

High Speed Bipolar Power Supply DOS Series



# DC to 200 kHz

# Fast ResponseFour-QuadrantBipolarPower SupplyDOS series

Max. output voltage ±20V to ±60V

Max. output current ±2.5A to ±100A

Max. output power 150W to 2kW

- ▶ Fast response "DC to 200kHz" and High power 2kW
- ▶ Available for expanding to 6kW with Master/Slave connection
- ▶ Four quadrant operation enables it to be used as DC power supply and DC electronic load.





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# **Series** Fast response four-quadrant bipolar power supply



#### **Features**

# Fast response

Suitable for transient response test because of its ultra high-speed response DC to 200 kHz and high power, maximum 2000 W.

#### Four-quadrant action

DOS Series can be used both as a high speed response DC power supply and as a DC electronic load.

#### DC bias

10-turn potentiometer to be used as the output setting volume when used as the DC power supply and as the bias setting dial at outputting AC waveform is equipped.

#### Constant voltage (CV)/Constant current (CC)

A single switch on the front panel selects between CV and CC modes.

#### Compact & light weight

For maximum compactness and light weight, DOS Series has been improved for small footprint and handiness.

#### DC output meter equipped

3-digit digital meter displays the DC value of the output voltage and current. (The option of rms indication is available.)

#### Complete protective functions

Protective functions against over voltage/current and against output short-circuit are completely provided.

#### Master-slave

Master/Slave control (option) for more power requirement. Both of Master unit and Slave unit are usable as individual amplifier. (Frequency response will vary in case of master/slave operation, please ask sales staff.)

- Applications
  - Inductive load such as coil and transformer
  - Various motor tests
  - Evaluation test for solar panel related devices
- Ripple test of capacitors
- Voltage regulation tests for in-vehicle electrical component
- For surface treatment

This product is not designed for charge and discharge of battery. Please contact nearby sales if unit is used for charge and discharge application.

#### Lineup

*Models with voltage	current or frequencies not listed here are also available. Please contact the nearest sales offic	æ.

	Maximum	Maximum	Maximum	Frequency re	esponse (-3 dB)	Weight
wodei	Output voltage	Output current	Output power	CV mode	CC mode	(approx.)
DOS20-7.5	_	±7.5 A	150 W			11 kg
DOS20-15		±15 A	300 W			17 kg
DOS20-30	±20 V	±30 A	600 W			23 kg
DOS20-60		±60 A	1200 W			40 kg
DOS20-100		±100 A	2000 W			47 kg
DOS25-6		±6 A	150 W			11 kg
DOS25-12		±12 A	300 W			17 kg
DOS25-24	±25 V	±24 A	600 W			23 kg
DOS25-48		±48 A	1200 W			40 kg
DOS25-80		±80 A	2000 W			47 kg
DOS45-3.3		±3.3 A	150 W	DC to 200 kHz	DC to 100 kHz	12 kg
DOS45-6.6		±6.6 A	300 W			17 kg
DOS45-13.3	±45 V	±13.3V	600 W			23 kg
DOS45-16		±16 A	720 W	_		23 kg
DOS45-26.7	-	±26.7 A	1200 W	_		40 kg
DOS45-44.4		±44.4 A	2000 W			47 kg
DOS60-2.5		±2.5 A	150 W			12 kg
DOS60-5		±5 A	300 W			17 kg
DOS60-10	±60 V	±10 A	600 W	1		23 kg
DOS60-20	1	±20 A	1200 W			40 kg
DOS60-33.3		±33.3 A	2000 W			47 kg

### Specifications

Input volt age Input current	Model	Rated Input voltage AC 50/60 Hz	Rated Input current	Recommended breaker
	150 W	100 V to 120 V single phase ±10%	4 A	115 Vac/15 A
	300 W		7 A	115 Vac/15 A
	600 W		7 A	230 Vac/15 A
	1.2 kW	200 V to 240 V single phase ±10%	13 A	230 Vac/20 A
	2 kW		20 A	230 Vac/30 A
External control voltage (Vcon-in)	-10 Vdc to +10 Vdc Input impedance is 10 k $\Omega$ or more.			
Output indication (DC value indication)	Output voltage : 3-digit digital meter ±999 Output current : 3-digit digital meter ±999			
DC bias	10-turn potentiometer enables setting between -100% and +100%			
Ripple	Less than 0.02% rms			
Stability	0.016%/Hr typ.			

