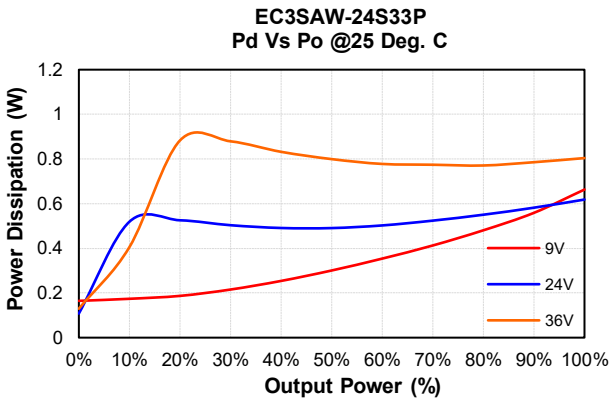
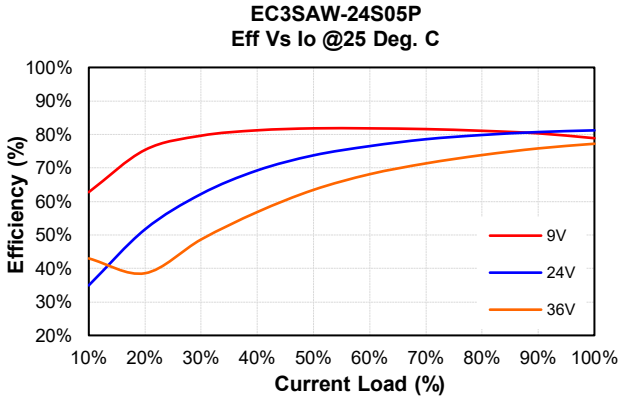
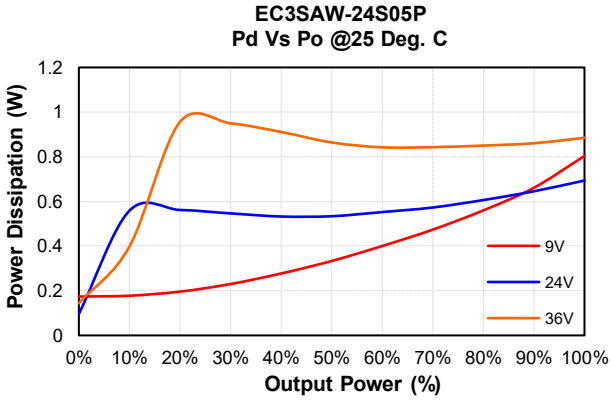
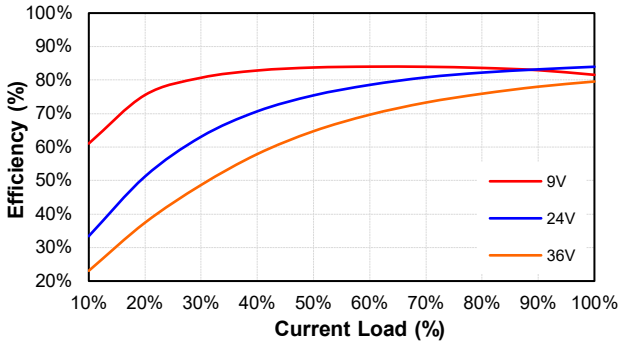








EC3SAW-24S12P
Eff Vs Io @25 Deg. C



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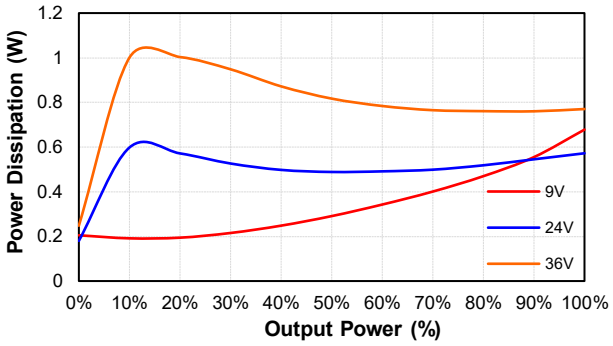

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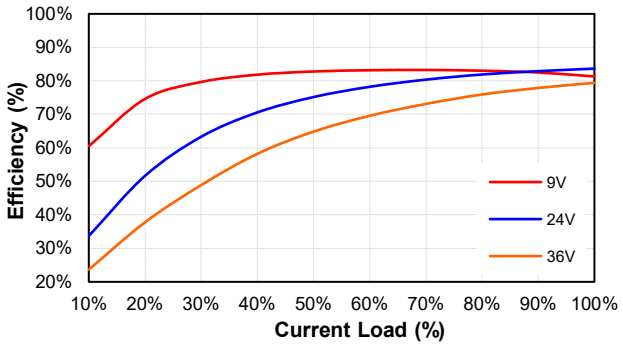

