



40W 1"x1" Package DC-DC Regulated Converter SKMW40 & DKMW40 series



■ Features

- DIP 1"x1" package with industry standard pinout
- 4:1 ultrawide input range
- Operating temperature range -40 ~ +80°C
- No minimum load required
- Comply to BS EN/EN55032 radiated Class A/B with additional components
- High efficiency up to 91%
- Protections: Short circuit (Continuous) / Overload / Over voltage / Over temperature / Input under voltage
- 2KVDC I/O isolation
- Remote ON/OFF control and Trimming output ($\pm 10\%$)
- 3 years warranty

■ Applications

- Telecom/datacom system
- Wireless network
- Industrial control facility
- Instrument
- Energy battery
- Data switch
- Space saving solution

■ Description

SKMW40 and DKMW40 series are 40W isolated and regulated module type DC-DC converter with DIP 1"x1" package. It features international standard pins, a high efficiency up to 91%, wide working temperature range -40~+85°C, 2KVDC I/P-O/P isolation voltage, compliance to BS EN/EN55032 radiated Class A/B with additional components, continuous-mode short circuit, overload, over temperature, input under voltage protection, remote ON/OFF and trimmable output voltage etc. The models account for different input voltage 9~36V and 18~75V 4:1 ultrawide input range, and various output voltage, 3.3V/5V/12V/15V/24V for single output and $\pm 12V/\pm 15V$ for dual outputs, which are suitable for all kinds of systems, such as industrial control, telecommunication field, distributed power architecture, and so on.

■ Model Encoding

SKMW40F-12

Output voltage (3.3/5/12/15/24Vdc, $\pm 12/\pm 15Vdc$)

Input voltage (F: 9~36Vdc, G: 18~75Vdc)

Rated wattage

Series name { S: Single output
D: Dual output



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MODEL SELECTION TABLE							
ORDER NO.	INPUT			OUTPUT		EFFICIENCY (TYP.)	CAPACITOR LOAD (MAX.)
	INPUT VOLTAGE (RANGE)	INPUT CURRENT		OUTPUT VOLTAGE	OUTPUT CURRENT		
		NO LOAD	FULL LOAD				
SKMW40F-03	24V (9 ~ 36V)	12mA	1570mA	3.3V	0~10000mA	86%	10000μF
SKMW40F-05		12mA	1850mA	5V	0~8000mA	88%	6000μF
SKMW40F-12		12mA	1840mA	12V	0~3333mA	89%	3000μF
SKMW40F-15		12mA	1800mA	15V	0~2667mA	91%	1000μF
SKMW40F-24		12mA	1830mA	24V	0~1667mA	89%	680μF
DKMW40F-12		12mA	1860mA	±12V	±0 ~ 1667mA	88%	*1500μF
DKMW40F-15		12mA	1870mA	±15V	±0 ~ 1333mA	88%	*1000μF
SKMW40G-03		48V (18 ~ 75V)	10mA	790mA	3.3V	0~10000mA	85%
SKMW40G-05	10mA		940mA	5V	0~8000mA	88%	6000μF
SKMW40G-12	10mA		920mA	12V	0~3333mA	89%	3000μF
SKMW40G-15	10mA		940mA	15V	0~2667mA	88%	1000μF
SKMW40G-24	10mA		920mA	24V	0~1667mA	89%	680μF
DKMW40G-12	10mA		925mA	±12V	±0 ~ 1667mA	89%	*1500μF
DKMW40G-15	10mA		940mA	±15V	±0 ~ 1333mA	89%	*1000μF

