

Integral Metal Substrate



SMD & Thru-hole Mounting

## MAC40 Series

Single, dual & triple Outputs

(Multiple Application Converter)

**Surface Mount & Thru-Hole Types**

**Pick & Place Packaging**

**Wide Input Range 2:1**

**High Efficiency to 89%**

**Remote On/Off**

**External Trim**

**Under-Voltage Lockout**

**-40C To 105C Operation**

**Overvoltage & Short Circuit Protection**

**1500Vdc Isolation**

*Floating or Common Auxiliaries  
Open Frame Construction.*

The MAC40 series of DC-DC converters have been designed as a surface-mount & thru-hole solution for a wide range of applications where light weight and ease of assembly are needed. Utilizing the latest thermal transfer techniques the MAC30 series packs up to 40 watts of power in 1.75" x 2.0" x .500" open frame construction and operating temperatures of -40c to + 105C. All models are designed to meet UL1950, CSA 950 and EN 60950.

### Model Selection Guide

Input Voltage		Iin @ Vin nom.		Output	Output	Po	Output	Typical	Model Number
Nom.	Range	FL(A)	NL	V1 & V2/V3	Current(FL)	(W)	OVP	Efficiency	Note (**)
12Vdc	9-18Vdc	1.623	7mA	2.5	6	15	3.9V	77%	MAC40-12S2V5(**)
12Vdc	9-18Vdc	2.083	7mA	3.30	6.0A	20	3.9V	80%	MAC40-12S3V3
12Vdc	9-18Vdc	3.012	7mA	5.00	6.0A	30	6.8V	83%	MAC40-12S05
12Vdc	9-18Vdc	2.941	7mA	12.00	2.5A	30	15V	85%	MAC40-12S12
12Vdc	9-18Vdc	2.907	7mA	15.00	2.0A	30	18V	86%	MAC40-12S15
12Vdc	9-18Vdc	2.941	7mA	+/-12	+/-1.26A	30	15V	85%	MAC40-12D12
12Vdc	9-18Vdc	2.541	7mA	3.3 & +/-12.00	4.8 & +/- .33A	25	3.9 (Vo1)	82%	MAC40-12T3D12
12Vdc	9-18Vdc	2.510	7mA	3.3 & +/-15.00	4.8 & +/- .26A	25	3.9 (Vo1)	83%	MAC40-12T3D15
12Vdc	9-18Vdc	2.510	7mA	3.3 & +/-24.00	4.8 & +/- .17A	25	3.9 (Vo1)	83%	MAC40-12T3D24
12Vdc	9-18Vdc	2.976	7mA	5.0 & +/-12.00	4.8 & +/- .33A	30	6.8 (Vo1)	84%	MAC40-12T5D12
12Vdc	9-18Vdc	2.874	7mA	5.0 & +/-15.00	4.8 & +/- .26A	30	6.8 (Vo1)	87%	MAC40-12T5D15
12Vdc	9-18Vdc	2.874	7mA	5.0 & +/-24.00	4.8 & +/- .17A	30	6.8 (Vo1)	87%	MAC40-12T5D24
24Vdc	18-36Vdc	1.068	7mA	2.50	8	20	3.9V	78%	MAC40-24S2V5
24Vdc	18-36Vdc	1.358	7mA	3.30	8	26.4	3.9V	81%	MAC40-24S3V3
24Vdc	18-36Vdc	1.984	7mA	5.00	8.0A	40	6.8V	84%	MAC40-24S05
24Vdc	18-36Vdc	1.938	7mA	12.00	3.33A	40	15V	86%	MAC40-24S12
24Vdc	18-36Vdc	1.894	7mA	15.00	2.66A	40	18V	88%	MAC40-24S15
24Vdc	18-36Vdc	1.916	7mA	+/-12	+/-1.66A	40	15V	87%	MAC40-24D12
24Vdc	18-36Vdc	1.506	7mA	3.3 & +/-12.00	6.0 & +/- .75	30	3.9 (Vo1)	83%	MAC40-24T3D12
24Vdc	18-36Vdc	1.488	7mA	3.3 & +/-15.00	6.0 & +/- .75A	30	3.9 (Vo1)	84%	MAC40-24T3D15
24Vdc	18-36Vdc	1.488	7mA	3.3 & +/-24.00	6.0 & +/- .375A	30	3.9 (Vo1)	84%	MAC40-24T3D24
24Vdc	18-36Vdc	1.961	7mA	5.0 & +/-12.00	6.0 & +/- .75	40	6.8 (Vo1)	85%	MAC40-24T5D12
24Vdc	18-36Vdc	1.894	7mA	5.0 & +/-15.00	6.0 & +/- .75A	40	6.8 (Vo1)	88%	MAC40-24T5D15
24Vdc	18-36Vdc	1.894	7mA	5.0 & +/-24.00	6.0 & +/- .375A	40	6.8 (Vo1)	88%	MAC40-24T5D24
48Vdc	36-75Vdc	0.527	7mA	2.50	8	20	3.9V	79%	MAC40-48S2V5
48Vdc	36-75Vdc	0.671	7mA	3.30	8	26.4	3.9V	82%	MAC40-48S3V3
48Vdc	36-75Vdc	0.980	7mA	5.00	8.0A	40	6.8V	85%	MAC40-48S05
48Vdc	36-75Vdc	0.958	7mA	12.00	3.33A	40	15V	87%	MAC40-48S12
48Vdc	36-75Vdc	0.936	7mA	15.00	2.66A	40	18V	89%	MAC40-48S15
48Vdc	36-75Vdc	0.958	7mA	+/-12	+/-1.66A	40	15V	87%	MAC40-48D12
48Vdc	36-75Vdc	0.744	7mA	3.3 & +/-12.00	6.0 & +/- .75	30	3.9 (Vo1)	84%	MAC40-48T3D12
48Vdc	36-75Vdc	0.718	7mA	3.3 & +/-15.00	6.0 & +/- .75A	30	3.9 (Vo1)	87%	MAC40-48T3D15
48Vdc	36-75Vdc	0.718	7mA	3.3 & +/-24.00	6.0 & +/- .375A	30	3.9 (Vo1)	87%	MAC40-48T3D24
48Vdc	36-75Vdc	0.958	7mA	5.0 & +/-12.00	6.0 & +/- .75	40	6.8 (Vo1)	87%	MAC40-48T5D1212
48Vdc	36-75Vdc	0.936	7mA	5.0 & +/-15.00	6.0 & +/- .75A	40	6.8 (Vo1)	89%	MAC40-48T5D15
48Vdc	36-75Vdc	0.936	7mA	5.0 & +/-24.00	6.0 & +/- .375A	40	6.8 (Vo1)	89%	MAC40-48T5D24