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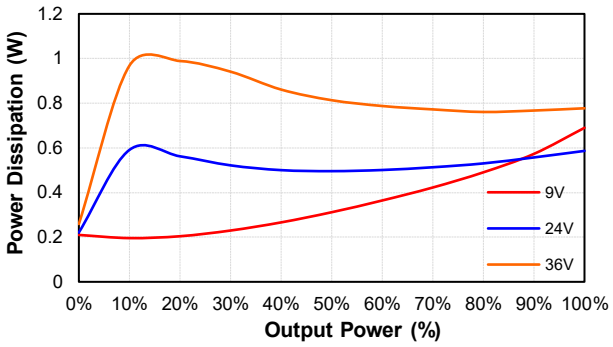

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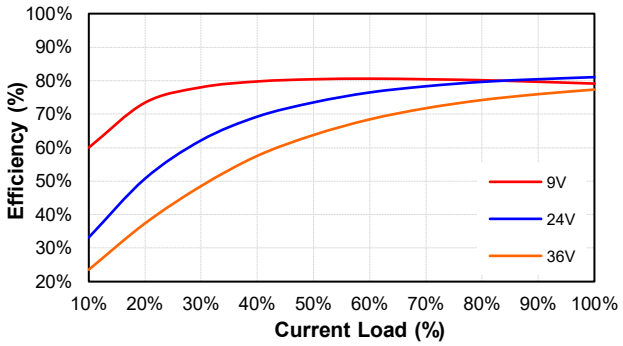

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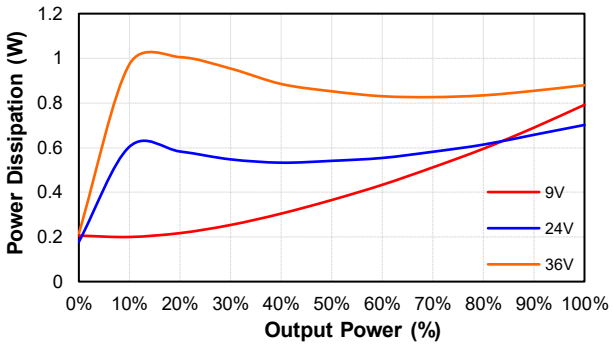

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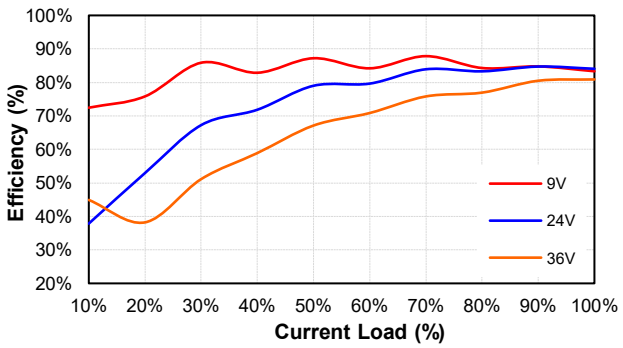

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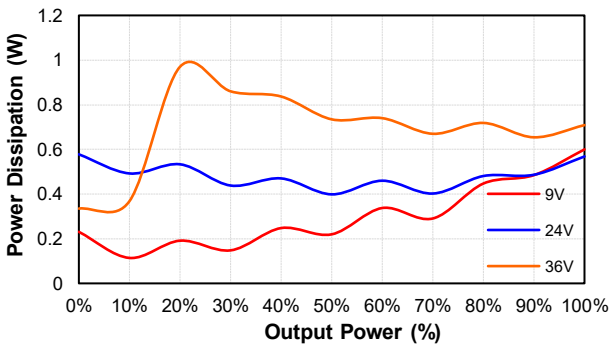

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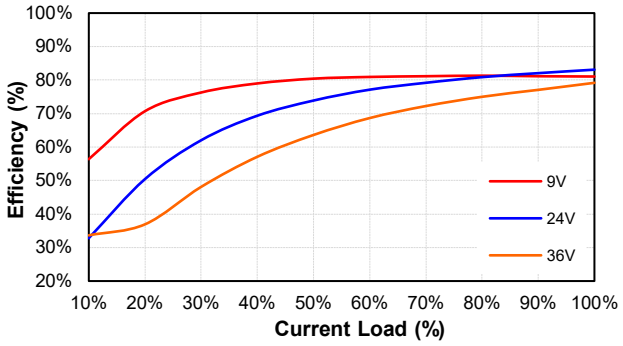