* For each output

SPECIFICATION				
INPUT	VOLTAGE RANGE	F: 9~36Vdc, G: 18~75Vdc		
	SURGE VOLTAGE (100ms max.)	24Vin models : 50Vdc, 48Vin models : 100Vdc		
	FILTER	Pi type		
	PROTECTION	Fuse recommended. 24Vin models: 8A delay time Type, 48Vin models: 5A delay time Type		
	INTERNAL POWER DISSIPATION	500mW		
OUTPUT	VOLTAGE ACCURACY	±1.0%		
	RATED POWER	40W		
	RIPPLE & NOISE <small>Note.2</small>	75mVp-p		
	LINE REGULATION <small>Note.3</small>	Single output models: ±0.2%, Dual output models: ±0.5%		
	LOAD REGULATION <small>Note.4</small>	Single output models: ±0.5%, Dual output models: ±1%		
	SWITCHING FREQUENCY (Typ.)	3.3/5Vout models: 300KHz, other models: 400KHz		
	EXTERNAL TRIM ADJ. RANGE (Typ.)	±10% (Single output model only)		
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery		
	OVERLOAD	110 ~ 200% rated output power		
		Protection type : Recovers automatically after fault condition is removed		
	OVER VOLTAGE	Protection type : Clamp by diode		
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down		
	UNDER VOLTAGE LOCKOUT	Start-up voltage	24Vin (F-type): 8.8Vdc, 48Vin (G-type): 17.5Vdc	
Shutdown voltage		24Vin (F-type): 8.5Vdc, 48Vin (G-type): 17Vdc		
FUNCTION	REMOTE CONTROL	Power ON: R.C. ~ -Vin >3.5~12Vdc or open circuit ; Power OFF: R.C. ~ -Vin <1.2Vdc or short		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +85°C (Refer to "Derating Curve")		
	CASE TEMPERATURE	+115°C max.		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.03% / °C (0 ~ 60°C)		
	SOLDERING TEMPERATURE	1.5mm from case of 1 ~ 3sec./260°C max.		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes		
SAFETY & EMC (Note.5)	SAFETY STANDARDS	EAC TP TC 020/2011 approved		
	WITHSTAND VOLTAGE	I/P-O/P:2KVDC		
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25°C / 70% RH		
	ISOLATION CAPACITANCE (Typ.)	1500pF		
	EMC EMISSION	Parameter	Standard	Test Level / Note
		Conducted	BS EN/EN55032(CISPR32)	N/A
	EMC IMMUNITY	Radiated	BS EN/EN55032(CISPR32)	Class A/B with external components
		Parameter	Standard	Test Level / Note
		ESD	BS EN/EN61000-4-2	Level 3, ±6KV contact
		Radiated Susceptibility	BS EN/EN61000-4-3	Level 2, 3V/m
		EFT/Bursts	BS EN/EN61000-4-4	Level 3, 2KV
		Surge	BS EN/EN61000-4-5	Level 3, 2KV Line-Line
		Conducted	BS EN/EN61000-4-6	Level 3, 10V/rms
Magnetic Field	BS EN/EN61000-4-8	Level 3, 10mA		
OTHERS	MTBF	560Khrs MIL-HDBK-217F(25°C)		
	DIMENSION (L*W*H)	25.4*25.4*10.5mm (1*1*0.4 inch)		
	CASE MATERIAL	Black coated copper with non-conductive base		
	PACKING	21g ; 8pcs/per tube, 512pcs/64 tube/per carton		
NOTE	<p>1.All parameters are specified at normal input(F:24Vdc, G:48Vdc), rated load, 25°C 70% RH ambient.</p> <p>2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf & 47µf capacitor.</p> <p>3.Line regulation is measured from low line to high line at rated load.</p> <p>4.Load regulation is measured from 0% to 100% rated load.</p> <p>5.The final equipment must be re-confirm that it still meet EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies."(as available on http://www.meanwell.com)</p> <p>※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx</p>			

External Output Trimming

In order to trim the voltage up or down one needs to connect the trim resistor either between the trim pin and -Vo for trim-up and between trim pin and +Vo for trim-down. The output voltage trim range is ±10%. This is shown in Figures 1 and 2:

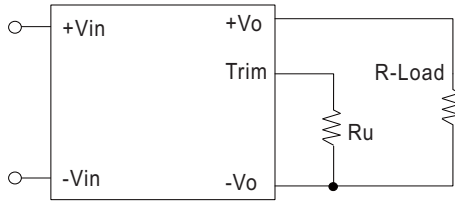


Figure 1. Trim-up Voltage Setup

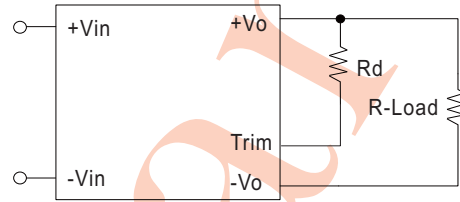


Figure 2. Trim-down Voltage Setup

1. The value of Rtrim-up defined as:

$$R_{\text{trim-up}} = \frac{aR_2}{R_2-a} - R_3, a = \frac{V_{\text{ref}}}{V_o' - V_{\text{ref}}} \times R_1$$