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# Specifications All specifications Are Typical @ Nominal Input, Full Load & 25C Unless Otherwise Stated

## Input

Input Voltage Range	.....	2:1
Note (3)	.....	9-18Vdc (12V Models)
	.....	18-36Vdc (24V Models)
	.....	36-75Vdc (48V Models)
Input filter	.....	LC Type
Under Voltage Lockout	.....	8.5V (12V Models)
	.....	16.5V (24V Models)
	.....	32V (48V Models)
Remote :ON	.....	+5V or open, Ref. (-)Vin
:OFF	.....	+0.7V, Ref (-)Vin
Conducted Noise	.....	EN55022, level A (Note 5)

## Output

Output Power	.....	40 W Continuous(Max)
Output Voltage/current	.....	See Model Table
Output Setting Accuracy		
Singles	.....	+/- 1% typ., +/- 1.5%max.
Aux	.....	+/-3% typ., +/- 5% max
Load Variation		
Singles(FL-10%L)	.....	+/- 0.5% Note (4),(6)
Aux (FL-50%L)	.....	+/-4%, V1(20%-FL)
Aux (FL-20%L)	.....	+/-10%, V1 (10%-FL)
Line Regulation	.....	+/- 0.5%(Vo1), +/-2% Aux
Total Error Band		
Singles	.....	+/- 3%, Line/Load&Temp.
Auxiliary outputs	.....	+/-10%(Io1,2&3 @ 20%-FL)
Ripple & Noise(20Mhz BW)	.....	100mV(Vo1), 1%(Aux)
Transient Response (FL-1/2L)	.....	2 % Deviation, 200uS
Temperature Coefficient	.....	+/- .01%/c
Short circuit Protection	.....	Indefinite, Modulated, AutomaticRecovery

## General

Efficiency	.....	See Model Table
Isolation Voltage	.....	1500Vdc ( 1Min)
Isolation Resistance	.....	100M
Switching Frequency	.....	400Khz
MTBF	.....	1.0M hrs.MIL-HDBK-217F Ground Benign @ 25C

## Enviromental

Operating Temperature Range	.....	- 40C to + 105C (See Derating Curve)
	.....	-40C To + 50C @ FL
Storage Temperature Range	.....	-55C To + 125C
Maximum Case Temperature	.....	110 C
Humidity	.....	5% To 95% RH, Non-condensing
Cooling	.....	Natural Convection
Processing (Note 2)	.....	(230C peak, 20 sec.)