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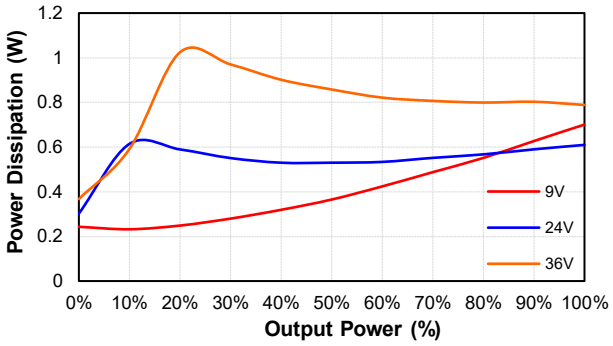

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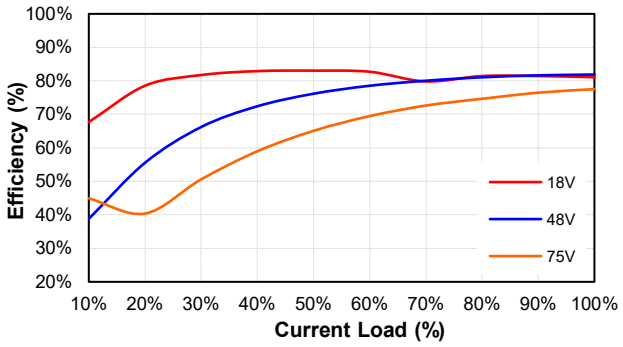

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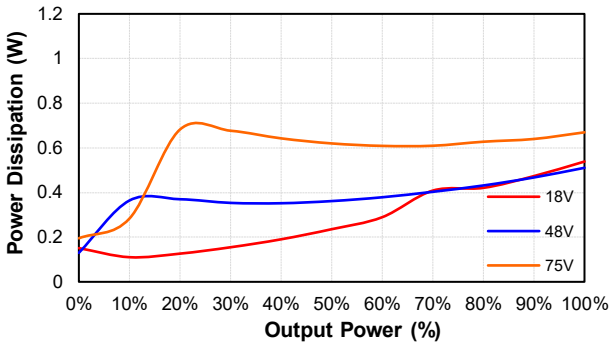

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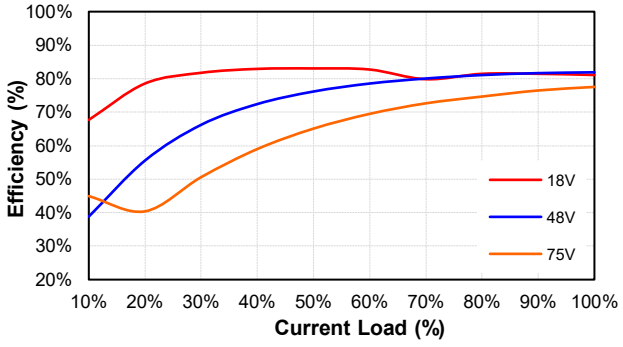

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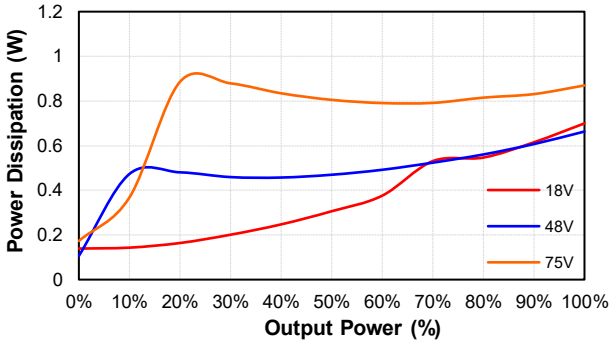

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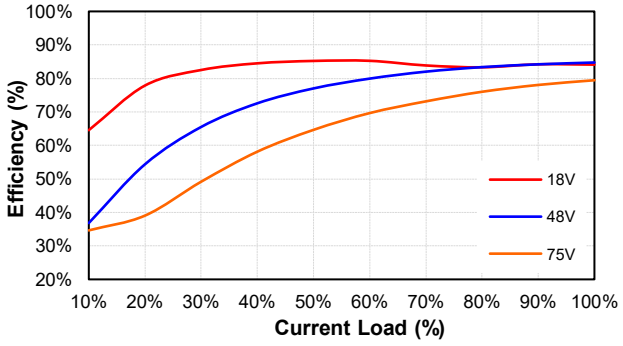