For example, to trim-up the output voltage of 5.0V module (SKMW40F-05) by 10% to 5.5V, Rtrim-up is calculated as follows:

$$V_o' = 5.5V$$

$$V_{\text{ref}} = 1.24V$$

$$R_1 = 33.5 K\Omega$$

$$R_2 = 11 K\Omega$$

$$R_3 = 73.2K\Omega$$

$$a = \frac{V_{\text{ref}}}{V_o' - V_{\text{ref}}} \times R_1$$

$$= \frac{1.24}{5.5 - 1.24} \times 33.5 = 9.75$$

$$R_{\text{trim-up}} = \frac{aR_2}{R_2-a} - R_3$$

$$= \frac{9.75 \times 11}{11 - 9.75} - 73.2$$

$$= \frac{107.25}{1.25} - 73.2$$

$$= 12.6K\Omega$$

Table 1 – Trim up and Trim down Resistor Values

Model No.	Vout	Vref	R1	R2	R3
SKMW40F-03 SKMW40G-03	3.3V	1.24V	16.7KΩ	10KΩ	52.3KΩ
SKMW40F-05 SKMW40G-05	5V	1.24V	33.5KΩ	11KΩ	73.2KΩ
SKMW40F-12 DKMW40F-12 SKMW40G-12 DKMW40G-12	12V	2.5V	38KΩ	10KΩ	48.7KΩ
SKMW40F-15 DKMW40F-15 SKMW40G-15 DKMW40G-15	15V	2.5V	50.1KΩ	10KΩ	64.9KΩ
SKMW40F-24 SKMW40G-24	24V	2.5V	86KΩ	10KΩ	73.2KΩ

Note:

1. Rtrim-up, Rtrim-down is mean trim resistor, please check the formula.

2. a & b: user define parameter, no actual meanings.

3. Vo' is target trim voltage.

4. Value for R1, R2, R3 and Vref refer to below table.

2. The value of Rtrim-down defined as:

$$R_{\text{trim-down}} = \frac{bR_1}{R_1-b} - R_3, b = \frac{V_o' - V_{\text{ref}}}{V_{\text{ref}}} \times R_2$$

For example, to trim-down the output voltage of 5.0V module (SKMW40F-05) by 10% to 4.5V, Rtrim-down is calculated as follows:

$$V_o' = 4.5V$$

$$V_{\text{ref}} = 1.24V$$

$$R_1 = 33.5 K\Omega$$

$$R_2 = 11 K\Omega$$

$$R_3 = 73.2K\Omega$$

$$b = \frac{V_o' - V_{\text{ref}}}{V_{\text{ref}}} \times R_2$$

$$= \frac{4.5 - 1.24}{1.24} \times 11 = 2.629 \times 11 = 28.919$$

$$R_{\text{trim-down}} = \frac{bR_1}{R_1-b} - R_3$$

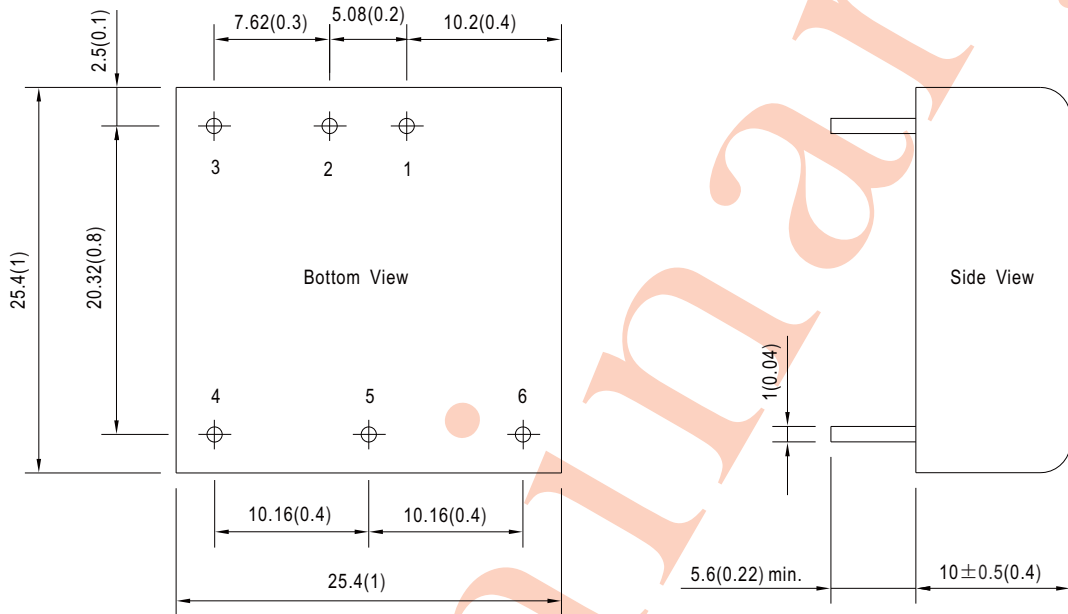
$$= \frac{28.919 \times 33.5}{33.5 - 28.919} - 73.2$$