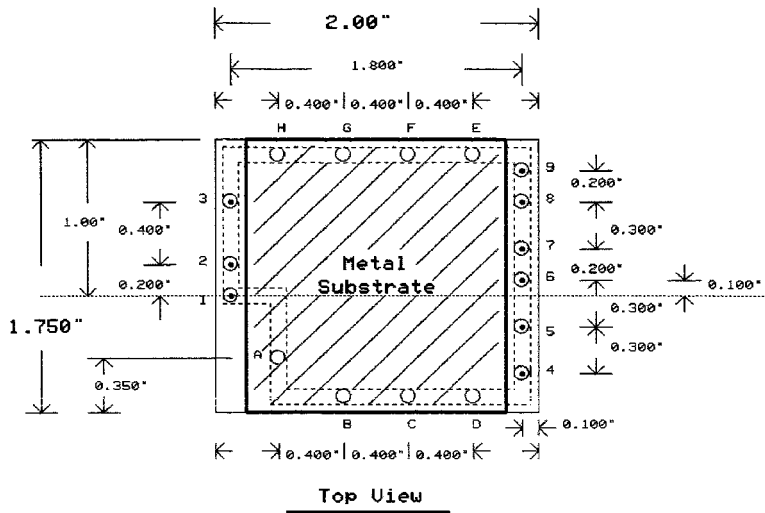
## Mechanical

Size	.....	1.75" X 2.00" X 0.500"
Weight	.....	
Mounting	.....	SMD & Through Hble Types
Case/Material	.....	Open-Frame, 94V-0 FR-4 P.C.B., with Bonded Aluminum Substrate

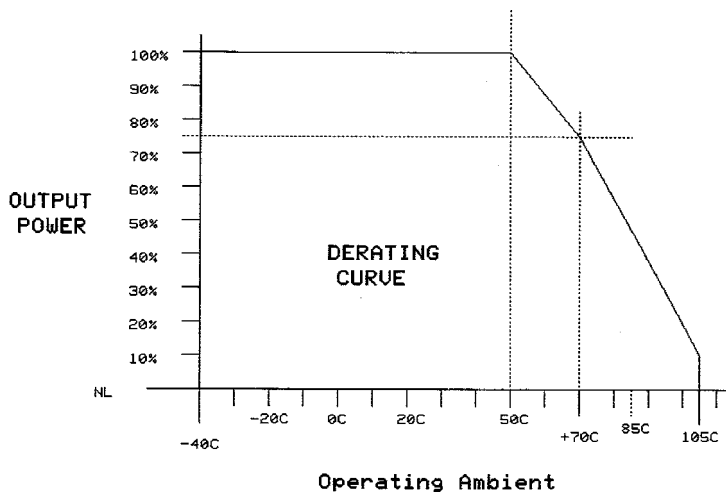
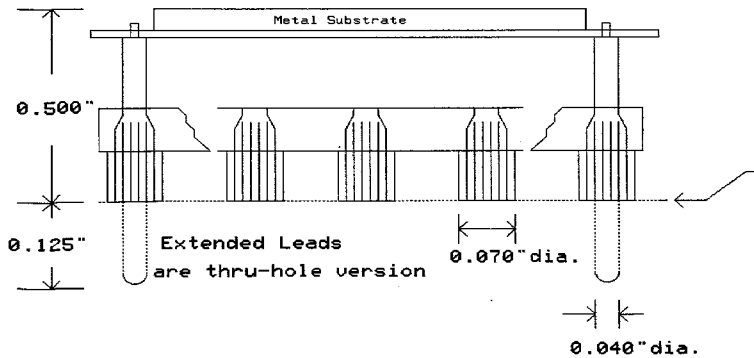
### Notes:

- 1) O.V.P. protection is across Vo1.
- 2) Consult factory for recommended reflow profile.
- 3) Typical start-up for 12Vin models is 9V. Maximum startup is 9.5V, with full operation down to 9.0V
- 4) Operation is allowed to No-Load on single outputs, however operation below 10% load may cause ripple & noise to exceed spec.
- 5) External Capacitor required to meet conducted noise requirement.
- 6) Auxillary output regulation rely's on cross coupling of output channels. A 10% minimum load is required on Vo1 for regulation
- 7) Output currents are maximum for each output however, max power is not to exceed is rated power output (refer to table)

# Mechanical Specifications



"Rail Pins" are alpha  
 "Input/Output" are numeric



## Pin Connections

Pin No.	Single	Triple	Dual
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
3	ON/OFF	ON/OFF	ON/OFF
4	NC	+V2	NC
5	NC	Com.V2/V3	Com.V2/V3
6	NC	-V3	-V3
7	+Vo	+V1	+V1
8	-Vo	Com.V1	Com.V1
9	Trim	Trim	Trim
A	NC	NC	NC
B	NC	NC	NC
C	NC	NC	NC
D	NC	NC	NC
E	NC	NC	NC
F	NC	NC	NC
G	NC	NC	NC
H	NC	NC	NC

Pin no.'s A -H are used for mechanical integrity and are intended for Surface Mount models only.