Setting accuracy	±0.5% Full scale			
Distortion factor	CV: 0.059	% CC: 0.5	5%	
Regulation	Line : 0.05% (for ±10% input change) Load: 0.05% (for 10% to 100% load change)			
Temperature coefficient	0.02%/°C			
Output monitor	Output voltage : -10 V to +10 V ±1% Full scale Output current : -10 V to +10 V ±1% Full scale Output impedance 1 k $\Omega$			
Protective function	Protection against output short-circuit, overvoltage, overcurrent Blackout protection (can be canceled with -LN option) Interlock			
Other functions	Remote s (external Output ON OFF	witch (Out relay or op Relay SHORT OPEN	tput ON/OFF) pen collector) Open collector $V_{CE} \le 0.4 V$ $V_{CE} \ge 2 V$	Sink Current 1 mA
Operating temp.	0°C to +4	0°C		
Storage temp.	-20°C to +70°C			
Relative humidity	20% to 80%, non condensing			
Accessories	Input cable 2.5 m (1) (3-pin connector for 115 V model, Flying lead for 230 V model) Instruction manual (1)			



#### Use of BIAS

When the "BIAS ON/OFF switch" is flipped to ON, bias output can be changed with the "BIAS setting dial." Bias voltage can be set when CV control mode, and Bias current can be set when CC control mode.

	In CV mode	In CC mode
Scale	Output voltage	Output current
000(ccw)	Max (-)	Max (-)
500	0 V	0 A
1000(cw)	Max (+)	Max (+)

#### **CV/CC** setting selection

Inputting voltage via Vcon-in enables the control of output voltage V when CV control mode and output current A when CC control mode.

	In CV mode	In CC mode
Vcon	Output voltage	Output current
-10 V	Max (-)	Max (-)
0 V	0 V	0 A
+10 V	Max (+)	Max (+)



#### Use of BIAS

When the "BIAS ON / OFF switch" is flipped to ON, bias output can be changed with the "BIAS setting dial." Bias voltage can be set when CV control mode, and Bias current can be set when CC control mode.

In CV mode In CC mode Scale Output voltage Output current 000(ccw) Max (-) Max (-) 500 0 V 0 A 1000(cw) Max (+) Max (+)

#### **CV/CC** setting selection

Inputting voltage via Vcon-in enables the control of output voltage V when CV control mode and output current A when CC control mode.





#### **Protective functions**

#### **Over voltage protection (O.V.P)**

DOS series is equipped with over voltage protection, which protects load by limiting voltage up to approx. 110% of the rated output voltage even at abnormal conditions.

 $^{\ast}$  It is possible to set variable 0% to approx. 110% output voltage range with -LVc option.

#### **Over current protection (O.C.P)**

DOS series is also equipped with over current protection, which protects power supplies and load by limiting current up to approx. 110% of the rated output current.

 $^{\ast}$  It is possible to set variable 0% to approx. 110% output current range with -LCc option.

#### High speed over current protection

DOS series is provided with 2 types of over current protections, high speed over current protection to limit the pulse current, and standard over current protection to limit the static current.

The standard over current protection limits the static current, responding at around 1msec. Additional high speed over current protection can limit pulse current of square waveforms or from a capacitive load at approximately 2 times rated current.



#### **Output range**

DOS series is a bipolar power supply which can perform four-quadrant operation. They can supply (source) and absorb (sink) current in the field of the drawing on the right.