$$= \frac{968.7865}{4.581} - 73.2$$

$$= 138.3K\Omega$$

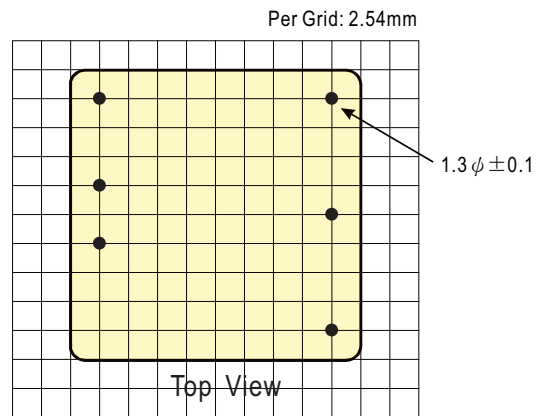
Mechanical Specification

- All dimensions in mm (inch)
- Tolerance: $x.xx \pm 1mm (x.xx \pm 0.25")$
- Pin size is $1 \pm 0.1mm (0.04" \pm 0.004")$

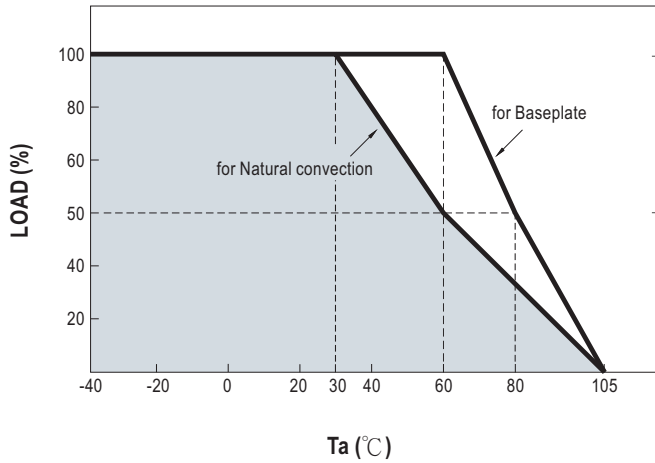


Plug Assignment

Pin-Out		
Pin No.	SKMW40 (Single output)	DKMW40 (Dual output)
1	+Vin	+Vin
2	-Vin	-Vin
3	R.C.	R.C.
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout



■ Derating Curve



Power Derating Curve

Power module can operate in variety of thermal environments. However, sufficient cooling should be provided to ensure the reliable operation of the unit. Heat can be removed by conduction, convection, and radiation to the surrounding environment. Figure 3 is the PCB layout, which to measure SKMW40F-05 thermal performed, the dimension is **95.4 * 85 * 1.6mm, 3 OZ**. There copper can help SKMW40F-05 to conduct heat through the body to the PCB.