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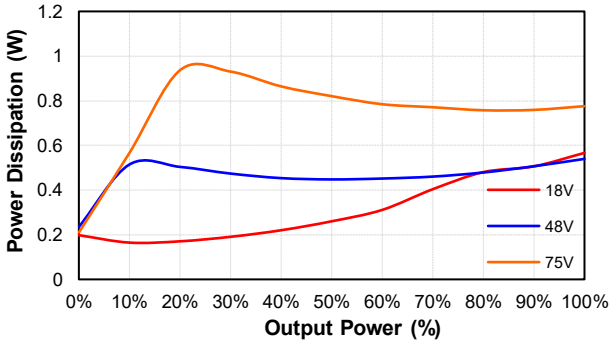

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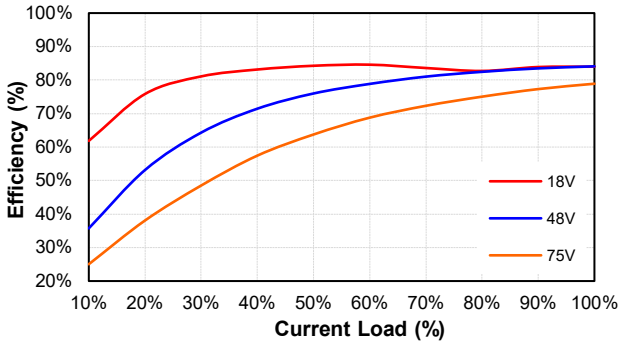

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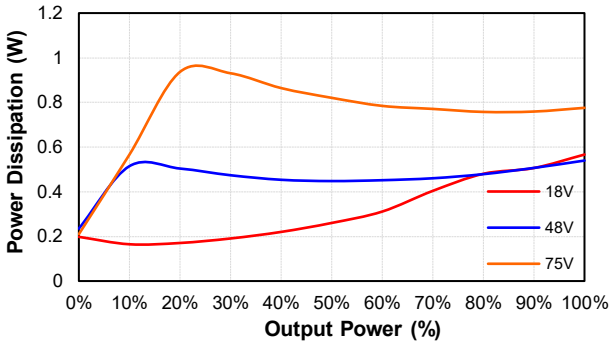

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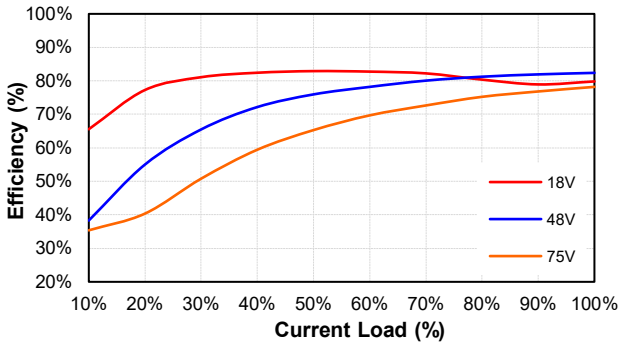

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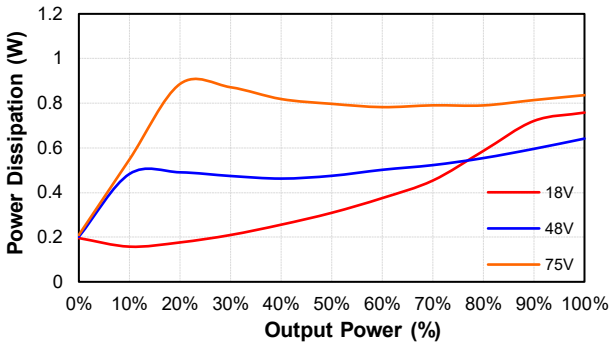

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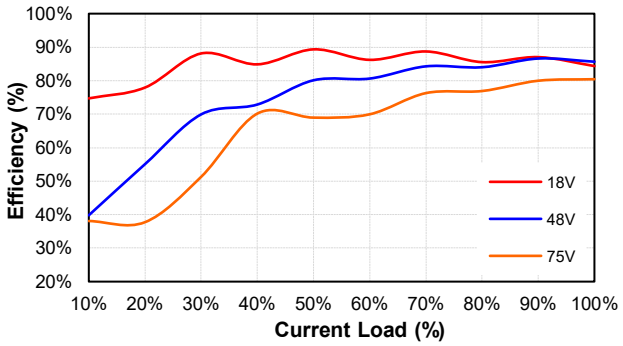