Vo max: rated output voltage lo max : rated output current



AC operation range (with 50 Hz or more frequency, 50% of duty cycle and without any DC bias)

DC operation range



#### Options

-LN	··· No protection against blackout
-LF	··· Floating ground (Resistant to pressure 200 Vdc)
-LMsm, -LMss	<ul> <li>Master/Slave control (parallel operation)</li> <li>Maximum 3 units including master unit are hooked. "-LMsm" for the master unit and "-LMss" for slave units.</li> <li>Please order required number of units. Every master unit and slave units are exclusive use, but operating individually is also available.</li> <li>When change the combination of Master/Slave, they should be readjusted in our shop.</li> </ul>
-LPr	··· rms display
-LVc	··· Output voltage limit Variable from 0 to approx. 110% with the dial on the front panel
-LCc	··· Output current limit Variable from 0 to approx. 110% with the dial on the front panel
-L(220V)	$\cdots$ 200 Vac to 240 Vac ±10% single phase, 50/60 Hz input (150 W and 300 W models only)

When ordering, suffix the following option mark to the model number. <Example> DOS25-12-LCcFMsmNPrVc(220V) (Alphabetical and input voltage order)

## Characteristic of amplifier

Rise time	(Stepping time): The response time is sometimes described by the rise time (as shown in the drawing on the right). The rise time of an amplifier at a response speed of (= frequency bandwidth) Fc (Hz) is generally acquired by "tr $\rightleftharpoons 0.35$ /fc." Fall time tf is the same as tr. Frequency bandwidth : at 200 kHz or lower, tr = tf = around 1.8 µs : at 100 kHz or lower, tr = tf = around 3.5 µs	<u>Vcon-in</u> <u>90%</u> <u>000%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>100%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0%</u> <u>0</u>
Response speed	When accurate output waveforms are required, select a amplifier with a frequency bandwidth higher enough than the operating frequency. In case of using sine waves, 3 times to 5 times more frequency bandwidth is required, and around 10-times more in case of square waves in general. Inadequate bandwidth causes not only decrease in the output amplitude but much difference between the input and output phases. Therefore operating the product while monitoring the actual output waveforms is recommended.	100% 92% 70% 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Capacitative load	Capacitative load may cause oscillation. In such cases, placed a power resistance in series with the output. Be careful that the frequency bandwidth is limited depending on the resistance a	nd capacitance placed in series when capacitative load.
Inductive load	Some inductance of inductive load may cause resonance in CC mode. In such cases, connect a C-R series circuit between output terminals to prev	vent resonance.

FAX	► USA/Canada : +1-888-652-8651 other countries : +81-6-6150-5089
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# Customer Inquiry Sheet (DOS series)

Please copy this page and above fax number after filling out form below.

	would	like
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A quotation	An explanation of product	A demonstration	To purchase
Other (		)	

Give us your requirement / comment

#### Please fill in below.

Address:	
Company:	
Dept.:	Title:
Name:	
Tel:	Fax:
E-mail:	

#### Manufacturer warranty

We warrant the specification, unless otherwise specified, at max. rated output after warm up, and scope of application is between 10% and 100% of max. rated output. We warrant that products contained in this catalog (hereinafter, the "Products") are free from defects in material and workmanship under normal use for a period of one (1) year from the date of shipment thereof. However, the warranty period for X-ray detectors and X-ray source shall be either one (1) year from the date of shipment or 1,000 hours, whichever shorter. The above warranty shall not apply to any Product which, at our sole judgment, has been: i) Repaired or altered by persons unauthorized by us; or ii) Connected, installed, adjusted or used otherwise than in accordance with the instructions furnished by us (including being used in an inappropriate installation environment, such as in corrosive gas, high temperature and humidity). We are not liable for any loss, damage or failure of the Products flat the shipment thereof caused by external factors such as disasters. We will not inspect, adjust or repair any of our power supply products in the field or at any customer supply products. If it is found that the problem is arising out of such power supply product after inspection, please contact your local sales office for additional troubleshooting. A "Return Merchandise Authorization" is required in case the power supply must be sent back to the factory in Japan for inspection and repair. We, at our sole discretion repair or replace such defective products at no cost to the purchaser. We assume no liability to the purchaser or any third party for special, including without limitation the implied warranties of merchantability or fitness for a particular purpose. The Products any and all other warranties not set forth herein, express or implied, including without limitation the implied warranties of merchantability or fitness for a particular purpose. The Products are not designed and produced for such applications as requiring extremely high

Make sure you read the specification in the latest catalog before you order. Contact nearby sales office for the latest catalog.

PLEASE SEE THE LINK BELOW FOR THE COMPLETE WARRANTY TERMS

https://www.matsusada.com/site/warranty.html

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