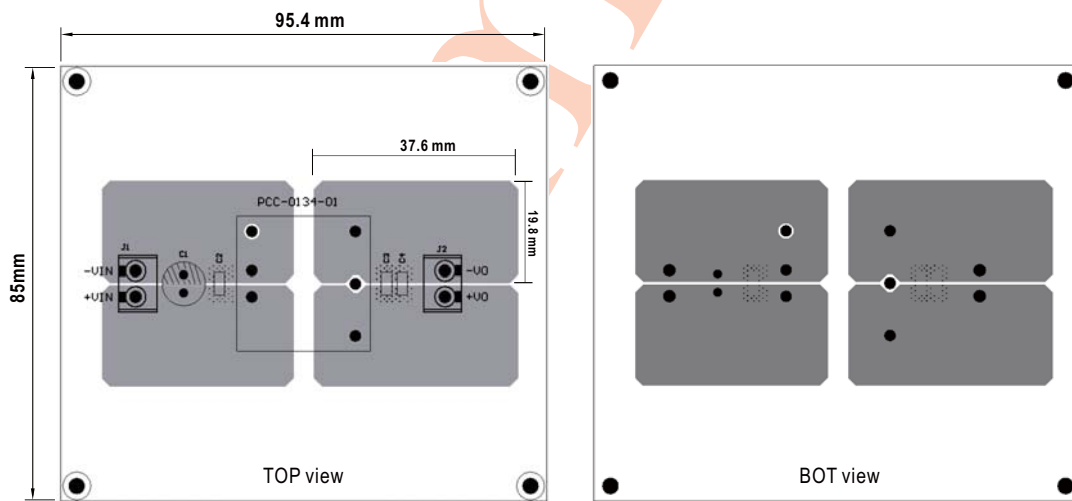
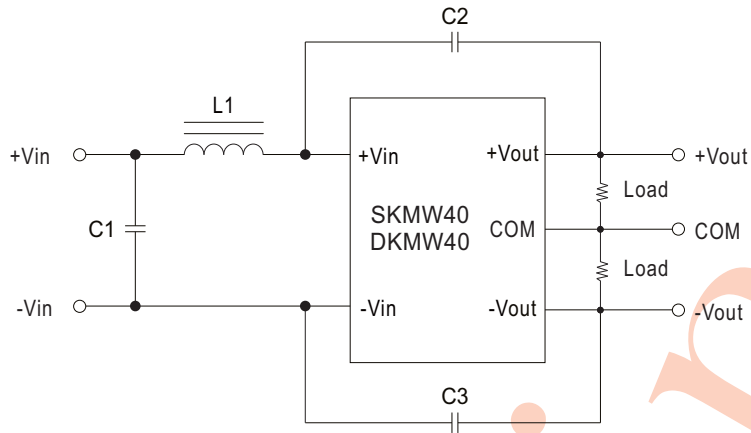


Figure 3

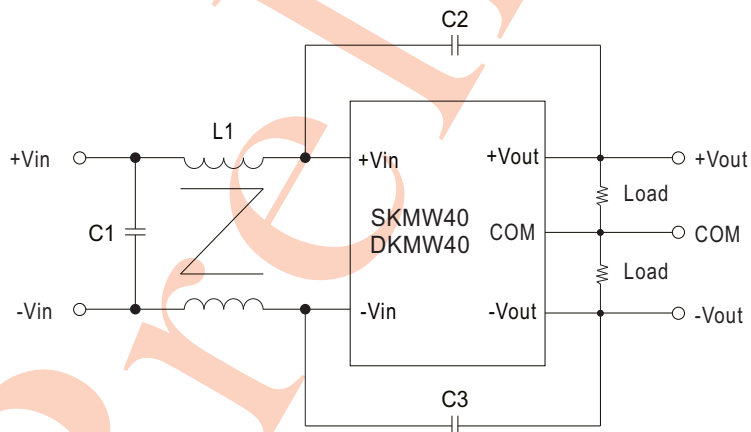
EMC Suggest Circuit

* Required external components to meet BS EN/EN55032 radiated Class A emission as below:



Models	C1	L1	C2	C3
SKMW40F-03	10 μ F	2.2 μ F	NA	2200pF
SKMW40G-03	10 μ F	2.2 μ F	2200pF	2200pF
SKMW40F,G-05				
SKMW40F,G-12				
SKMW40F,G-15				
SKMW40F,G-24				
DKMW40F,G-12	10 μ F	2.2 μ F	NA	2200pF
DKMW40F,G-15				

※ EMI Test standard:BS EN/EN55032 Class B Output Conducted & Radiated Emission are as below:



Models	C1	L1	C2	C3
SKMW40F-03	10 μ F	GSCM121160P-102-2P-AE	2200pF	2200pF
SKMW40G-03				
SKMW40F,G-05	10 μ F	GSCM121160P-102-2P-AE	6600pF	4400pF
SKMW40F,G-12				
SKMW40F,G-15				
SKMW40F,G-24	10 μ F	GSCM121160P-102-2P-AE	2200pF	2200pF
DKMW40F,G-12				
DKMW40F,G-15				

■ Packing

Standard Tube Packing	MPQ Per Tube (PCS)	One Tube G.W.	Max. Q'TY/ Carton(PCS)	One Carton G.W.
<p>Unit : mm</p>	8	200g	512	13.82Kg

■ Installation Manual

Please refer to : <http://www.meanwell.com/manual.html>