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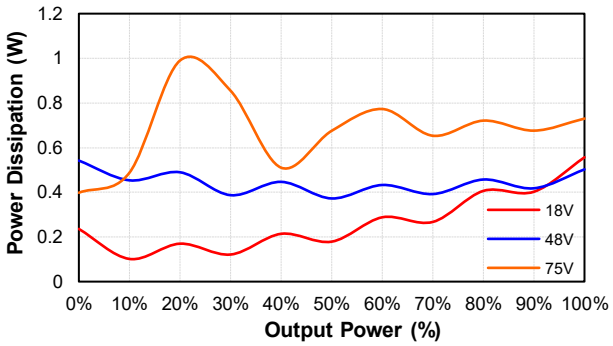

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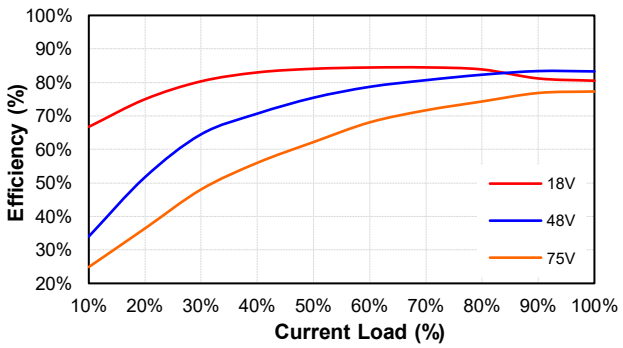

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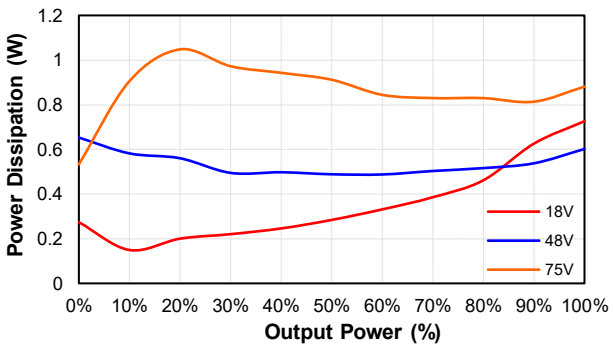
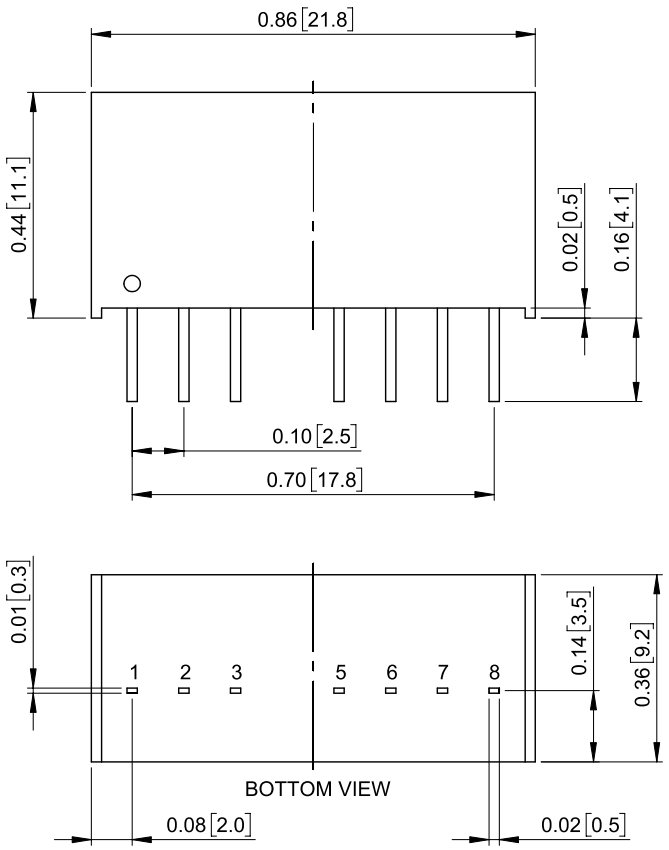


MECHANICAL SPECIFICATION



All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

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

NC:NO CONNECTION WITH PIN
Note:Pin Size is x.xx±0.002 Inch [x.x±0.05mm]

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